SPIXIANA

Zeitschrift für Zoologie

SPIXIANA • Band 27 • Heft 3 • 193-288 • München, 01. November 2004 • ISSN 0341-8391

SPIXIANA

ZEITSCHRIFT FÜR ZOOLOGIE

herausgegeben von der

ZOOLOGISCHEN STAATSSAMMLUNG MÜNCHEN

SPIXIANA bringt Originalarbeiten aus dem Gesamtgebiet der Zoologischen Systematik mit Schwerpunkten in Morphologie, Phylogenie, Tiergeographie und Ökologie. Manuskripte werden in Deutsch, Englisch oder Französisch angenommen. Pro Jahr erscheint ein Band zu drei Heften. Umfangreiche Beiträge können in Supplementbänden herausgegeben werden.

SPIXIANA publishes original papers on Zoological Systematics, with emphasis on Morphology, Phylogeny, Zoogeography and Ecology. Manuscripts will be accepted in German, English or French. A volume of three issues will be published annually. Extensive contributions may be edited in supplement volumes.

Manuskripte, Korrekturen und Besprechungsexemplare sind zu senden an die

Manuscripts, galley proofs, commentaries and review copies of books should be addressed to

Redaktion SPIXIANA
ZOOLOGISCHE STAATSSAMMLUNG MÜNCHEN
Münchhausenstraße 21, D-81247 München
Tel. (089) 8107-0 – Fax (089) 8107-300

This journal is fully refereed by external reviewers.

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Spixiana : Zeitschrift für Zoologie / hrsg. von der Zoologischen Staatssammlung München. – München : Pfeil.
Erscheint jährlich dreimal. - Früher verl. von der Zoologischen Staatssammlung, München. - Aufnahme nach Bd. 16, H. 1 (1993)
ISSN 0341-8391
Bd. 16, H. 1 (1993) -
Verl.-Wechsel-Anzeige

ISSN 0341-8391

Printed in Germany

– Gedruckt auf chlorfrei gebleichtem Papier –

Verlag Dr. Friedrich Pfeil, Wolfratshauser Straße 27, D-81379 München, Germany
Tel. +49-(0)89-74 28 27-0 – Fax +49-(0)89-72 42 772 – E-Mail: info@pfeil-verlag.de – www.pfeil-verlag.de

SPIXIANA	27	3	193–197	München, 01. November 2004	ISSN 0341-8391

Ascidians from Peru

Karen Sanamyan & Dirk Schories

Sanamayan, K. & D. Schories (2004): Ascidians from Peru. – Spixiana **27/3**: 193-197

Among four species of Ascidiacea identified in the material collected by SCUBA divers in Peru, two are cosmopolitan, one is a widely distributed Pacific species, and one, *Aplidium peruvianum*, spec. nov., is described as new. Large colonies of *Aplidium peruvianum* constitute one of the most significant components of the benthic communities of wave exposed sublittoral rocky hard bottoms on the Ballestas Islands, Paracas.

Karen Samayan, Kamchatka Branch of the Pacific Institute of Geography, Partizanskaya 6, Petropavlovsk-Kamchatsky, 683000, Russia;
e-mail: karen@sanamyan.com

Dr. Dirk Schories, University of Rostock, Albert-Einstein-Str. 3, D-18051 Rostock, Germany; e-mail: dirk.schories@gmx.de

Introduction

Ascidians from coastal waters of Peru are virtually unknown. In August 2002 Thetis IBN (Germany) organized an expedition to the Paracas National Reserve of Peru and several specimens of ascidians were collected by SCUBA diving. Two of the newly recorded species, *Ciona intestinalis* (Linnaeus, 1767) and *Diplosoma listerianum* (Milne-Edwards, 1841), are cosmopolitan, one, *Botrylloides perspicuum* Herdman, 1886, is widely distributed in tropical and temperate Pacific waters, and one, *Aplidium peruvianum*, spec. nov, is one of the most common species observed on the open coast of Paracas, especially near Ballestas Islands. This species dominates benthic rocky communities in depths of 5-10 m. It was found frequently along the open coast in areas with strong wave exposure, where it competes for space with balanid barnacles. The species was never found deeper than 10 m; however sampling was restricted to (1) the Ballestas Islands and (2) sheltered bays of the Paracas Penninsula. Unfavorable conditions, especially heavy wave exposure precluded collecting at many locations. This species occurs in two different colours, a white form and a pink or red form. It has large, sometimes up to 1 m^2 characteristic colonies allowing easy recognition of the species in the field and on underwater photographs. All other newly recorded species were found at depths between 1 and 3 m in Laguna Grande, a sheltered lagoon of Paracas Peninsula.

Description of species

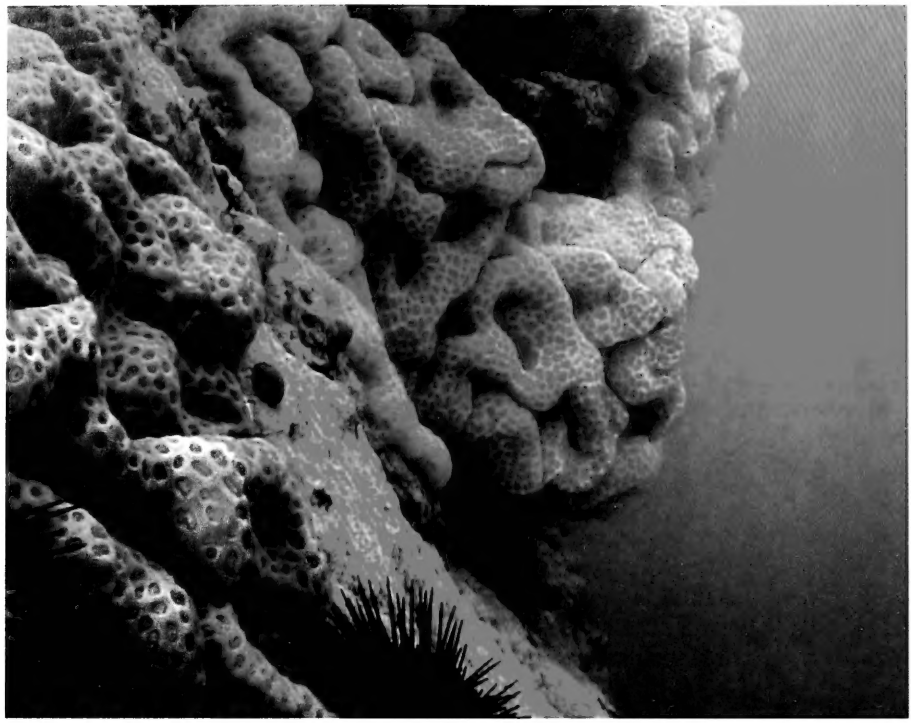
Aplidium peruvianum, spec. nov.

(Figs 1, 5)

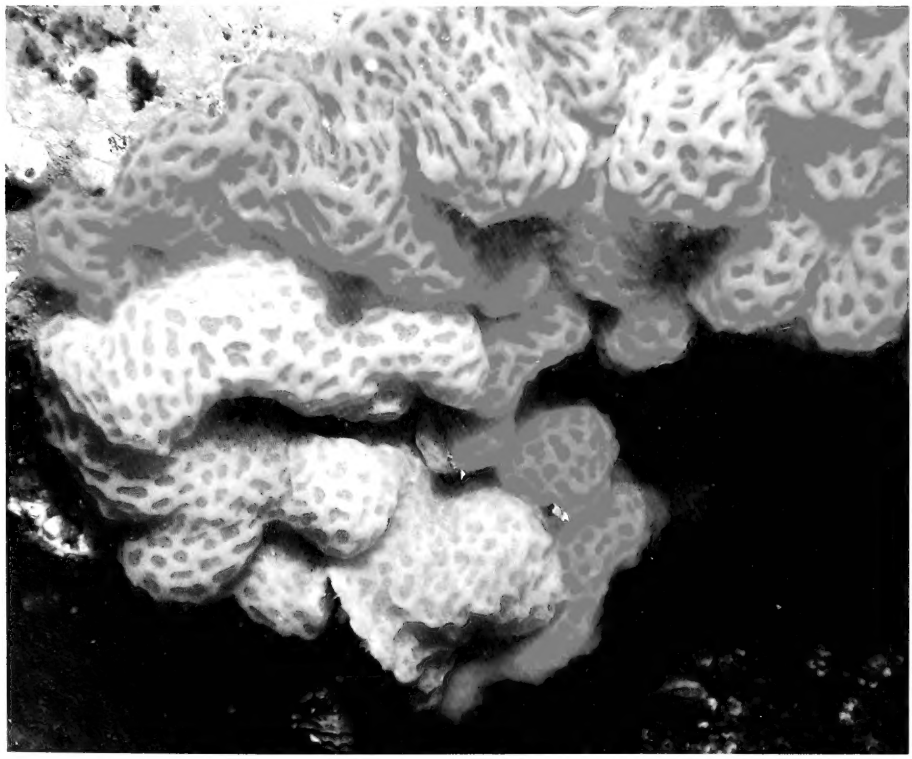
Types. Holotype: KIE 1/1121, 17 August 2002, Peru, Paracas, San Gallán Island. – Paratypes: KIE 2/1122, 17 August 2002, Peru, Paracas, San Gallán Island. Types are in Kamchatka Branch of the Pacific Institute of Geography.

Description

Colonies are robust, large and thick. Examined colonies were about 6 × 4 cm (surface dimensions) and 1 to 2 cm thick, but underwater photographs show much larger specimens. They are attached to rocky substratum by the whole basal surface. Colonies are ridged and folded and have wide but usually low, irregular and fusing lobes. Zooids are in small, mostly circular or oval, systems opening into the base of test depressions that are separated from one another by wide and smooth surface ridges. The depressions are usually relatively deep and clearly visible



1



2

Figs 1, 2. *Aplidium peruvianum,* spec. nov. Colonies (photos by D. Schories).

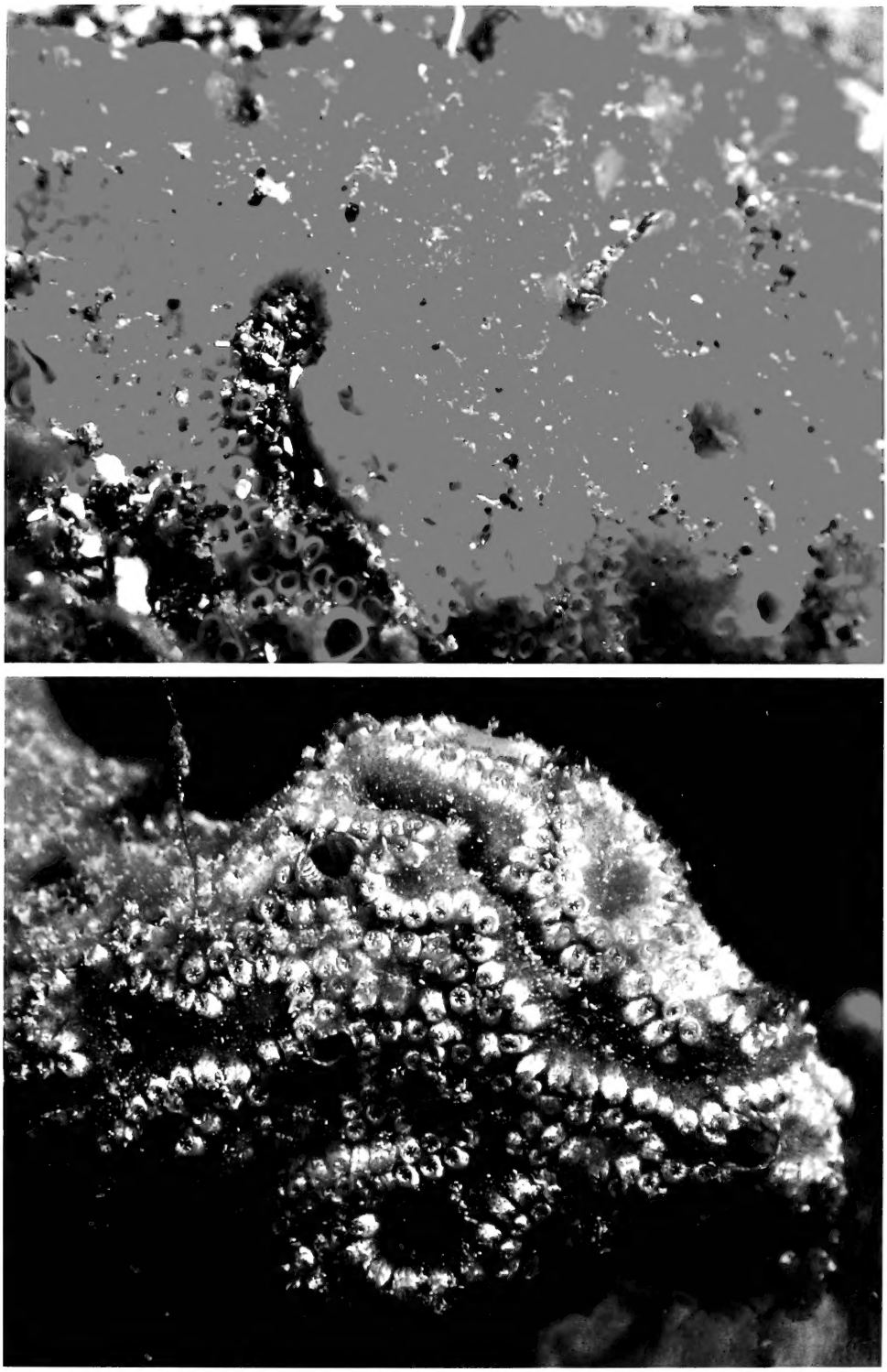


Fig. 3. *Botrylloides perspicuum* Herdman, 1886 (photos by Y. Hooker).

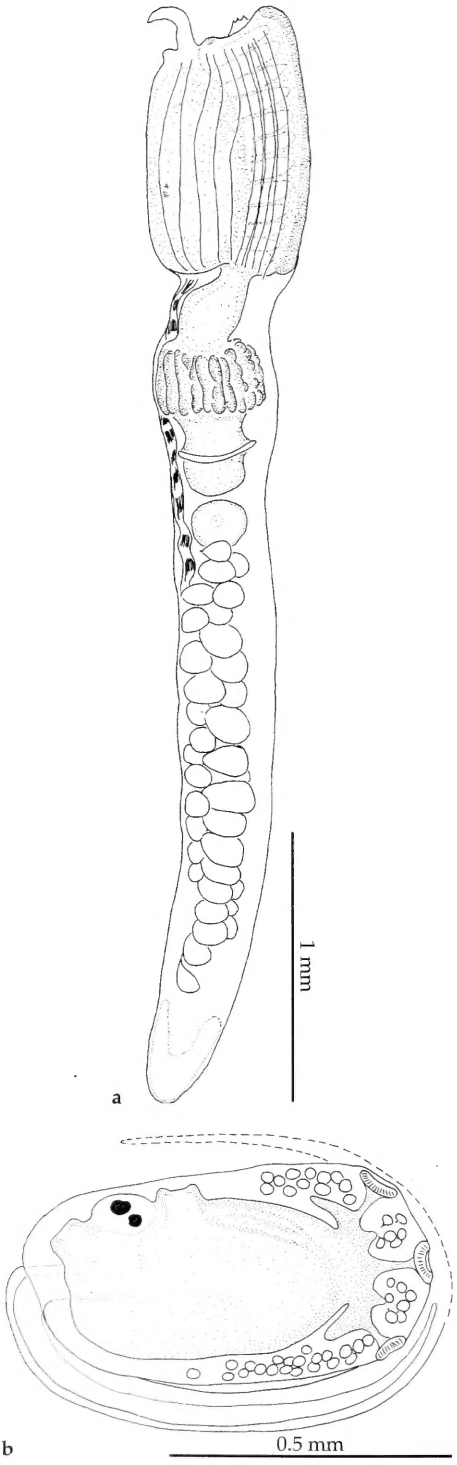


Fig. 5. *Aplidium peruvianum*, spec. nov. (**a**) zooid; (**b**) larva.

to the naked eye on both preserved and living colonies, but occasionally they are poorly developed and a part of the colony surface could be almost level. Each system consists of a single ring of zooids and has one central cloacal orifice, almost sessile or on a short siphon. Sometimes adjacent systems are joined and such joined systems may have two, rarely three cloacal openings.

In preservative the test is firmand opaque white. However photographs of living specimens show two colour varieties, one white and one red; the latter with bright red zooids and pink or sometimes almost white test ridges around them, giving the colony a very characteristic spotted appearance. Both colour varieties occasionally occur in close contact with each other (Fig. 1). Surface and internal test never have either adherent or embedded sand or other foreign matter.

Contracted zooids are from 2.5 to 5 mm long. In rare relaxed zooids the thorax is long and narrow, but in most zooids it is contracted and the same length as the abdomenThorax and abdomen together are 2 mm long. The short branchial siphon has six lobes; the atrial aperture is small, usually on a short siphon, with a short, simple atrial languet arising from its upper margin. About 15-20 relatively thick longitudinal muscles are on each side of the thorax and extend in two bands along each side of the abdomen and the posterior abdomen. Stigmata are in 12 or 13 rows of about 10 per row. A short,wide and symmetrical stomach halfway down the abdomen has 14 or 15 deep, but not very regular and sometimes interrupted longitudinal folds. The ovary is in anterior part of the postabdomen, just behind the gut loop. Large testis follicles, in a double row, occupy nearly whole length of the postabdomen.

A well developed tailed larva and up to three embryos are in the atrial cavity of many zooids. The larval trunk is 0.75 mm long. Three antero-median adhesive organs alternate with single short conical median papillae, each with a with a clusters of epidermal vesicles branching off into the larval test between the apertures. Epidermal vesicles also branch from a dorsal and a ventral epidermal ampulla on the median line respectively dorsal and ventral to the adhesive organs. These epidermal vesicles are not numerous and are relatively large.

Remarks. The characteristic colony of this species allows easy identification both in the field and in underwater photographs. Several colonial ascidian species belonging to different genera and families have similar colonies: *Botryllus closionis* Monniot, 2001, *Eudistoma reginum* Kott, 1990 (see photographs in Monniot and Monniot 1996, Pl. 5C,D), *Lissoclinum*

patella (Gottschaldt, 1898) (see Kott 2001, Pl. 19H) and *Synoicum castellatum* Kott, 1992.

Tropical *Aplidium gelasinum* Kott, 1992, known from single specimen from the Great Barrier Reef appears to have a similar colony and zooids, but has more rows of stigmata (16) and stomach folds (16-18) and the atrial lip sometimes has three points. The larva of this species not known and conspecificity with the present species is unlikely. Among other *Aplidium* species, with a similar colony the western Pacific *A. crateriferum* (Sluiter, 1909) differs in its zooids: they have more rows of stigmata (18-21), only five stomach folds, a different position of the atrial languet and a larger larva. The larva of the present species is reminiscent those of *A. caelestis* Monniot, 1987, *A. distaplium* Kott, 1992, *A. macrolobatum* Kott, 1992, *A. filiforme* Kott, 1992 and other species, all with different colonies and zooids.

Diplosoma listerianum (Milne-Edwards, 1841)

Diplosoma listerianum: Kott 2001: 339 (description and extensive list of synonyms).

Material examined: 20 August 2002, Peru, Paracas, Laguna Grande, 1 colony.

Remarks. The species is truly cosmopolitan, recorded from tropical and temperate waters of Pacific, Atlantic and Indian Oceans and the Mediterranean and North Seas (Kott, 2001: 340).

Ciona intestinalis (Linnaeus, 1767)

Ciona intestinalis: Hoshino & Nishikawa, 1985: 63 (full synonymy).

Material examined: 20 August 2002, Peru, Paracas, Laguna Grande, 1 specimen.

Remarks. This is one of the most widely distributed, almost cosmopolitan ascidian species especially abundant along coasts of northern Europe where it often forms large populations of hundreds and thousands of specimens. It is recorded also in the Mediterranean Sea, Atlantic coasts of North America, parts of the Atlantic and Pacific coasts of South America (where it is not abundant), California, Hawaii, South Africa, Australia, New Zealand, and Japan.

Botrylloides perspicuum Herdman, 1886

Fig. 3

Botrylloides perspicuum Herdman, 1886: 45; Kott 1985: 278 (synonymy), Sanamyan 1999: 1860.
Botryllus perspicuus: Monniot & Monniot, 2001: 313.
Botryllus firmus Monniot & Monniot, 1996: 238.

Material examined: 20 August 2002, Peru, Paracas, Laguna Grande, 3 colonies.

Remarks. The species shows great range of colour variations. Underwater photos of the present specimens show red and bluish colonies. *Botrylloides perspicuum* was previously recorded from the Red Sea, Indonesia, the Philippines, Papua New Guinea and from the waters around Australia, including Tasmania.

Acknowledgements

Our sincere thanks to Yuri Hooker at the Natural History Museum, Univ. Nacional Mayor de San Marcos, Lima, Peru. The expedition has received the generous technical support of the National Institute of Natural Resources (INRENA, Lima, Peru), the Marine Institute of Peru (IMARPE), the National Antarctic Institute of Peru (INANPE) and the National Council of Science and Technology (CONCYTEC), Peru.

References

Herdman, W. A. 1886. Report on the Tunicata collected during the voyage of H.M.S. Challenger during the years 1873-1876, part 2, Ascidiae compositae. – Report of the scientific results of the voyage of H.M.S. Challenger during the years 1873-76 **14**(38): 1-399

Hoshino, Z. & T. Nishikawa 1985. Taxonomic studies of *Ciona intestinalis* (L.) and its allies. – Publ. Seto Mar. Biol. Lab. **30**: 61-79

Kott, P. 1985. The Australian Ascidiacea part 1, Phlebobranchia and Stolidobranchia. – Mem. Queensland Mus. **23**: 1-440

-- 2001. The Australian Ascidiacea Part 4, Aplousobranchia (3), Didemnidae. – Mem. Queensland Mus. **47**(1), 1-407

Monniot, F. & C. Monniot 1996. New collections of ascidians from the Western Pacific and Southeastern Asia. – Micronesica **29**(2): 133-279

-- & -- 1996. Ascidians from the tropical western Pacific. – Zoosystema **23**(2): 201-383

Sanamyan, K & N. Sanamyan, 1999. Some benthic Tunicata from the southern Indo-Pacific Ocean. – J. Nat. Hist. **33**: 1835-1876

68. Morón, M. A. (ed.): Atlas de los escarabajos de México. Coleoptera: Lamellicornia. Vol. II. Familias Scarabaeidae, Trogidae, Passalidae y Lucanidae. – argania edtitio, Barcelona, 2003. 227 S., zahlr. SW-Abb., 12 Farbtaf. ISBN 84-931847-5-6.

Dieses opulent aufgemachte und ausgestattete Buch ist mehr als ein Atlas, es ist eigentlich eine Monographie eines Teiles der mexikanischen Blatthornkäfer im weiteren Sinn, da es auch die Passalidae (Zuckerkäfer) und Lucanidae (Hirschkäfer) einschließt. Es ist der zweite Teil der Bearbeitung dieser großen Käfergruppe für Mexiko, und wie im ersten Teil waren mehrere Autoren beteiligt, allesamt die führenden Spezialisten für diese Käfergruppe in der Neotropischen Region.

Auf eine kurze Einführung folgt sogleich die Behandlung der Gattungen und Arten, die jeweils in einer kurzen Diagnose vorgestellt sind. Die Verbreitung der Arten in Mexiko wird diskutiert und ist in Punktkarten dargestellt. Ein recht ausführliches Literaturverzeichnis, sowie ein Artenindex und ein Schlagwortindex beschließen das Buch.

Zwei negative und zwei positive Seiten dieses Bandes mögen hervorgehoben werden, wobei eines der Negativa nur den deutschen Leser stören wird: Das Buch ist – wie es sich eigentlich für einen Atlas der mexikanischen Fauna gehört – auf Spanisch geschrieben und das wird dem deutschen Benutzer zunächst einige Schwierigkeiten bereiten. Man kann sich aber daran gewöhnen! Wichtiger ist jedoch, daß auf Bestimmungsschlüssel verzichtet wurde. Sicher hätte dies den Umfang beträchtlich vergrößert und es lag vielleicht auch nicht im Sinn der Autoren, es ist aber trotzdem ein Mangel, den auch die Positiva dieses Buches nicht ganz beheben können. Diese sind die außerordentlich guten Schwarzweißabbildungen vieler Arten und morphologischer Merkmale im Text und die auf insgesamt zwölf Tafeln versammelten ungewöhnlich gelungenen Farbfotos von etwa 85 weiteren Arten. Das macht diesen Band – neben seinen anderen Qualitäten – dann doch noch zu einer Art Bestimmungsbuch, das demjenigen eine große Hilfe ist, der sich mit mexikanischen Tieren aus den behandelten, bei Sammlern sehr beliebten Käfergruppen beschäftigt. Die hohe Qualität dieses Atlas rechtfertigt daher auch den nicht gerade niedrigen Preis dieses sehr schönen Bandes.

M. Baehr

69. Vasquez, X. A.: European Fauna of Oedemeridae (Coleoptera). – argania editio, Barcelona. 2002, 179 pp., numerous figures., 27 colour plates. ISBN 84-931847-4-8

This is a very valuable monograph about one of the smaller European beetle families, members of which, however, are very common visitors of various flowers. The approximate 80 species and a number of additional subspecies do not seem to put difficulties to the determinator, but, due to many synonymies, species of the larger genera up to date they are not easily identified. Therefore, a comprehensive monograph like the present one is very useful, the more as this book is distinguished through its logical structure and easy use. The good keys to genera and species facilitate identification very much, all species are shortly characterized and described, their range in Europe is figured in maps, their habitat preference is pictured with a symbol, and their period of activity is shown in a plain diagram. A bibliography of almost 200 items, an extensive list of synonymies, a taxonomic index, and plain figures of various morphological characters are added. On 27 colour plates all European species are figured. Although some photographs are rather faint and others have a touch of blue, they are nevertheless highly informative and much facilitate recognition of species. Hence, this monograph is very useful and should belong in the library of all collectors of beetles, in particular of those who work on flower visiting and wood inhabiting species, and also of those who do faunistic-environmental research. M. Baehr

70. Williams, D. M. & P. L. Forey (Eds.): Milestones in Systematics. The Systematic Association Special Volume Series 67. – CRC Press, Boca Raton, London, New York, Washington, D.C., 2004. 290 pp. ISBN 0-415-28032-X.

"Nothing in Biology makes sense without the assumption of evolutionary history" – this is also true for systematics as a discipline. To understand the past is a necessary prerequisite to make sense of the future. The various authors of "Milestones in Systematics" present their historical analyses as reviews of the major issues in systematics theory and practice of the 20th century. The editors are to be congratulated to bring together theoretical systematists with historians.

The major goal of this book: it highlights the historical development of phylogenetic methodology (in its broadest sense including e.g., phenetics or numerical taxonomy) and the associated computer algorithms and software packages. In addition, also the changing influence and significance of the fossil record and palaeontological techniques are outlined. Finally, the impact of molecular data and the varying relationships between systematics, development (evo-devo), and evolutionary biology throughout the times are critically reviewed and commented.

This is a book by experts for experts and provides a platform for further debate and discussion. I found the chapter by Wolfgang Wägele on Hennigs methodology (compared with pattern cladistics) of particular interest and of high importance for current discussions in Germany or better mid-Europe. The negative point: the printing quality does not fulfil the expectation with regard to the price of the volume. Nevertheless, I recommend the book for libraries and experts in the field – they will find many interesting historical facts and issues to be considered in theoretical systematics. G. Haszprunar

SPIXIANA	27	3	199–204	München, 01. November 2004	ISSN 0341-8391

Description of the male and illustration of the female receptacula of *Yamia watasei* Kishida, 1920

(Arachnida, Araneae, Theraphosidae, Selenocosmiinae)

Joachim Haupt & Günter Schmidt

Haupt, J. & G. Schmidt (2004): Description of the male and illustration of the female receptacula of *Yamia watasei* Kishida, 1920 (Arachnida, Araneae, Theraphosidae, Selenocosmiinae). – Spixiana **27/3:** 199-204

Two males and two females of *Yamia watasei* Kishida, 1920 were collected on the island of Lanyu (Taiwan). The male (neotype) is described for the first time and the female receptacula are depicted. After comparison with similar species of the region which lack a tibial spur, the genus *Yamia* is newly defined and its relation is discussed. *Neochilobrachys mutus* and *Baccallbrapo bundokalbo* belong to the genus *Yamia*, as well. As far as no adult males are known, the systematic position of *Phlogiellus baeri* and *Phlogiellus insularis* remains unclear.

Dr. Joachim Haupt, Technische Universität Berlin, Institut für Ökologie, FR 1-1, Franklinstr. 28/29, D-10587 Berlin

Dr. Günter Schmidt, Von-Kleist-Weg 4, D-21407 Deutsch Evern

Introduction

The description of a female of *Yamia watasei* by Kishida (1920) was overlooked by Roewer (1942). Brignoli (1983) listed the species, but Raven (1985) referring to Bonnet (1959) and followed by Huber et al. (1996) considered it being a nomen nudum, although Kishidas description exists and it also allowed to find the species at the locus typicus. In the opinion of Song et al. (1999) *Yamia watasei* is a species inquirenda. According to Platnick (2003) it is a nomen dubium. Apparently, in Taiwan itself never any doubt occured about *Yamia watasei* as it appears in all faunal lists (Chen 1996, Kayashima 1943, Li 1964, Zhu & Okuma 1975).

One of the authors (J.H.) raised two males of this species from juveniles collected at the locus typicus in Lanyu, Taiwan in 2000. Because the female type of this species deposited in the Museum of the Zoological Institute, College of Science, Imperial University of Tokyo, was destroyed during the second world war, the designation of a neotype and a description of the species under contemporary taxonomic aspects was necessary.

Generally, the smaller and unconspicuous Theraphosids are fairly unknown. The reason may be rather simple, in the face of impressive large theraphosid spiders nobody pays much interest to the small ones. In this situation, we hope to add some clarification instead of increasing the mess and we suggest that different from the past practice, no single female in this group should be described as a new species without having the appropriate male, as well.

Material and methods

Investigations were carried out with a Wild M3 stereoscopic microscope equipped with a drawing prism and a magnification lens (Novoflex) allowing magnifications up to 80×. Besides two males and two females of *Yamia watasei* collected in Lanyu (portugese name Botel Tobago, japanese name Kōtōsho) (Taiwan) the following type material was studied for comparison: *Phlogiellus baeri* (Simon, 1877) (adult female during moulting) and *Phlogiellus insularis* (Simon, 1877) (juvenile male?, juvenile), *Neochilobrachys mutus* Giltay, 1835 (adult female, subadult female) and *Chilobrachys samarae* Giltay, 1935, as

well as *Ischnocolus inermis* Ausserer, 1871.

Receptacula, tarsal claws of leg I and IV, the eye tubercle, the palpal organ, spines on the metatarsus as well as scopulae of tarsi and metatarsi were studied.

Reference specimens are deposited in the collections of Zoologische Staatssammlung München (ZSM) (1♂, neotype), 1♀ paratype) and in the Museum of Natural History in Taichung (Taiwan) (NHTG) (1♂ paratype, 1♀ paratype).

Diagnosis of the genus *Yamia*

Small theraphosid spider lacking stridulation bristles. A tibial spur is absent. A third claw present at tarsus IV. Denticles (cuspules) present on 'labium' and ventral side of pedipalpal basipods. The eye tubercle is situated close to the anterior margin of the prosomal shield ('carapace') which means that a 'clypeus' is only narrow or even absent. Anterior eyes in almost straight row or slightly procurved. The palpal organ, although bulbous in its middle part, is characterized by a distinct keel running from the bulb along the embolus.

Yamia watasei Kishida, 1920 (Japanese name: Watasegumo)

Figs 1-7

Yamia watasei: Kayashima (1943).
Yamia watasei: Li (1964).
Yamia watasei: Zhu & Okuma (1975).
Yamia watasei: Chen (1996).

Types. Neotype: ♂, Yongchin farm, Yeyin village, Lanyu island, Taiwan, 2000-VIII-07, J. Haupt leg. (ZSM).

Additional material from neotype locality: 1♀ (ZSM), 1♂, 1♀ (MNHT), Yongchin farm, Yeyin village, Lanyu island, Taiwan, 2000-VIII-07, J. Haupt leg.

Diagnosis. Male with twisted keel along embolus, undivided scopulae on metatarsi and tarsi of legs I-III, scopulae on metatarsi and tarsi of leg IV divided by numerous long bristles. Female with divided scopulae on all legs. Tarsal trichobothrial shafts partly bulbous, while trichobothrial shafts on metatarsus and tibia are long and thin. Receptacula broad at base with simple rounding apically.

Description

Male neotype. Measurements. Total length 12.7 mm, dorsal prosomal shield 6.5×5.2 mm. Length (mm) of palpal and leg articles:

	femur	patella	tibia	meta-tarsus	tarsus	total
palp	3.3	1.7	2.6	–	1.3	9.0
leg I	5.2	3.1	4.2	3.6	2.9	19.0
leg II	4.8	2.7	3.5	3.3	2.6	17.0
leg III	3.9	2.3	2.5	3.5	2.3	14.5
leg IV	5.5	2.6	4.6	4.9	2.6	20.2

Eye tubercle (Fig. 1) 0.53×0.61 mm. Diameters of the eyes and their separation (mm): AME 0.25, AME-AME 0.14, ALE 0.33, AME-ALE 0.05, PME 0.22, PME-PME 0.53, AME-PME 0.11, PLE 0.28, PME-PLE 0.04, ALE-PLE 0.11.

Colour. Totally greyish brown, except for dark pigment around eyes.

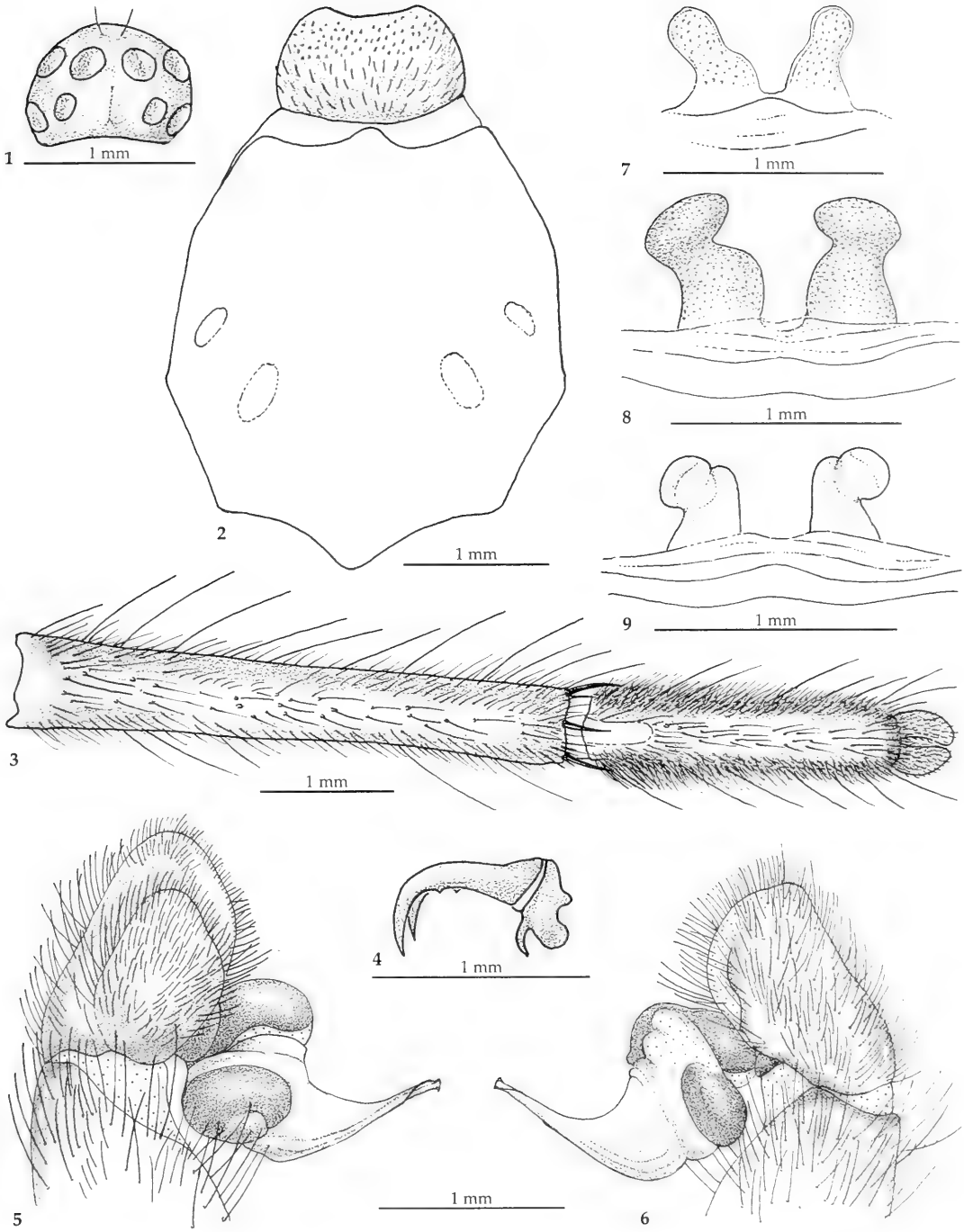
Dorsal prosomal shield ('carapace'). Cephalic area higher than thoracic area, fovea almost straight, slightly procurved, distinct space between eye tubercle and anterior margin of dorsal prosomal shield, first row of eyes almost straight, second row slightly recurved. Ventral prosomal plate ('sternum') (Fig. 2), widest between basipods II and III, sparsely clothed with short hairs. Two pairs of sigilla, the first pair opposite basipods II, marginal, the second pair opposite basipods III, more remote from the margin than its lower diameter. 'Labium' wider than long, numerous denticles (cuspules) occupying more than apical third of it, denticles also on the medioventral side of the pedipalpal basipods ('maxillae'). Chelicerae, as well as prolateral side of pedipalpal basipods lacking stridulatory organ. Promargin of chelicerae with 9 teeth.

Legs. Formula IV, I, II, III. Tarsal trichobothrial shafts partly bulbiform, those of metatarsi and tibiae all setiform. No tibial spur present. Scopulae: All tarsi and metatarsi fully scopulated, scopulae of metatarsi and tarsi of leg IV divided by long bristles (Fig. 3). Tarsi of all legs with two claws, these with 0-2 median teeth, third claw on tarsus IV rather small (Fig. 4). Spination: Metatarsus III with two dorsolateral subterminal spines, metatarsus IV with one retrolateral, subterminal spine.

Palpal organ. Bulb almost globular, without distinct hook, embolus curved, with distinct longitudinal keel twisted around the embolus (Figs 5, 6).

Opisthosoma 6.1 mm long, 3.6 mm wide. Posterior spinnerets: proximal article 1.05, middle article 0.7, distal article 1.4, total length 3.15. Colour greyish brown.

Female from neotype locality. Same as male, receptacula (Fig. 7) one pair, bulbous, basally thickened. Scopulae on ventral side of pedipalpal tarsi, tarsi and metatarsi of legs I-IV all divided by rows of long setae.



Figs 1-7. *Yamia watasei*. **1.** Eye tubercle of male neotype. **2.** 'Labium' and ventral prosomal plate ('sternum'). **3.** Left fourth leg, ventral view with divided scopulae on tarsus and metatarsus. **4.** Claws of 4th leg. **5-6.** Left palpal organ in prolateral (**5**) and retrolateral (**6**) view. Note the divided tarsus and the twisted keel around the embolus. **7.** Receptacula in dorsal aspect.
Fig. 8. Receptacula of *Yamia muta*.
Fig. 9. Receptacula of *Phlogiellus baeri*.

Distinction to *Yamia muta* by shape of the receptacula (Figs 7, 8). Anterior eyes of this species slightly procurved, posterior eyes almost straight, fovea slightly procurved, numerous denticles (cuspules) on 'labium' and pedipalpal basipods present, posterior pair of sigilla remote from margin, basal article of chelicerae with 10/9 teeth, respectively, stridulation organ lacking, tarsal scopulae I-II not divided, tarsal scopulae III divided by two rows of bristles, metatarsus lacking scopula, scopulae of tarsus and metatarsus IV divided by several rows of setae. Unfortunately, the male of this species is still unknown.

Distinction to *Yamia bundokalbo* by shape of palpal organ, which has a large keel on the bulb and by the shape of the receptacula which are not thickened basally (Barrion & Litsinger 1995: fig. 5q).

Natural history. *Yamia watasei* is locally rather abundant, apparently living stenoecous in shadowy forests which are close to natural conditions. It prefers to build the entrance to its subterraneous system of silk tubes under stones, apparently in order to avoid direct access of rain water. The soil must be moist. Prey consists mostly of insects seeking shelter under stones. After catching such prey which touched the silken mouth of a tube's entrance, the spider returns back into the tube system.

Discussion

When Kishida (1920) described *Yamia watasei*, he had considerable difficulties where to place it, and finally he created a new tribus Yamieae which would be a subfamily Yamiinae today. The reason for such taxonomic difficulties still exists, because the way of classifying is still the same (Simon 1892, Gravely 1915). The subfamilies Ischnocolinae and Selenocosmiinae are distinguished by characters like keeled embolus not present in Ischnocolinae (exception: *Plesiophrictus* according to Smith 1990) and the position of sigilla (more distant from the margin of the 'sternum' in Selenocosmiinae). A conspicuous character is the presence of a stridulatory organ, the existence of which in Theraphosids was first described by Pocock (1895). It divides several subfamilies, like the Selenocosmiinae, Theraphosinae, Harpactirinae, Aviculariinae.

Certain characters do not seem to be very useful for classification: Simon (1892, followed by Raven 1985) used the division of tarsal and metatarsal scopulae to distinguish different genera. Males and females of the same species could end up in different groups because their scopulae show considerable differences (Barrion & Litsinger 1995 and present species). Pocock (1897) already stated that 'the classification of the Theraphosidae according to the division of scopulae is purely artificial and valueless', even though Smith (1990) again used this character as one of several to distinguish different genera.

Thus we are left with the morphology of sexual organs. In many cases the palpal organ may offer more characters than the theraphosid receptacula, but not in all cases the male has been described. As a distinguishing character between Ischnocolinae and Selenocosmiinae we preliminarily propose the more or less deep division of the male pedipalpal tarsus, and the absence or presence of a keel on the palpal organ.

In this place we do not want to enter a wider discussion, because only newly collected material of both sexes and possibly the help of molecular biology may elucidate problems of classification and cladistics in this group of spiders.

In the classical way the genus *Yamia* has to be placed in the Selenocosmiinae without stridulation organs, a group distinguished by Gravely (1915) and Schmidt (1999). When Giltay (1935) described his new species *Neochilobrachys mutus*, he stated that '... se distingue des autres espèces du genre *Neochilobrachys* par la réduction extrème de l'organe stridulatoire.' But when studying the type material, it becomes obvious that the so-called stridulation organ which Giltay stated to be 'réduit à 1 seul bâtonnet', consists of nothing but one normal, relatively small seta which although a little bit longer than the few setae in the neighbourhood lacks all special differentiations of setae from a stridulatory organ. This means *Neochilobrachys mutus* lacks a stridulatory organ and was certainly misplaced in this genus. Herewith we transfer this species to the genus *Yamia*. The genus *Braccallbrapo* established on the occasion of the description of *B. bundokalbo* readily fits to *Yamia*. Therefore it is considered a junior synonym of this genus. It had been considered being a synonym of *Phlogiellus* by Raven (2000).

The types of *Phlogiellus baeri* and *Phlogiellus insularis* were considered to belong to this genus by Simon (1897, p. 955) within the Selenocosmiinae. Characters of both species are summarized here:

Phlogiellus baeri: Eye tubercle close to anterior margin of dorsal prosomal plate, anterior eyes procurved, posterior eyes recurved, ALE very large, fovea deep, slightly procurved, numerous denticles (cuspules) on the 'labium' and the pedipalpal basipods, receptacula bipartite (Fig. 9), posterior pair of sigillae remote from margin, basal articles of both chelicerae with 10 teeth, no stridulatory organ, tarsal and metatarsal scopulae I divided by small setae, II: tarsal scopulae divided by several rows of setae, metarsal scopulae divided by a few irregular, small

setae, III and IV: tarsal scopulae divided by several rows of setae, in metatarsi setae irregular, posterior article of lateral spinnerets rather long.

Phlogiellus insularis: Eye tubercle close to anterior margin of dorsal prosomal plate, anterior eyes weekly procurved, AME very large, almost touching each other, posterior eyes recurved, fovea distinctly procurved, numerous denticles (cuspules) on 'labium' and pedipalpal basipods, posterior pair of sigillae remote from margin, basal articles of chelicerae (both sides) with 9 teeth, stridulatory organ lacking, tarsal scopulae I undivided, II divided by 2 rows of setae and several additional setae, III and IV divided by several rows of setae, metatarsal scopulae IV only divided in distal part. No receptacula were found in the big specimen, the small one ('male') is a rather young juvenile. Although both species belong to the Selenocosmiinae, we consider them as incertae sedis, as the males are unknown.

Phlogiellus inermis could not be studied in detail: the left palpal organ may have been lost when the specimen was still alive, as the pedipalpal basipod is distally dark brown, while the right palpal organ had been cut off, lateron. Unfortunately it was lacking. But the palpal organ of this species is illustrated by Simon (1903, p. 953).

Zoogeographic considerations

The island of Lanyu is of volcanic origin dating back to Miocene-Pliocene volcanism (Pelletier & Stephan 1986) and it forms part of a volcanic arc which also includes the Batan Islands. Therefore, all species living there must have reached the island since that time or they were introduced by man. Some species are not likely to travel over the sea, although the prevailing sea current is in northern direction. While the whipscorpion *Typopeltis crucifer* e.g. occurs in Taiwan itself and in Lanyu (Haupt & Song 1996, Haupt 1997), *Yamia watasei* is limited to Lanyu and has never been found in Taiwan itself.

Since the early thirties of last century it is known that the indigenous Yami population obviously moved north to Lanyu, and there are still close linguistic connections to the Batan Islands in the northern Philippines (Utsurikawa 1931, West 1995). Therefore, it seems likely that *Yamia watasei* has been introduced to Lanyu from the Philippines by Yami people together with roots to be planted. Many biotopes in Lanyu have undergone considerable change during the past 60 years, therefore, it is unlikely to find out whether *Yamia watasei* has ever been more wide spread in this island.

Acknowledgements

We are most grateful to Christine Rollard (Museum National d'Histoire Naturelle, Paris), Leon Baert (Naturwetenschappen, Brüssel) and Jürgen Gruber (Naturhistorisches Museum Wien) for providing type material of Selenocosmiinae and Ischnocolinae, to S. Huber and J.-P. Rudloff for valuable discussions and to I-Min Tso and K. Miyazaki for providing literature not available in Europe. We also thank W. Roloff for carrying out the illustrations.

References

Barrion, A. T. & J. A. Litsinger 1995. Riceland spiders of south and southeast Asia, pp. 1-700. – CAB International, Wallingford

Bonnet, P. 1955-1959. Bibliographia araneorum. vol. **2**: 1-5058. – Douladoure, Toulouse

Brignoli, P. 1983. A catalogue of the araneae described between 1940 and 1981. pp. 1-755. – Manchester University Press, Manchester, New Hampshire

Chen, S. H. 1996. A checklist of spiders in Taiwan (chinese). – Ann. Taiwan Mus. **39**: 123-156

Giltay, L. 1935. Liste des arachnides d'extrème orient et des Indes orientales. – Bull. Mus. roy. Hist. Nat. Belg. **11**(20): 1-15

Gravely, F. H. 1915. Notes on Indian mygalomorph spiders. – Rec. Indian Mus. Calcutta **11**: 257-287

Haupt, J. 1997. A self-made taxonomic character in whip scorpions (Arachnida, Uropygi: Thelyphonida). – Proc. 16th Europ. Coll. Arachnol. 107-111

– – & D. Song 1996. Revision of East Asian whip scorpions (Arachnida Uropygi Thelyphonida). I. China and Japan. – Arthropoda Selecta **5**: 43-52

Huber, S., R. Samm & G. Schmidt 1996. Theraphosidae der Welt. – Arachnol. Mag. **42**: 1-64

Kayashima, I. 1943. Spiders of Taiwan (japanese). 70 p. – Totoshoseki kabushiki kaisha, Tokyo

Kishida, K. 1920. Notes on *Yamia watasei*, a new spider of the family Avicularíidae. – Zool. Mag. **32**: 299-307

Li, C. L. 1964. Spiders of Taiwan (chinese). 113 p. – Tachiang Publ., Taipei

Pelletier, B. & J. F. Stephan1986. Middle Miocene obduction and late Miocene beginning of collision registered in the Hengchun Peninsula: Geodynamic implication for the evolution of Taiwan. – Mem. Geol. Soc. China **7**: 301-324

Platnick, N. I. 2003. The world spider catalog, pp. 1-673. – Amer. Mus. Nat. Hist., New York

Pocock, R. I. 1895. Musical boxes in spiders. – Nat. Hist. **6**: 44-50

– – 1897. Spinnen (Araneae). – Abh. Senck. Naturf. Ges. **23**: 591-629

Raven, R. 1985. The spider infraorder Mygalomorphae (Araenae): cladistics and systematics. – Bull. Amer. Mus. Nat. Hist. **182**: 1-160

– – 2000. Taxonomica araneae I: Barychelidae, Theraphosidae, Nemesiidae and Dipluridae (Araneae). – Mem. Queensland Mus. **45**: 569-575

Roewer, C. F. 1942. Katalog der Araneae von 1758 bis 1940, pp. 1-1040. – Natura, Bremen
Schmidt, G. E. W. 1999. Selenocosmiinae ohne Stridulationsorgane. – Arachnida-Post **7**(34): 94-96
Smith, A. M. 1990. Baboon spiders. Tarantulas of Africa and the Middle East, 142 pp. – Fitzgerald, London
Simon, E. 1877. Arachnides recueillis aux îles Philippines par MM. G.-A. Baer et Laglaise. – Ann. Soc. Ent. France (5)**7**: 91-92
– – 1892-1903. Histoire naturelle des araignées I-IV, 1084 pp. – Librairie Encyclopédique de Roret: Paris
Song, D., M. Zhu & J. Chen 1999. The spiders of China, pp. 1-640. – Hebei Science and Technology Publishing House, Shijiazhuang
Utsurikawa, N. 1931. The natives of Botel Tobago and their relationship with those of the Batan Archipelago – tradition and fact. (japanese). – Nanpo Dozoku **1**: 15-37
West, A. 1995. Yami: introduction and word list. in: D. T. Tryon (ed.). Comparative austronesian dictionary: an introduction to Austronesian studies. part **1**(1): 315-320. – Trends in linguistics. Documentation 10. Mouton de Gruyter, Berlin & New York
Zhu, Y. & C. Okuma 1975. Spiders of Taiwan (chinese). – Taiwan State Museum, Nat. sci. ed. **17**: 29-49

SPIXIANA	27	3	205–246	München, 01. November 2004	ISSN 0341-8391

The genus *Lebia* Latreille in the Australian-Papuan Region

(Insecta, Coleoptera, Carabidae, Lebiinae)

Martin Baehr

Baehr, M. (2004). The genus *Lebia* Latreille in the Australian-Papuan Region (Insecta, Coleoptera, Carabidae, Lebiinae). – Spixiana **27/3:** 205-246

Three species of the genus *Lebia* Latreille related to *Lebia karenia* Bates, from New Guinea and Sulawesi; ten species related to *Lebia papuensis* Macleay, from Sulawesi, New Guinea, New Ireland, New Britain, Solomon Islands, and northern Australia; one species related to *L. calycophora* Schmidt-Göbel, from northern Australia; and two peculiar species of uncertain relationships from northeastern Australia, are described as new: *L. darlingtoniana* and *L. fallaciosa*, both from New Guinea, and *L. brisbanensis* from southeastern Queensland; *L. trivittata* and *L. adusta* from Sulawesi, *L. gemina*, *L. subglabra*, and *L. permutata* from New Guinea, *L. inornata* from Salawati Island, *L. laticollis* from North Queensland, *L. atripennis* from New Ireland, *L. novabritannica* from New Britain, *L. salomona* from Bougainville Island; *L. sedlaceki* from northern Australia; and *L. foveipennis* and *L. monteithi* from northern Australia.

The synonymy of *L. papuensis* Macleay, 1876 with *L. papuella* Darlington, 1968, proposed by Moore (Moore et al. 1987) is demonstrated to be incorrect by examination of the types of both species. The synonymy of *L. papuensis* Macleay, 1876 and *L. picipennis* (Maclay, 1871) is likewise incorrect due to differences in the morphology of the male genitalia of both species. Because *L. picipennis* (Macleay, 1871) is a junior homonyme of *L. picipennis* Motschulsky, 1864, the new name *L. australica* is proposed for this species. For *L. australica* a lectotype is designated.

The taxonomic status of *L. insularum* Darlington is fixed based on the examination of the male genitalia. The New Guinean species *L. cordifer* Darlington is firstly recorded from northern Australia and the male genitalia are examined and figured.

The remaining species *L. bicolor* (Sloane) and *L. melanonota* Chaudoir from Australia, and *L. barda* Darlington, *L. endynomena* Darlington, and *L. externa* Darlington, all from New Guinea, are confirmed based on the examination of types. Both Australian species are widespread and very distinctive through their conspicuous colour patterns. The New Guinean *L endynomena* and *L. externa* are easily identified by the angulate external angle of their elytra. Hence, these four species are not mentioned further but are included in the key. Only *L. barda* is more difficult to distinguish from related species, therefore, its male genitalia are dissected and figured.

A key for all known Australian and Papuan species of the genus *Lebia* is provided.

Dr. Martin Baehr, Zoologische Staatssammlung, Münchhausenstr. 21, D-81247 München, Germany; e-mail: Martin.Baehr@zsm.mwn.de

Introduction

In the course of determination of samples of ground beetles from New Guinea, New Britain, and New Ireland, collected by Dr. A. Riedel (Karlsruhe), A. Weigel (Pößneck), and during a canopy fogging survey carried out by O. Missa (Institut Royal des Sciences Naturelles, Bruxelles, IRSNB), a variety of species of the carabid genus *Lebia* s. l. Latreille were found of which only few species could be identified using Darlington's (1968) key to the New Guinean species. In the course of identification, additional specimens loaned from Australian National Insect Collection, Canberra (ANIC), B. P. Bishop Museum, Honolulu (BMH), Department of Primary Industries, Mareeba (DPIM), Queensland Museum, Brisbane (QMB), and South Australian Museum, Adelaide (SAMA) were included in the survey.

Although the genus *Lebia* (*sensu lato*) probably is one of the largest genera within Carabidae, in the Papuan-Australian Region it is by far less numerous than in the Oriental Region or in South America. Besides a few very characteristic species, the Papuan Region apparently is inhabited mainly by a group of small, extremely similar species that are difficult to distinguish by external morphological characters. Though even in certain conspicuous species that seemingly are easily identified, it became evident during the present survey that examination of the male genitalia is the best, in some instances even the single way, to distinguish between closely related species.

Material and methods

Altogether, about 300 specimens were available for this study of which almost 200, however, belong to the closely related New Guinean species *L. papuella* Darlington and *L. gemina*, spec. nov. and to the Australian species *L. australica*, nom. nov. Most other species either seem to be much rarer than these, or they were not yet sampled by appropriate methods. Apparently canopy fogging or beating are very successful means for collecting of *Lebia* species which in their most part seem to live on leaves and branches in the canopy of rain forest.

Due to the kindness of Dr. T. Deuve (Paris), Dr. G. A. Samuelson (Honolulu), and Mr. T. A. Weir (Canberra), I was able to compare the types of all *Lebia* species described from Australia and New Guinea except for that of *L. cordifer* Darlington which is a species well characterized by its elytral pattern, and also some types of species from adjacent areas in Southeast Asia. Species of which no additional material was available for this study, or that are sufficiently characterized in the key and are not easily mistaken, are not explicitly mentioned in this paper.

