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Two new species of the genus *Pogonus* Nicolai from Australia

(Insecta, Coleoptera, Carabidae, Pogoninae)

Martin Baehr

Baehr, M. (1997): Two new species of the genus *Pogonus* Nicolai from Australia (Insecta, Coleoptera, Carabidae, Pogoninae). – Spixiana **20/1:** 1-6

Pogonous saskiae, spec. nov. from South Australia and *P. diplochaetoides*, spec. nov. from Western Australia are described. A revised key to all Australian *Pogonus* is provided. New records of *Pogonus cardiotrachelus* Chaudoir and *P. hypharpagoides* Sloane are dealt with.

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Within a sample of carabids collected by Miss S. A. Hogenhout and Mr. S. Kamoun at salt lakes of South Australia and the southern part of Western Australia in 1994, four *Pogonus* species were recognized. Besides the well known *P. cardiotrachelus* Chaudoir and the apparently rare *P. hypharpagoides* Sloane, two new species were detected, namely a small, elongate, depigmented species that is rather similar to *Pogonus grossi* Moore, and a larger, likewise depigmented species that is not closely related to anyone of the known Australian *Pogonus* species. The new species are described herein and a revised key to all Australian *Pogonus* is provided that includes two species described recently (Baehr 1984, Moore 1991) and replaces the keys given by Moore (1977) and Baehr (1984).

Measurements

Measurements were taken using a stereo microscope with an ocular micrometer. Length has been measured from apical margin of labrum to apex of elytra, measurements, therefore, may slightly differ from those of other authors. Length of pronotum was taken along the midline, width of base between the posterior angles.

Location of material

The holotypes of the new species are donated to the Australian National Insect Collection, Canberra (ANIC), some paratypes and voucher specimens are kept in the working collection of author (CBM), the Zoologische Staatssammlung, München (ZSM), the South Australian Museum, Adelaide (SAMA), the Collection R. Sciaky, Milano (CSM), and in the collection of the collectors (CHK).

Key to the Australian species of the genus *Pogonus* Nicolai

1. Body completely metallic green or black .... 2.
– Body entirely or in parts testaceous .... 4.

2. Smaller (body length 6.3-6.8 mm), body narrower, more convex; pronotum markedly sinuate in front of the acute posterior angles, these being 90° or less; submarginal basal ridge of pronotum scarcely indicated. Southern Australia from Western Australia to Victoria along coast .... *australis* Chaudoir
– Larger (body length 7.5-8.5 mm), body wider, less convex; pronotum less sinuate, posterior angles more obtuse, c. 100°; submarginal basal ridge of pronotum conspicuous .... 3.

3. Colour greenish metallic; body narrower, more convex; pronotum less cordiform, widths of base and apex about equal; 6th and 7th striae conspicuously less marked than inner 5 striae; punctures of elytra finer, microreticulation conspicuous. Southern half of Australia along coast and inland .... *cardiotrachelus* Chaudoir
– Colour shining black; body wider, more depressed; pronotum markedly cordiform, base distinctly narrower than apex; 6th and 7th striae almost similar to inner 5 striae; punctures of elytra very coarse, microreticulation far less conspicuous. Northeastern Queensland, coastal and apparently also inland .... *nigrescens* Baehr

4. Bicoloured, head and pronotum distinctly darker than elytra .... 5.
– Completely testaceous or light reddish, head and pronotum not perceptibly darker than elytra (doubtful species under both couplets) .... 6.

5. Large, convex species (body length 9-11 mm); pronotum not lobate, distinctly sinuate in front of basal angles. Northern Australia from northwestern Queensland to the Kimberleys, coastal and along tidal rivers .... *variabilis* Moore
– Small, depressed species (body length 6.5 mm); pronotum lobate, barely sinuate in front of basal angles. Lake Eyre Basin in Western Australia and South Australia .... *zietzi* Sloane

6. Large species (body length 9-11 mm); pronotum distinctly sinuate in front of basal angles **and** base about as wide as apex. Northern Australia from northwestern Queensland to the Kimberleys, coastal and along tidal rivers .... *variabilis* Moore
– Smaller species (body length <8.5 mm); pronotum either not distinctly sinuate in front of basal angles **or** when distinctly sinuate, then base markedly narrower than apex. Inland in southern half of Australia .... 7.

7. Elytra broad; pronotum distinctly sinuate in front of basal angles **and** base markedly narrower than apex; left paramere with two apical setae, right paramere with a single apical seta. South Australia, Lake Eyre Basin .... *gilesi* Moore
– Elytra narrow; pronotum either not distinctly sinuate in front of basal angles **or** base about as wide as apex; left paramere with three, right paramere with two apical setae .... 8.

8. Large, convex species (body length 7.2-8.2 mm); head large, pronotum dorsally and laterally markedly convex. South Australia, Lake Eyre Basin .... *hypharpagoides* Sloane
– Smaller, more depressed species (body length <6.5 mm); head smaller, pronotum dorsally more depressed, laterally less convex .... 9.

9. Pronotum rather quadrate, lateral margin evenly curved from apex to base, widest in middle; elytral striae shallow, only three inner striae distinct, microreticulation conspicuous. Interior of Western Australia .... *diplochaetoides*, spec. nov.
– Pronotum more narrowed to base than to apex, widest in anterior third, lateral margin not evenly curved; elytral striae deep, at least five inner striae distinct, microreticulation inconspicuous. South Australia, Lake Eyre Basin .... 10.

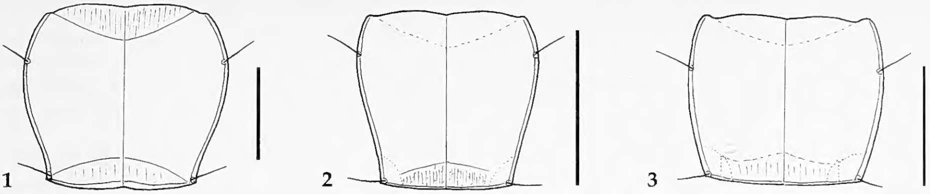

Fig. 1-3. Pronotum. **1.** *Pogonus hypharpagoides* Sloane. **2.** *P. saskiae*, spec. nov. **3.** *P. diplochaetoides*, spec. nov. Scales: 1 mm.

10. Larger species (body length 5.2-6.4 mm); lateral margin of pronotum convex to base, basal angle obtuse, little projecting. Lake Eyre .... *grossi* Moore
– Smaller species (body length 4.1-4.9 mm); lateral margin of pronotum straight or slightly concave in front of base, basal angle almost right, distinctly projecting. Vicinity of Lake Gairdner and Island Lagoon .... *saskiae*, spec. nov.

Pogonus cardiotrachelus Chaudoir

Chaudoir, 1871: 24; Moore 1977: 66; Baehr 1984: 171; Moore et al. 1987: 146.

New records: 14♂♂♀♀, S.A. 30 km N Policeman's Point, 6 March 1994, S. A. Hogenhout, Dry Lake, under algae (CBM, CHK); 24♂♂♀♀, WA 24, Annean Lake, 40 km s. Meekatharra, 6.-7.11.1987, leg. M. Baehr (CBM, CSM, ZSM).

A widespread species throughout the southern half of Australia, occurring in coastal and inland saline habitats. Both mentioned samples were collected under exactly the same circumstances, namely under dry algae at the shores of dry or drying inland lakes.

Pogonus hypharpagoides Sloane
Fig. 1

Sloane, 1895: 26; Moore 1977: 63, 66; Moore et al. 1987: 146.

New record: 1♂, 4♀♀, S.A. Lake Frome, 21 March 1994, S. A. Hogenhout, Dry salt Lake (CBM, CHK, ZSM).

This species was so far recorded from Lake Callabonna and Lake Eyre in South Australia. The new record from Lake Frome is close to the recorded range and this species seems to be restricted to the eastern part of the Lake Eyre basin proper.

Differing from the figure in Moore (1977, fig. 7), the specimens from Lake Frome have the lateral margin of the pronotum distinctly excised near base, and hence, the basal angles are laterally perceptibly projecting (Fig. 1). This difference, however, may be rather a local variation.

Pogonus saskiae, spec. nov.
Figs 2, 4

Types. Holotype: ♂, AUSTRALIA: S.A., Eucolo Creek, 30 km W. Pimba, 13 March 1994, S. A. Hogenhout, Dry Salt Lake, at light (ANIC). – Paratypes: 2♂♂, 7♀♀, same data (CBM, CHK, SAMA, ZSM); 1♀, AUSTRALIA: S. A., 17 km S. Kingoonya, 15 March 1994, S. A. Hogenhout, Dry desert bush (CHK).

Diagnosis. Small, elongate, uniformly reddish "syrdeniform" species, distinguished from related *P. grossi* Moore by lesser size, distinctly sinuate lateral margin of pronotum near base, almost rectangular basal angles of pronotum, and more regularly curved lower surface of aedeagus.

Description

Measurements (because a single small specimen differs in many respects from the rest of specimens, the measurements and ratios of this specimen are added in brackets). Length: (4.15) 4.65-4.90 mm; width: (1.40) 1.50-1.55 mm. Ratios. Width/length of pronotum: 1.07-1.11 (1.21); width base/apex of pronotum: (0.85) 0.87-0.88; width of pronotum/width of head: 1.03-1.10 (1.12); length/width of elytra: (1.90) 1.96-1.98; width elytra/pronotum: 1.29-1.40.

Colour. Light reddish, forebody very slightly darker than elytra. Labrum, palpi, antennae, and legs slightly lighter. Lower surface light reddish, apical half of abdomen becoming piceous. Eyes blackish, mandibles dark brown.

Head. Almost as wide as pronotum. Eyes rather small, laterally not much projecting, though posteriorly not enclosed. Mandibles rather short, apex moderately incurved. Antennae rather short, slightly surpassing base of pronotum. Clypeus and frons in middle convex, frontal furrows shallow, sinuate, curved inward and slightly deepened at position of anterior supraorbital seta. Surface medially of anterior half of eye with a low, convex ridge. Surface glossy, impunctate, with very fine, highly superficial traces of isodiametric microreticulation only.

Pronotum (Fig. 2). Slightly wider than long, cordiform, widest in anterior quarter about at position of anterior lateral seta. Apex slightly produced beyond anterior angles, in middle slightly excised. Anterior angles rounded off. Lateral border shortly rounded behind apex, then feebly convex to almost straight, faintly sinuate in front of the rectangular basal angles. Marginal channel narrow, slightly widened but not explanate towards base. Base in middle almost straight, laterally slightly oblique, margined. Anterior transverse sulcus wide, shallow, median line distinct, narrow, basal transverse sulcus deep, base irregularly punctate-striolate. Basal grooves rather deep. Surface with finest and highly superficial traces of microreticulation only, extremely finely punctulate and striolate, highly glossy.

Elytra. Elongate, subparallel, depressed, almost twice as long as wide. Humeri slightly projecting, almost rounded off. Lateral margin slightly widened towards anterior fourth, then almost straight. Lateral channel narrowed between 3rd and 4th anterior marginal pore. Disk distinctly depressed. Striation complete, striae distinct, coarsely punctate. 3rd interval near 3rd stria with 4-5 setiferous punctures, occasionally also 5th interval in middle with a single puncture. Submarginal pores consisting of 5 pores in anterior group, 6 in posterior group. Surface with rather superficial microreticulation. Wings fully developed.

Legs. Rather short, especially tarsi short, 1st tarsomere of metatarsus little more than 2 × longer than wide.

♂ genitalia (Fig. 4). Genital ring wide, triangular. Aedeagus short and compact, slightly asymmetric, lower surface regularly curved, apex rounded, slightly turned to right side. Internal sac with a triangular, sclerotized plate near base. Right paramere narrow, slightly smaller than left, left paramere large, triangular, suddenly narrowed to apex, both with two elongate and one short apical setae, the short seta situated below the longer ones.

Variation. There is one very small specimen collected together with others that differs by unusual small size, comparatively wide pronotum, short elytra, and deeper and coarser puncturation of elytral striae. Since the aedeagus does not differ significantly, I think it represents an intraspecific variation rather than a distinct taxon.

Habits. Largely unknown, though type series collected at light near dry salt lake. A halophile, presumably mainly noctural species.

Distribution. Western part of Lake Eyre Basin in central South Australia, near Lake Gairdner and Island Lagoon. Known only from two localities.

Relationship. Certainly, this little species is closely related to *P. grossi* Moore from Lake Eyre. Further better exploration of the halophile fauna of the salt lake belt of South Australia may settle the actual relationships of both species, in particular, whether intermediate populations exist.

Etymology. Named in honour of the collector of this and several other halophile species, Miss Saskia Hogenhout.

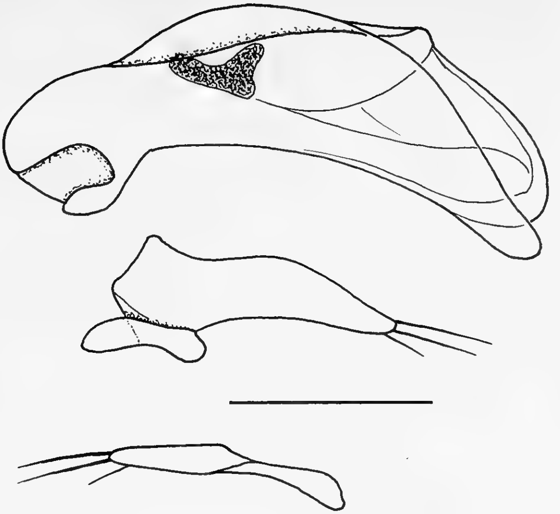

Fig. 4. *Pogonus saskiae*, spec. nov. ♂ genitalia. Scale: 0.25 mm.

Pogonus diplochaetoides, spec. nov.

Fig. 3

Types. Holotype: ♀, AUSTRALIA: W.A., 17 km S. Wiluna, near (N.W.) Lake Way, 8 April 1994, S. A. Hogenhout, Dry salt lake, at light (ANIC).

Diagnosis. Moderately small, rather elongate, uniformly reddish species, distinguished from all other depigmented Australian species by the rather quadrate pronotum and the weak striation and distinct microreticulation of the elytra.

Description

Measurements. Length: 6.25 mm; width: 2.1 mm. Ratios. Width/length of pronotum: 1.22; width base/apex of pronotum: 1.04; width of pronotum/width of head: 1.23; length/width of elytra: 1.82; width elytra/pronotum: 1.20.

Colour. Body, including all appendages, yellowish. Only eyes blackish and apex of mandibles piceous.

Head. Large, rather massive, though distinctly narrower than pronotum. Eyes rather small, laterally little projecting, posteriorly slightly enclosed by oblique orbits. Mandibles moderately elongate, apex rather incurved. Antennae moderately elongate, well surpassing base of pronotum. Clypeus and frons in middle convex, frontal furrows behind clypeus obsolete, medially of eye without ridge. Surface laterally behind eyes with some coarse punctures, highly glossy, almost without traces of microreticulation, impunctate.

Pronotum (Fig. 3). Distinctly wider than long, rather quadrate with base as wide as apex, widest slightly in front of middle, behind position of anterior lateral seta. Apex very faintly produced beyond anterior angles, in middle slightly excised. Anterior angles rounded off, slightly produced beyond lateral parts of apex. Lateral border evenly rounded throughout, basal angles almost rectangular. Marginal channel narrow, slightly widened towards base, but not explanate. Base faintly convex, margined. Anterior transverse sulcus very indistinct, almost obsolete, median line distinct, narrow, basal transverse sulcus deep, base longitudinally striolate. Basal grooves rather deep, with a longitudinal stria in bottom. Surface almost without traces of microreticulation, impunctate, highly glossy.

Elytra. Rather elongate, fairly convex. Humeri slightly projecting, angulate. Lateral margin slightly widened towards anterior fourth, once more irregularly widened shortly behind, then lightly rounded. Marginal channel almost interrupted at position of 4th submarginal pore. Surface moderately convex.

Striation incomplete, behind humeri and laterally obsolete, only inner two striae well impressed, outher striae becoming gradually lighter. Two inner striae moderately coarsely, outer striae lightly and more superficially punctate. 3rd interval with 3 setiferous punctures, both anterior punctures near 3rd stria, posterior pore near 2nd stria. Submarginal pores consisting of 4 pores in anterior group, 6 in posterior group, 4th pore of anterior group being very large. Surface with distinct though superficial, isodiametric microreticulation. Wings fully developed.

Legs. Rather short, especially tarsi fairly short, 1st tarsomere of metatarsus little more than 2× longer than wide.

♂ genitalia. Unknown.

Variation. Unknown.

Habits. Largely unknown. A halophile, presumably mainly noctural species.

Distribution. Interior of Western Australia. Known only from type locality.

Relationship. This species is perhaps nearest related to the group of fairly large, depigmented species that include *P. gilesii* Moore and *P. hypharpagoides* Sloane.

Etymology. Named for the external similarity to the American pogonine genus *Diplochaetus*.

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My sincere thanks are due to Miss Saskia Hogenhout and Mr. Sophien Kamoun, Leiden, who kindly submitted for identification the very interesting sample of halophile carabids collected by themselves. I also thank Dr. Eric Matthews (Adelaide) for the kind loan of types of *Pogonus grossi* Moore for comparison.

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Attraction of *Gabonia* and *Nzerekorena* to pyrrolizidine alkaloids – with descriptions of 13 new species and notes on male structural peculiarities

(Insecta, Coleoptera, Chrysomelidae, Alticinae)

Gerhard Scherer and **Michael Boppré**

Scherer, G. & M. Boppré (1997): Attraction of *Gabonia* and *Nzerekorena* to pyrrolizidine alkaloids – with descriptions of 13 new species and notes on male structural peculiarities (Insecta, Coleoptera, Chrysomelidae, Alticinae). – Spixiana **20/1:** 7-38

Baits containing pyrrolizidine alkaloids (PAs) attracted 17 species of *Gabonia* and 1 of *Nzerekorena* in Kenya, East Africa. In *Gabonia* attraction is strongly male-biased (>2600♂♂ vs 27♀♀). Attempts to discover the beetles' host plants were unsuccessful, but hosts of several other coleoptera were recorded, including that of one *Gabonia* species not attracted to PAs. In addition to field observations, the paper provides descriptions of 13 new species (12 *Gabonia* and 1 *Nzerekorena*), keys to the species, and a morphological characterization of peculiar structures in males.

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Introduction

Males of *Gabonia gabriela* Scherer have been reported to visit withered plants of *Heliotropium* (Boraginaceae), apparently in order to gather pyrrolizidine alkaloids (PAs) (Boppré & Scherer 1981). This finding has been confirmed and augmented during more recent field studies in Kenya, when pure PAs were used as baits. Moreover, 16 other *Gabonia* and 1 *Nzerekorena*, including 12 undescribed species, were found to exhibit similar behaviour. In order to supply a basis for further studies, we here describe the new species and report on the field observations, some feeding experiments as well as on some other Coleoptera found on PA-containing plants. Also, an account of surface fine structure for certain male characters is given for several *Gabonia* species. To date, the life history of these Alticinae is still dubious but from a comparative point of view they contribute to the understanding of pharmacophagous utilization of pyrrolizidine alkaloids, a feature which they share with various other insect groups (cf. Boppré 1986, 1990, and Discussion).

Material and Methods

Fig. 1

Plastic dishes (95 × 70 × 12 mm), usually containing 50, 100 or 200 mg of PAs extracted and purified from seeds of *Crotalaria scassellatii* Chiov. ("PA-extract"; major PA: axillaridine, Wiedenfeld et al. 1985, cf.

Boppré in prep.), were put out opportunistically in various habitats in the course of studies on Lepidoptera. The dishes were placed either on the ground, or on fallen trees up to a height of 80 cm. In addition, dishes with 50 mg of other PAs or PA N-oxides, and/or withered plant parts of *Heliotropium pectinatum* Vaupel in nylon-gauze bags, were sometimes used. Beetles attracted to any such baits were collected and analysed for species and sex.

Repeatedly, scrub, plants and trees of the baiting areas as well as all kinds of flowers were searched for *Gabonia*. With *G. gabriela* Scherer and *G. bicolor*, spec. nov. simple, preliminary feeding tests were made in confinement. We placed 5-15 beetles in clear plastic containers and offered leaves and seeds, respectively, of a variety of plant species, to see which plants were eaten and to study individual survival.

The field studies were conducted in Kenya, East Africa, mainly in the following habitats:

- Kakamega Forest, 1500 m, 35°E, 2°S: patches of moist primary forest of medium altitude type interspersed with cultivation;
- Maragoli, 35°7'E, Equator: cultivated land;
- Shimba Hills National Reserve and vicinity, Kwale District, up to 500 m, 39°30'E, 4°10' to 4°20'S: planted forest and grassland with patches of primary costal forest, 5 miles inland;
- Jadini Forest and vicinity: 39°6'E, 4°5'S, coastal scrub and forest with adjacent cultivation, near sea shore.

Beetles were preserved in the field in 70 % ethanol and later mounted and air-dried for taxonomic study.

Voucher material has been deposited at the National Museum, Nairobi, at the Zoologische Staatssammlung München, at The Natural History Museum, London, and in M. Boppré's collection. All holotypes are in the collection of the National Museum, Nairobi. Except otherwise stated, paratypes have been equally divided between the four collections mentioned above.

During the course of this study, type material of the following nominal species has been examined:

Gabonia: *carinulata* Bech., *citri* (Lab.), *coffeae* (Lab.), *colae* (Bryant), *crenicornis* Bech., *ganganensis* Bech., *impressipennis* Lab., *latimana* Lab., *lutea* Scherer, *malacorhinoides* Bech., *montivaga* Bryant, *nasalis* Bech., *punctipennis* (Lab.), *sexualis* Bech., *sheppardi* (Jac.), *tricolorata* Lab., *variola* Bech.

Nzerekorena: *basilewskyi* Scherer, *carinulata* Bech., *cerambycina* Bech., *clypeata* Bech., *foveolata* Bech., *garambaensis* Scherer, *macrophthalma* Bech.

Results

Baiting tests

Withered material of *Heliotropium pectinatum* and dishes containing PA-extract strongly attracted *Gabonia*. Other attractive PAs included monocrotaline, but dishes containing, for example, heliotrine or PA N-oxides failed to lure beetles (cf. Discussion). How many beetles visited a given bait varied not only according to species, habitat and season, but also to wind conditions and competition with natural sources of PAs etc. in the baiting areas (cf. Discussion); at best, after dusk a single bait lured about 100 *G. gabriela* within 45 mins. For several species attraction to baits appears to be correlated with the time of day (and/or the temperature conditions), however, data available are not sufficient for a final statement. Data of continuous collection from 7a.m. to 8p.m. demonstrate, at least, that baits attract specimens at any time. As previously reported for *G. gabriela* (Boppré & Scherer 1981), other *Gabonia* visiting PA-sources at night also usually jump off the bait if illuminated with a torch light. In confinement, however, the beetles exhibit a strong positive phototactic response.

Observations of beetles arriving at a bait revealed that the insects approached from upwind, usually settled about 10 cm away from the bait, and eventually continued their flight directly to the bait; sometimes they circled above the bait for a minute or so; intermediate stops on their way to the bait were frequently observed, too. Although no marking experiments were carried out, it was obvious that the beetles usually remained at a bait for extensive periods. Several times it was observed that species attracted at night were present on the bait the following day, even during light hours. A total of >2600 *Gabonia* specimens was collected at PA baits and analysed. The actual number of beetles observed at baits was much higher, but it was judged unnecessary to take all individuals of the most common and easily recognizable species (particularly *gabriela*, *gabrieletta*, and *bicolor*), especially when sample sizes were high.

Fig. 1. *Gabonia gabriela* at dish containing pyrolizidine alkaloids (Shimba Hills).

The baited material consists of 17 *Gabonia* species, including 11 previously undescribed ones. Of 11 spp. (*bicaveata*, spec. nov., *carinulata*, *cavipennis*, spec. nov., *fulvicornis*, spec. nov., *fuscitarsis*, spec. nov., *gabriela*, *gabrieletta*, spec. nov., *impressipennis*, *latimana*, *nigroapicalis*, spec. nov., *punctipennis*) the baits attracted males exclusively, of 6 spp. (*bicolor*, spec. nov., *colae*, *foraminipennis*, spec. nov., *picea*, spec. nov., *rubropicea*, spec. nov., *tibialis*, spec. nov.) a few females were caught; without counting *G. rubropicea*, spec. nov. (>700♂♂ vs 20♀♀) there are >1.900♂♂ vs 7♀♀. Males of the species occurring in the Shimba Hills were not only found at baits but also at flowers of PA-plants. Details are given in the bionomics paragraphs within the taxonomy chapter.

25 specimens of one *Nzerekorena* species only were found at PA baits; attraction of this species appears not to be sex-biased (14♂♂ vs 11♀♀).

Baited beetles included further species of *Gabonia* as well as of other genera; since they occurred in very small numbers, they are neglected in the following.

Further records and observations

Gabonia-visiting flowers

Occasionally, males of *G. gabriela* and *G. colae* were seen during day-time at flowers of *Heliotropium pectinatum* and at night at damaged leaves of this plant; other *Gabonia* species did not occur in the habitat of this plant. (The flea beetles *Longitarsus gossypii* Bryant live on *H. pectinatum* and chew holes in the leaves, which then become attractive to Danainae; these butterflies use their legs to scratch at the holes and damage the plant tissues further to gather PAs: Boppré 1983.) Several males of *G. cavipennis*, *colae*, *gabriela*, *picea*, and *rubropicea* were collected from withering flowers of *Ageratum conyzoides* L. and from flowers of *Gynura scandens* O. Hoffm. It seems that if *Gynura* is flowering, all *Gabonia* spp. occurring in the same habitat can be found at its flowers (cf. Discussion).

Host plants of *Gabonia*

Because the host plants of *Gabonia* spp. are unknown (see Discussion), we searched extensively for the beetles at plants, particularly when baiting indicated a high population density. Despite intensive efforts, no host plant of any of the species lured to PA-baits could be found.

In the Shimba Hills, we met both sexes of *Gabonia compressicornis*, spec. nov. in abundance on *Vangueria tomentosa* Hochst. (Rubiaceae; not a recognized PA-containing plant); this species, however, never visited our baits. On *V. tomentosa* we also recorded the only 2 females of *gabriela* ever found, 1 male *gabriela* plus several other Coleoptera.

Feeding tests with *Gabonia* in confinement

In order to find out about foodplants of *Gabonia*, specimens of *gabriela*, *bicolor* and *rubropicea* collected at PA-baits (i.e. males only) were offered leaves of a variety of plants from the baiting area. The beetles refused to feed on any of these plants except *Gynura scandens*, *Heliotorpium* spp. and *Crotalaria* spp., all of which contain PAs. The beetles chewed holes in the leaves of these plants. Roots of *Heliotropium pectinatum* and seeds (split into halves) of *Cortalaria* spp. were particularly well liked (cf. below). In this context it should be noted that defensive froth from *Rhodogastria* spp. (Lepidoptera: Arctiidae), which is rich in PA N-oxides if the adults have gathered PAs (Boppré & Wiedenfeld unpubl.), stimulated feeding in *Gabonia*: filter paper partly soaked with froth attracted the beetles, which then applied their mouthparts to the contaminated spots (Fig. 1b). Where the beetles apparently fed, the colour changed from yellowish to pink, which might indicate that they regurgitated fluid in order to dissolve PAs, as do Lepidoptera. Dead *Rhodogastria* moths which had had previously access to PAs were also attractive. In confinement, the beetles lived for only 1-2 days, probably because of starvation. With access to unripe seeds of *Crotalaria scassellatii* cut into pieces, they lived, however, up to 5 days.

Coleoptera found at living PA-containing plants

In the following we note species of Coleoptera which we found at living (intact) PA-containing plants. Some males of *G. gabriela*, *G. rubropicea* and some *Longitarsus* (plus unidentified Histeridae and Hydrophilidae) were found at living leaves and flowers of a *Crotalaria* sp. in the Shimba Hills.

Several *Longitarsus* sp. were encountered at living *Heliotropium pectinatum* Vaupel near Samburu (Coast Province) but no baiting tests could be conducted in this area.

Both sexes of *Longitarsus gossypii* Bryant were found in large numbers at *Heliotropium studneri* Vatke, *H. pectinatum* Vaupel and *H. gorinii* Chiouvenda; the beetles cause heavy damage by perforating the leaves.

In flowers of *Crotalaria scassellatii* Chiouv. (Fabaceae), Histeridae were found, and in seed pods of *Crotalaria* sp. larvae of bruchids were common.

Taxonomic account and descriptions of new species

The *Gabonia*-complex and the genera *Gabonia* and *Nzerekorena*

The genus *Gabonia* Jacoby, 1893 (1895) is restricted to the Afro-tropical region and presently comprises 141 valid species and 4 subspecies (Scherer unpubl.).

The complex of genera near *Gabonia* (Scherer 1961) is not well understood. In the system of Alticinae they are considered as sister-group of the subfamily Galerucinae beside *Luperomorpha* Weise, 1887 with its Afro-oriental distribution. They share high anterior coxae which are very closely approaching each other and are open behind; body moderately vaulted and longitudinal in shape, anterior angles of pronotum not beveled, no groove-like impression parallel to base of pronotum; upper side of tibiae rounded and not channelled; elytral punctures not arranged in 9 complete rows.

The *Gabonia*-complex separates from *Luperomorpha* and all others with its typical hind-tibial spur which is comparatively long, above all very typical straight. A further character considered to be typical for *Gabonia* is the short 3rd antennal segment which is as long or often shorter than the 2nd segment. In *Decaria* Weise, 1895 which resembles *Gabonia* in all other characters, the third antennite is lost (i.e. the antennae have only ten segments). *Gabonia* and *Decaria* are definitely very closely related; separating these genera on the basis of this single character is most weakly justified particularly since there is *G. atrophica* Bechyné, 1959 with an atrophied 3rd antennal segment. *Nzerekorena* Bechyné, 1955, *Upem-*

baltica Bechyné, 1960, *Kanonga* Bechyne, 1960, *Dimonikaea* Bechyné, 1968 are close to *Nzerekorena* but separated with respect to the shape of the antennites. *Malvernia* Jacoby, 1899, a *Gabonia*-like genus, is characterized by its antennal segments 8-10 which are roundish and short, its 3rd antennite is somewhat longer than 2nd.

Compared to *Gabonia*, species of *Nzerekorena* share the following characters: frons more or less plane or concave and – caused by the long genae – broad and rectangular; antennal calli very transverse and head behind them very short; along with these characters there is a half-moon-like impression in front of the base of the pronotum, which can be devided in the middle in an impression on each side of the pronotum; antennae are conspicuously long and filiform; all species have elytra with distinct basal calli and punctation in very narrow longitudinal rows. All other features are as in *Gabonia*. Pronotal and elytral characters as in *Nzerekorena* can be found in *Gabonia*, too; however, no *Gabonia* exhibits the peculiar shape of the head.

The species groups of *Gabonia*

As shown below, many species of *Gabonia* exhibit in the male sex secondary characters suited to establish species groups. Species around *latimana*, *coffeae*, and *rubropicea* require further study to recognize relationships. Arranging the *Gabonia* species treated in this paper as well as their known close relatives into groups is to facilitate identification and indicate relationships between species. While the males of many *Gabonia* exhibit structural peculiarities which support such grouping, females are not only difficult to identify but also difficult to associate with the males.

When appropriate we provide keys to the members of species groups to demonstrate those characters separating the species. A key to identify species recorded as visiting PA-sources in Kenya is given below.

Key to the *Gabonia* species groups treated in this paper

A) Sexes dimorphic, males characterized by conspicuous structures:

- First tarsal segment of fore-legs distinctly broader (1.3-1.5 ×) than apex of tibia; 2nd segment tiny, about half as broad as 1st segment .... *G. latimana*-group
- Hook-like structures on hind tibiae .... *G. colae*-group
- Serrate ridge on antennae .... *G. crenicornis*-group
- Various antennites enlarged and unusually shaped .... *G. gabriela*-group
- Depressions on elytral tips .... *G. pustulatipennis*-group
- Depressions on elytral sides behind humeral calli, elytra broadened from base up this point .... *G. bifoveolata*-group

B) Sexes similar:

- Length about 4 mm, colour reddish-brown .... *G. coffeae*-group
- Length 2.28-2.80 mm, colour dark-brown .... *G. rubropicea*-group

Gabonia latimana-group

This group comprises those species of which the males have their first tarsal segments of the fore-legs distinctly broader than apex of respective tibiae (1/3-1/2) and second segment tiny, about half as broad as first segment (cf. figs 2-4). In all other *Gabonia* species the first tarsal segment of the fore-legs is about as broad as the apex of the respective tibia, and the second segment is almost as wide as the first segment. The *Gabonia latimana*-group comprises the following species: *impressipennis* Laboissiere, 1942, *latimana* Laboissière, 1942, *mala* Bechyné, 1959, *platypoda* Bechyné, 1968, *punctipennis* (Laboissière, 1939), and *sexualis* Bechyné, 1960.

Gabonia impressipennis Laboissière
Fig. 2

Gabonia impressipennis Laboissière, 1942: 31.

Holotype: ♂, Zaire: Nyongera, près Rutshuru: Butumba (Tervuren) (examined).

Distribution. Zaire: Rutshuru (Laboissière 1942); Uele, Haut-Uele, (Mongbwalu) (Scherer 1962b); Côte d'Ivoire (Scherer 1969).

Distribution and bionomics in Kenya. Kakamega Forest: >47♂♂, no ♀, at PA-baits only; IV/84, V/84, IX/85, VI/86, III/88, V/88.

Gabonia latimana Laboissière
Fig. 3

Gabonia latimana Laboissière, 1942: 30.

Holotype: ♂, Zaire: Rutshuru (Tervuren) (examined).

Distribution and bionomics in Kenya. Kakamega Forest: >25♂♂, no ♀, at PA-baits only; IV/84, V/84, IX/85, VI/86.

This species is geographically variable, particularly with respect to the pronotum; in specimens from the type-locality it is wide but in those from Lukuga narrow, while it is intermediate in examples from Kakamega.

Gabonia punctipennis (Laboissière)
Fig. 4

Jamesonia punctipennis Laboissière, 1939: 403.
Gabonia punctipennis, Laboissière 1942: 31.

Holotype: ♂, Zaire: Haut-Uelé: Abimva (Tervuren) (examined).

Distribution. Zaire: Haute-Uele (Laboissière 1939); Kivu (Scherer 1962b).

Distribution and bionomics in Kenya. Kakamega forest: >70♂♂, no ♀, at PA-baits only; V/84, VIII/85, IX/85, VI/86, XI/86, IV/87, V/87, IX/87, XII/87, III/88, V/88.

In contrast to specimens from Zaire in those from Kakamega the pronotum is less vaulted near the base and the pronotal depression is more strongly developed. The eyes are larger and the eye diameter is as great or even greater than the width of the frons. Most individuals are reddish- or yellowish-brown with even brighter pronotum and frons, only a few have dark-brown elytra as the Zaire specimens. Some individuals resemble *G. sexualis* Bechyné.

Gabonia colae-group

This group comprises those species in which the males possess a hook-like structure on the upper side of the hind tibiae (cf. figs 5-8).

Key to species with a hook-like structure on hind tibiae

1. Head, pronotum reddish-brown, elytra dark-brown .... *G. bicolor*, spec. nov.
– Head, pronotum and elytra reddish-brown .... 2.

2. Sides of pronotum rounded .... 3.
– Sides of pronotum straight .... *G. tibialis*, spec. nov.

3. Frons distinctly narrower than eye diameter, 3 mm long. Distribution: Zaire: Upemba Park .... *G. fracta* Bechyné
– Frons somewhat broader than eye diameter, 2.36-2.56 mm long .... *G. colae* (Bryant, 1944/45)

Gabonia colae (Bryant)

Figs 5, 6, 23, 38

Jamesonia colae Bryant, 1944/45: 824.
Gabonia colae, Bechyné 1955b: 502.

Holotype: ♂, Sierra Leone: Njala (Brit. Mus. Nat. Hist.) (examined). – Allotype: ♀, Kenya: Jadini Forest, 06.07.1986 (National Museum Nairobi).

Description of female. It lacks the hook-like structure on hind tibiae, which is conspicuous in males, antennae are more slender, eyes are less convex, fore-tarsi are somewhat narrower than respective tibiae. All other characters are as in males. In the spermatheca (Fig. 38) of the only *colae* female available, the ductus is leading off the spermatheca and is thus not straightly opposed to the final capsule as is the case in all other species examined.
Male. Aedeagus (Fig. 23), for the first time figured.

Distribution. Sierra Leone: Njala (on Kola flowers); Zaire: Stanleyville (Yangambi) (Scherer 1962b); Kisangani, *Dimonika* (Bechyné 1968); Natal: Oribi Gorge Nat. Res. (Scherer 1963).
Distribution and bionomics in Kenya: Shimba Hills and Jadini Forest: >250♂♂, 1♀ at PA baits and at flowers of *Gynura scandens*; IX/83, IV/84, XII/84, VIII/85, IX/85, XII/85, VII/86, XII/86, IX/87, IV/88.

Gabonia bicolor, spec. nov.

Figs 7, 24, 39

Holotype: ♂, Kenya: Shimba Hills National Reserve, 04.-06.05.1984 (National Museum, Nairobi).- Paratypes: 240♂♂, 3♀♀, Kenya: Coast Province, 1983-1988.

Diagnosis. Length: 2.32-2.52 mm, av. 2.43 mm (n=16), holotype 2.40 mm; width: 1.32 mm; female: length 2.40 mm, width 1.36 mm.

Description
Head, pronotum and fore-legs bright reddish-brown; elytra and hind femora dark-brown with a reddish touch; hind tibiae infuscated; antennites 1-6 reddish-brown (1-4 more yellowish), 7 darker reddish, 8-11 dark-brown, nearly blackish, segment 11 at tip reddish.

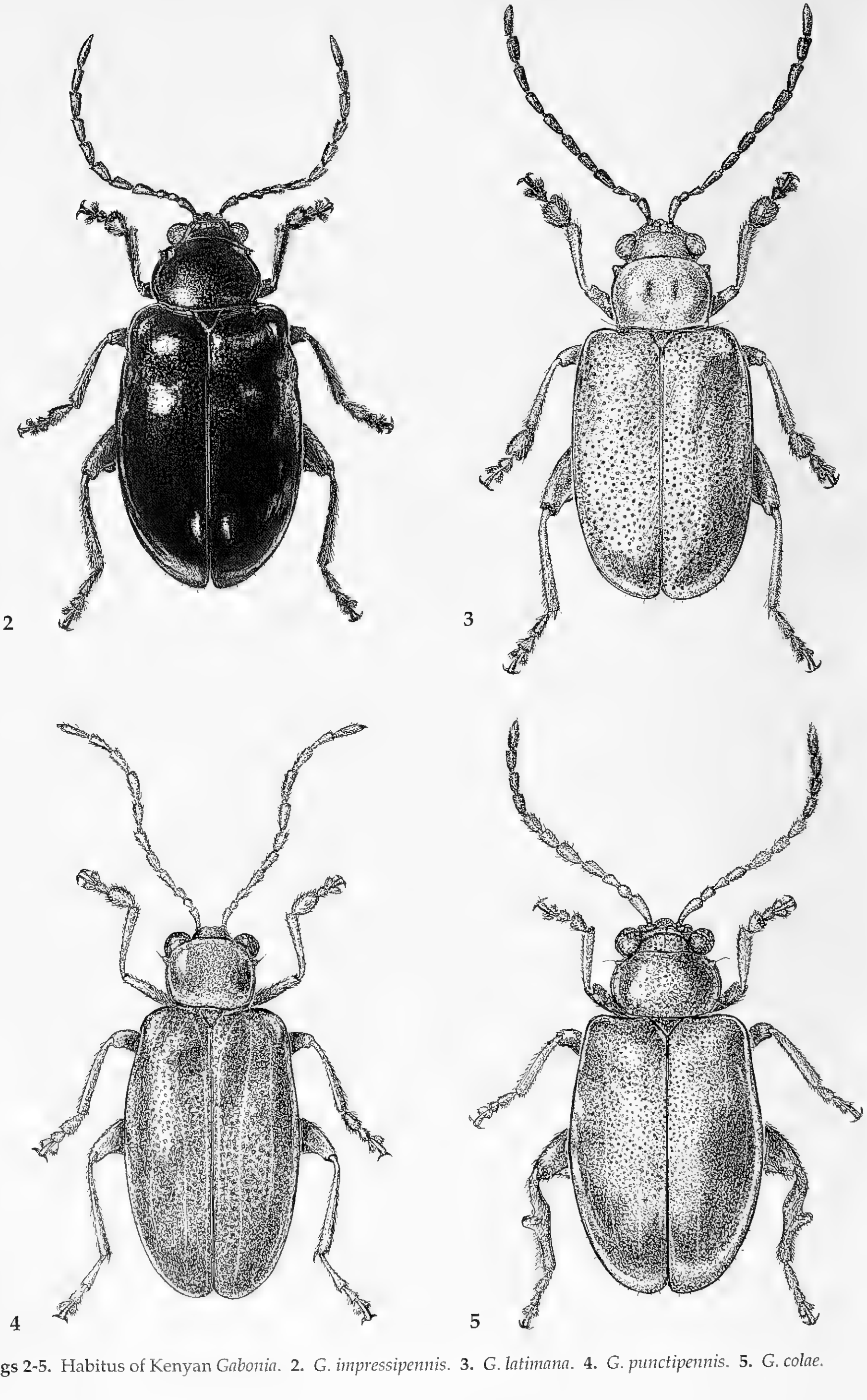
Antennal calli separated from each other by a fine line, bounded behind by a horizontal line which is marked with punctures; vertex with distinct punctures; frons 0.26 mm broad, eye diameter 0.24 mm. Antennae extending over first third of elytra; segments 5-11 nearly cylindrical, 4 more constricted towards base; lengths of antennites in mm: 0.22 : 0.08 : 0.10 : 0.14 : 0.14 : 0.14 : 0.14 : 0.14 : 0.14 : 0.13 : 0.22.

Punctures on pronotum as strong as those on vertex; sides slightly rounded and forming a semi circle with the base; hind angles only weekly marked; pronotum widest in the middle (0.8 mm), length 0.5 mm.

Elytra with distinct humeral calli but weakly developed basal calli; punctures distinctly stronger than those on pronotum, confusely arranged with a weak tendency to narrow longitudinal rows. Aedeagus (Fig. 24) 0.92-1.00 mm long, asymmetrical.

Hind tibiae with a hook-like structure (Fig. 7); first tarsal segment and fore-legs as broad as tibial apex.

Variation. There is much variation in the colour of the antennae, there are specimens with antennites 1-3 reddish and the rest blackish; punctation of head and pronotum can be fine; hind tibiae can be reddish or very dark.



Figs 2-5. Habitus of Kenyan *Gabonia*. **2.** *G. impressipennis*. **3.** *G. latimana*. **4.** *G. punctipennis*. **5.** *G. colae*.

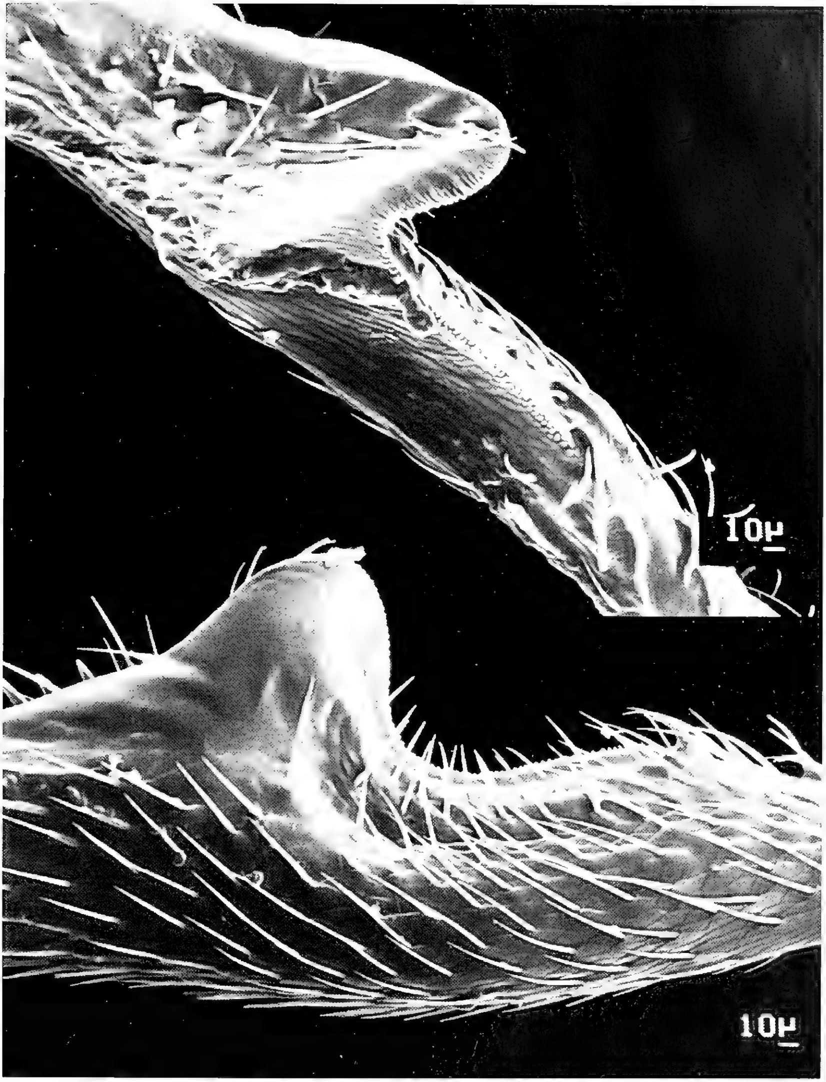


Fig. 6. Scanning electron micrographs of hind tibia of *Gabonia colae.*

Female. Frons 0.28 mm broad, eye diameter 0.24 mm; hind tibiae without hook-like structures, however, a very moderate curvature is noticeable. No differences to the male in size of body and pronotum. First tarsal segment of fore-tarsi narrower than apex of tibiae. Fig. 39 shows spermatheca.

Discussion. Apart from the colour, this species resembles strikingly *colae*, but the aedeagi are distinctly different in being asymmetric in *bicolor* and symmetric in *colae.*

Distribution and bionomics in Kenya. Shimba Hills and Jadini forest: > 240♂♂, 3♀♀, at PA-baits and at flowers of *Gynura scandens*; VIII/83, IV/84, V/84, XII/84, VIII/85, IX/85, VII/86, XII/86, IX/87, IV/88.

Gabonia tibialis, spec. nov.

Figs 8, 25, 40

Holotype: ♂, Kenya: Kakamega Forest, 01.12.1984 (National Museum, Nairobi). – Paratypes: 11♂♂, 1♀, Kenya: Kakamega Forest, 1984-1988.

Diagnosis. Length: 3.36-3.68 mm, av. 3.44 mm (n=4), holotype 3.40 mm; width: 1.52-1.68 mm, av. 1.60 mm (n=4), holotype 1.60 mm; female: length 3.56 mm, width 1.68 mm.

Description

Bright yellowish- to reddish-brown; pronotum and legs somewhat brighter, head darker; the last three antennites as bright as pronotum.

Frons narrow (0.20 mm) and eyes large (diameter 0.38 mm); antennal calli separated from each other by a fine line, bounded behind by a straight line; punctures on vertex somewhat finer than those on pronotum. Antennae extend backwards to middle of elytra; lengths of antennites in mm: 0.32 : 0.13 : 0.12 : 0.22 : 0.22 : 0.22 : 0.22 : 0.22 : 0.22 : 0.24 : 0.30.

Pronotum covered with punctures which are nearly as strong as those on elytra; pronotum comparatively small, sides straight and diverging somewhat anteriorly, width on hind angles 0.92 mm, near front angles 0.94 mm, and on front angles 0.88 mm, length 0.64 mm. Base of elytra broader than base of pronotum; humeral and basal calli distinct; punctation confuse, nearly no traces of narrow longitudinal rows.

Aedeagus (Fig. 25) 1.42 mm long, laterally arched, asymmetrical.

First tarsal segment of fore-tarsi as broad as tibial apex; hind tibiae with a hook-like structure.

Variation. In two specimens the punctation of head, pronotum and elytra is weak; antennae can be uniformely red-brown.

Female. Frons a little broader than in male (0.26 mm); eye as in male; punctation of elytra shows distinct traces of narrow longitudinal rows; no hook-like structure on hind tibiae rather a very weak curvature. Fig. 40 shows spermatheca.

Distribution and bionomics in Kenya. Kakamega Forest: 12♂♂, 1♀, at PA-baits only; XII/84, IX/85, XI/86, IV/87, VIII/87.

Gabonia crenicornis-group

This group comprises those species in which the males have a microscopically serrate structure on several antennal segments which appear comb-like if viewed from the sides; Bechyné (1955b, 1960a) has called it "Hyaline ridge". Species included in this group exhibit ridges on different segments: *carinulata* Bechyné, 1960: 6-11, *crenicornis* Bechyné, 1955: 6-9, *lukolela* Bechyné, 1960: 4-11, *pnirsa* Bechyné, 1960: 5-11.

Gabonia carinulata Bechyné

Fig. 11

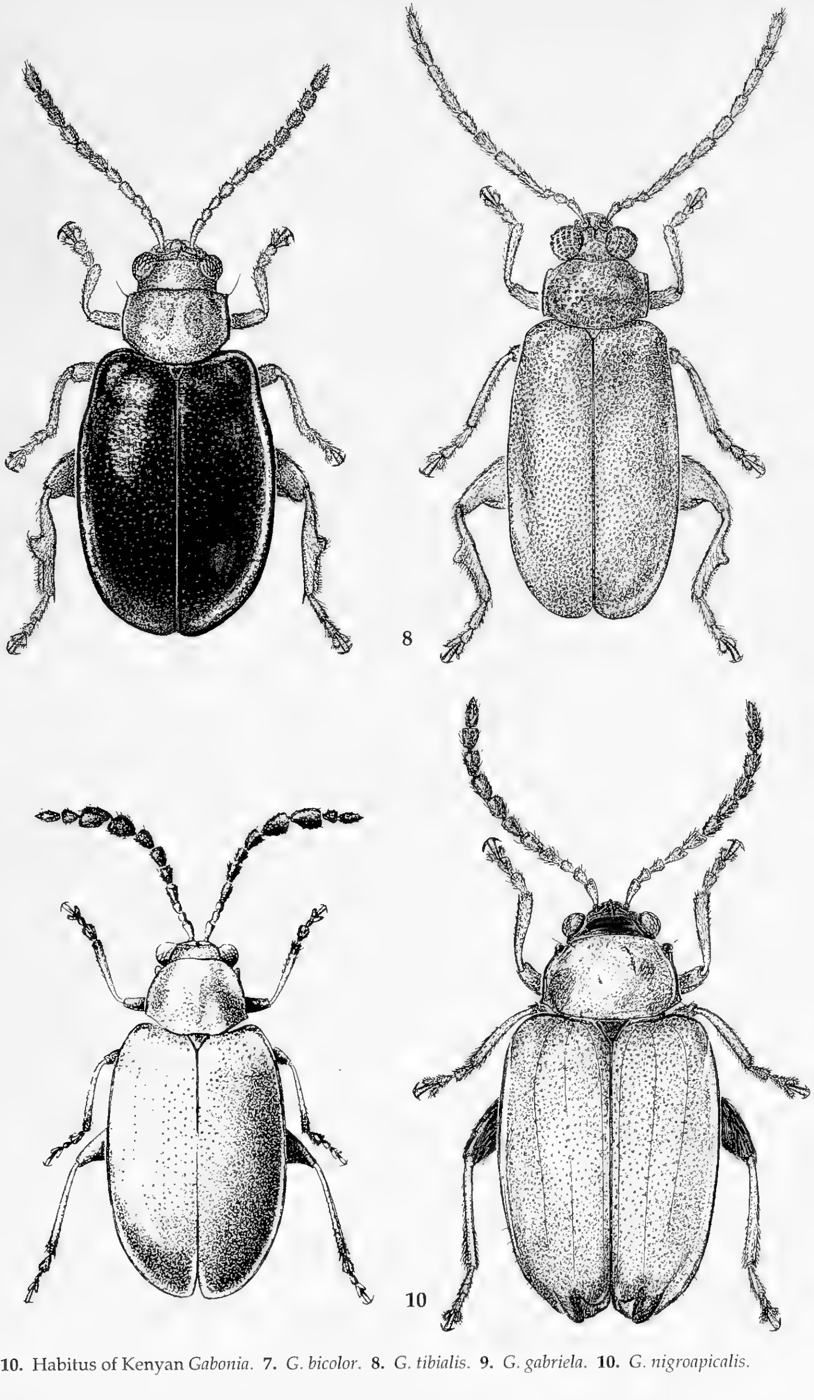
Gabonia carinulata Bechyné, 1960: 49.

Holotype: ♂, Zaire: Upemba Park (Riv. Dipid.) (Tervuren) (examined). The type specimen exhibits a serrate ridge on antennites 6-11, not on 5-11 as mentioned in the original description.

Fig. 11 scanning electron micrographs of antennae.

Distribution. Zaire: Upemba National Park (Bechyné 1960a).

Distribution and bionomics in Kenya. Kakamega Forest: >170♂♂, no ♀, at PA-baits only; IX/83, IV/84, XII/84, IX/85, XII/85, VI/86, XI/86, IV/87, V/87, IX/87, XII/87, III/88, V/88.



Figs 7-10. Habitus of Kenyan *Gabonia*. **7.** *G. bicolor*. **8.** *G. tibialis*. **9.** *G. gabriela*. **10.** *G. nigroapicalis*.

Gabonia gabriela-group

This group comprises those species which have in the male sex various antennites enlarged and unusually shaped. A key to the species of this group (*inusitaticornis* Scherer, 1959, *comes* Bechyné, 1955, *diversicornis* Scherer, 1959, *maynei* (Laboissière, 1939), *media* (Weise, 1913), *nodicornis* (Laboissière, 1939), *gloria* Bechyné, 1955, *amplicornis* Bechyné, 1955) is given by Boppré & Scherer (1981).

Gabonia gabriela Scherer

Figs 9, 22c, 26, 41

Gabonia gabriela Scherer, in Boppré & Scherer 1981: 439.

Holotype: ♂, Kenya: Shimba Hills National Reserve (Zoologische Staatssammlung München) (examined). – Allotpye: ♀, Kenya: Shimba Hills National Reserve, July 1986, at *Vangueria tomentosa* Hochst. (National Museum, Nairobi).

Descripton of female. In contrast to males, female antennae are shorter and plainly filiform; the eyes are smaller and less convex (width of frons 0.42 mm, eye diameter 0.28 mm); the pronotum is shorter (width 1.12 mm, length 0.76 mm); fore-tarsi are somewhat narrower than apex of respective tibiae; the two females available are of equal size of the males. Fig. 41 shows spermatheca.

Distribution and bionomics in Kenya. Shimba Hills: >260♂♂, at PA-baits, at flowers of *Gynura scandens*, at flowers of *Ageratum conyzoides*, 2♀♀ at *Vangueria tomentosa*; XII/86, IX/87, IV/88 (cf. Discussion).

Gabonia gabrieletta, spec. nov.

Figs 22 A-B, 27

Holotype: ♂, Kenya: Jadini Forest, 05.12.1984 (National Museum, Nairobi). – Paratypes: 350♂♂, Kenya: Coast District, 1983-1985.

Diagnosis. Length: 2.84-3.36 mm, av. 3.10 mm (n=16), holotype 3.10 mm; width: 1.44-1.72 mm, av. 1.61 mm (n=19), holotype 1.56 mm. Female unknown.

Description

G. gabrieletta, spec. nov. can be readily separated from *G. gabriela* Scherer by morphometries including body length and ratio width of frons to eye diameter, as well as by body and antennae coloration. In all other phenotypic traits the two appear to be very similar.
The following contradiction indicates the differences:

G. gabrieletta, spec. nov.	*G. gabriela* Scherer
light reddish-brown	chestnut-brown
antennites 1-4 reddish	antennites 1-3 reddish
tarsi dark brownish	tarsi blackish
tibiae not darkened	basal $^{2}/_{3}$ of tibiae darkened
av. length 3.10 mm	av. length 3.71 mm
(n=16, range: 2.84-3.44 mm, av. 3.10 ± 0.2)	(n=15, range: 3.20-4.40 mm, av. 3.71 ± 0.3)

Variation. Variation in the antennae of *gabrieletta* permits some subdivision of the species. Beetles with a tenth antennite as long as wide, especially those from Jadini Forest, form one group. *G. gabrieletta* with antennite 10 longer than wide can be divided into two groups, one of which has antennites 4-7 nearly all of same length, and all somewhat longer than 2 and 3 combined. The other (third) group has antennite 4 somewhat longer than 2-3, but 5, 6 and 7 each distinctly shorter than 4 (Fig. 22 A-B).

256 measurements had been taken in addition to the antennal structure, but no significant differences have been found. Very small differences can be seen, with difficulty, in the aedeagus (Figs 26-27).

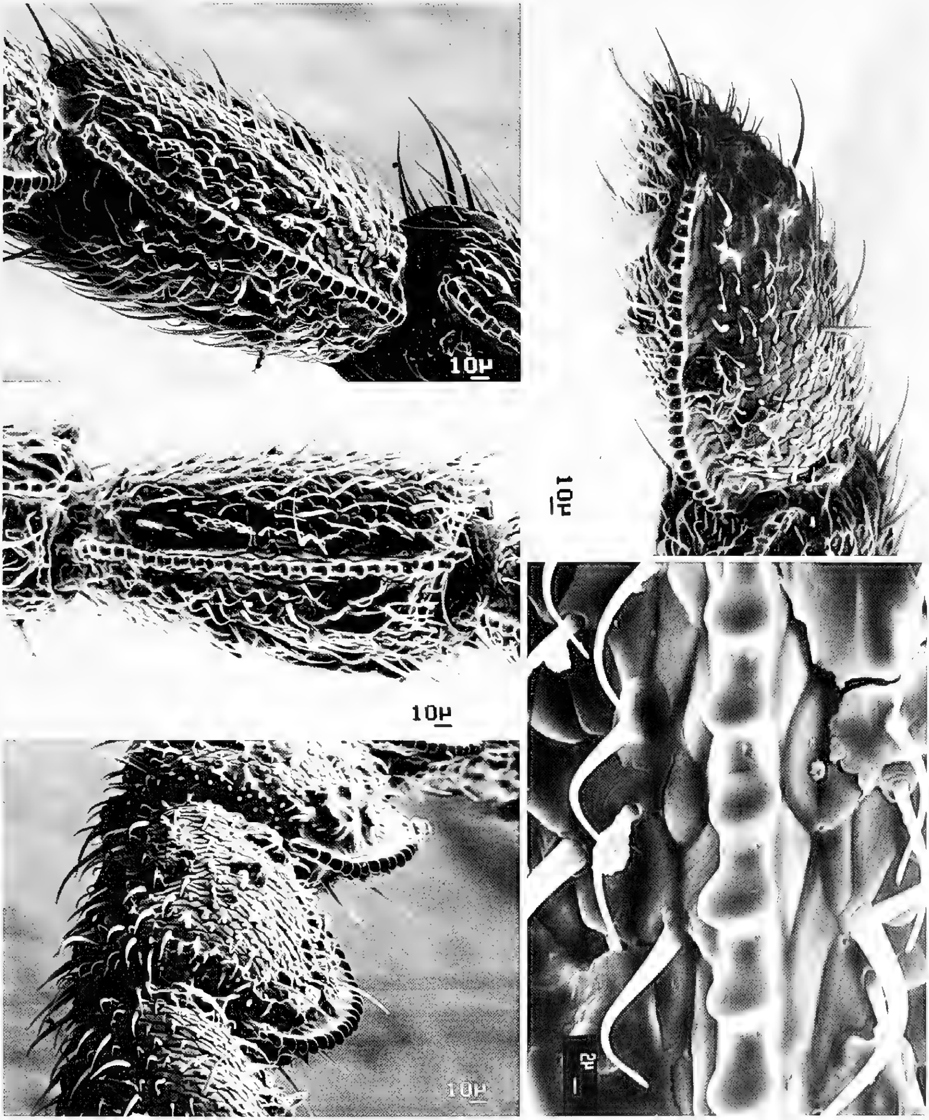


Fig. 11. Scanning electron micrographs of antennae of *Gabonia carinulata*.

Distribution and bionomics in Kenya. Shimba Hills and Jadini Forest: > 389♂♂, no ♀, at PA-baits only; VIII/83, IX/83, XII/84, VIII/85, IX/85.

Gabonia pustulatipennis-group

This group comprises those species in which the elytra of the males have pits at the apices close to the sutures. These pits can be surrounded by swellings.

Key to species with elytral pits near suture

1\. Smaller species, length 2.4-2.8 mm .... 2.

– Larger species, length 3.0-3.8 mm .... 5.

2\. Elytral suture broadly black; elytral pit somewhat preapical, as far from elytral point as pit is long; pit arched, more or less parallel to suture, its outer side margined by a swelling; length 2.4-2.8 mm. Distribution: Guinea; Nigeria; Zaire: Haut-Uelé .... *G. variola* Bechyné, 1955

– Elytral suture not black; pit closer to apical point .... 3.

3\. Elytral pit moderate and elongate, directed forward-outward .... 4.

– Elytral pit obviously deep and not elongated, tip of elytra nearly distorted and in most specimens darkened to black; clearly noticeable swellings around pits; head dark-brown, almost black, length 2.6-2.8 mm (extremes 2.3-2.9 mm) .... *G. nigroapicalis*, spec. nov.

4\. Elytral pits without swellings; yellowish-brown, only labrum black; length 2.6 mm. Distribution: Guinea .... *G. ganganensis* Bechyné, 1955

– Elytral pits with moderate swellings; yellowish-brown; head (at least frons or labrum) chocolate-brown; length 2.6-2.8 mm. Distribution: Guinea; Ivory Coast; Zaire: Haute-Uelé; Sudan: Equatoria .... *G. nasalis* Bechyné, 1955

5\. Length 3 mm .... 6.

– Longer species, length 3.76 mm; labrum and apical half of hind femora black; body reddish-brown; elytral pits close to utmost point of elytra and surrounded by very strong swelling .... *G. cavipennis*, spec. nov.

6\. Head and pronotum chocolate-brown, apical half of hind femora black; elytra yellowish-brown; elytral pits close to apical point, very deep near suture and surrounded by swellings; punctation on elytra irregular. Distribution: Zaire: Lubumbashi (Elisabethville) .. *G. pustulatipennis* Scherer, 1962

– Only labrum and apical half of hind-femora black, rest of body yellowish-brown; elytral pits without swellings; punctation on elytra in more or less regular but very narrow rows .... *G. foraminipennis*, spec. nov.

Gabonia nigroapicalis, spec. nov.

Figs 10, 28

Holotype: ♂, Kenya: near Maragoli, III-V/1986 (National Museum, Nairobi). – Paratypes: 122♂♂, Kenya, same data as holotype.

Diagnosis. Length: 2.32-2.88 mm, av. 2.67 mm (n=21), holotype 2.74 mm; width: 1.20-1.44 mm, av. 1.31 mm (n=12), holotype 1.36 mm. Female unknown.

Description

Head, scutellum, apices of hind femora, depressions on apices of elytra, and antennites 4-11 (4-5 somewhat brownish) black; pronotum and elytra yellowish-brown; reddish-brown antennites 1-3 and legs; tarsi dark-brown.

Antennal calli diverging to hind edge of eyes, not bounded horizontally; vertex nearly smooth, extreme fine scratch-like punctures recognizable (>50 x); width of frons 0.34 mm, eye diameter 0.26 mm. Antennae extending backwards over basal calli of elytra; segments 4-11 (especially 7-11) thick, ratio length to width about 2:3; lengths of antennites in mm: 0.22 : 0.10 : 0.12 : 0.16 : 0.16 : 0.16 : 0.18 : 0.16 : 0.16 : 0.16 : 0.19.

Pronotum extremely fine punctured; sides weakly rounded, broadest at base, 0.93 mm; short behind front angles 0.78 mm broad; length 0.55 mm; base in the middle slightly indentated.
Punctures on elytra distinctly stronger than those on pronotum with a little tendency to longitudinal rows; humeral calli distinct, basal calli weakly developed; apices of elytra with a strong impression which is both elytra in common, in front and especially behind this impression on each elytron a strong swelling (Fig. 10).

Aedeagus (Fig. 28) 1.22 (1.20-1.24) mm.

First segment of fore-tarsi narrower than apex of tibia.

Variation. The large material of males includes a few in which the apical impression on elytra are less dark coloured; the length of the antennae is variable.

Distribution and bionomics in Kenya. Near Maragoli: 123♂♂, no ♀, at PA-baits only; III-V/86.

Gabonia foraminipennis, spec. nov.

Figs 12, 29, 42

Holotype: ♂, Kenya: near Maragoli, 21.11.1984 (National Museum, Nairobi). – Paratypes: 82♂♂, 1♀, Kenya: near Maragoli, XI/1984, III-V/1986.

Diagnosis. Length: 2.80-3.12 mm, av. 2.99 mm (n=21), holotype 3.0 mm; width: 1.5 mm; female: length 3.16 mm, width 1.36 mm.

Description

Yellowish/reddish-brown; labrum, palpi, antennites 5-11, apical half of hind femora, and tarsi black. Head smooth with some scattered fine punctures on vertex; antennal calli well defined; distance between eyes 0.36 mm, eye diameter 0.28 mm. Antennae extending back to mid-point of elytra; antennites 6-11 more cylindrical, 3-5 more slender near base; lengths of antennites in mm: 0.23 : 0.11 : 0.12 : 0.16 : 0.16 : 0.16 : 0.16 : 0.16 : 0.17 : 0.17 : 0.24.

Pronotum distinctly but not densely punctured; lateral margins of basal half nearly parallel; anteriorly more constricted to front angles. Width of pronotum near base 0.98 mm, just behind front angles 0.85 mm on front angles 0.87 mm; length 0.6 mm; not as broad as base of elytra.
Elytra with inconspicuous basal calli; humeral calli distinct; elytral sides more or less parallel; punctation comparatively strong, punctures arranged in more or less orderly narrow rows; just before apex near suture, there is a round and shallow depression in both elytra, there is no marked swelling proximal/distal or around this impression.

Aedeagus (Fig. 29) 1.38 mm long.

Fore-tarsi not markedly widened, even somewhat narrower than tibiae.

Variation. Within the 83 specimens studied, a few bear fine punctures on the head, some have a darker head, a few dark-brown elytra, and some a blackish-brown abdomen.
Females without any apical depression near apex of elytra. Pronotum somewhat longer than in the male (0.66 mm), but width about the same; the rounded lateral margins lack a hind angle in the base; in front of the base is a shallow despression on the pronotum. Frons 0.42 mm broad, eye diameter 0.23 mm, lengths of antennites in mm: 0.20 : 0.08 : 0.16 : 0.18 : 0.17 : 0.16 : 0.18 : 0.16 : 0.16 : 0.16 : 0.25. Fig. 42 shows spermatheca.

Distribution and bionomics in Kenya. Near Maragoli: 83♂♂, 1♀, at PA-baits only; XI/84, III-V/86.,

Gabonia cavipennis, spec. nov.

Figs 13, 30

Holotype: ♂, Kenya: Shimba Hills National Reserve, 20.08.1985 (National Museum, Nairobi). – Paratypes: 36♂♂, Kenya: Coast Province, 1985-1987.

Diagnosis. Length: 3.28-3.96 mm, av. 3.59 mm (n=11), holotype 3.88 mm; width: 1.72-2.08 mm, av. 1.95 mm (n=10), holotype 2.0 mm. Female unknown.

Description
Reddish-brown; labrum, palpi, antennites 6-11, apical third of hind femora and tarsi black; tibiae apically darkened; antennite 5 somewhat blackened.

Head smooth, no punctures on vertex; antennal calli well defined; distance between eyes 0.42 mm; eye diameter 0.30 mm. Antennae extending backwards to middle of elytra; antennites 6-11 more cylindric, 3-5 more slender near base; lengths of antennites in mm: 0.27 : 0.14 : 0.13 : 0.17 : 0.20 : 0.18 : 0.18 : 0.17 : 0.18 : 0.16 : 0.20.

Pronotum covered with extremely fine punctures, the distance between punctures about 3-4 × diameter of a puncture. Sides lightly rounded, length 0.82 mm, width 1.44 mm, comparatively broad, as broad as base of elytra, and broadest at base.

Elytra without basal calli and consequently lacking postbasal depression, general appearance oval, humeral calli distinct; punctation fine and largely unorganized into longitudinal rows which can be traced very rarely and only for very short distances. Apically, near the suture, is a deep, short depression in both elytra, basad each of which is a strong swelling.

Aedeagus (Fig. 30) 1.78 mm long.

Tarsal segments on fore-legs only slightly widened.

Variation. Some specimens have antennites 1-4 reddish and 5-11 black or 5 darkened.

Distribution and bionomics in Kenya. Shimba Hills National Reserve: 37♂♂, no ♀, at PA-baits and at flowers of *Gynura scandens*; VIII/85, VII/86, XII/86, VI/87.

Gabonia bifoveolata-group

This group comprises those species in which the elytra of the males widen distinctly at about 1/3 of the elytral length (as measured from the base), beyond which they are constricted apically. Shortly before the point of maximum width near the lateral margin and behind the humeral calli, is a longitudinal or roundish depression which, in some cases, is also modified with swellings.

Key to species with depressions close to lateral margins of elytra behind humeral calli

1. Uniformly brown, head can be black and elytra dark-brown .... 2.
– Not uniformly brown, elytra black or yellow with red-brown margins .... 3.

2. Uniformly red-brown, elytra rarely somewhat blackish-brown; antennites 5-11 black, all antennites cylindrical; tarsae slightly darkened; hind femora uniformly reddish; hind tibiae straight; length 3.2-3.7 mm .... *G. bicaveata*, spec. nov.
– Pronotum and elytra reddish-brown; head black, only labrum and palpi brown; antennites 6-11 black; antennites 4-7 triangulary widened; apices of hind femora black; hind tibiae curved; length 4 mm. Distribution: S. Zaire: Upemba Park .... *G. kaswabilenga* Bechyné, 1960

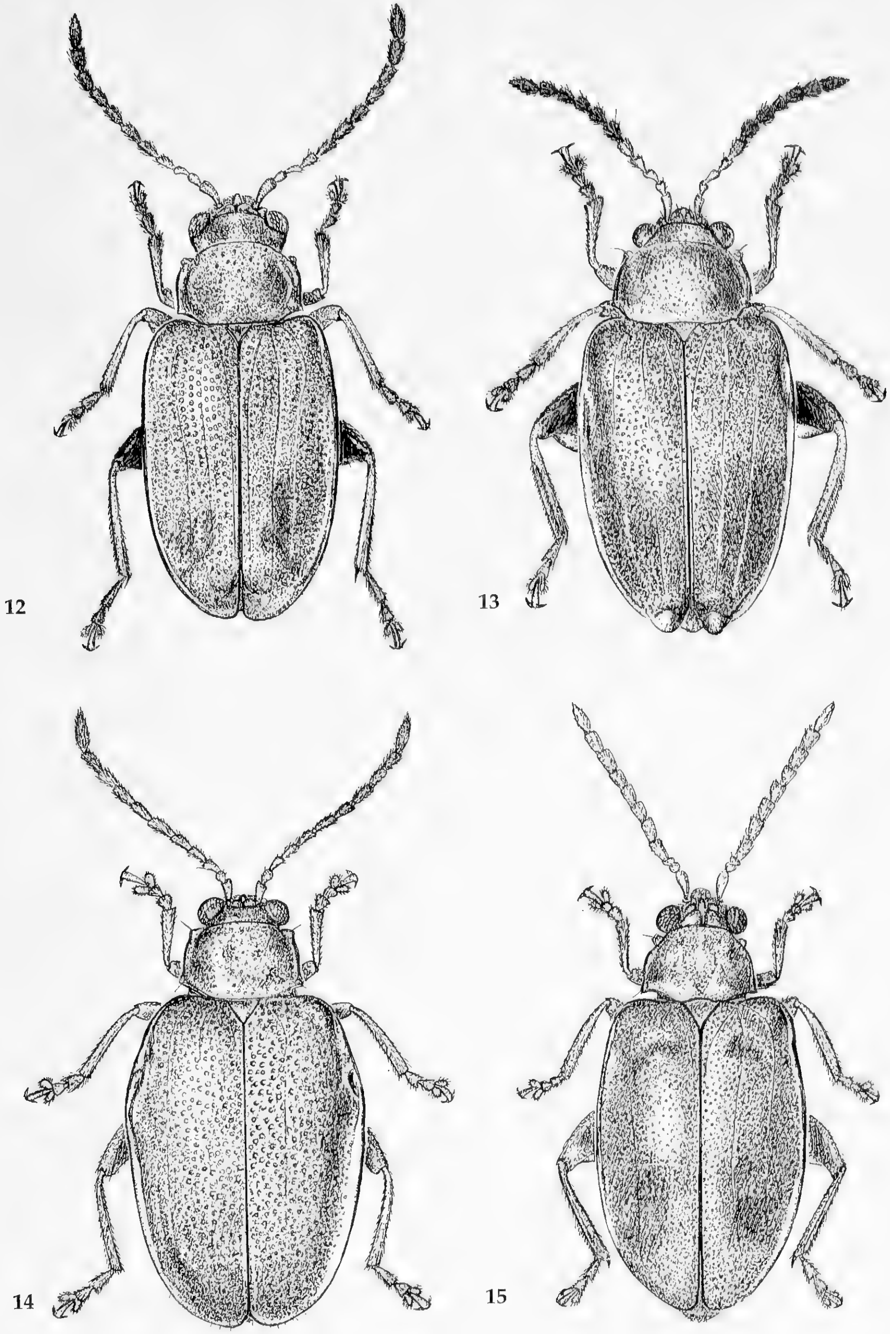
3. Yellowish-brown; vertex with two black spots; scutellum, side margins, base and apices of elytra red-brown; length 5 mm. Distribution: Guinea .... *G. malacorhinoides* Bechyné, 1955
– Elytra black; head and pronotum reddish-brown .... 4.

4. Length 5.5 mm. Distribution: E. Africa: Kwai .... *G. jacobyi* (Weise, 1902)
– Length 3 mm. Distribution: Ghana: Ashanti .... *G. bifoveolata* (Weise, 1895)

Gabonia bicaveata, spec. nov.
Figs 14, 31

Holotype: ♂, Kenya: near Maragoli, III-V/1986 (National Museum, Nairobi). – Paratypes: 2♂♂, Kenya, same data as holotype; 1♂, 4♀♀, Kenya: Mbita Point, V/1980.

Diagnosis. Length: 3.32-3.68 mm, av. 3.50 mm (n=3), holotype 3.6 mm; width 1.92-2.32 mm, av. 2.08 mm (n=3), holotype 2.32 mm; female, length 3.24-3.40 mm, av. 3.31 mm (n=4).



Figs 12-15. Habitus of Kenyan *Gabonia*. **12.** *G. foraminipennis*. **13.** *G. cavipennis*. **14.** *G. bicaveata*. **15.** *G. fulvicornis*.

Description
Head and elytra bright reddish-brown; pronotum and legs more yellowish-brown; tarsi darkened; antennites 1-4 reddish-brown, 5-6 dark reddish-brown, 7-11 dark-brown/blackish.

Width of frons 0.4 mm; eye diameter 0.31 mm, vertex nearly smooth, fine punctures recognizable (> 50 ×); antennal calli bounded behind by a deep line and separated from each other by a distinct line; frons roof like, frontal ridge distinct but not sharp. Antennae extending backwards along first fourth of elytra; lengths of antennites in mm: 0.30 : 0.12 : 0.16 : 0.20 : 0.20 : 0.22 : 0.22 : 0.22 : 0.20 : 0.20 : 0.28. Pronotum extremely fine punctured; sides nearly straight but slightly converging anteriorly; width near hind angles 1.19 mm, near centre 1.17 mm, just behind front angles 1.06 mm; length of pronotum 0.74 mm.

Elytra widen conspicuously from base backwards to ⅓ of elytral length, from this point towards apex they get constricted; width of elytra at the widest point towards apex they get constricted; width of elytra at the widest point 2.32 mm, where laterally a deep, roundish to oval hole is located; below this hole the epipleura are extremely broad and are abruptly and extremely narrowing apically; punctation on elytra distinct and confuse; on short distances more or less narrow regular rows can be seen.

Aedeagus (Fig. 31) 1.46 mm long.

First segment of fore-tarsi somewhat wider than apex of tibia.

Variation. Two specimens have a reddish head, pronotum and elytra which is mixed with piceous, the elytral suture is very narrowly stained with dark red-brown; tibiae and tarsi are darkened.
Female. Compared to the males elytra are less widening from base backwards, they are only 1.9 mm broad; instead of a hole at the widest point near margin they have a moderate convex, but round and smooth spot; epipleura are shaped as in the male; first segment of fore-tarsi are somewhat narrower than apex of tibiae.

Distribution and bionomics in Kenya. Near Maragoli: 3♂♂, no ♀, at PA-baits only; III-V/86. 1♂ and 4♀♀ were collected by D. Furth at Mbita Point (V/80) by sweeping (cf. Furth 1985).

Gabonia coffeae-group

This group comprises species which are about 4 mm in length, and have reddish-brown head, pronotum and elytra. The legs and antennae are in some cases darkened in part, and the antennae, fore-tarsi and elytra are structurally unmodified in the male.

G. fulvicornis, spec. nov. is very easily separable from the rest of this group by its straight pronotal sides which converge anteriorly. All other *coffeae*-group species have rounded pronotal sides; most *fulvicornis* have more yellowish-brown antennae and legs, which appear as good characters in addition to the straight pronotal sides. *G. fuscitarsis*, spec. nov. and *G. montivaga* Bryant, 1959 can be separated from the rest of the group by means of the antennae: all other *coffeae*-group species have comparatively short antennae, with antennites 4-11 cylindrical in shape, but *fuscitarsis* and *montivaga* have segments 4-11 longer, somewhat "cerambycid"-like in shape; in *montivaga* segments 7-10 are somewhat bowed, while in *fuscitarsis* segments 4-11 are narrow when seen from above (5:8), but segments 6-9 appear broadened and slightly compressed when viewed laterally. *G. montivaga* is separated from the new species by a weak depression on the pronotum which shows, under certain illumination, the four bosses typical of some *Gabonia* spp.

The rest of the species in this group, centered around *G. coffeae* (Laboissière, 1939) and *G. citri* (Laboissière, 1939), are very difficult to separate. They include *sawasawa* Bechyné, 1959, *kaniama* Bechyné, 1960, *ylla* Bechyné, 1960, *theobromae* (Bryant, 1944), and *aemula* Scherer, 1962, but *lutea* Scherer, 1959 is more distinct. *G. sheppardi* (Jacoby, 1906), of which the male is unknown, has black tarsi and blackish tibial apices. Conceivably, *sheppardi* represents the female of *testacea* (Weise, 1910).

Gabonia fulvicornis, spec. nov.

Figs 15, 32

Holotype: ♂, Kenya: Kakamega Forest, 27.06.1986 (National Museum, Nairobi). – Paratypes: 140♂♂, Kenya: Kakamega, 1984-1987.

Diagnosis. Length: 3.58-4.50 mm, av. 4.26 mm (n=16), holotype 4.2 mm; width: 1.83-2.33 mm, av. 2.14 mm (n=16), holotype 2.2 mm. Female unknown.

Description

Head, pronotum and elytra reddish-brown, shiny; front of labrum slightly darkened; legs and antennae yellowish-brown.

Frontal carina narrow and straight, not widening anteriorly; antennal calli well defined; frons (0.34 mm) somewhat narrower than eye diameter (0.36 mm); eyes very convex; at >50 x magnification scratch-like punctures are visible. Antennae extend backwards to more than ¼ way along the elytra; antennites 6-11 of cylindrical shape, 4 and 5 slightly, 3 strongly constricted at base; pubescence of antennites 4-11 fair; lengths of antennites in mm: 0.36 : 0.13 : 0.11 : 0.26 : 0.22 : 0.22 : 0.22 : 0.22 : 0.22 : 0.22 : 0.32.

Sides of pronotum nearly straight and converging in front, width of base 1.22 mm, just behind anterior angles 0.99 mm, length 0.8 mm, with extremely fine punctures (>50 x).

Base of elytra distinctly broader than base of pronotum; humeral calli distinct, basal calli very weak; behind humeral calli at lateral margin is a constriction beyond which the elytra widen again, and this indentation bears no groove; punctures on elytra very fine, not forming longitudinal rows.

Aedeagus (Fig. 32) 2.0 mm long.

Fore-tarsi only slightly enlarged, as broad as tibial apex.

Variation. The single punctures on the elytra can be marked by a dark halo, and the elytral suture can also be very narrowly darker reddish; very rarely antennites 8-11 blackish-brown and 4-7 darkened (4 out of 114 specimens), or in some specimens antennites 4-11 blackish-brown.

Distribution and bionomics in Kenya. Kakamega Forest: 145♂♂, no ♀, at PA-baits only; IX/83, VIII/85, IX/85, VI/86, IV/87, V/87, III/88.

Gabonia fuscitarsis, spec. nov.

Figs 16, 33

Holotype: ♂, Kenya: Shimba Hills National Reserve, 06.05.1984 (National Museum, Nairobi). – Paratypes: 13♂♂, Kenya: Shimba Hills National Reserve, IV/1988.

Diagnosis. Length: 4.00-4.72 mm, av. 4.34 mm (n=9), holotype 4.16 mm; width 1.88-2.20 mm (n=9), holotype 2.16 mm. Female unknown.

Description

Head, pronotum, elytra, antennites 1-3, and legs reddish-brown and shiny; front margin of labrum and tarsi blackish-brown; antennite 4 very dark reddish-brown; antennites 5-11 black.

Head smooth unless examined under a magnification of more than 50x, when puncture-like scratches become visible; antennal calli well-defined; frontal carina distinct but not sharp, flattened above; width of frons 0.50 mm; eye diameter: 0.36 mm. Antennae extending backwards to ½ way along elytra; when seen from above, segments 4-11 narrow, but widening laterally, 5-10 slightly compressed, ventrally very sharp, ratio width of upper side to side = 5:8; lengths of antennites in mm: 0.28 : 0.12 : 0.16 : 0.32 : 0.32 : 0.32 : 0.32 : 0.32 : 0.32 : 0.28 : 0.38.

Pronotum covered with punctures somewhat finer than those of elytra; sides rounded, margin groove-like; width at base 1.40 mm, just behind anterior angles 1.10 mm; length of pronotum 0.84 mm. Elytral base not much broader than pronotal base; humeral calli distinct, basal calli very weakly developed; the punctation has some tendency to form narrowly separated longitudinal rows.

Aedeagus (Fig. 33) 1.56 mm long.

Tarsi of fore-legs only slightly enlarged, a little wider than apex of tibia.

Variation. There is variation in the body size (cf. Diagnosis), a slight variation in the intensity of the reddish-brown colour of head, pronotum, and elytra; some specimens have no blackish front margin of labrum, in one specimen the entire labrum is black; the length of the aedeagus varies from 1.56-1.76 mm with an average of 1.66 mm (n =6).

Distribution and bionomics in Kenya. Shimba Hills National Reserve: 14♂♂, no ♀, at PA-bait; V/84, IV/88.

Gabonia rubropicea-group

This group comprises three small dark species of 2.28-2.80 mm. They have no peculiar characters and males and females are alike. The males of *G. picea*, spec. nov. and *rubropicea*, spec. nov. can only be distinguished by the shape of the aedeagus. *G. compressicornis*, spec. nov. is characterized in the male by the antennae, which are, however, quite variable. There are no species known which relate to the three new ones described here.

Gabonia picea, spec. nov.

Figs 17, 35

Holotype: ♂, Kenya: Shimba Hills National reserve, XII/1985 (National Museum, Nairobi). – Paratypes: 85♂♂, 1♀, Kenya, same data as holotype.

Diagnosis. Length. 2.2-2.4 mm, av. 2.32 mm (n=13), holotype 2.24 mm; width: 1.12-1.40 mm, av. 1.24 mm (n=13), holotype 1.32 mm; female: length 2.28 mm, width 1.24 mm.

Description

Reddish-brown with a blackish-brown touch; head somewhat darker; margins of pronotum, scutellum, and elytra very narrowly dark-brown to black edged; femora brown like upper side, tibiae and tarsi somewhat stained with piceus; antennites 1-3 brown, 4-11 almost black.

Width of frons 0.26 mm, eye diameter 0.22 mm; frontal carina narrow and as antennal calli well defined; vertex with some very fine punctures. Antennae extend backwards up to the first third of elytra; segments 4-6 moderately constricted towards base, others cylindrical. Lengths of antennites in mm: 0.18 : 0.08 : 0.06 : 0.12 : 0.13 : 0.13 : 0.13 : 0.13 : 0.13 : 0.13 : 0.17.

Sides of pronotum slightly rounded, broadest near hind angles; width of pronotum 0.73 mm, length 0.48 mm; upper side of pronotum not very densely covered with punctures which appear finer than those of elytra.

Elytra with distinct humeral calli and well visible basal calli; punctures exhibit a very moderate tendency to longitudinal rows.

Aedeagus (Fig. 35) 0.92-1.00 mm long, apically pointed. (The aedeagus of the holotype was not dissected but its apex is ventrally to be seen.)

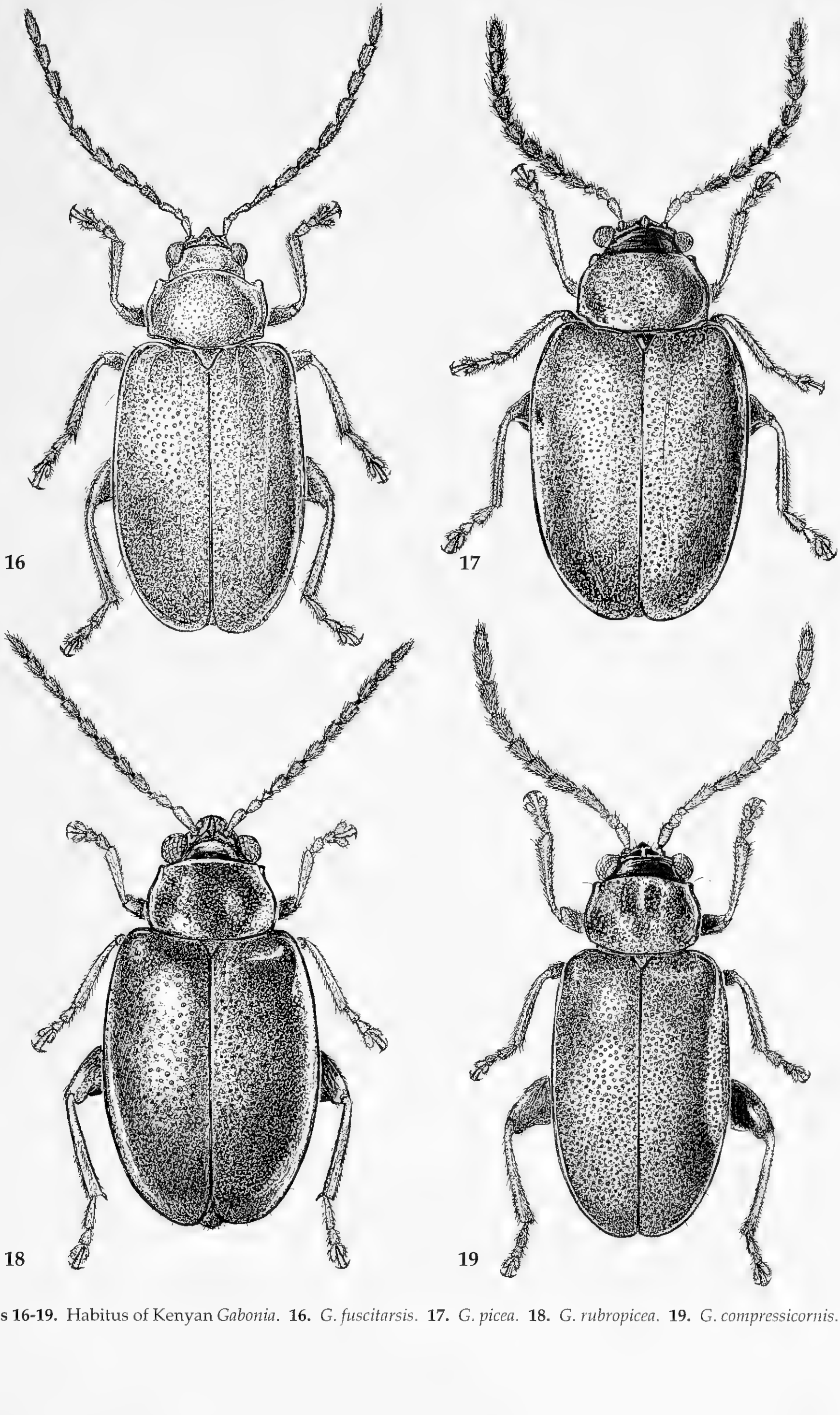
Variation. There is a variation to entirely dark piceus specimens with a colour of an unripe plum, and narrowly black elytral suture. Width of pronotum 0.74-0.77 mm, length 0.48-0.50 mm; width of frons 0.26-0.33 mm; eye diameter 0.20-0.22 mm.
Female. Width of frons 0.27 mm, eye diameter 0.20 mm, antennite 3 as long as 2.

Distribution and bionomics in Kenya. Shimba Hills: 90♂♂, 1♀, at PA-baits and at flowers of *Gynura scandens* (cf. Discussion); XII/85, XII/86.

Gabonia rubropicea, spec. nov.

Figs 18, 34, 44

Holotype: ♂, Kenya: Shimba Hills National Reserve, XI/1984 (National Museum, Nairobi). – Paratypes: 700♂♂, 20♀♀, Kenya, same data as holotype.



Figs 16-19. Habitus of Kenyan *Gabonia*. **16.** *G. fuscitarsis*. **17.** *G. picea*. **18.** *G. rubropicea*. **19.** *G. compressicornis*.

Diagnosis. Length: 2.0-2.4 mm, av. 2.15 mm (n=18), holotype 2.28 mm; width: 1.00-1.24 mm, av. 1.07 mm (n=14); female: length 2.20-2.68 mm, av. 2.35 mm (n=8); width 1.20-1.32 mm, av. 1.23 mm (n=8).

Description

Head, pronotum, elytra, hind femora dark blackish-brown with a reddish touch like an unripe plum; elytral suture very narrowly black; antennites 1-3 reddish-brown, 4-6 darker reddish-brown, 7-11 pitch brown; fore-legs, hind tibiae, and tarsi red-brown.

Width of frons 0.29 mm; eye diameter 0.23 mm; frontal carina and antennal calli as in preceeding species, also punctures on vertex. Antennae extend backwards over basal calli of elytra; lengths of antennites in mm: 0.18 : 0.10 : 0.08 : 0.15 : 0.15 : 0.15 : 0.14 : 0.14 : 0.14 : 0.14 : 0.18.

Width of pronotum 0.76 mm, length 0,5 mm; sides slightly rounded; punctation on pronotum and elytra as in preceding species.

Aedeagus (Fig. 34) 1.0-1.06 mm long, apically spoon-like rounded.

Variation. Compared to *G. picea* there is hardly any variation in the colour of head, pronotum, and elytra, only a few specimens have a brighter pronotum and elytra. Much variation, however, occurs in the colour of the antennae, antennites 7-11 can be reddish, segments 4-11 can be dark-brown, in many specimens segment 11 is somewhat reddish. Some specimens have brown hind femora. Width of frons 0.26-0.30 mm, eye diameter 0.22-0.30 mm, width of pronotum 0.79-0.84 mm, length of pronotum 0.44-0.50 mm.

Female. Width of frons 0.30 mm; eye diameter 0.22 mm; fore-tarsi a little less wide; there are no other sexual differences. Fig. 44 shows spermatheca.

Discussion. A more or less constant character is the antennal colour. In *picea* the antennites 1-3 are always yellowish-brown and 4-11 dark-brown, almost black. In *rubropicea* segment 4 is mostly reddish, 5-11 dark-brown or even dark reddish, often 1-6 reddish, but there are exceptional examples with dark-brown segments 4-11. In *rubropicea* the colour of head, pronotum, and elytra seems to be more constant, it is always reddish piceus to dark-reddish piceus, in *picea* there are also reddish specimens and dark-brown ones with a reddish touch. The only distinct difference which makes them easily identifyable is the aedeagus: in *rubropicea* it is apically spoon-like rounded, in *picea* pointed (cf. figs 34 and 35).

Distribution and bionomics in Kenya. Shimba Hills and Jadini Forest: >700♂♂, 20♀♀, at PA-baits, at flowers of *Gynura scandens* and *Ageratum conyzoides*, and at living leaves of *Crotalaria* sp. (cf. Discussion); V/82, VI/82, IV/83, IX/83, IV/84, V/84, XI/84, XII/84, V/85, VIII/85, IX/85, XII/85, VI/87, IX/87, IV/88.

Gabonia compressicornis, spec. nov.

Figs 19, 36, 43

Holotype: ♂, Kenya: Shimba Hills National Reserve, 11.09.1985 (National Museum, Nairobi). – Paratypes: 59♂♂, 100♀♀, Kenya, same data as holotype.

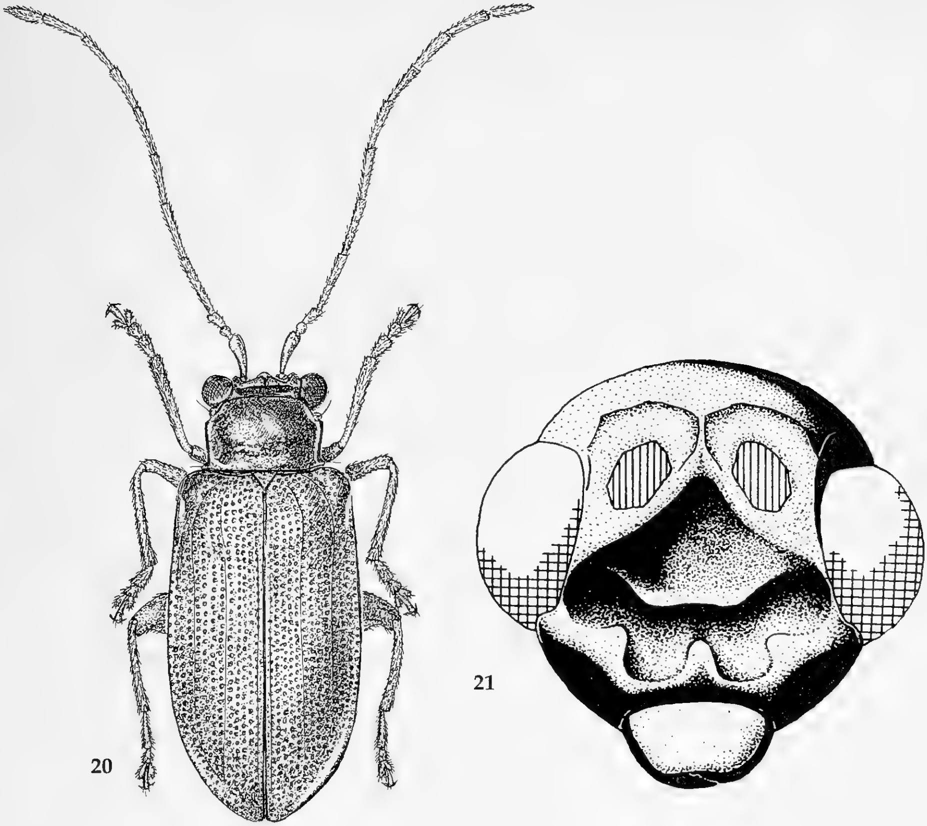
Diagnosis. Length: 2.48-2.88 mm, av. 2.71 mm (n=11), holotype 2.6 mm; width: 1.20-1.44 mm, av. 1.31 mm (n=11); female: length 2.48-3.04 mm, av. 2.71 mm (n=12), width 1.24-1.48 mm, av. 1.41 mm (n=12).

Description

Entirely dark-brown species with a reddish touch; antennites 1-3 reddish-brown, rest black; legs dark-brown.

Width of frons 0.37 mm; eye diameter 0.24 mm; antennal calli well defined, separated from each other by a fine line; vertex with a few very fine punctures. Antennae extend backwards over middle of elytra; antennites 7-11 laterally widened, especially 8-11 which are compressed in addition; lengths of antennites in mm: 0.23 : 0.08 : 0.05 : 0.24 : 0.20 : 0.18 : 0.20 : 0.20 : 0.22 : 0.21 : 0.30.

Width of pronotum 0.84 mm, length 0.6 mm; sides rounded and forming a semicircle with the base; hind angles small and hardly noticeable; upper surface covered with fine punctures, finer than those of elytra.



Figs 20-21. *Nzerekorena filiconis.* **20.** Habitus. **21.** Head.

Elytra with well-defined humeral and basal calli, irregularly but heavily punctured.

Aedeagus (Fig. 36) 1.32 mm (1.26-1.37 mm) long, on its ventral side laterally with ridges.

Variation. Some specimens with punctation on pronotum nearly as strong as on elytra. Males collected on 18.8.1985 have antennae with segments 8-11 less compressed laterally.

Female. Frons 0.34 mm broad, eye diameter 0.24 mm; antennites 8-11 cylindrical, 4-7 somewhat constricted towards base. Fig. 43 shows spermatheca.

Distribution and bionomics in Kenya. Shimba Hills: 60♂♂, 100♀♀, at leaves of *Vangueria tomentosa* only; IX/83, V/84, XI/84, VIII/85, VII/86, IX/87.

Nzerekorena filicornis, spec. nov.

Figs 20, 21, 37, 45

Holotype: ♂, Kenya: Kakamega forest, 22.06.1986 (National Museum, Nairobi). – Paratypes: 13♂♂, 11♀♀, Kenya: Kakamega Forest, 1986-1987.

Diagnosis. Length 3.40-3.76 mm, av. 3.63 mm (n=6), holotype 3.60 mm; width 1.52-1.68 mm, av. 1.61 mm (n=6), holotype 1.64 mm; female: length 3.32-3.84 mm, av. 3.65 mm (n=10), allotype 3.52 mm; width 1.52-2.00 mm, av. 1.71 mm (n=10), allotype 1.68 mm.

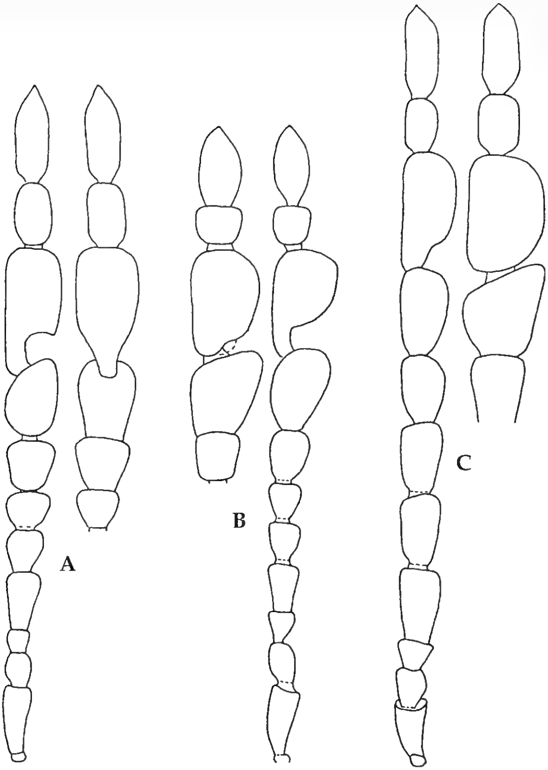


Fig. 22. Antennae. **A-B.** *Gabonia gabrieletta.* **A.** Shimba Hills, with longitudinal 10th antennal segment. **B.** Jadini Forest, with 10th antennal segment as short or shorter as wide. **C.** Antennae of *G. gabriela*, which are longer than in *G. gabrieletta.*

Description

Reddish-brown, legs more yellowish-brown; antennae reddish-brown, segments 6-9 darkened.

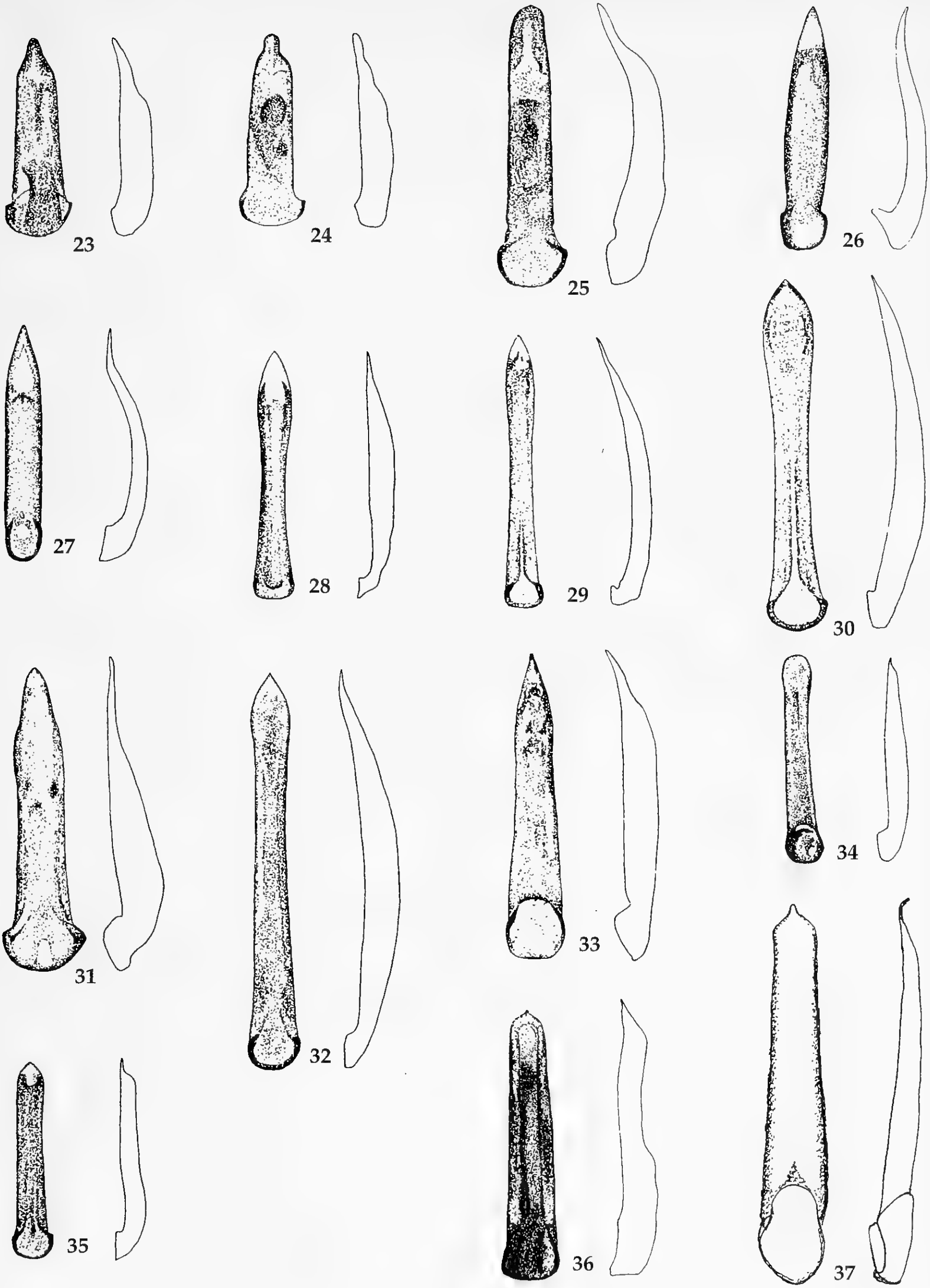
Head (Fig. 21) above antennal calli very short, with extremely fine scratch-like punctures; eyes obviously directed outwards; antennal calli chagreened and surrounding nearly like a semicircle the hind margin of antennal base, bounded behind by a deep line; frons 0.50 mm wide, eye diamter 0.36 mm; frons most extraordinary, deeply excavated from one eye to the other in front of antennal bases, this is not only a concave frons as in females or in other *Nzerekorena* species but a deep excavation to which the margins are projected and has in its centre a fine horizontal ridge. Antennae filiform and thin, extending to elytral decline; lengths of antennites in mm: 0.40 : 0.13 : 0.14 : 0.56 : 0.46 : 0.44 : 0.42 : 0.35 : 0.32 : 0.32 : 0.36.

Pronotum covered with fine, scattered but shallowly impressed punctures; punctures in the prebasal depression stronger and as strong as those on elytra; seen from above, it seems that the side margins are somewhat diverging in front; the reality shows that the pronotum is widest at base, the angles – or setiferous punctures – are directed outwards; width on hind angles of pronotum 0.98 mm, just in front of the hind angles 0.91 mm, and in the centre 0.94 mm; sides straight and nearly parallel; length of pronotum 0.62 mm.

Base of elytra distinctly broader than base of pronotum; basal calli distinct; punctation in narrow longitudinal rows.

Tarsi of fore-legs slightly broader than concerning tibiae.

Aedeagus (Fig. 37) 1.64 mm long.



Figs 23-37. Aedeagus. **23.** *Gabonia colae.* **24.** *G. bicolor.* **25.** *G. tibialis.* **26.** *G. gabriela.* **27.** *G. gabrieletta.* **28.** *G. nigroapicalis.* **29.** *G. foraminipennis.* **30.** *G. cavipennis.* **31.** *G. bicaveata.* **32.** *Gabonia fulvicornis.* **33.** *G. fuscitarsis.* **34.** *G. rubropicea.* **35.** *G. picea.* **36.** *G. compressicornis.* **37.** *Nzerekorena filoicornis.*

Variation. One specimen with antennites 6-11 and one with 4-9 darkened; in some specimens the elytral punctures are marked with a dark-red brown halo. Aedeagus varies from 1.64-1,68 mm in length.

Female. Frons 0.44 mm, eye diameter 0.33 mm; excavation on frons not as deep as in male but nevertheless distinct, a concave impression as known from other species of this genus; frontal longitudinal carina very thin; antennae shorter than in male: lengths of antennites in mm: 0.37 : 0.13 : 0.13 : 0.30 : 0.30 : 0.30 : 0.30 : 0.26 : 0.26 : 0.25 : 0.36; fore-tarsi only as broad as tibiae; there are no other differences to the male, even the pronotum shows the same measures. Fig. 45 shows spermatheca with transverse flutes which are absent in all examined spp. of *Gabonia*.

Distribution and bionomics in Kenya. Kakamega Forest: 14♂♂, 11♀♀, at PA-baits only; IX/85, VI/86, VIII/86, V/87, VIII/87, XII/87.

Discussion. The male is separated by its deeply, pit-like excavated frons from all other known *Nzerekorena* species. The female, which resembles somewhat *N. garambaensis*, is distinctly separated from this species by its basal calli on the elytra which are not heart-shaped and its shorter body length.

Key to recognized *Nzerekorena* species

1. Antennae long, but not longer than body .... 2.
– Antenna longer than body .... *N. cerambycina* Bechyné, 1955

2. No longitudinal frontal carina (only rudiments to be seen between antennae and on front margin of frons) .... 3.
– Frontal carina distinct .... 4.

3. Length 5 mm .... *N. carinulata* Bechyné, 1955
– Length 4 mm, pronotum with punctures only near base, impression on pronotum separated in the middle by a keel-like elevation, instead of a longitudinal carina on frons a longitudinal impression .... *N. clypeata* Bechyné, 1955
– Length 3.45-3.76 mm, pronotum with fine scattered punctures and stronger punctures in the half-moon-like impression, frons deeply pit-like excavated .... ♂ *N. filicornis*, spec. nov.

4. Pronotal impression like half-moon .... 5.
– Pronotal impression laterally restricted, not joining centrally .... 6.

5. Length 5 mm; frontal carina bulge-like, pronotum nearly smooth, only some scattered punctures inside impression, basal calli on elytra without prolongation along suture .... *N. macrophthalma* Bechyné, 1955
– Length 4.0-4.5 mm; longitudinal carina on frons between antenna bulge-like, from here very fine to front margin; punctation on pronotum fine and scattered, stronger and denser inside impression, basal calli on elytra very distinct and prolonged near suture backward, which gives them a heart-like appearance .... *N. garambaensis* Scherer, 1962
– Length 3.45-3.76 mm .... ♀ *N. filicornis*, spec. nov.

6. Length 5 mm, frons and vertex smooth and shiny .... *N. foveolata* Bechyné, 1955
– Length 4.5-4.8 mm, frons and vertex chagreened .... *N. basilewskyi* Scherer, 1962

Key to *Gabonia* and *Nzerekorena* species encountered at sources of PAs in Kenya

1. Antennites 6-11 with a microscopically serrate ridge .... *G. carinulata* Bechyné
– Withouth such a ridge on antennae .... 2.

2. Antennites 8-9 enlarged (Fig. 19) .... 3.
– Antennites normally shaped .... 4.

3. Light reddish-brown; antennites 1-4 reddish; tarsi darker brownish, tibiae not darkened; length 2.88-3.30 mm, av. 3.09 mm .... *E. gabrieletta*, spec. nov.

– Chestnut-brown; antennites 1-3 reddish; tarsi blackish, basal two thirds of tibiae darkened; length 3.2-4.4 mm, av. 3.70 mm .... *G. gabriela* Scherer

4. In fore-legs, 1st tarsal segment 1.3-1.5 x broader than apex of tibia (Figs 2-4); 2nd segment tiny (0.5 x 1st segment) .... 5.

– In fore-legs, 1st tarsal segment about as broad as apex of tibia; 2nd segment almost of same width as 1st .... 7.

5. Yellowish-brown, elytra can be darkened, tarsi darkened .... 6.

– Entirely black; a distinct depression across elytra; length about 5 mm .... *G. impressipennis* Laboissiere

6. Length 4.4-4.8 mm; head dull .... *G. latimana* Laboissière

– Length 3.8-4.4 mm; head shiny .... *G. punctipennis* Laboissière

7. Hind tibiae with hook-like structure (Figs 5-8) .... 8.

– Hind tibiae normal .... 10.

8. Eyes enlarged; width of frons narrower than eye diameter; pronotum narrow; base of elytra broader than base of pronotum; length 3.2-3.8 mm .... *G. tibialis*, spec. nov.

– Eyes of normal size; width of frons wider than eye diameter .... 9.

9. Entirely yellowish- to reddish-brown, only antennae apically darkened .... *G. colae* (Bryant)

– Reddish-brown, elytra black .... *G. bicolor*, spec. nov.

10. Elytra with pit-like depressions near side margins behind humeral calli or apically near suture .... 11.

– Elytra without pit-like depression .... 14.

11. Elytral depression near side margins of humeral calli .... *G. bicaveata*, spec. nov.

– Elytral depression apically near suture .... 12.

12. Elytral depression not darkened; only labrum black .... 13.

– Elytral depression darkened to black; head black; 2.6-2.8 mm .... *G. nigroapicalis*, spec. nov.

13. Length 3.8 mm; reddish-brown; antennal segments 1-5 reddish, rest black; general shape oval, elytra oval; punctation of pronotum and elytra fine; apical depression on elytra very strong with swelling behind .... *G. cavipennis*, spec. nov.

– Length 3 mm; yellowish-brown; antennal segments 1-4 yellowish-brown, rest black; general shape longitudinal, elytra more or less parallelly sided; punctation on pronotum and elytra fine but distinct; apical depression on elytra less strong, without a swelling .... *G. foraminipennis*, spec. nov.

14. Reddish-brown, length 3.45-4.60 mm .... 15.

– Blackish-brown, length 2.28-2.80 mm .... 17.

15. Antennae filiform, very thin and long, up to apical decline of elytra; antennite 4 as long as 1+2+3; transverse depression behind middle of pronotum .... *Nzerekorena filicornis*, spec. nov.

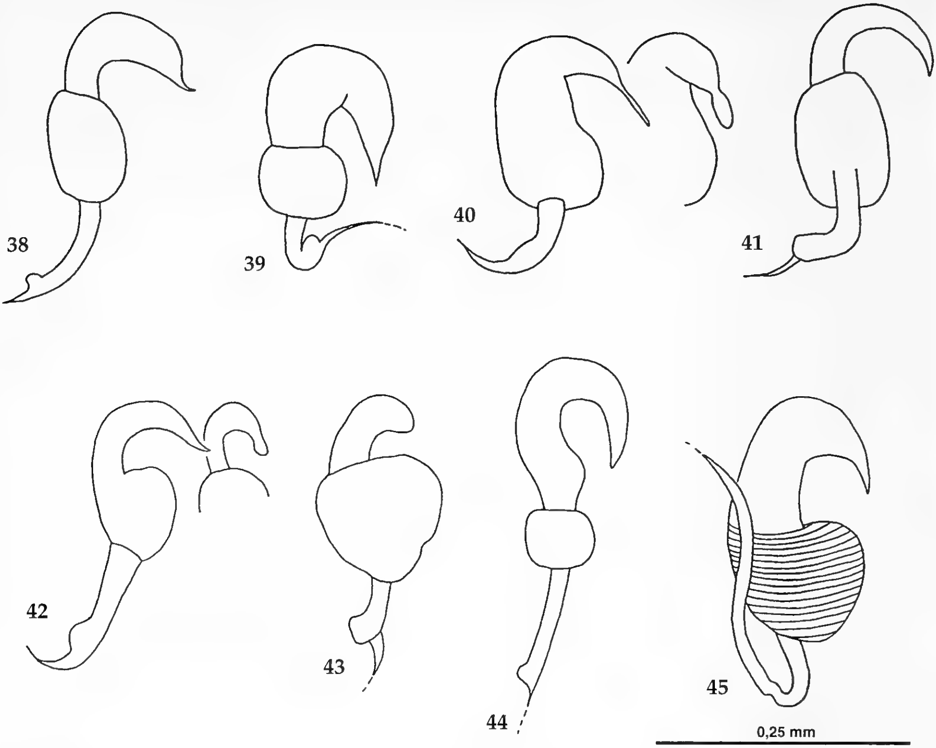
– Antennae stronger, shorter, antennite 4 as long as 2+3; no transverse depression of pronotum 16.

16. Antennae and legs yellowish-brown; length 3.58-4.50 mm .... *G. fulvicornis*, spec. nov.

– Antennites 4-11 black; tarsi darkened; length 4.2 mm .... *G. fuscitarsis*, spec. nov.

17. Aedeagus apically pointed (Fig. 35) .... *G. picea*, spec. nov.

– Aedeagus apically rounded (Fig. 34) .... *G. rubropicea*, spec. nov.



Figs 38-45. Spermatheca. **38.** *Gabonia colae.* **39.** *G. bicolor.* **40.** *G. tibialis* (different views). **41.** *G. gabriela.* **42.** *G. foraminipennis* (different views). **43.** *G. compressicornis.* **44.** *G. rubropicea.* **45.** *Nzerekorena filicornis.*

Discussion

The status of the classification of the genus *Gabonia* and its closely related genera is badly in need of a thorough revision. Practically nothing has been recorded on biology and ecology of these beetles. In the literature, information is scant even concerning the plants on which *Gabonia* have been collected. Le Pelley (1959) reports *Gabonia* sp. at *Hibiscus* sp. and *G. fracta* Bechyné, 1960 at *Coffea robusta*, but it is uncertain if these are host plants or not. Weise (1913, 1915) noted *G. antennalis* (Weise, 1913) and *G. pedestris* (Weise, 1915) (both as *Jamesonia*) having been baited with dead birds, which is currently inexplicable.

Finding males of 17 species of *Gabonia* to be strongly attracted to sources of pyrrolizidine alkaloids, unfortunately, did not yet result in conclusive biological knowledge on the genus – rather numerous new questions are being raised. Our difficulties in finding the majority of *Gabonia* species other than at PA-baits suggest, in combination with the recognition of their frequent nocturnal activity, that these beetles have an unusual life-style. Perhaps they mainly live in the canopy or some other habitat equally inaccessible to us, and/or they may be nocturnal in all their other adult activities. However, the large number of specimens obtained from PA-baits proves *Gabonia* to be by no means rare, and the fact that relatively few specimens are deposited in museum collections supports the above suggestion. Since our opportunistic collecting during a few visits to only some Kenyan habitats has resulted in the recognition of 12 new species, it must be suspected that many if not the majority of *Gabonia* species, are yet to be discovered. These arguments also seem to be valid for *Nzerekorena*.

The field data provided above are incomplete with respect to geographical distribution and habitat requirements. Looking for evidence for seasonality based on the dates of collection, specifying bait attractivity based on numbers of beetles gathered from a given bait etc. is not permissable because baiting was not conducted regularly. In particular, there are insufficient data to provide quantitative assessments of the relative attraction of the different types and/or amounts of PAs used as bait. Undoubtedly, the baits were not equally attractive, but under the given field conditions there were many unaccessable environment factors including strength and direction of wind, position of bait etc. Regardless of these limitations of the present work, attraction of *Gabonia* and *Nzerekorena* to sources of PAs is an interesting phenomenon. Without doubt, the beetles seek PAs and no other chemical(s) present in PA-plant because not only withered plants but also purified PAs are attractive. According to most recent findings on arctiid moths attracted to PAs, it is a volatile decomposition product of PAs which serves as an air-borne stimulus for PA-seeking behaviour (Bogner & Boppré 1989), and pilot tests in Kenya indicate that the beetles use the very same stimulus as Lepidoptera do.

Finding *Gabonia* at flowers of *Gynura scandens* was not surprising after it had been recognized that they are highly attractive for PA-utilizing Lepidoptera but not attractive for other nectar-searching insects (Boppré unpubl.). Subsequent chemical analyses (Wiedenfeld 1982) revealed *Gynura* as a plant rich in PAs, and it seems – where and when available – a major natural source of pyrrolizidine alkaloids. The same is true for *Ageratum conyzoides* (cf. Boppré & Wiedenfeld in prep., Wiedenfeld in prep.) which is a common if not the most common PA-plant.

There are obvious parallels between *Gabonia* and pharmacophagous insects known to be dependent on PAs. Such species take up PAs independent of feeding behaviour and utilize these allelochemics for a specific purpose other than primary metabolism or foodplant recognition (for definition of pharmacophagy see Boppré 1984). In Lepidoptera, for example, species of various families gather PAs as adults and store the plant chemicals for defence, the males of a variety of species synthesize a sex pheromone from PAs, and sex- and organ-specific growth regulation by PAs has also been recognized (for review see Boppré 1986, 1990). Attraction of *Zonocerus* (Orthoptera: Pyrgomorphidae; Boppré et al. 1984) and of certain Chloropidae (Diptera) (Boppré & Pitkin 1988) also occurs. However, with respect to *Gabonia*, the beetles cannot yet be called pharmacophagous because we still lack proof that they sequester the plant metabolites for a specific purpose.

Of some Lepidoptera (e.g. *Creatonotos*) the larvae are pharmacophagous with respect to PAs. If this is paralleled by *Gabonia* or other chrysomelid larvae remains an open question. The genus *Longitarsus* seems to be restricted to *Heliotropium* and/or other PA-containing plants (e.g. Frick 1970, Furth 1979, Huber 1981, Wapshere 1980); however, it is neither known if these chemicals play a role in host-finding, nor if they are sequestered.

While *Gabonia* and *Nzerekorena* are the only Coleoptera so far recognized to be attracted to PAs, attraction to and uptake of secondary metabolites is found in other beetles, too. Phenomenologically, the relation of the chrysomelids to PAs strongly resembles the one of Anthicidae (and other insects) to cantharidin: cantharidin, a secretion of meloid beetles, attracts – even in pure form – species of e.g. *Notoxus* and *Anthicus* and others which appear to take up the chemical; often, visitation of sources of cantharidin is sex-biased (for refs. see e.g. Görnitz 1937, Young 1984).

The question of the biological significance of visits by male *Gabonia* and both sexes of *Nzerekorena* to sources of pyrrolizidine alkaloids, briefly considered for *G. gabriela* by Boppré & Scherer (1981), is now seen more clearly. Although the sex-bias in *Gabonia* is indicative of a sexual function, it will be impossible to investigate functional aspects of the PA relationship unless the species can be reared. However, we can exclude the idea that PAs mimic a female sex pheromone because sympatric species are lured to PA-sources at the same time of day. Furthermore, the beetles ingest the chemicals, which is not to be expected if a female pheromone mimic was involved.

Morphological peculiarities in males occur in the majority of known *Gabonia*. There is no restriction of these sexual characters to a certain part of the body, rather elytra, antennae, tarsae, tibiae of hind legs are affected in various ways. Apart from the structures mentioned in this paper, there are species showing skijump elevations on the hind part of the elytra (e.g. in *G. unicostata* Jacoby, 1893), males of a group around *G. custos* (Weise, 1895) exhibits triangularly enlarged antennal segments, in *G. crassipes* Scherer, 1959 the hind tibiae are swollen in their centres, *G. miraculosa* Scherer, 1963 shows in the male hind femora with a deep excavation in which a chitinized peg is to be seen; this species and *descarpentriesi* Bechyné, 1968, a species likewise with excavated hind femora in the male, was placed by Bechyné (1968) in an own genus *Dimonikaea*.

Although, to date, we lack any evidence on the significance of the male peculiarities, they might turn out as a key for understanding uptake of PAs. Structurally, they greatly resemble the "Excitatoren" (= excitatory organs) found in Malachiidae (e.g. Evers 1958, 1963, Matthes 1960, 1962, 1972): male malachiids exhibit structural peculiarities of antennae, tibiae, thorax, head etc. which all seem to be glandular and equipped with sensory hairs. For several species, processing different types of Excitatoren, the mating behaviour has been studied, and it turned out, that prior to mating females nibble at the Excitatoren, apparently gathering secretion (and perhaps stimulating the male mechanically, too). For *Gabonia gabriela* it has been proved that antennites 8 and 9 are glandular (Fischer & Boppré 1990). Probably, the male peculiarities in other species are glandular, too: under SE♂, even visible under a stereo microscrope, the respective areas are usually covered by a crusty material, perhaps a coagulated secretion. Further histological but also chemical studies which we plan in addition to behavioural and further ecological work, might reveal that the male characters are the key for explaining the visitation of PA-sources: perhaps, as in several Lepidoptera (cf. Boppré 1986, 1990), PAs are used as precursors of male pheromones and/or as defensive chemicals presented to the females as nuptual gifts.

With respect to taxonomy, we have used male secondary features of *Gabonia* as taxonomic characters – an approach which is not unquestionable. For example, tibial hooks are typical for the *colae*-group, which is, however, diverse with respect to the aedeagi (symmetrical in *bicolor*, but asymmetrical in *colae* and *tibialis*); also, the ductus of the spermatheca in *colae* is quite different than in all other species examined. The taxonomic significance of asymmetrical or symmetrical aedeagus and shape of spermathecal ductus must be cleared. Beside the colour, there are no other external differences between *colae* and *bicolor*. Furthermore, numerous species lack a conspicuous sexual dimorphism at all. At present, however, the suggested grouping of the species appears helpful, and it is left to further work to extent such a treatment to the species not dealt with here or to find better characters. Also, it needs to await further data to judge which genera of the *Gabonia*-complex are justified ones. The generic classification of these halticine beetles, as elaborated by Jacoby (1895, 1899) and Weise (1895), needs to be reassessed and, perhaps, the association of species to PAs might turn out to be an important ecological character for taxonomic considerations. However, finding *G. compressicornis* at *Vangueria* but not (yet?) at PA-sources appears to contradict the idea of PA association to be a reliable generic feature. Furthermore, the equal attraction of both sexes of *Nzerekorena filicornis* is different to *Gabonia*, but baiting in further habitats and in different seasons are required before discussing such aspects.

Thus, a lot of more information has to be gathered in this genus; we hope to find the hostplant(s) at least of one or the other species, to be able to study the behaviour in some detail, and we shall accumulate as much information as possible to eventually result in a cladistic analysis.

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Typenrevision der von Victor Berthoumieu beschriebenen Ichneumoninae (ohne Phaeogenini)

(Insecta, Hymenoptera, Ichneumonidae)

Erich Diller und **Klaus Horstmann**

Diller, E. & K. Horstmann (1997): Typenrevision der von Victor Berthoumieu beschriebenen Ichneumoninae (ohne Phaeogenini) (Insecta, Hymenoptera, Ichneumonidae). – Spixiana **20/1:** 39-71

In the second part of a revision of Ichneumoninae described by Berthoumieu, 155 species (all species not belonging to the Phaeogenini; two unjustified emendations included) are revised, 102 lectotypes are designated and 66 new synonyms are indicated. Some publication dates of Berthoumieu's papers are corrected. An new name, *Neotypus tenerifae,* is given to the junior secondary homonym *Neotypus cabrerai* Berthoumieu, 1904. The varieties described by Berthoumieu are listed. Three varieties, the names of which are considered as available, are revised, but 119 names of varieties are considered as infrasubspecific and therefore unavailable. In an appendix, two taxa described by Pic and two taxa of Phaeogenini described by Berthoumieu are discussed.

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Einleitung

Hier wird der zweite Teil einer Revision der von Berthoumieu beschriebenen Ichneumoninae vorgelegt, nachdem im ersten Teil (Diller & Horstmann 1994) die Phaeogenini behandelt worden sind. Auf die allgemeinen Bemerkungen des ersten Teils wird verwiesen. Einige Arten, die kürzlich von Rasnitsyn (1981a) und Hilpert (1992) revidiert worden sind, werden angeführt, aber nicht noch einmal detailliert untersucht.

Die im ersten Teil genannten Zahlen der von Berthoumieu insgesamt beschriebenen Arten und Varietäten müssen korrigiert werden, da Taxa neu aufgefunden wurden und sich die Auffassung über den Status einiger Taxa bei der Bearbeitung des zweiten Teils geändert hat. Danach hat Berthoumieu in der Unterfamilie Ichneumoninae 215 neue Arten (und dazu 2 ungerechtfertigte Emendationen) und 122 neue Varietäten beschrieben.

Von den von Berthoumieu in der Gattung *Ichneumon* Linnaeus (s.l.) beschriebenen Arten sind 14 Arten, die zu *Ichneumon* s. str. gehören, in der Revision von Hilpert (1992) nicht erfaßt worden, weil nicht klar war, zu welchen modernen Gattungen diese Taxa gehören und/oder weil die Typen noch nicht aufgefunden worden waren. Von diesen stammen 11 aus Europa, sie sind alle unter anderen Namen in der Revision von Hilpert behandelt worden. Von drei aus Nordafrika beschriebenen und bisher unrevidierten Arten waren dagegen zwei bisher nicht unter anderen Namen bekannt. Man kann daraus schließen, daß die europäischen *Ichneumon*-Arten jetzt weitgehend erfaßt sind, die nordafrikanischen dagegen noch nicht. Für andere Gattungen ist die Situation ungünstiger; unrevidierte Arten gehören vor allem zu *Coelichneumon* Thomson, *Diphyus* Kriechbaumer und *Virgichneumon* Heinrich.

Für ihre Hilfe bei der Untersuchung der Typen danken wir Dr. J. Casewitz Weulersse und Mme C. Villemant (Muséum National d'Histoire Naturelle, Paris), Dr. I. Izquierdo (Museo Nacional de Ciencias Naturales, Madrid), Dr. F. Koch (Museum für Naturkunde, Berlin) und Dr. J. Pujade (Museu de Zoologia, Barcelona). Anderes Vergleichsmaterial sandten Dr. J. Selfa (Departament de Biologia Animal, Burjassot), Dr. M. Sorg (Neukirchen-Vluyn) und Dr. L. Zombori (Természettudományi Múzeum Állattára, Budapest). Zusätzliche Auskünfte über verschollene Typen gaben Mme M. Fouray (Muséum d'Histoire Naturelle, Rouen), G. Hazet (Musée d'Elbeuf) und Mlle. C. Thirion (Zoologie Générale et Appliquée, Gembloux). Allen danken wir herzlich.

Bemerkungen zu Sammlern und Sammlungen

Berthoumieu hat zahlreiche neue Taxa nach Material beschrieben, das er von anderen Sammlern erhalten hat, und hat einige Typen für seine Sammlung behalten, die Mehrzahl aber zurückgegeben. Auf der Suche nach verschollenen Typen wurden Nachforschungen über den Verbleib der Sammlungen angestellt. Die wichtigsten Sammlungen wurden bereits ausführlich besprochen (Diller & Horstmann 1994: 248ff.). Hier werden vor allem solche Informationen zusammengestellt, die den Verbleib verschollener Typen betreffen.

Aus der Sammlung Berthoumieu fehlen ausschließlich Typen von Arten, die in Berthoumieus erster Publikation (1892) beschrieben worden sind *(Amblyteles frustrator, Ichneumon bifossatus, I. erraticus, I. paganus)*. Es besteht die Möglichkeit, daß Berthoumieu Typen entfernt hat, wenn er eine seiner Arten mit einer schon beschriebenen anderen Art synonymisiert hat (Diller & Horstmann 1994: 248). Die Sammlung Pic mit zahlreichen Typen ist vollständig erhalten, von den aus ihr beschriebenen Arten Berthoumieus fehlt nur *Phaeogenes pici*.

Die Sammlungen du Buysson (zwei Brüder; mit Material von Abeille de Perrin), de Gaulle, Pérez und Vachal sind anscheinend vollständig und mit allen Typen an das Museum in Paris gekommen (vgl. Seyrig 1928: 146ff.; 1935: 134f.). Von diesen sind die Ichneumonidae der Sammlung du Buysson auf die allgemeine Sammlung des Museums verteilt worden, aus den Sammlungen de Gaulle und Vachal sind die Typen herausgesucht und in die allgemeine Sammlung oder die Sammlung Berthoumieu eingeordnet worden, und die Sammlung Pérez ist anscheinend unverändert.

Teile der Sammlungen Gadeau de Kerville (mit Material der Familie Mocquerys) und Pigeot werden in Paris aufbewahrt, allerdings nur mit wenigen Ichneumonidae. Eine Art *(Ichneumon kervillei)* war in Coll. Gadeau de Kerville vorhanden, andere fehlen *(Amblyteles macilentus, Ichneumon flebilis)*, und diese sind auch nicht im Muséum d'Histoire Naturelle in Rouen (Auskunft Mme M. Fouray) oder im Musée d'Elbeuf (Auskunft G. Hazet) zu finden, wo man sie nach den Angaben von Horn et al. (1990: 266) vermuten könnte. Von den drei aus der Sammlung Pigeot beschriebenen Arten hat Seyrig (1927: 176) eine *(Platylabus ambiguus)* revidiert und den Typus in die allgemeine Sammlung eingeordnet. Die Typen der beiden anderen *(Ichneumon pigeoti, I. productus)* fehlen; sie könnten eventuell in Paris noch vorhanden sein, da der entsprechende Teil der allgemeinen Sammlung (*Cratichneumon* Thomson und verwandte Gattungen) kaum geordnet ist.

Einige Typen von Arten, die Berthoumieu von Flamary und Lombard erhalten hat, befinden sich in Coll. Berthoumieu, andere fehlen (*Amblyteles macilentus* aus Coll. Flamary, *Ichneumon lombardi* aus Coll.Lombard). Möglicherweise hat Berthoumieu nur Dubletten behalten, und weitere Typen befinden sich in den genannten Sammlungen (an unbekanntem Ort) oder sind verloren.

Die Sammlungen Antiga und Bofill (vgl. Antiga & Bofill 1904) befinden sich in Barcelona und sind dort im Spanischen Bürgerkrieg teilweise zerstört worden (Auskunft Dr. J. Pujade). Typen von drei Arten *(Amblyteles rufescens, Ichneumon fallaciosus, I. lateritius)* sind in Barcelona erhalten, Typen von drei weiteren Arten (*Ichneumon albivalvus, I. antigai, I. famelicosus*; vermutlich Dubletten) fanden sich in Coll. Berthoumieu, die Typen von zwei Arten *(Ichneumon erebeus, Platylabus parvulus)* sind verschollen. Das von Bolivar und Dusmet eingesandte Materal befindet sich in Madrid (mit Ausnahme des verschollenen Typus von *Phaeogenes hispanicus*). Die Sammlung Cabrera befindet sich ebenfalls in Madrid, Material von den Canarischen Inseln auch in Paris. Da das Material dieser Sammlung von Cabrera neu etikettiert wurde, sind Typen nicht immer sicher zu identifizieren (vgl. Diller & Horstmann 1994: 250), und die Typen von zwei Arten *(Listrodromus cabrerai, Platylabus cabrerai)* sind verschollen. Die Sammlungen Eversmann und Radoszkowski sind von Rasnitsyn (1981a) in Krakow revidiert worden. Der Typus einer dort nicht vorhandenen Art *(Amblyteles distycus)* fand sich in Coll. Berthoumieu; vermutlich hat Berthoumieu vergessen, ihn nach der Untersuchung zurückzusenden. Die Typen der von Strand eingesandten neuen Arten werden in Berlin aufbewahrt.

Die Sammlung Medina befand sich an der Universität Sevilla und ist dort vollständig zerstört worden (vermutlich mit den Typen von *Amblyteles canariensis* und *A. medinai*) (Auskunft Dra. I. Izquierdo). Die Sammlung Deprez (Berthoumieu führt diesen Sammler versehentlich unter seinem Vornamen Victor an) ist im Ersten Weltkrieg zusammen mit der Sammlung Athimus (vgl. Athimus 1901) in einem Kloster in Grand-Halleux (bei Stavelot/Belgien) in Zusammenhang mit Kriegseinwirkungen verschwunden (vermutlich mit dem Holotypus von *Ichneumon lugubris*) (Auskunft Mlle. C. Thirion). Über den Verbleib der Sammlung de Turingia (vermutlich mit den Typen von *Ichneumon sexannularis*) liegt keine Information vor.

Insgesamt wurden Typen aus folgenden Museen untersucht:
Barcelona: Museu de Zoologia
Berlin: Museum für Naturkunde
Madrid: Museo Nacional de Ciencias Naturales
Paris: Muséum National d'Histoire Naturelle

Korrekturen der Erscheinungsdaten einiger Publikationen

Die letzten Hefte jedes Bandes der Zeitschriften der Societé Entomologique de France (Annales und Bulletin) sind jeweils erst im folgenden Jahr erschienen, also ein Jahr später, als dies für den betreffenden Jahrgang in der Regel angegeben wird. Davon sind auch einige Publikationen Berthoumieus betroffen.

In den Bänden 63 (Jahrgang 1894) und 64 (Jahrgang 1895) der Annales de la Societé Entomologique de France ist das erwartete Publikationsdatum jeweils in Fußleisten angegeben, und die genauen Daten für jedes Heft (Trimestre) finden sich für Band 63 im Bulletin des Séances et Bulletin Bibliographique de la Societé Entomologique de France 1894 (1895: CCCXXXV), und für Band 64 in den Annales de la Societé Entomologique de France 64 (1895) (1896: 724). In Band 65 (Jahrgang 1896) fehlen die Publikationsdaten in den Fußleisten. Nach dem Bulletin de la Societé Entomologique de France 1896 (N° 21, 1897: 470) ist nur das erste Trimestre noch im Dezember 1896 erschienen, und nach dem Bulletin 1897 (N° 20, 1898: 355) liegen die Erscheinungsdaten der anderen drei Trimestres im April, Mai und Dezember 1897. Allerdings kann man den Zeitschriftenbänden nicht entnehmen, welche Seiten jedes Trimestre umfaßt. Bei einem in der Zoologischen Staatssammlung (München) aufbewahrtes Separatum der Ichneumonides d'Europe et des pays limitrophes von Berthoumieu ist dagegen auf dem Titelblatt aufgedruckt, daß die entsprechenden Teile der Publikation im zweiten und dritten Trimestre von Band 65 enthalten sind (dazu findet sich handschriftlich das Eingangsjahr 1897). Aus diesen Quellen stammen die im Literaturverzeichnis genannten genauen Erscheinungsdaten.

Das Bulletin de la Societé Entomologique de France ist pro Jahr in 20-21 Heften erschienen, die den Sitzungen der Gesellschaft zugeordnet sind. Nur im Jahrgang 1903 (N° 21, 1904: 403) findet sich eine Liste der Publikationsdaten der einzelnen Hefte. In den Annales de la Societé Entomologique de Belgique ist in jedem Jahrgang in einem Bibliotheksbericht verzeichnet, welche Hefte des Bulletin de la Societé Entomologique de France bis zum 26. Dezember des betreffenden Jahres in Bruxelles eingegangen sind. Schließlich enthalten die in der Universitätsbibliothek Gießen vorhandenen Jahrgänge des Bulletin auf den Umschlagsblättern der Hefte Eingangsstempel der Bibliothek. Aus diesen Quellen ergibt sich, daß die Hefte jeweils ein bis zwei Monate nach der Sitzung erschienen sind, deren Datum sie tragen. Für die Arbeiten Berthoumieus ergibt sich aus dieser Verschiebung keine Änderung eines Publikationsjahrs.

Dagegen müssen die Publikationsdaten der in den Annales de la Societé Entomologique de France beschriebenen Phaeogenini berichtigt werden (vgl. Diller & Horstmann 1994). Folgende Publikationsjahre sind korrekt:

Centeterus elongator Berthoumieu, 1897
Diadromus pici Berthoumieu, 1897 (= *Diadromus rubicundus* Berthoumieu, 1895)
Dicaelotus andrei Berthoumieu, 1897
Dicaelotus pici Berthoumieu, 1897
Herpestomus gaullei Berthoumieu, 1897 (= *Dicaelotus gaullei* Berthoumieu, 1897)
Phaeogenes pici Berthoumieu, 1897

Revisionen der Arten

Amblyteles adventor Berthoumieu

Amblyteles adventor Berthoumieu, 1892: 43f. – Lectotypus (♀) hiermit festgelegt: “Tunesie”, “Type”, “*Ambl. adventor* Bert.” (der Kopf und Teile der Vorder- und Mittelbeine fehlen; große Teile der Fühler sind erhalten), Paris (aus Coll. Berthoumieu).

Gültiger Name: *Diphyus adventor* (Berthoumieu, 1892), comb. nov.

Amblyteles aemulus Berthoumieu

Amblyteles aemulus Berthoumieu, 1895: 161 – Lectotypus (♀) hiermit festgelegt: “Boghari”, “Rev. Bourb. N° 92 (aout 95) p.161”, “type”, “25”, “*Ambl. aemulus* n. sp.”, Paris (aus Coll. Pic).

Gültiger Name: *Thyrateles aemulus* (Berthoumieu, 1895), comb. nov., syn. nov. *Thyrateles gruenwaldti* Heinrich, 1980.

Amblyteles angustus Berthoumieu

Amblyteles angustus Berthoumieu, 1892: 43 – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Ctenichneumon angustus* (Berthoumieu, 1892) (Rasnitsyn 1981a: 137).

Amblyteles arduus Berthoumieu

Amblyteles arduus Berthoumieu, 1896: 195f. – Lectotypus (♀) von Heinrich beschriftet und hiermit festgelegt: “Brunig 29 sept 96”, “15”, “Rev. Bourb. 1896 N° 107-108 p.195”, “type”, “*A. arduus* ♀ n. sp.”, “*A. arduus* ♀ n. sp. Berth. vid.”, Paris (aus Coll. Pic). Zusätzlich ist in Paris ein Paralectotypus (♂) vom Fundort “Fiesch 31 août 96” vorhanden (aus Coll. Pic).

