ANNALES

de la
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et du
MUSÉUM D'HISTOIRE NATURELLE
de la Ville de Genève

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REVUE SUISSE DE ZOOLOGIE 113 (1): 3-21; mars 2006

Ten new species of coelotine spiders (Araneae, Amaurobiidae) from Thailand

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Ten new species of coelotine spiders (Araneae, Amaurobiidae) from Thailand. - Ten new coelotine spiders of the genera *Coronilla* and *Draconarius* are described from Thailand: *C. lanna* sp. n. (♀), *D. australis* sp. n. (♂), *D. monticola* sp. n. (♀), *D. montis* sp. n. (♂), *D. phuhin* sp. n. (♂, ♀), *D. promontorius* sp. n. (♀), *D. schwendingeri* sp. n. (♂, ♀), *D. silva* sp. n. (♂), *D. silvicola* sp. n. (♀) and *D. tentus* sp. n. (♂). The genus *Coronilla* is recorded from Thailand for the first time. The species *D. australis* sp. n. marks the southernmost distribution of the subfamily Coelotinae.

Keywords: Coelotinae - *Coronilla* - *Draconarius* - new species - taxonomy - zoogeography - Thailand.

INTRODUCTION

The recently published systematic papers on *Draconarius* and *Coelotes* reveal the richness of tropical spiders, particularly those occurring in evergreen forests of Thailand (Dankittipakul & Wang, 2003, 2004). In the first of these papers five *Draconarius* and a single *Coelotes* species were recorded from different mountains of the Dwana-Tenasserim range. All of them correspond with the recent definitions of these genera provided by Wang (2002). In the second paper (Dankittipakul & Wang, 2004) two coelotine species groups were identified: the *lateralis*-group that was established for three species, and the *elatus*-group established for the smallest known coelotine species. Both species groups were then tentatively placed in the genus *Draconarius* to avoid breaking up this species-rich taxon. Further material is required

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to confirm their relationship and to prove that they belong to distinct lineages. In the present paper ten additional new species of *Coronilla* and *Draconarius* are described from several parts of the country. *Draconarius australis* sp. n. currently marks the southernmost occurrence within the coelotines.

MATERIAL AND METHODS

All illustrations were made with a Nikon SMZ 800 stereomicroscope equipped with a drawing tube. Body measurements are in millimetres, except when stated otherwise. Measurements of leg segments were taken from the dorsal side, from midpoint of distal to midpoint of proximal margin. Epigynes were drawn in natural and cleared state (after immersing in lactic acid for 10-20 minutes). Male palps were drawn in retrolateral and ventral view. The specimens examined are deposited in the collections of the Muséum d'histoire naturelle, Genève (MHNG) and in Pakawin Dankittipakul's collection (PDC), which will be deposited in the MHNG later.

Abbreviations used in the text and in the figures: A, atrium; AC, atrial carina; ALE, anterior lateral eyes; AME, anterior median eyes; C, conductor; CD, copulatory duct; CL, conductor lamella; DC, dorsal apophysis of conductor (= conductor dorsal apophysis according to Wang, 2002); E, embolus; FD, fertilization duct; LE, lateral eyes; ME, median eyes; MOQ, median ocular quadrangle; PA, patellar apophysis; PLE, posterior lateral eyes; PLS, posterior lateral spinnerets; PME, posterior median eyes; PMS, posterior median spinnerets; RDTA, retrolateral dorsal tibial apophysis (= lateral tibial apophysis according to Wang, 2002); RTA, retrolateral tibial apophysis; SB, spermathecal base; SH, spermathecal head; SS, spermathecal stalk.

TAXONOMY

Coronilla Wang, 1994

Coronilla Wang, 1994: 281. Type species by original designation: *C. gemata* Wang, 1994.

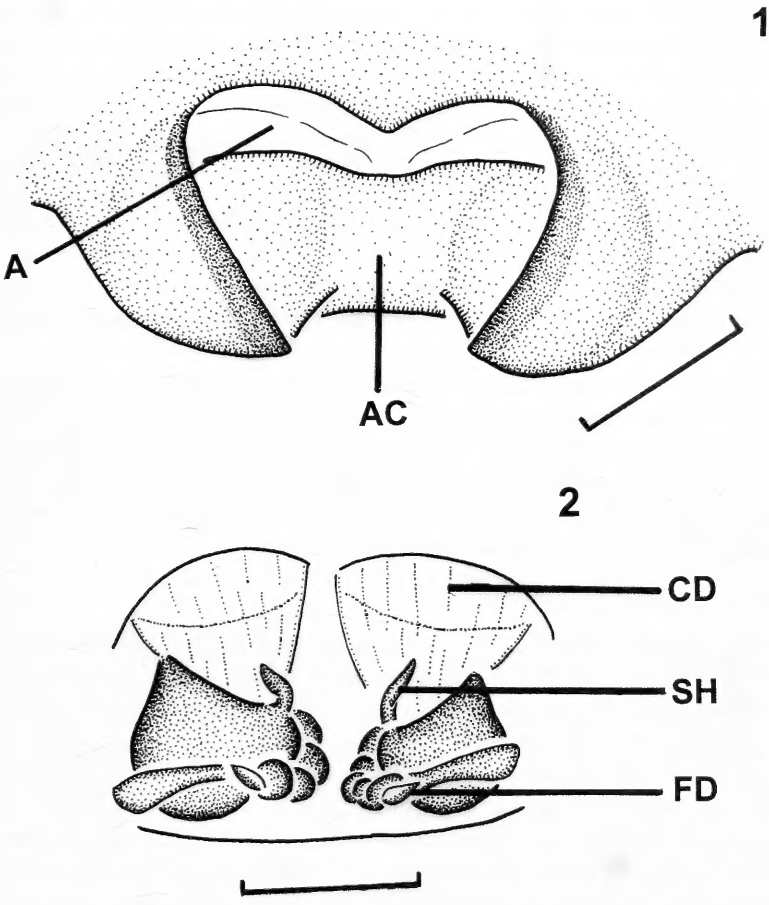
Diagnosis: Females of *Coronilla* can be recognized by the absence of epigynal teeth, the presence of a broad, transverse atrial septum, and the presence of posteriorly expanded epigynal margin; males by the presence of two patellar apophyses and a reduced retrolateral tibial apophysis. The genus *Coronilla* was previously reported from China and Vietnam.

Coronilla lanna sp. n. Figs 1, 2

Type material: HOLOTYPE: ♀, northern THAILAND, Nan Province, Tha Wang Pha District, Doi (Mt.) Wao (19°08'12.7"N, 100°38'28.8"E), 1380-1550 m, evergreen hill forest near the summit of the mountain, 15.-18.XII.2002, leg. P. J. Schwendinger & P. Dankittipakul (MHNG).

Etymology: The specific epithet refers to the former independent kingdom of Lanna Thai in today's northern Thailand. Noun in apposition.

Diagnosis: The female resembles that of *C. jianhuii* Tang & Yin, 2002 but can be distinguished by: The large copulatory ducts; the broad, laterally expanded spermathecae; and the widely separated spermathecal heads (Figs 1, 2).



FIGS 1-2

Coronilla lanna sp. n., ♀ holotype. Epigyne, ventral view (1). Vulva, dorsal view (2). Abbreviations: A, atrium; AC, atrial carina; CD, copulatory duct; FD, fertilization duct; SH, spermathecal head. Scale lines: 0.5 mm.

Description: ♀ (holotype). Total length 10.13. Carapace 4.43 long, 2.96 wide. Abdomen 5.95 long. Promargin of cheliceral groove with 3 teeth, retromargin with 4.

Eye sizes and interdistances: AME 0.16, ALE 0.20, PME 0.16, PLE 0.20; AME-AME 0.10, AME-ALE 0.08, PME-PME 0.16, PME-PLE 0.22, ALE-PLE 0.06; MOQ 0.56 long, anterior width 0.42, posterior width 0.50. Clypeus height 0.20.

Leg measurements:

	I	II	III	IV
Femur	3.42	3.04	2.56	3.22
Patella + Tibia	4.21	3.72	3.25	4.02
Metatarsus	3.10	2.61	2.40	3.30
Tarsus	1.62	1.45	1.16	1.36
Total	12.35	10.82	9.37	11.90

Epigyne and vulva (Figs 1, 2): Without epigynal teeth; atrium (A) large; atrial carina (AC) broad, transversely extended; lateral margins of atrium strongly sclerotized; copulatory ducts (CD) large; spermathecal heads (SH) relatively long, slender, situated anteriorly and widely separated from each other, pointing upward; spermathecae broad, with transverse extension; fertilization ducts (F) located posteriorly.

Distribution and habitat: Known only from the type locality. *Coronilla lanna* sp. n. was collected from a rotten log in an evergreen hill forest near the summit of the mountain. The spider built an irregular retreat beneath the loosened bark.

Draconarius Ovtchinnikov, 1999

Draconarius Ovtchinnikov, 1999: 70. Type species by original designation, *D. venustus* Ovtchinnikov, 1999.

Diagnosis: Members of the genus *Draconarius* resemble those of *Asiacoelotes* Wang, 2002 in having an elongated cymbial furrow, a long, slender embolus, and long, strongly convoluted spermathecae. Males can be distinguished by the presence of a conductor dorsal apophysis; females by the posteriorly originating copulatory ducts and widely separated spermathecae. The genus *Draconarius* is known from Tadzhikistan, Bhutan, Nepal, China, Korea and Thailand.

Draconarius australis sp. n. Figs 3, 4

Type material: HOLOTYPE: ♂, Prachuap Khiri Khan Province, Thap Sakae District, Nam Tok Huay Yang National Park, Khao Luang, 750 m, a few km west of Ban Huay Yang, ca 30 km south of Prachuap Khiri Khan City, 27.I.1991, leg. P. J. Schwendinger (MHNG).

Etymology: The specific epithet refers to the southernmost occurrence within this genus. Latin adjective *australis* = southern.

Diagnosis: *Draconarius australis* sp. n. is a very small coelotine (less than 5 mm long) in comparison with *Draconarius* spp. in other parts of the country. Another small-sized species, *D. elatus* Dankittipakul & Wang, 2004, was recorded from northern Thailand. Both species resemble agelenids in somatic appearance but the male palp of *D. australis* sp. n. corresponds well with other *Draconarius* spp. in possessing a patellar apophysis, a dorsal apophysis of the conductor and an elongate lateral cymbial furrow. The male of this new species can be easily distinguished from other members of the genus by: The very long cymbial furrow, which is almost as long as the cymbium; the extremely broad and round conductor base; the short, beaklike conductor; and the extraordinarily elongated embolus (Figs 3, 4).

Description: ♂ (holotype). Total length 3.85. Carapace 2.08 long, 1.73 wide. Abdomen 1.62 long. Promargin of cheliceral groove with 4 teeth, retromargin with 5.

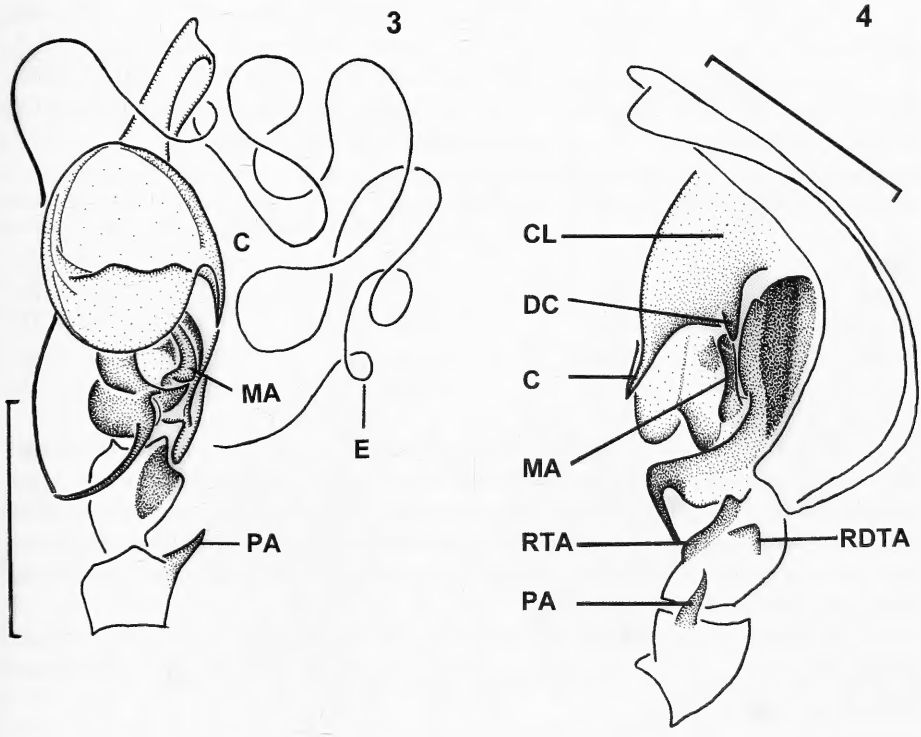
Eye sizes and interdistances: AME 0.04, ALE 0.10, PME 0.12, PLE 0.12; AME-AME 0.04, AME-ALE 0.04, PME-PME 0.08, PME-PLE 0.06, ALE-PLE 0.02; MOQ 0.22 long, anterior width 0.16, posterior width 0.32. Clypeus height 0.10.

Leg measurements:

	I	II	III	IV
Femur	2.08	1.82	1.63	2.13
Patella + Tibia	2.85	2.21	1.97	2.61

Metatarsus	2.03	1.76	1.71	2.35
Tarsus	1.26	1.03	0.85	1.02
Total	8.22	6.82	6.16	8.11

Male palp (Figs 3, 4): Patellar apophysis (PA) long, with sharply pointed apex; retrolateral tibial apophysis (RTA) short; retrolateral dorsal tibial apophysis (RDTA) present, separated from RTA; cymbial furrow very long, almost as long as cymbium; conductor lamella (CL) broad, modified to accommodate embolus (E); conductor (C) short, beaklike; dorsal apophysis of conductor (DC) small, pointing downward; median apophysis (MA) spoon-shaped, partly hidden underneath conductor base; embolus very long and slender, originating posteriorly.



FIGS 3-4

Draconarius australis sp. n., ♂ holotype. Male palp, ventral (3) and retrolateral (4) view. Abbreviations: C, conductor; CL, conductor lamella; DC, dorsal apophysis of conductor; E, embolus; MA, median apophysis; PA, patellar apophysis; RDTA, retrolateral dorsal tibial apophysis; RTA, retrolateral tibial apophysis. Scale lines: 1.0 mm.

Distribution and habitat: Known only from the type locality. The spider was collected in a forest on the eastern slope of Khao Luang which is part of a series of mountain ridges running through the peninsular. *Draconarius australis* sp. n. marks the southernmost limit of coelotine distribution.

Draconarius monticola sp. n. Figs 5-7

Type material: HOLOTYPE: ♀, Chiang Mai Province, Chiang Dao District, Doi Chiang Dao, San Pakia, 1380 m, 27.XII.1990, leg. P. J. Schwendinger (MHNG).

PARATYPES: 1♀, from the type locality, Huay Mae Kok, 1500 m, 27.I.1996; 1♀, Chiang Rai Province, Mae Sai District, Doi Tung, 1350 m, evergreen hill forest, 30.X.1991. All specimens leg. P. J. Schwendinger (MHNG).

Etymology: The specific epithet refers to the habitat of the spiders examined. Latin: *monticola* = mountain dweller; masculine noun in apposition.

Diagnosis: The female can be distinguished from those of other coelotines by small, widely separated epigynal teeth (Figs 5, 6), strongly looped copulatory ducts (with three to four loops) and anterolaterally situated spermathecal heads (Fig. 7).

Description: ♀ (holotype). Total length 10.12. Carapace 4.50 long, 3.03 wide. Abdomen 5.52 long. Promargin of cheliceral groove with 3 teeth, retromargin with 5.

Eye sizes and interdistances: AME 0.12, ALE 0.20, PME 0.16, PLE 0.16; AME-AME 0.10, AME-ALE 0.08, PME-PME 0.16, PME-PLE 0.30, ALE-PLE 0.08; MOQ 0.44 long, anterior width 0.44, posterior width 0.50. Clypeus height 0.12.

Leg measurements:

	I	II	III	IV
Femur	3.56	3.25	3.00	3.50
Patella + Tibia	4.36	3.94	3.10	4.20
Metatarsus	3.01	2.98	2.52	3.48
Tarsus	1.86	1.26	1.21	1.50
Total	12.79	11.43	9.83	12.68

Epigyne and vulva (Figs 5-7): Epigynal teeth small, widely separated from each other and from atrial margins; atrium small, situated close to epigastric furrow; copulatory ducts (CD) long and slender, originating posteriorly, winding three to four loops around spermathecae; spermathecal heads (SH) thin and elongated, situated anteriorly; spermathecal bases (SB) broad, widely separated; spermathecal stalks (SS) broad, anteriorly extending and converging.

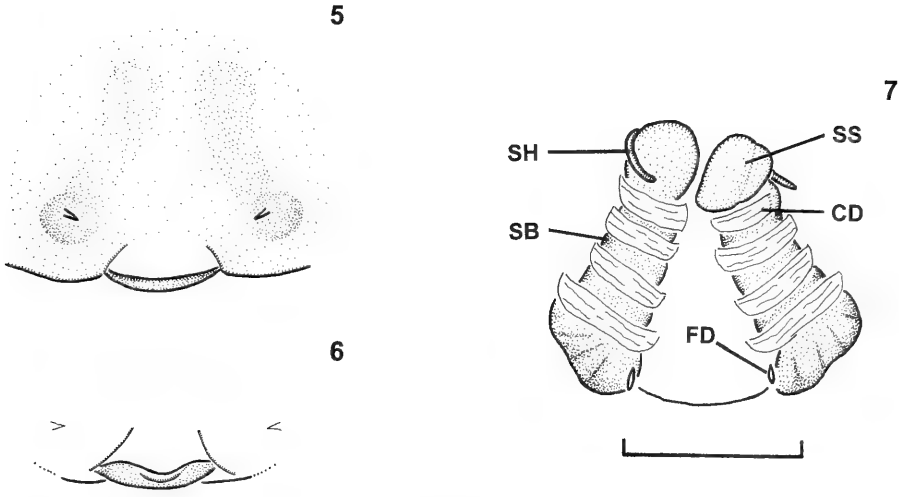
Distribution and habitat: Known from the Thai provinces of Chiang Rai and Chiang Mai. *Draconarius monticola* sp. n. was collected from evergreen hill forests between ca 1350-1500 m.

Draconarius montis sp. n. Figs 8, 9

Type material: HOLOTYPE: ♂, Nakhon Ratchasima Province, Khao Yai National Park, between the mountains near Heo Suwat Waterfall, 580 m, 29.IX.1994, leg. P. J. Schwendinger (MHNG).

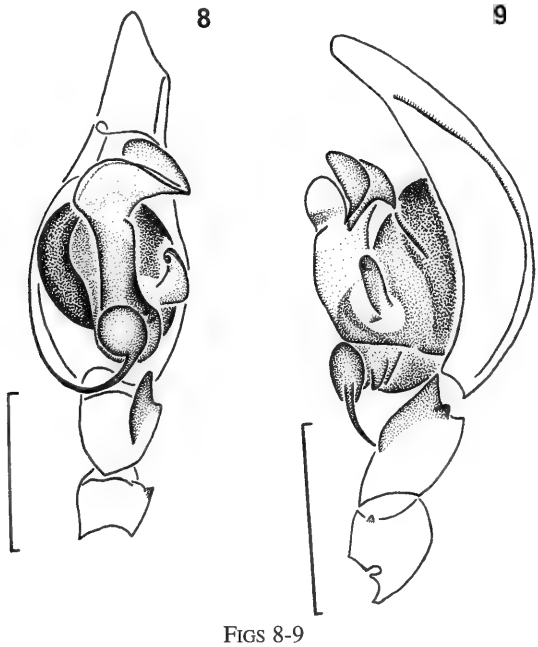
Etymology: The specific epithet refers to the habitat from where the holotype was collected (Latin: *mons, montis* = mountain). Noun in apposition (in genitive case).

Diagnosis: *Draconarius montis* sp. n. is similar to *D. anthonyi* Dankittipakul & Wang, 2003 but can be distinguished from the latter species by the presence of a minute patellar apophysis (absent in *D. anthonyi*) and by the round embolic base (Fig. 8).



FIGS 5-7

Draconarius monticola sp. n., ♀ holotype. Epigyne, ventral view (5, 6). Vulva, dorsal view (7). Abbreviations: CD, copulatory duct; FD, fertilization duct; SB, spermathecal base; SH, spermathecal head; SS, spermathecal stalk. Scale lines: 0.5 mm.



FIGS 8-9

Draconarius montis sp. n., ♂ holotype. Male palp, ventral (8) and retrolateral (9) view. Scale lines: 1.0 mm.

Description: ♂ (holotype). Total length 7.12. Carapace 3.71 long, 2.52 wide. Abdomen 3.08 long. Clypeus height 0.20. Promargin of cheliceral groove with 5 teeth, retromargin with 5.

Eye sizes and interdistances: AME 0.06, ALE 0.12, PME 0.10, PLE 0.12; AME-AME 0.10, AME-ALE 0.04, PME-PME 0.10, PME-PLE 0.14, ALE-PLE 0.04; MOQ 0.43 long, anterior width 0.36, posterior width 0.24.

Leg measurements:

	I	II	III	IV
Femur	3.15	2.72	2.80	3.41
Patella + Tibia	4.02	3.26	2.96	4.09
Metatarsus	3.01	2.80	2.50	3.68
Tarsus	2.05	1.65	1.52	1.60
Total	12.23	10.43	9.78	2.78

Male palp (Figs 8, 9): Patellar apophysis small, indistinct; RTA half of tibial length; retrolateral dorsal tibial apophysis close to RTA; cymbial furrow long, occupying approximately 3/4 of cymbium length; basal conductor lamella small; conductor broad, short; dorsal apophysis of conductor large, pointing downward; embolic base rounded; embolus long, slender, originating posteriorly.

Distribution and habitat: Known only from the type locality. *Draconarius montis* sp. n. is the first coelotine spider recorded from northeastern Thailand.

Draconarius phuhin sp. n. Figs 10-14

Type material: HOLOTYPE: ♂, Phitsanulok Province, Nakhon Thai District, Phu Hin Rong Kla National Park, Man Daeng Waterfall, 1400 m, evergreen hill forest, 15.IX.2002, leg. S. Sonthichai & P. Dankittipakul (MHNG).

PARATYPES: 3♂, 6♀, data as for holotype (MHNG, PDC).

Etymology: The specific epithet refers to the type locality, Phu Hin Rong Kla National Park. Thai: *Phu Hin* = granite massif. Noun in apposition.

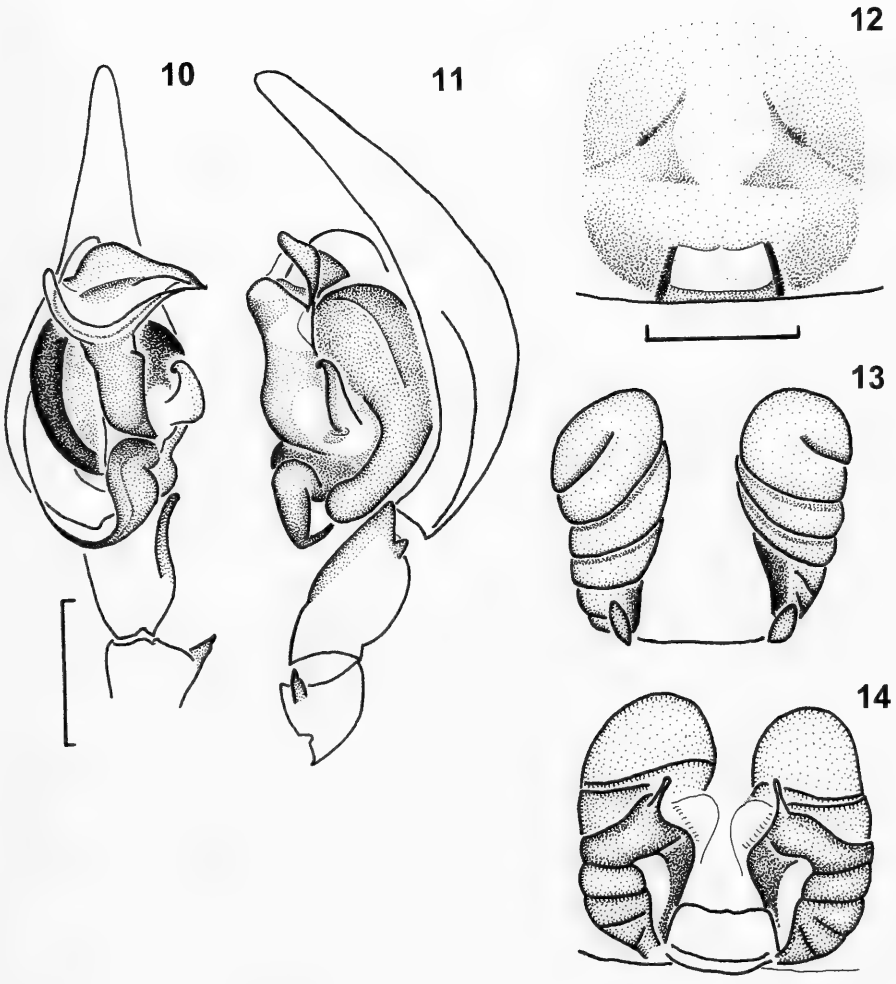
Diagnosis: The male palpal organ of *D. phuhin* sp. n. is similar to those of *D. anthonyi* and *D. australis* sp. n. but can be distinguished from *D. anthonyi* by the presence of a patellar apophysis and by the comparatively longer RTA; from *D. montis* sp. n. by the shorter lateral cymbial furrow and the different shapes of their embolic bases (round in *D. montis* sp. n., Fig. 8). Females are similar to those of *D. wudangensis* (Chen & Zhao, 1997) and other related species, but in *D. phuhin* sp. n. epigynal teeth are absent. Both sexes have five promarginal and five retromarginal teeth on their cheliceral groove.

Description: ♂ (holotype). Total length 7.80. Carapace 3.76 long, 2.58 wide. Abdomen 3.61 long. Promargin of cheliceral groove with 5 teeth, retromargin with 5.

Eye sizes and interdistances: AME 0.04, ALE 0.16, PME 0.12, PLE 0.12; AME-AME 0.06, AME-ALE 0.04, PME-PME 0.08, PME-PLE 0.10, ALE-PLE 0.04; MOQ 0.36 long, anterior width 0.20, posterior width 0.36. Clypeus height 0.10.

Leg measurements:

	I	II	III	IV
Femur	3.02	2.71	2.38	3.48
Patella + Tibia	3.76	2.90	2.81	3.96
Metatarsus	2.95	2.25	2.13	3.35
Tarsus	2.00	1.45	1.34	1.78
Total	11.73	9.31	8.66	12.57



FIGS 10-14

Draconarius phuhin sp. n., ♂ holotype (10, 11), ♀ paratype (12-14). Male palp, ventral (10) and retrolateral (11) view. Epigyne, ventral view (12). Vulva, ventral (13) and dorsal (14) view. Scale lines: 0.5 mm.

Male palp (Figs 10, 11): Patellar apophysis short, with slightly indented tip; RTA relatively long, occupying more than half of tibial length; retrolateral dorsal tibial apophysis small, situated close to RTA; cymbial furrow narrow, about half of cymbium length; basal lamella of conductor moderately developed; conductor short; dorsal apophysis of conductor triangular; embolus long and slender, originating posteriorly.

♀. Total length 9.25. Carapace 4.08 long, 2.83 wide. Abdomen 4.96 long. Promargin of cheliceral groove with 5 teeth, retromargin with 5.

Eye sizes and interdistances: AME 0.06, ALE 0.14, PME 0.14, PLE 0.16; AME-AME 0.10, AME-ALE 0.06, PME-PME 0.10, PME-PLE 0.12, ALE-PLE 0.06; MOQ 0.38 long, anterior width 0.28, posterior width 0.42. Clypeus height 0.16.

Leg measurements:

	I	II	III	IV
Femur	3.10	2.85	3.26	3.30
Patella + Tibia	3.87	3.00	2.76	4.00
Metatarsus	2.65	2.20	2.01	3.08
Tarsus	1.90	1.212	1.52	1.50
Total	11.52	9.26	9.55	11.88

Epigyne and vulva (Figs 12-14): Without epigynal teeth; atrium small, situated close to epigastric furrow; copulatory ducts short, originated medially; spermathecal heads drumstick-shaped, small, situated medially on spermathecae; spermathecal bases broad, widely separated; spermathecal stalks anteriorly extending.

Distribution and habitat: Known only from the type locality. *Draconarius phuhin* sp. n. is the second species of coelotine spiders recorded from northeastern Thailand. The spiders were obtained directly from their retreats in crevices of trees in evergreen hill forest. All specimens examined built their retreats close to the forest floor (less than 50 cm above ground).

Draconarius promontorius sp. n. Figs 15-17

Type material: HOLOTYPE: ♀, Chiang Mai Province, Fang District, Doi Pha Hom Pok National Park, Doi Pha Hom Pok, 2000-2100 m, evergreen hill forest, 15.-18.XII.2003, leg. S. Sonthichai & P. J. Schwendinger (MHNG).

PARATYPE: ♀, same data as for holotype (MHNG).

Etymology: The specific epithet, an adjective derived from the Latin *promontorium* = mountain peak/ridge, refers to the habitat from where the spider was collected.

Diagnosis: The female of *D. promontorius* sp. n. is similar to those of *D. abbreviatus* Dankittipakul & Wang, 2003 and *D. anthonyi* but can be distinguished from *D. abbreviatus* by its widely separated epigynal teeth, slender spermathecal heads and looped, laterally extended copulatory ducts; from *D. anthonyi* by the single loop of its copulatory ducts.

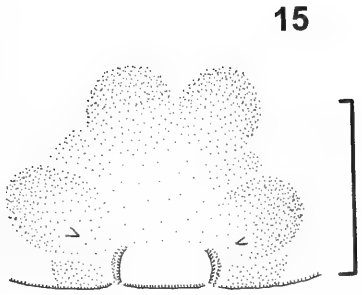
Description: ♀ (holotype). Total length 6.28. Carapace 2.71 long, 1.86 wide. Abdomen 3.12 long. Promargin of cheliceral groove with 4 teeth, retromargin with 5.

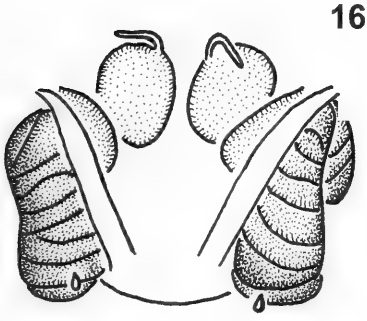
Eye sizes and interdistances: AME 0.12, ALE 0.12, PME 0.10, PLE 0.14; AME-AME 0.08, AME-ALE 0.06, PME-PME 0.10, PME-PLE 0.14, ALE-PLE 0.06; MOQ 0.40 long, anterior width 0.36, posterior width 0.38. Clypeus height 0.10.

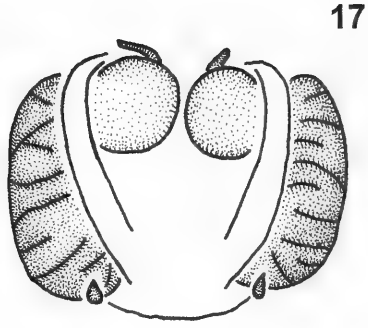
Leg measurements:

	I	II	III	IV
Femur	2.31	2.00	1.86	2.54
Patella + Tibia	2.72	2.21	1.92	2.76
Metatarsus	1.75	1.45	1.51	2.01
Tarsus	1.02	0.98	0.79	1.00
Total	7.80	6.64	6.08	8.31

Epigyne and vulva (Figs 15-17): Epigynal teeth short, widely separated from each other and from atrial margins; atrium small; copulatory ducts long and slender, originating posteriorly, looped around distal part of spermathecae; spermathecal heads







FIGS 15-17

Draconarius promontorius sp. n., ♀ holotype (15, 16) and ♀ paratype (17). Epigyne, ventral view (15). Vulva, dorsal view (16, 17). Scale lines: 0.5 mm.

relatively long and slender, situated anteriorly; spermathecal bases broad, widely separated from each other; spermathecal stalks broad, anteriorly extending and converging.

Distribution and habitat: Known only from the type locality, which is also the type locality of *D. silvicola* sp. n. Doi Pha Hom Pok is the second highest mountain (2285 m) of Thailand. The specimens were collected from their retreats in a large crevice near the base of a tree in an evergreen hill forest.

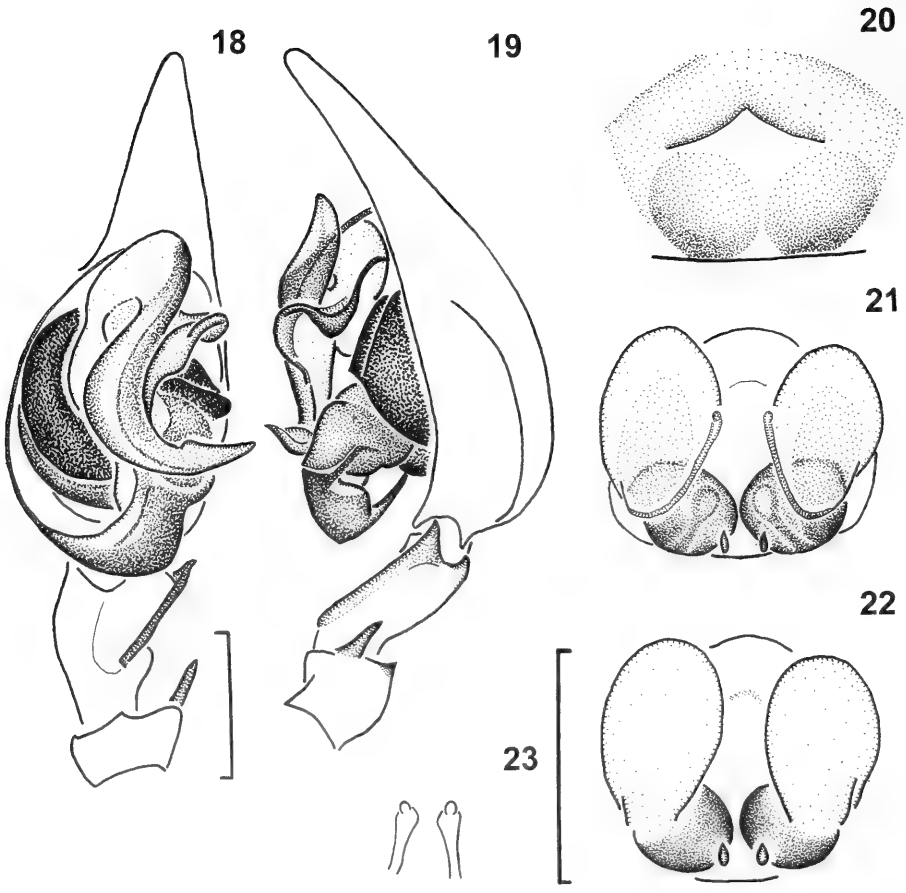
Draconarius schwendingeri sp. n. Figs 18-23

Type material: HOLOTYPE: ♂, Nan Province, Tha Wang Pha District, Doi Wao (19°08'12.7"N, 100°38'28.8"E), 1380-1550 m, evergreen hill forest near the summit of the mountain, 15-18.XII.2002, leg. P. J. Schwendinger & S. Sonthichai (MHNG).

PARATYPES: 5♂, 8♀, data as for holotype (MHNG, PDC).

Etymology: The species is named in honor of Dr P. J. Schwendinger (Geneva) who collected the type specimens.

Diagnosis: Females can be recognized by the absence of epigynal teeth, by their large copulatory ducts, rounded spermathecae (Figs 21, 22) and long, slender sper-



FIGS 18-23

Draconarius schwendingeri sp. n., ♂ holotype (18, 19), ♀ paratype (20-23). Male palp, ventral (18) and retrolateral (19) view. Epigyne, ventral view (20). Vulva, dorsal view (21, 22). Tip of spermathecal head (23) Scale lines: 0.5 mm.

mathecal heads (Figs 21, 23). Males can be identified by their long, spiraled, posteriorly extending conductor (Fig. 18).

Description: ♂ (holotype). Total length 6.56. Carapace 3.92 long, 2.73 wide. Abdomen 2.84 long. Promargin of cheliceral groove with 5 teeth, retromargin with 5.

Eye sizes and interdistances: AME 0.04, ALE 0.14, PME 0.15, PLE 0.12; AME-AME 0.06, AME-ALE 0.08, PME-PME 0.10, PME-PLE 0.12, ALE-PLE 0.04; MOQ 0.34 long, anterior width 0.20, posterior width 0.38. Clypeus height 0.06.

Leg measurements:

	I	II	III	IV
Femur	3.12	2.72	3.40	4.13
Patella + Tibia	3.28	3.10	3.70	4.94

Metatarsus	2.90	2.45	3.02	4.46
Tarsus	2.06	1.67	1.50	1.86
Total	11.36	9.94	11.62	15.39

Male palp (Figs 18, 19): Patellar apophysis long and slender, with pointed apex; RTA long, occupying most of tibial length; retrolateral dorsal tibial apophysis present but indistinct; cymbial furrow broad, about half of cymbium length; basal lamella of conductor present; conductor broad, long, posteriorly extending, spiraled with one loop and with slender apex; dorsal apophysis of conductor small; median apophysis absent; embolus long, slender, originating posteriorly.

♀ (paratype). Total length 9.21. Carapace 4.06 long, 2.90 wide. Abdomen 5.02 long. Promargin of cheliceral groove with 5 teeth, retromargin with 6.

Eye sizes and interdistances: AME 0.06, ALE 0.12, PME 0.14, PLE 0.16; AME-AME 0.06, AME-ALE 0.08, PME-PME 0.10, PME-PLE 0.12, ALE-PLE 0.06; MOQ 0.36 long, anterior width 0.22, posterior width 0.44. Clypeus height 0.12.

Leg measurements:

	I	II	III	IV
Femur	2.90	2.50	2.26	3.00
Patella + Tibia	3.61	2.84	2.45	3.42
Metatarsus	2.53	2.02	2.00	2.86
Tarsus	1.78	1.26	0.94	1.18
Total	10.82	8.62	7.65	10.46

Epigyne and vulva (Figs 20-23): Without epigynal teeth; atrium short and shallow, anteriorly situated; copulatory ducts large, anteriorly extending; spermathecal heads long, slender (Fig. 23); spermathecae broad, rounded, without lateral extension.

Distribution and habitat: Known only from the type locality. The specimens were collected from a road bank in an evergreen hill forest near the summit of the mountain. This is also the type locality for *C. lanna* sp. n. and *D. tentus* sp. n.