For the taxonomic treatment standard methods were used. The male genitalia were removed from specimens soaked for a night in a jar under wet atmosphere, then cleaned for a short while in hot KOH.

For examination of the generally fine though taxonomically important punctuation and microreticulation of the surface a high quality stereo microscope with up to 64 × magnification was used, supported by a lamp of high intensity giving natural light that could be focussed. For exact definition of the microsculpture such light is preferable, because fibre-glass optics substantially change the impression of the surface structures.

The habitus photographs were obtained by a digital camera using SPOT Advanced for Windows 3.5 and subsequently were worked with Corel Photo Paint 10.

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 the most advanced part of base to the most advanced part of apex. No base/apex ratios of pronotum could be taken, because the anterior angles are evenly rounded in all species. The measurements and ratios are abbreviated in the following manner:

w/l pr	width/length of prothorax
w pr/h	width of prothorax/width of head
l/w el	length/width of elytra
w el/pr	width of elytra/width of prothorax

Characters

Although colour pattern seems very significant in the patterned species, elytral pattern and colouration may vary to some degree, or, on the other hand, may be very similar in related species. Thus, pattern is not always the best way to distinguish species. In those species that lack a distinct pattern, degree and structure of the microsculpture of the surface, in particular on head and pronotum, can be used as differentiating characters. As size and body shape also vary to a considerable degree within species, shape and structure of the male genitalia generally yield the best, in some very similar species the sole useful character for distinction of species, because the aedeagus usually is furnished with a number of sclerotized plates or teeth-like spurs, the number and location of which is very characteristic for each species.

For better comparison, however, measurements and ratios of the respective groups of related species are tabulated below.

Abbreviations of collections

ANIC	Australian National Insect Collection, Canberra
BMH	B. P. Bishop Museum, Honolulu
CBM	Working collection M. Baehr, München
CSH	Collection A. Skale, Hof
CWP	Collection A. Weigel, Pößneck
DPIM	Department of Primary Industries, Mareeba

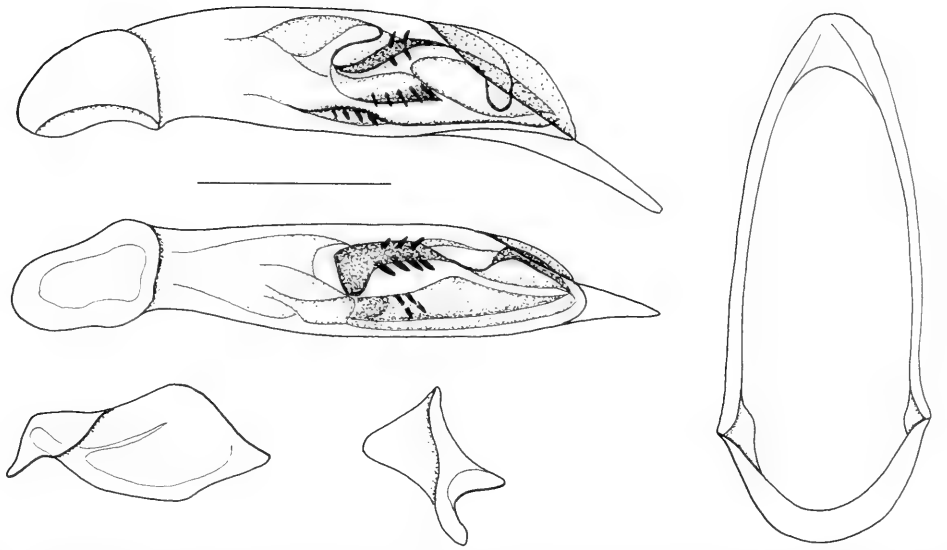


Fig. 1. *Lebia karenia* Bates. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

IRSNB Institut Royal des Sciences Naturelles, Bruxelles
QMB Queensland Museum, Brisbane
ZSM-CBM Zoologische Staatssammlung, München, as permanent loan in working collection M. Baehr

karenia-group

A group of rather large Oriental-Papuan species bearing a characteristic cruciate dark elytral pattern on yellow or light reddish ground. Apart from the four species mentioned in present paper, several additional species exist in South and East Asia.

Measurements and ratios see table 1.

Lebia karenia Bates

Figs 1, 22

Lebia karenia Bates, 1892: 32; Csiki 1932: 1325; Darlington 1968: 87; Lorenz 1998: 458.

Note. With respect to its apparently unique elytral pattern, *L. karenia* was recorded by Darlington (1968) for New Guinea. Careful examination of the available material from New Guinea and Sulawesi, in particular dissection of the male genitalia of all specimens, and comparison with *L. karenia* from mainland Asia revealed, however, that this species does not occur in New Guinea nor in Sulawesi, and moreover that the New Guinean specimens previously assigned to *L. karenia* belong to two different new species that are extremely similar in their external morphology (size, shape, and colour pattern), but possess quite different male genitalia. Thus, Darlington's records of *L. karenia* from New Guinea have to be neglected, and this species only occurs in India, Burma, Thailand, and perhaps also further east in mainland Southeast Asia, though apparently neither in Indonesia, nor further south.

Diagnosis. Fairly large species, with cruciate black elytral pattern that leaves an elongate subhumeral spot and the wide apical margin yellow. Apart from the differently shaped and structured aedeagus,

Table 1. Measurements and ratios of the mentioned species of the *karenia*-group.

	N	length	w/l pr	w pr/h	l/w el	w el/pr
karenia	3	6.2-6.8	1.53-1.56	1.22-1.26	1.45-1.54	1.63-1.69
darlingtoniana	8	6.75-8.1	1.51-1.59	1.16-1.22	1.37-1.41	1.78-1.91
brisbanensis	1	8.0	1.61	1.19	1.41	1.85
fallaciosa	6	6.2-7.8	1.68-1.71	1.21-1.28	1.34-1.40	1.66-1.76

further distinguished from the three new species *L. darlingtoniana*, *L. fallaciosa*, and *L. brisbanensis* by apex of black elytral spot angulate and recurved towards suture; marginal setae of elytra encircled by small, yellow spots (Fig. 21); microreticulation of elytra isodiametric; surface of head microreticulate; and surface of pronotum dull due to coarse microreticulation.

Supplementary description

Measurements (3 ex.). Length: 6.2-6.8 mm; width: 2.7-3.1 mm. Ratios: w/l pr: 1.53-1.56; w pr/h: 1.22-1.26; l/w el: 1.45-1.54; w el/pr: 1.63-1.69.

Male genitalia (Fig. 1). Genital ring elongate, barely asymmetric, rather parallel, with rather wide, convex apex and elongate basis. Aedeagus moderately slender and elongate, laterally not widened, barely sinuate, lower surface almost straight, in apical third gently concave. Apex elongate, depressed, straight, acute. Orificium moderately elongate. Folding of internal sac complex, with three patches of few sclerotized teeth at bottom, left side, and roof in middle of sac. Parameres of dissimilar shape, left paramere much larger than right one, with triangular apex; right paramere short, rhomboidal.

Distribution. Southern mainland Asia from South India to Burma, Thailand, and probably also to Laos and Vietnam.

Lebia darlingtoniana, spec. nov.

Figs 2, 23, 24

Types. Holotype: ♂, Irian Jaya, Jayapura, Sentani, Cyclops-Mt. 300-500 m, 30.10.1992, leg. A. Riedel (ZSM-CBM). – Paratypes: 1♀, Irian Jaya, Jayawijaya-Pr., Jayapura, Cyclops-Mt. 300-450 m, 8.8.1992, leg. A. Riedel (CBM); 1♂, Irian Jaya, Jayawijaya-Pr., Lereh, 300-550 m, 25.1.1995, leg. A. Riedel (CBM); 1♂, 1♀, Irian Jaya, Sorong-Pr., Batanta Isl. Waylebet, 0-100 m, 28.X.-2.XI.1996, 8.8.1992, leg. A. Riedel (CBM); 2♂♂, 4♀♀, W-PAPUA, Raja Ampat Pr. Waywesar/Batanta bor. 0°45'26"S, 130° 46'55"E, 13.I.2004, leg. A. Weigel (CBM, CWP); 1♂, W-PAPUA, Raja Ampat Pr. Batanta Isl. bor. Waywesar 0°45'26"S, 130°46'55"E, 12.-15.I.2004, leg. A. Skale UWP (CSH); 1♂, Sulawesi, Donggala-Bez. Kamaroro, Lore Lindu BP. 13.-18.4.1994, leg. Hiermeier (CBM); 1♀, C-Sulawesi, Lindu NP, 45 km se. Palu, 01.12'S, 120.08'E, 900 m, 19.-29.12.1994, leg. Hiermeier (CBM); 5♂♂, 4♀♀, Coll. I.R.Sc.N.B. Sulawesi, Utara, Hogg's Back (660 m). Sweeping, 23.X.1985, Leg. J. Van Stalle (CBM, IRSNB).

Diagnosis. Fairly large species, with cruciate black elytral pattern that leaves an elongate subhumeral spot and the wide apical margin yellow, though pattern very variable: dark spot commonly reduced to an anchor-shaped spot at suture, or lateral arms of dark pattern prolonged towards apex. Apart from differently shaped and structured aedeagus, further distinguished from *L. karenia* Bates by apex of black elytral spot oblique towards suture; marginal setae of elytra not encircled by yellow spots; microreticulation of elytra rather transverse; surface of head not microreticulate; and surface of pronotum rather glossy due to superficial microreticulation. Distinguished from *L. fallaciosa*, spec. nov. by densely denticulate sclerite within internal sac of aedeagus; apical yellow spot always touching apex; far less transverse microreticulation of surface of elytra; and narrower pronotum. Similarly patterned specimens of *L. darlingtoniana* distinguished from *L. brisbanensis*, spec. nov. by slightly narrower pronotum and denticulate band less complexly sinuate and not extending to left side.

Description

Measurements (8 ex.). Length: 6.75-8.1 mm; width: 3.25-3.8 mm. Ratios: w/l pr: 1.51-1.59; w pr/h: 1.16-1.22; l/w el: 1.37-1.41; w el/pr: 1.78-1.91.

Colour (Figs 23, 24). Fore body and lower surface, including mouth parts, antennae, and legs light reddish. Surface of elytra yellow with an anchor-shaped black spot in middle that commonly is prolonged along lateral margin to humerus and apex and then leaves an elongate humeral spot and a wide apical margin yellow. Apical margin of dark spot oblique towards suture. Lateral margin narrowly yellow, marginal setae not encircled by yellow spots.

Head. Of average size and shape, narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Surface, except for labrum that is finely microreticulate, without microreticulation, though with some wrinkles and scattered fine punctures, glossy.

Pronotum. Moderately wide, widest at apical third. Apical angles widely rounded off, lateral margin gently convex, but faintly sinuate just in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined, lateral margin explanate towards base, marginal channel rather deep. Surface with a distinct prebasal, transverse sulcus. Surface not perceptibly microreticulate, though with rather dense and coarse transverse wrinkles and with scattered punctures, surface glossy.

Elytra. Comparatively short, somewhat oval-shaped, widest behind middle. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex gently sinuate, apical angles wide-

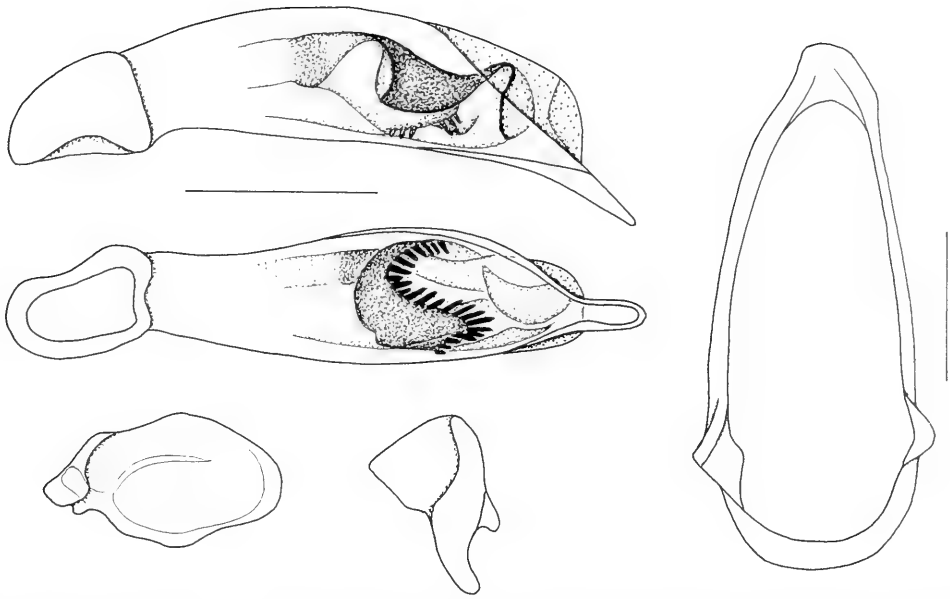


Fig. 2. *L. darlingtoniana*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

ly rounded, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with somewhat superficial, moderately transverse microreticulation and very scattered punctures, fairly glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2× as long as wide. Abdomen punctate and pilose, pilosity denser on terminal sternite. Terminal sternite 6-setose in male, 8- or 10-setose in female.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 5-6 large teeth.

Male genitalia. (Fig. 2). Genital ring elongate, barely asymmetric, rather parallel, with rather wide, convex apex and elongate basis. Aedeagus moderately elongate, distinctly widened near apex, slightly sinuate, lower surface almost straight, in apical third gently concave. Apex fairly elongate, depressed, straight, slightly spatulate. Orificium moderately elongate. Folding of internal sac complex, at bottom and at right side with characteristic, sinuate, densely denticulate sclerite. Parameres of dissimilar shape, left paramere much larger than right one, with triangular, broadly rounded apex; right paramere short, rhomboidal.

Variation (Figs 23, 24). Colour pattern of elytra varies to a considerable degree within this species, because the black spots can be more or less extended. Both available specimens from Sulawesi are significantly smaller (length 6.75 mm and 6.95 mm) and possess wider elytra in comparison with the pronotum (ratio w el/pr 1.88 and 1.91) than the New Guinean specimens (length 7.4-8.1 mm, mean 7.7 mm, w el/pr 1.78-1.85, mean 1.825). Apparently, none of these differences are sexual. The aedeagi of the examined Sulawesian and New Guinean specimens, however, are identical. As material from Sulawesi so far is very limited, any decisions about further taxonomical differentiation between the populations from New Guinea and Sulawesi are premature and have to be postponed until additional material from Sulawesi is at hand.

Distribution. New Guinea including surrounding islands, Sulawesi.

Collecting circumstances. Largely unknown. All specimens collected at low to medium altitude.

Etymology. The name is an acronym in honour of the famous reviser of the New Guinean ground beetle fauna, the late P. J. Darlington, Jr.

Relationships. This species belongs to a group of very closely related Oriental-Papuan species. It is next related to *L. brisbanensis*, spec. nov. from southeastern Queensland.

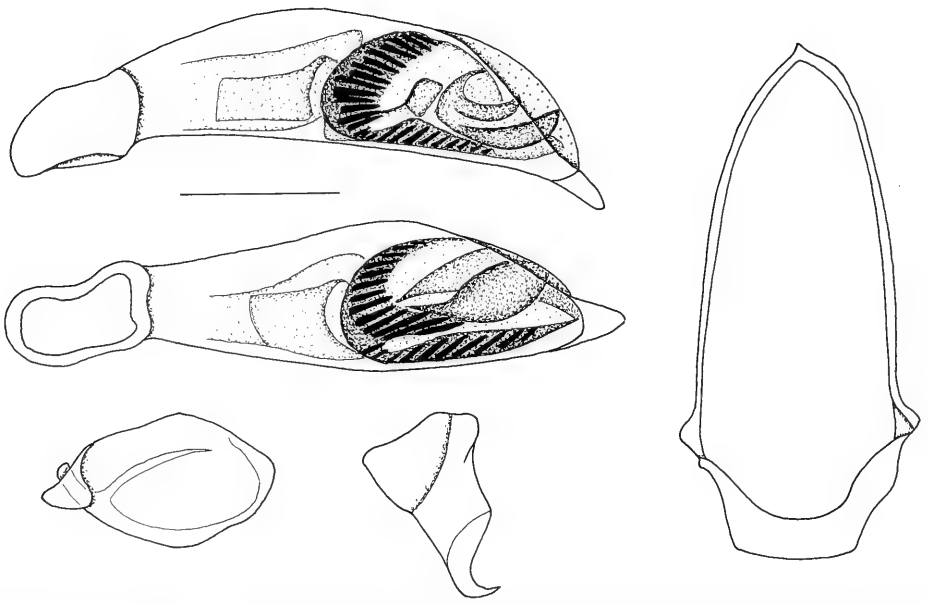


Fig. 3. *L. brisbanensis*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

Lebia brisbanensis, spec. nov.
Figs 3, 25

Types. Holotype: ♂, QLD: 27°29'S × 152°47'E, Mt. Cootha, 260 m, 10 Jan 2002. M V Light, G. B. Monteith, open forest. **10330** (QMT123516).

Diagnosis. Large species, with a dark anchor-shaped spot at suture and lateral margin dark. Distinguished from *L. karenia* Bates by marginal setae of elytra not encircled by yellow spots; microreticulation of elytra rather transverse; surface of head not microreticulate; and surface of pronotum rather glossy due to superficial microreticulation. Distinguished from *L. fallaciosa*, spec. nov. by colour pattern and densely denticulate sclerite within internal sac of aedeagus. Distinguished from similarly patterned specimens of *L. darlingtonia* by slightly wider pronotum and more complexly sinuate denticulate band that is also extended to left side.

Description

Measurements (1 ex.). Length: 8.0 mm; width: 3.7 mm. Ratios: w/l pr: 1.61; w pr/h: 1.19; l/w el: 1.41; w el/pr: 1.85.

Colour (Fig. 25). Fore body and lower surface, including mouth parts, antennae, and legs light reddish. Surface of elytra yellow with an anchor-shaped black spot in middle that leaves a wide apical margin yellow. 9th interval and basal half of 8th interval black, lateral margin narrowly yellow, marginal setae not encircled by yellow spots.

Head. Of average size and shape, narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Surface, except for labrum that is finely microreticulate, without microreticulation, though with some wrinkles and scattered fine punctures, glossy.

Pronotum. Moderately wide, widest at apical third. Apical angles widely rounded off, lateral margin gently convex, but faintly sinuate just in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined, lateral margin explanate towards base, marginal channel rather deep. Surface with a distinct prebasal, transverse sulcus. Surface not perceptibly microreticulate, though with rather dense and coarse transverse wrinkles and with scattered punctures, surface glossy.

Elytra. Comparatively short, somewhat oval-shaped, widest behind middle. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex gently sinuate, apical angles widely rounded, apical margin gently excised, slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in mid-

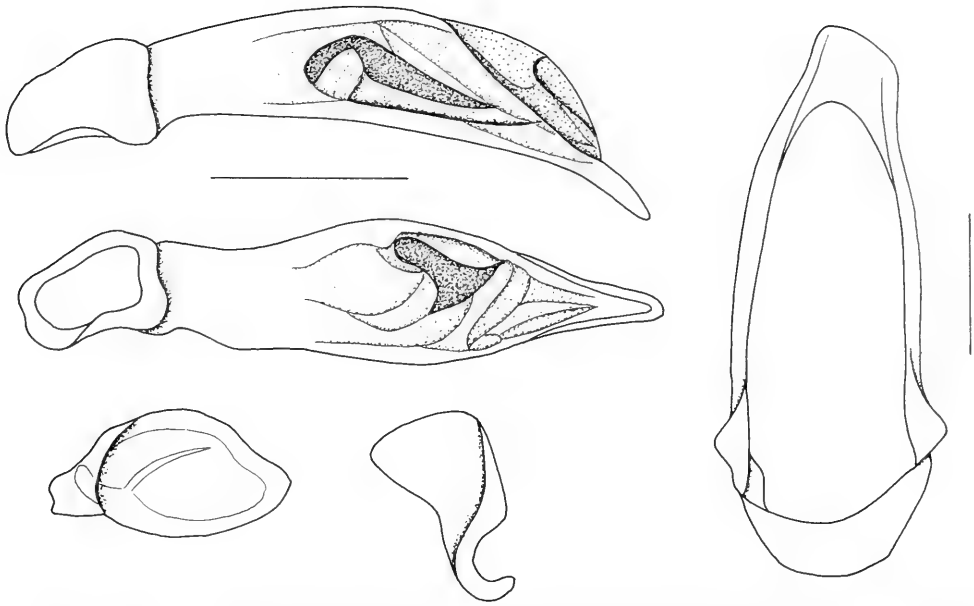


Fig. 4. *L. fallaciosa*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

dle. Intervals with somewhat superficial, moderately transverse microreticulation and very scattered punctures, fairly glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2× as long as wide. Abdomen punctate and pilose, pilosity denser on terminal sternite. Terminal sternite 4-setose in male.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 5-6 large teeth.

Male genitalia. (Fig. 3). Genital ring elongate, slightly asymmetric, rather parallel, with narrow, triangular apex and elongate, laterally somewhat angulate basis. Aedeagus moderately elongate, distinctly widened near apex, slightly sinuate, lower surface almost straight, in apical third gently concave. Apex rather short, depressed, straight, slightly spatulate. Orificium moderately elongate. Folding of internal sac complex, with characteristic, multisinuate, densely denticulate sclerite at bottom that extends to both sides. Parameres of dissimilar shape, left paramere much larger than right one, with triangular, broadly rounded apex; right paramere short, rhomboidal.

Variation. Unknown.

Distribution. Southeastern Queensland. Known only from type locality.

Collecting circumstances. Collected at light in median altitude in open forest. Actually, the type locality is within the city of Brisbane, at a locality very familiar with people as well as collectors. Hence, the discovery of a new and conspicuous lebiine at this locality is remarkable. At the same time it is very surprising why this species has not been discovered earlier and in greater numbers.

Etymology. The name refers to the type locality which is situated within the city of Brisbane.

Relationships. This species belongs to a group of very closely related Oriental-Papuan species. According to colour pattern of elytra and structure of internal sac of aedeagus, it is probably next related to *L. darlingtoniana*, spec. nov. from New Guinea.

Lebia fallaciosa, spec. nov.

Figs 4, 26

Types. Holotype: ♂, INDONESIA or. Irian Jaya, 170 km S Nabire, Epomani, 1150 m, 06.I.1996, leg. A. Weigel (ZSM-CBM). – Paratypes: 1♂, Irian Jaya, Jayapura, Sentani, Cyclops-Mts. 300 m, 9.-11.8.1991, leg. A. Riedel (CBM); 1♀, Irian Jaya, Jayawijaya-Pr., Jayapura, Cyclops-Mt. 300-450 m, 8.8.1992, leg. A. Riedel (CBM); 1♀, P.N.G., Madang Prov., Baiteta, Light AR 52, 23.V.1996, leg. O. Missa (IRSNB); 2♂♂, P.N.G., Madang Prov., Baiteta, Light AR 53, 28.V.1996, leg. O. Missa (IRSNB, CBM).

Diagnosis. Fairly large species, with cruciate black elytral pattern that leaves an elongate subhumeral

and a wide subapical spot yellow. Apart from differently shaped and structured aedeagus, further distinguished from *L. karenia* Bates by apex of black elytral spot oblique towards suture; marginal setae of elytra not encircled by yellow spots; microreticulation of elytra transverse; surface of head not microreticulate; and surface of pronotum rather glossy due to superficial microreticulation. Distinguished from *L. darlingtoniana*, spec. nov. and *L. brisbanensis*, spec. nov. by absence of any denticles within internal sac of aedeagus; apical yellow spot narrowly separated from apex; much more transverse microreticulation of surface of elytra.

Description

Measurements. Length: 6.2-7.8 mm; width: 2.85-3.75 mm. Ratios: w/l pr: 1.68-1.71; w pr/h: 1.21-1.28; l/w el: 1.34-1.40; w el/pr: 1.66-1.76.

Colour (Fig. 26). Fore body and lower surface, including mouth parts, antennae, and legs light reddish. Surface of elytra yellow with an anchor-shaped black spot in middle that is prolonged along lateral margin to humerus and along apical margin to suture, and leaves an elongate humeral spot and a wide subapical spot yellow. Apical margin of dark spot oblique towards suture. Lateral margin narrowly yellow, marginal setae not encircled by yellow spots.

Head. Of average size and shape, narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Surface, except for labrum that is finely microreticulate, without microreticulation, though with very few wrinkles and scattered fine punctures, highly glossy.

Pronotum. Comparatively wide, widest at apical third. Apical angles widely rounded off, lateral margin gently convex, but faintly sinuate just in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined, lateral margin explanate throughout, marginal channel wide, moderately deep. Surface with a distinct prebasal, transverse sulcus. Surface without microreticulation, with rather sparse, more or less superficial transverse wrinkles and with very scattered punctures, surface highly glossy.

Elytra. Comparatively short, somewhat oval-shaped, widest behind middle. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex gently sinuate, apical angles widely rounded, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with rather superficial, markedly transverse microreticulation and very scattered punctures, glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2× as long as wide. Abdomen punctate and pilose, pilosity slightly denser on terminal sternite. Terminal sternite 4-setose in male, 6-setose in female.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 4-5 large teeth.

Male genitalia (Fig. 4). Genital ring narrow and elongate, very gently asymmetric, rather parallel, with rather wide, convex apex and elongate basis. Aedeagus moderately elongate, distinctly widened in middle, rather sinuate, lower surface very gently concave throughout. Apex fairly elongate, depressed, straight, rather spatulate. Orificium moderately elongate. Folding of internal sac complex, without any denticulate sclerites. Parameres of dissimilar shape, left paramere much larger than right one, with triangular, slightly obtuse apex; right paramere short, rhomboidal.

Variation. Very little variation noted apart from some differences of size.

Distribution. New Guinea.

Collecting circumstances. Largely unknown. All specimens collected at low to medium altitude, some at light.

Etymology. The name refers to the extremely similar colouration that easily leads to confusion of this species with *L. darlingtoniana*, spec. nov.

Relationships. Probably this species is nearer related to *L. darlingtoniana*, spec. nov. than to the Oriental *L. karenia* Bates.

papuensis-group

A group of small, commonly unicolourous species of quite similar size and shape that are best distinguished by their differently structured aedeagi. Only few species from this group possess a distinct elytral pattern.

Measurements and ratios see table 2.

Lebia papuensis Macleay

Figs 5, 40

Lebia papuensis Macleay, 1876: 167; Sloane 1917: 424; Csiki 1932: 1326; Moore et al. 1987: 309; Lorenz 1998: 458.

Note. Sloane (1917) was the first to synonymize *Lebia papuensis* Macleay, 1876 with *Lebia picipennis* (Macleay, 1871) and all later authors followed him

in that synonymization. As *Lebia picipennis* (Macleay, 1871) is a junior homonyme of *Lebia picipennis* Motschoulsky, 1864, the name of Macleay's species had to be changed anyway and the later name *L. papuensis* Macleay, 1876 for a New Guinean species came in very handy to the authors. Admittedly, both species are quite similar, although *L. picipennis* (Macleay) was described from central eastern Australia and *L. papuensis* Macleay from southeastern New Guinea. Examination of the male genitalia of the types of both Macleay's species revealed, however, that they are different species. Hence, the synomization has to be invalidated and for *L. picipennis* (Macleay) a new name has to be given (see under *L. australica*).

Examined types. Holotype: ♂, *Lebia papuensis* Macl. M.S.S. Hall Sound N. Guinea/HOLOTYPE/NEW GUINEA (ANIC-MMS).

Diagnosis. Moderately large, almost unicolourous reddish species with lightly microreticulate head and densely microreticulate, rather wide pronotum; distinguished from most closely related species *L. australica*, nom. nov. by the uninterrupted, densely denticulate, transverse, sclerotized band that runs around the whole internal sac.

Supplementary description

Measurements (as the single available specimen has the elytra spread, ratios concerning width of elytra are somewhat tentative). Length: 6.2 mm; width: c. 2.9 mm. Ratios: w/l pr: 1.58; w pr/h: 1.20; l/w el: c. 1.40; w el/pr: c. 1.85.

Colour. Upper and lower surface, including mouth parts, antennae, and legs reddish to light brown.

Head. Of average size and shape, considerably narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 3 antennomeres. Surface with fine, superficial, though distinct isodiametric microreticulation, also with few wrinkles and scattered moderately coarse punctures, fairly glossy.

Pronotum (Fig. 40). Wide, widest about at middle. Apical angles widely rounded off, lateral margin evenly gently convex, faintly sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined throughout, lateral margin explanate throughout, marginal channel widened towards base, moderately deep. Surface with a distinct prebasal transverse sulcus. Disk with very distinct, almost isodiametric microreticulation, with many distinct transverse wrinkles and with very scattered punctures, surface rather dull.

Elytra. Comparatively elongate (for group), rather oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex gently sinuate, apical angles widely rounded, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with moderately distinct, slightly transverse microreticulation and

Table 2. Measurements and ratios of the species of the *papuensis*- and *calycophora*-groups.

	N	length	w/l pr	w pr/h	l/w el	w el/pr
papuensis	1	6.2	1.58	1.20	1.40	1.85
australica	4	4.6-5.6	1.46-1.55	1.12-1.18	1.37-1.42	1.90-1.96
papuella	6	4.5-5.2	1.52-1.57	1.06-1.12	1.37-1.40	1.88-1.96
gemina	6	4.8-6.0	1.59-1.69	1.13-1.18	1.36-1.41	1.81-1.89
barda	6	5.0-5.4	1.61-1.65	1.17-1.19	1.35-1.39	1.78-1.82
insularum	2	6.7-7.1	1.75-1.81	1.23-1.25	1.38-1.42	1.68-1.73
cordifer	3	5.7-6.2	1.48-1.58	1.13-1.21	1.40-1.43	1.80-1.85
subglabra	5	4.6-5.0	1.47-1.49	1.17-1.21	1.34-1.39	1.91-2.00
novabritannica	3	4.4-5.35	1.52-1.56	1.19-1.25	1.37-1.43	1.84-1.90
salomona	4	4.6-5.3	1.45-1.51	1.20-1.23	1.36-1.38	1.82-1.92
permutata	1	6.3	1.34	1.0	1.37	2.09
inornata	1	5.6	1.50	1.25	1.30	1.85
laticollis	2	4.5-4.8	1.67-1.69	1.30-1.32	1.31-1.34	1.66-1.70
atripennis	1	4.5	1.64	1.28	1.27	1.67
trivittata	6	5.0-5.7	1.38-1.46	1.16-1.21	1.35-1.41	1.90-2.00
adusta	2	4.2-4.3	1.43-1.44	1.20-1.21	1.35-1.37	1.92-1.93
sedlaceki	1	4.75	1.51	1.17	1.36	1.92

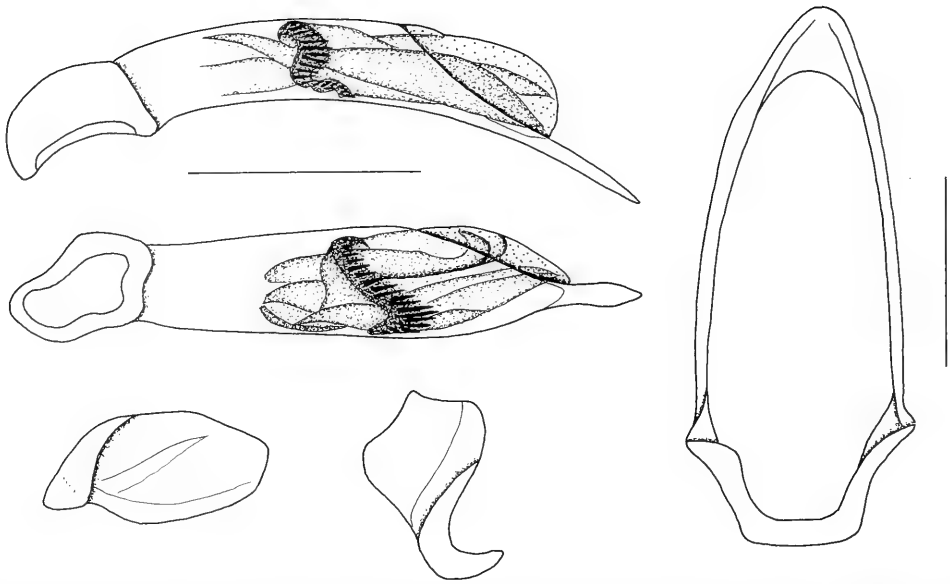


Fig. 5. *L. papuensis* Macleay. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

very fine, scattered punctures, fairly glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2× as long as wide. Abdomen punctate and sparsely pilose, pilosity slightly denser on terminal sternite. Terminal sternite 4-setose in male.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 4 large teeth.

Male genitalia (Fig. 5). Genital ring large, narrow and elongate, almost symmetric, rather triangular, with narrow, obtuse apex and narrow, elongate, at tip markedly transverse basis. Aedeagus narrow and elongate, not widened in middle, barely sinuate, lower surface very gently concave. Apex elongate, depressed, straight, parallel, situated asymmetrically on right side, with triangular, arrow-shaped, acute tip. Orificium very elongate. Folding of internal sac complex, with a transverse, densely denticulate, uninterrupted, and conspicuously bisinuate sclerite running from side to side along roof and bottom of internal sac. Parameres of dissimilar shape, left paramere narrow and elongate in comparison, longer than right one, with obliquely transverse apex; right paramere short but massive, rhomboidal.

Variation. Unknown.

Distribution. New Guinea. Known only from type locality.

Collecting circumstances. Unknown.

Additional examined material. None.

Relationships. With respect to shape, surface structure, and structure of internal sac of aedeagus, most closely related to *L. australica*, nom. nov., and also, but probably slightly less so, to *L. papuella* Darlington and *L. gemina*, spec. nov.

Lebia australica, nom. nov.

Figs 6, 27, 41

Eulebia picipennis Macleay, 1871: 87 (nec *Lebia picipennis* Motschoulsky, 1864); Sloane 1907: 376.

Lebia picipennis, Sloane 1917: 424; Csiki 1932: 1326; Darlington 1968: 88; Moore et al. 1987: 309; Lorenz 1998: 458.

Note. As explained above under *Lebia papuensis* Macleay, Sloane (1917) synonymized *Lebia papuensis* Macleay and *Lebia picipennis* (Macleay). As the latter name is a junior homonyme of *Lebia picipennis* Motschoulsky, 1864, the later name *L. papuensis* Macleay, 1876 was used by the all following authors. Although both species are quite similar, examination of the male genitalia of both Macleay's species revealed that they are different. Hence, the synomization has to be invalidated and for the preoccupied *L. picipennis* (Macleay) the new name *L. australia*, spec. nov. is created.

Examined types. Lectotype (by present designation): ♀, Queensland / SYNTYPE / *Eulebia picipennis* Macl. Wide Bay (ANIC-MMS).

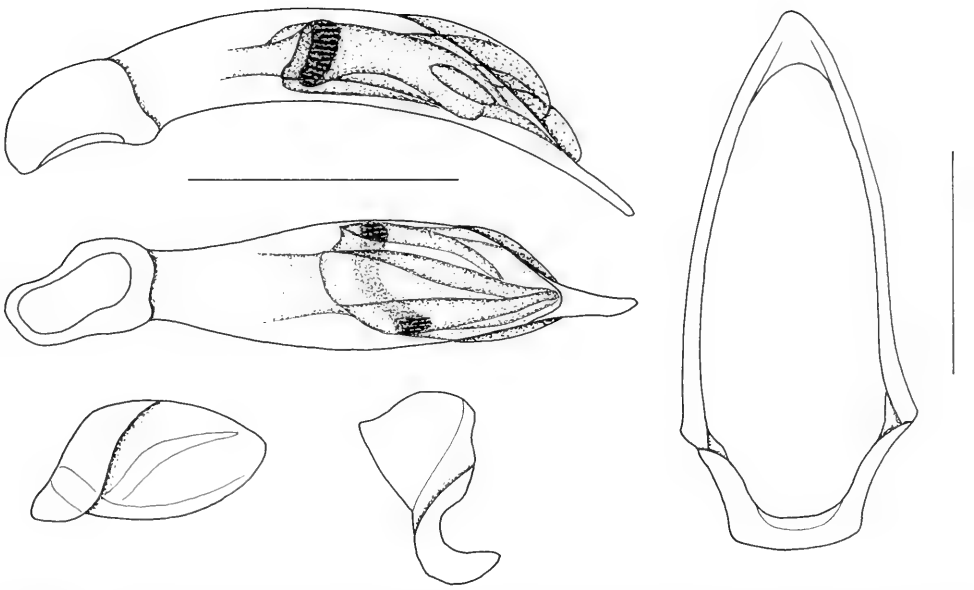


Fig. 6. *L. australica*, nom. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

Diagnosis. Rather small, almost unicolourous ligh reddish to light brownish species with lightly microreticulate head and densely microreticulate, moderately wide pronotum; distinguished from the most closely related species *L. papuensis* Macleay by the densely denticulate, transverse, sclerotized band that runs from the side to side along the top of internal sac, but is widely interrupted at bottom.

Supplementary description

Measurements. Length: 4.6-5.6 mm; width: 2.3-2.7 mm. Ratios: w/l pr: 1.46-1.55; w pr/h: 1.12-1.18; l/w el: 1.37-1.42; w el/pr: 1.90-1.96.

Colour (Fig. 27). Upper and lower surface, including mouth parts, antennae, and legs either uniformly reddish-brown, or elytra slightly darker, brown or piceous.

Head. Of average size and shape, slightly narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 3 antennomeres. Surface with fine, very superficial, isodiametric microreticulation in middle, also with few wrinkles and scattered fine punctures, glossy.

Pronotum (Fig. 41). Comparatively narrow, widest at or slightly in front of middle. Apical angles widely rounded off, lateral margin evenly gently convex, barely sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined, lateral margin explanate throughout, marginal channel slightly widened towards base, moderately deep. Surface with a distinct prebasal transverse sulcus. Disk with distinct, almost isodiametric microreticulation, with rather dense, fine, transverse wrinkles and with very scattered punctures, surface rather dull.

Elytra. Medium sized (for group), rather oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex gently sinuate, apical angles widely rounded, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex througho it. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with distinct, moderately transverse microreticulation, barely punctate, moderately glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2× as long as wide. Abdomen punctate and sparsely pilose, pilosity slightly denser on terminal sternite. Terminal sternite 4-setose in male, 6-setose in female.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 4 large teeth.

Male genitalia (Fig. 6). Genital ring large, narrow and elongate, almost symmetric, rather triangular, with narrow, obtuse apex and narrow, elongate, at tip markedly transverse basis. Aedeagus

moderately elongate, somewhat widened in middle, barely sinuate, lower surface gently concave. Apex elongate, depressed, straight, parallel, situated asymmetrically on right side, with triangular, asymmetric tip. Orificium elongate. Folding of internal sac complex, with a transverse, densely denticulate sclerite running from right side along roof of internal sac, where it is conspicuously sinuate, to left side, but is interrupted at bottom of internal sac. Parameres of dissimilar shape, left paramere rather elongate in comparison, longer than right one, with almost regular, very obtusely triangular apex; right paramere short but massive, rhomboidal.

Variation. Except for the darker colouration of the elytra in certain specimens, little variation noted, except for a single specimen that is larger than usual, has a wider pronotum, and the elytra are darker. Because it is a female, affiliation to this species cannot be verified nor denied, even when the specimen was caught together with male specimens of *L. australica*: 1♀, Qld: 27°24.1'S × 152°47.4'E, Boombana Nat. Pk. site 1. 16 Feb 2004. 440 m, QM party. **51837** (QMB).

Distribution. Eastern Queensland.

Collecting circumstances. Most specimens collected by pyrethrum fogging in rain forest or "vine scrub", a few in "flight intercept trap", single specimens at light, the old specimens do not bear any sampling records.

Etymology. The name refers to the distribution of this species in eastern Australia.

New records (55 ex.). **AUS:** 1♂ (defect, without head and pronotum), Yeppoon, Q. H.J.C. x/24/*Lebia picipennis* Macl. Id. by T. G. Sloane (ANIC); 1♀, 1 (sex ?, abdomen destroyed), R'hampt[n]. Q. T.G.S. 10.24 (ANIC); 1 (sex ?, abdomen destroyed), Townsville, F. P. Dodd/*Eulebia picipennis* 147 (ANIC); 1♀, Byfield Q. H.J.C. 10/24 (ANIC); 1 (sex?, abdomen destroyed), *Lebia picipennis* Macl. (*Eulebia* Macl.) Id. by T. G. Sloane (ANIC); 1♀, Tamborine Mtn. QLD 4 Jan. 1981, at light, J. Powell (CBM); 5♂♂, 4♀♀, MEQ: 23°12'S × 149°44'E, Boomer Ra, Python Scrub, site 5, 29 Sep 1999, GB Monteith, 240 m. **7780** (CBM, QMB); 2♂♂, MEQ: 23°12'S × 149°46'E, Boomer Ra, Mongrel Scrub, site 7, 29, 30 Sep 1999, GB Monteith, 220 m. **7786, 7790** (QMB); 2♂♂, 4♀♀, CEQ: 22°21'S × 149°21'E, St Lawrence, 18.5 km W, 29 May 2000. GB Monteith. 240 m. **9271** (CBM, QMB); 1♂, same locality, 25 May 2000. **10070** (QMB); 2♂♂, 2♀♀, MEQ: 21°35'S × 149°11'E, Cameron Creek, upper, 100 m. 1 Oct 1999. GB Monteith. **7793** (QMB); 2♀♀, SEQ: 28°31'S × 152°44'E, Camerons Scrub, gully, 13 Jan-16 May 1999. GB Monteith. 50 m. **7667** (QMB); 1♂, 1♀, QLD: 23°30'S × 150°34'E, Mt Archer, 0.5 km WNW, 24 Mar 2001. 520 m. GB Monteith. **10057** (QMB); 2♂♂, 1♀, SEQ: 27°30'S × 152°35'E, The Knobby, via Glamogan Vale, 240 m, 16 Sept 1998, G. Monteith & P. Bouchard. **7247** (QMB); 1♀, SEQ: 27°36'S × 153°13'E, Mt. Cotton, upper gully, 7 May 1998, 150 m. G. Monteith & G. Thompson. **5816** (QMB); 1♂, 1♀, same locality and data, Scott's Dam. 120 m. **5817** (QMB); 1♂, MEQ: 21°37'S × 148°59'E, Stony Ck. track crossing, 23 Mar-31 May 2000, Monteith & Cook. 280 m. **9414** (QMB); 1♂, MEQ: 23°09'S × 150° 28'E, Johannsens Cave, 18 Dec-21 Mar 2000. Monteith. 100 m. **9246** (QMB); 1♀, MEQ: 25°34'S × 152°03'E, Mt Walsh, 1 km N, 9 Oct-19 Dec 1999, D & I. Cook. 320 m. **9053** (QMB); 1♂, SEQ: 25°13'S × 148°59'E, Expedition R. Nat. Pk, **5733** Amphitheatre scrub, 520 m, 17 Dec-5 Mar 1998, Cook & Monteith (QMB); 1♂, SEQ: 23°37'S × 150° 28'E, Mt. Gavial, 3 km SSW, 27 Sep 1999. 320 m, G. B. Monteith. **7772** (QMB); 1♀, SEQ: 26°08'S × 151°58'E, Namgur State For., 24 Nov 1995, G. Monteith, 320 m (QMB); 2♂♂, CEQ: 21°46'S × 148°51'E, Pine Mt. 3 km S, 240 m, 1 June 2000. GB Monteith. **9279** (QMB); 1♀, SEQ: 26°17'S × 152°50'S, Cooran Tbld (Barracks), 12 Apr 1995, 400 m, Monteith, Koch & Thompson (QMB); 1♂, SEQ: 23°56'E × 151°21'E, Canoe Point E.P. 5m. 20 Mar 2000, G. Monteith. **9254** (QMB); 1♀, C.QLD: 20°12'S × 147°55'E, Mt. Aberdeen, Sth Summit, 6 Dec 1996, 900 m, G. Monteith (QMB); 2♂♂, Qld: 27°24.1'S × 152°47.4'E, Boombana Nat. Pk. site 1. 16 Feb 2004. 440 m, QM party. **51832, 51834** (QMB); 1♀, QLD: 21°34'S × 149°12'E, Upper E. Funnel Ck. 16 Nov 1992, 450 m, Monteith, Thompson & Janetzki (QMB); 1♀, Eurimbula Nat. Pk., C.Qld. 15 Sept 1989, G. B. Monteith (QMB); 1♀, Upper Dalrymple Ck. via Goomburra, SEQld, 21-22 Nov 1987, G. B. Monteith (QMB).

Relationships. With respect to shape, surface structure, and structure of internal sac of aedeagus, most closely related to *L. papuensis* Macleay, and also, but probably slightly less so, to *L. papuella* Darlington and *L. gemina*, spec. nov.

Lebia papuella Darlington (stat. restit.)

Figs 7, 42

Lebia papuella Darlington, 1968: 88 (**stat. restit.**).
Lebia papuensis Macleay, 1876: 167; Moore et al. 1987: 309; Lorenz 1998: 458.

Note. Moore in his catalogue (Moore et al. 1987) synonymized *L. papuella* Darlington with the Australian-New Guinean species *L. papuensis* Macleay [in his opinion = *L. picipennis* (Macleay), but see under *L. papuensis* Macleay and *L. australica*, nom. nov.], although Darlington (1968) in the description of his *L. papuella* already compared this with *L. papuensis* Macleay [in Darlington still as *L picipennis* (Macleay)] and even directed to the rather different microreticulation of the prothorax of both species. Hence, Moore's decision is quite difficult to understand, and probably it was not based on the examination of the types of *L. papuella*, but, if ever, per-

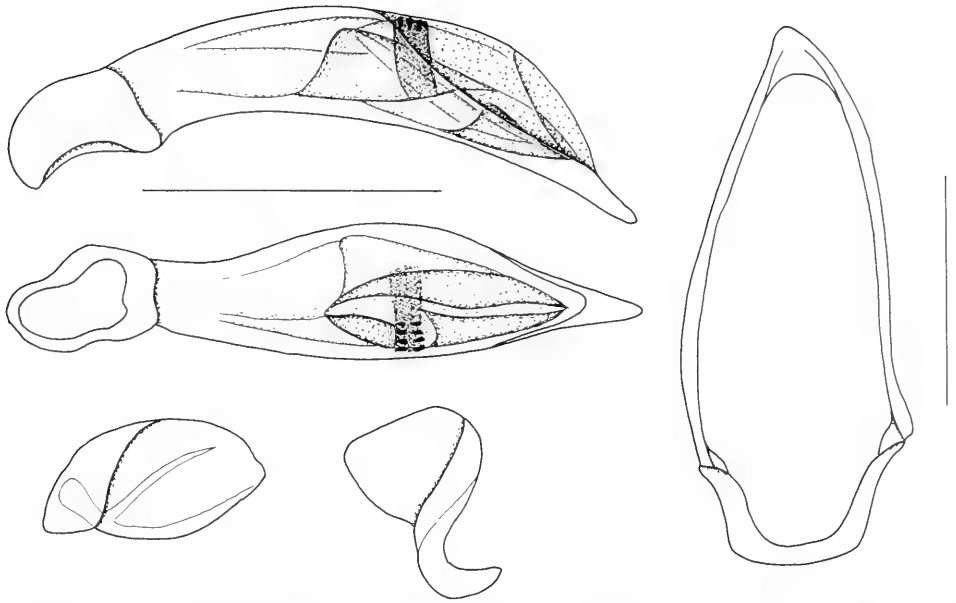


Fig. 7. *L. papuella* Darlington. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

haps only on those of *L. papuensis* Macleay and *L. picipennis* (Macleay). Because both latter species, however, actually do not refer to the same species, Moore united three different species. Lorenz (1998) simply accepted Moore's decision without further comment.

Diagnosis. Rather small, almost unicolourous dark yellowish to light brownish species with glossy, not microreticulate head and pronotum; further distinguished from the most closely related species *L. gemina*, spec. nov. by lesser size, narrower pronotum, and the densely denticulate, transverse, sclerotized band that runs from the top of internal sac down the right side.

Examined types. Paratype: 1♂, Dobodura Papua, N. G. Mar-July, 1944 Darlington/Paratype *Lebia papuella* Darl. (ANIC).

Supplementary description

Measurements. Length: 4.5-5.2 mm; width: 2.1-2.35 mm. Ratios: w/l pr: 1.52-1.57; w pr/h: 1.06-1.12; l/w el: 1.37-1.40; w el/pr: 1.88-1.96.

Colour. Upper and and lower surface, including mouth parts, antennae, and legs light reddish to light brown. Surface of elytra either unicolourous, or in middle with an indefinite brownish cloud. In darker specimens margins of pronotum slightly lighter.

Head. Of average size and shape, slightly narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 3 antennomeres. Surface without any microreticulation, with very few wrinkles and scattered, extremely fine punctures, highly glossy.

Pronotum (Fig. 42). Comparatively narrow, widest at or slightly in front of middle. Apical angles widely rounded off, lateral margin evenly gently convex, faintly sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined only laterally, base distinctly margined, lateral margin explanate throughout, marginal channel widened towards base, moderately deep. Surface with a distinct prebasal transverse sulcus. Disk without any microreticulation, with more or less dense and distinct transverse wrinkles and with very scattered punctures, surface highly glossy.

Elytra. Medium sized (for group), rather oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex gently sinuate, apical angles widely rounded, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in mid-

dle. Intervals with moderately distinct, markedly transverse microreticulation and very scattered punctures, fairly glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2 × as long as wide. Abdomen punctate and sparsely pilose, pilosity slightly denser on terminal sternite. Terminal sternite 4-setose in male, 6-setose in female.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 3 large teeth.

Male genitalia (Fig. 7). Genital ring large, narrow and elongate, slightly asymmetric, rather triangular, with narrow, obtuse apex and narrow, elongate, at tip markedly transverse basis. Aedeagus moderately elongate, asymmetrically widened in middle, barely sinuate, lower surface gently concave. Apex moderately elongate, depressed, straight, narrowly triangular, with obtuse tip. Orificium elongate. Folding of internal sac complex, with a transverse, densely denticulate sclerite running from the roof of internal sac on the left side. Parameres of dissimilar shape, left paramere rather elongate in comparison, longer than right one, with almost regular, obtusely triangular apex; right paramere short but massive, rhomboidal.

Variation. Apparently this species, like several other species of the genus *Lebia*, is rather variable with respect to size. One specimen from northern Australia that deviates in its particularly wide pronotum, was doubtfully affiliated to this species. Because it is a female, a reliable identification at present is not possible.

Distribution. New Guinea, northeastern Australia.

Collecting circumstances. Most specimens sampled at light in tropical lowland rain forest, others collected by canopy fogging and sifting in rain forest at rather low altitude. Provided appropriate sampling techniques are employed, this species can be captured in quite large numbers.

Relationships. With respect to shape and structure of surface of pronotum, next related to *L. gemina*, spec. nov., but on the basis of structure of internal sac of aedeagus, *L. papuella* is less closely related to *L. papuensis* Macleay and *L. australica*, nom. nov. than *L. gemina*.

New records (54 ex.). **NG:** P.N.G., Madang Prov., Baiteta, Light AR53, 28.V.1996, leg. O. Missa (CBM, IRSNB); same locality, Light AR52, 23.V.1996 (IRSNB); same locality, Light AR8, 11.VII.1996 (IRSNB); same locality, Light AR50, 18.III.1996 (IRSNB); same locality, Light AR10, 16.IV.1996 (IRSNB); same locality, Light X0, 29.IV.1996 (IRSNB); same locality, Fog AR15, 14.V.1996 (IRSNB); same locality, Fog AR63, 10.VII.1996 (IRSNB); same locality, Fog 23, 4.VII.1996 (IRSNB); same locality, Fog AR54, 3.VI.1996 (IRSNB); same locality, Fog AR30, 14.VII.1996 (IRSNB); same locality, Fog M9, 2.VI.1994 (IRSNB); Papua N. G., Morobe-Pr., Tekadu-Kakaro, Ivimka Riv. Stat. 180 m, 2-4.3.1998, A. Riedel (CBM); Irian Jaya, Jayapura, Sentani, Cyclops-Mt., 400-500 m, 10.8.1992, leg. A. Riedel (CBM); Mt. Lamington, N. E. Papua, 1300 to 1500 feet, C. T. McNamara (SAMA). – **AUS:** 15.47S 145.17E Moses Ck. 4 km N by E of Mt. Finnigan QLD, 14-16 Oct. 1980, T. Weir (ANIC).

Lebia gemina, spec. nov.

Figs 8, 28, 43

Examined types. Holotype: ♂, Coll. I.R.Sc.N.B. Canopy mission P.N.G. Madang province, Baiteta, Light AR53, 28.V.1996, Leg. O. Missa (IRSNB). – Paratypes: 40 ♂♂, 11♀♀, same data (CBM, IRSNB); 1♀, same locality, Light AR52, 20.V.1996 (IRSNB); 1♂, same locality, Light AR8, 11.VII.1996 (IRSNB); 1♂, same locality, Light AR20, 16.IV.1996 (IRSNB); 1♀, same locality, 16.IV.1966, Light AR10 (IRSNB).

Diagnosis. Rather small, almost unicolourous dark yellowish to light brownish species with glossy, not microreticulate head and pronotum; distinguished from the most closely related species *L. papuella* Darlington by slightly larger size, wider pronotum, and by the densely denticulate, transverse, sclerotized band that runs from the side to side along the top of internal sac, but is widely interrupted at bottom.

Supplementary description

Measurements. Length: 4.8-6.0 mm; width: 2.35-2.9 mm. Ratios: w/l pr: 1.59-1.69; w pr/h: 1.13-1.18; l/w el: 1.36-1.41; w el/pr: 1.81-1.89.

Colour (Fig. 28). Upper and and lower surface, including mouth parts and antennae light brown. Legs light reddish. Surface of elytra unicolourous, rarely (in lighter specimens) in middle with an indefinite brownish cloud. In darker specimens margins of pronotum slightly lighter.

Head. Of average size and shape, considerably narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by almost 3 antennomeres. Surface without any microreticulation, also without distinct wrinkles and almost impunctate, highly glossy.

Pronotum (Fig. 43). Rather wide, widest at or slightly in front of middle. Apical angles widely rounded off, lateral margin evenly gently convex, faintly sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently

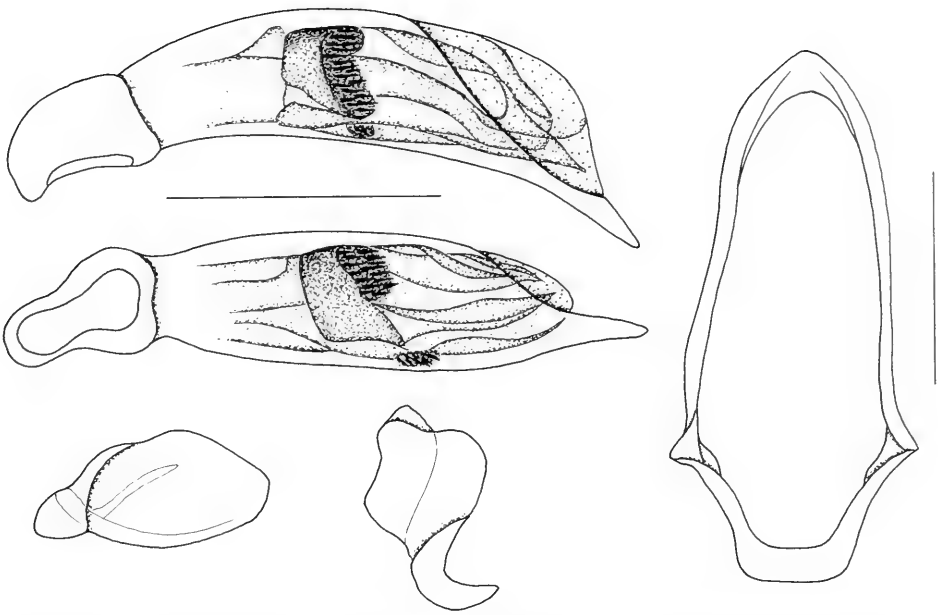


Fig. 8. *L. gemina*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

convex. Apex margined except in middle, base distinctly margined, lateral margin explanate throughout, marginal channel widened towards base, moderately deep. Surface with a distinct prebasal transverse sulcus. Disk with rather superficial, slightly transverse microreticulation, with rather dense, fairly distinct transverse wrinkles and with very scattered punctures, surface moderately dull.