Gültiger Name: *Diphyus arduus* (Berthoumieu, 1896), comb. nov. Der Paralectotypus (♂) gehört zu *Diphyus mercatorius mercatorius* (Fabricius, 1793). Heinrich (1929b: 16) hat die Art zu *Amblyteles infractorius* auct. (= *Diphyus mercatorius* Fabricius) gestellt, hat den Lectotypus aber erst im Jahr 1975 beschriftet. Dieser unterscheidet sich von *D. m. mercatorius* durch die dunkle Fühlerbasis und die weitgehend roten Beine (nur Coxen schwarz).

Amblyteles atratus Berthoumieu

Amblyteles atratus Berthoumieu, 1901: 321 – Lectotypus (♀) hiermit festgelegt: “B. Chargère 21 Sept. 1900”, “type”, “*A. atratus* n. sp.”, Paris (aus Coll. Pic).

Gültiger Name: *Diphyus palliatorius* (Gravenhorst, 1829), syn. nov.

Amblyteles bicuspis Berthoumieu

Amblyteles bicuspis Berthoumieu, 1892: 42 – Lectotypus (♀) hiermit festgelegt: “Savoie”, “Type”, “*bicuspis* Berth.” (beide Fühlerspitzen und größere Teile der Beine fehlen), Paris (aus Coll. Berthoumieu).

Gültiger Name: *Eutanyacra crispatoria* (Linnaeus, 1758) (Berthoumieu 1896 in 1894-1897: 625).

Amblyteles Bolivari Berthoumieu

Amblyteles Bolivari Berthoumieu, 1894: 179 – Lectotypus (♀) hiermit festgelegt: “Sanz Alcarria” (!), “*Amblyteles Bolivari* n. sp.”, Madrid. Berthoumieu gibt “Mariva” als Fundort an, hat aber vermutlich das Fundortetikett falsch entziffert.

Gültiger Name: *Triptognathus bolivari* (Berthoumieu, 1894) (Berthoumieu 1904d: 49).

Amblyteles canariensis Berthoumieu

Amblyteles canariensis Berthoumieu, 1903a: 310 – Syntypen (♀♂) aus Tenerife (aus Coll. Medina) zerstört.

Gültiger Name: ? *Ctenichneumon canariensis* (Berthoumieu, 1903). Die Art ist bisher ungedeutet. Die Einordnung in *Ctenichneumon* Thomson erfolgt nach Berthoumieu (1904d: 51).

Amblyteles capitatus Berthoumieu

Amblyteles capitatus Berthoumieu, 1892: 43 – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Colpognathus capitatus* (Berthoumieu, 1892) (Rasnitsyn 1981a: 137).

Amblyteles caucasicus Berthoumieu

Amblyteles caucasicus Berthoumieu, 1896 in 1894-1897: 598 und 603 – Lectotypus (♀) hiermit festgelegt: "Caucase", "Type", "*Ambl. caucasicus* Bert." (größere Teile der Fühler und Flügel fehlen), Paris (aus Coll. Berthoumieu).

Gültiger Name: *Triptognathus caucasicus* (Berthoumieu, 1896) (Berthoumieu 1904d: 49).

Amblyteles cephalotes Berthoumieu

Amblyteles cephalotes Berthoumieu, 1906: 60 – Lectotypus (♀) hiermit festgelegt: "Puy Nugère" "type", "*Amblyteles cephalotes* n. sp. (Berth. vid.)", "*Am. cephalotes* Berth.", Paris (aus Coll. Pic).

Gültiger Name: *Eristicus clarigator* (Wesmael, 1845), syn. nov.

Amblyteles coracinus Berthoumieu

Amblyteles coracinus Berthoumieu, 1894: 179 – Lectotypus (♀) hiermit festgelegt: "Marseille", "*Amblyteles coracinus* n. sp.", Paris (aus Coll. du Buysson). Zusätzlich ist in Paris ein Belegexemplar (♀) der von Berthoumieu beschriebenen Varietät vom Fundort "Escorial" vorhanden (aus Coll. Berthoumieu), das zu *Ctenichneumon divisorius* (Gravenhorst) gehört.

Gültiger Name: *Ctenichneumon coracinus* (Berthoumieu, 1894), species valida, syn. nov. *Amblyteles messorius* (Gravenhorst) var. *sassariensis* Pic, 1899 (vgl. Hilpert et al. 1993: 176). Heinrich (1934: 161) hat *C. coracinus* als Subspecies zu *Ctenichneumon edictorius* (Linnaeus) gestellt. Von dieser und den verwandten Arten unterscheidet sich *C. coracinus* durch: drittes Fühlerglied 1.3-1.4 mal so lang wie die Breite des Wangenraums; viertes Fühlerglied 1.3 mal so lang wie breit; Gaster breit, drittes Gastertergit 0.51-0.55 mal so lang wie breit; zweites und drittes Gastersternit mit Längsfalte; Fühler und Scutellum schwarz; Beine fast ganz schwarz (Vordertibien frontal gelb, Hintertibien median zuweilen rötlich überlaufen); Flügel deutlich getrübt; zweites und drittes Gastertergit rotbraun bis schwarzbraun.

Amblyteles decens Berthoumieu

Amblyteles decens Berthoumieu, 1910b: 328 – Holotypus (♀) in Berlin (nicht untersucht).

Gültiger Name: *Ichneumon caloscelis* Wesmael, 1845 (Heinrich 1928: 199; Hilpert 1992: 156).

Amblyteles declinatorius Berthoumieu

Amblyteles declinatorius Berthoumieu, 1896 in 1894-1897: 617 und 630 – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Eutanyacra declinatoria* (Berthoumieu, 1896) (Rasnitsyn 1981a: 138).

Amblyteles distycus Berthoumieu

Amblyteles distycus Berthoumieu, 1894: 180 – Lectotypus (♂ !) hiermit festgelegt: "Caucase", "type", "*Ambl. Dysticus.* Bert." (!) (Typus leicht deformiert und zusätzlich stark verschimmelt), Paris (aus Coll. Berthoumieu). Berthoumieu gibt an, die Art nach Weibchen beschrieben zu haben; dies halten wir für einen Irrtum.

Gültiger Name: *Eutanyacra glaucatoria glaucatoria* (Fabricius, 1793), syn. nov.

Amblyteles diversipes Berthoumieu

Amblyteles diversipes Berthoumieu, 1897: 255f. – Lectotypus (♀) hiermit festgelegt: "Royat 28-4", "type", Paris (aus Coll. Berthoumieu). Zusätzlich ist in Paris ein Paralectotypus (♀) vom gleichen Fundort vorhanden (aus Coll. Berthoumieu), der zur gleichen Art gehört.

Gültiger Name: *Triptognathus fumipennis* (Rudow, 1888) (Horstmann 1993: 12).

Amblyteles flavolaetus Berthoumieu

Amblyteles flavolaetus Berthoumieu, 1892: 41 – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Fileanta flavolaeta* (Berthoumieu, 1892) (Heinrich 1978: 64; Rasnitsyn 1981a: 138).

Amblyteles frustrator Berthoumieu

Amblyteles frustrator Berthoumieu, 1892: 42 – Syntypen (? Holotypus) (♀♀) aus den Basses-Alpes verschollen (Sammler vermutlich Berthoumieu).

Gültiger Name: *Spilothyrateles fabricii* (Schrank, 1802) (Berthoumieu 1896 in 1894-1897: 644).

Amblyteles Gaullei Berthoumieu

Amblyteles Gaullei Berthoumieu, 1900b: 249 – Lectotypus (♀) hiermit festgelegt: "Tunesie Cartage 4-98 de Gaulle", "*Amblyteles Gaullei* Berth typus", Paris (aus Coll. de Gaulle).

Gültiger Name: *Ctenichneumon coracinus* (Berthoumieu, 1894), syn. nov.

Amblyteles gibbosus Berthoumieu

Amblyteles gibbosus Berthoumieu, 1899: 137 – Lectotypus (♂) hiermit festgelegt: "St. Bern Luissier", "type", "*A. gibbosus* Bert.", "*Am. gibbosus* n sp. ♂ (gr. *divisorius*)", Paris (aus Coll. Pic).

Gültiger Name: ? *Diphyus gibbosus* (Berthoumieu, 1899). Der Lectotypus ist als Männchen nicht sicher einer Gattung zuzuordnen.

Amblyteles heteromallus Berthoumieu

Amblyteles heteromallus Berthoumieu, 1910a: 73 – Lectotypus (♀) hiermit festgelegt: "Abries (H^{tes} alpes)" "123", "type", "*Amblyteles heteromallus* Berth. n. sp. (Berth vidit)", Paris (aus Coll. Pic).

Gültiger Name: *Platylabus pedatorius* (Fabricius, 1793), syn. nov.

Amblyteles impolitus Berthoumieu

Amblyteles impolitus Berthoumieu, 1894: 179f. – Lectotypus (♀) hiermit festgelegt: "Sevilla 5.X.92.", "♀.", "*Amblyteles impolitus* Berth. A. Cabrera", Madrid (aus Coll. Cabrera). Zusätzlich ist in Madrid ein Paralectotypus (♀) vom gleichen Fundort vorhanden (aus Coll. Cabrera), der zur gleichen Art gehört.

Schließlich fanden sich in Paris (Coll. Pérez) 6 ♀♀ dieser Art, die möglicherweise Syntypen darstellen, denen aber diesbezügliche Hinweise fehlen.

Gültiger Name: *Triptognathus rubrocinctus* (Lucas, 1849) (Aubert 1980: 543).

Amblyteles inermis Berthoumieu

Amblyteles inermis Berthoumieu, 1892: 42 – Lectotypus (♀) hiermit festgelegt: "Isère", "*Ambl. inermis.* Bert.", Paris (aus Coll. Berthoumieu). Das einzige in der Sammlung vorhandene Exemplar wird wegen der sehr guten Übereinstimmung mit der Beschreibung als Lectotypus festgelegt, obwohl der Fundort von der Angabe in der Beschreibung ("Suisse") abweicht. Diese Angabe halten wir für einen Irrtum.

Gültiger Name: *Diphyus longigena* (Thomson, 1888), syn. nov. Diese Deutung wurde bereits von Heinrich (1936: 35) für möglich gehalten. Demgegenüber ist die Synonymisierung mit *Eutanyacra crispatoria* (Linnaeus) durch Constantineanu (1959: 987) irrig.

Amblyteles inflatus Berthoumieu

Amblyteles inflatus Berthoumieu, 1897: 256 – Lectotypus (♀) hiermit festgelegt: "Laghouat", "2", "type", "*A. inflatus* n. sp ♀", "*A. inflatus* n. sp. Berth. vid.", Paris (aus Coll. Pic).

Gültiger Name: *Diphyus inflatus* (Berthoumieu, 1897), comb. nov.

Amblyteles infuscatus Berthoumieu

Amblyteles infuscatus Berthoumieu, 1894: 179 – Lectotypus (♀) hiermit festgelegt: "Oran", "Type", "*Ambl. infuscatus* Bert.", Paris (aus Coll. Berthoumieu). Zusätzlich sind in Paris zwei Paralectotypen (♀♀) von den Fundorten "Tlemcen" und "Saida 29 août" (aus Coll.Pic) und ein Belegexemplar (♀) der von Berthoumieu beschriebenen Varietät vom Fundort "Oran 1890" (aus Coll. Vachal) vorhanden. Alle gehören zur gleichen Art.

Gültiger Name: *Ctenichneumon infuscatus* (Berthoumieu, 1894), comb. nov.

Amblyteles macilentus Berthoumieu

Amblyteles macilentus Berthoumieu, 1898: 332f. – Syntypen (♂♂) aus Puy-de-Dôme (leg. Flamary) und der Normandie (leg. Mocquerys) verschollen.

Gültiger Name: ? *Diphyus macilentus* (Berthoumieu, 1898). Die Art ist seit ihrer Beschreibung nicht wiedergefunden worden und ist bisher ungedeuet. Die Fundortangabe "Hispania" in Dalla Torre (1902: 822) beruht auf einem Irrtum. Die Einordnung in *Diphyus* Kriechbaumer erfolgt nach Berthoumieu (1904d: 52).

Amblyteles Massiliensis Berthoumieu

Amblyteles Massiliensis Berthoumieu, 1894: 180 – praeocc. durch *Amblyteles massiliensis* Rudow, 1888 – Lectotypus (♂) hiermit festgelegt: "Marseille", "*Amblyteles Massiliensis* n. sp. M^{le}", Paris (aus Coll. du Buysson).

Gültiger Name: *Pseudoamblyteles homocerus* (Wesmael, 1854), syn. nov.

Amblyteles Medinai Berthoumieu

Amblyteles Medinai Berthoumieu, 1903a: 310 – Syntypen (? Holotypus) (♂♂) aus Ciudad-Real (aus Coll. Medina) zerstört.

Gültiger Name: *Eutanyacra glaucatoria glaucatoria* (Fabricius, 1793), syn. nov. Bereits Ceballos (1924: 273) hat diese Deutung für möglich gehalten.

Amblyteles montivagans Berthoumieu

Amblyteles montivagans Berthoumieu, 1897 in 1894-1897: 398f. – ungerechtfertigte Emendation für *Amblyteles montivagus* Berthoumieu, 1896 (vgl. dort).

Gültiger Name: *Diphyus montivagans* (Berthoumieu, 1897) (Heinrich 1978: 55).

Amblyteles montivagus Berthoumieu

Amblyteles montivagus Berthoumieu, 1896: 196 – praeocc. durch *Amblyteles montivagus* Giraud, 1877 – Lectotypus (♀) von Heinrich (1978: 55) festgelegt: "*montivagus* var." (das Wort "var." durchgestrichen), "Serres Juin F. Lombard", Paris (aus Coll. Berthoumieu).

Gültiger Name: *Diphyus montivagans* (Berthoumieu, 1897) (Heinrich 1978: 55).

Amblyteles obesus Berthoumieu

Amblyteles obesus Berthoumieu, 1896: 196 – Lectotypus (♂) hiermit festgelegt: "Saida 29 août 96", "14", "Rev. Bourb. 96 N° 107-108 p.196", "type", "*Ambl. obesus* n sp", Paris (aus Coll. Pic).

Gültiger Name: *Eutanyacra glaucatoria glaucatoria* (Fabricius, 1793), syn. nov.

Amblyteles pedatus Berthoumieu

Amblyteles pedatus Berthoumieu, 1896 in 1894-1897: 600 und 611f. – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Diphyus pedatus* (Berthoumieu, 1896) (Rasnitsyn 1981a: 138). Die Zuordnung der Art zu *Diphyus* Kriechbaumer ist unsicher (Rasnitsyn 1986: 148).

Amblyteles Pici Berthoumieu

Amblyteles Pici Berthoumieu, 1894: 180 – Lectotypus (♀) hiermit festgelegt: "type", "*Ambl. Pici.* Bert.", Paris (aus Coll. Berthoumieu). Zusätzlich sind in Paris sechs Paralectotypen (♀♀) erhalten, drei mit dem Fundort "Djelfa Algerie", drei ohne Fundort, aber offensichtlich aus der gleichen Serie (1 ♀ aus Coll. Berthoumieu, 5♀♀ aus Coll. Pic). Alle gehören zur gleichen Art.

Gültiger Name: *Spilichneumon pici* (Berthoumieu, 1894), comb. nov. Bei der Art ist der Treffpunkt von Wangenleiste und Mundleiste auffällig lappenförmig nach innen gezogen.

Amblyteles praetextus Berthoumieu

Amblyteles praetextus Berthoumieu, 1910b: 329 – Holotypus (♂): "Berlin", "*Ambl. praetextus* n. sp. ♂", Berlin. Bei dem Holotypus war der Postpetiolus mit Klebstoff bedeckt, deshalb finden sich in der Beschreibung die irreführenden Angaben "postpetiolo gibboso, sublaevi".

Gültiger Name: *Eutanyacra glaucatoria glaucatoria* (Fabricius, 1793) (Heinrich 1928: 200).

Amblyteles Radoszkowskii Berthoumieu

Amblyteles Radoszkowskii Berthoumieu, 1892: 43 – Lectotypus (♀) von Rasnitsyn (1981a: 137) in Krakow festgelegt (nicht untersucht).

Gültiger Name: *Fileanta radoszkowskii* (Berthoumieu, 1892) (Townes et al. 1961: 387f.; Rasnitsyn 1981a: 137).

Amblyteles rufescens Berthoumieu

Amblyteles rufescens Berthoumieu, 1898: 332 – Lectotypus (♀) hiermit festgelegt: "ex col. Bofill i Pitxot", "S Joan de las Abadesses 16 VIII 98 332", "*Amblyteles rufescens* ♀" (beide Fühler und größere Teile der Beine fehlen), Barcelona.

Gültiger Name: *Pseudoamblyteles homocerus* (Wesmael, 1854), syn. nov. Der Typus ist ein rufinistisches Exemplar dieser Art.

Amblyteles rusticus Berthoumieu

Amblyteles rusticus Berthoumieu, 1898: 332 – Lectotypus (♀) hiermit festgelegt: "Leukoran", "42bis", "type", "*Am. rusticus* Bert.", "*Amblyteles rusticus* ♀ n sp. (Berth. vid)", Paris (aus Coll. Pic).

Gültiger Name: *Diphyus rusticus* (Berthoumieu, 1898). Die Zuordnung der Art zu *Diphyus* Kriechbaumer ist nicht ganz gesichert, denn das vierte Gastersternit besitzt eine deutliche Längsfalte.

Amblyteles solymus Berthoumieu

Amblyteles solymus Berthoumieu, 1900b: 249 – Lectotypus (♀) hiermit festgelegt: "Jerusalem 7 avril 99", "5", "*A.* n sp. pres *Fabricii* ?", "type", "*A. solymus* Bert. ♀", Paris (aus Coll. Pic). Zusätzlich sind in Paris ein Paralectotypus (♀) (aus Coll. Berthoumieu) und ein Belegexemplar des von Berthoumieu mit Bedenken zu dieser Art gestellten Männchens (aus Coll. Pic), beide vom gleichen Fundort, vorhanden. Alle gehören zur gleichen Art.

Gültiger Name: *Rictichneumon lombardi* (Berthoumieu, 1897), syn. nov.

Amblyteles tardus Berthoumieu

Amblyteles tardus Berthoumieu, 1897: 255 – Lectotypus (♀) hiermit festgelegt: "Cannes", "13", "type", "*Ambl. tardus* n. sp", "*I. tardus* ♀ n. sp. Berth. vid." (!), Paris (aus Coll. Pic).

Gültiger Name: *Thyrateles tardus* (Berthoumieu, 1897) (Rasnitsyn 1981b: 608).

Amblyteles Tischbeini Berthoumieu

Amblyteles Tischbeini Berthoumieu, 1896 in 1894-1897: 587 – Syntypen (♂♂) aus der Lombardei entweder in Coll. Tischbein vernichtet oder in Coll. Magretti (Genua) erhalten. Berthoumieu hat die Art nach den Männchen beschrieben, die Tischbein (1882: 483f.) zu *Amblyteles ater* Wesmael gestellt hat, die aber nach Berthoumieus Ansicht zu einer anderen, sonst bisher unbeschriebenen Art gehören. Es handelt sich also nicht um ein nomen novum im Sinne der Nomenklaturregeln. Da Berthoumieu seine Beschreibung ausdrücklich nur auf die von Tischbein erwähnten Männchen gründet, ist die Fundortangabe "Suisse" in seiner Beschreibung irrig.

Gültiger Name: ? *Ctenichneumon tischbeini* (Berthoumieu, 1896). Die Art ist bisher ungedeutet. Die Einordnung in *Ctenichneumon* Thomson erfolgt nach Berthoumieu (1904d: 50).

Amblyteles tuberosus Berthoumieu

Amblyteles tuberosus Berthoumieu, 1896 in 1894-1897: 635 und 647 – Holotypus (♀): "Drome", "Co-type", "*tuberosus* n. sp.", Paris (aus Coll. Berthoumieu). Berthoumieu hat die Art nach einem Exemplar beschrieben, für das er den Fundort "Isère" angibt. Wahrscheinlich hat Pic wegen des abweichenden Fundorts das Etikett "Co-type" zugefügt. Aus folgenden Gründen halten wir das einzige in der Sammlung vorhandene Exemplar für den Holotypus: Das Etikett "*tuberosus* n. sp." stammt von Berthoumieu und ähnelt Etiketten, mit denen dieser auch sonst Typen neuer Arten etikettiert hat. Berthoumieu hatte nur ein Exemplar der Art vor sich, denn er beschreibt eine auffällige Struktur des

Postpetiolus ("lisse et brillant au milieu") ausdrücklich als mögliche Aberration. Der Postpetiolus des als Holotypus gekennzeichneten Exemplars ist in Wirklichkeit dicht längsgestreift, aber er war anscheinend mit einer fettähnlichen Masse bedeckt, die noch daneben klebte, als wir das Tier zum erstenmal untersuchten. Die Fundortangabe in der Beschreibung ist deshalb entweder irrig (die Departements Drôme und Isère sind allerdings benachbart), oder sie bezieht sich auf den Fluß Isère, der auch durch das Departement Drôme fließt.

Gültiger Name: *Bureschias tuberosus* (Berthoumieu, 1896) (Rasnitsyn 1981b: 621).

Amblyteles unidentatus Berthoumieu

Amblyteles unidentatus Berthoumieu, 1894: 180 – Lectotypus (♀) hiermit festgelegt: "Madrid", "*Ambl. unidentatus* Bert.", "co-type", Paris (aus Coll. Berthoumieu). Zusätzlich ist in Madrid ein Paralectotypus (♂) vom gleichen Fundort vorhanden, der zur gleichen Art gehört.

Gültiger Name: *Triptognathus unifasciatus* (Spinola, 1843) (Horstmann 1991: 45).

Anisobas laticeps Berthoumieu, 1895

Anisobas laticeps Berthoumieu, 1895: 161 – Lectotypus (♀) hiermit festgelegt: "M Carrée 21 avril 95", "*Anisobas laticeps*", "*Anisobas*", "*laticeps* Berth." Paris (aus Coll. Pic). Zusätzlich sind in Paris drei Paralectotypen von den Fundorten "Frendah" (♀) und "Saida mai 94" (♂) (beide aus Coll. Pic) und ohne Fundort (♀) (aus Coll. Berthoumieu) vorhanden, die alle zur gleichen Art gehören. Berthoumieu bezieht sich in seiner Beschreibung nur auf Weibchen, aber das erwähnte Männchen aus Saida ist wegen seiner Etikettierung (zusätzliches Etikett: "Rev. Bourb. N° 92 (aout 95) p.161") und der Angaben von Pic (1903: 104) ein sicherer Syntypus. Heinrich (1980: 235) hat das hier als Lectotypus festgelegte Exemplar als Holotypus bezeichnet, aber nicht beschriftet.

Gültiger Name: *Anisobas buccatus* Kriechbaumer, 1882 (Heinrich 1980: 235).

Anisobas laticeps Berthoumieu, 1897

Anisobas laticeps Berthoumieu, 1897 in 1894-1897: 299 und 302 – praeocc. durch *Anisobas laticeps* Berthoumieu, 1895 – Lectotypus (♀) und Paralectotypen (2♀♀, 1♂) wie unter *Anisobas laticeps* Berthoumieu, 1895 angegeben, dazu ein Paralectotypus (♀) aus Tanger (aus Coll. de Gaulle). Es handelt sich hier um ein zweites, von *Anisobas laticeps* Berthoumieu, 1895 unabhängiges Taxon. Berthoumieu nimmt in der zweiten Beschreibung auf die erste mit keinem Wort Bezug (wie er es sonst regelmäßig tut), beide Beschreibungen weichen im Wortlaut deutlich voneinander ab, und auch die Typenserien sind nicht ganz identisch.

Gültiger Name: *Anisobas buccatus* Kriechbaumer, 1882, syn. nov.

Anisobas Pici Berthoumieu

Anisobas Pici Berthoumieu, 1910a: 73 – Lectotypus (♀) hiermit festgelegt: "Abries VIII-08", "144", "type", "*Anisobas Pici* (Berth vid)", Paris (aus Coll. Pic).

Gültiger Name: *Cyclolabus pactor* (Wesmael, 1845), syn. nov.

Catadelphus Anceyi Berthoumieu

Catadelphus Anceyi Berthoumieu, 1894: 180 – Lectotypus (♂) hiermit festgelegt: "Algérie", "Type", "*Catadelphus Anceyi*. Bert.", Paris (aus Coll. Berthoumieu). Zusätzlich ist in Paris ein Paralectotypus (♂) vom Fundort "Boghari" vorhanden (aus Coll. Pic), der zur gleichen Art gehört.

Gültiger Name: *Protichneumon fusorius anceyi* (Berthoumieu, 1894), stat. et comb. nov.

Catadelphus Dusmeti Berthoumieu

Catadelphus Dusmeti Berthoumieu, 1904c: 161f. – Lectotypus (♂) hiermit festgelegt: "Castilla. Vazquez.", "Coleccion Dusmet", "*Catadelphus Dusmeti* ♂ n. sp.", "Tipo de Berthoumieu", Madrid.

Gültiger Name: *Eurylabus larvatus* (Christ, 1791) (Ceballos 1924: 301).

Catadelphus Pestrei Berthoumieu

Catadelphus Pestrei Berthoumieu, 1892: 44 – Lectotypus (♂) hiermit festgelegt: "colettes" (!) (nach der Beschreibung aus dem Forêt des Collettes / Allier), "Type", "*Catadelphus Pestrei* Berth.", Paris (aus Coll. Berthoumieu).

Gültiger Name: *Eurylabus larvatus* (Christ, 1791) (Berthoumieu 1897 in 1894-1897: 294).

Eurylabus Andrei Berthoumieu

Eurylabus Andrei Berthoumieu, 1987 in 1894-1897: 307 und 309 – Lectotypus (♂) hiermit festgelegt: "Europe centrale", "Type", "*Eur. Andrei* Bert." (beide Fühlerspitzen, Teile der Mittel und Hinterbeine und je ein Vorder- und Hinterflügel fehlen), Paris (aus Coll. Berthoumieu).

Gültiger Name: *Megaplectes monticola* (Gravenhorst, 1829) (Sawoniewicz 1986: 375).

Eurylabus ruficornis Berthoumieu

Eurylabus ruficornis Berthoumieu, 1894: 181 – Holotypus (♂): "Oran 1890", "*Eurylabus ruficornis* Berth. ♂", "type" (Propodeum und erstes Gastersegment deformiert), Paris (aus Coll. Vachal).

Gültiger Name: *Eutanyacra glaucatoria glaucatoria* (Fabricius, 1793), syn. nov.

Exephanes clypeatus Berthoumieu

Exephanes clypeatus Berthoumieu, 1896 in 1894-1897: 573 und 577f. – Lectotypus (♂) hiermit festgelegt: "Sicilie", "*Exephanes clypeatus* Berth. Ann. Soc. Ent. F. 95 – 577 Europe" (große Teile der Fühler und Teile der Beine fehlen), Paris (aus Coll. de Gaulle).

Gültiger Name: *Vulgichneumon clypeatus* (Berthoumieu, 1896), comb. nov.

Hybophorus piceus Berthoumieu

Hybophorus piceus Berthoumieu, 1904b: 13 – Lectotypus (♀) hiermit festgelegt: "Caucase", "Type", "*Hybophorus piceus*. Bert." (Teile der Fühler und Beine fehlen), Paris (aus Coll. Berthoumieu).

Gültiger Name: *Zanthojoppa lutea* (Gravenhorst, 1829), syn. nov.

Ichneumon Abeillei Berthoumieu

Ichneumon Abeillei Berthoumieu, 1894 in 1894-1897: 530 und 540 – Lectotypus (♀) hiermit festgelegt: "Marseille", "*Ichneumon Abeillei* Berth. n. sp.", Paris (aus Coll. du Buysson).

Gültiger Name: *Ichneumon sarcitorius corsus* Kriechbaumer, 1888, syn. nov. Entweder wird durch den Typus das Verbreitungsgebiet dieser bisher nur von Korsika und Sardinien bekannten Subspecies ausgeweitet, oder die Fundortangabe ist irrig.

Ichneumon albivalvus Berthoumieu

Ichneumon albivalvus Berthoumieu, 1896: 193 – Lectotypus (♂) von Townes beschriftet und hiermit festgelegt: "Teniet", "4b", Algerie Pic", "type", "Rev. Bourb. 96 N° 107-108 p.193", "*I. albivalvus* n. sp.", Paris (aus Coll. Pic). Zusätzlich sind in Paris zwei Paralectotypen (♂♂) vom gleichen Fundort vorhanden (aus Coll. Berthoumieu und Coll. Pic), die zur gleichen Art gehören.

Gültiger Name: *Vulgichneumon cagnatus* (Boyer de Fonscolombe, 1847), comb. nov. (Horstmann 1980: 132).

Ichneumon ambifarius Berthoumieu

Ichneumon ambifarius Berthoumieu, 1904b: 13 – Lectotypus (♂) hiermit festgelegt: "Abondance", "101", "type", "*I. ambifarius* Bert n sp (Berth. vid.)" (viertes Gastertergit verkrüppelt), Paris (aus Coll. Pic).

Gültiger Name: *Ichneumon ? ignobilis* Wesmael, 1855. Der Lectotypus stimmt mit den Männchen überein, die Hilpert (1992: 313f.) mit Bedenken zu *I. ignobilis* gestellt hat.

Ichneumon ampliventris Berthoumieu

Ichneumon ampliventris Berthoumieu, 1894 in 1894-1897: 533 und 558 – Lectotypus (♂) und Paralectotypen (2 ♀♀, 1 ♂) in Paris (nicht untersucht).

Gültiger Name: *Ichneumon ampliventris* Berthoumieu, 1894 (Hilpert 1992: 151f.).

Ichneumon analogus Berthoumieu

Ichneumon analogus Berthoumieu, 1894: 179 – Lectotypus (♀) hiermit festgelegt: "Flammery Macon", "*I. analogus* n. sp. Berth", Paris (aus Coll. du Buysson).

Gültiger Name: *Aoplus deletus* (Wesmael, 1845), syn. nov. Bereits Berthoumieu (1896 in 1894-1897: 569) hat diese Deutung für möglich gehalten. Von den beiden in der gleichen Publikation beschriebenen Taxa *Ichneumon praestigiator* Wesmael und *I. deletus* Wesmael hat Kriechbaumer (1892: 294; 1894: 350) den Namen *I. deletus* als prioritätsberechtigt festgelegt.

Ichneumon anatorius Berthoumieu

Ichneumon anatorius Berthoumieu, 1899: 136 – Lectotypus (♀) hiermit festgelegt: "Peney 1-VII-75", "type", "*I. anatorius* Bert.", "*Ich. anatorius* Berth n sp ♀ (groupe *bilunulatus*)", Paris (aus Coll. Pic).

Gültiger Name: *Barichneumon anatorius* (Berthoumieu, 1899) (Aubert und Shaumar 1963: 246).

Ichneumon Andrei Berthoumieu

Ichneumon Andrei Berthoumieu, 1895 in 1894-1897: 636 und 659 – Lectotypus (♀) hiermit festgelegt: "Gray", "Type", "*Ich. Andrei.* Bert." (größere Teile der Beine fehlen), Paris (aus Coll. Berthoumieu).

Gültiger Name: *Ichneumon gratus* Wesmael, 1855, syn. nov.

Ichneumon Antigai Berthoumieu

Ichneumon Antigai Berthoumieu, 1896: 194f. – Lectotypus (♀) hiermit festgelegt: "Type", "*Ich. Antigai* Bert.", Paris (aus Coll. Berthoumieu). Zusätzlich ist in Paris ein Paralectotypus (♂) vom Fundort "Barcelone" vorhanden (aus Coll. Berthoumieu), der zur gleichen Art gehört. Ein möglicher Syntypus (♀) befindet sich in Madrid (nicht untersucht).

Gültiger Name: *Ichneumon caedator* Gravenhorst, 1829 (Heinrich 1936: 33).

Ichneumon apparitor Berthoumieu

Ichneumon apparitor Berthoumieu, 1894: 178 – Lectotypus (♀) hiermit festgelegt: "Broût-Vernet 29 VII 92 R. du Buysson", "S^t Gilbert", "*apparitor* Berth. n. sp.", Paris (aus Coll. du Buysson). Zusätzlich ist in Paris ein Paralectotypus (♀) vom gleichen Fundort vorhanden (aus Coll. Berthoumieu), der zur gleichen Art gehört.

Gültiger Name: *Cratichneumon albiscuta* (Thomson, 1893) (Heinrich 1936: 27).

Ichneumon arieticornis Berthoumieu

Ichneumon arieticornis Berthoumieu, 1906: 60 – Lectotypus (♀) hiermit festgelegt: "Frendah", "type", "*I. arieticornis* Berth. n. sp. (Berth. vid)", Paris (aus Coll. Pic). Zusätzlich sind in Paris fünf mögliche Paralectotypen (♀♀) vom gleichen Fundort vorhanden (aus Coll. Pic), die zur gleichen Art gehören. Nur einer von ihnen trägt allerdings wie der Lectotypus ein Typenetikett und den direkten Hinweis, daß er von Berthoumieu untersucht worden ist. Möglicherweise haben die anderen Exemplare Berthoumieu nicht vorgelegen.

Gültiger Name: *Melanichneumon leucocheilus* (Wesmael, 1845), syn. nov.

Ichneumon ater Berthoumieu

Ichneumon ater Berthoumieu, 1896 in 1894-1897: 653 – praeocc. durch *Ichneumon ater* Cresson, 1864 – Holotypus (♀ !): "299.", "*Ichneumon rubrocinctus,* Luc. ♂" (!), Paris (aus Coll. Lucas). Das Exemplar ist gleichzeitig der Holotypus von *Ichneumon rubrocinctus* Lucas (vgl. Horstmann 1983: 107). Berthoumieu wurde zu dieser Beschreibung durch einen Fehler bei der Übermittlung der Literatur veranlaßt. Er zitiert Lucas (1849), aber ohne Seitenzahl, und in dieser Publikation ist keine Art mit dem Namen *Ichneumon ater* beschrieben. Außerdem beschreibt er die Art in der Gattung *Ichneumon* Linnaeus, vermutet aber, daß sie zu *Amblyteles* Wesmael gehören könne. Spätere Autoren konnten die Art weder deuten noch einem bestimmten Autor oder einer bestimmten Gattung sicher zuordnen (vgl. Dalla Torre 1902: 802). Ein Vergleich der Beschreibungen zeigt, daß *I. ater* Berthoumieu mit *I. rubrocinctus* Lucas identisch ist. Die Diagnose von *I. rubrocinctus* beginnt mit den Worten "I. ater, abdomine rubro cincto; ...". Vermutlich hat Berthoumieu nur eine handschriftliche Abschrift dieser Beschreibung erhalten, bei der die Überschrift ("*Ichneumon rubro cinctus,* Luc.") verloren gegangen war, oder er hat diese Überschrift nicht für einen Artnamen gehalten. Jedenfalls hat er die beiden ersten Worte der Diagnose als Artnamen interpretiert. Für diese Auffassung spricht, daß beide Autoren den Holotypus (♀) irrtümlich für ein Männchen gehalten haben. Da Berthoumieu zwar auf die Publikation von Lucas verweist, aber weder eine bestimmte Seitenzahl noch einen in dieser Publikation zitierten Namen nennt, wird *Ichneumon ater* Berthoumieu nicht für eine inkorrekte sekundäre Schreibweise, sondern für den Namen eines eigenständigen Taxons gehalten.

Gültiger Name: *Triptognathus rubrocinctus* (Lucas, 1849), syn. nov.

Ichneumon atricolor Berthoumieu

Ichneumon atricolor Berthoumieu, 1910a: 73 – Lectotypus (♀) hiermit festgelegt: "Casset H^t alpes", "49", "type", "*Ichneumon atricolor* n sp (Berth. vidit)", Paris (aus Coll. Pic).

Gültiger Name: *Virgichneumon atricolor* (Berthoumieu, 1910), comb. nov.

Ichneumon aureipes Berthoumieu

Ichneumon aureipes Berthoumieu, 1896: 194 – Lectotypus (♂) hiermit festgelegt: "Barcelona Vallvidrera 4.X.1896.", "♂.", "*Ichneumon aureipes,* Berth. n. sp. t. A. Cabrera" (große Teile der Fühler fehlen), Madrid (aus Coll. Cabrera).

Gültiger Name: *Coelichneumon dorsosignatus* (Berthoumieu, 1894), syn. nov.

Ichneumon bifarius Berthoumieu

Ichneumon bifarius Berthoumieu, 1892: 41 – Lectotypus (♀) hiermit festgelegt: "Isère", blaues rechteckiges Etikett ohne Schrift, "*Ich. bifarius.* Bert.", "Type", Paris (aus Coll. Berthoumieu).
Gültiger Name: *Tycherus bifarius* (Berthoumieu, 1892), comb. nov.

Ichneumon bifossatus Berthoumieu

Ichneumon bifossatus Berthoumieu, 1892: 39f. – Syntypen (? Holotypus) (♂♂) aus Belley / Ain verschollen (Sammler vermutlich Berthoumieu), Deutung nach einem Nichttypus (♂) mit den Etiketten "Broût-Vernet 2 V 92 R. du Buysson", "*bifossatus* Berth." (ursprünglich: "*bifossatus* n. sp."; das Wort "Berth." ist von fremder Hand darübergeschrieben), Paris (aus Coll. du Buysson). Das einzige in Paris auffindbare Männchen stammt nicht vom Typenfundort, außerdem ist es etwas reicher weiß gezeichnet, als die Beschreibung angibt. Sonst ist die Übereinstimmung mit der Beschreibung gut.
Gültiger Name: *Stenobarichneumon basiglyptus* (Kriechbaumer, 1890), syn. nov.

Ichneumon Buyssoni Berthoumieu

Ichneumon Buyssoni Berthoumieu, 1892: 39 – Lectotypus (♂) hiermit festgelegt: "V.1891 bois du Buysson", "Type", "*Ich. Buyssoni* Bert.", Paris (aus Coll. Berthoumieu). Zusätzlich ist in Paris ein Paralectotypus (♂) vom Fundort "Broût-Vernet VIII.91. R. du Buysson" und ein ebenfalls als Typus etikettiertes Weibchen vom gleichen Fundort erhalten (beide aus Coll. du Buysson), die zur gleichen Art gehören. Das Weibchen wird als Nichttypus gedeutet, weil Berthoumieu nur Männchen beschrieben hat. Dieser Schluß ist nicht sicher, denn es könnte auch ein Versehen Berthoumieus vorliegen.
Gültiger Name: *Acolobus albimanus* (Gravenhorst, 1829), syn. nov. Seyrig (1935: 134f.) hat die Typen zu *Acolobus sericeus* Wesmael gestellt, hat aber wahrscheinlich *A. albimanus* nicht gekannt (nach Material im Museum Paris).

Ichneumon Cabrerai Berthoumieu

Ichneumon Cabrerai Berthoumieu, 1903a: 308f. – Lectotypus (♀) hiermit festgelegt: "Tenerife. Tegueste. 18.IV.1898.", "♀.", "n 60 c Berth", "*Ichneumon Cabrerai*, Berth. n. sp. A. Cabrera", Madrid (aus Coll. Cabrera). Zusätzlich sind in Madrid zehn mögliche Paralectotypen (2♀♀, 8♂♂) von Tenerife vorhanden (alle aus Coll. Cabrera), bei denen die Beschriftung in einigen Details abweicht, weshalb sie Berthoumieu vielleicht nicht vorgelegen haben (vgl. Diller & Horstmann 1994: 250).
Gültiger Name: *Coelichneumon cabrerai* (Berthoumieu, 1903) (Seyrig 1928: 375).

Ichneumon calculosus Berthoumieu

Ichneumon calculosus Berthoumieu, 1903b: 147 – Lectotypus (♀) hiermit festgelegt: "Contrexville 5 Aout 1902", "18", "type", "*calculosus* Berth.", Paris (aus Coll. Pic).
Gültiger Name: *Syspasis lineator* (Fabricius, 1781), syn. nov.

Ichneumon canariensis Berthoumieu

Ichneumon canariensis Berthoumieu, 1903a: 309 – Lectotypus (♀) hiermit festgelegt: "Tenerife Camino de Taganana 18.VI.1899.", "♀.", "n 55 c. Berth.", "ej tipo", "*Ichneumon canariensis* Berth. n. sp. A. Cabrera" (ein Fühler und je ein Vorder- und Hinterflügel fehlen), Madrid (aus Coll. Cabrera).
Gültiger Name: *Homotherus locutor bleusei* (Pic, 1898), syn. nov.

Ichneumon canescens Berthoumieu

Ichneumon canescens Berthoumieu, 1892: 40f. – praeocc. durch *Ichneumon canescens* Gmelin, 1790 – Lectotypus (♂) hiermit festgelegt: "var.", "Bayet (Allier)", "Type", "v. *canescens* Berth", "*Eupalamus*", "sp ex Seyrig (Bul Fr. 1935 p.135)", Paris (aus Coll. Berthoumieu). Von den angeführten Etiketten stammen das erste und dritte von Berthoumieu, die anderen (darunter das Fundortetikett) von Pic. Berthoumieu hatte den Typus vermutlich ursprünglich mit einem Namensetikett und dem noch vorhandenen Typenetikett versehen, ein Fundortetikett fehlte. Später hat er die Art als Varietät zu *Ichneumon nivatus* Gravenhorst gestellt (Berthoumieu 1895 in 1894-1897: 268) und hat bei dieser Gelegenheit das alte Namensetikett entfernt und ein Etikett "var." zugefügt. Als Pic die Sammlung übernommen hat, hat er ein der Beschreibung entsprechendes Fundortetikett und ein neues Namensetikett angefertigt. Danach hat Seyrig (1935: 135) den Typus untersucht und die Art zu *Eupalamus* Wesmael gestellt; auf diese Revision beziehen sich die beiden letzten Etiketten.

Gültiger Name: *Cratichneumon albiscuta* (Thomson, 1893), syn. nov.

Ichneumon capreolus Berthoumieu

Ichneumon capreolus Berthoumieu, 1899: 135f. – Lectotypus (♀) hiermit festgelegt: "Peney V.84", "type", "*I. Capreolus* Bert.", "*Ich. capreolus* Berth ♀ n sp. (groupe *fabricator*)", Paris (aus Coll. Pic).

Gültiger Name: *Cratichneumon fugitivus* (Gravenhorst, 1829) (Schmiedeknecht 1902 in 1902-1904: 65).

Ichneumon cenisiensis Berthoumieu

Ichneumon cenisiensis Berthoumieu, 1906: 60 – Lectotypus (♀) hiermit festgelegt: "M^t^. Cenis", "type", "*I. bilunulatus* var. *cenisiensis* (Berth. vid.)", Paris (aus Coll. Pic). Zusätzlich ist in Paris ein Paralectotypus (♀) vom gleichen Fundort vorhanden (aus Coll. Pic), der zur gleichen Art gehört.

Gültiger Name: *Barichneumon praeceptor* (Thunberg, 1822), syn. nov.

Ichneumon cintranus Berthoumieu

Ichneumon cintranus Berthoumieu, 1892: 38f. – Lectotypus (♀) hiermit festgelegt: "Estrella", "Type", "*Ich. cintranus* Bert.", Paris (aus Coll. Berthoumieu).

Gültiger Name: *Ichneumon luteipes* Wesmael, 1855, syn. nov.

Ichneumon completus Berthoumieu

Ichneumon completus Berthoumieu, 1894: 178f. – Lectotypus (♀) hiermit festgelegt: "Broût-Vernet 21 VIII 91 R. du Buysson", "les scopules" (?), "*completus* n. sp.", Paris (aus Coll. du Buysson).

Gültiger Name: *Vulgichneumon deceptor* (Scopoli, 1763), syn. nov.

Ichneumon contrarius Berthoumieu

Ichneumon contrarius Berthoumieu, 1895 in 1894-1897: 600 und 604f. – Lectotypus (♀) hiermit festgelegt: "Pyr", "3", "*Ichneumon contrarius* Berth. ♂♀" (große Teile der Fühler fehlen), Paris (aus Coll. Pérez). Zusätzlich ist in Paris ein Paralectotypus (♂) vom Fundort "Caudéran 17 mai" vorhanden (aus Coll. Pérez), der möglicherweise zur gleichen Art gehört.

Gültiger Name: *Ichneumon contrarius* Berthoumieu, 1895. Die Art stimmt mit *Ichneumon* spec. H (Hilpert 1992: 115f.) überein.

Ichneumon corax Berthoumieu

Ichneumon corax Berthoumieu, 1894 in 1894-1897: 531 und 542 – Lectotypus (♀) hiermit festlegt: "Oran", "Type Berth.", "*corax* Berth.", Paris (aus Coll. du Buysson).

Gültiger Name: *Ichneumon corax* Berthoumieu, 1894. Seyrig (1928: 146) hat den Typus untersucht und die Art zu *Coelichneumon* Thomson gestellt. Dies halten wir für einen Irrtum.

Ichneumon corvinipennis Berthoumieu

Ichneumon corvinipennis Berthoumieu, 1897 in 1894-1897: 393 – Lectotypus (♀) von Townes et al. (1965: 527) festgelegt: "Arzew", "19", "type", "*I. corvinipennis* n. sp. ♀", "*I. corvinipennis* n sp ♀ (Berth. vid.)", Paris (aus Coll. Pic). Zusätzlich sind in Paris sieben mögliche Paralectotypen (♂♂) vom Fundort "Saida" oder ohne Fundort vorhanden (6♂♂ aus Coll. Pic, 1♂ aus Coll. Berthoumieu), die zur gleichen Art gehören. Nur drei von ihnen tragen allerdings direkte Hinweise, daß sie von Berthoumieu untersucht worden sind. Vielleicht haben ihm die anderen Exemplare nicht vorgelegen.

Gültiger Name: *Coelichneumon nigratus* (Berthoumieu, 1894) (Townes et al. 1965: 527).

Ichneumon crenatus Berthoumieu

Ichneumon crenatus Berthoumieu, 1894 in 1894-1897: 562 und 571 – Holotypus (♂) in Krakow (nicht untersucht).

Gültiger Name: *Stenichneumon crenatus* (Bertoumieu, 1894) (Rasnitsyn 1981a: 135).

Ichneumon delphinias Berthoumieu

Ichneumon delphinias Berthoumieu, 1892: 39 – Lectotypus (♀) hiermit festgelegt: "Isère", "Type", "*Ich. delphinias.* Bert." (große Teile der Fühler fehlen), Paris (aus Coll. Berthoumieu).

Gültiger Name: *Platylabops apricus* (Gravenhorst, 1820), syn. nov.

Ichneumon discors Berthoumieu

Ichneumon discors Berthoumieu, 1899: 135 – Lectotypus (♀) hiermit festgelegt: "Tanger Olcèse", "161", "type", "*I. discors* Bert.", "*Ich. discors* Berth. ♀ n sp. (groupe *latrator*)", Paris (aus Coll. Pic).

Gültiger Name: *Ichneumon discors* Berthoumieu, 1899.

Ichneumon dorsosignatus Berthoumieu

Ichneumon dorsosignatus Berthoumieu, 1894 in 1894-1897: 561 und 564f. – Lectotypus (♀) und Paralectotypus (♂) in Krakow (nicht untersucht).

Gültiger Name: *Coelichneumon dorsosignatus* (Berthoumieu, 1894) (Rasnitsyn 1981a: 134f.).

Ichneumon ebeninus Berthoumieu

Ichneumon ebeninus Berthoumieu, 1895 in 1894-1897: 282 und 284f. – Lectotypus (♀) hiermit festgelegt: "Forêt de la Londe", "Type ?" (!), "*ebeninus* n. sp" (ein Vorderflügel fehlt; der Typus ist stark verschimmelt), Paris (aus Coll. Berthoumieu). Das angeführte Exemplar stimmt gut mit der Beschreibung überein, und wir sehen keinen Grund, warum es kein Syntypus sein sollte. Der Fundort ist allerdings auf Landkarten nicht zu finden (in der Beschreibung wird "Seine-Inférieure" genannt).

Gültiger Name: *Syspasis alboguttata* (Gravenhorst, 1820), syn. nov.

Ichneumon erebeus Berthoumieu

Ichneumon erebeus Berthoumieu, 1903b: 147 – Syntypen (? Holotypus) (♂♂) aus Cataluña (aus Coll. Antiga) verschollen.

Gültiger Name: ? *Coelichneumon erebeus* (Berthoumieu, 1903). Die Art ist bisher ungedeutet. Die Einordnung in *Coelichneumon* Thomson erfolgt nach Berthoumieu (1904d: 32).

Ichneumon erraticus Berthoumieu

Ichneumon erraticus Berthoumieu, 1892: 38 – Typen (? Holotypus) (♂♂) aus Cantal verschollen (Sammler vermutlich Berthoumieu), Deutung nach Material im Museum Budapest, das von Bajari als *I. erraticus* determiniert wurde und mit der Beschreibung gut übereinstimmt. *I. erraticus* sensu Ceballos (1924: 151) ist *Spilothyrateles fabricii* (Schrank), *I. erraticus* sensu Ulbricht (1926: 3) ist *Barichneumon albicaudatus* (Boyer de Fonscolombe), Material von beiden stimmt nicht mit der Beschreibung Berthoumieus überein.

Gültiger Name: *Spilothyrateles punctus* (Gravenhorst, 1829), syn. nov.

Ichneumon evanidus Berthoumieu

Ichneumon evanidus Berthoumieu, 1892: 37f. – Lectotypus (♀) hiermit festgelegt: "Le Montet (Allier)", "Type", "*evanidus*" (Thorax geborsten), Paris (aus Coll. Berthoumieu).

Gültiger Name: *Ichneumon bellipes* Wesmael, 1845, syn. nov. Diese Deutung wurde bereits von Berthoumieu (1895 in 1894-1897: 623) für möglich gehalten.

Ichneumon Eversmanni Berthoumieu

Ichneumon Eversmanni Berthoumieu, 1894 in 1894-1897: 561 und 565 – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Coelichneumon eversmanni* (Berthoumieu, 1894) (Rasnitsyn 1981a: 135).

Ichneumon externus Berthoumieu

Ichneumon externus Berthoumieu, 1895: 161 – Lectotypus (♀) hiermit festgelegt: "El Kroubs", "8", "Revue Bourb. nº 92 (Aout 95) p.161", "type", "*I. externus* n. sp." (fast der ganze Kopf, große Teile der Fühler und Unterseite und Spitze des Gasters fehlen), Paris (aus Coll. Pic).

Gültiger Name: *Rubicundiella externa* (Berthoumieu, 1895), comb. nov.

Ichneumon fallaciosus Berthoumieu

Ichneumon fallaciosus Berthoumieu, 1903b: 148 – Holotypus (♂) (von unbekannter Hand beschriftet): "ex col. Bofill i Pitxot", "Monistrol 4.V.903 473.", "*Ichneumon fallaciosus* Berth.", Barcelona.

Gültiger Name: *Baranisobas ridibundus* (Gravenhorst, 1829) (Aubert 1965: 101).

Ichneumon famelicosus Berthoumieu

Ichneumon famelicosus Berthoumieu, 1903b: 148 – Lectotypus (♂) von Horstmann beschriftet und von Selfa & Anento (1995: 113) publiziert: "Vallvidrera 27 IV 90 L 427", "38", "Type", "*Ich. famelicosus.* Bert.", Paris (aus Coll. Berthoumieu).

Gültiger Name: *Platylabops famelicosus* (Berthoumieu, 1903) (Selfa & Anento 1995: 113ff.).

Ichneumon Flamaryi Berthoumieu

Ichneumon Flamaryi Berthoumieu, 1897: 255 – Lectotypus (♀) hiermit festgelegt: "P. de Dome 24. 6", "Type", "*Ich. Flamaryi*. Bert." (größere Teile der Beine fehlen; Tier stark verschimmelt), Paris (aus Coll. Berthoumieu).

Gültiger Name: *Ichneumon luteipes* Wesmael, 1855, syn. nov.

Ichneumon flebilis Berthoumieu

Ichneumon flebilis Berthoumieu, 1903a: 308 – praeocc. durch *Ichneumon flebilis* Cresson, 1877 – Syntypen (? Holotypus) (♂♂) aus Évreux/Eure (aus Coll. Gadeau de Kerville) verschollen.

Gültiger Name: ? *Coelichneumon flebilis* (Berthoumieu, 1903). Die Art ist bisher ungedeutet. Die Einordnung in *Coelichneumon* Thomson erfolgt nach Aubert (1957: 217).

Ichneumon Gaullei Berthoumieu

Ichneumon Gaullei Berthoumieu, 1903b: 147f. – Lectotypus (♂) hiermit festgelegt: "m. D-bois" (?) (nach der Beschreibung aus der Umgebung von Paris)), "*Ichneumon Gaullei* n sp. dét. Berth." (große Teile der Fühler fehlen), Paris (aus Coll. de Gaulle).

Gültiger Name: *Barichneumon gaullei* (Berthoumieu, 1903), comb. nov.

Ichneumon impudicus Berthoumieu

Ichneumon impudicus Berthoumieu, 1894 in 1894-1897: 585 und 1895 in 1894-1897: 597 – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Ichneumon hypolius* Thomson, 1888 (Rasnitsyn 1981a: 136; Hilpert 1992: 192).

Ichneumon insignis Berthoumieu

Ichneumon insignis Berthoumieu, 1894 in 1894-1897: 586 und 1895 in 1894-1897: 595 – Lectotypus (♀) hiermit festgelegt: "Serres 1894", "Type", "*Ich. insignis* Bert." (Teile der Beine und beide Vorderflügel fehlen), Paris (aus Coll. Berthoumieu).

Gültiger Name: *Ichneumon quaesitorius* Linnaeus, 1761, syn. nov.

Ichneumon instabilis Berthoumieu

Ichneumon instabilis Berthoumieu, 1897: 255 – praeocc. durch *Ichneumon instabilis* Cresson, 1867 – Lectotypus (♀) hiermit festgelegt: "Kloster Dorf 13 Sept 96.", "type", "*Ich. versatilis* n. sp." (!), "*instabilis* Berth.", Paris (aus Coll. Berthoumieu). Berthoumieu hat offensichtlich zuerst den Namen *Ichneumon versatilis* verwendet und dies später korrigiert.

Gültiger Name: *Baranisobas ridibundus* (Gravenhorst, 1829), syn. nov., syn. nov. *Ichneumon inspercatus* Dalla Torre, 1902.

Ichneumon Kervillei Berthoumieu

Ichneumon Kervillei Berthoumieu, 1903a: 308 – Lectotypus (♂) hiermit festgelegt: "Oise. (Albert Mocquerys).", "*I. Kervillei* Bert.", "Cotype (ou type ?) de l'*Ichneumon Kervillei* Berth., décrit par l'abbé V. Berthoumieu dans le Bull. de la Soc. entomol. de France, ann. 1903, p. 308", Paris (aus Coll. Gadeau de Kerville).

Gültiger Name: *Barichneumon praeceptor* (Thunberg, 1822), syn. nov.

Ichneumon lateritius Berthoumieu

Ichneumon lateritius Berthoumieu, 1904a: 270 – Lectotypus (♀) hiermit festgelegt: "ex col. Bofill i Pitxot", "La Garriga 6 IX 903 579", "*Ichn. lateritius* n sp 1903 Berth.", "*Ichneumon lateritius*. n. sp. Berthoumieu." (große Teile der Fühler und Teile der Beine fehlen), Barcelona.

Gültiger Name: *Baranisobas lateritius* (Berthoumieu, 1904), syn. nov. *Stenichneumon rufatorius* Habermehl, 1916, syn. nov. *Ichneumon habermehli* Schmiedeknecht, 1928.

Ichneumon lautipes Berthoumieu

Ichneumon lautipes Berthoumieu, 1896: 195 – Lectotypus (♂) hiermit festgelegt: "Sapey 26 août 96", "8", "type", "Rev. Bourb. 1896 N° 107-108 p.195", "*I. lautipes* n. sp", "*I. lautipes* nov. sp. ♂ Berth. vid." (große Teile der Fühler fehlen), Paris (aus Coll. Pic).

Gültiger Name: *Aoplus theresae* (Berthoumieu, 1896), syn. nov.

Ichneumon levicoxa Berthoumieu

Ichneumon levicoxa Berthoumieu, 1892: 40 – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Virgichneumon levicoxa* (Berthoumieu, 1892) (Rasnitsyn 1981a: 137).

Ichneumon levicoxatus Berthoumieu

Ichneumon levicoxatus Berthoumieu, 1895 in 1894-1897: 234 und 250 – ungerechtfertigte Emendation für *Ichneumon levicoxa* Berthoumieu, 1892 (vgl. dort).

Gültiger Name: *Virgichneumon levicoxa* (Berthoumieu, 1892) (Rasnitsyn 1981a: 137).

Ichneumon Lombardi Berthoumieu

Ichneumon Lombardi Berthoumieu, 1897 in 1894-1897: 395f. – Syntypen (? Holotypus) (♀♀) aus den Hautes-Alpes (aus Coll. Lombard) verschollen, Deutung nach der Beschreibung und nach Material in Coll. Pic (Hinz det.).

Gültiger Name: *Rictichneumon lombardi* (Berthoumieu, 1897), syn. nov. *Barichneumon albanicus* Habermehl, 1926. Bereits Hinz (1984: 41) hat diese Deutung für möglich gehalten.

Ichneumon longisectus Berthoumieu

Ichneumon longisectus Berthoumieu, 1895 in 1894-1897: 601 und 618f. – Lectotypus (♀) hiermit festgelegt: "Gray", "Type", "*Ich. longisectus* Bert.", Paris (aus Coll. Berthoumieu).

Gültiger Name: *Ichneumon gracilicornis* Gravenhorst, 1829, syn. nov.

Ichneumon lugubris Berthoumieu

Ichneumon lugubris Berthoumieu, 1896: 194 – Holotypus (♀) aus Belgien verschollen, wahrscheinlich in Coll. Deprez verloren (vgl. Athimus 1901: 220), Deutung nach Material in Coll. Heinrich, München. Berthoumieu nennt "Victor" als Sammler; dies ist der Vorname von Deprez (Athimus 1901: 197).

Gültiger Name: *Aoplus lugubris* (Berthoumieu, 1896) (Heinrich 1951: 276f.).

Ichneumon madritinus Berthoumieu

Ichneumon madritinus Berthoumieu, 1894 in 1894-1897: 531 und 545 – Lectotypus (♀) hiermit festgelegt: "... Madrid", "*Ichn. madritinus* n. sp." (Teile der Beine, ein Vorderflügel und die Bohrerstilette fehlen), Madrid.

Gültiger Name: *Coelichneumon madritinus* (Berthoumieu, 1894) (Berthoumieu 1904d: 32).

Ichneumon medianus Berthoumieu

Ichneumon medianus Berthoumieu, 1910b: 331 – Holotypus (♀): "Norvegia E. coll. Strand Solum Overhalden 21.8.03", "*Ichn. medianus* n. sp. ♀", Berlin (aus Coll. Strand).

Gültiger Name: *Ichneumon stramentarius septentrionalis* Holmgren, 1864, syn. nov. Heinrich (1928: 199) und Hilpert (1992: 224) haben *I. medianus* fälschlich mit *I. bucculentus bucculentus* Wesmael, 1845 synonymisiert.

Ichneumon merdula Berthoumieu

Ichneumon merula Berthoumieu, 1894 in 1894-1897: 531 und 542 – Lectotypus (♀) hiermit festgelegt: "Teniet", "An Fr 94 p.542", "type", "*merula* Berth.", Paris (aus Coll. Pic). Zusätzlich sind in Paris zwei Paralectotypen vom Fundort "Teniet" (♂ aus Coll. Pic) und ohne Fundort (♀ aus Coll. Berthoumieu) vorhanden, die zur gleichen Art gehören.

Gültiger Name: *Coelichneumon merula* (Berthoumieu, 1894) (Berthoumieu 1904d: 32).

Ichneumon metidjensis Berthoumieu

Ichneumon metidjensis Berthoumieu, 1894 in 1894-1897: 532 und 545f. – Lectotypus (♀) hiermit festgelegt: "Algerie", "*metidjensis* n. sp", Paris (aus Coll. du Buysson). Zusätzlich ist in Paris ein Paralectotypus (♂) mit der gleichen Fundortangabe vorhanden (aus Coll. Berthoumieu), der zur gleichen Art gehört.

Gültiger Name: *Coelichneumon microstictus* (Gravenhorst, 1829), syn. nov.

Ichneumon mimus Berthoumieu

Ichneumon mimus Berthoumieu, 1899: 136 – Lectotypus (♀) hiermit festgelegt: "Seynes (B. alp.)", "21", "type", "*I. mimus* Bert.", "*Ich. mimus* ♀ Berth. n sp. (groupe *oscillator*)", Paris (aus Coll. Pic).

Gültiger Name: *Platylabops mimus* (Berthoumieu, 1899), comb. nov., syn. nov. *Platylabops alpinus* Heinrich, 1952.

Ichneumon multifarius Berthoumieu

Ichneumon multifarius Berthoumieu, 1897: 254f. – Lectotypus (♂) hiermit festgelegt: "Akfadou 10 juin 97", "25", "type", "*Ich. multifarius* n. sp", "*I. multifarius* n sp. ♂ (Berth. vid.) pres *lepidus, albivalvus*", Paris (aus Coll. Pic). Zusätzlich ist in Paris ein Paralectotypus (♂) vom gleichen Fundort vorhanden (aus Coll. Pic), der zur gleichen Art gehört.

Gültiger Name: *Crytea sanguinator* (Rossi, 1792), syn. nov.

Ichneumon nasica Berthoumieu

Ichneumon nasica Berthoumieu, 1895 in 1894-1897: 635 und 663f. – Lectotypus (♂) und Paralectotypen (1♀, 1♂) in Paris (nicht untersucht).

Gültiger Name: *Ichneumon proletarius flavomaculatus* Lucas, 1849 (Hilpert 1992: 233).

Ichneumon nigratus Berthoumieu

Ichneumon nigratus Berthoumieu, 1894 in 1894-1897: 532 und 554f. – Lectotypus (♀) von Townes et al. (1965: 527) festgelegt: "Mecheria", "26", "type", "1", "*I. nigratus* ♀ Berth. vid.", "*I. nigratus* Berth.", Paris (aus Coll. Pic). Zusätzlich sind in Paris zwei Paralectotypen vom Fundort Mecheria (♂ aus Coll. Pic) und ohne Fundort (♀ aus Coll. Berthoumieu) vorhanden, die zur gleichen Art gehören.

Gültiger Name: *Coelichneumon nigratus* (Berthoumieu, 1894) (Berthoumieu 1904d: 32).

Ichneumon nivaliensis Berthoumieu

Ichneumon nivaliensis Berthoumieu, 1903a: 309 – Lectotypus (♀) hiermit festgelegt: "Tenerife. San Diego. 4.X.1898.", "♀.", "n 57 c Berth", "*Ichneumon nivaliensis* Berth. n. sp. A. Cabrera", Madrid (aus Coll. Cabrera). Zusätzlich sind in Madrid ein Paralectotypus (♂) und fünf mögliche Paralectotypen (♀♀) von Tenerife vorhanden (aus Coll. Cabrera), die zur gleichen Art gehören. Bei den Weibchen weicht die Beschriftung in einigen Details ab, und sie haben Berthoumieu vielleicht nicht vorgelegen (vgl. Diller & Horstmann 1994: 250).

Gültiger Name: *Virgichneumon nivaliensis* (Berthoumieu, 1903), comb. nov.

Ichneumon nuperus Berthoumieu

Ichneumon nuperus Berthoumieu, 1910b: 329 – Lectotypus (♀) hiermit festgelegt: "Hammernes. Langvatn, Ranen 23.VII.03", "Norvegia. E coll. Strand", "*Ichn. nuperus* n. sp. ♀" (Teile der Fühler und Beine fehlen), Berlin (aus Coll. Strand). Zusätzlich ist in Berlin ein Paralectotypus (♀) vom Fundort "Grönlien Mo 26.VII.03" vorhanden (aus Coll. Strand), der zur gleichen Art gehört.

Gültiger Name: *Cratichneumon viator* (Scopoli, 1763), syn. nov.

Ichneumon operosus Berthoumieu

Ichneumon operosus Berthoumieu, 1901: 320f. – Lectotypus (♀) hiermit festgelegt: "B. Chargere 19 sept. 01", "type", "*I. operosus* n. sp.", "*I. operosus* n sp groupe *castaneus* (Berth. vid)", Paris (aus Coll. Pic).

Gültiger Name: *Syspasis haesitator* (Wesmael, 1845), syn. nov.

Ichneumon paganus Berthoumieu

Ichneumon paganus Berthoumieu, 1892: 38 – ? Syntypus (♂): "Bayet", "*paganus* Berth.", Paris (aus Coll. Berthoumieu). Der mögliche Syntypus steckte ursprünglich unetikettiert in Coll. Berthoumieu unter *Amblyteles truncicola* Thomson, und Pic hat den Fundort aus der Beschreibung erschlossen und die Etiketten zugefügt, als er in der Sammlung nach Typen gesucht hat (vgl. Diller & Horstmann 1994: 248f.). Das Männchen stimmt nicht ganz mit der Beschreibung überein (viertes Gastertergit überwiegend schwarz); allerdings hatte Berthoumieu mehrere Exemplare vor sich.

Gültiger Name: *Spilothyrateles fabricii* (Schrank, 1802) (Berthoumieu 1896 in 1894-1897: 644).

Ichneumon Pici Berthoumieu

Ichneumon Pici Berthoumieu, 1894: 179 – Lectotypus (♀) hiermit festgelegt: "Nazereg", "27", "Rev. Bourb. 94 p.179", "type", "*Ichn. Pici* ♀ n. sp.", Paris (aus Coll. Pic).

Gültiger Name: *Spilichneumon pici* (Berthoumieu, 1894), comb. nov.

Ichneumon Pigeoti **Berthoumieu**

Ichneumon Pigeoti Berthoumieu, 1914: 75 – Syntypen (? Holotypus) (♀♀) aus Rethel/Ardennes (aus Coll. Pigeot) verschollen.

Gültiger Name: ? *Cratichneumon pigeoti* (Berthoumieu, 1914). Die Art ist bisher ungedeutet. Die Einordnung in *Cratichneumon* Thomson erfolgt nach Aubert (1957: 217).

Ichneumon productus **Berthoumieu**

Ichneumon productus Berthoumieu, 1914: 75 – Syntypen (? Holotypus) (♂♂) aus den Ardennes (aus Coll. Pigeot) verschollen.

Gültiger Name: ? *Aoplus productus* (Berthoumieu, 1914). Die Art ist bisher ungedeutet. Die Einordnung in *Aoplus* Tischbein erfolgt nach Aubert (1957: 217).

Ichneumon reconditus **Berthoumieu**

Ichneumon reconditus Berthoumieu, 1904a: 270 – Lectotypus (♀) hiermit festgelegt: "Zaragoza 12-XI-3", "Zaragoza 12.XI.1903. R. P. L. Navás", "♀.", "nº. 7. Berth.", "*Ichneumon reconditus*, Berth. n. sp. A. Cabrera" ((Teile der Fühler fehlen), Madrid (aus Coll. Cabrera).

Gültiger Name: *Platylabops reconditus* (Berthoumieu, 1904), comb. nov.

Ichneumon Sabaudus **Berthoumieu**

Ichneumon Sabaudus Berthoumieu, 1904b: 13 – Lectotypus (♂) hiermit festgelegt: "Abondance 26-7-03", "85", "type", "*I. sabaudus* Berth n sp (Berth. vid.)" (stark beschädigt, der Kopf mit den Fühlern fehlt fast ganz, der Gaster zum großen Teil, der Thorax, das Propodeum und die Beine sind angefressen), Paris (aus Coll. Pic).

Gültiger Name: *Aoplus defraudator* (Wesmael, 1845), syn. nov.

Ichneumon scopulator **Berthoumieu**

Ichneumon scopulator Berthoumieu, 1892: 37 – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Ichneumon scopulator* Berthoumieu, 1892 (Rasnitsyn 1981a: 136).

Ichneumon sectatorius **Berthoumieu**

Ichneumon sectatorius Berthoumieu, 1895 in 1894-1897: 601 und 620 – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Ichneumon sectatorius* Berthoumieu, 1895 (Rasnitsyn 1981a: 136f.).

Ichneumon semicastaneus **Berthoumieu**

Ichneumon semicastaneus Berthoumieu, 1897: 254 – Lectotypus (♀) hiermit festgelegt: "Forêt de Yakouren 13 Juil 97", "type", "*I. semicastaneus* n. sp.", "*I. semicastaneus* ♀ n sp. (Berth. vid.)", "groupe *oscillator*", Paris (aus Coll. Pic). Zusätzlich ist in Paris ein Paralectotypus (♂) vom gleichen Fundort vorhanden (aus Coll. Pic), der wahrscheinlich zur gleichen Art gehört.

Gültiger Name: *Melanichneumon semicastaneus* (Berthoumieu, 1897), comb. nov.

Ichneumon septimus Berthoumieu

Ichneumon septimus Berthoumieu, 1910b: 328 – Holotypus (♀): "Berlin aus *Panolis piniperda* 10.2.1902 K. Heyn S.", "*Ichn. septimus* n. sp. ♀", Berlin.

Gültiger Name: *Rictichneumon pachymerus* (Hartig, 1838) (Heinrich 1928: 199).

Ichneumon sexannularis Berthoumieu

Ichneumon 6-annularis Berthoumieu, 1894 in 1894-1897: 530 und 537 – Holotypus (♀) aus Spanien (aus Coll. de Turingia) verschollen, Deutung nach der Beschreibung.

Gültiger Name: *Stenichneumon militarius* (Thunberg, 1822), syn. nov. Berthoumieu (1904d: 32) führt die Art unter *Coelichneumon* an, ihm folgen weitere Autoren (insbesondere Ceballos 1924: 50), von denen aber niemand ein Exemplar der Art untersuchen konnte. Ceballos (1960: 16) beschreibt ein Männchen, das aus *Paranthrene tabaniformis* (Rottemburg) gezogen wurde, aber diese Deutung ist wahrscheinlich falsch, denn Ceballos beschreibt die Gastrocoelen als mittelgroß, während sie nach Berthoumieu groß sein sollen. Außerdem ist dieses Männchen ebenfalls unauffindbar. Unseres Erachtens handelte es sich bei dem Holotypus um ein unausgefärbtes Exemplar. Darauf deutet insbesondere die Angabe hin, daß die Antennen apical verblaßt sein sollen, dazu kommen weitere Rufinismen. Unter der Voraussetzung, daß die Mehrzahl der in der Beschreibung als rot, braun oder blaß beschriebenen Körperteile bei einem normal ausgefärbtem Exemplar schwarz sind, stimmt die Beschreibung Berthoumieus gut mit *S. militarius* überein.

Ichneumon singularis Berthoumieu

Ichneumon singularis Berthoumieu, 1892: 37 – Holotypus (♂) in Krakow (nicht untersucht).

Gültiger Name: *Coelichneumon singularis* (Berthoumieu, 1892) (Berthoumieu 1904d: 32; Rasnitsyn 1981a: 134).

Ichneumon specularius Berthoumieu

Ichneumon specularius Berthoumieu, 1900a: 56 – Lectotypus (? Holotypus) (♀) hiermit festgelegt: "Les Guerreaux 7 Juin 1900", "19", "type", "*Ichn. specularius* n. sp.", "*I. specularius* Berth. n sp (Berth. vidit)", Paris (aus Coll. Pic).

Gültiger Name: *Ichneumon proletarius proletarius* Wesmael, 1848, syn. nov. Bei dem angeführten Typus von *I. specularius* ist der Postpetiolus völlig glatt, nur die Dorsalleisten sind ausgebildet. Außerdem sind die Seitenfelder des Propodeums ebenfalls weitgehend glatt, und die Begrenzungsleisten der Felder sind dort fast verschwunden. Schließlich ist das zweite Gastertergit frontal nur spärlich und sehr fein punktiert, und die Gastrocoelen sind nicht längsgestreift. Wir deuten diese Bildungen als Aberrationen; unter dieser Voraussetzung würde es sich bei dem Typus um den Holotypus handeln. In allen anderen Merkmalen ist die Übereinstimmung mit *I. proletarius proletarius* sehr gut.

Die genannten Merkmale des Typus sind völlig symmetrisch ausgebildet, nichts deutet auf das Vorliegen einer Aberration hin. Da das Exemplar mit diesen Merkmalen nach den vorliegenden modernen Bestimmungsschlüsseln nicht einmal bis zu einer beschriebenen Gattung bestimmbar ist, könnte man verleitet werden, eine neue Gattung aufzustellen. Dies weist einmal mehr auf die Problematik hin, neue Gattungen (und Arten) nach Einzelexemplaren zu beschreiben.

Ichneumon spicicornis Berthoumieu

Ichneumon spicicornis Berthoumieu, 1906: 59 – Lectotypus (♀) hiermit festgelegt: "Frendah Alg.", "type", "*I. spicicornis* Berth. n sp. (Berth. vid)", Paris (aus Coll. Pic).

Gültiger Name: *Virgichneumon spicicornis* (Berthoumieu, 1906), comb. nov.

Ichneumon Strandi Berthoumieu

Ichneumon Strandi Berthoumieu, 1910b: 330 – Holotypus (♀): "Ranum Overhalden 11.-22.VII.03", "Norvegia E. coll. Strand", "*Ichn. Strandi* nov. sp. ♀", Berlin (aus Coll. Strand).
Gültiger Name: *Coelichneumon truncatulus* (Thomson, 1886), syn. nov.

Ichneumon strenuus Berthoumieu

Ichneumon strenuus Berthoumieu, 1901: 320 – Lectotypus (♀) hiermit festgelegt: "Poul... 24 Sept. 1901", "type", "*I. strenuus* n. sp.", Paris (aus Coll. Pic).
Gültiger Name: *Tycherus bifarius* (Berthoumieu, 1892), syn. nov.

Ichneumon sulcatus Berthoumieu

Ichneumon sulcatus Berthoumieu, 1896: 195 – praeocc. durch *Ichneumon sulcatus* Razoumowsky, 1789 – Lectotypus (♀) und Paralectotypus (♀) in Paris (nicht untersucht).
Gültiger Name: *Ichneumon dilleri* Heinrich, 1980 (Hilpert 1992: 296f.).

Ichneumon tenuidens Berthoumieu

Ichneumon tenuidens Berthoumieu, 1904b: 13 – Lectotypus (♂) hiermit festgelegt: "Croatie", "Type", "*tenuidens* n sp" (beide Fühlerspitzen fehlen), Paris (aus Coll. Berthoumieu).
Gültiger Name: *Syspasis helleri* (Holmgren, 1878), syn. nov.

Ichneumon tenuipes Berthoumieu

Ichneumon tenuipes Berthoumieu, 1896: 193f. – Lectotypus (♀) hiermit festgelegt: "La Macta", "1", "type", "Rev. Bourb. 96 N° 107-108 p.193", "*I. tenuipes* n. sp", Paris (aus Coll. Pic).
Gültiger Name: *Virgichneumon tenuipes* (Berthoumieu, 1896), comb. nov.

Ichneumon Theresae Berthoumieu

Ichneumon Theresae Berthoumieu, 1896: 195 – Lectotypus (♀) hiermit festgelegt: "Fiesch 30 août 96", "268", "type", "Rev. Bourb. 1896 N° 107-108 p.195", "*I. Theresae* ♀ n. sp.", "*I. Theresae* Bert n sp. Berth. vid. ♀", Paris (aus Coll. Pic).
Gültiger Name: *Aoplus theresae* (Berthoumieu, 1896), comb. nov.

Ichneumon tholiferus Berthoumieu

Ichneumon tholiferus Berthoumieu, 1895 in 1894-1897: 628 – Lectotypus (♂) hiermit festgelegt: "Algerie", "Type", "*Ich. tholiferus*. Bert.", Paris (aus Coll. Berthoumieu).
Gültiger Name: *Ichneumon ampliventris* Berthoumieu, 1894, syn. nov.

Ichneumon trifarius Berthoumieu

Ichneumon trifarius Berthoumieu, 1892: 40 – Lectotypus (♀) hiermit festgelegt: "Type", Paris (aus Coll. Berthoumieu). Zusätzlich ist in Paris ein Paralectotypus (♀) mit den Etiketten "Evreux. 5", "Type", "*Ich. trifarius*. Bert." vorhanden (aus Coll. Berthoumieu), der offensichtlich zur gleichen Serie gehört, aber stark beschädigt ist. Beide gehören höchstwahrscheinlich zur gleichen Art.
Gültiger Name: *Vulgichneumon trifarius* (Berthoumieu, 1892) (Rasnitsyn 1981b: 588).

Ichneumon validus Berthoumieu

Ichneumon validus Berthoumieu, 1894 in 1894-1897: 560 und 565f. – ? Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Coelichneumon validus* (Berthoumieu, 1894), syn. *Ichneumon nigricornis* Wesmael, 1845 (Rasnitsyn 1981a: 135). Die Art Wesmaels ist durch *Ichneumon nigricornis* Gmelin, 1790 praeoccupiert.

Ichneumon vulcanalis Berthoumieu

Ichneumon vulcanalis Berthoumieu, 1898: 332 – Lectotypus (♂) hiermit festgelegt: "Puy de Dome 7 VI 97", "*Ichneumon vulcanalis* n. sp. Berth.", Paris (aus Coll. du Buysson).

Gültiger Name: *Platylabops vulcanalis* (Berthoumieu, 1898), comb. nov. Der Typus stimmt mit dem von Heinrich (1952: 1064) beschriebenen Männchen von *Platylabops mimus* (Berthoumieu) (syn. *alpinus* Heinrich) in der Struktur überein, weicht aber in der Färbung ab. Zusätzlich weißgelb sind: Mandibeln, Clypeus, Mitte des Gesichts, Scapus ventral, Strich der äußeren Orbiten, kurzer Strich vor der Basis der Vorderflügel, Vordercoxen frontal und Mittelcoxen apical. Der Gaster ist überwiegend schwarz, und nur das zweite bis vierte Tergit sind teilweise rotbraun gezeichnet. Deswegen werden vorläufig zwei Arten unterschieden.

Listrodromus Cabrerai Berthoumieu

Listrodromus Cabrerai Berthoumieu, 1896: 196 – Lectotypen (? Holotypus) (♀♀) aus Cataluña (aus Coll. Cabrera) verschollen, Deutung nach der Beschreibung und nach zwei mit diesem Namen bezeichneten Nichttypen (♂♂) aus Nordspanien in Madrid und Paris (beide aus Coll. Cabrera).

Gültiger Name: *Neotypus intermedius intermedius* Mocsary, 1883, syn. nov. Bereits Schmiedeknecht (1903 in 1902-1904: 258) hat diese Deutung für möglich gehalten. Die Färbung des Gasters, die Berthoumieu für *L. cabrerai* als kennzeichnend angibt (Tergite vom dritten an caudal weiß gerandet), kommt bei Weibchen von *N. intermedius intermedius* aus Spanien als Variation vor (Material aus Coll. Selfa).

Neotypus Bolivari Berthoumieu

Neotypus Bolivari Berthoumieu, 1894: 181 – Lectotypus (♂) hiermit festgelegt: "*Cryptus* nov. sp Andre 117 col. Gogorea Madrid", "*Neotypus Bolivari* n. sp" (beide Fühler und Teile der Beine fehlen), Madrid.

Gültiger Name: *Neotypus intermedius intermedius* Mocsary, 1883 (Berthoumieu 1897 in 1894-1897: 304).

Neotypus Cabrerai Berthoumieu

Neotypus Cabrerai Berthoumieu, 1904a: 270 – praeocc. in *Neotypus* Förster durch *Listrodromus cabrerai* Berthoumieu, 1896 – Lectotypus (♀) hiermit festgelegt: "Tenerife. Barranco Hondo. 14.XII.1903.", "♀.", "consulto Bertho.", "*Neotypus Cabrerai* Berth. n. sp. A. Cabrera", Madrid (aus Coll. Cabrera). Zusätzlich sind in Madrid zwei mögliche Paralectotypen (♀♀) von Tenerife vorhanden (aus Coll. Cabrera), die zur gleichen Art gehören. Da die Beschriftung in einigen Details abweicht, haben sie Berthoumieu vielleicht nicht vorgelegen (vgl. Diller und Horstmann 1994: 250).

Gültiger Name: *Neotypus tenerifae* nom. nov. Zu dieser Art gehören auch die von Hellén (1949: 2f.) unter dem Namen *Listrodromus cabrerai* Berthoumieu beschriebenen Exemplare aus Tenerife (1♀, 1♂ in Coll. Hellén, Helsinki).

Platylabus ambiguus Berthoumieu

Platylabus ambiguus Berthoumieu, 1914: 75 – Lectotypus (♀) hiermit festgelegt: "Ardennes J. 9.1898", "*Platy. ambiguus* Berth. type", Paris (aus Coll. Pigeot).
Gültiger Name: *Rhembobius quadrispinus* (Gravenhorst, 1829) (Seyrig 1927: 176).

Platylabus Cabrerai Berthoumieu

Platylabus Cabrerai Berthoumieu, 1903a: 309 – Syntypen (? Holotypus) (♀♀) aus Tenerife (aus Coll. Cabrera) verschollen, Deutung nach zwei mit diesem Namen bezeichneten Nichttypen (♀♀) von Tenerife in Madrid und Paris (beide aus Coll. Cabrera).
Gültiger Name: *Platylabus cabrerai* Berthoumieu, 1903.

Platylabus calidus Berthoumieu

Platylabus calidus Berthoumieu, 1904a: 270f. – Lectotypus (♀) hiermit festgelegt: "Barcelona. Pedralbes. 24.X.1895." "♀.", "n 9. Berth.", "*Platylabus callidus*, Berth. n. sp. A. Cabrera" (!), Madrid (aus Coll. Cabrera). Zusätzlich ist in Madrid ein Paralectotypus (♂) von Barcelona vorhanden (aus Coll. Cabrera), der zur gleichen Art gehört.
Gültiger Name: *Platylabus calidus* Berthoumieu, 1904.

Platylabus geometrae Berthoumieu

Platylabus geometrae Berthoumieu, 1894: 181 – Lectotypus (♂) hiermit festgelegt: "17", "éclos le 20 Août 89 d'une arpenteuse grisâtre du chêne d'Arlae (2 Juin 89)", "*Platylabus geometricus* Berth" (!) (die Fühler, die Augen und der größte Teil des Gasters fehlen, die Beine sind angefressen), Paris (aus Coll. Pérez).
Gültiger Name: *Poecilostictus cothurnatus* (Gravenhorst, 1829), syn. nov.

Platylabus judaicus Berthoumieu

Platylabus judaicus Berthoumieu, 1900b: 249f. – Lectotypus (♀) hiermit festgelegt: "Jerusalem", "type", "*Pl. judaicus* Bert. ♀", Paris (aus Coll. Pic). Zusätzlich ist in Paris ein Paralectotypus (♂) vom gleichen Fundort vorhanden (aus Coll. Pic), der zur gleichen Art gehört.
Gültiger Name: *Platylabus judaicus* Berthoumieu, 1900.

Platylabus maurus Berthoumieu

Platylabus maurus Berthoumieu, 1900b: 250 – Lectotypus (♂) hiermit festgelegt: "Tanger Olcese", "32", "*Pl. maurus* Berth", "*Platylabus mauritanicus* Berth n sp." (!), Paris (aus Coll. Pic). Zusätzlich ist in Paris ein Paralectotypus (♂) vom gleichen Fundort vorhanden (aus Coll. Pic), der zur gleichen Art gehört. Er ist als "type" gekennzeichnet, paßt aber in einigen Details schlechter mit der Beschreibung überein als das als Lectotypus ausgewählte Männchen.
Gültiger Name: *Platylabus tricingulatus* (Gravenhorst, 1820) (Aubert 1961: 210).

Platylabus moestificus Berthoumieu

Platylabus moestificus Berthoumieu, 1897 in 1894-1897: 311 und 316 – Holotypus (♂) in Krakow (nicht untersucht).
Gültiger Name: ? *Platylabus moestificus* Berthoumieu, 1897 (Rasnitsyn 1981a: 319f.).

Platylabus novellus Berthoumieu

Platylabus novellus Berthoumieu, 1910b: 328f. – Holotypus (♀): "Berlin Thurau.", "*Plat. novellus* nov. sp. ♀", Berlin.
Gültiger Name: *Platylabus iridipennis* (Gravenhorst, 1829), syn. nov.

Platylabus parvulus Berthoumieu

Platylabus parvulus Berthoumieu, 1904b: 13 – Syntypen (? Holotypus) (♀♀) aus Cataluña (aus Coll. Antiga) verschollen.
Gültiger Name: ? *Platylabus parvulus* Berthoumieu, 1904. Die Art ist bisher ungedeutet.

Platylabus Pici Berthoumieu

Platylabus Pici Berthoumieu, 1908: 4 – Lectotypus (♂) hiermit festgelegt: "Bussang août 06", "type", "*Platylabus Pici* Berth ♂ n sp" (größere Teile der Fühler und Beine fehlen), Paris (aus Coll. Pic).
Gültiger Name: *Ethelurgus sodalis* (Taschenberg, 1865), syn. nov.

Platylabus pimplarius Berthoumieu

Platylabus pimplarius Berthoumieu, 1904b: 13f. – Lectotypus (♂) hiermit festgelegt: "Liddes", "148", "type", "*Plat. pimplarius* Berth n sp. (Berth. vid.)", Paris (aus Coll. Pic).
Gültiger Name: *Blapsidotes vicinus* (Gravenhorst, 1829), syn. nov.

Platylabus tricolor Berthoumieu

Platylabus tricolor Berthoumieu, 1904b: 14 – Lectotypus (♂ !) hiermit festgelegt: "Abondance" "91", "type", "*Plat. tricolor* Berth n sp. (Berth. vid)", Paris (aus Coll. Pic).
Gültiger Name: *Linycus exhortator* (Fabricius, 1787), syn. nov.

Revisionen einiger Varietäten mit verfügbaren Namen

Im ersten Teil dieser Revision ist begründet worden, warum wir die Mehrzahl der von Berthoumieu beschriebenen Varietäten für infrasubspezifische und damit nicht verfügbare Namen halten (Diller & Horstmann 1994: 250f.). Bei weiterem Literaturstudium haben sich drei dieser Namen als verfügbar herausgestellt, weil sie vor 1985 als verfügbare Namen für Arten oder Unterarten aufgefaßt worden sind (vgl. Artikel 45,g,ii,1 der Nomenklaturregeln).

Amblyteles glaucatorius (Fabricius) var. *hispanicus* Berthoumieu

Amblyteles glaucatorius (Fabricius) var. *hispanicus* Berthoumieu, 1896 in 1894-1897: 631 – mögliche Syntypen (2♀♀) von den Fundorten "Vallvidrera X.94." und "Pedralbes 10.X.95", beide von Cabrera mit "*Amblyteles glaucatorius* F. v. *Hispanicus* Berth. ??" (!) und von unbekannter Hand mit "Sintipo" etikettiert, Madrid (aus Coll. Cabrera). Beide Exemplare entsprechen der Beschreibung in den Angaben über Fundort und Sammler, weichen aber in der Färbung deutlich ab: Fühler median breit gelbrot; Femora und Tibien rotbraun, nur Hintertibien apical verdunkelt; Pterostigma hellrot (Beschreibung: Antennen, Beine und Pterostigma schwarz). Nur durch ihr schwarzes Scutellum stimmen sie mit der Beschreibung überein und unterscheiden sich darin von der Nominatform der Art. Sie gehören zur Nominat-Unterart von *Eutanyacra glaucatoria* (Fabricius)

Gültiger Name: *Eutanyacra glaucatoria glaucatoria* (Fabricius, 1793), syn. nov. Heinrich (1978: 70) bezeichnet die Varietät Berthoumieus in einer sehr kurzen Notiz ohne weitere Begründung als Unterart; dadurch wird der Name verfügbar. Heinrich gibt aber nicht zu erkennen, ob er ein Exemplar gesehen hat, das mit der Beschreibung Berthoumieus übereinstimmt, und nimmt auch nicht zu den Angaben von Ceballos (1924: 271f.) Stellung, nach denen die Nominatform der Art in Spanien vorkommt (es dort also kaum eine eigene Unterart geben kann). Dazu kommt die Schwierigkeit bei der Bewertung der möglichen Syntypen, für die es drei Erklärungen geben kann: (1) Die Exemplare sind tatsächlich Syntypen der Varietät *hispanicus* Berthoumieu, die Abweichungen zur Beschreibung sind auf Flüchtigkeitsfehler zurückzuführen. (2) Berthoumieu hat ein der Beschreibung entsprechendes Exemplar von *E. glaucatoria* vorgelegen, das jetzt verschollen ist, das dann aber nur eine melanistische individuelle Variation gewesen sein kann. (3) Berthoumieu hat Material einer anderen Art vorgelegen, die mit der Beschreibung der Varietät übereinstimmt und die er falsch determiniert hat. Jedenfalls hat bisher niemand das Vorkommen einer eigenen Unterart in Spanien nachgewiesen.

Amblyteles unilineatus (Gravenhorst) var. *ligatorius* Berthoumieu

Amblyteles unilineatus (Gravenhorst) var. *ligatorius* Berthoumieu, 1896 in 1894-1897: 639 – Holotypus (♀) in Krakow (nicht untersucht).

Gültiger Name: *Diphyus ligatorius* (Berthoumieu, 1896) (Rasnitsyn 1981a: 138f.; Diller & Horstmann 1994: 251).

Ichneumon Coqueberti Wesmael var. *dorsoniger* Berthoumieu

Ichneumon Coqueberti Wesmael var. *dorso-niger* Berthoumieu, 1894 in 1894-1897: 524 – Syntypen (♀♀, ♂♂) nicht sicher identifizierbar, möglicher Syntypus (♂): "Evreux" (in Nordfrankreich), "v. *dorsoniger* Berth. ?" (!), Paris (aus Coll. Berthoumieu). Das Fundortetikett ist gedruckt, das Namensetikett stammt von Pic, der nach den Typen gesucht hat, als die Sammlung Berthoumieu in seinen Besitz kam (Diller & Horstmann 1994: 249). Als Verbreitungsgebiet für die Art (mit Einschluß der Varietät) wird in der Beschreibung Europa genannt, Angaben über den Sammler der Varietät fehlen. Das vorgefundene Exemplar stimmt durch die schwarze Färbung des Scutellums mit der Beschreibung überein, weicht aber durch das Vorkommen kurzer weißer Linien vor und unter den Tegulae von ihr ab. Es gehört zu *Protichneumon similatorius* (Fabricius) (syn. *coqueberti* Wesmael).

Gültiger Name: *Protichneumon similatorius* (Fabricius, 1798) (Teunissen 1972: 72). Heinrich (1929a: 309) hat Material aus dem Nord-Iran mit der Varietät Berthoumieus identifiziert und als eigene Unterart abgetrennt; dadurch wird der Name verfügbar. Dieses Material hat Heinrich (1957: 20) später zu *Protichneumon fusorius persicus* Morley gestellt. Die Deutung der Varietät aus Europa bleibt davon unberührt, sie hängt von der Identifikation möglicher Typen ab. Von den Publikationen, die Berthoumieu benutzt hat, enthält nur die Arbeit von Tischbein (1873: 349) die Beschreibung dunkel gezeichneter Exemplare vom Fundort Birkenfeld / Hunsrück (in Westdeutschland). Diese sind vermutlich mit der Sammlung Tischbein zerstört worden. Bei ihnen werden die weißen Linien vor und unter den Tegulae als fehlend angegeben, über die Färbung des Scutellums wird nichts ausgesagt (es war deshalb vermutlich weiß gezeichnet). Unseres Erachtens sind in der Beschreibung der Varietät *dorsoniger* Angaben über die Färbung der in den Sammlungen Berthoumieu und Tischbein vorhandenen Exemplare kombiniert. Da diese Exemplare aus dem Verbreitungsgebiet der Nominatform von *P. similatorius* stammen, kann es sich bei ihnen nur um individuelle Variationen handeln (beziehungsweise gehandelt haben).

Liste der Varietäten mit nicht verfügbaren Namen

Hier wird eine Liste der von Berthoumieu benannten Varietäten zusammengestellt, deren Namen wir für infrasubspezifisch und damit für nicht verfügbar halten (Begründung vgl. Diller & Horstmann 1994: 250f.). Die zu den Phaeogenini gehörenden und schon früher diskutierten Formen (Diller & Horstmann, l. c.) werden der Vollständigkeit halber ebenfalls angeführt.

Aethecerus dispar Wesmael var. *albipictus* (Berthoumieu 1897 in 1894-1897: 365)
Amblyteles atratorius (Fabricius) var. *orientalis* (Berthoumieu 1896 in 1894-1897: 625)
Amblyteles camelinus Wesmael var. *Brischkei* (Berthoumieu 1896 in 1894-1897: 594)
Amblyteles equitatorius (Panzer) var. *commutatus* (Berthoumieu 1896 in 1894-1897: 604)
Amblyteles equitatorius (Panzer) var. *nigricaudus* (Berthoumieu 1896 in 1894-1897: 604)
Amblyteles equitatorius (Panzer) var. *subniger* (Berthoumieu 1896 in 1894-1897: 604)
Amblyteles glaucatorius (Fabricius) var. *spoliatus* (Berthoumieu 1896 in 1894-1897: 631)
Amblyteles Gravenhorsti (!) (Wesmael) var. *flavolaetus* (Berthoumieu 1896 in 1894-1897: 644)
Amblyteles hungaricus Tischbein var. *meridionalis* (Berthoumieu 1896 in 1894-1897: 631)
Amblyteles hungaricus Tischbein var. *nigriventris* (Berthoumieu 1896 in 1894-1897: 631)
Amblyteles infractorius (Panzer) var. *nigricaudus* (Berthoumieu 1896 in 1894-1897: 621)
Amblyteles inspector Wesmael var. *Brischkei* (Berthoumieu 1896 in 1894-1897: 588)
Amblyteles inspector Wesmael var. *nigriventris* (Berthoumieu 1896 in 1894-1897: 588)
Amblyteles limnophilus Thomson var. *Brischkei* (Berthoumieu 1896 in 1894-1897: 647)
Amblyteles mesocastanus (!) (Gravenhorst) var. *nigro-castaneus* (Berthoumieu 1896 in 1894-1897: 589)
Amblyteles monitorius (Panzer) var. *fulvicornis* (Berthoumieu 1896 in 1894-1897: 623)
Amblyteles negatorius (Fabricius) var. *nigricornis* (Berthoumieu 1896 in 1894-1897: 640)
Amblyteles negatorius (Fabricius) var. *nubilus* (Berthoumieu 1896 in 1894-1897: 640)
Amblyteles occisorius (Fabricius) var. *nigrinior* (Berthoumieu 1896 in 1894-1897: 646)
Amblyteles occisorius (Fabricius) var. *nigrinus* (Berthoumieu 1896 in 1894-1897: 646)
Amblyteles occisorius (Fabricius) var. *rufinus* (Berthoumieu 1896 in 1894-1897: 645)
Amblyteles oratorius (Fabricius) var. *bipunctus* (Berthoumieu 1896 in 1894-1897: 650)
Amblyteles Panzeri Wesmael var. *immarginatus* (Berthoumieu 1896 in 1894-1897: 590)
Amblyteles Panzeri Wesmael var. *nigrinus* (Berthoumieu 1896 in 1894-1897: 590)
Amblyteles pseudonymus (Wesmael) var. *leucopsis* (Berthoumieu 1896 in 1894-1897: 613)
Amblyteles quadripunctorius (Müller) var. *carens* (Berthoumieu 1896 in 1894-1897: 624)
Amblyteles quadripunctorius (Müller) var. *indecoratus* (Berthoumieu 1896 in 1894-1897: 624)
Amblyteles quinquecinctus Mocsary (!) var. *caucasicus* (Berthoumieu 1896 in 1894-1897: 622)
Amblyteles sputator (Fabricius) var. *nigriventris* (Berthoumieu 1896 in 1894-1897: 593)
Amblyteles sputator (Fabricius) var. *solutus* (Berthoumieu 1896 in 1894-1897: 593)
Amblyteles strigatorius (Gravenhorst) var. *concolor* (Berthoumieu 1896 in 1894-1897: 630)
Amblyteles uniguttatus (Gravenhorst) var. *alpestris* (Berthoumieu 1905: 132)
Amblyteles uniguttatus (Gravenhorst) var. *alpina* (Berthoumieu 1905: 132)
Amblyteles uniguttatus (Gravenhorst) var. *caucasica* (Berthoumieu 1905: 124)
Amblyteles uniguttatus (Gravenhorst) var. *infuscata* (Berthoumieu 1905: 133)
Amblyteles uniguttatus (Gravenhorst) var. *luctuosa* (Berthoumieu 1905: 132)
Amblyteles uniguttatus (Gravenhorst) var. *nivernensis* (Berthoumieu 1905: 133)
Amblyteles uniguttatus (Gravenhorst) var. *obesa* (Berthoumieu 1905: 124)
Amblyteles uniguttatus (Gravenhorst) var. *rufinus* (Berthoumieu 1896 in 1894-1897: 642)
Amblyteles uniguttatus (Gravenhorst) var. *simplex* (Berthoumieu 1905: 133)
Amblyteles uniguttatus (Gravenhorst) var. *stygius* (Berthoumieu 1896 in 1894-1897: 601)
Chasmodes motatorius (Gravenhorst) (!) var. *nuptus* Berthoumieu (1894 in 1894-1897: 518)
Chasmodes motatorius (Gravenhorst) (!) var. *transitorius* (Berthoumieu 1894 in 1894-1897: 518)
Diadromus collaris (Gravenhorst) var. *Brischkei* (Berthoumieu 1897 in 1894-1897: 356)
Dicaelotus pumilus (Gravenhorst) var. *rufoniger* (Berthoumieu 1897 in 1894-1897: 341)
Dicoelotus (!) *pumilus* Wesmael (!) var. *analis* (Berthoumieu 1901: 321)
Dicoelotus (!) *pumilus* Wesmael (!) var. *punicus* (Berthoumieu 1901: 321)
Hoplismenus perniciosus Gravenhorst var. *annulatus* (Berthoumieu 1894 in 1894-1897: 513)
Hoplismenus terrificus Wesmael var. *albicans* (Berthoumieu 1894 in 1894-1897: 515)
Hoplismenus terrificus Wesmael var. *solutus* (Berthoumieu 1894 in 1894-1897: 515)
Hoplismenus uniguttatus Gravenhorst var. *Habermehli* (Berthoumieu 1894 in 1894-1897: 516)
Hypomecus albitarsis Wesmael var. *carens* (Berthoumieu 1897 in 1894-1897: 299)
Ichneumon albilarvatus Gravenhorst var. *obscurior* (Berthoumieu 1895 in 1894-1897: 281)
Ichneumon albinus Gravenhorst var. *caelebs* (Berthoumieu 1895 in 1894-1897: 239)
Ichneumon albipictus Gravenhorst var. *multipictus* (Berthoumieu 1895 in 1894-1897: 240)
Ichneumon albipictus Gravenhorst var. *obsoletus* (Berthoumieu 1895 in 1894-1897: 240)
Ichneumon albosignatus Gravenhorst var. *punctus* (Berthoumieu 1895 in 1894-1897: 236)
Ichneumon bilunatus (!) Gravenhorst var. *punctus* (Berthoumieu 1895 in 1894-1897: 249)
Ichneumon bilunatus (!) Gravenhorst var. *subannulatus* (Berthoumieu 1895 in 1894-1897: 249)
Ichneumon bilunatus (!) Gravenhorst var. *triplex* (Berthoumieu 1895 in 1894-1897: 249)

Ichneumon bucculentus Wesmael var. *similis* (Berthoumieu 1895 in 1894-1897: 646)
Ichneumon castaneus Gravenhorst var. *flaviger* (Berthoumieu 1896 in 1894-1897: 566)
Ichneumon castaneus Gravenhorst var. *subniger* (Berthoumieu 1896 in 1894-1897: 566)
Ichneumon castaniventris Gravenhorst var. *nigricaudus* (Berthoumieu 1894 in 1894-1897: 557)
Ichneumon castaniventris Gravenhorst var. *secretus* (Berthoumieu 1894 in 1894-1897: 558)
Ichneumon castaniventris Gravenhorst var. *subniger* (Berthoumieu 1894 in 1894-1897: 558)
Ichneumon cessator Müller var. *impollutus* (Berthoumieu 1894 in 1894-1897: 588)
Ichneumon clarigator Wesmael var. *subniger* (Berthoumieu 1895 in 1894-1897: 288)
Ichneumon computatorius Müller var. *insolitus* (Berthoumieu 1895 in 1894-1897: 599)
Ichneumon culpator Schrank var. *ater* (Berthoumieu 1894 in 1894-1897: 566)
Ichneumon deceptor Gravenhorst (!) var. *obscurior* (Berthoumieu 1895 in 1894-1897: 245)
Ichneumon erraticus Berthoumieu var. *nigriventris* (Berthoumieu 1895 in 1894-1897: 626)
Ichneumon erythraeus Gravenhorst var. *afer* (Berthoumeu 1895 in 1894-1897: 230)
Ichneumon fabricator Fabricius var. *ferrugineus* (Berthoumieu 1895 in 1894-1897: 267)
Ichneumon fabricator Fabricius var. *sponsus* (Berthoumieu 1895 in 1894-1897: 260)
Ichneumon faunus Gravenhorst var. *rufatus* (Berthoumieu 1895 in 1894-1897: 228)
Ichneumon ferreus Gravenhorst var. *numeratus* (Berthoumieu 1894 in 1894-1897: 545)
Ichneumon ferreus Gravenhorst var. *rufescens* (Berthoumieu 1894 in 1894-1897: 545)
Ichneumon funebris Holmgren var. *leucopis* (Berthoumieu 1894 in 1894-1897: 551)
Ichneumon fusorius Linnaeus var. *mediofulvus* (Berthoumieu 1894 in 1894-1897: 525)
Ichneumon fusorius Linnaeus var. *multipictus* (Berthoumieu 1894 in 1894-1897: 525)
Ichneumon gemellus Gravenhorst var. *analogus* (Berthoumieu 1895 in 1894-1897: 227)
Ichneumon gracilicornis Gravenhorst var. *nigricaudus* (Berthoumieu 1895 in 1894-1897: 619)
Ichneumon gracilicornis Gravenhorst var. *nigroscutellatus* (Berthoumieu 1895 in 1894-1897: 619)
Ichneumon incubitor Linnaeus var. *punctus* (Berthoumieu 1895 in 1894-1897: 251)
Ichneumon languidus Wesmael var. *hispanicus* (Berthoumieu 1895 in 1894-1897: 597)
Ichneumon leucomelas Gmelin var. *punctus* (Berthoumieu 1895 in 1894-1897: 239)
Ichneumon lineator Fabricius var. *numeratus* (Berthoumieu 1894 in 1894-1897: 544)
Ichneumon molitorius Gravenhorst (!) var. *discolor* (Berthoumieu 1895 in 1894-1897: 638)
Ichneumon multicinctus Gravenhorst var. *nigrinus* (Berthoumieu 1894 in 1894-1897: 563)
Ichneumon nigritarius Gravenhorst var. *Brischkei* (Berthoumieu 1895 in 1894-1897: 259)
Ichneumon personatus Gravenhorst var. *elaverensis* (Berthoumieu 1896 in 1894-1897: 565)
Ichneumon pistorius Gravenhorst var. *solutus* (Berthoumieu 1894 in 1894-1897: 567)
Ichneumon polynomus Wesmael var. *fallax* (Berthoumieu 1894 in 1894-1897: 584)
Ichneumon pulchellatus Bridgman var. *exannulatus* (Berthoumieu 1899: 136)
Ichneumon raptorius Gravenhorst (!) var. *albicaudus* (Berthoumieu 1895 in 1894-1897: 615)
Ichneumon rarus Tischbein var. *Thomsoni* (Berthoumieu 1895 in 1894-1897: 653)
Ichneumon ridibundus Gravenhorst var. *annulatus* (Berthoumieu 1896 in 1894-1897: 554)
Ichneumon rubens Boyer de Fonscolombe var. *nigrocastaneus* (Berthoumieu 1894 in 1894-1897: 523)
Ichneumon rubens Boyer de Fonscolombe var. *notatus* (Berthoumieu 1894 in 1894-1897: 523)
Ichneumon rufinus Gravenhorst var. *semirufus* (Berthoumieu 1894 in 1894-1897: 571)
Ichneumon sarcitorius Linnaeus var. *cingulatus* (Berthoumieu 1895 in 1894-1897: 647)
Ichneumon sarcitorius Linnaeus var. *fuscipennis* (Berthoumieu 1895 in 1894-1897: 647)
Ichneumon sarcitorius Linnaeus var. *mutabilis* (Berthoumieu 1895 in 1894-1897: 647)
Ichneumon scutellator Gravenhorst var. *rufescens* (Berthoumieu 1894 in 1894-1897: 568)
Ichneumon semirufus Gravenhorst var. *nigroscutatus* (Berthoumieu 1895 in 1894-1897: 279)
Ichneumon septentrionalis Holmgren var. *mutabilis* (Berthoumieu 1895 in 1894-1897: 645)
Ichneumon sexcinctus Gravenhorst var. *obscurus* (Berthoumieu 1895 in 1894-1897: 624)
Ichneumon stigmatorius Zetterstedt var. *pallidus* (Berthoumieu 1894 in 1894-1897: 582)
Ichneumon sugillatorius Linnaeus var. *nuptus* (Berthoumieu 1894 in 1894-1897: 528)
Ichneumon sugillatorius Linnaeus var. *ornatus* (Berthoumieu 1894 in 1894-1897: 528)
Ichneumon tergenus Gravenhorst var. *funereus* (Berthoumieu 1895 in 1894-1897: 250)
Ichneumon terminatorius Gravenhorst var. *Olivieri* (Berthoumieu 1895 in 1894-1897: 641)
Ichneumon trilineatus Gmelin var. *annulatus* (Berthoumieu 1894 in 1894-1897: 569)
Ichneumon trilineatus Gmelin var. *rufescens* (Berthoumieu 1894 in 1894-1897: 569)
Ichneumon tuberculipes Wesmael var. *rufoniger* (Berthoumieu 1895 in 1894-1897: 598)
Misetus oculatus Wesmael var. *obscurus* (Berthoumieu 1897 in 1894-1897: 345)
Platylabus rufus Wesmael var. *nigriventris* (Berthoumieu 1897 in 1894-1897: 314)
Platylabus rufus Wesmael var. *solutus* (Berthoumieu 1897 in 1894-1897: 314)

Nomina nuda

Amblyteles unidentatus Berthoumieu var. *nigroscutellatus* (Berthoumieu 1904c: 162)
Amblyteles uniguttatus (Gravenhorst) var. *nigripennis* (Berthoumieu 1904c: 162)

Nomina dubia

Einige Exemplare sind von Berthoumieu mit Namen beschriftet worden, die anscheinend nicht publiziert sind:

Amblyteles lautalicus (Paris, aus Coll. Pic)
Ichneumon lativentris (Paris, aus Coll. Berthoumieu)

Nachträge

Bei früheren Typenrevisionen der von Berthoumieu und Pic beschriebenen Ichneumoninae sind zwei Taxa übersehen worden, außerdem sind zu zwei weiteren Arten Ergänzungen notwendig.

Aethecerus exilis (Berthoumieu)

Die Art ist ein jüngeres sekundäres Homonym von *Aethecerus exilis* Wesmael, 1848.

Gültiger Name: *Aethecerus foveolatus* Gregor, 1940, syn. nov.

Aethecerus longior Berthoumieu

Aethecerus longior (De-Stefani in litt.) Berthoumieu 1897 in 1894-1897: 362 und 366 – Typen (? Holotypus) (♀♀) verschollen. Berthoumieu (l.c.) führt bei seiner Beschreibung den Namen "*Phaeog. longior* ♀ Steph." an, hat also offensichtlich Material der Art unter diesem Namen von De-Stefani aus Sizilien erhalten. Wahrscheinlich hat er es zurückgeschickt, denn in seiner Sammlung ist die Art nicht vertreten. Die Sammlung De-Stefani ist zerstört (Horn et al. 1990: 377).

Gültiger Name: ? *Aethecerus longior* Berthoumieu, 1897. Die Art ist bisher ungedeutet.

Amblyteles amatorius (Müller) var. *nigronotata* Pic

Amblyteles amatorius (Müller) var. *nigronotata* Pic, 1908: 67 – Holotypus (♀): "Monétier les Bains", "type", "v. *nigronotata* Pic", Paris (aus Coll. Pic).

Gültiger Name: *Diphyus amatorius* (Müller, 1776), syn. nov. Daß Townes et al. (1965: 496) und Gupta (1983: 99) diese Art zu *Triptognathus* Berthoumieu stellen, muß auf einem Irrtum beruhen. Rasnitsyn (1981b: 616) stellt sie korrekt zu *Diphyus* Kriechbaumer.

Ichneumon mequignoni Pic

Diese Art ist von Hilpert (1992: 104) mit *Ichneumon silaceus* Gravenhorst synonymisiert, von Hilpert et al. (1993: 183) dagegen als eigene Art angesehen worden. Dieser Widerspruch ist auf die verzögerte Publikation der zweiten Arbeit sowie darauf zurückzuführen, daß Hilpert seine Auffassung kurzfristig noch geändert hat. Bis über die Zuordnung der Geschlechter von *I. silaceus* neue Erkenntnisse vorliegen, ist *I. mequignoni* als jüngeres Synonym von *I. silaceus* anzusehen.

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Buchbesprechungen

1. D'Abrera, B.: Butterflies of the Neotropical Region, Part VI Riodinidae. – Hill House, Victoria, Australia, 1994. 216 p. (p. 880-1096), Format 25x35 cm, 106 großformatige Farbtafeln mit ca. 2500 abgebildeten Faltern.

In bewährter Weise legt der Autor ein hervorragend bebildertes Werk über die neotropischen Vertreter der Familie Riodinidae vor. Es ist die wohl derzeit umfassendste Informationsquelle und Determinationsgrundlage für südamerikanische Rhiodiniden. Ein wenig unbefriedigend wirkt auf manchen der Farbtafeln der Umstand, daß die Falter ziemlich klein abgebildet sind, der Hintergrund hingegen großflächig leer bleibt. Hier zollt das Prinzip, alle Falter in natürlicher Größe abzubilden, seinen Tribut. Der sehr kurz gehaltene Text entspricht in konsequenter Weise der Konzeption der Buchreihe. In manchen Fällen wäre es jedoch vielleicht besser gewesen, die wissenschaftlichen Begleittexte ausführlicher zu gestalten, zumal die Textseiten oft nur halbvoll sind, oder über Marginalien informieren, wie z.B. auf S. 920, wo der Leser in bezug auf die Art *Mesosemia gemina* die zwar hochinteressante, aber vielleicht im Zusammenhang auch ein wenig nebensächliche Anekdote eines Forschers erfährt, der kürzlich Stipendien-Gelder in Höhe von 80.000 US $ durch "Mineralwasser-Verbrauch" verschleuderte.

Über 1000 Arten werden unter Angabe der genauen Originalreferenz, der bisher bekannten Verbreitung, Herkunft der abgebildeten Falter und differentialdiagnostischen Kurzinformationen (nicht immer!) behandelt. Hinweise auf ca. 250 weitere, dem Autor nicht vorliegende Arten werden gegeben. Berücksichtigt man, daß D'Abrera ausdrücklich "keine taxonomische Revision vorlegen" wollte, so enthält die Arbeit immerhin doch die stattliche Anzahl von 12 neubeschriebenen Arten und einer neuen Unterart sowie einige weitere taxonomische Änderungen. Hierbei ist der neue Name "*Theope zyzyxoxyx*" zwar nomenklatorisch verfügbar, jedoch im Hinblick auf zungenbrecherische Gefahren beim Gebrauch bestimmt nicht besonders glücklich gewählt.

In überraschender und ausführlicher Weise stellt D'Abrera die gängigen Denkmodelle der Evolution in Frage, verbunden mit Ausdruck der Faszination über Vielfalt und Komplexität der Schöpfung und dem Glaubenszeugnis an den schöpferischen Gott als letzte Ursache dieser Diversität (S. 984; S. 1015-1016; S. 1026; S. 1038). Bemerkenswert hierbei der Mut des Autors, auch wenn dieses Betonen der "metaphysischen Dimension", wie D'Abrera es nennt, bisweilen wie eine undifferenzierte Attacke gegen die wissenschaftliche Forschung schlechthin wirkt, z.B. auf S. 1026: "Die Evolutionsreligion ist wie der Protestantismus, jeder Theoretiker ist sein eigener unfehlbarer Papst. Sie ist spalterisch, blindlings irrational und pathologisch ungeordnet und letztlich zerstörerisch gegen die christliche Ordnung und die westliche Zivilisation." A. Hausmann

2. Banarescu. P.: Zoogeography of Fresh Waters, Vol 3: Distribution and Dispersal of Freshwater Animals in Africa, Pacific Areas and South America. – AULA-Verlag Wiesbaden, 1995. 521 S., 53 Verbreitungskarten.

Nach dem allgemein beschreibenden Band 1 zur Verbreitung und Ausbreitung der Süßwasserfauna und dem Band 2 mit der näheren Betrachtung der Faunenbereiche von Nordamerika und Eurasien ist nun dieser 3. Band erschienen, der jetzt endlich auch das Sachregister mit den wissenschaftlichen Namen und das Literaturverzeichnis enthält. Beide zusammen umfassen allein 168 Seiten. Wie im vorhergehenden Band werden die zoogeographischen Regionen einzeln vorgestellt, wobei den Schwerpunkt die Fische bilden. Daneben finden Mollusken, Crustaceen, darunter auch Fischparasiten, niedere Gruppen der Wirbellosenfauna sowie Wasserinsekten und Milben Erwähnung. Die kleinräumigeren Faunenbereiche innerhalb der Regionen werden einzeln dokumentiert und mit Beispielen belegt. Dieser Darstellung folgt die Darlegung der Interaktionen zwischen diesen und die Aufzählung der Fossilfunde. Alles gemeinsam zusammengefaßt mündet in einer Hypothese der Geschichte der Süßwasserfauna Afrikas, Madagaskars und der umliegenden Inseln, Südamerikas, Zentralamerikas und der Karibik, der Australischen Region, Neuseelands und des Indo-Westpazifiks mit den Circum-Antarktischen Randzonen. Abschließend faßt dieser Band die in allen drei Büchern behandelten Darstellungen zur Verbreitung und Ausbreitungsgeschichte der Süßwassertiere noch einmal zusammen. Die Bände vermitteln einen groben Überblick über die hochdiverse Fauna der verschiedenen zoogeographischen Regionen und deren historischen Hintergrund, die mit den großräumigen plattentektonischen Gegebenheiten, aber auch mit kleinräumigen lokalen Bedingungen einhergehen. Sicher können hier nicht alle Tiergruppen und die neueren Erkenntnisse (Literatur nur bis Ende der 80iger Jahre) zu ihrer Vernetzung oder auch Isolation behandelt werden, dennoch eignen sich die drei Bände als gutes Nachschlagewerk. E.-G. Burmeister

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Syrphid flies in natural grass ecosystems of some areas of the Kraishte region (Bulgaria)

(Insecta, Diptera, Syrphidae)

Emilia Markova

Markova, E. (1997): Syrphid flies in natural grass ecosystems of some areas of the Kraishte region (Bulgaria) (Insecta, Diptera, Syrphidae). – Spixiana **20/1**: 73-79

The structure of the syrphid communities in 6 natural grass ecosystems was studied. Basic population and cenotic characteristics – species composition, frequency of separate species, population density, dominant and trophical structure of the communities – were established.

Four species of the established ones are new for the studied region. The most favorable ecological conditions for the syrphid communities are in the ecosystem of Breznik, the most unfavorable in the ecosystem of Pernik.

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Introduction

This investigation is the second regional faunistic-ecological study on Syrphidae in the areas of Trun, Breznik, Divlya, Pernik, Kyustendil and Dupnitsa and deals with the natural grass ecosystems. In a previous study, Markova (1995) made an ecological analysis of the syrphid communities in different types of agroecosystems of the same region of Bulgaria.

Material and methods

The investigation was carried out in May, August, September and October 1990, and June, August and October 1991. Six natural grass ecosystems were studied. Their disposition is shown in Fig. 1.

The material was collected by "mowing" with a standard entomological sack. The number of samples taken from each ecosystem was 10 in 1990 and 20 in 1991. Each sample is the result of 50 mowing movements with an average length of 1 m.

Different population and cenotic indexes were used to evaluate the status of the syrphid cenoses. The taxonomic similarity, the similarity of population density of the species and the biocenotic similarity were evaluated after the classification of Zlotin (1975). The frequency of the species was determined after Bodenheimer and Balogh (after Dazho 1975), but the dominant community structure after Arzamasov et al. (after Hotko et al. 1982). The data were statistically processed in order to determine the total density of the syrphid flies. The biocenotic similarity was graphically presented by cluster analysis (after Pesenko 1982).

The region studied is mainly in the zone of the temperate continental climate (Tishkov 1982, Georgiev 1985). The rainfall of this region is characterized by summer maximum and winter minimum. The area of Kyustendil is an exception because it belongs to the transitional continental climatic zone

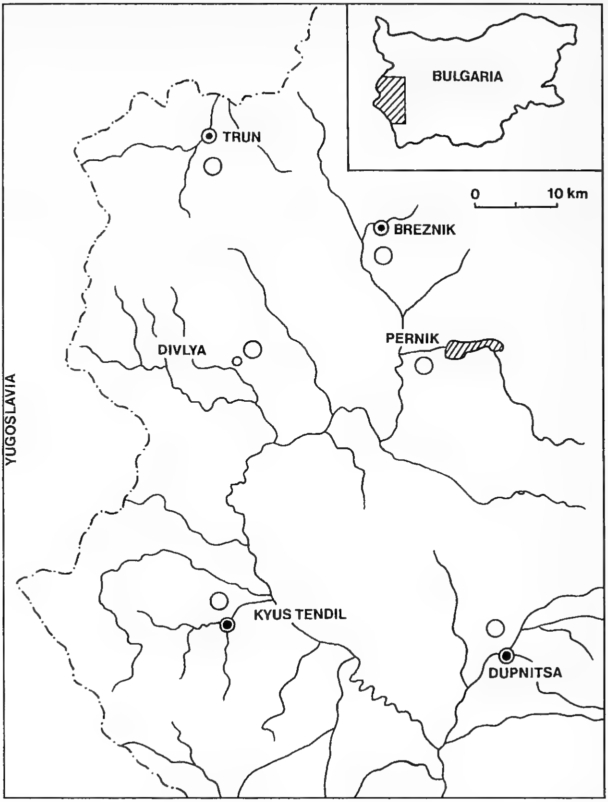


Fig. 1. Scheme of the investigated region and the ecosystems from which the material was gathered.

that is characterized by less rainfall during the spring and summer months in comparison with that of autumn and winter.

A certain difference between the Kyustendil are and the other studied areas is noted in accordance with the species composition of the natural grass ecosystems. The grass communities in the ecosystems studied in the areas of Trun, Breznik, Divlya, Pernik and Dupnitsa are composed of xeromesophytic and xerothermic grass formations of *Agrostis capillaris, Festuca valesiaca, Festuca stojanovii, Chrysopogon grylli* and others. The grass ecosystem studied in the area of Kyustendil is a mesophytic grass formation of *Poa silvicola* (Bondev 1991).

Results and discussion

As a result of the investigation, 22 species of syrphid flies were noted in 1990 and 18 species in 1991. The total number of recorded species is 26. 15 of them belong to subfamily Syrphinae and 11 species to subfamily Milesiinae. Together with the 6 species found by Nedjalkov (1912), the 6 species recorded by Drenski (1934), and the 24 species recorded by Markova the number of syrphid fly species reported for this part of Bulgaria is 36. Four species are new for the syrphid fauna in this region. They are marked with an asterix in the list below. For each species the numbers of the individuals per 1 ha are given in brackets behind the collection date. The recorded species are arranged after the classification of Vockeroth (for subfamily Syrphinae) and of Thompson & Hippa (for subfamily Milesiinae) after Peck (1988):

1. *Dasysyrphus lunulatus* (Meigen, 1822)*
   Breznik (8/28/1990: 67).

2. *Episyrphus balteatus* (De Geer, 1776)
   Trun (5/25, 8/28/1990: 67, 133 and 6/1, 8/3/1991: 100, 100); Breznik (5/25/1990: 67 and 6/1/1991: 133); Kyustendil (5/26/1990: 67 and 6/2, 8/4/1991: 133, 33).

3. *Metasyrphus corolae* (Fabricius, 1794)
   Breznik (5/25, 8/28, 10/1/1990: 67, 133, 67 and 6/1, 8/3/1991: 33, 200); Divlya (8/27, 10/2/1990: 133, 200 and 8/3, 10/5/1991: 200, 100); Pernik (8/26/1990: 67 and 8/4/1991: 67); Kyustendil (8/30/1990: 267 and 6/2, 8/4/1991: 100, 100); Dupnitsa (8/25/1990: 133 and 6/2, 8/4, 10/6/1991: 33, 33, 33).

4. *Metasyrphus latifasciatus* (Macquart, 1829)
   Breznik (8/28/1990: 67).

5. *Metasyrphus luniger* (Meigen, 1822)
   Kyustendil (9/27/1990: 67 and 8/4/1991: 33).

6. *Sphaerophoria philanthus* (Meigen, 1822)
   Dupnitsa (8/4/1991: 33).

7. *Sphaerophoria rueppelli* (Wiedemann, 1830)
   Breznik (5/25/1990: 67); Divlya (8/27/1990: 67); Kyustendil (8/30/1990: 67 and 8/4/1991: 33).

8. *Sphaerophoria scripta* (Linnaeus, 1758)
   Trun (5/25, 8/25, 10/1/1990: 200, 267, 400 and 6/1, 8/3, 10/5/1991: 233, 100, 200); Breznik (5/25, 8/28, 10/1/1990: 667, 200, 133 and 6/1, 8/3, 10/5/1991: 433, 233, 167); Divlya (5/28, *8/27*, 10/2/1990: 200, 33, 133 and 6/1, 8/3, 10/5/1991: 167, 133, 67); Pernik (5/25/1990: 133 and 6/2, 8/4, 10/6/1991: 67, 167, 33); Kyustendil (8/30, 9/27/1990: 67, 67 and 6/2, 8/4, 10/6/1991: 100, 100, 33); Dupnitsa (5/27, 8/25/1990: 200, 267 and 6/2, 8/4/1991: 167, 67).

9. *Syrphus vitripennis* Meigen, 1822
   Kyustendil (8/4/1991: 33).

10. *Melanostoma mellinum* (Linnaeus, 1758)
    Trun (5/25, 8/28/1990: 133, 67 and 6/1, 8/3, 10/5/1991: 100, 100, 33); Breznik (5/25, 8/28, 10/1/1990: 200, 200, 67 and 6/1, 8/3, 10/5/1991: 100, 133, 133); Divlya (5/28/1990: 67 and 6/1, 8/3, 10/5/1991: 67, 33, 67); Pernik (8/26, 9/30/1990: 67, 67 and 6/2, 8/4, 10/6/1991: 33, 67, 33); Kyustendil (9/27/1990: 67 and 6/2, 8/4, 10/6/1991: 67, 100, 167); Dupnitsa (5/27/1990: 133 and 6/2, 8/4, 10/6/1991: 100, 33, 67).

11. *Platycheirus angustatus* (Zetterstedt, 1843)*
    Breznik (8/28/1990: 67).

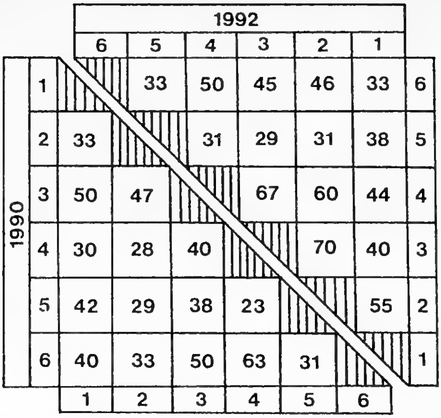
12. *Platycheirus immarginatus* (Zetterstedt, 1849)
    Trun (8/28, 10/1/1990: 67, 67 and 10/5/1991: 67); Breznik (5/28/1990: 133 and 6/1, 8/3/1991: 100, 67).

13. *Platycheirus podagratus* (Zetterstedt, 1838)
    Kyustendil (8/30/1990: 67).

14. *Paragus tibialis* (Fallén, 1817)
    Trun (10/1/1990: 67 and 8/3/1991: 33); Breznik (10/1/1990: 267 and 6/1, 8/3, 10/5/1991: 33, 67, 167); Divlya (8/27/1990: 67 and 6/4, 8/3/1991: 133, 67); Pernik (8/4/1991: 33); Kyustendil (5/26/1990: 67).

15. *Paragus bicolor* (Fabricius, 1794)
    Breznik (5/25, 8/28/1990: 67, 67 and 6/1, 8/3/1991: 100, 33); Divlya (8/27/1990: 67 and 8/3/1991: 33).

16. *Pipizella virens* (Fabricius, 1805)*
    Breznik (5/25/1990: 67).



	6	5	4	3	2	1	
1	▥	33	50	45	46	33	6
2	33	▥	31	29	31	38	5
3	50	47	▥	67	60	44	4
4	30	28	40	▥	70	40	3
5	42	29	38	23	▥	55	2
6	40	33	50	63	31	▥	1
	1	2	3	4	5	6	

Fig. 2. Taxonomic similarity among the syrphid complexes in the investigated ecosystems. 1. Trun; 2. Breznik; 3. Divlya; 4. Pernik; 5 Kyustendil; 6. Dupnitsa.

17. *Cheilosia velutina* Loew, 1840
Kyustendil (8/4/1991: 33).

18. *Chrysogaster viduata* (Linnaeus, 1758)
Breznik (8/28/1990: 267 and 8/3/1991: 67); Pernik (5/25, 8/26, 9/30/1990: 67, 67, 67 and 6/2, 10/6/1991: 67, 33); Dupnitsa (5/27, 8/25/1990: 67, 67 and 8/4/1991: 33).

19. *Lejogaster metallina* (Fabricius, 1781)
Breznik (8/28/1990: 67).

20. *Orthonevra frontalis* (Loew, 1843)*
Pernik (5/25/1990: 67).

21. *Neoascia podagrica* (Fabricius, 1775)
Dupnitsa (6/2/1991: 33).

22. *Eumerus trigatus* (Fallén, 1817)
Kyustendil (8/30, 9/27/1990: 67, 67 and 8/4/1991: 33).

23. *Eristalinus sepulchralis* (Linnaeus, 1758)
Breznik (5/25/1991: 67).

24. *Eristalis arbustorum* (Linnaeus, 1758)
Trun (8/28/1990: 200 and 8/3/1991: 67); Kyustendil (5/26/1990: 200 and 8/4/1991: 133); Dupnitsa (8/25, 9/28/1990: 133, 133 and 6/2, 8/4, 10/6/1991: 67, 200, 67).

25. *Eristalis tenax* (Linnaeus, 1758)
Breznik (8/28/1990: 67 and 8/3/1991: 33); Divlya (10/2/1990: 133 and 8/3, 10/5/1991: 67, 67); Dupnitsa (9/28/1990: 67 and 8/4, 10/6/1991: 33, 67).

26. *Syritta pipiens* (Linnaeus, 1758)
Trun (8/28/1990: 67 and 8/3, 10/5/1991: 133, 100); Breznik (8/28, 10/1/1990: 133, 133 and 8/3, 10/5/1991: 133, 67); Divlya (8/27, 10/2/1990: 67, 67 and 8/3/1991: 167); Pernik (8/26/1990: 133 and 6/2, 8/4/1991: 100, 67); Kyustendil (10/6/1991: 100); Dupnitsa (5/27, 8/25, 9/28/1990: 67, 133, 67 and 6/2, 8/4, 10/6/1991: 100, 267, 67).

The species composition recorded in the natural grass ecosystems does not differ in qualitative aspect from that found in the agroecosystems in the same region (Markova 1995). The number of the common species is 22 and the taxonomic similarity is high: 79 %.

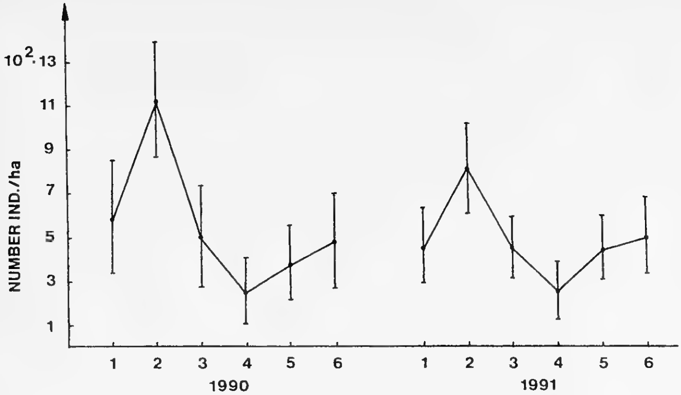


Fig. 3. Syrphid flies density in the investigated ecosystems. Vertical bars indicate 95 %, confidence intervals for arithmetic means. 1. Trun; 2. Breznik; 3. Divlya; 4. Pernik; 5. Kyustendil; 6. Dupnitsa.

In the different ecosystems the species number varies from 6 to 17 in 1990 and from 6 to 11 in 1991. For the whole investigation period the maximum species number is found in the ecosystem of Breznik, i.e. 17. The smallest number is that of the species established in the ecosystem of Trun and Pernik, i.e. 7 species in each of them. In the ecosystem of Kyustendil the species number is 13, in that of Dupnitsa 9, and in the ecosystem of Divlya 8.

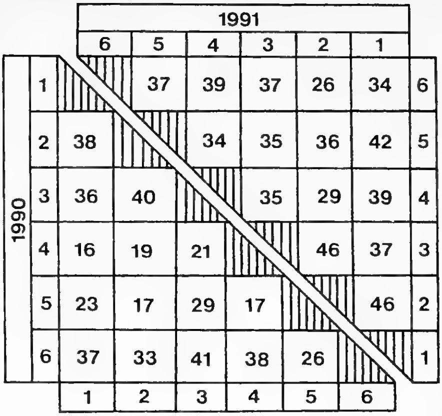
It becomes clear that the most frequent species in the region studied in 1990 are *S. scripta* and *M. mellinum*. They are found in all ecosystems and in each sampling period. The same species in the region plus *S. pipiens* were established as constantly permanent only in 1991. Permanent species, i.e. species with frequency over 50 % of the ecosystems in both years of the investigation are *M. corollae* and *P. tibialis*. The rest of the species has a lower degree of frequency. In 1990 8 species are accessory and 9 species accidental; in 1991 6 species are accessory and 7 species accidental.

The differences among the species spectra of the syrphid flies in the examined ecosystems should be considered as a result of various frequency of the species. The taxonomic community of the syrphid complexes is, within similar limits, varying from 23 to 63 % in 1990 and from 29 to 70 % in 1991 (Fig. 2). The similarity is middle in both years in most complexes. The complex in the ecosystem of Kyustendil, however is outstanding, because its taxonomic similarity with the other complexes is very low. In 1990 the taxonomic similarity of this complex varied from 23 to 42 % and in 1991 from 29 to 38 %.

The average density of the syrphid flies in the examined ecosystems presented during the time of study is given in Fig. 3. In 1990 the density of the syrphid flies is within the limits of 244 ± 75 ind./ha to 1.133 ± 128 ind./ha, and in 1991 from 253 ± 60 ind./ha to 811 ± 101 ind./ha. During the whole investigation period the density in the ecosystem of Breznik is the highest and reliably larger (2-3 × in 1990 and 1.6-3.2 × in 1991) than that of the rest of the ecosystems. The density in the ecosystem of Trun is the second in 1990, but in 1991 the second is that in the ecosystem of Dupnitsa. The density in these ecosystems is reliably larger with the exception of Pernik. The differences in the density of the rest of the ecosystems are statistically negligible. In both years the density of the ecosystem of Pernik is proved to be the lowest. The same is also established for most of the agroecosystems studied by Pernik (Markova 1995).

A difference among the syrphid complexes in the various ecosystems is observed in accordance with the density of the populations of the species (Fig. 4). In 1990 the similarity among the different complexes according to population density is within the limits of 16 to 41 % as in 9 of the variants it is middle and in 6 of them low. In 1991 it varies from 26 to 46 % and is middle in all variants.

The number of the dominant species, i.e. the species with relative number ≥10 % is from 2 to 5 in the different ecosystems. Generally 9 species appear to be dominant, namely: *E. balteatus, M. corollae, S. scripta, M. mellinum, P. tibialis, E. strigatus, E. arbustorum, C. viduata* and *S. pipiens*. However, only a part of the main species has a considerable relative part from the total number of all individuals. In 1990 these are 3 species, i.e. 54.1 % from all individuals. S. *scripta* has the biggest relative significance: 32.7 %,



1990 \ 1991	6	5	4	3	2	1	
1		37	39	37	26	34	6
2	38		34	35	36	42	5
3	36	40		35	29	39	4
4	16	19	21		46	37	3
5	23	17	29	17		46	2
6	37	33	41	38	26		1
	1	2	3	4	5	6	

Fig. 4. Similarity among the syrphid complexes in the investigated ecosystems on the base of the population density. 1. Trun; 2. Breznik; 3. Divlya; 4. Pernik; 5. Kyustendil; 6. Dupnitsa.

followed by *M. corollae* and *M. mellinum* with 10.7 % each. In 1991 the main species with the highest degree of dominancy are 4 with generally 69.5 %. Arranged according to their relative part of total number of individuals these are the following: *S. scripta:* 28.1 %, *M. mellinum:* 16.3 %, *S. pipiens:* 14.8 % and *M. corollae*: 10.3 %, which means that these are the very same 3 species as in 1990 plus *S. pipiens. S. scripta* is a constantly dominant species in both years of investigation. It is accompanied by *M. mellinum in* 1991.

The similarity among the complexes of the main species is within close limits in both years: 14-50 % in 1990 and 29-60 % in 1991. In most of the variants the taxonomic similarity among the complexes of the dominants is middle as it was found in the evaluation of the taxonomic similarity among the whole complexes in the different ecosystems. A clear differentiation of a complex from main species is not observed.

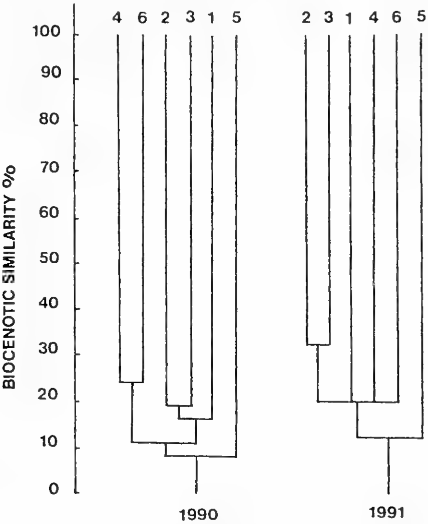


Fig. 5. Dendrogramme of the biocenotic similarity of the syrphid complexes in the investigated ecosystems. 1. Trun; 2. Breznik; 3. Divlya; 4. Pernik; 5. Kyustendil; 6. Dupnitsa.

An idea about the status of the syrphid cenoses in the different ecosystems is also presented by the integration index of Vainshtein. Summarizing the indexes for quantitative and qualitative similarity among the syrphid complexes it can be said that the index of Vainshtein varies from 4 to 24 % in 1990 in 1991 it is slightly higher and varies from 10 to 32 %. The extraordinary status of the complex in the ecosystem at Kyustendil is clearly seen especially considering the graphic expression of the biocenotic similarity shown in Fig. 5 with the help of cluster analysis. This determination is due to the climatic characteristics and the differences of the species composition of the natural grass ecosystem in the area of Kyustendil which affects directly and indirectly the qualitative indexes of the syrphid cenoses.

Considering the type of nutrition, the most recorded species belong to the group of the zoophages: 16 species. The saprophages are represented by e and the phytophages by only 2 species. The zoophages are 73 % of all individuals, the saprophages 26 %, and the phytophages only 1 %. *S. scripta* and *M. mellinum* predominate in the complex of zoophages and *S. pipiens* in the complex of saprophages mostly distributed in the region of investigation.

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3. Ax, P.: Das System der Metazoa I. Ein Lehrbuch der phylogenetischen Systematik. – Gustav Fischer Verlag, Stuttgart-Jena-New York, 1995. 226 S. ISBN 3-437-30803-3

Nahezu gleichzeitig wie Claus Nielsen (1995: Animal Evolution. Oxford Univ. Press, Oxford) legt nun auch Peter Ax, Emeritus aus Göttingen und Vorreiter der phylogenetischen Systematik in Deutschland, seine Sicht vom System der Metazoa vor. Im Gegensatz zum Vergleichswerk zeigt der vorliegende Band allerdings eine Reihe von grundlegenden Schwächen: Dieser Band leitet eine Serie von insgesamt 3 Bänden ein und behandelt die basalen Metazoa-Gruppen bis zu den Nemertinen. Wenn die Arthropoda allerdings mit gleicher Ausführlichkeit behandelt würden wie die Plathelminthes (für die Ax Fachmann ist), dann wären wohl 30 Bände nötig. Ein Lehrbuch bedarf einfach einer größeren Ausgeglichenheit.

Sowohl die theoretische Einführung als auch die Ausführungen zur Phylogenese der Metazoa sind teilweise fast unerträglich dogmatisch, vor allem dort, wo unser Wissen einfach noch begrenzt ist. Der unbedarfte Leser wird in den Glauben versetzt, daß praktisch alle Zusammenhänge bereits auf dem Tisch liegen und nur logisch aufgesammelt werden müssen. Phylogenetik beruht auf Wahrscheinlichkeitsschlüssen – diese Tatsache sucht man im vorliegenden Lehrbuch vergeblich. Fragwürdig auch die Praxis, Taxa ohne Autorenschaft anzugeben, vor allem dann, wenn sich darunter einige neue Vorschläge finden (z.B. Acrosomata = Ctenophora & Bilateria). Die Auswahl der Abbildungen ist nicht völlig klar. Abgesehen von Kladogrammen werden häufig Überblickszeichnungen der jeweiligen Gruppe angeboten – solche sind aber in jedem "normalen" Lehrbuch der Speziellen Zoologie zu finden. Hingegen werden viele der postulierten Synapomorphien nicht dargestellt. Unverzeihlich ist freilich die Tatsache, daß zum Zwecke der Eindeutigkeit der dargestellten phylogenetischen Zusammenhõnge die entsprechenden Alternativvorschläge anderer Autoren schlicht unterschlagen werden. Dies ist insbesonders im Kernbereich der Plathelminthes der Fall, wo sowohl neue Zusammenfassungen (etwa der Gruppe um R. Rieger) als auch alternative Hypothesen zur Phylogenie (etwa der Gruppe um K. Rohde) keinerlei Erwähnung finden. Eine Diskussion der vorliegenden molekularen Befunde sucht man ebenfalls vergeblich.

Auch dem Verlag müssen Vorwürfe gemacht werden. Text und viele Abbildungen sind vergleichsweise sehr groß geraten. Es ist daher um so weniger einzusehen, warum bei einer so geringen Seitenzahl drei Bände notwendig sind. Im direkten Vergleich mit dem so preiswerten Überblick von Nielsen (1995) hat man den Eindruck, daß hier dem Leser das Geld aus der Tasche gezogen werden soll.