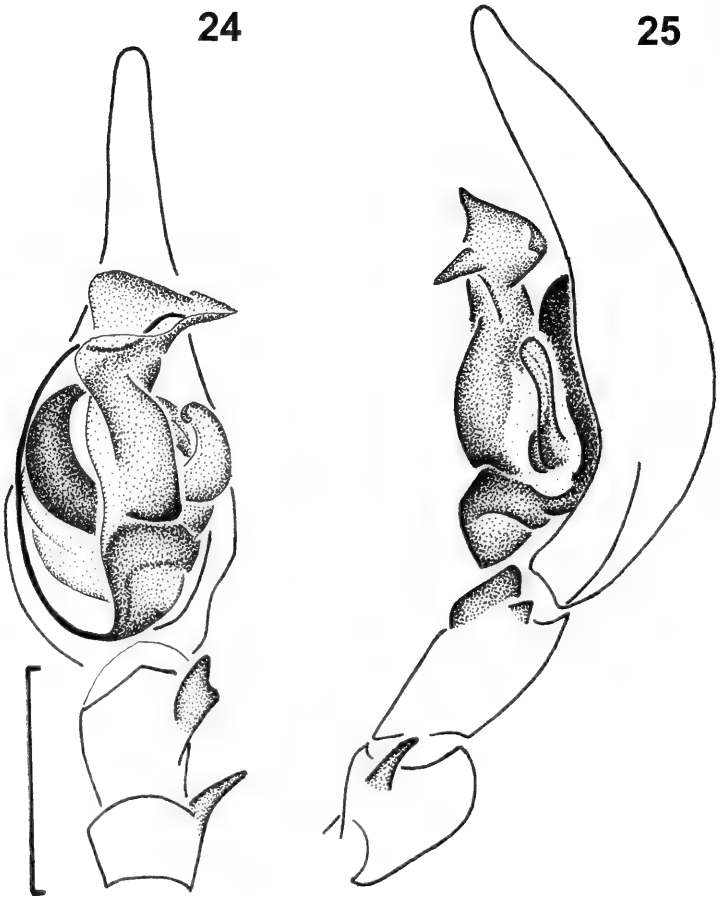
Draconarius silva sp. n. Figs 24, 25

Type material: HOLOTYPE: ♂, Kamphaeng Phet Province, Khlong Lan District, near Khlong Lan Waterfall (16°07'50.8"N, 99°16'41.0"E), 280 m, secondary forest, 11./12.XII.2003, leg. P. J. Schwendinger (MHNG TH-03/18).

Etymology: The specific epithet refers to the habitat of the spider. Latin: *silva* = forest; noun in apposition.

Diagnosis: *Draconarius silva* sp. n. is closely related to *D. abbreviatus*, which was collected from evergreen hill forests of Doi Inthanon National Park, northern Thailand. They share similar characters including short retrolateral tibial apophysis, long patellar apophysis and small conductor lamella. *Draconarius silva* sp. n. can be distinguished from *D. abbreviatus* by the shorter cymbial furrow, the broader conductor, a different shape of the median apophysis and the hooked dorsal apophysis of its conductor.

Description: ♂ (holotype). Total length 7.31. Carapace 4.02 long, 2.51 wide. Abdomen 3.25 long. Promargin of cheliceral groove with 3 teeth, retromargin with 5.



FIGS 24-25
Draconarius silva sp. n., ♂ holotype. Male palp, ventral (24) and retrolateral (25) view. Scale lines: 1.0 mm.

Eye sizes and interdistances: AME 0.10, ALE 0.18, PME 0.16, PLE 0.12; AME-AME 0.08, AME-ALE 0.06, PME-PME 0.10, PME-PLE 0.14, ALE-PLE 0.04; MOQ 0.46 long, anterior width 0.32, posterior width 0.46. Clypeus height 0.18.

Leg measurements:

	I	II	III	IV
Femur	4.12	3.65	3.10	4.03
Patella + Tibia	5.03	4.46	3.21	4.76
Metatarsus	4.01	3.54	3.25	4.50
Tarsus	2.18	1.85	1.73	2.00
Total	15.34	13.50	11.29	15.29

Male palp (Figs 24, 25): Patellar apophysis long, with pointed apex; RTA very short, less than half of tibial length; retrolateral dorsal tibial apophysis triangular; cymbial furrow narrow and short, occupying about 1/4 of cymbium length; basal conductor lamella relatively small; conductor broad, with point apex; dorsal apophysis of conductor triangular; median apophysis long, spoon-shaped; embolus relatively short, originating posteriorly.

Distribution and habitat: Known only from the type locality. *Draconarius silva* sp. n. is the first coelotine spider recorded from western Thailand. Most coelotine spiders in Thailand were collected from evergreen forests on the upper slopes of mountains that provide constantly low temperature and high humidity all year round. *Draconarius silva* sp. n. surprisingly lives in a secondary lowland forest with an annual rainfall of less than 1000 mm; the mean annual temperature of the type locality is relatively high.

Draconarius silvicola sp. n. Figs 26, 27

Type material: HOLOTYPE: ♀, Chiang Mai Province, Fang District, Doi Pha Hom Pok National Park, Doi Pha Hom Pok, 2000-2100 m, evergreen hill forest, 15.-18.XII.2003, leg. S. Sonthichai, P. J. Schwendinger & P. Dankittipakul (MHNG).

Etymology: The specific epithet refers to the habitat of the spider. Latin: *silvicola* = forest dweller; masculine noun in apposition.

Diagnosis: Somatic characters of *D. silvicola* sp. n. correspond well with the recent definition of the subfamily Coelotinae by Wang (2002). The species possesses long PLS and cylindrical gland spigots on PLS and PMS (see Wang, 2002). However, its epigyne is intermediate between those of coelotines and other amaurobiids. The atrium is relatively large. Though copulatory ducts are present or visible, its spermathecal stalks and spermathecal heads are indistinct. *Draconarius silvicola* sp. n. is recognized by the absence of epigynal teeth, by its anteriorly originating, posteriorly extending and anteriorly looped copulatory ducts, and the broad, anteriorly elongated spermathecae (Figs 26, 27).

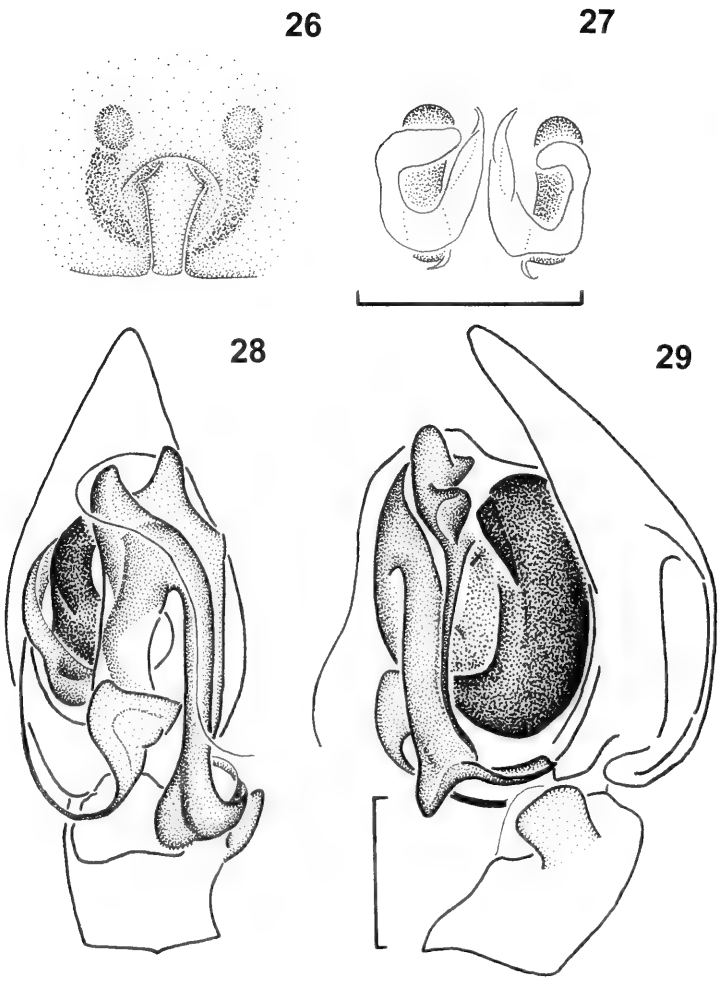
Description: ♀ (holotype). Total length 10.42. Carapace 4.56 long, 3.10 wide. Abdomen 5.83 long. Promargin of cheliceral groove with 3 teeth, retromargin with 2.

Eye sizes and interdistances: AME 0.12, ALE 0.20, PME 0.20, PLE 0.16; AME-AME 0.10, AME-ALE 0.10, PME-PME 0.10, PME-PLE 0.20, ALE-PLE 0.08; MOQ 0.54 long, anterior width 0.36, posterior width 0.44. Clypeus height 0.10.

Leg measurements:

	I	II	III	IV
Femur	3.56	3.01	2.71	3.61
Patella + Tibia	3.42	3.55	2.96	4.08
Metatarsus	3.00	2.27	2.10	3.10
Tarsus	1.82	1.53	1.32	1.86
Total	11.80	10.36	9.09	12.65

Epigyne and vulva (Figs 26, 27): Without epigynal teeth; atrium large, with distinct median carina; copulatory ducts large, originating anteriorly, extending posteriorly and looped anteriorly; spermathecal heads indistinct; spermathecae broad, longitudinally elongated, widely separated.



FIGS 26-29

Draconarius silvicola sp. n. (26, 27), ♀ holotype. Epigyne, ventral view (26). Vulva, dorsal view (27). *Draconarius tentus* sp. n. (28, 29), ♂ holotype. Male palp, ventral (28) and retrolateral (29) view. Scale lines: 0.5 mm.

Distribution and habitat: Known only from the type locality, which is also the type locality of *D. promontorius* sp. n.

Draconarius tentus sp. n. Figs 28, 29

Type material: HOLOTYPE: ♂, Nan Province, Tha Wang Pha District, Doi Wao (19°08'12.7"N, 100°38'28.8"E), 1380-1550 m, evergreen hill forest near the summit of the mountain, 15.-18.XII.2002, leg. P. J. Schwendinger & S. Sonthichai (MHNG).

Etymology: The specific epithet refers to the unusually long and twisted conductor. Latin: *tentus* (or *tensus*) is the participle of *tendere* = to extend, to stretch.

Diagnosis: The male of *D. tentus* sp. n. can be distinguished from those of other coelotines by its extremely long, posteriorly extending conductor, its strongly elevated RTA, the absence of a patellar apophysis, the absence of a retrolateral dorsal tibial apophysis, and the absence of a median apophysis (Figs 28, 29). The male can be easily recognized by the dark brown pars cephalica of the carapace and by the long ventral hairs on the femora of the anterior legs.

Description: ♂ (holotype). Total length 8.64. Carapace 4.70 long, 3.00 wide. Abdomen 4.06 long. Promargin of cheliceral groove with 3 teeth, retromargin with 3.

Eye sizes and interdistances: AME 0.12, ALE 0.16, PME 0.18, PLE 0.20; AME-AME 0.10, AME-ALE 0.06, PME-PME 0.12, PME-PLE 0.10, ALE-PLE 0.06; MOQ 0.44 long, anterior width 0.32, posterior width 0.50. Clypeus height 0.08.

Leg measurements:

	I	II	III	IV
Femur	3.64	3.00	2.63	3.48
Patella + Tibia	4.12	3.74	2.36	4.02
Metatarsus	3.02	2.25	2.00	3.00
Tarsus	1.46	1.35	1.10	1.20
Total	12.24	10.34	8.09	11.70

Male palp (Figs 28, 29): Without patellar apophysis; RTA short, blunt conspicuously projecting away from tibia; retrolateral dorsal tibial apophysis absent; cymbial furrow deep and narrow, occupying approximately half of cymbium length; basal conductor lamella relatively large; conductor elongate, strongly extending posteriorly and reaching the level of the tibia, with grooved, spoon-like, anteriorly bent apex; dorsal apophysis of conductor small; median apophysis absent; embolus long, slender, originating posteriorly.

Distribution and habitat: Known only from the type locality, which is also the type locality of *C. lanna* sp. n. and *D. schwendingeri* sp. n.

DISCUSSION

The inventory of Thai coelotine spiders has increased mainly through the discovery of several *Draconarius* species in the northern part of the country (Dankittipakul & Wang, 2003, 2004). A recent excursion organized by Chiang Mai University in 2002 surprisingly led to the discovery of an additional genus, *Caronilla*, from the province of Nan. The genus *Coronilla* was originally established for coelotine spiders described from eastern China (Wang, 1994). The only *Coronilla* species previously reported from Southeast Asia, *C. gemata* Wang, 1994, is based on a single male specimen from Vietnam (Wang, 2002). *Coronilla lanna* sp. n. was collected from an evergreen hill forest and corresponds well with the current interpretation of the genus by the absence of epigynal teeth and by the presence of a broad, transverse atrial septum and of a posteriorly expanded posterior epigynal margin. The discovery of *C. lanna* sp. n. in northern Thailand considerably expands the known distribution of the genus *Coronilla* towards the south.

The species *Draconarius tentus* sp. n. from the province of Nan corresponds with other coelotine species in the presence of a lateral cymbial furrow, of a conductor lamella and of the usual tegular sclerites of males, despite the presence of a distinctly erected RTA instead of one stretched along the tibia as found in other coelotines. It is not a surprise to discover more *Draconarius* species in the northern part of Thailand considering the very wide distributional range of this genus. However, the occurrence of *D. montis* sp. n. in the province of Nakhon Ratchasima, northeastern Thailand, *D. silva* sp. n. in the province of Kamphaeng Phet, western Thailand, and especially *D. australis* sp. n. in the province of Prachuap Khiri Khan, southern Thailand was definitely unexpected. This paper therefore probably records the southernmost occurrence of coelotine spiders.

At present most of the known species of coelotines are confined to mountain ranges, which make up a minor part of the country's land area. From the numbers of species in this and previous studies (Dankittipakul & Wang, 2003, 2004), we estimate that probably less than half of the coelotine spiders present in Thailand are known. It is likely that additional coelotine genera and species, at least those with broad geographical ranges (e.g. *Paracoelotes* Brignoli), occur in Thailand and other Southeast Asian countries as well. With an estimated 40-50 species present, Thailand has probably the richest coelotine fauna in Southeast Asia. Together with the ten new species described in this paper, three coelotine genera comprising twenty nominal species are recently known from the kingdom.

List of Coelotine species known from Thailand

Coelotes Blackwall, 1841

1. *Coelotes thailandensis* Dankittipakul & Wang, 2003

Coronilla Wang, 1994

2. *Coronilla lanna* sp. n

Draconarius Ovtchinnikov, 1999

3. *Draconarius abbreviatus* Dankittipakul & Wang, 2003
4. *Draconarius anthonyi* Dankittipakul & Wang, 2003
5. *Draconarius australis* sp. n.
6. *Draconarius elatus* Dankittipakul & Wang, 2004
7. *Draconarius inthanonensis* Dankittipakul & Wang, 2003
8. *Draconarius lateralis* Dankittipakul & Wang, 2004
9. *Draconarius monticola* sp. n.
10. *Draconarius montis* sp. n.
11. *Draconarius paralateralis* Dankittipakul & Wang, 2004
12. *Draconarius phuhin* sp. n.
13. *Draconarius promontorius* sp. n.
14. *Draconarius pseudolateralis* Dankittipakul & Wang, 2004
15. *Draconarius schwendingeri* sp. n.
16. *Draconarius siamensis* Dankittipakul & Wang, 2003
17. *Draconarius silva* sp. n.
18. *Draconarius silvicola* sp. n.
19. *Draconarius subulatus* Dankittipakul & Wang, 2003
20. *Draconarius tentus* sp. n.

ACKNOWLEDGEMENT

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The Royal Forest Department gave permission to collect spiders in protected areas. The Thailand Research Fund supported the first author at the beginning of the project with a TRF/BIOTEC Special Program for Biodiversity Research and Training Grant (project number BRT_R 145002 and BRT_T 542094).

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Note added in proof

The name *Draconarius monticola* had already been mentioned in Dankittipakul, Chami-Kranon & Wang 2005: 8, figs 13-15. Due to delay in print setting, the corresponding formal description is given here.

DANKITTIPAKUL, P., CHAMI-KRANON, T. & WANG, X.-P. 2005. New and poorly known species of coelotine spiders (Araneae, Amaurobiidae) from Thailand. *Zootaxa* 970: 1-11.

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On the Philippine species of Cyparіini and Scaphidiini (Coleoptera: Staphylinidae: Scaphidiinae)

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On the Philippine species of Cyparіini and Scaphidiini (Coleoptera: Staphylinidae: Scaphidiinae). - The Philippine species of Cyparіini and Scaphidiini are reviewed. The Cyparіini are represented by a single species, *Cyparium punctatum* Pic, the Scaphidiini by 13 species of *Scaphidium*, with five species described as new: *S. crassipes*, *S. flavicorne*, *S. ilanum*, *S. kurozawai*, and *S. rufofemorale*. The previously described species of *Scaphidium* are redescribed, and a key to the species is given.

Keywords: Coleoptera - Staphylinidae - Scaphidiinae - Philippines - systematics.

INTRODUCTION

The present article describes the previously published and new species of Philippine Cyparіini and Scaphidiini. While only a single Cyparіini species, *Cyparium punctatum* Pic, remains known from the Philippines, five new Scaphidiini species are described, all belonging to *Scaphidium* Olivier. The number of Philippine species of *Scaphidium* is hereby raised to thirteen. With the exception *S. tuberculipes* (Löbl) none of the previously published species was described with illustrations showing their diagnostic sexual characters. Such characters are illustrated here for the first time.

For purpose of the stability of nomenclature, lectotypes are designated for *S. badium* Heller, *S. luzonicum* Pic, *S. negrito* Heller, and *S. seriatum* Heller, each represented in the examined collections by a single syntype. Additional, unknown syntypes may exist in other collections and if, they may belong to other species than the specimens studied here.

One of the treated species is left is unmanned. It is similar to *S. philippense* Reitter and probably new. As long the type material of the latter remains unavailable for study, it is difficult to assert which one of the two species is the true *S. philippense*.

MATERIAL

The material is housed in the following collections:

FMNH Field Museum of Natural History, Chicago
MHNG Muséum d'histoire naturelle, Genève
MNHN Muséum National d'Histoire Naturelle, Paris

Manuscript accepted 01.02.2005

NHML The Natural History Museum, London
SMNS Staatliches Museum für Naturkunde, Stuttgart
SMTD Staatliches Museum für Tierkunde, Dresden
ZMB Zoologisches Museum, Berlin

Note: I have seen the relevant type material of Philippine scaphidiines preserved in MNHN many years ago. It became unavailable for re-examination, as consequence of the present situation in the Coleoptera department of that museum.

Other abbreviations:

TL = total length, including head and extruded part of abdomen; BL = body length, from middle of anterior pronotal margin to inner apical angles of elytra.

TAXONOMY

Cypariini Achard, 1924

Cyparium Erichson, 1845

Cyparium is pantropical in distribution, with a few species extending into temperate Asia, south of North America, South Africa, and New Zealand. A single species is known from the Philippines.

Cyparium punctatum Pic, 1916

Cyparium punctatum Pic, 1916: 18

Type material. Syntype from East Malaysia "Ile Banguye" (Island Banggi) (MNHN) (see Note under Material).

Additional material examined. Mindanao: 30 km NW of Maramag, Bagongsilang, 1700m, 13-17.May 1996, Bolm, 16 (SMNS, MHNG); Leyte: Visca N Baybay, 200-500m, prim. forest, 22.2.91, W. Schawaller, 2 (SMNS, MHNG); Palawan, Matalangao Fall nr. Roxas, 100m, 28.VII.1985, M. Sakai, 1 (MHNG).

Description. Length 2.9-3.4 mm (TL), 2.3-2.8 mm (BL). Body moderately elongate. Head, body and femora uniformly reddish-brown, antennal segment 1 to 6, tibiae and tarsi light ochreous, antennomeres 7 to 10 and usually basal part of segment 11 darkened, dark brown to almost blackish, apical part of antennal segment 11 light brown to yellowish, in some specimens entire segment 11 distinctly lighter than segment 10.

Head at narrowest interval between eyes 0.25-0.30 mm. Clypeus in same plan as frons, frontal ridges absent. Antennal segment 3 slightly longer than segment 4, about 1.3 times as long as segment 5 and 1.6 times as long as segment 5, segment 7 slightly longer than wide (without basal stalk), following 3 segments subequal in length, slightly shorter than segment 7, becoming gradually wide, segment 10 about twice as wide as long (without stalk).

Pronotum with lateral margins arcuate, lateral and anterior marginal striae exposed, except at and near anterior angles, punctation fine and dense, with several distinctly larger punctures near basal lobe sometimes arranged to form irregular arc. Prosternal and hypomeral microsculpture absent, punctation hardly visible. Prosternum short, shorter than procoxae, median process and posterior prosternal edge carinate. Exposed portion of scutellum flat, about as long as wide at base.

Elytra moderately elongate, distinctly narrowed apically, shorter than combined width, sutural striae shallow, not extending along basal margins, adsutural areas flat, impunctate. Each elytron with 6 irregular, discal puncture rows, two inner puncture rows shortened toward base, third puncture row extending to or almost to basal puncture row, outer puncture rows shortened, sixth row in some specimens rather indistinct. Punctation between puncture rows and near base reduced, punctation near apices coarse. Metathoracic wing fully developed.

Metasternum with metacoxal process flat, concave at apical margin and with prominent, acute angles. Abdominal segments with very fine, punctulate microsculpture. Tergites 7 and 8 with even, fine punctation, ventrites 1 to 3 each with pair of semi-erect setae, ventrite 4 with two pairs of semi-erect setae. Protibiae straight, meso and metatibiae slightly curved. Longest protibial spine as 7/10 protibial width at level of spine.

Male. Protarsal segments 1 to 3 weakly, almost equally enlarged, with ventral tenant setae. Aedeagus 0.85-1.0 mm long, with apical process strongly inflexed, acute at tip, internal sac lacking sclerotized pieces, parameres in lateral view evenly wide, hardly curved or sinuate, in dorsal view arcuate.

Distribution: Philipinnes: Mindanao, Leyte, Palawan; East Malaysia: Island Banggi.

Comments. *Cyparium punctatum* is very agile and flies away by minor derangement (personal observation near St. Rafael, Palawan, specimen not collected).

Scaphidiini Latreille, 1807

Scaphidium Olivier, 1795

The genus is species rich and widely distributed throughout the tropics and temperate regions, with notable absence from south of South America and New Zealand. Only seven species were to date known from the Philippines (Löbl, 1972, 1997). With the five additional ones described below their number appears still low compared to the highly diverse southeast Asian fauna of *Scaphidium*. The genus is inadequately studied and consequently a large number of species can be reliably identified only if compared to primary type material. The relationships within the genus have not yet been examined.

Nine of the Philippine species, *S. crassipes* sp. n., *S. flavicorne* sp. n., *S. ilanum* sp. n., *S. kurozawa* sp. n., *S. negrito* Heller, *S.* cf. *philippense* Reitter, *S.* sp. close to *philippense*, *S. rufofemorale* sp. n., and *S. thomasi* (Pic) share shortened mesocoxal lines, ventral side of male femora flattened, concave and conspicuously pubescent, aedeagus robust, with short, impressed apical valves and Y-shaped sclerite of the internal sac joined basally to a transverse sclerite. The first two character states are probably synapomorphies defining a species group that appears to be restricted to the Philippines.

Key to the Philippine species of *Scaphidium*

1 Pronotum and elytra uniformly coloured 2
- Pronotum and/or elytra bicoloured 7
2 Elytral disc with distinct, longitudinal puncture rows. Small species, body length 2.7 mm, body uniformly ochreous . . . . . *S. seriatum* Heller
- Elytral disc lacking puncture rows 3

3 Antennal club entirely yellowish or light brown. Large species, body length 4.0-4.8 mm ..... *S. flavicorne* sp. n.
- Antennal club entirely or to large extend black or very dark. Moderately large to small species, body length usually clearly less than 4 mm, not exceeding 4.1 mm 4
4 Body uniformly ochreous, apices of femora and tibiae darkened. Pronotum with lateral impunctate ..... *S. badium* Heller
- Body, femora and tibiae uniformly black or blackish-brown. Pronotum with lateral and anterior striae punctate 5
5 Pronotum with median puncture row short, touching antebasal puncture row. Hypomera conspicuously microsculptured ..... *S. negrito* Heller
- Pronotum lacking median puncture row. Hypomera lacking microsculpture .. 6
6 Punctation on pronotal disc coarser than that on elytral disc. Femora much lighter than tibiae. Male protibiae gradually widened apically ..... *S. rufofemorale* sp. n.
- Punctation on pronotal and elytral disc similar, very fine. Femora not, or slightly lighter than tibiae. Male protibiae evenly wide in apical halves ..... *S. ilanum* sp. n.
7 Elytra very dark reddish-brown to black, each with light basal and apical transverse fasciae reaching to suture and lateral margins 8
- Elytra reddish-brown, each with dark, isolated central spot, or dark lateral area. If dark lateral area extended on to disc, it never reaches up to suture 10
8 Pronotum uniformly black 9
- Pronotum bicolorous, black or very dark brown in middle and at base, reddish laterally. Male protibiae sinuate ..... *S. thomasi* (Pic)
9 Elytra with basal reddish fasciae large, about twice as long as apical fascia, reaching or almost reaching elytral mid-length. Male protibiae straight, widest at apex. Apical valves of aedeagus without or with minute mesal lamellae ..... *S.* cf. *philippense* Reitter
- Elytral with basal fasciae short, about 1.5 times as long as apical fascia, reaching middle third of elytral length. Male protibiae weakly sinuate, widest in middle. Apical valves of aedeagus with distinct mesal lamellae ..... *S.* sp. nr. *philippense* Reitter
10 Elytra black on adsutural areas, along base, and on lateral margins including epipleura and supra-epipleura, each with black medio-lateral spot. Most of elytral surface reddish or ochreous. Ventral side of male profemora and protibiae finely tuberculate ..... *S. tuberculipes* (Löbl)
- Colour pattern different. Male profemora and protibiae not tuberculate 11
11 Elytra with isolated, black, discal spot and black along apices. Male protibiae sinuate or almost straight 12
- Elytra with dark, transverse, central fascia extending from darkened sutural striae to outer fifth of elytral width. Pronotum with dark median spot narrowed and deeply notched anteriorly. Male protibiae arcuate ..... *S. luzonicum* (Achard)

12 Pronotum dark reddish, with black base and black median fascia. Elytra with small, black, humeral spot and black along apical margins. Male protibiae distinctly sinuate . . . . . *S. kurosawai* sp. n.

- Pronotum uniformly reddish-brown. Elytra lacking humeral spot, not darkened along apices. Male protibiae weakly sinuate . . . . . *S. crassipes* sp. n.

Scaphidium badium Heller Figs 1-2

Scaphidium badium Heller, 1917: 43.

Type material examined. Syntype ♀, with following original labels: "Mt. Makiling, Luzon, Baker /2145/ badium typus (red) /1916 / Staatl. Museum für Tierkunde. Dresden" (SMTD). It is here designated as lectotype and appropriately labelled.

Additional material examined. Luzon, Lagunas, Mt. Makiling, 400m, 19.XI.1995 and Mt. Makiling, ca 600m, 28.XI.1995, I. Löbl, 1 ♂,1 ♀ (MHNG).

Description. Length 4.5-5.0 mm (TL) and 3.8-4.1 mm (BL). Body convex, not particularly elongate. Head and body uniformly ochreous. Antennal segments 1 to 6 as body or slightly lighter, segments 7 to 10 black, segment 11 black with light apex. Coxae, femora, femoral apices excepted, and tarsi as body or slightly lighter than body. Femoral apices and tibiae darkened, dark brown to blackish.

Head at narrowest interval between eyes 0.10-0.11 mm, punctation very fine, punctures beyond eye line larger than most other punctures. Antennal segments 3 and 4 weakly thickened apically, segments 5 and 6 distinctly thickened apically, segment 4 slightly longer than segment 3, almost twice as long as segment 2, segment 5 about as long as segment 2 and almost 1.5 times as long as segment 6; club segments flattened, segment 7 subtriangular, shorter than segment 3, about as long as segments 9 and 10, segment 11 elongate-oval, longer than segment 10.

Pronotum swollen dorsally, in middle above plane of elytra, fairly strongly inclined and narrowed anteriorly, lateral margins clearly sinuate, concave in antebasal area, lateral margin carinae exposed in basal halves, concealed in anterior halves in dorsal view, lateral margin striae impunctate, anterior margin stria very finely punctate, antebasal puncture row dense, coarse, not impressed and not interrupted in middle, extended close to lateral margins, forming broad-concave line, disc lacking microsculpture, discal punctation even, very fine, consisting of very shallow, not clearly delimited punctures, punctures much smaller than puncture intervals. Exposed part of scutellum flat, slightly wider than long.

Elytra distinctly narrowed basally and apically, with lateral contours evenly rounded, lateral margin carinae throughout visible in dorsal view, apical margins with fine serration, sutural striae deep, very finely punctate, adsutural areas very weakly roof-like elevated, with extremely fine puncture rows, basal punctures sparse, joined by striae, consisting of punctures about as large as or slightly smaller than pronotal antebasal punctures, discal punctation similar to pronotal punctation, longitudinal puncture rows absent.

Prosternum lacking median ridge, finely punctate along anterior edge, lacking microsculpture. Hypomera impunctate, not microsculptured. Margin of mesosternum between mesocoxae transverse. Mesosternum with carinae transverse laterally, curved anteriorly and approximate to meet median mesosternal ridge. Mesosternal ridge low,

gradually elevated, not sulcate. Metasternum with mesocoxal lines extended along anterior margin and joined. Mesocoxal lines with few fairly coarse punctures beyond coxae. Metasternum lacking microsculpture, sparsely and very finely punctate, except for medio-apical surface in males. Legs long, tibiae striate.

Abdomen very finely punctate and with punctulate microsculpture.

Male. Posterior two thirds of middle part of metasternum strongly impressed, coarsely punctate. Intercoxal process prominent, truncate. Metasternal setose patch extended up to anterior third of metasternum, consisting of fairly short setae in middle and very long curled setae on lateral edges of patch. Femora lacking obvious sexual characters. Tibiae lacking rows of long, fine setae. Protibiae about as long as profemora, weakly arcuate, almost even, slightly widened at apex. Protarsi not widened, lacking ventral tenant or long setae, about as long as four tenth of protibiae. Mesotibiae and metatibiae weakly arcuate and as thick as protibiae, distinctly longer than protibiae. Mesotarsi long, about as long as two thirds of mesotibiae, longer than metatarsi. Aedeagus (Figs 1, 2) 1.15 mm long.

Distribution. Luzon.

Comments. This species is characterized by the colour pattern of its legs, the long tibiae and strongly impressed male metasternum. Its genital characters are very distinct from those in other Philippine species.

Scaphidium crassipes sp. n. Figs 3-4

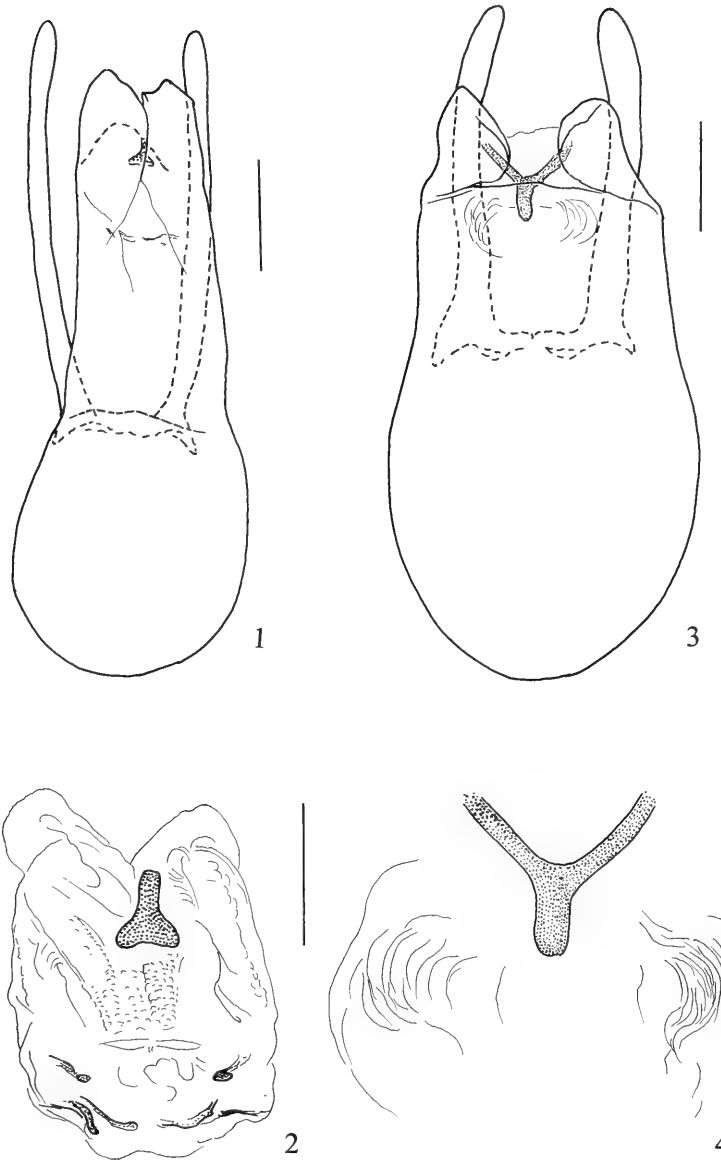
Holotype♂: Mindanao, Todaya, 29.VII. 1970, M. Satô (MHNG).

Description. Length 4.8 mm (TL), 3.75 mm (BL) mm. Head, ventral side of body and most of elytra uniformly reddish-brown. Pronotum reddish-brown, slightly darker than head. Elytra with fairly large, not clearly delimited, dark central spot. Apical abdominal tergites light reddish-brown. Antennal segments 1 to 5 and 11 light, ochreous, segments 6 to 10 black. Femora and tibiae as head, tarsi hardly lighter.

Head densely and very finely punctate, narrowest interval between eyes 0.12 mm. Antennae with segments 3 and 4 equally long and wide, segment 5 shorter and wider than segment 4, segment 6 subtriangular, widened apically, wider than segment 5, about as long as three fourth of segment 4, segment 7 subtriangular, slightly longer than wide (without basal stalk), segment 8 about as wide as and distinctly shorter than segment 7, segments 9 and 10 larger than segment 8, segment 11 oval, longer than segment 10.

Pronotum not swollen dorsally, gradually inclined and fairly narrowed anteriorly, lateral contours almost oblique, lateral margin carinae exposed throughout in dorsal view, lateral margin striae sparsely punctate, anterior margin stria densely, finely punctate, disc lacking microsculpture, antebasal puncture row arcuate, not impressed, fairly coarse, dense, becoming sparser laterally, not interrupted in middle, median puncture row absent, discal punctation fine and dense, consisting of well delimited punctures. Exposed part of scutellum flat, wider than long.

Elytra weekly narrowed basally and apically, with lateral contours oblique in middle, weekly rounded in anterior and posterior thirds, lateral margin carinae entirely visible in dorsal view, sutural striae deep, very finely punctate, adsutural areas flat, extremely finely punctate, basal puncture row consisting of moderately coarse punc-



FIGS 1 to 4. 1 and 2, *S. Scaphidium badium* Heller, aedeagus (1), scale bar = 0.2 mm, internal sac (2), scale bar 0.1 mm; 3 and 4, *S. crassipes* sp. n., aedeagus (3), scale bar = 0.2 mm, internal sac (4), scale bar = 0.1 mm.

tures extending almost up to humeral area, apical margins finely serrate. Discal punctation dense and fine, finer than pronotal punctation, longitudinal puncture rows absent.

Prosternum slightly swollen in middle, lacking median ridge, with microsculpture punctulate and distinct anteriorly, becoming obsolete toward coxae, puncture row

along anterior edge not interrupted in middle, coarse. Hypomera extremely finely punctate, lacking microsculpture. Mesepisterna with punctulate microsculpture. Mesosternal carinae arcuate, curved mesally and parallel on median ridge, joined at tip of median ridge. Median ridge robust, high, parallel-sided. Posterior margin of mesosternum arcuate. Mesocoxal lines shortened, ending far beyond meta-mesosternal suture, coarsely punctate. Metasternum lacking microsculpture, extremely finely punctate laterally. Legs long, protibiae and mesotibiae finely carinate, metatibiae not carinate.

Abdomen with distinct punctulate microsculpture except on middle part of sternite 1.

Male. Metasternum not swollen medio-anteriorly, with median impression extended to line of mesocoxal apices, lacking apical process, apical margin truncate. Setose patch covering posterior half of metasternum, setae long, curled at apices, very long and oblique near metacoxal margins, punctation coarse. Profemora curved, with ventral side flattened, concave and bearing dense, short pubescence. Protibiae weakly sinuate, appearing almost straight, gradually thickened apically, with short pubescence on mesal side. Protarsi slightly longer than half of protibiae, with segments 1 to 3 weekly widened, segments 3 and 4 with long ventral setae, tenant setae absent. Mesotibiae slightly longer than protibiae, slightly arcuate, slightly thickened apically, at apices narrower than protibiae, with mesal pubescence dense, robust, extended from apices to basal fifth. Mesotarsi about as long as two thirds of mesotibiae. Metatibiae not thickened apically, weekly arcuate, hardly longer than mesotibiae. Aedeagus (Figs 3, 4) 1.2 mm long.

Distribution. Mindanao.

Comments. This species is unique among the Philippine congeners in having its body reddish with exception of the dark elytra spot. It may be distinguished from the comparatively similar *S. badium* by the robust legs and male tibial characters. The aedeagi of both species are distinctive.

Scaphidium flavicorne sp. n. Figs 5-7

Holotype ♂: Mindanao, 30 km NW of Maramag, Bagong Silang, 1700m, 13-17.V.1996, Bolm (SMNS).

Paratypes: with same data as holotype, 1 ♀ (MHNG); Mindanao, Todaya, 29.VII.1970, M. Satô, 2 ♂ (MHNG); Mindanao, Mumungan [hand-written and not clearly readable], 1 ♂ (ZMB); Luzon, Ifugao Prov., Mt. Pollis, 1900m, 4-5 VI. 1977, M. Satô, 1 ♀ (MHNG).

Description. Length 5.0-5.5 mm (TL), 4.0-4.8 mm (BL). Body fairly convex. Head and body uniformly ochreous. Antennae much lighter than body, yellowish to light brown. Femora and tibiae dark reddish-brown to black, if dark reddish-brown tibiae darker than femora. Tarsi much lighter than tibiae, about as light as antennae.

Head with frons uniformly, very finely punctate, narrowest interval between eyes 0.20-0.26 mm. Antennae with segment 4 distinctly longer than segment 3 and as wide as latter, segment 5 slightly shorter and about 1.4 times as wide as segment 4, segment 6 triangular, almost twice as wide as segment 4, segments 7 to 10 subequal, slightly widened apically, segments 7, 9 and 10 about as long as wide, segment 8 slightly shorter than segment 7, segment 11 oval, slightly elongate, as wide as and longer than segment 10.

Pronotum not swollen dorsally, gradually inclined and fairly narrowed anteriorly, lateral contours straight or very weakly concave in basal two thirds, rounded near anterior angles, lateral margin carinae exposed throughout in dorsal view, lateral margin striae irregularly punctate, anterior margin stria very finely and densely punctate, disc lacking microsculpture, antebasal puncture row not impressed, not or shortly interrupted in middle, moderately coarse, bisinuate, not becoming sparser laterally, median puncture row absent, discal punctation dense and fine, distinct at low magnification, consisting of punctures much smaller than puncture intervals. Exposed part of scutellum convex, slightly longer than wide.

Elytra distinctly narrowed basally and apically, with lateral contours rounded, lateral margin carinae entirely visible in dorsal view, sutural striae deep, very finely punctate, adsutural areas weakly roof-like, extremely finely punctate, basal puncture row consisting of moderately coarse punctures extending up to humeral area, apical margins finely serrate. Discal punctation sparser and mostly still finer than pronotal punctation, longitudinal puncture rows absent.

Prosternum flat in middle, lacking median ridge, punctures along anterior margin large, not clearly delimited, elongate. Prosternal microsculpture forming brick-wall pattern. Hypomera lacking microsculpture, very finely punctate. Mesosternal margin between coxae arcuate. Mesosternal carinae transverse laterally, arcuate and gradually approximate anteriorly, extended on to median ridge. Median ridge long, fairly narrow, shallowly sulcate. Mesocoxal lines shortened, ending far beyond mesosternum, with comparatively small marginal punctures. Metasternum lacking microsculpture. Legs long, tibiae carinate.