Elytra. Medium sized (for group), rather oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex gently sinuate, apical angles widely rounded, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with moderately distinct, markedly transverse microreticulation and very scattered punctures, fairly glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2× as long as wide. Abdomen punctate and sparsely pilose, pilosity slightly denser on terminal sternite. Terminal sternite 4-setose in male, 6-setose in female.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 3 large and usually an additional small teeth.

Male genitalia (Fig. 8). Genital ring large, narrow and elongate, slightly asymmetric, rather triangular, with narrow, obtuse apex and narrow, elongate, at tip markedly transverse basis. Aedeagus moderately elongate, comparatively compact, barely widened in middle, barely sinuate, lower surface very gently concave. Apex elongate, depressed, straight, parallel, situated asymmetrically on right side, with slightly obtuse tip. Orificium moderately elongate. Folding of internal sac complex, with a transverse, densely denticulate sclerite running from right side along roof of internal sac, where it is conspicuously sinuate, to left side, but is interrupted at bottom of internal sac. Parameres of dissimilar shape, left paramere rather elongate in comparison, longer than right one, with slightly transverse apex; right paramere short but massive, rhomboidal.

Variation. Apparently, this species, like several other species of the genus *Lebia*, is rather variable with respect to size. Otherwise, little variation noted.

Distribution. Papua New Guinea, ? northeastern Australia.

Collecting circumstances. All specimens sampled at light in tropical lowland rain forest. Provided appropriate sampling techniques are employed, this species can be captured in quite large numbers.

Etymology. The name refers to the extremely similar shape of this species that easily leads to confusion with *L. papuella* Darlington.

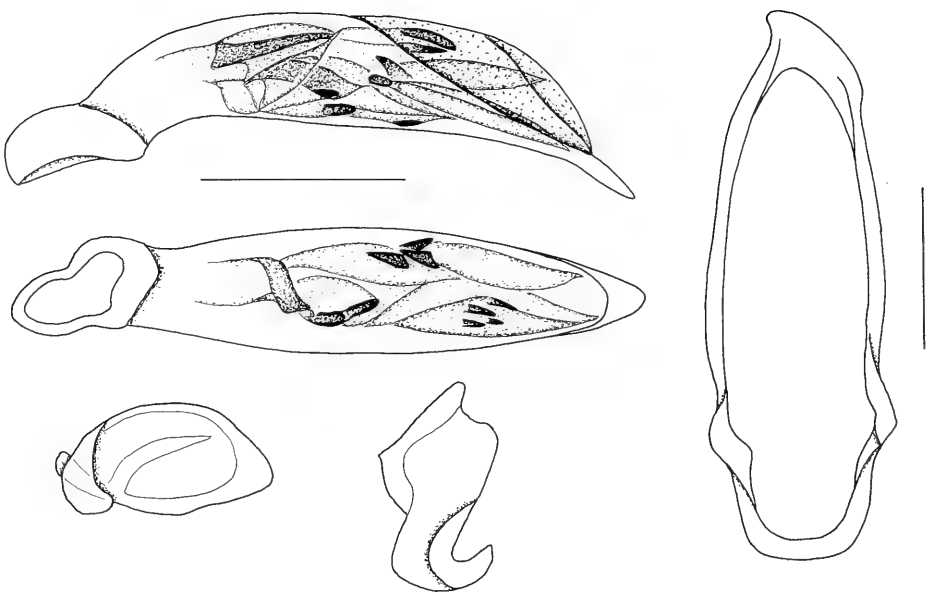


Fig. 9. *L. barda* Darlington. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

Additional material. Two specimens are tentatively attributed to this species, but, as they are females, they are not included in the type series. The one from northern Australia quite well matches *L. gemina* in shape and colour, but the specimen from Bulolo differs somewhat in colour, shape of pronotum, and presence of 8 setae at female terminal abdominal sternum. This may be even representative of an additional new species. This question can only be solved by sampling and examination of males from the same area: 1♀, AUSTRALIA: n. Qld, Wongabel S. F. via Atherton, 25.-27.III.1992, Storey, De Faveri (DPIM); 1♀, N. Guinea: NE, Bulolo, 700 m, 6.XI. 1969/J. Sedlacek Collector BISHOP/*Lebia externa* Darlington det. G. E.Ball, 1989 (BMH).

For future research measurements and ratios of both specimens are added:

Measurements (1♀ from north Queensland). Length: 5.5 mm; width: 2.7 mm. Ratios: w/l pr: 1.59; w pr/h: 1.13; l/w el: 1.37; w el/pr: 1.91.

Measurements (1♀ from Bulolo, PNG). Length: 6.15 mm; width: 2.85 mm. Ratios: w/l pr: 1.56; w pr/h: 1.10; l/w el: 1.43; w el/pr: 1.90.

Relationships. With respect to surface structure of pronotum most closely related to *L. papuella* Darlington, but to structure of internal sac of aedeagus, more similar to *L. papuensis* Macleay and *L. australia*, nom. nov.

Lebia barda Darlington

Figs 9, 44

Lebia barda Darlington, 1968: 88; Lorenz 1998: 456.

Diagnosis. Rather small, unicolourous yellowish species with distinctly microreticulate head and pronotum; distinguished from related species by internal sac of aedeagus strewn with many denticles.

Examined types. Paratype: 1♂, NEW GUINEA: PAPUA Normanby Is. Wakaiuna, Sewa Bay, Nov. 21-30, 1956, W. W. Brandt (BMH).

Supplementary description

Measurements. Length: 5.0-5.4 mm; width: 2.4-2.55 mm. Ratios: w/l pr: 1.61-1.65; w pr/h: 1.17-1.19; l/w el: 1.35-1.39; w el/pr: 1.78-1.82.

Male genitalia (Fig. 9). Genital ring large, very narrow and elongate, slightly asymmetric, rather parallel, with wide, oblique and convex apex and narrow, elongate basis. Aedeagus moderately elongate, slightly widened in middle, barely sinuate, lower surface straight, very gently concave towards apex. Apex moderately elongate, depressed, straight, wide, obtuse. Orificium elongate. Folding of internal sac complex, with many dentiform sclerites in each part of internal sac, and a complexly folded, only at borders sclerotized plate near base. Parameres of dissimilar shape, left paramere rather elongate in comparison, longer than right one, with

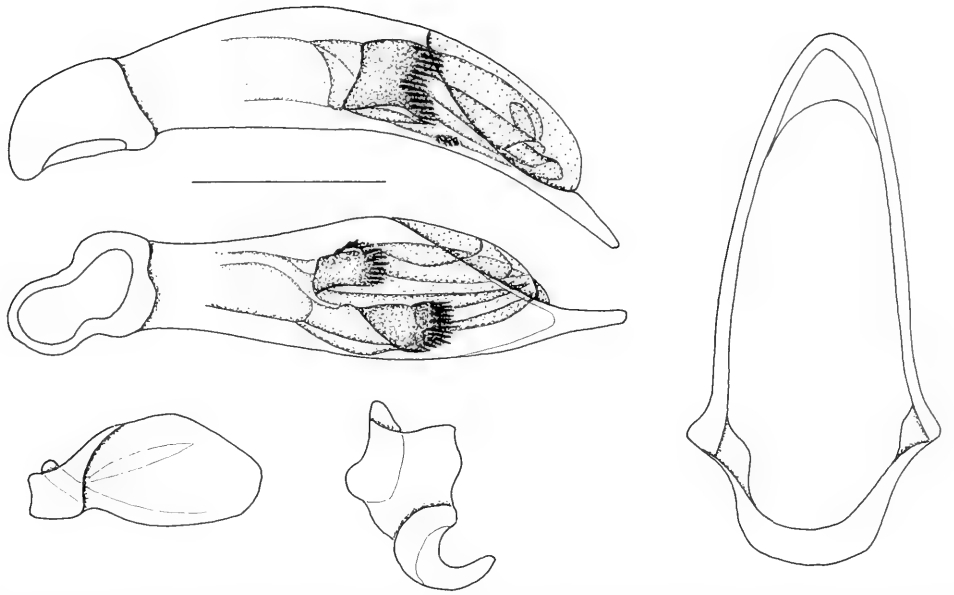


Fig. 10. *L. insularum* Darlington. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

triangular apex; right paramere short but massive, rhomboidal.

Variation. Very little variation noted.

Distribution. New Guinea.

Collecting circumstances. The specimens mentioned below sampled by canopy fogging in tropical lowland rain forest. At the mentioned locality, *L. barda* is by far less common than *L. papuensis*.

Relationships. According to shape and surface structure apparently most closely related to *L. inornata*, spec. nov. from Salawati Island. But relationships uncertain, as long as male genitalia are yet unknown of the latter species.

New records (5 ex.). P.N.G., Madang Prov., Baiteta, Light AR53, 28.V.1996, leg. O. Missa (IRSNB, CBM).

Lebia insularum Darlington
Figs 10, 29, 45

Lebia insularum Darlington, 1968: 89; Lorenz 1998: 458.

Diagnosis. Rather large, contrastingly coloured species with light fore body and piceous elytra, and glossy head and pronotum; distinguished from related species by internal sac of aedeagus with a transverse, densely denticulate, conspicuously sinuate sclerite that is narrowly interrupted at bottom and at the upper right side.

Examined types. Holotype: ♂, NEW GUINEA: PAPUA Normanby Is. Wakaiuna, Sewa Bay, Jan. 1-8-1957/ J. L. Gressitt Collector (BMNH). – Paratype: ♂, Rossel Is., S. E. Papua. Oct. 1963 W. W. Brandt/Paratype *Lebia insularum* Darl. (ANIC).

Supplementary description

Measurements. Length: 6.7-7.1 mm; width: 3.2-3.3 mm. Ratios: w/l pr: 1.75-1.81; w pr/h: 1.23-1.25; l/w el: 1.38-1.42; w el/pr: 1.68-1.73.

Colour (Fig. 29). Fore body and lower surface, including mouth parts, antennae, and legs light reddish. Surface of elytra contrastingly, unicolourous piceous.

Male genitalia (Fig. 10). Genital ring large, rather narrow and elongate, barely asymmetric, triangular, with rather narrow, obtuse apex and narrow, elongate, slightly convex basis. Aedeagus moderately elongate, widened in middle, slightly sinuate, lower surface at base straight, in apical half concave. Apex elongate, depressed, straight, almost parallel, situated asymmetrically on right side, with obtuse tip. Orificium elongate. Folding of internal sac complex, with a transverse, densely denticulate, conspicuously sinuate sclerite that is narrowly interrupted at bottom and at the upper right side of internal sac. Parameres of dissimilar shape, left paramere rather elongate in comparison, longer than right one, with remarkably transverse apex; right paramere short but massive, rhomboidal.

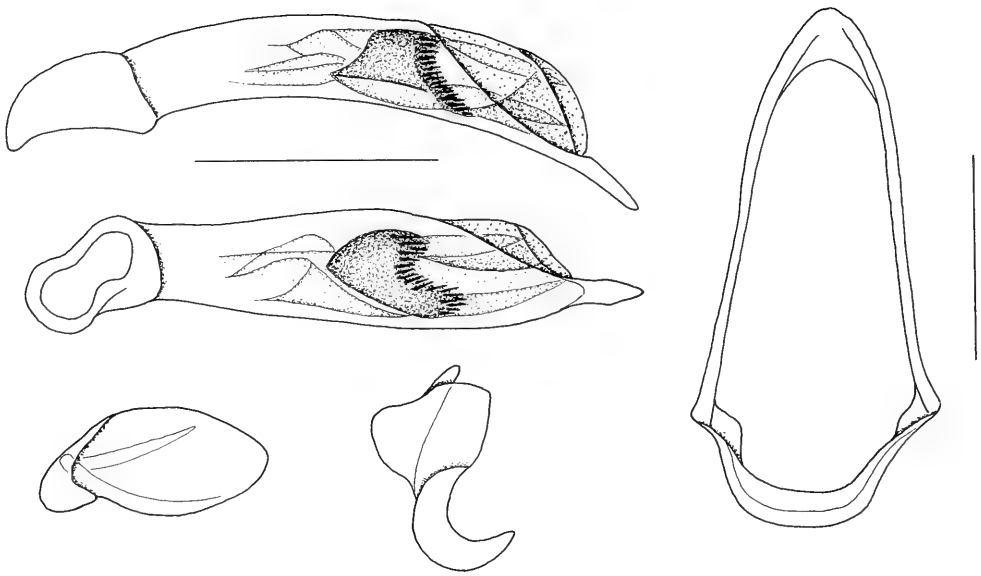


Fig. 11. *L. cordifer* Darlington. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

Distribution. So far known only from Normanby and Rossel Islands off the east coast of New Guinea.

Collecting circumstances. Unknown.

Relationships. Darlington in his description said that he did not know its relations. According to shape and surface structure of pronotum and to structure of male genitalia it is nearest related to *L. gemina*, spec. nov.

New records. None.

Lebia cordifer Darlington
Figs 11, 30

Lebia cordifer Darlington, 1968: 87; Lorenz 1998: 456.

Note. The holotype, and altogether single recorded specimen, of this characteristically patterned species was not available. Three specimens caught rather recently in northern Australia, however, match so exactly Darlington's description that I don't have any doubt about the species identity. As one of these specimens is a male, this gives the opportunity to dissect and figure the male genitalia. Darlington, in his description, unfortunately disclaimed to dissect the male holotype, and apparently, he generally did not have a high opinion of the use of male genitalia for taxonomy which unfortunately somewhat depreciates his taxonomic work.

Because certain other *Lebia* occur in New Guinea **and** northern Australia, this range extension is no too surprising, in particular, because this species so far was known only from the holotype.

Supplementary description

Measurements. Length: 5.7-6.2 mm; width: 2.6-2.8 mm. Ratios: w/l pr: 1.48-1.58; w pr/h: 1.13-1.21; l/w el: 1.40-1.43; w el/pr: 1.80-1.85.

Colour (Fig. 30). Head and pronotum yellow to light reddish, pronotum with or without slightly darker centre. Elytra piceous with a large, rather cordiform yellow sutural spot that at 5th and 6th intervals reaches the humerus, but does not attain the apex. Mouth parts, antennae, and legs yellow.

Male genitalia (Fig. 11). Genital ring large, narrow and elongate, barely asymmetric, triangular, with rather narrow, obtuse apex and moderately elongate, slightly convex basis. Aedeagus narrow and elongate, gently widened in middle, not sinuate, lower surface gently concave throughout. Apex elongate, depressed, straight, lancet-shaped, situated asymmetrically on right side, with acute tip. Orificium elongate. Folding of internal sac complex, with a transverse, densely denticulate, conspicuously sinuate, virtually uninterrupted sclerite. Parameres of dissimilar shape, left paramere rather elongate in comparison, longer than right one, with somewhat transverse apex; right paramere short but massive, rhomboidal.

Variation. Apart from the uniformly reddish coloured pronotum and generally less contrasting

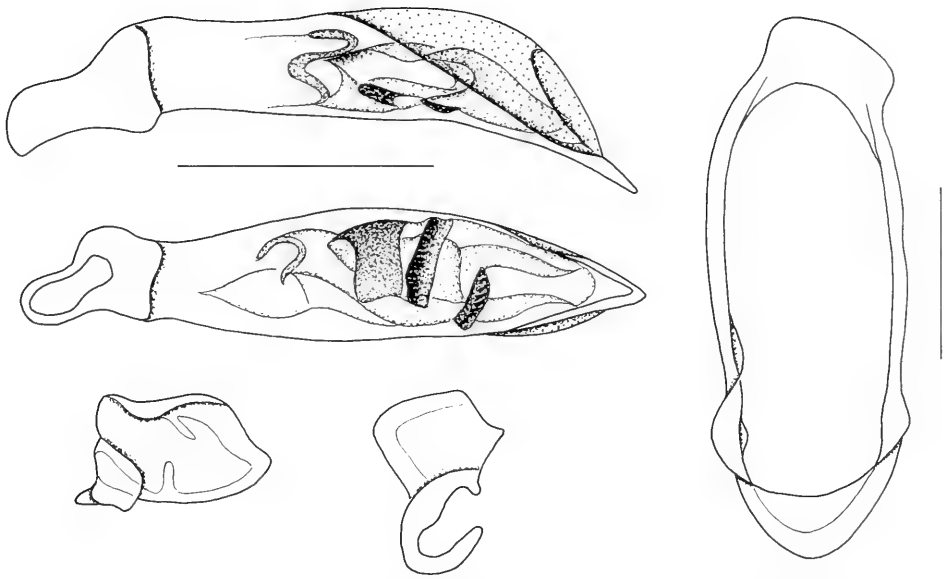


Fig. 12. *L. subglabra*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

colouration in one specimen that probably is due to rather fresh hatching of this specimen, little variation noted.

Distribution. Central Irian Jaya, New Guinea, and extreme northern and northwestern Australia.

Collecting circumstances. Largely unknown. Two of the three mentioned Australian specimens were collected by "Berlese extraction, closed forest litter", and "Rain forest, sieved litter".

Relationships. According to structure of male genitalia probably related to the *papuensis*-lineage, but unique in this group by its striking colour pattern.

New records (3 ex.). **AUS:** 14.25S 126.40E, CALM Site 4/3 14 km S by E of Kalumburu Mission, W.A., 3-6 June 1988, T. A. Weir/*Lebia* ? sp. nov. det. T. A. Weir 1989 (ANIC); 12.21S 130.42E, Casuarina Beach, NT, 10 km NNE of Darwin, 22.x.72, E. Britton (CBM); NT, sth. Alligator Inn, 8 July 1979, G. B. Monteith (QMB).

Lebia subglabra, spec. nov.

Figs 12, 46

Types. Holotype: ♂, Irian Jaya, Panai-Pr., Epomani, km 145, 550-750 m, 15.-16.1.1996, leg. A. Riedel (ZSM-CBM). – Paratypes: 1♀, same data (CBM); 1♂, Irian Jaya, Warmare, Manokwari-Pr. 200-700 m, 22.8.1991, leg. A. Riedel (CBM); 1♂, Dogon, Amazon Bay District, 2400 ft., S. E. Papua, Oct.-Nov. 1962 W. W. Brandt/*Lebia papuella* D. det. Darl. 69 (ANIC); 1♀, Mt. Lamington, N. E. Papua, 1300 to 1500 feet, C. T. McNamara (SAMA).

Diagnosis. Rather small, unicolourous light reddish or gently clouded species with superficial microreticulation of head and pronotum; distinguished from related species by two densely denticulate sclerites at bottom of internal sac and a third behind these that is strongly sclerotized at its left margin.

Description

Measurements. Length: 4.6-5.0 mm; width: 2.2-2.4 mm. Ratios: w/l pr: 1.47-1.49; w pr/h: 1.17-1.21; l/w el: 1.34-1.39; w el/pr: 1.91-2.0.

Colour. Fore body and lower surface, including mouth parts, antennae, and legs light reddish. Surface of elytra more or less light reddish, with or without an indefinite brownish cloud that extends from base, laterally to 5th or 6th stria, but leaves the apex widely light.

Head. Of average size and shape, narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Labrum in midle near base slightly impressed. Surface with fine, superficial, isodiametric microreticulation in middle, also with some very few wrinkles and scattered fine punctures, glossy.

Pronotum (Fig. 46). Moderately wide, widest at or slightly behind middle. Apical angles widely rounded off, lateral margin evenly gently convex,

faintly sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined, lateral margin explanate throughout, marginal channel widened towards base, moderately deep. Surface with a distinct prebasal transverse sulcus. Disk with rather superficial, slightly transverse microreticulation, with rather dense, fairly distinct transverse wrinkles and with very scattered punctures, surface moderately dull.

Elytra. Medium sized (for group), rather oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex gently sinuate, apical angles widely rounded, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with moderately distinct, markedly transverse microreticulation and very scattered punctures, fairly glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2× as long as wide. Abdomen punctate and sparsely pilose, pilosity slightly denser on terminal sternite. Terminal sternite 4-setose in male, 6-setose in female.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 4 large teeth.

Male genitalia (Fig. 12). Genital ring large, rather narrow and elongate, fairly asymmetric, widened towards apex, with wide, oblique and convex apex and narrow, elongate basis. Aedeagus moderately elongate, slightly widened in middle, barely sinuate, lower surface straight, very gently concave in apical third. Apex moderately elongate, depressed, straight, triangular. Orificium elongate. Folding of internal sac complex, with two transverse, very densely denticulate sclerites in middle at bottom, and another plate that is strongly sclerotized at its left margin. Parameres of dissimilar shape, left paramere short in comparison, though longer than right one, with triangular apex; right paramere short but massive, rhomboidal.

Variation. Apart from slight differences in colouration, slight variation noted in shape of pronotum that can be more or less distinctly sinuate near base.

Distribution. So far recorded at few localities from western Irian Jaya through the Central Highlands to southeastern Papua New Guinea.

Collecting circumstances. Largely unknown, most probably collected by sifting in rain forest at rather low altitude.

Etymology. The name refers to the moderately glabrous surface of this species.

Additional examined material: 1♀, Mt. Lamington, N. E. Papua, 1300 to 1500 feet, C. T. McNamara (SAMA). This specimen is tentatively attributed to *L. subglabra*, because shape and structure of pronotum rather matches those of the typical specimens. However, as only dissection of male genitalia provides certainty of species affiliation, it is not included in the type series. The specimen was mounted, and probably caught, together with a male specimen of *L. papuella* Darlington which corroborates the sympatric and probably also syntopic occurrence of both species.

Relationships. With respect to the absence of a distinct elytral pattern, this species seems to be closely related to the *papuana*-lineage of Australia and New Guinea, though structure of aedeagus is extremely similar to those of *L. novabritannica*, spec. nov. from New Britain and *L. salomona*, spec. nov. from Bougainville Island.

Lebia novabritannica, spec. nov.

Figs 13, 31

Types. Holotype: ♂, PNG: E New Britain Prov. 30 km SW Kokopo, 5 km SW Arabam, 04°35'75"S, 152°06'84"E, 200 m, 25.II.2000, leg. A. Weigel KL (CBM-ZSM). – Paratypes: 1♂, 1♀, same data (CBM, CWP).

Diagnosis. Rather small, yellow species with a contrasting black, somewhat anchor-shaped elytral spot; further distinguished from related species except for *L. subglabra*, spec. nov. by two transverse, densely denticulate sclerites in middle at bottom of internal sac of aedeagus, and another plate that is strongly sclerotized at its left margin.

Description

Measurements. Length: 4.4-5.35 mm; width: 2.0-2.55 mm. Ratios: w/l pr: 1.52-1.56; w pr/h: 1.19-1.25; l/w el: 1.37-1.43; w el/pr: 1.84-1.90.

Colour (Fig. 31). Upper and lower surface, including mouth parts, palpi, antennae, and legs yellow. Elytra with a black, gently anchor-shaped sutural spot of variable size in posterior half that does not attain the margin.

Head. Of average size and shape, narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Labrum in middle gently impressed. Frons without distinct impressions, but rather uneven, with a shallow, more or

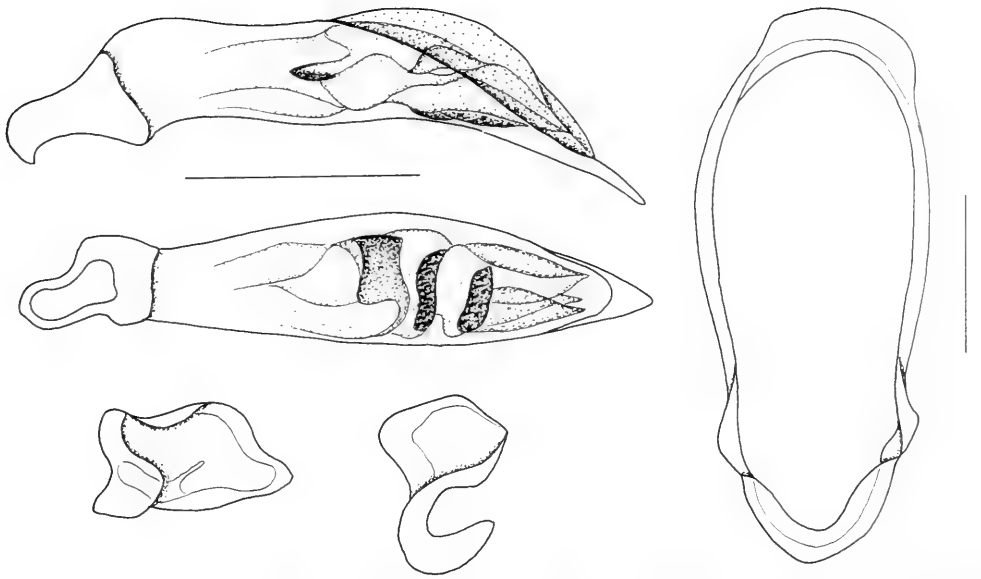


Fig. 13. *L. novabritannica*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

less distinct v-shaped impression in middle. Surface with rather superficial isodiametric microreticulation, with scattered fine punctures, rather glossy.

Pronotum. Moderately wide, slightly wider than head, widest at middle, slightly narrowed towards base. Apical angles widely rounded off, lateral margin anteriorly very convex, from middle gently convex to almost straight, not or barely sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined. Lateral margin explanate throughout, explanation even widened towards base, marginal channel fairly deep. Surface with a distinct prebasal transverse sulcus. Disk with rather distinct, about isodiametric microreticulation, with fairly dense, fine, more or less irregular wrinkles and with very scattered punctures, surface moderately glossy.

Elytra. Rather elongate (for group), oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apical angles widely rounded, apex gently sinuate, apical margin slightly incurved at suture. Striae complete, deep, at bottom more or less distinctly crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with distinct, almost isodiametric to gently transverse microreticulation and very scattered punctures, rather glossy. Inner wings fully developed.

Lower surface. Metepisternum rather elongate, almost 2× as long as wide. Abdomen sparsely punctate and pilose, pilosity slightly denser on terminal sternite. Terminal sternite in male 4-setose, in female 6-setose.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 4 large teeth.

Male genitalia (Fig. 13). Genitalia extremely similar to those of *L.* subglabra, spec. nov. Genital ring large, rather elongate, fairly asymmetric, remarkably widened towards apex, with wide, oblique and convex apex and narrow, elongate basis. Aedeagus moderately elongate, slightly widened in middle, barely sinuate, lower surface straight, gently concave in apical third. Apex rather elongate, depressed, straight, triangular. Orificium elongate. Folding of internal sac complex, with two transverse, very densely denticulate sclerites in middle at bottom, and another plate that is strongly sclerotized at its left margin. Parameres of dissimilar shape, left paramere short in comparison, though longer than right one, with triangular apex; right paramere short but massive, rhomboidal.

Variation. Apart from some differences in body size and relative shape of pronotum and elytra, some variation noted in shape of elytral spot that is perceptibly smaller in the holotype than in both paratypes.

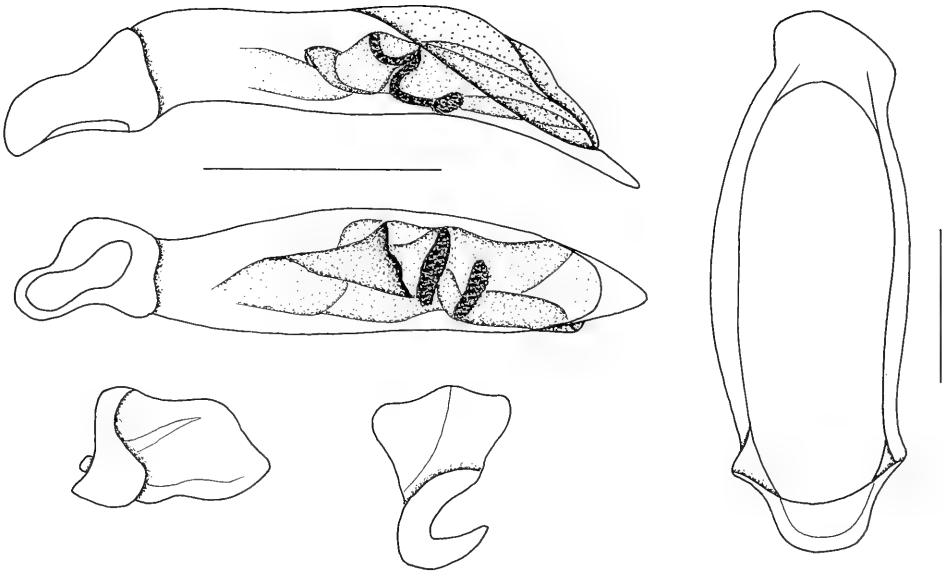


Fig. 14. *L. salomona*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

Distribution. New Britain. Known only from type locality.

Collecting circumstances. Largely unknown. Probably collected by sieving litter or moss from trees in rain forest.

Etymology. The name refers to the range of the species, the island of New Britain.

Relationships. With respect to elytral pattern, this seems to be a rather unique species in the Papuan-Australian region, rather similar to the Oriental *L. monostigma* Andrewes and its allies, though structure of aedeagus is extremely similar to those of *L. subglabra*, spec. nov. from New Guinea and *L. salomona*, spec. nov. from Bougainville Island.

Lebia salomona, spec. nov.

Figs 14, 32

Types. Holotype: ♂, SOLOMON ISLANDS, Bougainville Island, Kukugai Village (Buin), 17.10.1960-2.2.1961, W. W. Brandt (ANIC). – Paratypes: 2♀♀, same data (ANIC, CBM); 1♀, SOLOMON ISLANDS, Bougainville Island, Konga Village (Buin), 6.2.-21.3.1961, W. W. Brandt (ANIC).

Diagnosis. Rather small, light reddish species with a large, contrasting, black elytral spot that leaves the apex and in some specimens also the humeri yellow; further distinguished from related species except for *L. subglabra*, spec. nov. and *L. novabritannica*, spec. nov. by two transverse, densely denticulate sclerites in middle at bottom of internal sac of aedeagus, and another plate that is strongly sclerotized at its anterior margin.

Description

Measurements. Length: 4.6-5.3 mm; width: 2.25-2.5 mm. Ratios: w/l pr: 1.45-1.51; w pr/h: 1.20-1.23; l/w el: 1.36-1.38; w el/pr: 1.82-1.92.

Colour (Fig. 32). Upper and lower surface, including mouth parts, palpi, antennae, and legs yellow. Elytra with a large black spot of variable size that leaves the apex and in some specimens also the humeri yellow.

Head. Of average size and shape, narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Frons without distinct impressions. Surface with rather superficial isodiametric microreticulation, impunctate, rather glossy.

Pronotum. Moderately wide, slightly wider than head, widest at middle, slightly narrowed towards base. Apical angles widely rounded off, lateral margin anteriorly very convex, from middle gently convex to almost straight, not sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined. Lateral margin explanate throughout, explanation even widened

towards base, marginal channel fairly deep. Surface with a distinct prebasal transverse sulcus. Disk with rather distinct, about isodiametric microreticulation, with fairly dense, very fine, more or less irregular wrinkles, but without discernible punctures, surface moderately glossy.

Elytra. Rather elongate (for group), oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apical angles widely rounded, apex gently sinuate, apical margin slightly incurved at suture. Striae complete, deep, at bottom more or less distinctly crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with distinct, almost isodiametric to gently transverse microreticulation and very scattered punctures, rather glossy. Inner wings fully developed.

Lower surface. Metepisternum rather elongate, almost 2 × as long as wide. Abdomen sparsely punctate and pilose, pilosity slightly denser on terminal sternite. Terminal sternite in male 4-setose, in female 6-setose.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 3 large and mostly one additional smaller teeth.

Male genitalia (Fig. 14). Genitalia extremely similar to those of *L. subglabra*, spec. nov. and *L. novabritannica*, spec. nov. Genital ring large, elongate, comparatively wide, fairly asymmetric, widened towards apex, with wide, oblique and convex apex and very narrow, elongate basis. Aedeagus moderately elongate, slightly widened in middle, barely sinuate, lower surface almost straight, very gently concave in apical third. Apex moderately elongate, wide, depressed, straight, triangular, obtuse at tip. Orificium elongate. Folding of internal sac complex, with two transverse, very densely denticulate sclerites in middle at bottom, and another plate that is strongly sclerotized at its anterior left margin. Parameres of dissimilar shape, left paramere short in comparison, though longer than right one, with triangular apex; right paramere short but massive, rhomboidal.

Variation. The elytral pattern is quite variable in this species: in two specimens including the holotype the dark colour is reduced at the base of the elytra to such degree that the basal third is almost completely red. One of the two additional specimens from Kukugai village has the base completely dark, whereas in the single specimen from Konga Village the humeri are slightly less dark that the rest. The colouration of the elytral base in this species hence seems to be quite variable and may occupy all grades from almost completely red to completely black. The red apical margin, however, is quite similar in all examined specimens. The largest species also has the widest pronotum, thus, a sort of allometric variation may be present in this species.

Distribution. Bougainville, Solomon Islands.

Collecting circumstances. Unknown.

Etymology. The name refers to the range of the species, the Solomon Islands.

Relationships. With respect to elytral pattern, this seems to be a rather unique species in the Papuan-Australian region, though structure of aedeagus is extremely similar to those of *L. subglabra*, spec. nov. from New Guinea and *L. novabritannica*, spec. nov. from New Britain.

Lebia permutata, spec. nov.

Figs 15, 33, 47

Types. Holotype: ♂, Irian Jaya, Waropen Pr., Wapoga Riv. Kwadewa, km 62, Lux, 28.2.1999, A. Riedel (ZSM-CBM).

Diagnosis. Comparatively large, narrowly clouded species without microreticulation on head and pronotum; distinguished from related species by the very narrow, quadrate prothorax, the very acute apex of the aedeagus, and presence of a single, partly denticulate sclerite at roof of internal sac.

Description

Measurements. Length: 6.3 mm; width: 3.0 mm. Ratios: w/l pr: 1.34; w pr/h: 1.0; l/w el: 1.37; w el/pr: 2.09.

Colour (Fig. 33). Fore body and lower surface reddish, palpi, antennae, and legs light reddish. Surface of elytra reddish, with an indefinite, narrow, brownish cloud that extends from near base, occupies the 2nd and 3rd intervals, and leaves the apex widely light. Lateral margins of pronotum and elytra slightly lighter, yellowish.

Head. Of average size and shape, as wide as pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Labrum in middle near base very slightly impressed. Frons on either side with a circular impression behind clypeal suture and another behind near middle. Groove of anterior suprorbital seta large and deep. Surface without microreticulation, but with very scattered and fine punctures, highly glossy.

Pronotum (Fig. 47). Narrow, not wider than head, remarkably quadrate, widest at middle. Apical angles widely rounded off, lateral margin gently

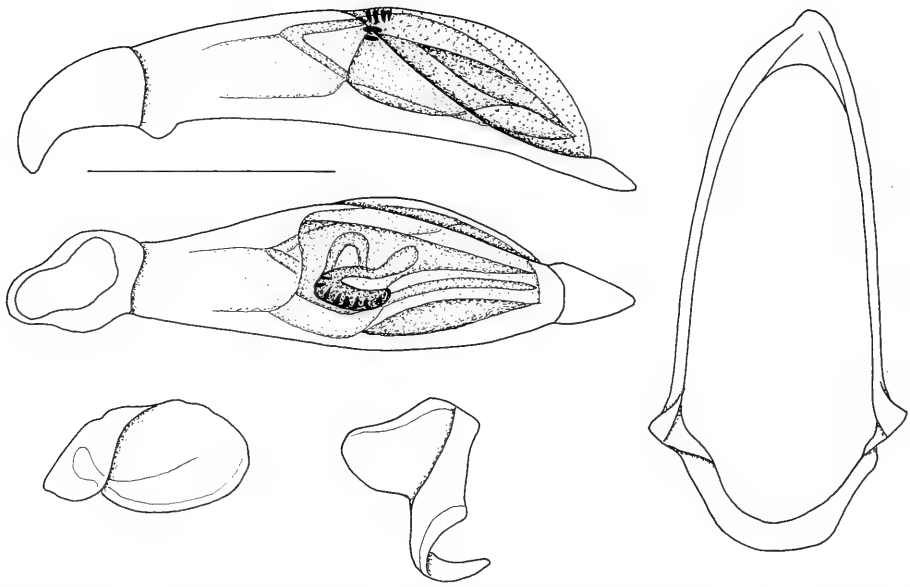


Fig. 15. *L. permutata*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

convex anteriorly, then almost straight, faintly sinuate in front of the rectangular basal angles. Base in middle much produced, this part relatively wider than usual, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined, lateral margin narrowly explanate throughout, marginal channel slightly widened towards base, moderately deep. Surface with a distinct prebasal transverse sulcus. Disk only with highly superficial traces of microreticulation, with rather dense, fairly distinct transverse wrinkles and with very scattered punctures, surface highly glossy.

Elytra. Medium sized (for group), rather oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface moderately convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex very little sinuate, apical angles widely rounded, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with moderately distinct, markedly transverse microreticulation and very scattered punctures, rather glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2× as long as wide. Abdomen very sparsely punctate and pilose, pilosity barely denser on terminal sternite. Terminal sternite 4-setose in male.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 5 large teeth.

Male genitalia (Fig. 15). Genital ring large, rather narrow and elongate, gently asymmetric, narrowed towards apex, with narrow, obtuse apex and narrow, elongate basis. Aedeagus moderately elongate, asymmetrically widened in middle, barely sinuate, lower surface almost straight, very gently concave at base of apex. Apex moderately elongate, depressed, straight, markedly triangular, slightly twisted. Orificium elongate. Folding of internal sac complex, with a partly denticulate, folded plate in middle at roof. Parameres of dissimilar shape, left paramere fairly elongate, with somewhat obtuse apex; right paramere short but massive, asymmetrically rhomboidal.

Variation. Unknown.

Distribution. Western Irian Jaya. Known only from type locality.

Collecting circumstances. The holotype was collected at light.

Etymology. The name refers to the high possibility to confound this species with certain quite similar New Guinean *Lebia*.

Relationships. This species is fairly unique and certainly less closely to any of the species of the *papuana*-group that all other species.

Lebia inornata, spec. nov.
Fig. 48

Types. Holotype: ♂ (immature), IRIAN JAYA, Sorong-Prov., leg. A. Riedel, 1996/Salawati Isl. Solol, 0-350 m, 6.-7.XI. (ZSM-CBM).

Diagnosis. Comparatively large, unicolourous yellowish species with dense and distinct microreticulation on head and pronotum; distinguished from related species by the laterally markedly rounded, not sinuate pronotum.

Description

Measurements. Length: 5.6 mm; width: 2.8 mm. Ratios: w/l pr: 1.50; w pr/h: 1.25; l/w el: 1.30; w el/pr: 1.85.

Colour. Upper and lower surface uniformly yellowish (perhaps due to immaturity).

Head. Of average size and shape, narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Labrum in middle near base very slightly impressed. Frons withou definite impressions, though surface with dense and complete, though rather superficial, isodimetric microreticulation and with very scattered and fine punctures, fairly glossy.

Pronotum (Fig. 48). Moderately wide, wider than head, widest slightly behind middle. Apical angles very widely rounded off, lateral margin almost completely convex, barely sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined, lateral margin rather wide and explanate throughout, marginal channel widened towards base, moderately deep. Surface with a distinct prebasal transverse sulcus. Disk with rather dense, moderately superficial, slightly transverse microreticulation, with dense, fairly distinct transverse wrinkles and with very scattered punctures, surface moderately dull.

Elytra. Rather short and wide (for group), oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface moderately convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex very little sinuate, apical angles widely rounded, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with moderately distinct, markedly transverse microreticulation and very scattered punctures, moderately glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2× as long as wide. Abdomen very sparsely punctate and pilose, pilosity barely denser on terminal sternite. Terminal sternite 4-setose in male.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 4, rarely 5 large teeth.

Male genitalia. Due to immaturity of holotype aedeagus not well preserved nor sclerotized.

Variation. Unknown.

Distribution. Salawati Island, off the west coast of New Guinea. Known only from type locality.

Collecting circumstances. Largely unknown, holotype most probably collected by sifting in rain forest at low altitude.

Etymology. The name refers to the absence of any distinct elytral pattern.

Relationships. Due to the unknown male genitalia, the nearest relatives are yet uncertain, though this species is probably closely related to the New Guinean species mentioned above.

Lebia laticollis, spec. nov.
Figs 16, 49

Types. Holotype: ♂, 15.29S 145.16E Mt. Cook Nat. Pk. Cooktown Q. 11-12 Oct. 1980 J. C. Cardale ex ethanol (ANIC). – Paratypes: 1♀, N. E. Qld: 19.16S, 147.03E, Mt Cleveland summit, 23 Mar 1991. Monteith. Pyrethr. Rain For. 500 m (QMB); 3♂♂, MEW: 21°35'S × 149°11'E, Cameron Creek, upper, 100 m, 1.Oct 1999. GB Monteith, pyrethrum trees, rainforest. **7793** (CBM, QMB); 1♂, SEQ: 23°37'S × 150°28'E, Mt. Gavial, 3 km SSW, 27 Sep 1999. 320 m, G.B. Monteith, vinescrtub pyrethrum-trees. **7772** (QMB); 1♂, 15/4/Bamaga, N.Q. Jan, 1984 J. H. Sedlacek (QMB).

Diagnosis. Rather small, unicolourous reddish species with dense and rather distinct microreticulation on head and pronotum; distinguished from related species by the remarkably wide, near base not sinuate pronotum.

Description

Measurements. Length: 4.5-4.8 mm; width: 2.2-2.4 mm. Ratios: w/l pr: 1.67-1.69; w pr/h: 1.30-1.32; l/w el: 1.31-1.34; w el/pr: 1.66-1.70.

Colour. Whole upper and and lower surface, including mouth parts, palpi, and antennae light reddish. Femora yellow, tibiae reddish, perceptibly darker than femora. Surface of elytra without any colour pattern.

Head. Of average size and shape, clearly narrower than pronotum. Eyes very large, semicircu-

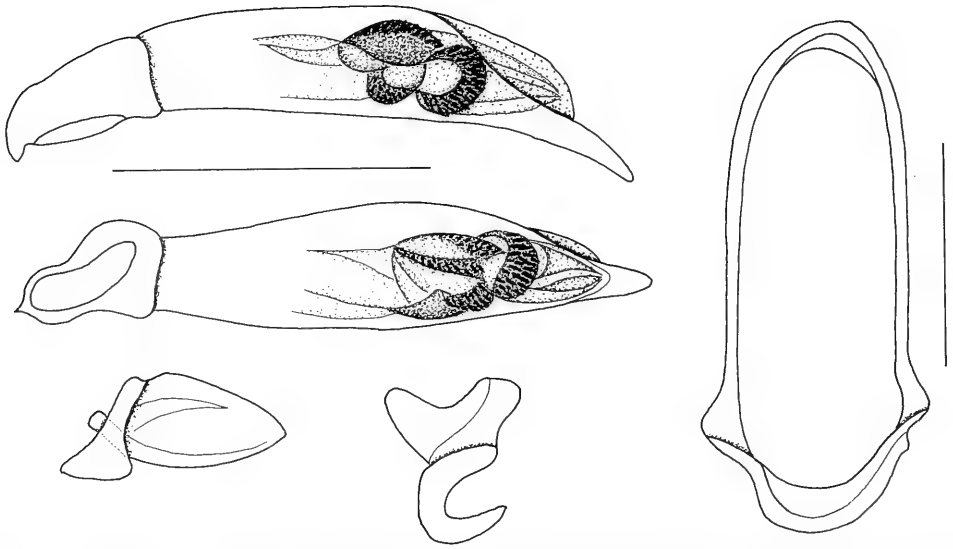


Fig. 16. *L. laticollis*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

lar. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Labrum in middle not impressed. Frons on either side with a circular impression behind clypeal suture and another elongate and slightly sinuate impression near middle. Surface with dense though rather superficial isodiametric microreticulation, with scattered but rather coarse punctures, moderately glossy.

Pronotum (Fig. 49). Unusually wide, considerably wider than head, widest at middle, but barely narrower towards base. Apical angles very widely rounded off, lateral margin anteriorly very convex, from middle almost straight, not sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined, lateral margin widely explanate throughout, marginal channel even widened towards base, rather shallow. Surface with a distinct prebasal transverse sulcus. Disk with distinct, though somewhat superficial, isodiametric microreticulation, with fairly dense, rather coarse, irregular wrinkles and with very scattered punctures, surface moderately dull.

Elytra. Medium sized (for group), rather oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface moderately convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apex very little sinuate, apical angles widely rounded, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with distinct, moderately transverse microreticulation and very scattered punctures, rather glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2× as long as wide. Abdomen sparsely punctate and pilose, pilosity slightly denser on terminal sternite. Terminal sternite in male 2-setose, in female 4-setose.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 4 large teeth.

Male genitalia (Fig. 16). Very small in comparison. Genital ring large, rather elongate, rather symmetric, laterally absolutely parallel, with rather wide, almost evenly convex apex and narrow, elongate, slightly asymmetric basis. Aedeagus rather elongate, slightly widened in middle, barely sinuate, lower surface almost straight. Apex moderately elongate, depressed, straight, rather wide, at tip rounded. Orificium comparatively short. Folding of internal sac complex, with two remarkably coiled, densely denticulate sclerites in middle. Parameres of dissimilar shape, left paramere narrow and elongate in comparison, longer than right one, with obtusely triangular apex; right paramere short, rhomboidal, with produced, comparatively narrow apex.

Variation. Very little variation noted.

Distribution. Eastern Queensland, Australia.

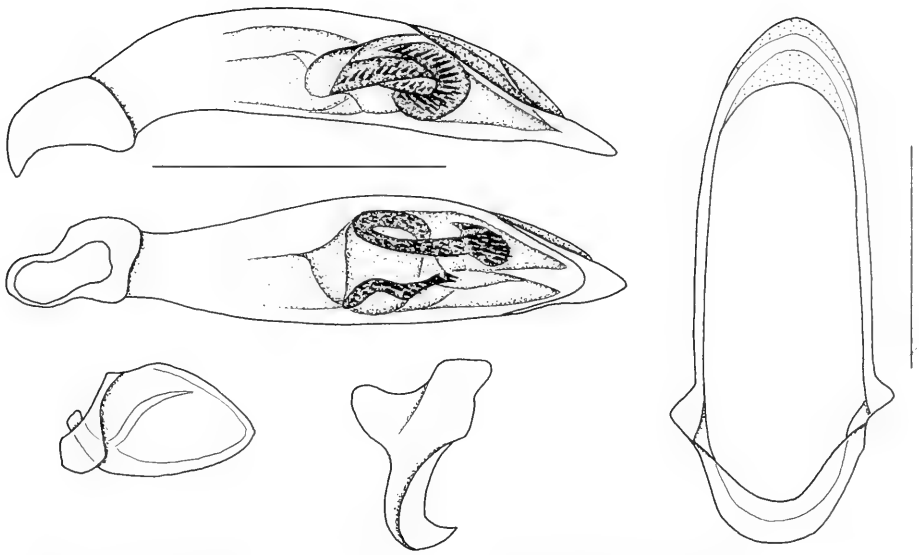


Fig. 17. *L. atripennis*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

Collecting circumstances. Most specimens captured by pyrethrum knockdown on logs in rain forest of median altitude.

Etymology. The name refers to the very wide pronotum of this species.

Relationships. With regard to body shape as well as to structure of male aedeagus, this species is quite unique within the Australian-New Guinean *Lebia*, and close relatives are so far unknwon.

Lebia atripennis, spec. nov.

Figs 17, 34

Types. Holotype: ♂, PNG: New Ireland Pr., New Ireland, 5 km SE Kamiraba, Lelet Plateau / 600-800 m, 03°15'33"S, 151°55'32"E, 11.III.2000, leg. A. Weigel KL (ZSM-CBM).

Diagnosis. Rather small, reddish species with contrasting black elytra; further distinguished from related species by a complexly coiled, very densely denticulate sclerite in middle of internal sac of aedeagus.

Description

Measurements. Length: 4.5 mm; width: 2.2 mm. Ratios: w/l pr: 1.64; w pr/h: 1.28; l/w el: 1.27; w el/pr: 1.67.

Colour (Fig. 34). Fore body, lower surface, mouth parts, palpi, and antennae light reddish. Elytra completely and contrastingly unicolourous black, except for the very base, scutellum, and a narrow spot behind scutellum which are reddish. Femora yellow, tibiae reddish, slightly darker than femora.

Head. Of average size and shape, perceptibly narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Labrum in middle barely impressed. Frons without distinct impressions, but rather uneven. Surface with dense though somewhat superficial isodiametric microreticulation, with scattered fine punctures, moderately glossy.

Pronotum. Wide, distinctly wider than head, widest at middle, slightly narrowed towards base. Apical angles very widely rounded off, lateral margin anteriorly very convex, from middle gently convex, not sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, gently convex. Apex margined except in middle, base distinctly margined. Lateral margin narrow in apical half, explanate posteriorly, marginal channel markedly widened towards base, rather shallow. Surface with a distinct prebasal transverse sulcus. Disk with distinct isodiametric microreticulation, with fairly dense, rather coarse, irregular wrinkles and with very scattered punctures, surface moderately dull.

Elytra. Rather short (for group), oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, not incised at basal third, apical angles widely rounded,

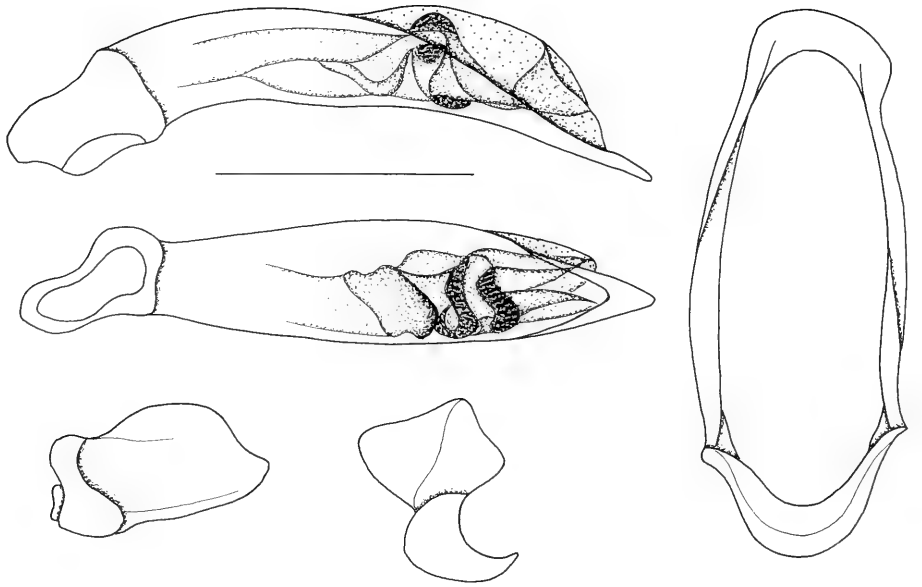


Fig. 18. *L. trivittata*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

apex not at all sinuate, transverse and almost straight, apical margin not incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with distinct, decidedly transverse microreticulation and very scattered punctures, rather glossy. Inner wings fully developed.

Lower surface. Metepisternum moderately elongate, less than 2 × as long as wide. Abdomen sparsely punctate and pilose, pilosity slightly denser on terminal sternite. Terminal sternite 4-setose in male. Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 4 large teeth.

Male genitalia (Fig. 17). Genitalia comparatively small. Genital ring large, narrow and elongate, parallel, almost symmetric, with evenly convex apex and narrow, elongate basis. Aedeagus moderately elongate, slightly widened in middle, barely sinuate, lower surface straight, laterally slightly incised towards apex. Apex moderately elongate, depressed, straight, obtusely triangular. Orificium moderately elongate. Folding of internal sac complex, with a complexly coiled, very densely denticulate sclerite in middle. Parameres of dissimilar shape, left paramere rather short in comparison, though longer than right one, with triangular apex; right paramere short, with obtuse apex.

Variation. Unknown.

Distribution. New Ireland. Known only from type locality.

Collecting circumstances. Largely unknown. The holotype was collected at median altitude, presumably in rain forest.

Etymology. The name refers to the uniformly black elytra.

Relationships. Concerning its external characters this species is closely related to the New Guinean species mentioned above, though the male genitalia are rather unique. Hence, this species may be rather isolated within the Australian-Papuan *Lebia*.

Lebia trivittata, spec. nov.

Figs 18, 35

Types. Holotype: ♂, Coll. I.R.Sc.N.B. Sulawesi, Utara, Hogg's Back (660 m), Sweeping, 23.X.1985, Leg. J. Van Stalle (IRSNB). – Paratypes: 2♂♂, 6♀♀, same data (CBM, IRSNB).

Diagnosis. Medium sized, yellow species with a contrasting dark, trivittate elytral pattern; further distinguished from related species including the fairly similarly patterned *L. adusta*, spec. nov., but except for *L. subglabra*, spec. nov., by two transverse, densely denticulate sclerites in middle at bottom of internal sac of aedeagus, and another plate that is strongly sclerotized at its left margin.

Description

Measurements. Length: 5.0-5.7 mm; width: 2.45-2.7 mm. Ratios: w/l pr: 1.38-1.46; w pr/h: 1.16-1.21; l/w el: 1.35-1.41; w el/pr: 1.90-2.0.

Colour (Fig. 35). Upper and lower surface, including mouth parts, palpi, antennae, and legs yellow. Elytra with a distinct pattern of three dark piceous to black vittae, one sutural and two submarginal ones which are united in posterior quarter and leave the apex broadly light.

Head. Of average size and shape, narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by almost 3 antennomeres, median antennomeres almost twice as long as wide. Labrum in middle gently impressed. Frons without distinct impressions, but with some shallow, longitudinal wrinkles near the eyes. Surface with distinct isodiametric microreticulation, impunctate, moderately glossy.

Pronotum. Comparatively narrow, slightly wider than head, widest at middle, slightly narrowed towards base. Apical angles widely rounded off, lateral margin anteriorly very convex, from middle gently almost straight to very gently sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, rather convex. Apex not margined, base margined though indistinctly in middle. Lateral margin explanate throughout, explanation considerably widened towards base, marginal channel fairly deep. Surface with a distinct prebasal transverse sulcus and slightly impressed median line. Disk with distinct, about isodiametric microreticulation, and with very fine, more or less irregular transverse wrinkles, apparently impunctate, surface moderately glossy.

Elytra. Rather short and wide (for group), oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apical angles widely rounded, apex gently sinuate, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with distinct, gently transverse microreticulation and very scattered punctures, rather glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, about 2× as long as wide. Abdomen sparsely punctate and pilose, pilosity slightly denser on terminal sternite. Terminal sternite in male 4-setose, in female 6-setose.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 3 large and one additional smaller teeth.

Male genitalia (Fig. 18). Genitalia extremely similar to those of *L. subglabra*, spec. nov. Genital ring large, rather elongate, fairly asymmetric, remarkably widened towards apex, with wide, oblique and convex apex and narrow, semilunar basis. Aedeagus rather narrow and elongate, slightly widened in middle, barely sinuate, lower surface straight, very gently concave in apical third. Apex rather elongate, depressed, straight, triangular. Orificium elongate. Folding of internal sac complex, with two transverse, very densely denticulate sclerites in middle at bottom, and another plate that is strongly sclerotized at its anterior margin. Parameres of dissimilar shape, left paramere short in comparison, though longer than right one, with triangular apex; right paramere short but massive, rhomboidal.

Variation. Apart from some differences in size, little variation noted.

Distribution. Sulawesi. Known only from type locality.

Collecting circumstances. All specimens collected by "sweeping" (vegetation).

Etymology. The name refers to the trivittate elytral pattern.