Es wäre prinzipiell mehr als zu begrüßen, daß es endlich ein Lehrbuch zur Phylogenese der Metazoa gibt. Leider muß man zum Schluß kommen, daß das vorliegende Werk gerade als Lehrbuch einfach nicht empfohlen werden kann.

G. Haszprunar

4. Hayward, P. & J. S. Ryland: Handbook of the Marine Fauna of North-West Europe. – Oxford Univ. Press, Oxford-New York-Tokyo, 1995. 800 S. ISBN 0-19-854054-X (hbk), 0-19-854055-8 (pbk).

This volume is a more compact (about 1.500 species), updated and modified version based on the two-volume "The Marine Fauna of the British Isles and North-West Europe" by the same authors. It is written for the beginning student or interested amateur being faced with thousends of new animals when becoming introduced with the marine fauna of the given area. The volume starts with instructive general surveys on the geology of the region, a short account on marine biology and on general systematics, including a guide to the main groups and an introduction into zoological taxonomy and collecting. Each of the major groups has been worked up by a specialist and their expert knowledge can be felt throughout the volume. An illustrated glossary on the description of the animal's morphology at the beginning of each chapter will probably be very helpful for users. Each species is illustrated by ink drawings of high quality, keys facilitate identification of the species, distribution notes are also provided. The volume finishes with a fine reference list and taxonomic and subject indices.

This is a very handy and useful book to get an overview on the marine fauna of Northwestern Europe and to provide a provisional identification. Of course it cannot replace specialized identification guides and concerns mainly the benthic macrofauna. The quality and quantity (800 pp.) of content contrast lovely with the low price, in particular for the paperback version. Summing up, this book can be recommended without doubt for all potential users, they will greatly benefit from its content.

G. Haszprunar

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On the Magellanic Nudibranch *Gargamella immaculata* Bergh, 1894, and its synonymy to *G. latior* Odhner, 1926

(Gastropoda, Nudibranchia, Kentrodorididae)

Michael Schrödl

Schrödl, M. (1997): On the Magellanic Nudibranch *Gargamella immaculata* Bergh, 1894, and its synonymy to *G. latior* Odhner, 1926 (Gastropoda, Nudibranchia, Kentrodorididae). – Spixiana **20/1**: 81-92

Several specimens of *Gargamella immaculata* Bergh, 1894 from shallow waters off central and southern Chile were studied alive and by means of dissection. This species is redescribed for the first time from living specimens and information on their ecology is included. The observed range of external and internal morphological variation includes that of *Gargamella latior* Odhner, 1926, whose type specimen has been reexamined. The latter species is therefore considered to be a junior synonym of *G. immaculata*.

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Introduction

Approximately 50 different nudibranch species have been reported from the littoral zone of southern Chile, Patagonia and the Falkland Islands, which comprises the Magellanic faunal province. This is mainly a result of collecting by international expeditions and species descriptions by D'Orbigny (1835-1846), Gould (1852), Cunningham (1871), Abraham (1877), Rochebrune & Mabille (1891), Bergh (1884; 1894; 1898), Eliot (1907), Odhner (1926), Marcus (1959) and Kaiser (1980). Unfortunately, several species which were found during the last century remain inadequately described for their re-identification, and in this century many new species were established based on a few preserved specimens without knowing their specific morphological and geographical range. The consequence is an accumulation of poorly known or similar species being separated only by external characters or small anatomical differences and having wide geographical distances between their type localities. Revising the genera *Bathydoris* and *Austrodoris*, Wägele (1989, 1990) was the first to show that there is a wide intraspecific variability regarding external structures, body proportions and anatomical characters within several magellanic and antarctic dorid species. It has recently been found that several magellanic nudibranch species known from Patagonia have wide geographical ranges which can extend far into central and northern Chile (Schrödl, 1997).

Two similar magellanic species belong to the genus *Gargamella* Bergh, 1894: The type species *Gargamella immaculata* Bergh, 1894 was described from 2 preserved specimens. Later, Odhner (1926) found 10 additional specimens of *G. immaculata*, and he also established a new species, *G. latior* Odhner, 1926, based on a single preserved specimen which had a conspiciously broader mantle rim. Marcus (1959) separated the two species using minor external and radular differences and he also distinguished differences in the structure of the vas deferens. In separating these two species, Marcus' material differed from Odhner's data concerning certain intestinal and reproductive characters.

Since both, intraspecific variability and the wide geographical ranges of magellanic nudibranchs, were not known at the time that these *Gargamella* species were originally described, a study was initiated to determine which anatomical features best characterize the species. Observations on living animals were made for the first time and some aspects of their natural history described. The morphological variability regarding taxonomically important external, digestive and reproductive characters is compared with that of the type material of *G. latior* which was reexamined by the author.

Material and Methods

During the years 1991-1995 Scuba diving was used several times to look for nudibranchs at the Bahía de Coliumo, central Chile. Additional specimens of *Gargamella immaculata* Bergh, 1894 were found at Queule, near Valdivia, and in the Seno Otway, near Punta Arenas, in January 1995 (Fig. 6; Tab. 3). The nudibranchs were observed in situ and their habitat was noted. After collection, the 30 living nudibranchs and their spawn were externally described and measured using the maximal values of length, width and height of the crawling specimens. Some specimens were kept in aquaria for observation and to collect their faeces. The nudibranchs were relaxed using a 10 % $MgCl_2$ solution and fixed in 70 % ethanol together with their spawn. Twelve of the larger specimens were measured in their preserved condition and dissected. Two voucher specimens from Seno Otway were deposited in the Swedish Museum of Natural History, Stockholm (SMNH) under the number 1567, another specimen in the Zoologische Staatssammlung München under the number 19960725. Additionally, the holotype of *Gargamella latior* Odhner, 1926 (SMNH, no. 1015), 9 specimens of *G. immaculata* det. Odhner, 1926 from Burdwood Bank (SMNH, no.'s 584, 585), one specimen of *G. immaculata* det. Odhner, 1926 from Northern Argentina (SMNH, no. 580), and *G. latior* det. Marcus, 1959 (SMNH, no. 1519) were reexamined.

Results

External morphology. The 30 living specimens observed were homogeneously coloured in white, yellow or orange (for colour photographs see Schrödl 1996). Generally the rhinophores were somewhat darker. After preservation all specimens lost their colour becoming whitish grey or yellowish. Living specimens of this oval-shaped and rather flattened dorid species ranged from 7-50 mm in length, 4-31 mm in width and reached up to 10 mm in height. The dorsum is densely covered by slender caryophyllidia of various size giving the white specimens a characteristic fuzzy appearence (Fig. 1A) which Marcus (1959) described as "they look like they are wearing a polar bear coat". In preserved specimens the diameter of the caryophyllidia ranges between a half and a third of their height. The caryophyllidia usually reach about 0.2-0.3 mm in length, in the largest specimen a few are up to

Tab. 1. List of *Gargamella immaculata* specimens anatomically examined.

Specimen No.	Location	Colour in life	Body length live; fixed [mm]	Free mantle rims/body breath	Radula dimensions [mm]	Radula formula	No. of vestibular hooks
1	Coliumo	orange	19; 15	0.35	2.7 × 2.1	80 × 79.0.79	6
2	Coliumo	orange	18; 12	0.50	2.8 × 1.9	60 × 73.0.73	5
5	Coliumo	orange	46; 28	0.50	4.8 × 3.5	91 × 98.0.98	7
6	Coliumo	yellowish	50; 40	0.45	5.5 × 4.2	88 × 95.0.95	6
7	Coliumo	orange	30; 23	0.65	4.5 × 3.3	79 × 84.0.84	6
8	Coliumo	white	29; 22	0.65	4.2 × 2.8	71 × 81.0.81	7
14	Seno Otway	yellow	– ; 26	0.40	4.8 × 3.5	67 × 85.0.85	7
15	Seno Otway	yellow	48; 31	0.60	4.2 × 3.4	63 × 80.0.80	5
16	Seno Otway	yellow	– ; 22	0.60	3.5 × 3.0	68 × 81.0.81	6
20	Queule	white	– ; 17	0.55	3.9 × 3.2	69 × 79.0.79	5
21	Queule	white	– ; 15	0.35	3.2 × 2.9	73 × 89.0.89	5
22	Queule	orange	– ; 14	0.35	3.6 × 2.9	68 × 84.0.84	6

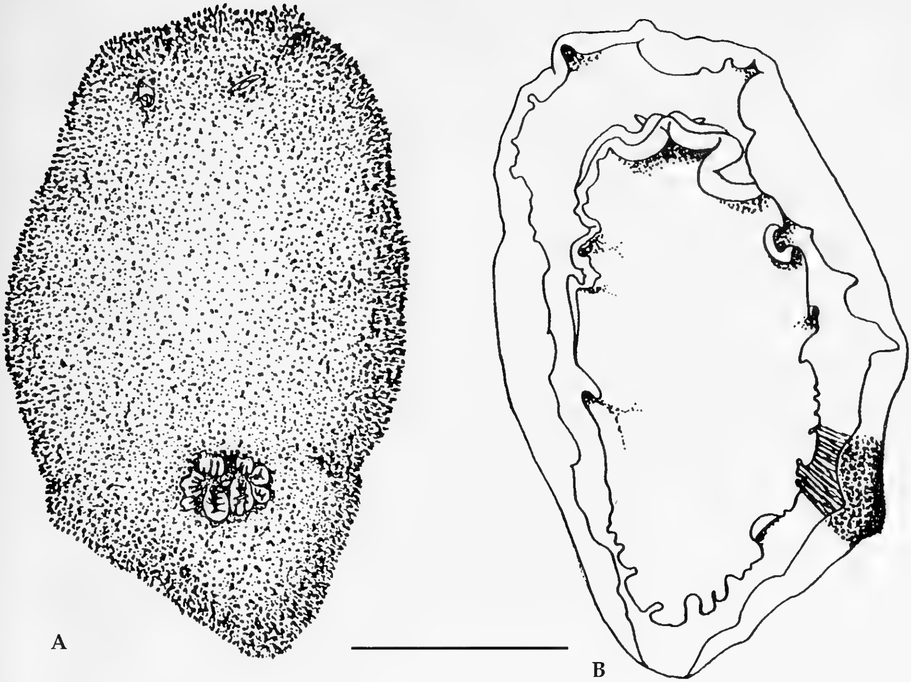

Fig. 1. External morphology of *G. immaculata* (drawn from photographs of the preserved specimen 1). **A.** Dorsal view. **B.** Ventral view. Scale bar: 0.5 mm.

0.8 mm. The rounded tip of the papilla is surrounded by 4-8 needlelike spicules. Ventrally, lines of radial spicules or connective fibres are visible through the transluscent mantle (Fig. 1B).

Rhinophoral sheaths are slightly elevated in living specimens, slightly or not at all elevated in preserved ones, and covered with average sized caryophyllidia. The smallest specimens possess about 10 rhinophore lamellae, the largest ones up to 18. The branchial sheaths are sometimes slightly elevated. Eight to twelve bi- or tripinnate branchial plumes surround the anal papilla in a complete circle. The expanded gills reach up to 12 mm in diameter in the largest living specimen.

The oral tentacles are long and digitiform in living specimens. In preserved ones, tentacles may be long and slender or heavily contracted and flattened lobes, even in the same individual. The foot was narrow in living specimens, but its width varied depending on the mode of movement. In preserved material, the foot width reaches $^{1}/_{3}$ to $^{2}/_{3}$ of the total body width (Tab. 1). Anteriorly, the foot is bilabiate, the upper lip is notched in the middle. At its posterior end the foot is slightly tapered.

Internal morphology. Twelve preserved specimens with a length varying from 12-40 mm were dissected. The blood gland covers the cerebral system forming an anterior longitudinal and a posterior transverse lobe. An outline of digestive and reproductive organs in situ is given in Figure 2. The positions and dimensions of these organs generally agree with Odhner's descriptions (Odhner 1926), but vary considerably regarding different specimens: Usually the ample prostate fills the anterior left side of the body between the pharynx, the median tubular esophagus and posteriorly, the digestive gland, and is visible in a dorsal view (Fig. 2A). In some specimens the esophagus forms a more or less large loop partly covering the prostate (Fig. 2B). In several individuals the prostate has a more median position, in one specimen it lies to the right of the esophagus under the digestive gland (Fig. 2C).

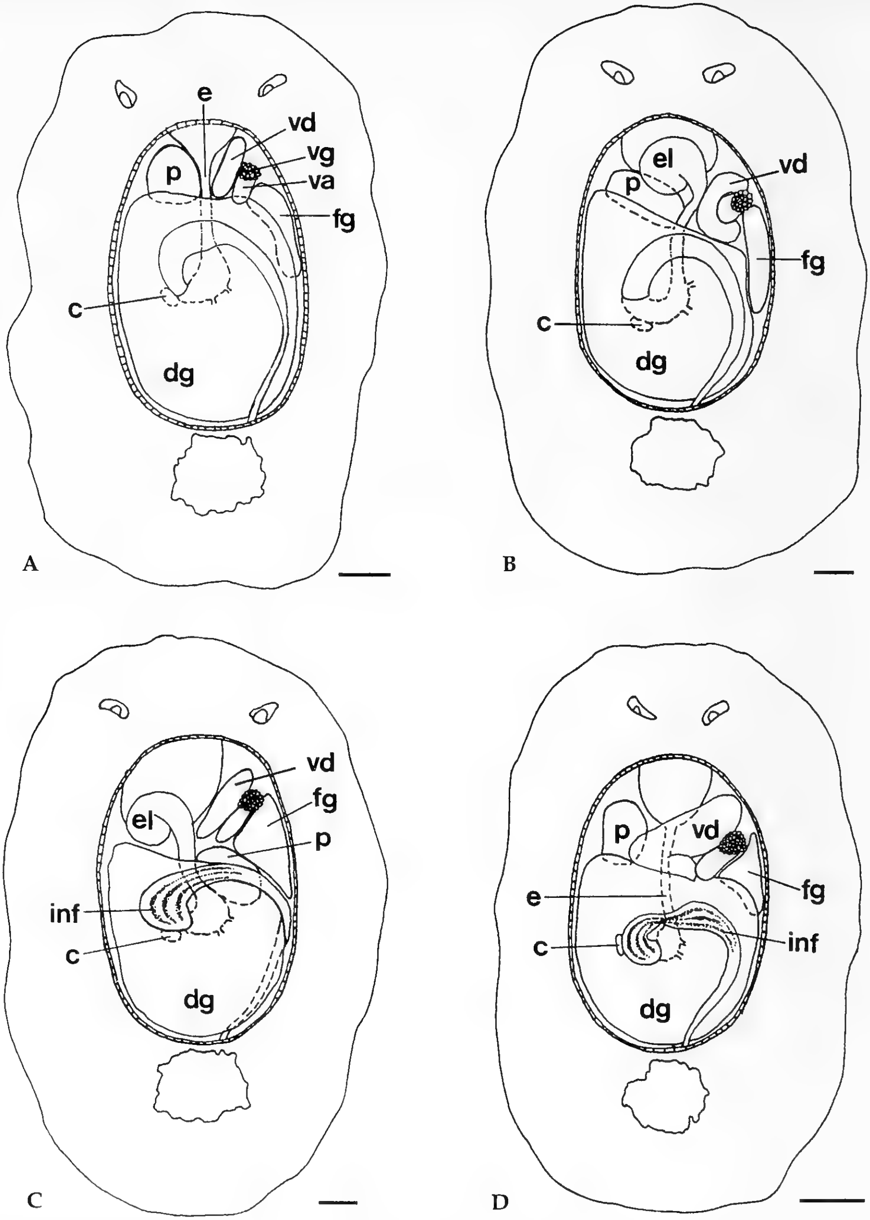

Fig. 2. Variation of internal organs in *G. immaculata*; stylized drawings from photographs of dorsally opened specimens. **A.** Usual positions (specimen 1). **B.** Looped esophagus (specimen 8). **C.** Looped esophagus, prostate displaced to the right body side (specimen 7). **D.** Long vas deferens extending to the left side, caecum reaching the liver surface, strongly folded proximal intestine (specimen 2). **c.** Caecum. **dg.** Digestive glands. **e.** Esophagus. **el.** Esophagus loop. **fg.** Female glands. **inf.** Intestinal folds. **p.** Prostate. **va.** Vagina. **vd.** Vas deferens. **vg.** Vestibular gland. Scale bars: 0.2 mm.

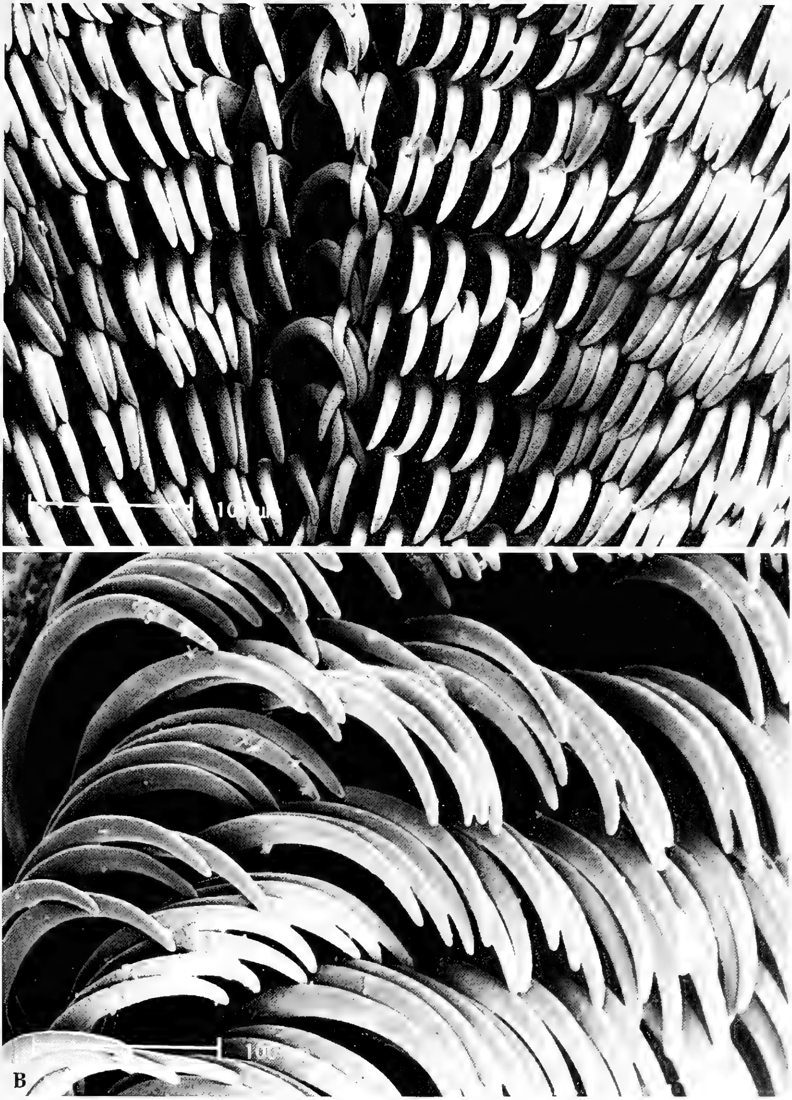

Fig. 3. Radula of *G. immaculata* (specimen 5). **A.** SEM-photograph of inner lateral teeth. **B.** SEM-photograph of outer lateral teeth. Scale bars: 0.1 mm.

In the anterior right body portion the vas deferens, the granular vestibular gland, the large vagina and the female gland mass are visible. Usually the distal part of the vas deferens which is ensheathed by a muscular layer is limited to the right body side (Fig. 2A-C), but in several specimen the vas deferens extends into the left body portion crossing the pharynx and covering the esophagus and parts of the prostate (Fig. 2D).

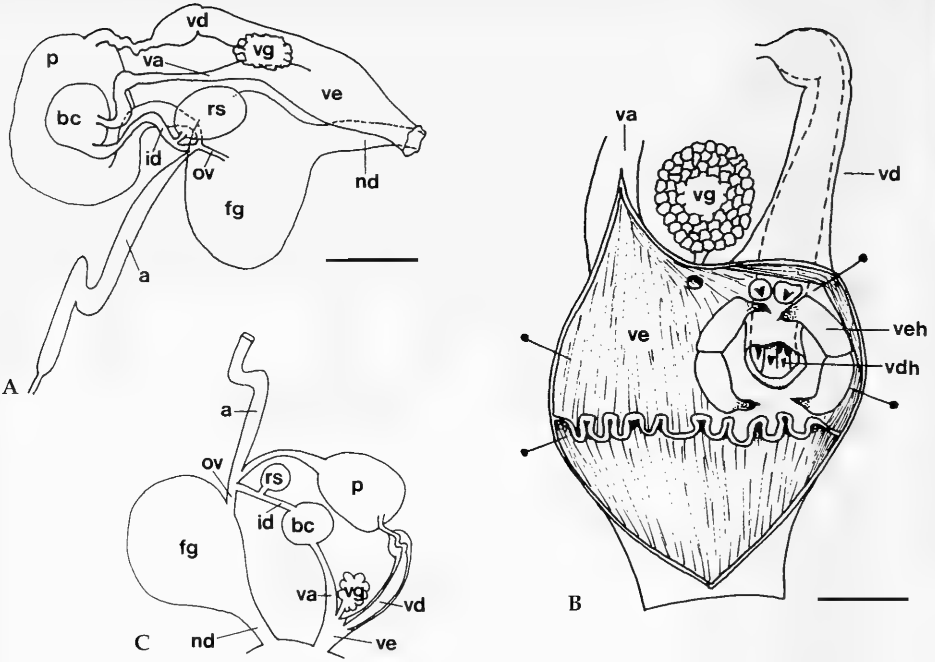

Fig. 4. Reproductive organs of *G. immaculata*. **A.** Reproductive system of specimen 7 in situ (dorsal view). **B.** Vestibular structures of specimen 6. **C.** Schematic outline of the genital system. **a.** Ampulla. **bc.** Bursa copulatrix. **fg.** Female glands. **id.** Insemination duct. **nd.** Nidamental duct. **ov.** Oviduct. **p.** Prostate. **rs.** Receptaculum seminis. **va.** Vagina. **vd.** Vas deferens. **vdh.** Vas deferens hooks. **ve.** Vestibule. **vg.** Vestibular gland. **veh.** Vestibular hooks. Scale bars: 1.0 mm.

Digestive system. The smooth labial cuticule is transparent, yellowish or brownish. The radula reaches 5.5 × 4.2 mm in the biggest specimen and consists of 60-91 rows with 73-98 simply hooked and rather uniform teeth per half row (Tab. 1, fig. 3). The teeth are very dense near the rhachis, but a rhachidian tooth is absent. The maximum tooth height is reached in the centre of the half rows and measures up to 0.25 mm, inner and more lateral teeth are slightly smaller. The smallest studied specimen totally had 60 rows, but only 44 of these were fully developed. The salivary glands are ribbon-like and thin. The esophagus may be tubular or widened, sometimes forming a loop partly covering the pharynx before extending straight backwards to the stomach (Fig. 2). The stomach lies medially within the digestive gland and bears on the left side a small bulbous caecum which reaches the surface of the digestive gland in some specimens (Fig. 2D). The intestine extends to the top of the digestive gland in a wide loop to its anterior border and then follows its right edge backwards to the anal papilla. The inner epithelium of the esophagus and of the anterior part of the intestine is more or less folded longitudinally. In some specimens the intestinal folds are well developed and strengthened, but there is no typhlosolis (Fig. 2D). The various portions of the stomach and the intestine may be more or less swollen; only the distal part of the intestine constantly forms a thin tube. In all specimens the stomach and the intestine are partly filled with brownish masses containing spicules of sponges and sand granules.

Reproductive system. An overview of the reproductive system is given in fig. 4. The ovotestes cover the surface of the digestive gland. The thin hermaphroditic duct is long and about 150 µm in diameter. It passes into an up to 0.5 mm thick ampulla which is closely attached to the prostate. After a conspicious loop a thinner duct leads to the female gland mass where it divides into a short oviduct

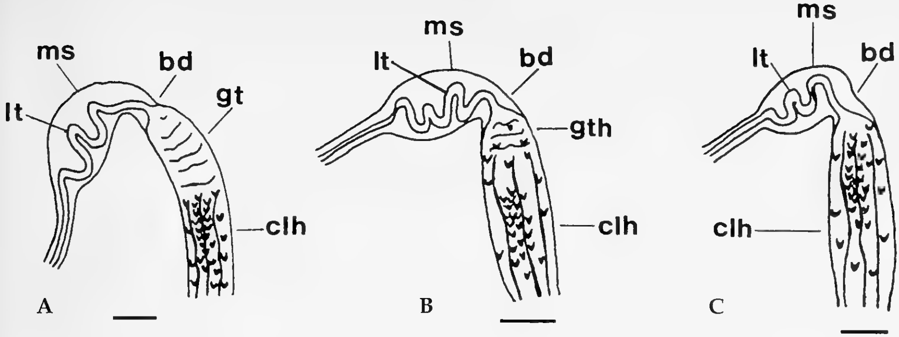

Fig. 5. Scheme of vas deferens variation in *G. immaculata*. **A.** Specimen 1. **B.** Specimen 8. **C.** Specimen 20. **bd.** Bend. **clh.** Cuticular longitudinally folded part with hooks. **gt.** Glandular transversely folded portion without hooks. **gth.** Glandular tranversely folded portion containing hooks. **lt.** Looped central tube. **ms.** Muscular sheath. Scale bars: 1.0 mm.

entering the female gland mass and the broader, flattened, vas deferens. The latter widens to 6 mm forming an amply rounded prostate and afterwards continues as a broad duct. After a curve the vas deferens passes into a thin, curved tube which is ensheathed by a muscular layer. Fusing with the vestibular sheath, this muscular layer suddenly widens bearing internally a thin central tube which usually forms several loops (Fig. 5). Where the vas deferens is externally more or less constricted and bent, internally the thick muscular sheath usually disappears and the central tube widens into an ample lumen. In the following portion of the vas deferens its lumen is covered by soft, transverse folds. Between these folds usually there are some small translucent cuticular hooks. Before ending in the vestibule, the epithelial lumen of the vas deferens is covered by a strong cuticular wall bearing many irregularly longitudinal folds. These folds bear conspicuous brownish hooks, especially in the dorsal posterior area, where in several specimens cuticular folds with up to 40 strong hooks are aggregated. Ventrally, near the vestibular opening of the vas deferens, there is another area where hooks may be concentrated. Beside these aggregations, in all specimens there are randomly distributed hooks. The total number of hooks varies between about 60 to 100 in the different specimens. The hooks have a diameter up to 0.15 mm at their base and a height up to 0.1 mm. The most distal cuticular part of the vas deferens passes into the vestibular wall. In some specimens the distal vas deferens is slightly everted into the vestibule (Fig. 4B). Marcus (1959) showed that on an individual of *G. immaculata* the cuticular hooked part of the vas deferens can be completely everted forming a shaft.

This complex structure of the distal vas deferens and the proportions of its different parts may vary considerably (Fig. 5): In several specimens a long transversely folded, glandular zone without hooks is present between the portion with a looped central tube and the part with longitudinally folded cuticle and hooks (Fig. 5A), as described in *G. immaculata* by Marcus (1959). In other specimens, the transversely folded zone may be short containing many hooks (Fig. 5B), or may be absent (Fig. 5C) as described in *G. latior* (Marcus 1959). In the two largest dissected specimens, the central tube after the bend of the vas deferens continues for some distance as a thin, more or less looped duct before widening into a lumen.

Around the opening of the vas deferens into a common vestibule, the fused vas deferens and vestibular wall forms a thickened cuticular ring containing 5, 6 or 7 very strong hooks (Fig. 4B). Laterally there are two fused hooks on each side which reach a length up to 1.5 mm, dorsally there are 1-3 separate hooks with a diameter up to 0,5 mm. Beside these structures the cuticular and folded vestibular wall lacks further hooks. The rounded and flattened, granular vestibular gland, which measures up to 1.5 mm in diameter, enters the vestibule with a short duct. The vagina is ample, its walls are longitudinally folded, cuticular, but softer than those of the vas deferens and without hooks. The vagina narrows to a thin duct before passing into the spherical bursa copulatrix which reaches a diameter up to 3 mm and is covered by the prostate. Separately from the insertion of the vagina the vaginal duct leaves the bursa copulatrix, runs adjacent to the proximal vas deferens and forms a narrow

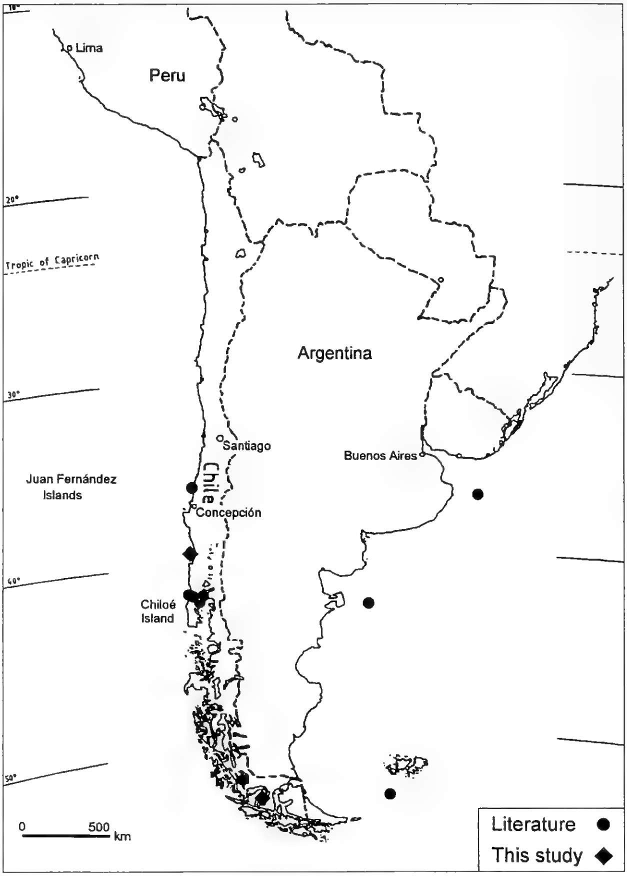

Fig. 6. Distribution of *G. immaculata*.

loop where the short duct of the oval receptaculum seminis inserts. The insemination duct enters the oviduct near its separation from the spermoviduct. The oviduct leads into the female gland mass which can be separated into rounded yellowish lobes of the albumen gland and the translucent mucous gland. The nidamental duct opens under the vestibular opening.

Habitat. All specimens were found in semiprotected bays on stony or hard substrates, often on vertical rocks near encrusting sponges, at 1 to 11 m depth.

Food. In the Bahía de Coliumo some specimens of *G. immaculata* were observed to feed on yellow encrusting demosponges. The orange body (and spawn) colouration of most specimens found in the Bahía de Coliumo may be the result of pigment accumulation from these yellow sponges. However, there were also a few large whitish specimens from this locality (see Tab. 1). In the intestinal system of all dissected specimens, spicules of sponges and sand granules were found. The intestine of one specimen contained a 5 mm long hydrozoan tube.

Life cycle and reproduction. From the literature and personal data, specimens of *G. immaculata* were found during the whole year with exception of the winter months June to August. Generally, collecting conditions in southern waters are poor in these months and a permanent occurence of *G. immaculata* is probable.

Tab. 2. Comparative information on external and internal morphological characters of all known specimens of *Gargamella immaculata* including the results of the reexamination of *G. latior* Odhner, 1926, *G. immaculata* det. Odhner, 1926 and *G. latior* det. Marcus, 1959. Bibliographic data in quotation marks.

Author	Bergh, 1894	Odhner, 1926			Marcus, 1959		this paper
Species	*G. immaculata*	*G. immaculata*	*G. immaculata*	*G. latior*	*G. immaculata*	*G. latior*	*G. immaculata*
Collecting site	"ENE off" Cabo Delgado	"Off northern Argentina"	"Burdwood Bank"	"Ultima Esperanza"	"Chiloé" St. M 21; St. M 42; St. M 98	"Chiloé St. M 24"	Bahía de Coliumo Queule Seno Otway
No.specimens reported and notes	"2"	1, partly dissected (SMNH, no. 580)	9, 4 specimens partly dissected, 5 entire (SMNH; no's 584, 585)	1, partly dissected (SMNH, no. 1015)	"7"	1, heavily dissected, only parts of the mantle preserved (SMNH, no. 1519)	30, 12 specimens partly dissected
Legth/width/height [mm] (preserved)	"20/11/9"	12/9/9	max. 20/16/10	15/14/6 foot contracted	"13-22/8-18/up to 12. Along the dorsal surface of M 98: 45 mm long"	"17/11/- deformed	"12-40/7-26/3-14
Width free mantle rim/total body width	"1/3"	1/9 contracted	2/5-1/2	2/3	"M 98: 3/5"	2/3	1/3-2/3
Tubercle shape	"dense small cylindrical tubercles"	"very dense papillae, upto 0,3 mm high, their point surrounded by 4-7 long spicules"	"small papillae up to 0,2 mm high, around their point up to 10 small conical prolongations". No spicules.	"Dense caryophyllidia up to 0,15 mm in height and 40-60 µm in diameter"	"Up to 0,15 mm high caryophyllidia. Spicules dissolved"	"Up to 0,2 mm high caryophyllidia. Each bears 5-7 spicules"	Slender caryophyllidia mostly up to 0,3 mm in height and about 0,1 mm in diameter.4-8 needle like spicules
Number of gills	8 tripinnate	9 bipinnate	9-11 bipinnate	9 bipinnate	"M 42: 7 bitripinnate M 21, 98: 10 tripinnate"	"8 bipinnate"	8-12 bi-tripinnate
Radula formula	"46-48×(60-67.0.60-67)"	–	"42×(80.0.80)" incomplete parts	63×(71.0.71)	"46-68×(77-90.0.77-90)"	70×(75.0.75)	60-88×(73-95.0. 73-95)
Intestinal structure	not mentioned	folded but soft	smooth-folded, soft-slightly hardened	hardened and folded	not mentioned	not mentioned	smooth-folded, soft-slightly hardened
Total number of vas deferens hooks (aprox.)	"100"	–	"well described by Bergh", not examined in detail	"many" not examined in detail	"40"	"80 or more"	60-100
Number of vestibular hooks	–	6	–	–	"about 5"	"7"	5-7

Two pairs copulated in the laboratory in April 1992. One pair copulated in situ and in aquaria in March 1994. Also in March 1994, some spawn could be found in situ on vertical rocks surrounded and well camouflaged by yellow sponges at 2 m depth. The spawn was an orange, 2 mm broad ribbon forming a spiral with a diameter of 2.5 cm. The preserved ribbon contains single, round white eggs with a diameter of 100-120 µm, each one within a rounded to oval capsule of 120-150 µm diameter.

Discussion

The specimens described here all belong to the same species. Examination of their external and internal morphology shows considerable variation regarding some characters. However, there are always intermediate forms and there are no specimens which are extreme in a number of important characters. Copulations have been observed between a wide range of specimens in the aquarium. According to Edmunds (1982) mating indicates conspecifity between nudibranchs. Specimens collected in the Seno Otway appear to have more gills with fewer branches than specimens from the northern locations (10-12 bipinnate vs. 8-10 bi-tripinnate). However, no other tendencies are evident when comparing different populations (see Tab. 1).

The species examined belongs to the genus *Gargamella* Bergh, 1894 which is caracterized by its densely tuberculate dorsum, its characteristic armature of the vas deferens, the presence of a vestibular gland and of a well developed prostate (Bergh, 1894). It differs from the poorly known *Gargamella novozealandica* Eliot, 1907 by its rounded anterior foot margin which does not bear projections, and its much higher number of radular rows and teeth (60-91 × 73-95 vs. 18 × 20). From *Homoiodoris novzealandiae* Bergh, 1904, which was presumed to be a *Gargamella* by Odhner (1926), it differs clearly by its higher number of radular rows and teeth per half row (60-91 × 73-98 vs 26-29 × 31-36), its simple hookshaped, not denticulate radular teeth and by its ungrooved labial tentacles (Bergh 1894). Due to its uniform white to orange colouration, this Chilean species can be easily distinguished from the two dark spotted and not yet internally described *Gargamella* species found in South Africa by Gosliner (1987). The specimens described here show characters of the two known Chilean species, *Gargamella immaculata* Bergh, 1894 and *G. latior* Odhner, 1926.

Tab. 2 shows the range of variation of taxonomically important characters of the here described specimens comparing it with the available bibliographic data of *G. immaculata* and *G. latior*, which is supplemented by the reexamination of the type specimen of *G. latior* Odhner, 1926, the specimens assigned to *G. immaculata* by Odhner (1926) and the specimens assigned to *G. latior* by Marcus (1959). The living material is white, yellowish or orange, but uniform in colouration. After fixation it becomes grey white in colour as was the reexamined museum material. The 12 preserved specimens dissected during this study, with lengths from 12-40 mm, cover the bibliographic range and extend the maximal preserved length from 22-40 mm. Regarding the nominal character of *G. latior*, the width of the free mantle rim, Bergh (1894), Odhner (1926) and Marcus (1959) reported free mantle rims of approximately ⅓ to ½ of the total body width for *G. immaculata* and Odhner and Marcus of about ⅔ for the two known specimens of *G. latior*. Observations of the living material showed that they had broad, but due to their movement, variable widths of the free mantle rims. After preservation they measured ⅓ to ⅔ of the entire body width and therefore include the range of all known Chilean specimens of both *Gargamella* species (Tab. 2). Regarding the form, dimensions and density of the tubercles, *G. immaculata* cannot be distinguished from *G. latior* by bibliographic data, nor from the specimens examined in this study. Further external characters used to distinguish *G. latior* from *G. immaculata*, like elevated rhinophorical sheaths, or shape and direction of the labial tentacles (Odhner 1926, Marcus 1959), are variable in the specimens examined and strongly influenced by preservation.

Odhner (1926) noticed different numbers of radular rows when comparing *G. immaculata* with his single specimen assigned to *G. latior*. According to Marcus (1959) the number of 42-68 radular rows and 60-90 teeth per half row of *G. immaculata* nearly covers the variation known from *G. latior* (63-70 × 71-75.0.71-75). As seen during the reexamination of the material studied by Odhner, the apparently smaller number of radular rows in *G. immaculata* is partly due to his examining a damaged radula having 42 rows but lacking an unknown number of additional rows. The specimens described here possess 60-91 rows and 73-98 teeth per half row. The increase in rows of teeth and teeth per half row is due to larger body sizes of the examined material (Tab. 1). According to Odhner (1926) the proximal intestine of *G. latior* is characterized by strong cuticulary structures, in contrast to *G. immaculata* which has a soft intestinal wall. However, Marcus (1959) did not mention any intestinal cuticle in his specimen assigned to *G. latior*. In the 12 specimens dissected during this study the digestive system shows a great variability in structure and position (Fig. 2): Whereas in several specimens the intestinal wall was folded, in other specimens it was less or none at all. Reexamination of the five partly dissected specimens assigned to *G. immaculata* by Odhner shows that there are transitional stages with more or less folded and somewhat hardened intestinal walls, even though none were as strongly hardened as in the type specimen of *G. latior*; this may be a preservation artifact.

Odhner (1926) did not notice any differences when comparing the reproductive system of *G. immaculata* and his individual of *G. latior*, but Marcus (1959) found that his single *G. latior* possessed about 80 hooks in the vas deferens and lacked a glandular soft-walled part of the vas deferens, whereas specimens he assigned to *G. immaculata* only possessed about 40 hooks and a hook-free glandular part was present. In addition, his *G. latior* had more large vestibular hooks than his *G. immaculata* (7 vs. 5). Nevertheless, Marcus (1959) himself doubted the taxonomical importance of these reproductive differences. The data presented in this study show clearly that the total number and the positions of the about 60-100 hooks in the vas deferens can vary considerably in different specimens. Moreover, it is difficult to detect small translucent hooks between the soft folds of the vas deferens in specimens considered to be *G. immaculata* and so some hooks could have been overlooked. There are transitional stages ranging from the presence of a long, transversely folded part of the vas deferens to its complete absence. The number of vestibular hooks seen in the specimens examined in this study is 5, 6 or 7 which encompasses the range reported for both, *G. immaculata* and *G. latior*.

Lacking further distinguishing features, it must be stated that all known specimens assigned to *Gargamella immaculata* or *G. latior* lie nearly completely within the range of variation of the newly collected material of the species examined during this study. Consequently, *Gargamella latior* Odhner, 1926 must be considered a junior synonym of *Gargamella immaculata* Bergh, 1894.

The morphological variability shown by this species confirms the conclusion of Wägele (1990), that Odhner (1926), and also Marcus (1959) as the most important subsequent author, sometimes overstressed the taxonomical importance of minor details in their studies of magellanic nudibranchs. The wide range of morphological and anatomical variation in *G. immaculata*, suggests that a review of several other Chilean and Patagonian nudibranch species, using sufficient material examined live, would give greater knowledge about a fauna which has been scientifically neglected for several decades.

Zoogeography. The known geographical range of *G. immaculata* extends from Argentina (37°50'S, 56°11'W) and the Burdwood Bank (Odhner 1926) in the Atlantic to Patagonia (Bergh 1894, Odhner 1926), Chiloé Island (Marcus 1959) and Bahia de Coliumo, central Chile (Schrödl 1997), in the southeastern Pacific. In addition, *G. immaculata* was found in this study at Queule, Valdivia and Seno Otway, near the Magellan Strait (Fig. 6, tab. 3). Ranging from northern Argentina over Patagonia to central Chile, *G. immaculata* shows a typical magellanic distribution with an overlap into the Peruvian faunal Province north of Chiloé Island (41°S). The genus *Gargamella* seems to be limited to the cold-temperate and subantarctic waters of the southern hemisphere, species are exclusively reported from New

Tab. 3. Known records of *Gargamella immaculata*.

Species	Collecting Locality
Gargamella immaculata Bergh, 1894	'ENE off Cabo Delgado' (42°24'S, 56°23'W (p. 158) or 42°24'S, 61°38'W (p. 172))
Gargamella immaculata det. Odhner, 1926	'North of Argentina' (37°50'S, 56°11'W, Odhner 1926). Burdwood Bank (53°41'S, 61°09'W, Odhner 1926) or 53°45'S, 61°10'W (labels of the museum's material))
Gargamella latior Odhner, 1926	Ultima Esperanza (51°40'S, 72°40'W)
Gargamella immaculata det. Marcus, 1959	Gulf of Ancud (41°48'50"S, 73°09'40") Gulf of Ancud (42°20'50"S, 73°22'00"W) Northern Chiloé (41°50'10"S, 73°51'20"W)
Gargamella latior det. Marcus, 1959	Reloncaví (41°44'25"S, 72°55'45"W)
Gargamella immaculata det. Schrödl (1997)	Bahía de Coliumo (36°32'S, 72°57'W)
Gargamella immaculata (present paper)	Queule (39°23'S, 73°13'W) Seno Otway (53°07'S, 71°22'W)

Zealand, the magellanic area and Southern Africa (Gosliner 1987).

Concerning vertical distribution, a total of 51 specimens of *G. immaculata*, including *G. latior*, were collected between 1 m and 140-150 m depth. Contrary to Marcus (1959), who regarded *G. immaculata* as a deeper water species, in the present study it is shown to be a common species in the shallow water of the Bahía de Coliumo, Queule and Seno Otway.

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A new *Semicassis* from Western Australia

(Mollusca, Gastropoda, Cassidae)

Kurt Kreipl

Kreipl, K. (1997): A new *Semicassis* from Western Australia (Mollusca, Gastropoda, Cassidae). – Spixiana **20/1:** 93-94

Semicassis westralis, spec. nov. is described and compared with similar species of the *Semicassis pyrum* group.

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Semicassis westralis, spec. nov.

Types. Holotype: Port Hedland, Western Australia, from 270 m (Zoologische Staatssammlung München, Reg. No. 19960634). – Paratype: Same data (Collection K. Kreipl, Öhringen).

Type locality. Port Hedland, Western Australia, from 270 m depth.

Description of holotype

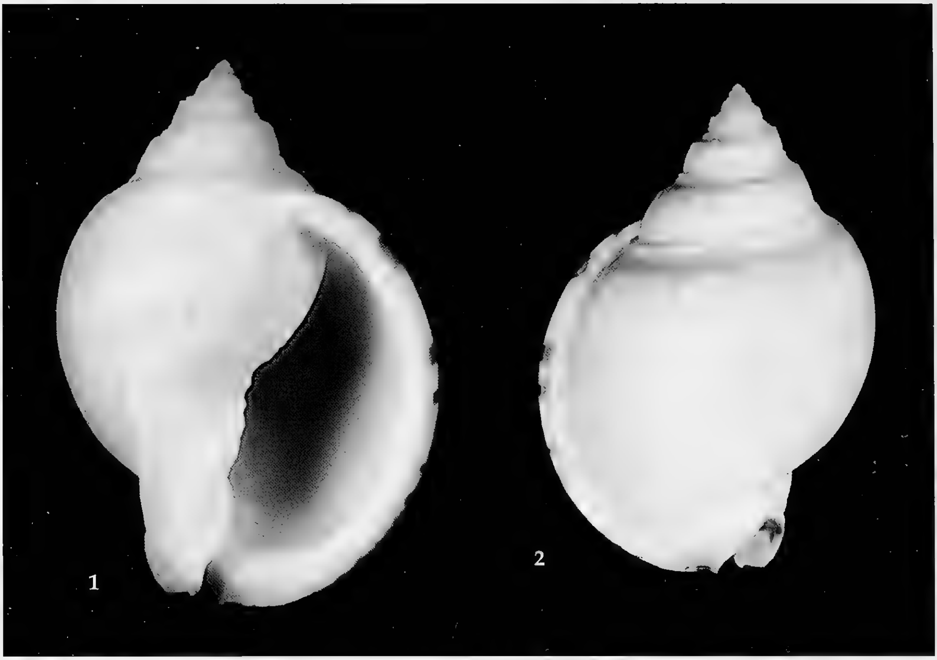
Height: 51.7 mm, width: 31.1 mm. Shell moderately thick with a high spire; protoconch consisting of 2 ½ smooth whorls; teleoconch consisting of 5 whorls, body whorl large and bulbous giving the shell a pyriforme shape, body whorl sculptured with numerous fine growth lines; early whorls strongly spirally striate and finely axially striate with distinct knobs on the shoulder, these knobs get obsolete on the shoulder of the body whorl; flat subsutural groove; outer lip with small elongate teeth along its entire length getting weaker at the posterior end of the aperture; columella ridged with more or less prominent lirae. Colour creamy-white with 5 spiral bands of very weak yellowish diffuse spots, outer edge of outer lip with 14 reddish-brown stripes; siphonal canal tipped with brown; inside of aperture creamy-white.

Measurements of paratype: Height: 56.1 mm, width: 36 mm.

Remarks. This new species is pictured in Barry Wilson (1993) "Australian Marine Shells", vol. 1, pl. 37, fig. 8, as *Semicassis* cf. *pyrum*.

Discussion

This new species is obviously closely related to *Semicassis pyrum* (Lamarck, 1822), especially to the relatively high-spired form *stadiale* Hedley, 1914, but differs by its more pyriform shape and the ridged columella. *Semicassis pyrum* f. *stadiale* grows much bigger (up to 110 mm) and has less colour stripes on its outer lip. From *Semicassis pauciruge* (Menke, 1843) it differs by its thinner shell, the knobs on the shoulder of the early whorls of the teleoconch and by the lack of the yellow-brown colour of the interior of the aperture.



Figs 1, 2. *Semicassis westralis,* spec. nov. Holotype. **1.** Ventral view. **2.** Dorsal view.

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5. Colditz, G.: Nützlinge und Schädlinge – Tiere als Helfer im Ökosystem Garten. – Naturbuch Verlag, 1992. 96 S.

Unter der Fülle von Handbüchern für unsere Gärten und für den Schutz unserer meist nicht bodenständigen Zierpflanzen zeigt auch dieses Buch die anthropozentrische Sichtweise, Tiere in Schädlinge und Nützlinge zu klassifizieren. Dadurch kommt es vielfach zu Fehleinschätzungen, da die Besiedler unserer Gärten im Lebenszyklus und unter bestimmten Umweltbedingungen ihre "Beziehung zum Menschen" ändern, indem z.B. Asseln Pflanzenwurzeln und Ohrwürmer Blütenknospen fressen im Widerspruch zu ihrem "Nützlingsstatus". Im vorliegenden Buch, das sich durch die Häufung wunderschöner Bilder namhafter Tierfotografen auszeichnet, wird zuerst das Ökosystem 'Garten' vorgestellt mit den regulierenden Eingriffen, die bereits Schadwirkungen eingrenzen können. Gerade an dieser Stelle wäre eine detailliertere Darstellung der heutigen Kenntnisse über Pflanzenverträglichkeiten, Pflanzen als Abwehr und Schutz für andere Nutzarten wünschenswert gewesen. Es folgt eine Vorstellung der einzelnen Tiergruppen, die mehr oder weniger in unseren Gärten zu finden sind. Nicht alle graphischen Beispiele beziehen sich auf Gartenbesiedler. Dennoch sind die Beschreibungen kurz und informativ über Regenwürmer, Schnecken, Spinnentiere, Asseln, Tausendfüßer, das Heer der Insekten von den kleinen bodenlebenden Springschwänzen bis zu den Bienen, denen als Bestäuber und nicht als Honigsammler herausragende Bedeutung zukommen, Lurchen, Kriechtieren, Vögeln und Säugetieren. Ein Kapitel ist der Wirkungsweise des biologischen Pflanzenschutzes gewidmet mit den Beschreibungen entsprechender Verfahren, die leider immer noch zu wenig eingesetzt werden. Eine Gegenüberstellung zur herkömmlichen "Chemischen Keule" wäre hier ebenso nützlich gewesen wie z.B. bei deren Einsatz die Aufzählung der Schädigungen anderer Arten als der Zielgruppe, etwa beim Einsatz von *Bacillus thuringiensis*, eine sog. biologische Bekämpfung! Den Abschluß dieses Gartenbuches bildet der Hinweis auf den Einsatz von Nützlingen in Gewächshaus und Freiland. Bei diesem Buch handelt es sich sicher um ein Hilfsmittel zum Verständnis der Tiere im Garten, was die Biologie betrifft. An mehreren Stellen würde man eine Vertiefung der Problematik der Schaden-Nutzenanalyse erwarten, auch wenn der Leserkreis bei den Gartenliebhabern zu erwarten ist. Auch fehlt ein Hinweis auf die Bedeutung der Tiere als Vektoren von pathogenen Mikroben und Pilzen.

E.-G. Burmeister

6. Barkemeyer, W.: Untersuchungen zum Vorkommen der Schwebfliegen in Niedersachsen und Bremen (Diptera: Syrphidae). – Naturschutz und Landschaftspflege in Niedersachsen 31. – Niedersächsisches Landesamt für Ökologie-Naturschutz, Hannover, 1994. 514 S.

Diese wissenschaftliche Bearbeitung der bedeutenden und vielfach auch auffälligen Fliegengruppe der beiden norddeutschen Bundesländer erfaßt 310 Arten, die einzeln beschreibend vorgestellt werden. Daneben erfolgt ein Abriß über die abiotischen Faktoren, vor allem der klimatischen Bedingungen, und eine synökologische Betrachtung. Den Abschluß dieser umfassenden, überwiegend faunistischen Arbeit bildet ein Tafelteil mit den punktuell eingetragenen Artnachweisen. Mehrere Verzeichnisse enthalten Querverweise zu Pflanzen und anderen Tierarten unter dem Stichwort "Blütenbesuch". Das umfassende Literaturverzeichnis dokumentiert die intensiven Studien, denen der Autor nachgegangen ist. Für jeden Faunisten und mit dieser Fliegengruppe Vertrauten bildet diese Zusammenfassung ein Standardwerk. Eine beigefügte Diskette enthält Untersuchungsmaterial für Arten mit mehr als 10 Nachweisen.

E.-G. Burmeister

7. Cole, T. C. H.: Taschenwörterbuch der Zoologie. Deutsch – Englisch, English – German. -Thieme Verlag, Stuttgart, 1995. 261 S. ISBN 3-13-101961-1.

Dieses Taschenwörterbuch hilft Biologen beim Lesen und Abfassen von englischsprachigen Veröffentlichungen. Es enthält 14000 Begriffe unter anderem aus den Bereichen der Morphologie, Physiologie, Ethologie, Biogeographie, Ökologie und Zytologie. Tiernamen sind nur in sehr begrenztem Umfang enthalten. Für viele deutschsprachige Benutzer wird dabei weniger die englische Übersetzung der Begriffe als ihre korrekte Rechtschreibung von großer Hilfe sein. Es ist zu hoffen, daß auch englischsprachige Benutzer das Taschenwörterbuch verwenden werden, um die durchaus lesenswerte deutschsprachige Literatur verstehen zu können.

K. Schönitzer

8. Kosarev, A. N. & E. A. Yablonskaya: The Caspian Sea. – SPB Academic Publishing, The Hague, 1994. 259 pp.

Das Kaspische Meer, Mündungsbecken des größten europäischen Stromes, der Wolga, wird hier erstmals in einer englischen Fassung monographisch vorgestellt. Langjährige Untersuchungen liegen dem Werk zugrunde, die gerade in jüngster Zeit die Austrocknungsprobleme dieser Eurasischen Region, wie z. B. am Aralsee, aufgezeigt haben. Es werden in getrennten Kapiteln, die durch ein ausführliches Literaturverzeichnis abgeschlossen sind, die hydrologische Struktur, die Dynamik des Wasserkörpers, die Hydrochemie und die Biologie des Binnenmeeres vorgestellt. Letzteres Kapitel nimmt den größten Raum ein, wobei die Bestandsentwicklung der Störe, ein Wirtschaftsfaktor der Region, besonders dokumentiert wird. Die Wandlungen des Lebensraumes durch natürliche und anthropogene Einflüsse werden ebenfalls besonders herausgestellt in ihrem Zusammenspiel von Nutzung und Erhaltung der natürlichen Resourcen. Die Limnologie dieses einzigartigen Gebietes ist von besonders großem Interesse gerade im Hinblick auf die sensible Beziehung des größten Binnenmeeres dieser Erde zu seinem zufließenden Strom. E.-G. Burmeister

9. Brunt, M. A. & J. E. Davies (ed.): The Cayman Islands, Natural History and Biogeography. – Monographiae Biologicae Vol 71.- Kluwer Academic Publishers Dordrecht, Boston, London, 1994. 624 S.

In 25 Kapiteln von 30 namhaften Autoren werden Teilaspekte dieser kleinen Inselgruppe südlich von Kuba und westlich von Jamaica vorgestellt. Detailkarten der Inseln vervollständigen die monographische Bearbeitung. Einführend werden die bisherigen wissenschaftlichen Forschungsaktivitäten und Expeditionen sowie Projekte auf den drei Inseln Grand Cayman, Cayman Brac und Little Cayman unter besonderer Berücksichtigung der Lage vorgestellt – im Süden der Inselgruppe verläuft ein isolierender bis zu 7000 m tiefer Graben. Diesem Kapitel folgen Arbeiten zur Geologie, zum Klima mit den beeinflussenden Hurricanen und den Meeresspiegelschwankungen, den Grundwasserkavernen, den vorgelagerten Riffen und Lagunen. Marinbiologische Untersuchungen werden in Einzelartikeln der marinen Flora – Algen – und Fauna – Schwämme, Mollusca, Seeigel, Fische und Meeresschildkröten – abgehandelt. Die Flora der Inseln selbst mit Angaben zur Besiedlungsgeschichte und den Beziehungen zur karibischen Florenregion unter besonderer Berücksichtigung der Mangrovensümpfe sind Gegenstand einzelner Kapitel. Diesen folgt die Dokumentation der terrestrischen Fauna, die durch Artenarmut, aber auch durch spezifische oder subspezifische Endemiten ausgezeichnet ist. Unter den Wirbellosen nehmen die Stechmücken eine herausragende Stellung ein. Nach Messungen stechen diese deutlich häufiger in den Zeiten der Dämmerung als im sog. "moskito-verseuchten" Nordkanada. Die Bevölkerung der Inseln, deren Hauptstadt Georgetown auf Grand Cayman die dichteste Besiedlung aufweist, ist durch diese Plage besonders beeinträchtigt, obwohl von den Moskitos übertragene Krankheiten vielfach eingeschleppt und nur subdominant vorhanden sind. Beeindruckender ist die Wirbeltierfauna trotz der geringen Artendichte. Daneben zeigen die quartären Fossilfunde den Ausgangspunkt der Besiedlunggeschichte der Fauna. Der Erstbesiedlung durch Schildkrötenfänger 1661 und 1685 folgt eine sehr geringe Bevölkerungsdichte bis 1960 mit nur 8500 Einwohnern. Inzwischen besuchen diese Inseln ein Vielfaches an Touristen. Die Zusammenfassung der Biologie und der Dokumentation des hohen Anteils an seltenen und endemischen Organismen dieser fast in Vergessenheit geratenen Inselgruppe ist von herausragender Bedeutung. E.-G. Burmeister

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Eine neue *Nelima* Roewer aus Bulgarien

(Arachnida, Opiliones, Phalangiidae)

Plamen G. Mitov

Mitov, P. G. (1997): Eine neue *Nelima* Roewer aus Bulgarien (Arachnida, Opiliones, Phalangiidae). – Spixiana **20/2:** 97-105

A new harvestmen – *Nelima aladjensis*, spec. nov. from Bulgaria is described. This species has affinities to *Nelima pontica* Charitonov, 1941, from which it differs in colour, microsculpture and penis structure. Brief biological and ecological notes about the new species are presented.

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Einleitung

Bisher ist in Bulgarien nur eine Art der Gattung *Nelima* Roewer, 1910 festgestellt worden, und zwar *Nelima pontica* Charitonov, 1941 (Mitov 1995, Beron & Mitov 1996). Während der Bearbeitung des an der nördlichen Schwarzmeerküste gesammelten Weberknechtmaterials wurde eine neue Art der Gattung *Nelima* gefunden. Die vorliegende Arbeit gibt dessen Beschreibung und anschließend kurze biologische und ökologische Notizen über diese Art.

Material und Methoden

Die REM-Aufnahmen wurden bei 10-20 kV, im Sekundärelektronen-Regime vom SEM "Philips 515" ausgeführt. Acht *Nelima aladjensis*, spec. nov. (4♂♂, 4♀♀ Paratypen) und zum Vergleich ein ♂ *Nelima pontica* (Bulgarien, Strandscha Gebirge, bei Mladeschko, in einer Felsnische neben der Höhle Eseroto, 150 m ü. NN, [UTM-NG 27], 01.V.1991, leg. B. Petrov) wurden mit einer 300-400 Å dicken Goldschicht bedampft und anschließlich skaniert. Eine weitere Serie von 8♂♂ und 2♀♀ *Nelima pontica* (Bulgarien, Strandscha Gebirge, bei Mladeschko, in der Höhle Eseroto, 150 m ü. NN, [UTM-NG 27], 25.V.1995, leg. P. Mitov) wurde zum Vergleich benutzt.

Exemplare von *Nelima aladjensis*, spec. nov. befinden sich in der Zoologischen Staatssammlung München (ZSM), in der Kollektion Ivo Karaman, Novi Sad (Serbien) (CKS) und in der Sammlung des Autors (CMS).

Nelima aladjensis, spec. nov.

Typen. Holotypus: ♂, NO Bulgarien: 14 km NO Varna, Aladscha-Kloster, "Die Katakomben", 220 m ü. NN, 31.VII.1993, leg. P. Mitov (CMS). – Paratypen: 1♂, 1♀, (ZSM); 5♂♂, 8♀♀, 6 juv., 17.VIII.1992 (CMS); 6 juv., 23.VII.1993 (CMS); 1 juv., 24.VII.1993 (CMS); 1 juv., 25.VII.1993 (CMS); 3♂♂, 1♀, 2♀♀ subad., 6 juv., 31.VII.1993 (CMS); 3♂♂ (CMS), 1♀ (ZSM), 1♀ (CKS), 14.VIII.1994, gleiche Funddaten; 9♂♂, 9♀♀, 6 juv., 28.VII.1993 (CMS); 1♂, 11.VIII.1994 (CKS); 11♂♂ (CMS), 2♂♂ (ZSM), 5♀♀ (CMS), 14.VIII.1994; 1♂, 17.VIII.1994 (CMS), Mischwald,

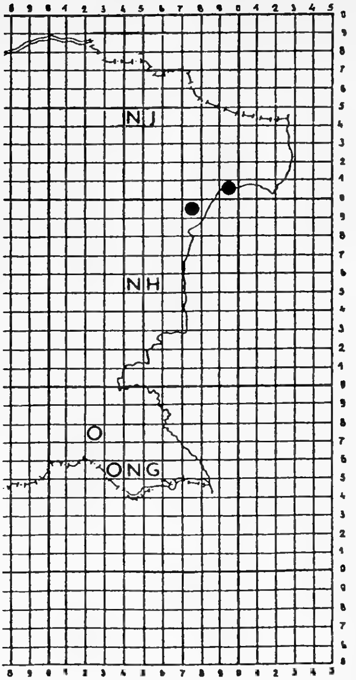

Abb. 1. Fundorte der *Nelima*-Arten in Bulgarien (UTM-Gitternetz, Kantenlänge: 10 km). (●) – *Nelima aladjensis*, spec. nov. (○) – *Nelima pontica* Charitonov.

auf Kalkfelsen in der Nähe vom Aladscha-Kloster, 100-200 m ü. NN, leg. P. Mitov; 1♂, 26.VII.1993 (CMS); 2♂♂, 2♀♀, 11.VIII.1994 (CMS), Baltschik (UTM-NJ 90), Botanischer Garten der Universität Sofia, 45-60 m ü. NN, leg. P. Mitov.

Locus typicus. NO Bulgarien, 14 km NO Varna, Aladscha-Kloster, (UTM-NH 79), 220 m ü. NN.

Derivatio nominis. *aladjensis* – nach dem Nahmen des locus typicus (Aladscha-Kloster). Die Latinisierung folgt Beilage "C" des International Code of Zoological Nomenclature.

Diagnose. Eine hellfarbene, gelbbraune, *Nelima*-Art mit kaudad geneigtem Tuber oculorum. Pedipalpus des ♂: Alle Glieder (ausgeschlossen der Trochanter) sind bedornt; Tarsus schwach ventrad gekrümmt und mit Körnchenfeld. Penis charakteristisch gestaltet.

Beschreibung des ♂ Holotypus (Abb. 2-9)
Körpermaße. Länge (L): 4.8 mm (Variabilität: 3.5-6.5 mm, Mittel 4.35±0.1 mm, bei n=40♂♂); Breite des Prosoma (BP): 3.4 mm; Länge des Prosoma (LP): 1.65 mm; Breite des Opisthosoma (BOp): 3.1 mm.

Färbung des Körpers. Gelbbraun, bleicht in Alkohol zu hellgelb (*Nelima pontica* ist dagegen dorsal schwarz und bleicht nicht in Alkohol). Durch die Kutikula kann man die Verzweigungen des Trachee-n-Systems sehen. Cephalothorax hell gelbbraun, medio-frontal mit 2 silbriggelben dreieckigen Flekken, lateral mit je einem großem, unregelmäßigem, silbriggelbem Fleck und einem medialen, hinter dem Tuber oculorum; auf dem 2. Thorakal-Tergit je ein lateraler, rechteckiger, silbriggelber Fleck. Nur die Dorsalfläche des Abdomen silbrig schimernd. Segmentgrenzen des Abdomen durch feine, gelbe, unpigmentierte Linien markiert. Area I mit 2 braunen paramedialen Fleckchen, Areae II-IV jeweils mit braunen, dreiekig-halbmondigen, paramedialen Fleckenpaaren, die zusammen mit den Flecken der Area I eine Sattelzeichnung andeuten; Areae III-IV lateral außerdem mit je einem kleinen braunen Fleck; an der Grenze zwischen Area IV und Area V drei längliche braune Fleckchen (vgl. mit dem

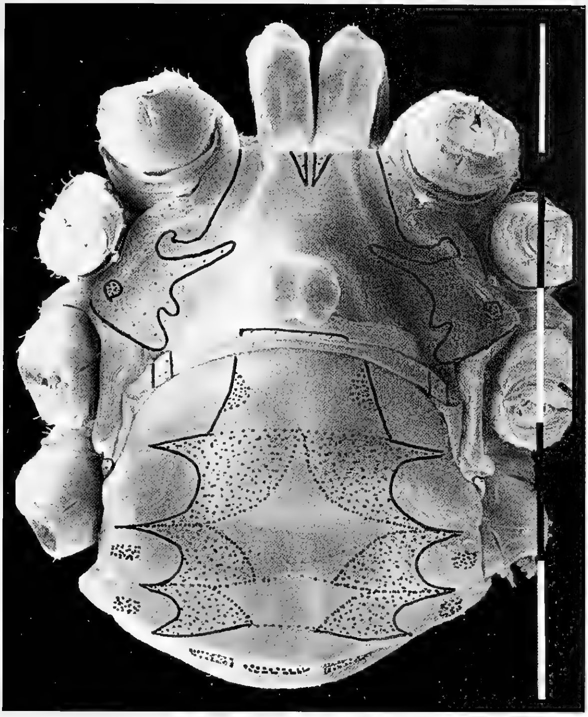

Abb. 2. *Nelima aladjensis*, spec. nov., ♂ Paratypus (vom locus typicus). Habitus und Zeichnungsmuster dorsal, x 20, Skala: 1 mm (stärker punktierte Felder: braun, schwächer punktierte Felder: silbriggelb).

Fleckmuster auf Abb. 2). Alle braune Flecke ohne silbrigem Schimmer. Bauchfläche gelb, schwach beborstet.

Bewehrung. Körper dorsal granuliert (Abb. 3), schwächer als bei *Nelima pontica*, die Oberfläche der Kutikula und der Skulpturelemente plissiert, abweihend von *Nelima pontica* (vgl. Abb. 3a-c und b-d). Labrum. Charakteristisch gestaltet (Abb. 4).

Tuber oculorum (Abb. 5). Kaudad geneigt, beiderseits mit 6:8 (bei einem Paratypus ♂ 11:8) schwarzen Tuberkeln besetzt; silbriggelb gefärbt, Augen silbrigschwarz umrandet, Höhe: 0.36 mm, Breite: 0.712 mm, Länge: 0.575 mm, Entfernung vom Stirnrand: 0.775 mm.

Cheliceren (Abb. 6). Glatt, gelb, nur Scherenspitze und Zähne schwarz, 1. Glied (Länge: 1.68 mm) dorsal und ventrolateral schwach beborstet, 2. Glied (1.85 mm) frontal und medio-lateral mit Börstchen, 3. Glied 0.64 mm lang.

Pedipalpen (Abb. 7). Gelb, die Glieder ohne Apophysen; Trochanter (0.532 mm) dorsal und ventral mit einigen Börstchen; Femur (1.778 mm) spärlich beborstet, dorsal am distalen Ende mit 2-3 schwarzen Dornen, ventro-lateral mit zwei Dornenfeldern; Patella (0.854 mm) spärlich beborstet und mit Dornen, die dorsal fast fehlen und ventral wie ventro-lateral zahlreicher sind; Tibia (1.302 mm) dorsal und lateral behaart, ventral beborstet, ventral-ventrolateral bedornt; Tarsus (1.904 mm) behaart und beborstet, ventral mit einem Körnchenfeld und mit einer Dornenreihe; Klaue (0.196 mm) schwarz mit 6 Zähnchen. Tibia und Tarsus der Pedipalpen weniger dicht beborstet als bei *Nelima pontica*.

Beine. Alle Glieder rund, Coxen gelb, ventral spärlich beborstet, mit schwarzen Zänchen am ventral-distalem Rand; Coxae I-III dorsal mit je einem schwarzen spitzen Dorn; Trochanter gelb, spärlich beborstet und dorso-lateral mit Zänchen versehen; Femur gelbbraun, beborstet, mit schuppenartigen Dornen, distal mit weißem Ring und 2-4 Dörnchen; Patella gelbbraun bis braun, beborstet, mit schuppenartigen Dornen, distal mit 3-4 Zähnchen; Tibia gelbbraun, distal braun verdunkelt, apikal mit

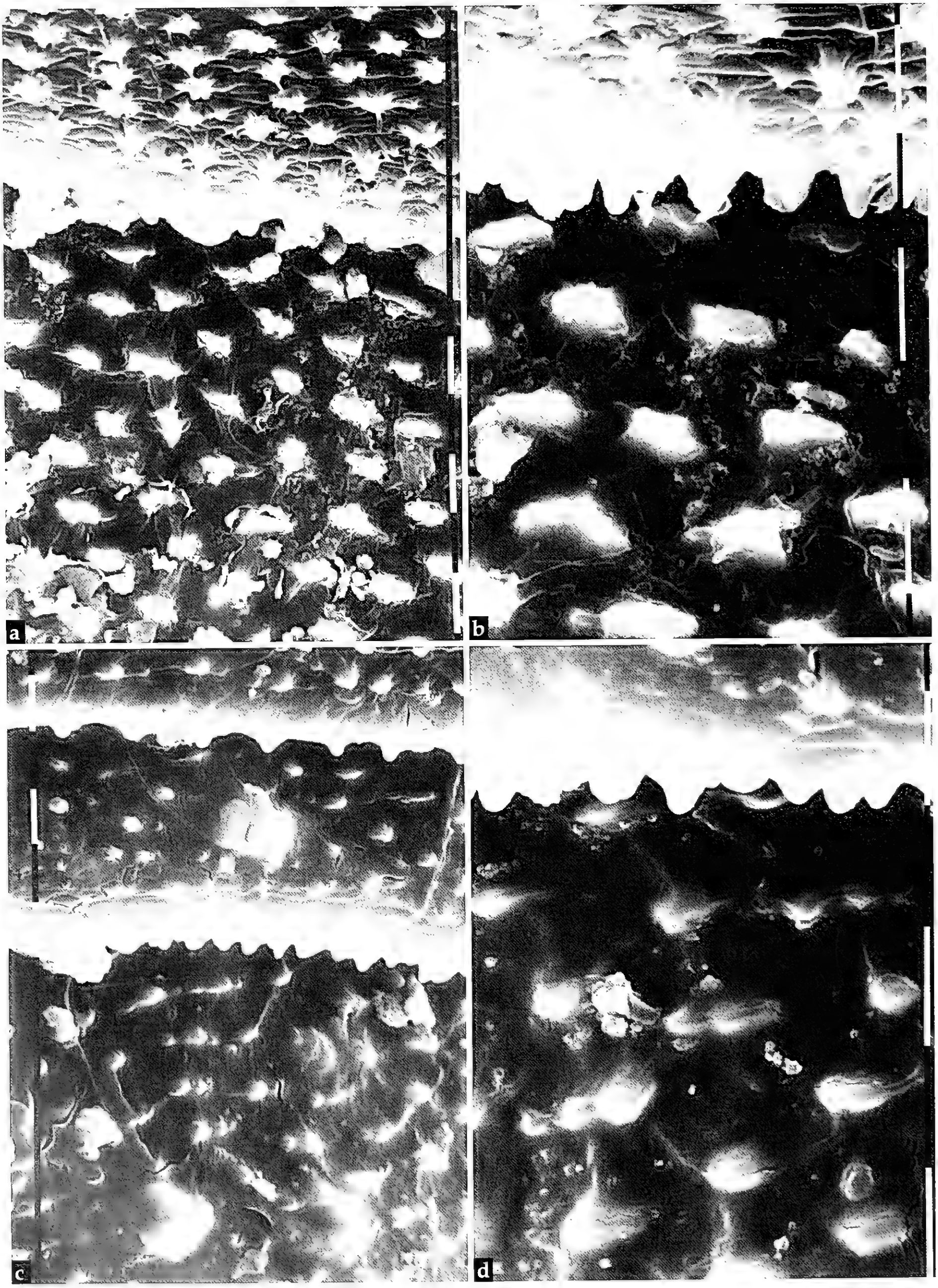

Abb. 3. Skulptur der Zone zwischen Thorakaltergit 2 und Area I. **a, b**. *Nelima aladjensis*, spec. nov., ♂ Paratypus (vom locus typicus), dorsal. **c, d.** *Nelima pontica* Charitonov, ♂, dorsal. **a, c.** ×1000; **b, d.** ×2000, Skalen: 10 µm.

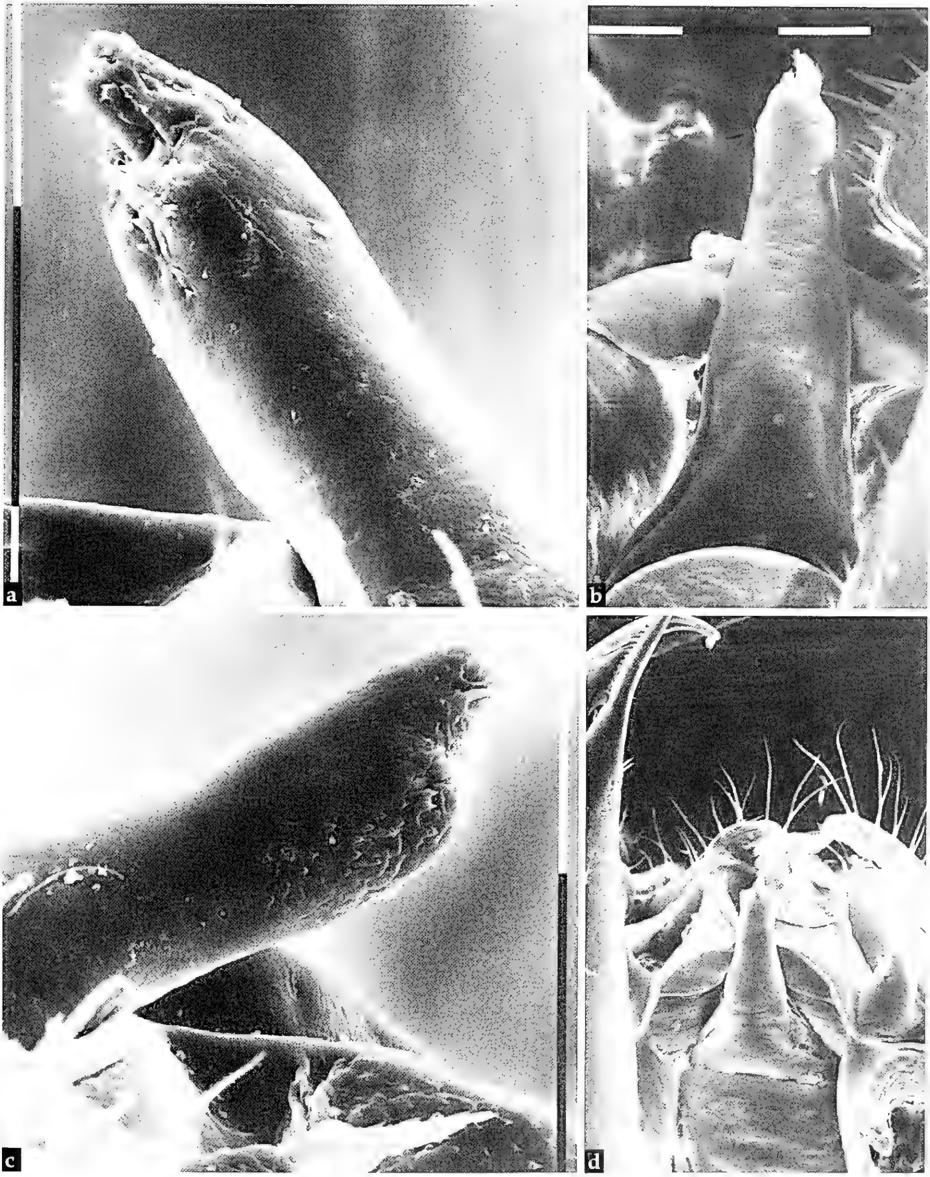

Abb. 4. Labrum. **a, b.** *Nelima aladjensis*, spec. nov., ♂ Paratypus (vom locus typicus). **a.** Lateral (von links). **b.** Dorsal. **c, d.** *Nelima pontica* Charitonov, ♂. **c.** Lateral (von rechts). **d.** Dorsal. **a, c.** ×370, Skala: 100 µm; **b.** ×130, Skala: 100 µm; **d.** ×65.

weißem Ring, beborstet, behaart und mit schuppenartigen Dornen; Metatarsus gelbbraun, behaart und proximal mit einigen schuppenartigen Dornen; Tarsus gelbbraun, behaart.

Beinmaße (in mm):

	Fe	Pt	Ti	Mt	Ta	Gesamt
I	10.9	2.0	10.5	13.0	20.7	57.1
II	17.8	1.7	17.0	15.7	40.0	92.2
III	10.5	2.0	10.7	14.4	20.2	57.8
IV	13.6	2.2	13.1	18.1	26.0	73.0

Penis (Abb. 8-9). Länge: 2.87 mm (bei zwei Paratypen kürzer: 2.52 mm, bzw. 2.59 mm). Glans penis mit 4 Börstchen und 2 Dorne; Stylus kürzer als bei *Nelima pontica* und dorsal mit einem Höcker, der bei *Nelima pontica* fehlt. Grundfarbe des Penis gelb. Truncus penis ventral mit Dörnchen.

Beschreibung eines ♀ Paratypus vom locus typicus (Abb. 10-11)
Körpermaße. KL 4.9 mm (Variabilitat: 3.5-8.5 mm, Mittel 5.37 ± 0.23 mm, bei n=28); LP 1.5 mm; BP 3.35 mm; BOp 3.25 mm.

Färbung wie beim ♂, aber die Sattelzeichnung nicht so ausgeprägt.

Tuber oculorum wie beim ♂, beiderseits mit 6:6 schwarzen Tuberkeln besetzt; Entfernung vom Stirnrand 0.644 mm.

Cheliceren. 1.: 1.694 mm, 2.: 1.876 mm und 3. Glied: 0.672 mm lang; nur beborstet, wie beim ♂; Färbung wie beim ♂.

Pedipalpen (Abb. 10). Alle Glieder beborstet, schwach bedornt (nur einige Dorne distal am Femur und dorsal an der Patella), Tibia und Tarsus auch dicht behaart, Tarsus ventral nur mit einem Körnchenfeld und nicht so gekrümmt wie beim ♂; die Klaue (0.322 mm lang) wie beim ♂.

Beine wie beim ♂.

Maße der Palpen und Beine: (in mm)

	Tr	Fe	Pt	Ti	Mt	Ta	Gesamt
Pp	0.52	1.61	0.77	1.05	–	1.93	5.88
I	–	9.40	1.92	8.70	11.50	15.80	47.32
II	–	15.20	1.87	14.80	14.50	26.01	72.38
III	–	9.10	1.80	8.90	12.60	17.60	50.00
IV	–	11.70	2.00	11.10	16.20	23.00	64.00

Ovipositor. Aus 28 Ringen bestehend (bei zwei anderen ♀♀ ebenfalls); Receptacula seminis (Abb. 11) sehr ähnlich den bei *Nelima pontica* (s. Ljovuschkin & Starobogatov 1963: f. 6), im 6. Segment (bei zwei anderen ♀♀ im 6. bzw. zwischen 4. und 5. Segment); Länge: 2.925 mm.
Die juvenilen Tiere sind gelbbraun bis ocker gefärbt, ihre Körperlänge beträgt 1.5 bis 4.5 mm (Mittel 3.08 mm, bei n=26).

Verwandtschaftliche Beziehungen. *Nelima aladjensis*, spec. nov. scheint am nächsten mit *Nelima pontica* Charitonov verwandt zu sein. Das bezeugen sowohl die Ähnlichkeiten im Körperbau wie die ähnliche Struktur des Penis (Staręga 1966, f. 22, Martens 1969, ff. 53-54, Chevrizov 1979, f. 70) und des Receptaculum seminis (Ljovuschkin & Starobogatov 1963: f. 6).

Verbreitung. Da *Nelima aladjensis*, spec. nov. und *Nelima pontica* nah verwandt sind, scheint es sinvoll, die Verbreitung des gesamten Artkomplexes (*aladjensis-pontica*) zu kommentieren. Bisher ist *Nelima aladjensis*, spec. nov. nur aus einem relativ kurzen und schmalen Streifen im nördlichen Schwarzmeergebiet Bulgariens bekannt. *Nelima pontica* dagegen ist bisher in Bulgarien nur im nördlichen Teil des Strandscha-Gebirges gefunden worden, ebenfalls von nur zwei Fundorten, von denen der zweite neu ist: Höhle Eseroto (s. Material und Methoden) und Naturschutzgebiet "Witanovo" bei Malko Tirnovo, Höhle Bratanovskata peschtera, 350 m ü. NN, SO Bulgarien, 04.VIII.1994, [UTM-NG 35], leg. D. Dimitrov – 1♀) (Abb. 1). Außerdem ist diese Art auch von Krasnodar-Gebiet, Abchasien, Grusien und Adscharien (Staręga 1978) bekannt und daher scheint dieser Artkomplex euxinisch verbreitet zu sein (euxinisches Faunenelement nach der Klassifikation von Gruev & Kusmanov 1994). Das weist auf ähnliche Eigenschaften der hypotetischen Stammart des Komplexes hin und die Vikarianz der Areale beider Arten läßt sich ganz natürlich mit einer Aufspaltung des Areals der Stammart erklären.

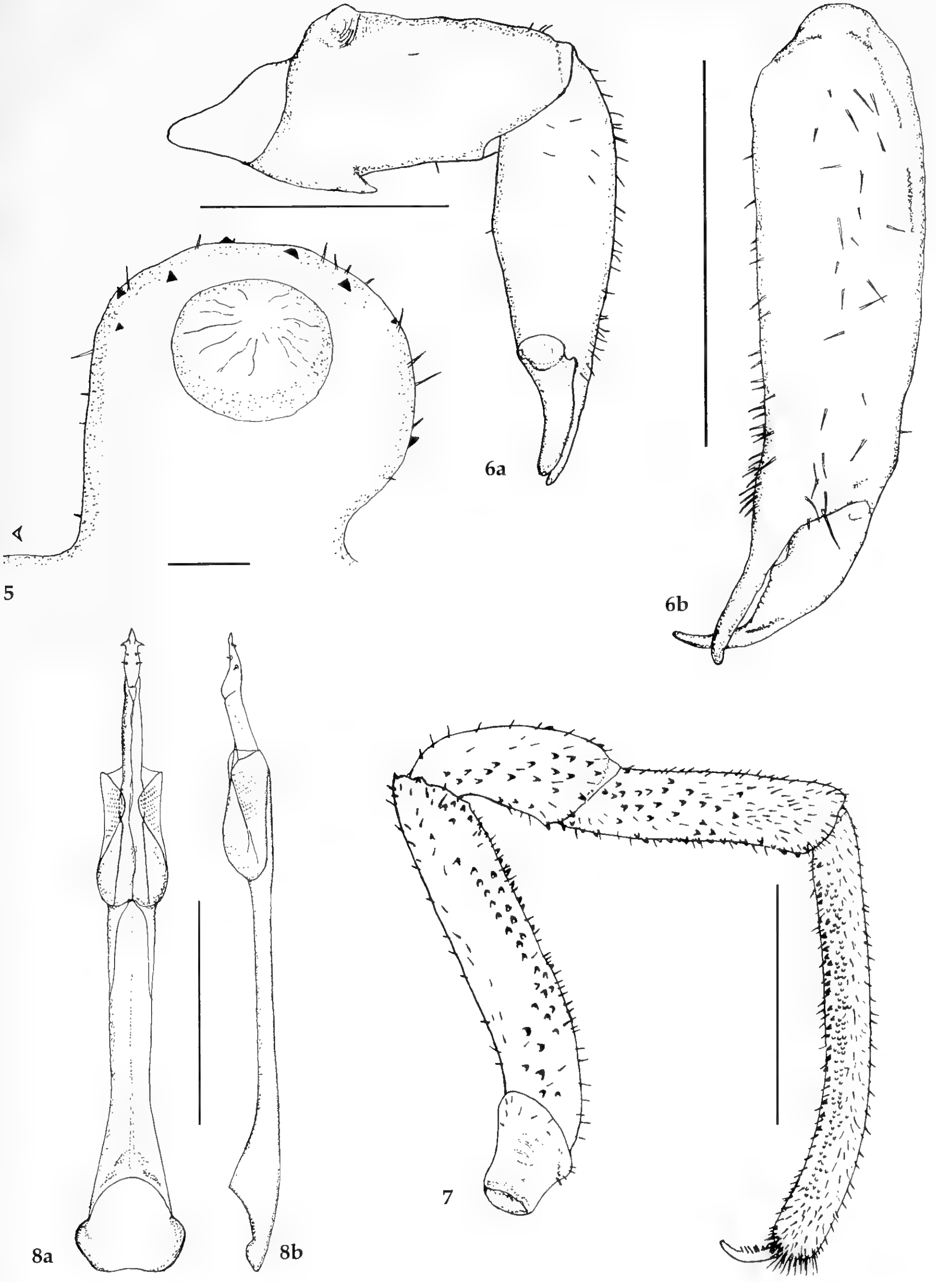

Abb. 5-8. *Nelima aladjensis*, spec. nov., ♂ Paratypus (vom locus typicus). **5.** Tuber oculorum von links (Pfeil weist nach frontal). **6.** Cheliceren. **6a.** Rechte, lateral. **6b.** Linke, frontal. **7.** Linker Pedipalpus, medial. **8.** Penis. **8a.** Dorsal. **8b.** Lateral. Skalen: 1mm

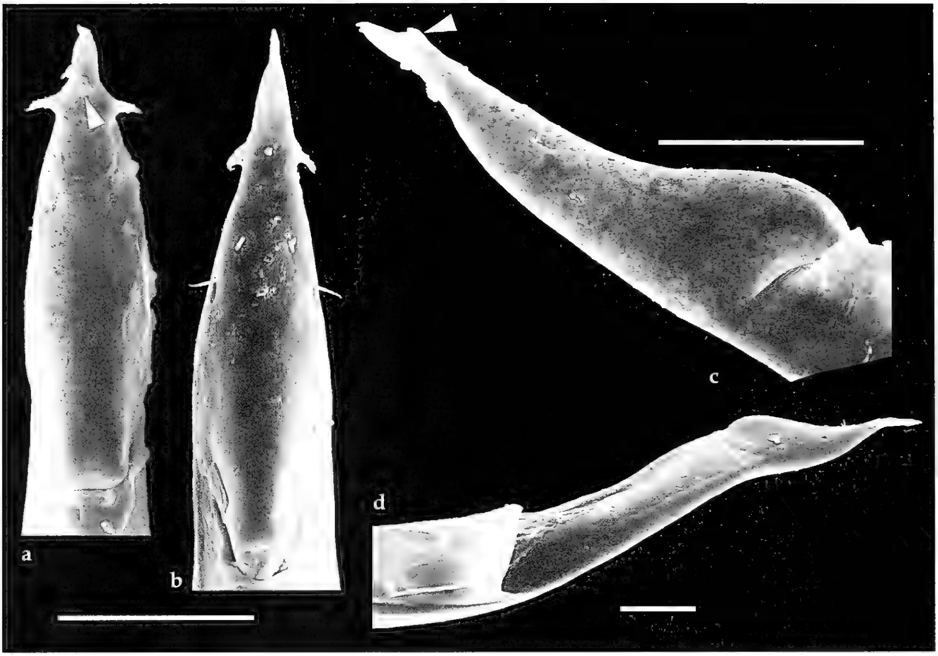

Abb. 9. Glans penis. **a, c.** *Nelima aladjensis*, spec. nov., Paratypus (vom locus typicus). **a.** Dorsal. **c.** Lateral. **b, d.** *Nelima pontica* Charitonov. **b.** Dorsal. **d.** Lateral. **a, c.** ×440; **b.** ×400; **d.** ×163. Skalen: 100 µm (Pfeil: Höcker).

Biologische und Ökologische Bemerkungen

Nelima aladjensis, spec. nov. wurde in natürlichen Höhlen ("Die Katakomben" vom Aladscha-Kloster, im gelblichweißem sarmatischen Kalkstein, 220 m ü. NN) gefunden, die von Mischwald umgeben sind (dominant: Bäume – *Carpinus betulus* L., *Acer campestre* L., *A. platanoides* L., *Pseudotsuga douglasii* Carr.; Gräser – *Melica uniflora* Retz., *M. nutans* L., *Dactylis glomerata* L. ssp. *lobata* (Drej) Lindb., *Buglossoides purpurocaerulea* (L.) I.M. Johnston u. a.; Sträucher – *Rubus* sp., *Cornus sanguinea* L., *Ruscus aculeatus* L.; Lianen – *Smilax excelsa* L., *Hedera helix* L., *Vitis vinifera* L. subsp. *sylvestris* (C.C.Gmel.) Hegi, *Clematis vitalba* L.). Diese Weberknechtart wurde auch im Wald und in Löchern und Spalten an Felsblöcken aus demselben Gestein gesammelt. Dank ihrer hellen Farbe ist *Nelima aladjensis*, spec. nov., wenn sie auf den Felsen und auf dem Fallaub herumläuft, schwer erkennbar.

Im Botanischen Garten von Baltschik wurde die neue Art in der Nähe eines Baches, unter einem Baumstamm, unter verfaultem Wurzelwerk und in Mauernischen gesammelt. Die Vegetation an diesem Fundort bestand aus *Populus tremula* L., *Cornus sanguinea* L., *Euonymus europaeus* L., *Hedera helix* L., *Vinca* sp., *Anthriscus sylvestris* (L.) Hoffm., *Brachypodium sylvaticum* (Huds.) P.B. u.a.

Trophische Beziehungen. In vier Spinnenweben von *Tegenaria* sp., die im Wald beim Aladscha-Kloster am 28.VII.1993 gesammelt wurden, fanden sich Reste von 1♀ und 4 juv. *Nelima aladjensis*. Daß die Nahrung dieses Weberknechts warscheinlich hauptsächlich aus Gliedertieren besteht, zeigen die in den Kotbällen gefundenen Arthropoden-Reste.

Phänologie. Tagsüber (11-12 Uhr) am 25-28.VII.1993 wurden 2, an Steinen zur Häutung aufgehängte, ♀♀ *Nelima aladjensis* beobachtet. Ende Juli und Mitte August wurden ♀♀ (mit KL von 5.4 bis 8.5 mm, Mittel 6.58±0.25mm, bei n=11) mit 16 bis 44 entwickelten Eiern (0.7×1.2 mm) gefunden. Die höhere Zahl der Juveniles im Juli, das Vorkommen von Subadulti und die kontinuierlich steigende Zahl der Weibchen mit entwickelten Eiern im August, läßt die Folgerung zu, daß die Eiablage mit hoher Wahrscheinlichkeit Ende August stattfindet.

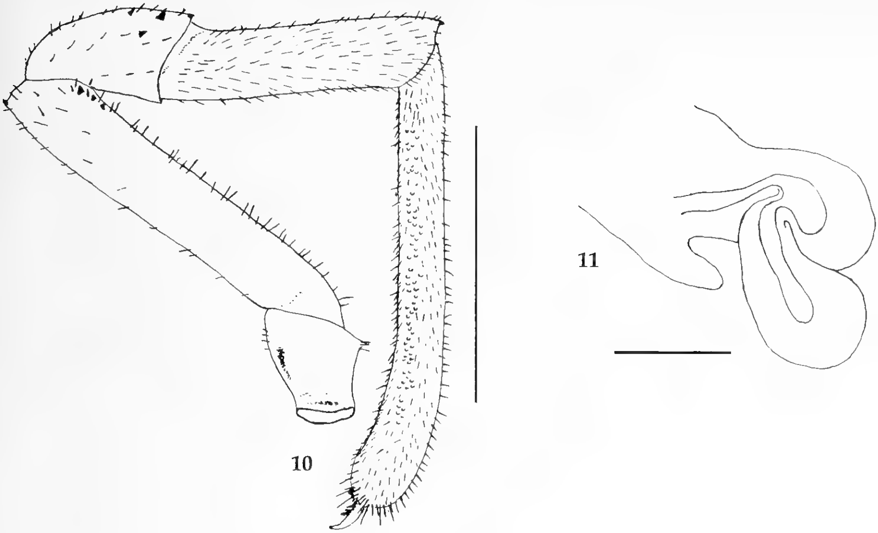

Abb. 10, 11. *Nelima aladjensis*, spec. nov., ♀ Paratypus (vom locus typicus). **10.** Rechter Pedipalpus, lateral. Skala: 1 mm. **11.** Receptaculum seminalis. Skala: 0.03 mm.

Im Gebiet des Aladscha-Klosters findet man zusammen mit *Nelima aladjensis*, spec. nov. auch die Weberknechtarten *Nemastoma bidentatum sparsum* Gruber et Martens, 1968, *Opilio saxatilis* C. L. Koch, 1839 und *Zacheus crista* (Brullé, 1832).

Danksagung

Ich danke herzlich Dr. C. Deltschev vom Zoologischen Institut in Sofia für die Bestimmung des Spinnenmaterials und Dr. D. Dimitrov vom Biologischen Fakultät der Universität Sofia, für das Determinieren des Pflanzenmaterials. Herzlichst sei hier auch Herrn V. Kinov, Curator des Aladscha-Klosters, für seine freundliche Hilfsbereitschaft und Erlaubnis zum Materialsammeln in "Der Katakombe" vom Aladscha-Kloster gedankt.

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"Saurer Regen" und "Waldsterben" sind ein – nach wie vor – aktuelles Problemthema bei allen Naturliebhabern, aber vor allem bei den Waldbesitzern. Zahlreiche Projekte zur Erforschung und Linderung des Waldsterbens wurden und werden durchgeführt. Kalkungsmaßnahmen sind dabei ein "Renner". Da auch diese nicht unumstritten sind, hat die Forstliche Versuchsanstalt Rheinland-Pfalz Versuchsanlagen in 4 repräsentativen Forsten des Landes eingerichtet. Hier konnten von der Verfasserin im Fichtenforst Adenau im Rahmen einer Dissertationsarbeit die Auswirkungen auf die Arthropoden-, vor allem die Insektenfauna erforscht werden. Das Buch gibt Einblicke in unterschiedliche Kalkungsmaßnahmen und Bodenchemismus, Klimafaktoren, Vegetation und Bodenfauna. Es werden die Erfassungsmethoden vor und nach den Kalkungen aufgezeigt. Speziell am Beispiel der Dipterenfauna wird versucht die Bedeutung des Kalkeintrages darzustellen. Der Beitrag beschäftigt sich mit ca. 20 Nematocera- und mit ca. 40 Brachycera-Familien. Die Fülle der biologischen Erkenntnisse sowohl zu den Familien allgemein, als auch zu einer großen Zahl einzelner Arten kann hier nicht aufgeführt werden. Bei den Arten sind vor allem die Nematocera schwerpunktmäßig bearbeitet. Bei den Arten der Brachycera stellen die Empidioidea eine Lieblingsgruppe dar. Die Darstellung der Taxa erfolgt meist in aufschlußreichen Tabellen mit Unterstützung einiger Abbildungen. Man erkennt unschwer, daß viel Literatur berücksichtigt wurde. Der Zweite Teil des Buches befaßt sich mit den Ergebnissen über den Einfluß der Kalkungen auf die Bodenfauna. Eine Fülle von vergleichenden Tabellen begleiten den Text. Hier werden zu den Dipteren auch noch viele andere Insekten- und Arthropodengruppen bearbeitet. Ein dickes Literaturverzeichnis beschließt den Band. Ein aktuelles Buch, das nicht nur den Waldbesitzer anspricht, sondern mit der Fülle biologischer Hinweise auch den Insektenforscher interessiert, vor allem den Dipterologen, und das in der Ökosystemforschung des Waldes einen wichtigen Platz einnimmt.

W. Schacht

11. Verzeichnis der Deutschen Stiftungen 1994. 2. Ausgabe. – Verlag Hoppenstedt GmbH, Postfach 100139, 64201 Darmstadt. Geb., 1061 Seiten. ISBN 3-8203-0321-9.

Das deutsche Stiftungswesen hat seit Beginn der 80er Jahre einen anhaltenden und deutlichen Aufschwung erlebt. Der Trend setzt sich in den 90er Jahren, verstärkt durch die Wiedervereinigung fort. So wurden zwischen 1990 und 1994 in der Bundesrepublik 527 Stiftungen neu gegründet. Um die Übersicht und die Verwendbarkeit dieser Vielfalt zu gewährleisten, hat der Darmstädter Hoppenstedt Verlag dieses Buch neu aufgelegt.

Das Nachschlagewerk enthält 5554 deutsche Stiftungen. Es wurden Stiftungen aus allen Bereichen erfaßt – von Kultur, Kunst und Bildung über Wissenschaft, Umwelt und Wirtschaft bis zur Politik. Aufgeführt sind neben verkehrstechnischen Daten Informationen zu Sitz, Ansprechpartner, Rechtsreform, Errichtungsjahr, zum allgemeinen Stiftungszweck, Einzelzweck, zu Vermögen und jährlichen Gesamtausgaben. Zusätzlich zu einem statistischen Überblick über die Entwicklung der Stiftungen mit zahlreichen Tabellen ermöglichen ein Ortsregister und ein Verzeichnis der allgemeinen Stiftungszwecke das schnelle Auffinden der gesuchten Informationen. Der Verband Deutscher Stiftungen hat das Lexikon herausgegeben und die Daten direkt bei den jeweiligen Institutionen recherchiert.

E. Diller

12. Fet, V. & K. I. Atamuradov (eds): Biogeograpy and Ecology of Turkmenistan. Monographiae Biologicae Vol. 72. – Kluwer Acad. Publ., Dordrecht, 1994. 650 pp., with many figures and maps, 33 authors. ISBN 0-7923-2738-1.

This comprehensive book gives a very good account of the biogeography, ecology and natural conservation in Turkmenistan. This is an extremely important and interesting region for historical biogeography situated in Central Asia, adjacent to Iran and Afghanistan. The landcsape includes deserts and dry mountain areas. 12 chapters deal with the climate, general biogeography, vegetation and desertification. In 10 chapters the vertebrate fauna is reviewed, 9 chapters deal with arthoropoda, and one with molluscs. This volume is unique in giving an English survey on the literature of a region within the former USSR, the scientific literature of which is usually only in Russian. We hope that this book will help further biogeographical investigations in this beautiful and interesting country.

K. Schönitzer

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Fossil Neuroptera of the Lower Cretaceous of Baisa, East Siberia
Part 3. Chrysopidae

(Insecta)

Vladimir N. Makarkin

Makarkin, V. N. (1997): Fossil Neuroptera of the Lower Cretaceous of Baisa, East Siberia. Part 3. Chrysopidae (Insecta). – Spixiana **20/2**: 107-118

The subfamily Limaiinae Martins-Neto et Vulcano, 1988 is redefined. The monotypic new genus *Baisochrysa*, gen. nov. with the type species *B. multinervis*, spec. nov., and the following six new species of the genus *Mesypochrysa* are described: *magna, falcata, chrysopa, curvimedia, angustialata, minima.*

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Introduction

The present paper on Chrysopidae forms the third part of a series dealing with Neuroptera from the Lower Cretaceous of Baisa (Makarkin 1990a, b). The locality is situated at the Vitim River, in Burayatia (East Siberia, Russia). The age of this fauna is Neocomian.

Mesozoic "chrysopids" have usually been assigned to the family Mesochrysopidae. This family was established by Handlirsch (1906- 1908) for the genus *Mesochrysopa* from the Jurassic of Bavaria, Germany. He considered this family as closely related to the Chrysopidae. Martynov (1927) described within Mesochrysopidae the second genus *Mesypochrysa* from Upper Jurassic of Karatau (Kazakhstan). The family has been considered in that composition for a long time, either as distinct family (Martynova 1949, 1962) or as subfamily within Chrysopidae (Adams 1967, Schlüter 1984). Later Panfilov (1980) included in Mesochrysopidae the genera *Chrysoleonites* Martynov, 1925, *Macronympha* Panfilov, 1980, *Aristenymphes* Panfilov, 1980, *Nemphoides* Panfilov, 1980, and *Microsmylus* Panfilov, 1980 from the Upper Jurassic of Karatau, and Ansorge and Schlüter (1990) added *Liassochrysa* from the Lower Jurassic of Dobbertin in Mecklenburg, Germany.

Heterogeneity of genera included is obvious (Adams & Penny, 1992). Most mesochrysopid genera do not possess the set of wing features characteristic of the Chrysopidae. In particular, Mesochrysopidae have fused apically the subcosta (Sc) and the radius (R) (except for *Liassochrysa* ?), and the space apical to Sc 1+ R broad, with long furcate branches. I think, Mesochrysopidae undoubtedly are a distinct family, except the genus *Mesypochrysa* which is a chrysopid one.

In 1988 Martins-Neto and Vulcano established a new subfamily Limaiinae within Chrysopidae including the genera *Limaia* Martins-Neto et Vulcano, 1988, *Araripechrysa* Martins-Neto et Vulcano, 1988, and *Caririchrysa* Martins-Neto et Vulcano, 1988 from the Santana Formation (Lower Cretaceous) of Brazil. Recently the genus *Caririchrysa* was synonymized with *Mesypochrysa* (Martins-Neto 1992), and *Mesypochrysa* transfered by me to Limaiinae (Makarkin 1994). In the present paper I redefine the Lamiinae and exclude the genus *Araripechrysa* from this subfamily.

The genera *Drakochrysa* Yang et Hong, 1990 from the Early Cretaceous of China and *Araripechrysa* apparently belong to the subfamily Nothochrysinae. The study is based on fossil material deposited in the Paleontological Institute in Moscow. The wings of all specimens are illustrated with the apex to right.

Subfamily Limaiinae Martins-Neto et Vulcano, 1988

Description. Forewing. R entering margin at or just beyond wing apex [1], with apical branches simple and very densely spaced [2]. Branches of the radial sector (Rs) not coalesced with the media (M) [3]. Intramedian cell long, tapering basally, at least four times as long as wide [4]. Crossvein between the intramedian cell and the anterior cubitus (CuA) (*imc-cua*) shift far distal [5]. Two regular gradate series of crossveins [6]. Anal veins simple [7].

Hindwing. Venation in general as in forewing. M forked nearly opposite the arising of Rs and connected to Rs by a crossvein (state 0) or with the anterior branch arising from the stem of Rs and the posterior branch straight, unforked (state 1) [8].

Composition. Two genera, *Mesypochrysa* Martynov, 1927 (13 species from the Upper Jurassic to Lower Cretaceous of Kazakhstan, Siberia, Mongolia and Brazil), and *Limaia* Martins-Neto et Vulcano, 1988 (1 species from the Lower Cretaceuos of the Santana Formation, Brazil).

Discussion. The configuration of the radius (character [1-2]) is a very conspicuous and characteristic feature of this subfamily. It may be considered the most convincing synapomorphy. Two other important features of wings of the Limaiinae are the distal shift of *imc-cua* in forewing [5] and migration of the origin of anterior branch of M to Rs in hindwing [7].

Limaia is the poorly defined genus within the subfamily. I was not able to identify any serious distinguishing features except the posterior cubitus (CuP) not fused basally to CuA (!). I guess it seems to be an incorrect interpretation. Possibly, the genus *Limaia* is a synonym of *Mysypochrysa*.

Remarks. Although in the genera *Cretachrysa* Makarkin, 1994 and *Baisochrysa*, gen. nov. the apical portion of the wings is unknown, they apparently belong to Lamiinae. This is supported by character [5].

Genus *Mesypochrysa* Martynov, 1927

Mesypochrysa Martynov, 1927: 764; Martynova 1949: 169; Martynova 1962: 281; Adams 1967: 219; Panfilov 1980: 108; Ponomarenko 1992: 107; Schlüter 1984: 7; Ansorge & Schlüter 1990: 92; Semeria & Nel 1990: 30; Adams & Penny 1992: 36; Martins-Neto 1992: 121; Makarkin 1994: 288.

Caririchrysa Martins-Neto et Vulcano, 1988: 196; Martins-Neto & Vulcano 1989: 313; Ansorge & Schlüter 1990: 92; Martins-Neto 1992: 121 (syn.).

Type species. *Mesypochrysa latipennis* Martynov, 1927 (by monotypy).

Composition. Four species from the Upper Jurassic of Karatau, Kazakhstan (Martynov 1927, Panfilov 1980); 6 species from the Lower Cretaceous of Baisa, East Siberia (described below); 1 species from the Lower Cretaceous Bon-Tsagan, Mongolia (Ponomarenko 1992); 2 species from the Lower Cretaceous of the Santana Formation of Brazil (Martins-Neto & Vulcano 1988).

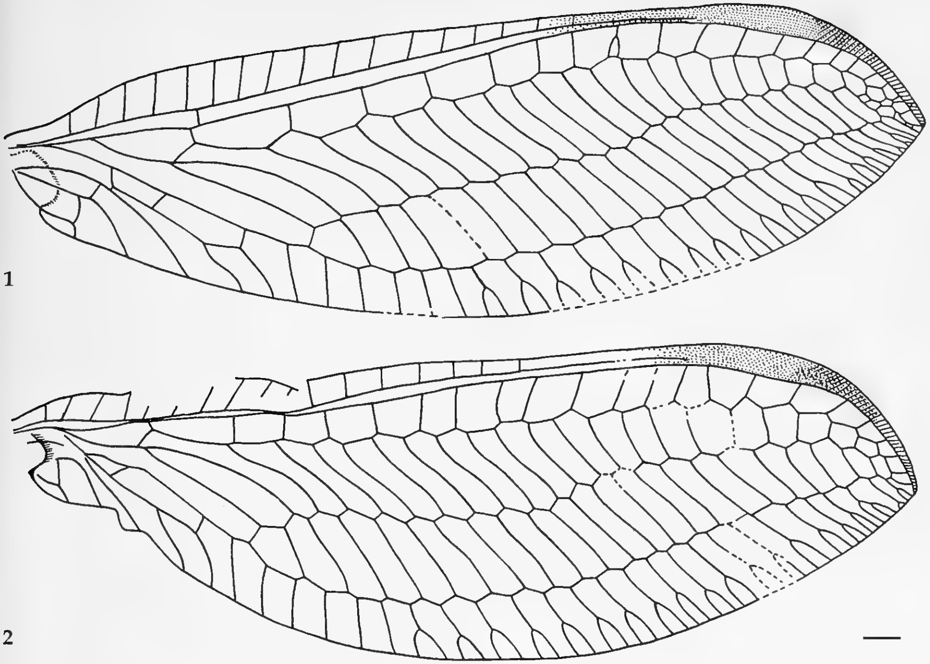
Mesypochrysa magna, spec. nov.

Figs 1-9

Types. Holotype: Specimen N 3064/2409, layer 15, a complete forewing. – Paratypes: Specimen N 3064/2411, layer 15, an almost complete forewing; specimen N 3064/2391, layer 27, a poorly preserved insect, with an incomplete forewing and hindwing overlapped; specimen N 1989/32, layer 19, a poorly preserved insect, with one incomplete forewing; specimen N 1989/41, layer 19, apical fragment of a forewing.

Other material examined. Specimen N 3064/968, layer 15, apical fragments of a forewing and hindwing overlapped.

Etymology. From Latin *magnus*, large.



Figs 1-2. *Mesypochrysa magna*, spec. nov. **1.** Holotype, specimen N 3064/2409, forewing. **2.** Paratype, specimen N 3064/2411, forewing. Scales: 1 mm.

Description. Body poorly preserved. Prothorax apparently very short. Legs covered with very short and dense bristles. Forewing. Length 26 mm, width 8.4 mm (N=2). Costal space moderately broad, 1.2 mm wide (N=3). Rs arising at nearly a right angle, slightly basally to *sc-r* and distally to the median fork. Basal stem of Rs (before *rs-m*) shorter than *rs-m*. Rs with 20-21 branches. Longest gradate cells 4.5-5.6× as long as wide. Intramedian cell 6.1-6.3× as long as wide (5.1 in No.3064/2411), smoothly tapering basally. Proximal intramedian crossvein (*ma-mp*) very short. The pseudocubitus well developed.

Hindwing incomplete. M with the anterior branch arising from the stem of Rs and the posterior branch straight, unforked.

Comparison. *M. magna*, spec. nov. is closely related to *M. chrysopoides* Ponomarenko, 1992, but the latter has Rs arising at an acute angle and basal stem of Rs longer than *rs-m*.

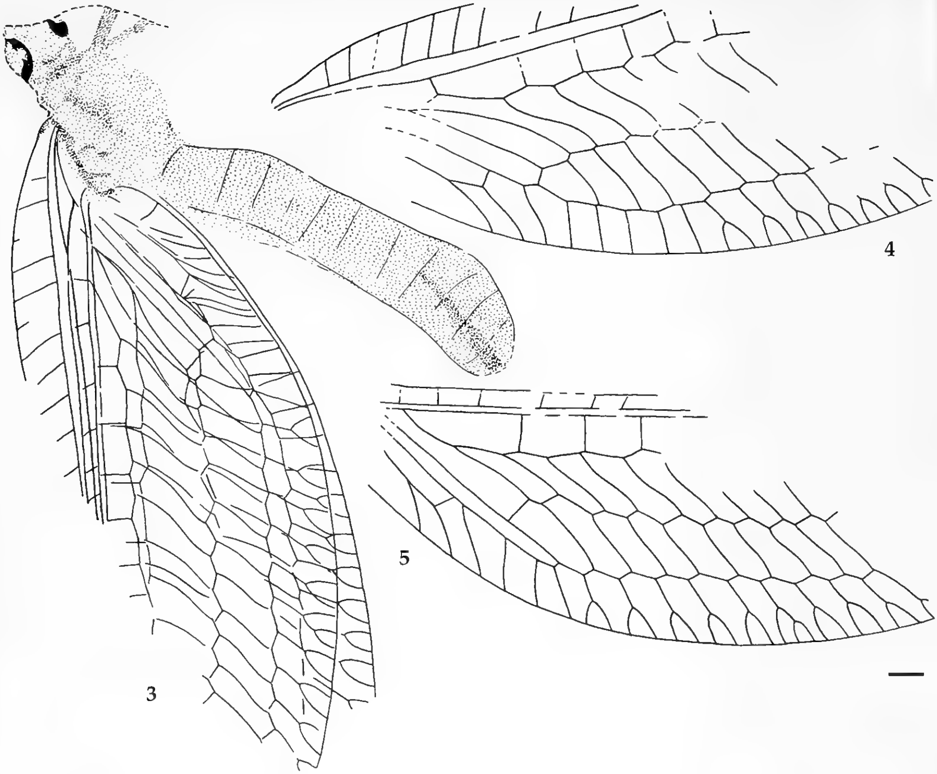
Mesypochrysa falcata, spec. nov.

Figs 10-12

Types. Holotype: Specimen N 1989/33, layer 19, apical fragments of a forewing and hindwing overlapped. – Paratype: Specimen N 1989/29, layer 19, complete apical $^3/_4$ of a hindwing.

Etymology. From Latin *falcatus*, axe-shaped.

Description. Forewing. Wing apically broadly rounded. Branches of Rs very closely spaced. Longest gradate cells 5.4-6.7× as long as wide.



Figs 3-5. *Mesypochrysa magna*, spec. nov. **3.** Paratype, specimen N 3064/2391. **4.** Same, forewing. **5.** Same, hindwing. Scale: 1 mm.

Hind wing. Estimated length about 25 mm. Slightly falcate. Rs with 19 branches or more. M apparently with the anterior branch arising from Rs. Rs covered with very sparse bristles, which are about 2 × as long as width of these veins. Bristles on the costa (C), Sc and R quite dense and very short, not longer than width of these veins.

Comparison. *M. falcata*, spec. nov. differs from all other species of the genus by having of the dense venation and falcate hindwing.

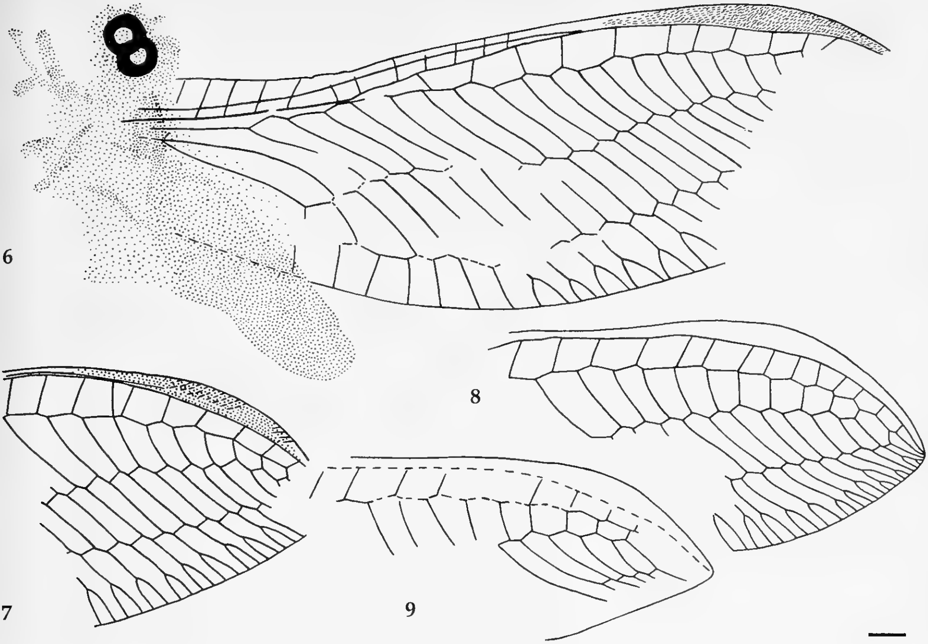
Mesypochrysa chrysopa, spec. nov.

Figs 13-14

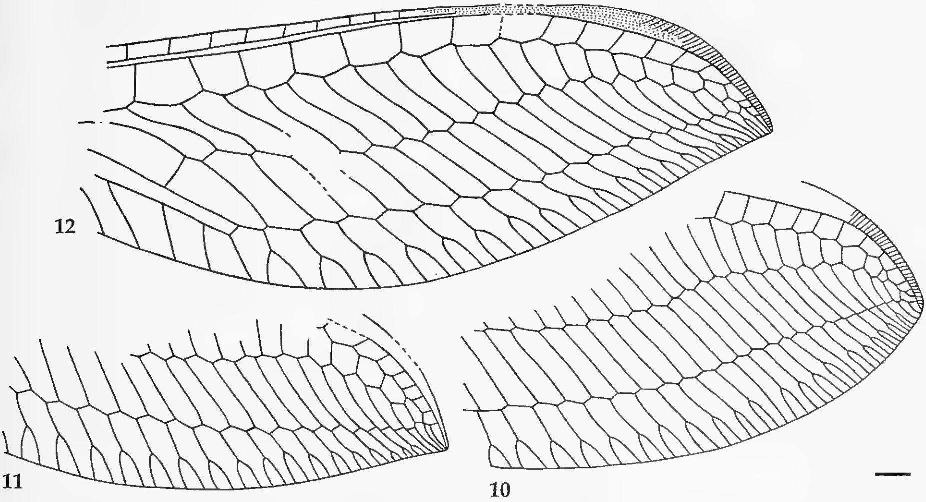
Types. Holotype: Specimen N 3064/2432, layer 31, a complete forewing. – Paratype: Specimen N 3064/2431, layer 31, an almost complete hindwing.

Etymology. From the generic name *Chrysopa*.

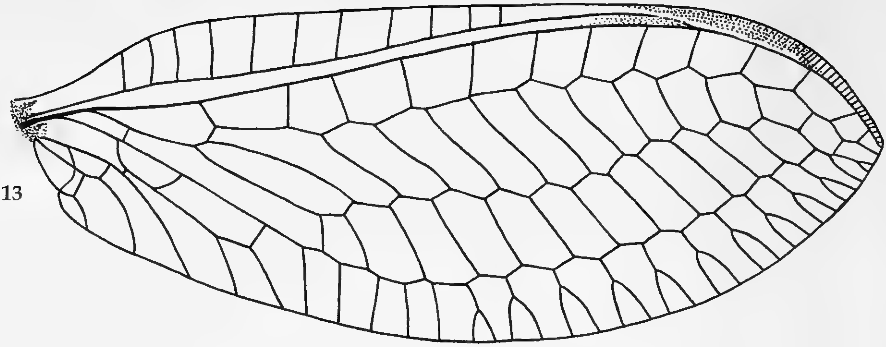
Description. Forewing. Length 17.2 mm, width 6.6 mm. Costal space quite broad, 1.1 mm wide. Basal stem of Rs somewhat longer than *rs-m*. Rs arising at obtuse angle, with 10 branches. Longest gradate cells 2.5-2.7× as long as wide. Intramedian cell 4.6× as long as wide. Proximal intramedian crossvein rather long. Bristles on branches of Rs widely spaced, short, somewhat longer than width of these veins.



Figs 6-9. *Mesypochrysa magna*, spec. nov. **6.** Paratype, specimen N 1989/32. **7.** Paratype, specimen N 1989/41, forewing. **8.** Specimen N 3064/968, forewing. **9.** Same, hindwing. Scale: 1 mm.



Figs 10-12. *Mesypochrysa falcata*, spec. nov. **10.** Holotype, specimen N 1989/33, forewing. **11.** Same, hindwing. **12.** Paratype, specimen N 1989/29, hindwing. Scale: 1 mm.



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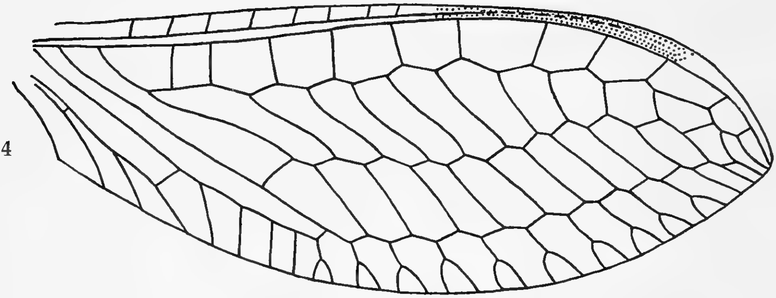

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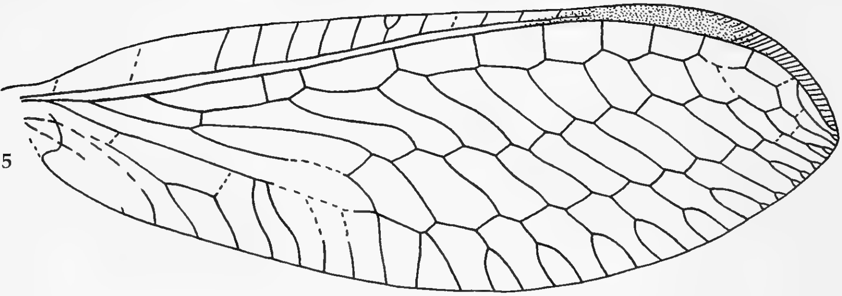

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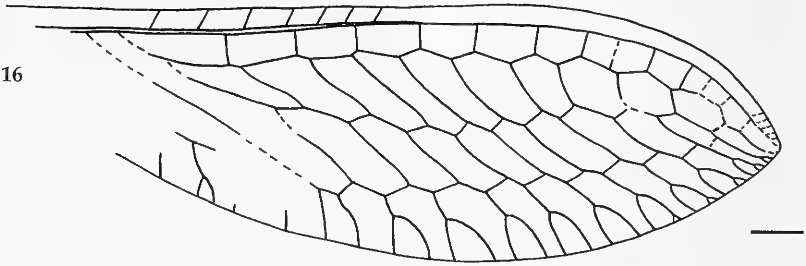

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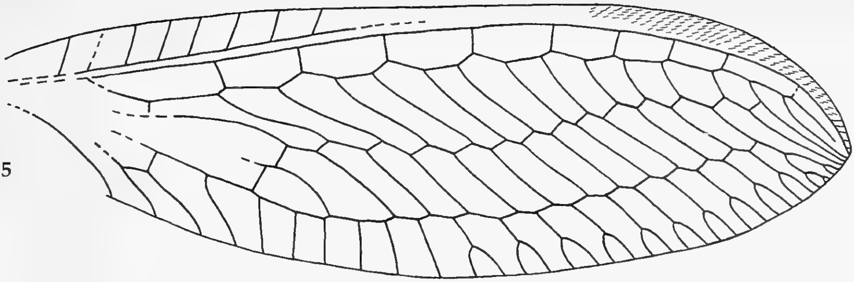
Figs 13-14. *Mesypochrysa chrysopa*, spec. nov. **13.** Holotype, specimen N 3064/2432, forewing. **14.** Paratype, specimen N 3064/2431, hindwing.
Figs 15-16. *Mesypochrysa curvimedia*, spec. nov. **15.** Holotype, specimen N 1989/44, forewing. **16.** Same, hindwing. Scale: 1 mm.



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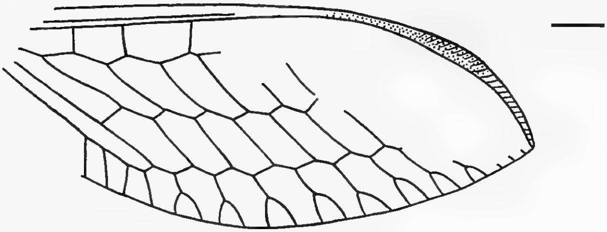

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Fig. 17. *Mesypochrysa angustialata*, spec. nov. Holotype, specimen N 3064/2209, forewing.
Fig. 18. *Mesypochrysa minima*, spec. nov. Holotype N 1989/7, hindwing. Scale: 1 mm.

Hindwing. Length 15.5 mm, width 5.7 mm. Rs with 11 branches. Anterior branch of M arising from Rs. Bristles as in forewing.

Comparison. This new species resembles by the shape of forewing *M. latipennis* Martynov, 1927 and *M. intermedia* Panfilov, 1980, but is distinguished from the former by fewer branchings of Rs, and from the latter by very dense venation in apical part of the wing.

Mesypochrysa curvimedia, spec. nov.

Figs 15-16

Types. Holotype: Specimen N 1989/44, layer 25, a complete forewing and hindwing overlapped.

Etymology. From the Latin adjective *curvus*, curved, and *media*, median vein.

Description. Forewing. Length 16.5 mm, width 5.5 mm. Costal space quite narrow, 0.8 mm wide. Rs with 10 branches. Intraradial area very narrow, espicially basally. Rs inclined about 30 degree. Basal *rs-ma* short. Longest gradate cells 3.0-3.5 × as long as wide. M running in a smooth curve, not angulate, then crossing inner gradate series. Intramedian cell 5.5 × as long as wide.

Hindwing. Length c. 15.5 mm, width 5.0 mm. Intraradial area very narrow. Apparently the anterior branch of M arising from Rs.

Comparison. *M. curvimedia*, spec. nov. differs from all other species of the genus by the smoothly curved media.

Mesypochrysa angustialata, spec. nov.
Figs 17, 23

Types. Holotype: Specimen N 4210/2209, layer 25, an almost complete insect, with all four wings overlapped.

Etymology. From Latin *angustus*, narrow, and *ala*, wing.

Description. Body poorly preserved. Antennae and legs covered with very short and dense bristles. Forewing. Length about 16.8 mm, width 5.2 mm. Costal space narrow, 0.7 mm wide. Rs inclined about 40 degree. Basal *rs-ma* short. Basal stem of Rs (in front of *rs-ma*) 4× as long as *rs-ma*. Longest gradate cells 4.8-5.0× as long as wide. Intramedian cell poorly preserved, about 5× as long as wide.

Hindwing. Apex of wing subacute. Details of the venation not visible.

Comparison. *M. angustialata*, spec. nov. is distinguished from all other species of the genus by very narrow forewings.

Mesypochrysa minima, spec. nov.
Fig. 18

Types. Holotype: Specimen N 1989/7, layer 31, an incomplete hindwing.

Etymology. From Latin *minimus*, small.

Description. Hindwing. Estimated length about 11.5 mm, width 4.3 mm. Rs with 8-9 branches. Anterior branch of M arising from Rs. Inner gradate series parallels the outer.

Comparison. *M. minima*, spec. nov. differs from all species of the genus by its small size.

Mesypochrysa spp.
Figs 19, 24-25

Material examined. Specimens N 3064/2234, layer 31; N 3064/2430, layer 31; N 3064/2423, layer 31; poorly preserved, almost complete insects, with all four wings overlapped.

Remarks. Three specimens are determined as *Mesypochrysa* spec. They do not have any distinguished feature, except the shape and size of forewing.

Subfamily indeterminated

Genus *Baisochrysa*, gen. nov.

Type species. *Baisochrysa multinervis*, spec. nov.

Etymology. From the locality Baisa and the genus name *Chrysopa.*

Description. A representative of the Chrysopidae, apparently Limaiinae, differing in having the following combination of features: branches of Rs not coalesced with M; intramedian cell long, tapering basally; crossvein between the intramedian cell and CuA (*imc-cua*) shift far distal; three gradate series in both wings; in forewing the first anal vein (A1) and A2 forked; in hindwing M bifurcate.

Composition. Only the type species.

Comparison. The new genus is distinguished easily from other genera by three gradate series and the anal veins forked. Martins-Neto and Vulcano (1988) described their new genus *Caririchrysa* as having three gradates. However, I think it seems to be an incorrect interpretation. Later, when Martins-Neto (1992) synonymized *Caririchrysa* and *Mesypochrysa*, they noted two gradate series in *Caririchrysa.*

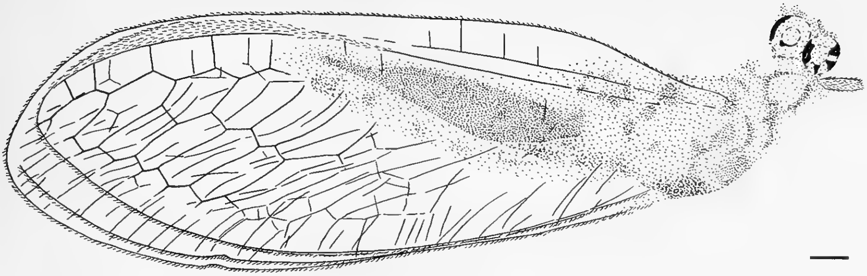

Fig. 19. *Mesypochrysa* spec. Specimen N 3064/2234. Scale: 1 mm.

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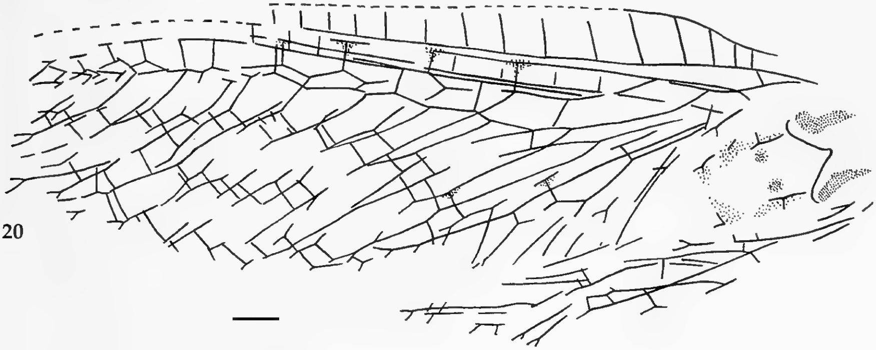

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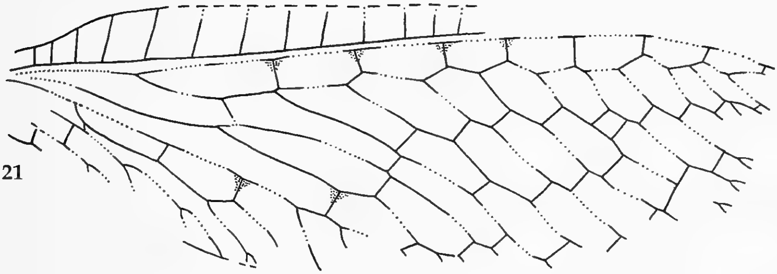

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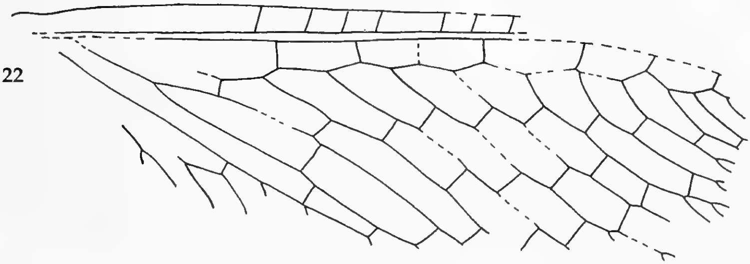
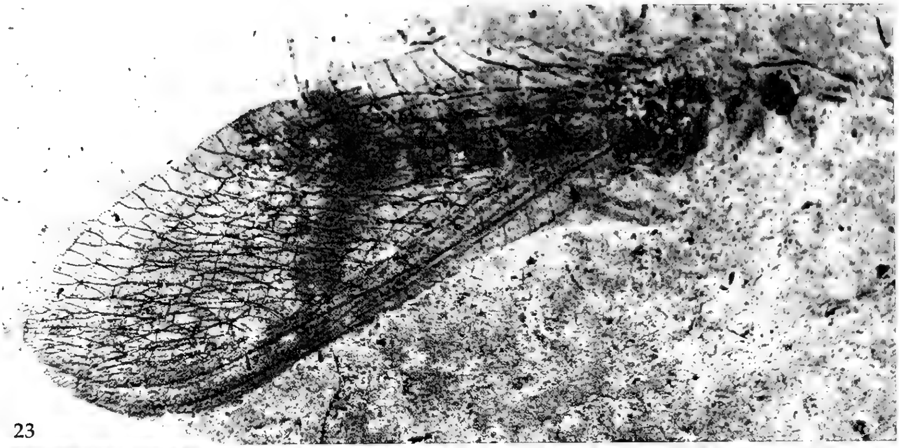


Figs 20-22. *Baisochrysa multinervis*, gen. et spec. nov. **20.** Holotype N 3064/2433. **21.** Same, forewing. **22.** Same, hindwing. Scale: 1 mm.



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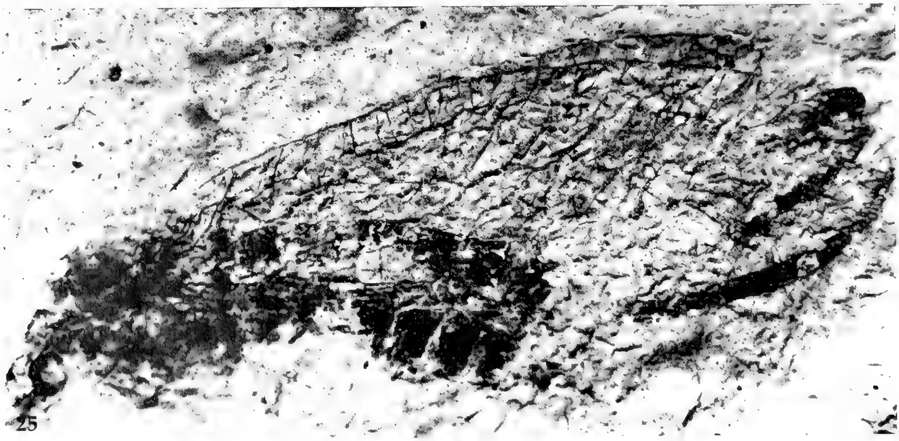

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Baisochrysa multinervis, spec. nov.
Figs 20-22

Types. Holotype: Specimen N 3064/2433, layer 31, a rather good preserved insect, with incomplete body and wings.

Etymology. From Latin, *multus*, many, and *nervus*, vein.

Description. Mesonotum with two lateral dark stripes. Metanotum with two dark spots.

Forewing. Six crossveins shaded anteriorly with dark, that is four basal intraradial crossveins, *mp-cua*, and distal *cua-cup*. Estimated length about 19 mm. Costal area moderataly broad, wide 1.1 mm. Intramedial cell 5× as long as wide. Basal piece of Rs (in front of *rs-ma*) longer than the distance between *rs-ma* and basal branch of Rs. A1 2× forked. A2 at least 1× forked.

Hindwing. Intramedal cell 5× as long as wide. A1 at least 1× forked.

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Fig. 23. *Mesypochrysa angustialata*, spec. nov. Holotype, specimen N 3064/2209.
Figs 24-25. *Mesypochrysa* spp. **24.** Specimen N 3064/2423. **25.** Specimen N 3064/2430. Scale: 1 mm.

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Biology and postembryonic development of *Ommatissus binotatus* Fieber, a pest of the Dwarf Palm in Sicily

(Insecta, Homoptera, Auchenorrhyncha, Tropiduchidae)

Adalgisa Guglielmino

Guglielmino, A. (1997): Biology and postembryonic development of *Ommatissus binotatus* Fieber, a pest of the Dwarf Palm in Sicily (Insecta, Homoptera, Auchenorrhyncha, Tropiduchidae). – Spixiana **20/2:** 119-130

The five immature stages of *Ommatissus binotatus* Fieber are described and illustrated. The main characters that allow us to easily distinguish the various stages are emphasized. Moreover, data are given on the biology of this species and on the phytopathological aspects resulting from the activity of this tropiduchid on the host plant.

O. binotatus, in Sicily, is a monophagous species on *Chamaerops humilis* L. It is univoltine and overwinters in the egg stage.

The distinctive characters between the fifth instar nymphs of *Ommatissus lofouensis* Muir and *Ommatissus binotatus* Fieber are also made evident.

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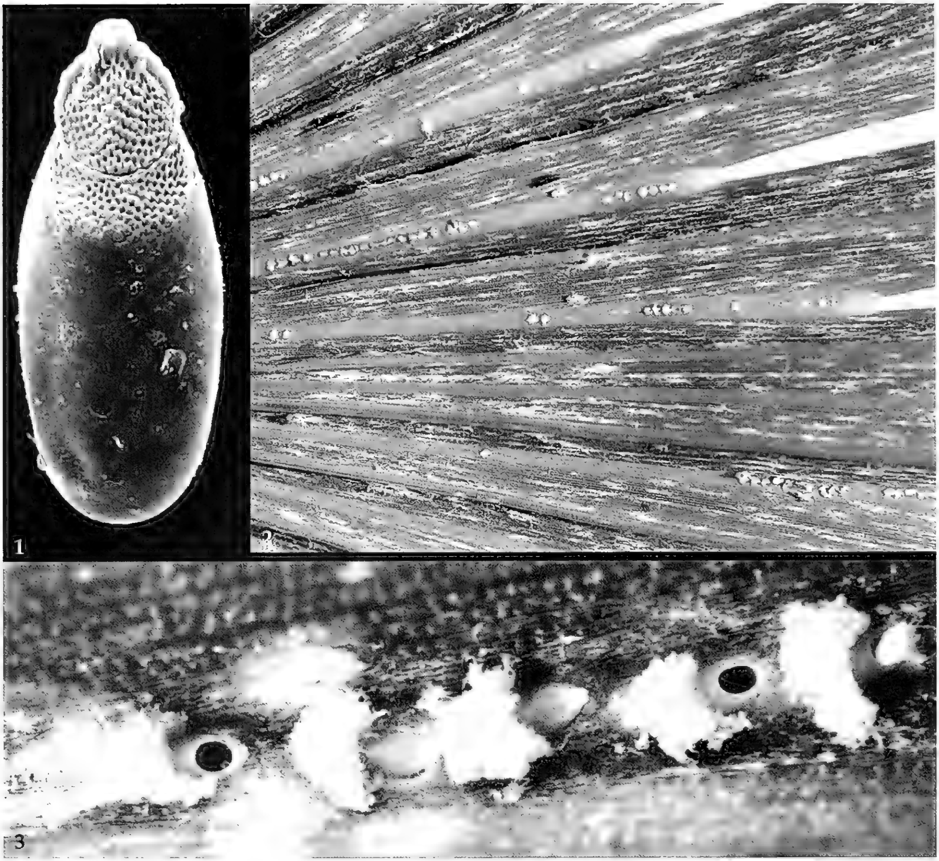
Introduction

Chamaerops humilis L., commonly called "dwarf palm" because of its reduced size, is the only palm native to Europe. This species, found in the western stenomediterranean region, is typical of the mediterranean woodland and prefers dry, sandy and rocky biotopes. In Italy, it characterizes, together with other essences such as *Olea europea* var. *sylvestris* Brot., *Ceratonia siliqua* L. and *Myrtus* sp., the vegetation belt defined as "thermomediterranean".

From an economic point of view, the market of *C. humilis*, in Italy, seems to be thriving, even though, unfortunately, precise data are missing both on the number of plants sold and on the business connected to this plant. However, it is in high demand not only as an ornamental plant particularly suitable for embellishing gardens and parks, but also as foliage, used mostly in floral decorations. In the past century, the leaves were used even to make brooms and mats, or as "vegetable hair" to stuff sofas and armchairs. Today it is no longer used for this purpose but there has been emphasis on the sale of leaves for ornamental reasons, directed mostly toward Central and Northern Europe.

Two species of Auchenorrhyncha, both belonging to the family Tropiduchidae and the genus *Ommatissus* Fieber (*O. binotatus* Fieber and *O. magribus* Asche & Wilson) are associated with the dwarf palm.

The genus *Ommatissus* includes 12 species widespread in the Oriental, Afrotropical and Palearctic Regions. Among these, four are known from the Oriental Region: *Ommatissus bimaculatus* Muir from northern India and Pakistan; *Ommatissus chinsanensis* Muir from China and Hong Kong; *Ommatissus lofouensis* Muir from southern China, Japan and Korea, and *Ommatissus vietnamicus* Asche & Wilson



Figs 1-3. *Ommatissus binotatus* Fieber. **1.** Egg at SEM (× 124). **2-3.** Eggs in *Chamaerops humilis* L. leaf.

from Vietnam. Five species are widespread in the Afrotropical Region: *Ommatissus alpinus* Linnavuori and *Ommatissus tumidulus* Linnavuori from Sudan; *Ommatissus bourgoini* Asche from Zaire; *Ommatissus kamerunus* Asche & Wilson from Cameroon; *Ommatissus natalensis* Asche & Wilson from South Africa. Three species are known from the Palearctic Region: *Ommatissus binotatus* Fieber from Italy (Sicily) and Iberian Peninsula; *Ommatissus lybicus* Bergevin from the Middle East; *Ommatissus magribus* Asche & Wilson from Morocco.

Little is known about the biology of these species, except for *Ommatissus lybicus* Bergevin which is considered the most serious pest of date palms in the Middle East (Alfieri 1934; Hussain 1963, 1974; Gharib 1966; Klein & Venezian 1985); as for the other species, only the host plant is known for some of them (*Ommatissus binotatus* and *Ommatissus magribus* live on *Chamaerops humilis* L. and *Ommatissus tumidulus* on *Poenix* sp.); knowledge on the others is inexistent. The study of the biology of the Auchenorrhyncha associated with palms can be important, because some species of these Homoptera are implicated in the transmission to palms of plant disease pathogens (for instance the Palm Lethal Yellowing) (Wilson 1987).

This paper contributes to the knowledge of the biology and postembryonic development of *Ommatissus binotatus* Fieber, the only species of the *Ommatissus* genus living in Italy.

Materials and Methods

The observations on the postembryonic development of *Ommatissus binotatus* were mainly made in a full field in the province of Siracusa (Sicily, Italy). In the three-year period 1994-96, the natural groupings of *Chamaerops humilis* L., in the Vendicari Natural Reserve, were periodically examined. During some trips, immature stages and adults were collected and later reared in laboratory for the purpose of obtaining plentiful material for the morphological descriptions and biological observations.