Exposed abdominal segments very finely punctate and with punctulate microsculpture.

Male. Medio-apical part of metasternum impressed. Metasternal process prominent, setose patch covering entire apical third and extended slightly anterior apical third of metasternum, with marginal setae long and curled, most setae recumbent, fairly short. Profemora with ventral side concave, flattened and wide, densely pubescent. Protibiae sinuate, gradually, weakly thickened from base toward mid-length, with flattened outer and inner sides, outer edge expanded near apex to form subapical carina (Fig. 5), apical half of inner side with short, oblique setae. Protarsi about as long as half of protibiae, weakly widened, segments 1 and 2 with short tenant setae, segments 3 and 4 with apical tuft of long setae. Mesotibiae about as long as protibiae, weakly arcuate, thickened from base to middle third, in apical two thirds evenly thick, with oblique setae on inner side dense, extended from apex almost up to basal fourth. Metatibiae similar to mesotibiae, slightly thicker and with oblique, less dense setae. Mesotarsi and metatarsi slightly longer than half of respective tibiae. Aedeagus (Figs 6, 7) 1.6 mm long.

Distribution. Mindanao and Luzon.

Comments. This species is unique in having uniformly light antennae, and by the shape of the antennomeres 5 and 6. It is also characterized by the strongly sinuate male protibiae. The male characters suggest relationship to *S. crassipes*.

Scaphidium ilanum sp. n. Figs 8-9

Holotype ♂: Socorro, 12. X. 1915, Böttcher (ZMB).

Description. Length 4 mm (TL), 3.2 mm (BL). Body comparatively convex. Head and body black, antennae with segments 1 to 6 dark reddish-brown, segments 7 to 10 black, segment 11 black with slightly lighter apical area. Femora reddish, tibiae and tarsi blackish-brown with reddish shine.

Head very finely punctate. Narrowest interval between eyes 0.10 mm. Antennal segments 3 to 5 equally long, segment 5 slightly thicker than segments 4 and 3, segment 6 slightly shorter and thicker than segment 5, segment 7 subtriangular, slightly longer than wide, about as long as segment 3, segment 8 shorter and narrower than segment 7, segments 9 and 10 similar in size, gradually widened apically, about as long as and wider than segment 7, segment 11 suboval, slightly longer than wide.

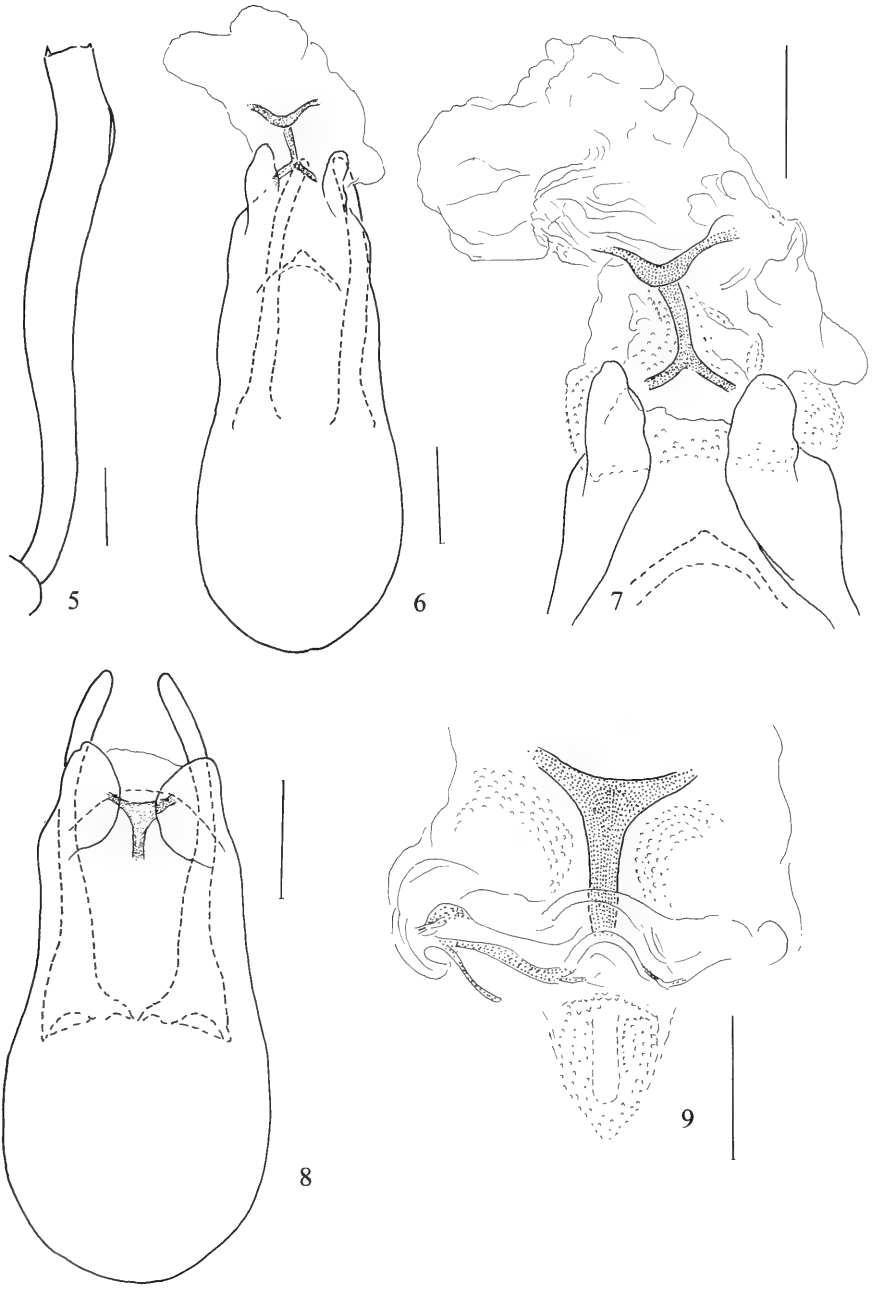
Pronotum not swollen dorsally, with central part of disc slightly above plan of elytral base, disc gradually inclined and narrowed anteriorly, lateral contours weakly emarginate in basal half, convexly rounded in anterior half, lateral margin carinae distinct in basal half and concealed in apical third in dorsal view, lateral margin striae each with two coarse antebasal punctures, anterior margin stria impunctate in middle, densely, distinctly punctate laterally, disc lacking microsculpture, antebasal puncture row hardly impressed, shortly interrupted in middle, arcuate, approximate to lateral margin, consisting of coarse punctures, outer one or two punctures approximate toward base. Discal punctation fairly dense and fine, distinct at low magnification, punctures much smaller than puncture intervals. Exposed part of scutellum flat, hardly wider than long.

Elytra weakly narrowed basally, fairly narrowed apically, with lateral contours rounded, lateral margin carinae throughout visible in dorsal view, sutural striae deep, very finely punctate, adsutural areas almost flat, finely punctate, basal puncture row consisting of coarse punctures extending onto humeral area, apical margins lacking serration. Discal punctation very fine, finer than that on pronotum, longitudinal puncture rows absent.

Prosternum with low median ridge, large punctures present along entire anterior margin, microsculpture forming very short striae and waves. Hypomera impunctate, lacking microsculpture. Margin of mesosternum between mesocoxae arcuate. Mesosternal carinae oblique, joined on to base of median ridge. Mesosternal ridge robust, not sulcate. Mesepisterna lacking microsculpture. Metasternum with mesocoxal lines shortened, ending far beyond mesosternum, coarsely punctate. Metasternum lacking microsculpture, very finely punctate laterally. Abdominal tergites 7 and 8 and exposed sternites with even, very fine punctation. Legs fairly short. Tibiae carinate.

Exposed abdominal segments with punctulate microsculpture.

Male. Posterior two thirds of median part of metasternum moderately impressed, finely punctate, with setose patch. Metasternal process prominent, bilobed. Profemora with ventral side widened, flattened and concave, bearing dense pubescence. Protibiae straight, lacking long, erect setae, with mesal side becoming thicker from base to middle third, widest shortly beyond basal third, from widest point very weakly narrowed apically in ventral view, widened and flattened in apical sixth in mesal view. Protarsi about as long as half of protibiae, with tarsomeres 1 to 3 widened



FIGS 5 to 9. 5, *Scaphidium flavicorne* sp. n., contours of male protibia, scale bar = .3 mm; 6 and 7, *S. flavicorne* sp. n., aedeagus (6), scale bar = 0.3 mm, apex of median lobe with extruded internal sac (7), scale bar = 0.2 mm; 8 and 9, *S. ilanum* sp. n., aedeagus (8), scale bar = 0.2 mm, internal sac (9), scale bar = 0.1 mm.

and bearing tenant setae, tarsomeres 3 and 4 with long ventral setae. Mesotibiae hardly longer than protibiae, about 1.5 times as long as mesotarsi, almost evenly thick and weakly arcuate, slightly narrowed toward base, with oblique mesal setae inconspicuous, extended from apex up to basal fifth. Metatibiae slightly longer than mesotibiae, almost twice as long as metatarsi, almost straight, slightly narrowed toward base. Aedeagus (Figs 8, 9) 1.05 mm long.

Distribution. Lucas Is.

Comments. This species resembles *S. negrito* by the uniformly dark body. It differs conspicuously by the reddish femora, emarginate lateral margins of pronotum and very fine elytral punctation. The metasternal pubescence is strongly damaged in the examined specimen.

Scaphidium kurosawai sp. n. Figs 10-11

Holotype ♂: Luzon, Ifugao Prov., Mt. Polis, 1900m, 5.V.1977, Y. Kurosawa (MHNG).

Paratypes: ♀, with same data as holotype (MHNG); ♂, Luzon, Balbalan, III. 1918, G. Böttcher (ZMB).

Description. Length 3.8-4.0 mm (BL), 4.5-5.5 mm (TL). Body comparatively convex. Head very dark reddish or black. Pronotum with black base, black median fascia and narrowly black along entire anterior and lateral edges. Large lateral parts of pronotum and upper parts of hypomera reddish. Elytra narrowly black along basal and apical edges, basal black fascia extended on to humeral areas to form small spots. Elytral disc with large, irregularly oval, black spot, adsutural areas reddish-brown, remaining surface ochreous. Venter of body black. Antennal segments 1 to 6 and legs reddish-brown, antennal segment 7 to 10 black, segment 11 ochreous.

Head punctation fine, irregular. Narrowest interval between eyes 0.12-0.13 mm wide. Antennal segments 3 and 4 equally long and thick, segment 5 slightly shorter and thicker than segment 4, segment 6 distinctly shorter and thicker than segment 5, segment 7 gradually widened apically, slightly longer than wide, segment 8 about as long as wide, segments 9 and 10 weakly widened apically, about bas long as wide, slightly larger than segment 7, segment 11 elongate-oval.

Pronotum not swollen dorsally, with central part of disc hardly above plan of elytral base, disc gradually inclined and narrowed anteriorly, lateral contours slightly rounded to oblique in basal half, convexly rounded in anterior half, lateral margin carinae throughout distinct in dorsal view, lateral margin striae very sparsely and very finely punctate, anterior margin stria throughout densely and finely punctate, disc lacking microsculpture, antebasal puncture row not or hardly impressed, very shortly interrupted in middle, arcuate, approximate to lateral margins, consisting of coarse punctures, few outer punctures approximate toward base. Discal punctation fairly sparse and fine, irregular, visible at low magnification. Exposed part of scutellum slightly convex, as wide as long.

Elytra narrowed basally and apically, with lateral contours rounded, lateral margin carinae throughout visible in dorsal view, sutural striae deep, very finely punctate, adsutural areas almost flat anteriorly, roof-like in apical two thirds, very finely punctate, basal puncture row consisting of coarse punctures extending on to humeral area, apical margins very finely serrate. Discal punctation very fine, much finer than that on pronotum, hardly visible on ochreous areas, longitudinal puncture rows absent.

Prosternum lacking microsculpture, flattened in middle and lacking median ridge, with anterior margin puncture row widely interrupted in middle, consisting of coarse and dense, not well delimited punctures. Hypomera lacking microsculpture, extremely finely punctate. Margin of mesosternal process arcuate. Mesosternal carinae oblique, curved anteriorly to meet on to median mesosternal ridge. Mesosternal ridge robust, parallel-sided, sulcate. Mesocoxal lines shortened, ending far beyond mesosternum, with few large marginal punctures. Metasternum lacking microsculpture. Legs long, tibiae carinate.

Abdominal sternites 1 to 4 lacking microsculpture, very finely punctate, apical abdominal segments with conspicuous punctulate microsculpture.

Male. Metasternum with large, deep medio-apical impression. Setose patch present on apical third on metasternum, consisting of recumbent, short setae, longer apical setae and bunches of very long, curled, erect setae near mesocoxae. Metasternal process prominent, hardly notched in middle. Profemora with ventral side flattened, concave, bearing dense, fairly long pubescence. Protibiae sinuate, widened from base toward middle, in apical halves almost evenly wide, at apices hardly widened, with short, dense pubescent on apical half of inner side. Protarsi about as long as half of protibiae, with segment 1 to 3 distinctly widened and bearing tenant setae, segments 3 to 5 with long ventral setae. Mesotibiae slightly longer than protibiae, slightly curved in apical halves, gradually, slightly thickened toward apices, flattened mesally, with dense, robust, mesal pubescence extended from apices to basal fourth. Mesotarsi slightly longer than halves of mesotibiae. Metatibiae and metatarsi about as mesotibiae and mesotarsi. Aedeagus (Figs 10, 11) 1.48 mm long.

Distribution. Luzon.

Comments. This species is similar to *S. philippense* and *S. thomasi*. Tt differs by the elytral spot, and from *S. philippense* by the bicolour pronotum. *S. kurozawai* may be distinguished from these two species also by the larger male metasternal process, the deeper metasternal impression, the metasternal setae much longer, the tibiae longer, and the mesotibiae and metatibiae gradually thickened apically.

Scaphidium luzonicum (Achard) Figs 12-13

Scaphidiolum luzonicum Achard, 1924: 152.
Scaphidium luzonicum; Leschen & Löbl, 1995: 472.

Type material examined. Syntype ♂, bearing following original labels: "SYN-TYPE" (round, blue) / 476136 / Luzon / Semper / Phillip Island / Fry Coll.1905.100 / Scaphidium luzonicum J. Achard det. TYPE / Scaphidium luzonicum Achard R.J.W.Aldridge det. 1976 SYN-TYPE (NHML). It is here designated as lectotype and appropriately labelled.

Description. Length 3.7 mm (BL), 5.4 mm (TL). Body comparatively convex. Head, body and appendages ochreous, except for darkened pronotal and elytral areas. Pronotum with black macula, starting at and touching antebasal puncture row, becoming narrower anteriorly, extended almost up to anterior fifth of pronotum, and divided anteriorly to form two narrow branches separated by ochreous median fascia. Elytra each with central, dark brown fascia touching sutural stria and extending up to outer sixth of elytral disc (in dorsal view). Elytral fasciae almost twice as wide as long, extended narrowly along sutural striae toward and along base, with irregular, not clearly delimited margins, posterior margin situated about in sutural mid-length.

Length of dark elytral fasciae about as interval between them and basal margins, and about as two thirds of interval between them and apical margins. Adsutural areas and apices of femora slightly darker than prevailing body surface.

Head punctation very shallow and indistinct, in middle part of vertex, beyond eyes, more dense and consisting of larger punctures than punctation between eyes. Narrowest interval between eyes 0.14 mm. Antennal segment 4 slightly longer than segment 3 and about 1.5 longer than segment 5, segments 3 to 5 almost equally thick.

Pronotum swollen dorsally, with central part of disc above plan of elytra, disc gradually inclined and fairly narrowed anteriorly, lateral contours distinctly emarginated in basal halves, arcuate in anterior halves, lateral margin carinae visible in dorsal view, anterior and lateral margin striae impunctate, disc lacking microsculpture, antebasal puncture row impressed, not interrupted in middle, extended almost to lateral margins, hardly bisinuate, antebasal punctures moderately coarse, laterally sparser than in middle. Median puncture row absent. Discal punctation irregular, fairly dense and fine on dark macula, almost indistinct laterally. Exposed part of scutellum swollen, slightly longer than wide.

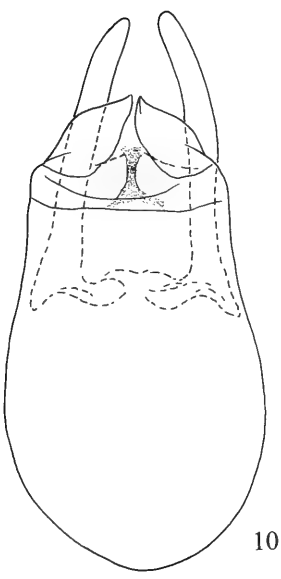
Elytra fairly narrowed basally and apically, with lateral contours rounded, lateral margin carinae entirely visible in dorsal view, sutural striae deep, finely punctate, adsutural areas roof-like, extremely finely punctate, basal puncture row consisting of comparatively fine punctures not extended on to humeral areas, apical margin serration present. Discal punctation irregular, dense and fine, similar to that on pronotal centre, longitudinal puncture rows absent.

Prosternum with low median ridge, large punctures along outer parts of anterior margin, central part of anterior margin impunctate, microsculpture hardly visible. Hypomera impunctate, lacking microsculpture. Mesosternal carinae almost transverse laterally, curved anteriorly and converging toward mid-line to form short triangle, joined on very low median ridge. Anterior part of median ridge not carinate and not sulcate. Margin of mesocoxal process transverse, truncate, in middle slightly more prominent than on sides. Metasternum with mesocoxal lines joined anteriorly, coarsely punctate along outer side of coxae. Metasternum lacking microsculpture, impunctate laterally. Legs long, tibiae carinate.

Abdominal sternites appearing impunctate, abdominal microsculpture punctulate, hardly visible on sternites 1 to 4, conspicuous on sternites 5 and 6.

Male. Metasternal process hardly prominent, truncate. Metasternal setose patch reaching almost up to anterior third of metasternum, consisting of recumbent, moderately long setae, and curled, very long latero-apical setal tufts. Medio-apical metasternal impression deep and large, impunctate in middle, coarsely punctate on sides. Femora long, narrow, lacking obvious sexual characters. Protibiae long and evenly narrow up to slightly thickened apex, slightly curved at base, almost straight toward apical third, in apical third distinctly curved. Protarsi about as long as third of protibiae, lacking tenant setae. Mesotibiae slightly longer than protibiae (7/6), gradually, very weekly thickened toward apex, with single, sparse setal row on mesal side. Metatibiae almost as long as mesotibiae, almost evenly narrow. Aedeagus (Figs 12, 13) 1.24 mm long.

Distribution. Luzon.



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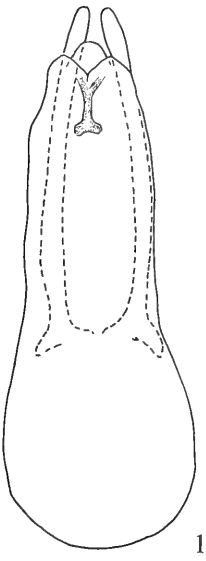

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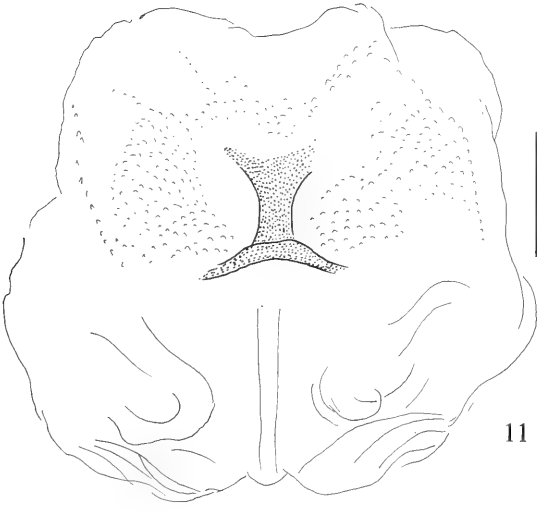

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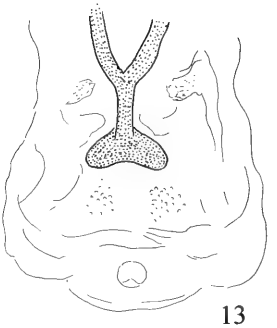


13

FIGS 10 to 13. 10 and 11, *Scaphidium kurozawai* sp. n., aedeagus (10), scale bar 0.3 mm, internal sac (11), scale bar = 0.1 mm; 12 and 13, *S. luzonicum* (Achard), aedeagus (12), scale bar = 0.3 mm, internal sac (13), scale bar = 0.1 mm.

Comments. This species may be easily distinguished from its Philippine congeners by the colour pattern. The sexual characters are similar to those in *S. badium* that has also the uninterrupted mesocoxal lines, long and narrow legs and elongate aedeagus.

The lectotype is the only available specimen and in poor condition: its prothorax is separated from the mesothorax, all left legs are missing, the right leg has only 2 basal tarsomeres, and the right metaleg lacks tarsi. Both antennae have only the 5 basal segments. In addition, the structures of the internal sac are not clearly visible in the slide and the respective illustration (Fig. 13) is therefore somewhat schematic.

Scaphidium negrito Heller Figs 14-15

Scaphidium negrito Heller, 1917: 42.

Type material examined. Syntype ♂, with following original labels: "P. Princesa Palawan Baker/1916 5/S. negrito typus. (red)/Staatl. Museum für Tierkunde. Dresden" (SMTD). It is here designated as lectotype and appropriately labelled.

Additional material examined. Palawan, Trident Mine, 500m, foot of Victoria Peak nr. Narra, 4. IX. 1985, M. Sakai, 1 ♂, 4 ♀ (MHNG).

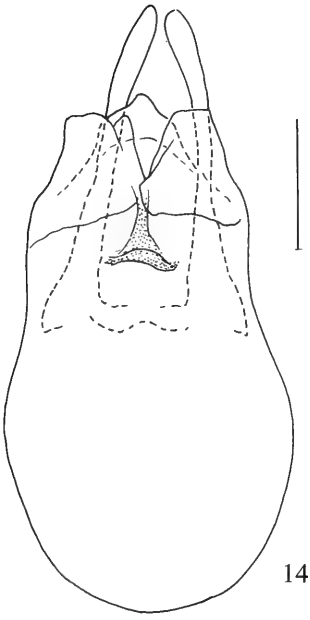
Description. Length 3.4-4.1 mm (TL) and 2.8-3.2 mm (BL). Body comparatively elongate, moderately convex. Head and body uniformly black. Antennal segments 1 to 6 dark brown, antennal club, apical segment included, black. Legs very dark brown to blackish.

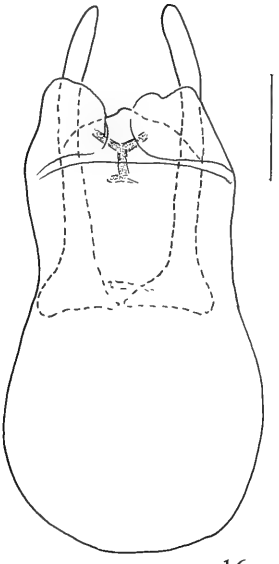
Head punctation beyond eyes more distinct than that in middle of frons, at narrowest interval between eyes 0.12-0.15 mm. Antennal segments 3 and 4 subequal, segment 5 slightly shorter and hardly thicker than segment 4, segment 6 as long as and distinctly thicker than segment 5, segment 7 subtriangular, as long as wide, longer than segment 3, segments 8 to 10 subquadrate, segment 8 as wide as and shorter than segment 7, segment 9 distinctly larger than segment 8, segment 10 larger than segment 9, segment 11 oval, slightly longer than wide.

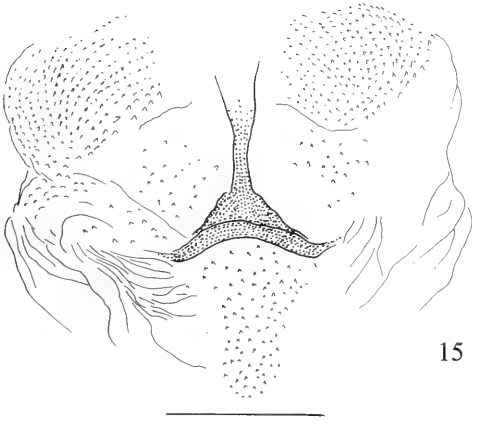
Pronotum not swollen dorsally, with central part of disc about in same plan as elytral base, disc gradually inclined and moderately narrowed anteriorly, lateral contours straight in basal half, rounded in anterior half, lateral margin carinae visible in dorsal view, anterior margin stria distinctly, very densely punctate, lateral margin striae with several, fairly coarse punctures, disc lacking microsculpture, antebasal puncture row not impressed and not interrupted in middle, bisinuate, punctures coarse, becoming laterally sparse, crossed in middle by short, median row of several coarse punctures, discal punctation fairly dense and fine, distinct at low magnification, most punctures much smaller than puncture intervals. Exposed part of scutellum flat, wider than long.

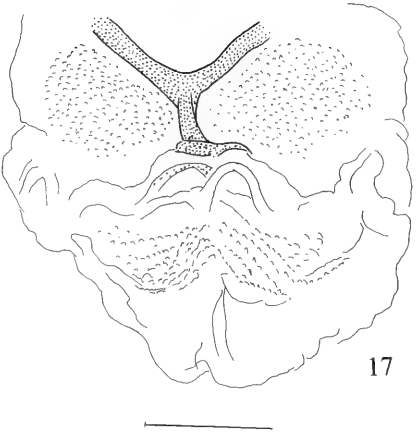
Elytra slightly narrowed basally and apically, with lateral contours weakly rounded, lateral margin carinae visible only near base in dorsal view, sutural striae deep, very finely punctate, adsutural areas roof-like, extremely finely punctate, basal puncture row consisting of coarse punctures extending on to humeral areas, apical margin serration absent. Discal punctation similar to that on pronotum, longitudinal puncture rows absent.

Prosternum with low median ridge, row of large punctures along anterior margin not interrupted in middle, microsculpture consisting of very short striae, waves and micropunctures, partly forming brick-wall pattern. Hypomera impunctate. Anterior part of hypomera with microsculpture forming brick-wall pattern or very short transverse striae, posterior part of hypomera with microsculpture consisting of elongate striae. Margin of mesosternal process arcuate. Mesosternal carinae oblique, curved









FIGS 14 to 17. 14 and 15, *Scaphidium negrito* Heller, aedeagus (14), scale bar = 0.2 mm, internal sac (15), scale bar = 0.1 mm; 16 and 17, *S. rufofemorale* sp. n., aedeagus (16), scale bar = 0.2 mm, internal sac (17), scale bar = 0.1 mm.

mesally on to median ridge. Mesosternal ridge wide, sulcate in mid-line, joined to oblique carinae. Mesepisterna distinctly microsculptured. Metasternum with mesocoxal lines shortened, ending far beyond mesosternum, coarsely punctate. Metasternal microsculpture punctulate and distinct on large median area, lateral parts of metasternum lacking microsculpture very finely punctate. Legs fairly short, tibiae carinate.

Abdominal tergites 7 and 8 and exposed sternites with even, very fine punctation. Abdominal microsculpture punctulate, and consisting of transverse and oblique striae on intercoxal process.

Male. Metasternum shallowly impressed medio-apically. Metasternal process strongly extended and bilobed. Metasternal setose patch restricted on to apical third of metasternum, consisting of recumbent, moderately long setae, and curled and fairly long apical setae. Profemora flattened and concave ventrally, bearing short pubescence. Protibiae lacking long erect setae, straight except in weakly arcuate basal part, with mesal side gradually thickened from base toward mid-length, evenly thick in apical half, with subapical carina on mesal side. Protarsi slightly widened, short, hardly longer than half of protibiae, ventral pubescence long, oblique. Mesotibiae slightly longer than protibiae, hardly curved, slightly thickened from base to middle third, beyond basal third evenly thick, with long, oblique setae on mesal side extended basally up to basal fifth. Mesotarsi slightly longer than two thirds of mesotibiae. Metatibiae slightly longer than mesotibiae, very weakly curved in apical half, contours of mesal side very weakly sinuate, mesal side with row of oblique setae extending from apex up to basal third. Metatarsi slightly longer than half of metatibiae. Aedeagus (Figs 14, 15) 0.95-1.0 mm long.

Distribution. Palawan.

Comments. This species is characterized by the elongate, weakly convex body and the pronotum with a median row of coarse punctures.

Scaphidium cf. ***philippense*** Reitter Figs 18-20

Scaphidium philippense Reitter, 1880: 39.
Scaphidium philippinense; Heller, 1917: 42 [misspelled]

Type material. From "Philippines" (MNHN), at present unavailable for study (see Note under Material).

Additional material examined. Luzon, Lagunas Prov., Mt. Makiling, 430m, 17-18.VI.1977, M. Satô, 1 ♂, 2 ♀ (MHNG); Lagunas Prov., Mt. Makiling, above Mad Springs, 400-700m, degrad. rainforest, 19-22.XI.1995, J. Kodada, 1 ♀ (MHNG); "Makiling" J. Sedlacek, 1 ♂ (MHNG); Luzon P. I. SE Bataan, July-Aug. 1945, Darlington, 1 ♂ (FMNH); "Manille" [=Manila], 1 ♀ (MHNG).

Description. Length 4.3-5.3 mm (TL), 3.6-4.1 mm (BL). Body comparatively convex. Head and body brown-black to black, antennomeres 1 to 6, abdomen, femora and tibiae lighter than body, dark brown to blackish, antennomeres 7 to 10 black, antennomere 11 black in basal half to two thirds, slightly lighter to light brown at apex, tarsi light brown or ochreous. Each elytron with large, light, ochreous or reddish, transverse basal and smaller, apical fascia. Margins of fasciae clearly delimited and almost regular. Basal fascia touching basal puncture row and lateral edges, not touching sutural striae, extended apically almost up to elytral mid-length. Apical fascia about half as long as basal fascia, reaching apical elytral edge, not touching sutural stria, with oblique anterior margin.

Head sparsely and very finely punctate between eyes, denser and less finely punctate in middle part of vertex. Narrowest interval between eyes 0.11-0.12 mm. Antennae with segment 4 slightly longer than segments 3 and 5, segment 5 thicker than segments 4 and 3, segment 6 subtriangular, widened apically, wider than segment 5, about as long as two thirds of segment 4; segment 7 subtriangular, slightly longer than

wide (without basal stalk), segment 8 about as wide as and distinctly shorter than segment 7, segments 9 and 10 larger than segment 8, segment 11 oval, longer than segment 10.

Pronotum weakly swollen dorsally, with central part of disc slightly above plan of elytral base, gradually inclined and fairly narrowed anteriorly, lateral contours weakly sinuate to almost oblique in basal halves, rounded in apical halves, lateral margin carinae exposed throughout in dorsal view, lateral margin striae with few fine punctures, anterior margin stria densely, finely punctate, disc lacking microsculpture, antebasal puncture row arcuate, not impressed, fairly coarse, dense, not becoming sparser laterally, not or very shortly interrupted in middle, median puncture row absent, discal punctation dense, fairly fine. Exposed part of scutellum flat, wider than long.

Elytra weekly narrowed basally and apically, with lateral contours almost straight in middle, weekly rounded in anterior and posterior thirds, lateral margin carinae entirely exposed in dorsal view, sutural striae deep, very finely punctate, adsutural areas flat anteriorly, elevated apically, very finely punctate, basal puncture row consisting of coarse punctures extending to humeral areas, apices finely serrate. Discal punctation sparse and very fine, much finer than pronotal punctation, longitudinal puncture rows absent.

Prosternum with punctulate microsculpture, lacking median ridge, punctures along anterior margin punctures coarse, except in middle. Hypomera lacking microsculpture, extremely finely punctate. Margin of mesosternal process between mesocoxae arcuate. Mesosternal carinae arcuate and gradually approximate toward median ridge. Mesosternal median ridge robust, fairly widely sulcate. Mesocoxal lines strongly shortened, with few, large punctures. Metasternum lacking microsculpture. Legs long, tibiae striate.

Abdomen with exposed tergites and ventrites extremely finely punctate, and with punctulate microsculpture.

Male. Metasternum hardly swollen medio-anteriorly, impressed in apical two thirds, with apical process weakly prominent, bilobed. Setose patch covering posterior third of metasternum, setae mostly short and recumbent, lateral setae long. Profemora curved, with ventral side flattened, concave, bearing dense, partly long pubescence. Protibiae straight, gradually thickened apically, widest shortly before apex (Fig. 18), with narrow subapical carina and short pubescence on mesal side. Protarsi about as long as half of protibiae, with segments 1 to 3 weekly widened, bearing tenant setae, segments 3 and 4 with long ventral setae. Mesotibiae slightly longer than protibiae, straight in basal third, slightly curved in apical two thirds, slightly thickened toward middle third, with dense, robust, mesal pubescence extended from apices about to basal third. Mesotarsi about as long as two thirds of mesotibiae. Metatibiae and metatarsi similar to mesotibiae and mesotarsi, but metatibiae not thickened apically. Aedeagus (Figs 19, 20) 1.15-1.20 mm long.

Distribution. Luzon.

Comments. Only two Philippine species possess characters that fit Reitter's original description. One of them has the basal elytral fasciae much larger the second species, and male sexual characters (see below) distinctive. The identification of the examined specimens is however tentative, mainly based on the female from "Manille"

that I have compared many years ago to a syntype of *S. philippense* preserved in MNHN. The material from Kingua identified as "*S. philippinense*" by Heller (1917) was not examined.

Scaphidium sp. near *philippense* Figs 21-23

Material examined. Luzon, Lagunas Prov., Mt. Makiling, 430m, 17-18.VI.1977, M. Satô, 3 ♂, 5 ♀ (MHNG); Lagunas Prov., Mt. Makiling, above Mad Springs, 400-700m, degrad. rainforest, 19-22.XI.1995, J. Kodada, 1 ♂, 1 ♀ (MHNG); Lagunas Prov., Mt. Makiling, summit rd., 600m, 21-22.XI.1995, fungi on large logs, I. Löbl, 2 ♂, 1 ♀ (MHNG).

With the characters of cf. *S. philippense* but antennomere 11 entirely light, elytral basal light fascia of elytra much narrower, reaching middle third or slightly extended beyond basal third of elytral disc, about 1.5 times as long as apical fascia. Apical elytral fascia with concave anterior margin, and not reaching up to apical elytral margin. Pronotal and elytral punctation comparatively finer, mesosternal median ridge narrow, with very narrow sulcus. Median part of metasternum with punctulate microsculpture. Male protibiae weakly sinuate, widest in middle, not carinate (Fig. 21). Aedeagus (Figs 22, 23) with apical valves extended by protruding mesal lamellae.

Distribution. Luzon.

Comments. I prefer not to name this species until the identity of specimens described above as *S.* cf. *philippense* will be clearly established.

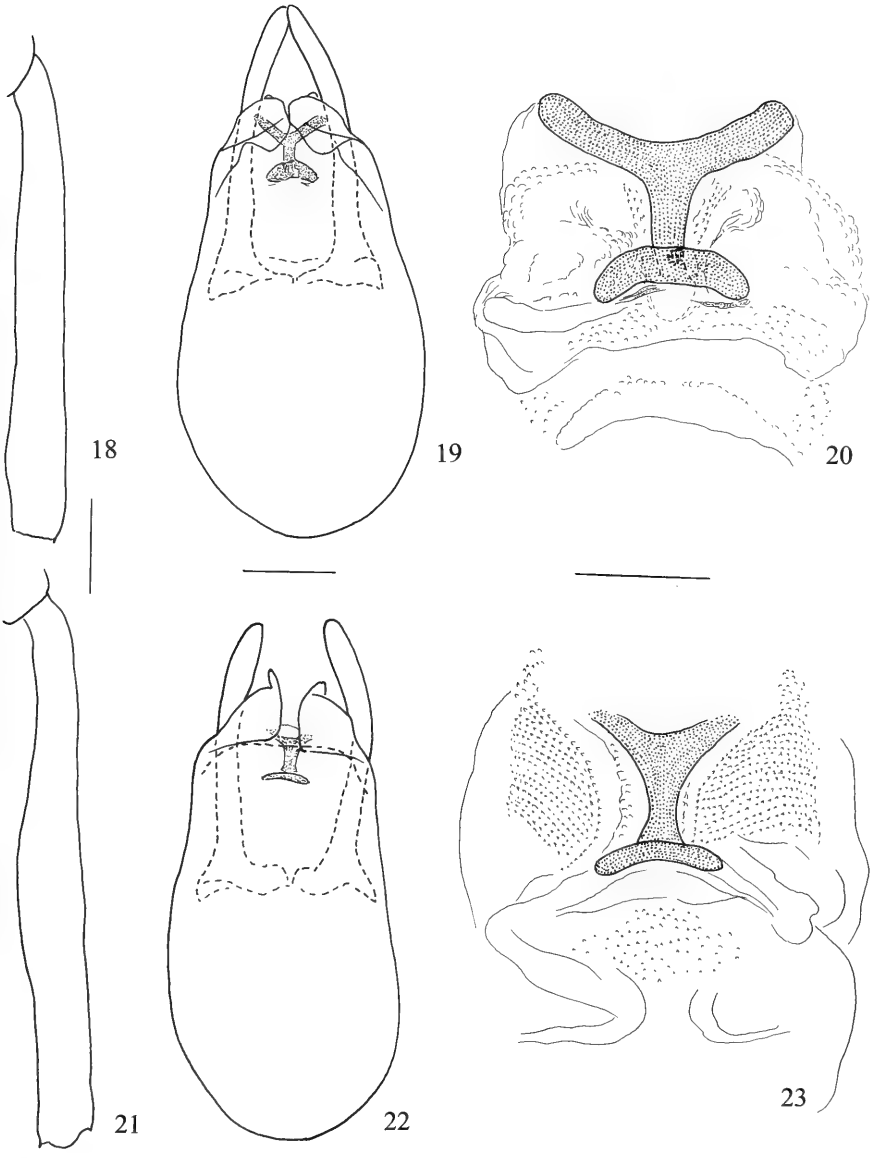
Scaphidium rufofemorale sp. n. Figs 16-17

Holotype ♂: Luzon, Sagada 1550m, nr. Bontoc Mount Prov., 23.VII.1985, M. Sakai (MHNG).

Description. Length 4 mm (TL), 3.3 mm (BL). Very similar to *S. ilanum*, it may be distinguished by femora light reddish, antennal segment 5 and 6 equally long, shorter than segment 4, antennal club uniformly black, segment 10 larger than segment 9, pronotum with discal punctation comparatively coarse, much coarser than that in *S. ilanum*, lateral margin striae of pronotum with several coarser punctures, prosternum with median carina entire, throughout robust, mesosternal process wide and low, with median sulcus wide, gradually narrowed anteriorly.

Male. Metasternum impressed in medio-apical half. Metasternal process extending beyond line of metacoxae, gradually narrowed, with apical margin notched in middle. Setose patch covering apical third of median part of metasternum, consisting of recumbent setae becoming longer apically. Profemora as in *S. ilanum*, with ventral side widened, flattened and concave, bearing dense pubescence. Protibiae straight, lacking long, erect setae, becoming gradually thicker toward apex, with outer margin very weakly concave, inner margin weakly convex. Protarsi slightly shorter than half of protibiae, with tarsomeres 1 to 3 widened and bearing tenant setae, tarsomeres 3 and 4 with long ventral setae. Mesotibiae slightly longer than protibiae, about 1.6 times as long as mesotarsi, almost evenly thick and weakly arcuate, slightly narrowed toward base, with long, oblique mesal setae, extended from apex up to basal fifth. Metatibiae slightly longer than mesotibiae, almost 1.7 times as long as metatarsi, very weakly curved in apical half straight, slightly narrowed toward base. Aedeagus (Figs 16, 17) 1.1 mm long.