Relationships. With respect to elytral pattern, this species is very similar to the syntopic *L. adusta*, spec. nov., though structure of aedeagus is extremely similar to that of *L. subglabra*, spec. nov. from New Guinea.

Lebia adusta, spec. nov.

Figs 19, 36

Types. Holotype: ♂, Coll. I.R.Sc.N.B. Sulawesi, Utara, Hogg's Back (660 m), Sweeping, 23.X.1985, Leg. J. Van Stalle (IRSNB). – Paratype: 1♀, same data (CBM).

Diagnosis. Rather small, yellow species with a little contrasting dark, trivittate elytral pattern; further distinguished from related species including the fairly similarly patterned *L. trivittata*, spec. nov. by the absence of any sclerotized or denticulate plates in the internal sac.

Description

Measurements. Length: 4.2-4.3 mm; width: 2.0-2.05 mm. Ratios: w/l pr: 1.43-1.44; w pr/h: 1.20-1.21; l/w el: 1.35-1.37; w el/pr: 1.92-1.93.

Colour (Fig. 36). Upper and lower surface, including mouth parts, palpi, antennae, and legs yellow. Elytra with a somewhat faded pattern of three

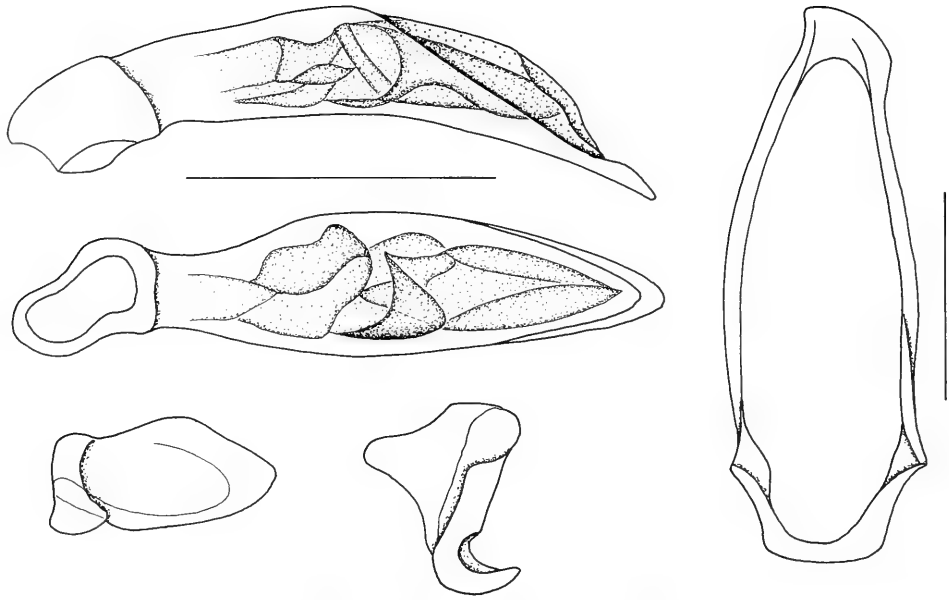


Fig. 19. *L. adusta*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

dark piceous to black vittae, one sutural and two submarginal ones which are united in posterior quarter and leave the apex broadly light.

Head. Of average size and shape, narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres, median antennomeres about 1.5 × as long as wide. Labrum in middle gently impressed. Frons without distinct impressions and without any longitudinal wrinkles near eyes. Surface with rather distinct isodiametric microreticulation, impunctate, fairly glossy.

Pronotum. Comparatively narrow, slightly wider than head, widest at middle, slightly narrowed towards base. Apical angles widely rounded off, lateral margin anteriorly very convex, from middle gently almost straight to very gently sinuate in front of the rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, rather convex. Apex not margined, base margined throughout. Lateral margin explanate throughout, explanation considerably widened towards base, marginal channel fairly deep. Surface with a distinct prebasal transverse sulcus and slightly impressed median line. Disk with rather distinct, about isodiametric microreticulation, and with very fine, more or less irregular transverse wrinkles, apparently impunctate, surface fairly glossy.

Elytra. Rather short and wide (for group), oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apical angles widely rounded, apex gently sinuate, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with distinct though somewhat superficial, gently transverse microreticulation and very scattered punctures, rather glossy. Inner wings fully developed.

Lower surface. Metepisternum elongate, almost 2 × as long as wide. Abdomen sparsely punctate and pilose, pilosity slightly denser on terminal sternite. Terminal sternite in male 4-setose, in female 6-setose.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 3 large teeth.

Male genitalia (Fig. 19). Genital ring elongate, narrow, slightly asymmetric, with rather wide, oblique and convex apex and narrow, elongate basis. Aedeagus elongate, widened in middle, barely sinuate, lower surface very gently concave. Apex symmetric, straight, moderately elongate, wide, depressed, tip obtuse. Orificium elongate. Folding of internal sac complex, but without any remarkably sclerotized or denticulate plates. Parameres of dissimilar shape, left paramere elongate in comparison, though larger than right one, with triangular

apex; right paramere short but massive, rhomboidal, with characteristically produced apex.

Variation. Due to scarce material little variation noted.

Distribution. Sulawesi. Known only from type locality.

Collecting circumstances. Collected by "sweeping" (vegetation).

Etymology. The name refers to the slightly darkened elytra of the species.

Relationships. With respect to elytral pattern, this species is very similar to the syntopic *L. trivittata*, spec. nov., though structure of aedeagus is unique within the examined group of species.

calycophora-group

A group of rather small, mainly Oriental species bearing a characteristic dark elytral pattern on yellow or light reddish ground. Apart from the species described below, several additional species exist in South and East Asia.

Measurements and ratios see table 2.

Lebia sedlaceki, spec. nov.

Fig. 37

Types. Holotype (slightly damaged): ♀, AUST., N. QLD, Bamaga, i.1984, J. H. Sedlacek (QMT123517).

Diagnosis. Rather small, yellow species, characterized by the contrasting, black elytral pattern of an narrow, elongate sutural stripe and an isolated lateral spot on either side behind middle.

Description

Measurements. Length: 4.75 mm; width: 2.3 mm. Ratios: w/l pr: 1.51; w pr/h: 1.17; l/w el: 1.36; w el/pr: 1.92.

Colour (Fig. 37). Upper and lower surface, including mouth parts, palpi, antennae, and legs light reddish. Elytra with a narrow brown sutural spot that is slightly widened near base and in apical half but does not attain the apex, and with an elongate, oval-shaped spot on either side behind middle on 5th-7th intervals.

Head. Of average size and shape, slightly narrower than pronotum. Eyes very large, semicircular. Antennae of moderate size, surpassing basal angles of pronotum by about 2 antennomeres. Labrum in middle gently impressed. Frons without distinct impressions, but somewhat uneven. Surface with distinct though somewhat superficial isodiametric microreticulation, with scattered, very fine punctures, fairly glossy.

Pronotum. Moderately wide, slightly wider than head, widest at middle, slightly narrowed towards base. Apical angles widely rounded off, lateral margin anteriorly very convex, from middle gently convex, slightly sinuate in front of the about rectangular basal angles. Base in middle much produced, lateral excision deep, lateral parts of base transversal, laterally towards angles gently convex. Apex margined except in middle, base distinctly margined. Lateral margin moderately wide, explanate, explanation widened towards base, marginal channel moderately deep. Surface with a distinct prebasal transverse sulcus. Disk with distinct, about isodiametric microreticulation, with very fine, rather irregular wrinkles and with very scattered punctures, surface rather dull.

Elytra. Medium sized (for group), oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface rather convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apical angles widely rounded, apex gently sinuate, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex throughout. 3rd interval bipunctate, punctures situated at 3rd stria. Series of marginal punctures not interrupted in middle. Intervals with distinct, almost isodiametric to gently transverse microreticulation and very scattered punctures, rather dull. Inner wings fully developed. Lower surface. Metepisternum rather elongate, almost 2× as long as wide. Abdomen sparsely punctate and pilose, pilosity denser on terminal sternite. Terminal sternite 6-setose in female.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 4 large teeth.

Male genitalia. Unknown.

Variation. Unknown.

Distribution. Northern tip of Cape York Peninsula, northern Queensland, Australia. Known only from type locality.

Collecting circumstances. Unknown.

Etymology. The name honours the collector of this and of a multitude of other species throughout New Guinea, the late J. Sedlacek.

Relationships. In structure of elytral pattern this species is similar to the oriental *L. calycophora* Schmidt-Göbel and its allies. As the male genitalia are still unknown, relationships at present remain uncertain.

foveipennis-group

A group of unknown relationships. Both species described below are closely related and form a group of strangely shaped *Lebia* that are distinguished by the great number of large, foveate setiferous punctures on the odd elytral intervals, and the wide, laterally explanate pronota. I do not known any *Lebia*'s of similar appearance in the Oriental and Australian regions.

Measurements and ratios see table 3.

Lebia foveipennis, spec. nov.

Figs 20, 38

Types. Holotype: ♂, Mt. Spec. N.Q. 4/69. GB./m 85./ *Lebia papuensis* Macl. det. B. P. Moore'69./*papuensis* Macl 1303./J. G. Brooks Bequest, 1976 (ANIC). – Paratypes: 1♀, Ewan Rd. 10-12 mls. W. of Paluma, N.Q. 4-6.i.66. J. G. and J. A. G. Brooks (ANIC); 1♀, Paluma Range, 900 m, 75 km nw. Townsville, n.Qld., Australien, 25.12.81-18.1. 1982, M. Baehr (CBM); 1♀, Mt. Fisher, 7 km SW Millaa Millaa NQ (Whiteing Rd) 5 May 1983, G. B. Monteith, D. K. Yeates/QM berlesate No. 584, 17.34S 145.34E, Rainforest 1200 m, sieved litter (QMB).

Diagnosis. Large, uniformly brown to piceous species with setose and characteristically interrupted odd intervals; distinguished from related *L. monteithi*, spec. nov. by smaller and narrower head and pronotum, posteriorly produced basal angles of pronotum, not longitudinally impressed elytral intervals, trisetose 3rd, bisetose 5th, but asetose 7th intervals, absence of microreticulation on the elytra, and smaller aedeagus with a wide, very densely denticulate, transverse band that is only narrowly interrupted at left side of bottom of internal sac.

Description

Measurements. Length: 7.3-7.7 mm; width: 3.3-3.7 mm. Ratios: w/l pr: 1.55-1.58; w pr/h: 1.31-1.40; l/w el: 1.36-1.42; w el/pr: 1.68-1.72.

Colour (Fig. 38). Chestnut brown with commonly slightly darker head and centre of pronotum. Mouth parts, antennae, and legs of same brown colour.

Head. Elongate, rather narrow in comparison to pronotum. Eyes large, projecting, though not semicircular, orbits small though present, oblique. Antennae of moderate size, surpassing basal angles of pronotum by almost 3 antennomeres. Labrum in middle gently impressed. Frons without shallow impressions, somewhat uneven, in middle with very shallow, v-shaped impression. Surface without any microreticulation, with extremely scattered, barely discernable punctures, highly glossy.

Pronotum. Wide, considerably wider than head, widest in anterior third, evenly narrowed towards base. Apical angles produced, widely rounded off, lateral margin anteriorly very convex, from middle gently convex, without any sinuation in front of the about rectangular though at tip obtuse basal angles. Base in middle very much produced, lateral excision deep, lateral parts of base transversal to slightly oblique, because the basal angles are somewhat produced backwards. Apex margined throughout, base coarsely margined. Lateral margin very wide, explanate, explanation little widened towards base, marginal channel moderately deep. Apical angles with some short, inconspicuous hairs along margin. Surface with shallow anterior and quite deep prebasal transverse sulcus and with well impressed median line. Disk without any microreticulation, surface rather uneven, in particular in marginal channel wich is covered by irregular wrinkles and very coarse scattered punctures, surface highly glossy.

Elytra. Comparatively elongate (for group), oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface moderately convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apical angles widely rounded, apex gently sinuate, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals evenly convex throughout. 3rd tripunctate, 5th interval bipunctate, punctures very wide, foveiform. Series of marginal punctures not interrupted in middle. Intervals without any microreticulation, with scattered fine and rather coarse punctures, highly glossy. Inner wings fully developed.

Lower surface. Metepisternum rather elongate, about 1.5 × as long as wide. Abdomen sparsely punctate and pilose, pilosity denser on terminal sternite. Terminal sternite in male 4-setose, in female 6-setose.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 5 comparatively small teeth.

Table 3. Measurements and ratios of the species of the *foveipennis*-group.

	N	length	w/l pr	w pr/h	l/w el	w el/pr
foveipennis	4	7.3-7.7	1.55-1.58	1.31-1.40	1.36-1.42	1.68-1.72
monteithi	6	7.9-9.1	1.65-1.69	1.31-1.39	1.42-1.45	1.65-1.68

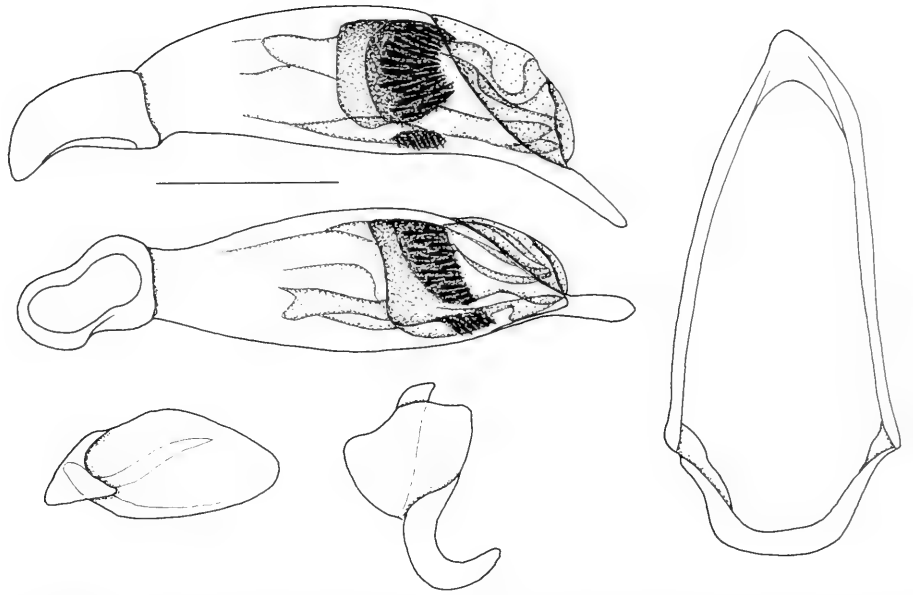


Fig. 20. *L. foveipennis*, spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

Male genitalia (Fig. 20). Genital ring large, rather elongate, slightly asymmetric, with rather narrow, obtuse apex and moderately elongate basis. Aedeagus moderately elongate, rather compact, widened in middle, barely sinuate, lower surface basally almost straight, gently concave in apical third. Apex rather elongate, depressed, straight, slightly spoon-shaped. Orificium moderately elongate. Folding of internal sac complex, with a very wide, transverse, remarkably sinuate, very densely denticulate band that is only narrowly interrupted at left side of bottom. Parameres of dissimilar shape, left paramere elongate in comparison, longer than right one, with triangularly convex apex; right paramere short but massive, rhomboidal.

Variation. Rather little variation noted.

Distribution. Northeastern Queensland from Mt. Spec plateau to Atherton Tableland, Australia.

Collecting circumstances. One specimen collected by Berlese extraction from rainforest litter, another captured at light. All four recorded specimens sampled in upland rain forests.

Etymology. The name refers to the conspicuous setiferous pits on the odd intervals.

Relationships. Very closely related to *L. monteithi*, spec. nov. that lives in the same area.

Lebia monteithi, spec. nov.

Figs 21, 39

Types. Holotype: ♂, AUST: QLD: NE, 10 km W Bones Knob, 10 Dec 1995, Cook, Monteith & Thompson/QM BERLESATE 902, 17°13'S × 145°25'E, Rainforest, 1100 m, Leaf Litter (QMT123515). – Paratypes: 1♀, same data (CBM); 1♀, NEQ: 16°35'S × 145°16'E, Upper Leichhardt Creek, 18 Nov. 1997, 840 m, G. B. Monteith **1627** Pyreth. on Bunya Pines (QMB); 1♀, NEQ: 16°34'S × 145°18'E, Mt. Lewis Rd., 16 km from Highway, 18 Nov. 1997, 840 m, G. B. Monteith **1629** Pyrethrum, trees & logs (QMB); 1♀, NEQ: 17°27'S × 145°29'E, Tower nr. The Crater NP, 10 Jan 1995 – 31 Mar 1995, Monteith & Hasenpusch, Flt. intercept trap, 1230 m (QMB); 1♀, Windsor Tbld., 35 km NNW Mt. Carbine, N. Qld. 25-26 Apr., 1982, 1050 m, 1♂, Mt. Fisher, 1050-1100 m, 7 km SW Millaa Millaa, N.Q. 27-29 Apr., 1982, Monteith, Yeates & Cook, Pyrethrum knockdown (QMB); 1♂, Charmillin Ck. Xing, 950 m, Tully Falls Rd., N. QLD 8 Dec 1989 – 5 Jan 1990, Montheith, Thompson & Janetzki, Pitfall & Intercept Traps (QMB); 1♀, Hinchinbrook Is, NE. QLD. Gayundah Ck. 10 m, 7-15 Nov 1984, Monteith, Cook & Thompson (QMB); 7♂♂, 8♀♀, QLD: 16°35'S × 145°16'E Leichhardt Crekk, upper 28 May 2003, G. B. Monteith Pyrethrum on Bunya Pine trunks, **1131** (CBM, QMB).

Diagnosis. Large, uniformly brown to piceous species with setose and characteristically interrupted odd intervals; distinguished from related *L. foveipennis*, spec. nov. by larger and wider head and pronotum, not produced basal angles of pronotum, longitudinally impressed elytral intervals, multisetose

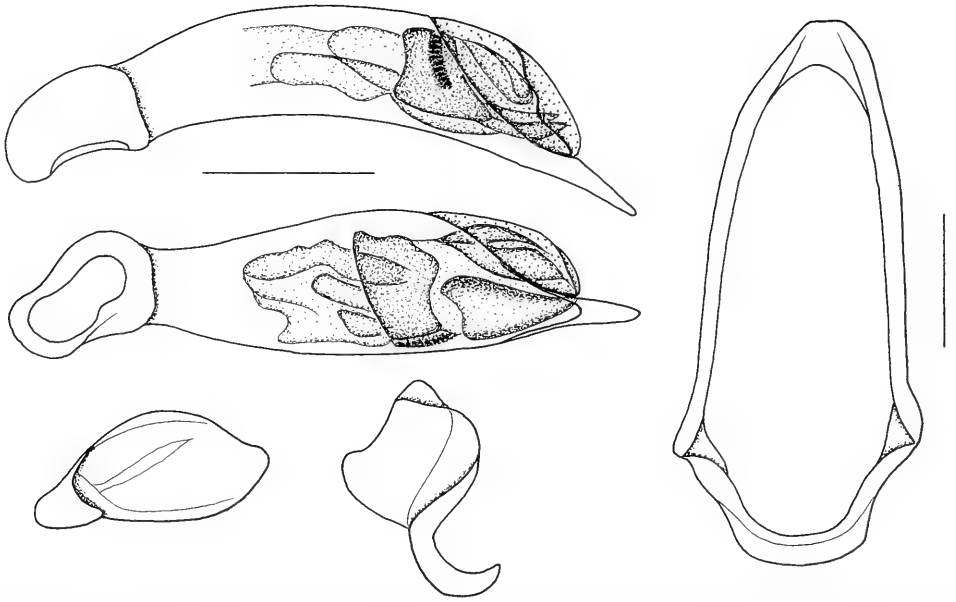


Fig. 21. *L. monteithi,* spec. nov. Male genitalia: Adeagus, lateral from left side, and ventral; parameres; genital ring. Scales: 0.5 mm.

3rd, 5th, and 7th, intervals, presence of microreticulation on the elytra, and larger aedeagus with a narrow denticulate band that is widely interrupted at lower left side and at bottom of internal sac.

Description

Measurements. Length: 7.9-9.1 mm; width: 3.7-4.3 mm. Ratios: w/l pr: 1.65-1.69; w pr/h: 1.31-1.39; l/w el: 1.42-1.45; w el/pr: 1.65-1.68.

Colour (Fig. 39). Chestnut brown to piceous with commonly slightly darker head and centre of pronotum. Mouth parts, antennae, and legs reddish-brown.

Head: Large and comparatively short, though rather narrow in comparison to pronotum. Eyes large, projecting, though not fully semicircular, orbits small though present, oblique. Antennae of moderate size, surpassing basal angles of pronotum by about 3 antennomeres. Labrum in middle gently impressed. Frons without shallow impressions, somewhat uneven, in middle with very shallow, v-shaped impression. Surface without any microreticulation, with extremely scattered, barely discernable punctures, highly glossy.

Pronotum. Very wide, considerably wider than head, widest in anterior third, evenly narrowed towards base. Apical angles produced, widely rounded off, lateral margin anteriorly very convex, from middle gently convex, without any sinuation in front of the very obtuse basal angles. Base in middle very much produced, lateral excision deep, lateral parts of base slightly convex, basal angles not produced backwards. Apex very inconspicuously margined, base coarsely margined. Lateral margin very wide, explanate, explanation little widened towards base, marginal channel moderately deep. Apical angles with some short, inconspicuous hairs along margin. Surface with shallow anterior and quite deep prebasal transverse sulcus and with well impressed median line. Disk without any microreticulation, surface rather uneven, in particular in marginal channel which is covered by irregular wrinkles and very coarse scattered punctures, surface highly glossy.

Elytra. Comparatively elongate (for group), oval-shaped, markedly widened towards apex, widest well behind middle. Upper surface moderately convex. Humeri rounded, lateral margin obliquely convex, barely incised at basal third, apical angles widely rounded, apex gently sinuate, apical margin slightly incurved at suture. Striae complete, deep, at bottom barely crenulate. Intervals convex though irregularly longitudinally impressed in middle. 3rd, 5th, and 7th intervals multipunctate, punctures very wide, foveiform. Series of marginal punctures not interrupted in middle. Intervals with rather distinct, slightly transverse microreticulation, with scattered fine and rather coarse punctures, glossy. Inner wings fully developed.

Lower surface. Metepisternum rather elongate, about 1.5 × as long as wide. Abdomen sparsely punc-

tate and pilose, pilosity denser on terminal sternite. Terminal sternite in male 4-setose, in female 6-setose.

Legs. Of moderate size. 4th tarsomeres very deeply excised. Tarsal claws with 5 comparatively small teeth.

Male genitalia (Fig. 21). Genital ring large, rather elongate, barely asymmetric, with fairly wide, obtuse apex and moderately elongate basis. Aedeagus moderately elongate, rather compact, widened in middle, barely sinuate, lower surface basally almost straight, gently concave in apical third. Apex rather elongate, depressed, straight, obtuse at tip. Orificium moderately elongate. Folding of internal sac complex, with a narrow, transverse, remarkably sinuate, denticulate band that is widely interrupted at lower left side and at bottom. Parameres of dissimilar shape, left paramere elongate in comparison, longer than right one, with triangularly convex apex; right paramere short but massive, rhomboidal, with triangularly projecting apex.

Variation. Apart from some differences in body size, little variation noted.

Distribution. Northeastern Queensland from Windsor Tableland and Mt. Lewis in the north down to Hitchinbrook Island north of Ingham, Australia.

Collecting circumstances. Specimens were collected in rainforest, on Bunya Pines *(Araucaria)*, by berlese extraction of litter, pyrethrum knockdown, and in flight intercept traps.

Etymology. The name honours the collector of this and a multitude of other new ground beetles throughout Queensland, G. B. Monteith.

Relationships. Very closely related to *L. foveipennis*, spec. nov. that lives in the same area.

Uncertain species

Lebia basipunctata Motschulsky

Lebia basipunctata Motschulsky, 1864: 227; Csiki 1932: 1325; Moore et al. 1987: 308; Lorenz 1998: 456.

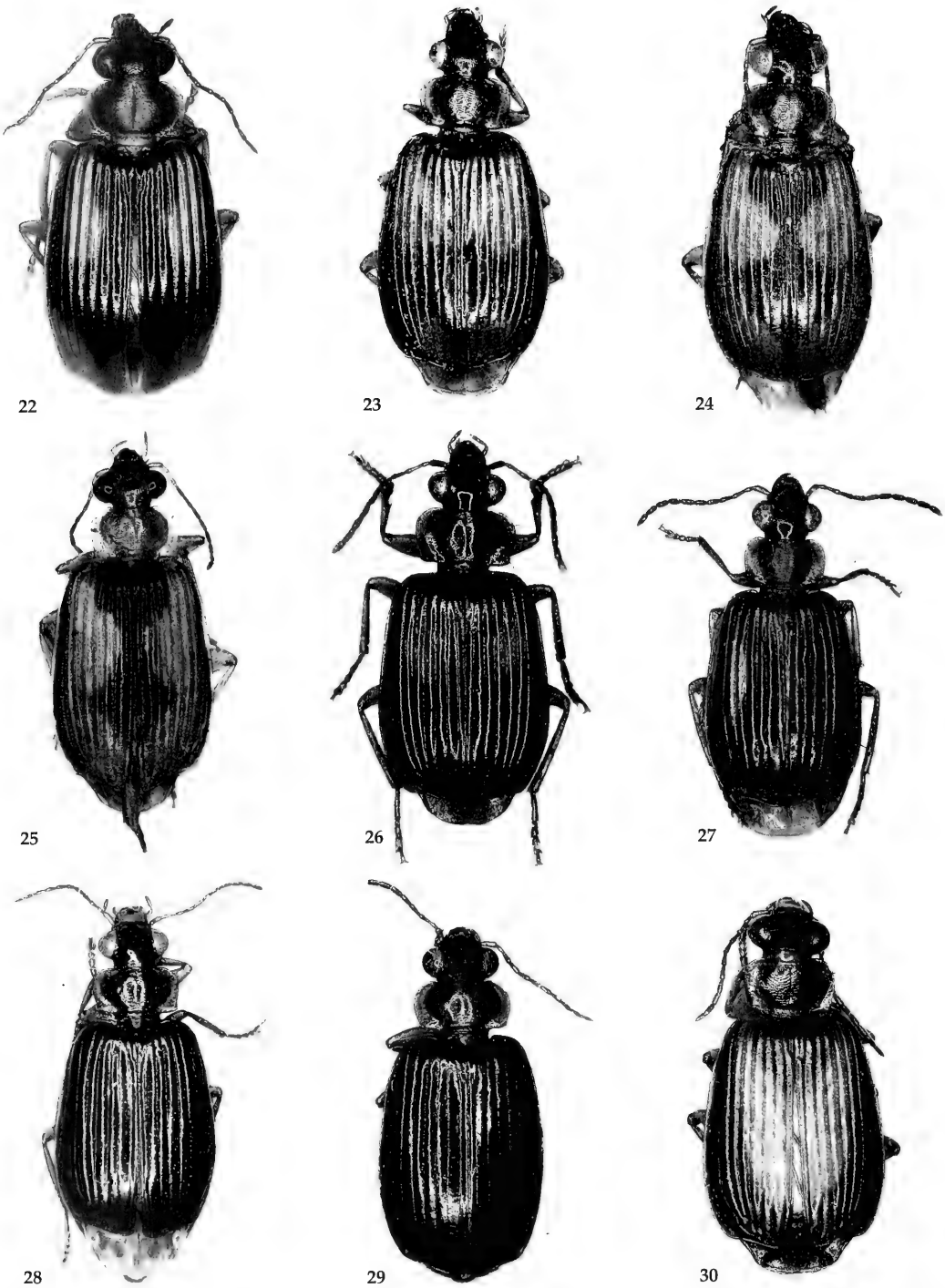
Note. This species is rather enigmatic. It was enumerated by Motschulsky as *Lebia basipunctata* Chaudoir, from an unknown locality, in a key, but without any other information. The types should be deposited in Museum national de l'Histoire Naturelle, Paris, but could not been found there when I recently looked for them. In his catalogue, Moore (Moore at al. 1987: 308) mentioned it as a *nomen nudum*, and since Motschulsky's "description" no records of the species are known. I believe that Moore's opinion is appropriate and thus, this species is omitted from the key below.

Recognition

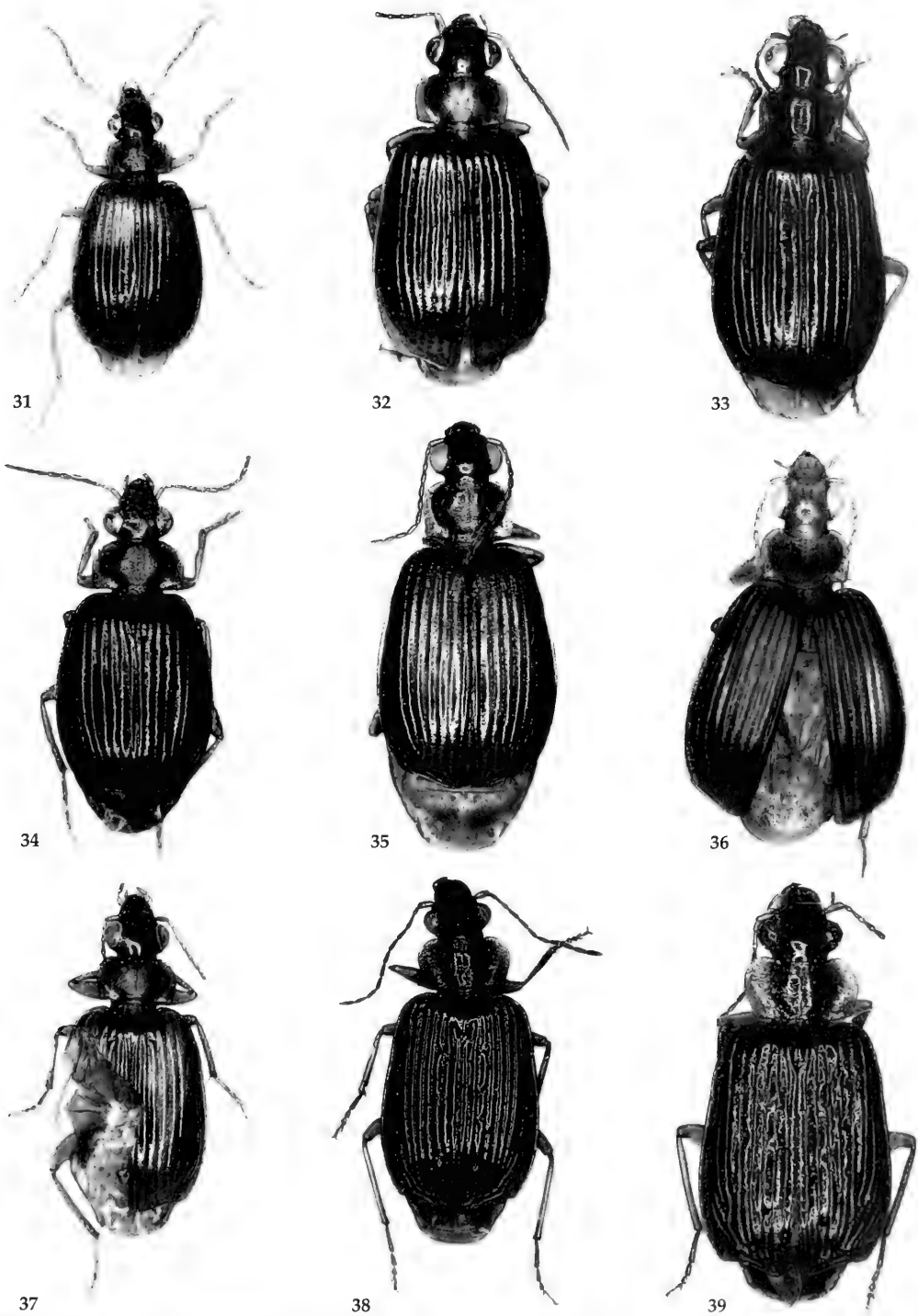
Certainly, it is far outside of the scope of the present work to give a key to all south Asiatic species of the genus *Lebia*, hence the key is restricted to the species from New Guinea, the surrounding islands, the Bismarck Archipelago, Solomon Islands, and Australia. Because Darlington (1968) in his key to the *Lebia* of New Guinea noted and wrongly identified the Oriental *L. karenia* Bates, this species also is included in the key below, although it does not occur within the treated area. Two new species from Sulawesi are also included in the key.

Key to the species of the genus *Lebia* from Australia, New Guinea, New Britain, New Ireland, and Solomon Islands

1. Outer apical angles of elytra angulate ..... 2.
– Outer apical angles of elytra rounded ..... 3.
2. Colour dark piceous; prothorax wider, c. 1.7 × as wide as long, margins distinctly sinuate near basal angle; elytra < 1.75 × as wide as prothorax. Papua New Guinea ..... *endynomena* Darlington
– Colour reddish; prothorax narrower, c. 1.55 × as wide as long, margins not or barely sinuate near basal angle; elytra > 1.9 × as wide as prothorax. Papua New Guinea ..... *externa* Darlington
3. Elytra with conspicuous and well confined pattern ..... 4.
– Elytra without conspicuous and well confined pattern, at most with indefinite dark cloud 15.
4. Elytra light reddish, with wide, parallel, black longitudinal sutural band that occupies the four inner intervals and does not reach the apex. Australia ..... *melanonota* Chaudoir
– Elytral pattern different ..... 5.
5. Elytra with black anchor-shaped mark, or dark with large yellow humeral and apical lunules or with dark sutural and isolate lateral stripes (Figs 22-26, 35-37) ..... 6.
– Elytral pattern different ..... 12.
6. Elytra with black sutural stripe and an isolate spot on either elytron (Fig. 37). Northern Australia ..... *sedlaceki*, spec. nov.
– Elytra with black anchor-shaped mark, or dark with large humeral and apical lunules (Figs 22-26, 35, 36). India, Burma, Thailand, Sulawesi, New Guinea, Australia ..... 7.



Figs 22-30. Habitus (body lengths in brackets). **22.** *Lebia karenia* Bates (6.8 mm). **23, 24.** *L. darlingtoniana*, spec. nov. (7.3 and 7.7 mm). Different types of elytral pattern. **25.** *L. brisbanensis*, spec. nov. **26.** *L. fallaciosa*, spec. nov. (7.5 mm). **27.** *L. australica*, nom. nov. (5.4 mm). **28.** *L. gemina*, spec. nov. (5.6 mm). **29.** *L. insularum* Darlington (7.1 mm). **30.** *L. cordifer* Darlington (6.2 mm).



Figs 31-39. Habitus (body lengths in brackets). **31.** *L. novabritannica*, spec. nov. (5.2 mm). **32.** *L. salomona*, spec. nov. (5.3 mm). **33.** *L. permutata*, spec. nov. (6.3 mm). **34.** *L. atripennis*, spec. nov. (4.5 mm). **35.** *L. trivittata*, spec. nov. (5.5 mm). **36.** *L. adusta*, spec. nov. (4.2 mm). **37.** *L. sedlacecki*, spec. nov. (4.75 mm). **38.** *L. foveipennis*, spec. nov. (7.5 mm). **39.** *L. monteithi*, spec. nov. (9.1 mm).

7. Larger species, length >6.2 mm; dark sutural spot covering two or three intervals, spot markedly widened at base (Figs 22-26) ..... 8.
- Smaller species, length <5.5 mm; dark sutural spot covering only the sutural interval, not widened at base (Figs 35, 36) ..... 11.

8. Apex of dark elytral spot characteristically angulate, marginal pores encircled by a small reddish spot (Fig. 22); pronotum densely microreticulate, dull; aedeagus barely widened, with elongate, acute apex, internal sac with three small denticulate sclerites (Fig. 1). India, Burma, Thailand ..... *karenia* Bates
- Apex of dark elytral spot not angulate, marginal pores unicolourous (Figs 23-26); pronotum barely microreticulate, shining; aedeagus widened in middle or near apex, with shorter, more obtuse apex, internal sac either without any denticulate sclerites (Fig. 4) or with sinuate denticulate band at bottom (Figs 2, 3). Sulawesi, New Guinea, Australia ..... 9.

9. Apical spot of elytra larger, less oblique, or apex of elytra completely yellow; apical margin less sinuate (Figs 23-25); margin of pronotum narrower, surface less glossy; aedeagus widest near apex, internal sac at bottom with conspicuous, sinuate, denticulate band (Figs 2, 3) ..... 10.
- Apical spot of elytra smaller, oblique, apex of elytra never completely yellow; apical margin more deeply sinuate (Fig. 26); margin of pronotum wider, surface glossier; aedeagus widest in middle, internal sac without any denticulate sclerites (Fig. 4). New Guinea ..... *fallaciosa*, spec. nov.

10. Dark sutural spot and lateral margin completely separated (Fig. 25); aedeagus with more complexly sinuate denticulate band that extends to both sides (Fig. 3). Australia: southeastern Queensland ..... *brisbanensis*, spec. nov.
- Dark sutural spot and lateral margin separated or not (Figs 23, 24); aedeagus with less complexly sinuate denticulate band that extends only to right side (Fig. 2). Sulawesi, New Guinea ..... *darlingtoniana*, spec. nov.

11. Larger species, length usually >5 mm; colour pattern extensive and distinct (Fig. 35); antenna slightly longer, median antennomeres almost 2× as long as wide; aedeagus with two transverse, very densely denticulate sclerites in middle at bottom of internal sac, and another plate that is strongly sclerotized at its anterior margin (Fig. 18). Sulawesi ..... *trivittata*, spec. nov.
- Smaller species, length usually < 4.5 mm; colour pattern less extensive and more faded (Fig. 36); antenna slightly shorter, median antennomeres about 1.5× as long as wide; aedeagus without any sclerotized or denticulate plates in internal sac (Fig. 19). Sulawesi ..... *adusta*, spec. nov.

12. Elytra testaceous with transverse dark spot ..... 13.
- Elytra dark with light cordiform spot (Fig. 30); aedeagus with a transverse, densely denticulate, conspicuously sinuate, virtually uninterrupted sclerite (Fig. 11). New Guinea, northern Australia ..... *cordifer* Darlington

13. Length >7 mm; elytra with wide, transverse, anterorly and posteriorly serrate, blue band in middle that broadly attains the lateral margin. Australia ..... *bicolor* (Sloane)
- Length < 5.5 mm; elytra with large black spot. Distribution different ..... 14.

14. Elytra with rather triangular, black spot in middle that does not attain the lateral margin (Fig. 31); pronotum slightly wider, ratio width/length >1.52; genital ring wider, remarkably widened towards apex (Fig. 13). New Britain . ..... *novabritannica*, spec. nov.
- Elytra either with wide black spot that broadly attains the lateral margin and with a narrow dark humeral stripe along 8th interval, or almost completely dark with light apex (Fig. 32); pronotum slightly narrower, ratio width/length <1.51; genital ring narrower, barely widened towards apex (Fig. 14). Bougainville, Solomon Islands ..... *salomona*, spec. nov.

15. Colouration contrasting with light fore body and unicolourous dark elytra (Figs 29, 34) .. 16.
- Colouration not contrasting, either elytra unicolourous light, or with an indistinct, slightly darker cloud (Figs. 27, 28, 38, 39) ..... 18.

16. Length >7 mm; pronotum wider, ratio width/length c. 1.8 (Figs 29, 45); aedeagus with a transverse, densely denticulate, conspicuously sinuate sclerite that is narrowly interrupted at bottom and at the upper right side of internal sac (Fig. 10). Islands east to Papua Peninsula, Papua New Guinea ..... *insularum* Darlington
- Length <5 mm; pronotum narrower, ratio width/length c. 1.65 (Figs 34, 46); aedeagus either with a complexly coiled, very densely denticulate sclerite in middle of internal sac (Fig. 17), or with two transverse, very densely denticulate sclerites at bottom and another strongly sclerotized plate at left margin of internal sac (Fig. 12) ..... 17.

17. Colour of elytra black; pronotum narrower, ratio width/length < 1.3 (Fig. 34); aedeagus with a complexly coiled, very densely denticulate sclerite in middle of internal sac (Fig. 17). New Ireland ..... *atripennis*, spec. nov.

– Colour of elytra dark piceous; pronotum wider, ratio width/length > 1.35 (Fig. 46); aedeagus with two transverse, very densely denticulate sclerites at bottom and another strongly sclerotized plate at left margin of internal sac (Fig. 12). New Guinea ..... *subglabra*, spec. nov.

18. 3rd and 5th intervals polysetose, setiferous punctures foveate, distinctly interrupting the intervals (Figs 38, 39) ..... 19.

– Only 3rd interval bisetose, setiferous punctures fine, not interrupting the intervals ..... 20.

19. Intervals evenly convex, without microreticulation; 3rd interval trisetose, 5th intervals bisetose, 7th interval asetose; basal angles of pronotum produced backwards (Fig. 38); aedeagus smaller, with wide, very densely denticulate, transverse band that is narrowly interrupted at left side of bottom of internal sac (Fig. 20). Northeastern Australia ..... *foveipennis*, spec. nov.

– Intervals longitudinally impressed or even sulcate, with distinct microreticulation; 3rd, 5th, and 7th intervals multisetose; basal angles of pronotum not produced backwards (Fig. 39); aedeagus larger, with narrow, far less densely denticulate, transverse band that is widely interrupted at lower left side and at bottom of internal sac (Fig. 21). Northeastern Australia ..... *monteithi*, spec. nov.

20. Pronotum and head not microreticulate (Figs 42, 43, 47) ..... 21.

– Pronotum, and usually also head, perceptibly microreticulate (Figs 40, 41, 44, 46, 48, 49) ... 23.

21. Prothorax narrow, ratio width length < 1.35, not wider than head (Fig. 47); elytra with indistinct dark cloud on 2-3 inner intervals (Fig. 33); aedeagus with basally wide, remarkably triangular apex, internal sac with partly denticulate, folded plate in middle at roof (Fig. 15). Irian Jaya ..... *permutata*, spec. nov.

– Prothorax wider, ratio width length < 1.5, wider than head (Figs 42, 43); elytra without dark cloud on 2-3 inner intervals, usually unicolorous, sometimes slightly darker than fore body (Fig. 28); aedeagus with narrowly triangular apex, internal sac with transverse, densely denticulate sclerite running either from the roof on the left side along right side to bottom (Fig. 7), or with a transverse, sinuate, at bottom distinctly interrupted, denticulate band (Fig. 8). New Guinea ..... 22.

22. Prothorax narrower, barely wider than head (Fig. 42); usually slightly smaller species, length 4.5-5.2 mm; aedeagus delicate, with narrowly triangular, almost symmetrically situated apex, internal sac with transverse, densely denticulate sclerite running from the roof on the left side along the right side to bottom (Fig. 7).New Guinea, north-eastern Australia ..... *papuella* Darlington

– Prothorax wider, considerably wider than head (Fig. 43); usually slightly larger species, length 4.8-6.0 mm; aedeagus compact, with narrow, elongate apex asymmetrically situated at right side, internal sac with a transverse, sinuate, denticulate band that is interrupted at bottom (Fig. 8). Papua New Guinea ..... *gemina*, spec. nov.

23. Pronotum very wide in comparison to head, ratio width of pronotum/width of head 1.32, with remarkably incurved anterior angles (Fig. 49); elytra shorter and wider, ratio length/width 1.66; aedeagus small with rather elongate, at tip rounded apex, internal sac with two remarkably coiled, densely denticulate sclerites in middle (Fig. 16). North-eastern Australia ..... *laticollis*, spec. nov.

– Pronotum narrower in comparison with head, ratio width of pronotum/width of head < 1.25, with less widely incurved anterior angles (Figs 40, 41, 44, 46, 48); elytra longer and narrower, ratio length/width > 1.78; aedeagus different (Figs 5, 6, 9, 12) ..... 24.

24. Microreticulation of head distinct and complete; pronotum wide and rather incurved towards apex (Fig. 44); aedeagus with wide, obtuse apex, internal sac with many dentiform sclerites (Fig. 9). New Guinea ..... *barda* Darlington

– Microreticulation of head superficial and incomplete; pronotum commonly narrower, always less incurved towards apex (Figs 40, 41, 46, 48); internal sac of aedeagus with a transverse, sinuate, denticulate band (Figs 5, 6), or with two denticulate sclerites in middle at bottom (Fig. 12), or unknown ..... 25.

25. Microreticulation of pronotum rather superficial (Fig. 46); elytra either unicolourous reddish or with large, slightly darker cloud; aedeagus with basally wide, symmetric, triangular apex, internal sac with two transverse, very densely denticulate sclerites at bottom and another strongly sclerotized plate at its left margin (Fig. 12). New Guinea ..... *subglabra*, spec. nov.

– Microreticulation of pronotum very distinct (Figs 40, 41, 48); elytra unicolourous reddish; aedeagus with narrow, elongate apex asymmetrically situated at right side, internal sac with a transverse, sinuate, denticulate band (Figs 5, 6), or unknown ..... 26.

26. Pronotum narrower, ratio width/length 1.50 (Fig. 48); elytra shorter and wider, ratio length/width 1.30; aedeagus unknown. Salawati Island, west of Irian Jaya ..... *inornata*, spec. nov.

– Pronotum wider, ratio width/length > 1.52, commonly wider (Figs 40, 41) (if ratio under 1.55, then from central eastern Queensland); elytra longer and narrower, ratio length/width > 1.35; aedeagus with narrow, elongate apex asymmetrically situated at right side, internal sac with a transverse, sinuate, denticulate band (Figs 5, 6) ..... 27.

27. Larger species, body length 6.2 mm; pronotum wider, ratio width/length 1.38 (Fig. 40); internal sac of aedeagus with a transverse, sinuate, uninterrupted, denticulate band (Fig. 5). Papua New Guinea ..... *papuensis* Macleay

– Smaller species, body length <5.6 mm; pronotum narrower, ratio width/length < 1.35 (Fig. 41); internal sac of aedeagus with a transverse, sinuate, at bottom distinctly interrupted, denticulate band (Fig. 6). central eastern and southeastern Queensland ..... *australica*, nom. nov.

Remarks

Although the number of species is increased substantially in this paper, it must be noted that few species only are available in sufficient numbers, whereas of several species only the holotype is known, or they are so far recorded only from the type locality. As mentioned above, this may be mainly due to the habitat that most species prefer, namely the canopy of rain forest, or at least branches and leaves of trees in dense forest. Therefore, many species are best sampled by canopy fogging or beating, and this may apply in particular to the small species of the *papuensis*-group. In view of the very few fogging surveys that have been carried out so far in the rain forests of New Guinea and Australia, not to speak from New Britain, New Ireland and additional islands to the east and southeast of New Guinea, the number of species may be substantially increased in future as such surveys are intensified and carried out at additional localities. The large numbers of *L. papuella* and *L. gemina* collected at Baiteta (Papua New Guinea), and those of *L. australica* at certain localities in eastern Queensland demonstrate that those small *Lebia*'s may be quite common where they occur. Certain species also may be fogged from the bark of standing trees, as for example the fine series of *L. monteithi* in northern Queensland.

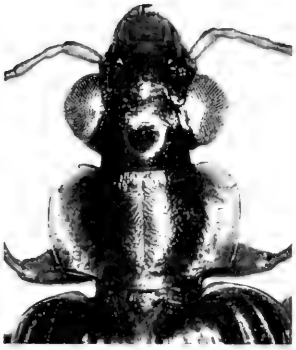
Even with the additional new species, the genus *Lebia* in the Papuan-Australian area evidently is becoming less speciose and is reaching its eastern limits. Australia, however, is unique for the occurrence of some conspicuous species, e.g. of the *foveipennis*-lineage which is unknown elsewhere. Even more striking is the existence – and on Mt. Fisher even the coexistence – of two closely related species of this group, which means that this lineage should be a rather old endemic element of the Australian fauna. The other Australian species, except for the likewise unique *L. bicolor* and *L. melanonota*, apparently immigrated rather recently and probably they all came from New Guinea. *L. papuella* and *L. cordifer* even seem to be very young immigrants, because they do not seem to have passed through any morphological change or taxonomic diversification in Australia.

Remarkably enough is the repeated sympatric and probably also syntopic coexistence of two or even three externally similar, extremely closely related species at certain localities that are only distinguished by their differently shaped and structured male aedeagi. This is true for *L. papuella* and *L. gemina* at Baiteta (New Guinea), for *L. trivittata* and *L. adusta* at Hogg's Back (Sulawesi), and for *L. foveipennis* and *L. monteithi* at Mt. Fisher (Queensland). At all localities specimens of either species were collected at the same date and by the same sampling method which means that they most probably live at the same time on the same spot. Similar coexistence may likewise occur in other species in and outside of the region mentioned in this paper. This raises questions as to which factors inhibit cross-breeding, or as to competition for food between so extremely similarly shaped and closely related species.

Checklist of the species of the genus *Lebia* of the Papuan-Australian region

adusta, spec. nov.	Sulawesi
atripennis, spec. nov.	New Ireland
australica, spec. nov.	Australia: e. Queensland
barda Darlington	New Guinea
bicolor (Sloane)	Australia
brisbanensis, spec. nov.	Australia: se. Queensland
cordifer Darlington	c. New Guinea, n. Australia
darlingtoniana, spec. nov.	Sulawesi, New Guinea
endynomena Darlington	e. New Guinea
externa Darlington	e. New Guinea
fallaciosa, spec. nov.	New Guinea

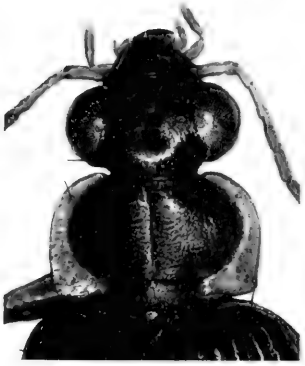
40



41

42

43



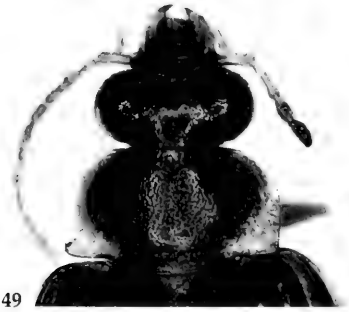
44

45

46

47

48



49

Figs 40-49. Pronotum. **40.** *Lebia papuensis* Macleay. **41.** *L. australica*, nom. nov. **42.** *L. papuella* Darlington. **43.** *L. gemina*, spec. nov. **44.** *L. barda* Darlington. **45.** *L. insularum* Darlington. **46.** *L. subglabra*, spec. nov. **47.** *L. permutata*, spec. nov. **48.** *L. inornata*, spec. nov. **49.** *L. laticollis*, spec. nov.

foveipennis, spec. nov.	Australia: ne. Queensland
gemina, spec. nov.	e. New Guinea
inornata, spec. nov.	w. New Guinea: Salawati Is.
insularum Darlington	e. New Guinea: Normanby Is, Rossel Is.
laticollis, spec. nov.	Australia: e. Queensland
melanonota Chaudoir	n. Australia
monteithi, spec. nov.	Australia: ne. Queensland
novabritannica, spec. nov.	New Britain
papuella Darlington	New Guinea, Australia: ne. Queensland
papuensis Macleay	se. New Guinea
permutata, spec. nov.	w. New Guinea
salomona, spec. nov.	Solomon islands: Bougainville
sedlaceki, spec. nov.	Australia: ne. Queensland
subglabra, spec. nov.	w. New Guinea
trivittata, spec. nov.	Sulawesi

Acknowledgements

My sincere thanks for the kind loan or gift of types and material for study are due to Dr. T. Deuve (Paris), Mr. A. Drumont (Bruxelles), Dr. E. G. Matthews (Adelaide), Dr. G. B. Monteith (Brisbane), Dr. A. Riedel (Karlsruhe), Dr. G. A. Samuelson (Honolulu), Mr. A. Skale (Hof), Mr. R. Storey (Mareeba), Mr. A. Weigel (Pößneck), and Mr. T. A. Weir (Canberra).

References

Bates, H. W. 1892. Viaggio di Leonardo Fea in Birmania e regione vicine, XLIV: List of the Carabidae. – Ann. Mus. Civ. Stor. Nat. Genova **32**: 267-428

Csiki, E. 1932. Coleopterorum Catalogus. Vol. III. Carabidae III: Pars 124, Harpalinae VII: 1279-1598. – W. Junk, Berlin

Darlington, P. J. Jr. 1968. The Carabid beetles of New Guinea. Part III. Harpalinae continued. Perigonini to Pseudomorphini. – Bull. Mus. Comp. Zool. **139**: 1-253

Lorenz, W. 1998. Systematic List of extant Ground Beetles of the World (Insecta Coleoptera "Geadephaga": Trachypachidae and Carabidae incl. Paussinae, Cicindelinae. Rhysodidae). – Tutzing, printed by the author. 502 pp.

Macleay, W. 1871. Notes on a collection of insects from Gayndah. – Trans. Ent. Soc. New South Wales **2**: 79-205

– – 1876. The Coleoptera of the Chevert Expedition. – Proc. Linn. Soc. New South Wales **1**: 164-168

Moore, B. P., T. A. Weir & J. E. Pyke 1987. Rhysodidae and Carabidae. In: Zoological Catalogue of Australia, **4**: 17-320. – Australian Government Publishing Service, Canberra

Motschulsky, V. 1864. Ènumération des nouvelles espèces de Coléoptères rapportés de ses voyages. 4-éme article. – Bull. Soc. Imp. Nat. Moscou **37**: 171-240

Sloane, T. G. 1907. Studies in Australian Entomology. No. XV. New genera and species of Carabidae, with some notes of synonymy (Clivinini, Scaritini, Cunipectini, Trigonotomini and Lebiini). – Proc. Linn. Soc. New South Wales **32**: 346-381

– – 1917. Carabidae from tropical Australia (New genera and species, notes and synonymy, and synoptic tables. Tribes Scaritini, Harpalini, Odacanthini, Lebiini, and Helluonini). – Proc. Linn. Soc. New South Wales **42**: 406-438

SPIXIANA	27	3	247–251	München, 01. November 2004	ISSN 0341-8391

A new species of the genus *Aristolebia* Bates from Thailand, with notes on some Papuan and Australian species

(Insecta, Coleoptera, Carabidae, Lebiinae)

Martin Baehr

Baehr, M. (2004): A new species of the genus *Aristolebia* Bates from Thailand, with notes on some Papuan and Australian species (Insecta, Coleoptera, Carabidae, Lebiinae). – Spixiana **27/3:** 247-251

Aristolebia crucigera, spec. nov. is described from northern Thailand. From all other species except for the New Guinean *A. capitis* Darlington the new species is distinguished at the first glance by the cruciate elytral pattern. From the latter species it differs by its narrower pronotum, angulate sutural angle of elytra, and presence of 7 teeth on the tarsal claws.

Examination of the type of the Australian cyclosomine species *Sarothrocrepis mucronata* Sloane reveals that this species actually belongs in the genus *Aristolebia* of Lebiinae and is conspecific with *A. papua* Darlington from New Guinea. As a consequence, the latter name becomes a younger synonym of *A. mucronata* (Sloane).

Additional records of Australian and New Guinean species of *Aristolebia* are dealt with.

Dr. Martin Baehr, Zoologische Staatssammlung, Münchhausenstr. 21, D-81247 München, Germany; e-mail: martin.baehr@zsm.mwn.de

Introduction

In the material collected by H. Malicky and coworkers at different localities in northern Thailand by means of regular sampling at light, few specimens of an undescribed species of the lebiine genus *Aristolebia* Bates were detected that proved to belong to a new species which is described in the present paper.

The six recorded species of the characteristically shaped lebiine genus *Aristolebia* Bates are distributed from southern India to China and the Philippines, and also from New Guinea to northern Australia (North Queensland) (Csiki 1932, Jedlicka 1963, Darlington 1968, Moore et al. 1987, Lorenz 1998). According to Darlington (1968) one species also occurs on or near Sulawesi. Main differentiating characters of the genus are the angulate external angle of the elytra, the concave excision of the elytral apex, the semicircular pronotum, and presence of two preapical excisions at the inner surface of the mesotibia in males. In many other characters, *Aristolebia* is rather similar to the large genus *Lebia sensu lato* with which *Aristolebia* certainly is closely related.