Laboratory studies mostly concerned the morphology of immature stages. Drawings and measurements were made on specimens preserved in 70 % alcohol and acetic acid. The following dimensions were taken from the juvenile stages: total body length, from the tip of the vertex to the distal apex of the abdomen; maximum thoracic width; thoracic length, from the anterior margin of the pronotum to the posterior margin of the metanotum. The measurements regarding body length of the various stages were taken on specimens which showed all the extended abdominal segments.

For the SEM observations, the eggs and immature instars were immersed in Karnovsky's fixative (Karnovsky 1965) for 2 h. After washing in 0.1 M (pH 7.2) cacodylate buffer, they were postfixed in 1 % osmium tetroxide for 1 h, rinsed in the same buffer and dehydrated in a graded ethanol series. This material was then dried by the critical-point method, using liquid CO_2 in a Balzers CPD 020 apparatus and gold-coated in a MED 010 Sputter Coater (Balzers Union) and observed under a Jeol JSM 5200 scanning electron microscope operating at 15 kV.

As regards the description of the immature stages, a detailed description of the first instar specimens is provided. Only the changes that differentiate them from the previous instar are highlighted for the later stages.

Description of eggs and immature stages

Eggs (Figs 1-3)

Dimensions. Length 0.72-0.80 mm; width 0.28-0.32 mm.

The egg is ellipsoidal with the anterior pole sharp and the posterior one rounded; the ventral surface is somewhat concave while the dorsal one is convex. Anteriorly, it has a large, subcircular respiratory area with the operculum and a short respiratory horn. At oviposition, the *O. binotatus* Fieber egg is milky white, but during embryonal development its colour can change to yellowish white.

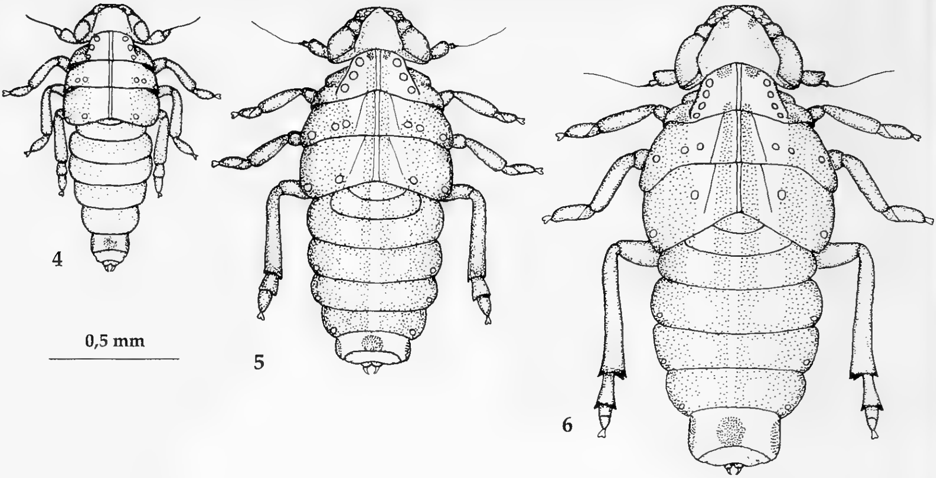
The female of *O. binotatus* Fieber inserts its eggs in the mesophyll of the leaf lamina in correspondence with the dehiscent lines of the *Chamaerops humilis* L. leaf. The eggs are laid only on the lower leaf surface and arranged in a linear sequence (Fig. 2). Each egg is entirely thrust into the leaf tissue, leaving only the operculum and respiratory horn exposed (Fig. 3).

First instar (Figs 4, 7)

Dimensions. Body length 1.02-1.42 mm; thoracic length 0.34-0.42 mm; thoracic width 0.40-0.46 mm.

Vertex pentagonal, wider than long; its surface slightly concave and has medially a longitudinal groove, just visible. The anterior margin forms an obtuse angle, posterior margin weakly concave. Frons, a bit wider than long, with a median carina, two lateral internal carinae and two lateral external carinae. All the carinae originate from the anterior margin of the frons and extend up to the frontoclypeal sutura. Surface between the median carina and each lateral internal carina large and flat. Area between each lateral internal carina and the corresponding lateral external one narrow and concave, with ten sensory pits. Clypeus convex, shows a subconical postclypeus and a subcylindrical anteclypeus. Antennae with anular and short scape; pedicel subcylindrical, long more than twice as long as scape; flagellum with bulbous basal portion, a little shorter than pedicel. The compound eyes are big and red.

Thorax wider than long, divided into three pairs of plates by a longitudinal median groove. Pronotum with rounded anterior margin and slightly arcuate posterior margin, longest medially. Each pronotal plate with a sinuous-shaped carina which originates anteromedially and extends posterolaterally, not reaching the posterior margin of the pronotum. Each pronotal plate with a row of three sensory pits near the inner side of the carina. Mesonotum about as long as pronotum, with weakly convex anterior margin and posterior margin slightly sinuous mostly in the lateral portions; even mesonotum longest medially. Each mesonotal plate with three sensory pits arranged parallel to the



Figs 4-6. *Ommatissus binotatus* Fieber. **4.** First instar. **5.** Second instar. **6.** Third instar.

posterior margin, two of which in dorsomedial position and one in lateral position. Metanotum a little longer than mesonotum, with slightly convex anterior margin and concave posterior margin. Each metanotal plate with two sensory pits near posterior margin, one of which in dorsomedial position, one in lateral position.

Pro- and mesocoxae elongated and subcylindrical; metacoxae quadrangular and fused with metasternum. Trochanters of all legs developed, particularly the posterior ones, which bear some cuticular sclerified folds medially (Fig. 7). Femora of all legs elongated and cylindrical; hind femora longest and most robust. Tibiae well developed and progressively expanded distally; hind tibiae, larger than pro- and mesotibiae, with a crown of four spines at distal tip of ventral surface. Pro- and mesotarsi consist of one segment, elongated and tapered distally, with two small apical claws; metatarsi two-segmented: proximal segment subcylindrical with four spines at distal tip of ventral surface; distal segment ovoidal, slightly curved and with two small claws at distal tip.

Abdomen slightly narrower than thorax, nine-segmented; last two segments often telescopically invaginated and therefore not always visible; IX segment surrounds the anus. IV, V and VI segments with one sensory pit lateroventrally; VII segment without sensory pit; VIII segment with one sensory pit lateroventrally, IX segment with as two sensory pits, one ventrally, the other dorsally. On each side of the membranous area of the VII and VIII segments there are wax-producing plates that secern long and fine waxy filaments.

All first instar specimens are white with areas mostly pigmented and, for the most part, weakly defined contours. On head, the clypeus is soft brown; thorax with two wide grey-brown bands laterally on each tergite, tarsi of all the legs soft brown; abdomen grey-brown with transversal bands on the I-VI tergites, lateral and lateroventral portions of IX segment with brown pigmentation. In this stage, furthermore, the specimens have black spots, characteristic for their number, position and extension: one very large spot occupies the basal half of the frons reaching to the frontoclypeal suture; three large spots, one circular and in dorsomedial position, two elongated and lateral, characterize the VII abdominal tergite.

Second instar (Fig. 5)

Dimensions. Body length 1.30-1.70 mm; thoracic length 0.50-0.54 mm; thoracic width 0-54-0.58 mm.

In this stage, the head has eleven sensory pits on the frons. On the whole, it is rather similar to the first instar.

Thorax similar to that of first instar specimens, even regarding number and arrangement of the sensory pits. Differences are in the medial carinae of the pronotum which are more distinct, and in the appearance of a carina on each plate of meso- and metanotum; it is barely evident and originates near the anteromedial angle, extends obliquely towards the posterior margin and ends just beyond the halfway point of the length of each segment. Anterior and median legs with two-segmented tarsi: the proximal segment shorter than the distal. Posterior legs with five spines at the distal tip of the tibiae; the two tarsal segments are more developed than those of the first instar, the proximal segment bears a crown of four spines on the distal margin.

The most significant differences regarding the abdomen concern the number of sensory pits. In the second instar, in fact, the IV-VI tergites have two sensory pits on each side, the VII tergite has one sensory pit in the lateral position; the VIII has two sensory pits lateroventrally and the IX tergite has two sensory pits, as in the first instar.

In the second instar specimens, coloration is different from that of the first instar ones. They bear two black spots at the apex of the frons; the black spot on the basal half of the frons is slightly reduced; the dorsal grey pigmentation on thorax and abdomen has more defined contours. Two dark suffused spots are on the anteromedial margin of the pronotum, from which two less pigmented median longitudinal bands originate, extending to the distal tip of the VI segment. The lateral portions of the thorax keep the soft greyish coloration already found in the first instar; on the abdominal tergites, the pigmentation is concentrated mostly on the sides of the midline, forming the above-mentioned longitudinal bands, and at the sides of each tergite; grey transversal streaks connect the lateral portions to the median bands.

Third instar (Fig. 6)
Dimensions. Body length 2.12-2.28 mm; thoracic length 0.60-0.72 mm; thoracic width 0.72-0.80 mm.

Head less turgid than in the previous instars. Face more elongated, with more distinct carinae. Frons with eleven sensory pits. Antennae with more developed scape, it is a little less than half as long as the pedicel; the bulbous portion of the flagellum approximately ⅓ of the length of the pedicel.

In this instar, the pronotum is the shortest tergite of the thorax and bears four sensory pits at the inner side of each medial carina. The mesonotum has more evident and longer median carinae than in the second instar; they do not reach the posterior margin; laterally, the mesonotum differentiates two short wingpads that cover the anterolateral margins of the metanotum. Metanotum as long as mesonotum or a little shorter , the medial carinae are more marked but shorter than the mesonotal ones; the wingpads differentiate themselves even on the metanotum and are broadly expanded lateroposteriorly to make the posterior margin seem strongly arcuate; besides, due to better development of the metanotal plates, each dorsal sensory pit takes on a central position, almost leaning against the outer side of the medial carina. Regarding the legs, the major differences are found in the hind legs: the tibiae bear distally a crown of six spines, the median pair of which has a more proximal insertion, and laterally a spine-shaped pad; metatarsi three-segmented: the proximal segment distally with a crown of five spines, the medial one is shorter than the previous segment and differentiates distally two rudimentary spines, the distal segment is of intermediate length and does not bear spines.

The IV, V and VI abdominal tergites show one pit without sensory hair situated medially with respect to the two sensory pits already observed in the previous instar; the VIII segment shows three sensory pits; the VII and IX segments have, as in the second instar specimens, one and two sensory pits, respectively.

Significant differences in coloration can be noticed. On the head, the black spot, situated in the basal half of the frons, is slightly reduced; on the anteromedial margins of the vertex two dark subtriangular spots are differentiated. On pronotum, the spots delineated in the second instar on the anteromedial margin are darker and more extensive; besides, near posterior margin two dark spots near the outer side of each medial carina are differentiated. The grey dorsal coloration of thorax and abdomen is better defined, and is represented by two medial longitudinal bands, which originate near posterior margin of pronotum and reach, as in the second instar, the posterior margin of the VI abdominal tergite. On abdomen, the pigmentation between each median band and the corresponding lateral portion of each segment is reduced progressively.

Fourth instar (Fig. 8)
Dimensions. Body length 2.60-2.80 mm; thoracic length 0.84-0.88 mm; thoracic width 1.00-1.04 mm.

Number and arrangement of the sensory pits on head, thorax and abdomen are the same as those of the third instar.

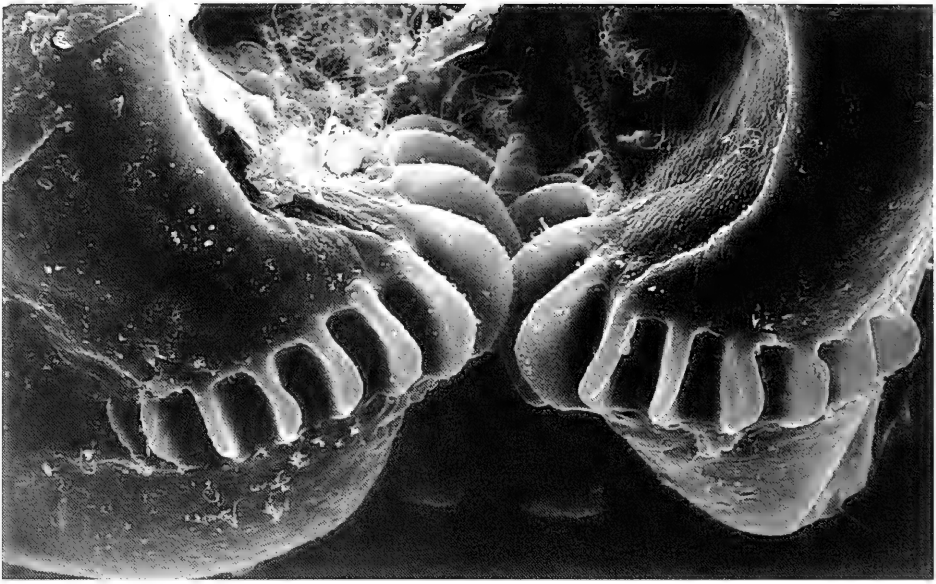


Fig. 7. *Ommatissus binotatus* Fieber.Cuticular folds on the metathoracic trochanters of the first instar (× 1900).

The head is generally more developed; the face is more elongated and the vertex shows a marked longitudinal median groove.

The mesonotum is the longest segment of the thorax. It has strongly lobate wingpads that cover each lateral portion of the metanotum for more than half of its length. Wingpads of metanotum are developed and extend posteriorly to the II or III abdominal segment. Other significant changes are on posterior legs: tibiae with a spine-like pad and a robust spine on lateral margin; at distal tip with a crown of six spines. First tarsal segment with five spines distally; second segment shorter than first, with two spines at distal tip.

Abdomen without any particular morphological differences compared to the third instar.

Coloration. Frons with a more and more reduced black spot on basal half; on the contrary, the two black spots located on apex which emerged in the second instar, are more extensive. The two subtriangular spots outlined on vertex in the third instar larger and black, just like the two pairs of spots on the pronotum. Even the grey dorsal coloration shows further modifications. Besides the two median longitudinal bands (which are, moreover, well outlined), the pigmentation on each side of meso- and metanotum results in two longitudinal streaks, while on each side of abdomen it forms a longitudinal band from the well defined contours.

Fifth instar (Fig. 9)

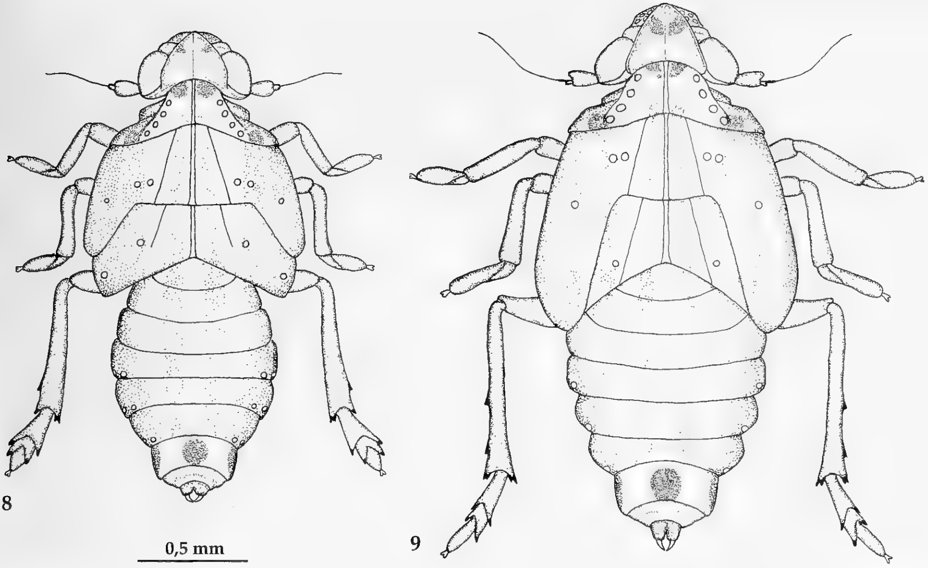
Dimensions. Body length 3.00-3.16 mm; thoracic length 1.00-1.08 mm; thoracic width 1.32-1.40 mm.

The most significant differences which allow to distinguish the fifth instar specimens from those of the fourth instar concern thorax and coloration.

On thorax, the mesonotal wingpads are much more developed and extend to the apex of the metanotal wingpads. Each metanotal plate has the median carina reaching posterior margin; each plate bears only one sensory pit in dorsomedial position.

Posterior tibiae with two robust spines on lateral margin and six/seven spines at distal tip; first tarsal segment with six spines distally, second segment with two.

Regarding the modifications of the black spots on head and thorax, the following can be observed: 1. further reduction of the spot located in basal half of frons; 2. greater extension of the spots located on vertex and those on posterior margin of pronotum; 3. reduction and different shape, from circular



Figs 8-9. *Ommatissus binotatus* Fieber. **8.** Fourth instar. **9.** Fifth instar.

to subtriangular, of the spots on anterior margin of pronotum. Further differences can be seen even in dorsal coloration. The two medial longitudinal bands are narrower and the pigmentation on the sides of meso- and metanotum forms three fine longitudinal streaks, instead of two as in fourth instar.

Biological data

The data regarding the annual cycle of *O. binotatus* Fieber are outlined in Tab. 1. In Sicily the species is univoltine and overwintering at the egg stage. The eggs hatch at the end of the second decade of April and continue scalarly until about the first decade of June. The first and second instar specimens move very little and they live on the lower leaf surface of the leaf lamina near the hatching site. The behaviour of the specimens in the later stages is different; they are more active as they develop and even move around, by jumping from one leaf to another or from one plant to another, if nearby.

Moulting occurs when the cuticle breaks according to two preformed lines of weakness; one, transversal, which extends on each side from the anterior margin of the vertex to near the anteromedial angle of the eye, following the outer side of the external lateral carinae; the other starts from the apex of the vertex and continues along the medial longitudinal grooves on vertex and thorax, reaching the posterior margin of the metanotum.

Since the hatching of the eggs is scalar, the specimens of all juvenile stages can be observed on vegetation during the first decade of June.

Tab. 1. Life history of *Ommatissus binotatus* Fieber in Sicily. Symbols: • = egg; o = nymphs; + = adult

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
•••	•••	•••	•••	•••	•						
			oo	ooo	ooo	ooo					
					+	+++	+++	+++	++		
						•	•••	•••	•••	•••	•••

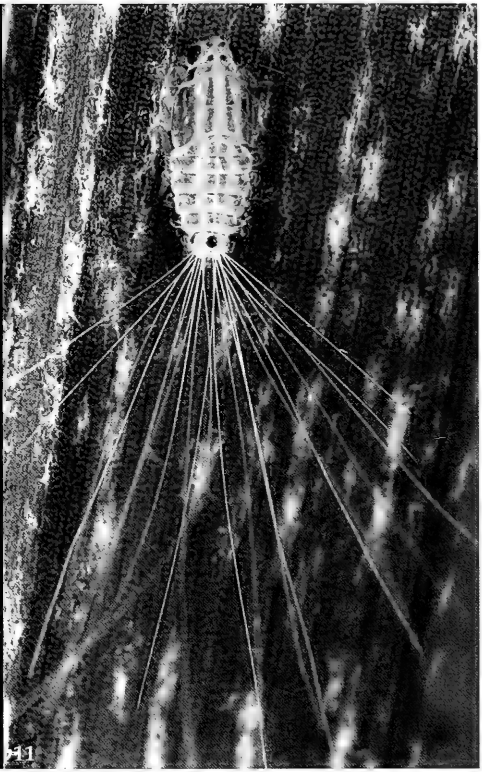


Fig. 10. Development of sooty mold on honeydew of *Ommatissus binotatus* Fieber on *Chamaerops humilis* L. leaf.
Fig. 11. Fourth instar nymph showing long waxy filaments posteriorly.

In all the immature stages there is an abundant production of honeydew.

The postembryonic development lasts about two months. The adults emerge in the last decade of June and the ovipositions begin in the third decade of July. The adults are present until the second decade of October with the last ovipositing females.

In Sicily, natural enemies were not observed preying upon or parasitizing the eggs or immature stages of *O. binotatus*.

Phytopathological aspects

The action of the insect on the plant comes about in various ways and with different effects. The feeding punctures, usually inflicted from the lower surface of the leaf, are to be considered negligible from a phytopathological point of view, since the areas concerned do not show alterations nor necrotic processes. From this point of view, the oviposition punctures are more important. The female digs a deep hole with her ovipositor in the thickness of the leaf lamina, in which she inserts the egg; the plant tissues concerned go into necrosis after a short time.

Another significant phytopathological aspect is the large quantity of honeydew produced in the immature stages. The production of honeydew is often followed by the development of sooty molds (Fig. 10). They cause damage to the plant indirectly; the development, in fact, of the mycelium forms a black papery layer that obstacles the photosynthetic activity and the gaseous exchanges in that area of the leaf.

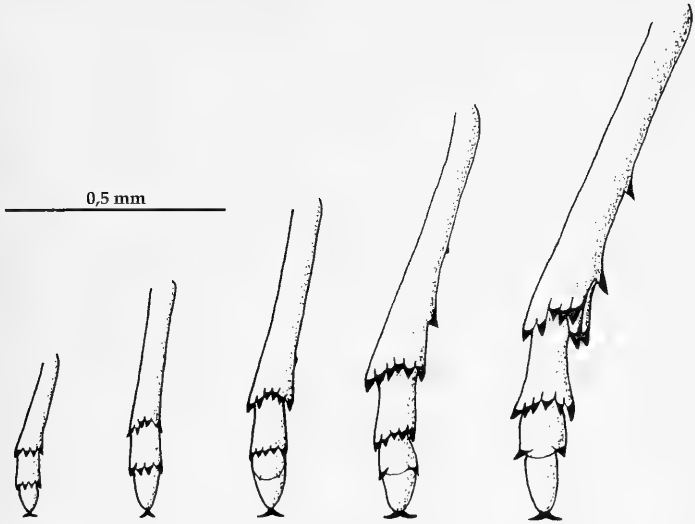


Fig. 12. Development of hind legs and arrangement of relative spines in the juvenile stages of *Ommatissus binotatus* Fieber.

As a consequence of the presence of honeydew and sooty molds, it is possible to observe various insects eating sugar solutions, especially bees, wasps and ants of the *Camponotus* genus, and Psocids on *Chamaerops* plants in Sicily.

Considering the above, it is easily understandable how the leaves concerned by the attack of this plant sucking insect are subject to significant alterations, even from an aesthetic point of view. Their presence cause, therefore, economic damage since the plants showing this damage can encounter difficulty in the commercialization process. However, it must be pointed out that the specimens of *O. binotatus* essentially carry out their biological cycle on not young leaves that the palm has already produced in the course of several months. Besides, it has been observed that the entity of the populations living on the natural groupings of *Chamaerops humilis* in Sicily is never excessively high and this allows the palm to tolerate the colonization of this insect without to many damages.

Conclusions

The five immature stages of *O. binotatus* Fieber differ among themselves not only for the dimensions but also the number of sensory pits, the presence and development of wingpads, the number of tarsal segments, the number of spines on the tibia and on the first and second tarsal segments of the hind legs, the presence and extension of black spots on the head, thorax and abdomen, and the general body coloration.

The main distinctive characters are outlined in Tab. 2; in this table the expression "2 + 1", referring to the number of pits present on the abdominal tergites helps to distinguish the two typical sensory pits from one pit without sensory hair. The development of the hind legs and the arrangement of its relative spines in the five stages is illustrated in Fig. 12.

The sensory pits (Fig. 13) are characteristic of the juvenile instars of the Fulgoromorpha; they are located on the frons, thoracic and abdominal tergites and show a deep depression, circular or elliptic, with a sensory hair arising from it, near its edge. The sensory pits, other than the sensory function, also seem to have a glandular function, with wax production, as observed in *Metcalfa pruinosa* (Say) (Lucchi & Santini 1993). Besides, in all the juvenile stages the specimens show long waxy filaments sunburst-arranged (Fig.11) at the distal tip of the abdomen. These filaments are produced in a waxy area (Fig. 4)

Tab. 2. Comparison of the postembryonic stages of *Ommatissus binotatus* Fieber. - = no spot; o = slightly visible or not very extensive spot; + = distinct and extensive spot; □ = distinct and very extensive spot. Other explanation in text.

	I° instar	II° instar	III° instar	IV° instar	V° instar
Spot on the basal half of the frons	□	□	+	+	o
Spots on the apex of the frons	–	□	□	□	□
Spots on the vertex	–	–	o	+	□
Spots on the anterior margin of the pronotum	–	o	+	□	□
Spots on the posterior margin of the pronotum	–	–	o	□	□
Spots on the VII° abdominal segment	□	□	□	□	□
Number of sensory pits on each side of the frons	10	11	11	11	11
Number of sensory pits on each side of the pronotum	3	3	4	4	4
Number of sensory pits on each side of the mesonotum	3	3	3	3	3
Number of sensory pits on each side of the metanotum	2	2	2	2	1
Number of spines on the lateral margin of the hind tibiae	–	–	–	1	2
Formula of the spines on the hind legs	4-4-0	5-4-0	6-5-0	6-5-2	6/7-6-2
Number of sensory pits on each side of the abdominal tergites:					
IV°	1	2	2 + 1	2 + 1	2 + 1
V°	1	2	2 + 1	2 + 1	2 + 1
VI°	1	2	2 + 1	2 + 1	2 + 1
VII°	–	1	1	1	1
VIII°	1	2	3	3	3
IX°	2	2	2	2	2

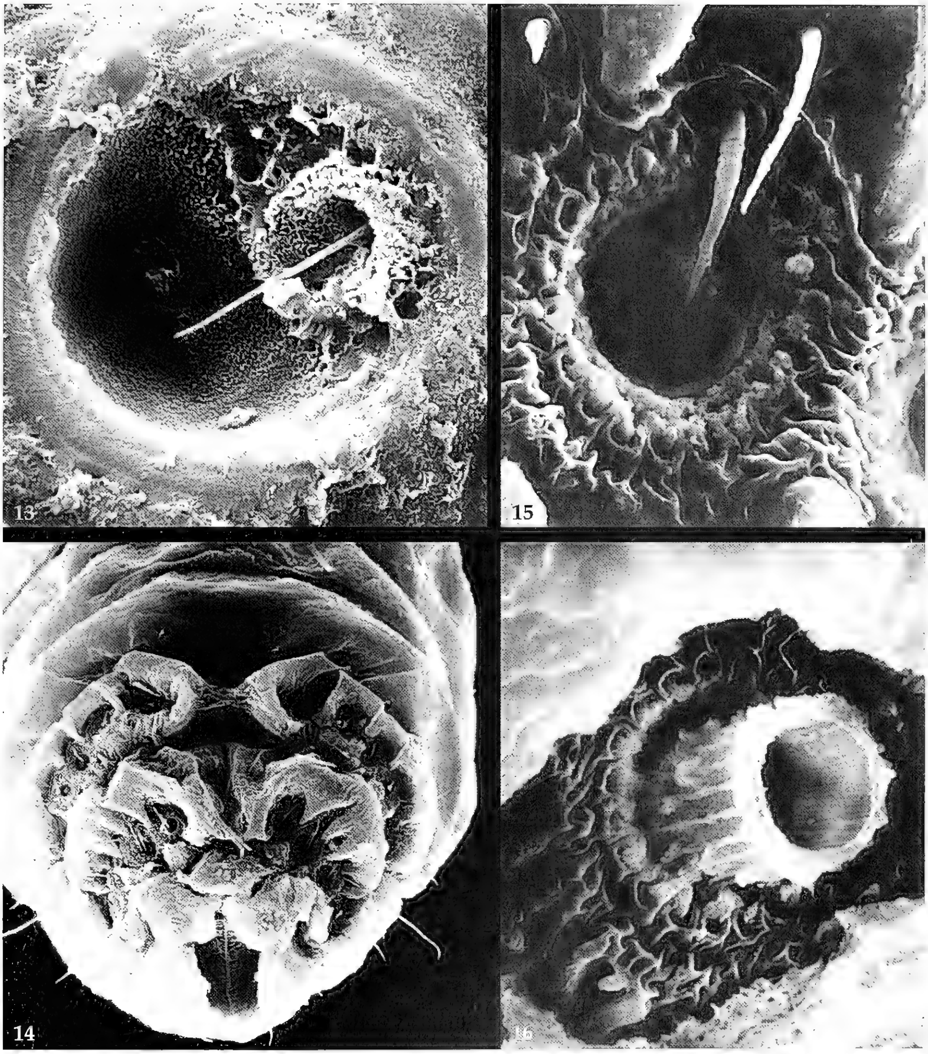
made up of six pits arranged on each side of the VII and VIII abdominal segments. Each pit represents a complex glandular structure since it is formed by a central canal, externally surrounded by a crown of small pores. On the superior margin there is a hair with a sensory function, whose distal tip reaches the central glandular cavity. It seems that the smaller pores produce ribbon-like wax (Fig. 15); the central glandular canal forms long waxy filaments which are entirely hollow (Fig. 16).

O. binotatus Fieber is a monophagous species on *Chamaerops humilis* L. In Italy, it has only been recorded in Sicily. Asche & Wilson (1989) reported it only from the western region ("above Trapani, Mount Erice"), but further investigations showed that this tropiduchid is widespread in the island.

The possibility of identifying the immature stages of the pest or those potentially so, is surely an important aspect in pest control programs. From a systematic point of view, the coloration, number and

Tab. 3. Comparison of the fifth instar of *Ommatissus binotatus* Fieber and *Ommatissus lofouensis* Muir.

V° instar	*O. binotatus*	*O. lofouensis*
Number of sensory pits on each side of the frons	11	11
Number of sensory pits on each side of the pronotum	4	5
Number of sensory pits on each side of the mesonotum	3	3
Number of sensory pits on each side of the metanotum	1	1
Number of spines on the lateral margin of the hind tibiae	2	2
Formula of the spines on the hind legs	6/7-6-2	6-6-2
Number of sensory pits on each side of the abdominal tergites:		
III°	–	2
IV°	2 + 1	3
V°	2 + 1	3
VI°	2 + 1	2
VII°	1	1
VIII°	3	3
IX°	2	3
Number of wax-pores on each side of the VII° abdominal segment	6	6
Number of wax-pores on each side of the VIII° abdominal segment	6	6



Figs 13-16. *Ommatissus binotatus* Fieber. **13.** Sensory pit on the abdomen of fifth instar nymph (× 1850). **14.** Posterior tip of the abdomen of fifth instar nymph showing wax-pores of the VII° and VIII° segments (× 310). **15.** Detail of secreting wax-pore (× 1800). **16.** Detail of wax-pore secreting a hollow filament (× 2600).

arrangement of the spines and sensory pits represent the most reliable characters for the identification of the Fulgoromorpha nymphs. Up to now, within the *Ommatissus* framework, the lack of studies allows us to specify some distinctive characters only in the fifth instar specimens of *O. lofouensis* Muir, described by Yang & Yang (1991), and *O. binotatus* Fieber. The main characters are summarized in Tab. 3; even in this table the typical sensory pits have been distinguished from those without sensory hair.

Acknowledgements

I wish to thank Dr. Annarita Taddei (Centro Interdisciplinare di Microscopia Elettronica, Università della Tuscia, Viterbo) for her technical assistance on the SEM and Mr. Massimo Vollaro (Dipartimento di Protezione delle Piante, Viterbo) for his macrophotographs.

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SPIXIANA	**20**	2	131–135	München, 01. Juli 1997	ISSN 0341-8391

A new species of *Trichotichnus* Morawitz from northern Australia

(Insecta, Coleoptera, Carabidae, Harpalinae)

Martin Baehr

Baehr, M. 1997: A new species of *Trichotichnus* Morawitz from northern Australia (Insecta, Coleoptera, Carabidae, Harpalinae). – Spixiana **20/2:** 131-135

Trichotichnus maculipennis, spec. nov. is described from northern Queensland, Australia, and compared with the *Trichotichnus*-species recorded from Australia. A revised key to all Australian species is presented.

Two name replacements are introduced: The genus name *Mooreana* Baehr, 1987 (Carabidae, Lebiinae) that is a junior homonyme of *Mooreana* Evans, 1926, is changed to *Barrymooreana*, nom. nov.; and the species name *Perileptus convexicollis* Baehr, 1987 that is a junior homonyme of *Perileptus convexicollis* Mateu, 1983 is changed to *Perileptus cylindricollis*, nom. nov.

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Introduction

Within a sample of Australian Carabid beetles, collected by A. Walford-Huggins and sent for examination by Dr. R. L. Davidson (Pittsburgh), there was a small series of a conspicuous *Trichotichnus*, identified as *T. brandti* Darlington, but certainly representing another, undescribed species.

Although being rather speciose in New Guinea (Darlington 1968), the genus *Trichotichnus* was unknown from Australia until about 15 years ago, when I published the first record from Australia (Baehr 1985) and described another – new – species from northeastern Queensland (Baehr 1983). In the meantime two additional species were described from Australia (Baehr 1990), but thus far all records are from North Queensland, within the area from Windsor Tableland in the north through Atherton Tableland down to the vicinity of Tully. The new species to be described below has been collected in the same area, namely the vicinity of Cairns.

Measurements

Measurements were taken using a stereo microscope with an ocular micrometer. Length has been measured from apex of labrum to apex of elytra. Lengths, therefore, may slightly differ from those of other authors. Length of pronotum was measured from middle of apex to base, width of apex between the most advanced points of the apex.

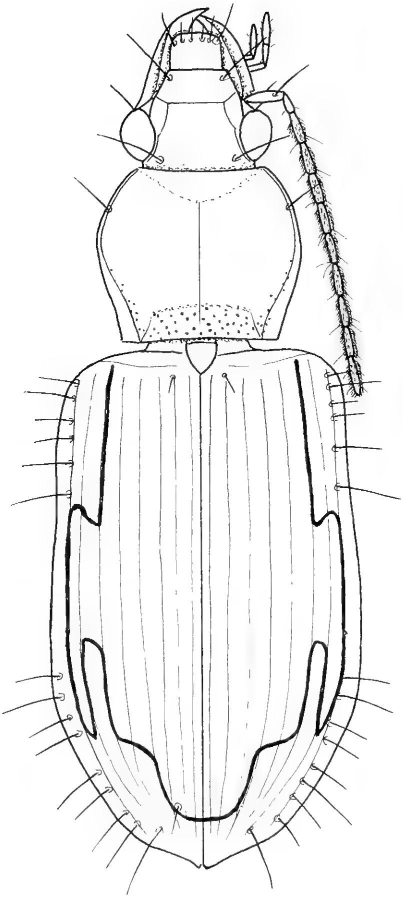


Fig. 1. *Trichotichnus maculipennis*, spec. nov. Habitus. Length: 7.2 mm.

Trichotichnus maculipennis, spec. nov.

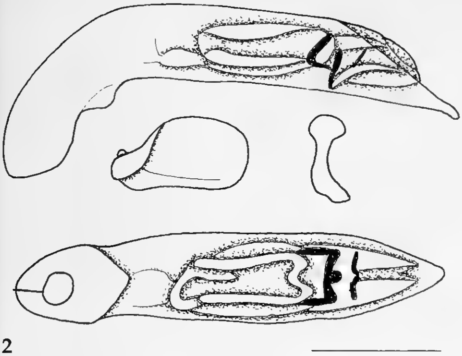
Figs 1-3

Types. Holotype: ♂, Cairns: N. Qld/ Kamerunga at M.V.L/ 17: July: 1972 A. & M. Walford-Huggins 6368/Walford-Huggins Collection Carnegie Museum Accession 35338/ *Trichotichnus brandti* Darl. (Series det. by A. Walford-Huggins) (Carnegie Museum, Pittsburgh). – Paratypes: 2♂♂, 1♀, same data (Carnegie Museum, Pittsburgh, working collection of author).

Diagnosis. Species of subgenus *Bellogenus* Clarke according to the character states used by Noonan (1985). Distinguished from all other Australian and New Guinean species by the light colour, the peculiar elytral pattern and the narrow, markedly cordiform pronotum with very sharp, rectangular basal angles.

Description

Measurements. Length: 6.8-7.3 mm; width: 2.7-2.9 mm. Ratios: Width/length of pronotum: 1.21-1.22; width of base/width of apex of pronotum: 1.24-1.26; width of pronotum/width of head: 1.39-1.42; length/width of elytra: 1.56-1.60; width of elytra/width of pronotum: 1.47-1.50.



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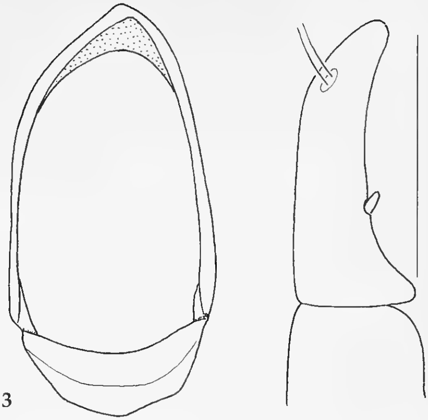

3

Figs 2, 3. *Trichotichnus maculipennis*, spec. nov. ♂ and ♀ genitalia. **2.** Genital ring, adeagus, and parameres. Scale: 0.5 mm. **3.** Stylomere 2 and apex of stylomere 1. Scale: 0.2 mm.

Colour. More or less dark reddish brown, head reddish, considerably lighter than pronotum and elytra, lateral margin of pronotum narrowly yellowish, lateral and apical margins of elytra from 7th interval yellow, though 7th and 8th intervals in middle dark, the dark colour widely interrupting the light margin, on 8th interval the dark colour narrowly prolonged backwards. The yellow marginal colour at apex extended to 4th and 5th intervals. Pronotal and elytral epipleurae yellow, lower surface piceous, though abdominal sterna with indistinct lighter spots that become more extended und more distinct towards apex. Terminal sternum almost wholly yellow. Mouthparts, antennae, and legs completely yellowish.

Head. Moderately large, with very large, rather protruding eyes. Orbits very short. Eyes separated from buccal fissure by c. $^{1}/_{10}$ of eye diameter. Clypeal suture deep. Clypeo-orbital sulcus distinct, elongate, almost attaining eye, weakly prolonged medially of eye very close to eye. Clypeus with one seta each side, labrum 6-setose. Mandible moderately elongate. Both terminal palpomeres of both palpi sparsely setose. Labium with elongate, unidentate tooth. Antenna elongate, surpassing base of pronotum by 2-3 antennomeres, median antennomeres almost 3 × as long as wide. Frons in middle with small punctiform impression. Surface without puncturation, without microreticulation, highly glossy.

Pronotum. Considerably wider than head, c. 1.2 × as wide as long, markedly cordiform, widest shortly behind position of lateral seta. Apex almost straight, anterior angles rounded, not projecting. Lateral borders in anterior two thirds convex, posteriorly concave, near basal angles straight, almost parallel. Basal angles sharp, rectangular. Base almost straight, laterally feebly oblique. Medin line distinct though shallow, anterior transverse sulcus very shallow, v-shaped, posterior sulcus likewise very shallow. Lateral channel anteriorly rather narrow, slightly widened towards basal angles, lateral margin distinct, base unbordered. Basal grooves deep, linear, elongate, separated from marginal channel by a wide, impunctate space. Base including basal grooves densely and coarsely punctate. Lateral marginal seta situated slightly in front of middle, basal marginal seta absent. Surface impunctate, without microreticulation, highly glossy.

Elytra. Elongate, rather convex, slightly widened in posterior half, lateral borders barely sinuate in front of apex. Humeri completely rounded, apex at suture with a minute denticle. Striae deep, complete, impunctate, intervals rather convex. Setiferous puncture of 3rd interval, when present, situated in middle between 2nd and 3rd stria, far down the apical declivity. Marginal series consisting of 6 setiferous punctures behind humerus and (7-)8 apical setiferous punctures in two groups of 4, separated from humeral group by a very wide, impunctate space. Microreticulation superficial and very fine, consisting of dense, transverse lines mixed with very wide meshes. Surface impunctate, rather glossy, though not iridescent. Wings fully developed.

Lower surface. Completely impunctate and impilose. Metepisternum rather elongate, c. 1.3× as long as wide. ♂ with 2, ♀ with 4 ambulatory setae at apex of terminal sternite.

Legs. Elongate. Anterior tibia barely widened at apex. In ♂ 1st-4th tarsomeres of anterior and median tarsi widened and squamose beneath. 1st tarsomere of metatarsus rather elongate, slightly shorter that 2nd and 3rd tarsomeres together.

♂ genitalia (Fig. 2). Genital ring large, c. ⅓ longer than aedeagus, rather wide, slightly asymmetric, with short, rounded apex and rather short, wide base. Aedeagus moderately elongate, rather stout, straight, lower surface straight. Apex rather short and stout, triangular, slightly directed to left. Orificium very elongate, occupying almost the complete upper surface of the aedeagus. Internal sac markedly symmetric, with two narrow sclerites near orificium, the anterior one being about w-shaped, the posterior one semicircular, the connecting bar in both sclerites situated at the lower surface of aedeagus. Parameres rather small, left much larger than right, for shape see fig. 2

♀ genitalia (Fig. 3). Stylomere 2 elongate, straight, with short, feebly curved apex. One tiny ventral ensiform seta situated close to base of stylomere, dorsal ensiform seta absent, 2 nematiform setae raising from a groove at apical fourth of stylomere. Apex of stylomere 1 without any setae.

Variation. Setiferous puncture of 3rd elytral interval variable, mostly absent, present unilaterally in a single specimen only. Otherwise, apart from less contrasting colouration in two specimens due to immaturity, little variation noted.

Distribution. Northeastern Queensland. Known only from type locality.

Collecting circumtances. Unknown.

Relationships. According to the subgeneric concept of Noonan (1985) the new species belongs to the subgenus *Bellogenus* Clarke. Of this subgenus a number of species occur in New Guinea. However, the peculiar colour pattern and the cordiform pronotum distinguish *T. maculipennis* from all New Guinean species (see Darlington 1968). In Australia thus far no species of the mentioned subgenus was recorded. The new species is, therefore, once more evidence for various independent colonizations of northeastern Australia by *Trichotichnus*-species of different subgenera. Probably, all these colonizations took their way via New Guinea, though, except for the presumably very recently immigrated *T. straneoi* Louwerens (Baehr 1985), all Australian species are taxonomically well separated from their possible New Guinean ancestors.

Updated key to the Australian species of *Trichotichnus* Morawitz

1. Prothorax wide with markedly convex sides; head only ⅔ as wide as prothorax; surface of elytra strongly iridescent .... *straneoi* (Louwerens)

– Prothorax less wide, sides posteriorly about straight or even sinuate; head almost ¾ as wide as prothorax; elytra not or but slightly iridescent .... 2.

2. Elytra distinctly bordered with yellow .... 3.

– Elytra unicolorous .... 4.

3. Lateral yellow border of elytra not interrupted at 8th interval, apical yellow border not serrate; pronotum wide, ratio width/length c. 1.5, sides basally convex, lateral parts of base clearly oblique, basal angles obtuse .... *storeyi* Baehr

– Lateral yellow border of elytra interrupted at 8th interval, apical yellow border serrate; pronotum narrow, ratio width/length c. 1.2, sides basally straight, lateral parts of base almost straight, basal angles rectangular .... *maculipennis*, spec. nov.

4. Larger species, length >9 mm; abdominal sternites with large, yellow lateral spots; femora conspicuously lighter than tibiae; pronotum widest in front of middle, sides basally straight .... *demarzi* Baehr

– Smaller species, length c. 7.5 mm; abdominal sternites without yellow spots; femora not conspicuously lighter than tibiae; pronotum widest at middle, sides basally sinuate .... *tolgae* Baehr

Name replacements

At this place, I want to introduce two replacement names for names given by me that recently turned out as preoccupied names.

Dr. Y. Bousquet, Ottawa, recently informed me kindly that the genus name *Mooreana* Baehr (Baehr 1987a), used for the lebiine species *M. quadrimaculata* Baehr, is a junior homonyme of *Mooreana* Evans, 1926. It is herewith replaced by *Barrymooreana*, nom. nov.

Mr. W. Lorenz, Tutzing, while finishing his catalogue of available carabid names, also informed me recently that the species name *Perileptus convexicollis* Baehr, 1987 (Baehr 1987b) is a junior homonyme of *Perileptus (Parablemus) convexicollis* Mateu, 1983 that was unknown to me when revising the Australian *Perileptus*. The species name is herewith changed to *Perileptus cylindricollis*, nom. nov.

Acknowledgements

My best thanks are due to Dr. R. L. Davidson (Pittsburgh) for kindly submitting the species for identification, and to Dr. Y. Bousquet (Ottawa) and Mr. W. Lorenz (Tutzing) for the nomenclatorial informations mentioned above.

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Darlington, P. J. Jr. 1968. The carabid beetles of New Guinea III. Harpalinae continued. Perigonini to Pseudomorphini. – Bull. Mus. comp. Zool. **137**: 1-253

Noonan, G. R. 1985. Classification and names of the Selenophori group (Coleoptera: Carabidae: Harpalini) and of nine genera and subgenera placed in incertae sedia within Harpalina. – Milwaukee Publ. Mus. Contr. Biol. Geol. **64**: 1-92

13. Wehner, R. & W. Gehring: Zoologie. 23. neu bearbeitete Auflage, begründet von Alfred Kühn. – G. Thieme Verlag, Stuttgart, 1995. 861 S, zahlr. Abb., Tab. und Boxen.

Die hiermit vorliegende 23 Auflage des bekannten und bewährten Lehrbuchs der Zoologie, nach dem sich schon Generationen von Studenten auf Prüfungen vorbereitet haben, folgt wieder der Gliederung des Stoffes von der Zelle über den Organismus zur Vielfalt der Organismen. Der Text ist wieder sehr informationsreich und doch gut leserlich. Das Buch ist hervorragend bebildert und mit vielen Übersichten, Tabellen und Boxen ausgestattet. Besonders gut ist die Verwendung des zweifarbigen Druckes, wodurch vor allem die vielen Schemazeichnungen an Übersichtlichkeit und Klarheit gewinnen. Die Gliederung der Tierstämme folgt eher den Traditionen als neuen Erkenntnissen, was in diesem Zusammenhang meistens durchaus vertretbar erscheint. In manchen Fällen aber, wie zum Beispiel bei den Prozozoa scheint eine Neugliederung duchaus angebracht. Sehr hilfreich ist der Anhang. Die Übersicht über das System der Tiere (Anhang 4) sollte allerdings in der nächsten Auflage überarbeitet werden (Pogonophora zu den Spiralia, Anzahl der Arten oft inzwischen höher, weitere Stämme wie Placozoa, Loricifera etc. aufnehmen). Die Besprechung der Grundlagen und Methoden der Zoologischen Systematik könnte vielleicht im Kapitel über die Tierstämme abgehandelt werden, statt im Kapitel über die Evolution. Für viele Studenten wird das neu aufgenommene Glossar eine große Hilfe sein. Das preiswerte und seit langem bewährte Lehrbuch ist nach wie vor allgemein bestens zu empfehlen. K. Schönitzer

14. Otte, D.: Orthoptera Species File No. 1, Crickets (Grylloidea). A Systematic Catalog. – The Orthopterists' Society & The Academy of Natural Sciences of Philadelphia, Philadelphia, 1994. 120 pp. ISBN 0-9640101-2-7 (number), 0-9640101-1-9 (series).

This book is the first part of a project being carried out at the Academy of Natural Sciences of Philadelphia in which all species of Orthoptera will be catalogued. In this volume 3511 species are listed which belong to the 4 families of Gryllidae, Mogoplistidae, Myrmecophilidae and Gryllotalpidae. The catalog is based on a computer database. Besides the bibliographic citation the catalog contains data on the locus typicus and where the type material is actually deposited. This catalog will greatly help scientists working with these insects. It is hoped that the further volumes will appear quite soon. K. Schönitzer

15. Lambert, D. M. & H. G. Spencer (eds.): Speciation and the recognition concept. Theory and Application. – Johns Hopkins University Press, Baltimore & London, 1995. 502 pp., 27 authors). ISBN 0-8018-4741-9.

To most biologists species represent the essential aspect of diversity. It is obvious then to ask what is the relationship between evolutionary process and the species as evolutionary units. A common criticism of Hugh Paterson's Species Recognition Concept is that the main factor which destinguishes it from the biological definition, the change in emphasis from isolation to recognition, is merely semantic because the central importance of gene flow remains unaltered. The main difference between the two concepts becomes appearent when considering the evolution of the intrinsic barriers that prevent genetic intermingling between species. In this book several interesting essays are brought together in which the views of the Species Recognition Concept are illustrated and its consequences are demonstrated and discussed. It is shown in this volume that the Species Recognition Concept is an interresting and new concept worth thinking about. K. Schönitzer

16. Pfannenstiel, H. D. (Hrsg.): Verhandlungen der Deutschen Zoologischen Gesellschaft, Band 88 (2 Teilbände). – G. Fischer Verlag, Stuttgart, 1995. 271 + 234 S. ISBN 3-437-30796-7.

In bewährter Weise werden in diesen beiden Teilbänden die Hauptvorträge und Kurzpublikationen der Jahresversammlung der Deutschen Zoologischen Gesellschaft in Kaiserslautern vorgestellt. Die Hauptthemen des wissenschaftlichen Programms waren: Neuron-Glia-Dialog, Populationsbiologie, und Regulation vegetativer Funktionen. Die Zoologische Systematik ist insbesondere durch einen Artikel über die Bedeutung von Fossilien für das Verständnis der Arthropoden-Evolution vertreten. K. Schönitzer

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Brachygluta angelinii, a new species from Southern Italy*

(Insecta, Coleoptera, Pselaphidae)

Giorgio Sabella

Sabella, G. (1997): *Brachygluta angelinii*, a new species from Southern Italy. (Insecta, Coleoptera, Pselaphidae). – Spixiana **20/2:** 137-140

A new species of pselaphid beetles *Brachygluta angelinii*, spec. nov. from Southern Italy is described and illustrated. It is similar to the species of the *globulicollis* group (sensu Karaman, 1961) by the median pit of the pronotum clearly smaller than the lateral ones. It differs from all known *Brachygluta* species in the presence of two small teeth at the posterior margin of the metasternum, a pair of semicircular keeles on the fifth abdominal tergite and the extremely reduced armature of the internal sac of the aedeagus.

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In the material of Pselaphid beetles collected with light traps by my colleague Fernando Angelini in Basilicata (Southern Italy), I encountered numerous specimens of a large *Brachygluta* species. Their particular exoskeletal characters clearly characterize them as representants of a species new to science. It is so different from all so far known *Brachygluta* species that it is difficult to define its affinities.

Brachygluta angelinii, spec. nov.

Figs 1-3

Types. Holotype: ♂, Italy, Basilicata, Matera: Ponte Cagnolino (Lago San Giuliano) 100 m, 7.8.1992 (Zoologische Staatssammlung München). – Paratypes: same locality, 7.8.1992, 1♂ (Zoologische Staatssammlung München); 2♂♂ (coll. Bückle, Tübingen); 2♂♂ (coll. Brachat, Geretsried); 10♂♂ (coll. Angelini, Francavilla Fontana); 11♂♂ (coll. Sabella, Catania); 9.8.1992, 7♂♂ (coll. Sabella, Catania); 14.8.1992, 8♂♂ (coll. Angelini, Francavilla Fontana); 7♂♂ (coll. Sabella, Catania); 19.8.1992, 1♂ (coll. Sabella, Catania); 25.8.1992, 2♂♂ (coll. Sabella, Catania); 27.8.1992 3♂♂ (Museo Storia Naturale Ginevra); 5.9.1992, 3♂♂ (coll. Sabella, Catania); 26.10.1992, 2♂♂ (coll. Sabella, Catania); 2♂♂, Potenza, Lago di Pignola 770 m, base *Salix*, 29.11.1992 (coll. Sabella, Catania). All material Angelini leg. with light traps.

Description

Length: 1.8-2.0 mm, winged, completely dark-reddish with slightly more clear palps. Pubescence not dense, formed by short golden hairs covering the whole body surface including antennae and legs. Further longer, more erected, dark yellowish hairs are found in particularly large number on the antennae, the epistoma, the posterior margin of the first abdominal tergite, between meso- and metasternum, at the base of the mesocoxal cavity and on the anterior margin of the first abdominal sternite.

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Head clearly wider (0.40-0.42 mm) than long (0.30-0.31 mm) and only slightly narrowed anteriorly (width of the frontal lobe: 0.24-0.25 mm). Eyes well developed but only slightly prominent, temples roundish and distinctly longer than the eyes. Between the eyes, only two interocular pits are found, while the major part of the *Brachygluta* species bears three pits. Pits large, densely pubescent and profound, separated by a slightly convex area of the cephalic surface similar in width to one interocular pit. Penultimate palp segment enlarged, but distally clearly narrower than the base of the large, ovoidal terminal segment. Surface of head shiny wherever no traces of punctuation are present. Antennae (Fig. 1) very long (1.10-1.15 mm), scapus and pedicellus slightly enlarged with respect to the funiculus segments. Scapus about 1.5 times longer than wide, pedicellus slightly longer than wide, segments 3, 4, 6, and 7 nearly of the same shape, about two times longer than wide, while segment 5 is more than two times longer than wide and segment 8 only slightly longer than wide. Antennal club is formed by three segments, all longer than wide but gradually enlarged from segment 9 towards segment 11; segment 11 only slightly shorter than segment 9 and 10 taken together and about 1.5 times longer than wide.

Pronotum slightly longer (0.42-0.45 mm) than wide (0.40-0.41 mm) and only slightly broader than head, the maximum width is just behind middle; its lateral margins are almost parallel posteriorly, but more clearly narrowed anteriorly. The pronotum bears three not very evident basal pits, the median one less noticeable than the two lateral ones, like in *Reichenbachia*. Amongst the *Brachygluta* of the Italian fauna only *B. globulicollis* has this characteristic. Tegument shiny without punctuation.

Elytra broader (0.76-0.80 mm) than long (0.66-0.68 mm), with a visible but not particulary prominent humeral callosity and two clearly visible basal pits on each side. The medial pit continues in a suture line that almost reaches the apex of the elitra, the lateral pit is extended into a discal line that reaches the distal half of the elitra. Surface covered by sparse big pores.

1st abdominal tergite very long (0.41 mm) and slightly narrowed posteriorly. Abdominal basal carinae very short, separated by a distance broader than half the width of the tergite. In ♂ the posterior margin of the 1st tergite is indented as shown in fig. 2. The disc of the 2nd tergite bears an elevated medial carina, which is larger posteriorly and progressively narrowed anteriorly. 5th sternite bears a pair of semicircular lateral keels (Fig. 2).

Legs very long and thin, their trochanters, femora and tibiae inarmed.

Metasternum not grooved, along its medial line there are two series of laterally bent hair. The posterior margin of the metasternum bears two ventrally directed small teeth (I do not know any *Brachygluta* species that has such a character).

The aedeagus (Fig. 3) is 0.23-0.25 mm long with short and stumpy parameres bearing two big subapical bristles and a large trasparent apical lamella. Armature of internal sac very simple, formed by a big slightly medially curved tooth, accompained by another smaller and poorly visible tooth.

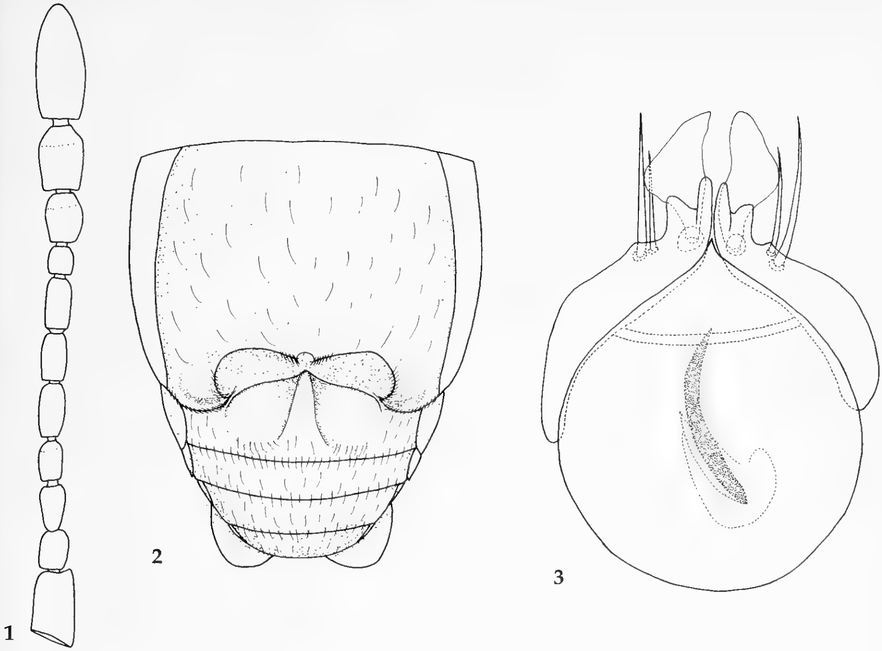
♀ unknown.

I dedicate this interesting species to Fernando Angelini, the well-known coleopterologist from Francavilla Fontana (Brindisi), who has contributed greatly to the knowledge of the Coleoptera fauna of Southern Italy.

Discussion

The genus *Brachygluta* Thomson, 1861 is distributed with 93 species (Newton & Chandler 1989: 42) mainly in the Holarctic region, in the Afrotropical region, and in Burma. The Palearctic region is the richest with 67 species (some of which are divided into numerous subspecies), distributed in whole Europe, throughout North Africa (except for Libya, probably due to lack of research) and in Asia including the Arabic peninsula as its southern limit, reaching Kazakistan to the north and Turkestan and Iran as its eastern border, despite Besuchet is presently describing (personal communication) a new species from Pakistan. No species are known from India, China and Japan.

Among the palaearctic *Brachygluta, B. angelinii,* spec. nov. is comparable only to those that have ♂♂ with modified abdominal tergites. Almost all these species have been assembled by Jeannel (1956) in the genus *Brachyglutodes* (today considered synonym of *Brachygluta*); most of them have been distributed to more or less homogenous and complete species groups: *haematica, ragusae, leprieuri, schueppeli, helferi, excavativentris* and *globulicollis*. The systematic assessment of all these groups needs revision.



Figs 1-3. *Brachygluta angelinii,* spec. nov., Holotype. **1.** Right antenna. **2.** Abdomen. **3.** Aedeagus, dorsal view.

B. angelinii cannot be inserted within any of the above mentioned groups. However, due to its uniform reddish colour, long and thin antennae and legs and mainly for the median pit of the pronotum that is clearly smaller than the lateral ones, it is similar to the species of the *globulicollis*-group (sensu Karaman 1961), including the five subspecies of *B. globulicollis* (Mulsant et Rey, 1861), *B. colchica* (Saulcy, 1876) and *B. iranica* (Saulcy, 1876).

However, *B. angelinii* is distinctly different from all *Brachygluta* species in the presence of two small teeth at the posterior margin of the metasternum and a pair of semicircular lateral keels at the fifth abdominal sternite. Also the particular morphology of the aedeagus, mainly the reduced armature of the internal sac separes *B. angelinii* from all known *Brachygluta* species.

Additional field work in the Balcanic peninsula, in Turkey and in SW Asia, areas poorly studied until now, surely will permit the discovery of new species. The study of this additional material will contribute to a more complete understanding of the relations between the *Brachygluta* species and species groups.

Riassunto

L'autore descrive e figura una nuova specie di *Brachygluta, B. angelinii,* spec. nov. dell'Italia meridionale. La nuova specie è nettamente separata dalle congeneriche per alcuni caratteri esoscheletrici esclusivi (presenza sul margine posteriore del metasterno di due dentini rivolti in basso, margini laterali del quinto sternite addominale allargati a semicerchio) e per la morfologia dell'edeago (con parameri corti e tozzi ed armatura del sacco interno ridotta ad un dente ricurvo ed ad un altro più piccolo addossato al primo).*B. angelinii* spec. nov.è comunque raffrontabile con le *Brachygluta* del gruppo *globulicollis* (*sensu* Karaman, 1961) essenzialmente per la fossetta mediana del pronoto nettamente più piccola delle laterali.

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The taxonomy, biology and distribution of the Australian jewel beetle *Chrysobothris saundersi* Macleay

(Insecta, Coleoptera, Buprestidae)

Trevor J. Hawkeswood and **James R. Turner**

Hawkeswood, T. J. & J. R. Turner (1997): The taxonomy, biology and distribution of the Australian jewel beetle *Chrysobothris saundersi* Macleay (Insecta, Coleoptera, Buprestidae). – Spixiana **20/2:** 141-149

The taxonomy, biology and distribution of the Australian jewel beetle, *Chrysobothris saundersi* Macleay (Coleoptera, Buprestidae, Chrysobothrinae) are described. *Chrysobothris hopei* Obenberger is confirmed as a synonym of *C. saundersi*. The adults of *C. saundersi* are redescribed and the species and its genitalia (both male and female) illustrated for the first time. Relationships with other *Chrysobothris* species are discussed and biological and ecological characteristics outlined. A key to the presently recognised species of *Chrysobothris* occurring in Australia is also provided. *Chrysobothris saundersi* is known to breed in the dead wood of *Acacia leiocalyx* (Domin) Pedley (Mimosaceae) in Queensland and *Casuarina stricta* Dryander (Casuarinaceae) in New South Wales. The larval galleries and pupal chambers are also described and illustrated. The first record of the species from New South Wales is also published.

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Introduction

The genus *Chrysobothris* Eschscholtz (Coleoptera, Buprestidae, Chrysobothrinae), is a very large genus of some 700 species distributed throughout the world, with North America north of Mexico containing about one quarter (25 %) of the world total (Fischer 1942). Australia is very poorly represented in terms of species of this genus; Carter (1925), who provided the last account of the Australian *Chrysobothris*, recognised only nine species. Obenberger (1923) described three new Australian species, namely *C. blackburni*, *C. carteri* and *C. hopei*, all of which Carter (1925, 1929, 1940) later synonymised with previously described species. Undaunted, Obenberger (1928) described a further two new species, namely *C. odewahni* and *C. macleayi*. Although these were both listed in Carter (1929), they were not critically examined and discussed by Carter in any of his subsequent publications on the group, apart from his statement that *C. odewahni* was a synonym of *C. australasiae* Laporte & Gory (Carter 1940) (which is erroneous, Hawkeswood,1983, unpublished data). Another new species, from Townsville, northern Queensland, was described in detail by Hawkeswood (1986a). The latest new *Chrysobothris* , *C. petersoni* T. J. Hawkeswood, has been described very recently from Western Australia, where it had remained unnamed since its initial discovery before the Second World War (Hawkeswood 1995).

The biology of the Australian species is also poorly known (with the exception of *C. queenslandica* T. J. Hawkeswood) and most of the species are poorly represented in museum collections. Adults of

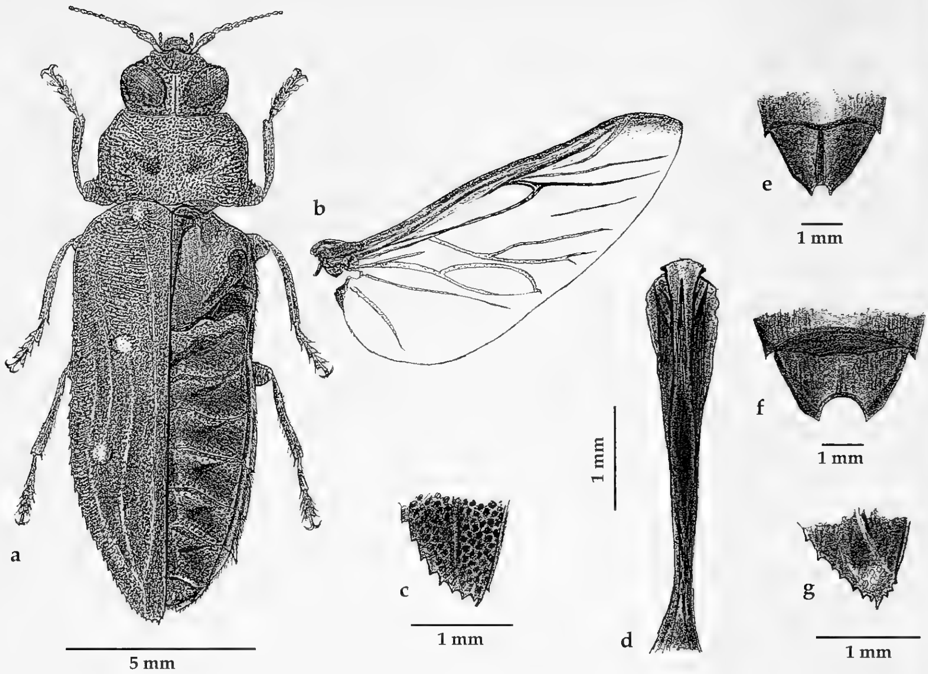

Fig. 1. *Chrysobothris saundersi* Macleay. **a.** Dorsal habitus of ♀ from the Turondale-Hill End area, New South Wales, with right elytron and wing removed to show tergites. **b.** Right wing of ♀. **c.** Apex of left elytron of ♀ showing puncturation. **d.** Ovipositor of ♀. **e.** Underside of abdomen of ♀ showing the prominently carinate keeled last sternite with shallow, narrow notch. **f.** Underside of abdomen of ♂ showing the non-carinate (or weakly impressed) last sternite with wide, deep notch. **g.** Apex of left elytron of ♂ showing puncturation. (Illustration: J. R. Turner).

some species appear to have a strong association with *Acacia* (Mimosaceae) (Carter 1925, 1927, 1932, Hawkeswood & Peterson 1982, Hawkeswood 1986a, 1988). *Chrysobothris queenslandica* is definitely known to breed in *Acacia bidwillii* Benth. (Mimosaceae) at Townsville, north-eastern Queensland (Hawkeswood 1986a), while *C. subsimilis* Thomson has been recorded more recently from *Acacia peuce* F. Muell. (Hawkeswood 1988). The food of the adults of the Australian species have never been recorded. Most of the species occur in arid or semi-arid areas of inland Australia, presumably where large stands of *Acacia* and other suitable hosts occur. The adults of the Australian species of *Chrysobothris* appear to be mostly diurnally active, although Williams (1982) attracted a specimen of an unidentified *Chrysobothris* species to light.

The following abbreviations for insect depositories are used in the following text: AM = Australian Museum, Sydney, New South Wales, Australia; ANIC = Australian National Insect Collection, Canberra, ACT, Australia; GHN = G.H. Nelson private collection, Pomona, California, USA; JH = Jean Harslett private collection, Amiens via Stanthorpe, Queensland, Australia; NMP = National Museum, Prague, Czech Republic; NMV = National Museum of Victoria, Melbourne, Victoria, Australia; QDF = Queensland Department of Forestry Collection, Department of Primary Industries, Indooroopilly, Queensland, Australia; QM = Queensland Museum, Brisbane, Queensland, Australia; SAM = South Australian Museum, Adelaide, South Australia; UQ = University of Queensland collection, Brisbane, Queensland, Australia.

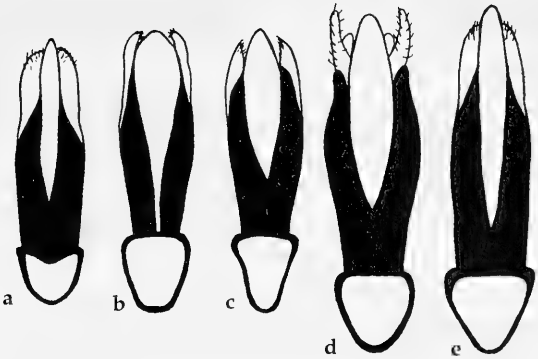

Fig. 2. ♂ genitalia of some Australian *Chrysobothris* species. **a.** *C. peroni* Laporte & Gory. **b.** *C. blackburni* Obenberger. **c.** *C. australasiae* Laporte & Gory. **d.** *C. subsimilis* Thomson. **e.** *C. saundersi* Macleay. (Illustration: T. J. Hawkeswood).

Chrysobothris saundersi Macleay

Chrysobothris saundersi Macleay (Figs 1a-g, 2e, this paper)
Chrysobothris saundersi Macleay, 1872: 246; Carter 1925: 226-227; 1929: 281.
Chrysobothris hopei Obenberger, 1923: 77; Carter 1925: 226; 1929: 281; 1940: 384.
Chrysobotris hopei Obenberger, 1928: 76, 312. (Erroneous spelling).

Type. Holotype: ♂, K32684, Gayndah, Queensland (AM) (Type of *C. saundersi* seen by authors).

Redescription

Male. Moderately elongate and robust, medium-sized, slightly convex; head, antennae, pronotum, scutellum, elytra, legs and undersurface of the body dull metallic bronze-black with copper to bronze reflections; eyes, black; elytra with four, small, median, mostly circular, dull coppery foveate depressions and two smaller or similar-sized, basal, coppery depressions near the anterior margin; mesothorax metallic violet to purple centrally, black elsewhere; tergites metallic coppery-red centrally, black elsewhere, apical tergite purple to violet.

Head coarsely, reticulately, rugose-punctate, moderately clothed with short, anteriorly-directed, silver-white hairs; vertex between the eyes narrow to moderate, about the same width as half the diameter of the eye or wider, with a median, longitudinal, dark, integumental line, not carinate; clypeus narrowly and deeply bisinuate at the anterior margin; frons triangular with two distinct impressions near the vertex; eyes moderately converging behind; antennae: antennomere 1 about 3.0-3.5 times longer than wide, wider at apex; antennomere 2 short, 1.2 times longer than wide; antennomere 3 more slender than antennomere 1, about 3.0 times longer than wide; antennomeres 4-11 progressively smaller, strongly serrate, each with a moderate number of anteriorly-directed, silver-white hairs.

Pronotum about 1.8 times wider than long, widest near the middle and slightly narrower than the width of the elytra; shallowly convex; anterior margin slightly arcuate or straight; posterior margin strongly bisinuate; sides parallel to sub-parallel, slightly arcuately narrowed in front towards anterior margin and behind, towards posterior margin; median line generally indicated by a very shallow depression extending from near base to apex; two, lunate to circular, shallow depressions situated on posterior half towards lateral margins, one opposite each basal fovea on elytra; pronotal disc densely and finely punctate, slightly rugose-striolate in the centre; lateral carina weakly developed, slightly arcuate, not visible from above; pronotum glabrous except for a fringe of short, erect, white hairs on the anterior margin and a few posteriorly-directed hairs on the posterior margin.

Scutellum small, triangular, impunctate.

Elytra slightly wider than pronotum, about 3.5-4.0 times longer than the length of the pronotum; ratio of length at base to length in the midline = 1:2.0-1:2.2 (5 specimens); base of each elytron abruptly rounded; sides parallel behind humeri then broadly, arcuately narrowed to apex; margins prominent and serrate from apex to median, apical serrations extending into suture (Fig. 1g); each elytron with a small, moderately deep, basal, circular foveate depression at middle, a similar, median, foveate depression in the middle and another post-median foveate depression about ⅔ the distance from the suture to the margin; sutural costa weakly developed, extending from post-median to apex; sutural costa not diverging; elytra without pubescence, densely, finely and evenly punctate.

Undersurface with a moderately dense pubescence of white hairs (especially so on the margins of the abdomen); whole surface densely punctate, becoming less so medianally; proepisternum punctate, moderately pubescent; last abdominal sternite deeply and broadly arcuately incised, non-carinate or with a weak, median impression (Fig. 1f).

Legs with pro-femorae with a well developed obtuse rectangular tooth which is irregularly and feebly denticulate on outer margin; pro-tibiae strongly curved, meso-tibiae straight and meta-tibiae very slightly curved inwards in the upper half; tibiae without teeth but with two sharp spines distally (near tarsi).

Genitalia. Typical of *Chrysobothris* in being straight, with strongly sclerotized, black parameres with membranous lobes bearing outwardly directed setae (Fig. 2e).

Female. Similar to the male and differs in mainly external morphology by having the last abdominal segment carinate and very narrowly incised (Fig. 1e); the female mesothorax is turquoise, emerald green and violet, the tergites (except last) are purple with violet margins and the last tergite is brownish-bronze; there appears to be some difference in the serration of the elytral apex between the sexes (Fig. 1c and 1g), but the consistency of this character has not been examined in any other material apart from that collected from New South Wales; females generally tend to be slightly larger than males, but this is not always the case.

Size (mm). ♂♂: 14.0 ± 1.2 × 5.2 ± 0.5 (13); ♀♀: 14.1 ± 1.9 × 5.3 ± 0.8 (16).

Specimens examined: **Queensland**: 1♂, Paratype K32684, Gayndah, [25°37'S, 151°36'E](no other data)(AM); 1♂, Rockhampton, [23°23'S, 150°31'E], 22 March 1941, E. Sutton and E. Vallis (QM); 2♂♂, Edungalba (via Rockhampton), [c. 23°30'S, 150°20'E], 10 January 1946, E. Adams and E. Sutton (QM); 1♂, Edungalba, January 1964, G.B. (?)(on same card as a ♂ of *Chrysobothris subsimilis* Thomson)(ANIC); 1♂, 1♀, same data (ANIC); 1♂, 2♀♀, Edungalba, E.E. Adams (GHN); 1♀, Milmerran, [27°50'S, 151°20'E], 30 October 1926, J. Macqueen (ANIC); 2♀♀, Milmerran, 11 February 1945, J. Macqueen (JH); 1♀, Milmerran, March 1945, J. Macqueen (NMV); ♀, Milmerran, February 1954, J. M (acqueen)(ANIC); 1♀, Milmerran, J. Macqueen (ANIC); 1♀, Dalby, F.H. Hobler (UQ); 1♂, Dunmore State Forest, via Dalby, 23 December 1980, F.R. Wylie and M. De Baar Acc. 1871-12, on *Acacia leiocalyx* (Domin) Pedley (Mimosaceae)(QDF); 1♀, Warra [near Dalby, 27°11'S, 151°16'E](no other data) (ANIC); 1♀, Fletcher [near Stanthorpe], E. Sutton (QM); 1♂, 1♀, Stanthorpe, [28°29'S, 151°57'E], February 1957, J. Harslett (JH); 2♀♀, "Qld." (no other data)(NMV); 2♀♀ (no collection data)(SAM); 1♀, (no collection data)(UQ). – **South Australia**: 1♂, Beltana, [30°48'S, 138°25'E], 3297 (no other data)(SAM). – **Northern Territory**: 1♂, Harts Range, Central Australia, [23°00'S, 134°56'E], November 1930, T. Hodge-Smith (AM). – **Western Australia**: 1♀, Coolgardie [30°57'S, 121°10'E](no other data)(SAM).

Key to the Australian species of *Chrysobothris*

1. Fronto-clypeus separated from the vertex by a prominent carina; apical sternite of male carinate, deeply and arcuately incised; apical sternite of female carinate, less prominently incised .... *C. macleayi* Obenberger
– Fronto-clypeus not separated from the vertex by a prominent carina .... 2.

2. Size large, total body length more than 19 mm long .... *C. petersoni* T. J. Hawkeswood
– Size smaller, total body length less than 19 mm long .... 3.

3. Pronotum with large and irregular callosities medianally and on the margins; apical sternite of male non-carinate, shallowly incised; apical sternite of female non-carinate, less prominently incised, sometimes more or less straight .... *C. caelatus* Carter
– Pronotum without such callosities .... 4.

4. Pronotum prominently emarginate towards anterior margin; apical sternite of male non-carinate, deeply incised; apical sternite of female non-carinate, shallowly incised ... *C. amplicollis* Thomson
– Pronotum not as above, widest at base or in the middle .... 5.

5. Pronotum broadly rounded at sides, as wide or slightly wider than width of elytra; apical sternite of male carinate, deeply incised; apical sternite of female carinate or weakly so, less incised .... *C. australasiae* Hope
– Pronotum slightly rounded to subparallel at sides, narrower than, or rarely equal to, the width of the elytra .... 6.

6. Underside of body deep metallic green to bronzy-green; elytral spots usually small, golden-green to green; apical sternite of male carinate or weakly so, shallowly to deeply incised; apical sternite of female carinate or weakly so, tri-spinose to almost straight .... *C. viridis* Macleay
– Underside of body not metallic green .... 7.

7. Abdominal sternites metallic purple-blue in basal (upper) half to one-third, copper in apical (lower) half to two-thirds; apical sternite of male carinate (or weakly so), deeply incised; apical sternite of female carinate, shallowly incised .... *C. blackburni* Obenberger
– Abdominal sternites not coloured as above (either multi-coloured, bronze, bronze-black, or copper) .... 8.

8. Elytral spots small, usually gold or golden-coppery .... 9.
– Elytral spots large, usually bright coppery-red .... 11.

9. Underside of body bright copper; apical sternite of male non-carinate, deeply incised, 4-spinose; apical sternite of female carinate, shallowly (but irregularly) incised, 3-spinose .... *C. queenslandica* T. J. Hawkeswood
– Underside of body multi-coloured, bronze or bronze-black rarely bronze-copper .... 10.

10. Apical abdominal sternite of male non-carinate, deeply incised, 4-spinose; last abdominal sternite of female carinate, 3-spinose .... *C. subsimilis* Thomson
– Apical abdominal sternite of male non-carinate, shallowly incised, 2-spinose; last abdominal sternite of female carinate, deeply incised, 2-spinose .... *C. saundersi* Macleay

11. Pronotum broadly arcuately narrowed towards anterior margin; apical sternite of both sexes carinate, that of the male usually more deeply incised than that of the female .... *C. peroni* Laporte & Gory
– Pronotum subparallel at sides, sharply narrowed near anterior and posterior margins; apical sternite of both sexes non-carinate, male deeply incised, 4-spinose; female shallowly incised, 2-spinose .... *C. octomaculata* Carter

Recent field observations on biology and host plant

During 5 November 1995, JRT visited an area south of Turondale, New South Wales (c. 33°07'S, 149°36'E), which is located about 20 km east of Hill End, in order to examine a scattered group of 10-metre tall *Casuarina stricta* Dryander (Casuarinaceae) trees growing near the top of a north-facing hillside. Several species of *Astraeus* (Buprestidae) had been collected at this site during December 1984-85 and because of this, the area was revisited. A number of trees were swept with a net without success so some of the *C. stricta* plants which had been blown down by the wind were then examined. A series of exit holes were found on a branch which was broken and hanging limply in a tree and a number of specimens of a new *Melobasis* species were obtained from this timber. Some dead adults were visible at their exit holes and proper dissection of the timber (later cut into billets) resulted in several adults and larvae being obtained. These will be the subject of a separate paper. Examination of the main trunk section of the tree which was lying on the ground, revealed a second type of exit hole scattered randomly along the trunk. Removal of the bark resulted in the discovery of the remains of another dead buprestid situated in a pupal chamber/exit hole. Initial examination suggested a *Torresita* sp., but when compared with named *Torresita* material in the collection of JRT, they were obviously very different. Later comparison with material of *Chrysobothris* and the type specimen of *C. saundersi* housed in the Entomology Department of the Australian Museum, confirmed the species involved as *C. saundersi.*

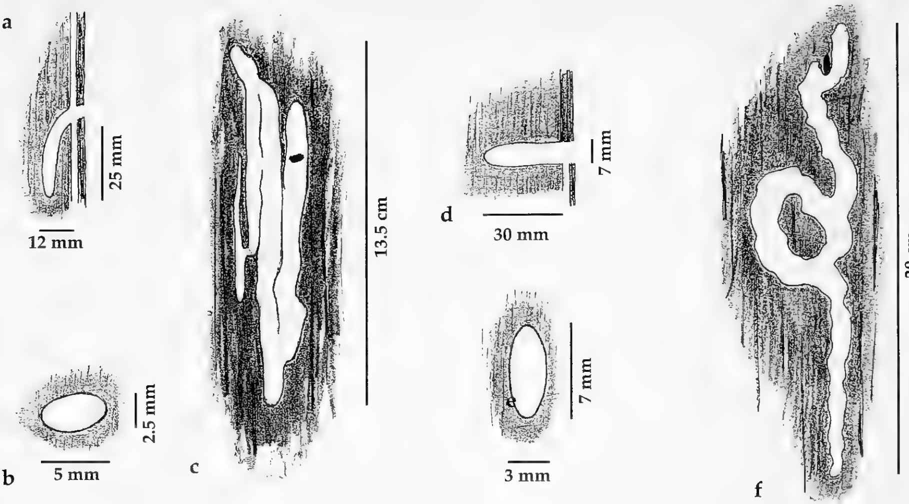

Fig. 3. Larval galleries, pupal chambers and exit holes of *C. saundersi* Macleay in the dead wood of *Casuarina stricta* Dryander (Casuarinaceae) in the Turondale-Hill End area of New South Wales. **a.** Lateral view of ♀ pupal chamber below bark and larval gallery. **b.** Exit hole of ♀. **c.** Larval gallery of ♀ showing position of exit hole with long axis perpendicular to grain of wood. **d.** Lateral view of ♂ pupal chamber below bark and at end of larval gallery. **e.** Exit hole of ♂. **f.** Larval gallery of ♂ showing position of exit hole parallel with grain of wood. (Illustration: J. R. Turner).

On 29 December 1995, during a visit to the same site in order to search for more plant and insect material, the discovery of a second *C. saundersi* specimen (a female) was recorded on videotape. During dissection of some billets of *C. stricta*, two additional specimens (males) were found dead in their pupal chambers.

Both male and female *Chrysobothris saundersi* form larval galleries between the bark and the sapwood (Figs 3a,c,3d,f), but their pupal chambers and exit holes are rather distinctive (Figs 3a,b, 3e,f). The female pupal chamber (Fig. 3a) is almost identical to that of *Agrilus australasiae* Laporte & Gory in shape (Turner & Hawkeswood 1996a, 1997), but is much larger and it slopes downwards into the sapwood; the adult beetle emerges from the chamber with the underside of body and feet facing downwards. The exit holes of the females slope at an angle of about 20 degrees either to the right or left in relation to the latitudinal axis of the branch/trunk (Figs 3b,c). The male pupal chamber enters the sapwood at 90 degrees to the longitudinal axis of the branch/trunk (Fig. 3d) and the exit hole (Fig. 3e) is narrow and vertical (long axis parallel with longitudinal axis of wood) and the adult beetle emerges sideways (90 degrees to vertical). The ratio of male to female exit holes was approx. 10:1 at this site, with those of the females located higher up in the thinner branches.

Discussion

Taxonomy and relationships with other *Chrysobothris* species

Carter (1925: 226) synonymised *C. hopei* Obenberger with *C. saundersi* Macleay but it is obvious that he did not see Obenberger's type specimen. Dr Svatopluk Bíly of the Czech Republic has sent the senior author a coloured photograph and notes on the holotype (female) of *C. hopei* housed in the National Museum of Prague. The specimen is labelled "Rockhampton, Queensland, Meek, No. 23209". Comparison of Obenberger's adequate description of this *Chrysobothris* (Obenberger, 1923: 77)(which mentions the morphology of the last abdominal sternite in detail), with the photograph of the type, leaves us with no doubt as to the synonymy, despite the protestations of Obenberger (1928) who fiercely defended his *C. hopei* as a separate, distinct species. Carter (1940: 384) further promoted his earlier synonymy of *C. hopei* with *C. saundersi*.

Fig. 4. Distribution of *Chrysobothris saundersi* Macleay. (Illustration: T. J. Hawkeswood).

Carter (1925: 227) erroneously stated that the apical abdominal segments of *C. saundersi* were carinate in both sexes which led him to wrongly key the species (Carter, 1925: 229). It is possible that some of this confusion could have arisen as a result of the similarity between *C. saundersi* and *C. subsimilis* Thomson (a closely related species which also has the last sternite of the male non-carinate and that of the female carinate). Carter may have mixed females of *C. subsimilis* with females of *C. saundersi*. Also, in some males of *C. saundersi*, the last abdominal sternite is weakly impressed (Fig. 1f) but when compared with the females, it can be clearly seen that the sternite is not carinated. The clypeus of *C. saundersi* is more deeply and narrowly incised than that of *C. subsimilis*, the impressions on the pronotum are larger, and the costae are generally not as well developed as in most specimens of *C. subsimilis* which we have examined. The last abdominal sternite of the male *C. subsimilis* is bispinose with two teeth at each apex, so that the sternite is really 4-spinose, whereas in *C. saundersi*, there is only one tooth at each apex, meaning the sternite is 2-spinose (Fig. 1f). The female *C. subsimilis* has a trispinose apical sternite, while the female *C. saundersi* has a bispinose one, with the incision usually very narrow and deep (Fig. 1e).

The male genitalia of *C. saundersi* are very similar in morphology to those of *C. peroni* Laporte & Gory (Fig. 2) but are somewhat larger. The two species can be distinguished on other morphological features (e.g. elytral spots and apical abdominal sternites, see Key to Species above). Despite being superficially alike on gross facies, the Australian species of *Chrysobothris* can be generally determined and distinguished on the size and shape of the male genitalia (e.g. see Fig. 2). *C. saundersi* has often been confused with *C. subsimilis* in museum collections, but again, these species can be separated clearly on the basis of the male genitalia. Although the male genitalia of these two species are similar in size (Figs 2d and 2e), the penis of *C. subsimilis* is wider and the membranous lobes on the parameres each have an additional smaller accessory lobe (Fig. 2d).

Distribution

The majority of the specimens of *C. saundersi* in the Australian collections have been collected from the central-east and south-east of Queensland (Fig. 4). These areas are largely dominated by *Acacia* scrublands and open *Eucalyptus-Callitris* woodlands, but a lot of the original vegetation has been cleared since the Second World War for agriculture. The specimens recorded from Beltana near the northern end of the Flinders Range of South Australia (30°48'S, 138°25'E), Harts Range of the Northern Territory (23°00'S, 134°56'E) and Coolgardie, Western Australia (30°57'S, 121°10'E)(Fig. 4) are surprising since there are no collections from the intervening areas which are very widely separated. These specimens may have been mislabelled or possibly the species has been poorly collected in these three States. However, the recent collection of *C. saundersi* from near Hill End, New South Wales, is the first record for this State and is also a considerable distance from the main sites of collection of this species in south-eastern Queensland. Perhaps these represent outlying, remnant populations of *C. saundersi*, a species which may have contracted in range over time, as a result of changing environmental conditions and/or competition with other insects. For instance, a related species,*Chrysobothris saundersi* Thomson, is widely distributed across the continent and it is possible that this species may have outcompeted *C. saundersi* during some stage throughout much of the latter species former range. However, this suggestion is hypothetical and the status and ecology of *C. saundersi* in these and intervening areas of South Australia, Northern Territory, New South Wales and Western Australia awaits further intensive field work.

Larval host plant

The larval host plants and general biology of the Australian *Chrysobothris* species are poorly known. Hawkeswood & Peterson (1982) and Hawkeswood (1986a) noted that the larvae of *C. queenslandica* Hawkeswood develop in the dead wood (trunk and branches) of still-standing *Acacia bidwillii* Benth. (Mimosaceae) in grassy wood-lands of north-eastern Queensland. Williams (1985) recorded *Rapanea variabilis* (R.Br.) Mez (Myrsinaceae) as a larval host for *C. viridis* Macleay (cited as *C. simplicifrons* Kerremans) in littoral rainforest in central coastal New South Wales. Hawkeswood (1988) recorded *A. peuce* F. Muell. (Mimosaceae) as a host for *C. subsimilis* Thomson in arid central Australia. The only previously published larval host record for *C. saundersi* Macleay is that of Hawkeswood (1986b) who recorded *A. leiocalyx* (Domin) Pedley (Mimosaceae) from semi-arid southern Queensland. Our new record of *Casuarina stricta* Dryander is therefore the first to record this plant genus as a host for a *Chrysobothris*. The only other Australian buprestids known to breed in this species of *Casuarina* are *Temognatha fortnumi* (Saunders) (Tepper 1887; as *Stigmodera fortnumi*) and *T. suturalis* (Donovan) (French 1909; as *Stigmodera suturalis*). Other Australian buprestids are known to breed in other *Casuarina* species (Hawkeswood & Peterson 1982, Hawkeswood & Turner, unpub. data). Overall, the preferred larval host plants of the Australian *Chrysobothris* (at least the arid and semi-arid adapted species) appear to be *Acacia*, but occasionally, as in the case of *C. saundersi*, *Casuarina* and possibly other plants, act as secondary host plants for the larvae. Further research in the Turondale-Hill End area may reveal *Acacia* as a primary host for *C. saundersi* as well.

Sexual differences in larval galleries and exit holes

Recently, the careful observations of JRT have revealed interspecific (inter-generic) differences in larval galleries, pupal chambers and/or exit holes and in some cases, marked intraspecific sexual differences in these features. For instance, in *Astraeus crassus* Van De Poll (Turner & Hawkeswood 1996b), the exit holes of the male beetle are usually positioned at 0° to the latitudinal axis of the host branch and measure mostly 6 mm × 5 mm, while those of the females are positioned about 45° to the latitudinal axis and are larger, measuring 8 mm × 6 mm. *Chrysobothris saundersi* from New South Wales appears to have markedly sexual dimophic larval galleries, pupal chambers and exit holes (Figs 3a-f). Whether these occur in other populations of the species remains to be determined.

Acknowledgements

TJH would like to thank Dr. S. Bíly, Department of Entomology, National Museum, Kunratíce, Czech Republic for sending him photographs, drawings and detailed information on the type specimens of Dr. J. Obenberger's described taxa housed in the National Museum at Prague, and for sending him reprints and data on the Buprestidae over many years. Thanks are also expressed to Dr. G. H. Nelson, College of Osteopathic Medicine of the Pacific, Pomona, California, United States of America, for sending a copy of the rare *Typi Buprestidarum* and *Appendix* by J. Thomson. Dr. C. L. Bellamy, National Museum, Pretoria, South Africa, sent TJH photographs of the Australian *Chrysobothris* types housed in the British Museum of Natural History, London, during a trip he made there during 1983. Gratitude is also expressed to Mr. M. De Baar, Queensland Forestry Service, Indooroopilly, Brisbane, Queensland, Australia for permission to TJH to use microscopes and camera lucida equipment, for information on *Chrysobothris* and for allowing access to the Forestry Service insect collection. Mr. E. E. Adams (Edungalba, Queensland), Mrs. J. Harslett (Amiens, Queensland), Dr. G.H. Nelson (Pomona, USA) and Messrs. M. Powell and M. Golding (Perth, Western Australia), allowed TJH to examine *Chrysobothris* specimens in their private collections. The directors and curators of AM (Australian Museum), ANIC (Australian National Insect Collection), NMV (National Museum of Victoria), QM (Queensland Museum), SAM (South Australian Museum) and UQ (University of Queensland) are thanked for allowing access to the collections of insects under their care. Finally, but not least, TJH would like to thank Mr. C.J. Parker, Brisbane, Queensland, for computer assistance and encouragement during times of uncertainty. JRT would like to thank Mr. M. S. Moulds and other staff of the AM in Sydney for allowing access to the insect collection and for other assistance during visits to that museum and to Mr. John Goldie, owner of the Turondale property for allowing field research to be undertaken there.

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Buchbesprechungen

17. Matile, L.: Diptères d' Europe occidentale, Tome 1. – Editions Boubée, Paris, 1993. 439 S. mit 12 Farbtafeln von E. Ségui.

Mit seinem im Jahre 1951 erschienenen "Atlas des Diptères de France, Belgique, Suisse" schuf der große französische Dipterologe Eugène Ségui ein Standardwerk über die Biologie der Dipteren, das dem Anfänger eine umfassende und informative Einführung in die Dipterenkunde bot, aber auch für den Spezialisten immer wieder schöne Information über das gesamte Spektrum des Wissensgebietes bereithielt. In dieser Tradition versteht sich auch die hier vorliegende – und inhaltlich gelungene – Neubearbeitung von Loïc Matile. Neben den Séguischen Originaltafeln werden auch wesentliche Elemente von Gliederung und Inhalt des früheren Werks übernommen; daher kann sie fast als auf doppelten Umfang erweiterte, aktualisierte Neuauflage des Klassikers bezeichnet werden. Kapitel über die Morphologie von Larve und Imago sowie Schlüssel zur Bestimmung der Familien sind stark erweitert bzw. neu aufgenommen worden. Darüber hinaus ist die maßgebende Literatur (immerhin auf dem Stand von 1990) im Anschluß an die jeweiligen Kapitel wiedergegeben. Es ist allerdings zu fragen, ob ein Gesamtverzeichnis am Schluß des Bandes nicht hilfreicher gewesen wäre. Aktuelle Auffassungen zur Phylogenese der Diptera sind dargestellt, schlagen sich jedoch, aus didaktischen Gründen, explizit nicht in der Großgliederung des Werks nieder. Der Umfang der einzelnen Kapitel richtet sich nach der Größe der besprochenen Familien und ihrer Bedeutung für den Menschen, wobei besonders die Abschnitte über die Biologie als gelungen bezeichnet werden können und immer wieder für Aha-Effekte sorgen. Manche der kleineren Familien sind nach unserer Auffassung jedoch zu kurz gekommen, da sie sogar in manchen Gesamtdarstellungen über die Insekten, wie etwa im "Jacobs-Renner", ausführlicher besprochen werden. Darüber hinaus wären zumindest ein paar weitergehende Hinweise auf das enorme Wissen, das von primär nicht systematisch arbeitenden Zoologen über die Dipteren zusammengetragen worden ist, wünschenswert, und einer Einführung in die Dipterologie angemessen. Diese geringen Mängel schmälern jedoch keineswegs die Leistung des Autors; der vorliegende Band erfüllt seinen Anspruch von der inhaltlichen Seite in vollem Umfang und wäre daher empfehlenswert, wenn das Werk von der verlegerischen Seite her adäquat umgesetzt worden wäre. Hierin liegen jedoch ernste Mängel. Über die zum Teil unbefriedigenden Strichzeichnungen, die offenbar mit Hilfe eines Computers verarbeitet wurden, könnte man noch hinwegsehen. Der horrende Preis ist für ein Buch dieses Umfangs und dieser Ausstattung jedoch nicht akzeptabel und verhindert geradezu eines der wichtigsten im Vorwort angesprochenen Ziele, nämlich den Nachwuchs zu interessieren und mit dem relevanten Grundwissen auszustatten.

R. Melzer & K. Schönitzer

18. Foelix, R. F.: Biologie der Spinnen. – Thieme Verlag Stuttgart, 1992. 331 S., 201 Abb., 6 Tab.

Die 2., überarbeitete Auflage des 1979 erstmals erschienen Taschenbuches ist mit über 50 neuen Abbildungen und 73 neu dazugekommenen Seiten in seinem Umfang deutlich erweitert worden. Dem Autor ist es gelungen, die meisten Kapitel an Hand von Originalarbeiten auf den neuesten Stand der arachnologischen Forschung zu bringen. Die laseroptischen Aufzeichnungen der Bewegungen der Kreuzspinne beim Netzbau z.B. waren von Zschokke bis dahin noch nicht veröffentlicht, sind also brandneu.

Wie in der ersten Auflage werden in 10 Kapiteln, erweitert durch zwei neu hinzugekommene Absätze, strukturelle und physiologische Eigenschaften genauso wie Sinnesleitungen, Fortpflanzung, Entwicklung, Ökologie und Stammesgeschichte der Spinnen präzise und doch verständlich beschrieben. Die Biologie dieser Tiere seht hierbei im Vordergrund, so daß deutlich wird, wie Struktur, Funktion und Verhaltensweisen miteinander vernetzt sind bzw. sich gegenseitig beeinflussen.

Der übersichtliche und trotz der vielen verarbeiteten Forschungsergebnisse gut verständliche Text, sowie die außerordentlich reichhaltige Bildauswahl (viele Zeichnungen und rasterelektronenmikroskopische Aufnahmen), macht dieses Taschenbuch für jeden biologisch interessierten Spinnenfreund lesenswert. Durch die Fülle der verarbeiteten Fachliteratur ist es für alle Arachnologen ein willkommenes Nachschlagewerk. B. Baehr

19. Storch, V. & U. Welsch: Kurzes Lehrbuch der Zoologie. 7. Auflage. – Gustav Fischer Verlag, Stuttgart, 1994. 593 S., 284 Abb. ISBN 3-437-50507-2.

Das bewährte Lehrbuch der Zoologie ist in einem sehr gut lesbaren Stil geschrieben und didaktisch hervorragend. Es ist sowohl für Studenten der unteren Semester, als auch später sehr zu empfehlen. Besonders gut ist auch in dieser Auflage die gebührende Behandlung der Systematischen Zoologie, die dem Studenten einen guten Überblick über die Vielfalt der Tiere gibt. K. Schönitzer

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Darkwinged *Heleniella* Gowin, 1943 from Thailand and China

(Insecta, Diptera, Chironomidae, Orthocladiinae)

Trond Andersen and **Xinhua Wang**

Andersen, T. & X. Wang (1997): Darkwinged *Heleniella* Gowin, 1943 from Thailand and China. (Insecta, Diptera, Chironomidae, Orthocladiinae). – Spixiana **20/2**: 151-160

Heleniella nebulosa, spec. nov. from northern Thailand is described in both sexes, and the occurrence of intersexes is commented on. A *Heleniella* female from China, most probably representing a separate species, is also described.

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Introduction

According to Cranston et al. (1989) the genus *Heleniella* Gowin, 1943, is Holarctic in distribution, with 5 species described from the Palaearctic region, 2 species from the Nearctic region and one from the Oriental region. Later, two new species with dark spotted wings have been described from Japan, *H. osarumaculata* Sasa, 1988 and *H. otujimaculata* Sasa et Okazawa, 1994: 77 (syn: *H. otujisecunda* Sasa et Okazawa, 1994: plate 6 fig. 9; Sasa et Kikuchi 1995). The oriental species, *H. asiatica* Reiss, 1968, is described from Tshola Tso (4.500 m a.s.l.) in Nepal (Reiss 1968).

During an excursion to the northern parts of Thailand in spring 1991, adult chironomids were collected both with sweep nets and Malaise traps, and a few larvae were taken with drift nets. The chironomid fauna of Thailand is apparently very superficially known (Giani & Bouguenec 1988, Moubayed 1988). During our excursion an undescribed, darkwinged *Heleniella* species was taken in Malaise traps at a small stream in a rainforest area in the Doi Suthep mountain near Chiang Mai. Additional material of the new species collected by Hans Malicky in northern Thailand and lodged in the Zoologische Staatssammlung, Munich, is also included. In addition, one female from Mt. Jinfo, Sichuan province in China, most probably representing a different species, is described here.

Methods and terminology

The material examined was mounted on slides in Canadabalsam following the procedure outlined by Sæther (1969). The general terminology follows Sæther (1980) except that the apodeme lobe of the female genitalia is regarded as primarily belonging to gonapophysis IX (not Viii) in accordance with Sæther (1990). The measurements are given as ranges followed by a mean, when four or more measurements are made.

The holotype and paratypes of *H. nebulosa*, spec. nov. are deposited in the Museum of Zoology, University of Bergen, Norway (ZMBN); paratypes are also lodged in the Zoologische Staatssammlung, Munich, Germany, and in the collection of Xinhua Wang, Nankai University, Tianjin, P. R. China. The *Heleniella* female from China is in the collection of Xinhua Wang.

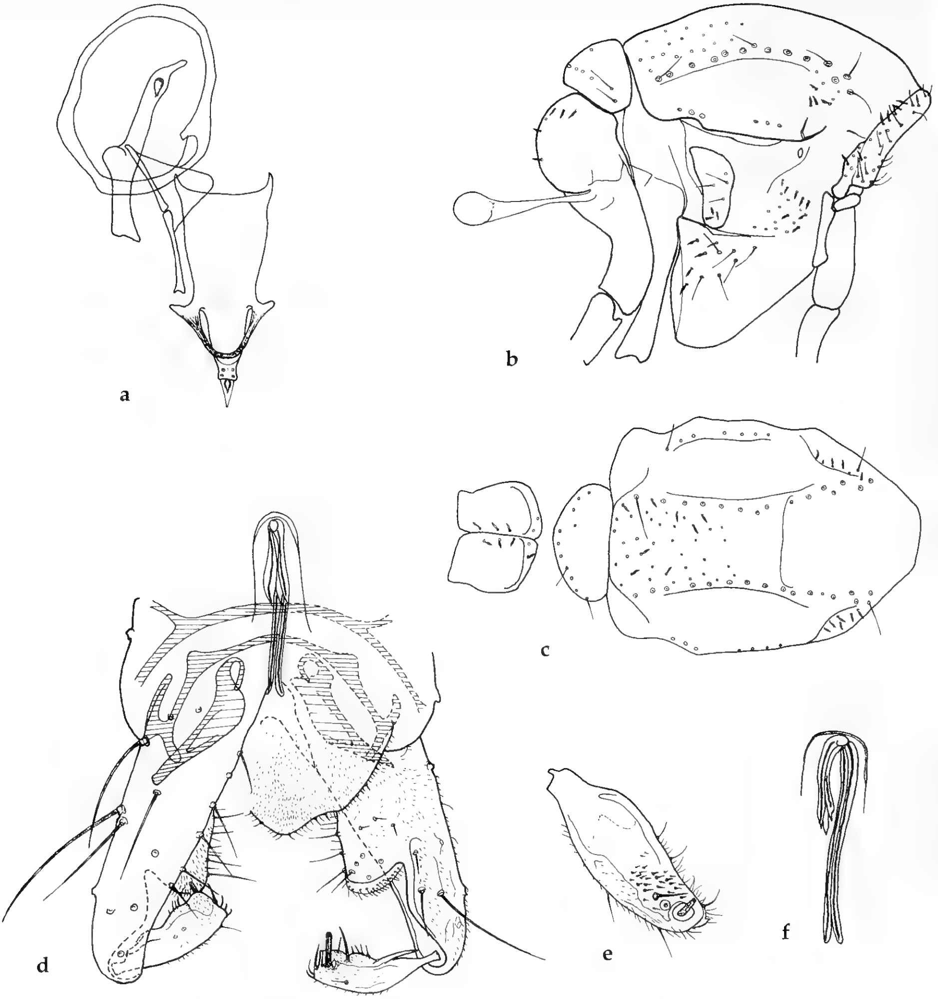

Fig. 1. *Heleniella nebulosa*, spec. nov., ♂. **a.** Cibarial pump, tentorium, stipes and pedicel. **b.** Thorax, lateral view. **c.** Thorax, dorsal view. **d.** Hypopygium, dorsal aspect right, ventral aspect left. **e.** Gonostylus, dorsal view. **f.** Virga, lateral view.

Heleniella nebulosa, spec. nov.

Figs 1-3, 4a-c

Type material. Holotype: ♂, THAILAND, Chiang Mai province, Doi Suthep, approx. 1 km northwest of Wat Phra That temple, Malaise trap, 9.-15.III.1991, T. Andersen & G. E. E. Søli leg. (ZMBN Type no. 166, on slide). – Paratypes: 18♂♂, 15♀♀, 6 intersex ♂♂, as holotype; 45♂♂, 14♀♀, as holotype except Chiang Mai, Chiang Mai Zoo, 400 m a.s.l., light trap, III.1988-II.1989, H. Malicky leg.; 4♂♂, 10♀♀, as holotype except Doi Inthanon, VIII.1989-III.1990, H. Malicky leg.; 10♂♂, 4♀♀, as holotype except Doi Inthanon, Bang Khun Klang, 98°31'E, 18°32'N, 1.200 m a.s.l., 5.-12.IX.1989, H. Malicky leg.

Diagnostic characters. The greyish-black coloured spots forming two dark bands across the wing separate *H. nebulosa*, spec. nov. from all other *Heleniella* species except *H. osarumaculata* and *H. otujima-*

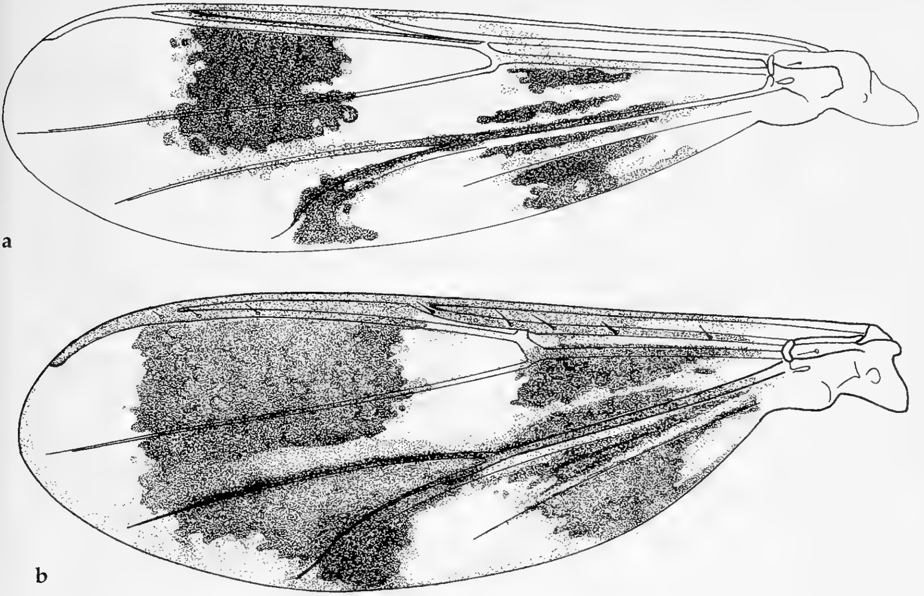

Fig. 2. *Heleniella nebulosa*, spec. nov., wing. **a.** ♂. **b.** ♀.

culata. Among the latter *H. nebulosa* may be identified by the lanceolate humerals and the lanceolate setae on antepronotum, anepisternum II, median anepisternum II and postnotum, by the triangular inferior volsella, and by the shape of virga apparently composed of two long and three short spines.

Etymology. From Latin *nebulosus* cloudy, dark, referring to the greyish-black coloured spots on the wings.

Description

Male (n=15, if not otherwise stated). Total length 1.64-2.12, 1.82 mm. Wing length 0.92-1.24, 1.04 mm. Total length/wing length 1.70-1.95, 1.80. Wing length/length of profemur 2.36-2.77, 2.53. Colouration blackish brown; femur of all legs brown, tibia and tarsi light brown.

Head (Fig. 1a). AR 0.44-0.72, 0.55 (n=30). Antenna with 13 segments. Thirteenth flagellomere 165-288, 219 µm (n=30). Temporal setae 8-14, 10 in single row; including 3-6, 5 inner verticals; 1-3, 2 outer verticals; and 2-6, 3 postorbitals. Clypeus with 7-11, 8 setae. Cibarial pump, tentorium, stipes and pedicel as in Fig. 1a. Tentorium 92-117, 102 µm long; 14-24, 19 µm wide. Stipes 73-91, 78 µm long; 24-38, 31 µm wide. Palp segment lengths (in µm): 16-26, 22; 24-36, 29; 49-71, 59; 52-77, 66; 104-137, 122. Apex of third segment with 1-2 sensilla clavata on the outside and 1-2 on the inside, 10-13, 11 µm long; apex of fourth segment apparently with 0-1 sensillum clavatum on the outside.

Thorax (Fig. 1b-c). Antepronotum with 30-48, 39 setae; of which 15-25, 18 hair-like, sitting mostly along anterior margin; and 15-27, 21 lanceolate along posterior margin. Dorsocentrals 37-57, 47; including 6-17, 11 lanceolate humerals; 14-25, 18 strong setae uniserial, sometimes biserial at anterior end; and 11-22, 17 lanceolate prescutellars. Humeral pit variable, most specimens with distinct margins and lanceolate setae confined to pit, other specimens less distinct, with lanceolate setae more spread towards or even in between anterior strong dorsocentrals. Prealars with 7-10, 9 strong setae in one line, usually separated in one anterior and one posterior group. Anepisternum II with 10-23, 16 small lanceolate setae. Median anepisternum II with 7-15, 10 setae; including 3-8, 5 posteroventral lanceolate setae; and 3-8, 5 stronger anterodorsal setae. Preepisternum with 11-24, 16 setae; including 5-11, 7 weak, posterodorsal, lanceolate setae; and 5-14, 9 stronger, dorsomedian setae. Scutellum with 10-23, 15 strong setae. Postnotum with 4-9, 5 dorsal and posterior, lanceolate setae on each side.

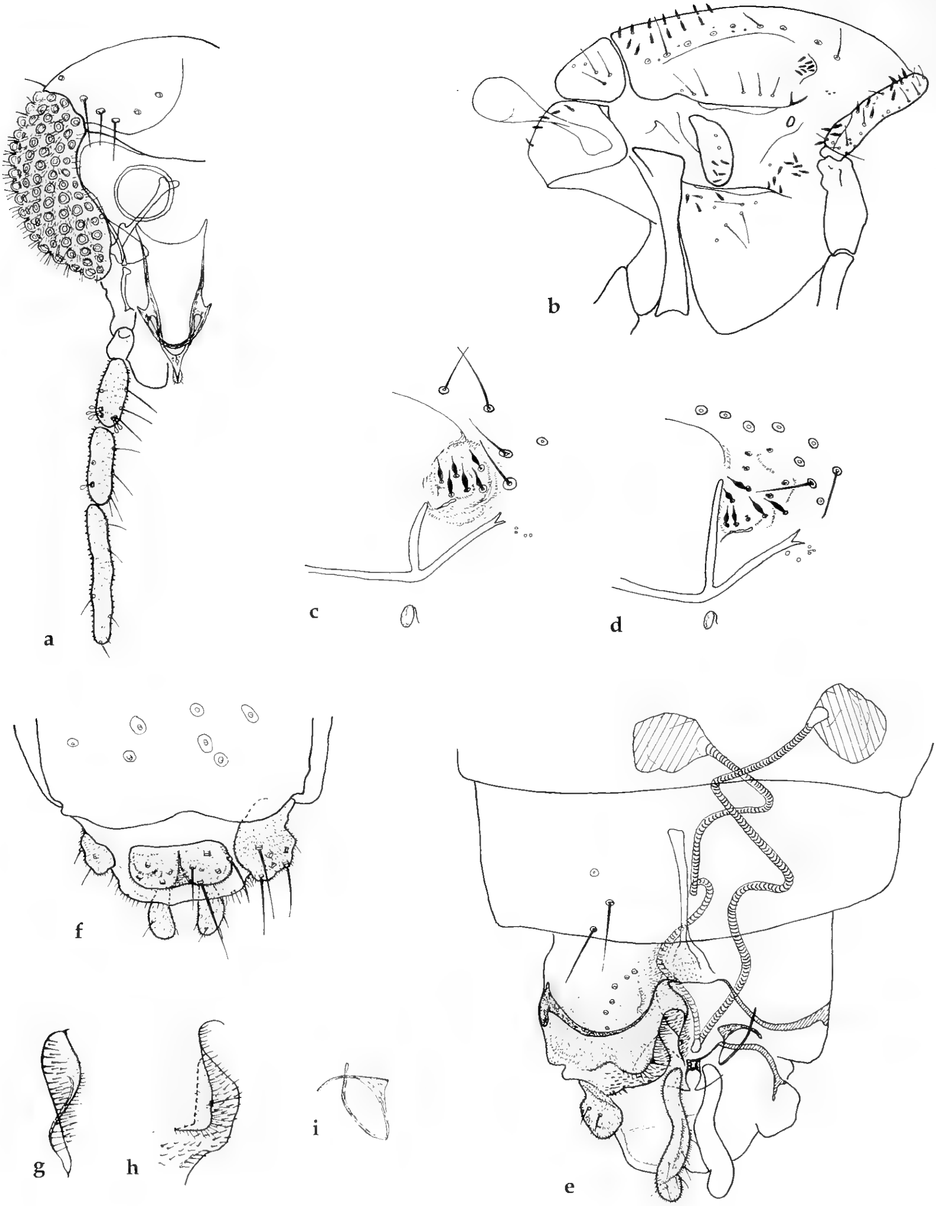

Fig. 3. *Heleniella nebulosa*, spec. nov., ♀. **a.** Head. **b.** Thorax, lateral view. **c-e.** Humeral area. **e.** Genitalia, ventral view. **f.** Genitalia, dorsal view. **g.** Dorsomesal lobe. **h.** Ventrolateral lobe. **i.** Apodeme lobe.

Wing (Fig. 2a). VR 1.14-1.26, 1.21. Costa extension 82-123, 101 µm long. R_{2+3} ends at $^3/_4$ to $^4/_5$ the distance between R_1 and R_{4+5}. Anal lobe reduced. Brachiolum with 1 setae. Wings with greyish-black coloured spots forming two dark bands across the wing as in Fig. 2a.

Legs. Spurs of front tibia 21-33, 27 µm long; spurs of middle tibia 8-13, 11 µm and 14-18, 16 µm long; of hind tibia 10-15, 12 µm and 32-44, 38 µm long. Width at apex of front tibia 21-28, 25 µm; of middle tibia 24-29, 25 µm; of hind tibia 28-36, 32 µm. Comb of 13-14, 13 setae; shortest setae 16-23, 19 µm, longest setae 34-48, 41 µm long. Sensilla chaetica lacking. Lengths (in µm) and proportions of legs:

	fe	ti	ta_1	ta_2	ta_3	ta_4
p_1	364-484, 408	431-596, 495	259-368, 297	150-216, 176	109-156, 127	67-84, 74
p_2	375-492, 420	353-480, 401	180-228, 198	86-120, 103	64- 90, 72	30-43, 35
p_3	371-488, 420	401-548, 457	210-304, 248	109-156, 126	83-120, 98	38-52, 42

	ta_5	LR	BV	SV	BR
p_1	44-60, 52	0.57-0.62, 0.60	2.61-2.98, 2.80	2.90-3.23, 3.05	2.0-2.7, 2.20
p_2	34-49, 41	0.47-0.53, 0.49	3.79-4.28, 4.15	3.96-4.41, 4.16	2.2-2.8, 2.49
p_3	36-53, 44	0.52-0.58, 0.54	3.43-3.69, 3.60	3.30-3.70, 3.54	2.4-3.0, 2.65

Hypopygium (Fig. 1d-f). Anal point proper lacking, tergum IX with small, rounded tip with 6-19, 13 weak setae; laterosternite IX with 2-4, 3 strong setae. Phallapodeme 55-69, 61 µm long; transverse sternapodeme 45-61, 51 µm long. Virga 58-77, 67 µm long, apparently with two long and three shorter spines; at least the two long spines composed of two to four thinner fibre-like spines. Gonocoxite 113-135, 125 µm long; with well developed, triangular inferior volsella. Gonostylus 45-59, 50 µm long; megaseta 11-14, 12 µm long. HR 2.238-2.71, 2.49; HV 3.59-3.85, 3.70.

Female (n=15). Total length 1.43-2.06, 1.65 mm. Wing length 0.88-1.23, 1.00 mm. Total length/wing length 1.37-1.82, 1.64. Wing length/length of profemur 2.48-3.03, 2.73. Colouration blackish brown; femur of all legs brown, tibia and tarsi light brown.

Head (Fig. 3a). AR 0.29-0.44, 0.38. Lengths of flagellomeres (in µm): 40-75, 60; 31-40, 35; 31-40, 35; 33-40, 35; 47-79, 63. Temporal setae 5-12, 8 in single row; including 2-4, 3 inner verticals; 1-2, 1 outer verticals; and 2-4, 3 postorbitals. Clypeus with 6-12, 9 setae. Tentorium 81-94, 85 µm long; 10-19, 13 µm wide. Stipes 68-79, 74 µm long; 22-38, 31 µm wide. Palp segment lengths (in µm): 17-23, 20; 19-28, 24; 47-59, 51; 55-73, 60; 97-125, 111. Apex of third segment with 2-3 sensilla clavata on the outside and 2 on the inside; apex of fourth segment with 1 sensillum clavatum on the outside.

Thorax (Fig. 3b-d). Antepronotum with 26-59, 39 setae; of which 12-26, 18 hair-like, sitting mostly along anterior margin; and 11-33, 20 lanceolate along posterior margin. Dorsocentrals 32-81, 43; including 6-37, 13 lanceolate humerals; 8-26, 15 strong setae uniserial, sometimes biserial at anterior end; and 8-22, 16 lanceolate prescutellars. Humeral pit variable (Fig. 3c-d), most specimens with distinct margins and lanceolate setae confined to pit, other specimens less distinct, with lanceolate setae more spread towards or even in between anterior strong dorsocentrals. Prealars with 6-16, 8 strong setae in one line, usually separated in one anterior and one posterior group. Anepisternum II with 11-35, 19 small lanceolate setae. Median anepisternum II with 5-13, 7 setae; including 2-8, 4 posteroventral lanceolate setae; and 2-5, 3 stronger anterodorsal setae. Preepisternum with 7-31, 12 setae; including 2-17, 6 weak, posterodorsal, lanceolate setae; and 2-14, 6 stronger, dorsomedian setae. Scutellum with 8-30, 14 strong setae. Postnotum with 3-9, 6 dorsal and posterior, lanceolate setae on each side.

Wing (Fig. 2b). VR 1.26-1.33, 1.29. Costa extension 132-196, 151 µm long. Anal lobe reduced. R with 3-9, 6 setae; R_1 with 1-3, 2; R_{4+5} with 1-4, 3; and costa extension beside marginal setae with 6-12, 10 setae. Squama lacking setae, brachiolum with 1 setae. Wings with greyish-black coloured bands forming two dark bands across the wing as in Fig. 2b.

Legs. Spurs of front tibia 12-18, 15 µm long; spurs of middle tibia 11-16, 14 µm and 17-21, 20 µm long; of hind tibia 19-23, 20 µm and 33-42, 35 µm long. Width at apex of front tibia 21-28, 24 µm; of middle tibia 23-29, 26 µm; of hind tibia 28-36, 32 µm. Comb of 13-14, 13 setae; shortest setae 17-26, 18 µm, longest setae 37-45, 40 µm long. Sensilla chaetica lacking. Lengths (in µm) and proportions of legs:

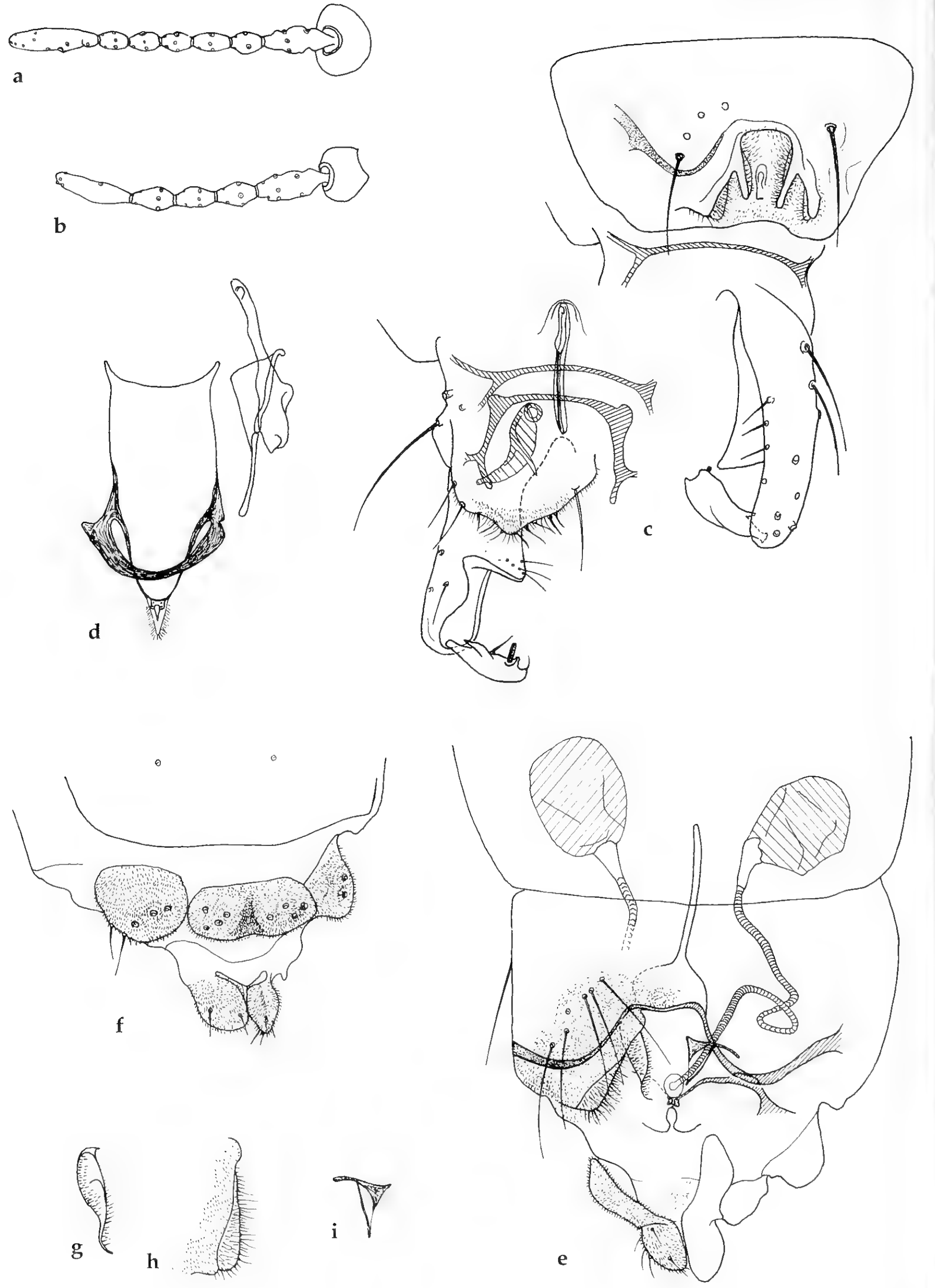

Fig. 4a-c. *Heleniella nebulosa*, spec. nov., intersex. **a.** Antenna, seven segmented. **b.** Antenna, five segmented. **c.** Abdomen, dorsal aspect left, ventral aspect right. **d-i.** *Heleniella* sp., ♀. **d.** Cibarial pump, tentorium and stipes. **e.** Genitalia, ventral view. **f.** Genitalia, dorsal view. **g.** Dorsomesal lobe. **h.** Ventrolateral lobe. **i.** Apodeme lobe.

	fe	ti	ta_1	ta_2	ta_3	ta_4
p_1	326-436, 375	398-524, 445	233-336, 262	135-184, 155	90-124, 103	49-72, 59
p_2	338-428, 377	330-412, 362	154-204, 173	76- 96, 83	49- 76, 58	26-32, 29
p_3	345-428, 382	360-472, 411	188-280, 218	94-132, 111	79-100, 86	30-38, 34

	ta_5	LR	BV	SV	BR
p_1	46-54, 48	0.58-0.65, 0.59	2.81-3.19, 2.97	2.85-3.40, 3.13	1.7-2.1, 1.89
p_2	32-41, 38	0.45-0.49, 0.47	4.05-4.83, 4.38	4.07-4.46, 4.28	1.9-2.3, 2.01
p_3	38-46, 43	0.50-0.59, 0.52	3.46-3.81, 3.69	3.20-3.88, 3.65	1.9-2.3, 2.12

Abdomen. Number of setae on tergites I-VIII as: 6-11, 8; 6-9, 7; 7-10, 8; 6-13, 9; 6-12, 9; 6-12, 9; 6-11, 8; 5-10, 7. Number of setae on sternites I-VII as: 0; 2-4, 3; 2-5, 4; 2-6, 5; 2-6, 4; 3-7, 4; 3-6, 4. On sternite VIII 10-16, 13 setae; 3-6, 4 on each side of the genital fissure, and 1-3, 2 along lateral margin.

Genitalia (Fig. 3e-i). Gonocoxite IX with 5-9, 7 long setae. Tergite IX divided, with 8-12, 9 setae. Cercus 77-92, 83 µm long; 21-26, 23 µm wide at apex (n=10); and with 16-29, 21 setae. Seminal capsule 64-75, 67 µm long including a 10-14, 12 µm long neck; sclerotized in apical 45-64, 51 µm; 35-49, 43 µm wide. Gonapophysis IX notum 66-99, 81 µm long.

Intersex. Of the 25 males taken in the Malaise trap near Wat Phra That temple in April 1991, six (24 %) are apparently intersexes. One of these intersexes has a 13 segmented antenna and is morphologically similar to the males, except that the virga is deformed and seems not to connect with the genital fissure; the AR is 0.44, the last flagellomere is 157 µm. One male lack virga and has a 12 segmented antenna; the AR is 0.44, the last flagellomere is 206 µm long. One male lack virga and has a 7 segmented antenna (Fig. 4a). Three males have five segmented antenna (Fig. 4b), one of these lack virga and one has a very short, deformed virga. The last one has a virga nearly as long as the normal males, but in addition to male hypopygium it also has female structures on sternite VIII (Fig. 4c). Several of the intersexes have a few strong setae on tergum IX. However, the bristle ratio of the front leg falls within the range of the males for all the intersexes.

Some of the intersexes are small compared to the other males from the same locality (Tab. 1). The specimen with 12 segmented antenna (intersex no. 2) even fall outside the range of the females with respect to total length and wing length. In other measurements, like the 5th palp segment length of the intersex with 7 segmented antenna (intersex no. 3) the segment is longer than in the largest male. Approximately 50 % of the ratios concerning body dimensions fall outside the range of the males, and several even falls outside the range of the females. Considering the hypopygium, most of the intersexes have a reduced phallapodeme and transverse sternapodeme. The three intersexes with 5 segmented antenna (intersex no. 4, 5 and 6) have a comparatively short gonocoxite; the gonostylus length falls within the range of the males for all the intersexes except for the intersex with 7 segmented antenna (intersex no. 3), which has an even longer gonostylus than the largest male.

None of the males from the other localities appear to be intersexes.

Heleniella sp.

Fig. 4d-i

Material examined: 1♀, CHINA, Sichuan province, Mt. Jinfo, 5.X.1986, X. Wang leg.

Description

Female (n=1). Total length 2.11 mm. Wing length 1.35 mm. Total length/wing length 1.67. Wing length/length of profemur 3.11. Colouration blackish brown.

Head (Fig. 4d). AR 0.42. Lengths (in µm) of flagellomeres: 68, 40, 40, 42, 80. Temporal setae 7 in single row, including 3 inner verticals, 2 outer verticals, and 2 postorbitals. Clypeus with 15 setae. Cibarial pump, tentorium and stipes as in Fig. 4d. Tentorium 96 µm long, 15 µm wide. Stipes 87 µm long, 24 µm wide. Palp segment lengths (in µm): 26, 28, 52, 73, 127. Apex of third segment with 2 sensilla clavata on the outside and 2 on the inside.

Thorax. Antepronotum with 38 setae, of which 18 hair-like, sitting mostly along anterior margin, and 19 lanceolate along posterior margin. Dorsocentrals 45, including 11 lanceolate humerals, 17 strong setae uniserial, biserial at anterior end, and 17 lanceolate prescutellars. Humeral pit less distinct, with lanceolate setae more spread towards anterior strong dorsocentrals. Prealars with 7 strong setae in one line, in two groups of 3 and 4 setae. Anepisternum II with 15 small lanceolate setae; median anepisternum II with 8 setae, including 3 posteroventral lanceolate setae, and 5 stronger anterodorsal setae. Preepisternum with 11 setae, including 3 weak, posterodorsal, lanceolate setae, and 8 stronger, dorsomedian setae. Scutellum with 12 strong setae. Postnotum with 5 dorsal and posterior, lanceolate setae on each side.

Wing. VR 1.27. Costa extension 174 µm long. Anal lobe reduced. R with 9 setae, R_1 with 3, R_{4+5} with 4, and costa extension beside marginal setae with 10 setae. Squama lacking setae, brachiolum with 1 setae. Wings with dark brown bands, similar to the wings marks in the female of *H. nebulosa*, spec. nov.

Legs. Spurs of front tibia 15 µm long, spurs of middle tibia 11 µm and 15 µm long, of hind tibia 11 µm and 35 µm long. Width at apex of front tibia 23 µm, of middle tibia 26 µm, of hind tibia 35 µm. Comb of 12 setae, shortest setae 19 µm, longest setae 38 µm long. Sensilla chaetica lacking. Lengths (in µm) and proportions of legs:

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	431	488	338	197	131	75	47	0.69	2.72	2.72	1.9
p_2	420	443	199	113	71	36	38	0.48	4.13	4.05	2.0
p_3	454	510	281	146	109	45	43	0.55	3.65	3.57	2.9

Abdomen. Number of setae on tergite and sternite VIII: 8 and 16, respectively.

Genitalia (Fig. 4e-i). Gonocoxite IX with 7 long setae. Tergite IX divided, with altogether 8 setae. Cercus 89 µm long. Seminal capsule 87 µm long including 19 µm neck, sclerotized in apical 64 µm, 61 µm wide. Gonapophysis IX notum 85 µm long.

Tab. 1. *Heleniella nebulosa* spec. nov. Selected measurements and ratios of the six intersexes from the Malaise trap catches near Wat Phra That temple, Doi Suthep, Northern Thailand 9.-15.III.1991, compared to range of the males and females from the same cathes. (segm. = segment, transv. = transverse)

	Males (n=10)	Intersex no. 1	2	3	4	5	6	Females (n=10)
No. antennae segm.	13	13	12	7	5	5	5	5
Total length (mm)	1.64-1.86	1.66	1.40	1.67	1.57	1.57	1.72	1.52-1.66
Wing length (mm)	0.92-1.09	0.88	0.86	1.00	0.92	1.00	0.97	0.88-0.98
5th palp segm. length (µm)	104-134	115	98	139	104	113	108	97-125
Fe-p_1 length (µm)	364-450	364	338	383	356	383	383	326-379
Ti-p_1 length (µm)	431-551	439	401	450	428	443	428	398-446
Phallapodeme length (µm)	55-64	59	49	42	28	35	48	–
Transv. sternapodeme length (µm)	45-59	52	44	47	33	42	56	–
Virga length (µm)	64-75	54	–	–	–	16	59	–
Gonocoxite length (µm)	113-127	113	113	120	106	104	106	–
Gonostylus length (µm)	45-51	48	47	52	45	45	45	–
Total length/Wing length	1.71-1.86	2.01	1.66	1.68	1.71	1.57	1.77	1.57-1.77
Wing length/Fe-p_1 length	2.41-2.58	2.42	2.67	2.61	2.58	2.61	2.53	2.48-2.77
LR-p_1	0.57-0.62	0.62	0.58	0.59	0.59	0.60	0.65	0.58-0.61
BV-p_1	2.61-2.89	2.71	2.85	2.93	2.97	3.25	2.82	2.81-3.01
SV-p_1	2.94-3.23	2.97	3.18	3.13	3.27	3.10	2.92	3.03-3.26
BR-p_1	2.0-2.7	2.2	2.0	2.2	2.2	2.3	2.0	1.7-2.1
HR	2.38-2.70	2.34	2.40	2.32	2.37	2.32	2.37	–
HV	3.59-3.81	3.44	2.97	3.23	3.51	3.51	3.85	–

Discussion

The new species can easily be separated from most *Heleniella* species on the dark wing marks; the only two described *Heleniella* species with dark coloured wings are *H. osarumaculata* and *H. otujimaculata,* both from Japan. Unfortunately, type material of both species is apparently not available for loan. However, according to the description and figures of the male of *H. osarumaculata* (Sasa, 1988: 39, plate 10A3; Sasa & Kikuchi 1995: 191, plate 68C) and of the male of *H. otujimaculata* (Sasa & Okazawa, 1994: 77, plate 6 fig. 9; Sasa & Kikuchi 1995: 191, plate 68D) *H. nebulosa*, spec. nov. can be easily separated from both on the presence of lanceolate setae on the thorax and on hypopygial features. *H. osarumaculata* and *H. otujimaculata* both have an evenly rounded tergum IX, lacking the small rounded tip found in *H. nebulosa*. *H. osarumaculata* has a large, rectangular inferior volsella, resembling the weaker, triangular volsella found in *H. nebulosa*, while *H. otujimaculata* has a broad, rounded inferior volsella, distinctly different to the one in *H. nebulosa*. In *H. osarumaculata* the virga is longer (100 µm), brush-like, and composed of numerous spines, while the length of the virga in *H. otujimaculata* (75 µm) falls within the range of the virga length of *H. nebulosa*, but it is horse-shoe formed and composed of "19 strong fibres". *H. nebulosa* also differs from the two Japanese species in other features. *H. osarumaculata* has two conspicuous dark-purplish wing spots, which appear to be more restricted than in *H. nebulosa* spec. nov., i.e. the distal spot do not extend below Cu_1. Also in the colour of body and legs the new species clearly differs; *H. osarumaculata* has e.g. entirely yellow tibia and tarsi of middle and hind legs. *H. nebulosa* is clearly smaller than *H. osarumaculata*, wing length is 0.92-1.24, 1.04 mm compared to 1.41-1.51 mm. The AR is lower, 0.44-0.72, 0.55 compared to 0.81. Further, the new species has fewer setae on head and thorax, it has e.g. only 8-14, 10 temporal setae in a single row, while *H. osarumaculata* has 18-24 setae in a double row.

H. otujimaculata has two large, conspicuous bluish wing spots, which appear to be even larger than in the new species. *H. otujimaculata* is a very small species with a wing length of only 0. 88 mm compared to 0.92-1.24, 1.04 mm in *H. nebulosa*. However, most ratios and setal counts appear to fall within the range of *H. nebulosa*.

The female from China most probably also represent a distinct species. The females of *H. osarumaculata* and *H. otujimaculata* are not known, but in having lanceolate setae on the thorax it is highly improbable that the female from China represent the female of any of these species. The female from China also differs from the female of *H. nebulosa*, it is somewhat larger and appears to have brownish wing marks. However, until the male is discovered, the species should not be named.

In most instances intersexualities or morphological changes of sexual dimorphous characters in chironomids are caused by parasitism, particularly by mermithids (Nematoda), although intersexes accountable to gynandromorphism are also known (e.g. Aagaard 1974, Sæther & Galloway 1980, Wülker 1961a, b). In male Chironomini the essential morphological changes due to mermithid parasitism are reduced length of tarsal bristles, feminized antenna, female structures on the VIII abdominal sternite and reduction or absence of ductus ejaculatorius (Wülker 1975). Apart from no noticeable reduction in the bristle ratio of the front legs, the morphological changes observed in the intersexes of *H. nebulosa* coincide with the changes caused by mermithid parasitism. The fact that intersexes were found in one locality only, in the Malaise trap catches at a small stream near Wat Phra That temple on Doi Suthep, strengthen the assumption that the morphological changes were caused by parasitism. However, no parasites were detected in these specimens, but mermithids are known to leave their host when collected in preservation fluid (Aagaard 1974).

The size of the intersexes apparently falls outside the range of the males in several of the structures measured and the body proportions as reflected in the ratios, can be outside the range of both males and females, see Tab. 1. As the morphological changes seemingly can be very subtle, care must be taken not to include intersexes when describing new species.

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Diagnostic characters distinguishing the larvae of *Ablabesmyia* and *Paramerina*, and first record of *Paramerina* in Brazil

(Insecta, Diptera, Chironomidae)

Elisabeth Stur and **Ernst Josef Fittkau**

Stur, E. & E. J. Fittkau (1997): Diagnostic characters distinguishing the larvae of *Ablabesmyia* and *Paramerina*, and first record of *Paramerina* in Brazil (Insecta, Diptera, Chironomidae). – Spixiana **20/2:** 161-165

Larvae of Tanypodinae were collected from the Bento Gomes river (56°30'W 16°S), Mato Grosso, Brazil. These samples were initially identified as belonging to the genus *Ablabesmyia* according to the key of Tanypodinae of the Holarctic region (Fittkau & Roback 1983). However, investigations into the thoracic horn of an associated pupa indicated this was not the case. Further analysis of cephalic setae and sensory points (following Kowalyk 1985) showed that these specimens belong to the genus *Paramerina*. This is the first record of this genus in Brasil.

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Introduction

The identification of South American chironomid-larvae, even at generic-level, often causes great difficulties as usually there is no associated material (for example larva with associated pupa, or reared material) availible and the larger part of the identification literature deals with the Holarctic fauna of Chironomidae. Furthermore, in only a few cases are the immature stages of Neotropical chironomids known. Working with comprehensive material of chironomid larvae from the Bento Gomes river, Mato Grosso, Brazil, a larva type was found that, using the key for Holarctic Chironomidae, leads up to the genus *Ablabesmyia*. However, because of the presence of an associated pupa, this larval-type can be classified as *Paramerina*.

Paramerina spec.

Larva. Medium sized, head yellowish brown, head capsule slender.

Antenna. A little less than half the length of the head; antennal ratio about 2.4; length ca. 320 µm; basal segment about 10× as long as basal width, with ring organ somewhat beyond middle. (Fig. 1a).

Mandible. Length ca. 95 µm (max. 98 µm, min. 91 µm, N=6) (Fig. 1b).

Maxilla. Basal segment of maxillary palp two-segmented, with ratio (proximal to distal) ca. 0,45. (Fig. 1c).

Ligula. As in Fig. 1d. Distal half dark and row of teeth weakly convex.

Paraligula. Bifid, slender and half length of ligula (Fig. 1d).

Pecten hypopharyngis. 12-14 teeth of various size (Fig. 1e).

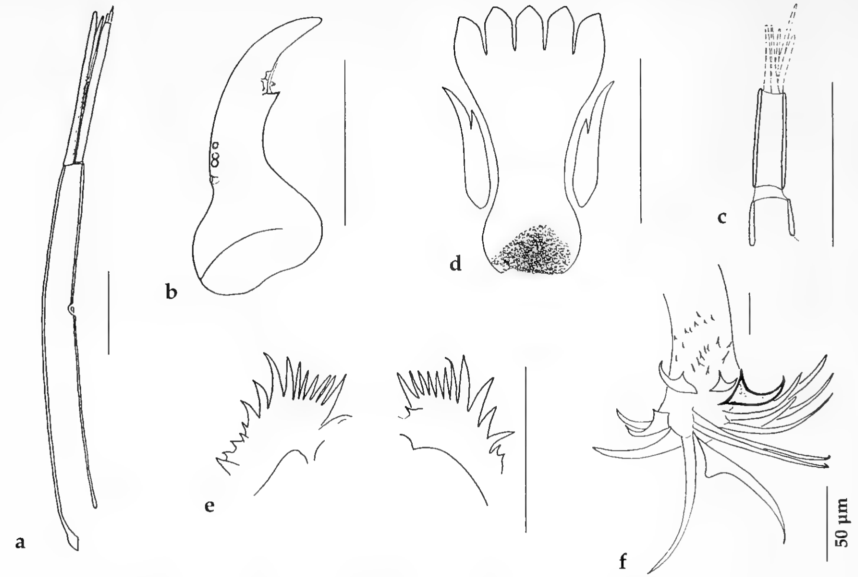

Fig. 1. *Paramerina* sp. Larva. **a.** Antenna. **b.** Mandible. **c.** Maxillary palp. **d.** Paraligula. **e.** Pecten hypopharyngis. **f.** Claws of posterior parapode. Scale: 50 µm.

Body. All claws of posterior parapode simple; one dark claw (Fig. 1f).

Pupa. Total length ca. 3.6 mm

Thoracic horn. As in Fig. 2a; length c. 240 µm; plastron plate opposite the corona; horn sac wall, a reticulate cuticular mesh opposite corona.

Abdomen. Segments VII and VIII with a fine shagreen of isolated spinules only on the ventral side; pattern of dorsal setae as in Fig. 2b. Anal lobe with fine shagreen dispersed on the anterior half; genital-sac of male projecting beyond the end of the anal lobe (Fig. 2c).