Distribution. Luzon.



FIGS 18 to 23. 18 to 20, *Scaphidium* cf. *philippense* Reitter, contours of male protibia (18), scale bar = 0.3, aedeagus (19), scale bar = 0.2 mm, internal sac (20), scale bar = 0.1 mm; *Scaphidium* sp. nr. *philippense*, contours of male protibia (21), aedeagus (22), scale bar = 0.2 mm, internal sac (23), scale bar = 0.1 mm.

Comments. This species may be readily distinguished from *S. ilanum* by the femoral coloration, coarser pronotal punctation, shape of male protibiae and larger male mesosternal process. The aedeagi in both species are almost identical.

Scaphidium seriatum Heller Figs 24-26

Scaphidium seriatum Heller, 1917: 44.

Type material examined. Syntype ♂, with following original labels: "Mt. Makiling Luzon, Baker /1916 S/ seriatum typus. (red) / Staatl. Museum für Tierkunde, Dresden" (SMTD). It is here designated as lectotype and appropriately labelled.

Description. Length 3.7 mm (TL) and 2.7 mm (BL). Body convex, comparatively short. Head and body uniformly ochreous. Antennal segments 1 to 6 lighter than body, segment 7 black (following segments absent). Coxae, femora, and tibiae as body (tarsi absent).

Head with punctation very fine, at narrowest point between eyes 0.12 mm. Antennal segments 3 and 4 similar, weakly but distinctly widened apically, segment 4 slightly longer than segment 3, about 1.6 times as long as segment 2, segments 5 and 6 distinctly widened apically, segment 5 about as long as segment 2 and about 1.3 times as long as segment 6, segment 7 subtriangular, shorter than segment 3.

Pronotum swollen dorsally, in middle above plane of elytra, strongly inclined and narrowed anteriorly, lateral margins oblique, rounded near base, lateral margin carinae entirely exposed, lateral margin striae impunctate, anterior margin stria finely punctate, antebasal puncture row not impressed, interrupted in middle, dense, moderately coarse, extended close to lateral margins, forming broad-concave line, median puncture row absent. Disc lacking microsculpture, discal punctation even, fine, consisting of very shallow, not clearly delimited punctures, most punctures smaller than puncture intervals. Exposed part of scutellum flat, slightly wider than long.

Elytra distinctly narrowed basally and apically, with lateral contours evenly rounded, lateral margin carinae throughout visible in dorsal view, lateral margin striae indistinctly punctate, apical serration present, sutural striae deep, finely punctate, adsutural areas weakly roof-like, with extremely fine puncture rows. Basal punctures joined by striae, forming fairly sparse rows and consisting of punctures larger than those of pronotal antebasal row. Elytral disc very finely punctate, with two distinct, parallel, longitudinal puncture rows. Longitudinal puncture rows extended about to apical fifth of elytral disc, inner longitudinal row joined to basal puncture row.

Prosternum with median ridge, punctures along anterior margin large, not clearly delimited. Prosternal microsculpture absent. Hypomera lacking microsculpture, impunctate. Mesosternal process fused to metasternum, suture traceable near coxae. Mesosternal median ridge narrow, becoming gradually higher anteriorly, not sulcate, rounded in lateral view. Mesosternal carinae absent. Metasternum lacking microsculpture. Mesocoxal lines joined along mesosternal margin, with coarse marginal punctures posterior and laterally coxae. Legs long, tibiae carinate.

Exposed abdominal segments very finely punctate and bearing punctulate microsculpture.

Male. Metasternal process prominent, reaching almost up to line of posterior metacoxal margins, with posterior margin arcuate. Setose patch and coarsely punctate area covering entire apical two thirds of metasternum, with most setae recumbent, fairly short, marginal setae long. Middle of metasternum impressed. Profemora lacking obvious sexual characters. Protibiae weakly curved in basal third, almost straight in apical two thirds, throughout almost equally wide. Mesotibiae and metatibiae similar,

arcuate, evenly thick, with mesal sides lacking long, erect or oblique setae. Aedeagus (Figs 24-26) 0.98 mm long.

Distribution. Luzon.

Comments. This species differs from the remaining Philippine congeners by the mesosternum fused to metasternum and lacking carinae. It may be also easily distinguished by the elytra having discal puncture rows. The single available specimen is in poor state, its right antenna lacks, only seven segments of the left antenna remain, all tarsi are broken off, one protibia and the hind right leg are missing. It was carelessly dissected previous to the present study.

Scaphidium thomasi (Pic) Figs 27-28

Scaphidiolum thomasi Pic, 1926: 3.
Scaphidium thomasi; Leschen & Löbl, 1995: 474.

Type material. From Luzon "St. Thomas" (MNHN), unavailable for present study.

Additional material examined: Luzon, Mountain Prov., Mt. Data 2250m, 14.vii.1985, M. Satô, 1 ♂, 1 ♀ (MHNG); Luzon, Mountain Prov., Mt. Data 7500ft, mossy forest table summit, H. Hoogstraal & D. Heyneman, 1 ♂ (FMNH); Luzon, Mountain Prov., Mt. Data lodge, 2200-2300m, 23-24.xii.1979, #154, L. Deharveng & J. Orousset, 1 ♂ (MHNG); Luzon, Mountain Prov., N & NE of Sagada, 15-19.xii.1979, # 143, L. Deharveng & J. Orousset, 1 ♂ (MHNG); Luzon, Benguet Prov., Mt. Mungeoto 2450m, 27.v.1977, M. Satô, 1 ♀ (MHNG); Luzon, Bontoc Prov., Palopal 2300m, 30.v.1977, M. Satô, 1 ♂, 1 ♀ (MHNG).

Description. Length 3.8-4.8 (TL) and 3.5-3.7 (BL) mm. Body comparatively elongate, moderately convex. Head black or very dark brown. Antennomeres 1 to 6 dark brown, 7 to 10 blackish or black, 11 dark reddish to ochreous. Pronotum black between basal margin and antebasal puncture row, and with black median fascia becoming wider anteriorly to extend up to anterior lateral angles. Large lateral areas of pronotum and entire prohypomera reddish. Scutellum black. Elytra reddish or ochreous, with narrowly black basal edge and fairly large black humeral spot, black or very dark brown adsutural areas, and large, transverse, black fascia. Latter with oblique anterior margin, reaching about anterior fourth of sutural length at sutural striae and hardly reaching mid-length at lateral pronotal edges. Posterior margin of transverse fascia strongly sinuate, separated from apical margin by about half of fascia width near sutural striae and by more than fascia width near lateral elytral edges. Ventral side of thorax and abdomen, abdominal apex excepted, black, femora and tibiae blackich, tarsi dark brown.

Head punctation regularly fine, or more distinct beyond eyes than in middle of frons. Narrowest interval between eyes 0.16-0.18 mm. Antennal segments 3 and 4 subequal, segment 5 slightly shorter and hardly thicker than segment 4, segment 6 shorter than and about as thick as segment 5, segments 7 and 8 subcylindrical, segment 7 about as long as segment 3, longer than wide and longer than segment 8, segments 9 and 10 similar in size, larger than segment 8, segment 11 oval, distinctly longer than segment 10.

Pronotum not swollen dorsally, with central part of disc about in same plan as elytral base, disc gradually inclined and moderately narrowed anteriorly, lateral contours sinuate, lateral margin carinae visible in dorsal view, anterior margin and lateral margins striae impunctate, disc lacking microsculpture, antebasal puncture row not impressed and not interrupted in middle, bisinuate, punctures coarse, almost evenly

dense, median puncture row absent, discal punctation fairly dense and fine on middle, very fine on reddish lateral areas. Exposed part of scutellum flat, about as long as wide.

Elytra moderately narrowed basally and apically, with lateral contours rounded, lateral margin carinae distinct near base in dorsal view, hardly visible near apex, sutural striae deep, very finely punctate, adsutural areas flat anteriorly, roof-like elevated apically, extremely finely punctate, basal puncture row consisting of coarse punctures reaching humeral areas, apical margin serration present. Discal punctation very fine, hardly visible, longitudinal puncture rows absent.

Prosternum lacking median ridge, row of anterior margin punctures widely interrupted in middle, microsculpture present only near anterior margin and consisting of short striae. Hypomera lacking microsculpture and extremely finely punctate. Margin of mesosternal process arcuate. Mesosternal carinae oblique, curved mesally on to median ridge. Mesosternal ridge narrow, very shortly sulcate basally, joined to oblique carinae. Mesepisterna with hardly visible punctulate microsculpture. Metasternum with mesocoxal lines shortened, ending far beyond mesosternum, coarsely punctate. Metasternal microsculpture absent. Legs fairly long. Tibiae carinate.

Abdominal tergites 7 and 8 and exposed sternites with even, very fine punctation. Abdominal microsculpture punctulate.

Male. Metasternum with shallowly impressed median part beyond line of mesocoxae. Metasternal process strongly extended, with minute notch in middle of apical margin. Metasternal setose patch restricted on to apical third of metasternum, consisting of recumbent, moderately long setae, and curled and fairly long lateral setae. Profemora flattened and concave ventrally, bearing dense, partly erect pubescence. Protibiae lacking long erect setae, with weakly sinuate dorsal edge, strongly sinuate ventral edge, widest in middle part, strongly narrowed basally, weakly narrowed subapically, at apex again widened. Protarsi slightly widened, as long as half of protibiae, ventral pubescence long, oblique. Mesotibiae slightly longer than protibiae, hardly curved, slightly thickened at apex, with long, oblique setae on mesal side extended up to basal fifth. Mesotarsi about as long as two thirds of mesotibiae. Metatibiae slightly longer than mesotibiae, straight, slightly thickened at apex, mesal side with row of oblique setae extending from apex up to basal fourth. Metatarsi slightly longer than half of metatibiae. Aedeagus (Figs 27, 28) 1.25-1.35 mm long.

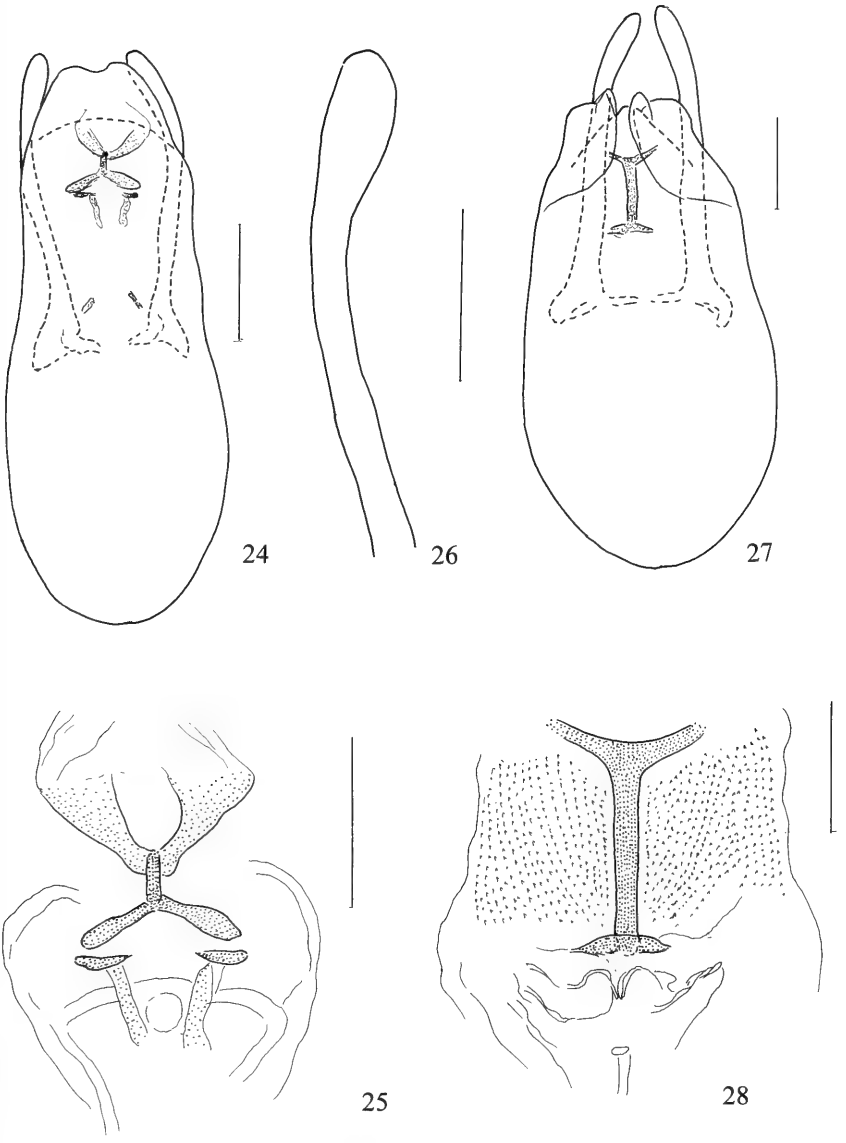
Distribution. Luzon.

Comments. Among the examined material only one species fits the original Pic's description "...niger, ...thorace laterifer et triangularites rufo ornato, ... elytris nigris, antice late rufo maculatis, apice rufo undulato-fasciatis, ...". This species is similar to *S. philippense*, but may be readily distinguished from the latter by the pronotal colour pattern and by the shape of the male protibiae. It is possibly restricted to high elevation habitats.

Scaphidium tuberculipes (Löbl, 1972)

Scaphidiolum tuberculipes Löbl, 1972: 79.
Scaphidium tuberculipes; Leschen & Löbl, 1995.

Type material examined. Holotype ♂ labelled "Philippinen Buccas Socorro X. 1916 G. Böttcher" (ZMB); paratype ♂ labelled "Siargao Dapa 30.9.16 G. Böttcher" (MHNG).



FIGS 24 to 28. 24 to 26, *Scaphidium seriatum* Heller, aedeagus (24), scale bar = 0.2 mm, internal sac (25), scale bar = 0.1 mm, paramere (26), scale bar = 0.3 mm; 27 and 28, *S. thomasi* (Pic), aedeagus (27), scale bar = 0.2 mm, internal sac (28), scale bar = 0.1 mm.

Additional material examined. "Mindanao Agin L., J. Sedlácek" 1 ♂ (MHNG); "Sorocco 12.Okt.1916 Böttcher" 1 ♀ (ZMB).

Description. Length 3.5-4.4 mm (TL) and 2.6-3.5 mm (BL). Body fairly convex. Head, most of pronotum, and most of elytra reddish-brown. Pronotum with black median fascia reaching basal and apical margins, weakly widened anteriorly,

strongly widened basally. Hypomera reddish, except along black ventral margins. Elytra with black adsutural areas, base, lateral edges, supra-epipleura and epipleura. Black lateral area extended posterior elytral mid-length to form a small spot. Ventral side of body black. Antennal segments 1 to 6 yellowish to light brown, segment 7 to 10 black, segment 11 uniformly very dark, brown to brown-black, or very dark mediobasally and becoming lighter laterally and apically. Femora black or almost black, protibiae dark reddish-brown, mesotibiae and metatibiae about as dark as femora, tarsi dark reddish-brown.

Head at narrowest point between eyes 0.11-0.12 mm, with punctation irregular, very fine. Antennal segment 3 about 1.3 times as long as segment 4, both weakly but distinctly widened apically, segment 5 about as thick as and distinctly shorter than segment 4, about as long as segment 2, segment 6 swollen apically but not subtriangular, about as long as three fourth of segment 5; segment 7 subtriangular, slightly longer than wide, about as long as segment 4.

Pronotum lacking microsculpture, weakly swollen dorsally, in middle above plane of elytra, strongly inclined and narrowed anteriorly, lateral margins oblique, not or very weakly emarginate near base, lateral margin carinae entirely exposed, lateral and anterior margin striae impunctate, antebasal puncture row impressed, broadly interrupted in middle, arcuate, approximate to lateral margins, consisting of small and shallow punctures. Discal punctation very fine, very shallow, punctures not clearly delimited, much smaller than puncture intervals. Median puncture row absent. Exposed part of scutellum flat, wider than long.

Elytra distinctly narrowed basally and apically, with lateral contours evenly rounded, lateral margin carinae throughout visible in dorsal view, lateral margin striae indistinctly punctate, apical serration present, sutural striae deep, finely punctate, adsutural areas roof-like elevated, extremely finely punctate, basal puncture rows dense, consisting of punctures larger than punctures forming pronotal antebasal row. Punctation on basal half of elytral disc very fine, similar to that on pronotal disc, punctation on apical half of elytra distinct, consisting of punctures much larger than those on basal half.

Prosternum lacking microsculpture and lacking median ridge, in median area slightly swollen, puncture row along anterior margin interrupted in middle, consisting of large, not clearly delimited punctures. Hypomera impunctate und lacking microsculpture. Margin of mesosternal process transverse. Mesosternal carinae transverse laterally, curved mesally to join on to median ridge. Mesosternal median ridge low, rounded, not clearly delimited, not sulcate, gradually narrowed anteriorly. Metasternum lacking microsculpture, very finely punctate. Mesocoxal lines joined in middle, coarsely punctate beyond and laterally coxae. Legs long, tibiae carinate.

Exposed abdominal segments with uniformly fine, punctulate microsculpture and with punctation very fine and sparse, similar to that on metasternal sides.

Male. Metasternum with entire median part impressed, impression shallow and sharply delimited anteriorly, deep and not clearly delimited in apical two thirds. Setose patch extended almost up to anterior third of metasternum, setae long, in particular apically and laterally, punctation coarse. Apical process strongly prominent, with margin arcuate, weakly notched in middle. Ventral sides of profemora slightly concave, not

flattened, with two rows of small tubercles. Protibiae straight, gradually, very weakly thickened from base toward apical fourth, from widest point somewhat narrowed toward apex, finely tuberculate on mesal side. Protarsi about as long as half of protibiae, with segments 1 to 3 distinctly widened and bearing tenant setae, segments 1 to 5 bearing long ventral setae. Mesotibiae and metatibiae lacking long setae on mesal side. Mesotibiae narrow, gradually, weakly thickened apically, straight in basal halves, arcuate in apical halves, about 1.5 times as long as protibiae. Mesotarsi long, about as long as three fourth of mesotibiae, bearing long, erect ventral setae. Metatibiae almost evenly narrow, straight in basal halves, weakly curved in apical halves, distinctly shorter than mesotibiae. Metatarsi about as long as two thirds of metatibiae. Aedeagus 1.0-1.17 mm long.

Distribution. Mindanao, Bucas Grande and Siargao Islands.

Comments. This species may be easily distinguished from the Philippine congeners by its colour pattern and the tuberculate protibiae and profemora. The tibial tubercles are variable in size and may be very small and uneasily seen in dry specimens.

ACKNOWLEDGEMENTS

Following colleagues assisted by loan of specimens from collections in their care: M. Brendell, London, late H. S. Dybas, Chicago, J. Frisch, Berlin, O. Jaeger, Dresden, and W. Schawaller, Stuttgart. In addition, material was generously given by L. Deharveng, Paris, J. Kodada, Bratislava, M. Sakai, Matsuyama, and M. Satô, Nagoya.

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A review of *Gongylidioides* spiders (Araneae: Linyphiidae: Erigoninae) from China

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A review of *Gongylidioides* spiders (Araneae: Linyphiidae: Erigoninae) from China. - The present paper gives a review of the spider genus *Gongylidioides* occurring in China. A total of eight species are recognized, including three new species: *Gongylidioides acmodontus* sp. n., *Gongylidioides angustus* sp. n. and *Gongylidioides kouqianensis* sp. n. Descriptions of the new species and redescriptions of the known species, except for *G. onoi* and *G. ussuricus*, are provided.

Keywords: China - Linyphiidae - Erigoninae - *Gongylidioides* - new species - taxonomy.

INTRODUCTION

The erigonine spider genus *Gongylidioides* was established by Oi (1960) for *Gongylidioides cucullatus* Oi, 1960. According to Platnick's spider catalogue (2005), the genus currently comprises ten species. They are *G. communis* Saito & Ono, 2001 (Japan), *G. cucullatus* Oi, 1960 (Japan), *G. foratus* (Ma & Zhu, 1990) (China), *G. galeritus* Saito & Ono, 2001 (Japan), *G. griseolineatus* (Schenkel, 1936) (Russia, China), *G. kaihotsui* Saito & Ono, 2001 (Japan), *G. onoi* Tazoe, 1994 (China, Vietnam, Japan), *G. monocornis* Saito & Ono, 2001 (Japan), *G. rimatus* (Ma & Zhu, 1990) (Russia, China) and *G. ussuricus* Eskov, 1992 (Russia, China). During our study of *Gongylidioides* material from China, three new species have been identified and are described in the present paper. With the three new species reported here, a total of eight *Gongylidioides* species are currently known from China.

MATERIAL AND METHODS

Specimens were examined and measured using an SZ11-Olympus stereomicroscope. Details were studied under an Olympus BX40 compound microscope. All illustrations were made using a drawing tube. Male palps and epigyna were examined and illustrated after being dissected and detached. Vulvae were cleared in a boiling KOH solution to dissolve non-chitinous tissue, and the embolic parts of male palps were excised by breaking the column (the membranous connection between the suprategulum and the radix). For examination of genital structures under a compound microscope, palps and epigyna were immersed in 75% alcohol solution, while embolus parts and vulvae were mounted in Hoyer's Solution.

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Updated information on the distribution of each species in China is provided at the provincial level. The locality names and distribution data are given according to current Chinese standard (see Peng, Li & Rollard, 2003). The material examined is deposited in the Institute of Zoology, Chinese Academy of Sciences in Beijing, China, unless otherwise indicated. Other repository institutions are: Muséum d'histoire naturelle, Genève, Switzerland (MHNG); Jilin University, Changchun, China (JLU, formerly called Norman Bethune University of Medical Sciences); Department of Zoology, National Science Museum, Tokyo, Japan (NSMT); Swedish Museum of Natural History, Stockholm, Sweden (SMNH).

Leg measurements are given in the following sequence: Total (femur, patella + tibia, metatarsus, tarsus). All measurements are in mm. Terminology for somatic morphology and genital structures is after Hormiga (2000, 2002). Abbreviations used are as follows:

Somatic morphology. AER - anterior eye row; ALE - anterior lateral eye; AME - anterior median eye; AMEd - diameter of AME; PER - posterior eye row; PLE - posterior lateral eye; PME - posterior median eye; PMEd - diameter of PME.

Male palp. DSA - distal suprategular apophysis; DTA - dorsal tibia apophysis; E - embolus; IT - inner tooth of tibia; LC - lamella characteristica; LSA - lateral suprategular apophysis; PT - protegulum; R - radix; SPT - suprategulum; STM - suprategular membrane; TP - tailpiece of radix.

Epigyne. CD - copulatory duct; CO - opening of copulatory duct; DP - dorsal plate of epigyne; FD - fertilization duct; FO - opening of fertilization duct; S - spermatheca; VP - ventral plate of epigyne.

TAXONOMIC DESCRIPTIONS

Gongylidioides Oi, 1960

Gongylidioides Oi, 1960: 172. Type species *Gongylidioides cucullatus* Oi, 1960, by monotypy.

Diagnosis. Males of *Gongylidioides* can be recognized by the thumb-like distal process of the paracymbium, the triangular lateral suprategular apophysis (LSA), the plate-shaped distal suprategular apophysis (DSA) and the U-shaped lamella characteristica (LC); females are characterized by the bisection of the ventral plate partly covering the anterior part of the well-developed dorsal plate.

Description. Total length: 1.93-3.3. Carapace of both sexes similar in general appearance, cephalic portion slightly convex behind ocular area, bearing several hairs on it. Ocular area black, AME usually smaller than other (subequal) eyes. AER recurved, intervals between anterior eyes about AMEd; PER straight, intervals of posterior eyes about PMEd or slightly longer; ALE and PLE juxtaposed. Chelicerae brown. Fang groove with five to six promarginal and three to five retromarginal teeth. Tibial spines: 2-2-1-1; Tm I: 0.59- 0.82; Tm IV present.

Male palp. Tibia short and wide, with one or two well-developed dorsal apophyses (DTA) and two smaller ventral apophyses and usually with a tooth (IT) on inner surface of dorsal apophysis. Two tibial trichobothria present, one prodorsally and one retrodorsally. Paracymbium U-shaped, covered with long hairs, apical part with distally situated thumb-like process. Protegulum (PT) present as a less sclerotized extension of the tegulum. Suprategulum with a triangular lateral apophysis (LSA) in pro-

lateral view and a plate-shaped, transparent distal apophysis (DSA) in retrolateral view. Suprategular membrane (STM) thin and translucent, projecting forwards from apical margin of distal suprategular apophysis. Embolic parts dominated by large, strongly sclerotized, U-shaped lamella characteristica (LC), its longer prolateral arm furnished with scale-like teeth on outer surface and inner part membranous, its shorter ectal arm with various modifications apically. Embolus projecting from beneath lamella characteristica. Radix with handle-shaped tailpiece (TP).

Epigyne. Well-developed dorsal plate (DP) slightly convex ventrally, extending to posterior margin. Bisection of ventral plate (VP) of various shapes, partly covering anterior part of dorsal plate. Copulatory ducts short, with conspicuous anterior turning and opening below divided ventral plate anteriorly.

Distribution. China (Gansu, Hubei, Hunan, Jilin, Shaanxi, Taiwan and Zhejiang), Japan, Russia and Vietnam.

Gongylidioides acmodontus sp. n. Fig. 1

Type material examined. ♂ holotype, Anghekou, Mt Erlangshan National Forest Park, Tianquan County, Sichuan Province, China, coll. Lihong Tu, 8 July 2004; 2♂1♀ paratypes, same data as for holotype; 1♂ paratype, same data as for holotype (MHNG); 1♀ paratype, Qingshi Town, Tianquan County, Sichuan Province, China, coll. Zhengtian Zhang, 11 July 2004 (MHNG); 1♀ paratype, Jintang Nature Reserve, Kangding County, Sichuan Province, China, coll. Lihong Tu, 18 July 2004.

Diagnosis. The male of *G. acmodontus* can be distinguished by a long, sharp dorsal apophysis (DTA) and a pointed inner tooth (IT) on the palpal tibia; the female by the bisection of the ventral plate with arced margins.

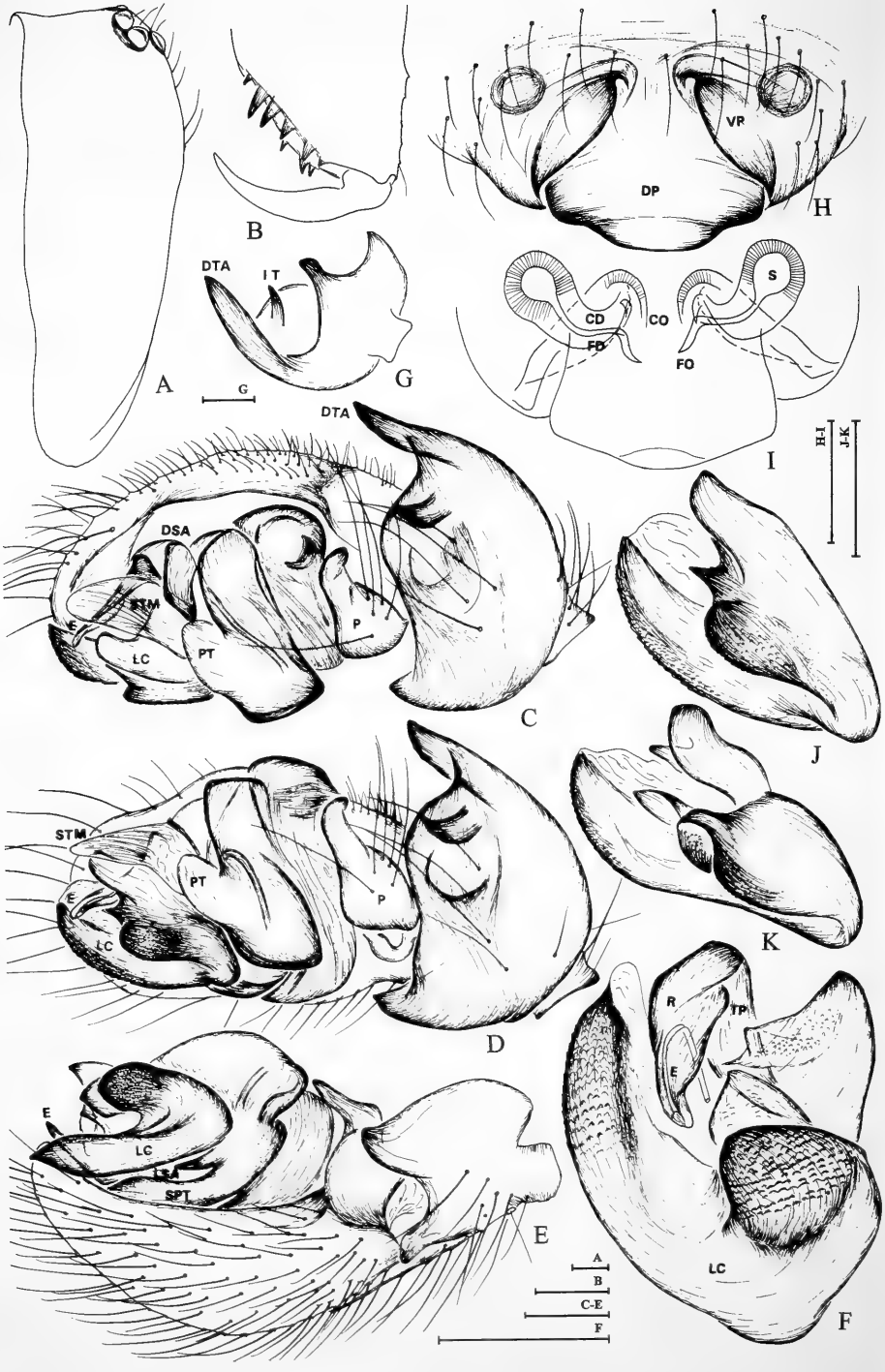
Description of male. Total length: 2.53. Carapace: 1.30 long, 0.90 wide. Abdomen: 1.33 long, 0.80 wide. Carapace (Fig. 1A) brown, unmodified, both sexes similar in general appearance. Chelicerae yellowish brown. Fang groove with six promarginal and three retromarginal teeth (Fig. 1B). Lengths of legs: I 4.06 (1.23+1.30+0.93+0.60), II 3.80 (1.10+1.20+0.90+0.60), III 3.03 (1.00+0.93+0.80+0.30), IV 4.03 (1.17+1.33+1.00+0.53). Tm I: 0.60. Sternum darker than carapace. Abdomen gray with some black spots dorsally.

Male palp (Fig. 1C-G, J). Tibia short and wide, with long, sharp dorsal apophysis (DTA) and pointed inner tooth (IT) (Fig. 1G). Embolic parts (Fig. 1F, J): ectal tip of lamella characteristica (LC) round, strongly sclerotized, equipped with scale-like teeth on outer surface and with two sclerotized projections, smaller one subtriangular, larger one less chitinized, furnished with many small granules. Embolus wide at base, narrowing apically and slightly curved at the tip in dorsal view (Fig. 1F).

Description of female. Total length: 2.53. Carapace: 1.20 long, 0.83 wide. Abdomen: 1.33 long, 0.90 wide. Lengths of legs: I 3.49 (1.03+1.13+0.80+0.53), II 3.09 (1.00+1.03+0.73+0.33), III 2.76 (0.83+0.83+0.70+0.40), IV 3.61 (1.07+1.17+0.87+0.50). Tm I: 0.60. Other somatic characters of female as in male.

Epigyne (Fig. 1H-I). In ventral view bisection of ventral plate long elliptoid, with arced margin. Copulatory ducts opening under its anterior part. Dorsal plate exposed, somewhat diamond-shaped, ventrally convex.

Etymology. The specific name comes from the latin adjective *acmodontus* (sharp tooth), and refers to the pointed inner tooth of the male tibia.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Remarks. The male of the new species is similar to that of *G. foratus* but differs in: 1) dorsal tibial apophysis (DTA) longer and sharper in the new species, shorter and stouter in the latter; 2) inner tibial tooth (IT) more pointed in the new species; 3) comparing the ectal tip of the lamella characteristica of the two species in retrolateral view (Fig. 1J-K) reveals conspicuous differences in shape. The epigyne of the female as seen in ventral view similar to that of *G. foratus*, *G. onoi* and *G. rimatus*, but each one is distinct by the shapes of the bisection of its ventral plate.

Distribution. China (Sichuan).

Gongylidioides angustus sp. n. Fig. 2

Type material examined. ♂ holotype, Lanyu, Taitung, Taiwan, China, coll. I-Min Tso, Aug. 2000 (THU-Ar-02-0239); 1 ♀ paratype, Lanyu, Taitung, Taiwan, China, coll. I-Min Tso, Aug. 2000 (THU-Ar-02-0237); 1 ♀ paratype, Lanyu, Taitung, Taiwan, China, coll. I-Min Tso, Feb. 2001 (THU-Ar-02-0238, MHNG).

Diagnosis. The male of this new species can be distinguished by its long embolus and the female by its two long, narrow, curved copulatory openings.

Description of male. Total length: 1.97. Carapace: 1.00 long, 0.70 wide. Abdomen: 0.97 long, 0.77 wide. Carapace (Fig. 2A) pale yellow, both sexes similar in general appearance, without conspicuous modifications. Chelicerae yellowish brown. Fang groove with five promarginal and five retromarginal teeth (Fig. 2B). Legs pale white, lengths of legs: I 3.17 (0.90+1.00+0.77+0.50), II 3.10 (0.90+0.97+0.73+0.50), III 2.57 (0.73+0.80+0.67+0.37), IV 3.38 (0.97+1.07+0.87+0.47). Tm I: 0.80. Sternum darker than carapace. Abdomen pale gray with some black spots dorsally.

Male palp (Fig. 2C-H). Dorsal tibial apophysis (DTA) short and stout, similar to that of *G. foratus* and *G. rimatus*, but inner tooth (IT) triangular (Fig. 2H), bigger than in *G. rimatus* (Fig. 6G). Ectal tip of lamella characteristica (LC) truncate in ventral view (Fig. 2D), with horn-shaped sclerotized projection slightly bent. Embolus long, curved, tapering off distally.

Description of female. Total length: 2.83. Carapace: 1.20 long, 0.80 wide. Abdomen: 1.80 long, 1.20 wide. Lengths of legs: I 3.50 (1.00+1.17+0.83+0.50), II 3.23 (0.93+1.00+0.80+0.50), III 2.80 (0.80+0.90+0.70+0.40), IV 3.74 (1.00+1.27+ 0.97+ 0.50). Tm I: 0.81. Other somatic characters as in male.

Epigyne (Fig. 2I-J). Bisection of ventral plate semicircular, with margins extending anterolaterally and forming a pair of long, narrow copulatory openings. Vulva with long copulatory ducts forming pair of large round loops anteriorly.

Etymology. The specific name, the latin adjective *angustus* (= narrow), refers to the long, narrow and semicircular copulatory openings of the female epigyne.

Remarks. The male of the new species is similar to that of *G. communis* Saito & Ono, 2001 in the unmodified carapace, the shape of tibia and the long curved

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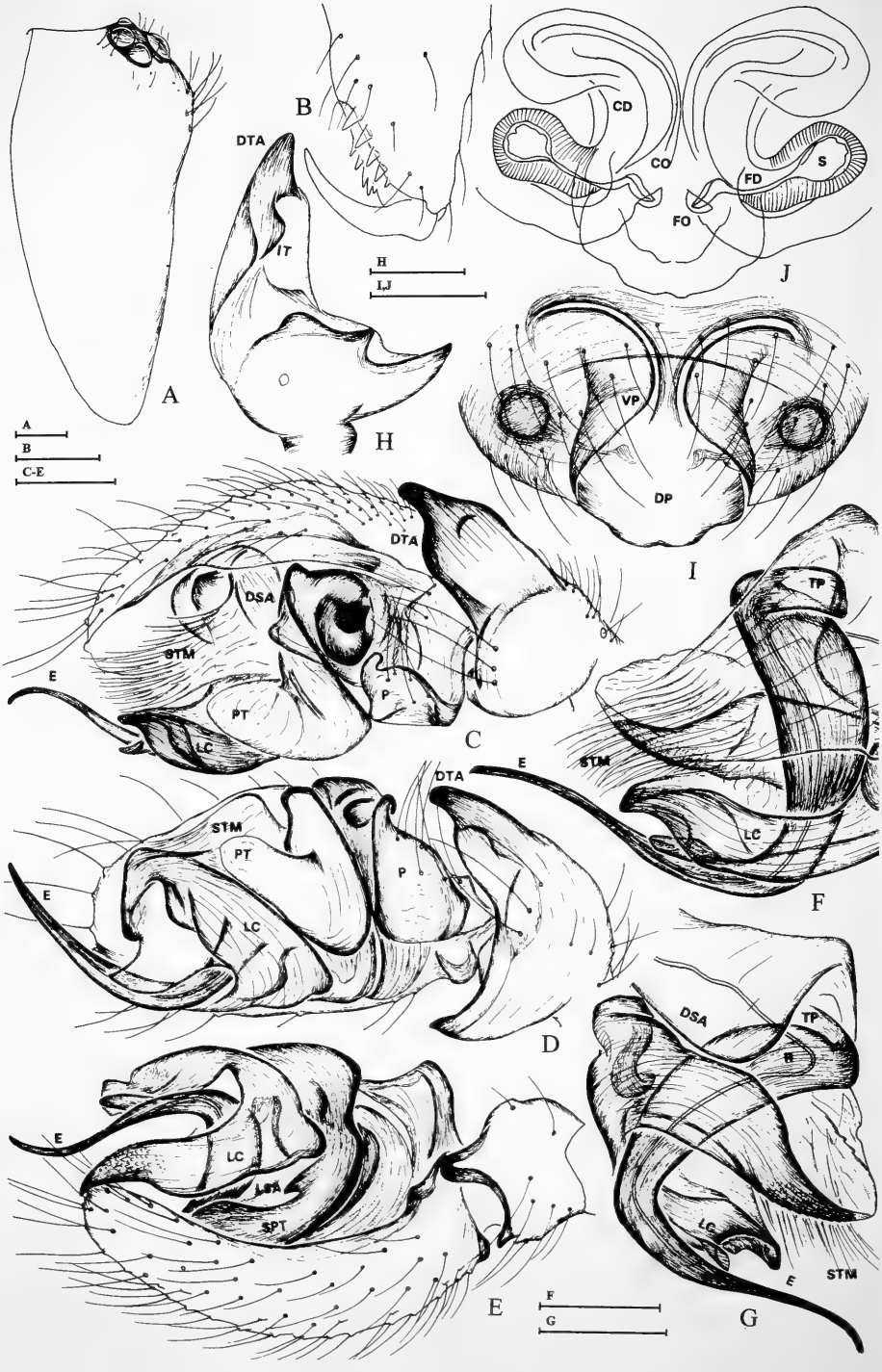
FIG. 1

A-J, *Gongylidioides acmodontus* sp. n. A, carapace, lateral view; B, left male chelicera, frontal view; C, left male palp, retrolateral view; D, ditto, ventral view; E, ditto, prolateral view; F, embolic parts, dorsal view; G, palpal tibia, dorsal view; H, epigyne, ventral view; I, vulva, dorsal view; J, lamella characteristica, retrolateral view. K, *Gongylidioides foratus*, lamella characteristica, retrolateral view. [Scale bars: 0.1 mm].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embolus, but they differ in: the protegulum of *G. communis*, not as thin sclerite as in *G. angustus* sp. n., but a large membrane extending forwards, with mamy papillae on it and the ectal tip of lamella characteristica in *G. communi* without horn-shaped, sclerotized projection. Epigyne of the female as seen in ventral view, similar to that of *G. onoi*, but anterior parts of grooves of copulatory openings ending mesally in *G. onoi*, without extending laterally as in *G. angustus* sp. n.