During a recent visit to certain Australian insect collections material of Australian and New Guinean species of *Aristolebia* was examined and the type of a species of *Aristolebia* was identified that was so far wrongly included in another genus and even another subfamily.

Methods

For the taxonomic treatment standard methods are used. The male genitalia were removed from specimens soaked for a night in a jar under wet atmosphere, then cleaned for a short while in hot KOH.

The habitus photograph was obtained by a digital camera using SPOT Advanced for Windows 3.5 and subsequently were worked with Corel Photo Paint 10.

Measurements were taken using a stereo microscope with an ocular micrometer. Length has been meas-

Fig. 1. *Aristolebia crucigera*, spec. nov. Habitus. Length: 5.7 mm.

ured from apex of labrum to apex of elytra. Lengths, therefore, may slightly differ from those of other authors. Length of pronotum was measured from the most advanced part of base to the most advanced part of apex; Length of elytra was taken from the most advanced part of humerus to the most advanced apex of elytra including apical denticles or spines. Ratios are somewhat variable in most species, but generally they offer rather good measures of relative shape.

The types of the new species are preserved in Zoologische Staatssammlung, München (ZSM) and in the working collection of the author (CBM) in ZSM. Other material is from Australian National Insect Collection, Canberra (ANIC), B. P. Bishop Museum, Honolulu (BMH), Museum of Comparative Zoology, Cambridge, Mass. (MCZ), Queensland Museum, Brisbane (QMB), and South Australian Museum, Adelaide (SAMA).

Aristolebia crucigera, spec. nov.

Figs 1, 2

Types. Holotype: ♂, Thailand, Doi Inthanon, 17.-24.5. 1990, leg. Malicky (ZSM). – Paratypes: 1♂, Thailand, Doi Inthanon, 5.-12.2.1991, leg. Malicky (CBM); 1♀, Thailand, Chiang Mai Zoo, 16.-23.11.1989, leg. Malicky (ZSM).

Differential diagnosis. Rather small species (in genus), distinguished at the first glance by the cruciate elytral pattern that leaves the apex of elytra light, but has the black central macula united with the black lateral stripe. Apart from colour pattern, this species is distinguished from the three Oriental species *A. davaonis* Heller, *A. prattiana* Bates, *A. quadridentata* Bates, and the New Guinean and North Australian *A. mucronata* (Sloane) (formerly *A. papua* Darlington – see note below) by its much lesser size. From the similarly sized New Guinean *A. wau* Darlington it is distinguished by the vividly patterned elytra, and from the most similarly coloured New Guinean *A. capitis* Darlington it is distinguished by relatively narrower pronotum, angulate instead of rounded sutural angle of elytra, and presence of 7 instead of 5 teeth on the tarsal claws.

Description

Measurements. Length: 5.7-7.4 mm; width: 2.5-3.3 mm. Ratios. Width/length of pronotum: 1.45-1.54; width of head/width of pronotum: 0.74-0.84; length/width of elytra: 1.52; width of elytra/width of pronotum 1.61-1.78.

Colour (Fig. 1). Head including mouth parts, and pronotum reddish, margins of pronotum slightly lighter, head between posterior half of eyes with a dark reddish or light brownish transverse stripe. Elytra yellow with a piceous or in parts even blackish cruciate pattern as depicted in fig. 1 that leaves the lateral margin narrowly and the apex very widely yellow.

Head. Of moderate size. Eyes very large, semicircular, laterally remarkably protruding. Labrum anteriorly slightly convex, 6-setose. Mentum with shallow, apically slightly bifid tooth. Glossa elongate, polysetose at apex, paraglossae wide, foliaceous, as long as glossa and fused to it, densely setose at margin. Galea with wide, rather depressed last segment that is extremely densely pilose. Lacinia large, with very elongate terminal hook and rather dense row of teeth at inner margin. Palpi of normal size, very sparsely pilose. Mentum asetose, but submentum with a very elongate seta at either side. Mandible short and wide, evenly curved. Antenna fairly elongate, surpassing base of pronotum by almost three antennomeres, pilose from 4th antennomere. Labrum and clypeus with fine and sparse

punctures, frons and neck with coarse and rather rugose puncturation. Microreticulation isodiametric, though superficial, therefore surface glossy.

Pronotum. Moderately wide, though rather variable. Anteriorly about semicrcular, widest about at middle, but little narrowed towards base, thus, base by far wider than apex. Apex almost straight, apical angles widely rounded, lateral margin convex throughout, basal angle about right, though slightly obtuse at tip, base in middle convex, produced. Apex narrowly margined, base in middle not or very feebly margined. Apical transverse sulcus and median line shallow, basal transverse sulcus deeply impressed. Lateral margin anteriorly narrow, widened and explanate towards base. Disk gently convex. Anterior lateral seta situated about at anterior third, slightly removed from margin, posterior seta at basal angle. Surface of disk with very irregular, rugose sulci, rather coriaceous, also with scattered punctures, and with distinct, isodiametric microreticulation, moderately glossy.

Elytra. Rather elongate, gently widened towards apex, widest about at apical third. Humeri evenly rounded, lateral margin faintly bisinuate at basal third, then gently convex. External apical angle angulate, forming a short, acute denticle. Sutural angle with very short denticle, apex gently oblique, straight, only near external angles slightly excised. Striae complete, well impressed, not or very feebly crenulate. Intervals convex. 3rd interval with two fixed setae, both situated at external margin of interval, the anterior one at about basal third, the posterior one behind apical fourth. Intervals impunctate, though with almost isodiametric, somewhat superficial microreticulation, rather glossy. Posterior wings fully developed.

Lower surface. With very sparse pilosity. Metepisternum very elongate, >2.5× longer than wide. Terminal sternite in male quadrisetose, in female six-setose, in both sexes with fairly dense and rather elongate additional pilosity.

Legs. Of average size. 4th tarsomeres of all legs widened, deeply (>half of tarsomere) excised, in both sexes with dense tarsal brush. 5th tarsomere with two rows of several setae on lower margin. Claws with 7 elongate teeth.

Male genitalia (Fig. 2). Both, aedeagus including parameres, and genital ring very heavily sclerotized. Genital ring very large, almost twice the length of the aedeagus, narrow, gently convex, symmetric, with shoehorn-shaped, symmetric apex that is remarkably curved inwards. Aedeagus moderately elongate, compact, orificium rather short, gently turned to left. Lower surface gently bisinuate, apex short, obtuse, straight. Internal sac with very heavily sclerotized, slightly twisted plate in middle, otherwise with rather simple folding. Parameres very dissimilar, rather wide, asetose.

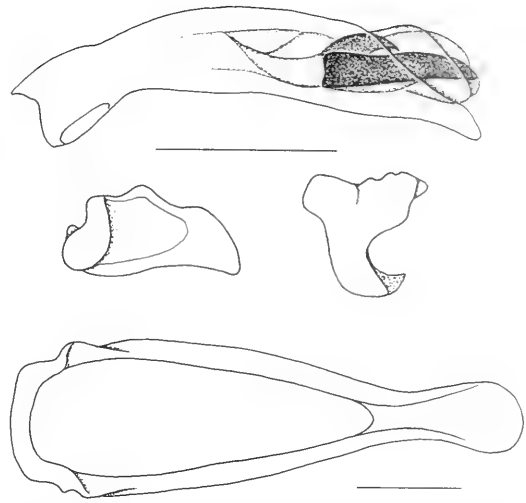


Fig. 2. *Aristolebia crucigera*, spec. nov. Male genitalia: aedeagus, parameres, and genital ring. Scales: 0.5 mm.

Female genitalia. Very similar to those of the genus *Lebia*. Stylomere 1 without apical setae, stylomere 2 very short, apically widely rounded, but with an extremely short, obtuse, almost punctiform apical seta.

Variation. Apart from larger size and considerably wider pronotum of the single female, little variation noted.

Distribution. Northern Thailand.

Collecting circumstances. All specimens captured at light in February, May, and November. Habits unknown, though this may be rather an arboricolous species.

Etymology. The name refers to the cruciate elytral pattern.

Remarks. With respect to colour pattern and the deeply excised 4th tarsomeres this species is most similar to the New Guinean *Aristolebia capitis* Darlington. This may or may not be evidence of close relationship which is uncertain as long as no examination of the phylogenetic relationships of the genus as a whole has been attempted.

Aristolebia papua Darlington

Darlington (1968: 84) described *Aristolebia papua* from New Guinea. Recent examinations of material from Australian National Insect Collection, Canberra

(ANIC), Queensland Museum, Brisbane (QMB), and South Australian Museum, Adelaide (SAMA) reveal that this species occurs also in northern Australia (see records below). During my examinations of the types of the Australian species of the genus *Sarothrocrepis* Chaudoir of the masoreine tribe Cyclosomini in ANIC I recognized that the type of *Sarothrocrepis mucronata* Sloane undoubtedly belongs to the genus *Aristolebia* and is conspecific with *A. papua* Darlington.

Surprisingly enough, Sloane himself noted on the label of the holotype "*Aristolebia*" with "*Sarothrocrepis*" only in brackets, but finally he described the species as *Sarothrocrepis*. It is likewise surprising why P. J. Darlington when fixing the status of the specimen as holotype, and B. P. Moore when again examining the type specimen for his catalogue of the Carabidae of Australia (Moore et al. 1987) did not recognize the obviously wrong generic affiliation and further on included the species in *Sarothrocrepis*.

As a consequence of this examination, *Sarothrocrepis mucronata* Sloane is moved to the genus *Aristolebia*, and the name *Aristolebia papua* Darlington becomes a younger synonym of *Aristolebia mucronata* (Sloane) and must be replaced by the former name.

Sarothrocrepis mucronata Sloane, 1907: 374; Moore et al. 1987: 280; Lorenz 1998: 428.

Aristolebia papua Darlington, 1968: 84; Lorenz 1998: 455 (**new synonymy**).

Types. Of *mucronata*: Holotype: ♀, Townsville, Qld. May 03 F. P. Dodd/*Aristolebia (Sarothrocrepis) mucronata* Sl. Type (Sloane's hand!)/HOLOTYPE *Sarothrocrepis mucronata* Sl. PJD (ANIC).
Of *papua*: Holotype: ♂, Wau, Morobe Distr. 1200-1300 m, May 7, 1963, J. Sedlacek (BMH). – Paratypes: 17, of same locality, but with slightly different dates (BMH, MCZ) (not examined).

Additional material from Australia. QLD: 1♂, Magnetic I., A. M. Lea (SAMA); 3♂♂, 7♀♀, Nelly Bay, Magnetic Is. NQ. Dez. 97, Jan. 98, S. Feam. (CBM, QMB); 1♂, Bamaga, xii.1983, J. Sedlacek (CBM). – **NT:** 1♀, 12.26S 130.56E Holmes Jungle, Berrimah, 10 km S. of Darwin, 8.xi.72, at light, E. Britton (ANIC); 2♂♂, 12.25S, 132.58E, 1 km N. of Cahills Crossing, (East Alligator River), 8.XI.72, M. S. Upton (ANIC, CBM); 1♀, 12.21S, 130.42E, Casuarina Beach, 10 km NNE of Darwin, 7.xi.72, E. Britton (ANIC).

Collecting circumstances. One specimens was collected in "rainforest, behind beach, at light", the specimens from Magnetic Island at "Black Light".

Distribution. Apart from its occurrence in New Guinea, this species apparently is distributed through the whole of tropical northern Australia from northern Queensland to at least northern parts of Northern Territory. It is to be examined whether it even ranges into far northwestern Australia and thus actually occupies the whole tropical belt of Australia.

Note. Darlington already noted that one of his specimens from New Guinea does not possess the conspicuous cruciate elytral pattern of the type series from Wau, but has almost unicolourous dark elytra. Of the 17 Australian specimens I have seen, five (including four from Magnetic Island close to the type locality of *A. mucronata*!) show the vividly coloured elytral pattern of the holotype of *A. papua*, whereas the others, including the holotype of *A. mucronata*, but also 7 specimens from Magnetic Island, have almost wholly dark elytra with very inconspicously lighter humeral and apical spots. In all other respects, however, they are similar to the vividly patterned specimens and undoubtedly belong to the same species which is also demonstrated by the common occurrence of unicolourous and patterned specimens at the same locality.

Incidentally, the four patterned specimens from Magnetic Islands are males, whereas all 7 uniform black ones are females. It would be worth examining with larger samples, whether this composition is accidental, whether it is sexual, and whether this sexual difference, if it is one at all, applies at other localities.

Aristolebia wau Darlington

Darlington, 1968: 84; Moore et al. 1987: 309, Lorenz 1998: 455.

Distribution. This small, unicolourous, light brown species is easily identified. It ranges from eastern New Guinea to northern Queensland and was already noted by Darlington (1968) from the tip of Cape York Peninsula. Moore et al. (1987) recorded the species from Cape York Peninsula down to Cape Tribulation, but I have seen specimens from as far south as Townsville. In the material at hand (26 ex.) no notes about collecting circumstances are given, but I guess that this is a tree-living species that lives in more or less closed forests.

Note. Although the species was mentioned as unicolourous light brownish (Darlington 1968), I saw a New Guinean specimen bearing humeral and apical spots like *A. capitis* Darlington and *A. crucigera*, spec. nov. which spots, however, are much less conspicuous than in both mentioned species. Comparison of the male genitalia of the patterned spec-

imen with those of unicolourous specimens of *A. wau* did not reveal any difference. Thus, this may represent a rare colour variant.

Aristolebia capitis Darlington

Darlington, 1968: 85; Lorenz 1998: 455.

This vividly coloured species was described from the western part of Vogelkop Peninsula, westernmost New Guinea. Few recently collected specimens from Batanta Island off the west coast of New Guinea differ from the type specimens by the almost completely dark colour of their elytra that only have a small and fairly inconspicuous semilunar preapical spot but no distinct humeral stripe which area is only very inconspicuously lighter. In all other respects they exactly match the types of *A. capitis* and undoubtedly belong to this species.

Additional material. 3♀♀, W-PAPUA, Raja Ampat Pr. Waywesar/Batanta bor. 0°45'26"S, 130°46'55"E, 13.I. 2004, leg. A. Weigel (CBM, CWP).

Distribution. This species apparently is restricted to the westernmost part of New Guinea, Vogelkop Peninsula and adjacent islands, but is to be examined, whether it also occurs on the other neighbouring islands (namely Salawati and Waigeo).

Remarks

Certainly the genus *Aristolebia* is sufficiently distinct from the large genus *Lebia sensu lato* to be maintained as a separate genus, even when some *Lebia's* from the same region likewise have excised apical margins and angulate apical angles of their elytra. Is has been recognized that colour and pattern, in particular that of the elytra, vary remarkably in several species. Such variation is also found in certain *Lebia* species, but the presence of black, almost unpatterned specimens is especially common in *Aristolebia*, though apparently without showing any regional distribution.

Further examination should reveal, whether the differences of colouration, namely the fading of elytral pattern in females of *A. mucronata* and *A. capitis*, is accidental or sexual.

The new records of *Aristolebia mucronata* in Australia again demonstrate the close relationship of the carabid faunas of Australia and New Guinea. As both *Aristolebia* species that occur in Australia are conspecific with New Guinean populations, the genus *Aristolebia* as a whole certainly is part of the northern faunal element that immigrated quite recently into Australia. This immigration may have been taken place in very recent times, probably even during the last glacial period when Australia was connected with New Guinea by a land bridge.

Acknowledgements

I am indebted to Dr. H. Malicky, who kindly presented the new and many other species from Thailand, to Mr. A. Weigel (Pößneck) for interesting material from New Guinea, and to Dr. E. Matthews, Adelaide, Dr. G. B. Monteith (Brisbane), Dr. G. Samuelson (Honolulu), and Mr. T. Weir (Canberra) for the kind loan of material and types and/or the opportunity to examine specimens in the collections they care for.

References

Csiki, E. 1932. Coleopterorum Catalogus. Vol. III. Carabidae III: Pars 124, Harpalinae VII: 1279-1598. W. Junk, Berlin.

Darlington, P. J. Jr. 1968. The Carabid Beetles of New Guinea. Part III. Harpalinae (continued): Perigonini to Pseudomorphini.– Bull. Mus. Comp. Zool. **137:** 1-253

Jedlicka, A. 1963. Monographie der Truncatipennen aus Ostasien. Lebiinae – Odacanthinae – Brachyninae (Coleoptera, Carabidae). – Ent. Abh. Ber. Mus. Tierkunde Dresden **28**: 269-579

Lorenz, W. 1998. Systematic List of extant Ground Beetles of the World (Insecta Coleoptera "Geadephaga": Trachpachidae and Carabidae incl. Paussinae, Cicindelinae. Rhysodidae). – Tutzing, printed by the author. 502 pp.

Moore, B. P., T. A. Weir & J. E. Pyke 1987. Rhysodidae and Carabidae. In: Zoological Catalogue of Australia, **4**: 17-320. – Australian Government Publishing Service, Canberra

Sloane, T. G. 1907. Studies in Australian Entomology. No. XV. New genera and species of Carabidae, with some notes of synonymy (Clivinini, Scaritini, Cunipectini, Trigonotomini and Lebiini). – Proc. Linn. Soc. New South Wales **32**: 346-381

71. Micó, E. & E. Galante: Atlas fotográfico de los escarabeidos florícolas íbero-baleares. – argania editio, Barcelona. 2002, 81 S. zahlr. Karten, Diagramme u. Farbfotos. ISBN 84-931847-3-X

Es schadet wenig, daß dieser Band in spanischer Sprache erschienen ist, denn sein Wert liegt nicht in erster Linie im Text, sondern in den sehr ansprechenden und gut gelungenen Farbfotos der blütenbesuchenden Blatthornkäfer der Iberischen Halbinsel. Obwohl das Buch keine Bestimmungsschlüssel enthält und die Artcharakteristiken recht kurz gehalten sind, kann man es doch als eine Art Bestimmungsbuch benutzen, weil die guten Fotos in vielen Fällen doch eine erste Bestimmung zulassen, die dann noch anhand den kurzen Beschreibungen und eventuell auch an den Verbreitungskarte nachkontrolliert werden kann. Jeder Art sind einige wenige bibliographische Angaben beigefügt, insgesamt ist die Bibliographie aber recht kurz gehalten. Kern des Buches sind eben die Farbfotos, dazu die Verbreitungskarten, sowie kurze Angaben zur Aktivitätsperiode, als einfaches Diagramm, sowie zum bevorzugten Habitat, als Symbol. Ein Buch wie geschaffen für den Freund und Sammler dieser beliebten und häufigen Blütenbesucher. M. Baehr

72. Sutter, H.-P.: Holzschädlinge an Kulturgütern erkennen und bekämpfen. Handbuch für Denkmalpfleger, Restauratoren, Konservatoren, Architekten und Holzfachleute (4. Aufl.). – Verlag Paul Haupt, Bern, Stuttgart, Wien. 2002, 166 S., zahlr. SW- und Farbabb. ISBN 3-258-06443-1

Die vierte Auflage des gut eingeführten Handbuches der Holzschädlinge ist wiederum überarbeitet und erweitert worden. Als Einführung werden ausführlich die Eigenschaften des Holzes bzw. der verschiedenen Holzarten behandelt. Die beiden folgenden Kapitel widmen sich dem Abbau bzw. der Zerstörung des Holzes durch Pilze und Insekten, wobei die wichtigsten Arten auch im einzelnen behandelt werden. In diesen Abschnitten sind die Befalls- und Fraßbilder von besonderem Interesse, denn sie machen das Buch zu einem wirklichen Bestimmungsbuch. Aber auch die Verursacher werden abgebildet, zum Teil in Fotografien, zum Teil in Strichzeichnungen. Einen großen Raum nimmt das darauffolgende Kapitel "Grundlagen des Holzschutzes" ein, in dem die verschiedenen gebräuchlichen Mittel, ihre Wirksamkeit und Gefahren, behandelt werden. Die ausführliche Darstellung der Arbeitsmethoden im Holzschutz beschließt den Hauptteil des Buches, das durch eine informative Bibliographie, eine Tabelle zur Widerstandsfähigkeit und Imprägnierbarkeit von Hölzern und ein Register abgeschlossen wird.

Eine gut lesbare, knappe, aber sehr informative Darstellung, die dem im Titel angesprochenen Benutzerkreis, aber darüber hinaus sicher auch weiteren Lesern, schnelle Information über alle Aspekte des Holzschutzes ermöglicht. In Zeiten zunehmenden Umweltbewußtseins spielt ja der umweltschonende Holzschutz eine steigende Rolle und daher dürfte der Leserkreis weit über die genannten Berufsgruppen hinausgehen. Auch der Sammlungskurator wird ja in den letzten Jahren zunehmend mit solchen Fragen konfrontiert, was beweist, wie sehr diese auch die Allgemeinheit berühren.
M. Baehr

73. Donoghue, P. C. J. & M. P. Smith (Eds.): Telling the Evolutionary Time. Molecular Clocks and the Fossil Record. The Systematic Association Special Volume Series 66. – CRC Press, Boca Raton, London, New York, Washington, D.C., 2003. 288 pp. ISBN 0-415-27524-5.

To infer the timing for the evolutionary origin of a particular clade is one of the major goals of phylogenetics. Scientists need this timing to examine the rates of evolutionary change, it may concern morphological or molecular characters. Also any correlation of intrinsic biological events with paleoclimatic or paleoenvironmental conditions (e.g., atmospheric or oceanographic changes, continental drifts and shifts) or with other interacting clades (co-evolution) require a precise timing of cladogenesis.

Philip C. J. Donoghue and M. Paul Smith, two world-leading experts of the subject, have edited this multi-author volume to compare two major lines of evidence concerning evolutionary timing: the fossil record of a clade provides the expert with the minimum time of age of the particular clade. Together with a sound cladistic tree this time-frame also implies the minimum age of the respective sister-taxon of that clade regardless whether a fossil record of the latter does exist at all (so-called "ghost range" of a clade). On the other hand sound models of evolutionary change rates of various molecules provide an independent line of evidence to infer the evolutionary age of a clade. It is one of the major goals of the last years to correlate both data sets for reciprocal illumination.

Typically there are experts for the fossil records and experts for inference of molecular clocks – and there is the majority of phylogenetists who need both data-sets. The present volume will serve as a landmark for all three groups. The examples are broad and concerning deep phylogeny well selected, the various experts, who provided each chapter, all did a very good job. However, I could not find a single example for the species level of evolution (shallow phylogeny), where timing is as important as it is for larger clades. Nevertheless, this volume can be recommended to everybody who wants to know something about timing of deep clades. Unfortunately, the price seems quite high, considering the total lack of high-quality half-tone printings; thus this volume probably will not find the way to the interested student.
G. Haszprunar

SPIXIANA	27	3	253–285	München, 01. November 2004	ISSN 0341-8391

The Blattoptera fauna of Switzerland and the adjacent regions of France, Italy and Austria
I. The species of the *sylvestris*-group of *Ectobius*

(Blattellidae, Ectobiinae)

Horst Bohn

Bohn, H. (2004): The Blattoptera fauna of Switzerland and the adjacent regions of France, Italy and Austria. I. The species of the *sylvestris*-group of *Ectobius* (Blattellidae, Ectobiinae). – Spixiana **27/3:** 253-285

In the first part of the revision of the Blattoptera of Switzerland the species of the *sylvestris*-group of *Ectobius* Stephens are treated. Two species of this group are already known: *E. sylvestris* (Poda) and *E. lucidus* (Hagenbach) which are widely distributed in Switzerland. One species is new for the country: *E. eckerleini* Harz, hitherto only known from the type locality in France, has been found in the cantons Waadt (Vaud) and Wallis (Valais) and also in several departments of southern France. Two other species are new to science: *E. ticinus*, spec. nov., is found in Tessin and the adjacent parts of Wallis and Graubünden (Grisons); in Italy in the southern Alps in between Valle d'Aosta and Lake Como. *E. supramontes*, spec. nov., occurs in Engadin (Graubünden); outside Switzerland it is found in Italy in the southern Alps between Lake Como and the river Adige, and in Austria near the border towards Engadin. The new species are described, depicted and compared with the known species. Important features in the male for the discrimination of the species of the *sylvestris*-group are shape of glandular pit, genital sclerites (helmet sclerite) and paraproct structures; in the female genital sclerites and colouration of abdominal segments. A key for the determination of the Swiss species and maps showing their distribution are presented.

- Prof. Dr. Horst Bohn, Biologie Department II, Universität München; present address: Zoologische Staatssammlung München, Münchhausenstraße 21, D-81247 München; e-mail: bohn@zi.biologie.uni-muenchen.de

Introduction

The Blattoptera fauna of Switzerland is still very poorly known. The last comprehensive work was published more than 80 years ago by Fruhstorfer (1921). It is of only restricted value since it appeared prior to Ramme's revision of the genus *Ectobius* Stephens in which the till then chaotic situation in the taxonomy of the European *Ectobius* species was clarified (Ramme 1923). Therefore, many of Fruhstorfer's determinations remain doubtful.

In Ramme's revision 7 species of *Ectobius* are listed as occurring in Switzerland: *E. erythronotus* Burr, *E. lapponicus* (Linnaeus), *E. pallidus* (Olivier), *E. (Capraiellus) panzeri* (Stephens), *E. punctatissimus* Ramme, *E. sylvestris* (Poda), and *E. vittiventris* (Costa); to these *E. lucidus* (Hagenbach) has to be added since the type specimen was found in Switzerland. Including two *Phyllodromica* Fieber and a *Loboptera* Brunner v. W. species recorded by Fruhstorfer, a total of 11 wild species of Blattaria has been reported from Switzerland.

During the following decades the Swiss Blattoptera fauna was almost completely neglected. The only investigation dealing with Swiss Blattoptera was that of Hofmänner (1951) about the Orthoptera

of the Schweizer Nationalpark containing also some records of cockroaches. Since, however, only females and larvae were found, an exact determination was not possible. In the comprehensive works on the European fauna by Princis (1965) and Harz (1976) the Swiss fauna was only treated incidentally, without presenting new recordings from Switzerland. It was not before the beginning of the next century that papers dealing with Swiss cockroaches appeared again: Landau & al. (2000) and Baur & al. (2004) report the obviously rapid expansion of a southern species *(Ectobius vittiventris)* into northern regions of Switzerland. Baur & Coray (2004) revised types and type specimens established by Fruhstorfer.

With the present paper the overdue revision of the Blattoptera of Switzerland is started, dealing first with the *sylvestris*-group of *Ectobius*. The revision is, on the one hand, based on the material of most of the Swiss museum collections. An especially rich collection was established by Dr. L. Reser (museums Luzern and Lugano) consisting of about 800 specimens captured with light traps mainly in Tessin over the last 25 years. The museum material is, on the other hand, supplemented by material collected by the author, especially from southern Switzerland and from the adjacent parts of France, Italy and Austria.

Materials and methods

Explanation for the sections "Material studied"

The localities of Switzerland are grouped with respect to the corresponding cantons, which are arranged alphabetically according to their abbreviations: AG (Aargau), BE (Bern), BL (Basel-Land), BS (Basel-Stadt), FR (Freiburg), GE (Genève, Genf), GL (Glarus), GR (Graubünden, Grisons), JU (Jura), LU (Luzern), NE (Neuchâtel), OW (Obwalden), SG (St. Gallen), SO (Solothurn), SZ (Schwyz), TG (Thurgau), TI (Tessin), UR (Uri), VD (Vaud, Waadt), VS (Valais, Wallis), ZG (Zug), ZH (Zürich). Within each canton the samples from the various museums are kept separately and listed in the following order: Basel (Ba), Bern (Be), Chur (Ch), Frauenfeld (Fr), Genève (Ge), Lausanne (La), Lugano (Lg), Luzern (Lz), Neuchâtel (Ne), Solothurn (So), Zürich (Zü), followed by the material collected by the author (HB). In each of these sections the localities are listed alphabetically; material without specified locality within a canton is put at the end. Geographical terms which I could not localize within a given canton have a question mark (in brackets) behind the name. Such questionable localities are, of course, not contained in the distribution maps. Material of doubtful derivation is placed after the cantons under XX.

In order to allow a clear identification of the museum specimens, the inscriptions on the labels are cited as literally as possible; different writings or abbreviations for the same collector, for example, are taken over from the labels. However, name or abbreviation of country and canton are omitted and the dates have been standardized. Additions or explanations of the author are put in brackets.

The localities of the material collected by the author have an identification code consisting of one or two letters designating the country (A = Austria, He = Switzerland, F = France, It = Italy) and a serial number. Example: "He 52" means locality no. 52 in Switzerland. The code is put in parentheses at the end of the collecting data of the respective locality. When a microscopical preparation has been made of an animal from that locality an individual number – separated by a slash – is added to the locality number. Example: "male, slide He 52/3" means that a microscopical slide has been made of one of the males from that locality. Slide and corresponding animal (pinned or in alcohol) are labelled with this identification number. In this case a separate locality number is not presented, since it is already contained in the identification number. Preparations made from museum material are designated with "Bo" (abbreviation of the author's name) and a serial number.

Records from localities which are situated outside the area of the distribution maps are designated with an asterisk.

Uncertain determinations are indicated by a question mark (in parantheses) placed before the specifications (number, sex, stage) of the corresponding specimens.

Preparation of microscopical slides, figures

For the study of the various cuticular structures important for the discrimination of the species (glandular pit, helmet sclerite, paraprocts, etc.) microscopical preparations had to be made. Usually, the complete abdomen was removed from the animal, treated with KOH, washed with water, and dissected; the pieces were then transferred to alkohol and xylol, and finally mounted in Canada Balsam on a microscopical slide.

A similar procedure was also performed with other parts of the body used for photographs. For the reproduction of colour patterns it has to be noted that the white colour, for example in the surroundings of the pronotum disk, is lost during the treatment with KOH. Wings were not treated with KOH prior to embedding. If not stated otherwise, the position of the structures in the figures is with the anterior end on top.

An earlier paper (Bohn 1989) already contains pictures from some of the species treated here. They are cited in the following text with numbers and small letters as they are designated in the respective paper: "Fig. 1a". Numbers with capital letters refer to the figures of the present paper: "Fig. 1A".

List of museums and their abbreviations

Abbr.	City	Museum
Ba	Basel	Naturhistorisches Museum Basel
Be	Bern	Naturhistorisches Museum Bern
Cf	La Chaux-de-Fonds	Musée d'Histoire Naturelle
Ch	Chur	Bündner Naturmuseum
Fr	Frauenfeld	Naturmuseum Thurgau
Ge	Genève	Musée d'Histoire Naturelle de Genève
La	Lausanne	Musée Cantonal de Zoologie Lausanne
Lg	Lugano	Museo cantonale di storia naturale, Lugano
Lz	Luzern	Naturmuseum Luzern
Ne	Neuchâtel	Musée d'Histoire Naturelle Neuchâtel
So	Solothurn	Naturmuseum Solothurn
Zü	Zürich	Entomologische Sammlung der ETHZ
ZSM	Zoologische Staatssammlung München	

Other abbreviations

L = larva, nymph
ex L = grown from larvae (nymphs); identification number of these animals underlined
O = ootheca(e)
S = abdominal sternite
T = abdominal tergite

Results

The species of the *sylvestris*-group

The group consists of 6 known species: *Ectobius eckerleini, E. lucidus, E. sylvestris, E. brunneri* Seoane, *E. pyrenaicus* Bohn, and *Phyllodromica chopardi* Fernandes (Bohn 1989). The latter three are endemic to the Iberian Peninsula. They differ in part of the characteristics described below: In *E. pyrenaicus* and *P. chopardi* the males have shortened tegmina not reaching the end of the abdomen and the hind wings are rudimentary in both sexes. Moreover, *P. chopardi* has a glandular pit on T7 with deep pouches not found in other species of the group. *E. brunneri* agrees in its characteristics with the other species outside the Iberian Peninsula but is easily distinguished by its light, straw-coloured pigmentation; the females of this species are unique in having tegmina with broadly rounded, almost truncate apex.

Characteristics

Morphological features. Males with fully developed wings at least reaching or surpassing the end of the abdomen. T6 at the posterior border with a moderately deep, broadly rounded concavity (Fig. 5F). T7 posteriorly weakly, more angularly excavated (Fig. 5G). Glandular pit of T7 relatively large (measuring ⅓ or more of the segment breadth and ½ or more of the segment length), transversely oval to rounded, moderately deep, open bowl-shaped, with a flat bottom covered with dispersed bristles having a curved tip. The posterior wall of the pit is rather steep, in microscopical preparations appearing as a sharp contour line (Fig. 5K), towards the bottom often hollowed out posteriorly to a very shallow, in dorsal view narrowly crescent-shaped, pouch (Fig. 1f); the anterior wall is much less steep, gradually sloping down to the bottom. Subgenital plate with a small unspecialized stylus (the left); genital sclerites with a helmet sclerite.

Females with shortened wings not reaching the end of the abdomen; oothecae with about 14 rather strong longitudinal ridges.

Colouration. The general pattern of colouration and the range of variations are described here. In the descriptions of species only important deviations from this pattern will be mentioned.

Head. Variously coloured, between almost completely dark (blackish) and mainly lightly brownish or yellowish; in females usually with lighter pigmentation than in males. Regular features are a narrow whitish or yellowish transversal band in the posterior part of the interocular space (in very dark species/specimens sometimes obscured), and anteriorly adjacent – when the head is otherwise lighter pigmented – a broad darker band (darker than the following frontal parts).

Pronotum. Disk hoof-shaped, posterior corners with or without slight lateral extensions, rarely more rounded, completely dark (blackish or dark brown) or variously lightened, in colour (lighter brown, reddish brown, orange-ochreous, yellowish, or straw-coloured) and extent, preferentially in the central area with the margins or only the posterior corners remaining darker, at the most completely lightly coloured. Legs. From nearly completely dark to almost completely yellowish; in females usually lighter pigmented than in males.

Tegmina. There are several elements contributing to the colouration pattern of the tegmina. 1. Dispersed fine dark dots mainly along the veins. This pattern is especially evident in in the lightly pigmented *E. brunneri* (Fig. 13d); in the other species it is more weakly developed and mostly obscured by

other patterns. 2. Darkenings of the interspaces of the veinal network causing a more or less pronounced mottling of the tegmina (Figs 4A,H). 3. Relatively large dark patches mainly in the distal two thirds of the tegmina brought about by the extension and fusion of interveinal darkenings. They are more often found in females (Figs 4C,D,H,I) than in males (Figs 4A,F). 4. Darkening along the the veinal trunk at the base of the tegmina (Fig. 4H).

Abdomen. Male: Tergites. Mostly dark brown, median part of all tergites lighter brown together forming a broad indistinct longitudinal band, but with transversal ridge and surroundings often remaining darker. Posterior tergites (T5 ff.) additionally lightened yellowish at the posterior margin and corners; T7 often almost completely yellowish with only small dark markings remaining anteriorly (Figs 6E-H). Sternites. Darker than tergites, lateral and posterior margins may have relatively narrow yellowish lightenings, especially on the posterior segments. – Female: Segments usually with lightly coloured lateral and posterior margins, the outer parts rather narrowly whitish, inwards followed by yellow. Tergites 2-6. Mostly dark, with variously broad whitish-yellow lateral and posterior margins, in the posterior corners often triangularly extended, sometimes with yellow patches within the dark anterior area (as in Fig. 14D, and larger). Tergites 7-10. Yellow areas usually larger than in the preceding segments. Sternites 2-6. Dark, with lightly coloured lateral and, in most cases, also posterior margins. The yellow area often variously extended: With two lighter coloured patches in the dark anterior area (Fig. 15F), which may extend and fuse with the yellow posterior area (Fig. 15G); finally the posterior half or more of the sternite may be yellow (Figs 14F, 15H). S7 (Subgenital plate). Either mostly dark, with a small yellowish area at the latero-posterior margins (Fig. 14K), or variously lightened with lighter brown or yellow, in the extreme with only the anterior margin and two patches at the posterior margin remaining dark (Fig. 15L).

Features important for the discrimination of the species

Males. Glandular pit. The differences in the structure of the glandular pit are not very dramatic; they mainly concern size (breadth) and shape of the pit and of its posterior contour line. The breadth of the pit (distance between the two ends of the contour line) is compared with the breadth of the lateral margins (distance between pit and lateral edge of the segment) (Tab. 1). *E. ticinus* has the smallest pit, being not broader than the lateral margins (about 100 %); in all other species the pit is considerably broader (> 120 %). The shape of the glandular pit is outlined by the posterior contour line and the anterior border of the bristle field. It may be more transversal, as in *E. lucidus* (Figs 7F,G) and *E. supramontes* (Figs 6G-K), or more rounded as in *E. sylvestris* (Figs 7B,C) and *E. ticinus* (Figs 5G-K). The pit of *E. eckerleini* (Figs 8B,C) is somehow in between; it is otherwise characterized by especially long and densely arranged bristles along the posterior margin.

Helmet sclerite. The helmet sclerite is a small sclerotization of the endophallus wall. At rest, with genitalia retracted, it is located at the base of the subgenital plate between the right and left phallomere (Figs 9E, 1b). It is not restricted to the *sylvestris*-group but is also found in a series of related groups. – A rapid tentative analysis of the structure of the helmet sclerite is possible in living anaesthetized animals: By pressing the abdomen the sclerite can be extruded with the endophallus and analyzed under a stereomicroscope. For a more detailed study microscopic preparations are preferable.

In *E. sylvestris* the sclerite has the shape of a

Tab. 1. Measurements of length of pronotum and tegmina and of the relative breadth of the glandular pit (= breadth of pit / breadth of margin) in *Ectobius* species. n number of specimens used for the measurements of glandular pit size; the numbers for the other measurements are listed in the descriptions.

	Length of pronotum (in mm)				Length of tegmina (in mm)				Relative breadth of glandular pit (%)		
	Male		Female		Male		Female				
	Range	Mean	Range	Mean	Range	Mean	Range	Mean	n	Range	Mean
E. sylvestris	2.0-2.3	2.1	2.1-2.6	2.4	9.2-11.1	10.0	4.6-5.9	5.2	14	111-153	122
E. lucidus	2.3-2.6	2.4	2.4-2.9	2.7	10.3-11.7	11.0	5.9-6.9	6.4	26	109-170	130
E. eckerleini	2.1-2.4	2.2	2.2-2.5	2.4	9.0-10.7	9.8	4.7-5.5	5.1	20	116-175	137
E. ticinus	2.1-2.5	2.3	2.2-2.8	2.5	10.3-12.3	11.4	5.1-6.5	5.9	23	83-112	101
E. supramontes	2.1-2.3	2.2	2.1-2.6	2.4	7.4- 9.9	9.1	4.6-5.9	5.2	22	108-167	128

laterally compressed helmet with the vertex pointing posteriorly, the opening for the face at the right, and opposite with an elongated neck part angularly set off from the main helmet (Figs 9A-D). The helmet is not exactly bilateral-symmetrical its right side (ventral in the animal) usually being more extended (Figs 9B,C). The surface of the sclerite is covered with acute scales (microtrichia) pointing towards the neck part.

The shape of the helmet varies between the species: In *E. sylvestris* (Figs 9A-D) the helmet is – as seen from its lateral side – fairly isodiametric; in *E. lucidus* (Figs 9E-H) it is higher and narrower; and it is still higher and narrower, almost gutter form, in *E. eckerleini* (Figs 10A,B). Two species, *E. ticinus* (Figs 10E-G) and *E. supramontes* (Figs 10C,D), have a completely aberrant helmet sclerite: The sclerite is no longer helmet-shaped, but forms a low and flat mound, oval in outline as seen from above (dorsal).

Paraprocts. The paraprocts are the sclerotized parts of the subanal lobes. The anus is enclosed in between the posterior ends of the subanal lobes and the small supraanal lobe (epiproct). Paraprocts and epiproct are considered as remnants of S10. The paraprocts are paired, but they show a strong left-right asymmetry.

Each paraproct (Figs 11A,B) consists of three parts: a central part (cp), forming the joint with T10, and, arising from there, two medially diverging arms: the medio-anterior arm (ap) and the medio-posterior arm (pp). In the right paraproct the three parts are fused to a relatively strong angular sclerite covering most of the subanal lobe. The central part of the right paraproct bears a strong, curved, medially directed spine (sp) presumably involved in the coupling between male and female genitalia. In the left paraproct the three parts are separate and rather small sclerites only partly covering the corresponding lobe; a spine is not present.

At the medio-anterior arm of the right paraproct two parts may be distinguished, separated by some kind of a furrow (arrow in Fig. 11B): a narrow, flat, bandlike proximal part being connected with the central part of the paraproct, and a more extended, variously shaped distal part with at least partly elevated surface. The two parts of the arm may be partly separated by a more or less deep lateral incision (arrows in Figs 11G,I,K).

Praeparaprocts (T10a). Anteriorly of the paraprocts is another pair of small sclerotizations (Figs 11A,B; pr). Each consists of a narrow lateral sclerite stripe lying just anteriorly of the ventral end of T10 and surpassing it considerably. The smaller left one (in the picture on the right) does not reach the ventral midline; it bears, shortly before its median end at the posterior side, a weakly sclerotized egg-shaped or globular structure. The larger right sclerite rises to a mostly membraneous club-shaped process fairly reaching the midline. The sclerotizations most likely are derivations from T10 and should be designated as T10a (Klass, pers. comm.). For practical reasons I call them praeparaprocts.

There is little variation in size and shape of these structures among the species of the *sylvestris*-group; but considerable differences can be found between the various species-groups of *Ectobius* and *Phyllodromica*. The praeparaprocts seem to be restricted to Ectobiinae.

Females. Genital sclerites. The genital sclerites of the females may be divided into an extended dorsal and a much smaller ventral complex. The latter is rather invariable and not further considered here (Fig. 1i); the dorsal complex, however, shows species specific variations in the structure of some of the sclerites.

The most prominent sclerites of the female genitalia are the basivalvular sclerites. In *E. sylvestris*, *E. lucidus* and *E. eckerleini* they are long and strongly converging anteriorly; *E. ticinus* and *E. supramontes* have shorter and less strongly converging sclerites (Figs 16A-E).

In *E. sylvestris* some kind of spermathecal plates are present, appearing as a pair of weakly sclerotized areas lying between the basivalvular sclerites (s in Fig. 16A). They are not always well developed, and in the seemingly closely related species, *E. lucidus*, sometimes similar structures may be indicated.

Another set of sclerites with some species specific variations is situated in between the intercalary sclerite (i) and the posterior lobe of valvifer II (f); the structures are designated here as prae-intercalary sclerites. Usually two such sclerites in parallel orientation are present on each side, a superficial posterior (the upper in Figs 16F,G) and a more deeply located anterior one. The latter may be missing (Fig. 16I); only the posterior is considered here. It also shows considerable intraspecific variation, and the identification of a species by means of only the shape of this sclerite is usually not possible; but it can be helpful for the determination in pairs of otherwise very similar species (*E. sylvestris* – *E. lucidus*, Figs 16F,G; *E. ticinus* – *E. supramontes*, Figs 16H,I).

Keys for the determination of the species of the *sylvestris*-group occurring outside the Iberian Peninsula

Males

1. Disk of pronotum completely dark; glandular pit of T7 large, considerably broader than lateral margins of the tergite, rounded, posterior contour line strongly curved throughout (Fig. 7B); helmet sclerite fairly isodiametric, with a marked neck-process (Fig. 9C); right paraproct: medio-anterior arm rather small, distal part very narrow (Fig. 11D) ..... *Ectobius sylvestris* (Poda)

– Disk of pronotum never completely dark, variously, though sometimes only minimally lightened; glandular pit either smaller, not broader than the lateral margins of the tergite (Fig. 5G), or posterior contour line less strongly curved (Fig. 6G); helmet higher and narrower (Fig. 9G) or sclerite not helmet-shaped at all (Figs 10F); right paraproct: medio-anterior arm large, distal part broader, fairly triangular (Fig. 11G) .... 2.

2. T6: median part of transversal ridge angularly bent anteriorly (Fig. 7E), bristles on the surface of the tergite short and weak (Fig. 7H); T7: posterior contour line of the glandular pit forming a very shallow bow, pit strongly transversal (Fig. 7F)..... *Ectobius lucidus* (Hagenbach)

– T6: median part of transversal ridge gradually and less strongly bent anteriorly (Fig. 7A), bristles on the surface relatively long and strong (Fig. 7D); T7: posterior contour line of glandular pit at least with lateral parts stronger curved anteriorly (Fig. 8B), pit rounded or transversal ..... 3.

3. Tegmina usually with some not very dark patches near the apex, veinal trunk without or with only very narrow darkening (Fig. 13c); lateral edges of T6 densely covered with short, but relatively strong bristles (Fig. 8E); glandular pit along the posterior margin with long, quite densely arranged bristles (Fig. 8C); helmet sclerite very high and narrow (Fig. 10B) .... *Ectobius eckerleini* Harz

– Tegmina mottled, but usually without dark patches, veinal trunk well darkened (Fig. 4A); lateral borders of T6 with few and weak bristles (Fig. 8F); bristles along the posterior margin of the pit smaller and less dense (Fig. 5I); helmet sclerite not helmet-shaped, but forming a flat mound (Fig. 10F) ..... 4.

4. Larger, length of tegmina 10.3-12.3 mm; glandular pit rounded, small, about as broad as the lateral margins of the tergite, posterior contour line strongly curved throughout (Fig. 5G); right paraproct: distal part of medio-anterior arm long, tongue-shaped, with cut or acute tip (Fig. 11K) ..... *Ectobius ticinus*, spec. nov.

– Smaller, length of tegmina 7.4-9.9 mm; glandular pit transversal, large, considerably broader than the lateral margins of the tergite, posterior contour line in the middle flat, laterally more strongly curved (Fig. 6G); right paraproct: distal part of medio-anterior arm short, triangular, with acute tip (Fig. 11I)..... ..... *Ectobius supramontes*, spec. nov.

Females

The determination of the females in the genus *Ectobius* is usually very difficult or impossible. In the *sylvestris*-group colouration and genital sclerites offer means for a quite certain determination, which, however, often requires the making of microscopical preparations, – even for the study of colouration since important parts of the segments may be hidden in dried or fixed animals. The following key should be used only for a preliminary orientation. Colouration characters could only be partly integrated. For a further confirmation of the determinations the colouration should be thoroughly studied and compared with the descriptions and accompanying figures.

1. S2-6 mostly dark, laterally and often also posteriorly with lightly coloured margins (Figs 12G, 13G); basivalvular sclerites less strongly converging anteriorly (Figs 16D-E) ..... 2.

– S2-6 as above, but lighter pigmentation more extended: usually at least with lighter brown or yellow patches in the dark anterior area (Figs 14H, 15F), in the extreme the posterior half or more of the sternite yellow (Figs 14F, 15H); basivalvular sclerites strongly converging anteriorly (Figs 16A-C) ..... 3.

2. Larger, length of tegmina 5.1-6.5 mm, mean 5.9 mm; latero-posterior corners of pronotum disk usually with slight lateral extensions (Figs 12A-C,E; but see Fig. 12D); posterior prae-intercalary sclerites relatively broad (Fig. 16H) .... *Ectobius ticinus*, spec. nov.

– Smaller, tegmina 4.6-5.9 mm, mean 5.2 mm; latero-posterior corners of pronotum disk without lateral extensions (Figs 13A-D); posterior prae-intercalary sclerites narrower (Fig. 16I)..... ..... *Ectobius supramontes*, spec. nov.

3. Tegmina short (4.7-5.5 mm, mean 5.1 mm), without darkened veinal trunk, but with numerous small dark patches; pronotum disk usually almost completely lightly coloured, indistinctly hoof-shaped, with or without small darker markings (Fig. 15C, Figs 12g-i), rarely distinctly hoof-shaped, with darker posterior corners (Figs 15B) or almost completely dark (Fig. 15A), posterior corners without lateral extensions ..... *Ectobius eckerleini* Harz

– Tegmina of various size, with darkened veinal trunk, either with fewer but larger patches or without patches; pronotum disk distinctly hoof-shaped, usually darker, mostly at least posterior corners dark, the latter with slight lateral extensions ..... 4.