Comments

Compared with the immature states of other *Paramerina* species, this Brazilian species seems to be similar to *P. fasciata* Sublette & Sasa, 1994, from Guatemala. Although the dimensions of only one larval head of *Paramerina fasciata* have been published, the size of antenna and mandible, and the ratio of the two- segmented basal segment of the maxillar palp fall within the ranges of the Brazilian species. In Sublette and Sasa's (1994) description, however, the larval antenna has a verv short antennal blade (half size of second segment), whereas the Brazilian species has an antennal blade longer than the second segment.

The Brazilian *Paramerina*-species can be distinguished from other *Paramerina*-species from Central and North America, by the following features:

P. anomalus Beck & Beck, 1966 Larva: all claws of posterior parapode pale; ligula, inner teeth and middle tooth points, pale. Pupa: length 3 mm, therefore smaller; genital-sac shorter than in *P.* sp. from Rio Bento Gomes, Brazil.

P. smithae (Sublette), 1964 Larva: posterior parapode, two smaller claws bifid and one smaller claw pectinate. Pupa: three spines subapically on inner margin of segment IX; thoracic horn, plastron plate smaller and neck of plastron plate thicker (Roback 1972).

Of *P. testa* Roback, 1971 (Florida) and *P. fragilis* (Walley), 1925 (South Carolina and probabely also Florida) the immature stages are not known (Epler 1995).

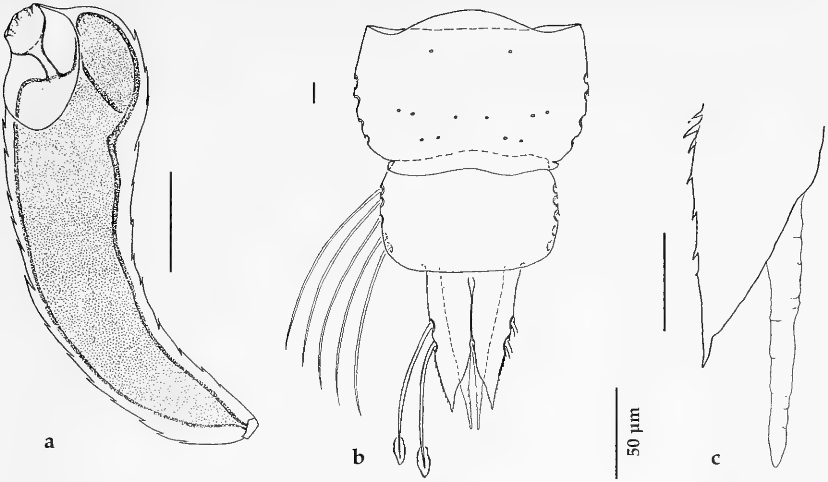

Fig. 2. *Paramerina* sp. Pupa. **a.** Thoracic horn. **b.** Segments VII and VIII. **c.** Part of anal lobe. Scale: 50 µm.

Ecological remarks

The larvae of *Paramerina* sp. are found in the middle reaches of the Rio Bento Gomes (ca. 56° 35'W, 15° 50'S). This intermittent tropical lowland river flows into the northern Pantanal in Mato Grosso, Brazil. During the period of sampling between May 1993 and June 1994, the mean water temperature was 25 °C (range 29 °C-17 °C), the mean pH 7.2 (range 8.0-6.0), and the mean conductivity 180 µS (range 50 µS-290 µS). Single specimens of *Paramerina* were collected during the dry and rainy seasons. The larvae were more numerous at the end of the dry and beginning of the rainy seasons. The larvae occured in leaf litter, which was either accumulated on the water surface or the river bottom.

Differentiation of *Paramerina* und *Ablabesmyia* in the larval stage

Larvae of *Ablabesmyia* have the basal segment of the maxillary palp subdivided into 2-6 segments (Roback 1985, Fittkau & Roback 1983). Normally, if the basal segment of maxillary palp is devided into two parts, they are subequal in length, or the proximal is longer than half of the distal part (Epler 1995). However, in *Paramerina* the proximal segment is shorter than half the length of the distal segment (see also Tab. 1). One or more claws of posterior parapode in *Ablabesmyia* are usually dark (Cranston 1996, Epler 1995, Fittkau & Roback 1983), with the exeption of *A. philosphagnos* Beck & Beck, 1966, which does

Tab. 1. First segment maxillary palp of *Paramerina*: ratio proximal to distal (meshured in the figures of the respective authors). Note that the ratio in *Ablabesmyia* differs from the usual.

species	ratio	source
P. anomalus Beck & Beck	no data given	Beck & Beck, 1966
P. fasciata Sublette & Sasa	0,5	Sublette & Sasa, 1994
P. parva (Freeman)	0,41	Cranston, 1996
P. smithae (Sublette)	0,27	Roback, 1972
P. sp.	0,36	Kowalyk, 1985
P. sp. [Brazil]	0,45	
A. philosphagnos Beck & Beck	0,46	Roback, 1985
A. sp.	0,45	Kowalyk, 1985

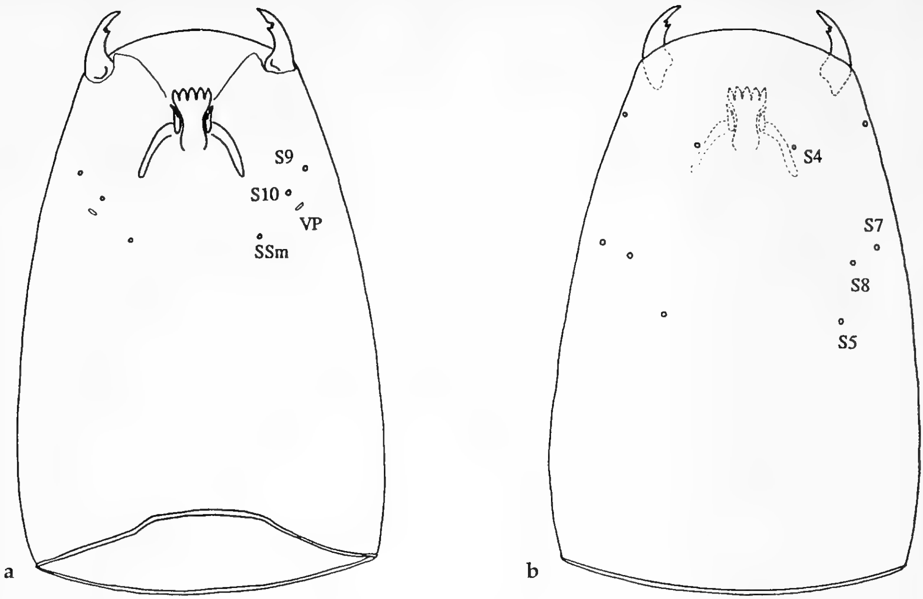

Fig. 3. *Paramerina* sp., Brazil, Rio Bento Gomes, with cephalic setae and sensory pores. **a.** Ventral view. **b.** Dorsal view. Abbreviations: DP: dorsal pore; S4-S10: cephalic setae; SSm: submental setae; VP: ventral pore.

not have dark claws on the posterior parapodes (Roback 1985). On the other hand, *Paramerina* is supposed not to have these dark claws (Cranston 1996, Epler 1995, Fittkau & Roback 1983), but one dark claw is present in the Brazilian *Paramerina*-larva.

In the subfamily Tanypodinae the analysis of the submental setae and sensory pores of the larval-heads makes it possible to distinguish the different genera in the larval stage (Kowalyk 1985) (Figs 3, 4). These setal pits and sensory pores result in a certain pattern which does not seem to vary within a genus. Kowalyk (1985) compared the patterns of various species of *Ablabesmyia*-larvae and did not find differences in the pit-patterns, and Cranston (1996) used these patterns to distinguish Australian genera. *A. annulata*, which also differs in other characters of ligula, procercus and posterior parapode from the remaining *Ablabesmyia*-species (Fittkau & Roback 1983), showed an other arrangement of the setae. Although the pit patterns of cephalic setae of *Ablabesmyia*-species are reasonable well known, to date the patterns only three *Paramerina*-species have been described. Kowalyk (1985) compared the patterns of the cephalic setae of *Paramerina* from *P. fragilis* (Walley), 1925, and *P.* sp. (Kowalyk 1985), and Cranston (1996) investigated those of *P. parva* (Freeman), 1961.

The clearest features to differenciate *Ablabesmyia* from *Paramerina* are the position of the submental setae S9, S10 and SSm, and the ventral pore Vp (Figs 3 A and 4 A). These patterns correspond with those mentioned by Kowalyk (1985) and Cranston (1986) for the respective genera.

Resumo

Entre as larvas de Tanypodinae do Rio Bento Gomes (56°30'W 16°S) Mato Grosso foi encontrado um tipo de larva que não pode ser diferenciada das do gênero *Ablabesmyia*, pela chave de Tanypodinae holárticos (Fittkau & Roback 1983). A forma do corno torácico indicou tratar-se de um outro gênero, e ainda uma análise das setas submentais possibilitou sua inclusão no gênero *Paramerina*, segundo Kowalyk (1985).

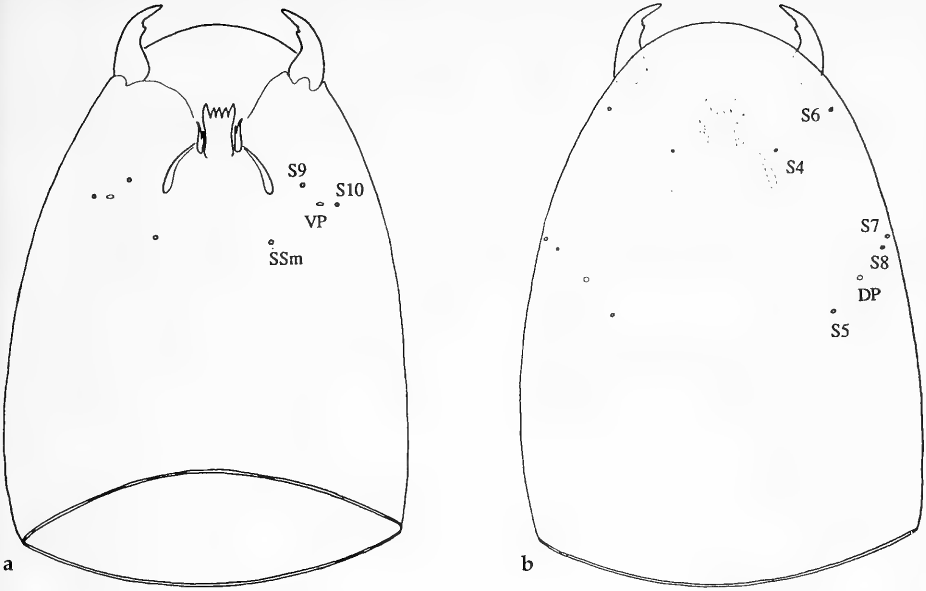

Fig. 4. *Ablabesmyia* sp., Brazil, Rio Bento Gomes, with cephalic setae and sensory pores. **a.** Ventral view. **b.** Dorsal view. Abbreviations: DP: dorsal pore; S4-S 0: cephalic setae; SSm: submental setae; VP: ventral pore.

Acknowledgements

We would like to thank Ulrike Nolte and Mirian A. Serrano for support in Brazil and Stephen Ridgway for comments on the draft. E. Stur received financial support from the Deutsche Forschungsgemeinschaft (DFG: Fi 99/11-1,2) granted to E. J. Fittkau.

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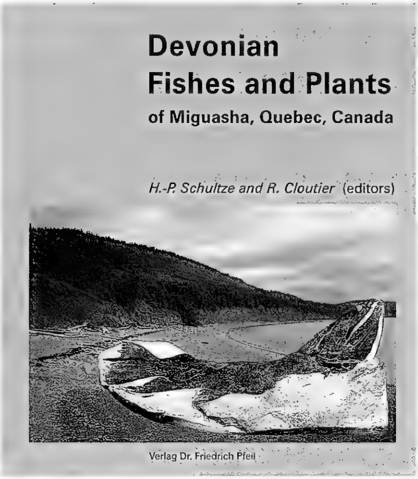
Sublette, J. E. & M. Sasa 1994. Chironomidae collected in Onchocerciasis endemic areas of Guatemala (Insecta, Diptera). – Spixiana Suppl. **20**: 1-60



20. Schultze, H. -P. & R. Cloutier (eds.): Devonian Fishes and Plants of Miguasha, Quebec, Canada. – Verlag Dr. Friedrich Pfeil, München, 1996. 374 S. ISBN 3-931516-03-2.

Among fossil localities, Miguahsa, better known in the classic geolocical and paleontological literature under the name "Scaumenac Bay", is considered as one of the most important sites of fish paleontology. For a long time, it has been the best documented upper Devonian vertebrate locality, famous for being the home locality of *Bothriolepis canadensis,* the best known antiarch placoderm, and of *Eusthenopteron foordi,* the crossopterygian central to numerous studies on early vertebrate structure. Surprisingly, no monograph of the whole locality was available yet, and the goal of the book has been to fill this gap.

Starting with a chapter on the history of the locality, the book includes 25 papers on geology, stratigraphy, paleoenvironment, preservation of fossils, plants, and animals of the locality, written by leading experts of the locality and of the respective groups. Paleobotany is rather poorly represented at this site, and it mainly consists of spores that give a rather good spectrum of the surrounding vegetal landscape. Chapters on Chelicerata and conchostracan Crustacea concern the rather scarce arthropodan fauna. More than two thirds of the volume are devoted to various vertebrate "fish" groups. Shorter chapters are dealing with Osteostraci, Anaspids, Placoderms, and Acnathodians that are excellently revised. A special account should be made to the extensive revisions of the actinopterygian *Cheirolepis canadensis,* the Dipnoans, and the Crossopterygians. Especially the famous *Eusthenopteron foordi* - associated since 50 years with the name of E. Jarvik – is extensively treated in two chapters. The book ends with a study of coprolites that reveal some important elements for the environmental analysis.

One strength of this book is the combination of volume, high printing quality, and reasonable price. In particular the photoplates are beautifully reproduced and highly instructive, but also the general style indicates that the publisher loved this contribution. The book will serve as a reference volume not only for Devonian paleoichthyologists and paleobotanists, but also all biologists interested in evolutionary studies in connection with the development of early vertebrates will find it very useful and stimulating. M. Baehr

21. Remane, R. & E. Wachmann: Zikaden kennenlernen, beobachten. – Naturbuchverlag, Augsburg, 1993. 288 S., zahlr. Fotos und Zeichnungen. ISBN 3-89440-0447.

In diesem Buch wird dem Leser ein Überblick über die Zikaden Europas gegeben. Das Buch ist unterteilt in einen allgemeinen Teil, in dem die Autoren den Bau und die Lebensweise dieser Insekten beschreiben und einen speziellen Teil mit Bestimmungstabellen und Einzeldarstellungen. Die Tabellen enthalten übersichtliche, klare Zeichnungen, die eine Bestimmung bis zur Familie ermöglichen. Die wichtigsten Arten der Familien werden mit Hilfe von Einzeldarstellungen besprochen. Zu jeder dort beschriebenen Art gibt es ein Farbfoto. Außerdem erfahren wir hier etwas über Lebensweise, Verwechslungsmöglichkeiten und Vorkommen der Arten. Durch die eindrucksvollen Bilder und die Art, wie die Zikaden beschrieben werden, ist es den Autoren gelungen, dem Leser die Schönheit der Zikaden nahezubringen und etwas von ihrer eigenen Faszination für diese Tiere zu vermitteln. Nicht nur für Spezialisten empfehlenswert. U. Oesterling

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Oliveiriella almeidai (Oliveira, 1946), gen. nov., comb. nov, from South America with description of the pupae

(Insecta, Diptera, Chiromidae, Orthocladiinae).

Sofia Wiedenbrug and **Ernst Josef Fittkau**

Wiedenbrug, S. & E. J. Fittkau (1997): *Oliveiriella almeidai* (Oliveira, 1946), gen. nov., comb. nov, from South America with description of the pupae (Diptera, Chiromidae, Orthocladiinae). – Spixiana **20/2:** 167-172

The new genus *Oliveiriella*, from South America is erected for the species *Spaniotoma (Stictocladius) almeidai* Oliveira, 1946. The type species is *Oliveiriella almeidai* (Oliveira), by monotypy. Diagnoses and descriptions are given for the adult male and pupa.

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Introduction

The species *Spaniotoma (Stictocladius) almeidai* was described by Oliveira (1946) and included in the subgenus *Stictocladius* Edwards, 1931, mainly because of the wing markings. Recently, *Spaniotoma* has been treated as a nomen dubium (Ashe 1983). Brundin (1956) transferred the entire subgenus *Stictocladius* to *Diplocladius* Kieffer, 1908. Cranston et al. (1989: 191) considered that *Stictocladius is* unrelated to *Diplocladius*. Spies & Reiss (1996) regarded *Stictocladius* as a genus, but listed *Spaniotoma (Stictocladius) almeidai* as an unplaced valid species in Orthocladiinae.

Pupal exuviae of this species have been found in Rio Grande do Sul (Brazil), and material from the Zoologische Staatssammlung shows that this species also occurs in Peru and Ecuador.

The new genus *Oliveiriella* is here erected for this species, and generic diagnoses are given for the adult male and pupa.

The terminology used in this publication follows that of Saether (1980).

Oliveiriella, gen. nov.

Type species: *Oliveiriella almeidai* (Oliveira, 1946: 279), by monotypy.

Generic diagnosis

Adult male. Head. Eye hairy. Antenna with 12 flagellomeres. Temporals divided into inner and outer verticals. Postorbitals absent. Palp 5-segmented.

Thorax. Antepronotals absent. Dorsocentrals small, decumbent, and uniserial. Acrostichals weak, starting near the antepronotum. Prealars not extending anterior to level of median anepisternum, scutellars in a single, transverse row.

Wings. Costa extended beyond R_{4+5}. R_{2+3} ending closer to R_1 than to R_{4+5}.

Abdomen. With few setae on the tergites. Anal point absent. Superior volsella absent, inferior

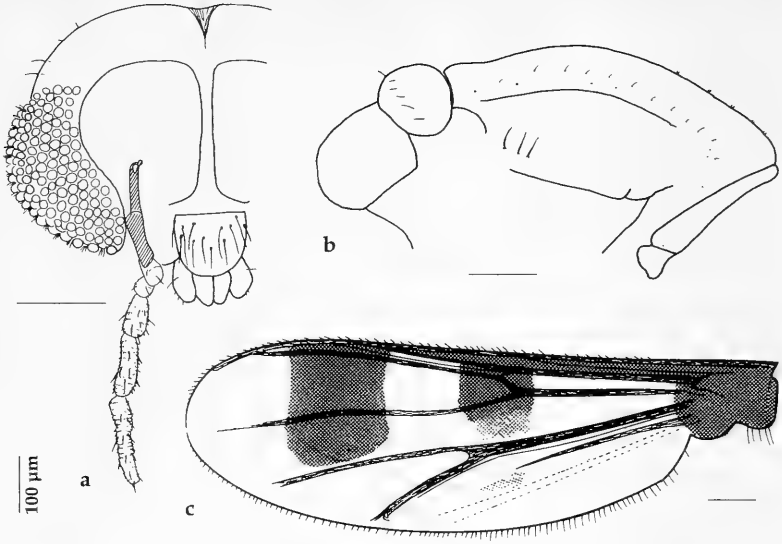


Fig. 1. *Oliveiriella almeidai.* **a.** Head. **b.** Thorax. **c.** Wing.

volsella present. Gonostylus simple, crista dorsalis present, ending apically in a strong tooth. Megaseta present.

Pupae

Cephalothorax. Frontal setae present on prefrons. Ocular field with 2 postorbitals. 2 median and 1 lateral antepronotal, 1 prealar. 3 precorneals, 2 pairs of dorsocentrals. Wing sheath without pearl row.

Abdomen. Tergites II to V with distal rows of conspicuous hooklets. VI with a strong row of spines on posterior margin. Shagreen absent on tergite I, reduced on tergite II, and occupying a larger field from tergites III to VI. Pedes spurii B absent. 1 lateral seta on segment I. Segments II to V with two lateral setae and an additional fine seta ventrally.

Anal lobe. 3 reduced anal macrosetae, 2 near the apex and the third located in the proximal ½. Internal anal lobe margin with 1 seta, difficult to see. Fringe absent.

Etymology. Named after Prof. Sebastião José de Oliveira who first described the species, and is motivating a new generation of chironomidologists in Brazil.

Systematics

Oliveiriella, gen. nov. differs from *Diplocladius* sensu Brundin (1956) by having a simple, not bifurcate gonostylus. In the key to the Chironomidae of the Holarctic region (Cranston et al. 1989) the males of *Oliveiriella* key to *Cricotopus* van der Wulp. The new genus definitely belongs in the "*Cricotopus*-Reihe" as defined by Hirvenoja (1973). The imaginal stage is closer to *Cricotopus* than the pupa. The combination: prealars not extending anterior to level of median anepisternum (i.e., n_a of Hirvenoja 1973 absent), reduced chaetotaxy of abdominal tergites, anal point absent, and crista dorsalis with a strong conical tooth on the distal part, allows the differentiation of both genera in the imaginal stage.

The pupa of *O. almeidai* differs from *Cricotopus* by: presence of hooklet rows on segments III to V, presence of setae on the internal anal lobe margin, and reduction and location of the macrosetae.

The "Genus 5" described by Roback & Coffman (1983) based on pupal exuviae from Venezuela may be identical to *Oliveiriella,* but their specimens possibly represent a different species.

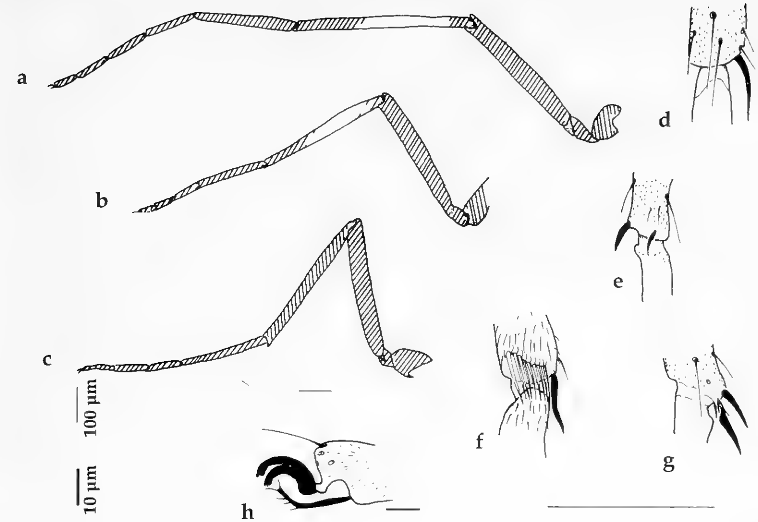


Fig. 2. *Oliveiriella almeidai*. **a.** Fore leg. **b.** Mid leg. **c.** Hind leg. **d.** Fore tibial spur. **e.** Mid tibial spur. **f, g.** Hind tibial spur. **h.** Distal part of tarsomere 5.

Oliveiriella almeidai (Oliveira), comb. nov.

Spaniotoma (Stictocladius) almeidai Oliveira, 1946.

Diagnosis. See diagnosis for the genus.

Description (Measurements given as means in µm).
Male. Length: Thorax 698 (n=2); Abdomen 1102 (n=1).

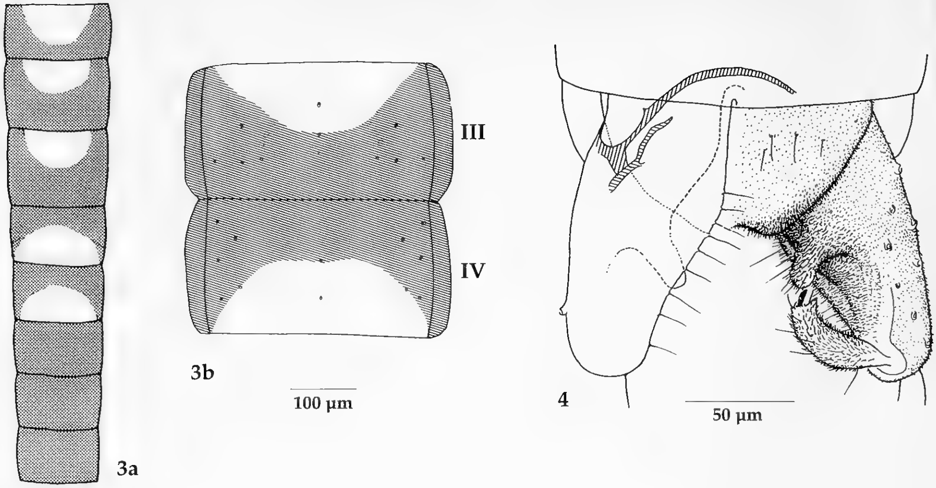
Head (Fig. 1a). Color: Head dark brown, almost black, antennae with flagellomeres light brown; plume light brown, pedicel dark brown, buccal parts light brown (Oliveira 1946). Eye hairy. Interocular distance 115 (n=3). Outer verticals 2, inner verticals 2. Mean AR=0.79 (n=2). Antenna without subapical setae. Antennal flagellomere length: 1st-11th 223 (n=2), 12th 165 (n=3). Clypeus rectangular, with 12 setae. Palpal segment lengths: 46, 46, 75, 113, 174; (n=3). CP=0.50.

Thorax (Fig. 1b). Color. Shiny dark brown; mesonotum shiny brown; "median part" darker and the rest lighter; scutellum dark brown; postnotum and pleura dark brown (Oliveira 1946). Acrostichals 10, prealars 3, dorsocentrals about 12, decumbent uniserial; scutellars 12, uniserial; antepronotal setae absent.

Wing (Fig. 1c). Length 1094, width 400; (n=2). With 2 anterior brown areas not reaching M_{3+4} and a small spot in the anal cell, wing basally darkened, veins brown. VR 1.29 (n=1). Costa extended beyond R_{4+5}, R_{2+3} ending at about ⅓ distance from R_1 to R_{4+5}, R_{4+5} ending distal to M_{3+4}, FCu distal to RM. Cu slightly curved. Squama with 5 setae.

Legs (Fig. 2). With a white ring on fore and mid tibiae covering at least half of each tibia. 1 tibial spur present on fore leg, 2 spurs of mid tibiae unequal in size, pulvilli absent.
Leg segment lengths (n=1):

	Fe	Ti	Ta1	Ta2	Ta3	Ta4	Ta5
Fore	307	412	214	112	86	68	49
Mid	281	289	139	49	52	30	34
Hind	293	307	180	82	67	37	41



Figs 3-4. *Oliveiriella almeidai.* **3a.** Abdomen. **3b.** Segments III and IV. **4.** Hypopigium.

Leg proportions:

	LR (n)	Bv (n)	Sv (n)
Fore	0.55 4	2.91 2	2.46 2
Mid	0.51 4	3.83 2	3.73 2
Hind	0.72 2	3.60 2	2.82 2

Abdomen (Fig. 3). Color. Tergites black; I shiny, from II to VII divided into a shiny apical and a velvety basal part; Sternites dark brown (Oliveira 1946). Tergites. I-III: with a whitish semi-circle from the anterior margin to about the middle of the tergite. IV-V: with a whitish semi-circle from the posterior margin to about the middle of the tergite.

Chaetotaxy of tergites: III: median setae 2, lateral setae 4. IV: median setae 2, lateral setae 5. VII: basal setae 5, setae along posterior margin 4. VIII: scattered setae 16.

Hypopygium (Fig.4). Lengths. Gonocoxite 204, gonostylus 82, (n=5), both white. Tergite with 4 setae on each side, in a staggered row. Anal point absent. Inferior volsella cylindrical, ventrally without setae, apically rounded. Ventral median edge of gonostylus with a row of about 10 medially directed, longer setae. Crista dorsalis ending in a strong, conical tooth. Megaseta present.

Pupa

Color. Light brown, segments II-VI with a darker anterior transverse band restricted to the region between the lateral muscle marks.

Length. Thorax 830 (770-936, n=10); abdomen 1661 (1434-1918, n=10).

Cephalothorax (Figs 5a, b). Setae: frontals on prefrons, postorbitals 2, median antepronotals 2, lateral antepronotal 1, prealar 1, precorneals 3, dorsocentrals 4 in two pairs. Thoracic horn simple, apex blunt, with sparse and very small spines; Length 181 (136-242, n=10). Thorax extensively granulated. Cephalic tubercles absent.

Abdomen. Pedes spurii B absent. Setae of segments I-VIII:

	I	II	III	IV	V	VI	VII	VIII
dorsals	4	4	4+1pit[1]	5	5	5	5	2
laterals[2]	1	3	3	3	3	3	3	3
ventrals	0	3	3+1pit[1]	3+1pit[1]	4	4	4	1
O_d setae	0	1	1	1	1	1	1	1

[1] Segments III and IV with additional dorsal and/or ventral setal pits not bearing setae in the specimens examined.

[2] Segments from II-V with 2 very strong lateral setae on small tubercles and a third thinner seta ventrally.

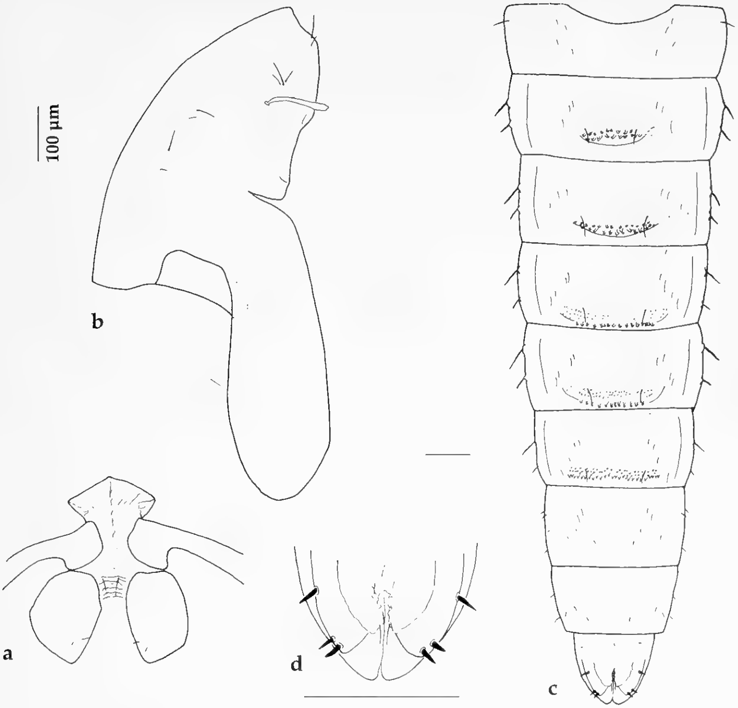


Fig. 5. *Oliveiriella almeidai*. **a.** Frontal apotome. **b.** Thorax. **c.** Tergites. **d.** Distal part of the anal lobus.

Tergites (Fig. 5c). I: bare. II: with posterior-median mound bearing 16-34 hooklets (m=21, n=10) in two rows; small shagreen patches laterally contiguous with the hooklet rows. III: about 26 hooklets (23-28, n=10) in two rows also on a mound, shagreen as on II. IV: about 15 hooklets (13-18, n=10) in a single row; 2 patches of shagreen, the first just anterior to the hooklets, and the second in the middle of the tergite. V: about 14 hooklets (11-18, n=10) in a single row, shagreen same as in IV. VI: hooklets absent, but up to 3 rows of spines present, the posterior one with stronger spines. VII: with anterior shagreen band and a small patch of shagreen postero-medially. VIII: two more or less separated, anterolateral patches of very fine shagreen. IX: 2 patches on the anterior margin laterally and another on the anterior margin medially. V and VI occasionally with shagreen on the paratergites.

Sternites. I: bare. II: fine shagreen on the anterior half and a small patch of small spines in the center. III: fine shagreen along the lateral muscle marks slightly expanded anteriorly and connected to a shagreen band along the posterior margin. IV: shagreen covering tergite except anterior margin. V. same as in IV. VI: shagreen same as in IV but more concentrated toward posterior margin. Conjunctives from VI/VII with lateral patches of fine spines (Pedes spurii A?). VII and VIII: Patches of fine shagreen antero-laterally, on VII patches connected by very sparse shagreen.

Anal lobe (Fig. 5d). 3 very short and thick anal macrosetae, 2 near the apex and the third located in the proximal ½. Median anal lobe margins with 1 small seta each, which may be difficult to see. Fringe absent.

Male genital sac overreaching the anal lobe, apically rounded.

Ecology and distribution. All pupal specimens collected from clear-water, lotic habitats of montane or submontane streams in southern to southeastern Brazil, and from the eastern slopes of the Andes in Ecuador and Peru.

Types. Holotype: ♂, allotype: ♀, Itatiaia, Estado do Rio de Janeiro, Brazil, 21.X.1940, leg. Barreto, at Coleção Entomológica do Instituto Oswaldo Cruz (FIOCRUZ).

New material (deposited in the Zoologische Staatsammlung, München, Germany and Coleção Entomológica do Instituto Oswaldo Cruz, Rio de Janeiro, RJ, Brazil): **Imagines:** 5♂♂, Arroio dos Carros, Taquara, RS, Brazil, XII/1994, leg. Fittkau & Wiedenbrug; 1♂, Rio Mazomba, Itaguaí, RJ, Brazil VIII/1989, leg. B. Stumpp; 1♀, Rio Cascatinha, Caledonia (Represa), Nova Friburgo, RJ, Brazil, VIII/1995, leg E. J: Fittkau; 1♂, Upper Ucayali, Peru, VI/1979, leg. E. J. Fittkau; 1♂, Rio Aguarico near San Pedro, Pr. Napo, Ecuador, VI/1977, leg. W. Schacht. **Pupal exuviae:** 36, Arroio dos Carros, Taquara, RS, Brazil, XII/1994, leg. Fittkau & Wiedenbrug; 7, Rio Mazomba, Itaguaí, RJ, Brazil VIII/1989, leg. B. Stumpp; 1, Rio Azul near mouth of Rio Tallumayo, Peru, V/1963, leg E. J. Fittkau; 1, Rio Chanchamayo, Merces, Peru V/1963, leg. Fittkau.

Resumo

O novo gênero *Oliveiriella*, da América do Sul, foi estabelecido para a espécie *Spaniotoma (Stictocladius) almeidai* Oliveira, 1946. São apresentadas diagnoses e descrições para o macho adulto e pupa. A espécie tipo é *Oliveiriella almeidai* (Oliveira).

Acknowledgements

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SPIXIANA	**20**	2	173–177	München, 01. Juli 1997	ISSN 0341-8391

The larva of *Limnephilus wittmeri* Malicky, 1972

(Insecta, Trichoptera, Limnephilidae)

Rufino Vieira-Lanero, Marcos A. González and **Fernando Cobo**

Vieira-Lanero, R., M. A. González & F. Cobo (1997): The larva of *Limnephilus wittmeri* Malicky, 1972 (Insecta, Trichoptera, Limnephilidae). – Spixiana **20/2:** 173-177

A description of the hitherto unknown larva of *Limnephilus wittmeri* Malicky, 1972, an endemic of the Iberian Peninsula, is given. The most important diagnostic features are illustrated, and an attempt is made to include the larva in an existing key for larvae of Limnephilidae published by Wallace et al. (1990). Some zoogeographical and ecological notes are included.

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Introduction

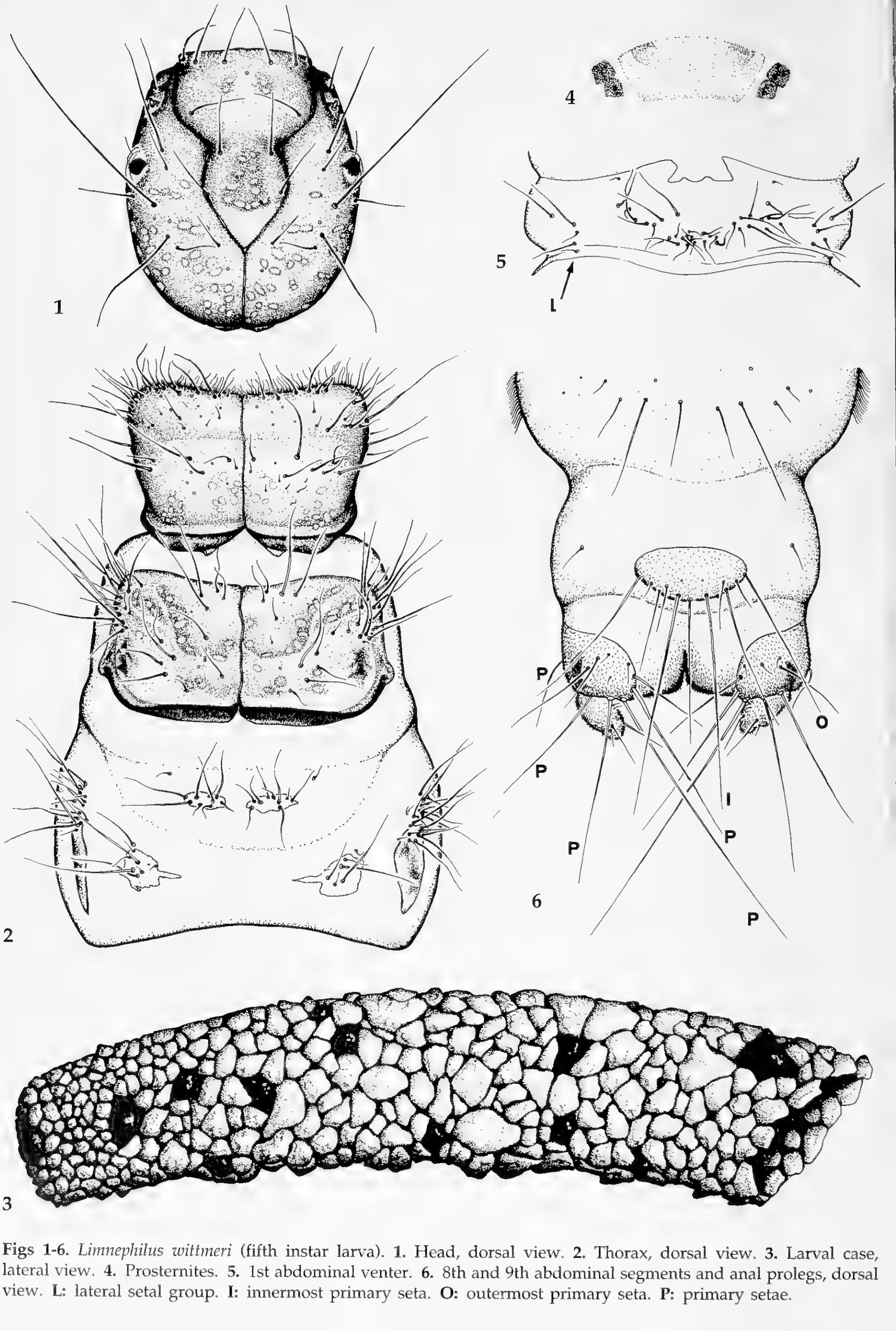
Twenty-three species of the genus *Limnephilus* have been reported by González et al. (1992) from the Iberian Peninsula. However, the presence of *L. coenosus* Curtis, 1834, *L. decipiens* (Kolenati, 1848), *L. extricatus* McLachlan, 1865, *L. griseus* (Linnaeus, 1758), *L. politus* McLachlan, 1865 and *L. stigma* Curtis, 1834 is considered doubtful whitin this region. Moreover, *L. subcentralis* (Brauer, 1857) was only reported from Portugal by Cortés (1989) and has been recently excluded from the catalogue of the Portuguese Trichoptera (Terra 1994).

After the publication of the Iberian species list, our own records and personal communications with several colleagues have corroborated the presence of three of this doubtful species in the Iberian Peninsula: *L. extricatus* was recorded in Lérida (Malicky, pers. comm.), *L. griseus* in Santander (Botosaneanu, pers. comm.) and Lérida (González, unpublished), and *L. stigma* was recorded in Lérida (González, unpublished).

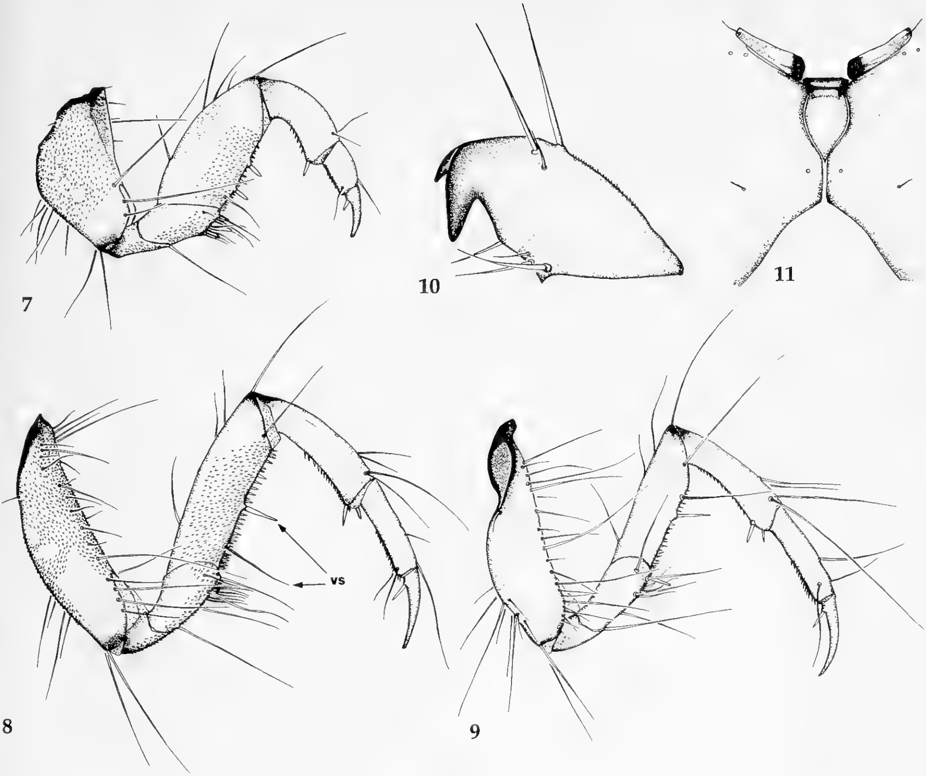
Thus, at present, the genus *Limnephilus* is represented by 19 species in the Iberian Peninsula, four of them endemics: *L. aistleitneri* Malicky, 1986, *L. guadarramicus* Schmid, 1955, *L. obsoletus* Rambur, 1842 and *L. wittmeri* Malicky, 1972. Larvae of *L. guadarramicus* have been described by Vera (1979), but larval descriptions for the other endemic species are still lacking.

Larval exuviae of *L. wittmeri* were obtained from larvae reared in the laboratory to the adult stage and from mature pupae with distinct genitalia collected in several field samples, thereby ensuring the association between larval and adult specimens. The objective of this paper is to describe fifth instar larvae of this species.

The morphological terminology and setal nomenclature follows Wallace et al. (1990).



Figs 1-6. *Limnephilus wittmeri* (fifth instar larva). **1.** Head, dorsal view. **2.** Thorax, dorsal view. **3.** Larval case, lateral view. **4.** Prosternites. **5.** 1st abdominal venter. **6.** 8th and 9th abdominal segments and anal prolegs, dorsal view. **L:** lateral setal group. **I:** innermost primary seta. **O:** outermost primary seta. **P:** primary setae.



Figs 7-11. *Limnephilus wittmeri* (fifth instar larva). **7.** Prothoracic leg. **8.** Mesothoracic leg. **9.** Metathoracic leg. **10.** Right anal claw. **11.** Ventral apotome. **vs:** ventral edge setae.

Description of the final instar larva

Material examined: fifth instar larval exuviae of 54 pupae reared in the laboratory, 15 field collected pupae and 6 last instar larvae, all from Sierra de Ancares (Lugo, NW of Spain).

Mean body length: 13 mm (range 12-15 mm).

Head capsule (Fig. 1). Mean head width 1.17 mm (range 1.12 - 1.26 mm). Uniformly dark brown in colour; the most conspicuous character is the absence of pigment from the triangular-shaped area at the aboral end of the fronto-clypeal apotome; sometimes a pale area on the posterior region of each parietal may also be present as in *L. griseus* (cf. Wallace et al. 1990, fig. 75B). The muscle attachment spots are clearly visible. Mandibles black, with distal margins reddish and five teeth along edges as well as with ridges in central concavity. The ventral apotome (Fig. 11) is slightly longer than the posterior ventral ecdysial line; inner area of cardo black in colour.

Thorax (Fig. 2). Pronotum uniformly brown with distinct muscle attachment spots and a transverse furrow separating the anterior third from the posterior two thirds; posterior margin with two small, black transverse stripes with overlapping ends and a brown space between them. Proventer (Fig. 4) with two small, black lateral prosternites normally fused, lying a little apart from the central prosternite. The central prosternite is almost indistinct except for two pigmented areas, sometimes inconspicuous, on its anterior margin. Mesonotum slightly more yellowish than pronotum; posterior margin and part of lateral margin narrow and blackish brown. Metadorsum with three pairs of little sclerites: posterior metadorsal sclerites with an inner process and without setae on soft cuticle between them; the anterior third of lateral metadorsal sclerites is ill-defined and more pale than the other two thirds.

Legs (Figs 7-9). Yellowish brown in colour with muscle attachment spots ill-defined. Mesothoracic leg slightly longer than metathoracic leg. Each trochanter without ventrodistal setal brush and without additional setae on proximal section. All femora with only one seta on inner dorsal half. Femur of first leg with two strong ventral edge setae *vs* pale in colour. Meso- and metafemora with two long ventral edge setae **vs** contrasting in colour. Neither femur has any additional setae on either the anterior or posterior face. Tarsal claw with a short basal seta.

Abdomen. 1st abdominal venter (Fig. 5) with 4 setae (range 3-5) in each lateral setal group ***l***. Lateral fringe extends from the beginning of the 3rd segment to the extreme end of the 8th; gills present on segments 2-7 with number of filaments as in tab. 1. Segment 8 dorsally (Fig. 6) with a continuous transverse row of 2 long and 6 shorter setae. 9th abdominal dorsal sclerite (Fig. 6) light brown or yellowish, with indistinct punctation at anterior margin and 4 primary setae; each side with one seta between innermost primary seta ***I*** and outermost primary seta **O** which is more than half as long as seta **O.** Lateral sclerite of anal proleg with no squat setae on the face; surface with 5-6 setae (apart of five primary setae **P**). Anal proleg claw (Fig. 10) chestnut brown, darker apically and with one accessory hook. Lobe of anal proleg with no setae **ls** on soft cuticle by anal slit.

Case (Fig. 3). Total length 12-14 mm, maximum width 3 mm. Slightly curved, smooth, almost uniform width but sometimes tapering posteriorly; made of fine sand grains; posterior opening closed by either a membrane with a large round hole, or by sand grains with several little holes. Pupal case entirely composed of sand grains.

Discussion

Hickin (1967), Hiley (1976), and Lepneva (1971) gave a key to larvae of Limnephilidae, but the most inclusive European identification key for Limnephilidae larvae was given by Wallace et al. (1990) for the British and Irish species where all Iberian species of *Limnephilus* are included, except *L. guadarramicus*. Thus it is possible to use this key as a starting point for this work.

When using Wallace's key, larvae of *L. wittmeri* will key out as *L. centralis* (couplet 59) because of the central prosternite about twice as wide as it is high. *L. wittmeri* larvae are very close to *L. centralis* and it's quite difficult to find a plain character to distinghish both species. The only reliable feature (see also Hickin 1967, Hiley 1976, Lepneva 1971 for *L. centralis*) is the length of the ventral apotome, slightly longer than the posterior ecdysial suture in *L. wittmeri,* whereas the ventral apotome of *L. centralis* almost reaches the occipital foramen. However, we can also use (with carefullness) the following characters of *L. wittmeri* to ensure identification: sclerites of metadorsum well defined (pale and indistinct in *L. centralis*); 4 setae only in each setal group **L** on 1st abdominal venter (1-11 in *L. centralis*); chaetotaxy of the 9th abdominal dorsal sclerite is seemingly different (cf. Lepneva 1971, Fig. 382); and the lateral sclerite of anal proleg bears 11-12 setae including the 5 primary setae **P** along posterior edge (11-18 in *L. centralis*). Moreover, it is important to note that *L. centralis* has never been reported from the study area.

Tab. 1. Number of filaments in tracheal gills on abdominal segments 2-7 of fifth instar larvae of *Limnephilus wittmeri* Malicky. Positions abbreviated as: **A:** anterior. **D:** dorsal. **L:** lateral. **P:** posterior. **V:** ventral.

Gill	Segment					
	2	3	4	5	6	7
AD	3	3	2-3	1-2	1	1
PD	3	3	2	1-2	1	0
ALD	1-2	2	0	0	0	0
PLV	2	1	0	0	0	0
AV	2	2	2	1	1	1-0
PV	3	3	2	2	2	1-0

Larval morphology of *L. wittmeri* and *L. guadarramicus* (cf. Vera 1979) is completely different and they can be immediately separated by many conspicuous characters: e.g. body size; colour patterning of head, pronotum, mesonotum and legs; case shape; number of filaments and tracheal gill arrangement, etc.

Habitat and distribution

Larvae of *L. wittmeri* were collected on May 5th, 1985 and on March 16th, 1994; prepupae and pupae on May 30th, 1991 and in May 28th, 1995. Prepupae and pupae were found attached to riparian submerged vegetation roots in shallow, flowing water pools in the river of Piornedo and a temporary pool, whereas fifth instar larvae were found in the bed of the stream. River Piornedo is a clean mountain brook with low temperatures; the temporary pool was produced by a spring; both sampling sites are in Sierra de Ancares (Lugo, ca. 1500 m above sea level).

L. wittmeri is an endemic species of the Iberian Peninsula where it is confined to the north-western quarter. In this area, adults have been recorded in several localities of Galicia and some adjacent provinces (Asturias, Cantabria and Zamora) at about 160 to 1650 m a.s.l. (González & Otero 1980, González et al. 1992). We have recorded adults in Galicia on May and from July to October (González 1988).

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We are specially grateful to Dr. Johann Waringer for his critical reading of this manuscript. We would also like to thank Miss. O. Vázquez for reviewing the text. This research was supported by XUGA 20001A96 of Xunta de Galicia.

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22. Hölldobler, B. & E. O. Wilson: Ameisen – Die Entdeckung Einer Faszinierenden Welt. – Birkhäuser Verlag Basel, 1995. 265 S. ISBN 3-7643-5152-7.

Der wohl bekannteste Myrmekologe Deutschlands, Bert Hölldobler, hat wieder einmal literarisch zugeschlagen. Nach seiner 1990 erschienenen Monographie "The Ants" ist nun das deutsch-sprachige Buch "Ameisen – Die Entdeckung einer faszinierenden Welt" erschienen. Wieder in Zusammenarbeit mit Edward O. Wilson ist ein Buch entstanden, das auch dem Laien einen Einblick in das wundersame Gemeinwesen der Ameisenvölker dieser Erde bietet. Spannend wie ein Krimi, lehrreich wie eine wissenschaftliche Abhandlung und doch leicht verständlich, fesselt dieses Buch den Leser von der ersten bis zur letzten Seite. Begleitet von vielen farbigen Abbildungen erfährt man alles über das Kolonieleben, Superorganismus, Kommunikation, Konflikt- und Dominanzverhalten, Arbeitsteilung, Trophobionten, Sozialparasiten und der ökologischen Bedeutung der Ameisen. Besonders gut hat mir das Kapitel "Die seltsamsten Ameisen" gefallen, in dem es sich z.B. um die derzeit schnellste Körperbewegung im Tierreich, "Stachelschweinjäger" und andere Kuriositäten dreht. Faszinierend ist auch der Abschnitt, der die Weberameisen behandelt. Zum Nestbau in luftigen Höhen ketten sich hunderte von Ameisen aneinander, um günstig gelegene Blätter zusammen zu ziehen und unter Zuhilfenahme ihrer Larven miteinander zu verweben. Im letzten Kapitel schließlich wurde an die Systematiker und Sammler gedacht. Hier erfährt man alles über Fang, Präparation und Haltung der kleinen Krabbler. Selbst der Transport von Kolonien und Beispiele für Versuchsaufbauten für soziobiologische Untersuchungen sind kurz beschrieben. Fazit: ein rundum gelungenes Buch, nur der Preis schmerzt ein wenig, obwohl er, auch der hervorragenden Farbphotos wegen, als angemessen erscheint. M. Schmelzle

23. Schmitt, M. (Hrsg): Wie sich das Leben entwickelte – Die faszinierende Geschichte der Evolution. – Mosaik Verlag, München, 1994. 176 S., mit vielen Abbildungen.

Schon wieder eine populärwissenschaftliche Darstellung zum schier unerschöpflichen Thema der Evolution? Ja, aber diese scheint mir aus dem üblichen Niveau herauszuragen. In diesem Buch sind von den Autoren die Themen der Evolutionsbiologie nicht nur verständlich und interessant dargestellt und reichhaltig illustriert, sondern es sind auch viele Beispiele genannt, die nicht allgemein bekannt sind. Die Autoren (der Herausgeber hat den größten Teil des Buches selbst geschrieben) sind offensichtlich sehr kompetent und der Text ist deshalb auch wissenschaftlich exakt. Besonders hervorheben möchte ich die vielen interessanten Stammbaumdarstellungen, die auf den Ergebnissen der phylogenetischen Systematik beruhen. Hier wird endlich auch für Laien deutlich, daß biologische Systematik die Wege der Evolution nachzeichnet. Ein Buch, das nicht nur für interessierte Laien, sonden ebenso für Biologen und Lehrer uneingeschränkt empfohlen werden kann.

K. Schönitzer

24. Gewecke, M. (Hrsg.): Physiologie der Insekten. – G. Fischer Verlag, Stuttgart, 1995. 445 S., 270 Abb., 21 Tabellen, 12 Einzelautoren.

Dieses neue Lehrbuch ist als Einführung in die Physiologie der Insekten konzipiert, in dem sowohl die klassischen Erkenntnisse, als auch aktuelle Forschungsergebnisse zusammenfaßt werden. Die Themen reichen vom Stoff- und Energiewechsel bis zur Kommunikation im Sozialverband. Dabei sind die einzelnen Kapitel in ihren Schwerpunkten stark subjektiv von den Autoren geprägt. Dies erscheint aber kein Nachteil zu sein, sondern gibt den einzelnen Kapiteln einen eingenen Charakter und Wert und entspricht dem Konzept des "Lernens am Beispiel". Das Buch enthält Boxen mit den Biographien der Väter der Insektenphysiologie. Dies belebt das Buch und illustriert sehr schön und lebendig die Entwicklung dieser Wissenschaft. Besonders möchte ich auf das Kapitel über die Systematik der Insekten hinweisen, das vielleicht für manchen überraschend sein mag. Es ist aber sehr wichtiog, daß alle, die physiologisch arbeiten, sich immer wieder daran erinnern, daß sie mit konkreten Arten arbeiten, und Ergebnisse nicht leichtfertig verallgemeinert werden dürfen. Es ist für jeden Physiologen von größter Bedeutung sich über die Verwandtschaftsverhältnisse der untersuchten Arten im Klaren zu sein. Zugleich ist dieses Kapitel auch eine gute Zusammenfassung für andere Biologen, die an der Stammesgeschichte der Insekten interessiert sind. Insgesamt ist dieses Lehrbuch sowohl für Studenten als auch Biologen aller Couleur uneingeschränkt zu empfehlen. K. Schönitzer

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Two new species of Mycetophilidae from Greece and the Netherlands

(Insecta, Diptera, Nematocera)

Dimitar Bechev

Bechev, D. (1997): Two new species of Mycetophilidae from Greece and the Netherlands (Insecta, Diptera, Nematocera). – Spixiana **20/2:** 179-180

Descriptions of two new species of the family Mycetophilidae with illustrations of the male genitalia are presented: *Leia graeca*, spec. nov. from Greece and *Sceptonia demeijerei*, spec. nov. from the Netherlands.

Dimitar Bechev, Department of Zoology, University of Plovdiv, 24 Tzar Assen Str., BG-4000, Plovdiv, Bulgaria.

Leia graeca, spec. nov.

Figs 1-3

Types. Holotype: ♂, Greece, Farsala, 20.IV.1994 (D.Bechev) (in author's collection). – Paratypes: 2♂♂, Greece, 2 km nw. of Langadia, 28.IV.1979 (A. E. Stubbs); 1♂, sw. of Lake Takka, 27.IV.1979 (A. E. Stubbs); 2♂♂, Fokis, Delphi, 5.V.1979 (A. E. Stubbs); 2♂♂, Cephalonia, Mount Enos, *Abies cephalonica* forest, 1300 m, 20.V.1981 and 23.V.1981 (I. F. G. Mc.Lean) (all in coll. of Dr. P. J. Chandler).

Description (♂)

Wing length 4.5 mm.

Head. Colour black. Clypeus, palpi, and mouthparts yellow. Antennae dark; scape and pedicel yellow; also flagellomeres 1-2 yellowish on underside.

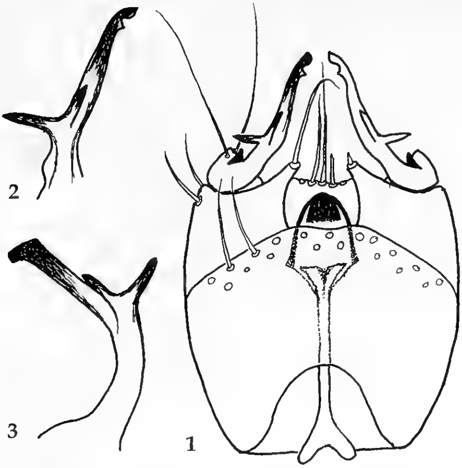
Thorax. Mesoscutum with confluent black stripes; lateral part yellow. Scutellum, mediotergite, laterotergite and pteropleura (=epimere 2) black; mesopleura (=anepisternum) and sternopleura (=katepisternum) blackish brown, partially yellowish; pronotum yellow. Mesoscutal bristles pale. Scutellum with four long yellow brownish setae; laterotergite with a number of long pale bristles.

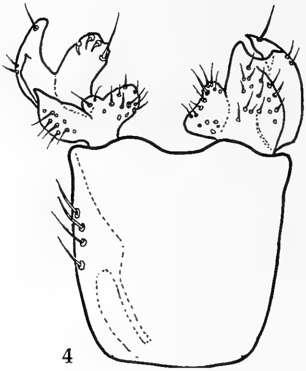
Wings. Membrane yellowish, without markings; veins dark. Halteres yellow.

Legs. Coxae, femora, and tibiae yellow, excluding only apex of hind femora. Tibial spurs yellow brownish. Tarsi brownish.

Abdomen. Tergites entirely black Sternites with yellow markings. Hypopygium (Fig. 1) dark. Apex of gonostyle tripartite but medial tooth free only extremely apically (Fig. 3).

Discussion. This species resembles *Leia umbrosa* Caspers (see Caspers, 1991: p. 328, fig. 13) from which it differs in the form of gonostyle.





Figs 1-3. *Leia graeca*, spec. nov. **1.** ♂ genitalia, dorsal view. **2.** Gonostyle, dorsal view. **3.** Gonostyle, lateral view. **Fig. 4.** *Sceptonia demeijerei*, spec. nov. ♂ genitalia, ventral view.

Sceptonia demeijerei, spec. nov.
Fig. 4

Types. Holotype: ♂, Netherlands, Hilversum, 10.V.08 (de Meijere) (ITZ). – Paratypes: 1♀, Netherlands, Hilversum, 20.V.08; 1♀, Hilversum, 22.VII.09; 1♀, Hilversum, 9.VII.05; 1♀, Hilversum, 15.IX.07 (de Meijere) (all in Institut voor Taxonomische Zoologie, Amsterdam).

Description (♂)
Wing length 1.9 mm.

Head. Entirely shining black. Antennae, scape and pedicel dark brown. Palpi yellowish.

Thorax. Entirely black, shining.

Wings. Membranae yellowish. R5 about three times its width removed from R1. Halteres yellow.

Legs. Yellow except dark near basal margin hind coxa, blackish apical third of hind femur and brownish tarsi. Mid tibia with 1pv, 2a, 3d; hind tibia with 6-7a, 3d.

Abdomen. Entirely black, shining.

Male genitalia. See fig.4.

Discussion. The new species resembles *Sceptonia fuscipalpis* Edwards (holotype examined) from which it differs in the form of the gonostyles (see Edwards 1925, figs. 171-173) and the yellowish palpi.

Acknowledgements.

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The genus *Sceptonia* Winnertz in the Oriental region

(Insecta, Diptera, Mycetophilidae)

Dimitar Bechev

Bechev, D. (1997): The genus *Sceptonia* Winnertz in the Oriental region (Insecta, Diptera, Mycetophilidae). – Spixiana **20/2**: 181-182

An enlarged description and illustration of the male genitalia of the type of the single known Oriental species, *Sceptonia collaris* Edwards and the description of *Sceptonia javanica*, spec. nov. from Java (Indonesia) are presented.

Dimitar Bechev, Department of Zoology, University of Plovdiv, 24, Tzar Assen Str., BG-4000 Plovdiv, Bulgaria.

Edwards (1931) described the single known Oriental species of the genus *Sceptonia*, *S. collaris* from Sumatra. By study of material from Java a second unknown species was detected that is decribed below.

Sceptonia collaris Edwards

Figs 4-6

Sceptonia collaris Edwards, 1931: 269.

Material examined: ♂ holotype, Sumatra: Fort de Kock, 1926 (E. Jacobson), B.M. 1930-538 (Natural History Museum, London).

Description

Male. Wing length 2.0 mm.

Head. Brown, yellowish near eyes. Scape, pedicel and base of first flagellomere yellow, rest of flagellomeres brown. Palpi yellow.

Thorax. Mesoscutum dark brown with yellow anterior margin and humeral spots. Pleurae dark brown.

Wings. Membranae faintly darkened about r-m. Costa produced at about ¼ from distance between apex of R5 and M1. R5 about its width removed from R1.

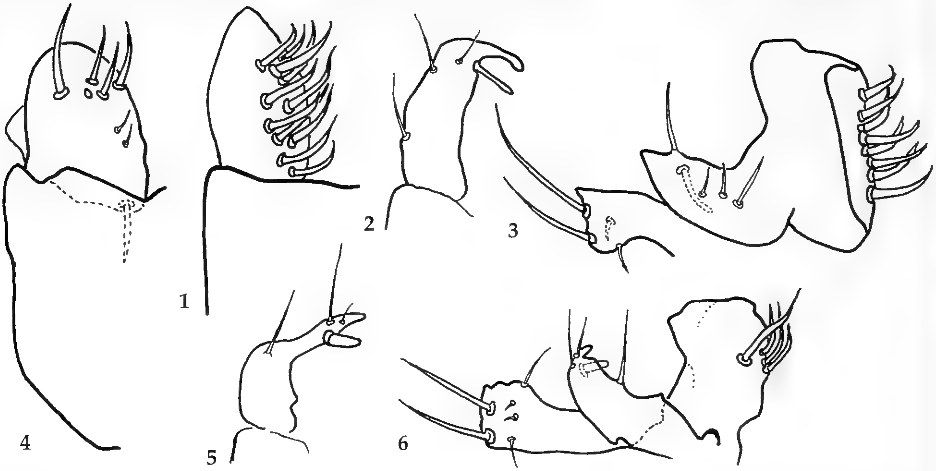
Legs. Yellowish except posterior coxae darkened in basal part, posterior femora dark in apical half, and tarsi brownish.

Abdomen. Dark brown, posterior margin of tergite 6 yellow. Gonostyles see figs 4-6.

Sceptonia javanica, spec. nov.

Figs 1-3

Types. Holotype: ♂, Java, Tjibodas, 5000-6000' (Koningsberg, 1913) (Institut voor Taxonomische Zoologie, Amsterdam).



Figs 1-6. Male genitalia. **1.** *Sceptonia javanica*, ventral view. **2.** *S.javanica*, medial part of gonostyle, ventral view. **3.** *S. javanica*, gonostyle, lateral view. **4.** *S. collaris*, ventral view. **5.** *S. collaris*, medial part of gonostyle, ventral view. **6.** *S. collaris*, gonostyle, lateral view.

Description

Male. Wing length 2.0 mm.

Head. Yellow brownish; scape and pedicel yellow, flagellomeres yellow brownish. Palpi yellow.

Thorax. Mesoscutum brown with yellow anterior third. Pleurae brown.

Wings. Membranae faintly darkened about r-m. Costa produced slightly beyond apex of R5. R5 about 1.5× its width removed from R1.

Legs. Yellow except posterior coxae darkened at base, posterior femora with dark apical part, and tarsi yellow brownish.

Abdomen. Brown except first segment and posterior margin of tergite yellowish. Gonostyles see figs 1-3.

Key to the species

1. Costa produced at about ¼ from distance between apex of R5 and M1. Ventral part of gonostyle with a few very strong setae (Fig. 4) .... *collaris* Edwards
- Costa produced slightly beyond apex of R5. Ventral part of gonostyle with great number very strong setae (Fig. 1) .... *javanica*, spec. nov.

Acknowledgements

I am very grateful to Dr. B. Brugge (Institut voor Taxonomische zoologie, Amsterdam) and Dr. J. Chainey (National History Museum, London) for the loan of material.

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SPIXIANA	**20**	2	183–190	München, 01. Juli 1997	ISSN 0341-8391

The production of arthropods on dead wood of spruce and beech in typical central European forests during the first five years after the breakdown of the trunks

Volker Nicolai

Nicolai, V. (1997): The production of arthropods on dead wood of spruce and beech in typical central European forests during the first five years after the breakdown of the trunks. – Spixiana **20/2:** 183-190

During a five year field study quantitative data were obtained on the fauna of freshly fallen trunks of spruce and of beech trees in typical stands of central Europe. On spruce the dominant fauna contained of Scolytidae, Acari, Collembola, and Sciaridae. On beech the dominant fauna contained of Scolytidae, Acari, Collembola, Sciaridae, and additionally of Formicidae, *Pityophagus ferrugineus* (Col., Nitidulidae), and of *Lymexylon navale* (Col., Lymexylonidae).

In total spruce trunks were settled in higher densities then beech trunks. In contrast to this a more diverse fauna was found on beech trunks then on spruce trunks which is shown for Diptera as an example. During the first years of degradation *Ips typographus* and *Pityogenes chalcographus* were the pioneer bark beetles which infested spruce trunks. Other bark beetle species as *Crypturgus hispidulus* follow them after a few years.

Two years after the beech trunks were fallen the highest densities of *Taphrorychus bicolor* (Col., Scolytidae) were found and several predaceous species follow. After 3-4 years of degradation the faunal composition changes deeply and e.g. on beech trunks Isopoda become more important.

The ecological roles of Scolytidae and their natural enemies are pointed out.

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Introduction

In central European forest ecosystems dead wood is one of the characteristic components. It is produced by varies sources e.g. like wind unpredictably in space and time (Nicolai 1994). During the regeneration cycle of central European forest ecosystems different amounts of dead wood were measured per area ranging from 5 % of the total biomas per area during the rejuvination time up to 70 % of the total biomas per area during the breakdown phase (Möller 1993). The present practise of management in German forests reduces this amount of dead wood per area to a minimum. However dead wood is settled by a high number of different and highly specialized organisms, and in Germany about 1500 species of funghi and about 1350 species of beetles are known to live exclusively on dead wood of different quantity and quality (Möller 1993). The present managing practise in German forests may be seen as the reason that about 60 % of these species are endangered (Andersson & Hytteborn 1991; Geiser 1986).

In this century in central Europe several times spruce plantations were blown down through storms e.g. in the 1940 ties (Bombosch 1954). These events resulted in outbreaks of bark beetles living on spruce (Wellenstein 1954) and the last gradation was registered after the storms in the winter of 1990 (Sperber 1990). At that time about 60 million m^3 of wood were blown down in Germany during a few nights. Since that time the fauna of dead wood of spruce and of beech was monitored quantitatively. The aims of this study were: to compare the different arthropod fauna on spruce and beech on areas which are representative for the present situation in German forests; to show the change of the arthropod fauna during the degradation of dead wood in time; to show possible interactions of the arthropod fauna.

Materials and methods

The investigations were carried out in forests near Marburg, Germany (50°48'N, 8°48'E). The first stand was a planted pure spruce stand (*Picea abies*) of about 88 years in 1990 at 320m a.s.l. During heavy storms in the winter of 1990 this stand was blown down nearly complete as many other pure spruce stands in Germany (Sperber 1990).

The second stand was a mixed beech-oak stand (*Fagus sylvatica, Quercus robur*) within about 15 km distance. This stand was 145 years of age in 1990, at 350 m a.s.l., and is part of a nature reserve without further management. During the heavy storms of 1990 single beeches and groups up to ten trunks were fallen creating single treefall gaps up to small openings in the closed canopy. The study sides were already described in more detail (Nicolai 1995a). In both stands further trunks were blown down during the winters at 1991/92 and 1992/93. In the years 1991-1995 bark eclectors were placed on 19 different fallen spruce trunks and on 21 different beech trunks in the study areas described. In total 30 bark eclectors were used to collect the emerging Scolytidae and other arthropod species out of the trunks. The bark eclectors contain of dark cages made out of dark plastic material with an area of 800 or 1000 cm^2. They are fixed on the bark surface of the trunks and chinks were carefully filled using black silikon. Arthropods emerging out of this darkened surface of the trunks were collected in white plastic boxes which are the only source of light into the dark cages. This gives quantitative data on the emerging arthropods per area of a fallen trunk. All bark eclectors were controlled once per week during the summers of 1991-1995 and monthly during the winters. All emerged arthropods were collected, counted, and identified in the laboratory. The method was described in more detail by Nicolai (1995b). Statistics follow Mühlenberg (1993).

Results

Tab. 1 presents the dominant fauna which emerged out of the spruce trunks during 1991-1995 (>5 % of all collected arthropods during one year at least) (n=30707). The bark beetles *Ips typographus, Pityogenes chalcographus, Xyloterus lineatus* and *Crypturgus hispidulus* and additionally mites, springtails,

Tab. 1. The dominant fauna (%, >5 % of all collected) emerged out of dead spruce trunks 1991-1995 (n =30.707).

	1991	1992	1993	1994	1995
Acari (excl. Oribatei)	7.4	4.2	1.3	10.4	2.5
Oribatei	5.8	5.6	7.8	1.8	10.3
Collembola	12.9	44.5	38.9	21.2	67.8
Ips typographus	3.1	1.4	1.2	24.7	0.9
Pityogenes chalcographus	36.3	6.8	7.0	4.2	0
Xyloterus lineatus	7.5	0	0.04	0	0
Crypturgus hispidulus	0.9	21.2	29.0	34.0	13.8
Sciaridae	12.8	9.1	4.0	0.2	0
Sum (%)	86.7	92.8	89.24	96.5	95.3
area (m^2)	9000	12600	12600	11800	8200
n (of all)	5984	12443	2400	7126	2754
n/m^2	6648.8	9875.4	1904.7	6038.9	3358.5

and sciarid flies made the dominant fauna which emerged out of the spruce trunks with high percentage values. In total these groups made more than 86 % of the total collected fauna in each year. During the years the percentage values of *P. chalcographus*, *X. lineatus* and *I. typographus* decreased, and the values of *C. hispidulus* increased up to 1994 and decreased again 1995. The calculated emerge rate per m^2 of spruce trunks were 1904.7 up to 9875.4 animals per m^2 and per year (Tab. 1). Tab. 2 presents the dominant fauna which emerged out of the beech trunks during 1991-1995 (>5 % of all collected arthtropods during one year at least) (n=11784). The bark beetles *Taphrorychus bicolor* and *Xyloterus domesticus* and additionally mites, springtailes, *Pityophagus ferrugineus* (Col, Nitidulidae), *Lymexylon navale* (Col., Lymexylonidae), sciarid flies and ants made the dominant fauna which emerged out of the beech trunks with high percentage values. In total these groups made more than 74 % of the total collected fauna in each year. During the years the percentage values of *T. bicolor* decreased, *P. ferrugineus* had high percentage values 1994, and *L. navale* reaches >5 % in 1995 for the first time. The calculated emerge rate per m^2 of beech trunks were 690.0 up to 2372.4 animals per m^2 and year (Tab. 2), which is significant lower than that found on spruce trunks (Tab. 1) (Mann-Whitney U-test, $p<0.001$).

The mean values of bark beetles emerged per m^2 and per year out of spruce trunks, and of *Medetera dendrobaena* show Fig. 1. High numbers of *Pityogenes chalcographus* emerged during the first two years after the trunks were blown down and their numbers decreased during the following years (Fig. 1a). With the exception of 1994 the numbers for *Ips typographus* emerged out of spruce trunks show a similar trend. 1993 further trunks were fallen which were intensively used by this species in 1994 and very high numbers of offsprings were produced (Fig. 1b).

With a delay of one year the third bark beetle species *Crypturgus hispidulus* settled the spruce trunks and produced high numbers of offsprings during the following years (Fig. 1c).

On spruce *Medetera dendrobaena* (Dipt., Dolichopodidae) was the only natural enemy which could be found in high numbers. During the first three years 80-90 individuals emerged in mean per m^2 of spruce and per year. The numbers decreased in the following years (Fig. 1d).

The mean values of bark beetles and their natural enemies emerged out of beech trunks show Fig. 2. Two years after the beech trunks were fallen *Taphrorychus bicolor* produced the highest emerging rates per m^2 of beech trunks. They again decreased during the following years (Fig. 2a).

As on spruce trunks *Medetera dendrobaena* was found on beech trunks as well, but in much lower densities. The population increased up to 1993 (one year later as the peak values of *Taphrorychus bicolor*) and decreased again during the following years (Fig. 2b)

On beech trunks two more natural enemies of bark beetles were found since 1992. They did not occur in the first year after the trunks were fallen. With a delay of one year and similar to *Medetera dendrobaena Pityophagus feurugineus* (Col, Nitidulidae) built up his population until it reached 1994 a peak density and decreased again 1995 (Fig. 2c). *Lonchaea seitneri* (Dipt., Lonchaeidae) firstly emerged 1992 out of beech trunks and showed 1994 peak densities which decreased again 1995 (Fig. 2d). These three natural enemies all prey on *T. bicolor* but not on *Xyloterus domesticus.*

The relation prey (bark beetles emerged per m^2 and per year) to predators (natural enemies

Tab. 2. The dominant fauna (%, >5 % of all collected) emerged out of dead beech trunks 1991-1995 (n =11784).

	1991	1992	1993	1994	1995
Acari (excl. Oribatei)	5.1	1.9	0.8	11.9	10.0
Oribatei	15.7	6.8	30.9	15.4	5.4
Collembola	22.5	37.6	33.1	23.5	38.4
Taphrorychus bicolor	36.5	24.1	6.9	1.1	0
Xyloterus domesticus	3.1	18.5	8.6	4.2	8.9
Pityophagus ferrugineus	0	2.5	3.4	12.7	3.6
Lymexylon navale	0	0.1	0.2	0.2	6.1
Sciaridae	0	0.5	4.4	10.6	1.6
Formicidae	0	0	0.05	8.9	0.5
Sum (%)	82.9	92.0	88.35	88.5	74.5
area (m^2)	9000	10800	13800	13800	11000
n (of all)	621	2902	3274	2811	2176
n/m^2	690.0	2687.0	2372.4	2036.9	1978.1

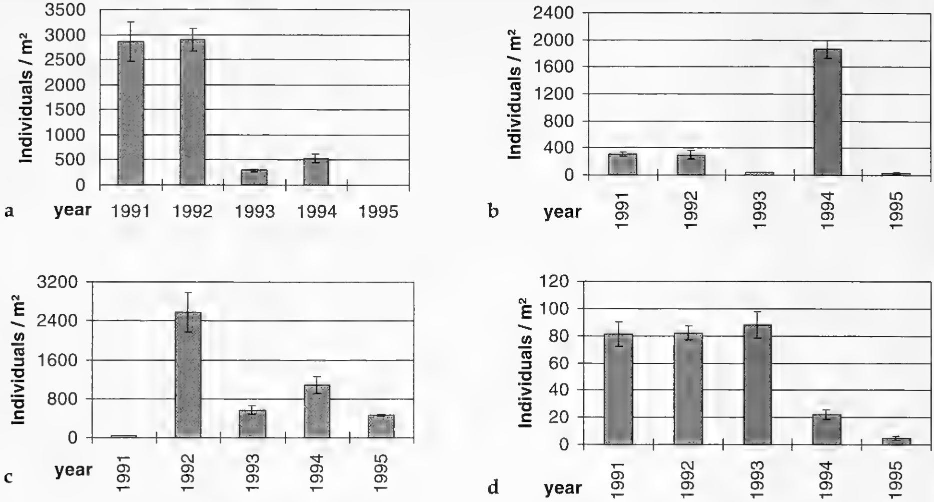

Fig. 1. Numbers of individuals (n/m² and s.d.) emerged out of spruce trunks during the years 1991-1995. **a.** *Pityogenes chalcographus* (Col., Scolytidae). **b.** *Ips typographus* (Col., Scolytidae). **c.** *Crypturgus hispidulus* (Col., Scolytidae). **d.** *Medetera dendrobaena* (Dipt., Dolichopodidae).

emerged per m² and per year) may be calculated. This relation decreased on beech trunks during the period of investigation (Fig. 3b). On spruce much more bark beetles were present per m² and the relation had significantly higher values (Mann-Whitney U-test, $p < 0.001$) and reaches highest values 1994 when there was the high emerging rate of *Ips typographus* (Fig. 3a). Vice versa that means per bark beetle there are many more predators present on beech trunks than on planted spruce trunks. After 3-4 years of degradation of trunks in forests typically the bark fells of the trunks.

Tab. 3 presents the dominant fauna which emerged out of spruce trunks with and without bark on the trunks in 1995. A similar fauna was found and on debarked trunks Empididae (Dipt.) were common. In total on debarked spruce trunks fewer arthropods were found than on trunks with bark (Mann-Whitney U- test, $p < 0.001$).

Tab. 4 presents the dominant fauna which emerged out of beech trunks with and without bark on the trunks in 1995. A deep change in the dominant faunal composition can bee seen and the occurence of species on debarked trunks, which did not settle trunks with attatched bark, e.g. Isopoda, Chironomidae (Dipt.), Sciaridae (Dipt.). As on spruce trunks fewer arthropods were found on debarked beech trunks than on beech trunks with intact bark (Mann-Whitney U-test, $p < 0.001$).

The dipteran fauna composition of dead trunks of spruce and beech may be compared as an example for the diversity found on the trunks. All Diptera were determined on the level of families and

Tab. 3. The dominant fauna (%, >5 % of all) emerged out of dead spruce trunks with and without bark on the trunks 1995.

	without bark	with bark
Oribatei	12.7	10.3
Collembola	68.7	67.8
Crypturgus hispidulus	0	13.8
Empididae	8.0	0
Sum (%)	89.4	91.9
area (m²)	2600	8200
n (of all)	173	2754
n/m²	665.3	3358.5

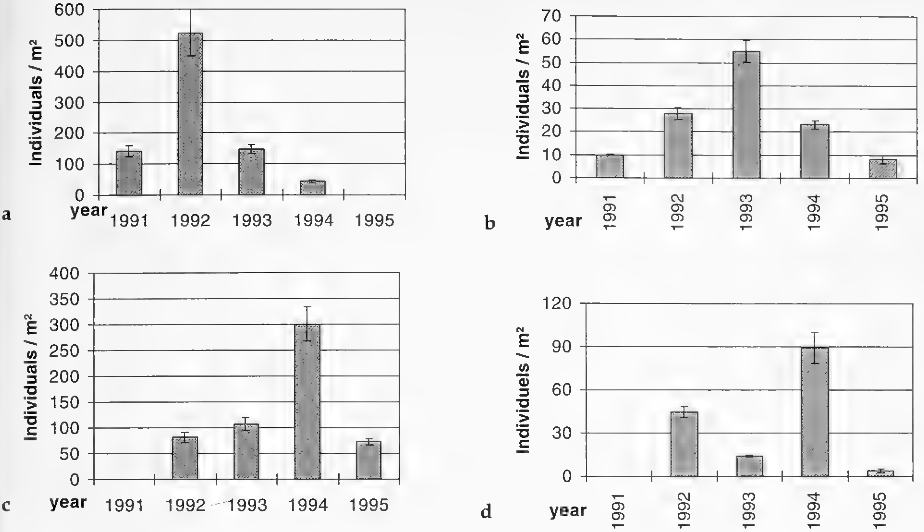

Fig. 2. Numbers of individuals (n/m² and s.d.) emerged out of beech trunks during the years 1991-1995. **a.** *Taphrorychus bicolor* (Col., Scolytidae). **b.** *Medetera dendrobaena* (Dipt., Dolichopodidae). **c.** *Pityophagus ferrugineus* (Col., Nitidulidae). **d.** *Lonchaea seitneri* (Dipt., Lonchaiedae).

on beech 24 different families were found (Tab. 5). With one exeption (Bibionidae) some of them settle spruce trunks as well, but only 13 different families of Diptera were found there. That means a poverished fauna lives on trunks of spruce compared to the fauna on trunks of beech.

Discussion

The study sites consist of a beech forest and of a spruce forest at similar elevations. Those stands are typical for the forests in Germany and in central Europe (Bick 1993). Therefore the fauna of decaying wood is comparable, and represents the present situation in German forests. The method used in this study has several advantages: the wood remains in the forests and is not destroyed; the animals captured alive can be released, if identified and counted in the field; quantitative data of emerged

Tab. 4. The dominant fauna (%) emerged out of dead beech trunks with and without bark on the trunks 1995.

	without bark	with bark
Isopoda	4.6	0
Acari (excl. Oribatei)	0	10.0
Oribatei	0	5.4
Collembola	6.0	38.4
Xyloterus domesticus	0	8.9
Pityophagus ferrugineus	5.3	0
Lymexylon navale	14.6	6.1
Chironomidae	10.0	0
Sciaridae	16.6	0
Sum (%)	57.1	68.8
area (m²)	2800	11000
n (of all)	150	2176
n/m²	535.7	1978.1

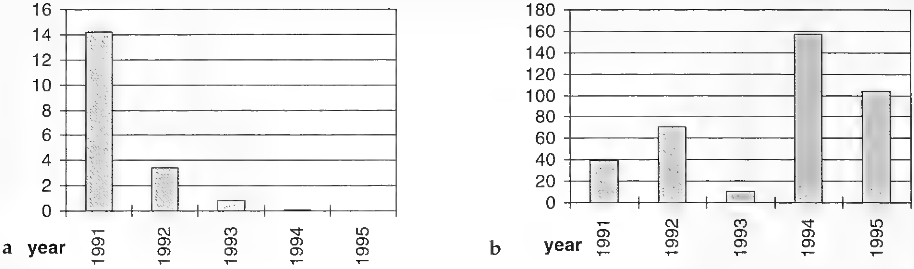

Fig. 3. The relation prey (bark beetles emerged per m² and per year) per predator (species which feed on bark beetles emerged per m² year) on dead trunks of beech (**a**) and of spruce (**b**) during the years 1991-1995.

arthropods per m² of wood are achieved. Bark beetles living on spruce at low elevations have two generations per year (Nicolai 1996) and their ability to produce a high number of offsprings is well known (Postner 1974). If there is produced a high amount of dead spruce wood through any event in spruce plantations mass outbreaks of them can result and this happened several times in German forests during the last decades (Wellenstein 1954). Several methods have been tried to prevent such outbreaks, but no method is presently successful (Zierl 1996), and Vite (1989) described the European struggle to control e.g. *Ips typographus*. During the last years there have been several studies about the influence of bark bettle predators (Dippel 1994, Dippel et al. 1997, Heidger 1994, Nicolai 1995c). During outbreaks of bark beetles these predators are not able to control them mainly because of their feeding capacity and reduced ability to produce two generations per year (Nicolai 1996).

Tab. 5. The families of Diptera found on dead trunks of beech and spruce (1991-1995).

	beech	spruce
Ceratopogonidae	+	
Anisopodidae	+	
Chaoboridae	+	
Chironomidae	+	+
Cecidomyiidae	+	+
Sciaridae	+	+
Mycetophilidae	+	
Culicidae	+	
Psychodidae	+	+
Bibionidae		+
Dolichopodidae	+	+
Empididae	+	+
Phoridae	+	+
Milichiidae	+	+
Lonchaeidae	+	+
Chloropidae	+	
Heleomyzidae	+	+
Aulacigastridae	+	
Chamaemyidae	+	
Pallopteridae	+	
Sphaeroceridae	+	
Periscelidae	+	+
Odiniidae	+	
Platypezidae	+	
Muscidae	+	+
Sum: 25	24	13

Due to the potential of bark beetles living on spruce at low elevation to produce high numbers of offsprings, even in this study high numbers per m^2 of spruce emerged during the first years. After the spruce trunks are settled by bark beetles other organisms are able to settle them as well. Therefore they may be seen as pioneer species and as key species for the breakdown of coarse wood in forest ecosystems. In Norwegian spruce forests Bakke and Kvamme (1993) found 92 species of beetles, which were directly associated with the occurrence of *I. typographus* on spruce trunks. On the other hand this study showed, that only a small fraction of the dipteran fauna was found compared with that found on beech wood at similar elevations.

At my study sites spruce was introduced by man about 100 years ago and comparably few species settled spruce trunks but in high numbers. This corresponds well with the results of Southwood et al. (1982) about insects living on introduced trees.

In main parts of Germany beech forests are the typical natural occurring forest types (Ellenberg 1986). Decaying trunks of beech are settled by different bark beetles and *Taphrorychus bicolor* was found to play an important role. However, this species was never found in such high numbers per m^2 of wood than any bark beetle living on spruce. On the other hand much more different families of flies inhabited decaying wood of beech giving an impression of loss of species diversity through planting of spruce on large areas.

In virgin forests bark beetles are the first colonizers of dead wood and are responsible for the initiation of the decomposition of the trunks. They use their habitat of freshly fallen trunks for one up to three years to produce off springs. The wood is settled by other organisms later. On the other hand that means suitable habitats for the first colonizers of dead trunks must be produced in the forest ecosystem within a time of three years and within a space smaller than the maximum distance the bark beetles are able to fly.

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25. Muirhead-Thomson, R. C.: Trap Responses of Flying Insects. The Influence of Trap Design on Capture Efficiency. – Academic Press, London, 1991. 287 pp.

Insect trapping is a basic field research tool for many entomologists. Over the years a great variety of treaps have been developed to suit particular species, habitats, and research requirements. In this volume a broad review of insect traps with a great variety of methods is given: light traps, suction traps, peromone-based and sex lure traps, animal-baited traps, carrion traps and many others. The various methods are compared, informative diagrams show the different patterns of response (quality and quantity). The analysis of flight response with respect to factors such as lunar cycles, sex ratio, wind and so forth is also very interesting. Unfortunately, however, the works reviewed come almost exclusively from the English language literature, and important works in other languages have been overlooked. This volume is of great interest to all those who plan a trapping programme or who have to develop methods and need to understand the interaction between the design of the traps and the specific behavior of the insects involved. K. Schönitzer & A. Hausmann

26. Vermeij, G. J.: A natural history of shells. – Princeton University Press, New Jersey, 1993. 207 pp. ISBN 0-691-00167-7.

The shell is one of the most interesting and frequently studied aspects of a mollusc. Recently there have been advances in the understanding of how shell form relates to both function and evolutionary history. Geerat Vermeij is one of the leaders in this field, and has published numerous papers on evolution of molluscs and the role of historical biogeography in the present day distributions of these animals.

This book is divided into three parts. Part I, 'The rules of shell construction', deals with the geometry of shells and the economics of having a shell. Theoretically possible shell-shapes are described and constraints on shell-shape in the real world are discussed. Part II, 'Life in a dangerous world', covers the environmental conditions that shells face in habitats from rocky shores to sandy and muddy sediments, and shell adaptations in these environments, as well as the role of predation on the evolution of shells. Part III, 'The dimension of time', shows how historical biogeography is important in understanding the present day distributions of shell traits and how they evolved, and covers both tropical and temperate / polar regions.

This book is a very well written and readable account of molluscan shells and will be of interest to both the professional malacologist and amateur collector alike. It would provide also an excellent introduction for students to the concepts of adaptation and evolution in the Mollusca. S. Ridgway

27. Schuh, R. T. & J. A. Slater: True Bugs of the World (Hemiptera: Heteroptera). Classification and Natural History. – Comstock Publishing Associates, Cornell Univ. Press, Ithaca & London, 1995. 337 pp., many figs. ISBN 0-8014-2066-0.

The Heteroptera, or true bugs, are the largest and most diverse group of hemimetabolous insects. Their structural and biological diversity is enormous. This volume provides a general summary of what is currently known about these interresting insects. The first chapters contain a general outline of the morphology and biology of heteroptera, as well as reviews on the major workers, techniqies, attributes of general biological interest, and of economic importance. Furthermore this book represents a synthesis of the current classification of the Heteroptera, which will certainly be a standard for many years. The book contains valuable keys, diagnoses and general natural history information of all Herteroptera to the subfamily and partly to the tribal level. The book contains numerous figures, both to show the habitus of the bugs or their morphological details. Especially helpful are the many scanning electron micrographs. The extensively cited literature is a key to find further information. This volume can highly be recommended to all who are interrested in bugs. K. Schönitzer

28. Otte, D.: Orthoptera Species File, 2 Grasshoppers (Acridomorpha) A, Eumastacoidea, Trigonopterygoidea, Pneumoroidea. – The Orthopterists' Society & The Academy of Natural Sciences of Philadelphia, Philadelphia, 1994. 162 pp. ISBN 0-9640101-3-5.

This catalogue constitutes the second volume of the Orthoptera Species File and is the first part of the systematic catalog to the world's grasshopper species. It includes all described species in the three superfamilies Eumastacoidea (Eumastacidae, Proscopiidae), Trigonopterygoidea, and the Pneumoroidea (Pneumoridae, Xyronotidae, and Tanaoceridae) with relevant bibliographic references. As far as possible this volume contains also data on types and their deposition. This catalogue will certainly be of great help to scientists working with Orthoptera.

K. Schönitzer

29. Ben-Dov, Y.: A Systematic Catalogue of the Mealybugs of the World (Insecta: Homoptera: Coccoidea). – Intercept Ltd., Andover, 1994. 686 pp. ISBN 1-898298-07-6.

This catalogue of the mealybugs (auf deutsch "Schmier- oder Wolläuse") of the world lists almost 2000 species and subspecies which have been described since Linnè. The mealybugs are terrestrial, plant-feeding insects that constitute the two families Pseudococcidae and Putoidae, among the 16 to 20 families of Coccoidea. This catalogue presents for all taxa mentioned extensive data on taxonomy, nomenclature, deposits of type-series, synonyms, geographical distribution, host plants, biology and economic importance. Several new combinations and new names are given. The catalogue also contains discussion on suprageneric groups in the families and provides biographical data on deceased coccidologists. Indices to genera and specie are given.

K. Schönitzer

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Redescription and systematic discussion of *Amphiporus heterophthalmus* (Schmarda, 1859)

(Nemertea, Hoplonemertea, Monostilifera)

Wolfgang Senz

Senz, W. (1997): Redescription and systematic discussion of *Amphiporus heterophthalmus* (Schmarda, 1859) (Nemertea, Hoplonemertea, Monostilifera). – Spixiana **20/3:** 193-198

The type material of *Amphiporus heterophthalmus* (Schmarda, 1859) is redescribed and illustrated. A reassessment of the classificatory status of the species indicates that *Amphiporus heterophthalmus* (Schmarda, 1859) should be transferred to the genus *Ischyronemertes* Gibson, 1990 as *I. heterophthalma* (Schmarda, 1859), comb. nov.

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Introduction

Schmarda (1859) described 17 new nemertean species. Since then only three of these species, *Emplectonema ophiocephala* (Schmarda, 1859), *Lineopsella trilineata* (Schmarda, 1859) and *Lineus atrocaeruleus* (Schmarda, 1859), became redescribed (see Wheeler 1934, Sánchez & Moretto 1984, Senz 1996a). Redescriptions of *Borlasia bilineata* Schmarda, 1859, *Lineus collaris* (Schmarda, 1859) and *Lineus schmardai* (Bürger, 1904) (= *Meckelia striata* Schmarda, 1859) will be provided by the author in a separate paper. The internal morphology of the remaining species remains unknown. Hence, from a modern point of view, these species cannot be classified in a satisfying way. In the present paper one of these species, *Amphiporus heterophthalmus* (Schmarda, 1859), is redescribed based on the type material.

Material and methods

The study is based on three complete specimens and the anterior fragments of two additional specimens. One of the complete specimens was fully sectioned, but only the anterior region of one of the other complete specimens was examined. The anterior fragments were completely sectioned. One of these fragments was longitudinally sectioned. The remaining series of sections are transverse sections. The material was embedded in 56° m.p., sectioned at 10 µm and stained by the Kernechtrot Pikroindigokarmin method.

Ischyronemertes heterophthalma (Schmarda, 1859), comb. nov.

Material examined: The study is based upon the syntypes deposited in the Naturhistorisches Museum in Wien: NHMW-EV 5179/3559, NHMW-EV 3560, NHMW-EV 3561, NHMW-EV 2562, NHMW-EV 16710.

External appearance. See Systematic discussion for original description by Schmarda (1859).

Body wall. The epidermis shows a typical hoplonemertean construction. Below it the dermis forms a well developed layer.

The body wall musculature is well developed, with outer circular, diagonal, longitudinal and inner circular muscle layer (Figs 1-4). The outer circular layer is as thick as the dermis. The diagonal musculature is a delicate layer. The longitudinal muscle layer is nowhere split. In front of the brain the major part of the longitudinal muscle layer bends inward to form the precerebral septum and the roots of the cephalic retractor muscles (Fig. 7). The remaining part of the longitudinal muscle layer reaches near the tip of the head as a thin layer. In the brain area and stomach area the inner circular muscle layer is well developed, forming a ventral and a dorsal plate, laterally interconnected by a meshwork of muscle fibres (Figs 1, 2). Several of these fibres correspond to dorsoventral muscles. The same arrangement occurs in the remaining foregut area and in the midgut area, although the inner circular muscle plates become incomplete and the dorsoventral muscles become well developed (Fig. 3).

Next to the rhynchocoel wall the inner circular muscle layer and the dorsoventral muscles cannot be separated from the rhynchocoelic circular musculature (Fig. 5; see also Systematic discussion).

Alimentary tract. The tubular oesophagus opens from the rhynchodaeum in the middle of the preseptal area. Its non-ciliary epithelium contains mucous cells. Behind the ventral commissure of the brain the oesophagus widens into the voluminous stomach. The stomach possesses deeply folded walls (Fig. 1). The stomach epithelium has a uniform construction throughout. Posteriorly the stomach continuously transforms into the long pylorus (Fig. 3). Some longitudinal muscle fibres lie adjacent to the oesophagus, stomach and anterior most part of the pyloric tube. In the postseptal area, the foregut is lined by dorsoventral muscles. Partly, these muscles are modified, forming an incomplete, weakly developed foregut circular musculature.

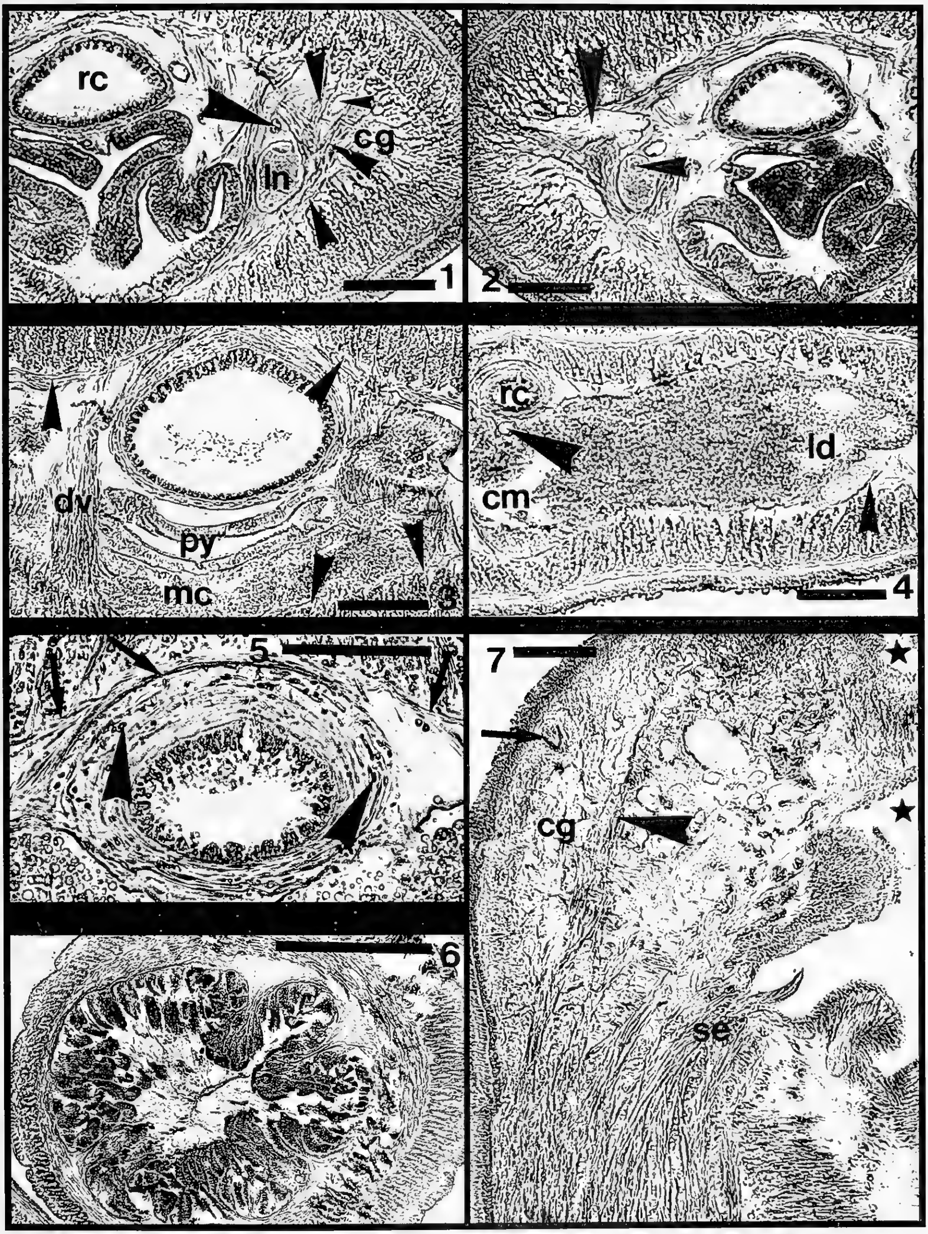
Posteriorly the pylorus opens into the dorsal wall of the midgut (Fig. 3). Hence a midgut caecum is formed. It is restricted to the posterior quarter of the pyloric area. The caecum ends in a long pair of terminal diverticula. These reach forwards into the stomach area, without reaching the brain. Lateral diverticula are absent. The lateral wall of the midgut caecum and the terminal diverticula is folded. These folds are associated with dorsoventral muscles. The main intestinal canal possesses deep lateral diverticula (Fig. 4).

Proboscis apparatus. The subterminal proboscis pore leads into a thin-walled rhynchodaeum the epithelium of which is neither ciliated nor glandular. Anteriorly to the oesophageal opening the rhynchodaeum is lined by an extremely delicate circular musculature. Behind the oesophageal opening this musculature becomes stronger. In front of the proboscis insertion it forms a muscular sphincter. The precerebral septum is closed. Several muscle fibres belonging to the septum extend anteriorly into the posterior preseptal area, forming a meshwork. This meshwork is traversed by the anterior most fibres of the inner circular muscle layer of the body wall.

The rhynchocoel extends backwards into the posterior half of the body, but does not reach the posterior end of the body by far. The rhynchocoel wall consists of a circular and longitudinal muscle layer, separated by a delicate connective tissue layer. The circular muscle layer is intermingled with several longitudinal muscle fibres (Fig. 5). In the posterior part of the rhynchocoel these fibres are somewhat more abundant. Several of the circular muscle fibres, intermingled with longitudinal muscle fibres, belong to the inner circular muscle layer of the body wall (see also above and Systematic discussion). Diverticula of the rhynchocoel are not present.

The proboscis shows a typical monostiliferous construction (see Senz, 1993a, for the use of the term 'monostiliferous'). Its anterior area, about 0.7 mm in overall diameter, contains three muscle layers (outer and inner circular, middle longitudinal) and about 20 proboscis nerves (Fig. 6). The middle part of the proboscis consists of the stylet apparatus bearing part and the muscle bulbus, both separated by the diaphragm. The armature consists of a single stylet (shape: nail-like; surface: smooth; length:

Figs 1-7. *Ischyronemertes heterophthalma* (Schmarda, 1859), comb. nov. **1.** Transverse section through the anterior stomach area; scale: 0.2 mm; cg: cephalic gland, ln: lateral nerve cord, rc: rhynchocoel, st: stomach, small arrow head: excretory tube, middle arrow heads: lateral meshwork of the inner circular musculature of the body wall, large arrows: vascular vessel. **2.** Transverse section through the posterior stomach area; scale: 0.2 mm; small arrow head: accessory nerve of the lateral nerve cord, large arrow head: cephalic gland lobe. **3.** Transverse section through the pyloric area; scale: 0.2 mm; dv: dorsoventral muscle, mc: midgut caecum, py: pylorus, arrow heads: inner circular muscle layer of the body wall. **4.** Transverse section through the midgut area; scale: 0.2 mm; cm: central canal of the midgut, ld: lateral diverticulum of the midgut, rc: rhynchocoel, small arrow head:



inner circular muscle layer, large arrow head: dorsal vascular vessel. **5.** Transverse section through the rhynchocoel; scale: 0.1 mm; arrow heads: longitudinal muscle fibres intermingled with the circular musculature enveloping the rhynchocoel wall, arrows: inner circular muscle layer of the body wall. **6.** Transverse section through the anterior part of the proboscis; scale: 0.2 mm. **7.** Longitudinal section through the anterior end of the body; scale: 0.2 mm; cg: cephalic gland, se: septum, asterix: rhynhodaeal tube, arrow: ocellus, arrow head: cephalic retractor muscle.

±125 µm). It is mounted on a slightly conical basis (length: ±80 µm; diameter at the anterior end: ±30 µm; diameter at the posterior end: ±37 µm). Two reserve stylet pouches are present. The posterior part of the proboscis is longer than the anterior one and posteriorly connected to a retractor muscle.

Zentralraum-organisation and mesenchymate tissue. An open 'Zentralraum' is present, associated with voluminous ledges in the midgut area (for terminology see Senz 1995). In the stomach area the lateral meshwork of the inner circular muscle layer fibres is embedded in well developed amounts of mesenchymate tissue (Figs 1-3). In the midgut area considerable amounts of mesenchymate tissue are present in the lateral area of the ledges only.

Nervous system. The brain is enveloped by a thick outer neurilemma. The inner neurilemma is absent. In front of the commissures each half of the brain contains a fibrous core, dorsally, laterally and ventrally enveloped by ganglionic cells. Posteriorly the fibrous core enlarges, forming the thick ventral commissure. The dorsal commissure is much thinner than the ventral commissure. Behind the commissures the dorsal and ventral brain lobes start separating from each other. Just before separation is finished, a thin nerve leaves the dorsal lobe and enters the ventral one. In the lateral nerve cord, this nerve becomes the accessory nerve (Fig. 2). It is restricted to the foregut area (extending into the anterior most part of the midgut area). The lateral nerve cords have a posterior origin from the ventral brain lobes. They possess neither an inner neurilemma nor neurochords but contain side stem muscle fibres. The lateral nerve cords lie proximally to the inner circular muscle layer (Figs 1, 2, 4).

Sense organs. The ocelli show a regular pigment cup construction (Fig. 7) (for arrangement see below).The cerebral organs have a typical monostiliferous organisation and lie well in front of the precerebral septum (position somewhat variable due to contraction). The cerebral organ proper is enveloped by a delicate connective tissue layer only. Hence the shape of the organ also depends on the degree of contraction. However, the glandular part dominates in the anterior area of the organ, the ganglionic part in the posterior area. The short canals of the cerebral organs open into oblique epidermal furrows.

Cephalic gland, cephalic musculature and frontal organ. The frontal organ is a small pit opening into the dorsal wall of the rhynchodaeum, near its opening to the exterior.

The cephalic gland, it consists of typical basophilic lobules, is by far the dominating organ in the preseptal area. Behind the septum it extends to the posterior end of the foregut in a lateral position (Figs 1, 2). Typically the postseptal part of the cephalic gland lies distally to the lateral meshwork of the inner circular muscle layer. Exceptionally it extends proximal of this meshwork (Fig. 2).

In the preseptal area the lobules of the cephalic gland are intermingled with the anterior cephalic musculature. This musculature is a derivative of the body wall and rhynchodaeal musculature (see Senz 1993b). Several of its fibres form an incomplete circular musculature enveloping the proximal part of the cephalic gland and the rhynchodaeum. Occasionally this musculature is in direct contact with the rhynchodaeal circular musculature proper.

Vascular apparatus. The vascular apparatus has a typical monostiliferous construction. Characters of particular interest are: no extra cerebral vessels are present; the mid-dorsal vessel emerges from the right lateral vessel and lacks a vascular plug; numerous valves are present; throughout the midgut area there are commissures between the longitudinal vessels. In the foregut area the lateral vessels lie proximally to or within the lateral meshwork of the inner circular muscle layer (Figs 1, 2).

Excretory apparatus. The excretory apparatus extends from immediately behind the brain to the posterior end of the foregut area. Most of the collecting tubules lie distally to the lateral meshwork of the inner circular muscle layer (Fig. 1). They show no regional differentiation (diameter somewhat variable). The single pair of efferent ducts lies in the stomach area. The nephridiopores have a dorsolateral position.

Reproductive apparatus. One of the specimens examined histologically is a male. The testes are small and no gonoducts are present. They are distributed dorsally, laterally and ventrally to the lateral midgut diverticula. The anterior most gonads occur in the posterior foregut area. The remaining specimens examined histologically contain small immature gonads (distribution as in the male). Their sex could not be determined.

Systematic discussion

Original description by Schmarda (1859: 41): '*Ommatoplea heterophthalma*. Schmarda. Char.: Corpus depressum teniaeforme. Linea mediana alba. Caput indistinctum, apice acuminatum. Oculi in lineis transversis. Der abgeplattete, fast bandförmige Körper ändert seine Form nur wenig. Seine Farbe ist roth mit einer weissen Rückenlinie. Der Bauch ist blassroth. Seine Länge 60 mm, Breite 4 mm. An dem zugespitzten Kopftheile stehen zwei Augen und in einiger Entfernung rückwärts sieben in einer Längslinie, hinter welcher drei in Form eines Dreiecks stehen. Die Oeffnung des Rüssels ist terminal. Dieser ist seiner ganzen Länge nach mit nesselförmigen Organen bedeckt. Die Stilette haben die Form einer Lanzette mit lang ausgezogener Spitze. Stiller Ocean, unter Steinen bei Auckland an der Küste von Neu-Seeland.'

All references to this species, published in the mean time, depend on the information provided by Schmarda (1859). Bürger (1895: 27) notices: '[*Ommatoplea*] *heterophthalma* Schm. Neuseeland stellt eine Metanemertine vor (*Amphiporus* oder *Eunemertes* [=*Emplectonema* Stimpson, 1857])'. However, in 1904 Bürger interprets *O. heterophthalma* as a valid species of *Amphiporus* Ehrenberg, 1831. Gibson & Crandall (1989: 459) designate *Amphiporus heterophthalmus* as a *nomen dubium* and notice: 'A strikingly marked species, *A. heterophthalmus* remains poorly characterised morphologically'.

So far no valid diagnosis of *Amphiporus* can be provided (see Gibson & Crandall 1989). But, the following character combination, present in *A. heterophthalmus*, indicates that this species cannot be incorporated within *Amphiporus* (see Friedrich 1955 and Gibson 1982 for *Amphiporus*): inner circular muscle layer of the body wall well developed; midgut caecum short and provided with long terminal diverticula; mid-dorsal vessel without vascular plug; rhynchocoel does not reach the posterior end of the body; lateral nerve cord with anterior accessory nerve; cephalic gland reaching to the posterior end of the foregut. The only described hoplonemertean genus provided with this character combination is *Ischyronemertes* Gibson, 1990 (see Gibson 1990). The diagnosis of this genus is in accordance with the here provided description of *A. heterophthalmus*, despite of the characters: length of the rhynchocoel; structure of the rhynchocoel wall musculature; vascular apparatus provided with commissures in the midgut area.

According to Gibson (1990) in *Ischyronemertes* the rhynchocoel is restricted to the anterior half of the body. In *A. heterophthalmus* the rhynchocoel extends into the posterior half of the body but without reaching the posterior end of the body by far. In several hoplonemertean genera the rhynchocoel reaches to the posterior tip of the body (Friedrich 1955).

In *Ischyronemertes* the rhynchocoel wall musculature consists of two separate muscle layers (longitudinal and circular) (Gibson 1990). In *A. heterophthalmus* longitudinal muscle fibres are intermingled with the circular musculature enveloping the rhynchocoel. It remains open to question, whether these muscle fibres actually belong to the longitudinal musculature of the rhynchocoel wall. First, there is a well demarcated longitudinal muscle layer next to the endothelium of the rhynchocoel wall. Second, the discussed longitudinal muscle fibres are intermingled with the inner circular musculature of the body wall adjacent to the rhynchocoel wall as well. It is worth noting that a well developed inner circular body wall muscle layer, as present in *A. heterophthalmus* and *Ischyronemertes*, is an unusual

Tab. 1. Characters that can be used to distinguish the known species of *Ischyronemertes* Gibson, 1990.

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Ischyronemertes albanyensis	–	–	–	d	++	p	d	–	–	ar	*a*
Ischyronemertes erythrophleps	+	+	–	vl	++	p	v	–	–	ar	*a*
Ischyronemertes tetrophthalma	+	–	+	d	+	a	v	–	–	ar	*a*
Ischyronemertes heterophthalma	+	+	+	vl	–	a	d	+	+	au	*b, c*

I oesophagus with (+) or without gland cells (-); **II** stomach epithelium regionally differentiated (+) or with uniform construction throughout (0); **III** stomach walls deeply folded (+) or little folded (0); **IV** cephalic gland lobules pass brain dorsally (d), laterally (v) or ventrally (l); **V** ocelli in four groups (++), four separate ocelli forming corner of trapezium (+) or arranged in another way (–); **VI** glandular component of cerebral sensory organs predominantly anterior (a) or posterior (p); **VII** nephridiopores dorsolateral (d) or ventrolateral (v); **VIII** vascular apparatus with (+) or without valves (–); **IX** foregut with (+) or without longitudinal muscle fibres (–); **X** distribution: Albany region (Western Autralia) (ar), Aukland (New-Zealand) (au); **XI** reference: *a* Gibson (1990), *b* Schmarda (1859), *c* this paper.

character within Monostilifera. Due to this the whole complex of circular and longitudinal muscle fibres is somewhat enigmatic from a phylogenetic viewpoint.

Hence, the presence of the transverse commissures of the vascular apparatus is the only distinct difference between *A. heterophthalmus* and the diagnosis of *Ischyronemertes* by Gibson (1990). Summing up there are characters indicating that *A. heterophthalmus* should be transferred to *Ischyronemertes*, and characters seemingly contradicting this viewpoint.

Contemporary hoplonemertean classification provides no rules, allowing to solve this problem in an unequivocal way. This is because supraspecific hoplonemertean taxa are based on the existence of a unique combination of characters, a method unlikely to lead to monophyletic taxa (Sundberg, 1993, but see also Moore & Gibson 1993).

It is beyond the scope of the present paper to provide a meaningful starting point for systematisation. However, it has to be the aim of the present paper to classify *A. heterophthalmus* in a way that is commensurable with the remaining hoplonemertean classification. Because of this the character combination method is used, since it is the method dominating in hoplonemertean classification so far (see also Senz 1996b).

Due to this *A. heterophthalmus* is transferred to the genus *Ischyronemertes*. First, this is possible because of the above mentioned characters present in both taxa. Second, the modification of the diagnosis of *Ischyronemertes* (see above) triggered because of the incorporation of the redescribed species still allows to define this genus in a meaningful way, if compared to the diagnosis of the remaining hoplonemertean genera.

So far three *Ischyronemertes* species have been distinguished: *I. albanyensis* Gibson, 1990; *I. erythrophleps* Gibson, 1990; *I. tetrophthalma* Gibson, 1990. Tab. 1 summarises several of those characters (not discussed so far) separating *I. heterophthalma* from the remaining *Ischyronemertes* species.

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New and old species of Malaconothroidea from Europe

(Acari, Oribatida)

Gerd Weigmann

Weigmann, G. (1997): New and old species of Malaconothroidea from Europe (Acari, Oribatida). – Spixiana **20/3:** 199-218

The species *Trhypochthonius tectorum, T. nigricans, T. cladonicola* (Trhypochthoniidae), *Mucronothrus nasalis* (Mucronothridae) and *Trhypochthoniellus longisetus* (Trhypochthoniellidae) are redescribed. The description of *Trhypochthonius sphagnicola,* spec. nov. is presented, which is similar to *T. nigricans.* A new genus of Trhypochthoniidae, *Altrhypochthonius* Weigmann, 1997 has been established recently for *Trhypochthonius badius,* which is redescribed also. The european species *Trhypochthoniellus crassus, T. excavatus* and *T. trichosus* are regarded as junior synonyms to the typical form of *T. longisetus. T. setosus* is regarded as a special form without sensilli of *T. longisetus,* having an intrasubspecific taxonomical status: *T. longisetus* forma *setosus.* within a mixed population of both forms different intermediar and asymmetric specimens have been found.

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Introduction

The phylogenetic relations of the widely distributed genera *Trhypochthonius* and *Trhypochthoniellus* have not been cleared up in the last decades though van der Hammen (1956) "drew attention to the fact that studies of the genera *Trhypochthonius* and *Trhypochthoniellus* are still badly needed in order to arrive at a firmly defined diagnosis of the family" Trhypochthoniidae Willmann, 1931. Van der Hammen planned a revision of the genera but published some remarks on this item only (1956, 1959). Knülle (1957) clarified the relations between *Trhypochthonius, Trhypochthoniellus, Malaconothrus* and *Trimalaconothrus* and proposed three distinct families (Trhypochthoniidae, Trhypochthoniellidae and Malaconothridae), but subsequent taxonomists (cp. Gilarov & Krivolutsky 1975, Balogh & Mahunka 1983) did not follow him by leaving *Trhypochthonius, Trhypochthoniellus* and *Mucronothrus* in a single family Trhypochthoniidae (in this contribution I will deal with european genera only). Kunst (1971) established a new family Mucronothridae within his keys, without indicating it as new and without an explicite definition; this family has been ignored by subsequent authors. Main difficulties of a phylogenetic analysis resulted from insufficient descriptions of the type species (and others) of the mentioned genera, besides *Malaconothrus* and *Trimalaconothrus* (cp. Knülle 1957).

It is the main task of this contribution to present redescriptions of important european species, including the type species, of *Trhypochthonius, Trhypochthoniellus* and *Mucronothrus.* These revisions led to a new phylogenetic analysis on the families and the genera (Weigmann 1997a), a new genus (*Altrhypochthonius* Weigmann, 1997) and a new species (*Trhypochthonius sphagnicola,* spec. nov.).

The mentioned families have been included into the Crotonioidea (= Nothroidea auct.) by most of the taxonomists, but Haumann (1991) separated the Malaconothroidea (as "Trhypochthonioidea"), including the families and genera this paper deals with.

In the following descriptions the numbers of symmetric paired elements are mentioned for one side each (e.g. 6 genital setae = 6 setae on each genital plate).

Trhypochthonius Berlese, 1904

Tumidalvus Ewing, 1908
Trilohmannia Willmann, 1923

Type species: *Hypochthonius tectorum* Berlese, 1896

Diagnosis. Well developed bothridia near the lateral margins of prodorsum with well developed sensilli; exobothridial setae reduced or at most one pair vestigial; 15 pairs of notogastral setae, in most of the species bacilliform and ciliated (16th pair of setae (f_1) vestigial or missing); on genital plates with 6-18 genital setae in a median row each; 1 pair of anal setae, 3 pairs of adanal setae; subcapitulum stenarthric, with 1 pair of vestigial *m*-setae; nearly complete leg setation (e.g. setal and solenidial formula of genua of legs I-IV: 5(+1)-5(+1)-3(+1)-3(+0); tibia I with 2 solenidia, w_2 of tarsus I in median high position near w_1; legs tridactyl.

Trhypochthonius tectorum (Berlese, 1896)
Fig. 1

Hypochthonius tectorum Berlese, 1896
Nothrus tectorum: Warburton & Pearce (1905)
Trhypochthonius tectorum: Berlese (1904)

Descriptions. Willmann (1931), Balogh & Mahunka (1983), Seniczak (1992)
General characters. Total length 580-775 µm (greatest of the palaearctic species), cuticula brown. Prodorsum. Cuticula punctulated; prodorsal setae long (70 to >100 µm), strait, ciliated; lamellar setae the thickest, rostral setae the thinnest; without exobothridial setae; sensilli long, >70 µm with ciliated clavate head (Figs 1b, c).

Notogaster. 15 pairs of notogastral setae well developed, bacilliform and ciliated, f_1 vestigial; c_1, d_1, d_2 the shortest notogastral setae (>12 µm); all other dorsal notogastral setae long (about 50-80 µm); setae h_1 inserted much more backwards than h_2 and h_3, as also in other Malaconothroidea; cuticula coarsely granulated in posterior and lateral regions, in anterior region appearing netlike; with lateral carina from c_3 to about e_2; normal number and positions of lyrifissures; opisthosomal gland near f_2 (Fig. 1a).

Ventral region. Complete epimeral setal formula 3-1-3-3; notogaster builds a frame partly overfolding the genito-anal region, behind the anal plates the frame continuous as longitudinal folds, between which is a flat groove without the coarse structure of the notogaster (Fig. 1d). *Ps*-setae of medium length (20-60 µm, increasing length from ps_3 to ps_1). 10-11 pairs of genital setae (variability not studied!); 3 pairs of adanal setae, 1 pair of anal setae (one studied specimen with 2 *an* at one side only). Normal pattern of lyrifissures: *ips*, *iad*, *ian*.

Gnathosoma. Subcapitulum stenarthric, setae *h* and *a* long, 1 pair of vestigial setae *m*; rutellum atelebasic, palpal setation (solenidium in parenthesis): 0-1-1-2-9(+1), two pairs of setae on palp tarsus are eupathids. (very similar *T. sphagnicola*, spec. nov., cp. fig. 4a).

Legs. with the most complete setation within the superfamily (as *T. sphagnicola*, spec. nov., cp. fig. 5). The setation formulas of legs are (solenids additional given in parenthesis):

leg I: 1 – 6 – 5(+1) – 5(+2) – 16(+3)
leg II: 1 – 6/7 – 5(+1) – 5(+1) – 13(+2)
leg III: 2 – 4 – 3(+1) – 3(+1) – 12
leg IV: 1 – 2 – 3 – 3(+1) – 12

Knülle (1957: 149) reports, that often F II has only 6 setae. The legs are tridactylous.

Discussion. *T. tectorum* seems to be variable in respect of total length. Balogh & Mahunka (1983) give the range of 660-775 µm; own material from Northern Germany and studied material from Austria (leg. H. Schatz) include some smaller specimens (580, 615, 635, 640 µm).

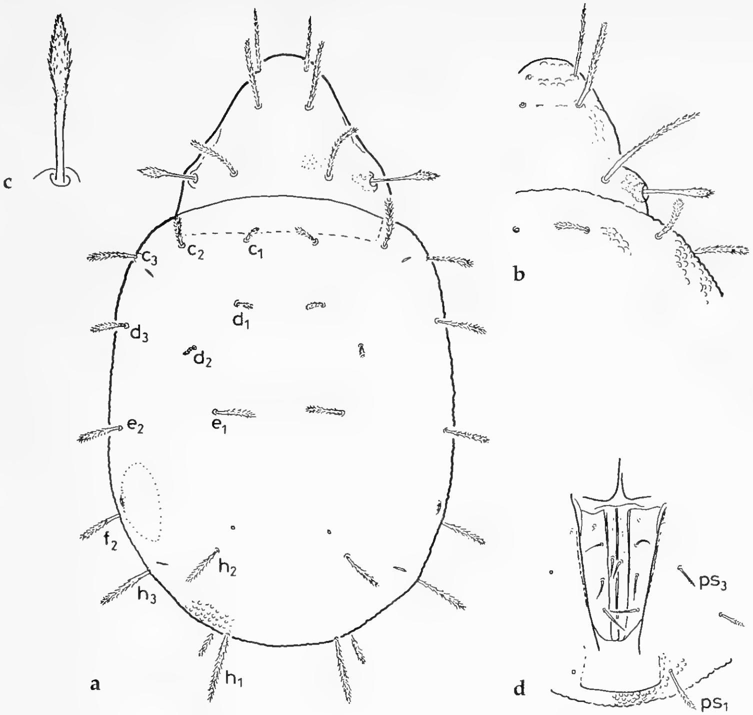

Fig. 1. *Trhypochthonius tectorum*. **a.** dorsal aspect (specimen from Austria). **b.** dorsal anterior part (Berlese coll. 23/48, Italia). **c.** sensillus. **d.** ventral aspect, anal region.

T. septentrionalis Fujikawa, 1995 is similar to *T. tectorum*; differences in body length, leg setation, setal shape and length are less important than reported by Fujikawa (1995), because some of her indications on *T. tectorum* cannot be confirmed. Studies on the variability of both species are needed.

T. tectorum is larger than the similar species *T. nigricans* and its notogastral setae (c_3 and posterior setae) are longer. But there is no distinct gap between the total length variabilities of both species.

Material studied: 8 specimens from Berlin region, North-East Germany; 5 specimens from Austria (leg. H. Schatz); 3 specimens from West Poland (leg. P. Skubala); 1 slide in Willmann-collection, Munich (from North Germany); slides in the Berlese-collection, Florence.

Ecology. In dry moss cushions, scarcely in forest soils.
Distribution. Holarctic.

Trhypochthonius nigricans Willmann, 1928

Fig. 2a

non: *T. nigricans*: sensu Seniczak & Norton (1994)

Descriptions. Willmann (1931), Balogh & Mahunka (1983).

This species has been studied only in microscopical slides in the Willmann-collection in Munich. The ventral characters, the subcapitulum and the legs could not be seen in detail. There were no observations in contrast to the genus characteristics above. The species is closely related to *T. tectorum*. Dorsal aspect. Smaller than *T. tectorum*, total length 525-590 µm (after Balogh & Mahunka 1983),

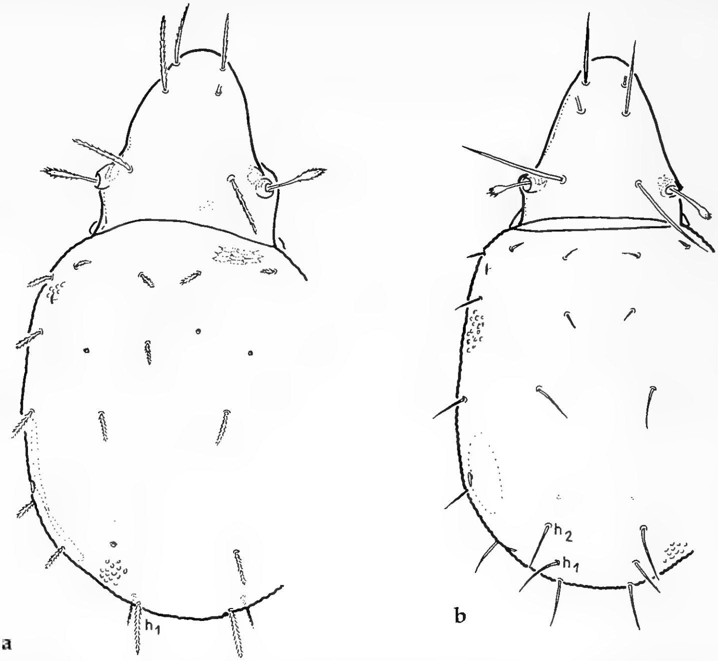

Fig. 2. a. *Trhypochthonius nigricans*, dorsal aspect (slide of Willmann coll.). **b.** *Trhypochthonius cladonicola*, dorsal aspect (slide of Willmann coll.).

525-550 µm (after Willmann 1931), lectotype in Willmann-collection 570 µm (Fig. 2a). Body shape very similar to *T. tectorum*. Prodorsum with punctated cuticula, prodorsal setae small bacilliform and ciliated (lengths of setae after lectotype specimen: *ro* about 60 µm, *le* about 77 µm, *in* > 65 µm, Sensillus with fusiform head, ciliated with pointed tip, 55 µm total length (Fig. 2a).

Notogaster in anterior region with broad netlike structure, in the other parts coarsely granulated (very similar to *T. tectorum*). Notogastral setation in number and position like in *T. tectorum*; setae not or less incrassate apically, length of c_1 about 20 µm, c_3 about 25 µm, e_1 and d_3 about 30 µm; posterior setae shorter than in *T. tectorum*: h_1 is the longest with about 50 µm, ps_1 about 30 µm.

The indication of Willmann (1931: p. 103; fig. 33) of a granulated prodorsum ("körnige Struktur ...") and generally of slightly arcuated dorsal setae ("Borsten... sämtlich etwas gekrümmt"), as also repeated in Balogh & Mahunka (1983) could not be confirmed by studying the lectotype specimen of the Willmann-collection.

Discussion. Total length with 525-590 µm generally smaller than *T. tectorum*; lateral setae (esp. c_3) shorter than in *T. tectorum* (< 40 µm), also posterior setae shorter than in *T. tectorum* (< 60 µm); all dorsal setae only slightly or not widened apically (in *T. tectorum* most setae appear to be widened apically). Fusiform and ciliated sensillus similar to that of *T. tectorum* (in contrast: in *T. cladonicola* and in *T. sphagnicola*, spec. nov., the sensilli have a rounded clavate head with apical spines).

Material studied: 4 slides in the Willmann-collection, Munich. Collected in Germany. Lectotype: Slide labelled "B 51, Büchel b. Wasserburg a./ Bodensee, 7.9.27" (South Germany, Lake Boden). Other locality: Brandmoor mire, Liebensee near Hannover (North Germany).

Ecology. In moss. Records by other authors must be reexamined, because of mix-up with *T. sphagnicola*, spec. nov.

Distribution. Germany.

Trhypochthonius cladonicola (Willmann, 1919)

Fig. 2b

Camisia cladonicola Willmann, 1919
Trilohmannia cladonicola: Willmann (1923)
Trhypochthonius cladonicola: Willmann (1931)

Descriptions. Willmann (1931), van der Hammen (1952), Balogh & Mahunka (1983), Seniczak (1992). *T. cladonicola* is a well known and characteristic species in Europe, the only one with smooth dorsal setae. The species has been studied only in a microscopical slide in the Willmann-collection in Munich. Only the dorsal characters could be studied with sufficient precision. The insertion point of d_2 has not been seen, but it should be present.

Dorsal aspect. pale brown, total length of the drawn specimen 533 µm; all dorsal setae smooth and pointed. *ro* and *le* about 70 µm, *in* about 100 µm; sensilli about 50 µm with rounded head, which has apical spines. Cuticula of prodorsum punctated, cuticula of notogaster in posterior and lateral region coarsely granulated. Anterior notogastral setae 13 µm or longer, posterior notogastral setae up to 50 µm. opisthosomal gland dark, opening near f_2. (Fig. 2b).

Differential diagnosis. Body length 530-550 µm (after Willmann 1931); smooth dorsal setation; head of sensillus rounded, with apical spines.

Material studied: 5 slides of the Willmann-collection. Collected in Germany.

Ecology. Moss and lichen patches, dry habitats like heather.
Distribution. Palaearctic.

Trhypochthonius sphagnicola, spec. nov.

Figs 3-5

nigricans: sensu Seniczak & Norton (1994)

Note. Some specimens of *Trhypochthonius* from a mire complex in north-eastern part of Germany (Brandenburg Country, leg. Miss Ch. Kehl) firstly were determined as *T. nigricans* Willmann, 1928 erroneously. Yet the study of *T. nigricans* in the Willmann-collection confirmed the different characters of the two species. Mainly the sensillus shape is quite different: fusiform and ciliated with a pointed tip in *T. nigricans*, clavate sensillus head with apical spines in *T. sphagnicola*, spec. nov. The bad description without any verbal characteristic of the sensillus and the poor drawings of Willmann's *T. nigricans* (Willmann 1928, 1931) did not allow to discriminate the both species. This is the reason that in Seniczak & Norton (1994) the new species (juveniles and adults) has been illustrated as "*T. nigricans*" erroneously.

Description

General characters. Total length 520-590 µm (means 550 µm) long, 310 µm broad. Colour brown, elliptical notogaster shape with more or less parallel sides in middle part.

Prodorsum. Cuticula punctated, the middle part with pavementlike rough structure; length of prodorsum about 200-220 µm. Prodorsal setae bacilliform and ciliated, *ro* about 60 µm, *le* about 30-35 µm, *in* about 40-45 µm (Figs 3a, d). Sensilli with rounded clavate head, with spines in apical part (Fig. 3b), about 40 µm long. Exobothridial setae reduced.

Notogaster. Anterior and median part appears with netlike cuticular structure; posterior, lateral and ventral cuticula appears with coarse granulation. All 15 pairs of notogastral setae bacilliform and strongly ciliated (f_1 is vestigial) (Fig. 3a). Short anterior setae (*c*, *d*) about 16-25 µm long; longer notogastral setae (*e*, *f*, *h*) about 25-40 µm long. opisthosomal gland near f_2. Normal numbers and positions of lyrifissures, *ia* and *ip* about 10-12 µm long, others about 6 µm. The lateral carina, visible in lateral view (Fig. 3d), from c_3 to middle of e_2 - f_2.

Ventral region. The epimeral setae formula is 3-1-3-3 (complete setation within superfamily). The ventral border of notogaster overfolds the lateral aggenital and adanal region; posterior of the anal plates this border builds a distinct groove (as in some other *Trhypochthonius* species), which has a distinct edge, appearing as a posterior bross from dorsal view. Inside the groove the cuticular structure

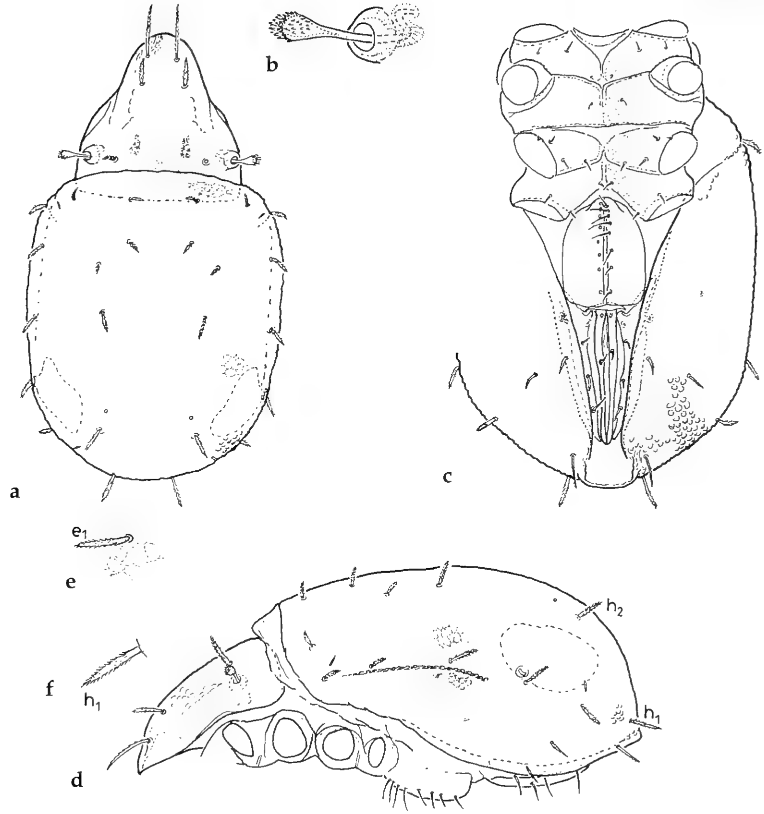

Fig. 3. *Trhypochthonius sphagnicola* spec. nov. **a.** dorsal aspect. **b.** sensillus and bothridia. **c.** ventral aspect, anogenital region and epimeres. **d.** lateral aspect. **e.** notogastral seta e_1 and notogaster structure. **f.** notogastral seta h_1.

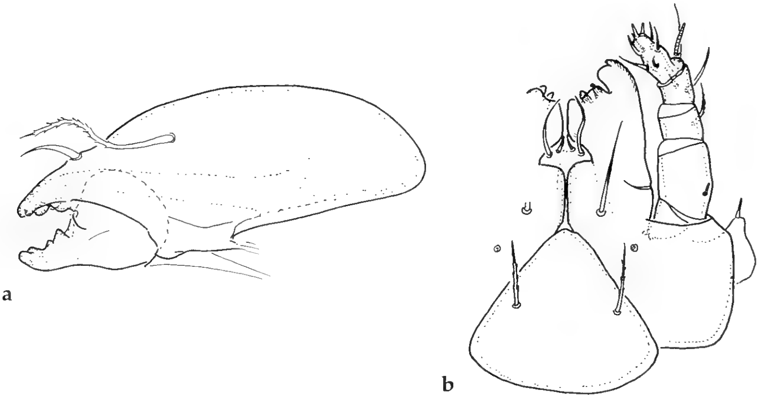

Fig. 4. *Trhypochthonius sphagnicola* spec. nov. **a.** chelicera. **b.** subcapitulum and pedipalp.

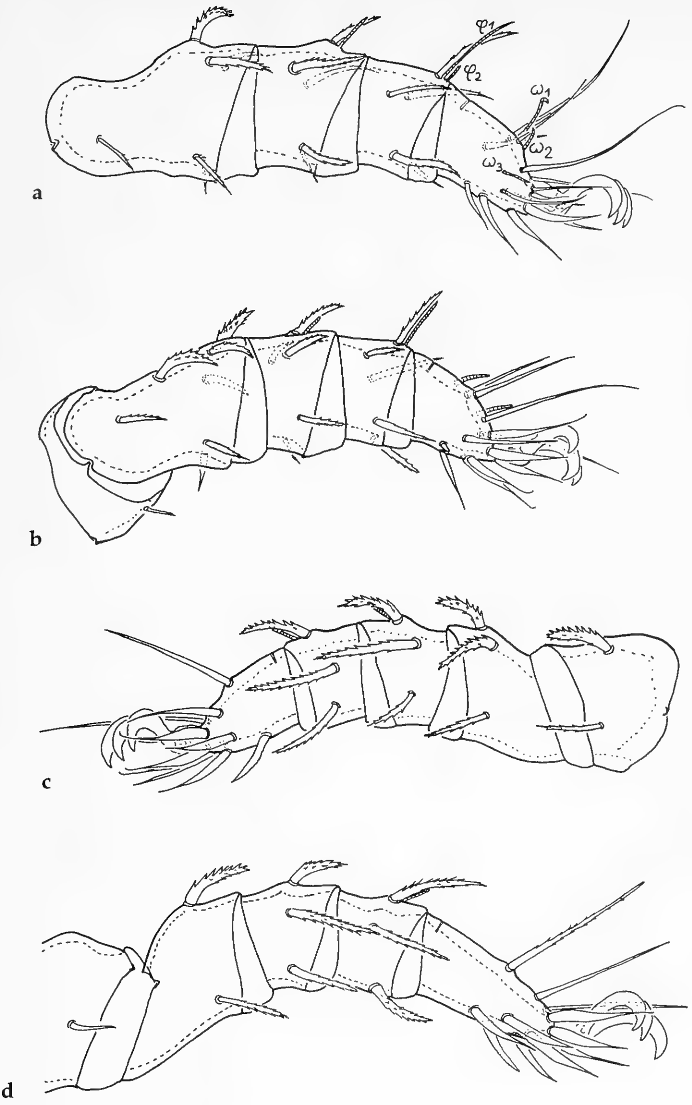

Fig. 5. *Trhypochthonius sphagnicola* spec. nov. **a–d.** legs I, II, III, IV.

is fine, outside coarse (Fig. 3c). The *ps*-setae are pointed and ciliated and about 20-40 µm in length (ps_3 - ps_1). The genital plates with a row of 8 setae each; narrow anal plates with 1 anal seta, adanal plates with 3 adanal setae each; lyrifissures *ips, iad* and *ian* present.

Gnathosoma. Subcapitulum stenarthric (Fig. 4b), setae *h* and *a* long, 1 pair of vestigial *m*-setae; atelebasic rutella; pedipalpal setae formula (solenidium additional in parenthesis): 0-1-1-2-9(+1), two apical setae are eupathids. Chelicers with Trägårdh's organ, about 105 µm long; setae *cha* long, ciliated, arcuated (Fig. 4a).

Legs. Tridactylous legs with almost complete setation. As typical in the genus the ventral setae of tarsi are long and pointed (Figs 5a-d). The setation formulas of legs are (solenids additional given in parenthesis):

leg I: 1 – 6 – 5(+1) – 5(+2) – 16(+3)
leg II: 1 – 7 – 5(+1) – 5(+1) – 13(+2)
leg III: 2 – 4 – 3(+1) – 3(+1) – 11
leg IV: 1 – 2 – 3 – 3(+1) – 12

Discussion. *T. sphagnicola*, spec. nov., belongs to a group of *Trhypochthonius* species with strongly ciliated dorsal setae (in Middle Europe also *T. tectorum*, *T. nigricans*). In contrast the setation of *T. cladonicola* (Willmann, 1919) is smooth; the japanese species *T. japonicus* Aoki, 1970 seems to be intermediate in this regard. *T. nigricans* has the same body length as *T. sphagnicola*, *T. tectorum* is a larger species with distinct longer dorsal setation (esp. prodorsal setae, c_3, f_2, h_1-h_3). The sensilli of *T. sphagnicola*, and of *T. cladonicola* have the same shape: rounded clavate head with apical spines, but in *T. tectorum* and in *T. nigricans* the sensilli are fusiform and with ciliated heads.

Material studied: 6 specimens from "Hechtdiebel" mire in Brandenburg Country, northern Berlin (leg. Miss Ch. Kehl). Type unmounted and 1 mounted syntype deposited in Staatssammlungen Munich.

Ecology. In wet bogs in cushions of *Sphagnum*.
Distribution. Poland, Germany.

Altrhypochthonius Weigmann, 1997

Type species: *Trhypochthonius badius* Berlese, 1905

Trhypochthonius badius Berlese, 1905 has some differences to the other *Trhypochthonius* species, and therefore has been placed into *Trhypochthoniellus* by some authors (van der Hammen 1959, Balogh & Mahunka 1983). But a phylogenetic analysis (Weigmann 1997a) has brought up more common characters with *Trhypochthonius* (reduced exobothridial setae, position of solenids on tarsus I) than to *Trhypochthoniellus* species (reduction of legs chaetotaxy, e.g. no setae v'' on genu I and II). The special synapomorphies of *Trhypochthoniellus* and Malaconothridae yet have not been found in *badius*, thus the leg chaetotaxy should be reduced convergently (it is not identical in detail!). The common characters of classical *Trhypochthonius* species and *badius* are regarded as characters of the family Trhypochthoniidae in a new definition (Weigmann 1997a), combining *Trhypochthonius* in a new definition with *Altrhypochthonius*.