Distribution. Only known from the type locality.

Gongylidioides foratus (Ma & Zhu, 1990) Figs 1K, 3

Oedothorax foratus Ma & Zhu, 1990: 433, figs 8-15.
Gongylidioides foratus Eskov, 1992: 159; Song, Zhu & Chen, 1999: 170, fig. 97D-E, M.

Type material examined. 6♂ 11♀ paratypes of *Oedothorax foratus* Ma & Zhu, 1990, Muyu Town, Shennongjia Forest Region, Hubei Province, China, 18 June 1986 (JLU).

Additional material examined. 2♂, Hunan Province, China, coll. Jiuchun Gao, 1985 (without further information on the label); 1♂1♀, Hunan Province, China, coll. Jiuchun Gao, 1985 (MHNG).

Diagnosis. The male of *G. foratus* can be distinguished by the axe-shaped inner tooth (IT) of the palpal tibia and the strong ectal tip of the lamella characteristica; the female is distinguished by the triangular ventral plate.

Description of male. Total length: 2.80. Carapace: 1.50 long, 1.20 wide. Abdomen: 1.53 long, 1.00 wide. Carapace (Fig. 3A) grayish brown, both sexes similar in general appearance, unmodified. Chelicerae yellowish brown. Fang groove with six promarginal and five retromarginal teeth (Fig. 3B). Legs pale white, lengths of legs: I 4.70 (1.40+1.47+1.10+0.73), II 4.23 (1.23+1.33+1.00+0.67), III 3.60 (1.07+1.13+ 0.90+0.50), IV 4.50 (1.30+1.47+1.10+0.63). Tm I: 0.63. Sternum dark brown. Abdomen with some grayish spots dorsally.

Male palp (Fig. 3C-E). Dorsal tibial apophysis (DTA) short and stout, with axe-like tooth (IT) on inner surface (Fig. 3H). Ectal tip of lamella characteristica (LC) strongly sclerotized, concaved anteriorly, outer surface equipped with many scale-like teeth and with two projections similar to that in *G. acmodomtus*, see description and remarks in *G. acmodomtus*. Embolus widened suddenly at base, narrowing apically forming round margin and pointed tip in dorsal view (Fig. 3F).

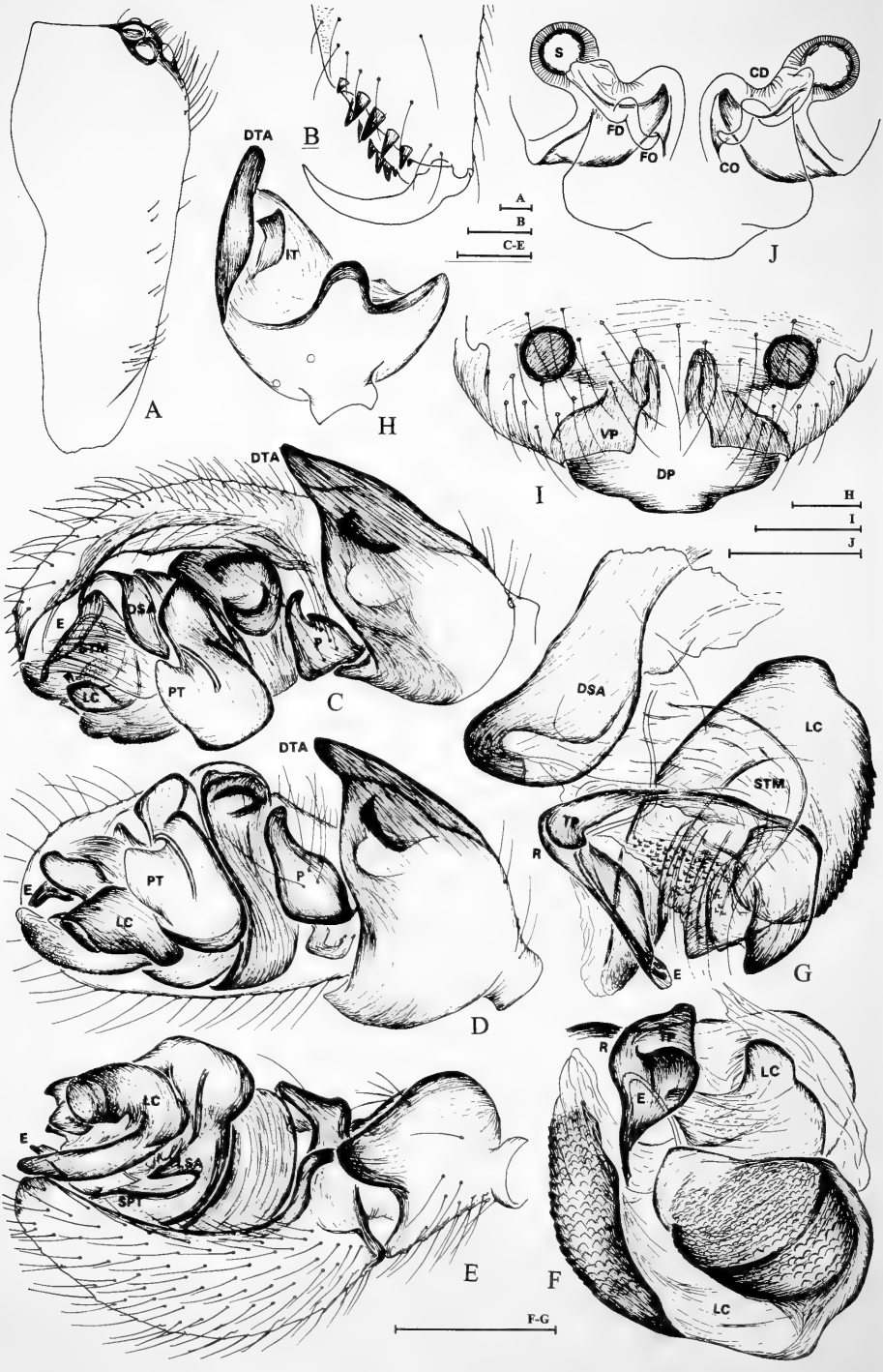
Description of female. Total length: 2.83. Carapace: 1.33 long, 1.00 wide. Abdomen: 1.57 long, 1.03 wide. Lengths of legs: I 4.20 (1.27+1.33+0.97+0.63), II 4.00 (1.20+1.33+0.90+0.57), III 3.19 (0.93+1.03+0.73+0.50), IV 4.20 (1.20+1.40+1.00+ 0.60). Tm I: 0.67. Other somatic characters of female as in male.

Epigyne (Fig. 3I-J). Bisection of ventral plate somewhat triangular, mesal margin and posterior margin almost in right angle.

Distribution. China (Hubei, Hunan).

FIG. 2

Gongylidioides angustus sp. n. A, carapace, lateral view; B, left male chelicera, frontal view; C, left male palp, retrolateral view; D, ditto, ventral view; E, ditto, prolateral view; F, embolic parts, ventral view; G, ditto, dorsal view; H, palpal tibia, dorsal view; I, epigyne, ventral view; J, vulva, dorsal view. [Scale bars: 0.1 mm].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Gongylidioides griseolineatus (Schenkel, 1936) Fig. 4

Gonatium griseolineatum Schenkel, 1936: 58, fig. 13.
Oinia griseolineata Tanasevitch, 1989: 170, fig. 222.
Gongylidioides griseolineatus Eskov, 1992: 159; Song, Zhu & Chen, 1999: 170, fig. 97I.

Type material examined. ♀ holotype of *Gonatium griseolineatum* Schenkel, 1936, Southern Gansu (without further information), China, coll. David Hummel, 1930 (SMNH, K13).

Diagnosis. The female of *G. griseolineatus* (male unknown) can be distinguished by the pair of sclerotized strongly curved folds in the centre of the epigyne.

Description of female. Total length: 3.30. Carapace: 1.67 long, 1.03 wide. Abdomen: 2.17 long, 1.70 wide. Carapace (Fig. 4A): unmodified. Ocular area black and slightly protruding. Chelicerae yellowish brown. Fang groove with five promarginal and four retromarginal teeth (Fig. 4B). Lengths of legs: I 4.99 (1.53+1.87+1.30+0.47), II 5.17 (1.53+1.87+1.30+0.47), III 3.97 (1.17+1.20+1.10+0.50), IV 4.90 (1.40+1.57+1.37+0.60). Tm I: 0.82. Sternum darker than carapace, with black margin. Abdomen pale white, with some grayish spots dorsally.

Epigyne (Fig. 4C-F). Ventral plate covering most part of epigyne. Copulatory ducts forming a pair of strongly curved folds, close to each other in the middle.

Male. Unknown.

Distribution. China (Gansu).

Gongylidioides kouqianensis sp. n. Fig. 5

Type material examined. ♂ holotype, Kouqian County, Jilin Province, China, coll. Ye Tao, 29 June 1989; 1♂ paratype, same data as for holotype.

Diagnosis. The male of *G. kouqianensis* sp. n. (female unknown) can be distinguished by the absence of a tooth on the inner surface of the dorsal tibial apophysis, which usually exists in other *Gongylidioides*, and by the horn-like ectal tip of the lamella characteristica.

Description of male. Total length: 2.40. Carapace: 1.17 long, 0.83 wide. Abdomen: 1.23 long, 0.83 wide. Carapace (Fig. 5A) brown, unmodified. Chelicerae brown. Fang groove with five promarginal and five retromarginal teeth (Fig. 5B). Legs brown, lengths of legs: I 3.36 (1.07+1.13+0.73+0.43), II 3.19 (0.93+1.03+0.73+0.57), III 2.80 (0.83+0.90+0.0.67+0.40), IV 3.53 (1.00+1.20+0.90+0.43). Tm I: 0.58. Sternum dark brown. Abdomen gray.

Male palp (Fig. 5C-G). Dorsal tibial apophysis (DTA) similar to that of *G. foratus*, but inner tooth absent (Fig. 5G). Ectal tip of lamella characteristica (LC) horn-like, strongly sclerotized, with two projections, inner one triangular in ventral view (Fig. 5F), dorsal one blunt. Embolus handgun-shaped.

Female. Unknown.

Distribution. Only known from the type locality.

FIG. 3

Gongylidioides foratus (Ma & Zhu, 1990). A, carapace, lateral view; B, left male chelicera, frontal view; C, left male palp, retrolateral view; D, ditto, ventral view; E, ditto, prolateral view; F, embolic parts, dorsal view; G, ditto, ventral view; H, palpal tibia, dorsal view; I, epigyne, ventral view; J, vulva, dorsal view. [Scale bars: 0.1 mm].

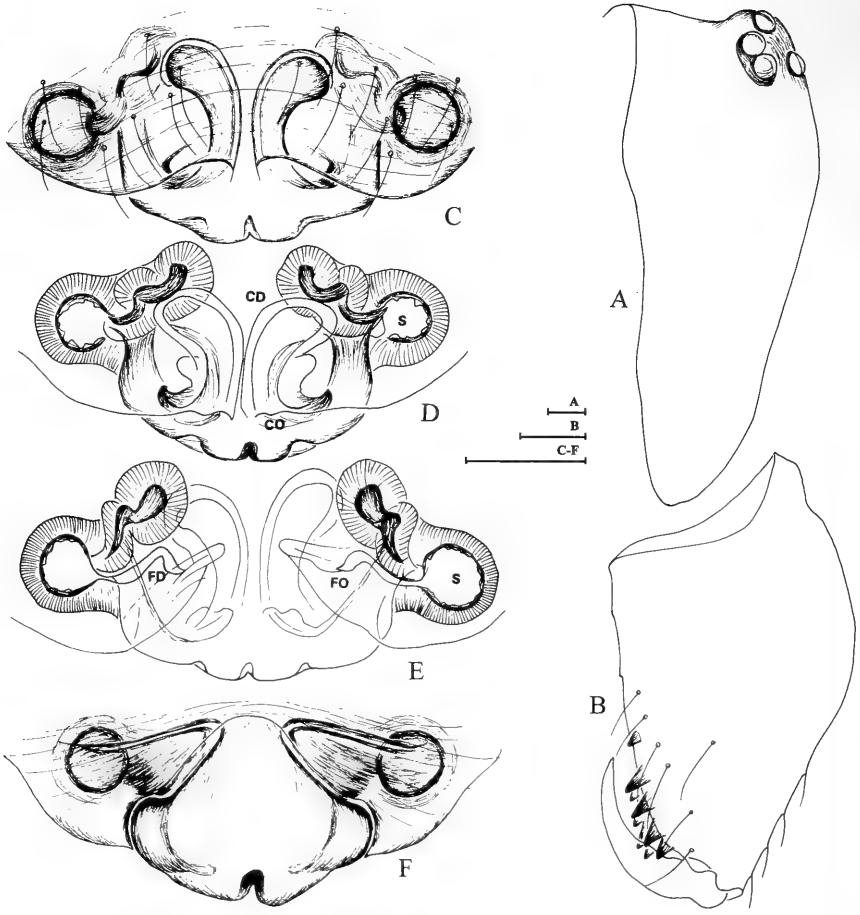


FIG. 4

Gongylidioides griseolineatus (Schenkel, 1936). A, carapace, lateral view; B, left chelicera, frontal view; C, epigyne, ventral view; D, vulva, ventral view; E, ditto, dorsal view, F, epigyne, dorsal view. [Scale bars: 0.1 mm].

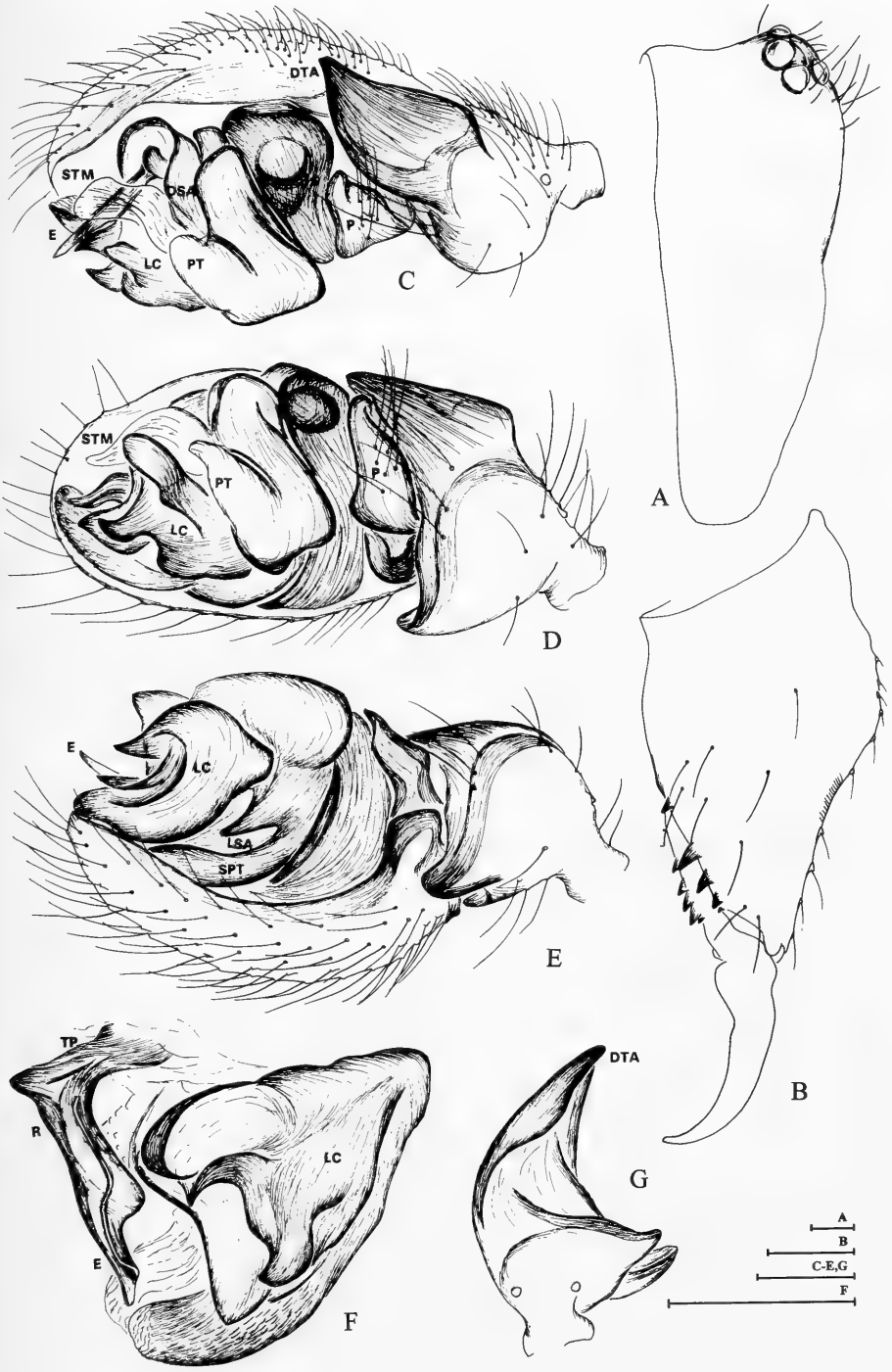
Gongylidioides onoi Tazoe, 1994

Gongylidioides onoi Tazoe, 1994: 131, figs 1-7; Tu & Li, 2004: 426, fig. 5A-I.
Aprifrontalia quadrialata Gao, Xing & Zhu, 1996: 293, fig. 2A-E; Song, Zhu & Chen, 1999: 156, fig. 85N-Q.

Type specimens examined. 2♂1♀ paratypes of *Gongylidioides onoi* Tazoe, 1994, Komi, Iriomotejima Is., Okinawa Pref., Japan, coll. A. Tanikawa, 30 Mar. 1989 (NSMT); 3♂4♀ paratypes of *Aprifrontalia quadrialata* Gao, Xing & Zhu, 1996, Mt Putuo, Zhejiang Province, China, 20 Aug. 1992 (JLU).

FIG. 5

Gongylidioides kouqianensis sp. n. A, carapace, lateral view; B, left male chelicera, frontal view; C, left male palp, retrolateral view; D, ditto, ventral view; E, ditto, prolateral view; F, embolic parts, ventral view; G, palpal tibia, dorsal view. [Scale bars: 0.1 mm].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Additional material examined. 1♂1♀, Tan Linh Village, Son Tay Province, Bavi District, Vietnam, coll. Shuqiang Li, 24 Dec. 2000 (MHNG); 1♀, Tan Linh Village, Son Tay Province, Bavi District, Vietnam, coll. Shuqiang Li, 24 Dec. 2000; 1♂, Lanyu, Taitung, Taiwan, China, coll. YiMin Tso, Feb. 2001; 1♀, Lanyu, Taidong County, Taiwan, China, coll. Guanzhou Chen, Feb. 2001.

Diagnosis. The male of *G. onoi* can be easily distinguished by the tibia with two dorsal apophyses (DTA) and by the curved, tube-shaped embolus. The female is characterized by the shape of the bisection of the ventral plate of its epigyne.

Description. This species has been thoroughly described by Tu & Li (2004).

Distribution. China (Taiwan, Zhejiang), Vietnam and Japan.

Gongylidioides rimatus (Ma & Zhu, 1990) Fig. 6

Oedothorax rimatus Ma & Zhu, 1990: 431, figs 1-7.
Gongylidioides rimatus Eskov, 1992: 159; Song, Zhu & Chen, 1999: 170, fig. 97F-G, N.

Type material examined. 5♂8♀ paratypes of *Oedothorax rimatus* Ma & Zhu, 1990, Liujiawuchang Town, Shennongjia Forest Region, Hubei Province, China, 21 June 1986 (JLU).

Additional material examined. 1♂1♀, Foping National Nature Reserve, Foping County, Shaanxi Province, China, coll. Jun Chen, 24 July 1998 (MHNG); 1♂3♀, Foping National Nature Reserve, Foping County, Shaanxi Province, China, coll. Jun Chen, 24 July 1998; 2♂, Huoditang Town, Ningxia County, Shannxi Province, China, coll. Jun Chen, 29 July 1998; 9♀, Liangfengya Village, Foping County, Shaanxi Province, China, coll. Jun Chen, 24 July 1998; 1♀, Miaotaizi Village, Liuba County, Shaanxi Province, China, alt. 1470, coll. Jian Yao, 1 July 1999; 2♀, Qiujiaba Village, Wen County, Gansu Province, China, coll. Jun Chen, 29 June 1989.

Diagnosis. The male of *G. rimatus* can be recognized by the small inner tibial tooth (IT) and by the small pointed ectal tip of the lamella characteristica. The female can be recognized by the reduced ventral plate and the exposed dorsal plate of the epigyne.

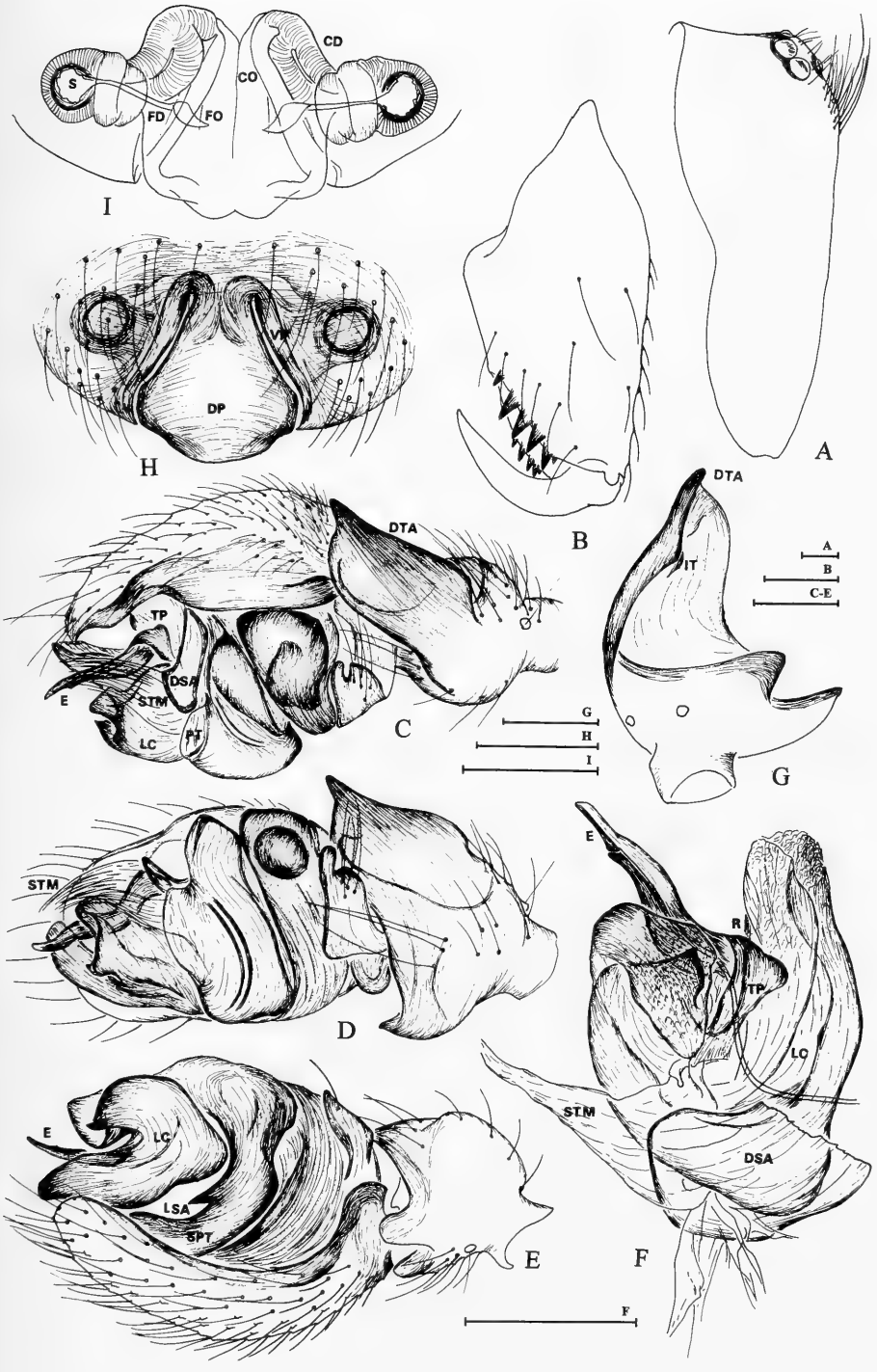
Description of male. Total length: 2.47. Carapace: 1.30 long, 0.93 wide. Abdomen: 1.40 long, 0.83 wide. Carapace (Fig. 6A) chestnut brown, in both sexes similar in general appearance, without conspicuous modifications. Chelicerae brown. Fang groove with six promarginal and four retromarginal teeth (Fig. 6B). Legs brown, lengths of legs: I 3.34 (1.07+1.10+0.67+0.50), II 3.40 (1.07+1.10+0.73+0.50), III 2.77 (0.80+0.90+0.67+0.40), IV 3.50 (1.00+1.20+0.87+0.43). Tm I: 0.64. Sternum darker than carapace. Abdomen dark gray.

Male palp (Fig. 6C-G). Dorsal tibial apophyses (DTA) similar to that of *G. angustus*, but inner tooth (IT) very small (Fig. 6G). Ectal tip of lamella characteristica (LC) small and pointed, with triangular sclerotized projection furnished with many teeth (Fig. 6F). Embolus stick like, somewhat sinuous.

Description of female. Total length: 3.00. Carapace: 1.30 long, 0.87 wide. Abdomen: 2.00 long, 1.40 wide. Lengths of legs: I 4.20 (1.27+1.33+0.97+0.63), II 4.00 (1.20+1.33+0.90+0.57), III 3.19 (0.93+1.03+0.73+0.50), IV 4.20 (1.20+1.40+1.00+0.60). Tm I: 0.73. Other somatic characters of female as in male.

FIG. 6

Gongylidioides rimatus (Ma & Zhu, 1990). A, carapace, lateral view; B, left male chelicera, frontal view; C, left male palp, retrolateral view; D, ditto, ventral view; E, ditto, prolateral view; F, embolic parts, ventral view; G, palpal tibia, dorsal view; H, epigyne, ventral view; I, vulva, dorsal view. [Scale bars: 0.1 mm].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Epigyne (Fig. 6H-I). Bisection of ventral plate much reduced, only small extension in lateral view, dorsal plate as seen in ventral view, almost exposed.

Distribution. China (Gansu, Hubei and Shaanxi).

Gongylidioides ussuricus Eskov, 1992

Gongylidioides ussuricus Eskov, 1992: 159, figs 21-26; Eskov & Marusik, 1994: 67; Song, Zhu & Chen, 1999: 170, fig. 97H, J-L.
Oedothorax longistriatus Fei & Zhu, 1992: 536, figs A-G.

Type material examined. 1♂2♀ paratypes of *Oedothorax longistriatus* Fei & Zhu, 1992, Badaogou Town, Mt Changbaishan, Jilin Province, China, 24 June 1990 (JLU).

Diagnosis. The male can be recognized by the cephalic lobe on its carapace. The female can be distinguished from those of other *Gongylidioides* by the distinct septum of the epigyne.

Description of male. Total length: 2.03. Carapace grayish brown, cephalic portion elevated into lobe behind ocular area, the frontal slope of lobe rising slowly and the back upright down, with some short hairs in front and some long hairs on top. Chelicerae brown. Fang groove with five promarginal and four retromarginal teeth. Legs brown, lengths of legs: I 3.52 (1.04+1.14+0.80+0.54), II 3.44 (0.96+1.12+0.84+0.52), III 3.06 (0.91+0.95+0.74+0.46), IV 3.93 (1.16+1.23+1.05+0.49). Tm I: 0.71. Sternum darker than carapace. Abdomen dark gray, with a long white band in the middle.

Description of female. Total length: 2.59. Carapace grayish brown, without cephalic lobe. Leg lengths: I 3.61 (1.05+1.19+0.81+0.56), II 3.37 (0.98+1.09+0.77+0.53), III 2.88 (0.88+0.88+0.70+0.42), IV 3.80 (1.12+1.19+0.95+0.54). Tm I: 0.78. Other somatic characters of female as in male.

Illustrations of genital structures, see Eskov (1992).

Distribution. China (Jilin), Russia.

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Otiorhynchus (Podonebistus) gasparoi sp. n., un Curculionide anoftalmo della Grecia (Coleoptera, Curculionidae, Entiminae, Otiorhynchini)

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***Otiorhynchus (Podonebistus) gasparoi* n. sp., a blind weevil from Greece (Coleoptera, Curculionidae, Entiminae, Otiorhynchini).** - *Otiorhynchus* (*Podonebistus*) *gasparoi* sp. n. from Megalo Spiliò Monastiraki (Acarnania – Greece) is described. This new, blind species, collected in a cave, is very closely related to some eyeless *Otiorhynchus* from Epirus and Jonian islands (Greece): *O.* (*P.*) *doriae* (Solari & Solari, 1903), *O.* (*P.*) *imprevisus* Magnano, 1998 and *O.* (*P.*) *loebli* (Osella, 1974) (all included in the subgenus *Podonebistus* Reitter, 1912 of the genus *Otiorhynchus* Germar, 1824). *Otiorhynchus* (*Podonebistus*) *gasparoi* is easily distinguishable by pronotum subparallel-sided, metafemora with very large tooth, elytral punctures vanishing and interstriae with long half-lifted setae. The taxon, probably rizophagous on *Quercus coccifera* L. roots, was collected in the Megalo Spiliò cave jointly to other cave-dwelling arthropods, like the Pseudoscorpiones (an undescribed species of *Neobisium*), Isopoda, Orthoptera and as some Coleoptera Carabidae like *Duvalius* (*Euduvalius*) *ruffoanus* Casale, Giachino, Vailati & Vigna Taglianti, 1996 and *Laemostenus* (*Antisphodrus*) *giachinoi* Casale, 1997.

Keywords: Curculionidae - *Podonebistus* - new species - Greece.

INTRODUZIONE

L'amico Fulvio Gasparo (Trieste) ci ha inviato in studio un esemplare di *Otiorhynchus* raccolto nella parte iniziale della grotta Megalo Spiliò (Acarnania – Grecia) che è risultato appartenere ad una entità inedita del sottogenere *Podonebistus* Reitter, 1914. Essa viene qui di seguito descritta con il nome di *Otiorhynchus* (*Podonebistus*) *gasparoi* n. sp. L'importanza della scoperta risiede non solo nel fatto che si tratta di una entità inedita, cieca, ma anche nel significato più strettamente zoogeografico ed ecologico. Il suo reperimento fa intravvedere come il sottogenere in discorso sia più ampiamente distribuito nella Grecia centro-meridionale ed endemizzi fortemente in particolare nell'area mediterraneo-balcanica. Il sottogenere *Podonebistus* è stato diagnosticato da Reitter (1914) (specie tipica: *Otiorhynchus prolongatus* Stierlin, 1861 - Grecia). Esso è caratterizzato, nell'ambito dei *Tournieria* Stierlin, 1861, per il corpo stretto ed allungato, per le elitre parallele nel maschio, non più larghe del protorace, per le interstrie liscie provviste di setole erette o semicoricate, per il pro-

Manoscritto accettato il 09.05.2005

torace punteggiato (almeno sul disco) ed elitre senza granuli distinti. La suddivisione del genere *Otiorhynchus* proposta da Reitter (1912a, 1912b, 1912c, 1913, 1914a, 1914b) è stato notevolmente modificata da Magnano con la creazione di nuovi generi, l'elevazione a generi a sè di alcuni sottogeneri "storici" e, soprattutto, con la suddivisione degli *Otiorhynchus* in quattro "sezioni" ognuna delle quali, a sua volta, ripartita in sottogeneri. Sempre nell'ambito di questo riordino, oltre all'individuazione dei sottogeneri, è stata proposta una diversa distribuzione negli stessi di 165 entità delle circa 1500 descritte. Scompaiono così i sottogeneri: *Otiorhynchus* s. str. Germar, 1824, *Tournieria* Stierlin, 1861, *Arammichnus* Gozis, 1882 e *Dorymerus* Seidlitz, 1890. I *Podonebistus* rientrano nella "sezione 3" caratterizzata da femori (almeno posteriori) dentati, declività delle interstrie 3° e 5° prive di tubercoli, margine esterno delle tibie anteriori diritto e margine interno, spesso, dentellato nei 2/3 distali con base del pronoto e delle elitre non strettamente connesse si da permettere una parziale visione, dall'alto, del mesotorace. I femori, infine, possono essere dentati o non dentati ma, nel primo caso, i profemori presentano un dente più sviluppato di quello (talora bifido) mediano e di quello posteriore (talora assente). Le zampe anteriori sono sempre molto più robuste delle mediane e delle posteriori. Nell'ambito di questa "sezione 3" (che include 24 sottogeneri) i *Podonebistus* si caratterizzano per: i femori dentati, il corpo stretto ed allungato, le interstrie con setole coricate, ordinate in un'unica serie. Magnano (1998) attribuisce ai *Podonebistus*, oltre alle entità elencate in Winkler (1932) (con l'esclusione di *O. prolixus* Rosenhauer, 1847 trasferito al subgenere *Troglorhynchus*) anche le seguenti che, per l'assenza degli occhi, erano state dagli AA attribuite al genere *Troglorhynchus* Schmidt, 1854:

Troglorhynchus beroni Angelov, 1985 - Bulgaria

Troglorhynchus doriae A. Solari & F. Solari, 1903 – Isola di Zante

Troglorhynchus gueorguievi Angelov, 1985 - Bulgaria

Troglorhynchus winkleri Solari, 1955 (ora *imprevisus* Magnano, 1998 nomen novum) – Isola di Corfù

Troglorhynchus loebli Osella, 1974 – Epiro.

A queste specie va aggiunto *Troglorhynchus angelovi* Guéorguiev & Petrov, 2004. (Bulgaria) e la specie di seguito descritta.

A *Podonebistus* sono attribuiti, alla data odierna, 24 specie distribuite nei Balcani, Europa orientale, Medio Oriente, Asia occidentale. Una specie (*Otiorhynchus holdhausi* A. Solari & F. Solari, 1913) è presente nell'Italia meridionale (Puglia, Calabria).

La biologia dei *Podonebistus* è sconosciuta. Le immagini delle entità epigee si raccolgono sotto pietre o nel terriccio di foreste a latifoglie. *Otiorhynchus* (*P.*) *holdhausi* A. Solari & F. Solari, 1913 è stato raccolto, in Italia, su *Crataegus monogyna* Jacq. (dati inediti).

Otiorhynchus (Podonebistus) gasparoi sp. n. Figs 1-3

Loc. typ.: Megalo Spiliò, Monastiraki, Grecia.

Materiale esaminato. Holotypus maschio etichettato "Grotta Megalo Spiliò, m 1000, Oros Sérekas, Monastiraki, Acarnania, F. Gasparo legit, 1.IX.2004" (conservato nelle collezioni del Museo Civico di Storia Naturale di Ginevra).

Diagnosi. Specie vicina agli *Otiorhynchus* (*Podonebistus*) ciechi, depigmentati dell'Epiro e delle isole Jonie di Grecia, in particolare ad *O.* (*P.*) *doriae* (Solari & Solari, 1903) ed *O.* (*P.*) *loebli* Osella, 1974 (Epiro), ma ben differenziato per il pronoto a lati subparalleli (Fig. 1) (ricurvi nelle due specie succitate) per il dente dei metafemori molto espanso (Fig. 2), per la punteggiatura delle strie elitrali quasi del tutto svanita e per le setole delle interstrie nettamente più lunghe semirilevate.

Descrizione. Corpo allungato, lucidissimo, brillante, anoftalmo, elitre con setole semirilevate, strie elitrali appena segnate con punteggiatura svanita, interstrie piane più larghe delle strie, con setole lunghette, femori dentati (Fig. 2). Rostro allungato (circa quattro volte il capo), dorsalmente a lati paralleli, con pterigi ampi, anteriormente aperti. Antenne allungate e sottili con scapo rettilineo, regolarmente ingrossato dalla base all'apice, con punteggiatura superficiale, sparsamente setoloso che, all'indietro, supera di poco il margine anteriore del pronoto. Funicolo alquanto più lungo dello scapo, setoloso, 1° e 2° articolo cilindrici, allungati (ma il 1° è leggermente più lungo del 2°), 3° e 4° alquanto più stretti dei primi due, appena più lunghi che larghi, 5° e 6° subsferici, 7° obconico un po' più lungo del 6°; clava ellittica, pubescente, debolmente appuntita. Capo sferico, liscio e brillante. Occhi assenti. Pronoto cilindrico, convesso dorsalmente, nettamente più lungo che largo, sparsamente e superficialmente punteggiato, con setole semirilevate e margini laterali debolmente arrotondati. L'ampiezza maggiore si osserva all'incirca a metà. Scutello assente. Elitre cilindrico-allungate, due volte più lunghe del protorace, debolmente zigrinate, leggermente convesse, con sutura evidente solo nella parte anteriore, strie mal visibili con punteggiatura appena accennata; interstrie, tre volte circa più larghe delle strie, piane, finemente punteggiate con setole semirilevate la cui lunghezza è pari a circa i 2/3 della larghezza delle interstrie. Strie ed interstrie sono particolarmente evidenti caudalmente (soprattutto la 5° interstria che dà alla specie vagamente l'aspetto che caratterizza *Otiorhynchus* (s.str.) *caudatus* (Rossi, 1792). Zampe lunghe e gracili con femori clavato-dentati, con dente particolarmente largo (triangolare) nei metafemori (Fig. 2). In tutti i femori, tra dente ed articolazione femoro-tibiale, sono presenti asperità granuliformi. Tibie dentellate sul margine interno, ad apice setoloso. Tarsi allungati, setolosi, gracili con 1° articolo cilindrico-conico, 2° sferico, 3° bilobo; onichio molto lungo e ricurvo (più lungo del 1°-2° articolo tarsali sommati insieme), unghie ricurve, anch'esse lunghe. Dal lato ventrale il rostro presenta un solco mediano netto che si prosegue con la sutura del capo. Prosterno e mesosterno finemente zigrinati; metasterno lievemente infossato medialmente. Urosterniti lisci, con piccola e sparsa punteggiatura e qualche setola lateralmente. Urosternite 1° lievemente incavato medialmente, alquanto più largo, medialmente, del 2°, separato da quest'ultimo per una sutura ricurva centralmente. Urosterniti 3° e 4° subeguali, stretti, meno larghi, sommati insieme, del 2°. Procoxe molto rilevate sferico-coniche, contigue; mesocoxe meno rilevate, brevemente separate alla base; metacoxe appiattite, ampiamente distanziate (lo spazio che le separa è pari a circa tre volte il diametro delle mesocoxe). Apparato genitale: Fig. 3. La struttura, negli *Otiorhynchus*, degli apparati genitali sia maschili sia femminili, riveste notevole importanza tassonomica, almeno a livello di "gruppi di specie" come dimostrato dagli autori a partire da Müller (1937). Nel caso nostro, tuttavia, i dati di letteratura sono ancora pochi per un discorso comparativo. In parti-

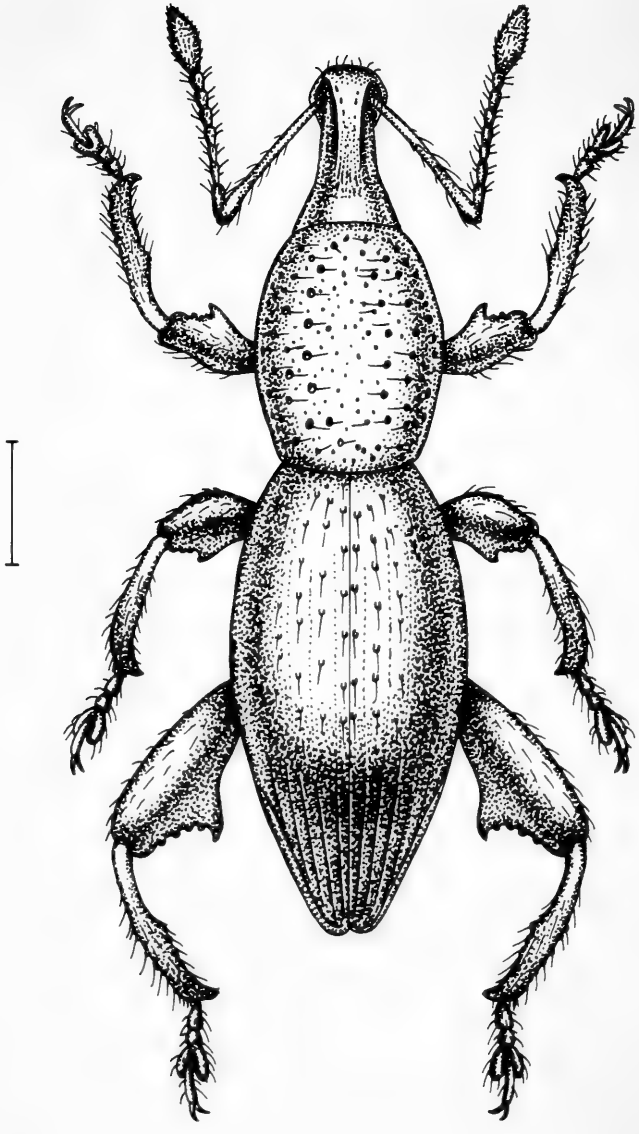

FIG. 1
Otiorhynchus (*Podonebistus*) *gasparoi* sp. n. (holotypus).

colare, per il caso specifico dei *Podonebistus* non si conosce alcunché in argomento per le entità greco-joniche geograficamente e morfologicamente vicine ad *Otiorhynchus* (*P.*) *gasparoi* n. sp. I materiali da noi esaminati, in passato [*Otiorhynchus* (*P.*) *loebli* ed *O.* (*P.*) *winkleri*] erano femmine. La struttura dell'edeago in *O. gasparoi* è peculiarissima non solo rispetto a quella di *O.* (*P.*) *angelovi* e ad *O.* (*P.*) *beroni* illustrate da Guéorguiev & Petrov (2004) ma altresì da ogni altro *Otiorhynchus* cono-

FIG. 2
Otiorhynchus (*Podonebistus*) *gasparoi* sp. n.: particolare della zampa.

sciuto. Sono ovviamente necessarie ulteriori indagini per meglio comprendere il significato tassonomico-evolutivo della struttura in oggetto ma ci sembra indubbio il fatto che le entità greco-joniche cieche costituiscano un gruppo a sé ben differenziato rispetto a quello delle entità anch'esse anoftalme ed ipogee di Bulgaria (vedi Note Comparative).