4. Tegmina relatively long (5.9-6.9 mm, mean 6.4 mm); pronotum disk never completely dark, often with a striking yellowish reversed y-shaped marking (Figs 11a-g); spermathecal plates missing (Fig. 16B); posterior prae-intercalary sclerites relatively broad, strikingly dark (Fig. 16G) ..... *Ectobius lucidus* (Hagenbach)

– Tegmina shorter (4.6-5.9 mm, mean 5.2); pronotum disk usually completely dark, if partially lightened usually without a striking yellowish reversed y-shaped marking (Figs 10a-f); spermathecal plates usually present (Fig. 16A); posterior prae-intercalary sclerites narrow, lighter pigmented (Fig. 16F) ..... *Ectobius sylvestris* (Poda)

Description of the species

Ectobius sylvestris (Poda, 1761)

Figs 1, 7A-D, 9A-D, 11D,E, 14G-M, 16A,F

Ectobius sylvestris (Poda, 1761): Bohn 1989: 322, Figs 1f, 3a-f, 10a-h, 13b,f

Material studied. Switzerland. AG: 1♂, Zeihen, Bözberg, 544 m, 16.VII.[19]67, leg. H. Bachmann (Ba). – 2♂♂, 1♀, 1 L, westl. Ortsende v. Auenstein (bei Lenzburg), 460 m, 15.VI.2002 (He 75); 3 LL, zw. Remigen & Gansingen, 550 m, 15.VI.2002 (He 72); 1♂, Wettingen, 500 m, 14.VI.2002 (He 71) (leg. B. & H. Bohn, HB). – **BE**: 1♂, Bern, 5.VII.[18]96, Dr. Th. Steck; 1♂, Bern, Bremgartenwald, 14.VI.[19]08, Steck; 2♂♂, Bern, Dählhölzli, 29.V.[19]09, Steck; 1♂, Bern, Dählhölzli, 22.VI.1912, Steck; 1♂, Biel, Jura, 500 m, unter Stein, 16.V.[19]25, Dr. Hofmänner; 4♂, Dentenberg, 24.V.1920, Steck; 1♂, Dentenberg, 7.VI.1925, Steck; 1♂, Gümligen, 9.VI.1918, Steck; 3♂♂, Gümligen, 1.VI.1927, Steck; 1♂, Könizbergwald, 16.VI.[19]07, Steck; 1♂, Könizbergwald, 6.VI.[19]09, Steck; 1♂, Könizbergwald, 29.VIII.1926, Steck; 2♂♂, Rüfenacht, 14.VI.1915, Steck; 1♂, Rüfenacht, 27.VII.1919, Steck; 1♂, Wabern, 3.VIII.1919, Steck (Ba). – 9♂♂, 1♀, Bern u. Umgebung; 1♀, Gurten, 24.IX.80; 1♂, Oberscherli, 25.V.[19]56; 1 L, Oberscherli, 30.V.1956; 12♂♂, Oberwil i. S., Schattigseli, 25.VII.1999, leg. H. Baur; 1♂, Reutigenmoos, 12.VI.[19]66; 1 L, Zollikofen, i. Wald, 10.V.[19]31, Montet (Be). – 1♂, [Orvin] (slide Bo 656) (Cf). – 1♂, Steffisburg, 480 m, 23.VI.1983, leg. Baur (Ge). – 1♂, Gadmental, Feldmoos, 1650 m, Tf, 31.VII.1981, Dr. L. Rezbanyai (Lz). – 2 LL, Büren, s.fol.qu.; 2 LL, Büren, II.[18]94 (So). – 4♂♂, 4♀♀, ex L: 2♂♂, 1♀, zw. Orvin & Les Prés d'Orvin, 850 m, 1.VI.2002 (He 58); 1♂, ex L: 1♂, Val de Tavanne, Sorvilier, 700 m, 1.VI.2002 (He 57) (leg. B. & H. Bohn, HB). – **BL**: 1♀, Diegten, Ränggen (SE-Hang: Waldweg), SSE Griessen, 627.175/249.125, 775 m, 31.V.2003, A. Coray; 2♂♂, Liestal, VII.1935, E. Handschin; 1♀, Liestal, Sichteren/Laubi, VI.[19]56, leg. H. P. Straumann; 1♂, Liestal, Laubi, VII.1956, H. P. Straumann; 2♂♂, Pratteln, V.1946, E. Handschin; 1♂, Röserental, 27.VI.1934 (Ba). – 1♂, 1♀, Münchenstein, 18.V.[19]45, Wolf (Zü). – **BS**: 1♂, Riehen, Im Linsberg (südl. Vormbergweg), 400 m, 14.VI.[19]94, A. Coray (Ba). – **FR**: 1♂, Bas Vully, Mont Vully, 8.V.2003, leg. C. Monnerat (Ne). – **GE**: 1♂, Versoix, 24.IX.[19]27, J. de Beaumont (La). – 2♂♂, Vernier, 18.V.[19]21, Frustorfer (Zü). – **GL**: 1♂, Filzbach, Gäsischachen, 19.VI.[19]68; 1♂, Filzbach, Süstli, 30.VI.[19]69 (Zü). – 2♂♂, 2♀♀, Biberlichopf bei Niederurnen, 550 m, 17.VI.2002 (He 87) (leg. B. & H. Bohn, HB). – **GR**: 1♂, V. Mesocco, Mesocco, 30.VI.1923, Steck; 1♀, Plan de Posa [?], Pinus, 31.VII.[19]17; 1♂, Sur, Alp Flix, Gioppas, Südrand, 769.6/155.0, 1955 m, 26.VIII.2002, leg. A. Coray; 1♀, Sur, Alp Flix, Lais Blos; Westrand d. südl. Lais Blos, 769.0/156.1, 1965 m, 26.VIII.2002, leg. A. Coray; 1♂, Trupchun, Arve, 2000 m, 22.VII.[19]47 (Ba). – 2♂♂, Aue bei Reichenau, 1.VI.[19]52; 1♂, Scanfs [S-chanf], 14.VIII.[19]17; 1♂, Scanfs, 15.VIII.[19]18; 1♀, Versam, VII.[18]97; 1♂, Versam, 9.VII.[18]98 (Be). – 1♂, Reichenau, Mähwiese am Rhein, 610 m, 5,VII.[19]60, leg. Nadig (Ge). – 1♂, Scanfs, 15.VII.[19]49, J. de Beaumont (La). – 3♂♂, Davoser Tal, Schia, 1500-1800 m, 24.VII.[19]31, Dr. J. P. Wolf; 1♂, Davoser Tal, 1550-1800 m, 17.VII.[19]39, Dr. Wolf; 1♂, Davoser Tal, 1500-1800 m, 22.VI.[19]40, Dr. Wolf; 1♂, Domleschg, 30.VII.[19]39, Dr. Wolf; 7♂♂, 3♀♀, Filisur, 30.VI.[19]40, Dr. J. P. Wolf (male, slide Bo 277); 1♂, 1♀, Glaris, 1300 m, 19.VII.[19]39, Dr. J. P. Wolf; 1♀, Glaris, Davoser Tal, 1300 m, 17.VIII.[19]38, Dr. J. P. Wolf (slide Bo 658); 1♂, Umg. Parpan, Jochalp, 5.IX.[19]53, leg. W. Sauter; 1♂, Umg. Parpan, Valbella, 9.IX.[19]53, leg. W. Sauter (slide Bo 279); 1♂, Piz Danis, Lenzerheide, 8.VIII.[19]92, Merz (slide Bo 278); 1♀, Samedan, Wiese, 1720 m, 15.VII.[19]86, leg. W. Sauter; 2♂♂, Samedan, Wiese, 20.VII.[19]87, leg. W. Sauter; 1♀, Samedan, Wald, 21.VII.[19]88, leg. W. Sauter (slide Bo 660); 1♀, Valbella/Casoja, Brache, 16.VII.[19]98, leg. B. Merz; 1♂, Zuoz, Sesleriawiese, 19.VII.[19]77, leg. W. Sauter; 1♀, Zuoz, Stipawiese, 1685 m, 22.VII.[19]87, leg. W. Sauter (slide Bo 659) (Zü). – 1♂, ex L: 1♀, Albula-Tal, Surava – Alveneu, 1000 m 23.VI.2001 (He 37); 2♂♂, 2♀♀, 1 L, ex L: 1♂, 1♀, Clavadel (bei Davos), 1630 m, 4.VII.2001 (He 46); 3♂♂, 6♀♀,1 L, ex L: 2♂♂, 3♀♀, Dom-

leschg, Scheid – Feldis, 1400-1500 m, 23.VI.2001 (He 35); 2♂♂, 1♀, 1 L, Filisur, 1080 m, 24.VI.2001 (He 39); 6♂♂, ex L: 1♀, Oberengadin, zw. La Punt & Bever, 1700 m, 24.VI.2001 (male, slide He 40/1); 1♂, 4♀♀, Oberengadin, zw. La Punt & Bever, 1700 m, 6.VII.2001 (He 40a); 4 LL, ex L: 2♂♂, 2♀♀, Oberengadin, Maloja, 1800 m, 24.VI.2001 (He 43); 1♂, 1♀, Oberengadin, Samedan, 1760 m, 5.VII. 2001 (He 51); 9♀♀, 2 LL, ex L: 1♂, 2♀♀, Oberhalbstein, zw. Tinizong & Savognin, 1300 m, 24.VI.2001 (He 44); 1♂, 5♀♀, Somvix, 1000-1200 m, 11.VII.1997 (He 20); 4♂♂, 5♀♀, 2 LL, ex L: 1♀, Val Calanca, Grono – Buseno, 2 km östl. Grono, 600 m, 17.VI.2002 (two males, slides He 80/1,2); 1♀, Valle Mesolcina, Leggia (bei Grono), 17.VI.2002 (He 82) (leg. B. & H. Bohn); 1♂, 1♀, 3 LL, Valser Tal, Marcheggen (bei Vals), 1900 m, VII.2000, leg. T. M. Saks (He 29) (HB). – **JU**: 1 L, Courtedoux, Combe du Pouche, 568.100/252.400, 545 m, TJ2, 20.VII.-3.VIII.1988, Y. Gonseth leg. (Ne). – **LU:** 1♂, Eigental, For[r]enmoos, 970 m, Lf, 7.VII.1983, Dr. L. Rezbanyai; 1♂, Eigental, For[r]enmoos, 965 m, Lf, 18.10.1984, Rezbanyai-Reser; 1♂, 1♀, Eigental, Forrenmoos, 965 m, Tf, 3.VII.1985, Rezbanyai-Reser; 1♂, Hasle, Balmoos, 14.VII.1975, leg. Rézbányai L.; 1♀, Hasle, Balmoos, IX.1975, leg. Rezbanyai; 1♂, Hasle, Balmoos, 970 m, 29.VII.1976, leg. Dr. Rezbanyai-Reser; 1 L, Hasle, Balmoos, 970 m, Tf, 30.V.1977, leg. Dr. Rezbanyai L.; 1 L, Hasle, Balmoos, 900 m, BF, e.VIII. 1977, leg. Dr. Rezbanyai L.; Hasle, Balmoos, 970 m, leg. Dr. Rezbanyai: 1 L, LF, 4.VII.1977, 1 L, 5.IX.1977, 1♂, 1L, TF, 11.IX.1978; 1♀, Luzern, Obergütsch, 550 m, Bf, a.VIII.1977, leg. Dr.Rezbanyai; Neudorf, Vogelmoos, 775 m, Tf, Rezbanyai-Reser: 1♂, 1♀, 10.VII.1987, 1♂, 14.VI. 1988; Romoos (Napf), Mittl. Grämsen, Wiese, 930 m, leg. Dr. L. Rezbanyai-Reser: 1♂, Lf, 2.VI.1993, 1♂, Tf, 7.VI.1993, 1♂, Tf, 25.VI.1993; 1♂, Napfgebiet, Romoos, Änzihüsli bis Ob.Änzi, 639.8-640.8/205.9-206.4, 1250 m, Tf, 17.IX.1997, leg. Dr. L. Rezbanyai-Reser; 1♂, Napfgebiet, Romoos, Neumatt, Altmülibach, 644.6-644.8/207.1-207.4, 680 m, Tf, 2.VII.1997, leg. Dr. L. Rezbanyai-Reser (Lz). – **NE**: 1 L, Champ du Moulin, 27.VIII. [19]41, J. de Beaumont; 1♂, Jura, VIII.[19]51, J. de Beaumont; 1♂, Villaret, 30.V.[19]54, Dr. Hofmänner (La). – 1♂, Neuchâtel (Eremitage), 561.2/205.5, 570 m, clairière prairie méso, 10.VI.1991, J.-P. Haenni; 1♂, Neuchâtel (r. Matile), 561.8/205.5, 550 m, lisière forêt thermophile, 21.VII.1993, JP Haenni; 1 L, Neuchâtel (Matile 77), Grande Cassarde, 561.9/205.5, 545 m,forêt thermophile/lisière, 4.III.1998, JP Haenni; 1 L, Neuchâtel, Matile 77 (maison), 550 m, 28.X.1998, JP Haenni leg.; 1♂, Rochefort (Les Grattes), 552.25/204.1, 1020 m, 20.VI. 1995, JP.Haenni leg. (Ne). – **OW**: 1♂, Alpnachstad, 600 m, 11.VI.[19]38 (Ba). – **SG**: 2♂♂, Vättis, Calfeisental, 15.VII.1930, Steck (Ba). – 1♂, Schänis, Biberlikopf, 3.VI. [19]68 (Zü). – 4♀♀, ex L: 1♂, Altstätten, 550 m, 14.VI.2002 (He 65) (leg. B. & H. Bohn, HB). – **SO**: 3♂♂, 2♀♀, St. Wolfgang bei Balsthal, 600 m, 3.VI.2002 (male, slide He 63/1) (leg. B. & H. Bohn, HB). – **SZ**: Gersau, Oberholz, 550 m, Dr. L. Rezbanyai: 2♂♂, Lf, 28.VI.1979, 1♂, Lf, 13.VI.1980, 6♂♂, Lf, 2.VI.1981, 1♂, Tf, 5.VI.1981, 1♂, Lf, 8.VI.1981, 1♂, Tf, 8.VII.1981, 2♂♂, Lf, 15.VII.1981, 1♂, Tf, 28.VII.1981, 1♂, Lf, 4.VIII.1981, 1♂, Tf, 31.V.1983, 1♀, Tf, 18.VII.1983; 1♀, Gersau, Oberholz, 550 m, BF, XI.1979, leg. Dr. Rezbanyai; 1♀, Gersau, Oberholz, 550 m, BF, VIII.1981, Rezb. & Herger; 1♀, Lauerz, Schuttwald, 480 m, BF, VII.1990, Rezbanyai; Lauerz, Schuttwald, 480 m, Dr. L.Rezbanyai-Reser: 1 L, Tf, 14.V.1991, 4♂♂, 1♀, 5 LL, Tf, 12.VI.1991, 1♂, Tf, 25.VI.1991, 1♂, Lf, 27.VI.1991, 1♂, Lf, 2.VII.1991, 1♀, Tf, 12.VII.1991, 1♂, Tf, 4.VIII.1991; 1♀, Lauerz, Schuttwald, 480 m, Tf, 5.IX.1991, leg. L.Rezbanyai-Reser; 1♂, Rigi-Kulm, 1600-1780 m, Dr. L. Rezbanyai (Lz). – **TG**: 1♀, D[iessen]hofen, 19.X.[19]00, leg. H. Wegelin (slide Bo 651); 1♂, Frauenfeld, 6.VI. [19]01, leg. Wegelin; 1♂, Frauenfeld, 7.VI.[19]02, leg. Wegelin; 1♂, Frauenfeld, 20.VI.[19]06, leg. Wegelin; 1 L, Frauenfeld, 9.X.[19]06, leg. Wegelin; 1♂, Frauenfeld, Stadt, Kantonsschule (Altb), 430 m, 22.VI.2002, leg. H. Blöchlinger; 1♀, Herdern, Schalmenbuck, 19.V.1990, leg. Blöchl.; 1♂, Müllheim, Tobelbach, 430 m, Li, 21.VI.1995, leg. H. Blöchlinger; 2♂♂, Stettfurt (Stapfete), 714.500/265.150, 560 m, 24.V.2000, leg. H. Blöchlinger (Fr). – 1♂, Kreuzlingen, Neuweiher, a. L., 7.VII.[19]69; 1♂, Kreuzlingen, Neuweiher, a. L., 5.VII.[19]70 (Zü). – 1♂, 4♀♀, 1 L, Weinfelden, Schloß, 550 m, 14.VI.2002 (He 67) (leg. B. & H. Bohn, HB). – **TI**: 1♂, San Salvatore, 19.V.1955, F. Keiser (slide Bo 315) (Ba). – 1♀, Curio, X.1953 (slide Bo 654) (Be). – 1♂, Bellinzona, 2.VII.[19]46, J. de Beaumont (La). – 1♂, Castel S. Pietro, Obino, Waldrand, 530 m, LF 11.-20.V.1992, Dr. L. Rezbanyai-Reser (slide Bo 571); 1♂, Lugano, Mt. Brè-Ost [Ca'Gina], 835 m, LF, 21.-30.VI.1986, Rezbanyai-Reser (slide Bo 583); Medeglia-Ost, Val d'Iseo, 718.5/108.1, LF, 700 m, leg. Dr. L. Rezbanyai-Reser: 2♂♂, 21.-30.VI.2000, 1♂, 1.-10.VII.2000, 1♂, 11.-20.VII.2000 (slide Bo 573); 1♂, Meride (Nordwest), Crocifisso, 716.05/84.5, 670 m, Tf, 15.V.1999, leg. L. Rezbanyai-Reser; Meride (West), Fontana, LF, Dr. L. Rezbanyai-Reser: 1♂, 11.-20.V.1992, 1♂, 11.-20.VI.1992, 1♂, 21.-31.V.1993, 1♂, 1.-10.VI.1993, 2♂♂, 11.-20.VI.1993, 2♂♂, 21.-30.VI.1993, 1♂, 11.-20.V.1994 (slide Bo 567),1♂, 21.-31.V.1994, 1♂, 21.-30.VI.1994; 1♂, Meride (West), Fontana, ca. 717.0/83.6, Tagfang, 12.VI.1999, leg. Dr. L. Rezbanyai-Reser; Meride (Ost), S. Antonio, 580 m, LF, Dr. L. Rezbanyai-Reser: 2♂♂, 1.-10.VI.1991, 3♂♂, 11.-20.VI.1991 (male, slide Bo 569), 1♂, 21.-30.VI.1991, 1♂, 11.-20.VII.1991; Meride, Serpiano, Wald, 715.7/85.65, 630 m, LF, Dr. L. Rezbanyai-Reser: 1♂, 1.-10.VI.1995, 2♂♂, 11.-20.VII.1995, 5♂♂, 11.-20.VI.1996 (two males, slides Bo 464, 465), 2♂♂, 21.-30.VI.1996, 2♂♂, 1.-10.VI. 1997, 1♂, 11.-20.VI.1997, 3♂♂, 21.-30.VI.1997; 1♂, Monte Ceneri-Nordseite, Spiano (Contone), 714.9/111.3, 475 m, Lf, 17.VI.1998, leg. Dr. L. Rezbanyai-Reser (slide Bo 584); Tesserete, Gola di Lago, Betuletum, 718.15/107.1, 975 m, Lf, leg. Dr. L. Rezbanyai-Reser: 2♂♂, 9.VII.1999, 1♂, 30. VII.2000 (slide Bo 575) (Lg). – 3♀♀, 10 L, Vellano (bei Giubiasco, Bellinzona), 800 m, 8.VIII.1996 (leg. B. & H. Bohn, HB). – **UR**: 1♂, Meien, 18.VII.[19]44, E. Handschin (Ba). – 1♂, Gigental, Hinter Wang, 686.2/193.7, 1500 m, Tf, 9.VIII.1980, leg. Dr. L. Rezbanyai; 1♂, Hospental, [Südrand, 1500 m,] LF, e.VII.[19]82 [Dr. L. Rezbanyai-Reser] (Lz). – **VD**: 1♂, 1♀, Agiez, VI.[19]55, Cl. Besuchet; 1♀, Belmont, 8.VI.[19]50, J. Aubert; 3♂♂, 5♀♀, 2 LL, Belmont, VI.[19]54, Cl. Besuchet (two females,

slides Bo 671, Bo 672); 5♂♂, 1♀, Belmont, V.[19]55, Cl. Besuchet; 1♀, Entreroches, 8.VI.[19]51, J. Aubert; 1♂, Ferreyres, VI.[19]55, Cl. Besuchet; 3♂♂, Ferreyres, 2.VII. 1971, J. Aubert; 1♀, Flon [?], 23.VIII.[19]42, F. Schmid; 2♀♀, Les Pleiades, 14.IX.[19]41, J.de Beaumont; 1♂, Les Pleiades, 16.VIII.[19]56, J. Aubert; 1♂, Mormont, V. [19]55, Cl. Besuchet; 1♂, Ollon, 29.V.[19]55, Cl. Besuchet; 1♂, Palézieux, 15.VI.[19]43, J. Aubert; 2♂♂, Puidoux, 26. VI.[19]38, J. de Beaumont; 3♂♂, St.Loup, 2 VI.[19]64, J. Aubert; 2♂♂, Vallorbe, 2.VII.[19]44, F. Schmid; 2♂♂, 1♀, Villars/Chamby, 4.VIII.[19]56, J. Aubert; 2♂♂, Vufflens, 6.VI.[19]42; 2♂♂, 1♀, Yverdon, 25.V.[19]55, CL. Besuchet (La). – 5♀♀, Eclépens (bei Sarraz), 550 m, 2.VI. 2002 (He 62) (leg. B. & H. Bohn, HB). **VS**: 1♂, Belenalp, 25.VI.[19]44, E. Handschin (Ba). – 1♂, Hohtenn, VI.[19]63; 1♀, 1 L, Pfinwald, 27.VIII.[19]83 (Be). – 1♂, Valais, Coll. Frey (Ge). – 3♂♂, 1♀, Bois Noir, 15.VI.[19]38, Coll. Cerutti; 1♂, Bourg-St.Pierre, 29.VII.[19]38, Coll. Cerutti; 1♂, B[ourg]-St.Pierre, 18.VIII.[19]38, Coll. Cerutti; 1♂, Grimentz, 24.VI.-8.VII.[19]49; 1♀, Mayens d'Arbaz [= Anobaz?], 14.VIII.[19]42, F.Schmid; 1♀, Praz de Fort, 11.VII. [19]44, F.Schmid; 1♂, Salvan, 21.VI.[19]36, Coll. Cerutti; 3♂♂, 1♀, St. Maurice, V.[19]55, Cl. Besuchet (female, slide Bo 670) (La). – 2♂♂, Val d'Illiez, Le Hazé, pré humide, 9.VII.[19]80, Collection Willy Matthey (Ne). – 1♀, Val d'Entremont, 2 km SE Liddes, 1500 m, 12.VII. 1997 (He 14a) (leg. B. & H. Bohn, HB). – **ZG**: 1♀, Zuger See, Walchwil, 450 m, 17.VI.2002 (He 86) (leg. B. & H. Bohn, HB). – **ZH**: 2♂♂, Dällikon, 15.V.[19]21; 1♀, Illnau, 25.VII.[19]86, leg. W. Sauter; 1♂, Illnau, Schüsselberg, 530-570 m, 13.VI.[19]87, leg. W. Sauter; 1♂, Illnau, Soorhalde, 510 m, 16.VIII.[19]84, leg. W. Sauter; 1♂, Illnau, Soorhalde, 510 m, 14.VIII.[19]87, leg. W. Sauter; 1♂, Illnau, Weid, 560 m, 9.VIII.[19]85, leg. W. Sauter; 1♂, Illnau, Wildert, 519 m, 21.VI.[19]85, leg. W. Sauter; 1♂, Illnau, Wildert, 519 m, 21.VI.[19]89, leg. W. Sauter; 1♂, Meilen; 1♂, Rehalp, 10.VII.[19]26; 1♀, Waltenstein, 600 m, 1.VIII. 1993, leg. Lengwiler; 1♂, Weiningen, 5.VI.[19]21; 1♂, 1♀, Wiesendangen, 23.V.[19]48; 1♂, Zürich, Umgebg. (Zü). – 1♀, Illnau (bei Effretikon), 520 m, 21.VI.1996 (He 10); 3♂♂, 3♀♀, 2 LL, Illnau (bei Effretikon), 520 m, 31.VII. 1996 (two males, slides He 10a/1,2); 1♀, 9 LL, Oberembrach (bei Embrach), 620 m, 30.VII.1996 (He 11); 1♂, 4♀♀, Otelfingen (bei Wettingen), 470 m, 14.VI.2002 (He 70) (leg. B. & H. Bohn, HB). – **XX**: 1♂, Ahlfeld, 30.V. [19]34. E. Handschin (Ba). – 1♂, Spielwald, 8.VI.1929 (Be).

Description

Size. Length of pronotum: ♂ 1.98-2.30 (mean 2.11) mm, ♀ 2.14-2.56 (mean 2.36) mm; length of tegmina: ♂ 9.23-11.05 (mean 9.97) mm, ♀ 4.55-5.85 (mean 5.19) mm. [n = 28♂♂, 37♀♀, from 22 localities in Switzerland]

Colouration. Male: Head. Apart from the often obscured interocular band (and the ocellar spots) completely dark, blackish. Pronotum. Disk hoof-shaped, posterior corners with slight lateral extensions, completely dark (Figs 10g,h). Tegmina. Distinctly and often very darkly mottled, usually with larger dark patches, veinal trunk strongly darkened (Fig. 13b).

Female: Pronotum. Disk hoof-shaped, posterior corners usually with slight lateral extensions, in most cases completely dark, but relatively frequently with reddish brown or ochreous lightenings, but never with a striking yellowish reversed y-shaped marking in the middle (Figs 10a-f). Tegmina. Similar as in male (Fig. 13f). Abdomen. T2-6 lightly coloured margins relatively narrow, no lighter patches in the dark area (Fig. 14G). S2-6 dark area usually at least with two lighter patches, at most with large anterior extensions from the yellow posterior marginal area (Figs 14H,I), but posterior half of sternite never completely yellowish (as occurring in *E. lucidus* and *E. eckerleini*). S7 often completely dark (the two latero-posterior patches excepted), lightenings never as extended as in the species just mentioned, larger dark areas remaining (Figs 14K-M).

Larva (later stages): Never with whitish patches on the metanotum.

Male structures. T6: Transversal ridge with median part slightly bent anteriorly (Fig. 7A), bristles of the tergite surface rather long and strong (Fig. 7D). T7: Glandular pit large, broader than the lateral margins of the segment, fairly rounded; posterior contour line strongly curved throughout (Figs 7B,C). Right paraproct: Medio-anterior arm rather small, distal part very narrow, towards the end still further tapering, curved or angularly bent towards anteriorly (Figs 11D,E). Helmet sclerite: typically helmet-shaped, the well developed neck part angularly set off, helmet in lateral view (dorsal in the animal) fairly isodiametric (Figs 9A-D).

Female genital structures. Basivalvular sclerites long, strongly converging anteriorly (Fig. 16A). Spermathecal plates usually present, sometimes only indicated. Posterior prae-intercalary sclerites narrow, elongated, weakly pigmented (Fig. 16F).

Geographical distribution (Fig. 1). Among the Swiss Blattoptera *E. sylvestris* is the species with the widest distribution; larger gaps in the distribution visible in Fig. 1 are – apart from regions with high mountains – most likely due to collecting gaps. At most localities the species is found quite frequently. At suitable places it can be found together with any of the other species of the group occurring in Switzerland. – The species occurs in all adjacent countries including northern Italy; its distribution reaches as far as to the Ural in the east. Hoebeke & Nickle (1981) reported the establishment of a population of *E. sylvestris* in Genova (New York, USA).

E. lucidus (Hagenbach, 1822)

Figs 2, 7E-H, 9E-H, 11A-C, 14A-F, 16B

Ectobius lucidus (Hagenbach, 1822): Bohn 1989: 322, Figs 1a-d, 2a-k, 3g-k, 4a-h, 7d,e, 11a-i, 12a,b, 13a,e, 16.

Material studied. Switzerland. – **BE**: 1♂, 1♀, Biel, 27.V.1897, Th. Steck; 1♂, Jura, 24.V.1906, Th.Steck; 1♀, Jura, Twann, 26.IX.1895, Steck (Ba). – 2 LL, Beatenberg, 10.IV.1940; 1♀, 1 O, La Neuveville, Le Gibet, W, 573.9/213.3, 590 m, 27.VII.2000, H. Baur; 1♂, 1♀, Ringgenberg, Schurmatta (im Haus)/Fensterbrett, 7.VII.2002, leg. S. Hohler (Be). – 2♂♂, Orvin; 2♀♀, 1 L, Orvin, VIII.1912 (Cf). – 2♂♂, Le Landeron, 580-600 m, 18.VII.1983, leg. Baur; 2♂♂, Orvin, 800 m, 4.VI.1983, leg. Baur (Ge). – 1♂, 2♀♀, 2 LL, Garide, 578/215, 3.V.2003, leg. C.Monnerat (Ne). – 1♂, 5♀♀, Brienzer See, Niederried, 600 m, 15.VI. 2002 (male, slide He 78/1); 5♂, 13♀♀, ex L: 5♀♀, Gelterfingen (am Belpberg), 660 m, 15.VI.2002 (male, slide He 76/1); 1♂, 1♀, Liesberg-Station (Laufen – Delémont), 380 m, 1.VI.2002 (male, slide He 56/1); 3♂♂, 7♀♀, 3 LL, ex L: 4♂♂, 6♀♀, zw. Orvin & Les Prés d'Orvin, 850 m, 1.VI.2002 (male, slide He 58/1); 1♂, 5♀♀, Thuner See, zw. Längenschachen & Aeschlen, 700 m, 15.VI.2002 (male, slide He 77/1); 7♂♂, 4♀♀, 1 L, ex L: 6♂♂, 8♀♀, Twann, 500 m, 2.VI.2002 (male, slide He 59/1) (leg. B.&.H.Bohn, HB). – **BL**: 1♂, neotype, Gempen – Stollen, 20.V.1950, E. Handschin; 1♀, Liestal, 20.X.1956, H. P. Straumann (Ba). – 1♀, Schafmatt, 15.VI. (Zü). – **GL**: 2♂♂, 7♀♀, Biberlichopf bei Niederurnen, 550 m, 17.VI.2002 (male, slide He 87/1) (leg. B. & H. Bohn, HB). – **GR**: 2♂♂, 2♀♀, Chur, Jochstrasse, nachts von Vegetation abgesammelt, 759.920/190.610, 605 m, 15.V.2004, leg. U.S.-BNM; 1 L, CH, GR, Malix, Sennereiweg 8, Garten, 759.810/186.730, 120 m, 1.V.2004, leg. U.S.-BNM (Ch). – 1♀, Chur, Fürstenwald, 3.IX.[19]31, Nadig (Ge). – 2♀♀, Davoser Tal, Leidboden b. Wiesen, XI.[19]33, Dr. J. P. Wolf; 9♂♂, 5♀♀, Domleschg, 24./25.V.[19]39, Dr. J. P. Wolf (male, slide Bo 301); 1♂, Filisur, 5.VIII.[19]39, Dr. J. P. Wolf (slide Bo 300); 1♀, Schmitten [bei] Filisur, 1000 m, 4.XI.[19]34, Dr.Wolf; 1♀, Schmitten [bei] Filisur, 18.XI. [19]34, Dr. J. P. Wolf (Zü). – 2♀♀, Albula-Tal, Brienz – Lenz, 1200 m, 23.VI.2001 (He 38); ex L: 1♂, 1♀, Albula-Tal, Surava – Alveneu, 1000 m, 23.VI.2001 (male, slide He 37/1); 1♂, 1♀, 1 L, Chur, 750 m, 30.VI.2002 (male, slide He 91/1); 1♂, 3♀♀, ex L: 1♀, Domleschg, Rothenbrunnen, 700 m, 23.VI.2001 (male, slide He 34/1); 5♂♂, 2♀♀, Domleschg, Scheid, 1050 m, 23.VI.2001 (male, slide He 36/1); 2♂♂, 10♀♀, 1 L, Filisur, 1080 m, 24.VI.2001 (two males, slides He 39/1,2); 2♀♀, Fläsch (bei Bad Ragaz), 550 m, 23.VI.2001 (He 33); ex L: 1♂, Oberhalbstein, zw. Tinizong & Savognin, 1300 m, 24.VI.2001 (slide He 44/1) (leg. B.&.H.Bohn, HB). – **NE**: 1♀, Bevaix, 26.VI. 1927; 1 L, Chambrelien, 12.VI.1927 (Cf). – 1 L, Neuchâtel (r. Matile 61), 561.8/205.5, 550 m, lisière de forêt thermophile, 11.-17.II.1990, J.-P. Haenni; 1 L, Neuchâtel (r. Matile 61), 561.8/205.5, 550 m, lisière de forêt thermophile, 18.-24.II.1990, J.-P. Haenni; 1♀, Neuchâtel (r. Matile 61), 561.8/205.5, 550 m, chênaie buissonnante, 22.-29.VII.1990, J.P. Haenni; 1♂, Neuchâtel (r. Matile), 561.8/205.5, 550 m, lisière forêt thermophile, à la lumière, 1.VI.1993, JP Haenni; 1 L, Neuchâtel (Matile 77), Grande Cassarde, 561.9/205.5, 545 m, forêt thermophile/lisière, maison, 20.V.1999, JP Haenni; 1♀, 1 O, Neuchâtel (Matile 77), Grande Cassarde, 561.9/205.5, 545 m, chênaie thermoph./lisière, maison, 7.VI.2002, JP Haenni; 1♂, Rochefort, Château, 551.350/201.750, 780 m, T. Malaise lumineuse, 21.-23.VI.1982, C.Dufour leg.; 1♀, Rochefort, Château, 551.350/201.750, 780 m, T. Malaise lumineuse, 7.-11.X.1982, C.Dufour leg. (Ne). – 3♂♂, 4♀♀, ex L: 1♀, Le Chanet (Le Landeron – Lignières), 620 m, 2.VI.2002 (male, slide He 60/1) (leg. B.&.H.Bohn, HB). – **SG**: 1♀,Tscherlach (bei Walenstadt), 500 m, 17.VI.2002 (He 88) (leg. B. & H. Bohn, HB). – **SO**: 1♀, Soloth. Jura, Flüh, 14.VIII.[19]49, Dr. J. P. Wolf; 1♂, Bas. Jura, Hofstetten, 8.V.[19]45, Wolf (slide Bo 299); 1♂, Soloth. Jura, Hofst[etter] K[öpfli], 8.V.[19]45, Dr. J. P. Wolf; 1♂, Soloth. Jura, Hofst. K., 27.IV.[19]45, Dr. J. P. Wolf; 1♀, Soloth. Jura, 14.VII.[19]46, Dr. J. P. Wolf; 1♂, Landskron, 8.V. [19]49, Dr. J. P. Wolf (Zü). – 7♂♂, 5♀♀, 1 L, ex L: 2♂♂, 6♀♀, Flüeberg bei Flüh (bei Hofstetten), 1.VI.2002 (three males, slides He 55/1,2,3); 1♀, 1 L, St. Wolfgang bei Balsthal, 600 m, 3.VI.2002 (He 63) (leg. B. & H. Bohn, HB). – **SZ**: 1 L, Gersau, Oberholz, 550 m, BF, X.1979, Rezb. & Herger; Gersau, Oberholz, 550 m, Dr. L. Rezbanyai: 1♂, Lf, 14.VIII.1979 (slide Bo 585), 1♀, Tf, 20.X. 1981, 1♀, Tf, 10.IX.1982 (Lz). – **TG**: 1♀, Weinfelden, Schloß, 550 m, 14.VI.2002 (He 67) (leg. B. & H. Bohn, HB). – **UR**: 1♂, 14♀♀, 6 LL, Vierwaldstätter See, Sisikon, 550 m, 17.VI.2002 (male, slide He 84/1) (leg. B. & H. Bohn, HB). – **VD**: 1♀, Nyon (in Wohnung), 4.VI.1998, Nr. 143, leg. Hagner SA (Be). – 1♂, Aigle, Weg n. Leysin, 17.VI.[19]27, Dr. Hofmänner (slide Bo 440); 3♂♂, 3 LL, Belmont, VI.[19]54, Cl. Besuchet (male, slide Bo 443); (?) 2 LL, Bois de Belmont, 31.VIII.[19]41, J. de Beaumont; 1♂, Bois de Chênes [?], 15.VII.1969, J. Aubert (slide Bo 454); 1♂, 1♀, Mormont, V.[19]55, Cl. Besuchet (male, slide Bo 442); 1♂, Ollon, 29.V.[19]55, Cl.Besuchet (slide Bo 441); 4♂♂, 6♀♀, Prangins, V.[19]55, Cl. Besuchet (male, slide Bo 458; 2 females, slides Bo 674, Bo 675); 2♂♂, Prangins, 12.VI.[19]55, Cl. Besuchet (two males, slides Bo 459, 461); 2♂♂, Prangins, V.[19]56, Cl. Besuchet (male, slide Bo 460); 1 L, Yverdon, 25.V.[19]55, Cl. Besuchet (La). – 7♂♂, 12♀♀, 1 L, ex L: 1♂, 11♀♀, Chassagne bei Bonvillars (bei Yverdon-les-Bains), 550 m, 2.VI.2002 (male, slide He 61/2); 5♂♂, 8♀♀, ex L: 1♀, Eclépens (bei Sarraz), 550 m, 2.VI.2002 (male, slide He 62/1) (leg. B. & H. Bohn, HB). – **VS**: 1♂, Außerberg, Mili, 17.V.2000, leg. H. Baur; 3♂♂, 3♀♀, 1 L, Fully, Les Follatères, 571.6/108.0, 620 m, 1.V.2003, leg. H. Baur; 1♀, Pfinwald, 19.IV.[19]64; 4♂♂, 1♀, Stalden, 25./27.VI.[19]09, Steck (male, slide Bo 471); 1♀, Zermatt, 27.VIII.[19]16 (Be). – 1♂, Chemin, 2.IX.[19]37, Coll. Cerutti (slide Bo 444); 1♂, Follaterrres, 20.V.1987, R. Delarze; 2♂♂, 1 L, Follaterres, Mayen Loton, 1.VI.1987, R. Delarze (male, slide Bo 483); 1♀, Follaterres, 16.VI.1987, R. Delarze; 1♀, Gueuroz, 31.V.[19]38, Coll. Cerutti; 1♀, Martigny, 10.-24.IX.[19]15, Coll. Cerutti; 1♂, Martigny, 14.VI.1937, Coll. Cerutti; 1♂, Montatuay, 4.VIII.[19]16, Coll. Cerutti, (slide Bo 445); 1♀, Mt. Rosel, 1000 m, 22.VII.1987, R. Delarze; 1♂, 1 L, St. Mau-

rice, V.[19]55, Cl. Besuchet (male slide Bo 457) (La).- Visperterminen, Brachland, Magerwiese, 635.2/122.6, 1300 m, Dr. L. Rezbanyai-Reser: 1♂, Lf, 26.VIII.1995 (slide Bo 586), 1♀, Tf, 10.IX.1995, 1♀, Lf, 12.XI.1995, 1♂, Lf, 16.VII.1997 (slide Bo 587) (Lz). – 1♀, Leuk: Finges, 614.3/129.1, 600 m, zone pionnière, sables, galets, buissons, pins, 9.VIII.1997, JP Haenni (Ne). – 2♂♂, 2♀♀, Valais (So). – 1♂, Wallis, [18?]82, Liniger; 1♂, Leuk – Rotafen, 16.V.1996, leg. Merz & Bächli (slide Bo 499); 1♀, Siders [=Sierre], 26.V.1869; 2♂♂, Visperterminen, 1540 m, 17.VII.1995, leg. B. Merz (male, slide Bo 296), 1♂, 1♀, Visperterminen, 1540 m, 19.VII.1995, leg. B. Merz (male, slide Bo 295); 1♀, Visperterminen, 1520 m, 20.VII. 1993, leg. B. Merz (Zü). – 6♂♂, 11♀♀, ex L: 1♂, 1♀, 1 km WSW Chermignon d'en Bas (bei Sierre), 840 m, 14.VI. 2001 (male, slide He 31/1); 1♂, 4♀♀, Hohtenn, 650 m, 26.V.1996 (He 4); 2♂♂, 4♀♀, Hohtenn, 650 m, 27.V.1998 (male, slide He 4a/1); 2♂♂, 3♀♀, Hohtenn, 900 m, 26.V.1996 (male, slide He 5/2); 2♂♂, 6 LL, ex L: 10♂♂, 3♀♀, Hohtenn, 1100 m, 26.V.1996 (male, slide He 6/1); 9♂♂, 1♀, 6 LL, ex L: 3♂♂, Pfynwald (bei Sierre), 600 m, 25.V.1996 (male, slide He 3/1); 2♀♀, 19 LL, Pfynwald (bei Sierre), 600 m, 6.VIII.1996 (male, slide He 3a); 1♀, Saillon, 500 m, 25.V.1996 (He 1); 2♀♀, 3 LL, Sembrancher (bei Martigny), 800 m, 6.VIII.1996 (He 15); 1♂, 4♀♀, Sierre, Raspille, 550 m, 25.V.1996 (He 2); 6♂♂, 8♀♀, Sierre, Forêt de Finges, 580 m, 27.V.1998 (male, slide He 2a/1); 1♂, 3♀♀, Unterstalden (bei Visp), 900 m, 26.V.1996 (male, slide He 7/2); 1♂, 3 LL, Val de Bagnes, Medières (bei Verbier), 1250 m, 6.VIII.1996 (He 16); 2♂♂, 4♀♀, 4 LL, 2 km E Visp (Visp – Bürchen), 1400 m, 27.V.1998 (male, slide He 28/2); 5 LL, ex L: 2♂♂, Visperterminen, 1450 m, 26.V.1996 (male, slide He 2/3); 2♂♂, 1♀, 8 LL, ex L: 3♂♂, 2♀♀, unterh. Visperterminen, 1100 m, 26.V.1996 (male, slide He 8/2) (leg. B. & H. Bohn, HB). – **ZH**: 4♀♀, L, Dättlikon (bei Winterthur), 460 m, 31.VII.1996 (He 12); 1 L, Freienstein (bei Embrach), 430 m, 31.VII.1996 (He 13) (leg. B. & H. Bohn, HB). – **XX**: 1♀, Hilterf.. [partly unreadable, Hilterfingen?], 11.X.[18]99 (Be). – **France. Dpt. Ain**: 4♂♂, 1♀, Bellegarde-sur-Valserine, 500 m, 12.VI.2001 (male, slide F 101/1); 10♂♂, 8 LL, ex L: 14♂♂, 5♀♀, W slope of Mt. Le Gd. Crêt d'Eau, above Confort (near Bellegarde-sur-Valserine), 750 m, 12.VI.2001 (male, slide F 102/1); 10 LL, ex L: 6♂♂, 2♀♀, W slope of Mt. Le Gd. Crêt d'Eau, above Confort (near Bellegarde-sur-Valserine),1200 m, 12.VI.2001 (male, slide F 103/1) (leg. B. & H. Bohn, HB). – **Dept. Haute Savoie**: 4♂♂, 4 LL, ex L: 8♂♂, 5♀♀, S slope of Mont Salève, above Cruseilles, 850-900 m, 3.VI.2002 (two males, slides F 104/2,5) (leg. B. & H. Bohn, HB). – **Italy. Valle d'Aosta**: 6♂♂, 17♀♀, Valle d'Aosta, W slope of Colle di Joux, Moron, 830 m, 16.VI.2002 (male, slide It 129/1); 4♂♂, 2♀♀, 1 L, ex L: 1♂, 10♀♀, Valle d'Aosta, W slope of Colle di Joux, near Salivod, 1300 m, 16.VI.2002 (It 152); 3 LL, ex L: 2♂♂, 1♀, Valle d'Aosta, W slope of Colle di Joux, Amay, 1500 m, 16.VI.2002 (It 185); 1♂, 1♀, Valle del Gran Bernardo, Eterno, 1660 m, 6.VIII.1996 (male, slide It 85/1); 8♂♂, 12♀♀, ex L: 1♀, Valle del Gran Bernardo, Eterno, 1660 m, 6.VIII.1996 (male, slide It 128/1) (leg. B. & H. Bohn, HB).

Description

Size. Length of pronotum: ♂ 2.30-2.56 (mean 2.43) mm, ♀ 2.40-2.94 (mean 2.66) mm; length of tegmina: ♂ 10.27-11.70 (mean 10.97) mm, ♀ 5.92-6.89 (mean 6.41). [n=31♂♂, 39♀♀, from 24 localities of Switzerland]

Colouration. Male: Pronotum. Disk hoof-shaped, posterior corners with slight lateral extensions, from almost completely dark to almost completely lightly coloured, nearly always with a striking yellowish reversed y-shaped marking in the middle (Figs 11h,i, 12a,b). Tegmina. Distinctly mottled, without larger patches; veinal trunk darkened (Fig. 13a).

Female: Pronotum. Similar as in males. Tegmina. Similar as in males but more often with dark patches (Fig.13e). Abdomen. T2-6 with lightly coloured margins rather broad, not seldom with yellow patches within the dark anterior area (Figs 14C,D). S2-6 dark area always with yellow patches or with large extensions from the posterior yellow area, in the extreme up to ⅔ of the sternite yellow (Figs 14E,F). S7 always with extended lightenings, often only the anterior margin and two posterior patches remaining dark (Figs 14A,B).

Larva (late stages): Always with a pair of whitish patches in the middle of the metanotum, which, however, may be obscured in darker animals.

Male structures. T6: Transversal ridge with median part angularly bent anteriorly (Fig. 7E), bristles of the tergite surface short and weak (Fig. 7H). T7: Glandular pit large, considerably broader than lateral margins of the segment, strongly transversal; posterior contour line weakly curved throughout (Figs 7F,G). Right paraproct: Medio-anterior arm rather large, distal part trapezoid to subtriangular, sometimes strongly tapering towards the end and then slightly resembling that in *E. sylvestris*, which, however, has a much shorter and narrower base (Figs 11A-C). Helmet sclerite: higher than broad, neck part small, not well set off (Figs 9E-H).

Female genital structures. Basivalvular sclerites long, anteriorly strongly converging (Fig. 16B). Spermathecal plates missing or, rarely, weakly indicated. Posterior prae-intercalary sclerites broad, ± oval, strikingly dark (Fig. 16G).

Geographical distribution (Fig. 2). The species is widely distributed in Switzerland but is restricted to warm places on southern exposed slopes of hills and mountains. It is completely missing in Tessin and Engadin (southeastern Graubünden) where it is replaced by *E. ticinus* and *E. supramontes*, respectively. Occurring at altitudes between 400 and 1500 m.

E. lucidus is a western European species which is distributed from northern Spain, France, Luxem-

burg to Germany, Switzerland and Italy. The eastern limits of its distribution are at about a longitude of 10°E in Germany (near Ulm, Bohn 2003) and similarly also in Switzerland. Whether it occurs in Austria remains to be clarified; it was absent in some spot-checks taken at the western border of the country near Landeck and at some localities near Innsbruck known for their thermophilic fauna (Thaler 1985). In northern Italy the species extends eastward along the southern Alps in the north, and along the Apennines in the south. In the southern Alps *E. lucidus* has its eastern limits presumably in the region of Valle d'Aosta at a longitude of about 8° E. In the Apennines it is distributed at least as far as the Abruzzi (Bohn, 1989). Recently, Hoebeke (pers. comm.) has discovered the establishment of a population of this species in New York (USA).

Ectobius eckerleini Harz, 1977
Figs 3, 8A-E, 10A,B, 11F,G, 15A-L, 16G

Ectobius eckerleini Harz, 1977: Bohn 1989: 328, Figs 6e-h, 12c-i, 13c,g

Material studied. Switzerland. – **VD**: 1♂, Champagne, 17.VI.[19]62, J. Aubert (slide Bo 484); 2♂♂, 2♀♀, Prangins, V.[19]55, Cl. Besuchet (two males, slides Bo 436, 437); 1♂, Prangins, V.[19]56, Cl. Besuchet (slide Bo 438); 1♂, 1♀, Roche, 16.VII.[19]55, Cl. Besuchet (male, slide Bo 439) (La). – 2♂♂, 7♀♀, Chassagne bei Bonvillars (bei Yverdon-les-Bains), 550 m, 2.VI.2002 (male, slide He 61/1) (leg. B. & H. Bohn, HB). – **VS**: 1♀, Saillon – Fully, 31.V.1936, Coll. Handschin (slide Bo 669) (Ba). – 14♂♂, 9♀♀, Fully, Les Follatères, 571.6/108.0, 620 m, 1.V.2003, leg. H. Baur (Be). – 2♂♂, Follaterres, 7.V.1987, R. Delarze (male, slide Bo 455); 1♂, 1♀, Follaterres, 10.VI.1987, R. Delarze (male, slide Bo 456); 1♂, Follaterres, 21.VI. 1987, R. Delarze; 1♀, Martigny, 30.VI.1973, J. Aubert (slide Bo 673); (?) 2 LL, 1.IV.1987, Mt. Rosel, R. Delarze; 1♀, (?) 1 L, Mt. Rosel, 6.V.1987, R. Delarze; 1♀, Mt. Rosel, 22.VI.1987, R. Delarze; 1♀, Mayen Loton, 8.VII.1987, R. Delarze (La). – 1♂, Visperterminen, Brachland, Mager wiese, 635.2/122.6, 1300 m, Lf, 17.VIII.1999, leg. L. Rezbanyai-Reser (slide Bo 588) (Lz). – 1♂, Valais (male, slide Bo 668) (So). – 1♂, Visp, 25.V. (slide Bo 253) (Zü). – 1♂, 2♀♀, 1 km WSW Chermignon d'en Bas (bei Sierre), 840 m, 14.VI.2001 (male, slide He 31/2); 3♂♂, 6♀♀, Mont du Rosel (bei Martigny), 450 m, 26.V.1998 (male, slide He 26/2); 2♀♀, Val d'Entremont, 2 km SE Liddes, 1550 m, 6.VIII.1996 (He 14); 3♂♂, 8♀♀, Val d'Entremont, 2 km SE Liddes, 1500 m, 12.VII.1997 (male, slide He 14a/1); 4♂♂, 8♀♀, 2 LL, 2 km E Visp (Visp – Bürchen), 1400 m, 27.V.1998 (male, slide He 28/3); 1♀, 1 km S Visp, 800 m, 14.VI.2001 (He 32); 12♂♂, 6♀♀, 4 LL, ex. L: 6♂♂, 14♀♀, Visperterminen, 1450 m, 26.V.1996 (four males, slides He 9/1,2,4,5); 1♂, 8♀♀, 2 LL, ex L: 1♂, 2♀♀, unterh. Visperterminen, 1100 m, 26.V.1996 (male, slide He 8/3) (leg. B. & H. Bohn, HB). – **France. Dept. Lozère**: *2♂♂, Mende, 12.VI.56, Cl. Besuchet (two males, slides Bo 485, 486) (La). – **Dept. Hautes-Alpes**: *2♂♂, La Faurie, 3.5 km ENE Agnielles, 1000 m, 7.VI.1994, st.3, Haenni J. P. & Dufour C. (male, slide Bo 665) (Ne). – **Dept. Ain**: 4♀♀, W slope of Mt. Le Gd. Crêt d'Eau, above Confort (near Bellegarde-sur-Valserine), 750 m, 12.VI.2001 (F 102). – **Depts. Drome/Basses-Alpes**: *7♂♂, 8♀♀, 1 L, Col de Pigiere (3 km SE Séderon), 970 m, 29.V.1998 (male, slide F 99/2). – **Dept. Haute-Savoie**: 10♂♂, 22♀♀, ex L: 1♀, S slope of Mont Salève, above Cruseilles, 850-900 m, 3.VI.2002 (three males, slides F 104/1,3,4) (leg. B. & H. Bohn, HB).

Description

Size. Length of pronotum: ♂ 2.11-2.37 (mean 2.20) mm, ♀ 2.24-2.53 (mean 2.38) mm; length of tegmina: ♂ 8.79-10.72 (mean 9.79) mm, ♀ 4.68-5.53 (mean 5.10) mm. [n=26♂♂, 26♀♀, from 12 localities in Switzerland and France]

Colouration. Male: Pronotum. Disk ± rounded, ochreous or pale ochreous, without or with variously extended brown markings, but never completely dark (Figs 12c-f). Tegmina. Lightly mottled, usually with some rather indistinct patches mainly in the distal ⅓ of the tegmina, veinal trunk quite narrowly darkened (Fig. 13c).

Female: Pronotum. Disk usually almost completely lightly coloured (ochreous to straw-coloured), indistinctly hoof-shaped, with only small dark spots (Figs 12h-i), occasionally with more extended darker markings (Figs 12g, 15C), rarely distinctly hoof-shaped with dark posterior corners (Fig. 15B) or almost completely dark (hazel) (Fig. 15A). Tegmina. Similar as in male, but usually with numerous relatively small dark patches, veinal trunk almost without darkening (Fig. 13g). Abdomen. Very similar to *E. lucidus*. T2-6 with quite broad lightly coloured margins (Figs 15D,E), sometimes with lighter patches in the dark area. S2-6 at least with light patches within the dark area (Figs 15F,G), often posterior ½ of the sternite completely yellow (Fig. 15H). S7 always with lightenings in addition to the two lateroposterior patches, quite often only the anterior margin and two posterior patches remaining dark (Figs 15I-L).

Larva (late stages): Without or with two relatively large fuzzy lighter patches on the metanotum.

Male structures. T6: Transversal ridge with median part moderately bent anteriorly (Fig. 8A); bristles of the tergite surface rather long and strong, the lateral edges of the tergite with densely arranged short but strong bristles giving them the appearance of being serrate (Figs 8D,E). T7: Glandular pit very large, considerably broader than the lateral margins of the segment, broadly transversely oval; posterior contour line forming a rather wide bow

with the lateral ends strongly curved anteriorly; along the posterior margin of the pit with unusually long and dense bristles (Figs 8B,C). Right paraproct: Medio-anterior arm similar as in *E. lucidus*, but with a short lateral incision between the proximal and distal part, the latter fairly triangular, often with a striking domelike elevation (Figs 11F,G). Helmet sclerite: extremely high and narrow, almost gutter-shaped, neck part insignificant (Figs 10A,B).

Female genital structures. Basivalvular sclerites long and strongly converging anteriorly (Fig. 16C). Spermathecal plates missing. Posterior prae-intercalary sclerites relatively large and dark, oval or more longitudinal, sometimes quite similar as in *E. lucidus*.

Geographical distribution (Fig. 3). Occurring in southwestern Switzerland in the cantons Waadt and Wallis. Hitherto, the species was only known from the Locus typicus, Montagne de Lure in the Dpt. Basses Alpes in France. This paper contains further reports from the Dpts. Ain, Haute Savoie, Lozère, and Drome/Basses Alpes showing that the species has a more extended distribution also in France. The species can be found together with *E. lucidus* and *E. sylvestris* at the same localities.

Ectobius ticinus, spec. nov.

Figs 3, 4A-E, 5A-M, 8F, 10E-G, 11K, 12A-K, 16A,H

Holotype: ♂, Switzerland, Graubünden, Sta. Maria in Calanca, 950 m, 16./17.VI.2002, leg. B. & H. Bohn (completely on three slides, He 79/1) ZMS.

Additional material. Switzerland. – **GR**: 1♂, bei Castasegna, Bergell, 900 m, 2.VII.1950, E. Sutter (slide Bo 317) (Ba). – 1♂, Bergell, Dr. Killias (slide Bo 652); 1♂, Misox, Dr. Killias (slide Bo 653) (Ch). – 3♂♂, 4♀♀, 1 L, same data as holotype (two males, slides He 79/2,3); 4♂♂, 8♀♀, Val Bregaglia, unterh. Soglio, 900 m, 24.VI.2001 (three males, slides He 41/1,2,3); 2♂♂, 3♀♀, ex L: 1♂, 3♀♀, Val Bregaglia, Soglio, 1200 m, 24.VI.2001 (male, slide He 42/1); 2♀♀, 1 L, ex L: 1♀, Val Calanca, Grono – Buseno, 2 km östl. Grono, 600 m, 17.VI.2002 (female, slide He 80/3) (leg. B. & H. Bohn, HB). – **TI**: 1♂, Novaggio, Val Muggio [?], 5.VIII.[19]56, leg. H. P. Straumann (slide Bo 318) (Ba). – 4♂♂, Mosogno, [V.] Onsernone, 22.VII.[19]62 (male, slide Bo 470) (Be). – Castel S. Pietro, Obino, Waldrand, 530 m, LF, Dr. L. Rezbanyai-Reser: 3♂♂, 11.-20.VI.1991, 3♂♂, 21.-30.VI.1991, 2♂♂, 1.-10.VII.1991, 1♂, 11.-20.VI.1992 (slide Bo 570), 1♂, 21.-30.VI.1992, 3♂♂, 11.-20.VI.1993, 2♂♂, 1.-10.VII.1993; 1♂, Dalpe, Bedrina, Hochmoor/torbiera, 702.5/148.8, 1230 m, Lf, 19.VIII. 2000, leg. Dr. L. Rezbanyai-Reser (slide Bo 581); 1♂, Gordevio, [Saleggio,] 300 m, LF, 1.-10.VII.1979, Imhoff & Rezbanyai (slide Bo 582); 1♂, Lugano, Mt. Brè-Ost, [Ca'Gina,] 835 m, LF, 21.-30.VI.1986, Rezbanyai-Reser (slide Bo 580); Medeglia-Ost, Val d'Iseo, 718.5/108.1, 700 m, LF, leg. Dr. L. Rezbanyai-Reser: 2♂♂, 21.-30.VI. 2000 (male, slide Bo 572), 2♂♂, 1.-10.VII.2000, 1♂, 1.-10. VIII.2000, 1♂, 21.-31.VIII.2000; 1♂, Meride (West), Fontana, 595 m, LF, 1.-10.VIII.1993, Dr. L. Rezbanyai-Reser (slide Bo 566); 1♂, Meride (Ost), S. Antonio, 580 m, LF, 11.-20.VII.1991, Dr. L. Rezbanyai-Reser (slide Bo 568); Meride, Serpiano, Wald, 715.7/85.65, 630 m, LF, Dr. L. Rezbanyai-Reser: 1♂, 1.-10.VI.1995, 6♂♂, 21.-30.VI.1995, 3♂♂, 1.-10.VII.1995, 2♂♂, 11.-20.VII.1995, 1♂, 21.-31.VII. 1995, 2♂♂, 1.-10.VI.1996, 4♂♂, 11.-20.VI.1996, 2♂♂, 21.-30.VI.1996, 4♂♂, 11.-20.VII.1996 (male, slide Bo 562), 1♂, 21.-31-VII.1996, 1♂, 11.-20.VIII.1996, 3♂♂, 1.-10.VI.1997 (male, slide Bo 563); Monte Generoso, Cragno, [Alpe di] Preé, 960 m, LF, Dr. L. Rezbanyai-Reser: 1♂, 11.-20.VI. 1994, 1♂, 21.-30.VI.1994, 2♂♂, 11.-20.VII.1994, 1♂, 21.-31. VII.1994 (slide Bo 577); [Monte Generoso,] Cragno, Alpe di Preé, 721.9/84.2, 960 m, LF, Dr. L. Rezbanyai-Reser: 1♂, 21.-30.VI.1995, 2♂♂, 21.-31.VII.1995, 2♂♂, 1.-10.VIII. 1996; 1♂, M. Generoso, Cragno, Strada Cragno, 721.0-721.9/84.1-84.4, 860-920 m, Tagfang, leg. Dr. L. Rezbanyai-Reser; M. Generoso, Muggiasca, Costa Stangada, 722.2/85.7, 1060 m, Lichtfang, leg. Dr. L. Rezbanyai-Reser: 1♂, 18.VII.1998 (slide Bo 578), 2♂♂, 2.VIII.1998; 1♂, M. Generoso, Somozza, Scereda, 720.1/83.85, 950 m, Lichtfang, 28.VI.1998, leg. Dr. L. Rezbanyai-Reser (slide Bo 579); 1♂, [M. Generoso,] Somazzo, Toretta (Ost), 590 m, LF, 1.-10.VII.1987, L.Rezbanyai-Reser; 2♂♂, Mt. Generoso, Valle della Giascia, Zoca, Nadelwald, 1040 m, Lf, 11.VII.1994, leg. L.Rezbanyai-Reser; M. Generoso, Valle della Giascia, Zoca, Nadel-Laubmischwald, 720.6/84.4, 1040 m, Lichtfang, leg. Dr. L. Rezbanyai-Reser: 2♂♂, 25.VII.1997, 1♂, 22.VIII.1997, 4♂♂, 28.VI.1998 (male, slide Bo 576), 1♂, 17.VII.1998, 2♂♂, 1.VIII.1998; 1♂, Tesserete, Gola di Lago, Betuletum, 718.15/107.1, 975 m, Lf, 30.VII.2000, leg. Dr. L. Rezbanyai-Reser (slide Bo 474) (Lg). – 1♂, Mairengo, 900 m, T. Malaise lumineuse, 25. VI.-1.VII.1979, C.Dufour, W. Geiger (slide Bo 662) (Ne). – 1 L, Piora, Wiese, 920 m, 24.VII.[19]84, leg. W. Sauter; 1♂, Mergoscia paese, a. L., 3.VII.[19]77 (slide Bo 500) (Zü). – 4♀♀, Bellavista am Südabhang des Mte. Generoso, 1150 m, 30.VI.2002 (female, slide He 89/1); 8♀♀, 2 LL, Mte. Gambarogno, A. di Neggio, 1400 m, 8.VIII.1996 (He 19); 3♂♂, 8♀♀, 2 LL, ex L: 3♂♂, 2♀♀, Mte. Gambarogno, A. di Neggio, 1400 m, 12.VII.1997 (male, slide He 19a/1); 3♂♂, 9♀♀, Südabhand des Mte. Generoso, 1350 m, 30.VI.2002 (male, slide He 90/1); 2♂♂, 4♀♀, Valle Leventina, Faido – Molare, 1000 m, 11.VII.1997 (male, slide He 21/1); 1♀, 1 L, Valle Leventina, Faido – Molare, 1500 m, 11.VII.1997 (female, slide He 22/1); 1♂, ex L: 1♀, Valle Leventina, Faido – Molare, 1300 m, 11.VII.1997 (male, slide He 23/1); 1♀, Vellano (bei Giubiasco, Bellinzona), 800 m, 8.VIII.1996 (female, slide He 18/3); 1♀, Vellano (bei Giubiasco, Bellinzona), 800 m, 11.VII.1997 (He 18a) (leg. B. & H. Bohn, HB). – **VS**: 1♀, Gondo, 8.X.[19]54, Dr. J. P. Wolf (slide Bo 655); 1♀, Gondo, 9.X.[19]54, Dr. J. P. Wolf (Zü). – 4♂♂, 1♀, 4 LL, ex L: 3♂♂, Gondoschlucht, Gabi, 1250 m, 13.VI.2003 (male, slide He 92/1) (leg. B. & H. Bohn, HB). – **Italy. Piemonte**: 4♂♂, 2♀♀, 10 LL, ex L: 7♂♂, 5♀♀, Arvogno (N Santa Maria Maggiore, Val

Vigezzo), 1250 m, 13.VI.2003 (male, slide It 173/1); 5♂♂, 1 L, ex L: 1♀, Finero (5 km SE Malesco, Val Vigezzo), 850-950 m, 12.VI.2003 (male, slide It 172/1); 13♂♂, 18♀♀, 5 LL, ex L: 1♂, 2♀♀, Lago Maggiore, 4 km NW Cheggio/Trarego-Viggione (NW Cannero), 1200 m, 12.VI.2003 (male, 4 females, slides It 170/1-5); 2♂♂, 5♀♀, Lago Maggiore, Pian d'Arla (2.5 km W Il Colle, W Cannero), 1300 m, 12.VI.2003 (male, slide It 171/1); 14♂♂, 12♀♀, 13 LL, ex L: 2♂♂, 4♀♀, Panorama Zegna (N Biella), Bochetta di Stavello, 1200 m, 14.VI.2003 (male, slide It 180/1); *11♂♂, 8♀♀, 3 LL, Panorama Zegna (N Biella), Bochettina Sessera, 1400 m, 15.VI.2003 (male, 2 females, slides It 181/ 1-3); 7♂♂, 16♀♀, 2 LL, O, Passo La Colma (10 km E Varallo), 940 m, 14.VI.2003 (male, slide It 177/1); 11♂♂, 14♀♀, 12 LL, O, ex L: 2♂♂, 2♀♀, Val di Antrona, btw. Antronapiana & Cheggio, 1150 m, 13/14.VI.2003 (male, slide It 175/1); 3♂♂, ex L: 3♂♂, 4♀♀, Val di Antrona, Cheggio, 1500 m, 14.VI.2003 (male, slide It 176/1); 2♂♂, 5♀♀, 7 LL, ex L: 1♀, Val Formazza, 3 km N Foggiano, 1150 m, 13.VI.2003 (male, slide It 174/1); 3♂♂, 7♀♀, O, Valsesia, Balmuccia, 500 m, 14.VI.2003 (male, slide It 179/1); 14♂♂, 5♀♀, 17 LL, ex L: 4♂♂, 2♀♀, Valsesia, Rima, 1400 m, 14.VI.2003 (male, female, slides It 178/ 1-2) (leg. B. & H. Bohn, HB).