Up to now we know only one species of *Altrhypochthonius*, *A. badius*. Therefore it is not sure which typical characters are of generic or of specific rank; the genus diagnosis is provisionally in this respect.

Diagnosis of the genus *Altrhypochthonius*. Differential characters (in contrast to *Trhypochthonius* s. str.): 2 anal setae; subcapitulum with 2 m-setae; on tarsus I seta f reduced; setation of legs moderately reduced: e.g. genua setae formula (genua I-IV; with solenidia in parenthesis): 4(+1)-4(+1)-2(+1)-2. Notogaster of ovoid shape.

Further characters. Well developed bothridia near the lateral margin of prodorsum with well developed sensilli; no exobothridial setae present (one pair vestigial); 15 pairs of notogastral setae (incl. ps_3); no genital neotrichy (about 6 g); 3 pairs of adanal setae; subcapitulum stenarthric; tibia I with 2 solenidia; w_2 of tarsus I in median high position near w_1; legs tridactyl.

Altrhypochthonius badius (Berlese, 1905)

Figs 6-8

Tripochthonius badius Berlese, 1905; Berlese 1913; Willmann 1931.
Trhypochthoniellus badius: Van der Hammen 1959; Balogh & Mahunka 1983.
Altrhypochthonius badius: Weigmann 1997a.

Redescription. The detailed redescription of the species by using fresh specimens from Germany has been confirmed in respect to important diagnostic characters (body size; dorsal and ventral setation,

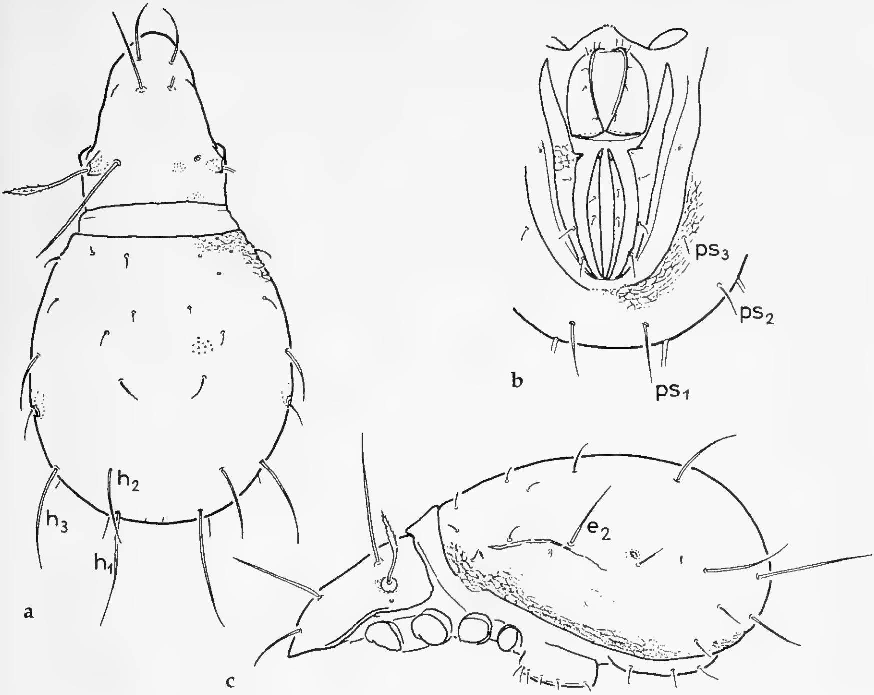

Fig. 6. *Altrhypochthonius badius*. **a.** dorsal aspect. **b.** ventral aspect, anogenital region. **c.** lateral aspect.

as e. g. 2 anal setae; leg I setation; stenarthric subcapitulum with 2 *m*-setae; 6 genital setae) by studying Berlese's slides. Also the specimens in the Willmann-collection show no differences.

General characters. Total length 500-560 µm, ovoid notogaster shape. Colour pale to chestnut brown.

Prodorsum. Cuticula punctated; length of prodorsum about 175-200 µm. Prodorsal setae glabrous and setiform, *ro* about 60 µm, *le* about 60-100 µm, *in* about 140 µm. Sensillus long, about 90-120 µm, with small fusiform and spiculated head. Exobothridial seta vestigial. (Figs 6a, c).

Notogaster. Anterior and lateral parts with netlike coriaceous structure, middle parts coarsely punctated. 15 pairs of notogastral setae, partly very short (c_1-c_3, d_1-d_3) about 3-15 µm, partly of middle size (e_1, f_2, ps_2, ps_3) about 30-40 µm long; four pairs of setae strong and long, e_2 about 80 µm, h_2 about 80-100 µm, h_1 about 100-150 µm, h_3 about 100 µm. Opisthosomal gland near f_2. Normal numbers and positions of lyrifissures, *ia* near c_3. The lateral carina extends from behind c_3 to the middle of the body. (Figs 6a, c).

Ventral region. The epimeral setae formula is 3-1-3-2 (*4a* is missing). The typical longitudinal groove of notogaster behind the anal plates, as in *Trhypochthonius*-species, is not visible, but the posterior border line of notogaster indistinct (this character might depend on swollen or shrinked notogaster by preparation). ps_3 is the shortest of the *ps*-setae (Fig. 6b). Genital plates with 6 setae, anal plates with two anal setae, adanal plates (fused with aggenital plates?) with 3 adanal setae; lyrifissures *ips*, *iad* and *ian* present.

Gnathosoma. Subcapitulum stenarthric, setae *h* and *a* long, 2 short *m*-setae, atelebasic rutella (Fig. 7a). Pedipalpal setae formula normal as in the family: 0-1-1-2-9(+1); two apical setae are eupathids. Chelicers (Fig. 7b) about 120 µm long with Trägård's organ, setae *cha* long, ciliated; with two accessary dents on digitus fixus.

Legs. Tridactylous legs (Figs 8a-d) with moderately reduced setation (compared with *Trhypochthonius* species). The setation formulas of legs are (solenids additional given in parenthesis):

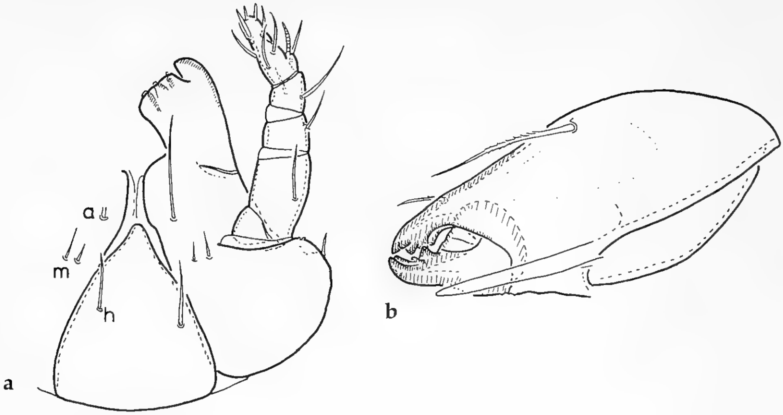

Fig. 7. *Altrhypochthonius badius*. **a.** subcapitulum and pedipalp. **b.** chelicera.

leg I: 1 – 6 – 4(+1) – 5(+2) – 15(+3)
leg II: 1 – 7 – 4(+1) – 4(+1) – 13(+2)
leg III: 2 – 3 – 2(+1) – 2(+1) – 12
leg IV: 1 – 2 – 2 – 2(+1) – 13

Material studied: Some slides in Berlese-collection in Florence, studied 1995: slide "29/1 *Tripochthonius badius* n. sp. Firenze sfagno" (3 specimens, lectotype specimen, selected by this paper shall be the specimen in the most upper-right position); slides 29/2-5 *T. badius*, from same locality; 2 slides of the Willmann-collection in Munich, studied 1993, collected in "Zehlau Bruch" 1919, West Russia; Material from North-East Germany, collected by Mrs. Christine Kehl in a bog "Hechtdiebel" north of Berlin in Brandenburg Country (7 specimens studied). 1 specimen deposited in the Staatssammlungen Munich.

Ecology. In wet bogs, mainly in *Sphagnum* cushions.
Distribution. Europe (Italy, Poland, Russia, Germany).

Mucronothrus Trägårdh, 1931

Type species: *Mucronothrus rostratus* Trägårdh, 1931; syn. of *M. nasalis* (Willmann, 1929)

Diagnosis of the genus. Large *Trhypochthonius*-like body shape; pale yellow; anterior part of rostrum forms a noselike tip, bearing the rostral setae; bothridium open, funnellike, in the base of which a setiform sensillus is inserted; legs monodactyl; genital neotrichy (11-22 genital setae); 2 adanal setae, 2 anal setae normally. Reduced leg setation (e.g. setal-solenidial formula of genua of legs I - IV: 4(+1)-4(+1)-3(+1)-3(+0).

Mucronothrus nasalis (Willmann, 1929)

Figs 9-10

Malaconothrus nasalis (Willmann, 1929)
Mucronothrus nasalis: Willmann (1931)
Mucronothrus rostratus Trägårdh, 1931

Descriptions. Willmann (1929, 1933), Trägårdh (1931), Hammer (1958, 1966), Travé (1973), Balogh & Mahunka (1983), Norton et al. (1996).
General characters. Total length 580-800 µm (maximal width about 300 µm at a specimen of 670 µm length) more or less flattened body; colour pale yellow, structure of cuticula on prodorsum punctulated, on notogaster reticulated to coarsely granulated; all setae smooth. (the following mesurements of

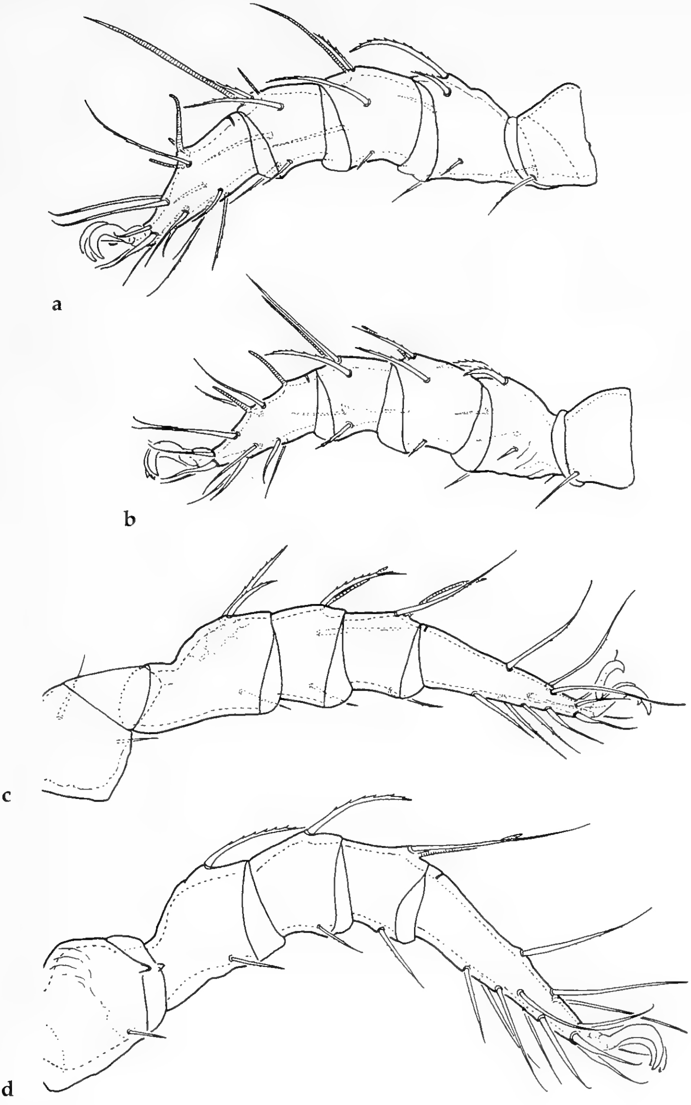

Fig. 8. *Altrhypochthonius badius.* **a–d.** legs I, II, III, IV.

setation after the figured specimen with 670 µm length from Pyrenean Mountains).

Prodorsum. Length about 250 µm. Anterior part nasiform, narrow, bent downwards (Figs 9a, e); two (in seldom cases three: cp. Willmann 1933) rostral setae of about 100 µm, bent sidewards; sides of prodorsum at the leg I–leg II region rounded; lamellar setae about 160 µm long and close together; interlamellar setae about 260 µm long; anterior exobothridial setae about 15 µm, posterior *ex* vestigial; sensilli setiform, about 35 µm length in an open funnellike bothridium formed like a normal seta, without bothridial basal apparatus (Figs 9b, c); sometimes with visible median maculae between interlamellar setae.

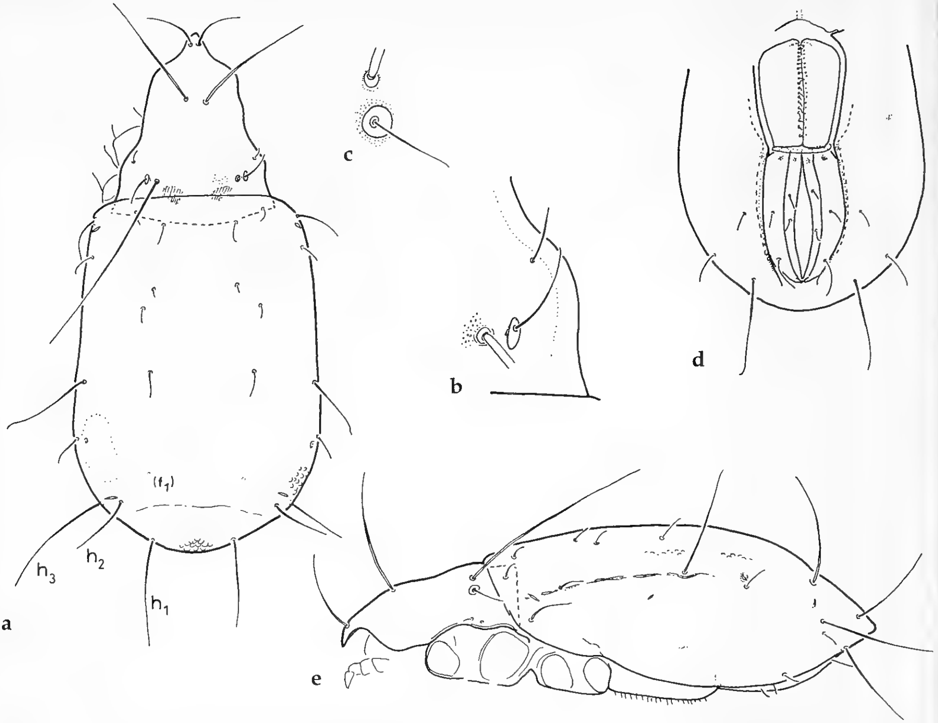

Fig. 9. *Mucronothrus nasalis*. **a.** dorsal aspect. **b.** part of prodorsum with sensillobothridial complex enlarged, dorsal view. **c.** dto, dorsolateral view. **d.** ventral aspect, anogenital region. **e.** lateral aspect.

Notogaster. In dorsal view shape nearly parallel-sided to conical, broadest part at setae f_2; with moderately developed lateral carina, to be seen in lateral view, reaching from *ia* in front to e_2; 15 notogastral setae; f_1 vestigial; most notogastral setae short (c_1, c_2, d_1-d_3, f_2, ps_2, ps_3 about 20-30 µm), some of medium length (c_3: 60 µm, e_1: 33 µm) and the other notogastral setae long (e_2, h_2, h_3 about 140-150 µm, h_1, ps_1 about 125 µm). Setae h_1 inserted much more backwards than h_2 and h_3. Five pairs of lyrifissures present, *ia* larger than the others; opisthosomal gland pore near f_2. (Figs 9a, e).

Ventral region. Epimeral setal formula is 3-1-2-2 (*3a* and *4a* missing; in one case at one side an additional *2b*); all epimeres are medially fused; the notogastral frame close to genital and adanal plates, at the posterior part behind anal plates with a flat groove (as in *Trhypochthonius*); genital plates with one row of 18-20 setae each (some populations out of Europe with higher variability of the genital neotrichy, 13-22 *g*; see Travé 1973); no aggenital plates and setae; 2 pairs of adanal setae, 2 pairs of anal setae, *iad* and *ian* present. (Fig. 9d).

Gnathosoma. Subcapitulum stenarthric (Fig. 10a), setae *h* short, 1 pair of setae *m*, setae *a* long (about 24 µm); adoral setae strong with furcated tip; rutellum of atelebasic type; palp with setation 0-1-1-2-8(+1). Chelicera (Fig. 10b) robust and short (130 µm) with Trägårdh's organ, with two setae (*cha* short) and four accessory dents on digitus fixus.

Legs. Setation is very variable (see Travé 1973) and compared with *Trhypochthonius* reduced (some setae vestigial or facultatively expressed); "normal" setation formulas of legs (solenidia not included and given in parenthesis):

leg I: 1 – 5 – 4(+1) – 4(+1) – 13 (+3)
leg II: 1 – 5 – 4(+1) – 4(+1) – 12 (+2)
leg III: 2 – 3 – 3(+1) – 3(+1) – 10
leg IV: 1 – 3 – 3 – 3(+1) – 10

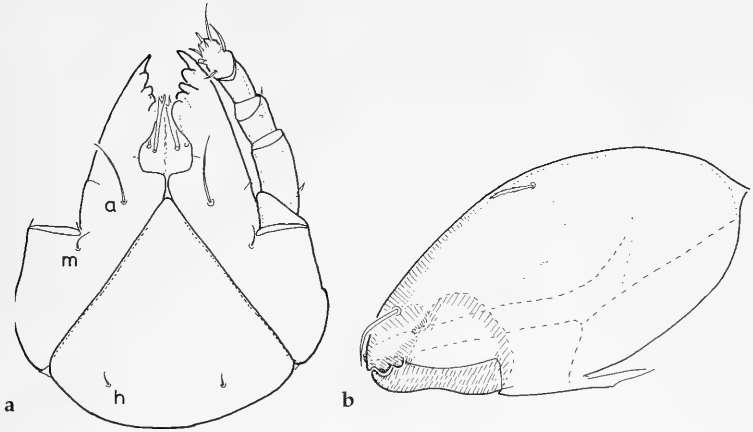

Fig. 10. *Mucronothrus nasalis.* **a.** subcapitulum and pedipalp. **b.** chelicera.

Discussion of phylogenetic relationships. *Mucronothrus* is a member of Malaconothroidea (lyrifissure *ia* relatively large; without aggenital plates: cp. Knülle 1957, Haumann 1991, Weigmann 1997a). Special characters within the superfamily are the noselike rostral tip, the sensillo-bothridial complex and the genital neotrichy (the last being convergent also in *Trhypochthoniellus*).

The leg setation is reduced and points to a relation to Trhypochthoniellidae and Malaconothridae (in contrast to Trhypochthoniidae). That was why Travé (1973) discussed the membership of *Mucronothrus* to Trhypochthoniellidae sensu Knülle (1957). Special similarities are: w_2 on Tarsus I in an anterior low position near w_3, tibia I only with 1 solenidium, ventral setation of tibiae short and thicker than others (however with pointed tip in *Mucronothrus*) leg setation at all reduced. A plesiomorphic character within the superfamily is the vestigial second exobothridial setae. *Mucronothrus* does not fit into one of the families mentioned, thus must be regarded as a distinct family Mucronothridae Kunst, 1971 (Weigmann 1997a).

After finishing this redescription I have got the description of the north american *M. nasalis* and a second species of *Mucronothrus*, *M. willmanni* Norton et al., 1996. There are no relevant differences of the american populations in contrast to the european with regard to the species characteristics given above. *M. willmanni* is characterized mainly by a narrower rostral mucro ("nose"), epimeres III and IV are medially separated by soft cuticle in adults also, the leg setation is more regressive than in *M. nasalis*.

The presented chaetotaxy of notogastral setae differs from those of some authors (cp. Fujikawa 1995, Norton et al. 1996) in regard of the *h*- and *ps*-rows. By comparing different Malaconothroidea species it seems to be most probable, that setae h_1 are inserted much more backwards than h_2 and h_3, as in some other species f_1 compared with f_2; the *ps*-row is situated at the ventral side more or less parallel to adanal plates, and *ps*-setae are shaped differently from *h*-setae sometimes.

Material studied: 5 specimens from Pyrenean Mountains (leg. J. Travé), 4 specimens from Altvater Mountains, Czechia in the collection of Museum für Naturkunde, Görlitz (leg. H.-D. Engelmann). Compared with specimens fron North America (leg. R. Norton).

Ecology. In moss of wet mountain habitats and wet subarctic habitats.
Distribution. Worldwide (in northern Europe, in Austria, Czechia, Pyrenean Mountains; eastern Palaearctic and Nearctic; South America, New Zealand).

Trhypochthoniellus Willmann, 1928

Type species: *Trhypochthoniellus setosus* Willmann, 1928; syn. of *T. longisetus* (Berlese, 1904)

The genus was described as a new subgenus *Thrypochthonius* (*Thrypochthoniellus*) (both wrong spelled as a lapsus) by Willmann (1928) for the new species *T. setosus* Willmann, 1928. The only mentioned discriminating character against *Trhypochthonius* s. str. is the lack of bothridia and sensilli. In Willmann (1931) *Trhypochthoniellus setosus* is mentioned as the single species of the genus *Trhypochthoniellus*.

Grandjean (1939) found the reduced leg setation of *T. setosus* and *Trhypochthonius excavatus* Willmann, 1919 being identical, and he based the genus *Trhypochthoniellus* on the leg setation consequently, though *T. excavatus* has well expressed bothridia and sensilli and *T. setosus* does not have both. In that paper Grandjean discussed the trichobothridial regression in the ontogeny from larvae to adults in Camisiidae, Malaconothridae, *Trhypochthoniellus* and other genera, and he pointed out that the presence or absence of the trichobothridial complex is of minor importance for the genus taxonomy, especially for *Trhypochthoniellus*.

Subsequent authors accepted Grandjean's conception of the holarctic genus. For instance in Balogh & Mahunka (1983) *Trhypochthoniellus* includes *T. setosus*, *T. longisetus* (Berlese, 1904), *T. excavatus*, *T. trichosus* (Schweizer, 1922) besides *T. badius* (the latter erroneously, as discussed above).

According to Knülle (1957) *Trhypochthoniellus* has a systematic position near Malaconothridae, in a distant position to Trhypochthoniidae (cp. Weigmann 1996, 1997a) and thus a distinct family Trhypochthoniellidae Knülle, 1957 must be accepted. Apomorphies of this family are the following characters: diarthric subcapitulum (anarthry in Malaconothridae, stenarthry in Trhypochthoniidae and Mucronothridae), notogastral setae ps_3 reduced (present in all other Malaconothroidea). The family includes only one genus up to now.

The present study of *Trhypochthoniellus* is based on the type series of *T. longisetus* (Berlese, 1904) (deposed in Florence), on slides with *T. setosus* Willmann, 1928 and "*T. trichosus*" from the Willmann-collection in Munich, on fresh material from Northern Germany, determined as *T. setosus*, and on fresh material from Northern Germany, at first determined as *T. trichosus* (Schweizer, 1922).

German specimens of "*setosus*" have been collected in the same samples than some of the "*trichosus*" specimens. A morphological analysis of variability and biometric correlations within the northern german "populations" in geographical separation led to the result that there are distinct strains of the obligatorily parthenogenetic *Trhypochthoniellus* subpopulations (Weigmann 1997b). Within two subpopulations from two localities there is a graduated regression of the trichobothridial complex, a high number of asymmetric differences (one side with sensillus, one side without; see fig. 12) and no strict combination with other morphometric parameters to absence or presence of the trichobothridial complex. As a result of this analysis the different subpopulations must be regarded of subspecific status of one species. Because of the obligatory thelytokous parthenogenesis the syntopic and allotopic subpopulations are regarded as genetically independent clones of one species.

But there might be also ecological differences between morphologically different clones. Therefore an intrasubspecific differentiation of a "forma typica" with developed trichobothridial complex and a "forma *setosus*" without this complex seems to be reasonable and is proposed in the following.

Our specimens, determined as *T. trichosus* (Schweizer, 1922), have been found conspecific with *T. longisetus* (Berlese, 1904) after studying Berlese's type material. *T. trichosus* is a junior synonym as will be discussed below.

Following this argumentation there is only one european *Trhypochthoniellus* species with two intrasubspecific taxa, i.e. two forms.

Trhypochthoniellus longisetus (Berlese, 1904) forma typica

Figs 11-12

Trhypochthonius longisetus Berlese, 1904
Trhypochthoniellus longisetus: Balogh & Mahunka 1983
Tripochthonius trichosus Schweizer, 1922: (**syn. nov.**); Willmann 1931
Trhypochthoniellus trichosus: Balogh & Mahunka 1983
Camisia excavata Willmann, 1919 (**syn. nov.**)
Trhypochthonius excavatus: Willmann 1931

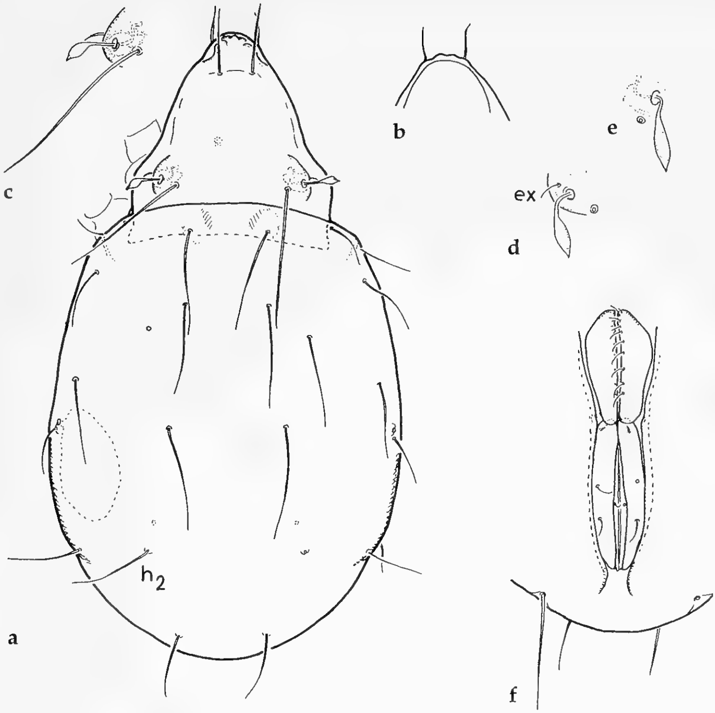

Fig. 11. *Trhypochthoniellus longisetus* forma typica, from slides of Berlese's type material. **a.** dorsal aspect. **b.** rostral line in ventral view. **c-e.** trichobothridial complex of different specimens. **f.** ventral aspect, anogenital region.

Trhypochthoniellus excavatus: Grandjean 1939; Balogh & Mahunka 1983
? *Nothrus crassus* Warburton & Pearce, 1905
Trhypochthonius crassus: redescribed by Luxton (1987) (assumed **syn. nov.**)

Descriptions. See list of synonyms
General characters. Total length 460-580 µm (mean 520 µm, n = 55); cuticula pale brown; opisthosomal gland large, obviously darker or not. In the posteriolateral region sometimes the contour is slightly incised (at h_3 and at ps_2 position; see figs 12a, b). (Following measures referred to specimens of middle size).

Prodorsum. Cuticula punctated; at the anterior part of the rostrum there are 4-5 humps causing a more or less undulated frontal border line (Figs 11a-b, 12a); dorsal setae smooth, *ro* about 30-40 µm, *le* about 50-70 µm, *in* about 100-130 µm (in Berlese's type 108 µm); sensillus (Figs 11a, c-e) with thick fusiform, smooth head, tip acutely pointed, about 30-40 µm long; exobothridial seta *ex* about 20 µm, inserted near to bothridia; at the border of the prodorsum besides *ex* there is a more or less distinct vestigium of a second exobothridial seta (?). (Figs 11a, 12a).

Notogaster. Coriaceous structure; in anterior, lateral and ventral region partly netlike, in the middle and posterior region appearing coarsely pustulated (Figs 11a, 12a). 14 smooth notogastral setae, mostly long (about 70-90 µm), c_2 is the shortest (about 30-40 µm); ps_3 totally missing, f_1 mostly vestigial or missing. Opisthosomal gland near f_2; lyrifissures *ia* and *ip* large, others small; lateral carina of notogaster reaching from *ia* to ps_2.

Ventral region. Epimeral setal formula is 3-1-3-2; ventral border of notogaster scarcely overfolding genital and anal region, between both regions with a toothlike extension, bearing the lyrifissure *ips*; behind anal region with a longitudinal flat groove (as in *Trhypochthonius* species). 10-14 pairs of genital

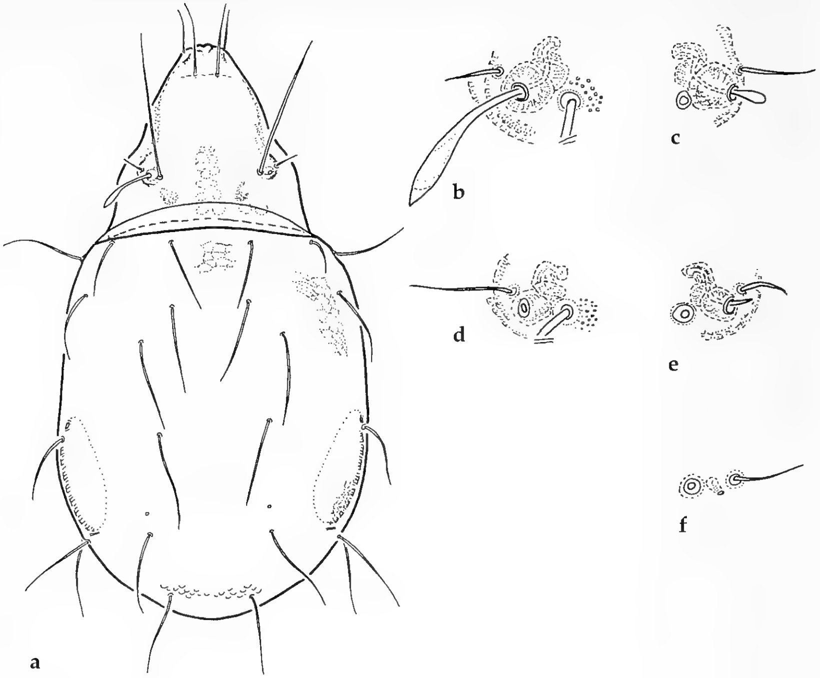

Fig. 12. *Trhypochthoniellus longisetus* from North East Germany. **a.** dorsal aspect of an asymmetric specimen (right sensillus reduced). **b.** left trichobothridial complex of an asymmetric specimen. **c.** right trichobothridial complex of the same specimen. **d.** left trichobothridial complex of an asymmetric specimen, sensillus reduced. **e.** right trichobothridial complex of the same specimen, sensillus as short seta. **f.** right trichobothridial complex of another specimen, trichobothridial complex extremely reduced.

setae (often with asymmetric numbers) in median rows; 1 anal seta, 2 adanal setae. Normal pattern of lyrifissures: *ips*, *iad*, *ian*. (Fig. 11f).

Gnathosoma. Subcapitulum diarthric, the oblique sutures of the borders of the hypostomal plate (sternit of pedipalp segment) are visible, the plate is fused with the base of the palps (cp. fig. 14a). Seta *h* short, seta *m* in the articulation also short; rutellum of atelebasic type; palpal setation (solenidium in parenthesis): 0-1-1-1-9(+1); two setae on palp tarsus are eupathids.

The chelicera (cp. fig. 14b) is about 100 µm long, with Trägårdh's organ.

Legs. Tridactylous (as in figs 15a-d), with reduced leg setation (compared with *Trhypochthonius*). The ventral setae of tarsus, tibia and genu short, thick and mostly glabrous (similar some further distal setae on tarsus). The setation formulas of the legs are (solenids additional given in parenthesis):

leg I: 1 – 6 – 3(+1) – 4(+1) – 12(+3)
leg II: 1 – 5 – 3(+1) – 3(+1) – 11(+2)
leg III: 2 – 2 – 2(+1) – 2(+1) – 10
leg IV: 1 – 2 – 2 – 2(+1) – 11

Discussion. The figure 44 on *T. longisetus* in Berlese (1904) shows very short setae *in*, which led to the description of *T. trichosus* Schweizer, 1922. Schweizer mentioned this fact (*in* about 110 µm) and declared the similarity to *T. longisetus*, but he did not mention *T. excavatus*. But the drawing of Berlese is wrong obviously: all specimens in the slides of Berlese show very long interlamellar setae. Therefore the key of Balogh & Mahunka (1983 p. 197) reports a mistake also ("interlamellar setae minute" in *T. longisetus*). There have been found no considerable differences between *T. longisetus* original specimens and northern german specimens, which had been determined as *T. trichosus* earlier. *T. trichosus* Schweizer, 1922 thus must be regarded as a junior synonym.

T. excavatus (Willmann, 1919) is described very poorly (including also the description in Willmann (1931), where the author expressed doubts regarding the separation of *excavatus* and *trichosus* as two good species). The differentiation of both species in the key of Willmann (1931) is not based on serious characters (position of bothridia and opisthosomal glands, shape of sensilli). The length of the notogastral setae (c_1, d_1 and others) has been drawn very short in Willmann's figure (1919); but this character has a high variability and is of doubtful worth to discriminate two species as done in the key of Balogh & Mahunka (1983: p. 197). In Willmann's collection of slides in Munich there was useful material for a reliable comparison of *T. excavatus*. Whithin 19 specimens in 9 slides from different localities 3 specimens show asymmetry with partly or totally regressed sensilli, comparable with northern german specimens (cp. fig. 12); the other specimens have typical sensilli (cp. fig. 11). Some of the slides show specimens with rather long notogastral setae; *T. excavatus* is a junior synonym of *T. longisetus*, very probably.

Luxton (1987) redescribed *Nothrus crassus* Warburton & Pearce, 1905 as *Trhypochthonius crassus*. Without doubts it is a *Trhypochthoniellus* species: 14 smooth and long notogastral setae (c_2 short); exobothridial setae near bothridia; pointed glabrous head of a fusiform sensillus. If the indication of three pairs of adanal setae should be an error, there is no reason that *T. crassus* is not a synonym to *T. longisetus* also.

Material studied: Type material of Berlese-collection in Florence: Slide 23/49 "*Trhypochthonius longisetus* n. sp., serre cascine, Firence" (with 3 specimens; lectotype shall be the specimen in the right upper corner). Slides 71/37, 71/37 bis; Slides of the Willmann-collection in Munich, labelled *T. trichosus* or *T. excavatus*; 58 specimens from North-East Germany (leg. Mrs. Christine Kehl): in a *Sphagnum* bog, "Hechtdiebel" mire north of Berlin in Brandenburg Country; "Hundekehle Fenn" mire in Berlin; "Postfenn" mire in Berlin.

Ecology. In wet mires, mainly in *Sphagnum* cushions.
Distribution. Worldwide (Palaearctic, North and South America, New Zealand).

Trhypochthoniellus longisetus forma *setosus* Willmann 1928

Figs 13-15

Trhypochthoniellus setosus Willmann, 1928:; Willmann 1931; Balogh & Mahunka 1983.

In the morphometric analysis of "*T. longisetus* forma typica" and "forma *setosus*" mentioned above (Weigmann 1997b) all details of both forms have been studied likewise. Besides of variable morphometric details without taxonomical worth only the expression of the trichobothridial complex has been found to differentiate the both forms. The specimens without bothridia and sensilli (Fig. 13a), described as *T. setosus* Willmann, 1928, will be regarded as "forma *setosus*" in its normal appearance. But detailed studies in a larger population, which was syntopic with *T. longisetus* forma typica (with fully expressed trichobothridial complex) brought a good number of intermediate specimens in regard to the bothridia and sensilli, some of them being asymmetric (Figs 12a-f). This is the main reason to bring together both forms with gradually "regressed" trichobothridial complex (compare Grandjean 1939) as a single species. Because of the identical morphology of notogaster, ventral region, gnathosoma and legs (Figs 13-15) most of these details have not been illustrated twice in this paper. One of the morphometric differences of both forms is the total body length: The range of *T. longisetus* forma *setosus* was 435-500 µm (mean 465 µm, n = 24), this is smaller than the means of the forma typica. Other parameters (setal length and distances) are in similar ranges.

Material studied: Willmann-collection in Munich, 1 slide labelled "*Trhypochthoniellus setosus*, M 63, Riedschatten, April 26" (locality unclear); 24 specimens from North-East Germany (leg. Mrs. Christine Kehl): in a *Sphagnum* bog, "Hechtdiebel" mire north of Berlin in Brandenburg Country.

Ecology. In wet mires, mainly in *Sphagnum* cushions.
Distribution. Holarctic.

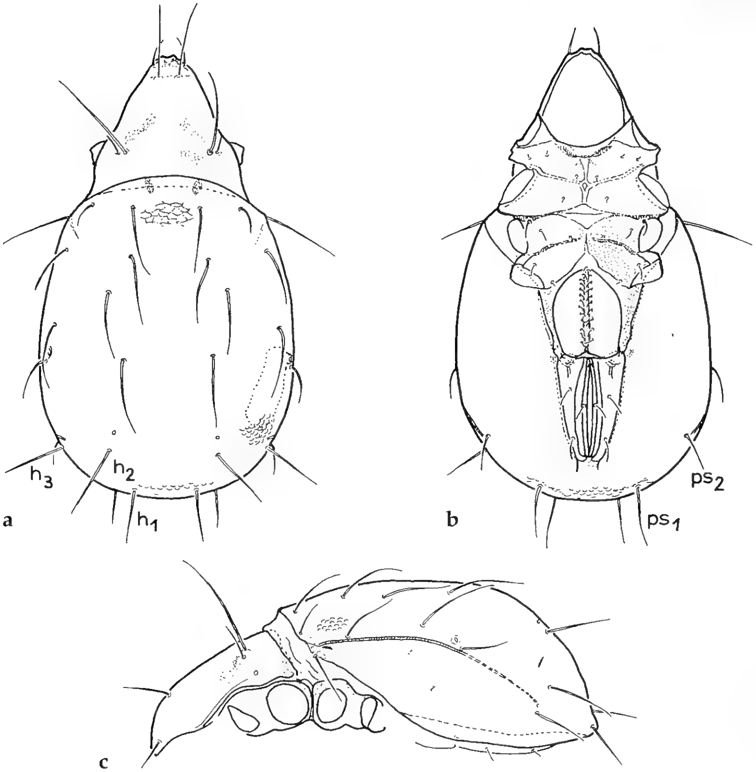

Fig. 13. *Trhypochthoniellus longisetus* forma *setosus*, from North East Germany. **a.** dorsal aspect. **b.** ventral aspect. **c.** lateral aspect.

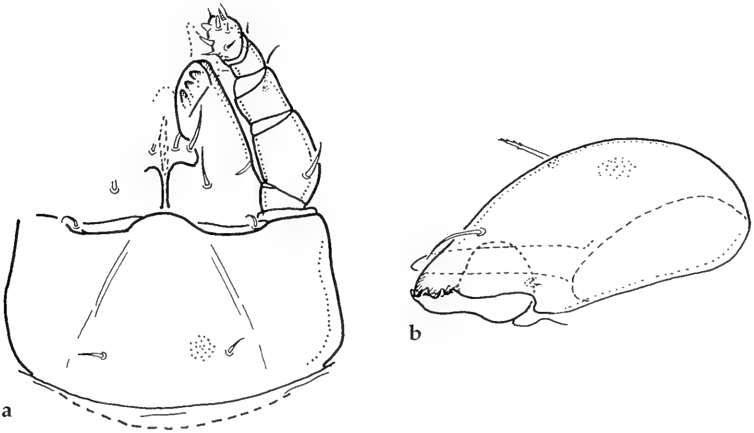

Fig. 14. *Trhypochthoniellus longisetus* forma *setosus*, from North East Germany. **a.** subcapitulum and pedipalp. **b.** chelicera.

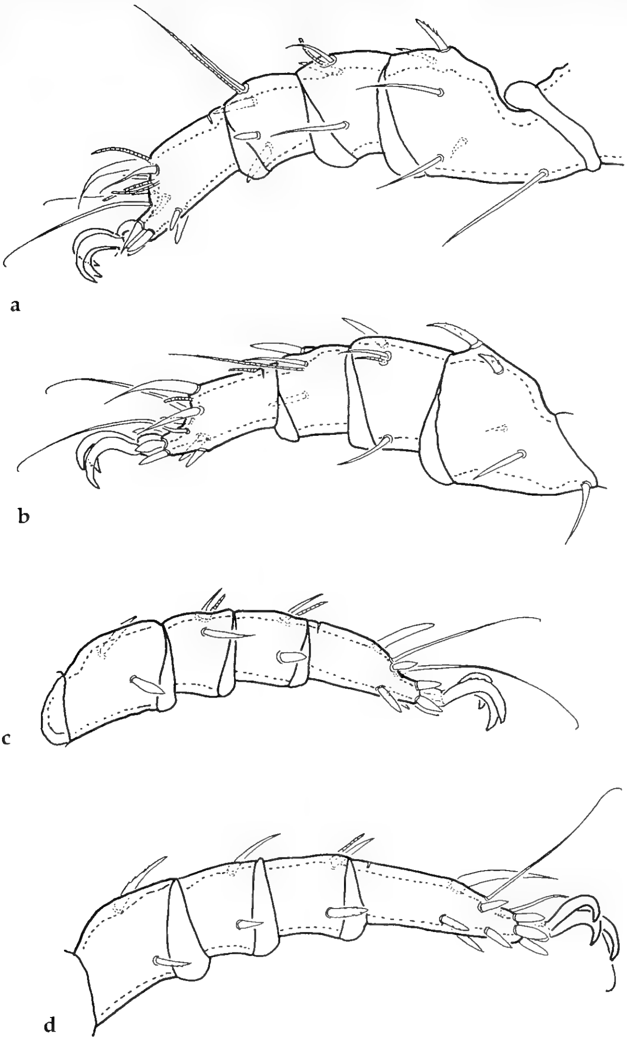

Fig. 15. *Trhypochthoniellus longisetus* forma *setosus*, from North East Germany. **a–d.** legs I, II, III, IV.

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Copulation mechanism and description of the East Australian *Helicopsyche copulata,* spec. nov.

(Insecta, Trichoptera, Helicopsychidae)

Kjell Arne Johanson

Johanson, K. A. (1997): Copulation mechanism and description of the East Australian *Helicopsyche copulata,* spec. nov. (Insecta, Trichoptera, Helicopsychidae). – Spixiana **20/3:** 219-226

One male and one female of an undescribed species from North Queensland, Australia were examined in copula. The species is described and named *Helicopsyche copulata,* spec. nov. The copulation mechanism of the species is described based on the two specimens.

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Introduction

The genus *Helicopsyche* is distributed through the tropics and subtropics (Johanson 1995a) and is currently represented by fifteen species in the Australian mainland and Tasmania. The distributional range of the genus in Australia is restricted to the northern and eastern part of the continent and mainly to forested high altitude areas.

Previously, little interest has been devoted to the copulatory mechanism in Trichoptera except for the Hydropsychidae (Denning 1943, Stätzner 1974, Tobias 1972, Unzicker 1968). Some of the male appendages are assumed to have certain functions, like the gonocoxites which grasp the female during copulation, and the phallus which is inserted into the female vagina.

The present work is intended to stimulate further research on this neglected but taxonomically important topic within caddisflies.

Methods

The two specimens of *H. copulata,* spec. nov. were initially examined *in copula* in glycerine with a Wild M5 binocular and Leitz Laborlux microscope for identification and preliminary examination. The wings were transferred to 100 % ethanol for dehydration, then to a solution of orange peel oil (*Aurantii dulcis aetheroleum*) for fixation, and permanently mounted in Canada balsam. The bodies were macerated in 8 % KOH and transferred to acetic acid, 100 % ethanol and orange peel oil for neutralization, dehydration and fixation. They were mounted in Canada balsam on a microscope slide together with their wings.

Helicopsyche copulata, spec. nov.

Figs 1-15

Types. Holotype: ♂, Australia, North Queensland, Mt. Lewis, nr. Julatten, 16°35'S, 145°15'E, 27 Oct. 1988, K. Walker leg. – Paratype: 1♀, as holotype (both deposited in Victoria Museum, Abbotsford, Victoria, Australia).

Diagnosis. Male scape very long and directed anteriorly; maxillary palp basal joint as long as scape and mesally with long, dark setae; genitalia with tergum X deeply divided and apically slightly upturned; gonocoxite divided into a two-lobed dorsal and simple ventral branch; ventral branch about twice the length of dorsal branch. Female posterior wing with long, dark, broad setae in anal region; abdominal sternite VIII divided into small rounded sclerites with long microtrichia; abdominal pleurite VIII posteriorly divided into scale-like microtrichia with one or two central microtrichia; tergum X, in lateral view, with dorsal branch pointed and ventral branch truncate.

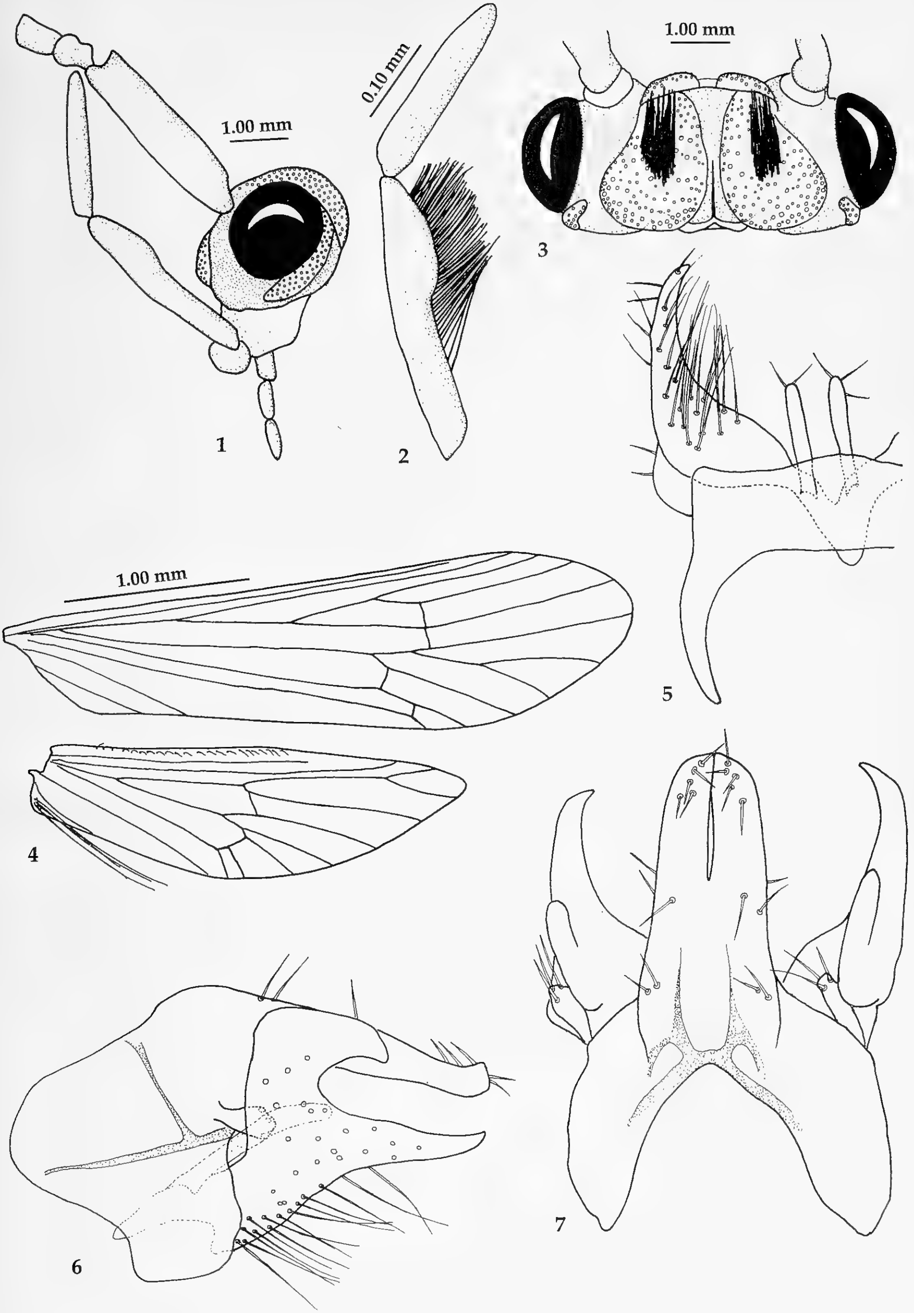
Description

Male (Figs 1-7, 12-15). Head cephalic warts large, pyriform; with central brush of black setae (Fig. 3). Eyes covering about 70 % of head in lateral view. Maxillary palp basal segment medially covered by long black setae (Figs 1, 2) and about 1.4 × longer than the distal joint. Antennae with long scape of equal length to proximal segment of the maxillary palps and 4.4 × longer than pedicel. Pronotum with two pairs of setal warts. Mesonotum, mesoscutellum and metascutellum with one pair of setal warts. Fore leg anterior spur about 2.0 × longer than posterior spur. Wings (Fig. 4): anterior wing length 3.3 mm. R_{2+3} bifurcate about midway on discoidal cell and opposite to bifurcation of M vein. Crossvein R_3-R_{4+5} opposite to bifurcation of R_{4+5}. Cu_1 and Cu_2 run parallel through their length. Hind wing length: 2.3 mm; with 22 hamuli. Fork 1 length about one third stalk length. Crossvein R-M closely opposite to bifurcation of R. Crossvein M-Cu_1 very short. Fork 5 present; Cu_{1a} joins crossvein M-Cu near M_{3+4}. Abdomen with truncate sternal process VI. Genitalia (Figs 5, 7, 12-15): segment IX with a horizontal and vertical apodeme. Superior appendage slightly club-shaped (Figs 12, 13), located laterally on the segment, above the horizontal IXth lateral apodeme. Gonocoxite primary branches divide into a posterioad curved upper branch and a tapering, slightly mesad curved lower branch (Figs 5, 12, 13). Lower branch with long setae on ventro-basal part, shorter setae on the lateral and distal parts (Fig. 5). Ventral branch of gonocoxites about as long as lower branch; slightly curved ventrad and with apical setae. Tergum X substraight, but distally slightly curved dorsad and with truncate apex (Fig. 13). Ten pairs of strong setae located in three groups on dorsal margin of segment: two basal pairs, three median pairs and five distal pairs (Figs, 7, 11). Phallus basally straight and distally slightly bent ventrad (Fig. 13).

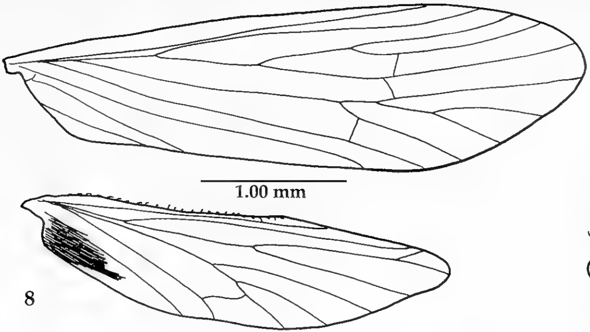
Female (Figs 8-9, 12-15). Wings (Figs 8-9): Anterior wing length 3.8 mm. Fork 1 as in male. Crossvein R_3-R_{4+5} located proximally to crossvein R-M. Forks 3 and 4 present. Fork 5 absent. Posterior wing length 2.8 mm. Fork 1 about one third length of R_{2+3}. R_{4+5} as long as M_1. Crossvein Cu1-M_{3+4} long and slightly sigmoid. Anal area with long, dark setae (Figs 8, 9). Abdominal sternite VI with truncate process present. Abdominal segment VIII laterally and ventrally with areas of small cells surrounding dark, circular oriented microtrichia (Fig. 12); sternite VIII with eight long stout setae oriented transversally on posterior half (Fig. 11). Genitalia (Figs 10, 12-15): Posterior margin of segment IX convex in lateral view (Fig. 13). Segment X, in lateral view, with dorsal branch tapering and slightly longer than ventral branch (Fig. 13); in dorsal view rounded and with several dorsolateral setae (Figs 10, 12); ventral branch smooth and rounded in lateral view (Fig. 13) and posteromedially notched in dorsal view (Fig. 10). Spermathecal sclerite subrectangular in dorsal view (Fig. 14). Ductus spermathecae posteriorly slender, with undulated margin, running anteriorly into slightly sclerotized and thicker part covered by microtrichia. Spermathecal gland slender, originating medially on posterior part of ductus spermathecae. Ductus bursae posterioally as long as spermathecal sclerite (Fig. 13).

Etymology. *Copulata*, from latin *copula*, referring to the copulatory state of the types of the species.

Remarks. The male genitalia closely resemble those of *Helicopsyche bellangrensis* Johanson, *H. tillyardi* Mosely and *H. neboissi* Johanson. The male *H. copulata* is easily distinguished from *bellangrensis* by the long scape and joints of the maxillary palp; the absence of long, dark setae on the anal region of the posterior wings; a shorter and thicker phallus; and the absence of lateral process on tergum X and the straight dorsal branches of the gonocoxite. It is distinguished from *tillyardi* by the absence of long, dark



Figs 1-7. *Helicopsyche copulata*, spec. nov. **1.** ♂ head, lateral view. **2.** ♂ maxillary palp, lateral view. **3.** ♂ head, dorsal view. **4.** ♂ right wings. **5.** ♂ genitalia, ventral view. **6.** ♂ genitalia, lateral view. **7.** ♂ genitalia, dorsal view.



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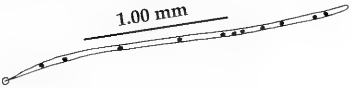

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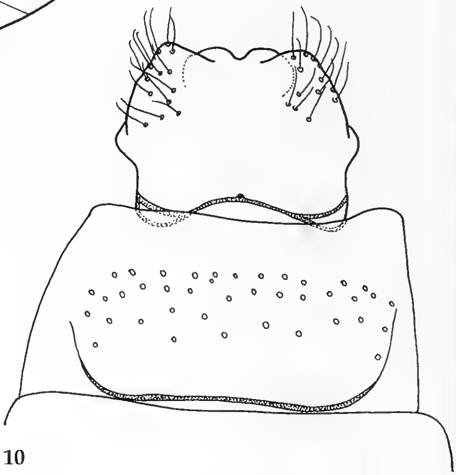

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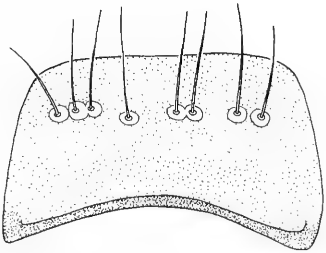

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Figs 8-11. *Helicopsyche copulata*, spec. nov. **8.** ♀ right wings. **9.** ♀ seta from anal area of hind wings, highly magnified. **10.** ♀ genitalia, dorsal view. **11.** ♀ sternite VIII, ventral view.

setae in the anal region of the posterior wing; narrower and ellipsoid division of the ventral branch of the gonocoxite; and the absence of a lateral process of tergum X. It is separated from *neboissi* by the IXth segment being anteriorly ellipsoid; tergum X, in dorsal view, apically more rounded and deeper divided; and the dorsal branch of the gonocoxite diverging.

The female is similar to those of *bellangrensis* and *tillyardi* but is easily distinguished by the long, dark modified setae in the anal region of the posterior wings; and, in dorsal view, the deeply incurved ventral branch of the Xth tergum.

Copulatory mechanism

The three parts of the male gonocoxites are all located on the external part the female genitalia (Fig. 12). The lower primary branches are pointed and bent mesad like large hooks; the upper primary branches are covered with strong setae on the inside. The ventral branches meet the posterior margin of the female segment IX and are not inserted (Fig. 13). Tergum X is inserted into the vagina together with the phallus immediately below (Fig. 13). The Xth tergite dorsal setae are directed slightly anterodorsad, forming spiniform hooks (Fig. 13). About half of the sclerotized part of the phallus is inserted into the female so that the apex of the posterior sclerotized part is located approximately opposite the apex of the Xth tergum (Fig. 13). The membranous part of the phallus is strongly erect, forming a dorsal and a posterior part (Fig. 13). The posterior erected part covers the posterior part of the spermathecal

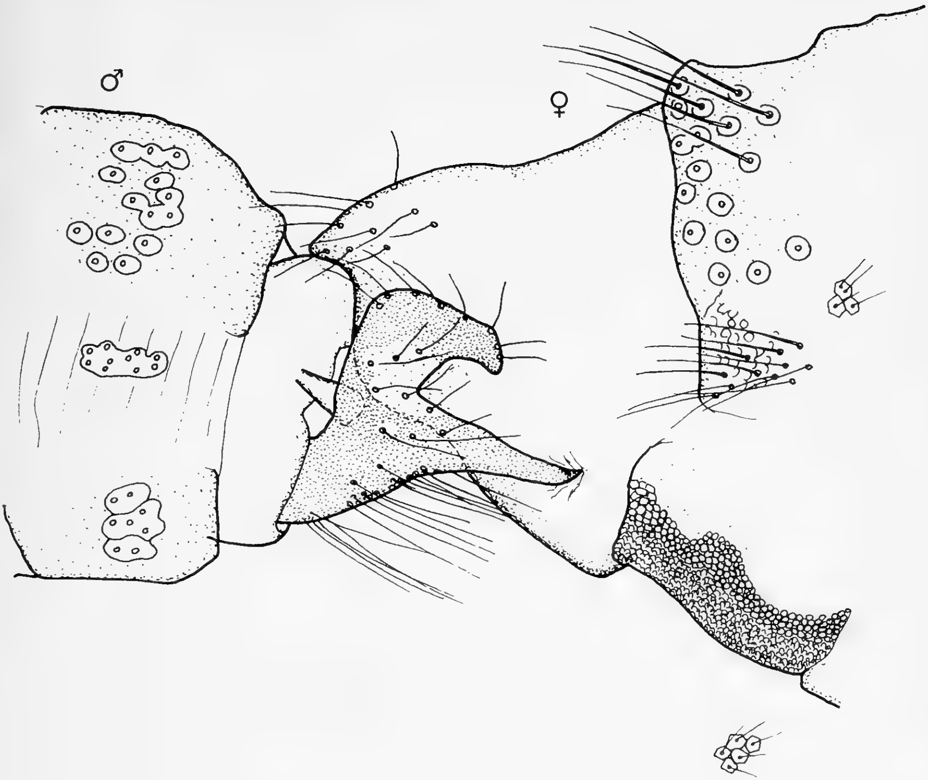
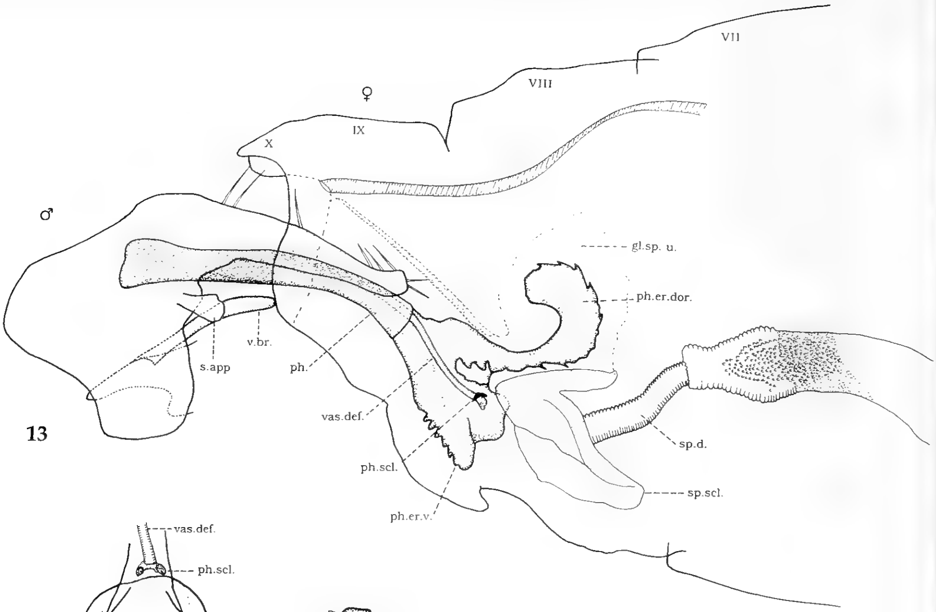


Fig. 12. *Helicopsyche copulata*, spec. nov., ♂ and ♀ in copula, lateral view from outside. Small cells of segment VIII highly magnified.

sclerite. The dorsal part is bifurcated into two lateral branches and runs dorsad into the spermathecal gland forming an S-shaped structure in lateral view (Fig. 13). The posterior margin of the dorsal part is covered by small microtrichia (Figs 13-15), and the microtrichia seem to touch both the dorsal part of the spermathecal sclerite and the anterior part of the colleteral duct (Fig. 13). The vas deferens of the phallus ends in the phallic sclerite (Figs 13-15).

Discussion

In Trichoptera the gonocoxites are generally considered inserted into female during the copulation. Studies on *Hydropsyche* (Tobias 1972, Unzicker 1968) and *Cheumatopsyche* (Denning 1943, Stätzner 1974) strengthened this hypothesis. In these examples from hydropsychids, the male gonocoxite is used to hold the female tight during copulation by insertion of the harpago into lateral pockets (= clasper receptacles (Denning 1943)) of the segment IX of the female. In most Helicopsychidae species, the gonocoxites are apically curved mesad, or have strong mesad directed setae on the inner part. They thus grip the female during copulation. Some species, like the East African *Helicopsyche* (Johanson 1993) all have strongly mesad curved ventral gonocoxite branches, and these are obviously very effective grabs. In male *Helicopsyche barbata* Johanson, 1993 a pair of lateral, pointed processes on tergite X of the male, previously termed phallus grip (Johanson 1993), probably have the same function of holding the female tight during copulation. The processes are probably inserted into ventrolateral pockets of the



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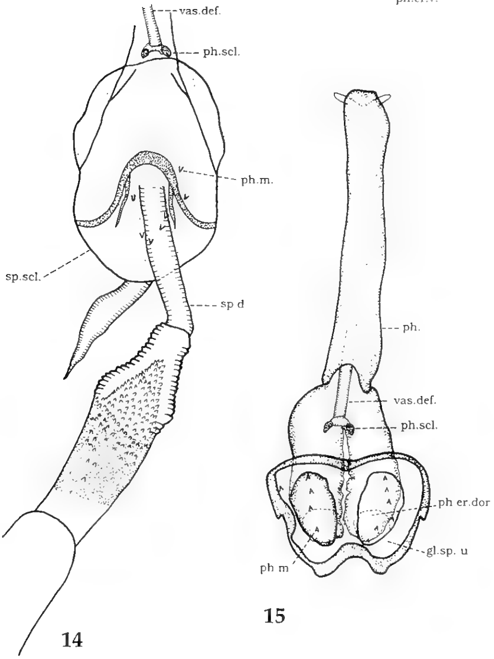

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Fig. 13. *Helicopsyche copulata*, spec. nov., ♂ and ♀ in copula, lateral view. The primary branches of the gonocoxite are excluded. Abbreviations: **gl.sp.u.**: upper part of the spermathecal gland. **ph.**: phallus, sclerotized part. **ph.er.dor.**: dorsal erected membranous part of phallus. **ph.er.v.**: ventral erected part of phallus. **ph.scl.**: phallotremal sclerite. **s.app.**: superior appendage. **sp.d.**: ductus spermathecae. **sp.scl.**: spermathecal sclerite. **v.br.**: ventral branch of gonocoxite. **vas.def.**: vas deferens. VII-X refer to the number of abdominal tergites.

Figs 14, 15. *Helicopsyche copulata*, spec. nov. **14.** ♂ and ♀ in copula, relative position of male phallic sclerite and the female spermathecal sclerite, dorsal view. **15.** ♂ and ♀ in copula, phallus, with orientation of erected membranous part near the roof of what is believed to be the spermathecal gland. Dorsal view. Abbreviations: **gl.sp.u.**: upper part of the spermathecal gland. **ph.**: phallus, sclerotized part. **ph.er.dor.**: dorsal erected membranous part of phallus. **ph.m.**: phallic microtrichia. **ph.scl.**: phallotremal sclerite. **sp.d.**: ductus spermathecae. **sp.scl.**: spermathecal sclerite. **vas.def.**: vas deferens.

female segment IX. In species like *Cochliopsyche vazquezae* strongly sclerotized, toothed structures are present distally on the mesal part of the gonocoxites. These structures possibly have the function of holding the female tight. In most of the New World and Oriental species of *Helicopsyche* the gonocoxites are ventro-basally covered by strong setae or megasetae. These setae might be effective in holding the ventral part of the female sternite IX. Most of the New World *Helicopsyche* have strong megasetae on the apical part of the ventral gonocoxite branches. The function of these branches is unclear because they are usually very short, and in many species the megasetae are oriented posterioad. They do, probably, touch upon the posteroventral part of the female segment IX, and possibly force the male genitalia into a fixed dorsoventral position. It is unclear whether the basal branches of the Australian *Helicopsyche* have the same function. Their length and form differ strongly between species, and probably havea more species-dependent function. Similar structures are found in European and Oriental *Helicopsyche* species.

The superior appendages seem not to be directly involved with copulation and their sexual function is unknown.

The significance of tergum X has been discussed earlier for Hydropsychidae. During copulation the Xth tergite of the male *Hydropsyche ornatula* [McLachlan] is oriented below the female tergite X and into the female segment IX (Tobias 1972). The male tergite X is not observed inside the female in this family. In *Helicopsyche copulata*, spec. nov. a large part of the tergum and megasetae is injected into the female vagina. The megasetae apparently function as hooks and probably work together with the gonocoxites to keep the male locked in a certain position during copulation.

The length, thickness and number of setae on tergum X vary consistently between species, and some extreme forms appear in the Australian *Helicopsyche curva* Johanson, 1995b and *Helicopsyche cochleaetesta* Korboot, 1964. In these species the setae are very long and thick and are assumed to be harmful to the female when tergum X is pulled out. Whether tergite X is inserted into the female vagina of these species, as in *H. copulata*, spec. nov. is not known, but it is reasonable to assume they are. Similar, but shorter setae are found in species of the New Caledonian *Helicopsyche vallonia* Ross, 1956 and *H. starmuehlneri* Ross, 1956. In some species, e.g. *Helicopsyche petersorum* Ross, 1956, *H. caledonia* Ross, 1956, *H. lapidaria* Ross, 1956, *H. boularia* Ross, 1956, and *H. hollowayi* Ross, 1956 the megasetae are even elevated on a dorsal process.

The phallic sclerite seems to be pulled by the erected membranous phallic mass. The vas deferens, which is attached to the phallic sclerite, thus gets in close contact with the spermathecal sclerite. During copulation, the sclerite and vas deferens come in contact with the spermathecal sclerite for sperm delivery into the ductus spermathecae. Different phallic sclerous processes are present in other Helicopsychidae species. The primary function of all these processes is uncertain, and not necessarily identical for all species. In the Oriental *H. maculata* the processes are directed posterioad and are long, straight and strongly pointed. In the African *Helicopsyche* species they are shorter, often covered with microtrichia. In Australian species, the processes are lacking, or if present short and nail-like or trianguloid. In *H. ptychopteryx* they are thin, pointed and strongly sickle-shaped.

The present study of copulation mechanism within Helicopsychidae is based on only one species. However, the genitalic appendages of other species in the group might possibly have the same function as in *H. copulata*. Some species within other families have strongly modified gonocoxites and tergites X, and the specific function of these structures certainly cannot be determined without critically examining each case. As shown by Stätzner (1974) the shape and length of the gonocoxite and the shape of tergite X of *Cheumatopsyche* are important taxonomic characters. He also demonstrated that hybridization between species can be prevented by these differences in shape and lengths. Due to the insertion of tergite X into the female vagina of *H. copulata*, spec. nov., and possibly other Helicopsychidae as well, the chaetotaxy of this segment is probably a very important taxonomic features of the Helicopsychidae. Not only the size, but also the number and position of setae on the segment should be focused on in the future systematics of the group.

Acknowledgements

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Review of the Australian-Papuan *laevigatus*-group of the genus *Catascopus* Kirby, with description of a new species

(Insecta, Coleoptera, Carabidae, Lebiinae)*

Martin Baehr

Baehr, M. (1997): Review of the Australian-Papuan *laevigatus*-group of the genus *Catascopus* Kirby, with description of a new species (Insecta, Coleoptera, Carabidae, Lebiinae). – Spixiana **20/3**: 227-234

The Australian-Papuan *laevigatus*-group sensu Straneo (1994) of the genus *Catascopus* is reviewed according to newly collected material mainly from New Guinea. The male genitalia of all species are figured for the first time and the description of *C. latus* Darlington is updated and completed as the ♂ is now available. *Catascopus riedeli*, spec. nov. is described from the westernmost part (Vogelkop) of Irian Jaya (New Guinea). It is next related to *C. laticollis* Macleay of Australia.

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In a sample of carabids, collected by A. Riedel (München) at several times and localities in western New Guinea (Irian Jaya), and kindly submitted for study by the collector, I detected inter alia a specimen of *Catascopus* of the *laevigatus*-group (called group 6 in Straneo 1994) that I was unable to identify using the key of Darlington (1968), nor by comparison with the other known species of that group. Also Straneo, who was at that time just finishing his review of the genus *Catascopus* in the Oriental and Australian regions, did not know this species and returned it to me undetermined. Repeated comparisons with all known species that possess several lateral pronotal setae convinced me that it represents a new species which is described below.

Thus far few ♂ genitalia have been recorded in the genus *Catascopus*. To give an example that aedeagi in *Catascopus* are by all means useful for species differentiation, the aedeagi of all species of the *laevigatus*-group (including the outstanding *C. latus* Darlington the unknown ♂ of which is now available) have been dissected and are figured herein, and are also used in the key.

Although the brightly coloured, splendid *Catascopus* species make highly prized collectors items and thus have been always eagerly collected and worked on, Straneo (1994) in his review of the Oriental and Papuan *Catascopus* was able to describe as many as 11 new species from these areas. This is evidence that the *Catascopus* fauna of the Oriental and Australian regions even now is certainly not exhaustively recorded. The review of the rather small *laevigatus*-group that certainly forms a well characterized monophyletic unit may show this as an example.

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* Results of the entomological collections of A. Riedel (München) in New Guinea in 1993 and 1996.

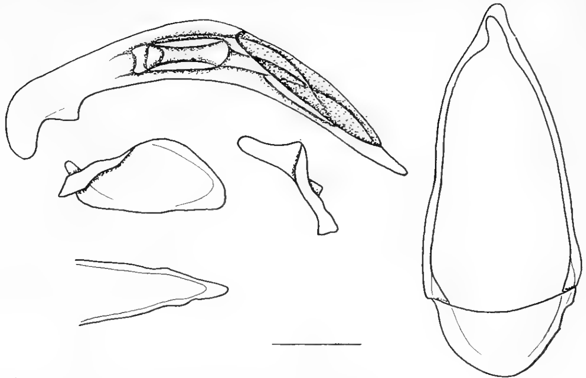


Fig. 1. *Catascopus laevigatus* Saunders. Adeagus. Scale: 0.5 mm.

Measurements

Measurements were made with a stereo microscope using an ocular micrometer. Length has been measured from apex of labrum to tip of elytra including sutural spines. Length of pronotum was taken along midline. Hence, measurements may slightly differ from those of other authors, especially Darlington (1968).

Abbreviation of collections

BMNH	The Natural History Museum, London
CBM	Collection M. Baehr, München
ZSM-CBM	Zoologische Staatssammlung, München – as permanent loan in the collection of the author.

Key to the species of the *laevigatus*-group of genus *Catascopus* (group 6 of Straneo 1994)

1. Large species, length >17 mm; aedeagus comparatively short and stout (Fig. 4). New Guinea .... C. *latus* Darlington

– Smaller species, length <14 mm; aedeagus longer and narrower (Figs 1-3, 5). New Guinea, northern Australia, Aru Islands, eastern Moluccas .... 2.

2. Humeri projecting, obtusely angulate; elytra distinctly ovalish, with wide lateral margin; striae barely impressed, though markedly punctate; lateral margin of pronotum narrow throughout, anterior angle with several elongate setae; aedeagus markedly elongate and delicate (Fig. 1). New Guinea, Aru Islands, eastern Moluccas .... C. *laevigatus* Saunders

– Humeri not projecting, evenly rounded; elytra rather parallel, with narrow lateral margins; striae impressed, less distinctly punctate; lateral margin of pronotum widened at least in basal part, anterior angle with 1-2 short hairs only; aedeagus stouter, less elongate (Figs 2-5). New Guinea, Australia .... 3.

3. Larger species, length >13 mm; striae barely punctate; fore body green with or without golden lustre, elytra green, or blue, or purplish, with or without green humeri; aedeagus stout though fairly elongate, markedly widened in middle (Fig. 3). New Guinea .... C. *sidus* Darlington

– Smaller species, length <12 mm; striae more or less distinctly punctate; colour either wholly green, or green with brigthly purplish humeri; aedeagus less stout, not markedly widened in middle (Figs 2, 5). New Guinea, northern Australia .... 4.

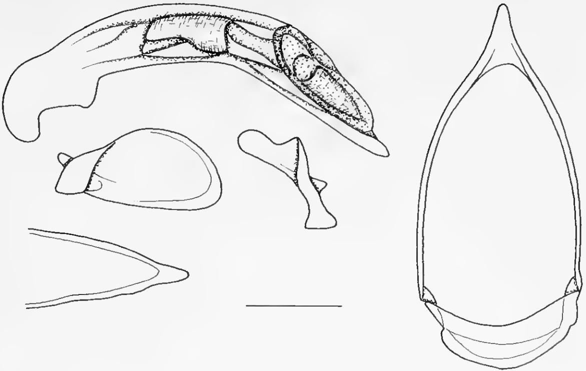


Fig. 2. *Catascopus laticollis* Macleay. Adeagus. Scale: 0.5 mm.

4. Slightly larger species, length 11-12 mm; colour green or green with indistinctly purplish humeri; elytral striae evenly impressed, barely punctate; lateral margin of pronotum wide in apical half; aedeagus longer, less curved, with shorter orificium and shorter and wider, straight apex (Fig. 2). Northern Queensland, Australia .... *C. laticollis* Macleay

– Slightly smaller species, length c. 10 mm; colour bright green with markedly purplish humeri; elytral striae impressed in basal half, superficial in apical half, distinctly punctate; lateral margin of pronotum narrow in apical half; aedeagus shorter, more curved, with longer orificium and longer and narrower, at tip slightly downcurved apex (Fig. 5). Western New Guinea .... *C. riedeli*, spec. nov.

Catascopus laevigatus Saunders
Fig. 1

Saunders, 1863: 465, pl. 18, figs 2a, b; Darlington 1968: 102, 104; Straneo 1994: 170.

This rather common and easily identified species is distributed throughout New Guinea; it occurs also on the Aru Islands and, according to Darlington (1968), on the eastern Moluccas: Batchian, Ternate, Halmahera, Buru, and Seram.

♂ genitalia (Fig. 1). Genital ring narrow and elongate, somewhat asymmetric, with elongate apex and elongate base. Aedeagus narrow and elongate, lower surface almost evenly curved, apex elongate, straight, orificium slightly shifted to left side, very elongate, almost occupying the apical half of aedeagus. Apex of internal sac with gently sclerotized fold. Both parameres comparatively elongate.

New records: I have seen about 15 specimens from various localities in Irian Jaya and Papua New Guinea (CBM, ZSM).

Collecting circumstances. Most specimens have been collected by sieving bark and litter from fallen logs in rain forest, mainly at rather low altitudes.

Catascopus laticollis Macleay
Fig. 2

Macleay, 1883: 410; Darlington 1968: 105; Straneo 1994: 170.

This is the single species of the *laevigatus*-group to occur in Australia. According to Darlington (1968) and Moore (1987) it has been recorded from several localities in northeast Queensland: Cairns, Kuranda, Iron Range, Coen area.

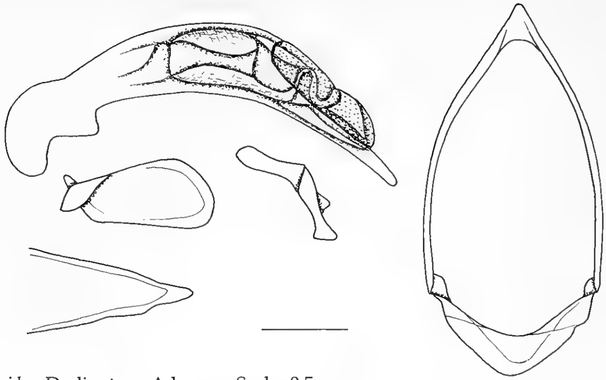


Fig. 3. *Catascopus sidus* Darlington. Adeagus. Scale: 0.5 mm.

♂ **genitalia** (Fig. 2). Genital ring rather wide, laterally evenly convex, almost completely symmetric, with narrow, elongate apex and rather short base. Aedeagus comparatively short and stout, lower surface in basal half almost straight, then rather distinctly turned down and straight again, apex short and straight, orificium slightly shifted to left side, rather short, occupying only the apical third of aedagus. Apex of internal sac with gently sclerotized fold. Both parameres comparatively short.

New record: The single specimen seen is purely labelled "ne. Qld" (CBM).

Collecting circumstances. Unknown, but presumably from under bark of trees and logs in rain forest, like related species.

Catascopus sidus Darlington
Fig. 3

Darlington, 1968: 102, 105, fig. 61; Straneo 1994: 170.

An apparently rather rare though nevertheless widely distributed species that occurs in both political divisions of New Guinea including Japen Island (Darlington 1968).

♂ **genitalia** (Fig. 3). Genital ring rather wide, laterally evenly convex, almost completely symmetric, with narrow, rather short apex and elongate base. Aedeagus comparatively short and stout, lower surface in basal half almost straight, then rather distinctly turned down and straight again, apex fairly short and straight, orificium slightly shifted to left side, rather short, occupying less than the apical two fifths of aedagus. Apex of internal sac with gently sclerotized fold. Left paramere comparatively short, right paramere more elongate.

New records: 1♂, Irian Jaya, Pr. Manokwari, Meydoudga, 1200-1400 m, 5.4.1993, leg. A. Riedel (CBM); 1♀, Irian Jaya, Pr. Manokwari, Testega, 1100-1300 m, 30.3.-12.4.1993, leg. A. Riedel (CBM); 1♂, Irian Jaya, Panai-Pr., Epomani-Ugida, km 179, 1350-1400 m, 19.-20.1.1996, leg. A. Riedel (CBM).

Collecting circumstances. The newly recorded specimens have been collected by sieving bark and litter from fallen logs in rain forest, at median altitudes.

Catascopus latus Darlington
Fig. 4

Darlington, 1968: 102, 104, fig. 60; Straneo 1994: 170.

Types. Holotype: ♀, W. Tami R., Pukusan-Humboldt Bay Dist., West New Guinea, June 1937, W. Stüber (BMNH).

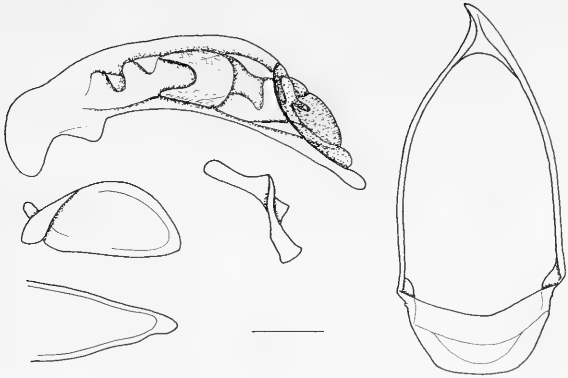


Fig. 4. *Catascopus latus* Darlington. Adeagus. Scale: 0.5 mm.

Note. Because this species was known only from the ♀ holotype and now a ♂ specimen is available, the description is completely revised.

Revised description

Measurements. Length (measurements of holotype ex Darlington 1968 included): 17.4-17.5 mm; width: 6.1-6.3 mm. Ratios. Width/length of prothorax: 1.55-1.77; width of base/apex of prothorax: 0.97-1.03; width of prothorax/width of head: 1.14-1.15; length/width of elytra: 1.69; width of elytra/width of prothorax: 1.39.

Colour. Head and pronotum green or dark green, elytra blue-purple or purple. Mouth parts, antennae, and legs piceous-black.

Head. Of average size. Eyes large, markedly protruding, orbits very small, oblique. Labrum elongate, anterior margin distinctly excised in middle. Mandibles of average size. Palpi fairly elongate. Mental tooth feeble, wide, obtusely triangular. Antenna comparatively short, median antennomeres <2 × as long as wide. Sulcus medially of eyes rather inconspicuous, surpassing posterior border of eye. Frons laterally with a rather deep, linear, oblique impression on either side, laterally of their posterior end with a deep umbilical puncture, frons in middle with some inconspicuous transverse lines. Labrum finely punctate, frons and vertex impunctate, without microreticulation, highly glossy.

Pronotum. Short and wide, rather convex. Apex deeply excised, slightly projecting in middle, anterior angles projecting, rounded off. Lateral border anteriorly evenly rounded, sinuate in posterior fourth, parallel in front of posterior angles. Basal angles rectangular, base gently excised in middle. Apex not margined, lateral margins in anterior half moderate, posteriorly explanate, base margined. Median line shallow, anterior sulcus in middle fairly deep, laterally shallow, posterior sulcus deep throughout. Basal grooves deep, short. Lateral margin in holotype (according to Darlington 1968) with 2 resp. 3, in the recently collected ♂ with 6 marginal setae in anterior ⅔ and with the posterior marginal seta at basal angle. Surface sparsely and extremely feebly punctate, with some superficial transverse lines, highly glossy.

Elytra. Moderately elongate, rather depressed, almost parallel-sided. Humeri evenly rounded, lateral margin faintly incurved in basal third, then slightly widened. Lateral apical angle angulate to even shortly spinose. Sutural angle spinose, spines fairly elongate, dehiscent, apical margin concave. Elytra fully and evenly striate, striae moderately impressed for their whole length, impunctate. All intervals moderately convex, 7th interval not carinate. Scutellar stria distinct, elongate. 3rd interval tripunctate, anterior puncture and seta adjacent to 3rd stria, median puncture situated in middle of 3rd interval, apical puncture adjacent to 2nd stria, the latter puncture situated far down the apical declivity. Marginal series consisting of 8 punctures behind humerus, 2-3 intercalar punctures in front of middle, 6 punctures in apical third of lateral margin, and 1 puncture near end of 3rd interval. Intervals almost impunctate, with moderately distinct, very fine microreticulation of transverse meshes, fairly glossy. Lower surface. Intercoxal process between procoxae and at apex with several short setae. Metepister-

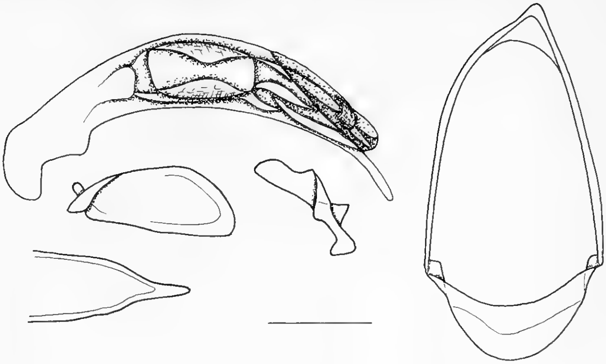


Fig. 5. *Catascopus riedeli*, spec. nov. Adeagus. Scale: 0.5 mm.

num very elongate, >2.5 × as long as wide. Terminal sternite of ♂ bisetose, apex in middle gently excised, excision very shortly pilose. In ♂ all sternites except for the terminal one laterally with a conspicuous, deep, circular impression, in middle with a large, densely setose patch, outside of this patch impunctate, glossy.

Legs. Of average size. 1st-3rd tarsomeres of ♂ protarsus biseriately squamose.

♂ genitalia (Fig. 4). Genital ring rather narrow, laterally evenly convex, almost completely symmetric, with narrow, elongate, markedly curved apex and rather elongate base. Aedeagus short and stout, lower surface slightly though almost evenly curved, apex short and stout, straight, orificium slightly shifted to left side, short, occupying barely the apical third of aedagus. Apex of internal sac with odd-shaped, gently sclerotized fold. Left paramere comparatively short and small, right paramere fairly elongate.

♀ genitalia. Unknown.

Variation. Some variation noted in width of pronotum and in the number of anterior lateral setae of pronotum.

Distribution. The holotype was recorded from northeastern Irian Jaya, the recently collected ♂ specimen was captured in central Irian Jaya rather close to the southern border of the central mountain range.

Collecting circumstances. Unknown of holotype. The newly captured ♂ specimen was collected by sieving litter from under fallen logs in rain forest of low altitude.

New record: 1♂, Irian Jaya, Jayawijaya-Pr. Samboca, 200 m, 10.-14.X.1996, leg. A. Riedel (CBM).

Catascopus riedeli, spec. nov.

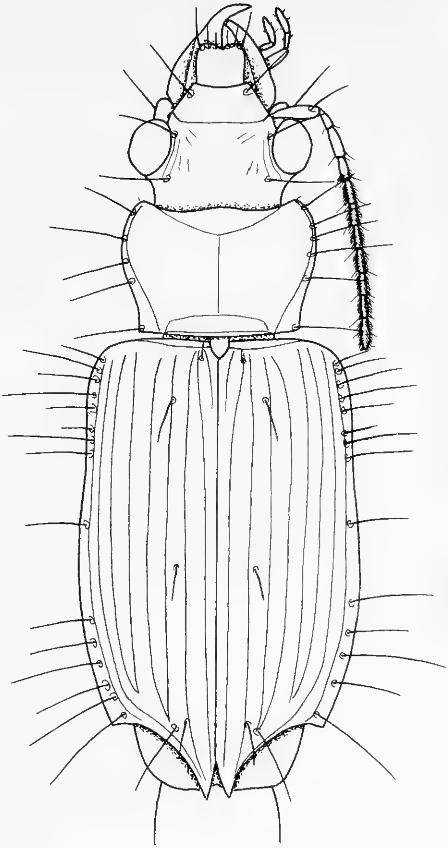
Figs 5, 6

Types. Holotype: ♂, Irian Jaya, Pr. Manokwari, Meydoudga, 1200-1400 m, 5.4.1993 leg. A. Riedel (ZSM-CBM).

Diagnosis. Species of the *laevigatus*-group (group 6 of Straneo 1994), that is characterized by the presence of several lateral pronotal setae. Distinguished from the most similar species *C. laticollis* Macleay by lesser size, more contrasting colour, narrow marginal channel in apical half of pronotum, distinctly punctate elytral striae that are deeply impressed only in basal third, and short, markedly curved aedeagus with longer and narrower apex that is slightly pointed down at the very tip.

Description

Measurements. Length (sutural spines included): 10.2 mm; width: 3.9 mm. Ratios. Width/length of prothorax: 1.60; width of base/apex of prothorax: 1.09; width of prothorax/width of head: 1.09; length/width of elytra: 1.65; width of elytra/width of prothorax: 1.43.



Figs 6, 7. *Catascopus riedeli*, spec. nov. Holotype. Length: 10.2 mm.

Colour. Head and pronotum bright green with some golden reflexions, though labrum and mandibles black. Elytra bright green, humeri and lateral part of apex cupreous. Lower surface piceous-black with slight greenish lustre. Palpi piceous with light reddish apex. Antenna piceous, basal antennomere blackish with slight metallic lustre. Legs dark piceous, tarsi slightly lighter.

Head. Of average size. Eyes large, markedly protruding, orbits small, oblique. Labrum elongate, anterior margin slightly excised in middle. Mandibles of average size. Palpi fairly elongate. Mental tooth very feeble, less developed than in other species of the group. Antenna comparatively short, median antennomeres <1.5 × as long as wide. Sulcus medially of eyes rather inconspicuous, surpassing posterior border of eye. Frons medially near clypeal suture with shallow v-shaped groove, in middle with some inconspicuous transverse lines, near eyes with some longitudinal lines. Surface impunctate, without microreticulation, highly glossy.

Pronotum. Short and wide, rather convex. Apex deeply excised, slightly projecting in middle, anterior angles projecting, rounded off. Lateral border anteriorly evenly rounded, sinuate in posterior fourth, parallel in front of posterior angles. Basal angles rectangular, base gently bisinuate. Apex not margined, lateral margins in anterior half narrow, then explanate, base margined. Median line shallow, connecting the shallow anterior sulcus and the deep posterior sulcus. Basal grooves deep, short. Lateral margin with 4 resp. 5 marginal setae in anterior ⅔ and with the posterior marginal seta at basal angle.

Apical angle with a tiny hair. Surface very feebly and sparsely punctate, with some superficial transverse lines, without microreticulation, highly glossy.

Elytra. Moderately elongate, rather depressed, almost parallel-sided. Humeri evenly rounded, lateral margin faintly incurved in basal third, then slightly widened. Lateral apical angle angulate, not spinose. Sutural angle spinose, spines rather short and stout, dehiscent, apical margin concave. Elytra fully striate, though striae distinctly impressed only in basal third, in posterior half merely consisting of rows of punctures. Especially 5th-7th striae rather conspicuously impressed near humeri. Striae rather coarsely punctate. Lateral intervals at humerus slightly convex, 7th interval even faintly carinate, all intervals depressed in apical half. Scutellar stria superficial, moderately elongate. 5th-7th intervals in apical fourth with shallow impression. 3rd interval tripunctate, anterior puncture and seta adjacent to 3rd stria, median and apical punctures adjacent to 2nd stria. Marginal series consisting of 8 punctures behind humerus, 1 intercalar puncture in front of middle, 6 punctures in apical third of lateral margin, and 1 puncture at end of 3rd interval. Intervals almost impunctate, with very superficial, extremely fine microreticulation of transverse meshes, highly glossy.

Lower surface. Intercoxal process with two short setae. Metepisternum very elongate, >2.5 × as long as wide. Terminal sternite of ♂ bisetose, apex in middle gently excised. Surface of abdomen impunctate, glossy.

Legs. Of average size. 1st-3rd tarsomeres of ♂ protarsus biseriately squamose.

♂ genitalia (Fig. 5). Genital ring rather short and wide, laterally convex, fairly asymmetric, with very short apex and elongate base. Aedeagus moderately elongate, lower surface almost evenly curved, apex elongate, narrow, at the very tip slightly curved down, orificium slightly shifted to left side, fairly elongate, occupying about the apical two fifth of aedagus. Apex of internal sac with gently sclerotized fold. Left paramere large and elongate, right paramere comparatively short.

♀ genitalia. Unknown.

Variation. Unknown.

Distribution. Vogelkop, westernmost New Guinea (Irian Jaya). Known only from type locality.

Collecting circumstances. Largely unknown. The specimen was collected under bark of a log in rain forest at median altitude.

Etymology. Named in honour of the collector.

Relationships. This new species belongs to the *laevigatus*-group (group 6 of Straneo 1994) and is probably most closely related to *C. laticollis* Macleay of northern Queensland and to *C. sidus* Darlington of New Guinea. The differences between the species of this group are tabulated above in a revised key to the *laevigatus*-group. The species-group itself is highly evolved in several aspects: high number of lateral pronotal setae, spined internal and at least angulate external angle of elytra, depressed form. Thus far the group is known only from New Guinea, northern Australia and some islands to the west of New Guinea, which means that it is a genuine Papuan faunal element – another example of the presence of a definite zoogeographic Papuan Subregion.

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Nouvelles espèces asiatiques appartenant aux genres *Paradromius* Fowler et *Dromius* Bonelli (II)

(Insecta, Coleoptera, Carabidae, Lebiinae)

Joaquín Mateu

Mateu, J. (1997): Nouvelles espèces asiatiques appartenant aux genres *Paradromius* Fowler et *Dromius* Bonelli (II) (Insecta, Coleoptera, Carabidae, Lebiinae). – Spixiana **20/3:** 235-244

The genera *Dromius* Bonelli, 1809 and *Paradromius* Fowler, 1996 from Southeast Asia are specially known by H. E. Andrewes' and A. Jedlicka's works during the XXth century, besides some descriptions of new species done by the author within the last years.

In this paper following new species are described: one *Paradromius* belonging to the subgenus *Rugadromius* and five *Dromius* belonging to the subgenus *Klepterus*. The first, *P. (Rugadromius) riedeli*, spec. nov. from Southern India is most closely related to *P. (Rugadromius) steno* (Bates, 1886), but is different by the striolation and punctuation on head and pronotum, jointly with some other features concerning strong elytral striation, convexity of the intervals and structure of aedeagus. Among the five new *Dromius*, three are from south India, one from NE India, one from Vietnam. All species differ principally by structure of their aedeagi and female genitalia. However, *D. (Klepterus) apterus*, spec. nov. shows a different structure of the prothorax and is altogether the single apterous (micropterous) species. Of the other species, three are winged (*D. rufocastaneus*, spec. nov., *D. meghalayanus*, spec. nov. and *D. ledouxi*, spec. nov.), and the last (*D. baehri*, spec. nov.), is brachypterous.

Finally, *D. (Klepterus) meghalayanus* from Meghalaya (Assam) and *D. (Klepterus) ledouxi* from Vietnam are easily distinguished by coulor, as head, prothorax, margins of the elytra, legs and antennae are yellow, but the four median intervals are entirely black, while in the other species the elytra are unicolourous brown or reddish.

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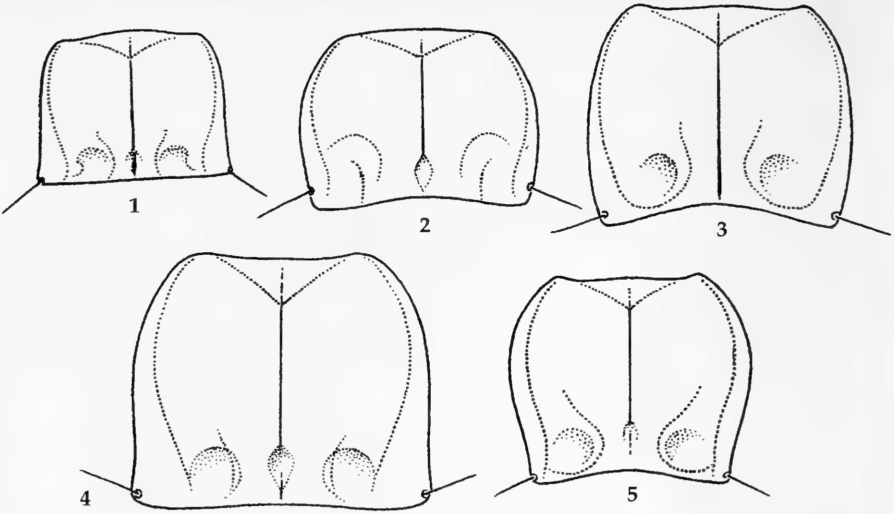
Introduction

Les *Dromius* et *Paradromius* asiatiques nous sont connus, en partie, grâce aux travaux de H. W. Bates au dernier quart du XIXè siècle aprés la description des genres par Bonelli (1809) et Fowler (1886), Bates décrivit diverses espèces de l'Inde et de la Birmanie et du Japon aussi. Nonobstant, sont bien les travaux de H. E. Andrewes du British Museum de Londres et de A. Jedlicka du Musée de Prague qui approfondirent davantage nos connaissances sur ces deux genres-là. Andrewes publia déjà en 1923 un tableau de détermination sur les espèces de l'Himalaya, *Dromius* et *Philorhizus* et développa ses études sur l'Inde, Birmanie et Indonésie tout au long des années 1920 à 1947. A son tour, A. Jedlicka dressa en 1940 un premier tableau déterminatif sur les *Dromius* de l'Est asiatique (y compris les *Lebidromius* décrits en 1931 par lui même). Puis, à l'occasion de décrire son genre *Obodromius*, 1947, il redonna un nouveau tableau des *Lebidromius* Jedlicka, 1931; finalement, en 1973 il reprenait l'ensemble du groupe



Figs 1-5. Pronotum des *Dromius*. **1.** *D. (Klepterus) rufocastaneus*, spec. nov. de l'Inde. **2.** *D. (Klepterus) meghalayanus*, spec. nov. de Meghalaya, Inde. **3.** *D. (Klepterus) baehri*, spec. nov. du S. Inde. **4.** *D. (Klepterus) ledouxi*, spec. nov. du Vietnam. **5.** *D. (Klepterus) apterus*, spec. nov. du S. Inde.

dans sa revision des Truncatipennes de l'Asie orientale séparant génériquement les *Paradromius Lebidromius* et *Dromius*, ainsi que les *Philorhizus* Hope, 1838, etc. Il faut dire, cependant, que cette revision de Jedlicka n'apporta aucune clarté sur la séparation en genres ou subgenres des *Paradromius* et *Philorhizus* par rapport aux vrais *Dromius*, *Lebidromius* et *Obodromius*!

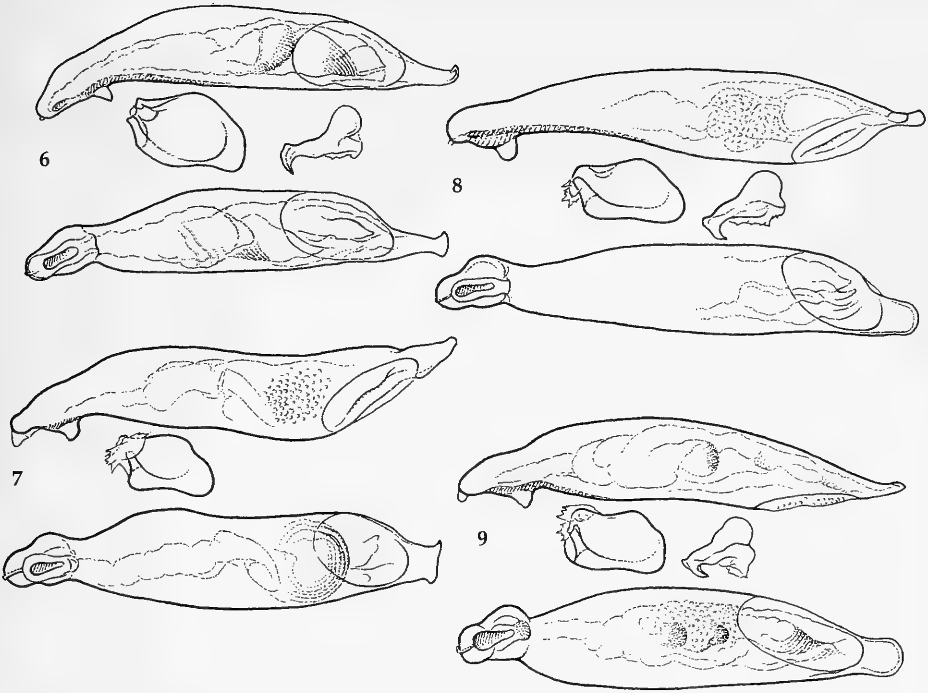
En 1955 O. Landin du Musée de Stockholm finit d'étudier les Carabiques de la Mission Suedoise dans l'Inde et en Birmanie, dont une partie avait été déjà étudiée et publiée en 1947 par Andrewes. Landin décrit encore quelques autres *Dromius* (4 espèces nouvelles), plus *D. tuberculipes* , spec. nov., qu'il maintient dans le genre *Dromius*, mais faisant partie du subg. *Dromiolus* Reitter avec le *D. adoxus* Andr. (*Dromiolus* Reitter, 1905 syn. de *Philorhizus* Hope, 1838); dans la même année, 1954, l'auteur suédois fait connaître son subg. *Rugadromius*, mais d'après lui inféodé au genre *Dromius* Bonelli.

Quelques années plus tard, 1967, parut l'ouvrage d'A. Habu sur les Truncatipennes du Japon et il écrivit sur le groupe qui nous occupe maintenant. Son étude aboutit à considérer *Paradromius* et *Lebidromius* simples sous-genres des *Dromius* Bonelli, mais il accepta la catégorie générique indépendante pour les *Philorhizus* Hope, 1938.

En ce qui nous concerne, nous avons aussi publié quelques articles entre 1977 et 1991 sur les *Dromius* et *Paradromius* d'Asie en décrivant quelques nouveautés de l'Arabie, du Buthan et du Japon; puis, en 1984, nous nous sommes occupés des *Paradromius* Fowler et des trois nouvelles espèces du sous-genre *Rugadromius* Landin, deux de l'Inde et une du Tonkin.

Dans cette brève esquisse sur les travaux et les auteurs qui ont travaillé sur les *Dromius* asiatiques, nous avons retenu seulement ceux qui l'ont fait d'une façon assez étendue sans tenir compte des quelques rares descriptions isolées, de même non plus, que des espèces appartenant à l'Asie paléarctique.

Dans les pages suivantes nous allons décrire maintenant une nouvelle espèce de *Paradromius (Rugadromius)* de l'Inde et 5 nouvelles espèces de *Dromius (Klepterus)* de l'Inde et du Vietnam du matériel reçu en communication des Musées de Paris, Munich, Basel et de notre collection. Signalons, pour finir, que le sous-genre *Klepterus* diffère essentiellement des *Dromius* s.str., par le manque de soies antérieures sur la marge du pronotum (ce caractère se retrouve aussi chez les *Paradromius*), et par la présence ou absence du dent labial. Cependant, ce dernier caractère nous paraît trop variable pour être retenu.



Figs 6-9. Edéage. **6.** *Paradromius (Rugadromius) riedeli*, spec. nov. du S. Inde. **7.** *Dromius (Klepterus) rufocastaneus*, spec. nov., du S. Inde. **8.** *D. (Klepterus) baehri*, spec. nov. du S. Inde. **9.** *D. (Klepterus) meghalayanus*, spec. nov. de Meghalaya, Inde.

Déscriptions

Paradromius (Rugadromius) riedeli, spec. nov.

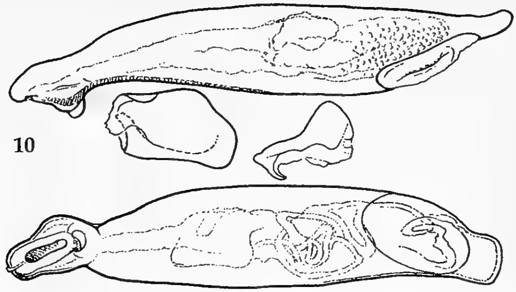
Fig. 6

Types. Holotype: ♂, Tamil Nadu, Kodaikanal, 14 km de Munnar, 26-VIII-1989 (Riedel leg.), au Musée de Munich (coll. Baehr).

Déscription. Long. 4.1 mm. Aptère. Couleur rouge brique foncée. Pattes, antennes et palpes flaves. Forme allongée, étroite avec des élytres étroits et peu élargis en arrière. Tête grosse, obtuse mais légèrement allongée et peu convexe, pubescente, les yeux assez grands et saillants. Tempes allongées et légèrement bombées. Front longitudinalement ridé-ponctué pas très profondément. Antennes fines et longues. Pronotum plus large que la tête, 1.15 fois plus large que longue et peu cordiforme. Angles postérieurs presque droits avec la sinuosité préangulaire longue et peu profonde. Surface pronotale ponctuée-rugueuse. Fossettes basales superficielles. Base rectiligne. Sillon médian assez fin n'atteignant pas les marges. Deux soies marginales. Elytres allongés, convexes, subparallèles et peu élargis en arrière, avec les épaules arrondies et effacées. Stries profondes, lisses, à intervalles bien convexes et lisses. Pas de strie suturale. Apex tronqué. Pattes longues et fines. Dernier ventrite légèrement échancré au milieu et bisétulé de chaque côté.

Edéage (Fig. 6) allongé et subrectiligne, avec son bord ventral à peine convexe; l'apex en pointe fine et retroussée.

Derivatio nominis. Dédié à son récolteur A. Riedel.



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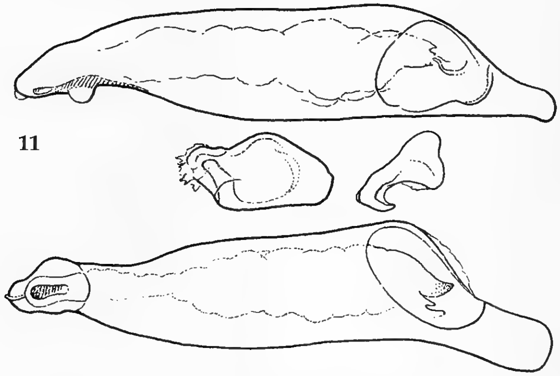

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Figs 10, 11. Edéage des *Dromius*. **10.** *D. (Klepterus) apterus*, spec. nov. du S. Inde. **11.** *D. (Klepterus)* ledouxi, spec. nov. du Vietnam.

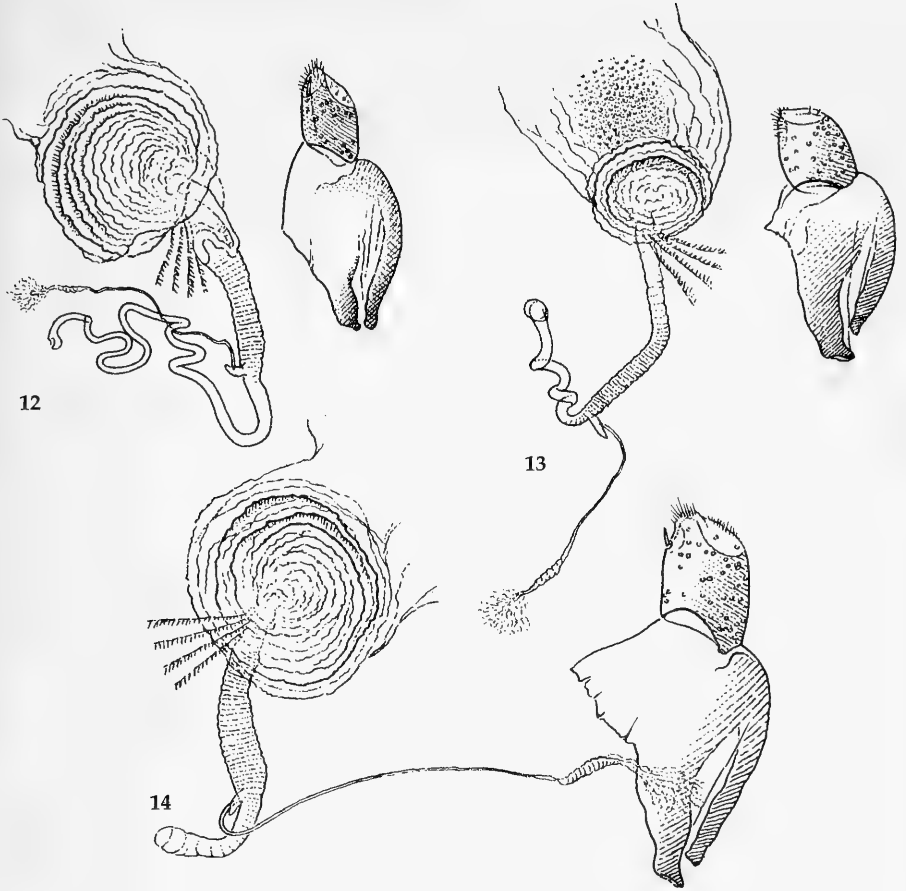
Remarques. Cette nouvelle espèce serait à rapprocher du *P. steno* (Bates, 1886), par sa couleur et par sa forme générale, mais elle en diffère par la ponctuation et ridulation de sa tête et pronotum; tête lisse au milieu, seulement ridée sur les côtés et pronotum entièrement lisse avec les angles postérieurs arrondis chez *steno*, tandis que chez notre nouveau *Paradromius* la tête est fortement ponctuée et longitudinalement ridée, le pronotum ridé a les angles postérieurs presque rectangulaires, les stries élytrales trés fortes, les intervalles trés convexes, édéage plus robuste à plateau apical plus large, droit et à petite pointe, etc. Ces caractères permettent de reconnaître notre espèce des cinq autres *Rugadromius* connus et publiés dans la révision du sous-genre (1984).

Dromius (Klepterus) baehri, spec. nov.

Figs 3, 8, 13

Types. Holotype: ♂, Ootacamund, Avelanche, Tamil Nadu, S. India 23-VIII-1989, (A. Riedel leg.), au Musée de Munich (coll. Baehr). – Paratypes: 12 ex. dont 3 récoltés avec l'holotype, et 9 autres d'Ootacamund, Pypkara, Tamil Nadu, S. India 20-24-VIII-1989 (A. Riedel leg.), au Musée de Munich (coll. Baehr) et dans notre collection; 4 ex. de Coonour, Nilghiris. S. India, 1500-2000 m. alt., 15-30-VII-1907 (M. Maindron leg.), au Muséum de Paris et dans notre collection.

Déscription. Long. 4.2-4.8 mm. Brachyptère. Brun foncé ou légèrement rougeâtre, le pronotum un peu plus clair sur les marges. Antennes, pièces buccales et pattes flaves. Forme générale assez allongée et convexe. Tête allongée, lisse et convexe, à tempes longues et obliques prolongeant obliquement la courbure des yeux qui sont modérément grands et saillants. Pronotum (Fig. 3) peu convexe, presque carré, un peu plus large que long (0.73 fois plus large que long) à côtés faiblement arrondis en avant et point en arrière où il est à peine sinueux; c'est à la base qu'il se trouve la largeur maximale du sclérite,



Figs 12-14. Appareil sexuel ♀ des *Dromius*. **12.** *D. (Klepterus) rufocastaneus*, spec. nov. du S. Inde. **13.** *D. (Klepterus) baehri*, spec. nov. du S. Inde. **14.** *D. (Klepterus) apterus*, spec. nov. du S. Inde.

elle est un peu concave au centre et rectiligne sur les côtés, bien réfléchis aprés le milieu. Angles antérieurs petits, un soupçon avancés, les postérieurs grands et pratiquement droits. Fossettes basales larges, peu profondes, tout au plus subrugueuses. Sillon médian bien marqué, arrivant en arrière jusqu'au bord basal aprés la profonde fossette médiane. Surface lisse, seulement on aperçoit quelques fines rides assez courtes post-discales. Il est 1.46 fois plus large que la tête avec les yeux compris. Elytres en ovale allongé, modérément convexes, rétrécis vers les épaules, celles-ci entièrement effacées. Apex sinueux au milieu avec les angles externes arrondis tandis que les angles suturaux sont petits et quasi jointifs. Stries superficielles presque lisses, de même que les intervalles, le 3è pourvu de quelques rares pores, peu visibles qui sont un peu plus nombreux et mieux marqués sur le 7è, accollés à la 6è strie.

Edéage catopique (Fig. 8), robuste mais allongé. Bulbe basal petit et fin, le dernier tiers du lobe médian lui aussi fin et étroit, le bord dorsal trés peu convexe, quasi rectiligne au centre, tandis que le bord ventral est trés épais et très fortement convexe dans sa portion apicale; l'apex termine en pointe courte, étroite, parallèle et vraiment très petite par rapport au lobe médian en entier, mousse à son extrêmité légèrement retroussée.

Appareil sexuel ♀ (Fig. 13), pourvu d'un gran sac vaginal au fond duquel s'insère le ductus de la spermathéque, long et cylindrique où débouche, sans interruption, le vrai "receptaculum seminis" un peu plus étroit et en spirale, au début duquel vient s'insérer le petit diverticule dactyliforme de la glande annexe; cette dernière est fine et d'une longueur à peu prés équivalente à celle du ductus de la spermathèque. Gonocoxite presque carré, pourvu au sommet du côté gauche d'un tuf pas très dense de courtes soies latéro-terminales.

Dominatio nominis. Dédié amicalement à M. M. Baehr du Musée de Munich.

Dromius (Klepterus) rufocastaneus, spec. nov.

Figs 1, 7, 12

Types. Holotype: ♂, Coonor, Nilghiris, 1500-2000 m. alt., S. India, 15-30-VII-1901 (M. Maindron leg.), au Muséum de Paris. – Paratypes: 15♂♂ et ♀♀, tous capturés avec l'holotype, exceptés 2 ex., dont l'étiquette de localité est labellée ainsi: Nilghiri, Coonour (M. Maindron) 1902; tous dans les collections du Muséum de Paris et dans la collection de l'auteur.

Déscription: Long. 3.7-4.2 mm. Ailé. D'une couleur brun plus ou moins rougeâtre, parfois la tête et le pronotum plus foncés, assez brillants. Antennes, pièces buccales et pattes flaves. Tête peu convexe, légèrement aplatie entre les yeux qui sont grands et convexes; pronotum (Fig. 1) semblant en avant à celui du *D. baehri* mais campaniforme; néanmoins, il est en moyenne de plus petite taille; les stries sont moins profondes (les intervalles presque plats), les internes plus fines et effacées le long de la suture dans la zone post discale, tandis que chez *baehri* les intervalles sont bien convexes et les stries profondes dans toute sa longueur. Ces caractères sont bien constants dans les deux espèces. Cependant ce qui les caractèrise le mieux sont les édéages: chez *rufocastaneus* (Fig. 7), le lobe médian est bien plus épais et robuste vu de profil, avec une pointe apicale nettement plus grosse, élargie à sa base et fortement retroussée au bout, le bord dorsal aplani au milieu, le bord ventral légèrement convexe dans sa portion apicale (bulbaire). Examiné à plat, c'est-à-dire, avec le foramen du bulbe tourné vers l'examinateur, le plateau apical se présente court et large, subparallèle et sinueusement tronqué à l'avant les pointes s'étirant anguleusement de chaque côté. Chez *baehri* (Fig. 8) l'édéage est allongé, visiblement fin et étroit sur la moitié basale ou bulbaire et très convexe sur la partie apicale du bord ventral ; vu de profil, l'apex est court, fin et parallèle, faiblement retroussé, le lobe médian est plus fusiforme avec le plateau apical un peu plus long, parallèle et tout à fait arrrondi au bout.

L'appareil sexuel ♀ nous montre aussi des différences entre les deux espèces (Figs 12 et 13). Dans *rufocastaneus* le ductus spermathecal est court, assez large et épais, avec le "receptaculum seminis" proprement dit, bien plus long, étroit et cylindrique, la glande supplémentaire longue et fine, bien plus longue que le ductus spermathecal; le gonocoxite est plus petit et allongé et comporte une phanère spiniforme prés du bord gauche du sclérite, à la base du groupe de soies sommitales. Chez *baehri* le ductus spermathecal est plus long et étroit tandis que le "receptaculum seminis" est plus court et robuste, la glande supplémentaire est également plus courte, la longueur est à peu près celle du ductus. En ce qui concerne le gonocoxite, celui-là est plus grand et plus large que celui du *rufocastaneus*, moins parallèle aussi, et manque de grosse phanère à la base des soies du sommet de le sclérite.

Les deux espèces ont été récoltées dans le sud de l'Inde dans des régions relativement proches.

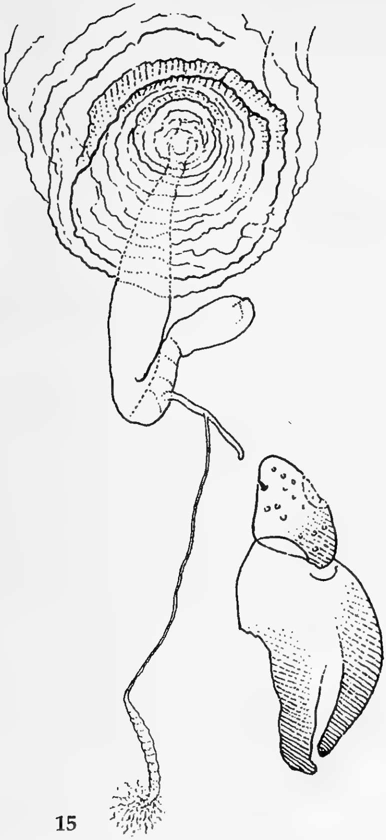
Derivatio nominis. De "rufus" rougeâtre et "castaneus" châtain, couleur de la châtaigne.

Dromius (Klepterus) meghalayanus, spec. nov.

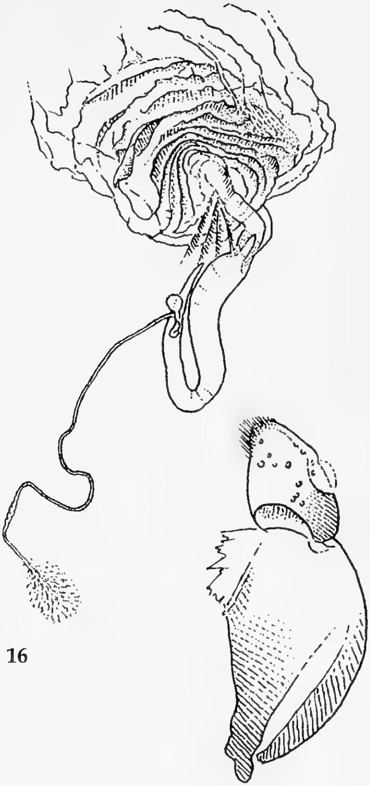
Figs 2, 9, 15

Types. Holotype: ♂, Derugi, Garo Hills, Meghalaya, NE. India, 450 m. alt., 19-V-1976 (Wittmer, Baroni, Urbani leg.), au Musée de Bâle. – Paratypes: 17♂♂ et ♀♀, récoltés avec l'holotype, au Musée de Bâle et dans notre collection.

Déscription. Long. 4.5-5.2 mm. Ailé. De couleur jaune parfois un peu rougeâtre y compris les antennes, pièces buccales et pattes. Elytres pourvus d'une longue tache noirâtre, en forme de flèche, qui s'étend depuis l'écusson jusqu'à presque l'apex, plus fine aux extrémités, elle s'élargit progressive-



15



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Figs 15, 16. Appareil sexuel ♀ des *Dromius*. **15.** *D. (Klepterus) meghalayanus*, spec. nov. de Meghalaya, Inde. **16.** *D. (Klepterus) ledouxi*, spec. nov. du Vietnam.

ment depuis le premier intervalle jusqu'à la zone discale où elle atteint sa largeur maximale (trois ou quatre intervalles internes). Sur le disque, les interstries foncées détachent una branche transversale, irrégulière, qui arrive jusqu'à la marge, ou presque; cette bande est plus étroite et moins obscure que la bande longitudinale, laquelle, aux environs des 4/5è de sa longueur totale rétrécit brusquement, en se poursuivant uniquement sur le 1er intervalle et disparaît peu avant l'apex.

D. meghalayanus, spec. nov., diffère aisément des deux autres espèces antérieurement décrites par la couleur tout autre et aussi par les caractères suivants: taille plus grande, tête petite, moins large avec le col plus fin et yeux gros et convexes. Pronotum transversal, (Fig. 2), 1.47 fois plus large que long, nullement campaniforme, les côtés peu arrondis mais rétrécis vers la base. Elytres longs, parallèles et convexes, 1.7 fois plus longs que larges, à stries lisses et interstries assez convexes. Edéage (Fig. 9) fin, allongé, dorsalement convexe et concave du côté ventral regardé de profil.

Appareil sexuel ♀ (Fig. 15), robuste, le receptacle épais, un peu sacciforme mais allongé, loin du fin ductus et du long et fin "receptaculum seminis" des espèces précédantes (voir figures); enfin, le gonocoxite est glabre dépourvu du tuf de soies terminales des deux autres espèces et seulement présentant une petite et courte phanère latérale.

Dominatio nominis. De Meghalaya, l'actuel nom de l'ancien Assam du NE de l'Inde.

Remarques. Par sa coloration jaune avec des bandes noirâtres sur les élytres cette nouvelle espèce pourrait se rapporter au groupe de celles déjà connues telles *Dromius macer* Andrewes, *indicus* Andrewes, *hauseri* Jedlicka, etc., voire le nouveau *Dromius* du Tonkin qui sera décrit dans les pages qui viennent. En plus, les genitalia chez les deux sexes diffèrent notablement, non seulement dans les espèces qui figurent ici dans cet article, mais aussi chez toutes les espèces décrites ou inédites que nous connaissons et que nous ferons connaître, au fur et à mesure, dans des prochaines publications.

Dromius (Klepterus) apterus, spec. nov.

Figs 5, 10, 14

Types. Holotype: ♂, Pulney Hills, S. India, 1898, (R.P. Castets), au Muséum de Paris. – Paratypes: 1♀, récoltée avec l'holotype, et 1♀ de Mts. Kodeikanal, S. India, 1898 (R.P. Castets) au Muséum de Paris et, dans notre collection: 1♀, Trichinopoly, S. India, 1898 (R.P. Castets); 1♂, 2♀♀, Kodaikanal, 18 km W de Munnar, S. India, (A. Riedel leg.) au Musée de Munich et dans notre collection.

Déscription. Long. 4.5-5.1 mm. Aptère. D'une couleur rouge brique foncée. Antennes, pièces buccales et pattes flaves. Tête plutôt allongée, à yeux modérément convexes e suivant la ligne des tempes, ce dernières obliques et bien rétrécies en arrière. Pronotum (Fig. 5) à peine convexe, faiblement subcordiforme et légèrement transversal, 1.27 fois plus large que long (type), les autres exemplaires fluctuent entre 1.27 et 1.33 fois plus large que long, à sinuosité latérale faible et allongée, les côtés peu élargis, assez rétrécis vers les angles antérieurs qui sont petits et peu avancés; les angles postérieurs sont subdroits ou faiblement obtus. Base presque droite, plus large que le bord antérieur. Fossettes basales pas trop petites mais assez profondes. Sillon médian très fin, les côtés un peu réfléchis en arrière. Le pronotum est plus large que la tête, 1.33 plus large que celle-là. Elytres convexes, allongés et peu élargis en arrière, l'apex tronqué. Humérus tout à fait effacés. Stries lisses et pas très profondes, les intervalles peu ou un soupçon convexes. Canal marginal étroit. Pas de strie scutellaire. Dernier ventrite pourvu de deux soies de chaque côté chez les deux sexes. Microsculpture assez forte sur tous les téguments, ce qui donne à l'insecte une texture assez terne et mate.

Edéage (Fig. 10) plutôt allongé, peu convexe sur les deux bords examiné de profil, avec l'apex petit, légèrement courbe et retroussé au bout. Regardé sur sa face ventrale, l'apex est court, large et parallèle, presque subtronqué en avant.

Appareil sexuel ♀ (Fig. 14) pourvu d'un "receptaculum seminis" dactyliforme court et assez large; glande supplementaire longue et fine, le ductus spermathecal épais et robuste; le gonocoxite montre une phanère latérale près du sommet, ce dernier étant pubescent aut bout.

Derivatio nominis. Du nom "apterus", aptère, c'est-à-dire manque d'ailes.

Remarques. La conformation du pronotum avec sa base plus large que le bord antérieur et ses côtés largement mais faiblement sinueux, avec leurs angles postérieurs subdroits, différencient bien cette espèce des autres que nous présentons dans cette note. L'aptérisme alaire aide cette constatation.

Un des exemplaires du Muséum de Paris est porteur d'une étiquette de détermination d'Andrewes lui même, avec le nom de *Dromius capnodes* Andrewes. Mais cette détermination est fausse, car le vrai *capnodes* décrit est dessiné par Andrewes en 1933 (habitus), montre qu'il s'agit d'une toute autre espèce. D'ailleurs, un cotype de celui-là se trouve dans les collections du Muséum de Paris, et il est absolument conforme à la description et au dessin qui figurent dans la description originale du *capnodes*. Bref, l'étiquette qui se trouve dans notre paratype est certainement un produit d'une erreur d'étiquetage. Egalement, un paratype d'*apterus* récolté par le Père Castets porte une étiquette des "Indes orientales, Kodeikanal". Kodaikanal est une localité du South India, presque à la pointe du subcontinent Indien et du côté occidental de cette pointe, non loin des célèbres Nilgiri Hills des anglais. Il est évident qu'il s'agit dans ce cas d'une mauvaise interprétation géographique et d'une mauvaise graphie de Kodaikanal.

Dromius (Klepterus) ledouxi spec. nov.
Figs 4, 11, 16

Types. Holotype: ♂, Tam-Dao, Tonkin (H. Perrot leg.), dans notre collection. – Paratypes: 1♂, 3♀♀, récoltés avec l'holotype; 5♀♀, N. Vietnam, Tonkin, prov. Vinh Phu, Tam-Dao, 6-9-V-1990 (C. Pacholátko leg.) au Musée de Bâle et dans notre collection.

Déscription. Long. 5.5-6.1 mm. Ailé. Allongé, peu convexe, d'une couleur jaune-brique, pattes et antennes plus claires, avec les intervalles 3-4 des élytres brun noirâtre, cette bande allongée se rétrécit postérieurement aprés le disque restant uniquement l'intervalle sutural foncé qui disparaît avant l'apex. Tête allongée, lisse, peu convexe, 1.9 mm., de largeur, à gros yeux convexes, tempes obliques et un peu moins longues que les yeux; col délié. Pronotum (Fig. 4) plus large que long, plus ou moins un peu campaniforme, peu convexe, les côtés arrondis en avant jusqu'aux angles antérieurs, nullement ou à peine avancés; à partir du milieu, les côtés se rétrécissent faiblement en ligne à peine concave, se redressant de nouveau près des angles postérieurs un peu saillants et arrondis. Base plus large que le bord antérieur presque subdroite ou légèrement arquée; surface pronotale avec de très légères ondulations transversales. Sillon médian modérément incisé. Gouttière marginale large, notamment en arrière près des fossettes basales, celles-ci lisses et assez grandes et profondes. Elytres allongés, subparallèles, convexes mais dorsalement aplanis. Humérus effacés. Stries lisses, intervalles internes inermes mais convexes, le 7è pourvu de 8 ou 9 pores adossés à la 6è strie. Apex subtronqué, sinueux au centre, les angles externes arrondis, les angles suturaux petits et presque jointifs.

Les deux sexes étant pourvus de 2 soies de chaque côté du dernier ventrite qui est subtronqué. Microsculpture assez forte, isodiamétrique sur la tête, plus fine et à maillons transverses sur le pronotum et quadrangulaires et encore plus superficielle sur les élytres qui sont plus brillants.

Edéage (Fig. 11) relativement proche à celui que nous avons décrit en 1977 du *D. buthanensis* du Buthan *(Lebidromius=Klepterus)*, excepté le lobe médian plus grand et allongé chez *ledouxi*, le plateau apical est plus court, à peine spatulé et subparallèle; l'apex, vu de profil a une base large et épaisse; le lobe médian est moins convexe mais plus long et sinueux sur les deux bords avec la pointe apicale plus courte et infléchie, tandis qu'elle est longue, parallèle et redressée dans l'espèce du Buthan qui montre, vu par dessous, un plateau apical avec l'extrémité fortement élargie, irrégulière et largement tronquée par devant.

Appareil sexuel ♀ (Fig. 16) assez semblable à celui du *buthanensis* Mateu, 1977, mais dans notre nouveau *Dromius* le conduit de la spermathèque est relativement allongé et robuste, tandis que le diverticule, ou dactylos, où débouche la glande supplémentaire est court et petit, terminé en boule sphérique, bien différents donc, aux mêmes organes du *buthanensis.*

Dominatio nominis. Nommé en hommage de notre collègue M. G. Ledoux, de Paris, qui nous a offert gentillement la courte série d'exemplaires de cette nouvelle espèce récoltée par H. Perrot.

Remarques. En plus des caractères fournis par les genitalia des deux sexes, *D. ledouxi* se sépare du *buthanensis* par sa plus forte taille, par son chromatisme tout autre, par la conformation de son pronotum, par ses intervalles élytrales lisses nullement caténulés, le troisième sans pores, etc. Enfin, cela nous permet de ne pas insister davantage sur les notables différences morphologiques et anatomiques qui caractérisent ces espèces.

Résumé

Les genres *Dromius* Bonelli, 1809 et *Paradromius* Fowler, 1886, de l'Asie méridionale sont connus spécialement grâce aux travaux des entomologistes H.E. Andrewes et A. Jedlicka le long du XXè siècle, plus quelques autres espèces en partie décrites par nous même dans ces dernier ans.

Dans cet article nous allons maintenant décrire un nouveau *Paradromius* du subg. *Rugadromius* du S. Inde plus cinq nouveaux *Dromius* du subg. *Klepterus*: 4 provenant du D. Inde et 1 du Vietnam.

P. (*Rugadromius*) *riedeli*, spec. nov. s'agit d'une espèce voisine du *P.* (*Rugadromius*) *steno* (Bates, 1886), dont il diffère par son pronotum, par la microsculpture et ponctuation des téguments, de même que par la striation des élytres et la conformation de l'édéage. Par la suite. nous décrivons les 4 *Dromius* de l'Inde et celui du Vietnam. Toutes ces espèces se caractérisent, surtout, par la structure édéagienne et par l'appareil sexuel W. En plus, *D. apterus*, spec. nov., présente aussi un pronotum différemment conformé, en plus il s'agit de l'unique

espèce aptère parmi celles que nous décrivons ici. Les autres *Dromius* inédits sont ailés, excepté *D. baehri*, spec. nov., généralement brachyptère. Signalons encore que les *D. meghalayanus*, spec. nov. et *D. ledouxi*, spec. nov. de l'Inde et du Vietnam sont ailés et se distinguent aisément des trois autres espèces par leur chromatisme: tête, pronotum, marge élytrale, pattes et antennes flaves, avec les 3-4 premiers intervalles internes des élytres entièrement obscurs ou noirs, tandis que les autres espèces ont les téguments uniformément bruns ou rouge brique. Quant au genitalia, ♂♂ et ♀♀ sont différents chez toutes ces espèces. Il est donc plus que probable, que l'Asie méridionale garde encore de nombreux Dromiini inconnus par la Science.

Remerciements

Nous remercions bien vivement M. Baehr du Musée de Munich, M. Brancucci du Musée de Basel, M. Th. Deuve du Muséum de Paris et M. G. Ledoux de Paris pour l'envoi du matériel qui a motivé l'étude que nous avons présentée.

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Taxonomy, ecology and descriptions of the larva, pupa and adult of the Australian hispine beetle, *Eurispa vittata* Baly

(Insecta, Coleoptera, Chrysomelidae)

T. J. Hawkeswood and **H. Takizawa**

Hawkeswood, T. J. & H. Takizawa (1997): Taxonomy, ecology and descriptions of the larva, pupa and adult of the Australian hispine beetle, *Eurispa vittata* Baly (Insecta, Coleoptera, Chrysomelidae). – Spixiana **20/3:** 245-253

The biology, host plant, larva, pupa and adult and other features of the Australian hispine beetle, *Eurispa vittata* Baly (Coleoptera, Chrysomelidae, Hispinae) are described. The species is apparently monophagous on the native sedge, *Gahnia sieberiana* Kunth (Cyperaceae: Monocotyledonae) growing in heathlands in New South Wales. The larva of *Eurispa* differs from the larvae of other described Hispinae in the Australo-Papuan region by having a very slender body without lateral processes and in the shape of the pronotum and the caudal processes of the abdomen.

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Introduction

The Hispinae are a major subfamily of the Chrysomelidae, most of which feed as adults and larvae on leaves of monocots such as the Poaceae and Arecaceae (Jolivet 1989, Macedo et al. 1994, Jolivet & Hawkeswood 1995). The Hispinae are mostly distributed in the tropical and subtropical regions of the world (e.g. Seeno & Wilcox 1982, Jolivet 1989) but there appear to be very few species recorded from Australia, despite the abundance of tropical and subtropical regions and suitable host plants. Almost nothing has been recorded on the biology and distribution of the Hispinae known from Australia.

During 1991, the first author provided preliminary observations on the biology and host plant of one species from Australia, namely *Eurispa vittata* Baly, which is very closely associated with the native sedge, *Gahnia sieberiana* Kunth (Cyperaceae) (Hawkeswood 1991). The genus *Eurispa* Baly belongs to the tribe Eurispini and is grouped with the genera *Leucispa* Chapuis from Australia and *Squamispa* Maulik from India (Seeno & Wilcox 1982). Nothing appears to have been recorded on the host plants and biology of the latter two genera (Jolivet & Hawkeswood 1995). All of the presently available data on the adults, larvae, pupae, host plants and ecology of *E. vittata* are recorded below. The larva, pupa and adult are described in detail because the species, although common, is poorly known and adequate descriptions of its life stages are lacking.

Observations

Study site

Most of the material used for our study of *E. vittata* has been collected from the township of Hastings Point, north-eastern New South Wales, Australia (c. 28°20'S, 153°35'E). The vegetation of the Hastings Point area has been greatly disturbed during the past decades by sand-mining, agriculture and clearing for residential developments, but there are still a few small areas that have not been disturbed or have been disturbed only slightly and which contain stands of healthy, native vegetation. The site where the majority of the material of *E. vittata* was collected consists of *Banksia* heathland merging into *Eucalyptus* woodland on the southern and western margins. Most of this vegetation occurs on a vacant block of land owned by a national telephone company and continues westwards to the base of a hill where the *Eucalyptus* woodland is better developed on the higher, better drained and deeper soils. The upper soil layers of the *Banksia* heathland habitat are mostly pale grey Holocene sands which are somewhat acid (pH=5.5-6.5) and severely leached. A number of small ephemeral creeks traverse the main study area, mostly from east to west. This area suffers bushfire damage about once every two to three years.

The vegetation of the *Banksia* heathland consists of the following main species: *Banksia aemula* R. Br., *B. robur* Cav., *Conospermum taxifolium* Sm., *Persoonia lanceolata* Andr., *P. virgata* R. Br. (Proteaceae), *Hibbertia* spp. (Dilleniaceae), *Ricinocarpos pinifolius* Desf. (Euphorbiaceae), *Acacia sophorae* (Labill.) R. Br., *A. suaveolens* (Sm.) Willd., *A. ulicifolia* (Salisb.) Court (Mimosaceae), *Aotus ericoides* (Vent.) G. Don, *Dillwynia retorta* (Wendl.) Willd., *Gompholobium virgatum* Sieb. ex DC., *Kennedia rubicunda* Vent., *Phyllota phylicoides* (Sieb. ex DC.) Benth. (Fabaceae), *Boronia falcifolia* A. Cunn. ex Lindley, *Zieria smithii* Andr. (Rutaceae), *Brachyloma daphnoides* (Sm.) Benth., *Epacris obtusifolia* Sm., *Sprengelia sprengelioides* (R. Br.) Druce, *Styphelia viridis* Andr. *(Epacridaceae), Dampiera stricta* (Sm.) R. Br. (Goodeniaceae), *Sowerbaea juncea* Sm. (Liliaceae sens. lat.), *Patersonia sericea* R. Br. (Iridaceae), *Lomandra longifolia* Labill., *Xanthorrhoea* spp. (Xanthorrhoeaceae), *Theymitra* sp. (Orchidaceae), *Gahnia sieberiana* Kunth, *G. erythrocarpa* R. Br. (Cyperaceae), *Xyris gracilis* R. Br. (Xyridaceae), *Baeckea stenophylla* F. Muell., *Callistemon pachyphyllus* Cheel, *Eucalyptus* spp., *Leptospermum whitei* Cheel, *L. semibaccatum* Cheel, *L. laevigatum* (Sol. ex Gaertn.) F. Muell., *Melaleuca quinquenervia* (Cav.) S. T. Blake (Myrtaceae) and *Cassytha glabella* R. Br. (Cassythaceae).

Notes on the host plant of *E. vittata, Gahnia sieberiana* Kunth (Cyperaceae)

Gahnia sieberiana is a coarse, caespitose perennial herb, growing to about 1.5 metres in height, with solid, terete stems each having four nodes. The leaves are long-linear, up to 80 cm long, 8-20 mm wide, situated mostly at the base of the stems and have closed sheaths. They are protected with abundant silica cells, especially on the lateral margins, which cut the skin if touched even lightly. The inflorescence is paniculate, and each branch is subtended by a more or less leafy bract. The spikelets are numerous, generally with two flowers each, with only the upper one perfect and fertile. Each flower is without a perianth and has 3-6 stamens and with a trifid style. The plants produce a globular, red-brown nut. In the study area, *G. sieberiana* occurs in both habitats, i.e. the *Banksia* heathland and the *Eucalyptus* woodland, but mostly occurs in exposed to semi-exposed positions in the heathland on lower ground where the soil is often wet for some period of time, e.g. along the banks of the ephemeral creeks that traverse the area. The species is rather common on the hind dunes but residential and other developments in the Hastings Point area and elsewhere along the coast of north-eastern New South Wales are reducing the heathland and associated woodland habitats and numbers of *G. sieberiana* have been steadily declining over the past decade along with common and less common native plant species.

Methods

Collection of adults and larvae of *E. vittata* – plants of *Gahnia sieberiana* were randomly selected and examined for the presence of beetles at various times during 1991-1995 and observations recorded. General collecting of adults and larvae were undertaken. During November and December 1995, more extensive observations and collections were undertaken. The number of adults and larvae collected/

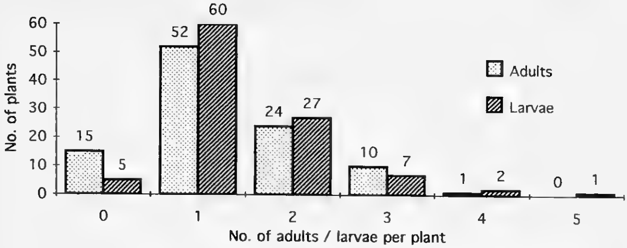

Fig. 1. Relationship between the numbers of adults and larvae (all stages) of *Eurispa vittata* Baly and the number of plants of *Gahnia sieberiana* Kunth (Cyperaceae) at Hastings Point, New South Wales, during November to December, 1995. (Graph: T. J. Hawkeswood & C. J. Parker).

observed from 102 plants of *G. sieberiana* were noted and a graph showing the numbers of adults and larvae (all stages grouped together) per plant was plotted (Fig. 1). All biological observations are described in the section following the descriptions of the life stages.