Misure dell'Holotypus. Lunghezza totale incluso il rostro: 7.27 mm. Lunghezza del rostro: 1.38 mm. Larghezza del rostro incluse le scrobe: 0.69 mm. Larghezza del rostro escluse le scrobe: 0.52. Lunghezza del capo: 0.27 mm. Larghezza del capo: 0.93 mm. Lunghezza dello scapo: 1.27 mm. Lunghezza del 1° articolo del funicolo: 0.34 mm. Lunghezza del 2° articolo del funicolo: 0.27 mm. Lunghezza del 3° articolo del funicolo: 0.17 mm. Lunghezza del 4° articolo del funicolo: 0.17 mm. Lunghezza del 5° articolo del funicolo: 0.17 mm. Lunghezza del 6° articolo del funicolo: 0.17 mm. Lunghezza del 7° articolo del funicolo: 0.19 mm. Lunghezza del funicolo: 1.48 mm. Lunghezza della clava: 0.48 mm. Lunghezza del pronoto: 2.10 mm. Larghezza del pronoto: 1.59 mm. Lunghezza delle elitre: 3.79 mm. Larghezza delle elitre: 2.07 mm. Larghezza della base delle elitre: 1.38 mm.

Derivatio nominis. Con piacere dedichiamo la n. sp. al raccoglitore Dr. Fulvio Gasparo, entomologo e biospeleologo di vaglia cui si devono scoperte di grande rilievo per la migliore conoscenza dell'ambiente cavernicolo italiano e mediterraneo.

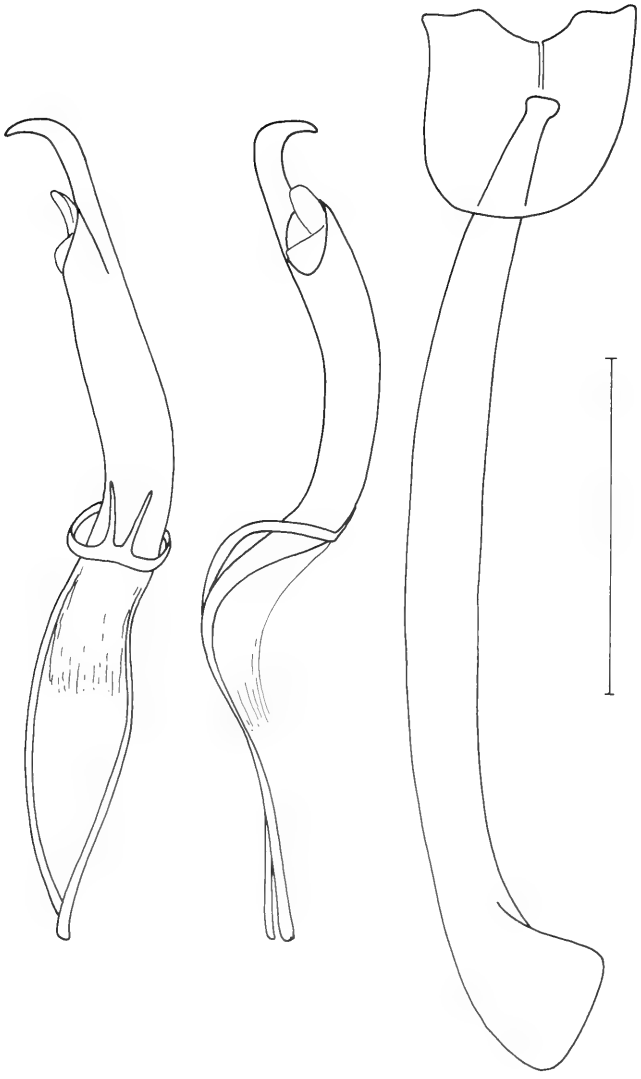

FIG. 3
Otiorhynchus (*Podonebistus*) *gasparoi* sp. n.: edeago e spiculum gastrale.

Note comparative. La nuova specie rientra nell'ambito dei *Podonebistus* ciechi greco-jonici tipici abitatori dell'ambiente cavernicolo e forestale di superficie (Fig. 4). Questo gruppo comprende le seguenti specie: *Otiorhynchus* (*Podonebistus*) *doriae* (Solari & Solari, 1903) (Cefalonia), *O.* (*P.*) *loebli* (Osella, 1974) (Epiro), *O.* (*P.*) *imprevisus* Magnano, 1998 [nomen novum per *O.* (*P.*) *winkleri* Solari F., 1937 (Zante)]. Il gruppo si caratterizza per la punteggiatura del corpo fine, il pronoto allungato (circa due volte più lungo che largo) ed i metafemori dentellati sul margine

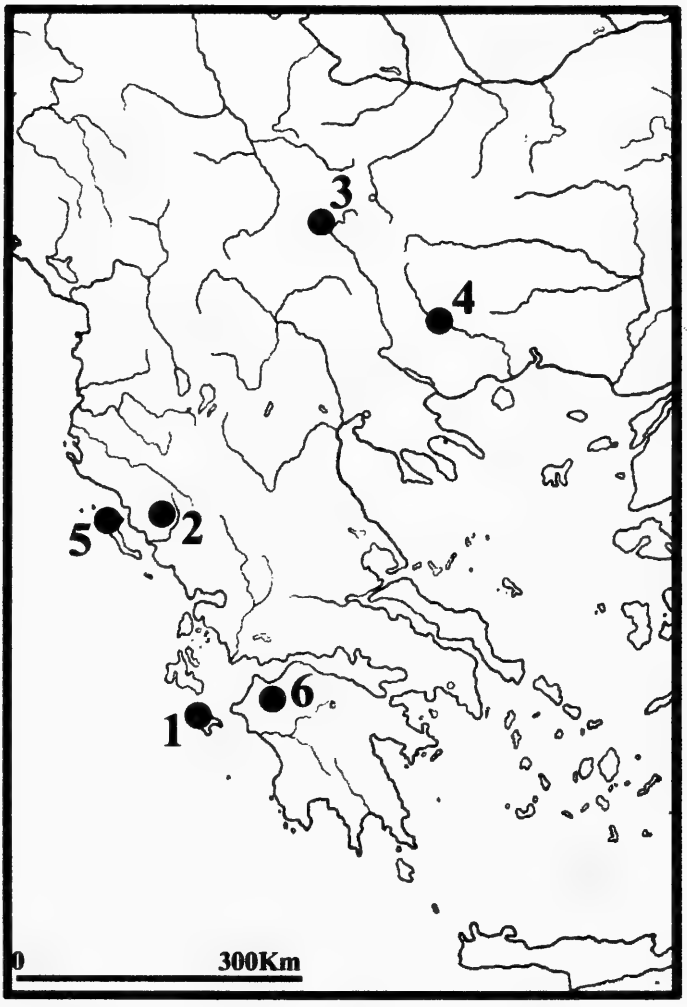

FIG. 4

Distribuzione del sottogenere *Podonebistus* : *Otiorhynchus* (*Podonebistus*) *doriae* (Solari & Solari, 1903) (1), *O.* (*P.*) *loebli* (Osella, 1974) (2), *O.* (*P.*) *gueorgievi* Angelov, 1985 (3), *O.* (*P.*) *beroni* Angelov, 1985 (4), *O.* (*P.*) *imprevisus* Magnano, 1998 (5), *Otiorhynchus* (*Podonebistus*) *gasparoi* sp. n. (6).

interno. Pertanto tutte queste specie si differenziano notevolmente dai tre *Otiorhynchus* (*Podonebistus*) noti per la Bulgaria: *O.* (*P.*) *beroni* Angelov, 1985 (Monti Rodopi) ed *O.* (*P.*) *gueorgievi* Angelov, 1985 (Stara Planina), *O.* (*P.*) *angelovi* Guéorguiev & Petrov (2004) (Rodopi orientali) anch'essi ciechi, depigmentati, ma con rostro molto più allungato, conico, con pronoto all'incirca lungo quanto largo, con punteggiatura del pronoto e delle elitre nettamente più evidente. Sembra pertanto fuori discussione che essi appartengano ad un diverso gruppo di specie che, in comune con le entità greco-

joniche, abbiano esclusivamente la depigmentazione e l'anoftalmia. *O. gasparoi* si avvicina per la conformazione del corpo e la punteggiatura ad *O.* (*P.*) *loebli* e, soprattutto, a *O.* (*P.*) *doriae* da cui si differenzia per la punteggiatura svanita delle strie elitrali, le setole delle interstrie semirilevate, nettamente più lunghe e per il dente dei metafemori triangolare molto più grande. Più evidenti ancora sono le differenze che separano *O. gasparoi* dalle altre due entità (entrambi insulari), in particolare da *O.* (*P.*) *imprevisus* che si presenta elitre più ristrette apicalmente e punteggiatura delle strie elitrali nettamente marcata, nonché setole elitrali brevissime (cfr. Osella, 1974).

Note ecologiche. Secondo quanto ci comunica F. Gasparo (lettera in data 26 settembre 2004) la nuova specie "... è stata rinvenuta alla base della breve china iniziale a circa 10 m dall'entrata della cavità sotto un frammento di crostone calcitico poggiato su argilla in una zona con radici superficiali probabilmente di *Quercus coccifera* di cui sono presenti alcuni esemplari nell'arido canalone dove si trova l'ingresso". La Grotta Megalo Spiliò è ben nota ai biospeleologi per essere la patria tipica di *Duvalius* (*Euduvalius*) *ruffoanus* Casale, Giachino, Vailati & Vigna Taglianti, 1996 e *Laemostenus* (*Antisphodrus*) *giachinoi* Casale, 1997. Nella grotta sono stati rinvenuti anche Pseudoscorpioni del genere *Neobisium* (una probabile n. sp.) (Casale, 1997) nonché Isopodi e Ortotteri del genere *Dolichopoda* ancora indeterminati. Pur trattandosi di una cavità non molto estesa (una cinquantina di metri) risulta popolata da una fauna varia e molto interessante sia sotto il profilo faunistico sia sotto quello dell'origine biogeografia del popolamento. *O. gasparoi* è il solo *Podonebistus* greco-jonico raccolto in grotta. Pur non trattandosi di entità cavernicole (come tutti i Coleotteri Curculionoidei dell'ambiente ipogeo) presenta tuttavia alcuni caratteri adattativi peculiari, quali la punteggiatura svanita delle elitre ed i tegumenti brillanti. Ricordiamo poi che *Podonebistus* è uno dei quattro sottogeneri di *Otiorhynchus* con specie anoftalme o microftalme che, in passato, erano attribuiti a *Troglorhynchus*: *Jelenantus* Reitter, 1912, *Namertanus* Reitter, 1912, *Troglorhynchus* Schmidt, 1854, *Lixorhynchus* Reitter, 1914. Ad essi va aggiunto *Baldorhynchus* (Di Marco & Osella, 2002), l'unico sottogenere invece con specie tutte anoftalme.

Osservazioni zoogeografiche. E' interessante osservare come la distribuzione dei *Podonebistus* anoftalmi balcanici ricalchi quella dei Coleotteri Carabidi del genere *Duvalius* Delarouzé, 1859 (Casale *et al.,* 1996). Infatti *Duvalius* (*Euduvalius*) *ruffoanus* (Casale *et al.,* 1996), noto esclusivamente della Grotta Megalo Spillò, rientra nell'ambito dei *Duvalius* ad affinità illirico-dalmata ben diversi dai *Duvalius* macedono-bulgari. Similare osservazione è rilevabile per i *Podonebistus* qui analizzati. Ulteriori considerazioni non sono, al momento, proponibili data la carenza delle nostre conoscenze per l'area balcanica ed, in particolare, per la Grecia continentale.

RINGRAZIAMENTI

Siamo molto grati all'amico Fulvio Gasparo per l'invio di questa specie di *Otiorhynchus* veramente notevole che arricchisce le nostre conoscenze sulla fauna endogea della penisola greca. Un ringraziamento infine al revisore del testo per i suggerimenti fornitici.

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Northeast African racers of the *Platyceps rhodorachis* complex (Reptilia: Squamata: Colubrinae)

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Northeast African racers of the *Platyceps rhodorachis* complex (Reptilia: Squamata: Colubrinae). - Racers from Eritrea and the Dahlak archipelago to central Somalia usually referred to *Platyceps rhodorachis subniger* (Boettger, 1893) are remarkable for the homogeneity of their scale features (e.g., preocular, anterior subocular, supralabials, ventrals, subcaudals, and dorsal scale rows). This taxon is morphologically closest to southern Arabian populations of Jan's cliff racer, *P. rhodorachis* auct.

Keywords: *Platyceps rhodorachis subniger* - *P. rhodorachis* auct. - *P. rhodorachis* group - morphology - distribution.

INTRODUCTION

Since Parker's (1949) revalidation of *Platyceps rhodorachis subniger* (Boettger, 1893a) within the hotchpotch racer genus *Coluber* auct., this taxon was understood to include NE African populations of *P. rhodorachis* (Jan, 1863). But Jan's cliff racer, long thought to be distributed from the central Sahara (Ahaggar Mountains) and the Horn of Africa to the Indian subcontinent, may not occur west of the Euphrates and adjacent areas of the Arabian Peninsula.

Platyceps rhodorachis auct. is a systematic complex including, for instance, *P. afarensis* Schätti & Ineich, 2004 from Djibouti and *P. saharicus* Schätti & McCarthy, 2004. The latter encroaches upon the northwestern corner of the Arabian Peninsula and is sympatric with a yet unassigned taxon ("*Platyceps* sp.") from Jordan to southern Arabia that may belong to Jan's cliff racer.

This study, a further step towards a systematic revision of Afro-Arabian racers of the *Platyceps rhodorachis* group, investigates morphological features (pholidosis, dorsal colour pattern, dentition, hemipenis) of populations from Eritrea to central Somalia usually assigned to Jan's cliff racer.

MATERIAL AND METHODS

Sixty-five specimens from virtually the whole distribution range were analyzed. They are deposited in The Natural History Museum (formerly British Museum [Natural History]), London (BMNH), the Field Museum of Natural History, Chicago (FMNH), Muséum National d'Histoire Naturelle, Paris (MNHN), Museo Civico di

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Storia Naturale, Genova (MSNG), Museo Civico di Storia Naturale, Milano (MSNM), Museo Zoologico dell'Università di Firenze ["La Specola"] (MZUF), Museo ed Istituto di Zoologia sistematica della Università, Torino (MZUT), Naturhistorisches Museum, Wien (NMW), and the Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main (SMF).

The comparative sample of 47 Arabian *Platyceps rhodorachis* auct. (Appendix) is made up of specimens borrowed from four of the above mentioned institutions (BMNH, FMNH, MZUT, NMW) as well as the California Academy of Sciences (CAS) and the Muséum d'Histoire Naturelle, Genève (MHNG). LIVM stands for the Liverpool Museum (Department of Zoology).

Morphological terms and measurements are defined in Schätti (1988) and Schätti & McCarthy (2004). Numbers in parenthesis indicate intraspecific variation. The scale formulae give the dorsal scale row (dsr) counts at the 15th ventral, midbody (msr), and five ventrals prior to the vent. The reduction pattern is expressed in terms of ventrals and as a percentage of their total number (%ven), based on the average of the right and left side. Maxillary teeth were usually examined on the right bone. The length of the hemipenis *in situ* and the insertion of the *M. retractor penis magnus* are given in absolute numbers of subcaudals and as a percentage thereof (%sub).

The synonymy lists references presenting new material and other relevant information, accession numbers of specimens examined by the author (usually cited at their first mention), and material studied by other herpetologists (in brackets). To be consistent with, for instance, Lanza (1981) and Largen & Rasmussen (1993), most coordinates and the spelling of place names are theirs; other coordinates are from the Gazetteers of the United States Board on Geographic Names (Ethiopia, Somalia) and the GEONET database (http://earth-info.nima.mil) or from collector's notes (MZUF 2599).

RESULTS

Platyceps rhodorachis subniger (Boettger, 1893) – Boettger's racer

?*Z.[amenis] florulentus*. - Parenti & Picaglia, 1886: 69 ("Coste del Mar Rosso" [not examined]).

Zamenis ladacensis var. *subnigra* Boettger, 1893a: 118 - "Ogadeen, Somaliland" (SMF 62595, subad. ♂, not examined).

Zamenis ladacensis Aud. [sic] var. *subnigra*. - Boettger, 1893b: 132 (checklist: "Somaliland").

Zamenis rhodorhachis [sic]. - Boulenger, 1896a: 553 ("Assab" [Aseb]: MSNG 30554, see footnote 2); Boulenger, 1896b: 623 ("Zaila" [Zeila]: BMNH 95.11.27.12, see footnote 2).

Zamenis rhodorhachus [sic]. - Meek & Elliot, 1897: 179 ("South of Toyo Plain": FMNH 374).

Zamenis rhodorhachis [sic]. - Boulenger, 1901: 49 (Biji: BMNH 1900.11.28.5); Calabresi, 1927: 53 (fide Boettger, 1893a; Boulanger, 1901).

Zamenis rhodorhachis [sic] *ladacensis* Anderson, 1871. - Scortecci, 1928: 299 ("Isole presso Massaua" [Mesewa, Shaykh Sayd Island (?)], "Isole Daalac" [Dahlak Al-Kabir]: MSNM 1885-86); Vinciguerra, 1931: 101 ("Gaarre" [Gaare, 13°13'N 42°07'E, approx. 150 m a.s.l.]).

Coluber rhodorhachis [sic]. - Parker, 1932: [337] 362 ("near Dagah Shabell" [♂♀, juv., incl. 1931.8.1.172 and 174]: BMNH 1931.8.1.173).

Coluber rhodorachis. - Loveridge, 1936: 27 (see Meek & Elliot, 1897).

Coluber rhodorhachis subnigra [sic]. - Parker, 1949: [28] 30, Figs 1-4 (9°57'-11°25'N 42°40'-45°07'E: incl. BMNH 1949.2.1.49-51, 1949.2.2.61) [1].

Coluber rhodorachis subniger. - Lanza, 1963: [388] 390, Fig. 5 [map] ("Abal Uen", Bosaso, Candala, "Carim" [Carin], Eil, "Galcaio" [Galka'yo], "Ghed Med Med": MSNM 1241, 2140, 2142-43; MZUF 918, 2599, 2600).

Coluber rhodorhachis subnigra [sic]. - Gans *et al.*, 1965: 61 (Candala [MCZ 71862]).

Coluber rhodorhachis [sic] *subniger*. - Lanza, 1983: 223 ("north Ethiopia; Somalia" [northern Somalia and Mudug Province]).

Coluber rhodorachis [*subniger*]. - Schätti, 1989: 928 (Dikhil: MZUF 36364); Largen & Rasmussen, 1993: [334] 335 [412], Fig. 1 [Dahlak Al-Kabir], map 13 ("near Berbera", Bulhar, Hargeisa, "SW shore of Dahlac Island": BMNH 1905.10.30.120-121, 1911.5.22.2-4, 1954.1.12.81, 1973.3212, see footnote 1); Largen, 1997: 89 ("Difrein Island" [Difnein, Dahlak archipelago, LIVM 1994.77] and "eastern Ethiopia", see Morphology and Distribution).

Platyceps rhodorachis. - Schätti, 2001: 140 [148] (Dahlak archipelago [review]).

Coluber rhodorachis subniger. - Ineich, 2003 ("Djibouti" [five MNHN specimens], La Hadge ["près de Djibouti", MNHN 1973.422], Maskali ["11°42,85'N - 43°09,46'E", MNHN 1999.6576] and Musha Island [11°42'59"N 43°12'22"E, MNHN 1981.477], Randa [11°50'49"N 42°39'38"E, MNHN 9599-9601], Gulf of Tadjura area ["environs du Golfe"]: incl. BMNH 1971.1477, MNHN 1960.116-119).

Platyceps rhodorachis subniger. - Schätti & Ineich, 2004: 685 [687] (comb. n.).

Material examined (Specimens marked with an asterisk were used for the calculation of cephalic indices; a † denotes an adult [MZUF 6697, damaged] and two juveniles without data; ventral counts are missing in four damaged specimens, i.e., MNHN 1960.116, MSNM 2143, MZUF 6698, and MZUT 650). DJIBOUTI: BMNH 1971.1477 ("Djibouti" [11°36'N 43°09'E], ♀); MNHN 1960.116-119 (vic. Tadjura [11°47'N 42°53'E], ♂♂♀♀), *2001.649 and (*)2001.652-53 (Arta, 11°31'N 42°51'E, approx. 700 m a.s.l., ♀♀♂); MZUF 36364 (Dikhil, 11°07'N 42°22'E, ♀). ERITREA: BMNH 1973.3212 (Dahlak Al-Kabir, 15°35'N 40°15'E, ♀); MSNG *30554 (Aseb, 13°01'N 42°44'E, ♀, see footnote 2); MSNM †1885 ("Isole presso Massaua"

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[1] Parker's (1949) material (BMNH 1949.2.1.49-55, 1949.2.2.61, and 1949.1.3.47) is reported from the Zeila and Berbera region, i.e., *11°25'N 43°15'E, 0-150 feet a.s.l. (5 specimens), *10°35'N 42°40'E, 2'500-3'000 ft. (1949.2.1.52-53), 10°45'N 43°E, 3'000 ft. (1949.2.1.55), and 9°57'N 45°07'E, 4'800 ft. (1949.1.3.47). The file register in the BMNH gives all specimens as from «Somaliland» and lists, for instance, 1949.2.1.49-51 (3 ♀♀) from 11°25'N 45°15'E, 1949.2.1.55 as a female (♂ according to Parker, 1949) from *10°25'N 43°15'E, and 1949.1.3.47 from «Tidah Yehi, 4'040 ft.» at *9°55'N 45°07'E (see also Material examined). Coordinates marked with an asterisk were used for the preparation of the map (Fig. 1); the collecting site at 10°35'N 42°40'E is shown on Ethiopian territory in Largen & Rasmussen (1993: map 13).

[Shaykh Sayd Island (?): 15°35'N 39°29'E], juv.), †1886 (Dahlak Al-Kabir, juv. ♂); MZUT 650 (Aseb, ♂); NMW 36146 (Harat, Dahlak archipelago, 16°06'N 39°27'E, subad.). SOMALIA: BMNH 95.11.27.12 (Zeila, 11°21'N 43°30'E, juv., see footnote 2), 1900.11.28.5 (Biji, 10°11'N 44°06'E, ♂), 1905.10.30.120-121 ("near Berbera", ca. 10°25'N 45°02'E, ♀, juv.), 1911.5.22.2-4 (Bulhar, 10°23'N 44°25'E, ♀♀), 1931.8.1.173 ("5 mls. S. Dagah Shabell [D. Shabel, 10°09'N 43°13'E], 500 m", ♀), 1949.2.1.49-51 and 1949.2.2.61 (11°25'N 43°15'E, see footnote 1, ♀♀, ♂), 1954.1.12.81 (Hargeisa, 9°33'N 44°04'E, ♂), 1956.1.3.15 (Al-Medu [Al-Mado Mts., "5000', 100 mls. E Erigava" (Erigavo)], ca. 11°00'N 48°30'E, ♂); FMNH 374 ("South of Toyo Plain", ca. 9°15'N 45°00'E, subad. ♀); MSNM 1241 (Bosaso [Bender Cassim], 11°17'N 49°11'E, ♂), 2140 (Galka'yo, 6°46'N 47°25'E, ♀), 2142 (Candala [Qandala], 11°23'N 49°53'E, ♂), 2143 (Carin [Karin], 10°59'N 49°13'E, ♀); MZUF *918 (Eil, 7°58'N 49°48'E, ♂), 2599 ("Ghed Med Med", ca. 11°11'N 49°45'E, ♀), *2600 ("Abal Uen" [Abal Uein Mts.], 11°17'N 49°40'E, ♂), *6679-6706 [†6697, ♀] (Galgalo [Galgala], 11°00'N 49°03'E, 8 ♂♂, 20 ♀♀; all with head measurements).

MORPHOLOGY

Rostral 1.81-2.11 times broader than high. Internasals shorter (or much shorter) than prefrontals. Frontal 1.28-1.59 times longer than broad, 1.18-1.67 times longer than internasals and prefrontals, 0.87-1.07 times as long as parietals. Posterior border of parietals straight, rounded (convex), or forming an obtuse (concave) angle; indented at the median suture or not; lateral border distinctly constricted above the second row of temporals in BMNH 1973.3212. Head 2.21-2.51 times longer than broad.

Distance from the nostril to the eye 0.83-0.98 times the length of the internasals and prefrontals. Loreal longer, or much longer, than high; below touching third and posterior portion of second supralabial. Preocular single and usually in contact with frontal except in MZUF 6679 (left), 6689, and 6700; the mention of two preoculars (Gans *et al.*, 1965) probably includes the anterior subocular. The latter single except on left side of MZUF 918 (absent); fused on right side with fifth supralabial in MZUF 6701. Nine supralabials (eighth and ninth virtually fused in MZUF 6695), fifth and sixth in contact with eye, last three being larger. Two postoculars; upper larger, coalesced with supraocular on left side in BMNH 1973.3212. Posterior subocular absent. Two anterior (lower larger) and usually three posterior temporals (two in MZUF 6705, and on one side of BMNH 1971.1477, MSNM 2140, MZUF 6699, 6700, and 6702); upper second temporal on left side of MZUF 6685 elongate, extending along lateral edge of parietal to its posterior border.

Ten sublabials, nine on right side of MZUF 6706, eleven in MNHN 2001.652 (see also Gans *et al.*, 1965); the four anterior in contact with first inframaxillary, sixth largest. Anterior pair of chin shields shorter and broader than posterior; the latter separated in front by two rows of scales (rarely one) and usually four to five (three) rows behind. Gulars in four (three) oblique rows between the posterior chin shields and the first ventral.

Ventrals in specimens examined 208-228 (♂♂ 208-219, ♀♀ 210-225, 228 in BMNH 95.11.27.12); anal scute divided; 112-132 (♂♂ 112 in BMNH 1900.11.28.5

and 118-129, ♀♀ 113-132) paired subcaudals (see below); sum of ventrals and subcaudals 326-355 (♂♂ 329-344 and 326 in BMNH 1900.11.28.5, ♀♀ 333-355) [2].

Ventral data for Eritrea populations are scarce (see Material examined and footnote 2); two females (BMNH 1973.3212, MSNG 30554) have 220-225. NMW 36146, a subadult from Harat (Dahlak archipelago), has 218 ventrals; its low number of subcaudals (111) may be due to an incomplete tail. According to Vinciguerra (1931), five unsexed specimens from Gaare possess 219-225 ventrals, and up to 127 subcaudals. Compared to this and the taxon in general, the fragmented skin of LIVM 1994.77 from Difnein (16°37'N 39°20'E) with "ca. 208" ventrals (Malcolm J. Largen *in litt.*) has few scales; populations from Difnein and probably other islands in the Dahlak archipelago require further investigation.

Dorsals with paired apical pits, in 19-19-13 rows except in MZUF 6690 and 6698 which have 11 dsr in front of the vent (see remark in Material section) and NMW 36146 with 13 dsr on the posterior part of the body but 15 prior to the anal scute (no detailed data ascertained). Parker's (1949: 28) key entry ("Scales at mid-body in 17-19 rows") refers to *Platyceps brevis* (Boulenger, 1895).

In males, the first and second posterior reduction occur between ventrals 122 and 133 (58-61%ven) and 124-135 (59-64%ven), respectively; the third (last) reduction is situated from 140-163 (66-75%ven) and at ventral 172 (right) and 173 (left) in MNHN 2001.653 (82%). MZUF 6690 (♂, 215 ventrals) with a fourth reduction of dsr involving rows 3+4 at ventrals 198 and 202 (93%). In females, the values are 124-134 (57-61%ven) and 138 in MSNM 2140 (224 ventrals: 62%), 125-139 (58-63%ven), and 142-168 (66-77%ven) (180/179 in MSNM 2140: 80%), respectively. In both sexes, the sequence of the first and second dsr reduction is variable, viz., lateral (usually rows 3-5, 2-4 in MZUF 6694) or paravertebral (rows 7-9, 6-8 in MSNM 2140); the third (last) fusion usually involves rows 6+7, sometimes row 8 (5+6 in MZUF 6692).

Longest male (MZUF 6689) approximately 990 mm (ca. 750 + 240 mm); females with a snout-vent length of ca. 900 mm (BMNH 1973.3212, tail incomplete) and ca. 1000 mm (ca. 720 + 280 mm) total length in MZUF 6696. Tail/body ratio in adults 0.37-0.43 for both sexes except MSNG 30554 (♀, 0.35).

Head of holotype brownish grey above; nape black with irregular light greyish or bluish dots, approximately one dorsal scale large, extending along first quarter of trunk; remainder of body completely black. Head and fore-body yellowish white below, ventrals gradually provided with steel grey lateral edges ("mehr und mehr mit bleigrauen Rändern versehen") and obscure whitish dots on second quarter, dark with a vibrant slaty lustre ("lebhaftem Stahlglanz") posteriorly including underside of tail (Boettger, 1893a).

Vinciguerra (1931) mentioned four *Platyceps rhodorachis subniger* from Eritrea which are uniformly leaden ("grigio-plumbeo") above; one specimen from the same area (vicinity of Gaare) exhibits densly packed ("molto ravvicinate") oblique

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[2] Boulenger (1896a) notified 215 ventrals and 122 subcaudals for MSNG 30554 (leg. V. Ragazzi 1888) instead of 225 and 113, respectively (verified by Giuliano Doria *in litt.*). Boulenger's (1896b) ventral count (229) for a juvenile (probably a female) from Zeila (BMNH 95.11.27.12) includes a preventral, and the specimen has 127 (instead of 129) subcaudals.

transverse bands. Largen & Rasmussen (1993: fig. 1) illustrated an adult female from Dahlak Al-Kabir (BMNH 1973.3212) with dorsal markings slightly narrower than the light interspaces and arranged in alternating cross-bars or transverse bands fading on the posterior portion of the trunk.

Supraocular and frontal region usually darkened except along their borders. Parietal often bearing an x-shaped marking, anterior lateral extensions confluent with a lateral stripe running to the anterior temporals. Sometimes with a short streak from the posterior edge of the parietals to the first nuchal band (e.g., Galgalo). Dorsal colour pattern of specimens examined roughly concurring with BMNH 1973.3212 (see above) but transverse bands often oblique, broken up into a median and a ventrolateral series or, in the case of large individuals from Somalia, more or less uniform; with a distinct dark longitudinal stripe on dorsal scales in, for instance, BMNH 1911.5.22. 2-4. Chin and belly ivory to yellowish; lateral edges of ventrals usually encroached by dorsal markings.

Maxillary normally with 15-16 teeth (18 specimens with 15, 29 with 16), 14 in MSNM 2140, and 17 in BMNH 1911.5.22.1; anterior series subisodont, diastema distinct, posterior two teeth only slightly enlarged, last offset laterad. Palatine with 8-9 teeth.

Hemipenis subcylindrical and spinose, *sulcus spermaticus* simple. Apex *in situ* at subcaudals 9-12 (8-9%sub); insertion of *M. retractor penis magnus* at subcaudals 26-28 (21-24%sub).

Distribution and Ecology

Platyceps rhodorachis subniger is known from coastal Eritrea (Aseb [Assab], Gaare, Mesewa [Massawa]), Dahlak Al-Kabir, Harat and possibly further islands of the Dahlak archipelago, Djibouti including the islets of Maskali (11°42'53"N 43°09'30"E) and Musha (11°42'59"N 43°12'22"E), and Somalia to as far south as Mudug Province (Galka'yo) in central Somalia (Fig. 1). The taxon is recorded from sea level to approximately 1'500 m (see footnote 1) in the Hargeisa Mountains roughly 50 km south of Berbera.

Except for the holotype from "Ogadeen, Somaliland" (Boettger, 1893a), supposedly in Ethiopia (e.g., Mertens, 1967), there are no specimens known from this country (see Fig. 1 and footnote 1). However, Boettger's racer certainly has a larger distribution in the Ethiopian border region with Djibouti and Somalia than documented on the map.

Parker (1949) noted that *Platyceps rhodorachis subniger* "was collected by Col. Taylor throughout the dry season (November to March) and during the early part of the 'Ju' rains. It was found only in stony places in arid localities with little vegetation." This taxon "is clearly associated with desert and semi-desert environments" (Largen & Rasmussen, 1993). However, Ineich (2003) described the habitat in Djibouti as cliffs and rocky areas ("Falaises et zones rocheuses") as well as mangroves.

Food items include unidentified lizards (e.g., MNHN 1960.116, MSNM 1241) and the frog *Tomopterna* cf. *cryptotis* (Boulenger) (MNHN 9599). MNHN 1981.477 from Musha Island returned from the sea ("sortait de la mer", Ineich, 2003). A pregnant female (MZUF 6695) had three eggs in the oviduct.

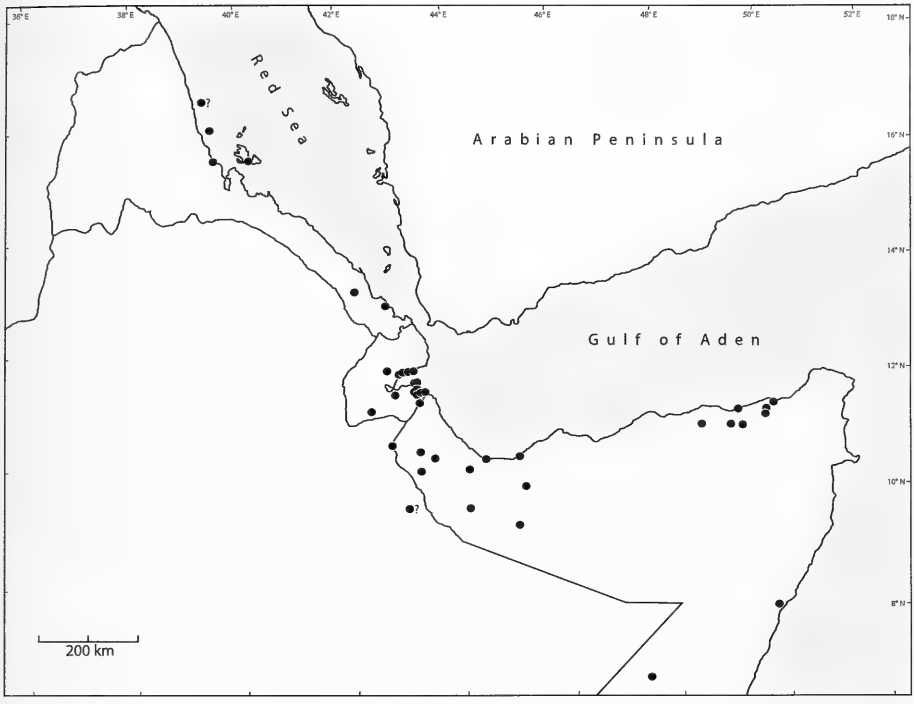

FIG. 1

Known distribution of *Platyceps rhodorachis subniger* based on the examined material and literature records (see footnote 1). Question marks denote the vague type locality ("Ogaden"), arbitrarily placed at 9°30'N 43°00'E, and Difnein Island, northern Dahlak archipelago (see Morphology).

DISCUSSION

Zamenis ladacensis var. *subnigra* Boettger was described on the basis of a single specimen with vague origin (see above). Boulenger (1896a, 1901) did not confer subspecific rank to this taxon, and Scortecci (1928) and Vinciguerra (1931) assigned populations from Eritrea to *Z. rhodorhachis* [sic] *ladacensis* Anderson [3].

Parker (1949) revalidated Boettger's racer (as *Coluber rhodorhachis subnigra*) for East African *Platyceps rhodorachis* auct. on the basis of "a lower number of ventral and subcaudal scales and by a head in which the prefrontal region is relatively longer in relation to the frontal" vis-à-vis populations usually referred to Jan's cliff racer from northern Africa (*P. saharicus*) and the Arabian Peninsula to the Himalayas. This view, i.e., the use of trinominals for populations from Eritrea to the Horn of Africa, was generally accepted by later herpetologists (see synonymy).

Stressing the alleged absence of *Platyceps rhodorachis* auct. from Sudan (see Schätti & McCarthy, 2004 and below), Largen & Rasmussen (1993) thought it "appropriate to recognise the isolated population occupying eastern Ethiopia and northern Somalia, which has ventral and subcaudal counts that are, on average, rather

[3] Boulenger (1892, 1893) ranked *Zamenis ladacensis* Anderson, 1871 as a junior synonym of *Z. rhodorachis* Jan, 1863.

lower than in the typical form, as subspecifically distinct (Parker, 1949)." Lanza (1990: 453) noted that the East African "subspecies [is] poorly differentiated from that inhabiting N Africa and Arabia."