Etymology. The species is named after the river Ticino, the drainage area of which is the center of its distribution.

Description

Size. Length of pronotum: ♂ 2.11-2.50 (mean 2.31) mm, ♀ 2.24-2.75 (mean 2.52) mm; length of tegmina: ♂ 10.27-12.28 (mean 11.39) mm, ♀ 5.07-6.50 (mean 5.90) mm. [n = 44♂♂, 39♀♀, from 24 localities in Switzerland and Italy]

Colouration. Male: Pronotum. Disk hoof-shaped, posterior corners with slight lateral extensions, from almost completely dark brown, with only minimal lightenings, to almost completly lightly coloured (ochreous), usually with quite contrasting pattern (Figs 5A-D). Tegmina. Distinctly and often rather darkly mottled, rarely with larger patches, veinal trunk strongly darkened (Fig. 4A). Abdomen. Tergites rather dark, posterior lightenings often quite narrow, median light longitudinal band often rather distinct, causing a very contrasting colouring especially on T7 (Fig. 5H).

Female: Pronotum. Disk hoof-shaped, posterior corners usually with slight lateral extensions, but sometimes also without (Fig. 12D), completely dark brown or variously lightened to a rather contrasting pattern, often with a striking yellowish reversed y-shaped marking in the middle of the disk (Figs 12A-E). Tegmina. Similar as in male, but more often with larger patches and often darker (Figs 4C,D). Abdomen. T2-6 with rather narrow lightly coloured margins, no other lightenings. S2-6 similar to tergites, lightening at posterior margin often indistinct or missing. S7 often without lightenings except at latero-posterior margins, at the most about ½ of the surface lightened (Figs 12H-K). Characteristic in minimally lightened specimens is a pair of light patches near the anterior apodemes, not found in other species (arrow in Fig. 12I).

Larva (late stages): Always with a pair of whitish patches in the middle of the metanotum (Fig. 16K).

Male structures. Tegmina usually surpassing the abdomen considerably. T6: Transversal ridge with median part weakly bent anteriorly, bristles of the tergite surface rather long and strong (Figs 5F, 8F). T7: Glandular pit in shape similar as in *E. sylvestris*, but considerably smaller, not broader than the lateral margins of the tergite, in outline fairly rounded; posterior contour line strongly curved throughout (Figs 5G-K). Right paraproct: Medio-anterior arm lightly pigmented, proximal part rather narrow, separated laterally by a deep incision from the distal part, which forms a long, gradually tapering tongue with cut (Fig. 11K) or more acute tip. Helmet sclerite: not helmet-shaped, forming a low, flat mound, ±oval in outline (Figs 10E-G). Phallomeres: Not differing remarkably from other species of the group. Right phallomere with interconnected R3 and cleft sclerite (Fig. 10E). Left phallomere with endophallus apodeme and hook (for the natural arrangement and orientation of the phallomeres see Fig. 1b). Hook consisting of a long shaft with a trough over its full length, a short stalk, and a claw with a well developed membraneous velum (Figs 5L,M).

Female genital structures. Basivalvular sclerites relatively short, not strongly converging anteriorly (Fig. 16D). Spermathecal plates missing. Posterior prae-intercalary sclerites relatively large, oval or rectangular, not strikingly dark (Fig. 16H).

Geographical distribution (Fig. 3). Distributed in the southern Alps in between Valle d'Aosta and Lake Como, at altitudes of 300-1400 m. In Switzerland mainly occurring in Tessin but touching also Wallis at its eastern border (near Gondo) and Graubünden (Grisons) at its western border (valleys of Mesocco and Bergell). In the eastern part of its distribution area, mainly in Tessin, there is some overlapping with the distribution area of *E. sylvestris*; both species can be found together at the same localities.

Ectobius supramontes, spec. nov.

Figs 3, 4F-K, 6A-M, 8G, 9C,D, 11H,I, 13A-K

Holotype: ♂, Switzerland, Graubünden, Unterengadin, zw. Scuol & Ftan, 1430 m, 5.VII.2001, leg B. & H. Bohn (completely on 3 slides, He 49/2) ZSM.

Additional material. Switzerland. – **GR**: 1♂, S.N.P., Il Fuorn, Laborfenster, Licht, 1800 m, 26.VIII.[19]63, W. Eglin (slide Bo 319); 1♂, Schuls, Straße nach Fetan, Handschin (slide Bo 316) (Ba). – 2♀♀, S.N.P., Ardez, Steinsberg, 1525 m, 16.VIII.[19]34, Dr. Hofmänner (female, slide Bo 646); 1♀, S.N.P., Fuorn, a. Piceazapfen, 16.VIII.[19]34, Dr. Hofmänner (slide Bo 648); 1♂, S.N.P., Larscheida, 1800 m, Wiesen, 17.VIII.[19]34, Dr. Hofmänner (slide Bo 645); (?) 2 LL, S.N.P., Livignoweg, Scheitel, 1800 m, unt. Nadeln, 14.VIII.[19]34, Dr. Hofmänner; 1♀, O, S.N.P., Praspöl, 1695 m, Wiesen, 23.VIII.[19]27, Dr. Hofmänner (slide Bo 647); 1♀, S.N.P., V. Cluozza, 1900 m, unt. Legföhre, 21.VIII.[19]38, Dr. Hofmänner (slide Bo 649); 1♀, Tarasp, Dr. Killias (slide Bo 644) (Ch). – 1♀, Sta. Maria, Münstertal, 15.IX.[19]30, Nadig (slide Bo 650) (Ge). – 1♂, Il Fuorn, 20.VII.[19]49, J. de Beaumont (slide Bo 449); 1♀, Il Fuorn, VI.[19]52, J. Aubert; 1♂, P.N., Val Fruz [?], 15.VII.[19]51, J. Aubert (slide Bo 450); 1♂, Pradatsch, V. Scarl, 18.VIII.[19]51, J. Aubert (slide Bo 448); 1♂, Val Sesvenna, 1900 m, 19.VIII.[19]55, Cl. Besuchet (slide Bo 447) (La). – 1♂, 1♀, Val Müstair, Lü, Nordwestrand (Lü Daint), 823.8/168.2, 1950 m, Lf, 13.VIII. 1999, leg. Dr. L. Rezbanyai-Reser (male, slide Bo 589) (Lz). – 3♂♂, Samedan, Wiese, 1860 m, 19.VII.[19]88, leg. W. Sauter (2 males, slides Bo 297, 788); 1♂, Samedan, Geröll, 1830 m, 20.VII.[19]88 (slide Bo 249); 1♀, Samedan, Steppe, 1720 m, 19.VII.1989, leg. W. Sauter (slide Bo 661) (Zü). – 1♂, 4♀♀, 3 LL, ex L: 2♂♂, Il Fuorn, 1820 m, 5.VII.2001 (male, slide He 47/1); ex L: 1♂, 1♀, Oberengadin, zw. La Punt & Bever, 1700 m, 24.VI.2001 (male, slide He 40/2); 2♂♂, 2♀♀, Unterengadin, Martina, 1060 m, 5.VII.2001 (male, slide He 48/1); 7♂♂, 11♀♀, same data as holotype (three males, slides He 49/1,3,4); 7♂♂, 6♀♀, 2 LL, ex L: 4♀♀, Unterengadin, Susch, 1480 m, 5.VII.2001 (male, slide He 50/1); 3♂♂, 6♀♀, 1 L, Val Poschiavo, Piazzo, 950 m, 6.VII.2001 (male, slide He 52/1) (leg. B. & H. Bohn, HB). – **Italy.** – **Lombardia**: 1♂, Mte. Legnone, W-Grat, 1550 m, 23.VII.[19]63, leg. Nadig, Coll. Harz (slide Bo 598) (Ge). – *1♂, Mte. Pari [= Cima Pari, near Riva del Garda ?], Tirol.m. (slide Bo 597) (Sammlung KOFLER). – 10♂♂, 4♀♀, 2 LL, Alpi Orobie, SE slope of Passo di S. Marco, 1530 m, 29.VI.2002 (male, slide It 140/1); 21♂♂, 15♀♀, 20 LL, ex L: 6♂♂, 6♀♀, Alpi Orobie, 2 km ENE Passo del Vivione (Malonno – Schilpario), 1700 m, 29.VI.2002 (male, slide It 135/1); 2♂♂, 4♀♀, Alpi Orobie, Ronco (Schilpario – Barzesto), 1100 m, 29.VI. 2002 (male, slide It 136/1); 9♂♂, 9♀♀, 'Bergamo', Passo della Crocetta (Gorno – Serina), 1250 m, 29.VI.2002 (male, slide It 138/1); 3♂♂, 7♀♀, 5 LL, Isolaccia/Valdidentro (near Bormio), 1350 m, 3.VII.2003 (male, slide It 186/1); *1♂, 1♀, 4 km SW Passo di Nota (W Lago di Garda), 950 m, 28.VI.2002 (male, slide It 130/1); 8♂♂, 10♀♀, 14 LL, ex L: 1♂, 6♀♀, Passo della Foppa (Grosio – Monno, NE Edolo), 1800 m, 3.VII.2003 (male, 4 females, slides It 188/1-5); *3♂♂, 1♀, 6 LL, ex L: 1♂, 2♀♀, 2 km WNW Passo di Nota (W Lago di Garda), 1350 m, 28.VI.2002 (male, slide It 131/1); 10♂♂, 2♀♀, Poiro (near Civo, Morbegno), 1100 m, 6.VII.2001 (male, slide It 127/1); 1♀, 5 LL, ex L: 4♀♀, 2 km E Ponte di Legno (NE Edolo), 1600 m, 4.VII.2003 (female, slide It 189/1); 6♂♂, 7♀♀, Valtellina, Fusino (NW Grosio), 1200 m, 3.VII.2003 (male, slide It 187/1); 1♂, 1♀, Val Camonica, btw. Astrio & Prescarzo (near Breno), 700 m, 28.VI.2002 (male, slide It 134/1); 5♂♂, 5♀♀, 3 LL, Valle del Caffaro, 1 km NNE Valle Dorizzo, 1250 m, 28.VI.2002 (male, slide It 133/1) (leg. B. & H. Bohn, HB). – **Trentino-Alto Adige**: *9♂♂, ex L: 3♂♂, S slope of Monte Penegal (near Bozen), 1600 m, 4.VII.2003 (male, slide It 191/1); *2♂♂, 4♀♀, 3 LL, Schnalstal, Vernagt Stausee, 1700 m, 4.VII.2003 (male, slide It 192/1); *1♀, Val d'Algone, 800-900 m, 20.VII. 2003 (female, slide It 202/1); *1♂, Val d'Ambiez, 850 m, 20.VII. 2003 (slide It 201/1); *1♂, 7♀♀, 2 LL, O, Val di Sole, btw. Castello & Menas (WSW Malè), 1400 m, 4.VII.2003 (male, slide It 190/1) (leg. B. & H. Bohn, HB). – **Austria. Tirol**: 1♂, Serfaus, 1500 m, 2.VII.2003 (slide A 58/1) (leg. B. & H. Bohn, HB).

Etymology. The species name refers to its occurrence high up in the mountains.

Description

Size. Length of pronotum: ♂ 2.05-2.34 (mean 2.19) mm, ♀ 2.14-2.56 (mean 2.39) mm; length of tegmina: ♂ 7.41-9.88 (mean 9.11) mm, ♀ 4.62-5.85 (mean 5.23) mm. [n = 39♂♂, 35♀♀, from 16 localities in Switzerland and Italy]

Colouration. Male: Pronotum. Disk more or less rounded or with only indicated posterior corners, usually lightly coloured (orange-ochreous) with weak and small darker markings, rarely with extended and strong darkenings, as a rule much lighter coloured than *E. ticinus* (Figs 6A-D). Tegmina. Lightly mottled, without larger patches, veinal trunk moderately darkened (Fig. 4F).

Female: Pronotum. Disk hoof-shaped, posterior corners without lateral extensions, often completely dark or variously lightened, usually with less contrasting pattern than in *E. ticinus*. Tegmina. Distinctly mottled, often with larger patches, veinal trunk strongly darkened (Figs 4H,I). Abdomen. T2-6 with rather narrow lightly coloured margins, no other lightenings. S2-6 similar to tergites, lightening at posterior margin often missing. S7 often without lightenings except at latero-posterior margins, at most with not much more than about ½ of the surface lightened (Figs 13H-K). Characteristic in specimens with lightened T7 are the whitish anterior apodemes and surroundings, not found in other species (arrows in Figs 13H-K).

Larva (later stages): Usually without (Fig. 16L), but exceptionally also with a pair of small whitish patches in the middle of the metanotum.

Male structures. Tegmina shorter than in *E. ticinus*, sometimes scarcely reaching the end of the abdomen. T6: Transversal ridge with median part only weakly bent anteriorly (Fig. 6F); bristles of the tergite surface rather long and strong (Fig. 8G). T7: Glandular pit distinctly transversal, broader than lateral margins of the tergite; posterior contour line usually forming a wide bow, with the lateral ends rather strongly curved anteriorly (Figs 6G-K). Right paraproct: Medio-anterior arm similar as in *E. ticinus*, but distal part shorter, triangular to crescent-shaped with an acute tip. Helmet sclerite: not helmet-shaped, forming a low and flat mound, fairly oval in outline (not different from *E. ticinus*) (Figs 10C,D). Phallomeres: Similar as in *E. ticinus* (Figs 6L,M).

Female genital structures. Basivalvular sclerites as in *E.ticinus* relatively short, not strongly converging anteriorly (Fig. 16E). Spermathecal plates missing. Posterior prae-intercalary sclerites narrower than in *E. ticinus*, elongated (Fig. 16I).

Remarks. In some cases the differences in the shape of the glandular pit between *E. ticinus* and *E. supramontes* may not be as clear as shown in Figs 5G,H and 6G,H; the two species also show some overlap in the size of the pits (Tab. 1). In these cases consideration of additional features such as are length of tegmina and structure of the right paraproct should allow an unequivocal determination.

Geographical distribution (Fig. 3). In Switzerland the species is restricted to the southeastern part of Graubünden, the Engadin, along and south of the river Inn. In the valley of the Inn it also reaches Austria (near Serfaus). The species has its widest distribution in the southern Alps of Italy reaching from Lake Como in the west up to the river Adige in the east, including also the Vinschgau (Schnalstal). *E. supramontes* is a high montane species inhabiting altitudes between 700 m and 1900 m; it is rarely found below 1000 m. – At the northern and eastern borders of its distribution there is a narrow zone of overlapping with the distribution area of *E. sylvestris* where both species may be found together at the same localities.

Discussion

The glandular pit of T7 in males has – since Ramme's pioneering work (1923) successfully continued and improved by Failla & Messina (1978) – turned out to be an indispensible means for the discrimination of *Ectobius* (and *Phyllodromica*) species. In the *sylvestris*-group, unfortunately, the differences in the structure of the pit are rather small. The great morphological similarities on the one hand, and the high variability in colouration on the other hand make the discrimination of the species of this group even in the male quite difficult, not to speak of the still much more problematic females.

The discovery of additional distinguishing features – such as the helmet sclerite and the paraprocts in males and the genital sclerites and colouration in females – now allow a very reliable determination of males and, in most cases, also of females. Moreover, comparison of the structures mentioned also allow conclusions about the phylogenetic relationships of the species. The various shapes of the helmet sclerite can be arranged quite well in a continuous series suggesting the following relationships: *sylvestris* + (*lucidus* + (*eckerleini* + (*ticinus* + *supramontes*))). The possession of some kind of a spermathecal plate in *E. sylvestris* can be considered as a primitive character. The sister group relationships of the last three taxa also get support from the structure of the right paraproct: the medio-anterior arm has a lateral incision, short in *E. eckerleini*, much deeper, however, in *E. ticinus* and *E. supramontes*. The similarities in the shape of the basivalvular sclerites may be considered as another synapomorphy of the latter two species. These preliminary conclusions, of course, need confirmation by a more extended cladistic analysis including also the Iberian species and all available structures.

The distribution of the species is in good agreement with the assumed relationships. *E. sylvestris* inhabits almost the whole Europe north of the latitude of about 45° (with the exception of the British Isles and possibly also of Norway). *E lucidus* is a more southern and western species reaching not further than to the longitude of 10° in the west (eastern end of Lake Constance). The distribution of the other species is still more restricted. The areas of *E. eckerleini*, *E. ticinus* and *E. supramontes* follow each other from the west to the east. This sequence might reflect the direction of a former spreading in connection with a splitting of species.

The distribution of some of the species of the *sylvestris*-group is remarkable: *E. lucidus*, *E. ticinus* and *E. supramontes* have separate distribution areas, and the same is also true for *E. eckerleini* and the latter two species. The distances between the adjacent areas is not very great. Considering the restricted mobility of the species in which only the males are able to fly, and the geographic situation in the regions in question with chains of high mountains as effective migration barriers, the occurrence of several species in separate areas should not be astonishing. Seemingly unsurmountable altitudes, indeed, separate the areas of *E. eckerleini* and *E. ticinus*

(Simplon, Nufenen and Furka Pass) as well as those of *E. lucidus* and *E. supramontes* (Julier, Albula and Flüela Pass). But slightly more to the south no such geographical barriers can be found between the areas of *E. lucidus* and *E. ticinus*, and between those of *E. ticinus* and *E. supramontes*.

One might ask whether the separation of the species is maintained by interspecific competition which does not allow their coexistence at one place. On the other hand, other species of the group can obviously coexist quite well. *E. sylvestris*, for example, may be accompanied by any of the other four species, especially frequently by *E. lucidus*: very often – in Switzerland as well as in Germany – the two species can be found together at the same locality.

The separation of the distribution areas as it appears now might, however, be a sampling artefact. The localities, especially in northern Italy, are not that densely arranged to exclude the possibility of an overlapping of the areas. Much more sampling has to be done to clarify the distribution of the species of this group in Italy, but also in southern France and in Austria.

Acknowledgements

I wish to thank the following curators of Swiss museums for their kindness in providing me with material from their collections: Armin Coray (Basel); Hannes Baur (Bern, formerly Zürich); Marcel S. Jaquat (La Chaux-de-Fonds), Ulrich E. Schneppat (Chur); Hermann Blöchlinger (Frauenfeld); Charles Lienhard and Peter Schwendinger (Genève); Anne Freitag and Sandra Knispel (Lausanne); Ladislaus Reser (Luzern); Jean-Paul Haenni (Neuchâtel); Elsa Obrecht (Solothurn); Marion Schmid and other members of the staff of the Entomologische Sammlung der ETH (Zürich). I am especially obliged to L'. Vidlička and L. Reser for their kind permission to read their still unpublished paper and to make use of pertinent material (Vidlička & Reser, in press). I am grateful to Alois Kofler (Linz) for making his collection available to me. K.-D. Klass (Museum für Tierkunde Dresden) has kindly studied the structure of the praeparaprocts of *Ectobius* species and communicated his interpretations. My thanks also go to Jens M. Bohn (ZSM) for his manifold help in computer technics, to Teresa M. Saks for proof reading the manuscript, and, last but not least, to my wife Barbara for accompanying me on many of the collecting excursions.

The work was done at the Department Biologie II der Universität München. I am very grateful to W. Gabriel (Evolutionsökologie) and S. Diehl (Aquatische Ökologie) for their generous support in providing me with room and the facilities of the Department after my retirement.

References

Baur, H. & A. Coray (2004). A revision of the Blattodea, Ensifera and Caelifera described by H. Fruhstorfer. – Rev. suisse Zool. **111**(3)

Baur, H., I. Landau, G. Müller, M. Schmidt & A. Coray (2004). Taxonomie der Bernstein-Waldschabe *Ectobius vittiventris* (A. Costa, 1847) (Blattodea: Blattellidae) und ihre Verbreitung in der Schweiz. – Rev. suisse Zool. **111**(2): 395-424

Bohn, H. 1989. Revision of the Sylvestris Group of *Ectobius* Stephens in Europe (Blattaria: Blattellidae). – Ent. Scand. **20**: 317-342

– – 2003 Verzeichnis der Schaben (Blattoptera) Deutschlands. – Entomofauna Germ. **6**: 47-53

Failla, M. C. & A. Messina 1978. Struttura della fossetta ghiandolare dei maschi delle specie italiane di *Ectobius* Steph. (Blattaria, Ectobiidae). – Animalia **5**: 357-394

Fruhstorfer, H. 1921. Die Orthopteren der Schweiz und der Nachbarländer auf geographischer sowie oekologischer Grundlage mit Berücksichtigung der fossilen Arten. – Arch. Naturgesch. **87**A(5): 1-262

Harz, K. 1976. Ordnung Blattoptera. In: Harz, K. & A. Kaltenbach: Die Orthopteren Europas. **3**: 169-305. The Hague

Hofmänner, B. 1951. Die Geradflügler (Dermaptera und Orthoptera) des Schweizerischen Nationalparkes und der angrenzenden Gebiete. – Ergebn. wiss. Unters. schweiz. Nationalparks **3**(N.F.): 241-311

Hoebeke, E. R. & D.A. Nickle 1981. The forest cockroach, *Ectobius sylvestris* (Poda), an European species newly discovered in North America (Dictyoptera: Blattodea: Ectobiinae). – Proc. Ent. Soc. Wash. **83**(4): 592-595

Landau, I., H. Baur, G. Müller & M. Schmidt 2000. Zur Verbreitung und Taxonomie von *Ectobius vittiventris* (Costa) (Blattoptera: Ectobiidae) in der Schweiz. – Mitt. Schweiz. Entom. Ges. **73**: 179-180

Princis, K. 1965. Ordnung Blattariae (Schaben). In: Beier, M. (ed.): Bestimm. Büch. Bodenfauna Europ. **3**: 1-50. – Akademie-Verlag, Berlin

Ramme, W. 1923. Vorarbeiten zu einer Monographie des Blattidengenus *Ectobius* Steph. Arch. Naturgesch. **89**A(7): 97-145

Thaler, K. 1985. Über die epigäische Spinnenfauna am Xerothermstandort des Tiroler Inntales (Österreich) (Arachnida: Aranei). – Veröff. Mus. Ferdinandeum Innsbruck **65**: 81-103

Vidlička, L'. & L. Rezbanyai-Reser (in press). Neuere Angaben zur Schabenfauna der Schweiz (Blattaria, Blattellidae: *Ectobius*). – Mitt. Schweiz. Entom. Ges.

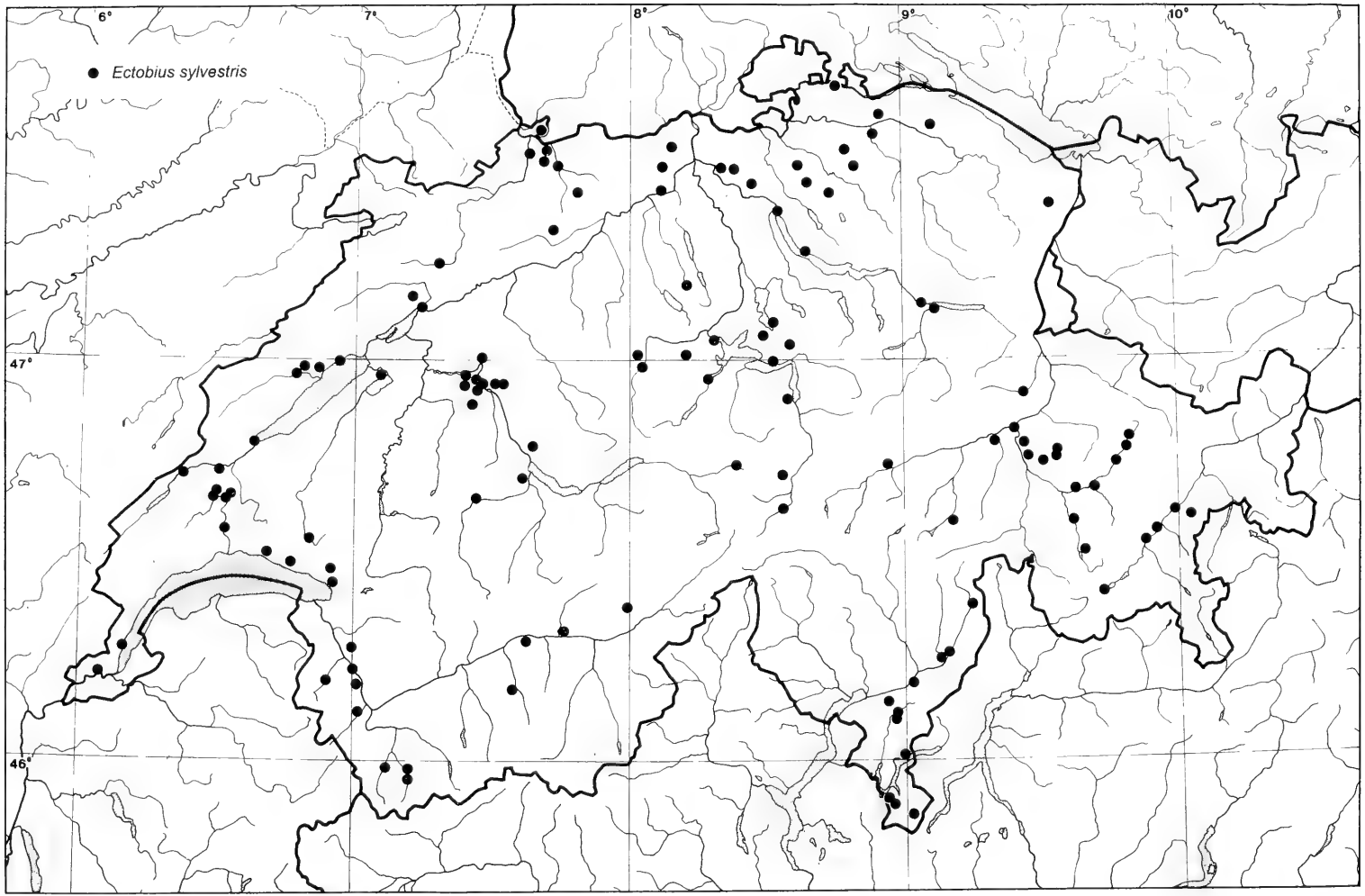


Fig. 1. Distribution of *E. sylvestris* in Switzerland.

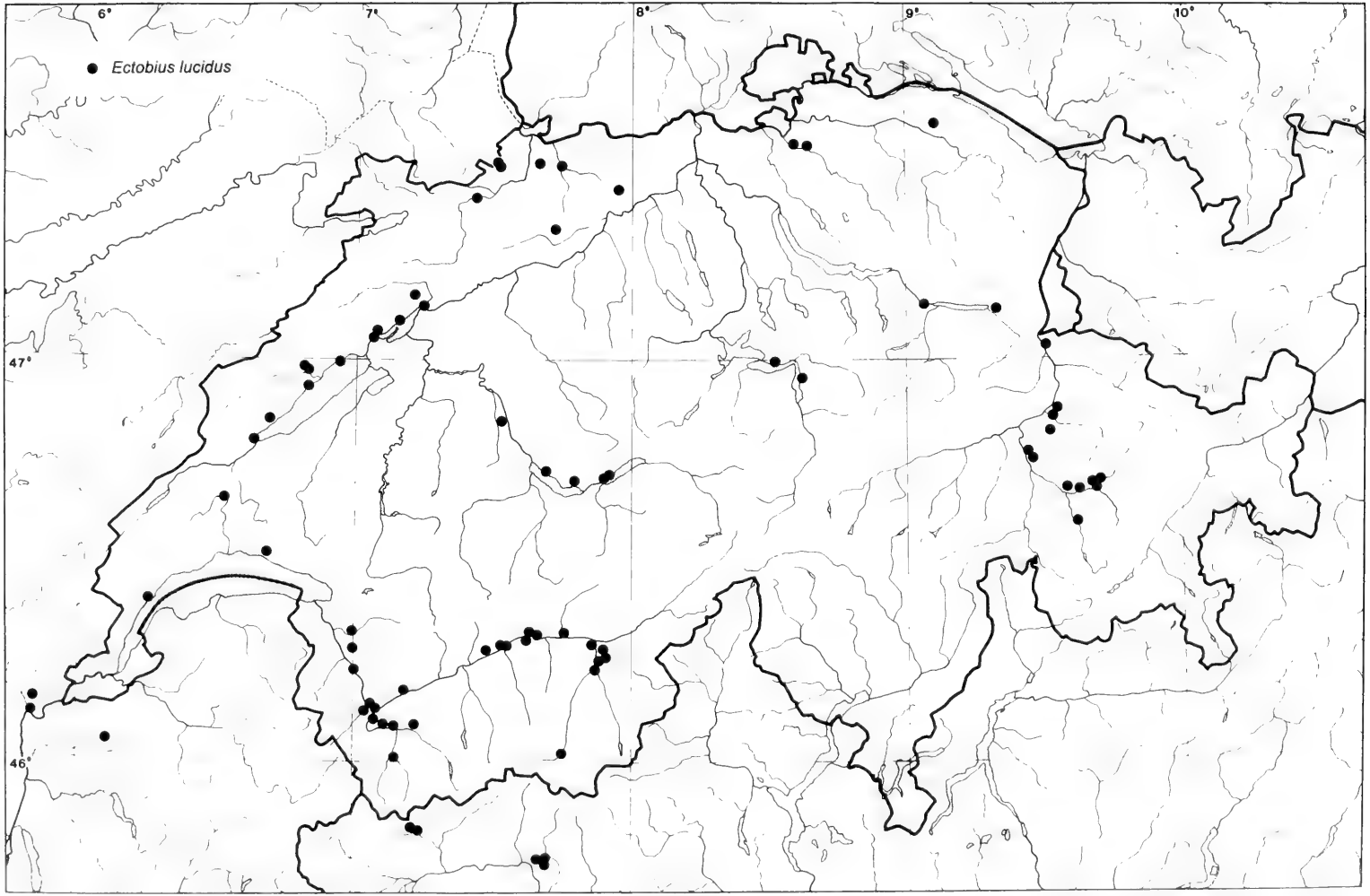


Fig. 2. Distribution of *E. lucidus* in Switzerland and in the adjacent southern parts of France and Italy. In France collecting was done only at the localities labeled; the species may be distributed throughout the area depicted. In Austria *E. lucidus* has not yet been found; for its distribution in Germany see Fig. 2 in Bohn (2003).

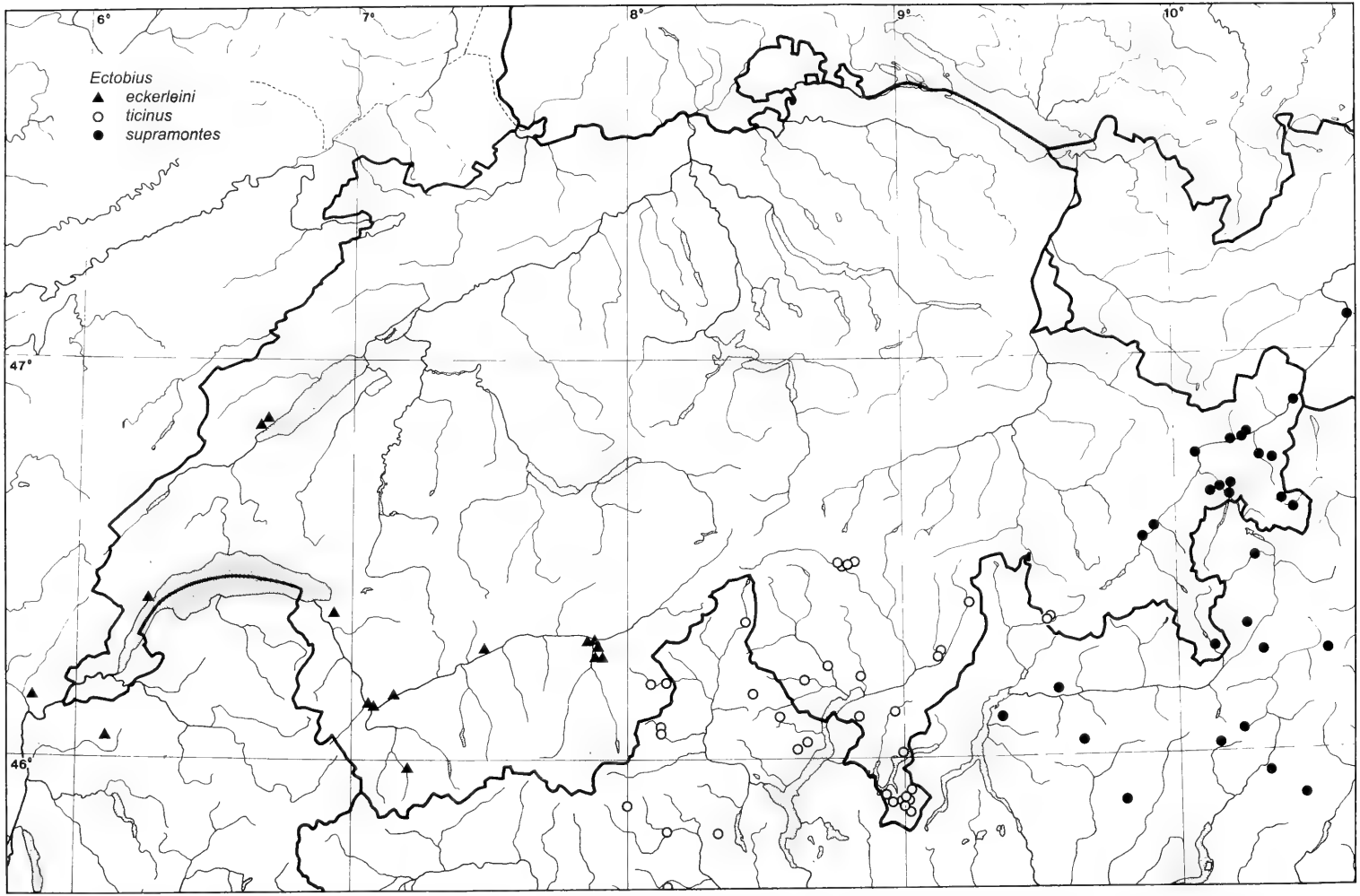


Fig. 3. Distribution of *E. eckerleini*, *E. ticinus* and *E. supramontes* in Switzerland and the adjacent southern regions of France, Italy, and Austria. *E. eckerleini* might have a more extended distribution in France, especially south of Lake Lemon. The distribution of *E. supramontes* in the east reaching as far as Lake Garda and the river Adige, including the Vinschgau.

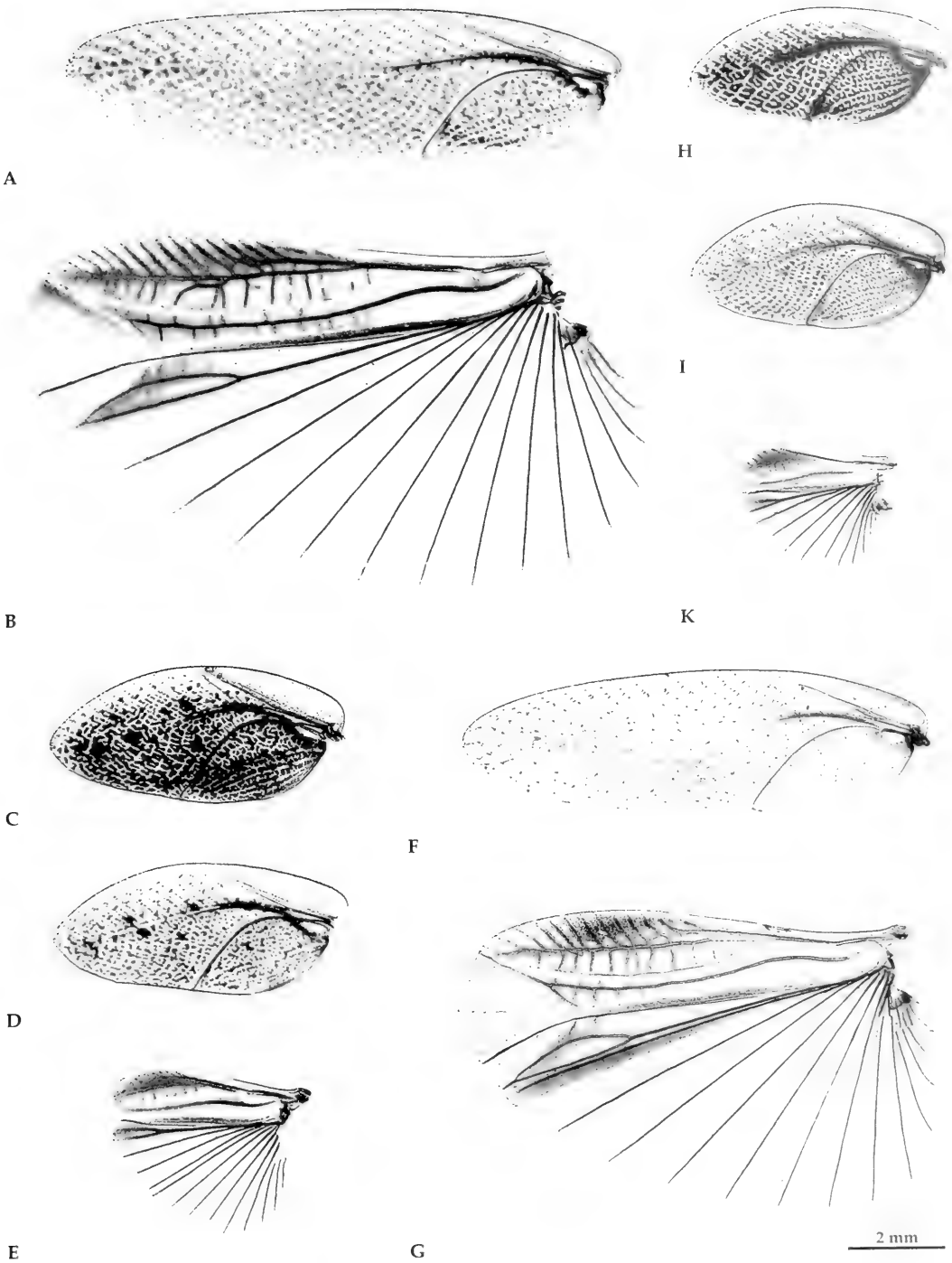


Fig. 4. Wings of the new species. **A-E.** *E. ticinus*. **F-K.** *E. supramontes*. Males (**A, B, F, G**), females (**C-E, H-K**), tegmina (**A, C, D, F, H, I**), hind wings (**B, E, G, K**). Same scale for all figures. Identification: He 79/1, holotype (**A, B**), It 170/4 (**C, E**), It 170/5 (**D**), He 49/2, holotype (**F, G**), It 189/1 (**H**), It 188/4 (**I**), It 188/2 (**K**).

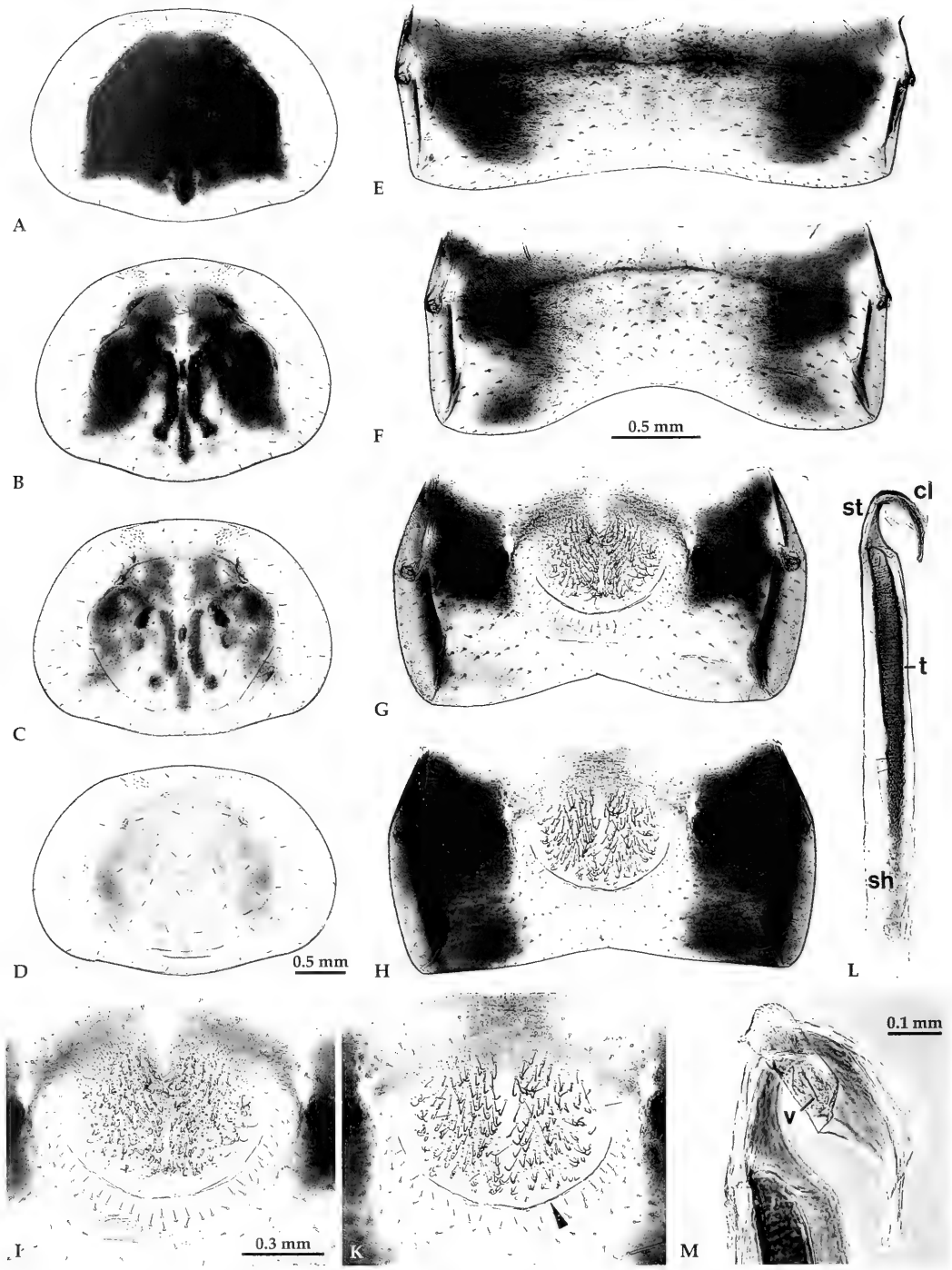


Fig. 5. *E. ticinus*, male structures. Pronotum (**A-D**), T5 (**E**), T6 (**F**), T7 (**G, H**), glandular pit of T7 (**I, K**, arrow points to posterior contour line), hook of left phallomere (**L**, posterior end on top), claw of hook (**M**). **cl** claw, **sh** shaft, **st** stalk, **t** trough, **v** velum. Same scale for (**A-D**), (**E-H, L**) and (**I, K**). Identification: He 79/3 (**A**), He 79/1, holotype (**B, E-G, I**), He 90/1 (**D**), He 41/3 (**H, K**), He 79/2 (**L**), It 174/1 (**M**).

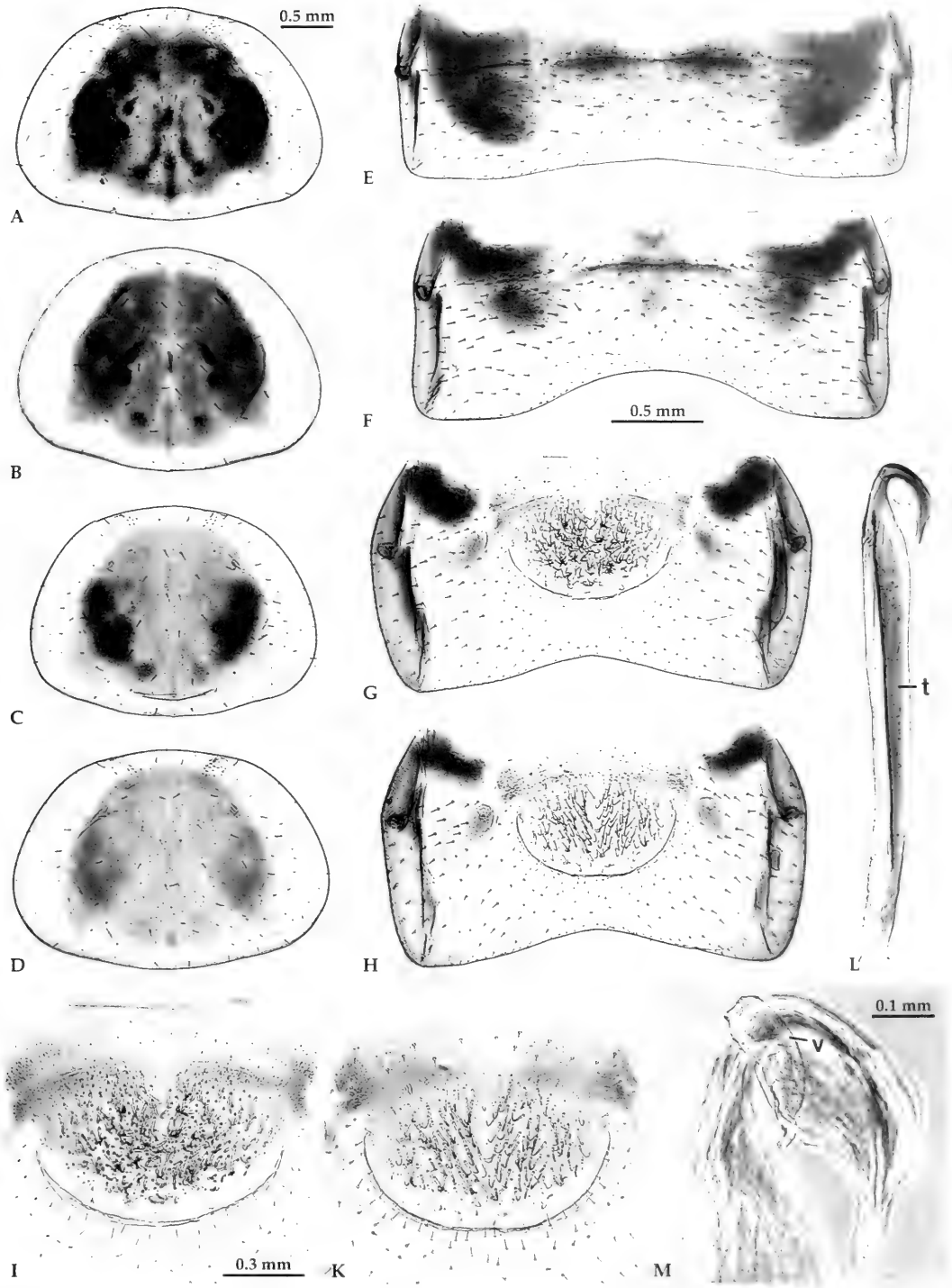


Fig. 6. *E. supramontes*, male structures. Pronotum (**A-D**), T5 (**E**), T6 (**F**), T7 (**G, H**), glandular pit of T7 (**I, K**), hook of left phallomere (**L**, posterior end on top), claw of hook (**M**). t trough, v velum. Same scale for (**A-D**), (**E-H, L**), and (**I, K**). Identification: It 201/1 (**A**), It 134/1 (**B**), It 140/1 (**C**), He 49/2, holotype (**D, E-G, I, L, M**).

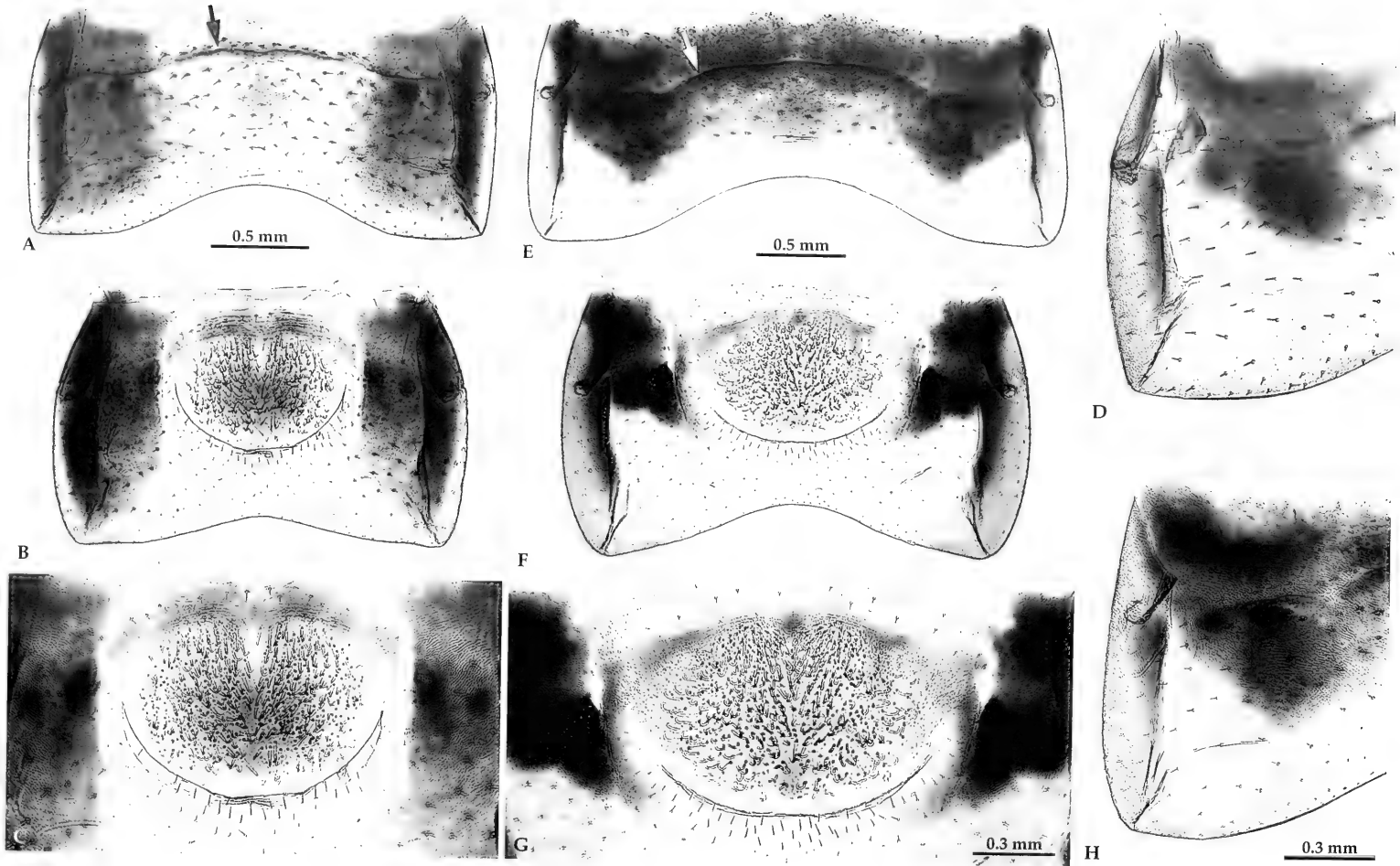


Fig. 7. Male tergites. **A-D.** *E. sylvestris*. **E-H.** *E. lucidus*. T6 (**A, E**), left margin of T6 (**D, H**), T7 (**B, F**), glandular pit of T7 (**C, G**). The arrows point to the transversal ridge of T6. Same scale for (**A, B**), (**E, F**) and (**C, D, H**). Identification: He 35/4 (**A-D**), He 55/3 (**E-H**).

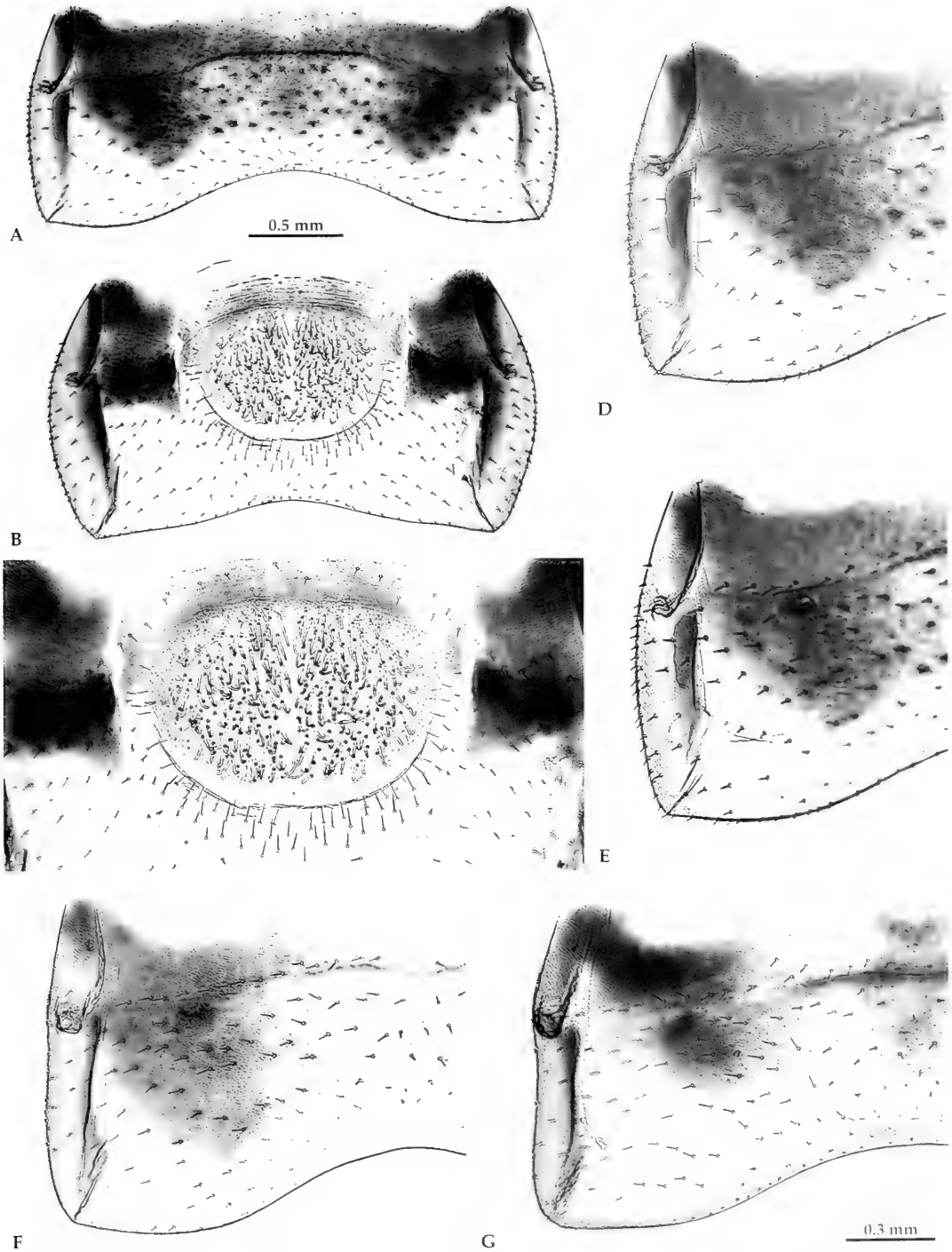


Fig. 8. Male tergites. **A-E.** *E. eckerleini*. **F.** *E. ticinus*. **G.** *E. supramontes*. T6 (**A**), left margin of T6 (**D-G**; **D, E** same specimen in different focus), T7 (**B**), glandular pit of T7 (**C**). Same scale for (**A, B**) and (**C-G**). Identification: He 28/3 (**A-E**), He 42/1 (**F**), He 49/2, holotype (**G**).