Descriptions

Eurispa vittata Baly

Eurispa vittata Baly, 1858: 86, plate II, Fig. 3; plate VII, Fig.1.
Eurispa vittata Baly (Figs 2a-h, 3a-d, this paper)

Adult male. Elongate, flattened, 9.5-11.5 mm long. Head black with deep purple reflections, deeply and coarsely punctate, each puncture with a short, stout silvery-golden seta; head about ¾ the diameter of the pronotum at the widest point; clypeus with long, silvery, anteriorly directed hairs; head in the lateral region developed forwards to cover part of the eye. Antennae black with purplish reflections, segment 1 almost globular, truncated at the basal margin to accommodate the shape of the head; segment 2 almost cylindrical, about twice as long as segment 1; segment 3 obconic, slightly narrower and longer than segment 2, wider at apex; segment 4 shorter, but longer than segment 1; segments 5 and 6 almost equal in size, obconic, about the same length as segment 1; segments 7-10 almost equal, thick and almost cylindrical; segment 11 same width at base as segments 7-10, then tapered in the ⅓ to ⅖ to a blunt point; segments 7-10 with a denser coverage of setae than the previous 6 segments. Pronotum about 1.2 times longer than wide, sub-parallel-sided but moderately constricted anterior to middle and weakly constricted anterior to base; deeply and densely punctured, more so at the lateral margins; with a mostly impunctate median central strip and a slightly raised impunctate area just anterior to middle. Scutellum black, subtriangular, impunctate, raised apically. Elytra about 4.0-4.5 times longer than the width of the body, glabrous, sub-parallel-sided, but weakly broadened behind middle; apex elongated, terminating in a long, sharp spine and a short, subapical sharp tooth; elytral disc very densely and regularly punctate, punctures situated in 10 longitudinal rows, the rows at the lateral margins very close to each other and sometimes merging; longitudinal sutural dark brown stripe extending to the third row of punctures laterally, longitudinal, narrow, marginal maroon-coloured stripe extending laterally from suture across puncture rows 6-9, both coloured stripes extending into the apical spine which is black at the tip from the mergence of these two coloured stripes. Underside of the body black, mostly glabrous and impunctate, with small and shallow punctures on the sides of the metathorax and on the abdominal segments mostly on the lateral and apical margins with a few on the basal (anterior) margin; prothorax densely and irregularly punctate; meso- and metathorax with wrinkles at the sides; a few scattered setae present on the lateral margins of the thoracic segments; apical sternite with dense setae at the apex. Legs shiny black with dense setae on the tibiae, setae less dense on the femora which have at least one area shiny and glabrous. Aedeagus narrow, parallel-sided, smooth, glabrous, non-wrinkled, c. 1.5 mm long, 0.15-0.2 mm wide, black, brownish-red at the apex, without dorsal and ventral longitudinal grooves, basal third (with basal piece) curved upwards to lie perpendicular to the rest of the aedeagus; apex acute; basal piece oval-shaped.

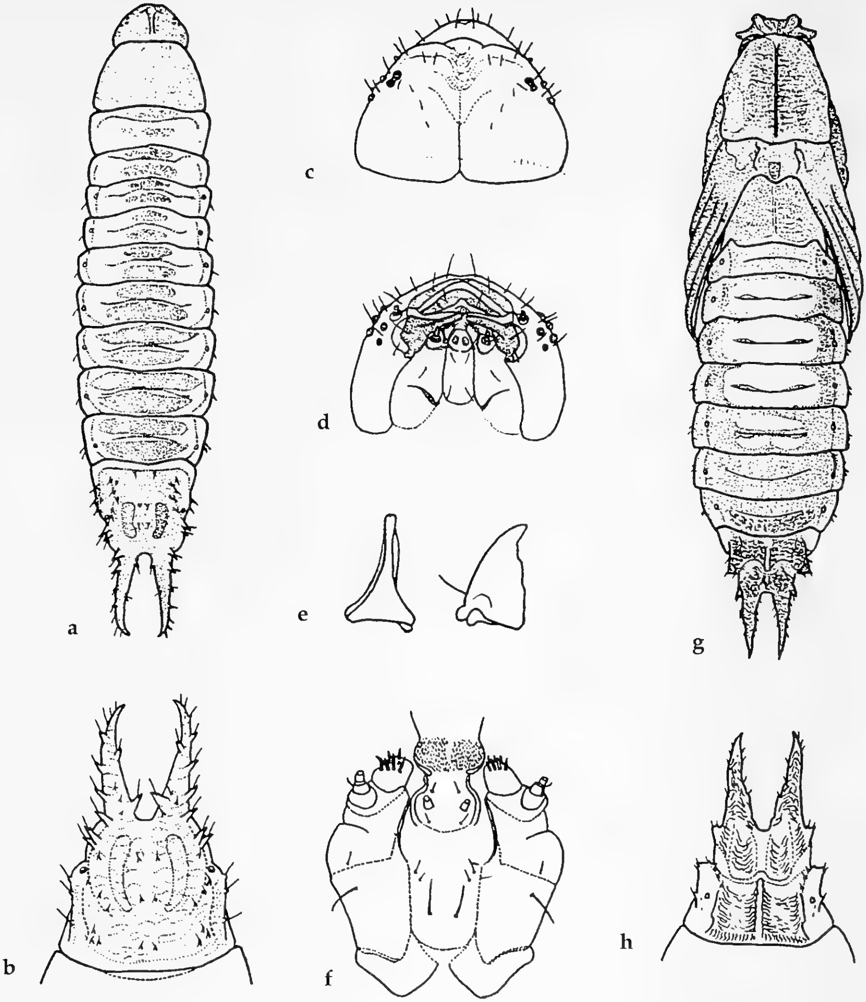

Fig. 2. *Eurispa vittata* Baly. **a-f.** Last instar larva. **a.** Dorsal view. **b.** Last abdominal segment showing caudal processes and spines **c.** Dorsal view of head showing position of ocelli and setae. **d.** Ventral view of head. **e.** Side and dorsal views of left mandible. **f.** Lower mouthparts. **g-h.** Pupa. **g.** Dorsal view. **h.** Last abdominal segment showing caudal processes. (Illustrations: H. Takizawa).

Adult female. Similar in morphology and colour to that of the male, but slightly longer, 12.5-13.0 mm long, and the sub-apical elytral tooth not as developed and acute as in the male.

Larva. Last instar larva (Figs 2a-f). Body (Fig. 2a) elongate, sub-parallel-sided without lateral processes, 12-13 mm in length, pale yellowish-brown with head, pronotum, two weakly transverse bands on each of meso– and metathorax, abdominal segments 1-7 and last abdominal segment slightly darkened (in alcohol preserved specimens). Head (Fig. 2c) prognathous, semicircular in outline, not deeply inserted into prothorax; coronal suture visible, frontal sutures poorly developed; frons markedly depressed and rugose along median line; clypeus well produced anteriorly, with a pair of longer setae medially; 5 or 6 ocelli present, well pigmented; antennae (Fig. 2d) short, two-segmented; labrum

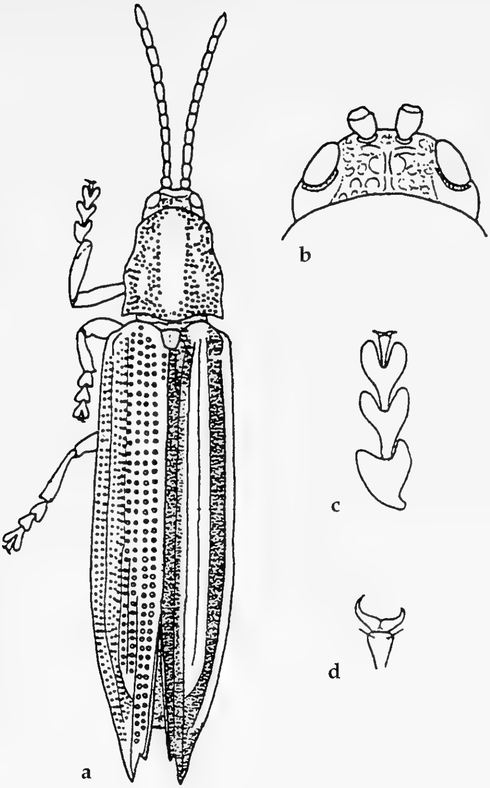

Fig. 3. Adult of *Eurispa vittata* Baly. **a.** Dorsal view. **b.** Close-up of dorsal part of head. **c.** Tarsus of left proleg. **d.** Close-up of tarsal claw of left proleg. (Illustration: H. Takizawa).

(Fig. 2d) weakly chitinized both basally and apically; mandible (Fig. 2e) flattened dorso-ventrally, with a narrow tooth; lower mouth-parts (Fig. 2f) very weakly chitinized, with mentum and maxillae almost fused together. Pronotum (Fig. 2a) evenly convex from side to side, with a row of microsetae along margin. Mesothorax, metathorax and abdominal segments 1-7 dorsally divided into two transverse areas (Fig. 2a), each with a median, transverse, darker, minutely wrinkled band; this band gradually widens from the lst to 7th segment; each abdominal segment dorsally with 6 or 7 microsetae; spiracles blackish, almost circular and prominently raised; last abdominal segment (Fig. 2b) entirely wrinkled, with a pair of longitudinal depressions which are raised laterally, surface of segment with numerous, small, brownish spinules and two pairs of larger teeth posteriorly to spiracle; caudal processes (Fig. 2b) stout, situated rather close to each other at base, gradually narrowed to acute apices, with about 5 or 6 larger spines. Legs stout and two-segmented, with a distinct pulvillus and claw.

Pupa. Mature pupa (Figs 2g-h). Body elongate, subparallel-sided without lateral processes, strongly chitinized and almost glabrous, 12-13 mm in length; caudal processes well developed; body light brown with venter and abdominal segments 2-5 medially yellowish-brown; head with a pair of small processes near base of antenna and with larger processes medially and laterally. Pronotum (Fig. 2g) almost as wide as long, narrowed anteriorly; pro– and metathorax transversely wrinkled on the dorsum. Abdominal tergite 1 (Fig. 2g) costate above spiracle; tergite 7 weakly wrinkled; last abdominal tergite costate longitudinally, laterally produced angularly at middle, with a pair of stout, straight apical processes; surface wrinkled with numerous minute spinules.

Specimens examined: 5 larvae, 3 pupae, 12 adults, Hastings Point, New South Wales, Nov.-Dec. 1995, T. J. Hawkeswood, from the foliage of *Gahnia sieberiana* Kunth (Cyperaceae) (TJH).

Field observations

Adults and larvae of *E. vittata* are usually found in the tight spaces between the basal unfolded parts of the leaves of the native sedge plant, *Gahnia sieberiana* Kunth (Cyperaceae). During mating, adults are often located and exposed on unfolded leaves at or near the ends of the leaves at the tops of plants. Young larvae are mostly found feeding on the newer, recently unfolded foliage in the centre of plants or amidst leaf bundles, at or near the tops of plants. They later crawl downwards towards the more tightly clustered leaves at the bases of plants. Wherever they feed, the larvae and adults chew extensive patches of mesophyll tissue between the parallel veins of the host plant leaves. These areas later become brownish in colour and are thus conspicuous on the plants. The mature larvae pupate at or near the base of the plant or leaf bundle between tightly clustered leaf bases. Adults are present concealed amongst the tight foliage for most of the year but numbers increase during the months of November to January but gradually decline again during February to April, reaching the lowest level during June and July. Adults which remain through the coldest months of May to September are most likely overwintering and possibly undergo some kind of dormancy as they are very sluggish when collected. Larvae are usually not present during the winter but young larvae first appear on the host plants during late October to early November. Eggs have not been observed in the field but are probably attached to dried leaves at the base of leaf bundles or more likely to foliage near the ends of leaves at the tops of the leaf bundles, from where the newly hatched larvae feed. Feeding by larvae and adults is usually extensive on several leaves per leaf bundle and occurs in one area for a period of time before they move to another area on the same leaf or an adjacent leaf. Flight was not observed and movement to other plants may not occur too frequently but when it does, the larvae and adults must crawl from one leaf to another one which is overlapping. No predation on larvae and adults by invertebrate or vertebrate predatörs has been observed, although an unidentified species of crab spider (Thomisidae) was common in the tightly folded leaf bases and a huntsman spider, *Isopeda* sp.(?) (Sparassidae) was also present, in lesser numbers, amongst tightly clustered or looser leaves. Either or both of these two spider species may be potential predators of the larvae or even the adults of *E. vittata*.

Examination of 102 plants of *G. sieberiana* during November to December 1995 revealed that about 15 % of all plants were devoid of adult beetles, about 51 % of plants possessed only one adult at the time of observation, about 24 % of all plants hosted a single pair of beetles (usually one of each sex), 8 % of all plants hosted 3 beetles each and only about 1 % of plants hosted 4 beetles (Fig. 1). No plants were found to possess more than 4 beetles (Fig. 1). The numbers of larvae per plant were similarly distributed to those of the adults (Fig. 1), but there was much variation in the ratio of no. of adults: no. of larvae per plant, e.g. one plant hosted five larvae but only one adult beetle, while many plants hosted only one larva and one adult (this was the most common combination). In addition, the highest numbers of adults and larvae were not necessarily found on the largest and most vigorous plants (c. 1.0-1.5 m high), e.g. occasionally large plants were totally devoid of larvae and adults, while smaller plants (0.2-0.4 m high) with lesser foliage, yielded up to 4 adults and 2 or 3 larvae.

Adults usually dropped to the ground or slid down the leaf blade towards the base of the plant if disturbed and were never observed taking or engaging in flight, even during hot, humid days. No regurgitation of food materials occurred, even when the beetles were handled. Mature larvae either remained on their host leaves when disturbed, or slightly curled up their bodies from head to abdomen before rolling or falling directly down the leaf to the base of the plant in a similar fashion to the adults. Examination of specimens of the related species of *Gahnia*, i.e. *G. erythrocarpa* R. Br., which tends to grow in discrete clumps in more shadier niches and is much rarer than *G. sieberiana*, as well as many specimens of grasses (Poaceae) in the study area, failed to produce any larvae, pupae or adults of *E. vittata*.

Discussion

Eurispa vittata is an attractive species of hispine beetle which appears to be monophagous on the leaves of *Gahnia sieberiana* (Cyperaceae), at least in eastern, coastal New South Wales. In an early published record, Froggatt (1907) briefly noted that members of the genus frequent sedges (Cyperaceae), while McKeown (1942) noted that *Eurispa vittata* often occurred in large numbers in swampy areas. Monteith (1970) and Lawrence & Britton (1994) also briefly noted that *Eurispa* are associated with sedges, but both references erroneously stated that grasses (Poaceae) are also utilized by these hispines as food. Examination of available Poaceae (e.g. *Themeda, Rhynchelytrum, Spinifex* and *Imperata)* as well as other sedges (e.g. *Gymnoschoenus, Caustis* – Cyperaceae) growing amongst and around the stands of *G. sieberiana* examined in this study, showed clearly that these plants were not being utilized as hosts by *E. vittata* nor for overwintering sites (as do other Australian Chrysomelidae which overwinter in plants which are not the normal trophic host, e.g. *Lilioceris fuscomaculata* Clark=*L. bakewelli* (Baly) (Hawkeswood 1987, LeBreton & Hawkeswood 1993). It can be safely stated that *E. vittata* does not utilise Poaceae either as food or resting/overwintering sites and its apparent strict monophagy on Cyperaceae is most likely to be found in other species of the genus. LeBreton & Hawkeswood (1993) also failed to find *E. vittata* utilizing *G. erythrocarpa* and in a recent review of the host plants of Chrysomelidae of the world, Jolivet & Hawkeswood (1995) have rejected Poaceae records for *Eurispa*.

Eurispa vittata is a common species of beetle, but is sparsely and patchily distributed within the heathland habitat at Hastings Point. Although few adults and larvae are present per plant (Fig. 1) at any one time of the year, the large number of *G. sieberiana* plants growing per unit area, especially along creeks and more moister areas, assures that the total population of *E. vittata* in any one region is large, and probably much larger than that of other chrysomelids or other Coleoptera in the same region or area (Hawkeswood, unpub. data). The particular plants of *G. sieberiana* selected by adults of *E. vittata* for colonization are not always the largest and most vigorous plants with the greatest number of choice leaves, but often small, young plants with limited foliage are selected. However, the size of the plant is not correlated with the degree of protection that is afforded to these flat-bodied beetles. Small plants are able to provide them with adequate protection and food and the limited amount of plant biomass allows better chances of mate location.

The hispine appears to be relatively long-lived with overwintering adults contributing to the next generation in the spring and summer. There is at least one generation per year and probably usually two.

The beetles appear to be adequately protected from predation by the closely sheathed, siliceous leaves of *G. sieberiana* and they do not apparently rely on defensive fluids from the mouth like other Chrysomelidae or the hispine *Mecistomela marginata* (Thunberg) (Macedo et al., 1994). According to Kalshoven (1957), Jolivet (1989) and Jolivet & Hawkeswood (1995), the Hispinae can be divided into four main groups based on larval feeding. *E. vittata* belongs to the first group, i.e. those species which live between the folded leaves of monocotyledons, between folded folioles of new fronds, at the base of petioles of palms (Arecaceae) or at the bases of crowns. Both adults and larvae of *E. vittata* are external leaf feeders which chew the epidermis and mesophyll parenchyma of the host, leaving whitish streaks which later brown with necrosis.

The larva of *E. vittata*, the first hispine larva to be fully described for the Australian fauna, is characterized by having a slender body without lateral processes, a head visible from above and the last abdominal segment with a pair of straight caudal processes. These distinguishing features of *Eurispa* larvae were described by Gressitt (1963) in a key to the species of larval Hispinae from the Australo-Papuan region. Unfortunately, Gressitt, although indicating that he had larval material of *Eurispa* to describe, did not eventually provide any descriptions in the 1963 paper nor in any of his subsequent papers. The larva of *Eurispa* is quite distinguishable from other Hispinae of the Oriental region in the character of the slender body without lateral processes. The larvae of most genera from the Australo-Papuan region have distinctive lateral processes on the sides of the body (Gressitt 1963).

It is interesting to ponder on and speculate as to why the Hispinae fauna of Australia is so depauperate in terms of species as compared to smaller neighbouring islands like New Guinea which have such a diverse fauna, and why the distribution of *E. vittata* encompasses heathlands from north-eastern New South Wales to Tasmania. Gressitt (1959, 1967) stated that the Papua New Guinea fauna, although having some endemic genera, e.g. *Ceratispa, Oxycephala* etc., is primarily related to the Malayan and Philippine faunas, and is thus Oriental. Gressitt (1959) also noted that only one true Australian genus, *Eurispa*, occurs in New Guinea, where it has only been found in Papua (south-east

New Guinea). By this statement, Gressitt has inferred that *Eurispa* has originated in Australia and has extended to New Guinea, where it has evolved into at least two species, but the reverse scenario could also be true. For some reason, Hispinae have not diversified in Australia to the extent that they have done in other tropical places such as New Guinea (even though Australia is close geographically to New Guinea) and South America. *Eurispa vittata* is an unusual species which has adapted to a climatic gradient (temperature and rainfall differences) from New South Wales to Tasmania. Gressitt (1959) made the interesting observation that hispine beetles (at least species from the Oriental Region), are less tolerant of cold than their host plants. This may explain why Hispinae are also largely absent from the southern areas of Australia and Tasmania and why the Chrysomelidae fauna of New Zealand is also very depauperate, i.e. these areas were already cold in the Tertiary when migration of ancestral Coleoptera from hotter, more equitorial regions occurred; these warm to hot tolerant species failed to adapt to the colder regions. *Eurispa vittata* seems to be a notable exception. However, most of the Australian Hispinae occur in the warmer northern half of the continent, e.g. *Promecotheca callosa* Baly from Cape York Peninsula and *P. varipes* Baly from Darwin, Northern Territory (Froggatt 1914). At least one of these northern tropical species, *P. callosa*, is also found in New Guinea. If *Promecotheca* and *Eurispa* were represented by more species in more regions over the Australian continent, it could be said that Australia is (was) the centre of diversification of these genera but since they appear to represented more strongly in New Guinea, this does not seem to be the case.

A lack of suitable host plants for evolving Hispinae cannot be proposed for the lack of speciation of Hispinae in Australia, because the main plant hosts of the subfamily in the Oriental region, i.e. Poaceae, Cyperaceae, Pandanaceae, Arecaceae, Araceae and Musaceae (with the possible exception of the last family), are well represented in the Australian flora. For instance, the Zingiberaceae are well represented in Australian tropical and subtropical rainforests, but as yet, no Chrysomelidae have been collected from them, yet *Alpinia, Elettaria* and *Zingiber* are hosts to many Chrysomelidae in New Guinea and elsewhere (e.g. Gressitt 1957, 1960, 1963, 1965; Kimoto et al. 1984; Schmitt 1988; Hawkeswood & Samuelson 1995, Jolivet & Hawkeswood 1995). Likewise, the Pandanaceae are well represented in Australia, especially in the northern parts of the continent, but only one species of hispine, *Promecotheca varipes* Baly has been recorded from *Pandanus* in Australia (Froggatt 1914). Pandanus is also well utilized by Chrysomelidae in New Guinea, the Solomon Islands and other Pacific regions (e.g. Gressitt 1957, 1960, 1963, 1965; Jolivet & Hawkeswood 1995).

Since *E. vittata* is monophagic on *Gahnia sieberiana*, this relationship is probably an ancestral one and most likely co-evolutionary. The Cyperaceae are an ancient group of Monocotyledonae and are well represented by many endemic genera in Australia, but most of these do not appear to have any Coleoptera/ plant associations. In Australia, the fossil pollen record shows that Cyperaceae appear first during the late Eocene (37-45 million years B. P.) in the Tertiary Period in northern Australia (White 1990). At the present state of knowledge, it is not possible to categorically state that *E. vittata* has been associated with *G. sieberiana* for that length of time, but fossils of both plant and insect (or their ancestors) need to be found to shed more light on the duration of this association. The fact that *E. vittata* feeds as larvae and adults only on *G. sieberiana* and refuses the foliage of closely related species of *Gahnia* such as *G. erythrocarpa* and other monocots growing in the same heathlands, indicates that the beetle may not be rapidly evolving to other hosts and may be at an evolutionary dead-end. The heathlands of New South Wales where the species inhabits are continually being cleared for residential, tourist and other developments. The specificity of *E. vittata* to its host and habitat means that it will become extinct in areas which are being decimated by humans. It is to be recommended that the remaining heathlands in New South Wales and other States be better protected since other fauna are likely to be as ecologically specific as *E. vittata*.

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White, M. E. 1990. The Nature of Hidden Worlds. (Animals and Plants in Prehistoric Australia and New Zealand). – Reed Books Pty. Ltd., Sydney, 256 pp.

30. Riedmann, M.: The Pinnipeds. Seals, Sea Lions, and Walruses. – University of Chicago Press, Berkeley and Los Angeles, 1990. 439 S., zahlr. Abb. u. Tab.

Das Buch ist eine ausführliche und aktuelle Naturgeschichte der gesamten Ordnung bzw. Unterordnung Pinnipedia. Nach zwei einleitenden Kapiteln über Anpassungen an Schwimmen und Tauchen sowie über Evolution und Systematik werden alle biologischen Themen wie Physiologie, Ökologie, Fortpflanzung, Verhalten, Nahrungserwerb, Feinde und Wanderungen ausführlich und auf den neuesten Forschungsergebnissen basierend abgehandelt. Sogar die Verwendung von Seelöwen für strategische Aufgaben in der U.S.-Marine – z.B. bei der Bergung von Seeminen – wird erwähnt. Der trotz seiner wissenschaftlichen Seriosität anschaulich abgefaßte Text wird durch zahlreiche Zeichnungen und Fotos ergänzt. Das Buch vermittelt eine Fülle an faszinierender Information. Darüberhinaus ist es der Autorin gelungen, durch ihren fesselnden und engagierten Schreibstil etwas von dem Enthusiasmus, den sie selbst für diese Tiere empfindet, auf den Leser zu übertragen.

R. Kraft

31. Corbet, G. B. & J. E. Hill: The mammals of the Indomalayan region: a systematic review. – Oxford University Press, Oxford, New York, Toronto usw. (Natural History Museum Publications), 1992. – 488 S., 45 Abb., 273 Tab., 177 Verbreitungskarten.

Die Säugetiere der Indomalayschen Region wurden bisher nur in Checklists erfaßt, eine zusammenfassende Darstellung mit detaillierten Beschreibungen und Bestimmungsschlüsseln fehlte. Mit dem vorliegenden Buch wird diese Lücke geschlossen. Das behandelte Gebiet reicht vom Indusbecken im Westen über die Indonesischen Inseln bis zu den Philippinen, Molukken und Ryukyu-Inseln im Osten. Im Norden schließt es den Himalaya und S-China bis zum 35°N ein. In diesem Gebiet leben über 1000 Säugetierarten, deren Merkmale, Verbreitung und taxonomische Stellung ausführlich beschrieben werden, wobei auch die Wale und Seekühe berücksichtigt werden. Bestimmungsschlüssel, Synonymielisten, Verbreitungskarten, Tabellen mit Körper- und Schädelmaßen sowie Habitus- und Schädelzeichnungen machen das Werk zu einem wertvollen Handbuch für die behandelte Region.

Alle Informationen stammen sozusagen aus erster Hand, denn die Autoren haben nicht nur die gesamte einschlägige Literatur kritisch revidiert (das Literaturverzeichnis enthält über 3000 Zitate!), sondern durch ihre eigene, jahrzehntelange Forschungsarbeit wesentlich zur Kenntnis der indomalayschen Säugetierfauna beigetragen. Der Spezialist wird zwar feststellen, daß viele taxonomische Fragen noch auf Klärung warten, was auch die Autoren nicht verschweigen. Das Buch ist jedoch eine umfassende Darstellung des aktuellen Kenntnisstandes und will gleichzeitig zu weiterer Forschung anregen.

R. Kraft

32. Haller, H.: Zur Ökologie des Luchses *Lynx lynx* im Verlauf seiner Wiederansiedlung in den Walliser Alpen. – Verlag Paul Parey, Hamburg, Berlin (Mammalia depicta; 15), 1992. 62 S., 24 Abb., 11 Tab.

Die Wiederansiedlung des Luchses in der Schweiz, die seit ungefähr 20 Jahren betrieben wird, hat zu kontroversen Diskussionen zwischen Jägern, Viehhaltern und Natürschützern geführt. Ziel der vorliegenden Studie war es, Daten zur Bestandsdichte, zum Lebensraum und zur Ernährung des Luchses zu sammeln, um die Diskussion auf eine sachliche Grundlage zu stellen. Von der aus etwa 10 Tieren bestehenden Population des Wallis, die auf heimliche Aussetzungen in den 70er Jahren zurückgeht, wurden 6 Exemplare mit Halsbandsendern versehen und radiotelemetrisch überwacht. Außerdem wurden 114 Beutetiere bzw. deren Reste sichergestellt, die sich einzelnen Luchsindividuen zuordnen ließen. Hauptbeutetiere mit über 90% der aufgenommenen Biomasse waren Rehe und Gemsen. Zu drastischen Rückgängen dieser beiden Arten durch den Luchs kam es nur dort, wo deren Bestände aufgrund von Hegemaßnahmen vor Auftreten des Luchses überhöht waren. Der Autor kommt zu dem Schluß, daß eine Koexistenz von Luchs und ökologisch vertretbaren Schalenwildbeständen durch wechselseitige Anpassungsmechanismen möglich ist. Die vorliegende Publikation ist eine der gründlichsten und umfassendsten Untersuchungen zur Populationsökologie des Luchses.

R. Kraft

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Two new species of the Neotropical genus *Oukuriella* Epler, 1986

(Insecta, Diptera, Chironomidae)

Maria Conceição Messias and **Ernst Josef Fittkau**

Messias, M. C. & E.-J. Fittkau (1997): Two new species of the Neotropical genus *Oukuriella* Epler, 1986 (Insecta, Diptera, Chironomidae). – Spixiana **20/3:** 255-260

The males of two new species of *Oukuriella* Epler, 1986 are described from Brazil: *Oukuriella oliveirai*, spec. nov. and *Oukuriella epleri*, spec. nov. *Oukuriella oliveirai*, spec. nov. is similar to *Oukuriella albistyla* Epler, 1986, but can be separated by the more slender superior volsella and fewer dorsocentral setae. *Oukuriella epleri*, spec. nov. is distinguished from other species by possessing setal tufts on the abdominal segments, a well developed median notch in the posterior margin of T IX, and wings with markings.

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Prof. Dr. Ernst Josef Fittkau, c/o Zoologische Staatssammlung, Münchhausenstr. 21, D-81247 München, Germany.

Introduction

Epler (1986) established the genus *Oukuriella* on the basis of specimens from Brazil, Colombia, and Uruguay. Until now, six species have been described (Epler 1986, 1996, Spies & Reiss 1996). In the collection of the Zoologische Staatssammlung München, there are several new species, two of which are here described. A key is provided to separate the known species.

Methodology

Morphological terminology and abbreviations follow Saether (1980). All measurements follow Epler (1988) unless otherwise stated. Values are given in µm and, in parentheses, with the number of the specimens utilized if different from the number cited at the beginning of the description. Abbreviations used: INPA: Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas; IOC: Instituto Oswaldo Cruz, Rio de Janeiro, Brazil; FIOCRUZ: Fundação Oswaldo Cruz, Rio de Janeiro, Brazil; ZSM: Zoologische Staatssammlung, Munich, Germany.

Key to adult males of *Oukuriella*

1. Abdomen light brown, with darker brown transverse bands on some tergites .... 3.
– Abdomen brown, without transverse bands of darker color .... 2.

2. Tergites with setal tufts .... *Oukuriella epleri*, spec. nov.
– Tergites without setal tufts .... 4.

3. Tergites III, IV, VI, and VII with transverse bands .... *O. annamae* Epler
– Only tergites IV and VI with transverse bands .... *O. fasciata* Epler

4. AR less than 0.50; T IX without posterior median notch .... *O. costaricensis* Epler
– AR greater than 1.00; T IX with median notch .... 5.

5. Femora and tibiae without darkened apices .... 6.
– Anterior femur and tibia with darkened apices .... 7.

6. Superior volsella with upper arm longer than digitus, and with rounded apex; inferior volsella with 11-14 sensilla chaetica .... *O. albistyla* Epler
– Superior volsella slender, digitus about as long as upper arm; inferior volsella with 10-12 sensilla chaetica .... *O. oliveirai*, spec. nov.

7. Superior volsella with 8 sensilla chaetica near bend of upper arm; inferior volsella with 16 dorsal sensilla chaetica .... *O. rushi* Epler
– Superior volsella with 2-3 sensilla chaetica near bend of upper arm; inferior volsella with 9-11 dorsal sensilla chaetica .... *O. simulatrix* Epler

***Oukuriella oliveirai*, spec. nov.**

Fig. 1

Types. Holotype: ♂ imago, slide-mounted in Canada Balsam, Brazil, Pará, Rio Cururu, at light 6/2/61, leg E. J. Fittkau (to be deposited at INPA). – Paratypes: 2♂♂, 16/1/61; 1♂, 6/2/61; 13♂♂, 19/1/61, Brazil, Pará, Rio Cururu, leg. E. J. Fittkau, at light, slide-mounted in Canada Balsam (IOC, ZSM).

Diagnosis. *Oukuriella oliveirai* is distinguished by the slender superior volsella, posterior margin of T IX, and the low number of dorsocentral setae.

Imago ♂ (n = 17)

Colour (slide-mounted specimens). Head, thorax and abdomen brownish. Wing mostly clear with a light brown tinge, veins light brown.

Head (Fig. 1a). Temporals 10-12. Clypeus with 12-14 setae. Palpomere lengths (n = 14) 23-29; 34; 88-93; 107-112; 166-176. AR (n = 8) 1.23-1.40 .

Thorax (Fig. 1b). Acrostichals 5; dorsocentrals 5-7; scutellars 4; prealars 1.

Wing. Length (n = 9) 1.42-1.55 mm. VR: 0.73-0.80. R with 9 setae. R_{4+5} with 15-20 setae.

Legs. Segment lengths and proportions :

	p_1(11)	p_2 (12)	p_3 (12)
fe	912- 988 (15)	912-950	931-988
ti	570- 646 (15)	722-760	741-798
ta_1	988-1083	456-627	475-608 (11)
ta_2	741- 798	190-380	228-494
ta_3	456- 532	152-222	152-304
ta_4	380- 418	95-190	95-190
ta_5	133- 171	57	76
LR	1.68	0.62	0.74 (10)
BV	1.45	3.71 (9)	3.24 (11)
SV	1.50	3.37 (9)	3.36 (11)

Abdomen (Figs 1c-d). Segments I-VII with 7 pairs of lateral setae, 11 dorsal and 9 ventral setae; Segment VIII with approximately 20 dorsal setae, 4 lateral setae and 1 ventral tuft with 18 setae.

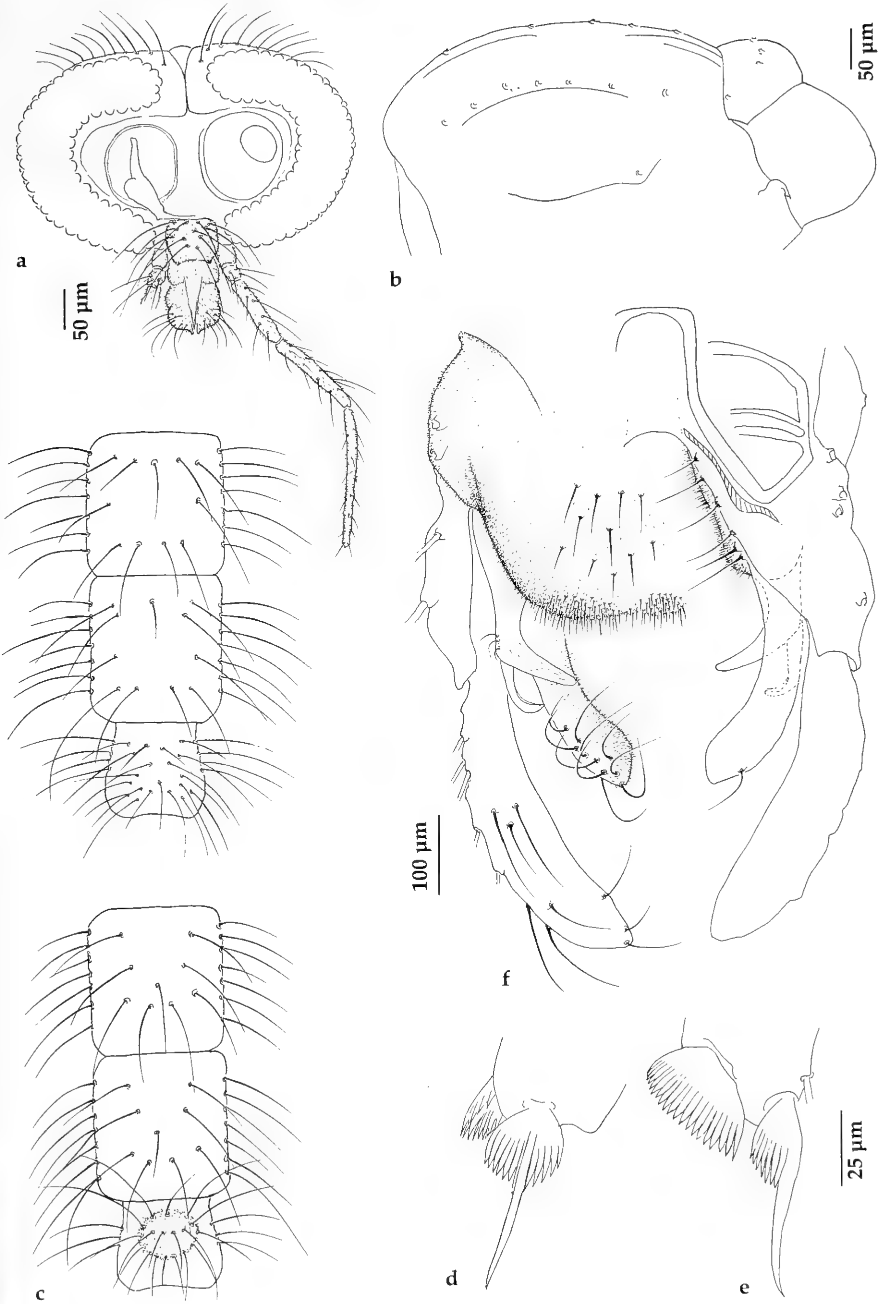

Fig. 1. *Oukuriella oliveirai*, spec. nov. **a.** Head, frontal view. **b.** Thorax. **c.** Abdomen, segments VI-VIII, dorsal/ventral. **d.** Mid tibial apex. **e.** Hind tibial apex. **f.** Hypopygium.

Hypopygium (Fig. 1f). Posterior margin of T IX with weak median notch. Superior volsella with 3-4 sensilla chaetica laterally at the bend of the upper arm, digitus slender, approximately equivalent in length to upper arm, and posteriorly directed. Inferior volsella with 9-11 apical, dorsal sensilla chaetica, and 1 ventral sensillum chaeticum.

Remarks. The hypopygium of this species is somewhat similar to *Oukuriella albistyla* Epler. However, *Oukuriella oliveirai* lacks humeral setae, has 5-7 dorsocentral and 4 scutellar setae, the superior volsella is slender, with 3-4 sensilla chaetica near the bend of the upper arm.

Etymology. Named in honour of Prof. Sebastião José de Oliveira, Curator of the Coleção Entomológica do Instituto Oswaldo Cruz, Departamento de Entomologia-FIOCRUZ, who has contributed much to the knowledge of Neotropical Chironomidae and to the entomology in general. The first author would like to especially thank Prof. Oliveira for his support and encouragement as supervisor. His expertise, patience and not least friendship has inspired M. C. Messias with her work on Chironomidae.

Oukuriella epleri, spec. nov.

Figs 2, 3

Types. Holotype: ♂, slide-mounted in Canada Balsam, Brazil, Pará, Rio Cururu, at light 6/2/61, leg. E. J. Fittkau, to be deposited at INPA. – Paratypes: 1♂, Brazil, Pará, Rio Tocantins, 6/11/60; 1♂, Brazil, Amazonas, Rio Branquinho, 23/7/61; 1♂, Brazil, Amazonas, Rio Solimões, 12/9/61; 1♂, Brazil, Amazonas, Rio Preto, Brazil, 7/7/62, leg E. J. Fittkau, at light, slide-mounted in Canada Balsam or Euparal (FIOCRUZ, IOC, ZSM).

Diagnosis. *Oukuriella epleri* is distinguished by the clypeus with 44-50 setae, scutum with strong tubercle with 3-4 setae, wing with brown markings, abdominal tergites with setal tufts, posterior margin of T IX with well developed median notch, and the slender gonostylus.

Imago ♂ (n = 5)
Colour (slide mounted specimens). Head, thorax and abdomen brown. Wing with mostly elongate, brown markings(Fig. 2c). Legs stramineous with faint brownish rings.

Head (Fig. 2a). Temporals 5. Clypeus with 44-50 setae.

Thorax (Fig. 2b). Scutum with strong central tubercle. Acrostichals 5, dorsocentrals 7-10, humeral 1, scutellars 4-7, prealars 2-3.

Wing (Fig. 2c). With markings in cells r_{2+3}, r_{4+5}, m_{3+4}, cu, and an.

Length. 1.71-1.90 mm. VR: 0.77-1.26. R with 18-21, R_1 with 12-15, R_{4+5} with 15-24 setae.

Legs (Fig. 3d-e). All legs densely setose, with brownish rings on basal ⅗ and apex of femora, base and apex of tibiae, middle and apex of fore and mid ta_1, base and apex of hind ta_1, and apices of ta_2-ta_5.

Segments lengths and proportions of legs:

	p_1 (3)	p_2	p_3
fe	1235-1425 (4)	1159-1254 (2)	1164-1311
ti	608- 741	660- 836	665- 874
ta_1	1330-1482	570- 703	627- 779
ta_2	950-1140	266- 456	399- 551
ta_3	570- 684 (4)	190- 380 (4)	323- 361
ta_4	475- 532	95- 228 (4)	190- 228
ta_5	190- 247	76- 95 (4)	76- 114
LR	2.08	0.78	0.88
BV	2.09 (2)	4 (1)	2.36 (3)
SV	1.44	3.68 (2)	2.95 (3)

Abdomen (Figs 3a-b). Segments I-VII with 8 pairs of lateral setae, 10 dorsal and 28 ventral setae; T II-VII each with 2 setal tufts; segment VIII with approximately 14 dorsal setae, 8 laterally setae and 1 ventral tuft with approximately 30 setae.

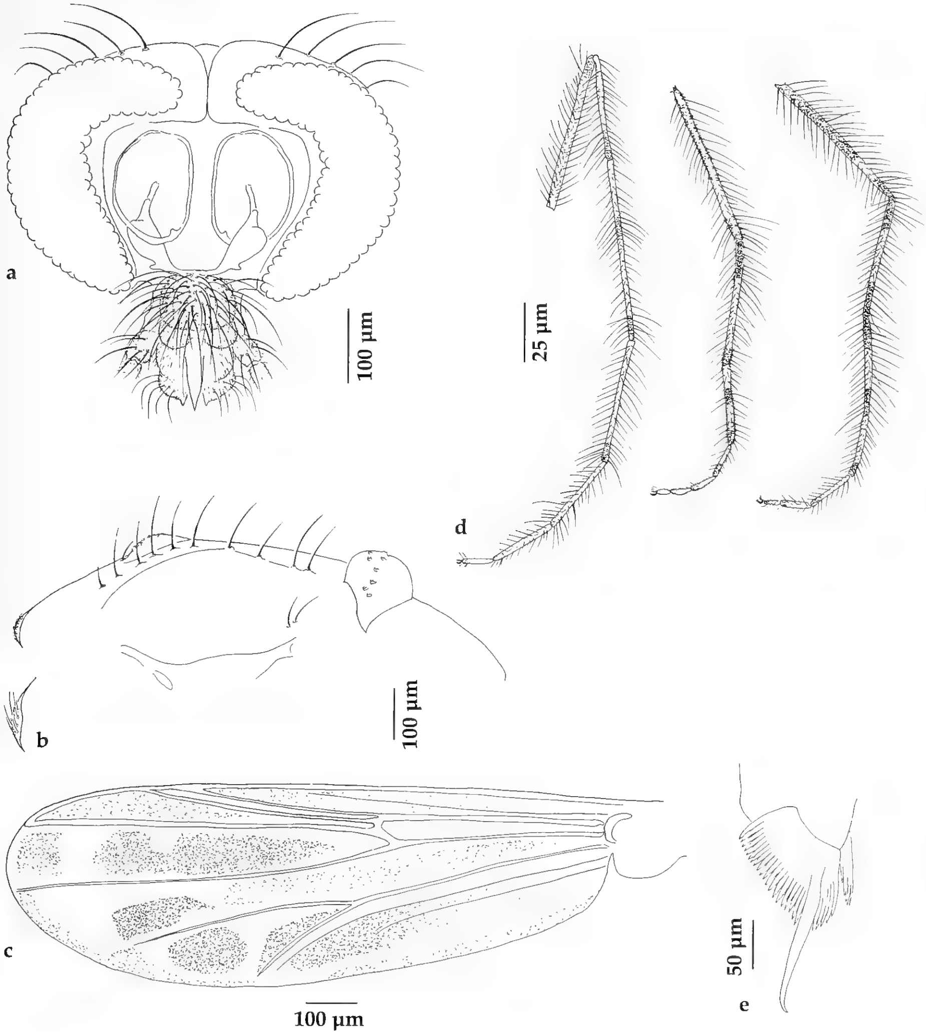

Fig. 2. *Oukuriella epleri, spec. nov.* **a.** Head, frontal view. **b.** Thorax **c.** Wing. **d.** Legs. **e.** Hind tibial apex.

Hypopygium (Fig. 3c). Posterior margin of T IX with 36-40 setae and well developed median notch. Gonostylus slender. Superior volsella with 8-10 sensilla chaetica near bend of upper arm. Inferior volsella with 10-12, dorsal sensilla chaetica, and with ventral sensilum chaeticum.

Etymology. Named after Dr. J. H. Epler, the author of the genus *Oukuriella*, in honour of his contributions to the study of the Chironomidae.

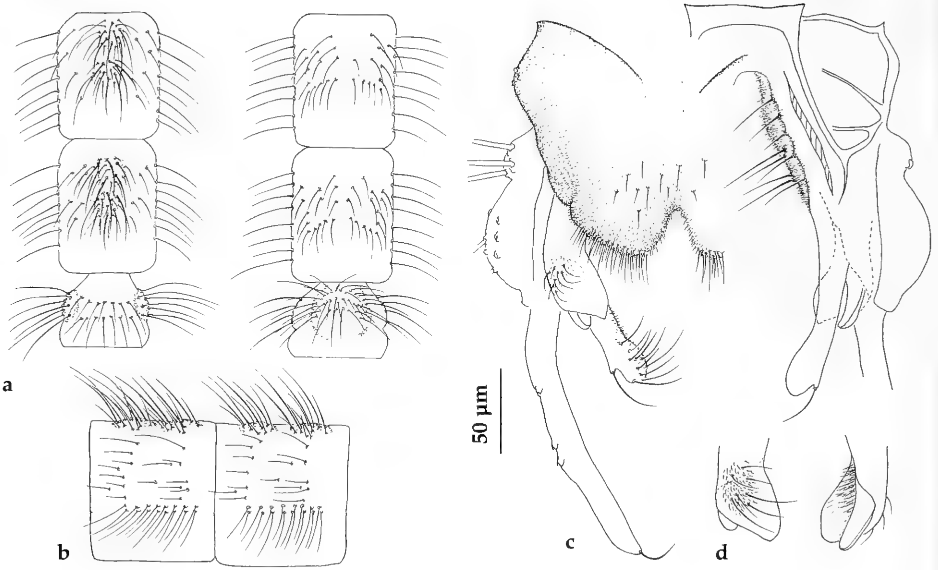

Fig. 3. *Oukuriella epleri*, spec. nov. **a.** Abdomen, segments VI-VIII, dorsal/ventral. **b.** Abdomen, segments IV-V, lateral view. **c.** Hypopygium. **d.** Superior volsella, dorsal/ventral.

Resumo

Descreve-se a partir de espécimens machos: *Oukuriella oliveirai*, spec. nov. e *Oukuriella epleri, spec. nov. Oukuriella oliveirai*, spec. nov. assemelha-se à *Oukuriella albistyla* Epler, 1986, mas desta se diferencia por possuir a volsella superior mais estreita e um menor número de cerdas dorsocentrais. *Oukuriella epleri*, spec. nov. difere de todas as outras espécies do gênero, por possuir tergitos com tufos de cerdas, a margem posterior do T IX com uma reentrância bem desenvolvida e asas manchadas.

Acknowledgments

We would like to thank Dr. F. Reiss (München) for his constant readiness to help, and for valuable discussions. We would also like to thank Mr. M. Spies (München) for correcting the English, and for comments on an earlier draft of this paper. This publication is a part of the first author's ongoing Ph.D. thesis at the Instituto Oswaldo Cruz in Rio de Janeiro, Brazil, prepared as a Doctoral Program in Cooperation ("Sandwich" Program) of the DAAD (Deutscher Akademischer Austauschdienst).

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Degia Walker, 1862 und *Mekla* Swinhoe, 1892: Zwei orientalische Psychidae-Gattungen

(Insecta, Lepidoptera)

†Wolfgang Dierl

Dierl, W. (1997): *Degia* Walker, 1862 and *Mekla* Swinhoe, 1892: Two Oriental Psychidae Genera (Insecta, Lepidoptera). – Spixiana **20/3**: 261-270

Studies on the type specimens of the species of the two genera indicate their placement within the lepidopterous family Psychidae. The characters of the imagines, neuration structures and genitalia construction of both sexes give information for this taxonomic position. They are described here. The form of the larval case is discussed. It is considered that the "Spiral Faggotworm" by Watt & Mann, 1898 belongs to the genera mentioned. This indication comes from notices of the pest controls of coffee and tea. Other genera of the Oriental region like *Eusceletaula* Meyrick, 1936, *Eriochrysis* Meyrick, 1937, *Porthetes* West, 1932 (nomen praeocc.), *Cossus lepta* West, 1932, and some *"Melasina"* species by Meyrick may belong to this lepidopterous group. Even so, some African *"Melasina"* species can be included, basing on the description of imagines and larval cases. This paper may give some impulses for the systematic arrangement of species groups which hitherto were included in Psychidae, Cossidae, Tineidae, Melasinidae and Compsoctenidae.

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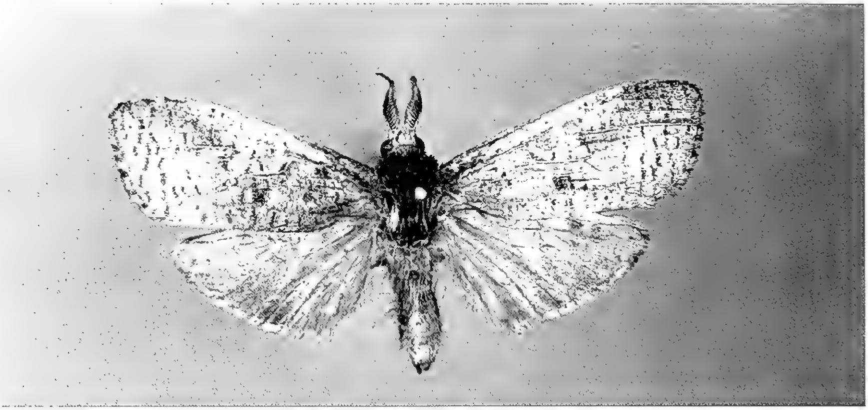
1 Einleitung

Die weltweit verbreitete Familie Psychidae ist auf bemerkenswert einfach Weise zu definieren: Sie besitzt im ♂ Genitale einen absolut gleichförmigen Bauplan (vgl. Abb. 7, 8) und im Larvalstadium ein Gehäuse, das als Grundlage eine runde Röhre aufweist, die im Verlauf der Evolution zu quadratischen und davon wieder zu schraubigen Strukturen übergehen kann (Abb. 10). Sie besitzt aber nie einen dreieckigen Querschnitt wie die Solenobien und Taleporien, die deshalb nach Meinung des Autors keine Psychiden sind, oder Gehäuse mit Blattrollen oder anderen Strukturen wie *Lithocolletis*, Tortricidae und andere. In der Reduktion der ♀♀, die voll geflügelt bis absolut madenförmig mit völlig reduzierten Gliedmaßen sein können, besteht kein Hindernis in der Familienzugehörigkeit, da eine vollständige Reduktionsreihe der ♀♀ festgestellt werden kann, daneben eine ebenso klare Verbindung zu den Grundmerkmalen der ♂♂ und dem Gehäusebau. Die Analogie zur Gruppe der Solenobien in ihren Reduktionsformen und im schon erwähnten Gehäusebau ist offenkundig, zeigt sich aber auch in anderen Merkmalen wie der Cytogenie, z.B. Chromosomenzahlen (Seiler 1921, Dierl 1964), die bisher nicht in die phylogenetischen Überlegungen einbezogen wurden.

1



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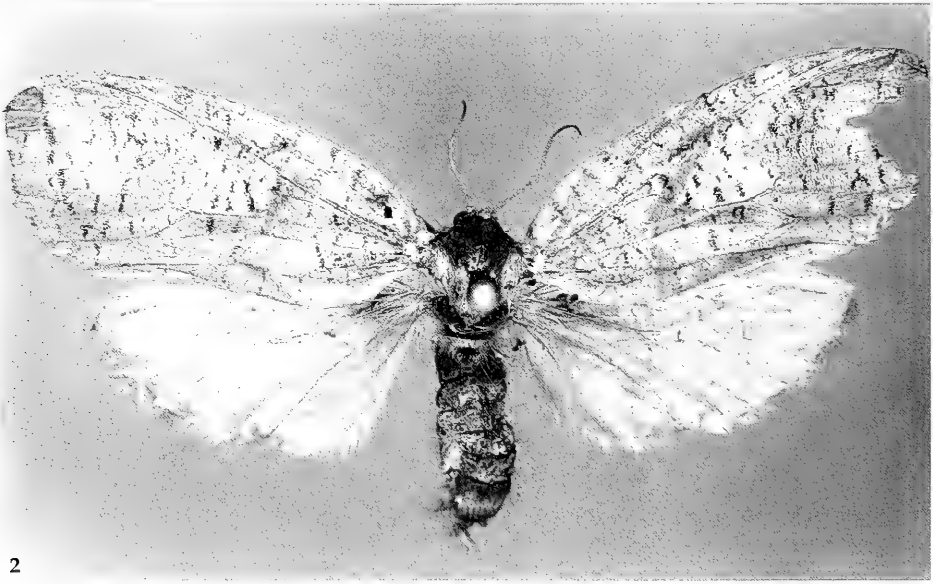

Abb. 1, 2. *Degia imparata* Walker. Sumatra, Batakberge, s. Delhi. **1.** ♂. Spannweite 30 mm. **2.** ♀. Spannweite 47 mm.

2 Bewertung einzelner Merkmalsgruppen

Früher wurden die Schmetterlinge nach relativ einfachen habituellen Merkmalen gruppiert, und so war es nicht verwunderlich, daß die beiden hier zu behandelnden Genera zu den Cossiden gestellt wurden. Sie sind rindenartig gezeichnet, beide Geschlechter sind geflügelt, und von Gehäusen wußte man nichts. Das Geäder gehört dem sehr ursprünglichen Lepidopterentypus an und kann mehreren Familien zugeordnet werden, die phylogenetisch nicht sehr nahe verwandt sind. Roepke (1957) war der erste Autor, der durch Untersuchungen der ♂ Genitalmorphologie und der Annahme eines Gehäusebaus der Raupen die beiden Gattungen den Psychidae zuschrieb. Diese Feststellung wird hier übernommen. Dazu müssen einzelne Merkmale in ihrer heutigen phylogenetischen Auffassung genauer betrachtet werden:

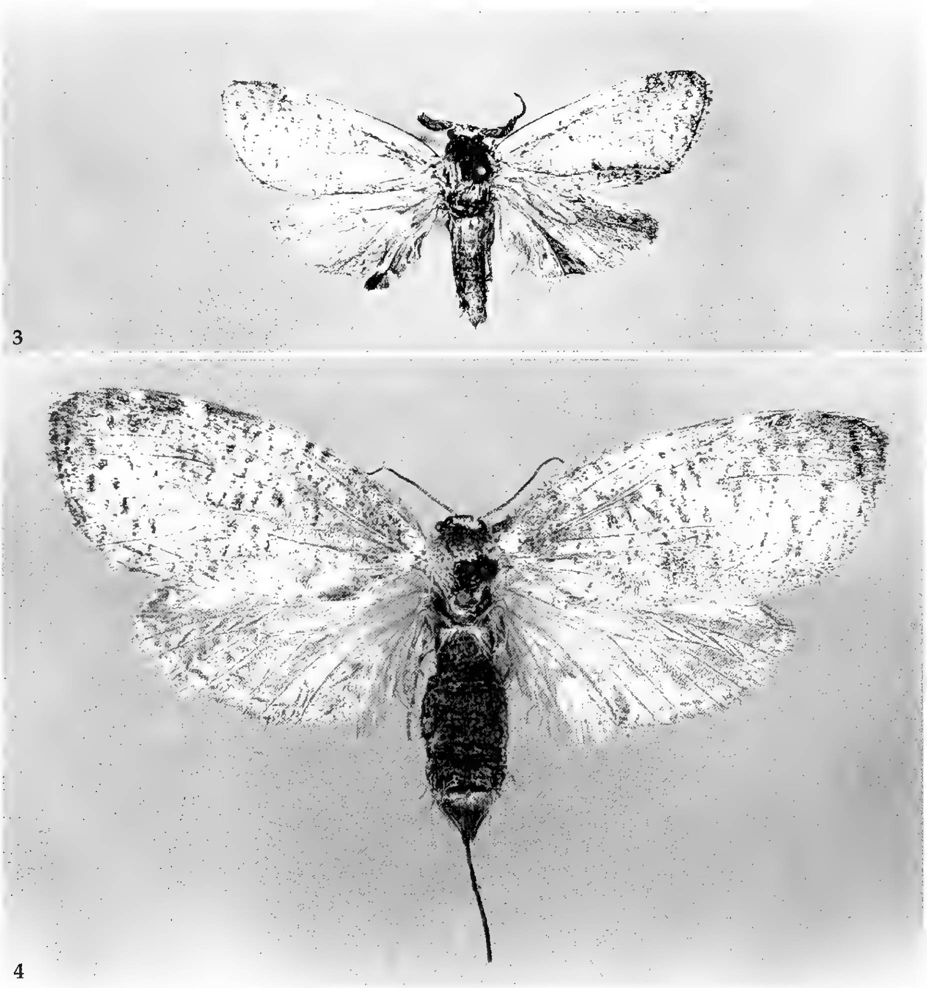

Abb. 3, 4. *Mekla deficiens* (Walker). **3.** ♂. Sumatra sept., Dolok Merangir, 1500 m, 9.VI.-1.IX.1967. Spannweite 22 mm. **4.** ♀. Sumatra sept., Dolok Merangir, 1500 m, 20.V.1966. Spannweite 36 mm.

Augen. Sie sagen lediglich etwas über die Flugzeit der Imagines aus (Dierl 1969). Der Index des Augenabstands (kleinster Augenabstand, gemessen am Rande, geteilt durch den größten Augendurchmesser) beträgt >1.2 bei Tagfliegern (kleine Augen!) und <1.2 bei Nachtfliegern (große Augen). Übergänge sind möglich. Das Merkmal ist taxonomisch verwertbar. Ozellen fehlen.

Die Palpen sind bei ♂♂ der Arten mit geflügelten ♀♀ kurz und dreigliedrig; innerhalb der Reduktionsreihe vermindert sich die Zahl der Palpenglieder auf zwei und schließlich auf eines (vgl. *Psyche*, *Fumaria* auct. Dierl 1964). Die ♂♂ z.B. von *Degia* haben noch sehr kleingliedrige Palpen mit drei Gliedern. In der Reduktionsreihe vermindert sich die Zahl der Palpenglieder bei den mikropteren ♀♀ auf eines (Dierl 1964) und ist bei den apteren Arten ganz reduziert.

Die Maxillarpalpen der ♂♂ sind zu minimalen Skleriten reduziert, die der ♀♀, wenn vorhanden, noch kleiner.

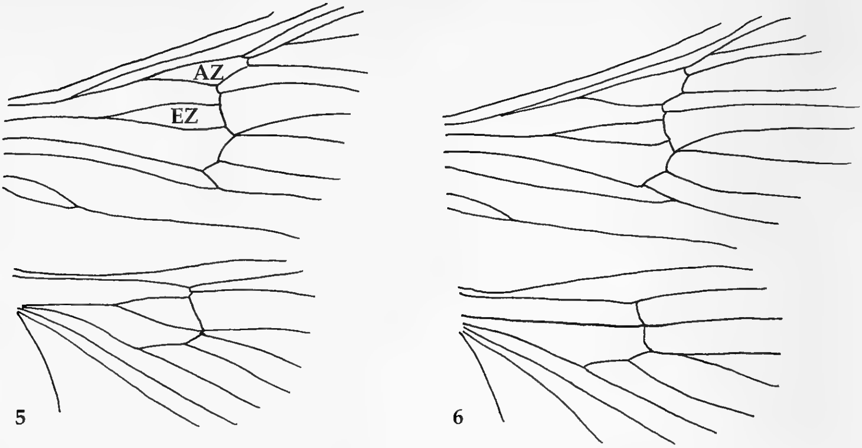

Abb. 5, 6. Geäderschema nach dem Typusexemplar. **5.** *Degia imparata* Walker. **6.** *Mekla deficiens* (Walker). **EZ.** Eingeschobene Zelle. **AZ.** Anhangzelle.

Der Rüssel ist immer reduziert und funktionsunfähig und in der Entwicklungsreihe bis auf kleinste Höcker vereinfacht.

Die Fühler der ♂♂ sind immer gut entwickelt und gefiedert. Eine Ausnahme bildet *Apterona* mit sägezähnigen Fühlern. Die Fühler der ursprünglichen Arten sind gleichförmig gefiedert, während die spezialisierten Arten eine plötzliche Abnahme der Fiederlänge zur Fühlerspitze aufweisen. Dieses Merkmal geht aber nicht parallel zur Reduktion der zugehörigen ♀♀. Vielleicht handelt es sich hier um einen Zusammenhang mit dem Flugverhalten.

Die Fühler der ♀♀ sind filiform, lang bei den geflügelten Arten, sehr kurz bei den mikropteren (*Psyche, Fumaria* auct.) und fehlend bei den apteren Arten.

Eine Chaetosema fehlt.

Das Geäder besteht innerhalb der hier zu betrachtenden Gruppen aus 12 Adern im Vorderflügel, die ursprünglich nicht gestielt sind, innerhalb der Entwicklungsreihe aber unterschiedlich und auch innerhalb der Arten variabel gestielt sein können. In der Zelle gibt es eine gegabelte Media (Eingeschobene Zelle: EZ) und eine Anhangzelle (AZ, vgl. Abb. 5, 6). Beide werden im Verlauf der Entwicklungsreihe reduziert; die Anhangzelle verschwindet, die Media in der Zelle ist nicht mehr gegabelt und verschwindet schließlich. Verschiedene Adern entspringen gestielt und verschmelzen schließlich, so daß ihre Zahl vermindert wird. Hier ist ein Zusammenhang zu sehen mit der Verschmälerung der Flügel, wie sie analog bei vielen der Kleinschmetterlings-Familien zu finden ist. Die Zahl der Analadern ist ebenfalls der Reduktion durch Verschmelzen, Schlingenbildung und einfachem Abbau unterworfen. Ein Sonderfall ist hier die Verbindung zwischen Postcubitus und Cubitus nach dem Zellende wie bei den hier beschriebenen Gattungen (vgl. Abb. 5, 6).

Im Hinterflügel gelten die gleichen Grundsätze: ursprünglich 8 Adern und eine gegabelte Media in der Zelle. Die Media wird später einfach und verschwindet schließlich. Adern werden gestielt und verschmelzen, so daß die Zahl verringert wird. Die Analadern bleiben konstant.

Das Geäder der geflügelten ♀♀ entspricht jenem der ♂♂; jenes der wenigen brachypteren Arten weist noch Reste der Stammadern auf; bei den mikropteren Arten fehlen die Adern.

Die Beschuppung der Flügel besteht ursprünglich aus breiten Schuppen, die haarförmig werden können oder schuppenfreie "Fenster" bilden.

Die Beine weisen eine Apophyse – "Putzsporn" – an den Tibien der Vorderbeine auf, die durch ihre relative Länge, d.h. Ursprungsstelle an der Tibia (vgl. Dierl 1964, Spornindex) von taxonomischer Bedeutung ist. Die Apophyse und die Sporne an den Mittel- und Hinterbeinen (1 Paar bzw. 2 Paare) sind bei den ♂♂ verkleinert (geflügelte Arten), oder zu kurzen Stummeln an den Hinterbeinen bei den mikropteren Arten reduziert.

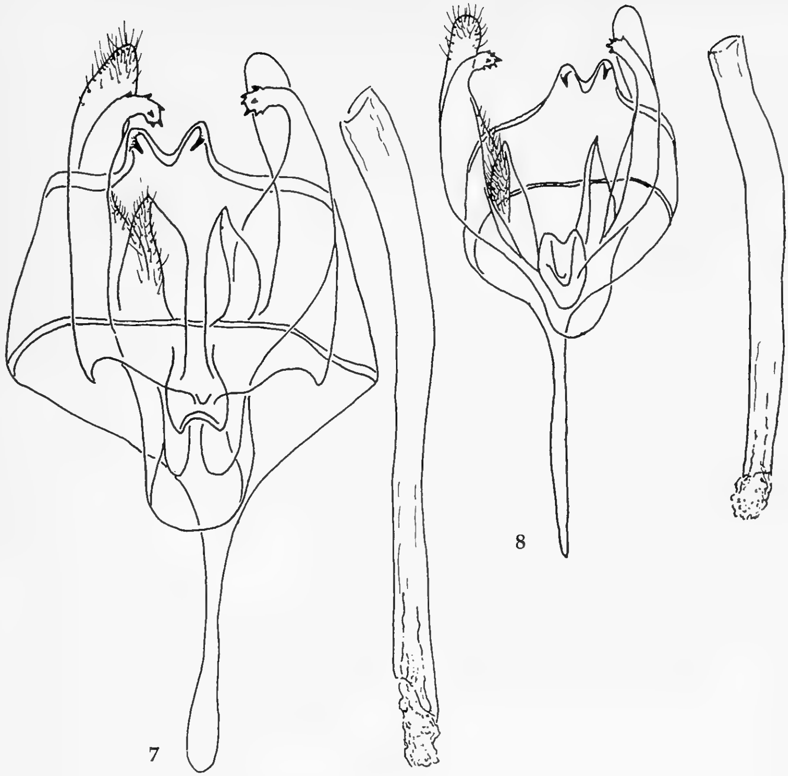

Abb. 7, 8. ♂ Genitale. **7.** *Degia imparata* Walker. **8.** *Mekla deficiens* (Walker).

Die Sklerite des 8. Abdominalsegments weisen ursprünglich keine Besonderheiten auf, können bei höher entwickelten Formen aber gattungstypisch gestaltet sein, ohne aber besondere Spezialisierungen erkennen zu lassen.

Der ♂ Genitalapparat ist in seiner Form sehr einheitlich. Er besteht aus einem recht einfachen Ring aus Tegumen und Vinculum, mit dorsalen, caudal vorspringenden doppelten Vorwölbungen, die bei den Arten mit geflügelten ♂♂ in zwei kurzen Spitzen enden. Man kann dieses Gebilde als Uncus auffassen. Am Vinculum befindet sich ein stabförmiger Saccu, der auch fehlen oder als dreieckige Struktur mit dem Vinculum verschmelzen kann. In der Membran gibt es eine doppelt ohrenförmige Struktur, die hier Anellus genannt wird, und die Position des Penis bei der Paarung bestimmt. Die Muskulatur gibt darüber Auskunft (Dierl 1964). Der Penis besteht aus einem leicht gekrümmten Rohr von fast gleichem Durchmesser und kann in der Vesica kleine dornförmige Cornuti aufweisen.

Die ♀ Genitalmorphologie einschließlich Muskulatur und Histologie wurde von Dierl (1964, 1970) beschrieben, bezogen auf nur wenige Arten. Der äußere Apparat besteht aus einem teleskopartig ausschiebbaren Ovipositor, der ursprünglich von drei Paaren stäbchenförmiger Apophysen gestützt wird, zwei Paare in IX+X, wobei das dorsale sehr lang sein kann, und ein Paar in VIII. Mit zunehmender Reduktion verschmelzen zuerst die ventralen Stäbchen in IX+X und verschwinden dann völlig. Schließlich verbleiben nur kurze Stummel der dorsalen Apophyses posteriores bei jenen Arten, die das Gehäuse bzw. die Puppenexuvie nicht mehr verlassen, und der Ovipositor ist insgesamt sehr verkürzt. Die Strukturen um das Ostium bursae sind ohne Besonderheiten, ebenso das Corpus bursae ohne Strukturen, als einfache Blase. Das gilt auch für die anderen ektodermalen Teile. Die Glandula sebacea ist zweiteilig. Die Reduktionsreihe der ♀ Genitalien ist am besten bei Davis (1964) dargestellt.

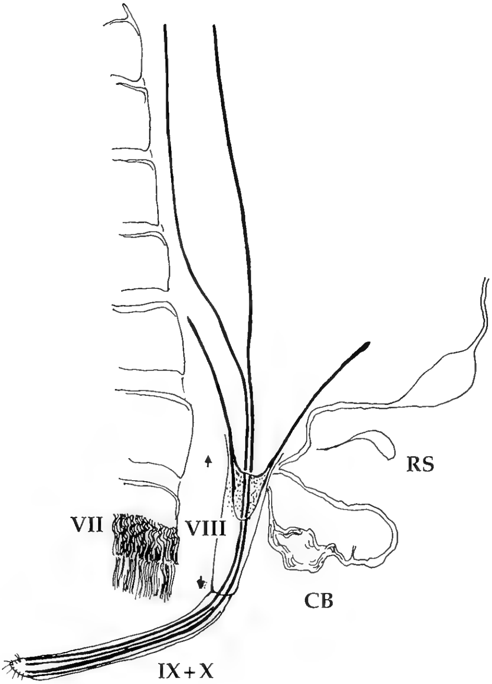

Abb. 9. *Mekla deficiens* (Walker). ♀ Genital. **RS.** Receptaculum seminis. **CB.** Corpus bursae, römische Zahlen-segmente.

3 Die Merkmale der Gattungen *Degia* und *Mekla*

Der Habitus beider Geschlechter beider Arten (Abb. 1-4) erinnert durch seine Rindenzeichnung an Cossiden. Das ♀ ist voll geflügelt und besitzt einen langen Ovipositor mit einem vollständigen Kranz von Haaren an der Basis am 7. Segment. Für beide Gattungen gilt gefiederte Antenne der ♂ Tiere mit stark verkürzten Fiedern im proximalen Drittel, fadenförmige Antennen der ♀♀. Palpen sehr kurz, dreigliedrig, Rüssel sehr reduziert, Vorderbeine mit Apophyse, Mittelbeine mit einem Spornpaar, Hinterbeine mit zwei (bei beiden Geschlechtern). Die Größe der Augen weist bei beiden Geschlechtern auf Nachtflieger hin, was auch die Fangdaten bestätigen.

Vergleich der beiden Gattungen:

	Degia imparata	*Mekla deficiens*
Spannweite	♂ 30-34 mm	♂ 19-22 mm
	♀ 47 mm	♀ 32-37 mm
Augenabstand	♂ 0.45	♂ 0.32
	♀ 0.32	♀ 0.40
Geäder	Vfl. 12 Adern	Vfl. 12 Adern
	♂, ♀ 8+9	♂ 9+10
		♀ 9+10 od. 10+9+8
	Hfl. 8 Adern	Hfl. 8 Adern
	♂, ♀ Media gegabelt	♂, ♀ Media einfach (einzeln gegabelt)

Das Geäder spiegelt die Variabilität der ursprünglichen Psychidae wider.

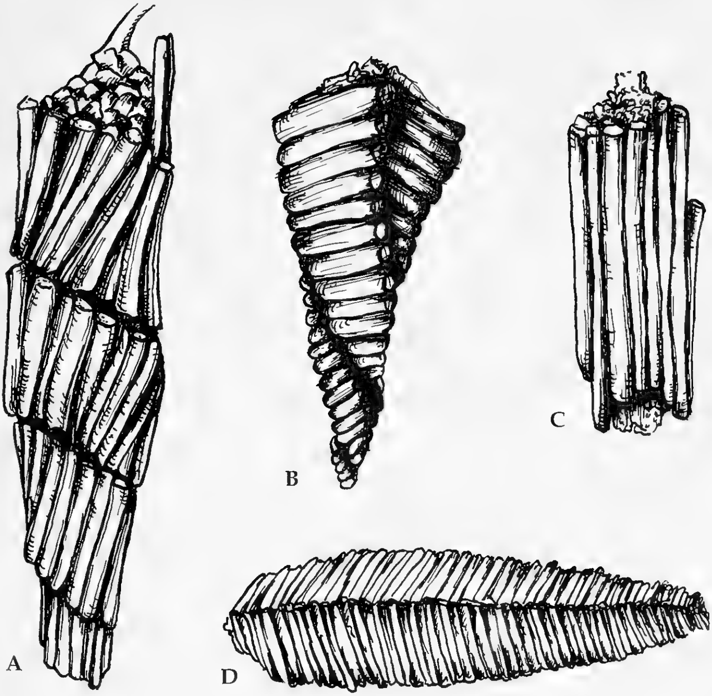

Abb. 10. Gehäuseformen. **A.** *"Clania" holmesi* nach Watt & Mann. **B.** *Orophora triangularis* nach Das. **C.** *Eumeta* spec. **D.** *Amicta quadrangularis.*

Der ♂ Genitalapparat entspricht dem allgemeinen Typus der Psychidae (Abb. 7 *D. imparata*, Abb. 8, *M. deficiens*). Hervorzuheben ist lediglich, daß bei dem Typusexemplar von *M. deficiens* (Sarawak) der Saccus doppelt so lang ist wie in Abb. 7 (Variation oder Subspezies gegenüber Tieren von Sumatra?).

Im ♀ Genitalapparat fallen die sehr langen dorsalen Apophyses anteriores auf (Abb. 9 *M. deficiens*). Zusammen gibt es drei Paare. In einzelnen Fällen verschmilzt das ventrale Paar von IX+X zu einer diffusen länglichen Platte. Wieweit dieses Merkmal als Gattungs- oder Artmerkmal zu betrachten ist, kann derzeit mangels Materials nicht entschieden werden. Es liegen einzelne Exemplare von *M. deficiens* und ein ♀ von *D. imparata* aus Sumatra vor. Die inneren ♀ Organe von ektodermalem Ursprung sind sehr dünnhäutig und machen die Präparation schwierig. Demnach besteht der Corpus bursae lediglich aus einer Erweiterung des Ductus bursae. Das Receptaculum seminis (im Präparat abgerissen) ist sehr einfach. Das Ostium bursae ist von einer ovalen Spange umzogen und die Membranen im Umfeld von feinen Dörnchen besetzt. Die Analwolle besteht aus zwei Stufen verschiedener Länge und ist immer haarförmig, wobei die längeren über den kürzeren liegen und gröber sind als diese.

4 Zuordnung der Larvalgehäuse

Es ist davon auszugehen, daß alle beschriebenen Psychidae-Taxa ein mehr oder weniger spezifisches Larvalgehäuse aufweisen. So ist die Mehrzahl der nominellen orientalischen Taxa mit einem typischen Larvalgehäuse verbunden. Diese Zuordnung beruht auf Kulturen oder verwandtschaftlichen Indikationen, da innerhalb von Gattungen die Arten in der Regel ein einheitliches Bauprinzip einhalten. Übrig bleiben Arten, deren zugeordnete Gehäuse auf Fehlbestimmungen beruhen, oder solche, die nur nach Gehäusen beschrieben wurden. Wenn man nun alle sicher bestimmten oder durch Indikationen bestimmbaren abzieht, bleiben jene übrig, die für die Diskussion um die Gehäuseform von *Degia* und *Mekla* in Frage kommen. Dazu kommen einige Hinweise, die sich auf Lebensweise und dergleichen beziehen. Natürlich bestehen auf diese Weise eine Reihe von Hypothesen, die aber mit einer gewissen Wahrscheinlichkeit auflösbar sind.

4.1 Die fraglichen Taxa und deren Gehäuse

4.1.1 *"Chalia" javana* Heylaerts, 1885, aus Java. Der Autor beschreibt die Art zunächst ohne Kenntnis des Gehäuses. Später erwähnt Heylaerts, 1888 (p. 61) ein wendeltreppenartiges Gehäuse (Abb. 10B), das hierher gehören soll. Piepers und Snellen (1902) stellen die habituelle Ähnlichkeit ihrer Art *C. bifenestralis* aus Java mit *C. javana* fest. Dudgeon (1905) beschreibt *"Clania" destructor* aus Sikkim, die ebenfalls große Ähnlichkeit aufweist. Das (1959) beschreibt Vergleiche der drei Taxa, die von ihm, Betrem, Bourgogne und Tams vorgenommen wurden und die auf Synomymie der drei Taxa hinweisen. Die Taxa haben Gehäuse, die wie Abb. 10C aussehen, also mit parallel zur Längsachse gerichteten Zweigstücken. Dieser Gehäusetyp ist bei der Gattung *Eumeta* Walker verbreitet. Spiralgehäuse gibt es in dieser Gattung nicht. Die Zuordnung von Heylaerts (1888) ist damit falsch.

4.1.2 *Orophora triangularis* Das, 1959. Der Autor beschreibt diese Art eindeutig zusammen mit einem wendeltreppenartigen Gehäuse (Abb. 10B), als Schädling an Tee in Indien. Ein vergleichbares Gehäuse wird von Hampson (1910) für seine Art *"Mahasena" poliotricha* aus dem Punjab beschrieben. Beide als Imagines bekannte Arten haben mit *Degia* und *Mekla* keine Ähnlichkeit, wodurch die Gehäuseform auch nicht in Verbindung gebracht werden kann.

4.1.3 Gehäuse in Spiralform mit parallel zur Längsachse gerichteten Zweigen (Abb. 10A).

4.1.3.1 *"Clania" holmesi* Watt & Mann, 1898, "Spiral Faggotworm" aus Assam an Tee. Die Beschreibung entspricht der Abb. 10A. Die Imago ist unbekannt.

4.1.3.2 *"Metisa" atra* de Joannis, 1929, aus Tonkin. Die Imago wird beschrieben, die zugeordneten Gehäuse als nur wahrscheinlich hierher gehörig bezeichnet. Sie entsprechen der Abb. 10A. Die Imago gehört in eine andere Gattungsgruppe, die mit Sicherheit keine Spiralgehäuse aufweist.

Somit verbleiben, allerdings mit gewisser Vorsicht, die beiden Gattungen *Degia* und *Mekla* als Besitzer von Spiralgehäusen. Eine andere Kombination mit anderen Gattungen und entsprechenden Arten ist derzeit nicht möglich.

Schließlich sei nur nebenbei die Gattung *Amicta* Heylaerts, 1881, erwähnt, deren im Querschnitt quadratisches Gehäuse (Abb. 10D) besonders markant ist und die von Afghanistan bis zu den Kanaren im Westen mit mehreren Arten vertreten ist.

Aus Afrika sind drei Arten beschrieben, die nach Habitus und Gehäuseform zur Gruppe um *Degia* gehören können: *"Melasina" cnaphalodes* Meyrick, 1917, *M. tyrophanes* Meyrick, 1917, nur nach ♂, und *M. craterodes* Meyrick, 1917, nur ♀. Die beiden letzteren können synonym sein, was aber durch weitere Untersuchungen bestätigt werden muß.

Aus Thailand und Sumatra liegen einige weitere noch unbenannte Arten vor, die man früher als *"Melasina"* bezeichnet hätte. In diese Gruppe gehören auch *Eusceletaula immodica* Meyrick, 1936, an Kaffee in Malaya (der Autor vermutet Gehäuse), die wahrscheinlich mit *Degia imparata* übereinstimmt, *Eriochrysis penelope* Meyrick, 1937, Malaya, *Melasina evagata* Meyrick, 1921 Java, *Porthetes** *cyrtozona* West, 1932, und *Cossus lepta* West, 1932, beide von den Philippinen. Darauf weist schon Roepke (1957) hin.

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* *Porthetes* West, 1932, ist praeokkupiert von *Porthetes* Schönherr, 1838, Coleoptera

5 Nomenklatorische Übersicht

Degia Walker, 1862

J. Proc. Linn. Soc. (Zool.) VI: 177-178.
Typusart: *Degia imparata* Walker, 1862, loc. cit. durch Indikation sec. Swinhoe, 1892.
imparata Walker, 1862, loc. cit. (*Degia*)
Typus: Oxford Museum, untersucht.

Mögliche Synonyme:
Eusceletaula immodica Meyrick, 1936, Exot. Microlepidopt. 5: 56.
Cossus lepta West, 1932, Nov. Zool. 37: 56.
? *Clania holmesi* Watt & Mann, 1898.

Mekla Swinhoe, 1892

Cat. East. Austr. Lepidopt. Mus. Oxf. 1: 283.
Typusart: *Degia deficiens* Walker, 1862, loc. cit. durch Monotypie.
deficiens Walker, 1862, loc. cit. (*Degia*).
Typus: Oxford Museum, untersucht.

Mögliche Synonyme:
? *Clania holmesi* Watt & Mann, 1898.

6 Untersuchtes Material

***Degia imparata*:** 1♂, 1♀, Batakberge s. Delhi, leg. Martin. Fotos; 2♂♂, Dolok Merangir, IX.70.-I.71, leg. Diehl; ♂, Doulou 1.200 m, 1973, leg. Diehl; 10♂♂, 20 km ö. Krabi/S.-Thailand, 7.-25.IV.62, leg. Friedel.

***Mekla deficiens*:** 3♂♂, 5♀♀, Dolok Merangir, IX.70-I.71, leg. Diehl, Fotos; 1♀, Doulou 1.200 m, 1973, leg. Diehl; 1♂, Batakberge s. Delhi, leg. Martin; 32♂♂, 1♀, 20 km ö. Krabi/S.-Thailand, 7.-25.IV.62, leg. Friedel.

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– – 1921. Descriptions of some new South African microlepidopterous bagworms. – Zool. Meded. **6**: 201-202
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Microtendipes schuecki, eine neue Art der *numerosus*-Gruppe aus Thailand

(Insecta, Diptera, Chironomidae)

Friedrich Reiss

Reiss, F. (1997): *Microtendipes schuecki*, a new species of the *numerosus* group from Thailand (Insecta, Diptera, Chironomidae). – Spixiana **20/3**: 271-276

The male adult of *Microtendipes schuecki*, spec. nov. is described from northern Thailand and identified as a member of the *numerosus* group of species whose diagnostic characteristics are discussed. The female adult is not reliably associated, the pupa and larva are unknown.

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Einleitung

Obwohl weltweit verbreitet, hat die mäßig artenreiche Gattung *Microtendipes* Kieffer, 1915 ihren Verbreitungsschwerpunkt in der Holarktis, Afrotropis und Orientalis. Schon jetzt lassen sich, auch ohne die ausstehende Gattungsrevision, mehrere Artengruppen mit jeweils mehreren Arten unterscheiden. Eine dieser Gruppen soll hier, im Vorgriff auf eine umfassende Bearbeitung, *numerosus*-Gruppe genannt und im folgenden definiert werden. Der Name wurde nach *Microtendipes numerosus* Lehmann, 1979 gewählt, ein aus dem Kivu-Gebiet in Nordost-Zaire beschriebenes Taxon.

Weitere Vertreter dieser Artengruppe fanden sich inzwischen in der Osttürkei, Nordindien, Sri Lanka, Nepal, Thailand, Südwest-China, Sabah auf Borneo, den Philippinen und in Südafrika.

Microtendipes schuecki, spec. nov.

Typen. Holotypus: 1♂ Imago, Nord-Thailand, Doi Inthanon, Bang Khun Klang, 1.200 m NN, 98°32'E, 18°32'N, 8.-22.1.1991, Lichtfang, leg. H. Malicky. – Paratypen: 5♂♂ Imagines vom locus typicus (10.-17.10.1989; 21.-28.11.1989; 14.-21.8.1990; das Typenmaterial befindet sich als 6 Euparal-Dauerpräparate in der Zoologischen Staatssammlung München.

Weiteres Material. 2♀, nicht sicher zugeordnete Exemplare vom locus typicus 8.-22.1.1991 (Zoologische Staatssammlung München).

Differentialdiagnose. *Microtendipes schuecki* unterscheidet sich als ♂ Imago von *M. numerosus* (in Klammern), dem einzigen bisher beschriebenen Vertreter der *numerosus*-Gruppe in folgenden Merkmalen: Acrostichalsetae fehlen (meist 3-4 vorhanden); Vorderfemur und ta_1 aller Beine ohne medianen dunklen Ring (mit Ring); ta_4 an P_I apikal breit dunkel (schmal dunkel); Flügel in r_{4+5} mit 2, in m_{1+2} mit 1 dunklen Flecken (genannte Flügelzellen mit je 3 dunklen Flecken); an ohne dunklen Fleck (mit Fleck); besonders Abdominaltergite III und IV mit dunklem, T-förmigem Muster (Tergite II-VII mit anteriorem, schmalem, dunklem Querstreifen); obere Volsella apikal spitz zulaufend (gerundet); mediane Volsella nicht vorstehend (als deutlicher Lobus ausgebildet); untere Volsella in der apikalen

Hälfte keulig verbreitert (kaum verbreitert); Gonostylus distal ohne Konzentration von Setae (mit 3-4 pinselförmig konzentrierten Setae).

Dem Vergleich liegt die Typenserie von *Microtendipes numerosus* aus der Zoologischen Staatssammlung München zugrunde.

Beschreibung

Imago ♂

Färbung in Alkohol gelbbraun mit dunklerer Thorax- und Flügelzeichnung. Fast alle Beinglieder, zum Teil auch mehrfach, dunkel geringelt. Abdominaltergit I und II hellbraun, III und IV (V-VI) mit T-förmigem dunklem Muster (Abb. 3).

Kopf. Länge der Palpenglieder 2-5 in µm (Holotypus): 35, 114, 216, 252. AR=1,03-1,12 (n=2). Frontaltuberkel fehlen.

Thorax. Dorsocentralsetae 10-13 (M=11,4; n=5), uniserial stehend; Acrostichaelsetae o; Praealarsetae 2-3 (M=2,5; n=6); Scutellarsetae 21-25 (M=23,3; n=4). Laterale Vittae braun, ebenso gefärbt ein medianer Querstreif des Scutellums, das Postnotum, das anteriore Anepisternum, das Epimeron II sowie ein medianer Querstreifen auf dem Praeepisternum (Abb. 2a).

Flügel. Länge 1,9-2,0 mm (M=1,95; n=4). Gefleckt, jeweils 1 dunkler Fleck proximal und distal in r_{4+5}, in m_{1+2} im distalen Anschluß an RM, proximal und distal in m_{3+4} sowie unter FCu; außerdem ist FCu und die Region um RM verdunkelt (Abb. 1). Anallobus mäßig ausgebildet, Squama mit 10-14 (M=1,95; n=4) langen Setae. Flügelmembran ohne Setae. R, R_1, distale Hälfte von R_{4+5} uniserial mit Setae besetzt. C endet deutlich distal des Endes von M_{1+2}. R_{2+3} endet im proximalen Drittel des Abstandes zwischen den Enden von R_1 und R_{4+5}.

Beine. Alle Beinpaare mit schmalen, distalen dunklen Ringen an fast allen Gliedern. Ausnahme sind die Tibien aller Beine, die zusätzlich einen basalen dunklen Ring besitzen sowie der weitgehend dunkle ta_4 aller Beine und die komplett hellen ta_5.

Länge der Beinglieder in µm (Holotypus; ta_2-ta_5 an P_I von Paratypus 2):

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5
P_I	900	960	1080	540	495	495	165
P_{II}	1080	850	600	270	210	135	90
P_{III}	1200	930	885	510	375	225	105

Sensilla chaetica nicht zu erkennen, jedoch haben die Tarsenglieder generell zahlreiche Setae verloren. Femur von P_I (Abb. 1b) mit 2 Reihen senkrecht abstehender oder leicht proximalwärts gerichteter starrer, kräftiger Setae.

Hypogygium (Abb.2). Analspitze lang, schlank konisch, apikal abgestutzt, lateral in der basalen Hälfte mit 2-4 (M=3,5; n=4) eng anliegenden langen Setae bestanden. Analtergit mit breiten, median getrennten Bändern, an deren Ende 2-3 mediane, lange Setae, zum Teil in hellen Feldern, stehen. Die lateralen Analtergitsetae reichen weit auf den Distalteil des Analtergits hinauf und umschließen die Basis der Analspitze komplett.

Obere Volsella schlank, fast querstehend, apikale Hälfte verbreitert, distal zugespitzt; basallateral mit einem kräftigen, gerundeten Lobus, der mit 3-5 (M=4,1; n=7) Setae bestanden ist, Distalteil des Lobus mit Mikrotrichien. Distalteil der oberen Vorsella lappig ventralwärts gebogen, basalmedian ein ventraler Tuberkel mit langer Seta.

Mediane Volsella nicht vorstehend; sie besteht bei *M. schuecki* aus 4-7 kräftigen, eng zusammenstehenden Setae.

Untere Volsella relativ kurz, median verengt und distal keulig verbreitert; der dorsalwärts weisende Keulenkopf trägt zahlreiche Setae und ist mit Mikrotrichien besetzt. Basalteil der unteren Volsella fast nackt, mit Ausnahme einiger medianwärts gerichteter Mikrotrichien.

Gonocoxit basalmedian mit 5 geschwungenen Setae. Distalmediane Kontur durch einen dunklen Skleritstreifen verstärkt.

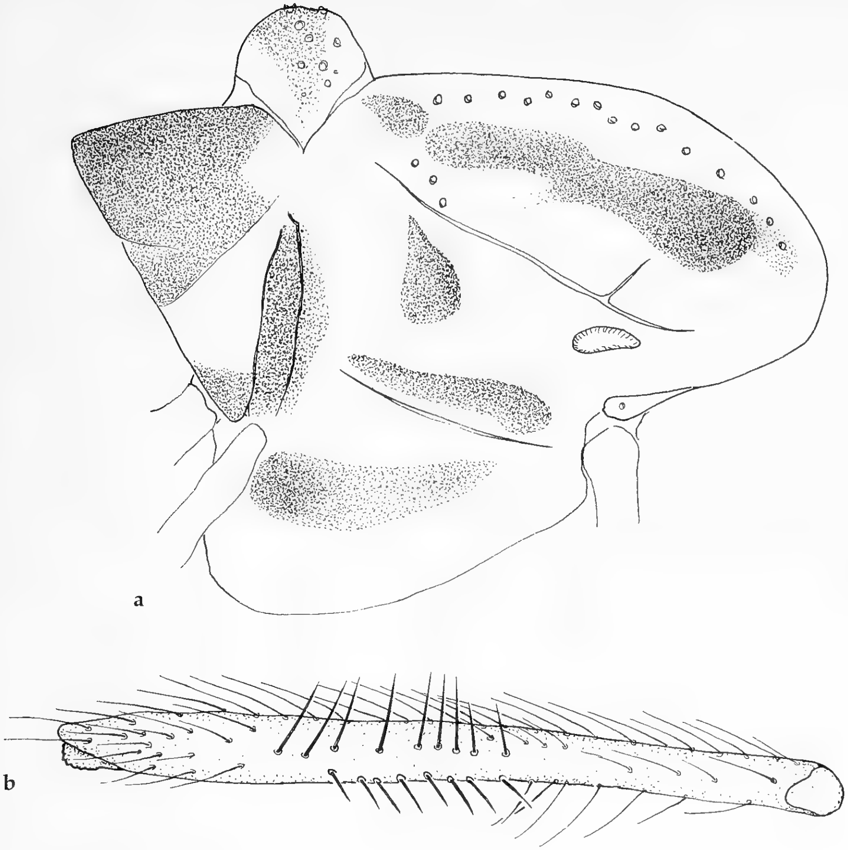

Abb. 1. *Microtendipes schuecki,* spec. nov. **a.** Thorax lateral. **b.** Vorderfemur lateral.

Gonostylus kurz, leicht medianwärts eingeschlagen und in der distalmedianen Hälfte gleichmäßig mit mittellangen Setae besetzt.

Sternapodem mit mäßig breitem Mittelteil, der sich lateralwärts kräftig verbreitert.

Imago ♀. Zwei vermutlich zu *M. schuecki* gehörige Exemplare liegen vor.

Puppe und Larve. Unbekannt.

Etymologie. Die neue Art ist Herrn Florian Schück sen., Nürnberg, von seinem Sohn Florian zum 70. Geburtstag gewidmet. Die damit verbundene finanzielle Zuwendung hilft der Zoologischen Staatssammlung München in vorbildlicher Weise, ihren wissenschaftlichen Aufgaben im Bereich der Taxonomie gerecht zu werden.

Systematische Stellung. Wie schon früher erwähnt, gliedert sich die Gattung *Microtendipes* in mehrere gut definierbare Artgengruppen (Pinder & Reiss 1983). Die *numerosus*-Gruppe, zu der momentan nur 2 beschriebene Arten, *M. numerosus* und *M. schuecki* gehören, hat eine weitgehend palaeotropische Verbreitung und weicht in mehreren Merkmalen deutlich von den vorwiegend palaearktisch, resp. holarktisch verbreiteten Vertretern der *pedellus*-Gruppe ab.

Charakteristische diagnostische Merkmale, denen teilweise auch phylogenetische Bedeutung zukommt, sind für die ♂ Imagines der *numerosus*-Gruppe: Auffällig hell-dunkel gefärbt, mit zahlreichen

Abb. 2. *Microtendipes schuecki*, spec. nov. Hypopygium dorsal.

dunklen Thorax- und Flügelflecken sowie zum Teil mehrfach geringelten Beingliedern; Analspitze des Hypopygiums lang, schlank konisch, lateral mit mehreren eng anliegenden, langen Setae bestand, distal abgestutzt; obere Volsella mit typischem basallateralem Lobus, der mit langen Setae und Mikrotrichien versehen ist; mediane Volsella entweder ein mit Setae bestandener, unterschiedlich stark ausgebildeter Lobus oder nur durch eine Gruppe eng zusammenstehender Setae repräsentiert.

Da nur von *M. numerosus* Puppen und Larven vorliegen, kann derzeit bei den Jugendstadien keine bindende Aussage über Gruppenmerkmale gemacht werden. Die Puppe läßt jedoch im Bereich des Frontalapotoms, bei der lateralen Chaetotaxie des Abdominaltergits V, die Larve am Mentum solche Merkmale vermuten.

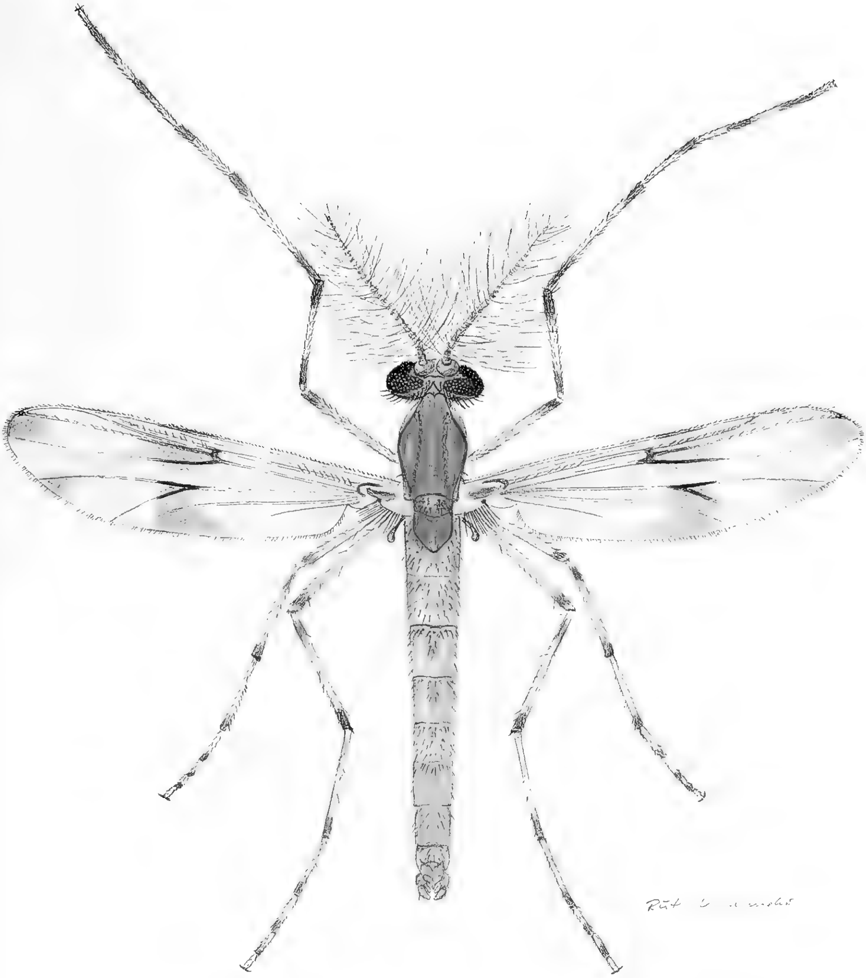

Abb. 3. *Microtendipes schuecki*, spec. nov. ♂ Imago, dorsal, Gesamtansicht.

Bemerkungen. Bei der Untersuchung eines Paratypusexemplars von *Kribiocosmus tumulus* Dutta & Chaudhuri, 1995 aus Westbengalen, Indien, zeigte sich, daß diese Art der Gattung *Microtendipes* angehört. Der Erstnachweis von *Kribiocosmus* aus der Orientalis wird damit hinfällig, und die Gattung bleibt weiterhin ausschließlich afrotropisch verbreitet. *Microtendipes tumulus*, comb. nov. besitzt, wie die meisten Gattungsvertreter, am Vorderfemur abstehende, zum Teil körperwärts gerichtete kurze, kräftige und starre Setae. Außerdem sind im Kontrast zur Originalbeschreibung am Hypopyg mehrere lange mediane Analtergitborsten vorhanden, am Flügel ist die FCu und die RM-Region verdunkelt, und das Schüppchen der Vordertibia ist ungespornt.

Danksagung

Herrn Priv.-Doz. Dr. Hans Malicky danke ich für die Bereitstellung eines sehr umfangreichen Lichtfallenmaterials aus Thailand, dem auch die behandelte Art zugehört. Frau Ruth Kühbandner sei für die Anfertigung der Farbabbildung herzlich gedankt.

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Thalassodes mohrae spec. nov., ein neuer Grünspanner aus Sumatra

(Insecta, Lepidoptera, Geometridae, Geometrinae)

Manfred Sommerer

Sommerer, M. (1997): *Thalassodes mohrae* spec. nov., a new green Geometrid from Sumatra (Insecta, Lepidoptera, Geometridae, Geometrinae). – Spixiana **20/3:** 277-280

Thalassodes mohrae is externally similar to *Th. diaphana* Debauche, 1941 from Sulawesi but differs mainly in the structure of the 8th abdominal segment and in the features of valves and aedeagus of the male genitalia. In spite of the modified 8th segment and the absence of reddish edging to the margins of the wings, the setal patches on the third sternite as well as the coremata in the male genitalia support the new species being ranged in *Thalassodes* as defined by Holloway (1996). Only a few specimens have so far been sampled from lower montane localities (1000-1450 m) in North and West Sumatra.

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Einleitung

In der Gattung *Thalassodes* Guenée, 1857 hatte Prout (1933) bei der Bearbeitung der Gruppe im "Seitz" (Band 12) ca. 40 Arten des indo-australischen Faunengebiets zusammengefaßt. Weitere Arten kommen in Afrika vor. Die Arten der Gruppe sind zumeist von meergrüner Färbung mit geringer Zeichnung und sind sich zum großen Teil recht ähnlich, so daß ihre Unterscheidung mühsam und häufig nur durch anatomische Merkmale der Genitalarmatur möglich ist. Genauere Untersuchungen haben inzwischen zur Entdeckung vieler neuer Arten auf den südostasiatischen Inselgruppen geführt.

Für die Fauna von Borneo hat Holloway (1996) kürzlich eine Revision der Gruppe bezüglich der dort vertretenen Arten unternommen. Vorwiegend anhand der ♂ und ♀ Genitalstrukturen und der Form des 8. Abdominalsegments gelangte Holloway dabei zu einer Aufgliederung der Gattung in drei Gattungen: *Thalassodes* Guenée, *Orothalassodes* Holloway und *Pelagodes* Holloway.

Aus Sumatra liegt eine kleine Serie einer schönen und großen Art (Farbabb. A) vor, die keinem bekannten Taxon zugeordnet werden konnte und im BMNH nicht vertreten ist. Die Merkmale der neuen Art entsprechen insoweit der Definition Holloways für die Gattung *Thalassodes*, als sich beim ♂ im 3. Abdominalsternit Borstenfelder finden und der Genitalapparat mit Coremata versehen ist. Andererseits hat die neue Art keinen roten Flügelsaum und weist eine Modifikation des 8. Abdominalsegments auf, wie sie nach Holloway für die Gattung *Orothalassodes* charakteristisch ist. Die habituell der neuen Art ähnliche, aber wesentlich kleinere *curiosa* Swinhoe 1902, stellte Holloway ebenfalls noch zu *Thalassodes*, obwohl auch bei dieser Art kein roter Flügelsaum vorhanden ist. Wie *curiosa* stellt auch die neue Art einen Übergang zur nächsten Gattung *Orothalassodes* dar.

Abb. A. *Thalassodes mohrae,* spec. nov., ♂, Paratypus (25.II.1995). Ruth Kühbandner pinx.

Abkürzungen

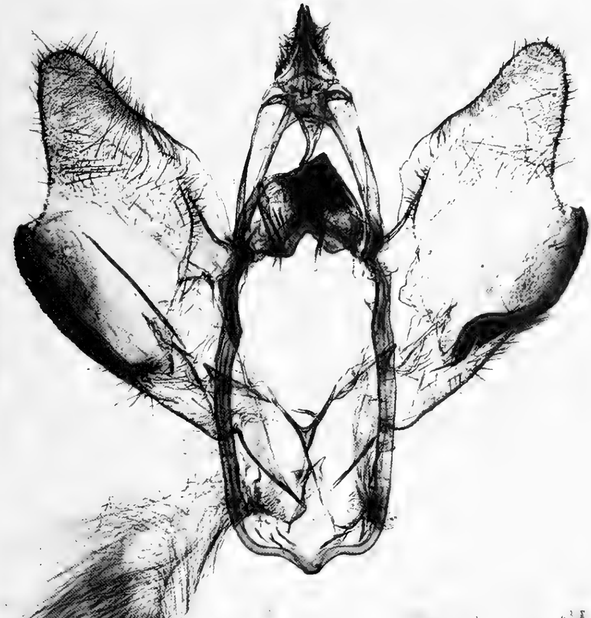
BMNH	The Natural History Museum (London)
ZSM	Zoologische Staatssammlung (München)

Thalassodes mohrae spec. nov.

Typen. Holotype: ♂, SUMATRA sept. (Tapanuli sel.), "Sipirok 3" 1300 m, 10 km NE Sipirok, 25.II.1995 – Gen. Präp. Nr. MS 1997-19 (ZSM). – Paratypen (7): wie Holotype, 1♂, 23.VII.1995 (BMNH); 1♂, 25.II.1995. (Simalungun) "Holzweg 3a" 1150 m, 14 km NE Prapat, 1♂,18.III.1993. (Simalungun) Sitahoan 1450 m, 98°55'E / 2°40'N; 1♀, 7.IV.1996. (Simalungun) "Holzweg 2" 1050 m, 28 km SW Siantar, 1♀, 31.III.1986, Gen. Präp. Nr. MS 1995-226. SUMATRA occ., Tapan 1000 m, 1♂, Gen. Präp. Nr. MS 1984-08; 1♀, 18.II.1976, leg. Sommerer. – Soweit nichts anderes angegeben, wurde das Material von Dr. E. W. Diehl (Sumatra) gesammelt und befindet sich in coll. Sommerer.

Diagnose

Vorderflügellänge 23-25 mm. Färbung meergrün. Flügel durchscheinend mit schwacher, durch dichtere Beschuppung bewirkter Zeichnung, dabei die – insbesondere basal – schwach beschuppten



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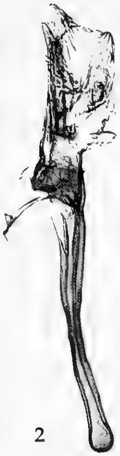

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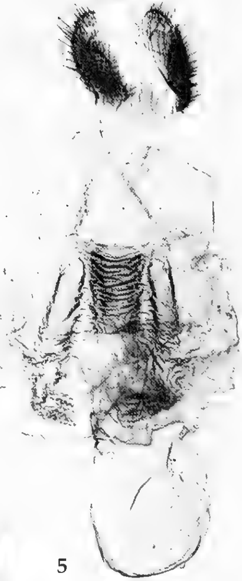

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Abb. 1-4. *Thalassodes mohrae,* spec. nov., Holotypus, ♂ Genital- und Abdominalstrukturen. **1, 2.** Genital und Aedeagus. **3.** 3. Abdominalsternit. **4.** 8. Abdominalsegment.
Abb. 5. *Thalassodes mohrae,* spec. nov., ♀, Paratypus (Gen. Präp. Nr. MS 1995-226), ♀ Genital.

Partien irisierend. In der Zeichnungsanlage mit *curiosa* vergleichbar und mit der von der Größe (Vorderflügellänge 26 mm) her besser passenden *diaphana* Debauche, 1941 aus Celebes (Type von Menado; Farbdia im BMNH). Mit *diaphana* stimmt *mohrae* in einer Reihe äußerer Merkmale überein:

Stirn und Scheitel grün mit weißer Fühlerbasis; Palpen grün; Thorax und Abdomen dorsal zeichnungslos grün, ventral weißlich; Beine weißlich, die beiden ersten Beinpaare außen rotbraun, die Hintertibien beim ♂ verdickt mit zwei Spornpaaren, wovon der innere jeweils deutlich länger ist; Fühler beim ♂ gekämmt bis etwa zur Hälfte der Länge, beim ♀ einfach; Fransen aller Flügel grün. Im Gegensatz zu *diaphana* sind im Vorderflügel Diskalpunkte erkennbar und fehlt im Hinterflügel eine deutliche weiße Querlinie.

♂ Genital (Abb. 1, 2). Uncus kurz und schmal mit behaarten Socii. Gnathos zentral zu langer Spitze ausgezogen. Valven zweigeteilt, distal membranös, Ventralrand stark sklerotisiert mit feinen Dornen. An der Valvenbasis ein großer chitinöser Lappen mit distal gerichteten Zacken, starke Coremata. Juxta flächig, herzförmig, mit dichten Zähnchen besetzt. Im Gegensatz zu *diaphana* sind die Valven symmetrisch und ohne Aus- bzw. Einbuchtung und der Aedeagus ist lang (4.2 mm) mit einem über drei Fünftel seiner Länge reichenden dünneren Basalstiel. Vesica ohne spezielle Struktur.

Das 3. Abdominalsternit (Abb. 3) ist mit zwei Feldern ca. 0.5 mm langer Haare besetzt. Das 8. Tergit besteht aus einem tiefen, symmetrisch doppelt gewellten Lappen, das 8. Sternit weist einen kräftigen Mittelzapfen auf (Abb. 4). Bei *diaphana* fehlt dieser Zapfen und sind die Strukturen von Tergit und Sternit asymmetrisch.

♀ Genital (Abb. 5). Apophyses posteriores lang (1.5 mm), anteriores kurz (0.4 mm) und schwach sklerotisiert. Lamella antevaginalis vor allem lateral stark gefältelt. Ductus bursae breit (0.5 mm), schwach chitinisiert, stark faltig. Corpus bursae gedrungen zylindrisch, breit (1.0 mm) und lang (1.9 mm).

Verbreitung. In niederen Berglagen (1000-1450 m) von Nord- und West-Sumatra bekannt.

Etymologie. Die neue Art wird Frau Dorothea Mohr gewidmet.

Zusammenfassung

Thalassodes mohrae ist eine neue grüne Spannerart aus Sumatra, die habituell und strukturell der *Thalassodes diaphana* Debauche, 1941 von Sulawesi nahe steht. Die neue, Frau Dorothea Mohr gewidmete Art ist insbesondere durch den kräftigen Mittelzapfen im 8. Sternit, den symmetrisch doppelt gewellten Distalrand des 8. Tergits, die symmetrischen Valven mit gut sklerotisiertem Ventralrand und den langen Aedeagus in der ♂ Genitalstruktur gekennzeichnet. Borstenfelder auf dem 3. Sternit und starke Coremata beim ♂ legen die Zuordnung zur Gattung *Thalassodes* nach der Definition durch Holloway (1996) nahe. Holotypus (♂) in der ZSM, Paratypus (♂) im BMNH, weitere Paratypen (3♂♂, 3♀♀) in coll. Sommerer.

Danksagung

Unterstützung und wertvolle Hinweise verdanke ich Dr. Axel Hausmann (ZSM), Dr. Jeremy D. Holloway (Tillinglea), Prof. Dr. Hiroshi Inoue (Iruma City), Frau Marianne Müller (ZSM), Dr. Bernhard Ruthensteiner (ZSM) und Dr. Gerhard Tarmann (Tiroler Landesmuseum – Naturwissenschaften – Innsbruck). Für Gastfreundschaft in Sumatra und Überlassung des Materials danke ich herzlich Herrn Dr. E. W. Diehl.

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Beschreibung einer neuen Art aus der Gattung *Clethrorasa* Hampson, 1910 aus Nord Vietnam und Süd China

(Insecta, Lepidoptera, Noctuidae, Amphipyrinae)

Gottfried Behounek

Behounek, G. (1997): A new species of the genus *Clethrorasa* from Vietnam, (Insecta, Lepidoptera, Noctuidae, Amphipyrinae). – Spixiana **20/3:** 281-284

Clethrorasa kossnerae, spec. nov. from Vietnam and south China is newly described and compared with the two other known species of the genus.

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Einleitung

Die Gattung *Clethrorasa* wurde von Hampson bereits im Jahre 1906 aufgestellt, jedoch erst 1910 stellte Hampson sein Taxon *Leocyma pilcheri* Hampson, 1906 in die Gattung *Clethrorasa* und machte den Gattungsnamen damit verfügbar. Ca. 80 Jahre galt die Gattung als monotypisch, erst Holloway (1989) beschrieb eine weitere Art von Borneo und Sumatra. In dem nun vorliegenden umfangreichen Material aus Vietnam konnte eine weitere recht auffallende Art gefunden werden, welche nachfolgend beschrieben wird. Die Fauna von Vietnam ist noch weitgehend unbekannt. Zusammenfassende Arbeiten finden sich nur bei Candeze (1927), Joannis (1928), Ronkay (1989) und Kljutschko (1993). Die beiden letztgenannten Autoren behandeln in ihren Arbeiten nur die Unterfamilie der Plusiinae. Wegen der über lange Jahre dauernden politischen Situation waren gezielte Expeditionen nicht durchführbar. Erst in letzter Zeit konnten umfangreiche Aufsammlungen, speziell von Sinajev, Simonov, Schintlmeister und Brechlin erfolgen.

Checkliste der Gattung *Clathrorasa*

Clethrorasa pilcheri (Hampson, 1906)	Verbreitung: NO. Himalaya, über Malaysia und Borneo bis Sumatra
Clethrorasa kossnerae, spec. nov.	Verbreitung: N. Vietnam und S. China
Clethrorasa micropuncta Holloway, 1989	Verbreitung: Borneo, Brunei, Sumatra,

Clethrorasa kossnerae spec. nov.

Abb. 1, 2-3

Typen. Holotypus: ♂, N. Vietnam, Mt. Fan-si-Pan, W-Seite, Cha-pa (= Sapa) 1600-1800 m, 22°20'N, 103°40'E, 30.6.-12.7.1994, leg. Sinajev & einh. Sammler, coll. Behounek, Deisenhofen, coll. ZSM, München, Gen.Prp. 5235 Behounek. – Paratypen: 1♀, N. Vietnam, Mt. Fan-si-Pan, W-Seite, Cha-pa (= Sapa) 1600-1800 m, 22°20'N 103°40'E Sek. Wald/Kulturland 30.6.-12.7.1994, leg. Brechlin & Schintlmeister, coll. Schintlmeister, Dresden; 1♀, gleiche

Abb. 1. *Clethrorasa kossnerae*, spec. nov. ♂ Holotypus (Zeichnung R. Kühbandner).

Daten wie Holotypus, coll. Krusek, Prag; 1♀, [China] Linping, Pr. Kwangtung, 9.5.1992, [leg.] H. Höne, ZFMK, Bonn. 2♂♂, N. Vietnam, 1600 m, Mt. Fan-si-Pan (Nord) Cha-pa, Primärwald, 22°17'N, 103°44'E, 20.30.4.1995, leg. Sinajev & einh. Sammler, coll. Hreblay, M.-Erd.)

Beschreibung

Maße und äußere Merkmale. Vorderflügellänge ♂ 16 mm, ♀ 17 mm. Kopf hellgelb, Halskragen mit ausgedehnter schwazer Behaarung. Thorax ebenfalls hellgelb mit vier schwarzen Flecken. Abdomen schwarz, gelb geringt, Afterbusch gelb. Die hellgelben Vorderflügel sind mit großen schwarzen Flekken gezeichnet. Diese Zeichnung setzt sich auch auf den Fransen fort. Hinterflügel des ♂ dunkelgrau, gegen den Außenrand hin aufgehellt. Die Aufhellung reicht jedoch nicht bis zum Analwinkel. Fransen weiß. Die Hinterflügel des ♀ sind durchgehend einfarbig schwargrau, die Fransen ebenfalls weiß.

♂ Genitalapparat (Abb. 7). Genital symmetrisch, Valven länglich, im oberen Drittel stark, schaufelähnlich verbreutet, hier ein stark sclerotisierten gekrümmter Processus. Apex der Valve zu einem Dorn umgebildet. Aedoeagus relativ kurz und gedrungen. Die Vesica sehr einfach, ohne Ausbuchtungen, gebaut, im mittleren Bereich ein große Anzahl kurzer aber kräftiger Cornuti.

♀ Genitalapparat wurde nicht untersucht

Etymologie: Die Art ist der erst kürzlich verstorbenen Frau Margot Kossner, München gewidmet. Dem Ehepaar Kossner ist die Zoologische Staatssammlung zu tiefem Dank für die Unterstützung zoologischer Forschungsarbeiten verpflichtet.

Clethrorasa pilcheri (HAMPSON, 1906)

Abb. 4, 5

Untersuchtes Material. 1♀, Indonesien, N. Sumatra, Prapat, HW [Holzweg] 3, 98°58'E, 2°46'N, 21.1.1983, leg. Diehl; 1♂, Indonesien, N. Sumatra, Prapat, HW [Holzweg] 2, 98°59'E, 2°46'N, 11.12.1991, leg. Diehl; 1♂, gleicher Fundort, 21.5.1993, leg. Diehl; 1♂, Indonesien, N. Sumatra, 15 km NO Prapat, HW [Holzweg] 4, 1150 m, 3.-8.1.1994, leg. K. Cerny, Gen.Prp.5236 Behounek; 1♀, Indonesien, N. Sumatra, Brastagi, 13.10.1963, ex coll. Walter; 2 ♀♀, Indonesien, N. Sumatra, 80 km SSW Medan, Berastagi, 1000 m, 4.6.1973, leg. Diehl

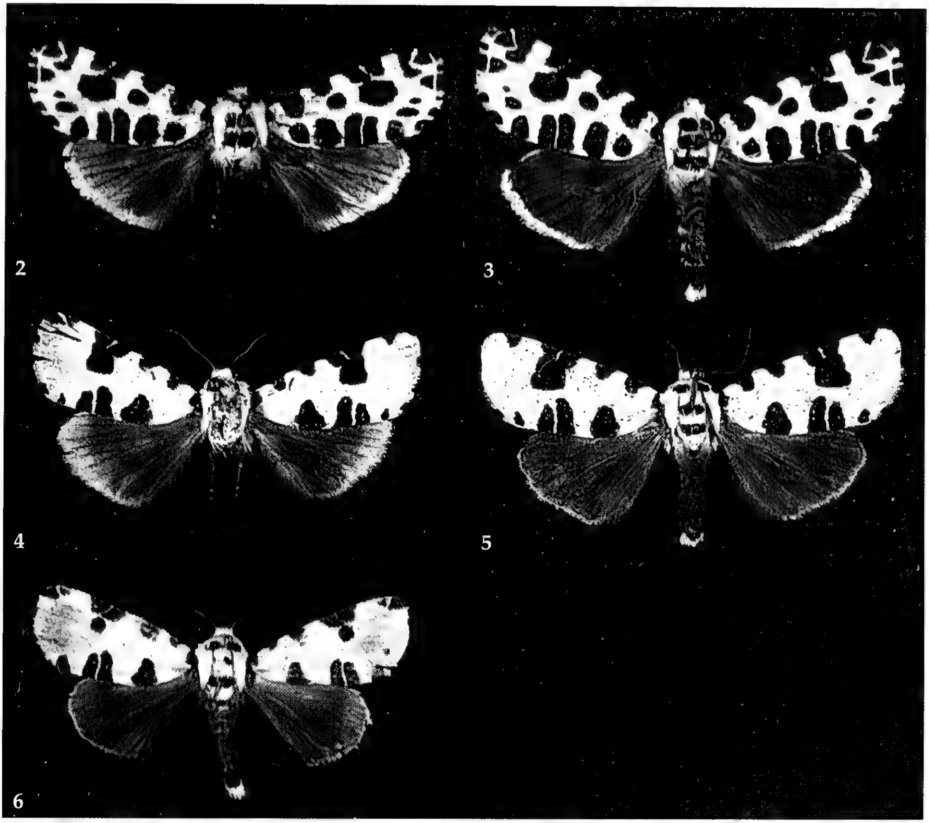

Abb. 2-6. *Clethrorasa* species. **2.** *Clethrorasa kossnerae,* spec. nov. ♂ Holotypus. **3.** *C. kossnerae,* spec. nov. ♀ Paratypus. **4.** *C. pilcheri* Hampson, ♂. **5.** *C. pilcheri* Hampson, ♀. **6.** *C. micropuncta* Holloway, ♀.

Clethrorasa micropuncta HOLLOWAY, 1989
Abb. 6

Untersuchtes Material. 1♀, Indonesien, N. Sumatra, 15 km NO Prapat, HW [Holzweg] 4, 1150 m, 3.-8.1.1994, leg. Diehl.

Differentialdiagnose

Alle drei Arten der Gattung *Clethrorasa* Hampson, 1910 weisen prinzipiell die gleiche Grundstruktur der Zeichnungselemente auf den Vorderflügeln auf. Aufgrund der viel stärker ausgedehnten schwarzen Fleckenzeichnung kann jedoch *C. kossnerae,* spec.nov. von den beiden anderen Arten sofort abgetrennt werden. *C. micropuncta* Holloway, 1989 hat die Fleckenzeichnung am stärksten reduziert. Mit einer Vorderflügellänge von 16 bzw. 17 mm ist *C. kossnerae* etwas größer als *C. micropuncta,* jedoch erheblich gößer als *C. pilcheri* (Hampson,1906), welche nur eine Vorderflügellänge von 14 mm aufweist. Die Genitalstruktur des ♂ von *C. kossnerae* ist sehr ähnlich, aber insgesamt größer und kräftiger als die von *C. pilcheri.* Der Processus von *C. kossnerae* ist länger und stärker gekrümmt. Der am Valvenapex sitzende Dorn ist ebenfalls länger als bei *C. pilcheri.* Die evertierte Vesica ist deutlich länger und breiter und weist mit ca. 30 pfeilspitzenähnlichen Cornuti eine um ca. 40 % niedrigere Anzahl an

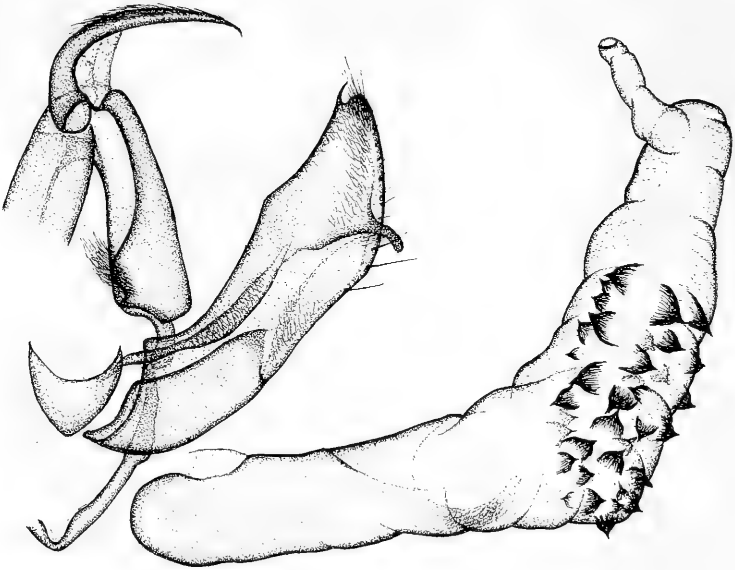

Abb. 7. ♂ Genital von *Clethrorasa kossnerae*, spec. nov. Holotypus.

Cornuti auf. Die Valve von *C. micropuncta* ist erheblich breiter und viel gedrungener. Die ♂ Genitalstrukturen von *C. pilcheri* und *C. micropuncta* sind auch bei Holloway (1989) gut abgebildet.

Zusammenfassung

Eine neue Noctuidenart aus Nord Vietnam und Süd China wird unter dem Namen *Clethrorasa kossnerae*, spec. nov. beschrieben und mit den anderen beiden bekannten Arten der Gattung verglichen.

Danksagung

Bei allen bereits in der Einleitung erwähnten Herren möchte ich mich für die Überlassung des Untersuchungsmateriales herzlich bedanken. Mein besonderer Dank gilt auch Herrn Dr. V. S. Kononenko, Vladiwostok, der während seines Aufenthaltes in Bonn die China-Sammlungen überprüfte und mir die Daten des bisher einzigen aus China bekannten Tieres bereitwillig übermittelte. Herrn Prof. Dr. L. Kobes, Göttingen, möchte ich herzlichst danken für die Überlassung und Ausleihe von Vergleichsmaterial aus seiner umfangreichen Sumatra-Noctuidensammlung.

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SPIXIANA | 20 | 3 | 285–290 | München, 01. November 1997 | ISSN 0341-8391

Eine neue Art der Gattung *Nebula* Bruand, 1846 von der Sinai-Halbinsel

(Insecta, Lepidoptera, Geometridae, Larentiinae)

Axel Hausmann

Hausmann, A. (1997): A new species of the genus *Nebula* Bruand, 1846 from the Sinai peninsula (Insecta, Lepidoptera, Geometridae). – Spixiana **20/3:** 285-290

Nebula mantelorum, spec. nov. is newly described from E. Egypt, Sinai peninsula, and compared with some closely related species of the genus.

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Einleitung

In einer umfangreichen Geometriden-Ausbeute, die dem Autor von Herrn Gyula László, Budapest, nach dessen Sinai-Expedition im Frühjahr 1996 vorgelegt wurde, fand sich unter vielen anderen interessanten Taxa eine neue Art der Gattung *Nebula* Bruand, 1846. Diese wird im folgenden beschrieben.

Nebula mantelorum, spec. nov.

Abb. 1, 2

Typen. Holotypus: ♂, Egypt, Sinai, west end of the Nabq wadi, watersource, 750 m, 25.III.1996, leg. László (ZSM). – Paratypen: 2♂♂, 1♀, id.; 2♂♂, 3♀♀, id. (Coll. László); 1♂, Egypt, Sinai, 15 km SW Nuweiba, El Bigiya village, 700 m, 26.III.1996, leg. et coll. László; 17♂♂, 6♀♀, Egypt, Sinai, 17 km SW Nuweiba, Zirig Wadi, 750 m, 31.III.-2.IV.1996, leg. et coll. László; 5♂♂, 4♀♀, id. (ZSM); 7♂♂, 2♀♀, Egypt, Sinai, 16-17 km SW Nuweiba, Zirig Wadi, 650-750 m, 27-29.III.1996, leg. et coll. László; 6♂♂, 2♀♀, id. (ZSM); 5♂♂, 5♀♀, Egypt, Sinai, 17 km SW Nuweiba, Zirig Wadi, 750 m, 5.IV.1996, leg. et coll. László; 2♂♂, 1♀, id. (ZSM); 1♂, Egypt, Sinai, 25 km SW Nuweiba, Hlaylat Wadi, 900 m, 3.IV.1996, leg. et coll. László; 1♂, Egypt, Sinai, 24 km SW Nuweiba, Hlaylat Wadi, 1000 m, 4.-6.IV.1996, leg. et coll. László; 2♂♂, id. (ZSM); 1♀, Egypt, Sinai, Lathi Wadi, 500 m, 23.III.1996, leg. László (ZSM).

Beschreibung

Maße und äußere Strukturmerkmale. Vorderflügellänge beim ♂ 11.7-14.6 mm, beim ♀ 14.0-15.2 mm. Stirn deutlich vorgewölbt, namentlich in der unteren Hälfte. Saugrüssel gut entwickelt. Palpenlänge beim ♂ und ♀ 0.9-1.1 mm (=1.3-1.4facher Augendurchmesser). ♂ Fühler dicht und lang bewimpert, längste Wimpern doppelte Geißelbreite. ♀ Fühler vergleichsweise dicht bewimpert, Wimperlänge in etwa gleich Geißelbreite. Sporenformel in beiden Geschlechtern 0-2-4. Vorderflügelsaum sehr gerade, am Innenwinkel und Apex relativ spitz. Vorderflügelcosta deutlich konvex. Frenulum beim ♂ vorhanden, vergleichsweise schwach, beim ♀ als schwach entwickeltes Schuppenbüschel.

Färbung und Zeichnung. Grundfärbung der Vorderflügel sandfarben, an der Costa deutlich heller. Vorderflügelbasis mit zwei schwach gebogenen graubraunen Querlinien. Antemediane leicht gewellt,

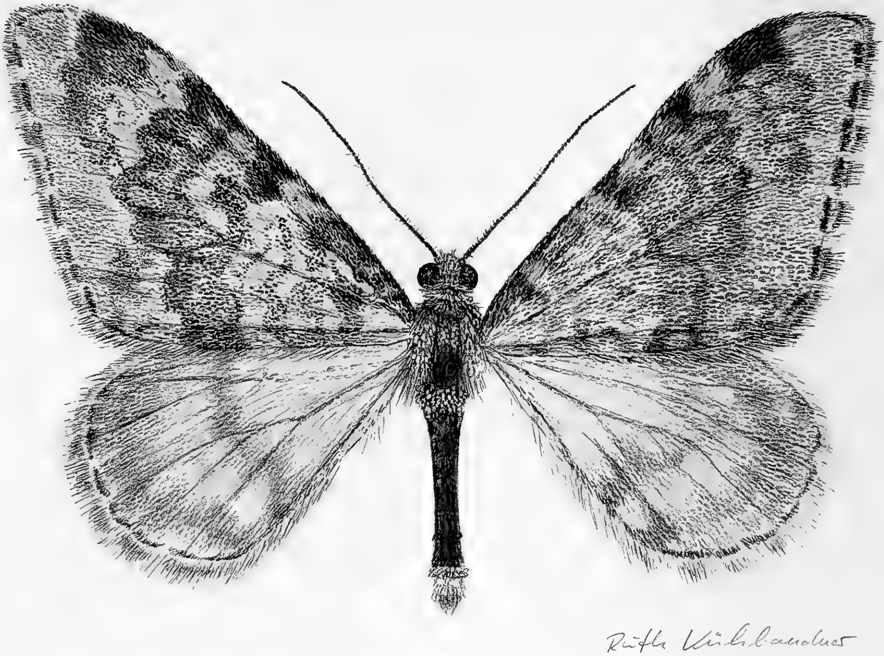

Abb. 1. *Nebula mantelorum*, spec. nov., ♂ Holotypus (Zeichnung R. Kühbandner).

beiderseits hell eingefaßt. Mittelband graubraun, in deutlichem Kontrast zur Grundfärbung, am Innenrand vergleichsweise schmal, oberhalb der Ader CuA1 stark verbreitert, gegabelt und ein helles Feld an der Costa einschließend. Distalbegrenzung des Mittelbandes bogenförmig gezackt, an den Adern basalwärts vorspringend. Mittelpunkt schwarz, strichförmig, sehr fein, oft nahezu unsichtbar. Saumfeld sandfarben. Die graubraune Wellenlinie im Saumfeld zur Costa hin kontinuierlich deutlicher werdend. Hinterflügel weißlich grau. Postmediane der Hinterflügel grau, schmal, etwas verschwommen, an der Ader M3 mehr oder weniger deutlich geknickt. distal breit weißlich grau begrenzt. Saumband grau. Terminallinie aller Flügel in winzige schwarze Striche aufgelöst, von denen je zwei ein Aderende markieren.

Flügelunterseite hellgrau, Postmediane aller Flügel dunkelgrau und deutlich kontrastiert, jeweils zwischen M3 und CuA1 deutlich geknickt. Der gesamte Vorderflügel basal der Postmedianlinie leicht verdunkelt. Vorderflügelapex in Form eines länglichen Dreiecks hell ausgespart. Mittelpunkte aller Flügel gut erkennbar. Saumbänder grau und deutlich, jedoch heller als die Postmediane. Fransen sandfarben. Zeichnungsanlage des ♀ wie beim ♂, lediglich etwas rundflügeliger und meist etwas dunkler gefärbt. Stirn und Scheitel glatt beschuppt, einfarbig sandfarben. Palpen grau, meist mit weißlicher Spitze.

♂ Genitalapparat (Abb. 3, 5, 6). Uncus lang und schmal. Transtilla mit zwei caudalwärts gerichteten fingerförmigen Fortsätzen (labides). Diese terminal und lateral mit langen Borstenhaaren besetzt. Enddorn des Transtillafortsatzes (hamulus) vergleichsweise kurz (ca. 0.35 mm), gleichmäßig einwärts gekrümmt, an der Spitze mit einem kurzen Haken. Valve lang und schmal, ohne Sonderbildungen. Aedoeagus mittelbreit und relativ kurz (1.2-1.3 mm), ohne Cornuti, S-förmig gebogen. Im Terminalbereich seitlich mit schuppenbandartig strukturierter Vesica.

♀ Genitalapparat (Abb. 4). Apophysen vergleichsweise kurz: Apophyses posteriores 0.75 mm, Apophyses anteriores 0.35 mm. Lamella antevaginalis in Form eines ca. 0.1 mm breiten Chitinbandes

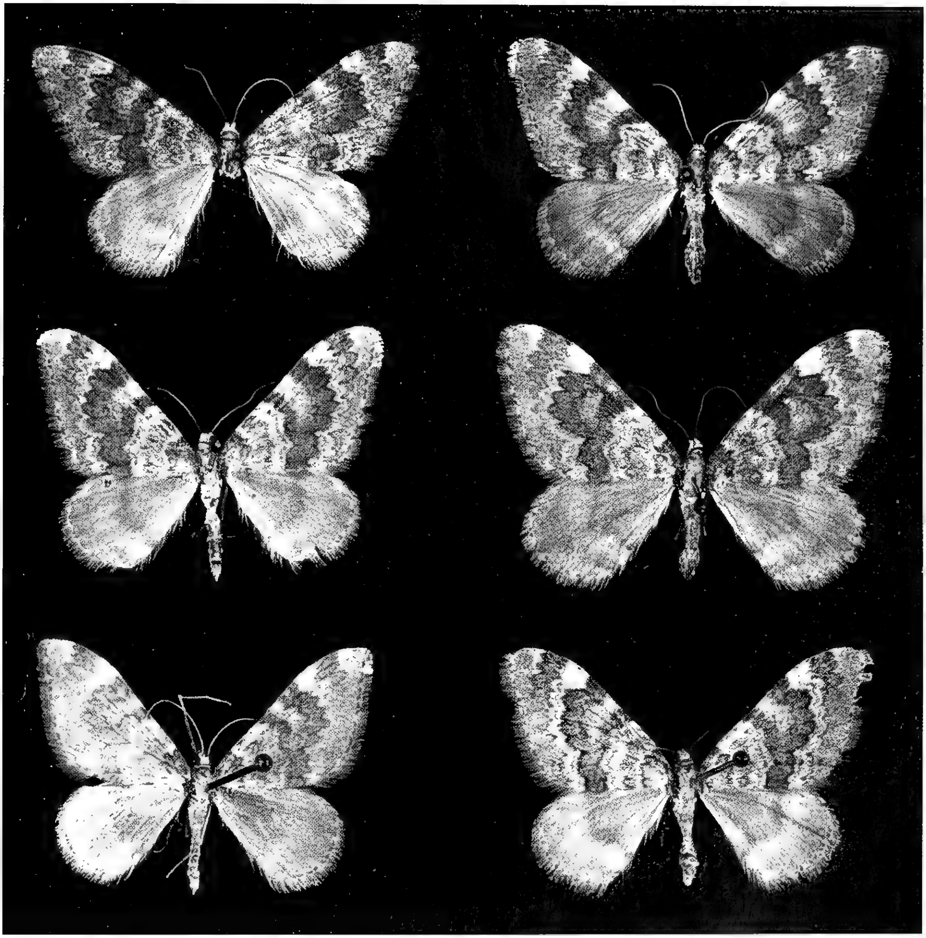

Abb. 2. *Nebula mantelorum*, spec. nov., Variabilität: linke Spalte ♂, rechte Spalte ♀ (Foto M. Müller).

ausgebildet. Ductus Bursae im caudalen Teil schmal, mit einer Chitinspange, Ductus Bursae unterhalb dieser chitinisierten Verengung vergleichsweise kurz und breit. Corpus Bursae groß, oval. Signum als rauh strukturierte Chitinplatte an der Oberfläche, in Form einer Pfeilspitze, am Oralrand herzförmig eingeschnitten.

Verbreitung. O. Ägypten, Sinai-Halbinsel. Vermutlich endemisch. Von den nah verwandten Arten *Nebula rastremata* (Turati & Krüger, 1936) aus Libyen, *Nebula juvenilata* (Zerny, 1933) aus dem Libanon und *Nebula saidabadi* (Brandt, 1941) aus dem S. Iran geographisch gut isoliert. Letztere ist in einer separaten Unterart auch in N. Oman verbreitet (Beschreibung im Druck). Bisher fehlen aus dem afrikanischen Teil Ägyptens (vgl. Wiltshire 1948), Israel (vgl. Amsel 1933, Hausmann 1997), Jordanien (vgl. Hausmann 1991), Syrien, Irak mit Ausnahme des Nordens (vgl. Wiltshire 1957) und der arabischen Halbinsel mit Ausnahme des N. Oman (vgl. Wiltshire 1990) Nachweise von Vertretern der Gattung *Nebula* s.str.

Phänologie. Bisher nur Funde von Ende März bis Anfang April.

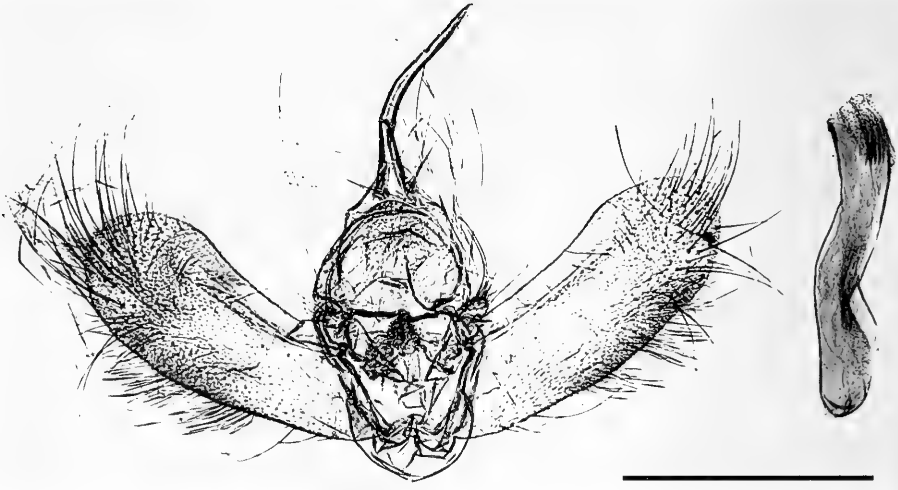

Abb. 3. *Nebula mantelorum*, spec. nov., ♂ Genitalapparat, Skala = 1 mm.

Etymologie. Die neue Art ist der Familie Mantel, v.a. Herrn Matthias Mantel und seinen Neffen Juliette und Raphael für die Unterstützung der systematisch-zoologischen Forschung an der ZSM gewidmet.

Differentialdiagnose

Innerhalb der Larentiinae stellt das Vorhandensein zweier fingerförmiger Transtilla-Fortsätze (labides) mit je einem gebogenen, stark chitinisierten Endhaken (hamulus) im ♂ Genitalapparat ein wichtiges apomorphes Merkmal der Tribus Cidariini und der Gattung *Nebula* Bruand, 1846 dar. Ähnliche Strukturen, wenn auch in abgewandelter Form findet man z.B. auch in der nahe verwandten Gattung *Lampropteryx* Stephens, 1831. Innerhalb der Gattung *Nebula* fallen die Arten *N. ablutaria* und *N. salicata* durch gekämmte Fühler des ♂ und sehr kurze hamuli aus dem Rahmen. Eine Abtrennung, z.B. als separate Untergattung, sollte diskutiert werden.

Die Arten *N. nebulata* (Treitschke, 1828), *N. ibericata* (Staudinger, 1871), *N. achromaria* (de la Harpe, 1853), *N. approximata* (Staudinger, 1881), *N. propagata* (Christoph, 1893), *N. senectaria* (Herrich-Schäffer, 1857), *N. reclamata* (Prout, 1914) und *N. propagata* (Christoph, 1893) sowie deren nähere Verwandte bilden eine Artengruppe, die sich durch kurze Fühlerbewimperung (♂ Wimperlänge maximal gleich Geißelbreite; ♀ maximal halbe Geißelbreite) und eine mit dunklen Schuppen übersäte Stirn auszeichnet. *N. senectaria* (Herrich-Schäffer, 1857), *N. reclamata* (Prout, 1914) und *N. propagata* (Christoph, 1893) sind im Vergleich mit der neuen Art im ♂ Genital durch einen

Abb. 4. *Nebula mantelorum*, spec. nov., ♀ Genitalapparat, Skala = 1 mm.

Abb. 5. *Nebula mantelorum,* spec. nov., ♂ Genitalapparat, Detailvergrößerung des Transtilla-Fortsatzes (labis); Skala = 0.1 mm.

Abb. 6. *Nebula mantelorum,* spec. nov., ♂ Genitalapparat, Detailvergrößerung des Transtilla-Fortsatzes (Variante); Skala = 0.1 mm.

breiteren Uncus, breitere Valven, längeren Aedoeagus und meist etwas längere und kräftigere Labides charakterisiert. Im ♀ Genital sind die Apophysen länger, die Lamella antevaginalis schmaler, der Ductus Bursae meist schmaler und das Signum kürzer.

Die neue Art ähnelt in Flügelschnitt, -zeichnung und -färbung am meisten *N. saidabadi*, *N. juvenilata* und *N. rastremata*. Diese drei genannten Arten bilden zusammen mit der hier beschriebenen eine natürliche Verwandtschaftsgruppe mit außergewöhnlich langen ♂ Fühlerwimpern (♂ 1.5-2.0fache, ♀ ca. 1.0fache Geißelbreite). Die genannten Arten zeichnen sich zudem durch einfarbig helle Stirn und im ♂ Genital durch schmalen Uncus, schmale, lange Valven und meist etwas verkürzte Labides aus.

N. rastremata aus Libyen unterscheidet sich jedoch habituell deutlich durch die dunkler überflogenen Vorderflügel, die Zeichnungsanlage ist weniger scharf, im Saumfeld des Vorderflügels nahe dem Apex befinden sich voneinander getrennte schwarze Makeln. Die Flügelunterseite von *N. rastremata* ist glänzend hellbraun gefärbt mit nur schwach von oben durchscheinender Flügelzeichnung.

N. juvenilata aus dem Libanon ist im Vorderflügel durch die gezackteren Basallinien, das nicht verdunkelte Mittelband und die helleren, zeichnungsloseren Hinterflügel gut von *N. mantelorum* zu unterscheiden. Die ♂ Fühlerwimpern sind etwas kürzer (1.5fache Geißelbreite).

N. saidabadi aus S. Iran und dem Oman steht strukturell und genitaliter nahe *N. mantelorum*, hat jedoch schmalere Valven, sowie einen schmaleren und längeren Aedoeagus. Im ♀ Genitalapparat sehr ähnlich der neuen Art. Äußerlich unterscheidet sich *N. saidabadi* deutlich durch oberseits viel verschwommenere, dunklere Flügelzeichnung, unterseits durch das dunklere Saumband aller Flügel und den rechteckigen hellen Fleck im Vorderflügelapex.

Zusammenfassung

Eine neue Larentiinen-Art, *Nebula mantelorum*, spec. nov., wird von der Sinai-Halbinsel, O. Ägypten beschrieben und mit einigen näher verwandten Arten verglichen.

Dank

Herrn Gy. László, Budapest, sei herzlich gedankt für die partielle Schenkung des Materiales, Frau R. Kühbandner, ZSM, für die Zeichnung des Holotypus und Frau M. Müller, ZSM, für die Fotografie der Abb. 2 und weitere fotografische Arbeiten. Herr Dr. L. Reser, Luzern, half durch einige nützliche Hinweise zur Systematik der Gattung *Nebula*.

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Beitrag zur Systematik der Gattung *Mixocera* Warren, 1901

(Insecta, Lepidoptera, Geometridae, Geometrinae)

Axel Hausmann

Hausmann, A. (1997): Contribution to the taxonomy of the genus *Mixocera* Warren, 1901 (Insecta, Lepidoptera, Geometridae, Geometrinae). – Spixiana **20/3:** 291-302

In this paper the morphology of eight species of the genus *Mixocera* Warren, 1901 is discussed. Three new species and one new subspecies are described: *Mixocera katharinae, spec.* nov. from Congo; *M. wiedenorum*, spec. nov. from Madagascar; *M. ledermanni*, spec. nov. from Nigeria and *M. albistrigata politzari*, subspec. nov. from Nigeria.