Anderson (1901) examined a *Platyceps rhodorachis* auct. (BMNH 99.12.13.86) from "Abyan country" in SW Yemen that was "of a uniform greyish-blue or slate-colour" anteriorly and "purplish brown" on the latter third of the trunk and the upper surface of the tail, produced by "a narrow interrupted blackish mesial line" on the neck, "becoming more marked as it is traces backwards, and so broad at the anterior fourth as to cover the greater part of the back, ultimately extending over the whole of the dorsal surface". Anderson (1901) concluded "that the type of coloration first indicated by Boettger may be said to be common to individuals of Z. *rhodorhachis* [sic] from both sides of the Red Sea in the latitude of Aden." However, the semimelanistic ("*subniger*") colour pattern exhibited by the holotype of Boettger's racer (see Morphology) appears to be uncommon in Africa.

Platyceps rhodorachis subniger is exceptional among *Platyceps* spp., and in particular taxa of the *P. rhodorachis* group (*afarensis, rhodorachis, saharicus*, and sp. *incertae sedis* sensu Schätti & McCarthy, 2004), in the homogeneity of its scale characters (e.g., preocular and anterior subocular virtually always single, nine supralabials, usually three posterior temporals, mostly 19-19-13 dsr) including low variability of ventrals and subcaudals as well as the position of dsr reductions.

Platyceps afarensis from Djibouti, only known from the type series (two specimens), has 21 msr and 19 maxillary teeth. This species and *P. saharicus* (south to Nubia, Sudan) have, for instance, much higher ventral counts and more subcaudals than Boettger's racer (Schätti & Ineich, 2004; Schätti & McCarthy, 2004).

Platyceps rhodorachis subniger is considered morphologically closest to *P. rhodorachis* auct. from SW Arabia (see Appendix) with, for instance, 215-229 ventrals, 112-142 subcaudals, and 14-16 maxillary teeth. The phylogenetic relationships and systematic status of the latter require a more detailed analysis, but possible conspecificity with NE African populations is consistent with the Afro-Arabian ranges of, for instance, the semaphore gecko *Pristurus rupestris* Blanford (north to Jordan and the Gulf area), the lacertid *Mesalina martini* (Boulenger) from the Red Sea coast of Sudan to Somalia and the southern Yemen littoral, or the skink *Trachylepis brevicollis* (Wiegmann) from eastern Africa and the Arabian Peninsula.

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APPENDIX. Comparative sample of Arabian *Platyceps rhodorachis* auct. SAUDI ARABIA: BMNH 1929.8.1.3 (♂), 1938.2.1.71 (♂), and 1951.1.1.53 (Jiddah, ♀); CAS 135250 (♂), 139516-17 (♂♀), and 139533 (Jiddah, ♀). YEMEN: BMNH 97.3.11.110 ("Hadramawt", ♂), BMNH 99.12.13.86 ("Abian County", ♂), BMNH 1903.1.28.8 (Khawbar, ♂), BMNH 1903.3.6.18 ("Schaf Ravine", ♀), BMNH 1903.3.6.50 and 1903.6.26.32 (Khawbar, ♂♂), BMNH 1962.939-40 (♀♀), 1962.942-43 (♂♂), 1962.947 (♀), and 1962.950 ("Aden Protectorate", ♀), BMNH 1962.952 (♀), 1962.954 (♀), and 1962.959 (Al-Mukalla, ♂), BMNH 1962.963-64 (Jawl Bahawa, ♂♀); FMNH 18218 (Aden, ♀), FMNH 66145 (Al-Hudaydah, ♂); MHNG 2456.65 (Sana'a – Dhamar rd., ♂), MHNG 2456.67 (Jabal Umm Layla, ♂); MZUF 25194 (Sana'a, ♂); MZUT 628 ("Hadramawt", ♀); NMW 15169 (Hayt Al-Lim, ♀), NMW 25444.1-2 (Qishn, ♀♂). OMAN (Dhofar): BMNH 1931.7.16.59-62 and 1931.7.16.64-67 ("Zara Mts." [Jabal Qara], 3♂♂, 5♀♀), BMNH 1971.1337-38 (♂♀) and 1977.1189 (Salalah, ♂), BMNH 1976.1484 (Wadi Sarfait, Jabal Qamr, ♂); MHNG 2443.38-39 (Salalah, ♂♀).

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A new species of *Hisonotus* (Siluriformes, Loricariidae, Otothyrini) from the República Oriental del Uruguay

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A new species of *Hisonotus* (Siluriformes, Loricariidae, Otothyrini) from the República Oriental del Uruguay. - *Hisonotus charrua* sp. n. is described from the Río de la Plata and río Uruguay basins in the República Oriental del Uruguay. *Hisonotus charrua* sp. n. is distinguished by the following combination of characters: lateral plates 23-25, posterior margin of pectoral spine smooth, 18 to 24 plates bearing laterosensory canals, snout with an anterior odontode free area, and caudal peduncle depth 10.8-12.3% SL.

Keywords: Freshwaters - Siluriformes - loricarids - Hypoptopomatinae - *Hisonotus* - systematics.

INTRODUCTION

The genus *Hisonotus* Eigenmann & Eigenmann, 1889, is diagnosed by the absence of plates anterior to nostrils and the presence of rostral plates with large odontodes (Schaefer, 1998). Six species of *Hisonotus* have been recorded from río Uruguay basin, rio Jacui, Río de la Plata, and Lagoa dos Patos system. In the República Oriental del Uruguay two species of the genus *Hisonotus* have been found so far from the río Uruguay basin: *H. maculipinnis* and *H. ringueleti* (Aquino, 1997 and Aquino *et al.*, 2001 respectively). The aim of this paper is to describe a new species of *Hisonotus* from the lower río Uruguay and Río de la Plata basins in the República Oriental del Uruguay.

MATERIAL AND METHODS

Specimens were cleared and counterstained following Taylor & Van Dyke (1985). Straight line distances were measured to the nearest 0.1 mm using a digital calliper. Counts include 3 cleared and stained (C&S) specimens, holotype, and 15 paratypes. Values of the holotype are indicated by an asterisk. Vertebrae count includes those ones corresponding to the Weberian apparatus and the caudal complex centrum as one element. Institutional abbreviations are as listed in Leviton *et al.* (1985) with the addition of Asociación Ictiológica, La Plata, Argentina (AI); Facultad de Ciencias,

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Universidad de la República, Montevideo, República Oriental del Uruguay (ZVC-P); and Staatliches Museum für Tierkunde, Dresden, Germany (MTD F).

Comparative material examined (SL in mm): *Hisonotus charrua*: AI 171, 3 ex., 21.0-32.2 (C&S), Río de la Plata basin, arroyo Tropa Vieja (34°44.99'S - 55°50.78'W), Departamento Canelones, Uruguay. *Hisonotus maculipinnis* (Regan, 1912): AI 122, 1 ex., 27.5 (C&S), Argentina, Corrientes province, río Paraná, Ita Ibaté. AI 123, 5 ex., 23.4-27.0, Argentina, Corrientes province, río Paraná basin, Esteros del Iberá, Rincón del Diablo, Laguna Yacaré. *Hisonotus nigricauda* (Boulenger, 1891): AI 178, 6 ex., 30.0-38.0, Brazil, Rio Grande do Sul, São Leopoldo, Rio Jacuí basin, rio dos Sinos, 29°45'S - 51°10'W. *Hisonotus* sp. A, AI 120, 1 ex., 23.3, Argentina, Misiones, río Uruguay basin, arroyo Oveja Negra. *Hisonotus* sp. B: MHNG 2408.025, 10 ex., 17.8-29.0, Paraguay, route 2, arroyo Pirayu. *Hisonotus ringueleti* Aquino, Schaefer & Miquelarena, 2001: AI 179, 1 ex., 36.4, República Oriental del Uruguay, Departamento Artigas, río Uruguay basin, arroyo Lenguazo. *Hypoptopoma inexspectata* (Holmberg, 1893): AI 119, 1 ex., 35.0, Argentina, Corrientes province, río Paraná, Puerto Abra. *Otocinclus flexilis* Cope, 1894: AI 117, 2 ex., 36.0-36.5, Argentina, Entre Ríos province, arroyo Ñancay. *Otocinclus vestitus* Cope, 1872: AI 118, 3 ex., 26.0-30.4, Argentina, Corrientes province, río Paraná, Puerto Abra. *Otocinclus vittatus* Regan, 1904: AI 121, 1 ex. C&S, 27.0, Argentina, Corrientes province, río Paraná, Ita Ibaté. AI 127, 1 ex., 26.2, Argentina, Buenos Aires province, Río de la Plata basin, arroyo El Pescado. *Epactionotus yasi* Almirón, Azpelicueta & Casciotta, 2004: MACN-ict 8649, 1 ex. 32.0, Argentina, Misiones province, río Iguazú basin, arroyo Lobo.

RESULTS

Hisonotus charrua sp. n. Figs 1-5, Tables 1-2

Holotype. ZVC-P 5639, 50.7 mm SL, República Oriental del Uruguay, Departamento Tacuarembó, río Uruguay basin, Cañada de Los Peña (31°39.09'S - 56°12.32'W), coll: P. Laurino, T. Litz, E. Perujo, F. Prieto and H. Salvia, 16 March 2003.

Paratypes. República Oriental del Uruguay: AI 186, 1 ex., 40.5 mm SL, Departamento Artigas, río Uruguay basin, arroyo Catalán Grande, (30°50.66'S - 56°14.50'W), coll: P. Laurino *et al.*, 16 August 2002. AI 173, 1 ex., 52.7 mm SL, Departamento Lavalleja, Río de la Plata basin, arroyo Minas Viejas, (34°26,86'S - 55°12,30'W), coll: E. Lartigau *et al.*, 22 March 2003. AI 174, 1 ex., 35.8 mm SL, Departamento San José, Río de la Plata basin, arroyo Cardoso (34°24.84'S - 56°26.82'W), coll: E. Lartigau *et al.*, 23 March 2003. AI 165, 5 ex., 3 males-2 females, 37.4-50.0 mm SL, Departamento Tacuarembó, río Uruguay basin, Cañada de Los Peña (31°39.09'S - 56°12.32'W), collected with the holotype. AI 170, 5 ex., males, 35.0-44.7 mm SL (1 C&S), Departamento Canelones, Río de la Plata basin, arroyo Tropa Vieja (34°44.99'S - 55°50.78'W), coll: W. Barreiro *et al.*, 19 August 2002. AI 175, 1 ex., 37.2 mm SL, Departamento Canelones, Río de la Plata basin, arroyo Tropa Vieja (34°44.99'S - 55°50.78'W), coll: L. Lartigau *et al.*, 23 March 2003. AI 176, 1 ex., 36.6 mm SL, Departamento Salto, río Uruguay basin, Salto Grande dam, arroyo Aspinillar in Constitución, coll: F. Prieto and J. Reichert, 5 - 7. July 2000. MHNG 2650.51, 6 ex., 29.0-35.0 mm SL; MTD-F 28503-28506, 4 ex., 26.0-28.8 mm SL; AI 172, 6 ex., 32.5-37.0 mm SL; ZVC-P 5644, 6 ex., 24.2-32.0 mm SL; Departamento Canelones, Río de la Plata basin, arroyo Tropa Vieja (34°44.99'S - 55°50.78'W), coll: T. Litz and F. Prieto, 22 October 1999. ZVC-P 5617, 1 ex., 46.0 mm SL, Departamento Montevideo, Cañada del Dragón a 1 km de la desembocadura en el arroyo de las Piedras, coll: F. Teixeira de Melo *et al.*, 30 November 2001.

Diagnosis. Hisonotus charrua sp. n. is diagnosed by the following combination of characters: lateral plates 23-25, posterior margin of pectoral spine smooth, 18 to 24

TABLE 1. Morphometric data of the holotype and 15 paratypes of *Hisonotus charrua* sp. n. SD: standard deviation.

	Holotype	Range	Mean	SD
Standard length [mm]	50.7	29.0-50.7		
Percents of SL				
Predorsal distance	44.8	44.3-50.3	46.4	1.60
Head length	32.5	32.5-38.5	36.3	1.56
Cleithral width	22.1	22.1-25.4	23.8	0.95
Dorsal-fin spine length	24.1	22.3-29.2	25.5	1.74
Trunk length	16.2	13.0-20.0	16.6	1.71
Pectoral-fin spine length	25.6	25.5-29.7	27.6	1.45
First pelvic-fin ray length	14.8	14.8-24.0	19.6	3.30
Abdominal length	20.7	17.6-24.6	21.1	1.59
Caudal peduncle length	33.3	30.4-34.7	33.2	1.18
Caudal peduncle depth	12.2	10.8-12.3	11.4	0.46
Head depth	16.8	14.7-17.9	16.6	0.78
Snout length	15.8	15.8-18.6	17.3	0.78
Horizontal eye diameter	4.7	4.7-5.9	5.3	0.33
Interorbital width	13.6	13.2-15.4	14.4	0.64
Percents of HL				
Head depth	51.5	42.1-51.5	45.8	2.50
Snout length	48.5	46.0-50.0	47.6	1.22
Horizontal eye diameter	14.5	12.9-16.2	14.5	0.95
Interorbital width	41.8	36.0-43.0	39.7	2.02
Cleithral width	67.9	61.2-68.5	65.5	2.10

plates bearing laterosensory canals, snout with an anterior odontode free area, and caudal peduncle depth 10.8-12.3% of SL.

Description. Morphometrics of holotype and 15 paratypes are presented in Table 1. Body elongated, head slightly depressed. Greatest body depth at dorsal-fin origin (Fig. 1). Trunk slightly wider than head. Dorsal profile of head from snout tip to orbital level, slightly concave; slightly convex over supraoccipital. Snout tip rounded in dorsal view (Fig. 2). Rostral median plate with notch. Naked area anterior to anterior nares. Eyes placed laterally, suborbital depth slightly longer than horizontal eye diameter; horizontal diameter as large as nare diameter. Iris diverticulum present, about half of pupil diameter. Three infraorbitals surrounding orbit, fourth infraorbital expanded ventrally. Margins and surface of lips covered with papillae. Maxillary barbels short (Fig. 3), half length of eye diameter. Jaw teeth bifid, tooth slender with major cusp expanded, its tip pointed or truncated, and a minor one rounded. Absence of accessory teeth on premaxilla and dentary. One series of teeth, 11-19 (mode 15) on premaxilla and 10-16 (mode 12) on dentary. Pterotic-supracleithrum bearing large openings. The preopercular sensory canals directed toward pterotic-supracleithrum.

Body covered by dermal plates except the ventral region. Abdominal area with few plates in smaller specimens (less than 30 mm SL), partially covered in medium sized specimens (ca. 32 mm SL), and almost completely covered in specimens over 35 mm SL. Lateral and anterior rostral plates slightly reflected ventrally. Five lateral series of plates on trunk. Plates of dorsal series continuous; mid-dorsal series continuous and

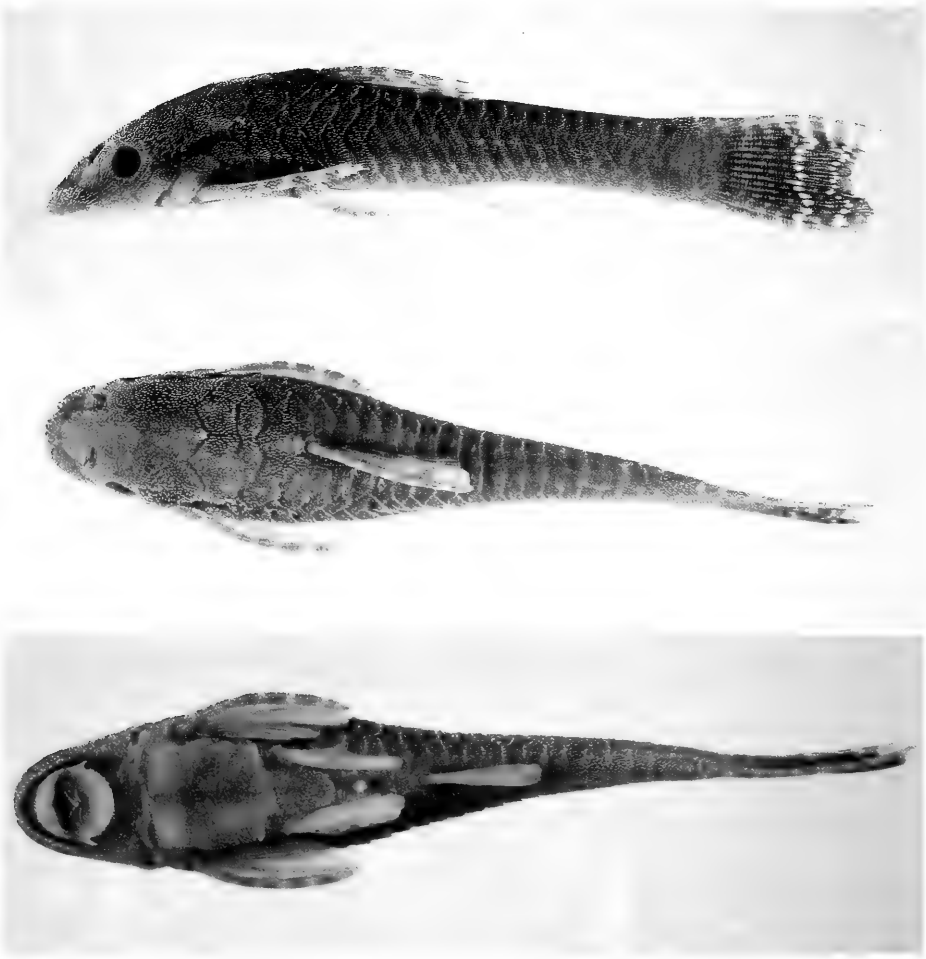

FIG. 1-3

Hisonotus charrua sp. n., holotype, 50.7 mm SL, República Oriental del Uruguay, Departamento Tacuarembó, río Uruguay basin, Cañada de Los Peña. 1, lateral view; 2, dorsal view; 3, ventral view.

incomplete. Median series discontinuous and complete with 23*-25 (mode 24). Mid-ventral series incomplete and continuous; ventral one continuous and complete. Lateral line continuous or discontinuous with one or two gaps, 18*-24 (mode 22), plates bearing lateral-line canals. First two lateral line plates small, the second one placed on rib of sixth vertebra. Anal fin preceded by 3 or 4 pairs of lateral plates. Coracoid and cleithrum exposed ventrally, excluded arrector fossae area. Two or three pairs of predorsal plates.

Odontodes covering head, trunk, and fin rays. Head and trunk odontodes uniformely distributed. Odontodes usually small on body and pelvic spines, large ones on pectoral spine. Tuft of odontodes at posterior supraoccipital tip. Large odontodes along

anterior margin of snout biserially arranged, dorsad and ventrad series separated by a naked area.

Dorsal-fin with one spine and 7 branched rays, its origin posterior to vertical through pelvic-fin origin. Dorsal fin moved posteriorly behind seventh vertebra. First dorsal-fin proximal radial articulated with eighth vertebra. Adipose fin absent. Anal fin with one unbranched and 5 branched rays, its origin posterior to vertical through last dorsal-fin ray insertion. Pectoral fin with one spine without serrae and 6 branched rays, reaching half of pelvic-fin length in males or surpassing that point in females. Pectoral-fin axillary slit present. Pelvic fin with one unbranched and 5 branched rays, surpassing anal-fin origin in males. Presence of fleshy flap on pelvic fin in males. Caudal fin with fourteen branched rays. Total vertebral number 29 (1 ex.). Neural spine of seventh vertebra in contact with nuchal plate.

Color in alcohol: Ground color of dorsolateral body surface brownish, ventral surface of head and trunk pale brown. Narrow light stripe from snout tip to eye. Dorsum of body and upper third of flanks light, this area extending from supraoccipital margin to caudal fin. Pectoral, pelvic, dorsal, and anal fins pale brown with dots forming series of darker bands. Caudal fin dark brown with light scattered dots, and two light vertical bars; first one at about middle fin, second one narrower, placed near distal margin and sometimes less evident. Caudal fin with light area on tip of three or four uppermost rays.

Sexual dimorphism. Pelvic-fin unbranched ray of males longer than that of females (21.4-24.0 vs. 14.8-18.4% SL; 9 females and 7 males). Distal tip of pelvic fins surpassing anal-fin origin in males. Males with flap on first ray of pelvic fin. Genital papilla of males longer, slender and more acute than that of females. Preanal region without median plates in males.

Etymology. the specific epithet *charrúa* is the name of the aborigines that lived in the Uruguayan coast of the Río de la Plata; a noun in apposition.

Distribution. *Hisonotus charrua* sp. n. is known from streams of the Río de la Plata basin, and the lower Uruguay basin in República Oriental del Uruguay (Fig. 4).

Habitat. Cañada de Los Peña, the type locality (Fig. 5), is a small, shallow creek with rocks, loose stones, and gravel bottom with clear rapid-flowing water. A waterfall of about 2 m high separating upper and lower parts of the creek. Grass and other vegetation were present in the margins and also dense fields of *Echinodorus uruguayensis* grew on some areas. In some moments with very low water level, plants densely covered the different areas of the stream. All the other localities have similar habitat conditions. Some environmental variables of four of the five localities are presented in Table 2. Some comments on arroyo Tropa Vieja and the Río Santa Lucía system were published by Lartigau *et al.* (2002) and Prieto *et al.* (2004) respectively.

DISCUSSION

Following Schaefer (1998), the genus *Hisonotus* has been diagnosed by the absence of plates anterior to the nostrils and the presence of robust rostral plates with enlarged odontodes. The genus *Hisonotus* includes 14 species (Aquino *et al.*, 2001 and Britski & Garavello, 2003). Some species were described from the upper río Paraná

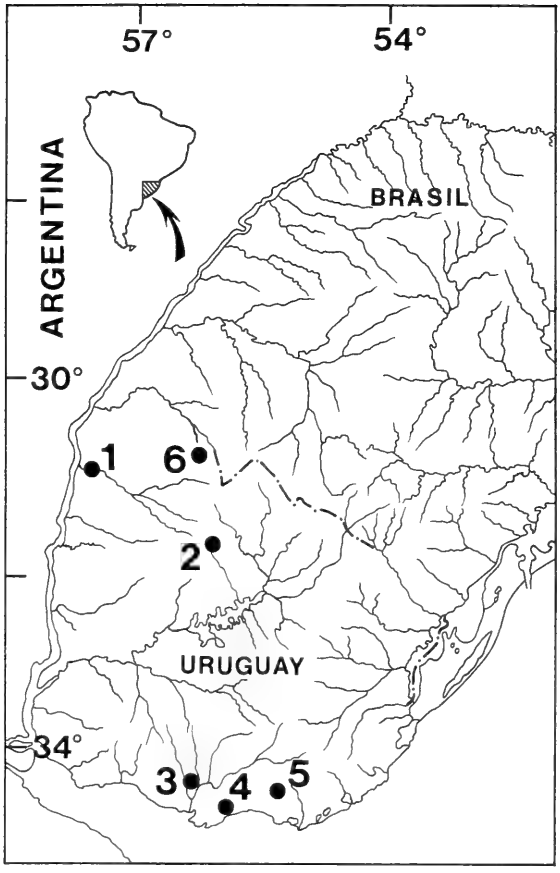

FIG. 4
Geographical distribution of *Hisonotus charrua* sp. n. 1, arroyo Aspinillar; 2, Cañada de los Peña (type locality); 3, arroyo Cardoso; 4, arroyo Tropa Vieja and Cañada del Dragón; 5, arroyo Minas Viejas; and 6, arroyo Catalán Grande.

TABLE 2. Values of environmental variables of the habitat at five localities inhabited by *Hisonotus charrua* sp. n.

	Air temperature(°C)	Water temperature (°C)	pH	Conductivity $\mu S.cm^{-1}$
Cañada de los Peña	16-28	16-25	7.1	170-210
Arroyo Minas Viejas	19.5	16	7.7	340
Arroyo Cardoso	23	22	7.9	480
Arroyo Tropa Vieja	13-21	13.5-22	6.5-6.8	200-220
Arroyo Catalán Grande	18-20	11.5-17	7.2	160-200

basin: *H. insperatus* Britski & Garavello, 2003, *H. depressicauda* (Miranda Ribeiro, 1918), *H. depressinotus* (Miranda Ribeiro, 1918), *H. paulinus* (Regan, 1908), and *H. francirochai* (Ihering, 1928). Some of the species of *Hisonotus* come from Minas

FIG. 5
Cañada de los Peña, type locality of *Hisonotus charrua*.

Gerais, Rio de Janeiro and São Paulo: *H. notatus* Eigenmann & Eigenmann, 1889, was described from Santa Cruz and Juiz de Fora, and *H. leucofrenatus* (Miranda Ribeiro, 1908), was described from Rio Riveira de Iguape Basin and other ones were described from Lagoa dos Patos system: *H. taimensis* (Buckup, 1981), *H. laevior* Cope, 1894, and *H. leptochilus* Cope, 1894. *Hisonotus nigricauda* was described from Rio Grande

do Sul. *Hisonotus maculipinnis* was recorded from "La Plata" without precise locality, *H. ringueleti* from río Uruguay basin, and there is one still undescribed species from the río Paraguay basin (*Hisonotus* sp. B).

Among the species of *Hisonotus* distributed in the Río de la Plata basin, and Lagoa dos Patos system, *H. charrua* sp. n. differs from *H. taimensis*, *H. leptochilus*, and *H. laevior* by the lower number of lateral plates (23-25 vs. 26-31 in *H. taimensis* and 28 plates in *H. leptochilus* and *H. laevior*). *Hisonotus charrua* sp. n. is different from *H. nigricauda, H. maculipinnis*, and *Hisonotus* sp. B in having an odontode free area in the anterior margin of the snout. Also, *H. charrua* sp. n. has deeper body than that of *H. maculipinnis* (17.2-19.7 vs. 16.2-17.9 % SL). *Hisonotus charrua* shares with *H. ringueleti* the odontode free area in the anterior margin of the snout but differs in having the posterior margin of the pectoral spine smooth vs. serrated, lower peduncle depth (10.8-12.3 vs. 13-15% SL), and the stripped caudal fin vs. spotted one.

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The Raymondionymidae of the Curti collection, with description of *Raymondionymus curtii* sp. n. (Coleoptera, Curculionoidea)

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The Raymondionymidae of the Curti collection, with description of *Raymondionymus curtii* sp. n. (Coleoptera, Curculionoidea). - The Coleoptera Curculionoidea Raymondionymidae collected by Marc Curti and preserved in the Muséum d'histoire naturelle, Geneva, Switzerland were studied. A list of the 16 species and all specimens is given. Taxonomy, mutual relationships and distribution range of *R. ochsii, R. problematicus* and *R. orientalis* are discussed. *R. curtii* sp. n. (type locality: Italy, Piedmont, Valle Varaita, Castello, 44°37'N 07°03'E) is described. *R. sanfilippoi* is a new record for the French fauna. Short remarks on the relationships among some species of the genus are also given.

Keywords: Coleoptera - Curculionoidea - Raymondionymidae - taxonomy - new species - Curti collection.

INTRODUCTION

Our friend and colleague Dr Ivan Löbl has proposed us to study a rich collection of endogeic weevils collected by the French entomologist Marc Curti, including many species of Raymondionymidae. This collection is extremely important for the knowledge of the endogeic weevil fauna, in particular of the south-western Alps and southern France, where only occasional researches had been previously carried out, in particular by Hervé (1949, 1950, 1953). It allows a significant contribution to the knowledge of chorology and systematics of some French and Italian taxa of the family, and includes a new species, which is described here.

MATERIAL AND METHODS

Specimens examined are housed in the following collections: Muséum d'histoire naturelle, Geneva, Switzerland (MHNG); coll. Meregalli, Turin, Italy (MER); coll. Osella, L'Aquila, Italy (OSL). Several specimens for each species were dissected, female genitalia were embedded in Canada balsam and male genitalia were mounted dry. Genitalia preparations are pinned below the respective specimen. The photographs

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were taken with a Nikon Coolpix 4500 Digital camera, on a Wild Stereomicroscope, with 10x oculars, and elaborated with Adobe Photoshop 7.0. The type material and all the other available specimens cited by Osella (1977), Osella & Giusto (1985) and Osella & Abbazzi (1985) of *R. andreinii* (Osella, 1977), *R. bartolii* (Osella, 1977), *R. gardinii* (Osella & Giusto, 1985), *R. magnificus* (Osella, 1977), *R. meggiolaroi* (Osella, 1977), *R. mingazzinii* (Osella & Abbazzi, 1985), *R. mirabilis* (Osella, 1977), *R. sanfilippoi* (Osella & Giusto, 1985), *R. stricticollis picenus* (Osella, 1977) and *R. zoiai* (Osella & Giusto, 1985) were examined; data for further specimens of these and other species not included in the papers cited above are reported in the remarks chapter under the relative species. Except when otherwise indicated, the specimens belong to the Curti collection and are housed at MHNG. "Collecting data" are cited verbatim according to labels. The symbol "Ω", used by Curti in some labels, means "grotte" (*cave*).

LIST OF THE SPECIES AND TAXONOMIC REMARKS

Alaocephala delarouzei coiffati Hoffmann, 1958
Alaocephala delarouzei coiffati Hoffmann, 1958: 1749.

FRANCE, PYRÉNÉES ORIENTALES: "Monbollo, Py. or., 23.X.1974, Leg. Curti M.", 1 ex.

Raymondionymus perrisi (Grenier, 1864)
Raymondia perrisi Grenier, 1864: 137.

FRANCE, HAUTE GARONNE: "Arbas N.E., Ω Goucildi, Her., 15.X.1964", 1 ex. – FRANCE, ARIÈGE: "Gouffre de Italiens, Cogire, H.te Gar., 8.VIII.1977, ± 30 m, Leg. Curti M.", 3 exs; "Barjac, Ariège, St. Lizier, 5.VIII.1977", 5 exs (3 exs MHNG; 1 ex. MER; 1 ex. OSL); "Taurignan vieux, Ariège, 11.VIII.1970, Leg. Curti M. / entrée de la grotte Touesse", 1 ex.; "Col de la Crauzette, Ariège, 19.VIII.1977, Leg. Curti M.", 1 ex.; "Grotte d'Aubert, Ariège, 20.VIII.1977, Leg. Curti M.", 2 exs; "Grotte du Cap de la Bouiche, Ariège, 29.VIII.1977, Leg. Curti M.", 1 ex.; "Lac de Betmale, Ariège, 4.VIII.1977, Leg. Curti M., 1 ex. – FRANCE, BASSES PYRÉNÉES: "Larrau, Bass. Pyr., 20.IX.1979, Leg. Curti M.", 2 exs; "Bois du Bager d'Olor., Oloron, B. Pyr., 21.IX.1979, Hêtraie, Leg. Curti M.", 1 ex.; "Bois du Bager, Oloron, B.P., 20.IX.1979, vers Oloron", 2 exs; "Arette, B. Pyr., Ambielle, 24.IX.1979, Leg. Curti M.", 3 exs (2 exs MHNG, 1 ex. MER).

Raymondionymus laevithorax (Perris, 1875)
Raymondia laevithorax Perris, 1875: 11.

FRANCE, CORSICA: "Ω Zabara: Port do Castirla, 24.IX.1973, Corse, Leg. Curti M.", 1 ex.

Raymondionymus laneyrei Hervé, 1949
Raymondionymus laneyrei Hervé, 1949: 133.

FRANCE, VAR: "La Garde Freynet, Var, 3.XI.1966", 2 exs (1 ex. MHNG; 1 ex. MER); "La Garde Freynet, Var, Tirasol, 5.X.1969", 1 ex.; "La Garde Freynet, Var, Tirasol, 8.X.1966", 1 ex.

Raymondionymus lavagnei Mayet, 1898

Raymondionymus lavagnei Mayet, 1898: 87.

FRANCE, HERAULT: "Mireval, Herault, 22.III.1972, Leg. Curti M.", 1 ex.

Raymondionymus ochsi Hervé, 1949

Raymondionymus ochsi Hervé, 1949: 136.
Pararaymondionymus ochsi (Hervé): Osella, 1977: 53.

Raymondionymus problematicus Hervé, 1949

Raymondionymus ochsi race *problematicus* Hervé, 1949: 137.
Pararaymondionymus ochsi ssp. *problematicus* (Hervé): Osella, 1977: 53-54, partim.

Raymondionymus orientalis Hervé, 1953

Raymondionymus hoffmanni var. *orientalis* Hervé, 1953: 9-11.
Pararaymondionymus orientalis (Hervé): Osella, 1977: 54.
Pararaymondionymus ochsi ssp. *problematicus* (Hervé): Osella, 1977: 53-54, partim.

REMARKS. The conspicuous material (about 80 exs) collected by Curti allows understanding the mutual relationships among these three closely related, and morphologically very similar, taxa.

Osella (1977) could not examine specimens from the type localities of *R. ochsi* and *R. problematicus* and derived his taxonomic interpretation from the various comments by Hervé (1949, 1950, 1953). In particular, Osella (1977: 54) considered *R. ochsi* composed of two subspecies, the nominal subspecies from the surrounding of Vence, and the subspecies *R. ochsi problematicus*. The author attributed to this subspecies all the specimens he examined from the Maritime Alps, between Beuil, the type locality of *R. ochsi* «race» *problematicus* Hervé, and the Italian province of Imperia (various localities between 800 and 1500 m). *R. orientalis*, whose type locality is Albarea, near Sospel, thus within the range of *R. ochsi problematicus* sensu Osella (Osella, 1977: 152, map 4), was maintained as a distinct species.

The specimens in coll. Curti clarify that the three taxa are differentiated at species rank and are apparently allopatric (Fig. 72). They can be differentiated as indicated in Table 1.

Raymondionymus ochsi Hervé, 1949 Figs 4, 6-7, 10-11, 21-24, 56-57, 63-64

SPECIMENS IN CURTI COLLECTION:

FRANCE, ALPES MARITIMES: "Vence, A. M., 12.IV.1968", 1 ex.; "Vence, A. M., V. 1965, Riou, Leg. Curti M.", 5 exs (3 exs MHNG; 1 ex. MER; 1 ex. OSL); "Le Bar, A. M., 3.V.1981, Leg. Curti M.", 1 ♀; "Le Bar, A. M., Hubai, 27.III.1982, Leg. Curti M.", 1 ♀; "Menton, A. M., 15.III.1968", 1 ex.; "Beausoleil, 9.II.1972, A. M., Tunnel Corniche, Leg. Curti M.", 1 ex.; "Eze, A. M., 21.V.1969, P.te Funel, Vallon, Leg. Curti M.", 1 ex., "Eze, A. M., 24.IV.1968, Vallon, P.te Funel, Leg. Curti M.", 2 exs (1 ex. MHNG; 1 ex. MER); "Eze, A. M., 21.IV.1969, Vallon, P.te Funel, Leg. Curti M.", 1 ex.

OTHER SPECIMENS EXAMINED:

FRANCE, ALPES MARITIMES: "Roquefort les Pins, A. M., capturé le 10.II.1979, piegé le 15.IV.1978, Grotte, Coll J.C. Jordan", 1 ♂ (OSL).

TABLE I

Morphological differentiation of *Raymondionymus ochsi, R. problematicus, R. orientalis.*

Raymondionymus ochsi	*Raymondionymus problematicus*	*Raymondionymus orientalis*
Rostrum: slender, ratio length/width 4.6, in lateral view upper margin of scrobe reaching lower margin of rostrum (Fig. 4); dorsum weakly convex transversely; dorso-lateral margins moderately curved inwards, minimum width in the first half, setae on sides inserted in low granules, visible from above.	*Rostrum:* very slender, ratio length/width 5.2, in lateral view upper margin of scrobe running sub-parallel to lower margin of rostrum (Fig. 1); dorsum flattened, dorso-lateral margins weakly but distinctly compressed, curved inwards, minimum width at mid length between base and insertion of antennae; sides with setae not inserted in microscopic granules.	*Rostrum:* shorter and stouter, ratio length/width 4.2; in lateral view upper margin of scrobe not reaching lower margin of rostrum (Figs 2-3); dorsum transversely convex, dorso-lateral margins indistinctly curvilinear, minimum width near base, regularly widened up to insertion of antennae; sides with scarcely differentiated granules.
Antenna: Segment 2 1.5 x longer than wide, half as long as 1; segment 3 two thirds as long as 2 (Figs 6-7)	*Antenna:* funicle thin, at least segments 1 to 4 longer than wide, segment 3 nearly as long as 2 (Fig. 5).	*Antenna:* funicle with only segments 1-3 longer than wide, segment 3 distinctly shorter than 2 (Figs 8-9).
Pronotum: sides very regularly rounded (Figs 63-64), not constricted towards apex, maximum width slightly beyond mid of length; punctures regularly impressed, slightly smaller than those of the striae; interspaces nearly as wide as the punctures; median line scarcely distinct; sides with small granules below the punctures.	*Pronotum:* sides weakly and regularly rounded (Fig. 65), not constricted towards apex, maximum width at middle of length; punctures on dorsum large, dense near base and smaller, more spaced towards apex, where interspaces are at least as wide as or wider than the punctures; median line distinct for nearly the whole length; granules on sides indistinct.	*Pronotum:* sides broadened, constricted and slightly sinuate at apex (Figs. 66-68), maximum width slightly beyond middle of length; dorsum with large dense punctures, interspaces usually narrower than the punctures, median line usually distinct; anterior half with minute raised granules, higher on sides and near apex.
Elytra: sides weakly curvilinear; intervals with minute but visible granules, usually mainly distinct on interval 7 when seen from above.	*Elytra:* sides subparallel; intervals smooth, lacking acute microscopic granules.	*Elytra:* sides weakly curvilinear; intervals with minute but visible granules, usually mainly distinct on interval 7 when seen from above.
Fore tibia: moderately and regularly thickened at middle of length, outer margin with about 4-5 isolated teeth and long setae, moderately narrowed before apex; fringe reduced to a series of single broad setae (Figs 10-11).	*Fore tibia*: scarcely broadened with maximum broadness, and longest tooth, at two/thirds of length, strongly constricted before apex; outer margin with 2-3 very prominent teeth and few isolated setae; fringe of setae missing, replaced by 5-6 isolated short broad setae evenly spaced (Fig. 12)	*Fore tibia:* broadly thickened at middle of length, nearly straight before apex; outer margin with few short and small teeth and isolated setae; fringe of setae towards apex variable, relatively dense or reduced to a series of broad setae (Figs 13-14).
Aedeagus: Figs 21-24.	*Aedeagus:* Figs 19-20.	*Aedeagus:* Figs 15-18.

The specimens in coll. Curti expand the range of *R. ochsi* from the surroundings of Vence, the type locality, along the Mediterranean coast up to Menton. The specimens from the type locality are very uniform for most of the morphological traits; the most significant variation regards the punctures on the striae, which can be slightly broader. A *Raymondionymus* from Le Bar was cited by Osella (1977: 57) as *R. hoffmanni,* based on an identification by Hervé. However, the two ♀♀ ex coll. Curti from Le Bar do not show any significant difference with respect to *R. ochsi.* This is also the case of the ♂ from Roquefort les Pins, a locality not far from Cannes. The specimens from the eastern part of the range, along the Mediterranean coast, have stouter rostrum, with subparallel dorso-lateral margins, slightly narrower elytra, with sides subparallel for most of their length and fore tibiae with slightly less prominent teeth. In the eastern part of the range *R. ochsi* lives very near to *R. orientalis,* but it seems to be usually associated to xerophyll woods in drier, Mediterranean habitats, at lower altitude. *R.ochsi* and *R. orientalis* are well distinct, although morphological differences are small. Aedeagus is a key-trait allowing differentiation (Figs 17-18; 21-24).