Fig. 9. Male subgenital plate (S9) and helmet sclerite. **A-D.** *E. sylvestris*. **E-H.** *E. lucidus*. Subgenital plate with helmet sclerite in fairly natural position (**A, E**), helmet sclerite in more detail (**B-D, F-H**). Dorsal view except for **B** (ventral view), posterior end on top. **a** anterior apodemes of the subgenital plate, **h** helmet sclerite, **s** (left) stylus; parts of the right phallomere: **R3** sclerite, **cs** cleft (both removed in A); left phallomere: **e** endophallic apodeme (hook removed). Same scale for (**A, E**) and (**B-D, F-H**). Identification: Bo 564 (**A**), It 123/2 (**B, C**), It 111/2 (**D**), He 4a/1 (**E**), He 55/1 (**F**), He 55/2 (**G**), He 56/1 (**H**).

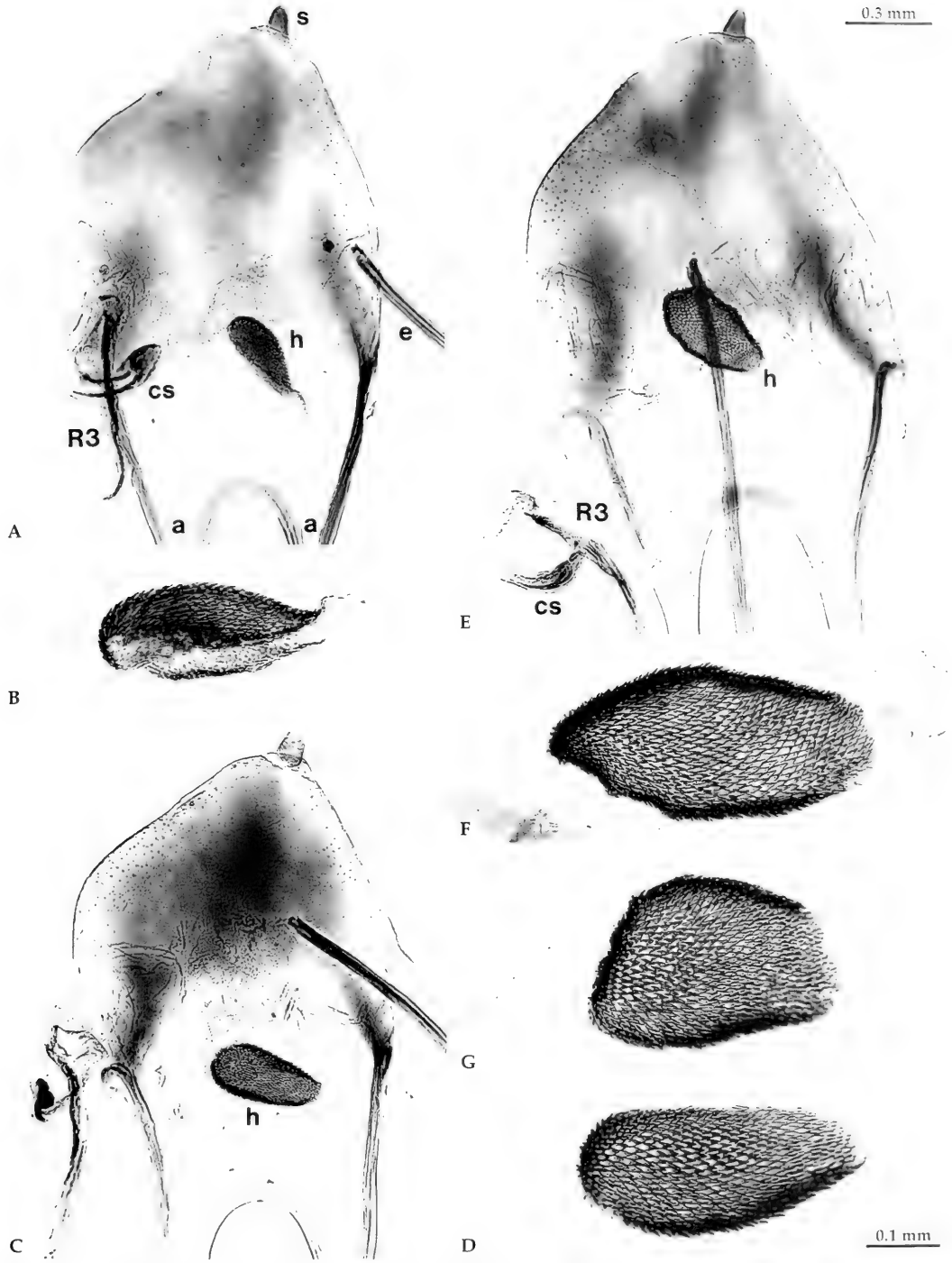


Fig. 10. Male subgenital plate (S9) and helmet sclerite. **A-B.** *E. eckerleini*. **C-D.** *E. supramontes*. **E-G.** *E. ticinus*. Subgenital plate with helmet sclerite in fairly natural position (**A, C, E**), helmet sclerite in more detail (**B, D, F, G**). Dorsal view, posterior end on top. For abbreviations see preceding figure. Same scale for (**A, C, E**) and (**B, D, F, G**). Identification: He 28/3 (**A**), F 104/3 (**B**), He 49/1 (**C**), He 49/4 (**D**), He 79/1, holotype (**E**), He 79/2 (**F**), It 173/1 (**G**).

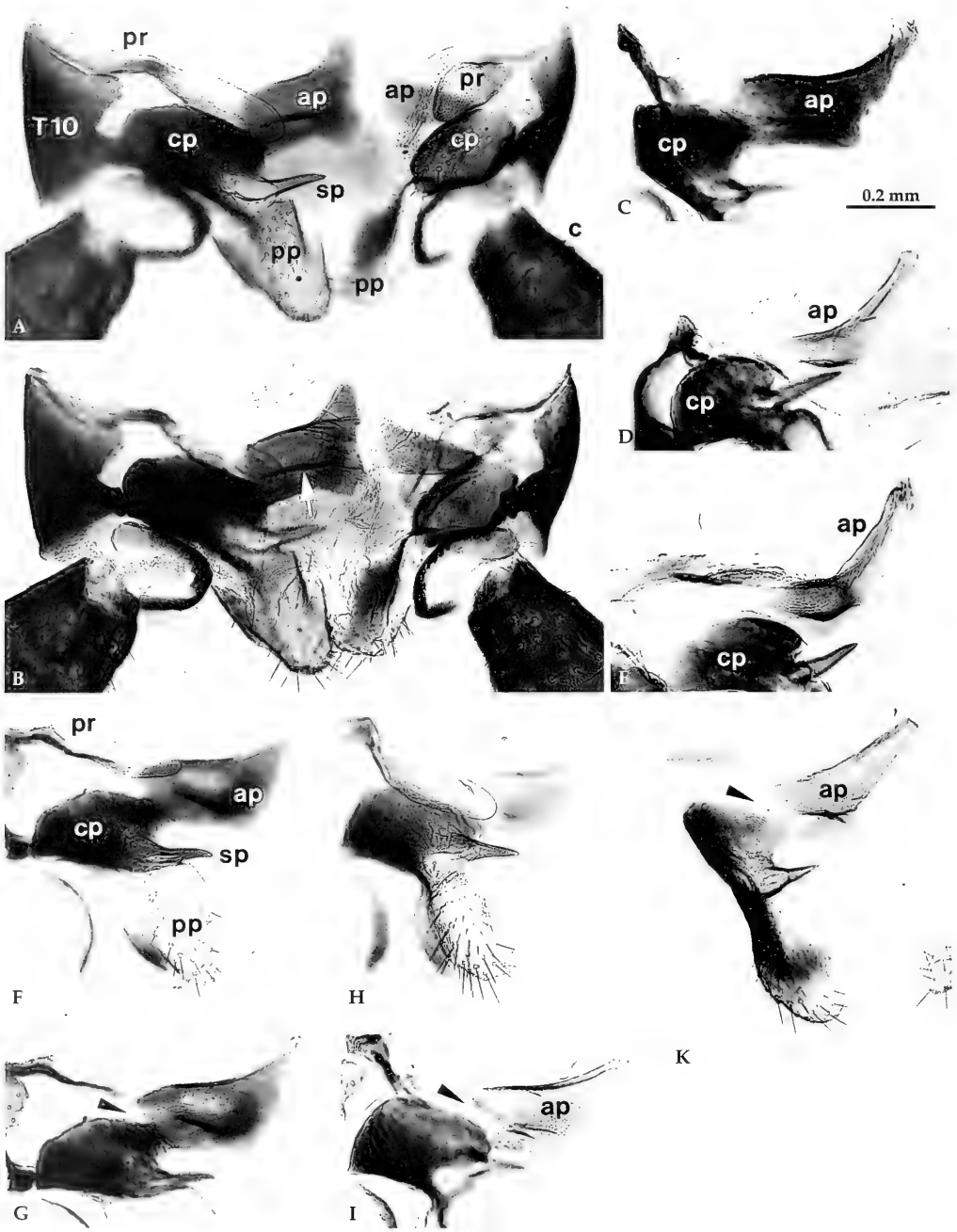


Fig. 11. Male paraprocts and praeparaprocts. **A-C.** *E. lucidus*. **D-E.** *E. sylvestris*. **F-G.** *E. eckerleini*. **H-I.** *E. supramontes*. **K.** *E. ticinus*. (**A, B**) last abdominal segment showing paraprocts and praeparaprocts of both sides; (**C-K**) only right paraproct or part of it shown. In three cases the same structures are photographed twice with different focussing: (**A, B**), (**F, G**), and (**H, I**). Ventral view. **c** cercus, **pr** praeparaproct, **T10** tergite 10; paraproct parts: **ap** medio-anterior arm, **cp** central part, **sp** spine (only on the right), **pp** medio-posterior arm. Arrow in (**B**) points to border between distal (on top) and proximal part of the medio-anterior arm, in **G, I** and **K** to an incision between these two parts. Same scale for all figures. Identification: Bo 457 (**A, B**), He 55/3 (**C**), He 80/2 (**D**), It 123/2 (**E**), F 104/4 (**F, G**), He 49/4 (**H, I**), It 170/1 (**K**).

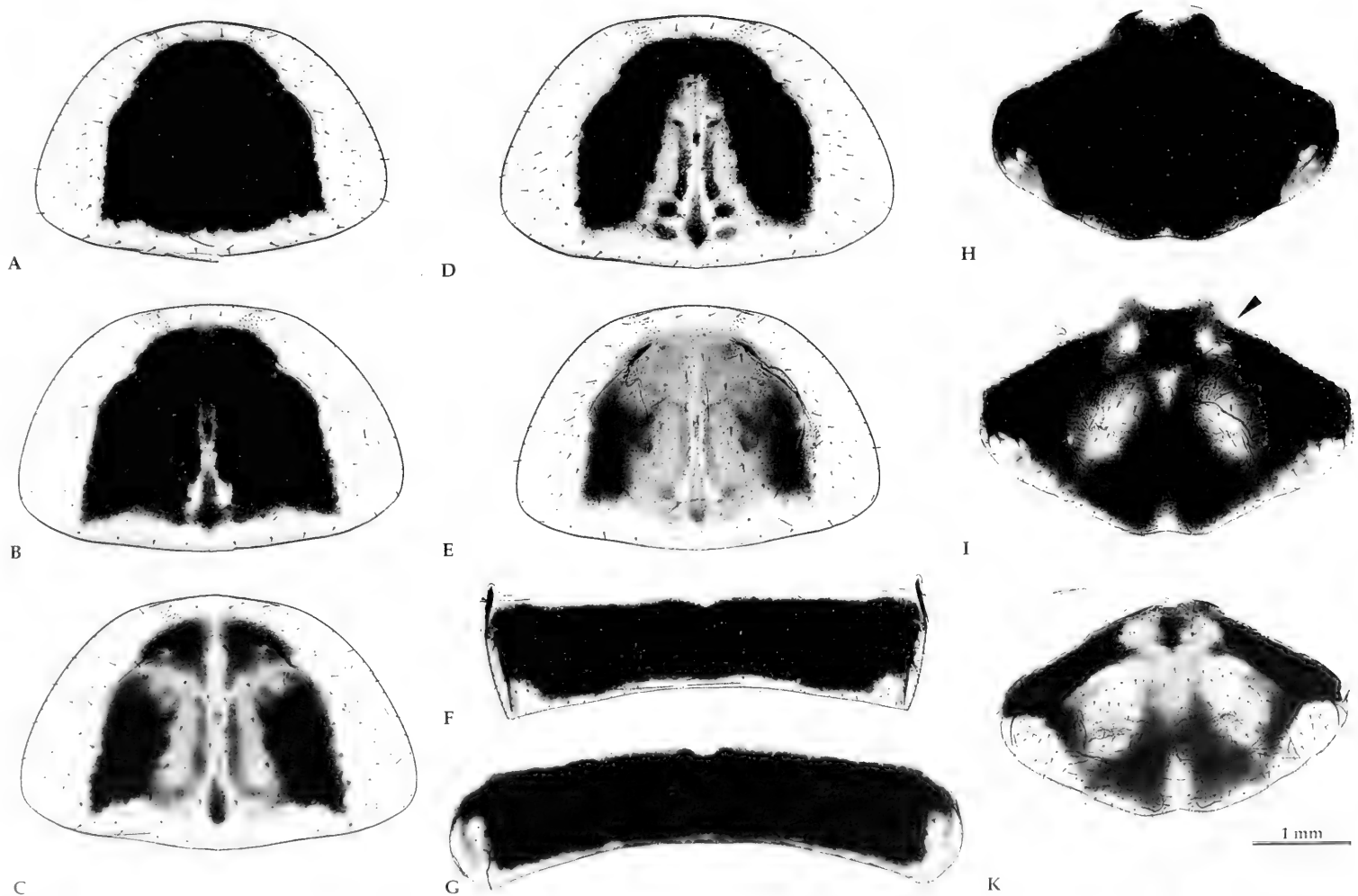


Fig. 12. *E. ticinus*, females, colour pattern of pronotum and abdominal tergites and sternites. Pronotum (**A-E**), T5 (**F**), S5 (**G**), S7 (**H,I,K**). Arrow in (I) points to characteristic lightenings of S7. Same scale in all figures. Identification: It 178/2 (**A**), He 41/4 (**B,F,G**), It 170/3 (**C**), It 181/3 (**D**), It 170/2 (**E**), He 89/1 (H), He 80/3 (**I**), It 180/1 (**K**).

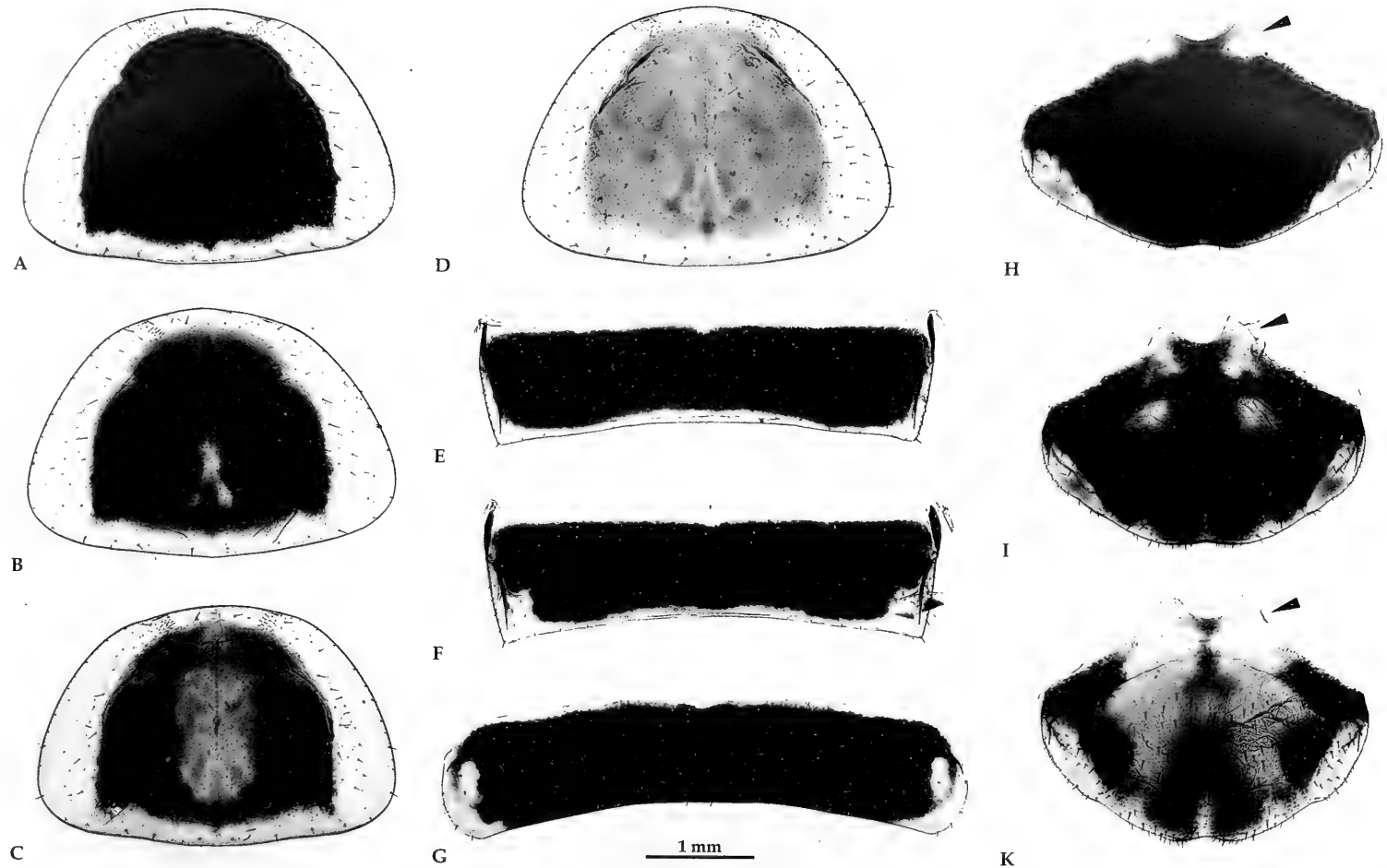


Fig. 13. *E. supramontes*, females, colouration pattern of pronotum and abdominal tergites and sternites. Pronotum (**A-D**), T5 (**E, F**), S5 (**G**), S7 (**H, I, K**). Arrows in (**H-K**) point to characteristic lightenings of S7. Same scale for all figures. Identification: It 189/1 (**A**), It 188/2 (**B**), It 180/3 (**C**), It 188/4 (**D, K**), It 187/3 (**E, G, H**), It 187/2 (**F**), It 188/3 (**I**).

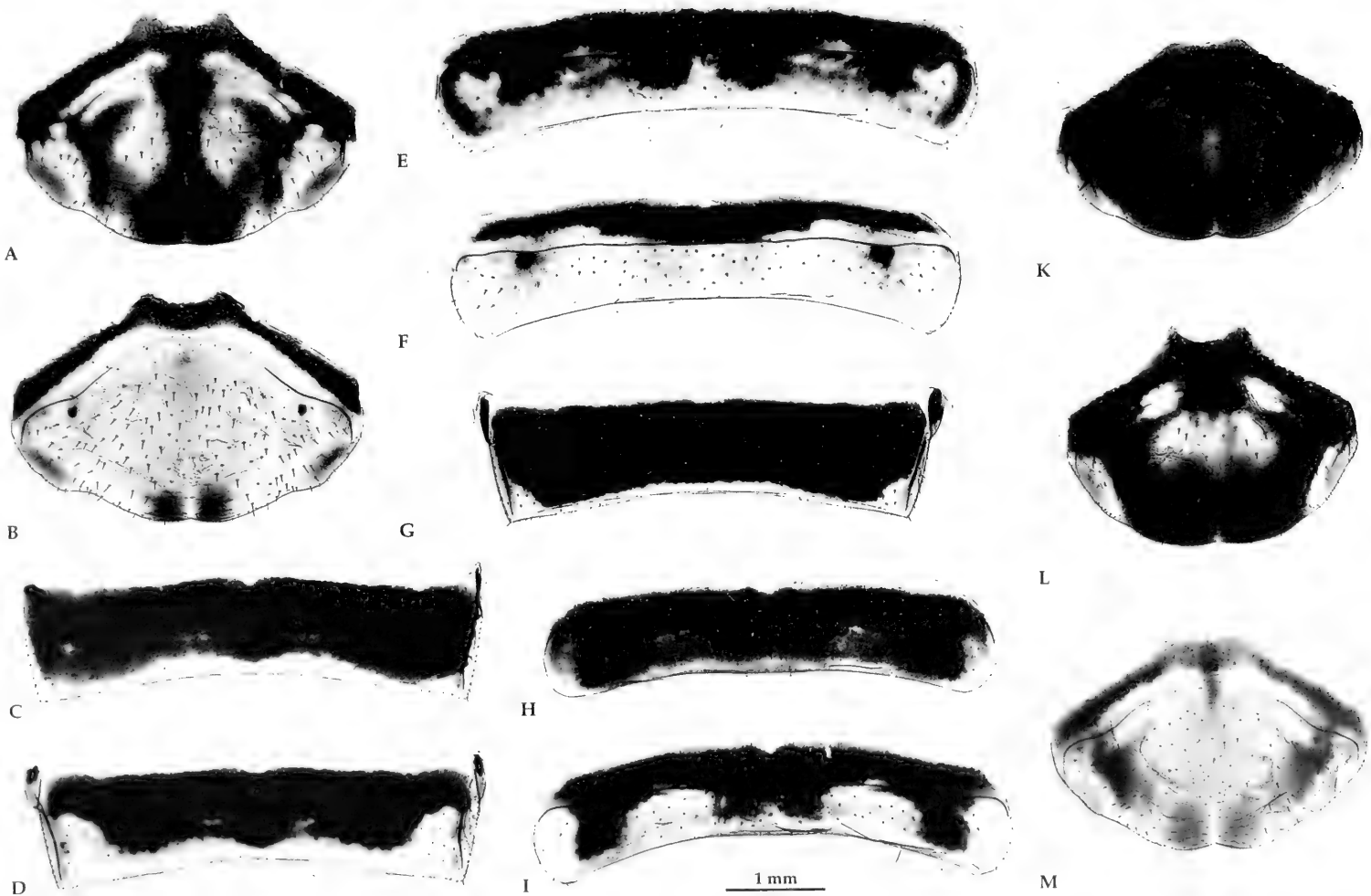


Fig. 14. Females, colour pattern of abdominal tergites and sternites. **A-F.** *E. lucidus*. **G-M.** *E. sylvestris*. T5 (**C, D, G**), S5 (**E, F, H, I**), S7 (**A, B, K, L, M**). Same scale for all figures. Identification: He 55/4 (**A**), He 55/5 (**B**), He 55/4 (**C, E**), He 31/4 (**D, F**), He 75/1 (**G**), He 20/1 (**H**), He 87/2 (**I**), He 20/7 (**K**), Bo 659 (**L**), Bo 651 (M).

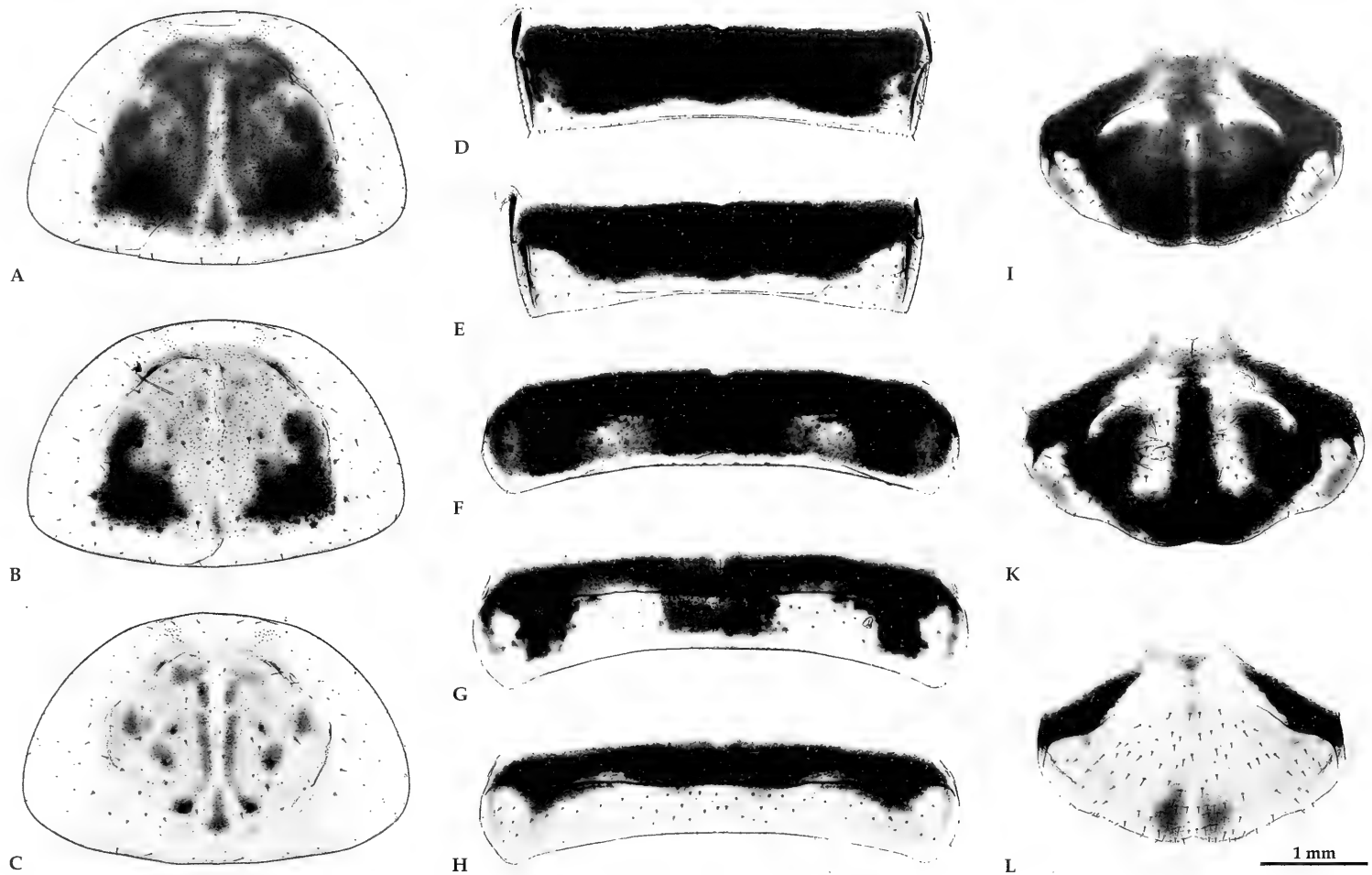


Fig. 15. *E. eckerleini*, females, colouration patterns of pronotum and abdominal tergites and sternites. Pronotum (**A, B, C**), T5 (**D, E**), S5 (**F, G, H**), S7 (**I, K, L**). Same scale for all figures. Identification: F 104/6 (**A**), F 104/7 (**B, D, F**), He 14a/2 (**C, G, K**), F 25/5 (**E**), F 25/4 (**H**), F 24/8 (**I**), F 24/7 (**L**).

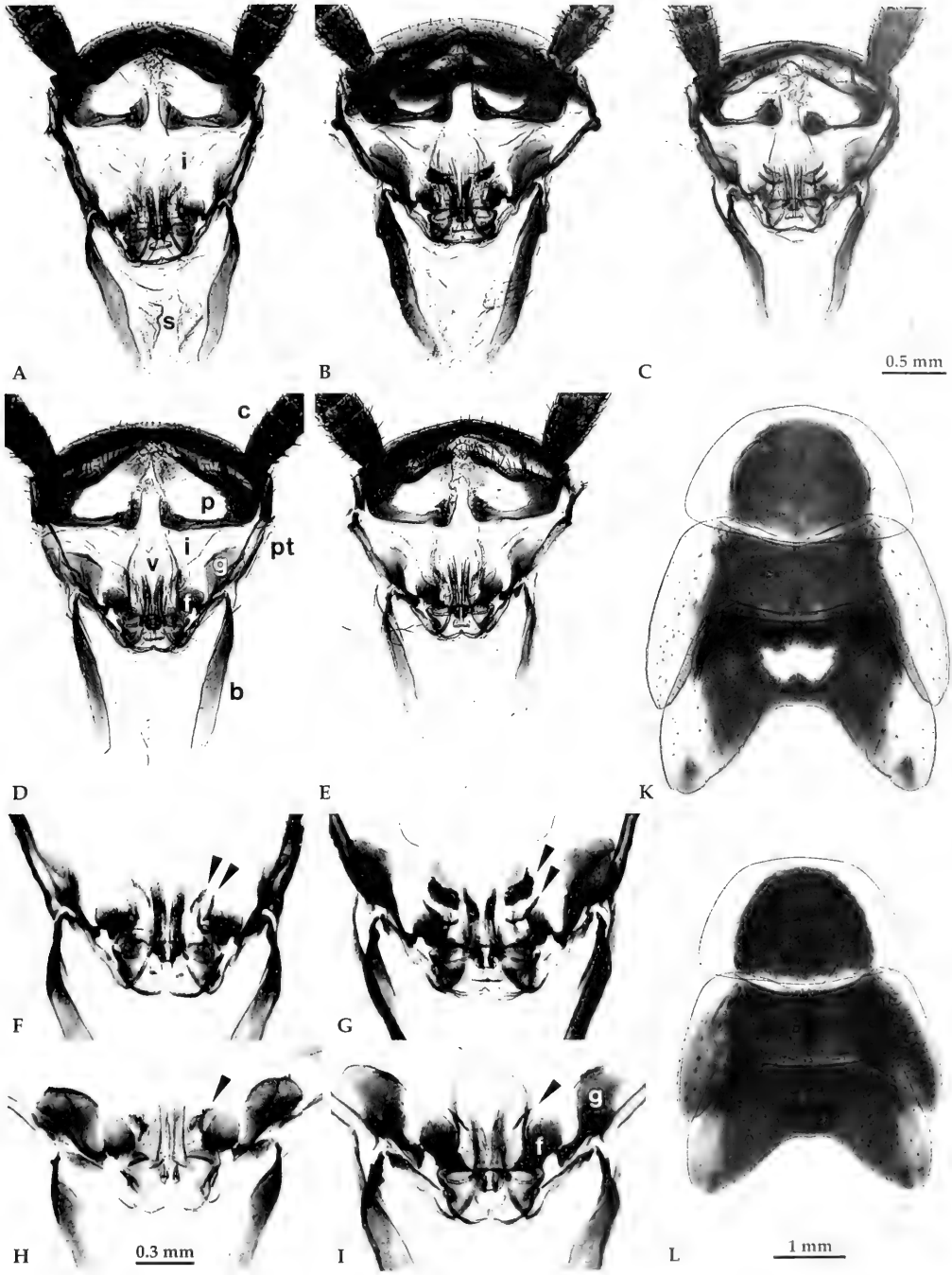


Fig. 16. A-I. Females, dorsal complex of genital sclerites, posterior end on top. (**A-E**) Complete structure, ventral view; (**F-I**) detail, dorsal view, arrows pointing to the prae-intercalary sclerites. **b** basivalvular sclerites, **c** cercus, **f** valvifer II, **g** gonangulum (laterosternite 9), **i** intercalary sclerite (weakly sclerotized), **p** paraproct, **pt** paratergites 8,9, **s** spermathecal plate, **v** valves of ovipositor. **K-L.** Larvae (last stage), colouration of thoracal nota. **A, F.** *E. sylvestris*. **B, G.** *E. lucidus*. **C.** *E. eckerleini*. **D, H, K.** *E. ticinus*. **E, I, L.** *E. supramontes*. Same scale for (**A-E**), (**F-I**), and (**K, L**). Identification: He 87/2 (**A, F**), He 55/5 (**B**), F 99/4 (**C**), It 181/2 (**D**), It 187/2 (**E**), He 55/4 (**G**), It 178/2 (**H**), It 202/1 (**I**), It 180/3 (**K**), It 181/3 (**L**).

74. Bräunicke, M. & J. Trautner: Die Laufkäfer der Bodenseeufer. Indikatoren für naturschutzfachliche Bedeutung und Entwicklungsziele. "Bristol-Schriftenreihe" Bd. 9 – Verlag Paul Haupt, Bern. 116 S. zahlr. Karten u. Farbabb. ISBN 3-258-06507-1

Laufkäfer gelten seit längerer Zeit schon als eine der wichtigsten Zeigergruppen für Umweltzustand und Veränderungen. Diese liegt wohl einerseits daran, daß ihre Systematik – jedenfalls bei uns – recht gut bekannt ist, andererseits sind sie mit relativ einfachen Methoden in Anzahl und repräsentativ zu erfassen, und schließlich ist es vermutlich eine der Insektengruppen, von denen wir am meisten über ihre Biologie, also Verhalten, Ansprüche an die Umwelt, Fortpflanzung, Lebenszyklen u.a. wissen. Das haben wir eben solchen Autoren wie denen dieses Bändchens zu verdanken, die rastlos die Laufkäferfauna Baden-Württembergs in all ihren Faktoren erforschen. Zahlreiche andere Bundesländer könnten sich übrigens daran ein Beispiel nehmen!

Der Bodensee und seine nähere Umgebung bietet sich für eine solche Studie an, weil er mit seinen Ufern eine Reihe von seltenen (oder selten gewordenen) Habitaten umfaßt, deren Fauna in den letzten Jahren stark zurückgegangen ist, sei es, daß Umweltzerstörung das ihre getan hat, sei es auch, daß es sich um Eiszeitrelikte handelt, die sowieso im Rückzug begriffen sind und dabei durch die Klimaerwärmung der letzten Jahre noch zusätzlich beeinflußt werden – aber diese kann man zum Teil ja ebenfalls unter Umweltzerstörung subsummieren!

Ein kurzes einleitendes Kapitel befaßt sich daher auch mit Laufkäfern als Indikatoren. Dann folgt eine gründliche Vorstellung des Untersuchungsgebietes und der Vegetation der verschiedenen Habitate sowie der angewandten Methoden. Im Hauptteil werden die Laufkäferfaunen der verschiedenen Ufertypen behandelt, wobei eine Reihe von wichtigen, also seltenen oder besonders charakteristischen Arten noch gesondert behandelt wird. Das abschließende Kapitel widmet sich der Bewertung der Ergebnisse für die naturschutzfachliche Arbeit und gibt Ausblicke und Anregungen für zukünftige Pflege bzw. Renaturierung gefährdeter Uferzonen. Artenlisten, Verzeichnisse der Probestellen und eine recht ausführliche Bibliographie beschließen diesen sehr informativen Band, der – und das soll besonders hervorgehoben werden – reich mit Verbreitungskarten und sehr guten Fotos von Uferzonen, ihrer Vegetation und den verschiedensten Laufkäfern bebildert ist. Man bekommt somit einen guten Eindruck von dem Reichtum an sehr verschiedenen Habitaten und ihrer Laufkäferfauna. Eine gelungenen Studie, zu empfehlen sowohl allen Käferfreunden, wie allen, die mit Naturschutz in jeglicher Form befaßt sind oder sich auch nur dafür interessieren.

M. Baehr

75. Gaulke, M.: Naturreiseführer Philippinen. – Natur und Tier Verlag, Münster, 2001. 416 S. ISBN 3-931587-39-8

Wer die Inselwelt des faszinierenden Archipels der Philippinen mit der Sichtweise eines Naturfreundes besuchen möchte und auch vor Ort sich über das Erlebte zu informieren sucht, der ist mit diesem Reiseführer aus der Reihe der Naturreiseführer sehr gut bedient. Zunächst liefert dieses Bändchen, das verständlicherweise nur einen Teil der Inseln behandeln kann, allgemeine Hinweise zur Geographie. In ihrer Tier- und Pflanzenwelt sind diese durchaus unterschiedlich, was auf die gegenseitige, aber auch die meeresbedingte Beeinflussung des Pazifik und des Südchinesischen Meeres zurückzuführen ist, ebenso wie auf die Besiedlungswellen aus unterschiedlichen Regionen, wie auch von den anderen großen südostasiatischen Inseln. So weisen besonders die Großinseln eine Vielfalt an Regionen verschiedenster Ausprägung auf, was seinen Niederschlag in der abschließenden Vorstellung ihrer Lebensräume findet, dabei unter besonderer Berücksichtigung der Nationalparks.

Die Geologie zeigt, daß die Philippinen ihren Ursprung dreier Platten und ihrer Verschiebung und dem damit einhergehendem Vulkanismus verdanken, wobei heute noch aktive Vulkane auf einer Verbindungslinie von Luzon im Norden nach Mindanao im Süden zu finden sind. Neben den Eruptivgesteinen bilden ausgedehnte Kalkformationen mit Höhlen und oberirdischen Einbrüchen die Grundlage für die Vegetation. Sie zeigt gemeinsam mit der Fauna, daß diese Inselgruppe zu den artenreichsten Regionen der Erde gehört und eine Fülle von Endemiten aufweist. So durchzieht neben anderen die berühmte Wallace-Linie diese Inseln, die großräumige biogeographische Regionen voneinander abgrenzt.

Im Hauptteil des Führers werden die Pflanzen nach ihren Vegetationseinheiten vom Mangrovewald bis zur Montan- und Nebelwaldstufe vorgestellt. Auch die Kulturlandschaften und die Probleme nach der Abholzung, wenn sich auf Grund der Bodenbeschaffenheit kein Sekundärwald einstellt, finden im Kapitel zur Umweltsituation Raum. Es folgt der umfangreiche Teil, der die Fauna vorstellt, beginnend mit den Säugetieren in systematischer Reihung und endend mit dem Lebensraum Korallenriff. Bedauerlicher-, aber auch verständlicherweise werden die wirbellosen Tiere nur exemplarisch an wenigen Beispielen vorgestellt. Den Abschluß dieses Reiseführers bilden Hinweise zu Land und Leuten sowie allgemein touristische Hinweise. Jedem der Kapitel ist ein Verzeichnis weiterführender Literatur beigefügt. Für den Naturfreund und Entdeckungsreisenden in Sachen Natur ist dieser Führer für die Inselwelt der Philippinen eine besonders wertvolle Hilfe und Einstiegslesestoff.

E.-G. Burmeister

76. Hildebrand, M. & G. E. Goslow: Vergleichende und funktionelle Anatomie der Wirbeltiere. – Springer-Verlag, Berlin, Heidelberg, New York, 2004. 709 S. ISBN 3-540-00757-1 (deutsche Ausgabe)

Im englischsprachigen Raum ist "der Hildebrand", der bereits 2001 in seiner 5. Auflage erschienen ist, ein Standardwerk in Bezug zur Anatomie und Funktionsmorphologie der Wirbeltiere. Die hier vorliegende deutsche Übersetzung von Frau Dr. Distler, die in einigen Punkten neuere Erkenntnisse einbaut und deutsche Literaturhinweise hinzugefügt hat, besitzt gute Voraussetzungen, diesen Stellenwert auch in der Lehre des Zoologiestudiums im deutschsprachigen Raum einzunehmen. Die vorgestellten Fakten der vergleichenden Anatomie der Organsysteme sind besonders anschaulich erklärt und mit zahlreichen Beispielen belegt. Die verbindende Aussage orientiert sich allerdings nicht am konsequent phylogenetischen System dieser Tiergruppe. Diese Lücke wird inzwischen durch ein anderes Werk geschlossen und beide gemeinsam erfassen die Wirbeltiere sowohl anatomisch wie auch stammesgeschichtlich erschöpfend. Im 1. Teil wird allgemein die Morphologie der Vertebrata vorgestellt, wobei zunächst die Klärung der Begriffe und das Ziel der morphologischen Untersuchung im Vordergrund steht. Diesem folgt die Vorstellung der Tiergruppen nach klassischen systematischen Zuordnungen unter Einbeziehung der morphologischen Muster. Den Hauptteil nimmt die Evolution der Organsysteme auch in der Zeit ein. Beginnend mit der frühen Ontogenese über die Struktur des Integuments, der Zähne, des Kopf- und Körperskeletts, der Muskeln und ihrer besonderen Funktion etwa als elektrische Organe, das Coelom und die Coelothelien, Verdauungssystem, Atmung und Statische Organe wie die Schwimmblase, Kreislaufsystem, Exkretionssystem, Fortpflanzungsorgane, Nervensystem von den peripheren Nerven bis zum Gehirn, Sinnesorgane und abschließend die endokrinen Drüsen. Diesem folgt der Abschnitt zur Strukturellen Adaptation als Evolution in Verbindung zu Lebensweise und Habitat. Dabei wird über die Mechanik bis hin zur Energetik und Nahrungsaufnahme der Bezug zwischen der dokumentierten Bewegung und dem Ablauf der Einzelfaktoren bis zur so komplexen Vorgängen wie dem Fliegen, Gleiten, Klettern, Schwimmen und Tauchen hergestellt. In jedem Kapitel sind Exkurse eingefügt, die sehr anschaulich die Problemkreise darstellen. Kapitelweise angehängt ist das weiterführende Literaturangebot. Bedauerlicherweise läßt die Qualität der vielfach originalen Halbtonabbildungen zu wünschen übrig. Das Sachverzeichnis am Ende macht die Suche nach der gesuchten Funktionsanalyse leichter, das Glossar gibt Aufklärung über die Begriffsvielfalt. Diesem vorangestellt ist noch ein Kapitel zur Präparationstechnik.

E.-G. Burmeister

77. Dettner, K. & W. Peters (Hrsg.): Lehrbuch der Entomologie, 2. Auflage. – Spektrum Akademischer Verlag, Heidelberg, Berlin, 2003. 936 S. ISBN 3-8274-1102-5

Überraschend bald nach der ersten Auflage dieser Zusammenfassung der Insektenkunde war eine zweite notwendig, was an die Reproduktionsgeschwindigkeit, aber auch an die Anzahl der Insekten erinnert. Der gesamte Text wurde überarbeitet und vor allem aktualisiert. Innerhalb von 3 Jahren haben sich zahlreiche neue Erkenntnisse ergeben, die in diese vorliegende Auflage integriert wurden. Allein im molekularen Bereich konnte die gesamte Sequenz des Genoms von *Drosophila melanogaster*, der Malariamücke *Anopheles gambiae* und des durch sie übertragenen Malariaerregers *Plasmodium* analysiert und publiziert werden. Die neue Ordnung der Mantophasmatodea hat weltweit für Aufsehen gesorgt, obwohl die Tiere bereits als Fossilien bekannt, aber nicht entsprechend zugeordnet waren. Auch wurden die potentiellen Artenzahlen immer wieder neu formuliert und die Erfahrungen aus den Tropen in ein neues Gefügeumfeld gestellt, was nicht zuletzt dazu führte, die zu erwartenden Artenzahlen deutlich nach unten zu korrigieren. Diese Entwicklungen zeigen nicht nur die ungemeine Fülle an Informationsgehalten in dieser Tiergruppe, sondern auch die Kreativität der zahlreichen Entomologen bei der Erschließung dieser faszinierenden Merkmale, Funktionen, Verhaltensäußerungen etc. So wurden im vorliegenden Band das Kapitel über die Genetik der embryonalen Musterbildung neu eingefügt und das des Atemsystems und Hämolymphe / Hämolymphtransport vollständig neu bearbeitet. Das System wurde ebenso aktualisiert, wobei jedoch bei der phylogenetischen Betrachtung auf das Lehrbuch zur Speziellen Zoologie (Dathe 2003) verwiesen wird. Neu eingebrachte Abbildungen und Tabellen zeugen von den Anregungen zahlreicher Entomologen, welche die Herausgeber und Autoren dadurch in vielen Punkten unterstützt haben.

Die 27 Kapitel behandeln die verschiedenen Organsysteme, wobei Anatomie und Physiologie ineinandergreifen, die Fortpflanzung, soziale Insekten, Koevolution von Insekten und Pflanzen, Insekten und ihre Freßfeinde, entomophage Insekten, Leuchtvermögen, Beziehung zu Mikroorganismen als Symbionten bis zu deren Anwendung zur Beherrschung von Kalamitäten, medizinische Entomologie, biologisch-chemische Schädlingsbekämpfung, Regulationsmechanismen der Populationsdichte, Tiergeographie, Systematik und eine Übersicht über die Vielfalt dieser erdbeherrschenden Tiergruppe. Es ist besonders tragisch, daß der Mitherausgeber, Prof. Werner Peters, das Erscheinen der 2. stark erweiterten Auflage dieses vorzüglichen Lehrbuches der Entomologie nicht mehr erleben konnte.

E.-G. Burmeister

78. Westheide, W. & R. Rieger: Spezielle Zoologie; Teil 1: Einzeller und Wirbellose Tiere; Teil 2: Wirbel- und Schädeltiere. – Spektrum Akademischer Verlag, Heidelberg, Berlin, 2004 (Teil 1: korr. und ergänzter Nachdruck der 1. Aufl. 1996; Teil 2: 1. Aufl.). 919 und 712 S. ISBN 3-82274-1482-2 und 3-8274-0307-3

25 namhafte Spezialisten der unterschiedlichen Tiergruppen konnten gewonnen werden, den ersten Teil dieses herausragenden Lehrbuches der Speziellen Zoologie zu gestalten. Dabei ist es gelungen, nicht nur einen Abriß über die Tiergruppen, eingebunden in ein heute gebräuchliches, aber nicht fixiertes System, zu präsentieren, sondern auch ein Nachschlagewerk zu schaffen, das sicher für Lehrende wie Lernende des Studienganges Biologie genutzt werden wird. Dabei ergaben sich im Vergleich zu früheren Lehrbüchern einige grundlegende Änderungen, die den neueren Untersuchungen insbesondere der Ultrastrukturforschung Rechnung tragen. So werden hier nicht nur die äußere Anatomie, sondern auch die Cytologie und Histologie besonders einbezogen und verständlich erläutert. Hilfreich sind dabei besonders die zahllosen Abbildungen sowohl der Details, wobei vielfach rasterelektronenmikroskopische Aufnahmen besonders ins Auge fallen, als auch abstrahierende Zeichnungen. All diese morphologischen Merkmale dienen der Hinführung zu einem Bauplan und dessen Modifikationen. Diese machen es möglich, Verwandtschaftsbeziehungen leichter zu erkennen. Völlig neu ist die Einteilung der ehemaligen "Protozoa", die in ein aktuelles System der einzelligen Eukaryonten einbezogen werden. Die systematische Stellung der Gruppen wird belegt, wobei erste Schnellschüsse im System wie die Etablierung der Ecdysozoa (Nemathelminthes + Arthropoda) keine Erwähnung mehr finden. Andererseits haben sich hier Erkenntnisse der letzten Jahre hinsichtlich der Interpretation und Zuordnung niedergeschlagen. Für die vorgestellten Taxa werden einzelne, vor allem heimische Arten vorgestellt, die wirtschaftlich, ökologisch, medizinisch oder funktionsmorphologisch von besonderer Bedeutung sind.

Der zweite Teil, der die Wirbeltiere umfaßt und an dem 32 Autoren mitgewirkt haben, beginnt mit einer Einführung in die Organsysteme und Körperregionen der Wirbeltiere. Dabei werden besonders auch funktionsmorphologische Aspekte berücksichtigt. Im speziellen Teil werden die einzelnen Untergruppen detailliert und durch zahlreiche eindrückliche Abbildungen stützend vorgestellt. Dabei werden höhere Taxa durch einzelne Arten vorgestellt, die phylogenetisch, ökologisch, ethologisch oder wirtschaftlich besonders bedeutend sind. Hauptaugenmerk liegt dabei auch bei heimischen Arten. Dieser neu erstellte Band gemeinsam mit dem 1. Teil, der bereits 1996 erstmals erschienen ist, liefert einen fast erschöpfenden Einblick in die faszinierende Tierwelt, deren verwandtschaftliche Beziehungen unter Einbeziehung phylogenetischer Analyse, und ist ein Lehrbuch von besonderem Wert. Dieses kann auch durch Recherchen im inzwischen gebräuchlichen Medium Internet nicht ersetzt werden und sollte auch vom Umfang her keinen zoologisch Interessierten abschrecken.

E.-G. Burmeister

79. Storch, V. & U. Welsch: Systematische Zoologie, 6. Auflage. – Spektrum Akademischer Verlag, Heidelberg, Berlin, 2004. 853 S. ISBN 3-8274-1112-2

Bemerkenswerterweise werden vermehrt Lehrbücher angeboten, deren Inhalt die Grundlagendisziplin der Systematischen Biologie und hier im Speziellen der Zoologie ist, obwohl diese in den Lehrplänen der Universitäten zunehmend durch andere Fachgebiete verdrängt wird. Dieser Stellenwert beruht nicht auf der mangelnden Fachkompetenz der Lehrenden sondern auf dem mangelnden Ressourcenverschleiß nach dem Motto: was nichts kostet, kann auch nichts wert sein. Erst durch Hinzuziehung teurer moderner Methoden zur Auffindung zusätzlicher Merkmale wird der Stellenwert wieder gehoben. So ist es der unermüdliche Einsatz der "Systematiker", die Vielfalt der Organismen und deren stammesgeschichtlicher Verwandtschaft weiterhin im Bewußtsein der Studierenden und damit der Universitäten als Lehranstalten zu etablieren. Inzwischen werden ohne Vorbehalte in die Systematik neben morphologischen alle verfügbaren Merkmale wie physiologische, molekularbiologische, entwicklungsbiologische und ethologische eingebracht. Morphologie, die Entdeckung neuer Tiergruppen und deren Detailbearbeitung, Molekularbiologie und Paläontologie haben in den letzten Jahren für die Systematik viele neue Erkenntnisse erbracht, die nicht nur das Spektrum der Detailkenntnisse erweiterten, sondern auch allgemeine Prinzipien deutlich werden ließen. Viele von ihnen konnten in die vorliegende Neuauflage aufgenommen werden. Neben der Vorstellung der Tiergruppen in ihrer systematischen Stellung sind in diesem Standardwerk auch viele Lebensbilder enthalten, die Lebensräume und ihre Bewohner vorstellen, so daß dem Benutzer nicht der Blick für die komplexen Biozönosen verloren geht, die vielfach Motor evolutiver Prozesse sind. Neu aufgenommen wurden auch elektronische Fotos, die Merkmale z.T. auch im Vergleich verdeutlichen. Die Diskussion um die Stellungen verschiedener Gruppen im System oder deren Aufspaltung auch unter Berücksichtigung moderner phylogenetischer Verfahrensweisen wird weitgehend vermieden. Dennoch ist dem Studierenden hier ein Buch an die Hand gegeben, das Morphologie der zahllosen Tiergruppen vermittelt und in ein klassisches System einbaut.

E.-G. Burmeister

SPIXIANA – Zeitschrift für Zoologie

herausgegeben von der

Zoologischen Staatssammlung München

SPIXIANA – Journal of Zoology

published by

The Zoological State Collection Munich

SPIXIANA bringt Originalarbeiten aus dem Gesamtgebiet der Zoologischen Systematik mit Schwerpunkten in Morphologie, Phylogenie, Tiergeographie und Ökologie. Manuskripte werden in Deutsch, Englisch oder Französisch angenommen. Pro Jahr erscheint ein Band zu drei Heften. Umfangreiche Beiträge können in Supplementbänden herausgegeben werden.

Ein Jahresabonnement kostet € 60. Supplementbände werden gesondert nach Umfang berechnet. Mitglieder der "Freunde der Zoologischen Staatssammlung München" können die Zeitschrift zum ermäßigten Preis von € 25,50 beziehen.

SPIXIANA publishes original papers on Zoological Systematics, with emphasis on Morphology, Phylogeny, Zoogeography and Ecology. Manuscripts will be accepted in German, English or French. A volume of three issues will be published annually. Extensive contributions may be edited in supplement volumes.

Annual subscription rate is € 60 or any internationally convertible currency in the value of € 60. Supplements are charged at special rates depending on the number of printed pages. Members of the "Freunde der Zoologischen Staatssammlung München" may order the journal at the reduced rate of € 25.50.

Bestellungen sind zu richten an die

Orders should be addressed to the library of the

Zoologische Staatssammlung München
Münchhausenstraße 21
D-81247 München

Hinweise für Autoren

Die Manuskripte sollen in zweifacher Ausfertigung eingereicht werden. Sie sollen einseitig und weitzeilig mit mindestens vier cm breitem Rand geschrieben sein. Sie müssen den allgemeinen Bedingungen für die Abfassung wissenschaftlicher Manuskripte entsprechen. Für die Form der Manuskripte ist die jeweils letzte Ausgabe der SPIXIANA maßgebend und genau zu beachten. Eine englische Zusammenfassung ist der Arbeit voranzustellen. Tabellen und Abbildungsvorlagen sind gesondert beizufügen. Der Gesamtumfang eines Beitrages sollte nicht mehr als 2 Druckbogen (32 Druckseiten) umfassen.

Manuskripte auf Computerdisketten werden bevorzugt. In diesem Falle müssen die Diskette und zwei gedruckte Exemplare eingereicht werden. Der Text sollte keine Absatzformatierungen enthalten, die Tabellen sollten aber mit Tabulatoren formatiert sein. Gattungs- und Artnamen können kursiv gesetzt werden. Von der Verwendung anderer Zeichenformatierungen ist abzusehen. Anstelle von ♀ und ♂ sollte eine Zeichenkombination, welche im Text sonst nicht vorkommt, z. B. '#w' und '#m', verwendet werden. Es sollten 3,5" Disketten, lesbar auf IBM-kompatiblen Computern, eingereicht werden. Die Texte sollten möglichst als WINWORD-Datei abgegeben werden.

Die Herausgabe dieser Zeitschrift erfolgt ohne gewerblichen Gewinn. Mitarbeiter und Herausgeber erhalten kein Honorar. Die Autoren erhalten 1 Heft mit ihrer Arbeit. Sonderdrucke werden nach Wunsch gegen Rechnung angefertigt. Die Bestellung muß bei Rückgabe der Fahnenkorrektur erfolgen.

Notice to Contributors:

The manuscript should be presented in two complete copies. It must be typed on one side of the paper only and double spaced with a margin of at least four centimetres. It should correspond to the universal composition of scientific manuscripts. The form should observe the SPIXIANA standard outlay set up in the previous issue. An English abstract should precede the paper. Tables, graphs and illustrations must be enclosed separately. The total text of a contribution should not exceed two galley proofs (32 printed pages).

Manuscripts on word processor discs are preferred. The floppy disc with text (and graphic-files, if present) and two hard copies shoud be send to the Editor. Do not format the text, except for italics (for names of genera and species) and tabs (only for tables !). Instead of ♀ and ♂ use '#f' and '#m' or any other combinations of signs which do not occur elsewhere in the text. The text should be on 3.5" discs, readable on IBM-compatibles. WINWORD-files are preferred.

The publication of this journal ensues without material profit. Co-workers and publishers receive no payment. The authors will receive 1 copy of the part of the volume in which their paper appears. Reprints must be ordered when the proofs are returned.

68. € 95,–; **69.** € 80,–; **70.** GBP 60.99; **71.** € 60,–; **72.** € 49,–; **73.** GBP 67.–; **74.** € 24,–; **75.** € 24,80; **76.** € 59,95; **77.** € 69,95; **78.** € 149,–; **79.** € 49,95.

SPIXIANA	27	3	193–288	München, 01. November 2004	ISSN 0341–8391

INHALT - CONTENTS