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Einleitung

Seit dem grundlegenden Werk über afrikanische Geometriden von Prout (1930: 45-46) befaßten sich nur vier Arbeiten mit der Gattung *Mixocera* Warren, 1901 (s.str.): Janse (1935: 383 ff.) bildete erstmals Genitalapparate ab, beide behandelte Arten sind jedoch fehldeterminiert. Fletcher (1978: 50) analysierte die Genitalmorphologie dreier Arten in korrekter Weise. In Hausmann (1995: 581-583) wurde die Gattung *Thelycera* Prout, 1912 von *Mixocera* abgetrennt. Beide wurden schließlich in Hausmann (1996: 57) der Tribus Microloxiini zugeordnet. Die nordindische "*Mixocera*" *albilineata* Walia & Pajni, 1984 ist vorläufig der Gattung *Thelycera* zuzuordnen. Die von Walia & Pajni (1984) vorgestellte generische Diagnose bezieht sich summarisch auf *Mixocera* und *Thelycera*. Die Notwendigkeit einer Gattungsrevision kam in den genannten Arbeiten vielfach zum Ausdruck.

Mixocera Warren, 1901

Beschreibung

Flügelfärbung grün, bei den Belegstücken zoologischer Sammlungen sehr häufig blaßgelb verfärbt. Postmediane des Vorderflügels weißlich und gerade, stets deutlich. Palpen kurz und schlank. Stirn flach, meist intensiv rotbraun. Fühler des ♂ doppelt gekämmt, des ♀ gezähnt bis gekämmt, oberseits bis in die Spitze weiß beschuppt. Saugrüssel kurz und schwach ausgebildet. Hintertibien in beiden Geschlechtern mit zwei Sporen, nicht verdickt. Hintertarsus nicht verkürzt. Frenulum beim ♂ und ♀ fehlend.

Äderung. Vorderflügel R1 in Sc mündend. R2-R5 und M1 kurz gestielt. Hinterflügel Sc+R1 und Rs an der Zellbasis kurz miteinander verschmolzen. Rs und M1 lang gestielt (⅓ bis ½ des Abstandes Zelle-Termen). Nur eine Analader entwickelt.

♂ Genitalapparat. Uncusspitze nicht gespalten. Socii lang. Gnathos fehlend. Basale Coremata der Valven fehlend. Valve geteilt in membranösen Teil (Costa bis Spitze) und einen stärker chitinisierten Ventralteil, dessen Form und Bedornung oft artspezifische Merkmale beinhalten. Aedoeagus ver-

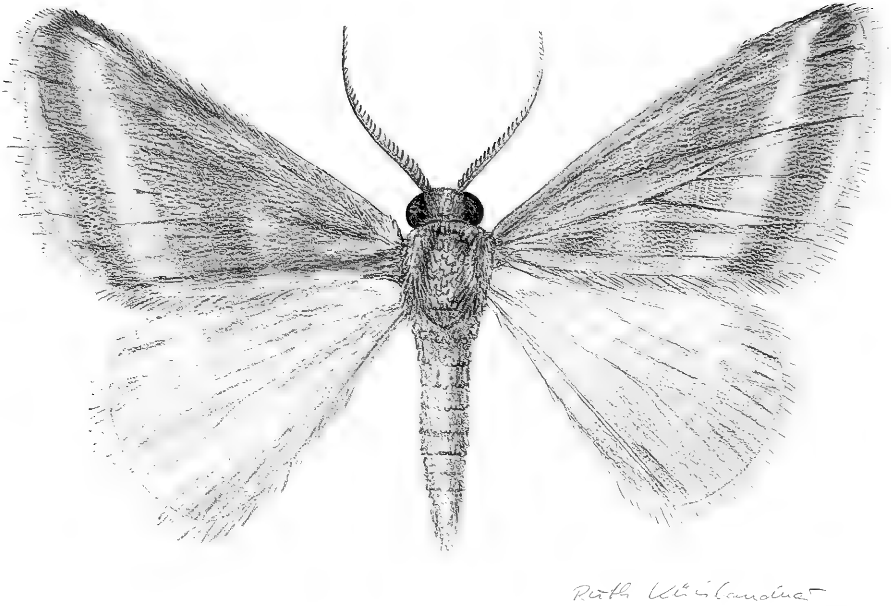

Abb. 1. *Mixocera katharinae*, spec. nov., ♂ Holotypus. (Zeichnung R. Kühbandner).

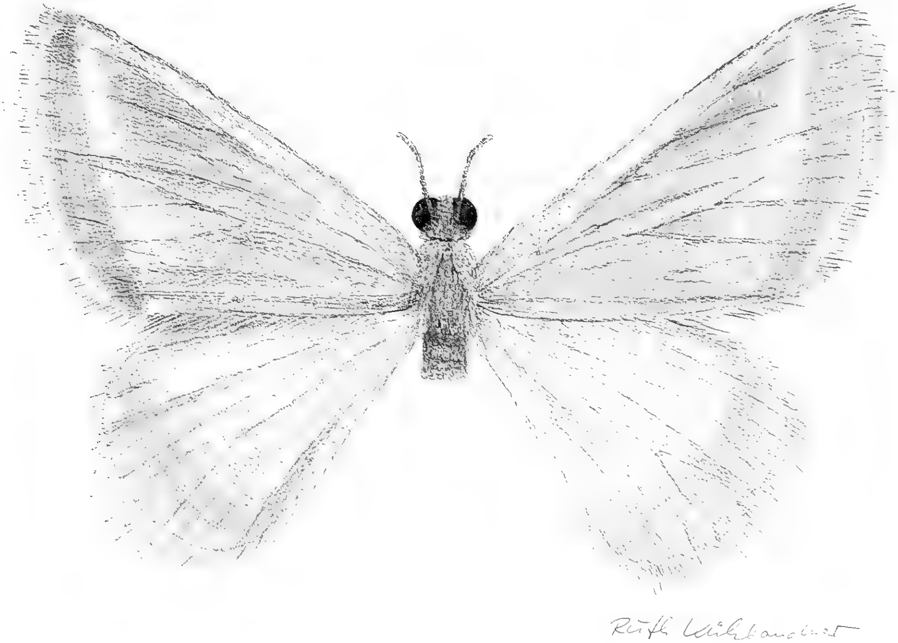

Abb. 2. *Mixocera wiedenorum*, spec. nov., ♀ Holotypus. (Zeichnung R. Kühbandner).

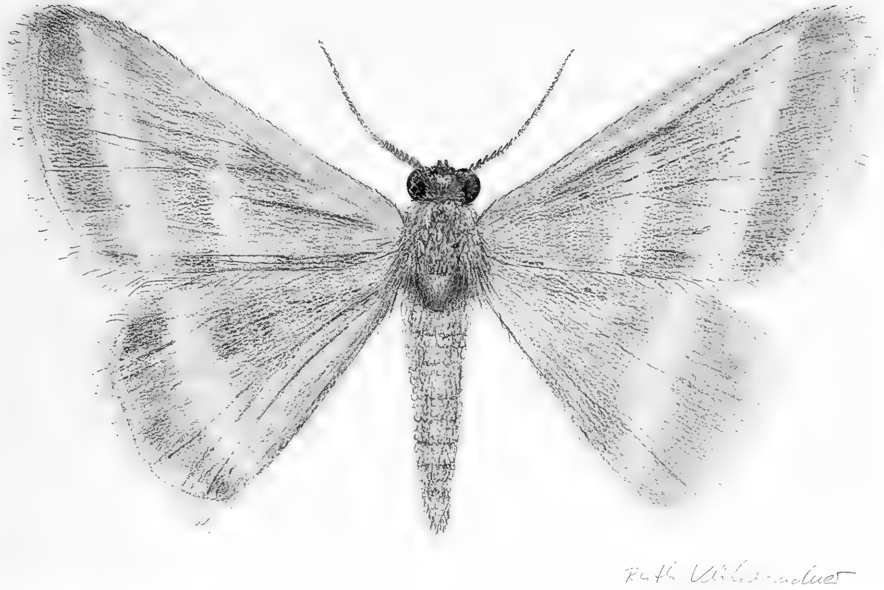

Abb. 3. *Mixocera ledermanni*, spec. nov., ♂ Holotypus. (Zeichnung R. Kühbandner).

gleichsweise schmal, meist mit vielen kleinen Cornuti. 8. Sternit mit Ausnahme einer Art ohne Sonderbildungen.

♀ Genitalapparat. Apophysen mittellang, sehr fein. Typischerweise der 7. Sternit (Lamella antevaginalis) stark gefurcht. Signa fehlend.

Differentialdiagnose. Das Fehlen des Frenulums, die sehr kurzen Palpen, der rudimentäre Saugrüssel, die Zahl der Hintertibialsporen, das Fehlen der Coremata an den Valven des ♂ Genitalapparates und die lange Stielung der Hinterflügeladern Rs und M1 stellen weitverbreitete typische Merkmale innerhalb der Tribus Microloxiini dar. Von vielen anderen Microloxiini-Gattungen durch die schmalen Hintertibien des ♂ und die nur kurze Anastomose der Hinterflügeladern Sc+R1 und Rs verschieden. Die beiden letztgenannten Merkmale stellen *Mixocera* in die Nachbarschaft von *Microloxia* Warren, 1893, von der sie jedoch z.B. durch das fehlende Frenulum klar abzutrennen ist. Von der nahverwandten Gattung *Thelycera* Prout, 1912, unterscheidet sich *Mixocera* v.a. durch die Fühlerstruktur beider Geschlechter, den schmaleren Aedoeagus und die fehlenden Coremata im ♂ Genitalapparat sowie durch die starke Furchung der Lamella antevaginalis im ♀ Genitalapparat (vgl. Hausmann 1995).

Mixocera latilineata (Walker, 1866)

Geometra latilineata Walker, 1866: List. Lep. Ins. Brit. Mus. 35: 1605 (loc.typ.: Moreton Bay, Queensland, Australia).

Beschreibung

Saugrüssellänge 1.2 mm. Fühler beim ♂ lang gekämmt, beim ♀ kürzer, längste Fühlerkammzähne des ♀ ca. 1.5fache Geißelbreite. Äderung siehe Gattungsdiagnose, Fusion der Hinterflügeladern Sc+R1 und Rs über ca. ⅓ Länge der Zelle.

Verbreitung. Australien.

Differentialdiagnose. Von den anderen Arten der Gattung v.a. verschieden durch die in beiden Geschlechtern länger gefiederten Fühler. Eine australische Art, die verschiedentlich als Untergattung

Gynandria Turner, 1910 abgetrennt wurde, eine derartige Differenzierung erscheint jedoch nach den vorliegenden Studien überflüssig.

Mixocera parvulata (Walker, [1863])
Abb. 4

Nemoria ? parvulata Walker, [1863]: List. Lep. Ins. Brit. Mus. 26: 1559 (loc. typ.: Hindostan, India).
Euchloris rectifasciata Hampson, 1896: Fanua Ind. Moths 4: 566 (loc. typ.: Puttalam, Ceylon).

Beschreibung
Fühler beim ♂ kurz gekämmt, längste Fühlerkammzähne ca. Geißelbreite. Stirn beige, seitlich und unten mit orangefarbenen Schuppen. Äderung siehe Gattungsdiagnose, Hinterflügeladern Rs und M1 relativ kurz gestielt, Stiellänge ca. ¼ des Abstandes Zelle-Termen.

♂ Genitalapparat (Abb. 4). Socii bis nahe Caudalende breit. Membranöses Valvenende schmal. Ventralteil der Valve rundlich. Aedoeagus schmal, mit zentral liegendem Feld kleinster Cornuti. 8. Sternit caudal flach mit leicht angedeuteter Mediankerbe.

Verbreitung. Indien, Ceylon

Differentialdiagnose. Von den anderen Arten der Gattung durch die Färbung der Stirn (ähnlich der Gattung *Microloxia*) sowie die Form des Ventralteiles der Valve im ♂ Genitalapparat verschieden. Innerhalb des Artenkomplexes *Mixocera parvulata*, *M. katharinae* und *M. wiedenorum* sind die Form der Socii, des Aedoeagus und des membranösen Valvenendes im ♂ Genitalapparat als weitere bedeutsame Differentialmerkmale zu nennen.

Mixocera katharinae, spec. nov.
Abb. 1, 5, 10

Mixocera albistrigata: sensu Janse, 1935: 385, pl. VIII, fig. 19, pl. X, fig. 17, fig. 116, err. det. nec Pagenstecher, 1893.
Mixocera parvulata: sensu Fletcher, 1978: 50 partim, nec Walker [1863].
Mixocera albistrigata: sensu Hausmann, 1995: fig. 40, err. det. nec Pagenstecher, 1893.

Typen. Holotypus: ♂, Kongo, Elisabethville, 28.III.1957, leg. Seydel (ZSM). – Paratypus: 1♀, id., 5.III.1957 (ZSM).

Weiteres Material: 1♀, D.O. Afrika, Kware b. Moshi, 27.XII.-13.I.1952 (ZSM); 1♂, Rhodesia, Salisburg, leg. Ertl (ZSM); 2♂♂, Kenya, Se'engal, 18.XI.1973 leg. Politzar (ZSM); 2♂♂, S. Mozambique, Bazaruto, Sitone, 19.-27.I.1997, leg. Köhler (ZSM).

Beschreibung
Maße und äußere Strukturmerkmale. Vorderflügellänge beim ♂ 7.8-8.4 mm, beim ♀ 8.8-9.5 mm. Palpenlänge 0.5-0.6 mm (= 0.7-0.8facher Augendurchmesser). Längste Fühlerkammzähne beim ♂ ca. 1.5fache Geißelbreite, bei Faltern aus O. und SO. Afrika etwas kürzer (1.0fach). ♀ Fühler bewimpert, mit sehr kurzen, nur angedeuteten Zähnen, deren Länge ca. 0.2fache Geißelbreite, Wimperlänge ca. ⅓ Geißelbreite.

Färbung und Zeichnung. Vorderflügel hell olivgrün. Postmediane weißlich und deutlich. Antemediane gekrümmt, jedoch schwach und sehr schmal. Fransen und äußerste Saum der Flügel weißlich. Hinterflügel weißlich, in deutlichem Kontrast zu den Vorderflügeln. Palpen ockerfarben mit rotbraunen Schuppen. Stirn rotbraun, unten etwas heller.

Bei ost- und südafrikanischen Populationen Hinterflügel oft zartgrün überflogen, die Postmediane und der Saumbereich weißlich ausgespart, zur Basis hin ebenfalls stark aufgehellt (vgl. die gute Abbildung in Janse 1935). Zwei vorliegende Falter aus Mozambique vergleichsweise dunkel laubgrün, mit sehr breiten Ante- und Postmedianen auf den Vorderflügeln, welche einander fast berühren; Hinterflügel weißlich und nur das Saumband distal der Postmedianen grün.

♂ Genitalapparat (Abb. 5). Socii nur in der unteren Hälfte breit. Membranöses Valvenende rundlich. Chitinisierter Ventralteil der Valve lang und spitz. Aedoeagus breit, mit zentral liegendem Feld kleinster Cornuti. 8. Sternit caudal leicht konvex.

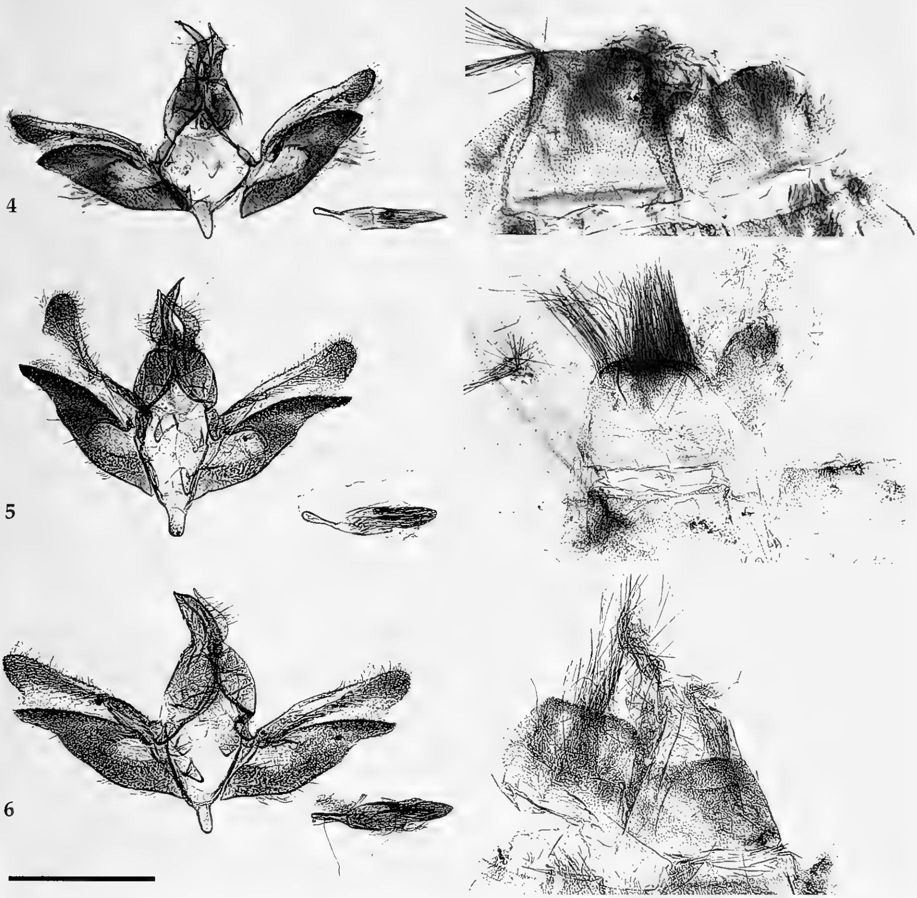

Abb. 4-6. ♂ Genitalapparat und 8. Tergit/Sternit. Skala = 1 mm. **4.** *Mixocera parvulata* (Walker, [1863]). **5.** *M. katharinae*, spec. nov. **6.** *M. wiedenorum*, spec. nov.

♀ Genitalapparat (Abb. 10). Lamella antevaginalis (7. Sternit) in Form zweier mächtiger, stark gefalteter Chitinlappen ausgebildet. Ostium Bursae tief kelchförmig ausgeschnitten. Ductus Bursae zum Ostium Bursae hin sehr eng. Ductus Bursae relativ breit, längsgefurcht und stark chitinisiert. Corpus Bursae oval.

Verbreitung. Allopatrische Schwesterart von *Mixocera parvulata* und *Mixocera wiedenorum*. Typische Populationen bisher nur aus Zentralafrika (Kongo). Die vorläufig hierhergezogenen Populationen Süd- und Ostafrikas (S. Afrika, Mozambique, Tansania und Kenya) scheinen sich in mehreren Merkmalen konstant zu unterscheiden (siehe oben), und werden sich bei der Analyse umfangreicheren Materiales vielleicht als subspezifisch verschieden herausstellen.

Phänologie. Alle bisherigen Funddaten liegen auffälligerweise in einem Intervall von Mitte November bis Ende März.

Etymologie. Diese Art ist Fräulein Katharina Otto, Duisburg, gewidmet. Der Familie Otto gebührt unser tiefer Dank für die tatkräftige Unterstützung zoologischer Forschungsarbeiten an der ZSM, wodurch u.a. auch der Druck der vorliegenden Gattungsrevision ermöglicht wurde.

Differentialdiagnose. Flügelgrundfärbung etwas dunkler als bei den anderen Arten der Gattung. Der Artenkomplex *Mixocera parvulata*, *M. katharinae* und *M. wiedenorum* ist vor allem durch die hellen Hinterflügel charakterisiert, die in deutlichem Kontrast zu den Vorderflügeln stehen. Innerhalb dieses Artenkomplexes sind in erster Linie die Form des chitinisierten Valven-Ventralteiles, aber auch die Form der Socii, des membranösen Valvenendes und des Aedoeagus im ♂ Genitalapparat als bedeutsame Differentialmerkmale zu nennen. Darüber hinaus unterscheidet sich *M. parvulata* von *M. katharinae* durch die Färbung der Stirn. *M. wiedenorum* ist kleiner als *M. katharinae* und zeigt auch im Genital des ♀ Strukturunterschiede (Form von Lamella antevaginalis, Ostium Bursae, Ductus Bursae, Corpus Bursae).

Mixocera wiedenorum, spec. nov.

Abb. 2, 6, 11

Typen. Holotypus: ♀, Madagaskar, leg. Melon, ex coll. Oberthür (ZSM). – Paratypen: 2♂♂, Madag. centr., Parc de Tsimbazaza, 1200 m, 9.I.-14.II.1952, leg. Viette (Coll. Herbulot); 1♂, Madag. est, 42 km N de Sambava, forêt d'Analabe, 50m, 15.-20.XI.1958, leg. Griveaud, Peyrieras & Viette (Coll. Herbulot).

Beschreibung

Maße und äußere Strukturmerkmale. Vorderflügellänge ♂ 6.8-8.0 mm, ♀ 7.7 mm. Palpenlänge 0.4-0.5 mm (= 0.8-1.0facher Augendurchmesser). Saugrüssellänge ca. 0.8 mm. ♂ Fühler nur kurz gekämmt, Länge der längsten Fühlerkammzähne etwas variabel von ⅔ bis 1.0fache Geißelbreite. ♀ Fühler bewimpert, mit sehr kurzen, nur angedeuteten ‘Zähnen’, deren Vorwölbung ca. 0.3fache Geißelbreite erreicht; Wimperlänge ca. ⅓ Geißelbreite.

Färbung und Zeichnung. Vorderflügel gelblichgrün. Postmediane weißlich und deutlich. Antemediane schwach und leicht gebogen oder erloschen. Fransen und äußerste Saum der Flügel weißlich. Hinterflügel zartgrün überflogen, die Postmediane, der Saumbereich und die Flügelwurzel weiß. Palpen ockerfarben. Stirn ockerfarben bis rotbraun, nur wenig Kontrast zum ockerfarbenen Scheitel.

♂ Genitalapparat (Abb. 6). Socii insgesamt recht breit. Saccus vergleichsweise lang. Membranöses Valvenende rundlich. Chitinisierter Ventralteil der Valve terminal zugespitzt, basal jedoch relativ breit. Aedoeagus breit, mit zentral liegendem Feld kleinster Cornuti. 8. Sternit caudal konvex, nahezu gewinkelt (vgl. Bemerkungen in Fletcher 1978: 50).

♀ Genitalapparat (Abb. 11). Lamella antevaginalis (7. Sternit) vergleichsweise schwach chitinisiert. Ostium Bursae klein, halbrund, caudal nur schwach ausgeschnitten. Ductus Bursae zum Ostium Bursae hin sehr eng. Ductus Bursae längsgefurcht und im unteren (oralen) Teil allmählich in den Corpus Bursae übergehend. Corpus Bursae birnenförmig.

Verbreitung. Madagassische allopatrische Schwesterart von *Mixocera parvulata* und *Mixocera wiedenorum*.

Phänologie. Bisherige Funddaten von Mitte November bis Mitte Februar.

Etymologie. Die vorliegende Art ist der Familie Wieden, Leichlingen, gewidmet, in Dankbarkeit für die Förderung systematisch-zoologischer Studien an der ZSM.

Differentialdiagnose. Differentialmerkmale des Artenkomplexes *Mixocera parvulata*, *M. katharinae* und *M. wiedenorum* siehe Diagnose bei *M. katharinae*. *M. wiedenorum* unterscheidet sich von *M. katharinae* im ♂ Genitalapparat vor allem durch den etwas breiteren Valven-Ventralteil, die breiteren Socii, den längeren Saccus, sowie im ♀ Genital durch die stärker chitinisierte Lamella antevaginalis, das kleinere Ostium Bursae, den kürzeren Ductus Bursae und die Form des Corpus Bursae. *M. wiedenorum* fällt zudem durch stärkere Grünfärbung im Saumfeld des Hinterflügels auf und ist kleiner als jene. Das ♂ hat deutlich kürzere Fühlerkammzähne. Von *M. parvulata* vor allem durch Genitalunterschiede beim ♂, z.B. die Form des Valven-Ventralteiles oder die Aedoeagusbreite klar zu trennen (siehe oben).

Mixocera albimargo Warren, 1901

Mixocera albimargo Warren, 1901: Novitates Zool. 8: 206 (loc. typ.: Ogrugu, Amambara River, Lower Niger, Nigeria).

Beschreibung

Maße. Spannweite des ♂ Holotypus 17 mm (Warren 1901).

Färbung und Zeichnung. Die Erstbeschreibung charakterisiert diese Art als ähnlich *Mixocera latilineata* aus Australien. Im Unterschied zu jener ist ein zusätzliches weißes Marginalband auf allen Flügeln ausgeprägt. Fransen weiß.

♂ Genitalapparat (vgl. Fletcher 1978). Socii schmal. Ventralteil der Valve lang, distal gerundet. Aedoeagus ohne Cornuti. 8. Sternit ohne Dorn.

♀ Genitalapparat. Unbekannt.

Verbreitung. Nigeria.

Differentialdiagnose. Von den meisten anderen Arten durch das Fehlen der Cornuti im Aedoeagus und die schmalen Socii unterschieden. Ventralteil der Valve distal nicht zugespitzt wie bei *Mixocera katharinae* oder *M. albistrigata*. Kein kräftiger Dorn über der Valvenmitte (vgl. *M. ledermanni*). 8. Sternit ohne Sonderbildungen (vgl. *M. albistrigata*). Die Länge des Ventralteiles der Valve entspricht den Verhältnissen im *M. parvulata*-Komplex.

Mixocera ledermanni, spec. nov.

Abb. 3, 7, 12

Typen. Holotypus: ♂, Nigeria, Bara, 15.VI.1974, leg. Politzar (ZSM). - Paratypen: 6♂♂, 1♀, id.; 5♂♂, id. (Coll. Kuchler); 1♀, N. Nigeria, Kaduna, 30.VIII.1970, leg. Politzar (ZSM); 1♂, Obervolta, Bobo, 14.VII.1975, leg. Politzar (ZSM); 1♀, Obervolta, Bobo, Dioulasso, 6.VIII.1975, leg. Politzar (ZSM); 1♀, id., 1.IX.1977.

Beschreibung

Maße und äußere Strukturmerkmale. Vorderflügellänge beim ♂ 5.3-6.7 mm, beim ♀ 7.6-8.1 mm. Palpenlänge 0.4-0.6 mm (= 1.0-1.2facher Augendurchmesser). Längste Fühlerkammzähne beim ♂ ca. 1.0-1.5fache Geißelbreite. ♀ Fühler bewimpert, leicht gezähnt, Länge der Zähne ca. ⅓ Geißelbreite, Wimperlänge ca. ⅓ Geißelbreite.

Färbung und Zeichnung. Grundfärbung aller Flügel blaßgrün. Postmediane grünlich-weiß und deutlich. Eine schmale Antemediane ist meist nur auf den Vorderflügeln angedeutet. Fransen blaßgrün, recht ähnlich der Grundfärbung. Palpen meist tief rotbraun. Stirn tief rotbraun.

♂ Genitalapparat (Abb. 7). Socii bis ⅔ der Länge breit, im terminalen Drittel sehr schlank. Membranöses Valvenende schmal. Chitinisierter Ventralteil der Valve kurz, mit kräftigem Dorn über der Valvenmitte. Aedoeagus breit, ohne Cornuti. 8. Sternit caudal leicht konvex, bei einem Falter aus Obervolta mit leichter Mediankerbe.

♀ Genitalapparat (Abb. 12). Lamella antevaginalis (7. Sternit) in Form zweier stark gefalteter und stark chitinisierter Chitinlappen ausgebildet. Ostium Bursae mehr oder weniger halbkreisförmig. Ductus Bursae zum Ostium Bursae hin sehr eng. Ductus Bursae vergleichsweise lang, längsgefurcht und stark chitinisiert. Corpus Bursae in Form eines länglichen membranösen Sackes ausgebildet.

Verbreitung. Nigeria, Obervolta. Vermutlich rein westafrikanisch verbreitet.

Phänologie. Alle bisherigen Funddaten liegen auffälligerweise in einem Intervall von Mitte Juni bis Anfang September.

Etymologie. Die vorliegende Art ist Herrn Volker D. Ledermann, Sick, gewidmet. Die ZSM ist ihm für die umfangreiche Unterstützung laufender Projekte zu tiefem Dank verpflichtet.

Differentialdiagnose. Deutlich kleiner als die meisten anderen Arten der Gattung. Flügelgrundfärbung heller als bei den anderen Arten. Als autapomorphes Merkmal ist vor allem der Dorn in der Valvenmitte des ♂ Genitalapparates von größter Bedeutung. Das Fehlen von Cornuti verbindet die neue Art mit *Mixocera albimargo* und *M. albistrigata*. Von ersterer ist *M. ledermanni* abgesehen von der

Valvenstruktur durch die breiteren Socii zu trennen, von der zweiten Art durch das Fehlen des Dornes am 8. Sternit. Die Lamella antevaginalis des ♀ Genitalapparates ist vergleichsweise stark chitinisiert.

Mixocera albistrigata (Pagenstecher, 1893)
Abb. 8

Eucrostis albistrigata Pagenstecher, 1893: Jahrb. Hamb. Anst. 10: 252 (loc. typ.: Quilimane, O. Afrika).
Euchloris oleagina Warren, 1897: Novitates Zool. 4: 38 (loc. typ.: Weenen, Natal); Synonymie nach Fletcher (1978).
Microloxia (?) *serraticornis* Warren, 1897: Novitates Zool. 4: 42 (loc. typ.: "Natal"); Synonymie nach Fletcher (1978).
Mixocera frustratoria: sensu Janse, 1935: 384, pl. X, fig. 16, fig. 116, nec Wallengren, 1863.

Beschreibung
Maße und äußere Strukturmerkmale. Vorderflügellänge beim ♂ 6.3-7.5 mm. Längste Fühlerkammzähne beim ♂ ca. Geißelbreite. Fühler des ♀ vermutlich deutlich gezähnt (vgl. subsp. *politzari*). Vorderflügelapex vergleichsweise spitz, Termen nicht konvex.

Färbung und Zeichnung. Grundfärbung aller Flügel hell olivgrün. Postmediane weißlich, gerade und auf allen Flügeln deutlich. Fransen und äußerste Saumbereiche der Flügel weißlich, meist in deutlichem Kontrast zur Grundfärbung. Antemediane gerade, meist auf allen Flügeln deutlich. Palpen und Stirn rotbraun.

♂ Genitalapparat (Abb. 8). Socii schlank. Membranöses Valvenende rundlich. Chitinisierter Ventralteil der Valve kurz, breit angelegt und distal in einer scharfen Spitze endend. Aedoeagus vergleichsweise breit, Distalhälfte mit vielen kleinen Cornuti. 8. Sternit caudal mit scharfem langem Dornfortsatz.

♀ Genitalapparat. Unbekannt (vergleiche subsp. *politzari*).

Verbreitung. Natal, Tansania, Ruanda, Kenya. Auf den Osten Afrikas beschränkt.

Phänologie. Bisher nur von November bis Anfang Februar nachgewiesen.

Differentialdiagnose. Von vielen anderen Arten durch die breite weiße, scharf begrenzte Saumlinie auf allen Flügeln und durch die breite geradlinige Postmediane der Hinterflügel, die nahezu in den Analwinkel mündet, unterschieden. Von *Mixocera frustratoria* und *M. ledermanni* zusätzlich durch die breitere Postmediane und vorhandene Antemediane zu unterscheiden. Von *M. katharinae* durch schärfer gezeichnete Hinterflügel und geraderen Verlauf der Antemedianen der Vorderflügel getrennt Fühlerkammzähne beim ♀ etwas länger als bei den anderen afrikanischen Arten. Im Genitalapparat des ♂ stellt die Sonderbildung des 8. Sternits ein nur hier ausgebildetes (autapomorphes) Merkmal innerhalb der Gattung dar. Im Genitalapparat des ♀ unterscheidet sich vor allem der breite Ductus Bursae von den entsprechenden Strukturen verwandter Arten.

Bemerkungen. Die Typenserie Pagenstechers sollte daraufhin untersucht werden, ob alle Tiere untereinánder konspezifisch sind. Pagenstecher's Bemerkung "Stirn weißlich-grün" verleitet zu der Annahme, daß die Typenserie weitere nicht-kongenerische Arten enthält. Die Genitalabbildung in Janse (1935: fig. 116) stellt die südostafrikanischen Populationen eindeutig zur Nominat-Unterart.

Mixocera albistrigata politzari, subspec. nov.
Abb. 9, 13

Typen. Holotypus: ♂, N. Nigeria, Kaduna, 4.VIII.1970, leg. Politzar (ZSM). - Paratypen: 4♂♂, id., 8.VIII.-18.VIII.1971 (ZSM); 4♂♂, id. (Coll. Kuchler); 2♂♂, 1♀, id., 6.VIII.-8.IX.1970 (ZSM); 1♂, Ivory Coast, Foret de Tai, 5.VIII.1985, leg. Politzar (ZSM); 1♂, Ivory Coast, Yamoussoukro, 18.IX.1981, leg. Politzar (ZSM); 5♂♂, 2♀♀, Cote d'Ivoire, Yapo-Sud, 22 km SSE Agboville, 12.-18.IV.1969, leg et coll. Herbulot.

Beschreibung
Maße und äußere Strukturmerkmale. Vorderflügellänge beim ♂ 6.7-8.4 mm, beim ♀ 8.0-10.1 mm Fühler des ♂ doppelt gekämmt, längste Fühlerkammzähne ca. 1.5fache Geißelbreite. Fühler des ♀ deutlich gezähnt, längste Kammzähne ½ bis ¾ Geißelbreite. Vorderflügelapex vergleichsweise rund, Termen konvex.

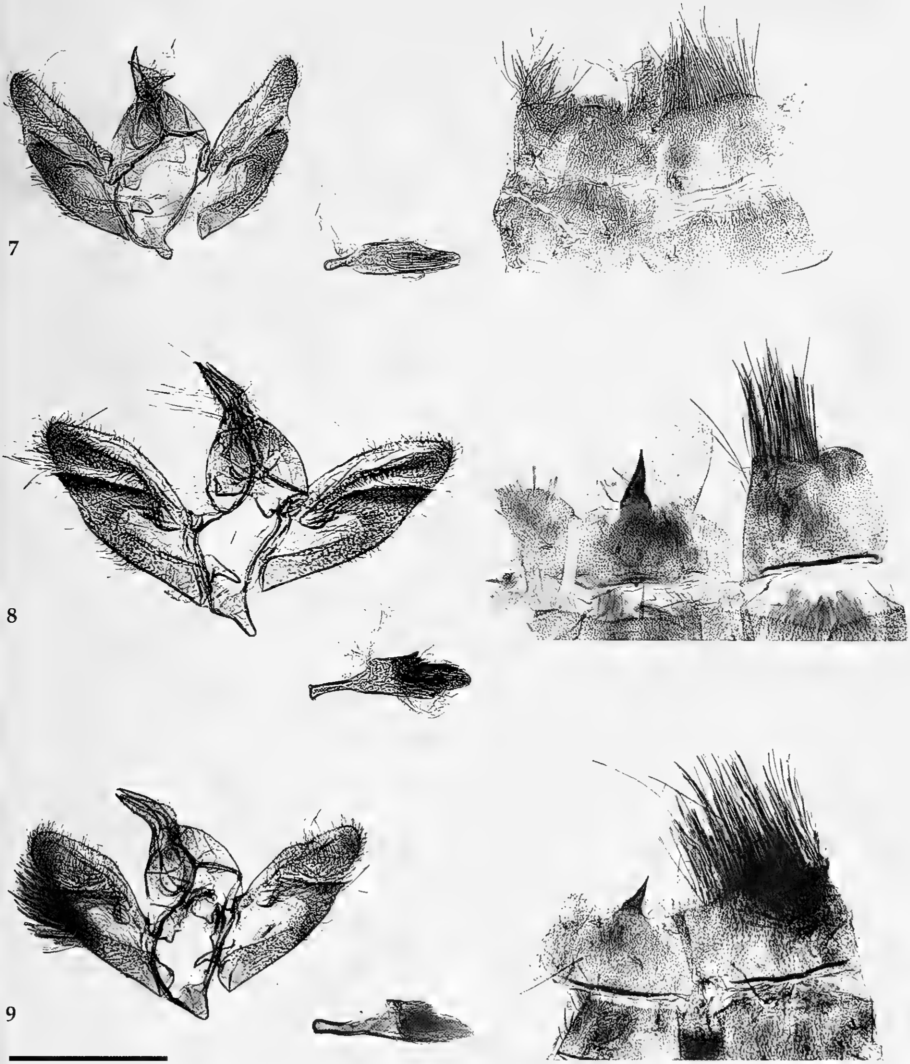

Abb. 7-9. ♂ Genitalapparat und 8. Sternit/Tergit. Skala=1 mm. **7.** *Mixocera ledermanni*, spec. nov. **8.** *M. albistrigata* (Pagenstecher, 1893). **9.** *M. albistrigata politzari* subspec. nov.

Färbung und Zeichnung. Grundfärbung aller Flügel hell olivgrün. Postmediane weißlich, gerade und auf allen Flügeln deutlich. Fransen und äußerste Saumbereiche der Flügel weißlich, meist in deutlichem Kontrast zur Grundfärbung. Antemediane gerade, meist auf allen Flügeln deutlich. Palpen und Stirn rotbraun.

♂ Genitalapparat (Abb. 9). Socii schlank. Membranöses Valvenende rundlich. Chitinisierter Ventralteil der Valve relativ lang, distal in einer scharfen Spitze endend. Aedoeagus vergleichsweise breit, Distalhälfte mit vielen kleinen Cornuti. 8. Sternit caudal mit scharfem langem Dornfortsatz.

♀ Genitalapparat (Abb. 13). Lamella antevaginalis (7. Sternit) gefaltet, das Ostium Bursae U-förmig ventral umschließend. Ostium Bursae in der Form eines Rechtecks stark chitinisiert. Ductus Bursae breit in das Ostium Bursae mündend, oralwärts gleichmäßig in den länglichen Corpus Bursae übergehend.

Verbreitung. Elfenbeinküste, Nigeria. Auf den Westen Afrikas beschränkt.

Phänologie. Bi- oder polyvoltin, bisher im April und von Anfang August bis Mitte September nachgewiesen.

Etymologie. Herrn H. Politzar, Goldrain, gewidmet für seine Verdienste zur Erforschung der Lepidopterenfauna Afrikas. Herrn Politzar sei auch für die Schenkung umfangreichen Materiales an die ZSM, darunter auch drei der vier in dieser Arbeit beschriebenen Taxa, herzlich gedankt.

Differentialdiagnose. Siehe Differentialdiagnose der Nominat-Unterart. Im Vergleich zu jener größer und rundflügeliger, Postmedianlinien etwas breiter angelegt, Fühlerkammzähne des ♂ länger, Ventralteil der Valve im ♂ Genitalapparat deutlich länger.

Mixocera frustratoria (Wallengren, 1863)

Eucrostis frustratoria Wallengren, 1863: Wien Ent. Monatss, 7: 150 (loc. typ.: "Caffraria orientalis", Südafrika).
Eucrostis frustatoria Walker, 1866: List. Lep. Ins. Brit. Mus. 35: 1610 (incorrect subsequent spelling).

Beschreibung

Maße und äußere Strukturmerkmale. Flügelspannweite des ♀ Holotypus 16 mm (Wallengren 1863). Fühlerkammzähne des ♂ vergleichsweise kurz (Prout 1930).

Färbung und Zeichnung. Grundfärbung von Vorder- und Hinterflügel grün. Postmediane fein, Antemediane verloschen (Prout 1930).

♂ Genitalapparat. Unbekannt.

♀ Genitalapparat. Unbekannt.

Verbreitung. Südafrika.

Differentialdiagnose. Die oben dargelegten Merkmale stimmen am ehesten mit der Nominat-Unterart von *Mixocera albistrigata* überein. Die Flügelspannweite schließt eine Konspezifität mit *M. ledermanni* aus, die grünen Hinterflügel mit feiner Postmediane belegen Artverschiedenheit von *M. katharinae*. Prout`s Beschreibung der ♂ Fühler und die daraus resultierende Einordnung in die Gattung *Mixocera* könnte eventuell auf einem Bestimmungsfehler beruhen. Eine Zugehörigkeit zur Gattung *Thelycera* ist daher nicht ausgeschlossen. Dieses Taxon bedarf einer genaueren Untersuchung des ♀ Holotypus.

Dank

Herrn Dr. M. Baehr, ZSM, sei herzlich gedankt für die Schenkung von australischen Geometriden, darunter *Mixocera latilineata* Wlk. Die Herren Kuchler, München, und Herbulot, Paris, stellten freundlicherweise Leihmaterial aus ihren umfangreichen Sammlungen afrikanischer Geometriden zur Verfügung. Frau R. Kühbandner, ZSM, zeichnete die farbigen Abbildungen und Frau M. Müller, ZSM, half bei den fotografischen Arbeiten.

Zusammenfassung

In der vorliegenden Arbeit wird die Morphologie von acht Arten der Gattung *Mixocera* Warren, 1901 eingehend diskutiert. Drei neue Arten und eine neue Unterart werden beschrieben: *Mixocera katharinae*, spec. nov. aus dem Kongo; *M. wiedenorum*, spec. nov. aus Madagaskar; *M. ledermanni*, spec. nov. aus Nigeria und *M. albistrigata politzari* subspec. nov. aus Nigeria.

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Abb. 10-13. ♀ Genitalapparate. Skala = 1 mm. **10.** *Mixocera katharinae*, spec. nov. **11.** *M. wiedenorum*, spec. nov. **12.** *M. ledermanni*, spec. nov. **13.** *M. albistrigata politzari* subspec. nov.

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Leptothorax nordmeyeri, spec. nov., an interesting ant of subtropical India

(Insecta, Hymenoptera, Formicidae, Myrmicinae)

Andreas Schulz

Schulz, A. (1997): *Leptothorax nordmeyeri*, spec. nov., an interesting ant of subtropical India (Insecta, Hymenoptera, Formicidae, Myrmicinae). – Spixiana **20/3:** 303-308

Leptothorax nordmeyeri is described as a new species of ants. Characteristical features of its morphology include: large eyes, long head, very long propodeal spines, the uniform pale yellow colour, and long, thin body hairs. The new species was recorded from a subtropical secondary monsoon forest in the south-western part of India. For *Leptothorax galeatus* Wheeler, 1927 a lectotype is designated.

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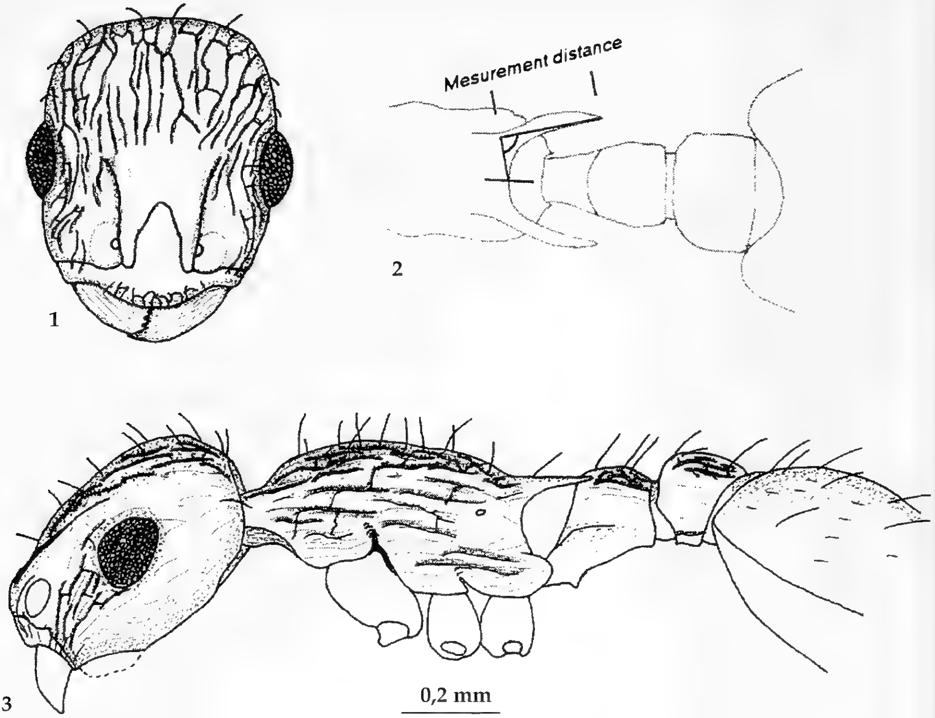
Introduction

Leptothorax Mayr, 1855 is a myrmicine monomorphic genus that is arranged in the tribus Formicoxenini (Bolton 1994). With a nearly world-wide distribution, excluding the Australian continent, it is the most diverse ant genus of the Holarctic region (Bolton 1991, Schulz unpubl.). The majority of the species are in the Holarctic region. Of more than 300 described species and infrasubspecific taxa, only 8 valid taxa occur in the subcontinent of India including the Himalayan mountains (Bingham 1903, Bolton 1996). On the other hand, nearly 30 undescribed species of *Leptothorax* have been detected only in the Himalayan region and additional 10 species in Indochina (Schulz unpubl). Two Australian species originally described as *Leptothorax* were transfered by Bolton (1991) to his new genus *Vombisidris*. In more southern ecosystems of "Old World Tropics" the species richness of *Leptothorax* is very low. South of the Himalayan mountains and northern India the few *Leptothorax* species so far discovered have an arboreal lifestyle, in contrast to the probably terrestrial nesting of *L. nordmeyeri* (Floren 1995, pers., Schulz unpubl.).

Except for the afrotropical species, knowledge about taxonomy of *Leptothorax* in the Old World is in poor condition. Especially the knowledge of taxonomy of the Palaearctic species is very unsufficient. In addition to the confused taxonomy on the species level, the generic limits within the tribe Formicoxenini (= Leptothoracini) are not clearly understood (Bolton 1991, Francoeur & Loiselle 1988).

Measurements

All measurements were taken with a Zeiss Stemi SR stereo microscope with an ocular graticule, and are given in mm in the following succession: range [mean ± standard deviation]. The absolute magnification of measurements was 250 ×.



Figs 1-3. *Leptothorax nordmeyeri*, spec. nov., holotype. **1.** Head in frontal view. **2.** Spines, caudal mesosoma waist in dorsal view, including the measurement method of propodeal spine length. **3.** Mesosoma, head, waist and part of gaster in lateral view.

Abbreviations

TL	**total length of specimens**, measured with head in prognathous position
HL	maximum **head length** from midpoint of anterior margin of clypeal border to posterior margin of occipital border, measured with both borders in focus
HW	maximum **head width** behind the eyes, measured in full-face view
SL	maximum **scape length**, measured with both ends of scape in focus
AD	maximum **eye diameter**, measured in lateral view
CI	**cephalic index**: HW/HL × 100
SI	**scape index**: HW/SL × 100
AI	**eye index**: AD/HW × 100
ML	means **Weber's length**
MW	**mesosoma width**, measured as the maximum distance of pronotum corners in dorsal view
MI	**mesosoma index**: MW/ML × 100
PSL	**propodeal spine length**, measured in dorsal view, with the distal tip in focus. Details of measurement method shown in Fig. 1
PSI	**propodeal spine index**: PSL/ML × 100
PL	maximum **petiole length** measured form insertion of posterior border of lateral propodeal lobe to midpoint of the petiole-postpetiole joint
PH	**petiole height** posterior border of highest point of angle to anterior border, measured in lateral view
PI	**petiole index**: PH/PL × 100

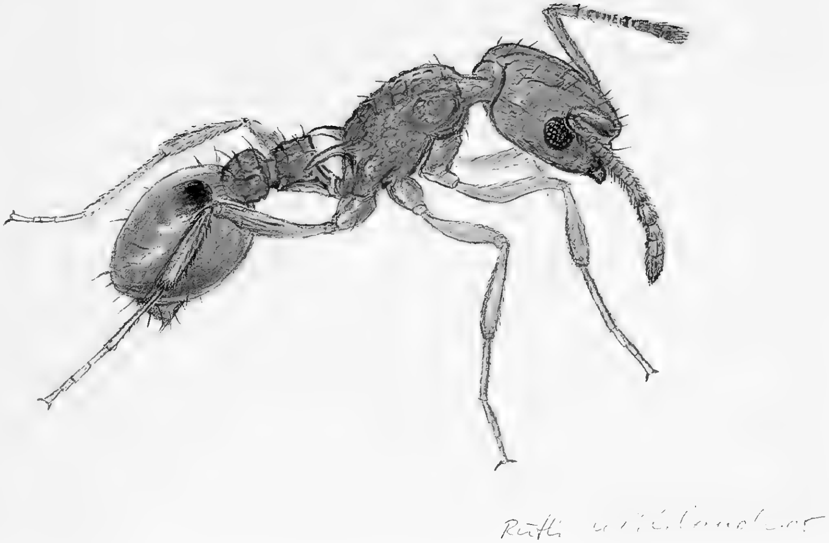


Fig 4. *Leptothorax nordmeyeri*, spec. nov., holotype. Habitus (Zeichnung R. Kühbandner).

Leptothorax nordmeyeri, spec. nov.
(Figs 1-4)

Types. Holotype: 1 worker labelled "Indien_08: Goa, Distr. Mormugao, vic. Velsao, 5 km E. Dabolim Air Port, 50mH, 14.01.1997, Leg. A. Schulz, K. Vock". (in Zoologische Staatssammlung München). – Paratypes: 12 workers with same labels as holotype. Depository: 2 in Zoologische Staatssammmlung München; 1 in Muséum d'Histoire naturelle, Genève; 2 in Staatliches Museum für Naturkunde Karlsruhe; 7 in the author's collection.

Main morphology as usual in the genus. Head robust, occipital corners evenly convex. Occipital margin without straight border. Margins of head sides not parallel but weakly convex behind eyes, evenly convex anterior of eyes up to the clypeal border. Compound eyes large. The longest distance through the eyes cuts about 15 ommatidia. Clypeus strongly convex, medially distinctly widened. Frontal carinae strong, ending on a hypothetical line through the median of the eyes. Frontal triangle clearly bounded, framed and slightly deeper than the surroundding parts of the head. From lateral view the frontal lobes distinctly project over the main profile of the head and the head is faintly depressed.

Description of worker

Measurements. Holotype worker: TL 2.25, HL 0.57, HW 0.47, CI 82, SL 0.50, SI 93, AD 0.15, AI 33, ML 0.65, MW 0.34, MI 53, PSL 0.21, PSLI 61, PL 0.30, PH 0.18, PHI 59.

Paratype workers: TL 2.0-2,5, HL 0.54-0.58 [0.56 ± 0,01], HW 0.43-0.47[0.45 ± 0.02], CI 78-83 [80 ± 2], SL 0.48-0.51 [0.49 ± 0.01], SI 89-94 [91 ± 2], AD 0.14-0.16 [0.15 ± 0.004], AI 32-34 [33 ± 1], ML 0.60-0.66 [0.63 ± 0.02], MW 0.31-0.34 [0.33 ± 0.01], MI 50-54 [52 ± 2], PSL 0.20-0.23 [0.21 ± 0.01], PSLI 61-67 [64 ± 2], PL 0.22-0.30 [0.26 ± 0.03], PH 0.17-0.19 [0.18 ± 0.01], PHI 59-77 [71 ± 7] (n=10).

Scapes reach beyond the occipital margin by approx. ⅙ of its total length. Antennae with 12 segments, first funiculus segment 2.2 × as long as broad. Second funiculus segment as long as broad, the next 4 distal segments half as long as broad, next 2 segments as long as broad. With well defined 3-segmented apical club. Proximate club segment smaller and longer as the median segment. Distal club segment 2.2 times as long as broad.

Mandibles nearly triangular and little compressed, with 3 large distal teeth, and 2 very small barely recognizable proximate teeth. Apical tooth larger than all other teeth.

Mesosoma typical of *Leptothorax*. In lateral view margin of mesosoma from the pronotal neck to the insertion of propodeal spines evenly convex. Mesosoma slightly compressed. Propodeal spines very long. Base of spines narrow. In profile the spines generally straight, quite thin and with a sharp tip directed nearly horizontally. In dorsal view the spines give the impression of a horseshoe, with straight distal parts.

Petiole barely stalked but elongate. From mesosoma the cranial dorsal margin proceeds evenly and slightly concave to the vertex. Petiolar dome regularly convex and proceeding up to the postpetiolar joint. In dorsal view the dome is depressed, and the petiole widens from mesosoma insertion up to the postpetiolar joint. Postpetiole broad, in dorsal view with slightly obliquely depressed.

Pilosity long, thin, distally somewhat pointed. Pilosity on gaster, petiole, postpetiole and spines longer than on mesosoma and head. Pilosity generally sparse. First gaster tergite with less than 20 hairs, occipital margin and border with only 5 erect hairs. Appendages with densely and semidecumbent pubescence.

Colour of body and appendages uniformly pale yellow. Mesosoma and waist slightly darker due to the more robust sculpture, teeth of the mandibles likewise little darker.

On head, mesosoma and waist the sculpture (definition after Harris 1979) relatively uniform and dense. Gaster evenly smooth and shining. Surface of head mainly costate to rugulose, frons and central part of vertex more shining and irregularly wrinkled. Intervals between the wrinkles diffuse sublucid. Genae rugose, frontal triangle smooth and shining. Region of occipital corners and margin stronger rugulose to rugose than the other parts of head. Distal part of clypeus rugulose, proximate part weakly rugulose or sublucid. Mandibles finely and weakly transversely costate. Mesosoma uniformly and more or less regularly rugulose with some longitudinal wrinkles. Surface between the wrinkles sublucid to smooth. Surface between the propodeal spines more finely sculptured. Waist rugulose, between the strong rugae some with finely reticulate-rugulose sculpture.

Female unknown.

Male unknown.

Collecting circumstances. *L. nordmeyeri*, spec. nov. was found in south-western India in the State of Goa. The place of discovery was a mosaic of cultured trees, shrubs, grass areas and single old Sal trees. During the approximately 5-months long dry season trees do not carry leaves in this area. Then, the soil surface dries out completely. The ground was covered with an about 1 cm thick layer of litter. In tropical ecosystems formicoxenine ants, especially those of the genus *Leptothorax,* are often rare or seem to be absent. Most of the world-wide known tropical species of *Leptothorax* are arboreal. In contrast to this, *L. nordmeyeri* probably has a cryptic lifestyle and a terrestrial nest. The nest of *L. nordmeyeri* was not discovered, the specimens were found approximately 5-10 cm deep in the ground in narrow gaits, closely related to an old Sal tree. This probably cryptical lifestyle and prognosted terrestrial nesting has been not yet recorded from any other Asiatic *Leptothorax* species. Most of the Holarctic species of *Leptothorax* live predominantly between small and thin stone slabs, under stones, in bark, or under pieces of wood on the ground, to guarantee an optimal insolation for growing up the brood. In tropical ecosystems they prefer arboreal strata, where the nests are located under bark, in arid twigs, or in epiphytes (Baroni Urbani 1978, Kempf 1959).

Dedication and derivatio nominis

This new *Leptothorax* species is dedicated to Mrs. Rose Nordmeyer. Mrs. Nordmeyer generously financially supported the biosystematic research at the Zoologische Staatssammlung München.

Differential diagnosis and comments on similar species.

There are clear morphological differences between *L. nordmeyeri* and the 250 described and undescribed *Leptothorax* species known to the author, namely the very uniformly pale yellow colour, the relatively regular dense and rugulose-reticulate sculpture, the large eyes, the elongate head with long scape, the convex mesosoma profile without metanotal groove, the terseness very long, barely curved propodeal spines, the elongate, thin hairs, and the elongate, robust and low petiole node.

Only *L. galeatus* Wheeler, 1927 from China and *L. finzii* Menozzi, 1925 form eastern Mediterranean area are rather similar to *L. nordmeyeri* from the morphological view. But both species own clearly different character combinations, so an easy delimitation to *L. nordmeyeri* is possible.

L. nordmeyeri differs from *L. galeatus* by the smaler size (*L. nordmeyeri*: 2.0-2.5 mm; *L. galeatus*: >2.8 mm), the somewhat more elongate mesosoma, the more elongate head and the less erected petiole. *L. nordmeyeri* has relativly larger eyes than *L. galeatus* (AD 0.15-0.16 [0.16]), AI 27-29 [28] n = 3; *L. nordmeyeri:* (AD 0.14-0.16 [0.15 ± 0.004], AI 32-34 [33 ± 1]) The colour of all parts of *L. nordmeyeri* is uniform pale yellow, whereas *L. galeatus* has brown antennal clubs, a predominantly dark brown gaster, and a diffuse brown anterior part of the head. The main coloration of *L. galeatus* is bright orange brown.

Designation of the lectotype worker of *Leptothorax galeatus*: First label "Peking China R. H. Lefiuse" [Wheeler's handwriting], second "M. C. Z. Type j. 21025" [in part printed on red cardboard], third "Leptothorax galeatus Whlr. Syntype" [not Wheeler's handwriting], fourth "MCZ Museum of Comparative Zoology" [printed], fifth "LECTOTYPE *Leptothorax galeatus* Wheeler des.: A. Schulz 1997" [on red cardboard]. The lectotype of L. galeatus is deposited in the collection of the Museum of Comparative Zoology Harvard University USA.

L. finzii differs from *L. nordmeyeri* by the following characters: *L. nordmeyeri* is distinctly smaller than *L. finzii* (HL 0.58-0.72 [0.65 ± 0.04], ML 0.68-0.90 [0.79 ± 0,06] n=32; *L. nordmeyeri:* HL 0.54-0.58 [0.56 ± 0,01], ML 0.60-0.66 [0.63 ± 0.02]) and has clearly longer spines than *L. finzii* (PSL 0.09-0.17 [0.14 ± 0.02]; *L. nordmeyeri:* PSL 0.20-0.23 [0.21 ± 0.01]). Furthermore, *L. nordmeyeri* has an uniformly arched mesosoma profile, whereas *L. finzii* has a distinct and extensive metanotal groove. *L. nordmeyeri* has an elongated, robust and low petiole (Fig. 3), whereas the petiole of *L. finzii* is shorter and higher with a clear separate dorsal angle. *L. nordmeyeri* is more densely sculptured than *L. finzii*.

Zusammenfassung

Leptothorax nordmeyeri wird als eine neue Ameisenart beschrieben. Charakteristische Merkmale ihrer Morphologie sind: große Augen, länglicher Kopf, sehr lange Propodealdornen, einheitlich gelbe Färbung und lange, dünne Körperhaare. Die neue Art stammt aus einem subtropischen sekundären Monsunwald Südwest-Indiens.

Acknowledgements

I sincerely thank the following persons who enabled me to examine relevant type material from different museums and which were all very helpful: Valter Raineri (MCSN Genova), Stefan P. Cover (MCZ Cambridge), Michel Brancucci (NHM Basel), and Ivan Löbl (MHN Genf). I am also very grateful to Mr. M. Verhaagh who kindly improved the English.

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Eine neue Sandbiene aus Zentralasien, die der *Andrena (Carandrena) subsmaragdina* Osytshnjuk ähnlich ist: *Andrena ledermanni*, spec. nov.

(Insecta, Hymenoptera, Apidae)

Klaus Schönitzer

Schönitzer, K. (1997): A new sandbee from Central Asia which is similar to *Andrena (Carandrena) subsmaragdina* Osytshnjuk: *A. ledermanni*, spec. nov. (Insecta, Hymenoptera, Apidae) – Spixiana **20/3:** 309-316

Andrena ledermanni, spec. nov. from Turkmenistan is described. It was caught end of April/beginning of May in the Kugitang mountains at 1.100 to 1.500 m altitude. It is similar to *Andrena (Carandrena) subsmaragdina* Osytshnjuk, 1984. The new spcies can be differentiated from the latter by the dull clypeus, the longer 3rd joint of the antenna (almost as long as the three following ones) and the distance of the lateral ocellae from the vertex (about eaqual to its diameter). The middle and posterior part of the propodeum, the scutellum and postscutellum of the new species are remarkably dull and are unpunctured. Since only the female is known, is is not clear to which subgenus or species-group the new species belongs.

Klaus Schönitzer, Zoologische Staatssammlung, Münchhausenstr. 21, D-81247 München, Germany.

Einleitung

Das Kugitang-Gebirge (= Kugitangtau) ist der östlichste Ausläufer des Ghissaro-Darvaz Gebirgsystems und ist mit 3.137 m (Gipfel des Airibaba) das höchste Gebirge von Turkmenistan. Es liegt im äußersten Osten dieser jungen Republik an der Grenze zu Usbekistan. Sein Name bedeutet soviel wie "zerschnittenes Gebirge", weil es von einer Reihe von Schluchten durchzogen ist. Jede dieser Schluchten hat eine eigene Fauna und Flora. Die Fauna dieses Gebietes gehört zur Asiatischen Gebirgs-Provinz, die den Ghissaro-Alai, Tien Shan, Pamir und Tibet umfaßt und reich an gefährdeten und endemischen Arten ist. Es kommen hier interessante Säuger und Vögel, wie zum Beispiel die endemische Schraubenziege *Capra falconeri heptneri*, das Wildschaf *Ovis ammon bucharensis* und der Lämmergeier *Gypaetus barbatus aureus* vor (Rustamov & Sopyev 1994). Interessant ist in diesem Gebiet auch der erst 1982 entdeckte blinde Höhlenfisch *Nemachilus starostini*, der einzige Höhlenfisch auf dem Gebiet der ehemaligen UdSSR (Rustamov & Sopyev 1994). Entomologisch ist das Kugitang-Gebirge noch sehr wenig erforscht, aber es sind doch schon eine Reihe von endemischen Arten und Gattungen aus diesem Gebiet bekannt (z.B: Käfer: Kryzhanovsky & Atamuradov 1994, Orthoptera: Tokgaev 1994). Mit der Hilfe von Prof. Dolin (Kiev) und Dr. Atamuradov (Aŝchabad) und der finanziellen Unterstützung der Freunde der Zoologischen Staatssammlung e.V. konnte ich 1995 in diesem für Westeuropäer schwer erreichbaren Gebiet sammeln.

Frau Osytshnjuk aus Kiev hat eine Revision der zentralasiatischen Arten der Untergattung *Carandrena* Warncke, 1968 publiziert, die einen (russischen) Bestimmungsschlüssel für diese Artengruppe enthält (Osytshnjuk1984), und in der sie *Andrena subsmaragdina* beschreibt. Auf der oben erwähnten

Sammelreise fing ich eine Serie von Andrenen, die der von Osytshnjuk (1984) beschriebenen Art sehr ähnlich sind, sich aber eindeutig von ihr unterscheiden. Die neue Art soll im folgenden beschrieben werden.

Methode

Bei der lichtmikroskopischen Untersuchung und Dokumentation wurde Wert darauf gelegt, die Tiere mit diffusem Licht zu beleuchten (Leuchtstoffröhre), um die Chagrinierung und zum Teil sehr feine Punktierung deutlicher sichtbar zu machen und störende Glanzlichter zu reduzieren. Für die rasterelektronenmikroskopischen Aufnahmen wurde unbesputtertes Material verwendet, das meistens genadelt, teils aber auch auf elektrisch leitendem doppelseitigen Klebeplättchen befestigt war. Technische Angaben: Rasterelektronenmikroskop Philips XL-20, low voltage anode, Beschleunigungsspannung 1,2-1,7 kV, Bildspeicher i.d.R.: integrate 4, slow scan 2, Videoprints.

Andrena ledermanni spec. nov.

Typen. Holotypus: ♀, Turkmenistan, Kugitang-Gebirge, Plateau neben Dareidare, ca. 1.500 m, ca. 50 km östlich von Gaurdak, ca. 40 km nördl. von Karlyuk, 66°30'O, 37°19'N; 30.4.1995, leg. K. Schönitzer. (Zoologische Staatssammlung München – ZSM). – Paratypen: 16♀♀, Funddaten wie Holotypus; 1♀, ca. 1.100 m; 29.4.1995, sonst wie Holotypus; 3♀♀, Kugitang-Gebirge, Hodschapil, oberhalb des "Plateau's der Dinosaurier", ca. 1.400-1.500 m, je ca. 65 km östl. von Gaurdak und nördl. von Karlyuk, 66°35'O, 37°26'N; 3.5.1995; alle leg. K. Schönitzer. (Je 1♀ Institut für Zoologie Kiev und Oberösterreichisches Landesmuseum Linz, alle anderen ZSM).

Beschreibung

Weibchen. Länge 8-9 mm ($\bar{x} = 8.46$). Habitus siehe Abb. 1 und 2.

Kopf von vorne gesehen deutlich breiter als lang (Abb. 3). Clypeus gewölbt, stark, ± querrunzelig chagriniert, nicht glänzend, undeutlich punktiert (Abb. 12, 14). Punktierung im unteren Drittel etwas dichter und deutlicher als sonst. Labrumanhang breit, Vorderrand leicht eingebuchtet oder gerade (Abb. 16). Galea etwa doppelt so lang wie breit, deutlich chagriniert, unpunktiert (Abb. 16). Die Maxilarpalpen überragen die Galea um 2 Glieder. Fovea facialis sehr nahe an den Komplexaugen, wenig vertieft, oben und unten flach auslaufend, reicht nach unten etwa so weit wie der Unterrand der Antenneneinlenkung, reicht nach oben nicht bis zum Oberrand der Komplexaugen (Abb. 4, 10). Breite der Fovea facialis im oberen Drittel etwa 0.35 der Gesichtshälfte (gemessen nach Schmid-Egger und Scheuchel 1997). Stirn längsgerieft, Mittellinie relativ wenig erhaben. Seitlich von den Seitenocellen, oberhalb der Fovea wabig chagriniert (Abb. 10). Abstand der seitlichen Ocellen vom Scheitelrand etwa gleich ihrem Durchmesser. Antennen: Scapus relativ kurz, reicht nur knapp bis zum Unterrand der Mittelocelle. 3. Antennenglied fast so lang wie die drei folgenden zusammen, 4. und 5. Antennenglied kürzer als breit, 6. und 7. etwa quadratisch, die folgenden länger als breit. Schläfen etwa so breit wie das Komplexauge, chagriniert, zerstreut punktiert.

Thorax insgesamt deutlich chagriniert und höchstens undeutlich punktiert. Pronotum nicht gekielt. Mesonotum im vorderen Drittel schwach glänzend chagriniert, undeutlich punktiert; die hinteren ⅔ ebenso wie Scutellum und Postscutellum durch starke Chagrinierung völlig matt und unpunktiert erscheinend (Abb. 5, 6). Mittelfeld des Propodeums wabig chagriniert, ohne gratige Erhebungen, teilweise vorne median mit einer feinen Linie (Abb. 6). Körbchen des Propodeums undifferenziert. Flügel: Nervulus deutlich antefurcal, 1. Discoidalader mündet vor der Mitte in die 2. Cubitalzelle (Abb. 1).

Tergite deutlich chagriniert, mit seidigem Glanz. Die beiden vorderen Tergite praktisch unpunktiert, Tergite III-IV undeutlich, flach, zerstreut punktiert, lediglich Tergit V deutlich punktiert (Abb. 7). Depressionen sehr wenig niedergedrückt, fast die Hälfte der Tergite (II-IV) einnehmend. Ebenso fein wie oder feiner als der vordere Teil der Tergite chagriniert. Pygidium in der Mitte leicht hochgewölbt, die Seiten bilden einen Winkel von 55-60° (Abb. 17).

Färbung des Integumentes schwarz. Basale Glieder der Antennen dunkel, 4. und 5. Antennenglied teilweise aufgehellt, ab dem 6. Antennenglied auf der Unterseite gelblich, oberseits braun (Abb. 3). Endränder der Tergite durchscheinend. Klauenglieder braun.

Abb. 1. Habitus von *Andrena ledermanni*, spec. nov.

Behaarung insgesamt schwach, grau. Kopf schütter, grau behaart (Abb. 1). Rücken sehr schwach behaart, Thoraxseiten weißlich. Körbchenbegrenzung schwach, Körbchenboden locker behaart, feine fiedrige Haare. Binden weiß, am Tergit I fehlend oder nur ganz seitlich, Tergit II median breit unterbrochene Binde, Tergit III unterbrochene oder durchgehende Binde (Abb. 7), Tergit IV meist durchgehende Binde. Endfranse goldgelb. Sternite gelblich, am Hinterrand struppig behaart. Flocculus nicht sehr stark ausgeprägt, fein gefiederte Haare. Hinterfemur unten mit sehr fein gefiederten weißen Haaren. Scopa gelblich, nicht so fein gefiedert (Abb. 18).

♂ unbekannt.

Differentialdiagnose

Da *Andrena subsmaragdina* Osytshnjuk, 1984 offensichtlich der neuen Art sehr ähnlich ist, sind in der folgenden Tabelle die wichtigsten Unterschiede zwischen *Andrena ledermanni*, spec. nov. und *A. subsmaragdina* zusammengestellt (Abb. 10-15). Daß es sich eindeutig um zwei Arten handelt und keinesfalls um Unterarten, zeigt sich auch daran, daß ich im Hodschapil beide Arten im gleichen Biotop fangen konnte.

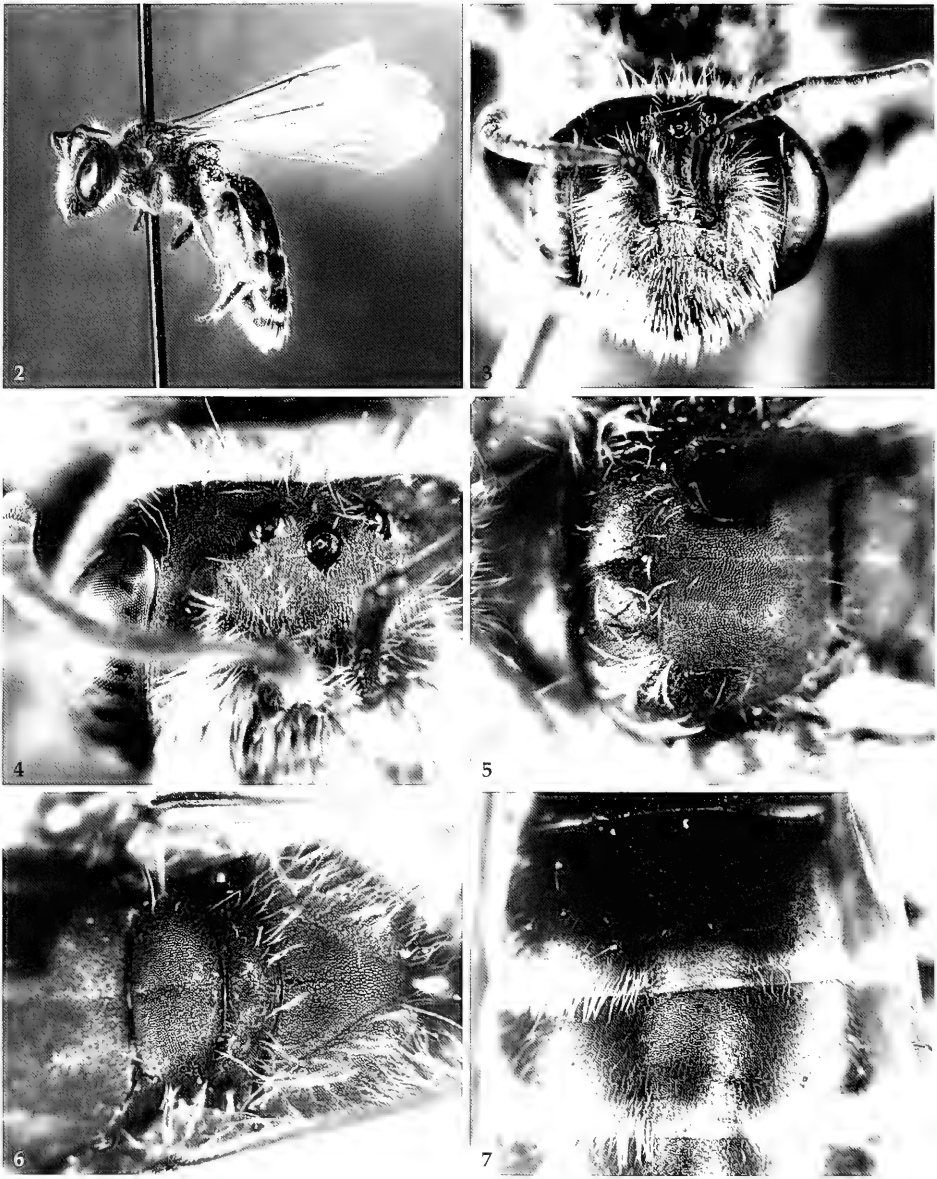

Abb. 2-7. *Andrena ledermanni*, spec. nov. **2.** Holotypus, Habitus. **3.** Holotypus, Kopf von vorne. **4.** Holotypus, Blick auf die Stirn. **5.** Paratypus, Mesonotum von dorsal, Orientierung: links = anterior. **6.** Paratypus, Scutellum, Postscutellum und Mittelfeld des Propodeums, links = anterior. **7.** Tergite II und III, oben = anterior.


8


9

Abb. 8-9. *Andrena subsmaragdina* Osytshnjuk 1984. **8.** Kopf von vorne. Offene Pfeile: glatter Kutikulastreifen zwischen Auge und Fovea facialis. **9.** Mesonotum von dorsal, links = anterior.

	Andrena ledermanni spec. nov	*Andrena subsmaragdina* Os., 1984
Antenne, 1. Geißelglied	deutlich länger als die beiden folgenden	etwa so lang wie die beiden folgenden
Fovea facialis	kaum vertieft, nicht vom Augenrand entfernt, breiter (Abb. 10)	deutlich vertieft, zwischen Augenrand und Fovea glänzender Kutikulastreifen, schmäler (Abb. 11)
Clypeus	nicht glänzend (Abb. 12,14)	glänzend (Abb. 8, 13, 15)
Mesonotum (Scheibe) und Scutellum	unpunktiert, matt (Abb. 5, 6)	punktiert, metallisch glänzend (Abb. 9)
Abstand Scheitel – Seitenocelle	so groß wie Ocellendurchmesser (Abb. 10)	halb so groß wie Ocellendurchmesser (Abb. 11)
Depressionen der Tergite	sehr wenig niedergedrückt, knapp die Hälfte der Tergite einnehmend (Abb. 7)	stärker niedergedrückt, etwa ein drittel der Tergite einnehmend
Pygidium	in der Mitte gewölbt mit schmalem Rand (Abb. 17)	in der Mitte flach, mit breiterem Rand

A. subsmaragdina gehört nach Osytshnjuk (1984) in die Untergattung *Carandrena*, Warncke 1968, benannt nach *Anderena cara* Nurse, 1904. Diese Art wurde allerdings kurz zuvor von Warncke selbst (1967) als ungeklärt bezeichnet (ein ähnliches Vorgehen wie bei *Distandrena*, Schönitzer et al. 1992). Als Typusart hat Warncke folglich *A. aerinifrons* Dours,1873 festgelegt (Warncke 1968). Dylewska (1987) faßt die Arten der Untergattung *Carandrena* in der *A. aerinifrons*-Gruppe zusammen.

A. aerinifrons ist vom Habitus, der Behaarung und starken Chagrinierung der *A. ledermanni* ähnlich. *A. aerinifrons* ist deutlich größer als *A. ledermanni*, die Fovea facialis ist sehr eng, deutlich eingesenkt, oben kaum verbreitert. Das Mesonotum ist zerstreut, aber deutlich punktiert, die Tergite sind undeutlich punktiert. Das Pygidium ist breit und in der Mitte nicht erhaben.

A. cara Nurse, 1904 unterscheidet sich im Habitus und in der gesamten Morphologie stark von *A. ledermanni*. Sie ist kleiner als *A. ledermanni*, weiß und dichter behaart, hat rote Tergite I-III, der Clypeus ist vorne median deutlich glänzend. Die Samtbehaarung der flachen Fovea facialis ist weiß. Die seitlichen Ocellen liegen nahe beim Scheitel (½ Ocellendurchmesser). Die Scheibe des Mesonotums

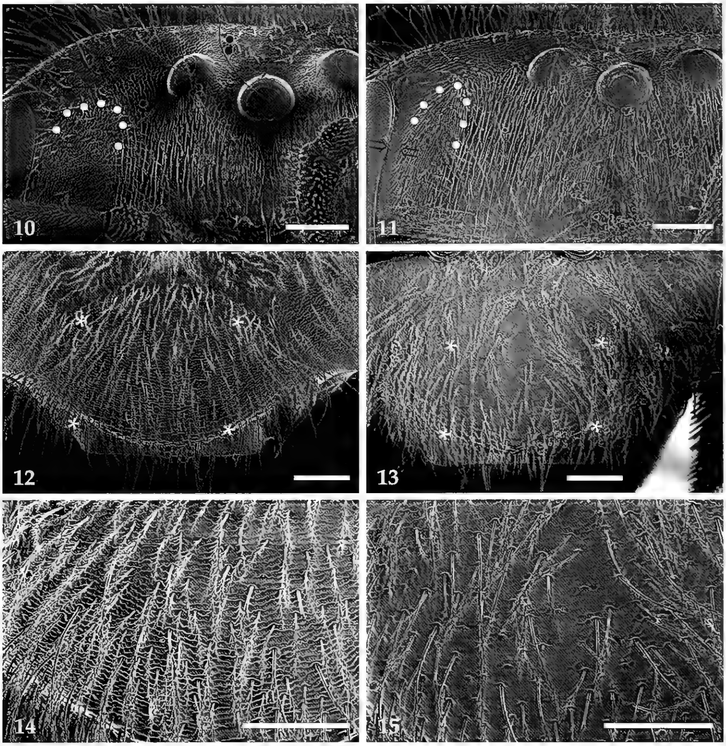

Abb. 10-15. Vergleich zwischen *Andrena ledermanni*, spec. nov., ♀ (Abb. 10, 12, 14) und *Andrena subsmaragdina* Osytshnjuk, ♀ (Abb. 11, 13, 15). **10, 11.** Oberer Teil des Kopfes. Punkte: obere Grenze der Fovea facialis. Offene Pfeile: Glatte Kutikula zwischen Auge und Fovea facialis. **12, 13.** Blick von vorne auf Clypeus. Weiße Sterne: Bildausschnitt für Abb. 14 und 15. **14, 15.** Mittlerer Teil des Clypeus. Maßstab=200 µm.

und das Scutellum sind glatt, stark glänzend und zerstreut punktiert. Die Haare der Scopa sind kaum gefiedert. Die Tergite sind viel weniger chagriniert als bei *A. ledermanni* und glänzen mehr.

Untersuchtes Material: *Andrena subsmaragdina*: 3♀♀ Paratypen ex coll. Osytshnjuk; 1♀, Turkmenistan, Kugitang-Gebirge, Hodschapil, 1400-1500 m, 3.5.1995 leg. K. Schönitzer (ZSM); 1♀, Turkmenistan, Umgebung Ashchabad, 17.4.1995, leg. K. Schönitzer (ZSM).

A. aerinifrons: 2♀♀, Tunis, Belvedere, leg., det. und coll. Grünwaldt; 5♀♀, Türkei, 20 km westl. Kilis, leg. Warncke (*A. a.* ssp. *levantina* Hedicke, 1938, det. Warncke), ZSM.

A. cara: 4♀♀, Peshin (Pakistan), 3.2.19??, leg. C. G. Nurse, coll. Grünwaldt.

Die einzige mitteleuropäische Art der Untergattung *Carandrena* ist *Andrena schlettereri* Friese, 1896, die außer in Südosteuropa (Griechenland, Albanien, ehem. Jugoslavien, Rumänien, Türkei) in Süd-Ungarn und im Süden der Slowakei vorkommt (Kocourek 1966, Dylewska 1987).

Verwandtschaftliche Verhältnisse

Die Ähnlichkeit zwischen *Andrena subsmaragdina* und *A. ledermanni* legt die Vermutung nahe, daß auch *A. ledermanni* zur Untergattung *Carandrena* (= *A. aerinifrons*-Gruppe) gehört. Es dürfte sich bei *Carandrena* um ein monophyletisches Taxon handeln. Als Synapomorphie deute ich folgendes Merkmal, das

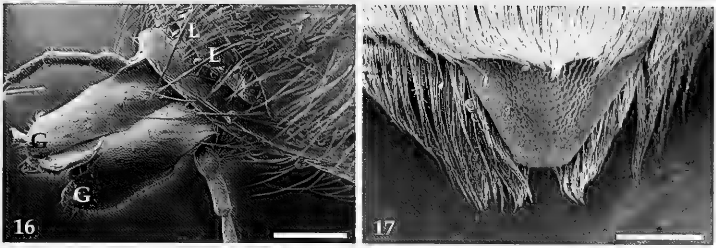

Abb. 16-17. *Andrena ledermanni*, spec. nov., ♀, Paratypus. **16.** Mundwerkzeuge; G: Galea. L: Labrumanhang. **17.** Pygidialplatte. Maßstab = 200 µm.

alle Männchen dieser Untergattung aufweisen, das aber sonst innerhalb der Gattung nur bei der *A. nigriceps*-Gruppe (*Cnemidandrena* Hedicke, 1933) vorkommt: Die Männchen haben relativ breite Schläfen ("Wangen" bei Warncke 1968) mit einem Kiel am Hinterrand ("leistenartig aufgebogenem Außenrand", Warncke 1968; siehe auch Zeichnungen in Warncke 1975, S. 91 und in Osytshnjuk 1984). Da ich kein sicheres Merkmal für die Weibchen dieser Untergattung kenne, muß die Frage, ob *A. ledermanni* in diese Gruppe gehört, zumindest so lange offen bleiben, als das zugehörige Männchen nicht bekannt ist. Die Angelegenheit ist auch wegen der Form des Pronotums offen, welches bei *Carandrena* gewöhnlich deutlich gekielt (bei *A. subsmaragdina* schwach gekielt), aber bei *A. ledermanni* ungekielt ist (Warncke 1968, Osytshnjuk mündl.). Ein gekieltes Pronotum kommt auch bei der *A. helvola*-Gruppe (*Andrena* s.str.) vor.

Nach Dylewska (1987) gehört die *A. aerinifrons*-Gruppe zur Übergruppe XIX, bei der ebenso wie bei den Übergruppen XX und XXI das "Mittelfeld des Propodeums mikroskulptiert und punktiert" ist. Eine Punktierung des Mittelfeldes kann ich jedoch für keine der in Frage kommenden Arten bestätigen. Auch bei *A. ledermanni* ist das Mittelfeld des Propodeums eindeutig nicht punktiert (Abb. 6). Möglicherweise nennt Dylewska in diesem Zusammenhang die stellenweise etwas größeren Kutikulaplatten der chagrinierten Oberfläche punktiert. Dies entspricht allerdings nicht dem üblichen Sprachgebrauch und ist dadurch mißverständlich.

Dedikation

Diese Art erhält mit der Neubeschreibung den Namen von Herrn **Volker D. Ledermann** aus Sieck, der die biosystematische Forschung an der Zoologischen Staatssammlung München großzügig finanziell unterstützt hat.

Dank

Ganz besonders bin ich Frau Dr. A. Osytshnjuk aus Kiev, der derzeit besten Kennerin der zentralasiatischen Sandbienen, zu Dank verpflichtet. Sie hat mir bei der Bearbeitung der Ausbeute aus Turkmenistan sehr geholfen. Für hilfreiche Hinweise und langjährige Zusammenarbeit danke ich Herrn Dr. W. Grünwaldt und HerrnJ. Schuberth (beide München). Letzterem danke ich auch besonders für sein gründliches Korrekturlesen. Frau Mag. V. Ziegler (Innsbruck) hat freundlicherweise verschiedene russische Texte ins Deutsche und die Zusammenfassung ins Russische übersetzt. Frau R. Kühbandner hat die Zeichnung, Frau M. Müller (beide München) die Fotoarbeiten gemacht. Herr Dr. R. Melzer (München) ermöglichte mir die Benutzung des Rasterelektronenmikroskops am Zoologischen Institut der LMU. Die Reise nach Turkmenistan wurde finanziell durch die "Freunde der Zoologischen Staatssammlung e.V." unterstützt. Ich danke auch allen Expeditionsteilnehmern, insbesondere Herrn Dr. K. Atamuradov (Aŝchabad) und Herrn Prof. V. Dolin (Kiev) für die schöne Zeit in Turkmenistan.

Zusammenfassung

Andrena ledermanni, spec. nov. aus Turkmenistan wird beschrieben. Sie wurde Ende April/Anfang Mai im Kugitang-Gebirge in 1.100 bis 1.500 m über NN gefangen. Sie ist der *Andrena (Carandrena) subsmaragdina* Osytshnjuk, 1984 ähnlich. Die neue Art kann unter anderem an dem stark chagrinierten Clypeus, dem längeren 3. Antennenglied (fast so lang wie die drei folgenden Glieder) und dem Abstand der seitlichen Ocellen vom Scheitel (etwa gleich ihrem Durchmesser), unterschieden werden. Die Scheibe des Propodeums, das Scutellum und Postscutellum der neuen Art sind auffällig matt und sind unpunktiert. Da nur das Weibchen bekannt ist kann ihre Zugehörigkeit zu einer Untergattung oder Artengruppe nur vermutet werden.

Резюме

Описывается *Andrena ledermanni*, sp. n. из Туркменистана.

В конце апреля/начале мая *Andrena ledermanni* была поймана в горах Кугитанг–тау на высоте 1100-1500 м. н.н.

Вид близок к *Andrena (Carandrena) subsmaragdina* Osytshnjuk, 1984. Новый вид отличается грубо шагренированным наличником, более длинным третьим членом жгутиков усиков (его длина соответствует длине следующих трех члеников) и расстоянием боковых простых глазок от темени (это расстояние соответствует диаметру простых глазок). Определить принадлежность к какому-либо подроду или группе видов невозможно, так как нам известна только самка.

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SPIXIANA	**20**	3	317–322	München, 01. November 1997	ISSN 0341-8391

Eine neue Gattung und Art der Subtribus Dicaelodontina aus Mittelamerika: *Hintelmannia elisabethae*

(Insecta, Hymenoptera, Ichneumonidae, Ichneumoninae, Phaeogenini)

Erich Diller und **Klaus Schönitzer**

Diller, E. & K. Schönitzer (1997): A new genus and species of the subtribe Dicaelodontina from Middle America: *Hintelmannia elisabethae.* (Insecta, Hymenoptera, Ichneumonidae, Ichneumoninae, Phaeogenini). – Spixiana **20/3:** 317-322

In the present paper, the genus *Hintelmannia,* gen nov., and the species *elisabethae,* spec. nov. from Mexiko and Costa Rica are described. The new genus and species belong to the subtribe Dicaelodontina. A key for the previously described genera of the Dicaelodontina is given.

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Einleitung

Die Subtribus Dicaelodontina wurde auf Grund der Kombinationen von fehlenden Thyridia und einzähnigen Mandibulae von den bisher bekannten Subtribus der Phaeogenini als vermutlich monophyletische Gruppe abgetrennt (Diller 1994). Die bisher aus dieser Subtribus beschriebenen Gattungen *Maxodontus* und *Liaodontus* stammen aus Mittel- und Südamerika, *Dicaelodontus* stammt aus Nepal. Es wird hier eine neue Gattung und Art aus Mittelamerika vorgestellt.

Das Material, das der Bearbeitung vorlag, ist im Besitz des American Entomological Institute, Gainesville, USA.

Methodik

Die rasterelektronischen Aufnahmen wurden an unbesputtertem, genadeltem Material gemacht (Philips XL-20, Beschleunigungsspannung 1,5 kV, Bildspeicher: Integrate 4, Slow scan 2, Videoprints). Die Nadel wurde mit Leit-C Plast an einem Objekttischchen befestigt. Näheres zur Technik siehe Selfa & Schönitzer (1994).

Bestimmungsschlüssel der Gattungen der Dicaelodontina

1. Scutellum stark ausgeprägt, hoch und vollständig, inklusive des Hinterrandes gerandet .... 2.
– Scutellum nicht oder nur an der Basis und nicht hoch gerandet .... 3.

2. Genal- und Occipitalcarina vorhanden (Abb. 2) .... *Maxodontus* Diller
– Genal- und Occipitalcarina nicht vorhanden (Abb. 4) .... *Liaodontus* Diller

3. Flagella und Flagellaglieder kurz und gedrungen, dick. Distanz der Supraclypealarea zu den Augen weit (Abb. 2). Clypeus kurz und gedrungen. Clypeusendrand nicht dünn und aufgeworfen (Abb. 2). Körper mit Punktierung. Propodeum von der Basis an nicht stark abfallend .... *Dicaelodontus* Diller

– Flagella und Flagellaglieder lang und dünn. Distanz der Supraclypealarea zu den Augen schmal (Abb. 1, 12). Clypeus lang und nicht gedrungen. Clypeusendrand dünn und besonders in der Mitte stark aufgeworfen (Abb. 1). Körper ohne Punktierung (Abb. 1, 12). Propodeum von der Basis an stark abfallend (Abb. 11, 12) .... *Hintelmannia*, gen. nov.

Hintelmannia, gen. nov.

Typusart: *Hintelmannia elisabethae*, spec. nov.

Die neue Gattung *Hintelmannia* unterscheidet sich grundlegend von den in der Subtribus Dicaelodontina enthaltenen Gattungen *Maxodontus* Diller, 1994, vor allem durch das ungerandete Scutellum, durch die tief eingeprägten und langen Notauli, durch das Fehlen der Punktierung auf dem Körper und zusätzlich durch das Vorhandensein einer Genal- und Occipitalcarina von *Liaodontus* Diller, 1994. Von *Dicaelodontus* Diller, 1994, unterscheidet sich die neue Gattung unter anderem durch die langen und schmalen Fühlerglieder, durch die flache Frontpartie des Kopfes mit der geringen Distanz der Supraclypealarea zu den Augen, durch den langen und relativ flachen Clypeus, mit seinem dünnen, in der Mitte stark aufgeworfenen Rand, sowie durch das von der Basis an steil abfallende Propodeum und durch die fehlende Punktierung des Körpers.

Bis heute ist diese neue Gattung nur aus Mexiko und Costa Rica nachzuweisen. Weder Townes & Townes (1966) noch Gauld (1991) lagen Tiere vor, die in diese Gattung gehören könnten.

Die neu beschriebene Gattung entspricht voll den Kriterien, die den Dicaelodontina zu eigen sind und gehört innerhalb dieser Subtribus in den Komplex der Gattungen *Maxodontus* und *Liaodontus* (Diller 1994), die sich durch sehr lange und dünne Fühlerglieder, ein flaches, langes Gesicht, einen flachen und relativ langen Clypeus und einen von der Basis steil abfallenden Propodeum gegenüber der Gattung *Dicaelodontus* auszeichnen. Diese, innerhalb der Dicaelodontina herausragenden, vermutlich abgeleiteten morphologischen Merkmale sprechen für eine Monophylie der mittel- und südamerikanischen Gattungen der Dicaelodontina. Im Gegensatz dazu steht die aus dem Himalaja stammende Typusart der Subtribus *Dicaelodontus haesitator* Diller, 1994. Diese hat kurze und breite Fühlerglieder, ein kurzes und stark aufgewölbtes Gesicht und einen kurzen, gewölbten Clypeus (das Aussehen des ganzen Gesichtes erinnert an *Stenodontus* Berthoumieu, 1896, vergl. Diller et. al. 1996), sowie ein Propodeum, das von der Basis an nicht steil abfällt, sondern basal eine fast horizontale Ebene aufweist. Man kann davon ausgehen, daß diese Gattung an der Basis der Dicaelodontina steht (Diller 1994).

Hintelmannia elisabethae, spec. nov.

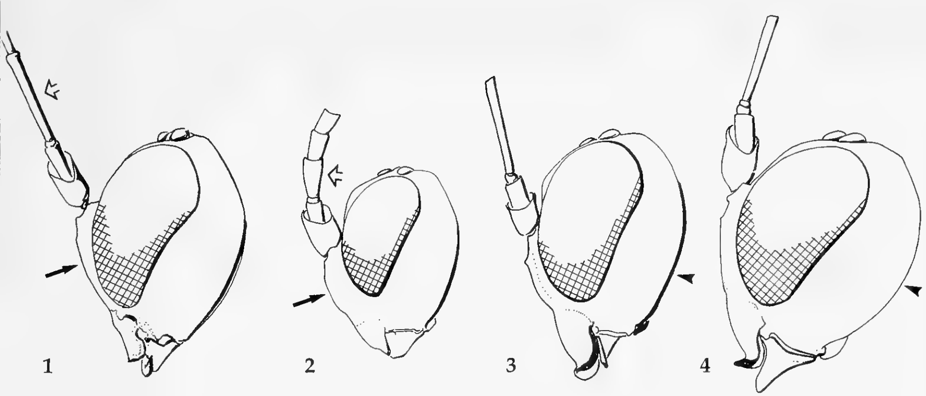
(Abb. 1, 5, 8-12)

Typen. Holotypus: ♀, Costa Rica. San Vito de C.B. Las Cruces, 1200 m, 17-VIII-12-IX-1982 B. Gill (coll. Amer. Ent. Inst. Gainesville). – Paratypus: ♀, Vista Hermosa, Oax., Mex. 96.5 km. SW of Tuxtepec X.17.62 1200 m. H. & M. Townes (coll. Amer. Ent. Inst. Gainesville).

Beschreibung

♀: 5.4-6 mm.

Kopf. Glatt und glänzend, nicht punktiert (Abb. 1, 5, 12). Auch die Frons ohne Struktur (Abb. 5). Clypeus glatt und glänzend, durch eine flache Kerbe von der Supraclypealarea getrennt (Abb. 5, 8). Der dünne Clypeusendsaum nur lateral schwach aufgeworfen und vom restlichen Clypeus abgesetzt. Die Mitte des Endrandes biegt sich jedoch in einem sehr ausgeprägten Bogen nach oben, darunter befindet sich, frontal sichtbar, der glatte, großflächige, beinahe senkrecht abfallende, eine Platte bildende, untere Clypeusteil (Abb. 8). Clypealfoveae groß und tief (Abb. 1, 2, 8). Malarraum etwas kürzer als die Mandibelbasis. Genalsulcus seicht, schmal und chagriniert (Abb. 5). Mandibulae einzähnig und sichelförmig gebogen. Die Genalcarina trifft unmittelbar an der Mandibelbasis auf die Oralcarina (Abb. 1).



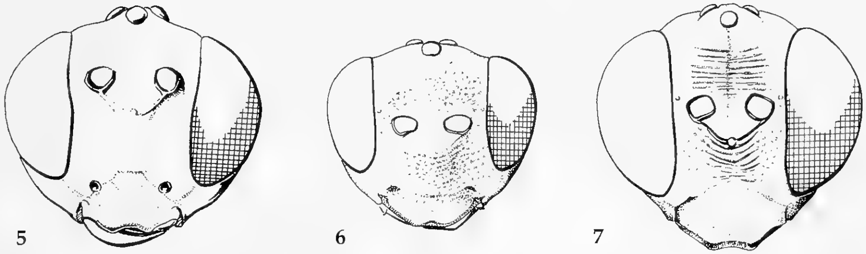


Abb. 1-4. Kopf lateral, ♀. **1.** *Hintelmannia elisabethae*, spec. nov. Flagellaglieder lang und dünn (offener Pfeil), Distanz zur Supraclypealarea (dunkler Pfeil). **2.** *Dicaelodontus haesitator* Diller, 1994. Flagellaglieder kurz und gedrungen (offener Pfeil), Distanz zur Supraclypealarea (dunkler Pfeil). **3.** *Maxodontus costaricator* Diller, 1994. Genal- und Ocipitalcarina vorhanden (Pfeilspitze). **4.** *Liaodontus maxfischeri* Diller, 1994. Genal- und Ocipitalcarina fehlen (Pfeilspitze).

Abb. 5-7. Kopf frontal, ♀. **5.** *Hintelmannia elisabethae*, spec. nov. **6.** *Dicaelodontus haesitator* Diller, 1994. **7.** *Maxodontus costaricator* Diller, 1994.

Abb. 8-9. *Hintelmannia elisabethae*, spec. nov., ♀. **8.** Clypeus frontal. **9.** Abdomen dorsal, mit Farbmuster.

Flagella. 24 Glieder. Fühler lang und schlank (Abb. 1, 12), besonders auffallend verhält sich dies bis zum neunten Flagellaglied, von da ab verbreitern sich die Glieder etwas und werden kürzer. Jedoch sind die Flagellaglieder immer länger als breit. Ab Flagellaglied 17 bis zur Spitze verjüngen sich die Glieder wieder. Ab Flagellaglied 4 finden sich erst einzelne, zur Fühlerspitze dann mehrere, verstreute Sinnesleisten, die lateral und dorsal angeordnet sind.

Thorax. Glatt und glänzend, ohne Punktierung. Mesoscutum mit schwacher Chagrinierung. Notauli in der Vorderhälfte des Mesoscutums tief eingeprägt. In der Fortsetzung zu den Notauli ziehen sich über die Mitte ausgeprägte, parallele Carinulae bis zum Apikalrand des Mesoscutum (Abb. 10). Scutellum nur sehr kurz an der äußersten Basis gerandet. Mesopleurummitte sehr schwach chagriniert. Über den Mittelcoxen erstrecken sich zur Mesopleuralnaht wenige, schwache, horizontale Carinulae.

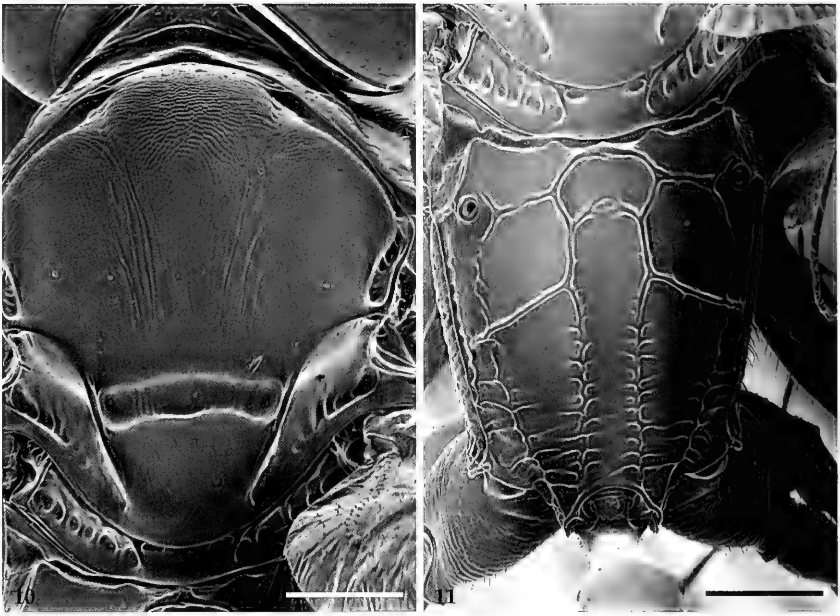


Abb. 10-11. *Hintelmannia elisabethae*, spec. nov., ♀ Holotypus. **10.** Mesoscutum dorsal. **11.** Propodeum dorsal. Maßstab = 200µm.

Sternauli im Vorderdrittel des Mesopleurums tief eingeprägt. Die stark ausgeprägte Praepectalcarina sendet eine schwache Carina zum Collaris. Epomia stark ausgeprägt.

Propodeum. Glatt und glänzend und von der Basis an kontinuierlich steil abfallend. Metapleurum und Juxtacoxalarea sehr schwach chagriniert. Carinae beinahe vollständig ausgeprägt, einschließlich der kompletten Juxtacoxalcarina, lediglich die Area basalis fehlt (Abb. 11). Direkt an der Basis des Propodeums setzt die auffallend kleine, vierseitige Area superomedia an, die wesentlich breiter als lang ist (Querformat) (Abb. 11), beim Paratypus ist sie in der Mitte durch eine kleine Carina geteilt. Die Area posteromedia sehr schmal und sehr lang, und auf deren Apikaldrittel befinden sich teilweise stark ausgeprägte Quercarinulae (Abb. 11). Auf der Area metapleuralis und auf der Area coxalis sind (etwas schwächer auf deren Basen) deutliche Vertikalcarinulae, auf letzterer auch Diagonalcarinulae ausgeprägt. Apikalrand weit über die Basen der Hintercoxae verlängert (Abb. 11).

Flügel. Areola groß, fünfseitig geschlossen, jedoch der zweite Intercubitus schwach. Der Außennerv des Cubitus nur an der Basis zur Areola angedeutet. Auf dem Hinterflügel fehlen der Außennerv der Cubitella, die Discoidella und die Brachiella. Nervellus schräg nach innen gerichtet (Abb. 12). Beine. Glatt und glänzend. Coxae, Tibiae und Tarsi schwach chagriniert.

Abdomen. Glatt und glänzend. Das zweite Tergit trägt lateral viele, schwache, parallele Längscarinulae. Das dritte Tergit ist deutlicher, die restlichen Tergite sind lateral schwächer charginiert. Thyridia fehlen. Die Spiraculi befinden sich in den Tergiten. Der gerade, mit sehr schmalen Scheiden versehene Ovipositor ragt weit über das Abdomenende. Seine Länge hat die Ausmaße vom zweiten und dritten Hintertarsenglied.

Färbung. Schwarz. Braunrot sind: Thorax und Propodeum (Abb. 12) mit schwärzlicher Collaris und schwarzer Area coxalis, deren Schwarzfärbung ventral schwach auch das Metapleurum verdunkelt. Der Apikalrand des Propodeums ist ebenfalls schwärzlich. Gelb sind: die Fühler, die etwa ab der Mitte bis zur Spitze bräunlich durchsetzt werden, die Mandibulae, ohne deren dunklen Spitzen, die Palpi, die Flügelbasen mit den Tegulae, die Coxae, Trochanter, Trochantelli, wobei die Hintercoxae apikal einen braunen Anflug haben können. Dies trifft auch ventral auf die Hintertrochanter und ausgedehnter auf die Hintertrochantelli zu. Die Hinterfemora haben an den Basen und am Ende einen

Abb. 12. *Hintelmannia elisabethae*, spec. nov., ♀. Habitusbild des Holotypus.

leicht verdunkelten Ring. Das schwarze Abdomen hat ab der Mitte des zweiten Tergites nach hinten einen breiten, gelben Mittelstreifen, der sich auch in die Apikalränder der restlichen Tergite zieht (Abb. 9). Die sklerotisierten Teile der Sternite sind dunkelbraun.

♂. Unbekannt.

Dedikation

Die in dieser Arbeit beschriebene neue Ichneumoniden-Gattung und -Art *Hintelmannia elisabethae*, gen. et spec. nov. wird von den Autoren Frau Elisabeth Hintelmann (München) in großer Dankbarkeit gewidmet. Frau Elisabeth Hintelmann hat sich in vielen Jahren durch ihr sehr großes, uneigennütziges Engagement für die systematische Forschung der Zoologischen Staatssammlung große Verdienste erworben.

Zusammenfassung

Beim Studium von Ichneumonidae aus Mittelamerika, die in die Tribus Phaeogenini einzuordnen sind, wurde eine neue Gattung und Art der Subtribus Dicaelodontina Diller, 1994 festgestellt. *Hintelmannia elisabethae*, gen. et spec. nov., mit dem derzeit bekannten Verbreitungsgebiet in Mexiko und Costa Rica, wird neu beschrieben.

Resumen

En el artículo presente se describen el género *Hintelmannia* gen. nov. y la especie *elisabethae* spec. nov. de Méjico y Costa Rica. El género y la especie nueva pertenecen a la subtribu Dicaelodontina. Se presenta una clave para las especies de Dicaelodontina ya descritas anteriormente.

Danksagung

Herrn Dr. David B. Wahl (Gainesville) wird für die Bereitstellung der Tiere, die der Bearbeitung zu Grunde lagen, gedankt. Dank gebührt für die Anfertigung der Habituszeichnung des Holotypus Frau Ruth Kühbandner (Zoologische Staatssammlung München) und Herrn Dr. Roland Melzer für die Benutzung des Rasterelektronenmikroskopes des Zoologischen Institutes der Ludwigs-Maximilians-Universität München (LMU).

Berichtigung

In der Arbeit: Diller, E. 1994. Beschreibungen einer neuen Subtribus, neuer Gattungen und Arten der Tribus Phaeogenini (Insecta: Hymenoptera: Ichneumonidae: Phaeogenini). – Ann. Naturhist. Mus. Wien, **96**B: 125-136 – wurde in der Abbildungslegende Seite 127 versehentlich *Dicaelotus haesitator* statt *Dicaelodontus haesitator* geschrieben.

Literatur

Diller, E. 1981. Bemerkungen zur Systematik der Phaeogenini mit einem vorläufigen Katalog der Gattungen (Hymenoptera, Ichneumonidae). – Entomofauna **2**(8): 93-109

– – 1994. Beschreibungen einer neuen Subtribus, neuer Gattungen und Arten der Tribus Phaeogenini (Insecta: Hymenoptera: Ichneumonidae: Phaeogenini). – Ann. Naturhist. Mus. Wien, **96**B: 125-136

– – , Yao-Kluge, A. L. & K. Schönitzer 1996. Zur Verbreitung der Gattung *Stenodontus* Berthoumieu, 1896, nebst Beschreibung einer neuen Art (Insecta, Hymenoptera, Ichneumonidae, Ichneumoninae, Phaeogenini). – Spixiana Suppl. **22**, 15-22

Gauld, I. 1991. The Ichneumonidae of Costa Rica, 1. – Mem. Amer. Ent. Inst. **47**, 489 pp.

Selfa, J. & K. Schönitzer 1994. Taxonomy of the Europaean Species of Neotypus Förster, 1869, with a key for their identification (Hymenoptera, Ichneumondea, Ichneumoninae, Listrodomini). – Entomofauna **15**: 469-480

Townes, H. & M. Townes 1966. A Catalogue and Reclassification of the Neotropic Ichneumonidae. – Mem. Amer. Ent. Inst, **8**: 367 pp.

33. Redford, K. H. & J. F. Eisenberg: Mammals of the Neotropics. The Southern Cone. Vol. 2. – The University of Chicago Press, Chicago and London,1992. 430 S., zahlr. Abb. und Verbreitungskarten im Text, 18 Tafeln, davon 8 farbig.

Ein Handbuch oder Feldführer über die Säugetierfauna Südamerikas fehlte bisher, wenn man von einigen regional bzw. nationalstaatlich gegliederten Werken absieht. In den zurückliegenden Jahren haben jedoch verschiedene nordamerikanische "Schulen" durch intensive Forschungstätigkeit die Kenntnisse über die südamerikanische Säugetierfauna wesentlich erweitert, so daß die Zeit für ein zusammenfassendes Werk reif schien. Dieses bringt nun der bekannte Südamerikaforscher John F. Eisenberg mit einer dreibändigen Handbuchreihe auf den Markt, wovon dem Rezensenten der 2. Band vorliegt, der die Säugetiere der südlichen Staaten Paraguay, Uruguay, Chile und Argentinien behandelt. Die nördlichen Staaten der Neotropis wurden im ersten Band (Eisenberg 1989) behandelt, ein dritter Band mit den zentralen Staaten Südamerikas Brasilien, Bolivien, Peru und Ecuador soll folgen.

Text und Ausstattung sind so, wie man es sich bei einem Handbuch nur wünschen kann: konsequent gegliedert nach Ordnungen, Familien, Gattungen und Arten, enthält das Buch klare und ausführliche Merkmalsbeschreibungen, Tabellen mit Körpermaßen, detaillierte Punktverbreitungskarten, informative und gleichzeitig ansprechende Habituszeichnungen, für einige Arten auch Schädel- und Gebißzeichnungen. Auch allgemeine Zusammenhänge der Biogeographie, der Klimatologie, der Landschafts- und Vegetationskunde und des Naturschutzes werden angesprochen. Das Buch ist ein ausführliches Kompendium aller Säugetierarten des Geltungsbereiches. Die kenntnisreiche Darlegung phylogenetischer und ökologischer Zusammenhänge macht es darüberhinaus zu einer spannenden und anregenden Lektüre. R. Kraft

34. Merritt, J.F., Kirkland G.L. & R.K. Rose (Hrsg): Advances in the Biology of Shrews. – Carnegie Museum of Natural History Special Publication No. 18, Pittsburgh, 1994. 458 S. ISBN 0-911239-44-8.

Das Buch enthält die Beiträge zu einem Symposium über die Biologie der Soriciden, das 1990 am Carnegiemuseum in Pittsburgh stattfand. "Biologie" wird hier in sehr weitem Sinn aufgefaßt, entsprechend breit ist das Spektrum der Themen, die behandelt werden. Die Inhalte der 45 Referate, die teilweise den Charakter von Übersichtsartikeln haben, lassen sich zu folgenden Hauptthemen gruppieren: 1.) Freilandstudien zur Populationsbiologie, Territorialität und Fortpflanzungsperiodik. Gezeigt wird unter anderem, wie die Koexistenz syntoper Arten auf Grund unterschiedlicher Habitat- oder Nahrungspräferenzen möglich ist. 2.) Ernährungsstrategien, Thermoregulation und Stoffwechselraten. 3.) Morphologie, Histologie und Embryologie. 4.) Abstammung, Entwicklung und Systematik. Mehrere Beiträge dieses letztgenannten Themenkreises befassen sich mit der Chromosomenevolution und der Bedeutung von "Chromosomenrassen" bei der Gattung *Sorex*, aber auch serologische Befunde sowie kladistische Computeranalysen werden zur Aufstellung von Stammbäumen herangezogen.

Die meisten Referenten sind dem Soricidenspezialisten aus der Literatur wohlbekannt und haben jahre-, teilweise sogar jahrzehntelange Erfahrung auf ihrem jeweiligen Fachgebiet, entsprechend hoch sind Qualität und Informationsgehalt der einzelnen Beiträge. R. Kraft

35. Kielan-Jaworowska, Z. & P.P. Gambaryan: Postcranial anatomy and habits of Asian multituberculate mammals. – Fossils and Strata No. 36, 1994. Scandinavian University Press, Oslo. 92 S. ISBN 82-00-37650-8.

Postcranial anatomy of six Late Cretaceous Multituberculate taxa from the Gobi Desert are described. In three of them the skeletons have been preserved more or less complete with the individual bones in articulation, allowing the description of their complete locomotory apparatus. Combined with the reconstruction of muscles and muscle attachment areas in the bones, an analysis of multituberculate locomotion is given. The authors conclude that the Asian taxa of the order Multituberculata were terrestrial runners with a gait that was different from that occuring in modern mammals. Only four characters support the hypothesis that Therians and Multituberculates are sister groups, whereas 18 characters distinguish the multituberculate postcranial skeleton from that of all other mammals, therefore no closer relationsship of multituberculates and therians are suggested.
R. Kraft

Buchbesprechungen

36. Ridgway, S. H. & R. J. Harrison (Hrsg.): Handbook of Marine Mammals. Vol. 5: The first Book of Dolphins. - Academic Press, London & San Diego, 1994. 416 S. ISBN 0-12-588505-9.

This handbook series was commissioned as a comprehensive account of all marine mammal species. The previous four volumes covered pinnipeds, sea otters, sea cows, baleen whales, river dolphins and greater toothed whales, while this fifth volume covers 20 species of the Delpinidae. The remaining species of the dolphin family will be included in the 6th volume, which should follow shortly. The books of this series are intended as field guides that present descriptions of identifying characters, but in addition to this they also provide useful basic information on the biology of marine mammals in their natural environment, including parasites, diseases and human effects such as fisheries and oceanic pollution. Each chapter is written by an international expert on the particular species. Therefore many subtle observations that might be overlooked by an ordinary reviewer are reported. The book contains a wealth of authoritative information. It is illustrated with skull photos, pictures of external charcteristics (unfortunately only in black and white) and life photos; even if colour plates would have been useful, these illustrations are informative and serve well to identify live animals as well as stranded carcasses. R. Kraft

37. Haberl, W.: The Shrew Bibliography, CD-ROM Version, 1995. ISBN 3-9500483-0-8. Apple MacIntosh / MS-DOS / Windows kompatibel.

Die Erforschung der Spitzmäuse (Mammalia: Insectivora: Soricidae) hat während der letzten zehn Jahre einen immensen Aufschwung erfahren, wobei sich der Autor selbst intensiv mit dieser Gruppe beschäftigt. Die vorliegende CD stellt eine sehr wertvolle und umfangreiche Datenbank der relevanten Literatur dar. Enthalten sind auch Felder wie "abstracts" und "keywords", die eine effiziente Suche nach bestimmten Themen ermöglichen. Zeitschriften und Bücher zu verschiedenen Themen (Ökologie, Verhalten, Anatomie, Histologie, Genetik, Physiologie, Räuber, Parasiten, Paläontologie, Reproduktion, Entwicklung, Ultrastruktur, Zytologie, Medizinische Forschung, Systematik, Taxonomie, Evolution, Fang und Methoden, Zucht im Labor, Zoogeographie, Schutz etc.) als auch nicht publizierte Daten (z.B. Beiträge auf Treffen, Dissertationen, Thesen) wurden berücksichtigt.

Die Datenbank liegt in mehreren Formaten vor. Befindet man sich im Besitz von Microsoft Access, so ist der Zugriff ein Kinderspiel. Ist dies nicht der Fall, erfordert es einige Fachkenntnisse, die Daten für den Anwender nutzbar zu machen. Trotz dieser Schwierigkeiten ist diese Bibliographie eine zu empfehlende Anschaffung für jede größere Zoologische Bibliothek und den Spezialisten. Der relativ hohe Preis ist durch den großen Aufwand des Autors und die niedrige absetzbare Stückzahl durchaus gerechtfertigt. Es ist zu hoffen, daß diese Bibliographie in regelmäßigen Zeitabständen eine Überarbeitung erfahren wird M. Hiermeier

38. Robineau, D., Duguy, R. & M. Klima (Hrsg.): Handbuch der Säugetiere Europas. Band 6: Meeressäuger, Teil I: Wale und Delphine. – Aula-Verlag, Wiesbaden, 1994/95. 2 Teilbände mit zus. 811 S., 154 Abb.

Die von Niethammer & Krapp begründete Handbuchreihe genießt internationale Anerkennung und ist eine unersetzliche Informationsquelle für alle europäischen Säugetierkundler geworden. Der lange erwartete Cetaceen-Band enthält alle zirkumpolar bzw. subarktisch verbreiteten Walarten, sofern sie europäische Küstengewässer aufsuchen. Eingeschlossen sind auch Irrgäste sowie seltene Sichtungen oder Strandungen. Die beiden Bände bilden zusammen den Teilband I des 6. Bandes, nachdem Teilband II mit den Robben bereits 1992 erschienen ist. Teilband IA enthält neben der Einführung die Monodontidae, Phocoenidae und Delphinidae, Teilband IB die übrigen Walfamilien. Jede Art wird monographisch nach folgenden Gesichtspunkten abgehandelt: Diagnose, Karyotyp, Taxonomie, Beschreibung, Verbreitung, Merkmalsvariation, Ökologie und Verhalten. Ähnlich wie im Teilband II mit den Robben wird jedem Artkapitel ein Abschnitt über den menschlichen Einfluß auf Bestandsgrößen sowie Schutzmaßnahmen beigegeben. Um der Sonderstellung der Wale innerhalb der Säugetiere Rechnung zu tragen, wurden die allgemeinen, einführenden Kapitel auf insgesamt 179 Seiten ausgedehnt. Diese Beiträge berichten unter anderem über neueste Forschungsergebnisse zur Abstammung und Klassifizierung der Wale. Zwar wird bei der Gliederung des Bandes die traditionelle Unterteilung in die beiden Unterordnungen Zahnwale und Bartenwale beibehalten, doch werden abweichende Klassifizierungsvorschläge auf der Grundlage molekularbiologischer Methoden diskutiert. Weitere Themen der Einführung sind: Anpassungen an die aquatische Lebensweise, Morphologie, Anatomie, Paläontologie, Verhalten und Verbreitung. Besondere Aufmerksamkeit wird erwartungsgemäß der Bestandsituation der Wale sowie internationalen Schutzbemühungen gewidmet. Bemerkenswert ist auch eine vollständige Liste aller Walparasiten und -epizoen. An der Abfassung der beiden Bände waren insgesamt 25 Autoren, jeweils international anerkannte Spezialisten auf ihrem Fachgebiet, beteiligt. Dank seiner Ausführlichkeit und Aktualität dürfte auch dieser Teilband zum anerkannten Renomee der Reihe beitragen. R. Kraft

39. Starck, D.: Lehrbuch der Speziellen Zoologie. Begründet von A. Kaestner. Bd. II: Wirbeltiere, Teil 5/1-2: Säugetiere. – Gustav Fischer-Verlag, Jena, 1995. Zus. 1241 S., 564 Abb.

Trotz einer Fülle von mammologischen Neuerscheinungen fehlt seit langem ein umfassendes Werk, das Baupläne, systematische Beziehungen und Umfang aller Säugetierordnungen und -familien beschreibt. So greift auch heute noch mancher Säugetierkundler nach der klassischen Säugetierenzyklopädie von Max Weber (letzte Ausgabe 1928), um sich einen schnellen Überblick über eine bestimmte Gruppe oder ein bestimmtes Organsystem zu verschaffen. Die vorliegende Neuerscheinung dürfte einen würdigen und aktuellen Nachfolger dieses Standardwerkes bilden.

Die allgemeine Einleitung, die allein 269 Seiten des ersten Teilbandes umfaßt, beschreibt die morphologischen, anatomischen und physiologischen Merkmale der Säugetiere. Ausführlich wird dabei auch auf den frühen Ontogenesemodus und auf Anpassungen an die Viviparie eingegangen. Im systematischen Teil werden alle rezenten Säugetierordnungen bis hin zu den Gattungen besprochen. Ausgestorbene Formen werden behandelt, soweit sie für das Verständnis rezenter Formen bzw. deren Stammesgeschichte von Bedeutung sind. Wie schon in seiner Abhandlung über die vergleichende Anatomie der Wirbeltiere (Springer-Verlag, 1978-1982) hat der Autor auch im vorliegenden Werk die stammesgeschichtliche und ontogenetische Entwicklung von Organen und Organsystemen in den Vordergrund gestellt. Grundlage der Darstellung bilden die Befunde der Morphologie, Anatomie, und Paläontologie, doch werden auch physiologische, karyologische und Verhaltensmerkmerkmale beschrieben. Bemerkenswert ist auch das überaus umfangreiche, nach Themen bzw. Ordnungen gegliederte Literaturverzeichnis.

Die Leistung des Autors, einen derart profunden und umfassenden Überblick über das gesamte System der Säugetiere zu geben, kann man nicht genug würdigen. Professor Starck hat mit dieser herausragenden Neuerscheinung wieder einmal sein in Fachkreisen weithin bekanntes enzyklopädisches Wissen unter Beweis gestellt. Trotz aller Detailgenauigkeit versteht es der Autor, die phylogenetische Entwicklung und die vielfältigen Anpassungserscheinungen dieser Tierklasse in einer Weise darzustellen, die das Lesen des Textes zu einem reinen Vergnügen macht. Das Buch wird wohl für Jahrzehnte das Standardwerk schlechthin für alle systematisch und morphologisch orientierten Säugetierkundler darstellen. R. Kraft

40. Hausser, J. (Hrsg.): Säugetiere der Schweiz. Verbreitung, Biologie, Ökologie. – Denkschriftenkommission der Schweizerischen Akademie für Naturwissenschaften & Birkhäuser Verlag AG, Basel, 1995 (unveränderter Nachdruck 1996). – 501 S., zahlr. Abb. [Deutsch, französisch & italienisch]

Säugetierfaunistische Daten für die gesamte Schweiz sind in der Literatur relativ dünn gesät und teilweise schon mehrere Jahrzehnte alt. Das vorliegende Buch schließt diese Informationslücke. An seinem Zustandekommen war eine Vielzahl von Personen beteiligt, sei es als Autoren oder als Lieferanten faunistischer oder biologischer Daten. Der Text ist dreisprachig (in drei Spalten nebeneinander) abgefaßt und behandelt Aussehen, Lebensweise, Lebensraum und geographische Verbreitung aller in der Schweiz vorkommenden Säugetierarten. Hier wäre lediglich zu bemängeln, daß außer Zahnformeln keine Merkmale an Schädeln und Zähnen beschrieben werden, die für die Artbestimmung herangezogen werden können. Das Literaturverzeichnis ist relativ umfangreich, doch wird der laufende Text nicht mit Zitaten belegt, lediglich die wichtigsten Literaturquellen werden am Ende eines jeden Artkapitels genannt. Alle Arten werden in ansprechenden und informativen Farbfotos abgebildet.

Neue Wege wurden bei der Erstellung der Rasterverbreitungskarten beschritten: Um möglichst detaillierte Angaben machen zu können, wurde als Rasterlänge 1 km gewählt, woraus sich für die gesamte Schweiz über 40000 Planquadrate ergeben. Zwar haben sich die Autoren bemüht, möglichst viele Nachweisdaten (aus der Literatur, der Jagdstatistik, aus Museumssammlungen, Beobachtungen von Wildhütern und Wildforschern usw.) zusammenzutragen, doch ergeben sich bei einem derart engen Raster erwartungsgemäß zahlreiche Dokumentationslücken, die in der graphischen Darstellung Negativnachweise vortäuschen würden. Daher wurde mit Hilfe einer multivariaten Analyse für jedes einzelne Planquadrat die Eignung als Lebensraum für die behandelten Arten errechnet und als "potentielles Verbreitungsgebiet" – zusätzlich zu den echten Nachweisen – in den Karten eingetragen. Bei diesem Verfahren wurde für jedes Quadrat ein Durchschnittswert von insgesamt 34 ökogeographischen Parametern (z.B. Höhenlage, Exposition, Vegetation, land- oder forstwirtschaftliche Nutzung usw.) errechnet und mit demjenigen von Quadraten verglichen, in denen die betreffende Art nachgewiesen ist. So kann die Wahrscheinlichkeit (in %) angegeben werden, mit der die Arten in den einzelnen Planquadraten anzutreffen sind.

Das Buch vermittelt in ansprechender Aufmachung und zu einem akzeptablen Preis eine Fülle interessanter biologischer Sachverhalte. Darüberhinaus dürfte die schwerpunktmäßige Behandlung der wirklichen und potentiellen Lebensräume wichtiges Grundlagenmaterial für den Natur- und Artenschutz liefern. R. Kraft

Buchbesprechungen

41. Haufellner, A.; Schilfarth, J. & G. Schweiger: Elefanten in Zoo und Circus. Dokumentation Teil 2: Nordamerika. 200 Jahre Elefantenhaltung in Amerika 1796-1996. – European Elefant Group (Hrsg.), München, 1997. 288 S., zahlr. Abb. und Tab.. (Zu beziehen über: A. Haufellner, Frühlingstr. 57, D-85598 Baldham)

Vor rund zweihundert Jahren kam erstmals ein lebender Elefant als Schiffsfracht in den Vereinigten Staaten an und wurde Attraktion einer Wandermenagerie. Mit diesem Import begann die Elefantenhaltung in Nordamerika, deren Geschichte die Autoren im vorliegenden Band rekonstruieren. Der erste Teil widmet sich dem Elefant im Zirkus. In fesselnden Beiträgen beleuchten die Autoren die Entwicklung der Elefantenvorführung von den Anfängen in kleinen Menagerien bis hin zu den ausgefeilten Dressurnummern der großen amerikanischen Zirkusunternehmen. Legendäre und zu ihrer Zeit berühmte Elefantengestalten werden portraitiert – Riesengestalten, Träger überdimensionaler Stoßzähne sowie berüchtigte "man-killer" – sowie die ersten Nachzuchterfolge dargestellt. Die akribisch recherchierten Berichte zeigen, daß Elefantenhaltung und -dressur vor allem im 19. Jahrhundert ein riskantes Unternehmen darstellte, das zahlreiche Opfer – unter den Elefanten ebenso wie unter den Betreuern – forderte.

Die Autoren sind gleichzeitig die Initiatoren der "European Elephant Group", eines unabhängigen Kreises von Elefantenfreunden, der sich seit über 15 Jahren um Verbesserungen bei der Elefantenhaltung in Zoo und Zirkus bemüht. Demzufolge wird auch nicht mit Kritik an manchen grausamen Dressurpraktiken gespart und entwürdigende Dressurnummern angeprangert wie der "Einbein-Stand" oder der Kopfstand.

Der zweite Teil widmet sich der Elefantenhaltung in 26 nordamerikanischen Zoos und Safariparks. Dabei wird deutlich, daß sich die Haltungsbedingungen im Lauf der Jahrzehnte überall verbessert haben. Stallboxen statt Ankettung, artgerecht ausstaffierte Außenanlagen sowie Sand- statt Betonböden sind heute allgemeiner Standard. Anlaß zu Kritik gibt jedoch die Tatsache, daß sich in manchen Zoos aufgrund häufigen Wechsels in der Zusammensetzung der Gruppen kein intakter Sozialverband entwickeln kann. Zu bedauern ist auch, daß viele Haltungsstätten offenbar das Interesse an der Zucht afrikanischer Elefanten verloren haben.

Der "Serviceteil" enthält Detailinformationen in Listenform: Umstände und Daten aller in amerikanischen Haltungen je erfolgten Elefantengeburten; Elefantenbestände in den Zoos zu verschiedenen Jahren seit 1933 sowie den aktuellen (1996) Bestand in amerikanischen und kanadischen Zoos sowie Wild- und Safariparks.

Das Buch ist eine überaus spannende und lehrreiche Lektüre und eine begrüßenswerte Ergänzung des 1. Bandes (erschienen 1993), der die Geschichte der europäischen Elefantenhaltung behandelte. Die Entwicklung der großen amerikanischen Zoos und Zirkusunternehmen und die Schwierigkeiten, ein solch kräftiges und gewaltiges Geschöpf wie den Elefanten zu halten und zu zähmen, sind für sich genommen schon interessante Themen. Darüberhinaus erfährt der Leser aber auch sehr viel Wissenswertes über die Biologie und die Haltungsansprüche dieser faszinierenden Tiere. Bemerkenswert sind auch die zahlreichen, teils historischen Abbildungen von Elefanten wie auch berühmter Pfleger und Betreuer. Dabei konnten die Autoren auf ein eigenes Elefantenarchiv zurückgreifen, das in jahrelanger Arbeit aufgebaut wurde und eine Fülle von authentischem Bild- und Informationsmaterial enthält. R. Kraft

42. Gielis, C.: Pterophoridae. – In: Huemer, P., Karsholt, O. & L. Lyneborg (eds.): Microlepidoptera of Europe, Vol. 1. – Apollo Books, Stenstrup, 1996. 222 S., 287 Genitalabb., 163 Farbfotos auf 16 Farbtafeln, hardback.

Die Federmotten (Pterophoridae) gehören unter den "Kleinschmetterlingen" im klassischen Sinn sicherlich zu den auffälligsten und in Amateurkreisen beliebtesten Familien. Aus diesem Grunde taten die Herausgeber sicherlich gut daran, dieser Familie den ersten Band einer umfangreichen Buchreihe zu widmen, in deren Rahmen einmal sämtliche Kleinschmetterlings-Familien Europas vollständig bearbeitet werden sollen. Bei einem solch immensen Vorhaben könnte man fast bezweifeln, daß es jemals zur Vollendung gelangen wird, wäre da eben nicht in dem nun erschienenen Buch ein wegweisendes Exempel gelungen, wie auch dem 'Laien' in knapper, präziser Form ein brauchbarer Überblick über eine nicht unerhebliche Artenzahl (133) an die Hand gegeben werden kann.

Sämtliche Arten werden farbig abgebildet, wobei die unterschiedlichen Abbbildungsmaßstäbe und die heterogene Hintergrundfärbung ein wenig stören. Besonders wertvoll sind die 271 detaillierten Zeichnungen der Genitalapparate aller Arten (beide Geschlechter). 21 Farbfotos dokumentieren die Präimaginalstadien einiger Arten. In einem Anhang werden die Verbreitungsareale in einer Tabelle vorgestellt, die leider nicht besonders benutzerfreundlich ist, da die Länderfaunen alphabetisch sortiert und mit Abkürzungen verschlüsselt sind. Das vorgelegte Literaturverzeichnis ist als außergewöhnlich umfangreich einzustufen.

Ein großes Plus dieser Buchreihe liegt im günstigen Preis-Leistungsverhältnis, das vielen Nicht-Mikrolepidopterologen wohl erstmals über die Anschaffung eines geeigneten Arbeitsmittels den Einstieg in die betreffende Gruppe ermöglicht. Angenehm ist auch das handliche Format. Bleibt der nun begonnenen Buchreihe zu wünschen, daß möglichst schnell viele weitere Familien in ähnlicher Qualität bearbeitet werden. A. Hausmann

Buchbesprechungen

43. Bengtsson, B. A.: Scythrididae. – In: Huemer, P., Karsholt, O. & Lyneborg, L. (eds.): Microlepidoptera of Europe, Vol. 2. – Apollo Books, Stenstrup, 1997. 301 S., 418 Genitalabb., 258 Falterabb. auf 14 Farbtafeln, hardback.

Dieser zweite Band in der Buchreihe über die Kleinschmetterlinge Europas führt in ebenbürtiger Weise das mit dem Federmotten-Band so vielversprechend begonnene Werk weiter. Im Vergleich mit dem ersten Band ist der geographische Horizont durch die Mitberücksichtigung Nordafrikas und des europäischen Teiles Rußlands wesentlich erweitert, so daß insgesamt 237 Scythrididen-Arten behandelt werden. Die Zahl von vierzig (!) neubeschriebenen Arten dokumentiert in augenfälliger Weise, wie unerforscht die Westpalaearktische Scythrididen-Fauna bisher noch ist, und unterstreicht gleichzeitig den Wert und die Wichtigkeit einer Zusammenfassung des aktuellen Wissenstandes wie in der vorliegenden Buchreihe. Die vom Autor selbst angefertigten farbigen Zeichnungen der Imagines sind von höchster Qualität und Aussagekraft. A. Hausmann

44. Hannemann, H.-J.: Flachleibmotten (Depressariidae), Kleinschmetterlinge oder Microlepidoptera. – 4. – In: Dahl, F. (Begr.), Schumann, H. (ed.): Die Tierwelt Deutschlands und der angrenzenden Meeresteile nach ihren Merkmalen und nach ihrer Lebensweise, 69. Teil. – Verlag G. Fischer, Stuttgart, 1995. 3 Farb- und 10 Schwarzweißtafeln mit 138 abgebildeten Faltern, 84 Verbreitungstab., über 250 weitere Detail-Abb., paperback.

In der Reihe über die "Tierwelt Deutschlands" erschien nun nach längerer Pause der Band 69 über die Flachleibmotten (Depressariidae). Durch genaue morphologische Beschreibungen und Bestimmungsschlüssel, sowie durch Detailzeichnungen der Genitalapparate beider Geschlechter, Verbreitungskarten und Falterabbildungen (teilweise farbig) erhält der Leser einen lückenlosen und umfassenden Überblick über die 84 Depressariiden-Arten Deutschlands. Auf den Farbtafeln sind die abgebildeten Falter nicht numeriert, daher ergeben sich gewisse Schwierigkeiten bei der Zuordnung. Abgesehen von diesem kleinen Schönheitsfehler ist der vorliegenden Band allen Fachleuten und Liebhabern, die sich speziell mit Kleinschmetterlingen befassen, zum Kauf zu empfehlen, auch wenn der Preis als nicht besonders niedrig zu bezeichnen ist. A. Hausmann

45. Arenberger, E.: Pterophoridae (erster Teil). – In: Amsel, H. G., Gregor, F. & H. Reisser (Hrsg.): Microlepidoptera palaearctica, 9. Band. – Verlag G. Braun, Karlsruhe, 1995. Textband 258 S., 86 Abb.; Tafelband: 26 Farbtafeln mit 166 abgebildeten Faltern, 79 Schwarzweißtafeln, 9 Verbreitungstabellen und 167 Verbreitungskarten, Leinen.

Die in der Reihe "Microlepidoptera Palaearctica" erscheinenden Bücher bedürfen keiner ausführlichen Rezension mehr, da die unangefochtene Qualität der Abbildungen, der außergewöhnliche Umfang der textlichen Darstellung und die Kompetenz der Autoren allgemein bekannt und geschätzt sind. So fügt sich der nun vorliegende erste Teilband der Pterophoriden, welcher 168 palaearktische Arten behandelt, in die lange Reihe verläßlicher Standardwerke ein, ohne auch nur irgendeinen Anlaß zur Kritik zu bieten. Der relativ hohe Preis ist für dieses erstklassige Werk angesichts der nicht zu überbietenden Qualität durchaus gerechtfertigt.
A. Hausmann

46. Common, I. F. B.: Oecophorine Genera of Australia, 1., The *Wingia* Group (Lepidoptera: Oecophoridae). – In: Nielsen, E. S. et al. (eds.): Monographs on Australian Lepidoptera, Vol. 3. – CSIRO Publications, Melbourne, 1994. 390 S., 712 Schwarzweißabb., hardback.

An der Schwelle zum dritten Jahrtausend ist es noch immer geradezu eine Überraschung, wenn eine ausführliche Monographie über tropische Microlepidopteren erscheint. So geschehen im Rahmen der Reihe "Monographs on Australian Lepidoptera", Band 3, über einen Teil der Oecophorinae, nämlich die "*Wingia*"-Gruppe. Die Oecophorinen umfassen allein in Australien schätzungsweise 5000 (!) Arten, von denen hier 770 Arten in 91 Gattungen behandelt werden. Wie bei einer bisher so mangelhaft erforschten Schmetterlingsfamilie nicht anders zu erwarten war, machte die Bearbeitung eine schier unübersehbare Fülle von Neubeschreibungen und taxonomischen Änderungen nötig. Dieses modern konzipierte, verläßliche Arbeitsmittel beim Studium australischer Kleinschmetterlinge besticht durch die detaillierte Beschreibung der Morphologie, die kritische Überprüfung der Nomenklatur, die ungeheure Fülle von Abbildungen (Genitalabbildungen beider Geschlechter, Imagines, auch im Freiland, Äderungen, rasterelektronische Detailaufnahmen u.s.w.) und die aktuellen Daten zu Verbreitung, Biologie und Raupenfutterpflanzen. A. Hausmann

Buchbesprechungen

47. Nielsen, E. S., Edwards, E. D. & T. V. Rangsi: Checklist of the Lepidoptera of Australia. – In: Nielsen, E. S. et al. (eds.): Monographs on Australian Lepidoptera, Vol. 4. – CSIRO Publications, Melbourne, 1996. 529 S., 89 Schwarzweißabb., hardback.

Es mutet dem Europäer fast schon erniedrigend an, daß die erste moderne Lepidopteren-Checkliste eines gesamten Kontinents (wenn auch nur mit einem Vorsprung von einigen Monaten) ausgerechnet aus Australien stammt und nicht aus den historischen "Hochburgen" entomologischer Forschung. Nach immensen Recherchen über 11 Jahre hinweg erschien nun die über 17000 Namen der Artgruppe umfassende Liste. Über 10500 Artnamen werden als gültig betrachtet. Dem systematisch geordneten Hauptteil folgen wertvolle Anmerkungen – meist taxonomischer Art – zu immerhin 800 Arten. Das Literaturverzeichnis umfaßt ca. 1500 Titel. Der über 100 Seiten lange Index sowie die beigelegte CD-ROM (leider nur im ASCII-Format) gewährleisten ein leichtes Auffinden aller Taxa. Der Benutzer des Buches wird die hochwertige Druckqualität (obwohl es sich um eine textorientierte Checkliste handelt) sicherlich als angenehm empfinden. A. Hausmann

48. Goodger, D. T. & A. Watson: The Afrotropical Tiger-Moths. – Apollo Books, Stenstrup, 1995. 65 S., 4 Farbtaf. mit 89 abgebildeten Faltern, 109 Schwarzweißabb. (Genitalapparate), paperback.

Das vorliegende Werk ist eine schöne Kurzstudie über die momentan bekannten 411 afrikanischen Arctiinae (Familie Arctiidae, Bärenspinner). Es handelt sich hierbei um einen erweiterten Artenkatalog, der durch Verbreitungsangaben, generische Diagnosen, farbige Imaginalabbildungen und Schwarweiß-Genitalfotos (nur Männchen) angereichert ist. Die vier wunderschönen Farbtafeln (mit vielen Typenexemplaren) und die manchmal leider etwas unscharfen Genitalabbildungen ermöglichen die Bestimmung einer Vielzahl von Arten. Für 72 Arten werden in einer Übersicht Raupenfutterpflanzen genannt. A. Hausmann

49. Ackery, P. R., Smith, C. R. & R. I. Vane-Wright (eds.): Carcasson's African Butterflies. – CSIRO Publications, Melbourne, 1995. 803 S., 300 Schwarzweißabb. (Falter), hardback.

Ein äußerst umfangreicher Artenkatalog afrikanischer Tagfalter und Dickkopffalter, der ca. 3600 Arten in 300 Gattungen behandelt. Zusammen mit den Synonymen werden insgesamt ca. 14000 Namen systematisch eingeordnet. Dies bedeutet einen Sektor von ca. 20 % der gesamten Tagfalterarten unserer Erde! Es handelt sich hier gleichzeitig um den ersten umfassenden Tagfalterkatalog einer größeren tropischen Region. Da obligatorisch Verbreitungsangaben, und oft auch Raupenfutterpflanzen, Habitat sowie weitere ökologische Informationen vorgestellt werden, ist die Bezeichnung 'Katalog' im Grunde genommen untertrieben. Jeweils eine Art pro Gattung ist in einer Schwarzweiß-Abbildung dargestellt. Den Autoren sei gedankt, daß sie sich 20 Jahre lang die Mühe machten Carcasson's Lebenswerk zur Druckreife zu bringen. Das Literaturverzeichnis umfaßt die stolze Zahl von über 2200 Titeln. Das Buch wird sicherlich auf Jahrzehnte hinaus die unersetzliche Grundlage für jeden darstellen, der sich mit afrikanischen Tagfaltern beschäftigen will. A. Hausmann

50. D'Abrera, B.: Saturniidae Mundi, Part I. – Hill House Publishers & Automeris Press, Melbourne, London, Keltern 1995. 177 S., 77 Farbtaf., hardback.

In der allseits bekannten exzellenten Qualität bildet der Autor diesmal 550 Pfauenspinner-Arten (Saturniidae) der Unterfamilien Arsenurinae, Agliinae, Ceratocampinae und Hemilucinae (partim) ab. Dies entspricht in etwa 40% der weltweit bekannten Arten dieser Familie. Die Konzeption des Buches entspricht derjenigen des vor einigen Jahren erschienenen "Sphingidae Mundi"-Bandes. Wie immer wird eine große Anzahl von Typenexemplaren aus dem British Museum of Natural History dargestellt, das Werk wird dadurch gleichermaßen für den Fachmann wie auch für den Liebhaber zu einem wertvollen Arbeitsmittel. Eine ebenso interessante wie ungewöhnliche Einleitung mit philosophischen Erläuterungen öffnet den Blick auf Fragen bezüglich Herkunft oder Entstehung einer solchen Vielzahl schöner und imposanter Schmetterlingsarten. A. Hausmann

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