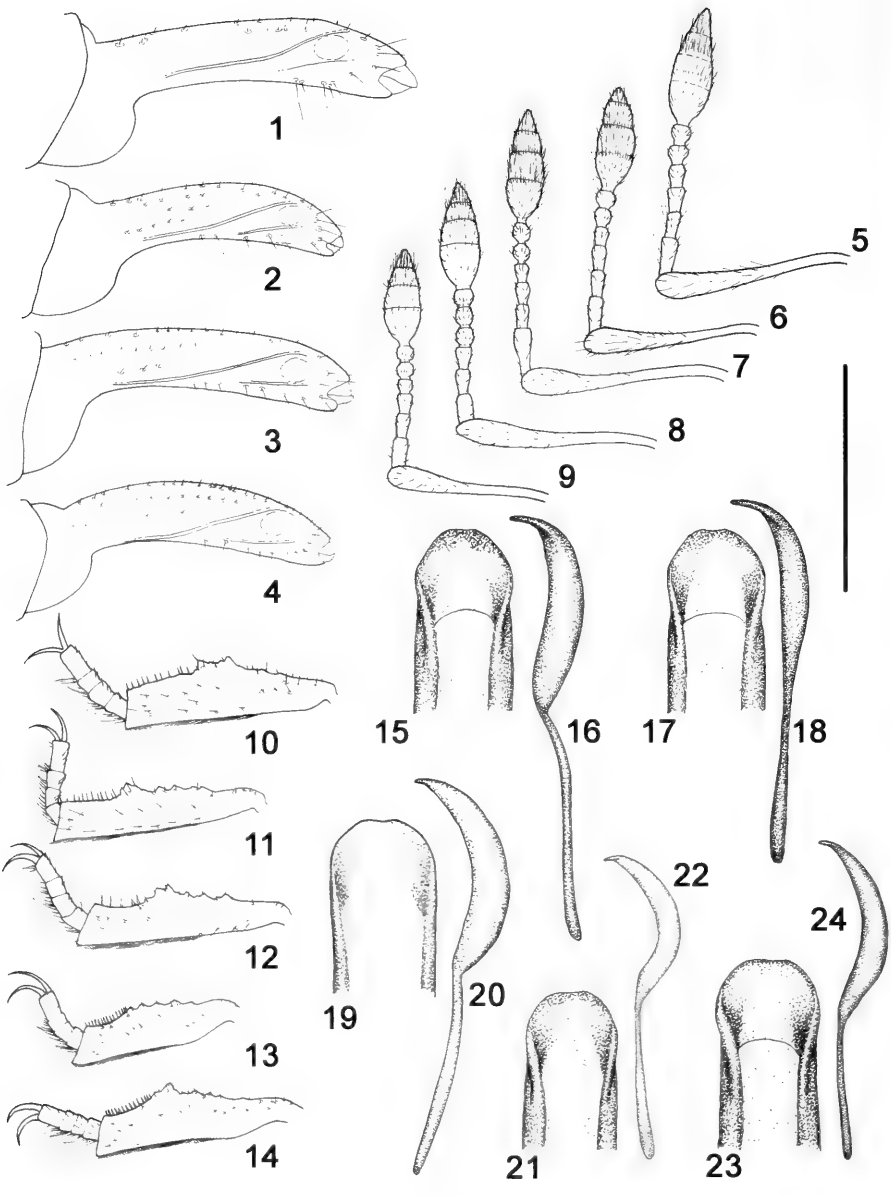
Raymondionymus problematicus Hervé, 1949 Figs 1, 5, 12, 19-20, 62, 65

France, Basses Alpes: "S. Annot, B.A., 20.VI.1974", 1 ♂. – France, Alpes Maritimes: "Valberg, A. M., VI 1975", 1 ♂; "Valberg, A. M., 10.VII.1975", 1 ♀; "Covillote, A. M., 4.IX.1966", 2 ♀♀ (1 ♀ MHNG; 1 ♀ MER); "Peone, A. M., 20.V.1975", 1 ♀.

R. problematicus was described from Beuil. Five ♀♀ in coll. Curti were collected in the surroundings of Beuil (Valberg, Covillote, Péone); they are very uniform for all the morphological traits; a sixth specimen, and the only ♂ examined, comes from Annot, a locality about 30 km south-west of Beuil, in the right side of the river Var valley; it does not differ from the previous specimens, but by the slightly broader pronotum.

The two ♀♀ from Mont Mounier cited by Osella (1977: 54) as *P. ochsi problematicus* are confirmed to belong to *R. problematicus*, whereas the specimens from Moulinet, referred by Hervé (1949) to *R. ochsi* «race» *problematicus,* should be attributed to *R. orientalis*, as suggested by the two specimens collected by Curti. These, indeed, have slightly more slender fore tibiae, with sharper and more prominent teeth and slightly narrower prothorax and elytra, showing thus an apparent similitude with *R. problematicus*; however, the most prominent tooth is at mid length of the fore tibia, and is followed by denser apical setae; also the pronotum, sinuate and granulose at the apex, confirms the attribution of this population to *R. orientalis*, in agreement with its geographical distribution.

The rank of the epithet *problematicus* Hervé, 1949, originally named as «race», is subspecific according to Art. 45.6 ICZN (1999), as the author explicitly proposed it as such: "Il s'agit d'une race bien différencée et peut-être d'une espèce distincte" (Hervé, 1949: 137) (*It is a well differentiated race and perhaps a different species*). Therefore, the epithet can be applied to this taxon with Hervé, 1949 as the author.



FIGS 1-24

Raymondionymus problematicus, ♀, France, Alpes Maritimes, Covillote: rostrum, ♀ (1); antenna (5). *R. problematicus,* ♀, France, Alpes Maritimes, Valberg: fore tibia (12). *R. problematicus,* ♂, France, Alpes Maritimes, S. Annot: aedeagus (19-20). – *R. orientalis,* ♂, France, Alpes Maritimes, Col de Castillon: rostrum (2); antenna (9); fore tibia (13); aedeagus (15-16). *R. orientalis,* ♂, Italy, Liguria, Colle Melosa: rostrum (3); antenna (8); fore tibia (14); aedeagus (17-18). – *R. ochsi,* ♂, France, Alpes Maritimes, Vence: rostrum (4); antenna (6); fore tibia (11); aedeagus (21-22). *R. ochsi,* ♂, France, Alpes Maritimes, Eze: antenna (7); fore tibia (10); aedeagus (23-24). – Bar: Figs 1-14, 16, 18, 20, 22, 24: 0.5 mm; figs 15, 17, 19, 21, 23: 0.25 mm.

Raymondionymus orientalis Hervé, 1953 Figs 2-3, 8-9, 13-14, 15-18, 58-59, 66-68

FRANCE, ALPES MARITIMES: "Sospel, La Vasta, A. M., 10.VI.1973", 2 exs; "Col de Castillon, A. M., 8.IV.1972, Leg. Curti M.", 3 exs; "Col de Castillon, A. M., 9.IV.1973", 10 exs (6 exs MHNG; 2 exs MER; 2 exs OSL); "Peille, Banquette, A. M., 13.V.1960, Leg. Curti M.", 5 exs; "Peille, A. M., 13.XII.1976", 1 ex.; "Casterino, A. M., 27.VI.1974, Biaso, m 1850, Leg. Curti M.", 5 exs; "Le Moulinet, A. M., vers 900 m, 25.VI.1975, Leg. Curti M.", 2 ♀♀; "Bois de Sanson, 22.VII.1974, La Brigue, Leg. Curti M.", 1 ex. – ITALY, LIGURIA: "lav. Melosa, Italie, VII.75", 9 exs (5 exs MHNG; 2 exs MER; 2 exs OSL); "Pigna, Melosa, Italie, 25.V.1973, Leg. Curti M.", 7 exs (5 exx MHNG; 1 ex. MER; 1 ex. OSL); "Colle Melosa, Italie, Pigna, 14.VII.1976, Leg. Curti M.", 4 exs; "Melosa, Italie, Pigna, m 2000, 2.X.1975, Leg. Curti M.", 5 exs; "Passo di Guta, Italie, Pigna, 7.VI.1960, Leg. Curti M.", 1 ex.; "Gouta, Italie, Pigna, 25.VI.1974, Leg. Curti M.", 3 exs; "Upega, Pont, 13.V.1973, Leg. Curti M., 2 exs; Upega, Italie, 25.V.1972", 1 ex.

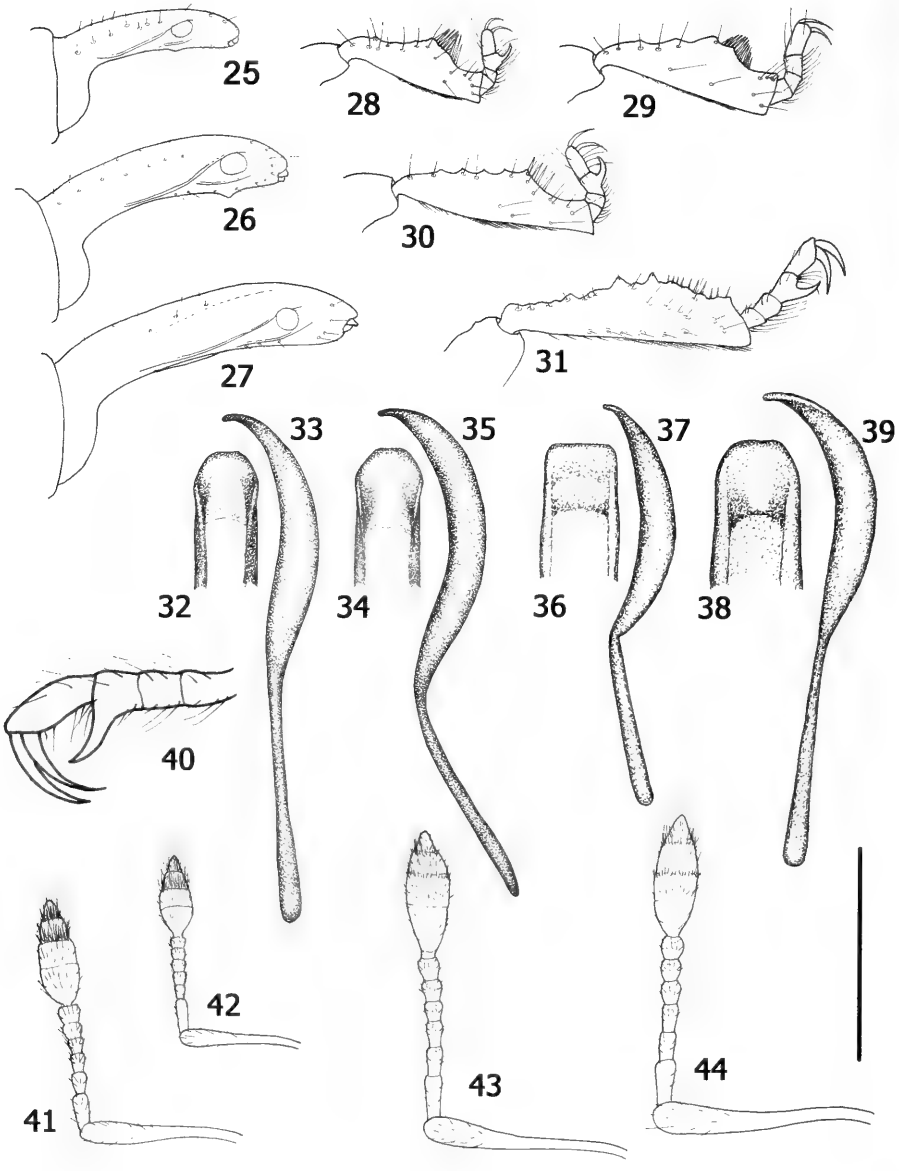
R. orientalis was described from Albarea, near Sospel. Several specimens from the immediate surroundings of Sospel (La Vasta and Col de Castillon) were examined. The range of variation mainly regards the dorso-lateral margins of rostrum, often slightly curvilinear, and the punctures on the dorsum of pronotum, usually large and dense, seldom smaller, and with interspaces nearly as wide as the punctures. Some specimens have slender fore tibia, with apparently more prominent teeth. The specimens from Italy, province of Imperia (Colle Melosa; Colle Gouta; Pigna and Upega) and those from the same province cited as *Pararaymondionymus ochsi problematicus* by Osella (1977: 54) belong to this species, which thus ranges from Sospel to the province of Imperia (Fig. 72); it seems associated to the low-montane to montane habitat, that is, from 600 m (Sospel) to about 2000 m (Colle Melosa), in mixed broadleaved forests, including chestnut and, in the sites of higher altitude, beech. The Italian specimens do not show peculiar and constant differences with respect to those from Sospel; variation in these specimens mainly regards width of pronotum, sometimes less broadened, and its puncturation, which can be dense and deep (Fig. 67) or shallower, with small punctures and broad interspaces (Fig. 68); in a few specimens pronotum is weakly transversely depressed before apex. The fore tibiae are also quite variable, sometimes not differentiated from those of the specimens from Sospel, but often narrower, less thickened at middle of their length and with sharper teeth.

R. orientalis is nearly sympatric with *R. sanfilippoi* (Osella & Giusto, 1985) in part of its range. This species can be distinguished from *R. orientalis* by the presence of a spine on the inner side of segment 3 of the ♂ tarsi; the ♀♀ are distinguished by the segment 2 of the funicle much shorter, barely longer than 3, the pronotum with sides more widened at middle, and with a shallow, but distinct, semicircular impression before the apex.

Raymondionymus longicollis Perris, 1869, sensu lato Figs 25-27; 28-30; 36-39; 41-42

Raymondionymus longicollis Perris, 1869: 29.

A) FORM FROM NORTHERN CORSICA: "Grotte d'Acorte, Pietra Corbara, 7.XI.1972, Corse, Leg. Curti M.", 1 ♀ 1 ♂; "Brando, Corse, Castello, 7.XI.1972, Leg. Curti M.", 1 ♀.



FIGS 25-44

Raymondionymus longicollis s.l., ♂, Corsica, Pietra Corbara: rostrum (25); fore tibia (28); aedeagus (36-37); antenna (42). *R. longicollis* s.l., ♀, Corsica, Lano: rostrum (26); fore tibia (29). *R. longicollis* s.l., ♂, Corsica, Col de Verde: rostrum (27); fore tibia (30); aedeagus (38-39); antenna (41). – *R. sanfilippoi*, ♂, France, Alpes Maritimes, M. Ferisson: fore tibia (31); aedeagus (32-33); antenna (43). *R. sanfilippoi*, ♂, Italy, Val Pesio: aedeagus (34-35); fore tarsus (40); antenna (44). – Bar: Figs 25-31, 33, 35, 37, 39, 41-44: 0.5 mm; Figs. 32, 34, 36, 38, 40: 0.25 mm.

B) FORM FROM CENTRAL CORSICA: "Grotte de Lano, Lano, Corse, IX.1970, Leg. Curti M.", 1 ♀.

C) FORM FROM CENTRAL-SOUTHERN CORSICA: "Col de Verde, Corse, 2.XI.1972, Leg. Curti M.", 1 ♂.

REMARKS. The five specimens examined come from different localities. Two ♂♂ and 1 ♀ come from north of Bastia; a ♀ was sampled in central Corsica, and a further ♂ is from Col de Verde, in the central-southern part of the island. Each locality, or geographical area, is colonized by specimens showing peculiar traits, although all these forms are closely related and apparently of monophyletic origin. The specimen from Col de Verde is more diversified, also for the aedeagus (Figs 36-39) and could probably be referred to a distinct species. However, as mutual differences are relatively limited, and the available material is very scarce, no definitive decision regarding the rank to be attributed to each form is taken; moreover, *R. longicollis* was simply described of «Corse» (Perris, 1869), and the description does not allow attributing the type specimen to any of the known populations. A complete taxonomic analysis will require more material from various localities of Corsica and the study of the type specimen. The ♂ of *R. longicollis* presents a spine in the inner side of segment 3 of the fore tarsi, indicating its phylogenetic affinity with species native to the western and maritime Alps.

Raymondionymus sanfilippoi (Osella & Giusto, 1985) Figs 31-35, 40, 43-44, 69

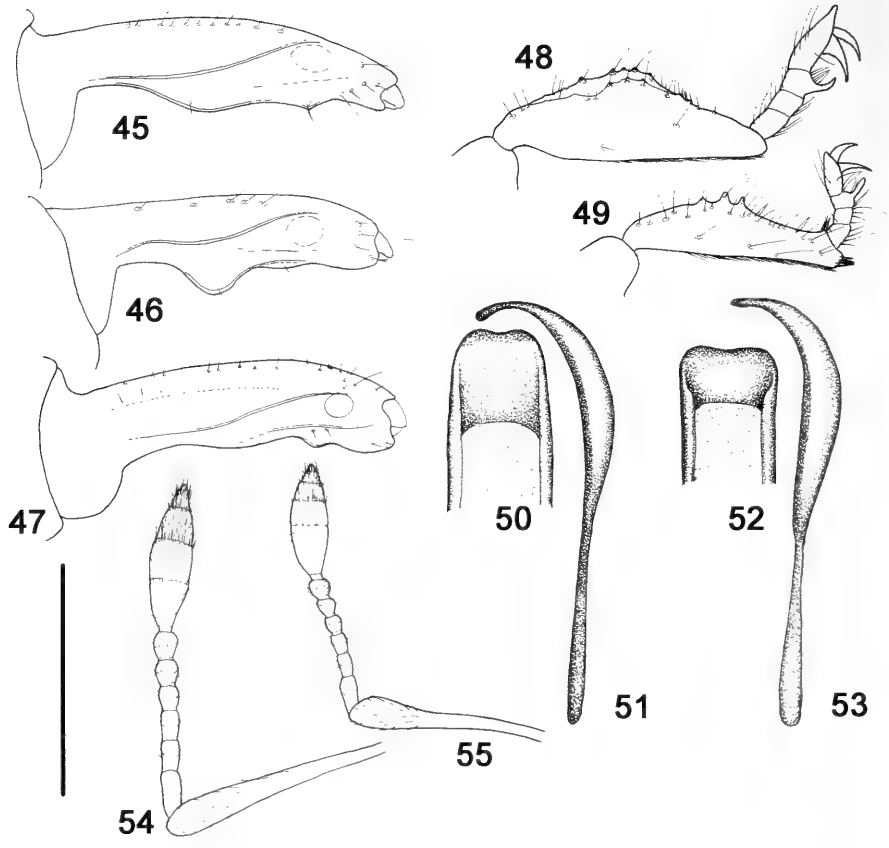
Pararaymondionymus sanfilippoi Osella & Giusto, 1985: 432.

ITALY, PIEDMONT: "Val Pesio, Italie, Pont, m 1500, 22.VII.1973, Leg. Curti M.", 2 ♂♂ 1 ♀ (1 ♂ 1 ♀ MHNG; 1 ♂ MER). – FRANCE, ALPES MARITIMES: "Ferisson, A. M., Gadelasque, 22.VIII.1973, Leg. Curti M. / lavage de terre à 2000-2200 m près de la bergerie", 1 ♂; "M. Ferisson, A. M., 2000, VIII", 1 ♂ 1 ♀ (1 ♀ MHNG; 1 ♂ OSL).

REMARKS. Two specimens were listed in the «Materiale esaminato» paragraph of the original description (Osella & Giusto, 1985): a ♀ from «Val Pesio, Pian Creuse, m 1250» and another ♀, from «App. Ligure occ., Murialdo (SV)», a locality about 40 km east of Val Pesio, in the western Ligurian Apennine, high Bormida Valley. None of the two specimens was explicitly indicated as the holotype, but that from Murialdo was only doubtfully attributed to *R. sanfilippoi* (Osella & Giusto, 1985: 434): according to Art. 72.4.1 (ICZN, 1999) this act excludes this last specimen from the type series and the specimen from Val Pesio is thus the holotype. This is confirmed by two implicit indications: «Val Pesio» was reported as the «Loc. tip.» (type locality), and the caption of the illustrations (Osella & Giusto, 1985: 433, Figs 13-15; 18-19) refers to the specimen from Val Pesio as to the holotype.

The original description compared the new species with *R. gardinii*, the taxon most closely related morphologically, and included drawings of body, fore tibia and spermatheca.

The three specimens ex coll. Curti were collected at a slightly higher altitude, 1500 m instead of 1250 m. They have pronotum with smaller punctures, interspaces strongly microsculptured, matt, as wide as the punctures; middle keel indistinct in one specimen and barely visible in the others; punctures of the elytra smaller, as in *R. gar-*



FIGS 45-55

Raymondionymus zoiai, ♂, Italy, Piedmont, Crissolo: rostrum (45); fore tibia (48); aedeagus (50-51); antenna (54). *R. zoiai*, ♀, Italy, Piedmont, Crissolo: rostrum (46). – *R. curtii*, holotype: rostrum (47); fore tibia (49); aedeagus (52-53); antenna (55). – Bar: Figs 45-49, 51, 53, 54-55: 0.5 mm; Figs 50, 52: 0.25 mm.

dinii. The interval 6, near its base, has minute granules, which are less prominent than in *R. gardinii*. The male tarsi have a strong spine on segment 3, and the onychium has a very short, scarcely distinct prominence at the apex. Antenna, ♂ tarsus, aedeagus as illustrated in Figs 34-35, 40, 44.

The specimens from Mount Ferisson, in the Mercantour massif, show minor differences: pronotum with a distinct middle keel, slightly convex in the anterior half in two specimens; punctures on dorsum variable, dense, deeply impressed, irregular, with slightly convex interspaces in one specimen; smaller, with barely convex interspaces in the second and shallowly impressed, with flat wide interspaces in the third specimen. Interval 6 of the elytra usually with a row of sparse minutes granules. Pronotum a little larger, with more regularly curved sides. Aedeagus not significantly distinct (Figs 32-33), very similar to the aedeagus of *G. gardinii*.

The specimen ♀ from Murialdo shows some differences with respect to those from Val Pesio: shallower punctures on pronotum and elytra, pronotum slightly broader and more depressed apicad, more robust fore tibiae, with a different position of the teeth on the outer margin. The identification of this specimen is doubtful. In central-western Liguria, not far from Murialdo, *R. bartolii* (Osella & Giusto, 1985) and the very closely related *R. gardinii* (Osella, 1977) were described, respectively based on two and one specimens, and both are morphologically similar to *R. sanfilippoi,* also for the form of the aedeagus. Three more specimens, all ♀♀, found in the neighbouring localities of Altare and Nasino (Fig. 72), belong to this complex but could not be referred to any of the described taxa: specimens from each locality show in fact a peculiar morphology, and interpretation of taxonomy of the whole group requires more material. However, as also the specimen from Murialdo belongs to this group, it is preferable to exclude it from *R. sanfilippoi*, in order to maintain a morphological and biogeographical homogeneity to each of the described taxa in this complex. The range of *R. sanfilippoi* remains thus limited to the Maritime Alps, between the Mercantour massif at west and the Marguareis at east (Fig. 72), at relatively high altitudes, between 1250 and more than 2000 m.

New species for the French fauna

Raymondionymus curtii sp. n. Figs 47, 49, 52-53, 55, 61, 71

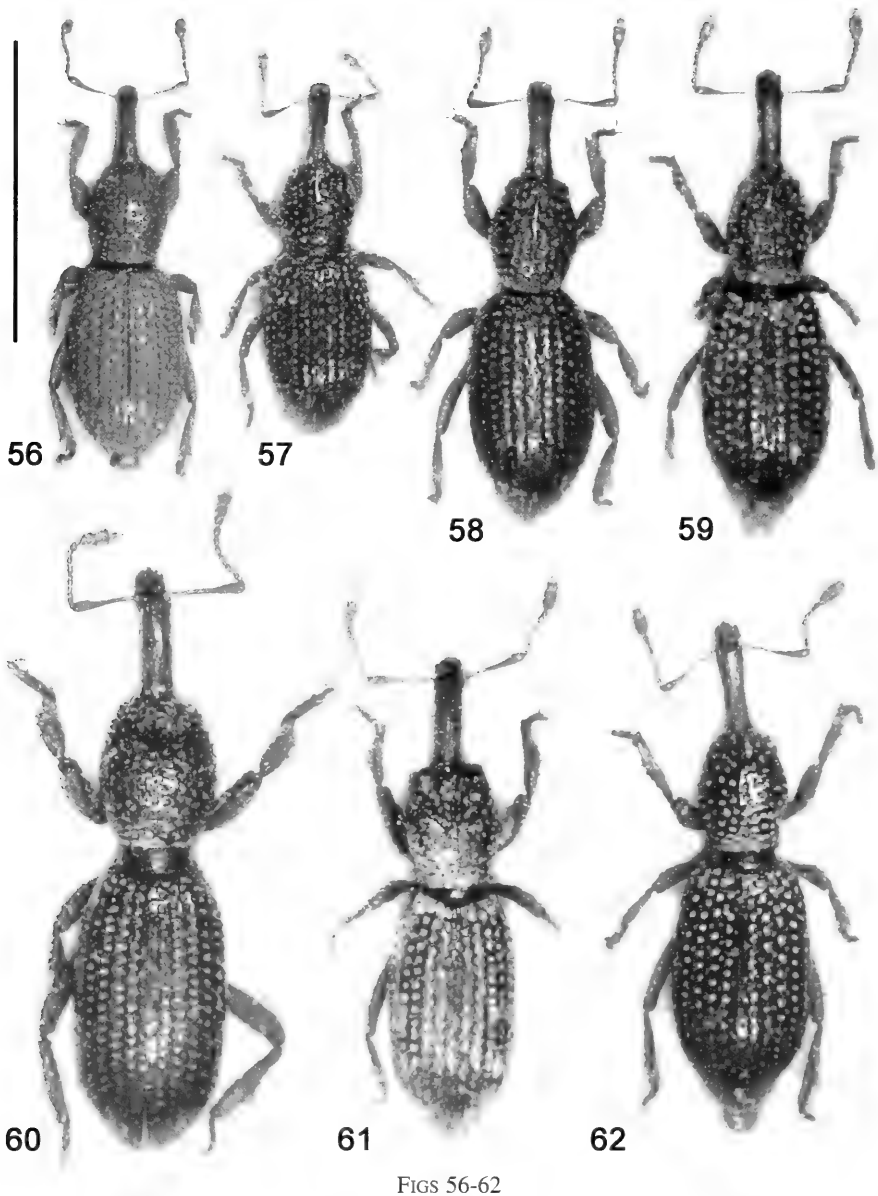
Type locality: Italy, Piedmont, Valle Varaita, Castello [44°37'N 07°03'E].

Holotype: ITALY, PIEDMONT: «Castello, Italie, Valle Varaita, 12.VI.1974, m 1500, Leg. Curti M.» 1 ♂ (MHNG, Curti collection).

DIAGNOSIS. A *Raymondionymus* morphologically and systematically related to *R. zoiai*, characterized by rostrum with the lower margin of scrobe scarcely expanded downwards; pronotum weakly narrowed apicad, with distinct semicircular shallow depression; elytra narrower; curved part of the apex of aedeagus shorter.

MEASUREMENTS. Length including rostrum: 3.12 mm. Rostrum: length 0.74 mm; width without the expansions of the scrobes: 0.17 mm; width including the expansions of the scrobes: 0.23 mm. Pronotum: length 0.77 mm; width 0.62 mm; length/width ratio 1.24. Elytra: length 1.60 mm; width 0.81 mm; length/width ratio 1.98.

DESCRIPTION. Body dark reddish, integument scarcely glossy, dorsum flattened. Rostrum subcylindrical, flattened dorsally, dorso-lateral margins rectilinear, weakly keeled and slightly darker near base; upper margin of scrobe expanded laterally, fully visible from above, weakly curved, with maximum width at mid of its length. Dorsum with trace of longitudinal wrinkles, lacking isolated punctures. In lateral view dorsum moderately and regularly curved; upper margin of scrobe sinuate, curved downwards at middle of its length; lower margin of scrobe weakly curved downwards but not distinctly expanded. Antenna short, scape weakly sinuate, strongly thickened at apex; segment 1 of the funicle cylindrical, 1.5x longer than wide; segment 2 subconical, isodiametric; 3 longer than 2; 4-6 globose; club large, elliptical, segments well distinct. Pronotum longer than wide, apex distinctly broader than base, sides strongly, sublinearly widened from base, maximum width at middle, scarcely converging apicad. Surface with dense and deep punctures, interspaces narrower than the punctures, with



FIGS 56-62

Body of *Raymondionymus* spp.: *R. ochsi*, ♂, France, Alpes Maritimes, Vence (56); *R. ochsi*, ♂, France, Alpes Maritimes, Eze (57). – *R. orientalis*, ♂, France, Alpes Maritimes, Col de Castillon (58); *R. orientalis*, ♂, Italy, Liguria, Colle Melosa (59). – *R. zoiai*, ♂, Italy, Piedmont, Crissolo (60). – *R. curtii*, holotype (61). – *R. problematicus*, ♀, France, Alpes Maritimes, Valberg (62). Bar: 2 mm.

distinct wrinkled microsculpture; median line narrow, convex, nearly keeled, well delineate from base to apex; anterior half with a shallow semicircular depression; dorso-lateral part with raised granules; dorsum and sides with stiff lifted setae, oriented

forwards, inserted on the hind margin of the punctures and on the granules. Elytra slender, long elliptical, base curved, sides very scarcely broadened, nearly sub-parallel for most of their length. Striae with dense, regularly impressed round punctures, smaller on declivity; intervals nearly as wide as the striae, narrower at base, weakly convex, with microscopic shallow punctures only visible at high enlargement, evenly spaced, preceded, on intervals 4 to 6 and on declivity, by minute dark granules, sharper on interval 6 than on intervals 4 and 5; each of the punctures bearing a lifted stiff seta, oriented backwards, as long as or, on sides and declivity, longer than the intervals. Fore femora thickened, with small granules on the outer side; fore tibiae moderately thickened in cross section, maximum width in the inner side before mid of their length, narrowed towards apex; outer margin with a few small granules and some long setae, lacking a sub-apical fringe, which is replaced by a few isolated short thick setae; tarsi short, fore tarsi with a spine on the inner side of segment 3; onychium sub-acute at apex. Middle and hind femora less thickened, not or indistinctly granulose on their outer margin. Hind tibiae slender, with sub-apical teeth moderately developed. Ventrites glossy, 1 and 2 with small punctures regularly impressed, interspaces of the punctures wider than the punctures. Aedeagus as illustrated in Figs 52-53.

ETYMOLOGY. This species is named after Marc Curti, an entomologist with an extreme skill in sampling of endogeic insects, as it is also demonstrated by the extraordinarily rich material here studied.

REMARKS. *R. curtii* is morphologically similar to *R. zoiai,* from which it differs by the smaller size, the lower margin of scrobe slightly curving downwards but not expanded as in the ♂ of *R. zoiai*; the sides of pronotum weakly converging at apex, with much more prominent granules; the elytra narrower, with distinctly raised granules on interval 6; the granules present also on intervals 4 and 5 and on declivity; the fore tibia less expanded and lacking a subapical fringe of setae; the onychium of male fore tarsi not expanded apically; the shorter apex of aedeagus. *R. sanfilippoi*, spread in the Maritime Alps between the Marguareis and the Mercantour massifs, differs by the upper margin of scrobe not expanded laterally when seen from above; the sides of pronotum regularly curved, its apex approximately as wide as base; the dorsum with the semicircular impression in the anterior half nearly indistinct; the elytra more convex, with slightly more rounded sides; the narrower striae and the flat and wider intervals, interval 6 with scarcely distinct granules; the setae on elytra irregularly spaced; the fore tibiae smaller and less thickened at middle in cross section.

DISTRIBUTION. The new species, known so far of the upper part of Val Varaita, is a southern vicariant of *R. zoiai*. Investigations in the valleys south of Val Varaita are needed to define its distribution; researches in a beech forest at about 1000 m a.s.l. in Val Maira, the next valley south of Val Varaita, have proved so far negative for Raymondionymidae (Meregalli, personal observations).

Raymondionymus zoiai (Osella & Giusto, 1985) Figs 45-46, 48, 50-51, 54, 60, 70

Pararaymondionymus zoiai Osella & Giusto, 1985: 434.

SPECIMENS IN CURTI COLLECTION:

ITALY, PIEDMONT: "Crissolo, Pont, Italie, 28.VII.1973, Leg. Curti M.", 1 ♂.

OTHER SPECIMENS EXAMINED:

ITALY, PIEDMONT: «Piemonte, Valle Po, Crissolo, faggeta, m 1200, 13.VIII.1996, S. Zoia legit», 1 ♀ (MER).[1]

REMARKS. This species was based on 2 ♀♀ from of Rorà (the type locality) and a further ♀ from Crissolo. The specimens from Crissolo differ from those from Rorà by some traits of limited importance: upper margin of scrobe slightly sinuate in lateral view, curved downwards; expansion of the lower margin of scrobe broader and more regularly expanded in the ♀ (see below for remarks on the secondary sexual characters); rostrum on dorsum with shallow irregular longitudinal wrinkles, lacking clearly differentiated punctures; segment 5 of antennal funicle isodiametric; pronotum more robust, with more rounded sides; punctures on its dorsum shallower, smaller and more spaced; punctures of elytra variable, smaller in the ♀, which has thus intervals as wide as the striae, and completely flat and larger in the ♂, which has narrower and weakly convex intervals; granules on interval 6 more evident; ventrites 1 and 2 with smaller and shallower punctures. This species presents the most striking dimorphism in secondary sexual characters in the whole family Raymondionymidae. The ♂ has underside of rostrum with a preapical acute prominence and expansion of lower margin of the scrobe less developed (Figs 45-46). The fore tibiae are strongly thickened in cross section at middle and their inner side is more expanded at this level; the fore tarsi have a spine on segment 3, as typical of this group, and in addition onychium has an evident projection at apex; moreover, claws are very robust, flattened.

Raymondiellus doderoi (Ganglbauer, 1906)

Raymondionymus (Raymondiellus) doderoi Ganglbauer, 1906: 166.

ITALY, SARDEGNA: "Sindia, Sardaigne, 9.III.1979, Leg. Curti M. / Mt. San Antonio, lavage terre chénes-liège", 1 ex.

Ferreria marqueti apennina (Dieck, 1869)

Raymondia apennina Dieck, 1869: 10.

ITALY, TOSCANA: "Carrare, Italie, 23.XII.1975, Leg. Curti M.", 1 ex. – ITALY, EMILIA: "M.te Fumaiolo, Verghereto, 22.VI.1976, Leg. Curti M. / lavage de terre source du Tevere", 2 exs – ITALIA, MARCHE: "Monte Nerone, Cagli, 24.VI.1976, Leg. Curti M. / davant le relais de television sous une grosse pierre", 1 ex.

Ferreria doriai (Osella, 1977)

Raymondionymus doriai Osella, 1977: 77.

ITALY, LIGURIA: "S. Lorenzo, Gênes, 13.V.1973, Leg. Curti M.", 4 exs (3 exs MHNG; 1 ex. MER); "Ruta, Ligurie, 13.V.1973, Leg. Curti M.", 3 exs; "Uscio, Ligurie, 17.V.1973", 6 exs (4 exs MHNG; 1 ex. MER; 1 ex. OSL).

Ubychia leonhardi leonhardi Reitter, 1914

Ubychia Leonhardi Reitter, 1914: 82.

Ubychia leonhardi leonhardi Reitter, 1914: Osella, 1977: 141-142.

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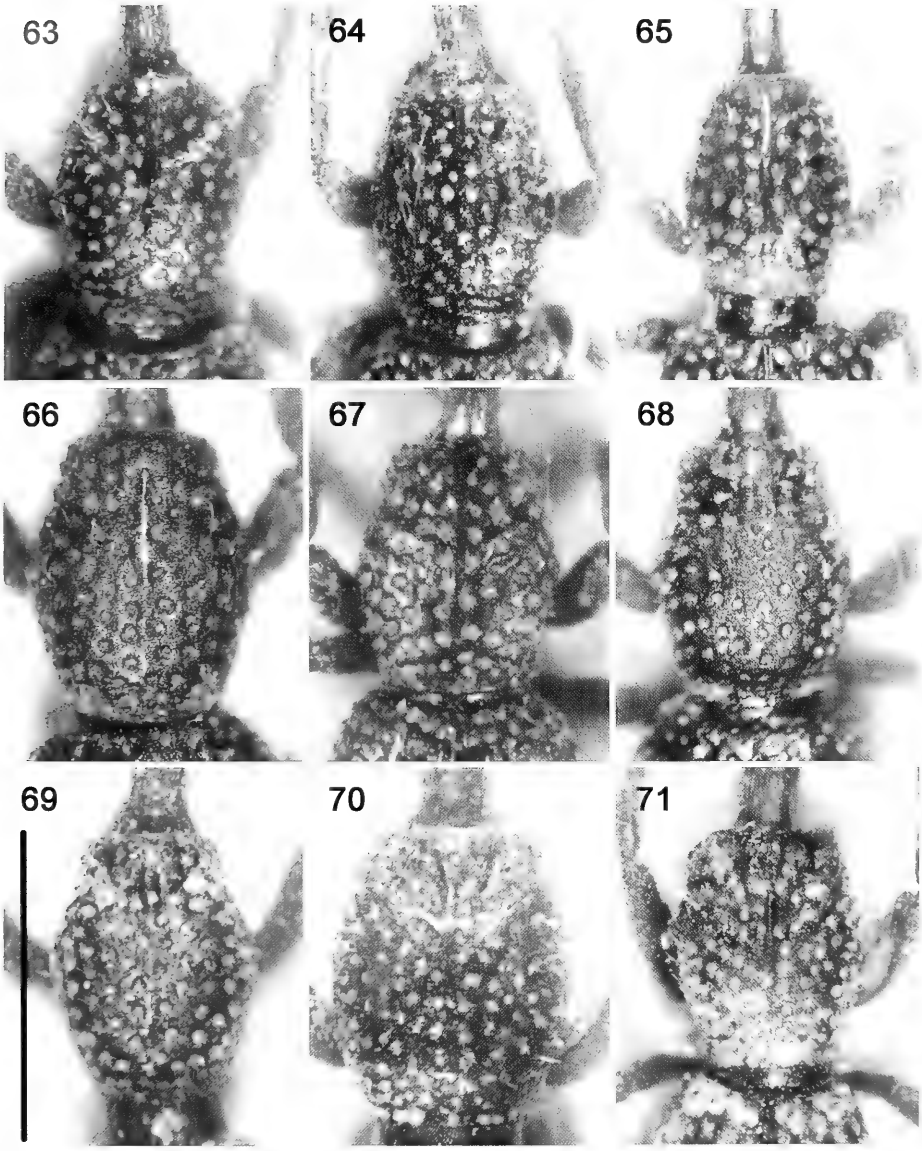
[1] *Note added in proof.* While the paper was in press, another specimen was found, expanding the range of *F. zoiai* to Val Germanasca (a tributary of Val Chisone): Val Germanasca, Chiabrano, Grotta 'Tuna dal Diau' [44°56'55.9" N 7°6'25.3" E], m 1150, X.2005, P.M. Giachino leg., 1♂.



Figs 63-71

Pronotum of *Raymondionymus* spp.: *R. ochsi*, ♂, France, Alpes Maritimes, Vence (63); *R. ochsi*, ♂, France, Alpes Maritimes, Eze (64). – *R. problematicus*, ♀, France, Alpes Maritimes, Covillote (65). – *R. orientalis*, ♂, France, Alpes Maritimes, Col de Castillon (66); *R. orientalis*, ♂, Italy, Liguria, Colle Melosa (67); *R. orientalis*, ♀, Italy, Liguria, Pigna (68). – *R. sanfilippoi*, ♂, France, Alpes Maritimes, M. Ferisson (69). – *R. zoiai*, ♂, Italy, Piedmont, Crissolo (70). – *R. curtii*, holotype (71). – Bar: 1 mm.

ITALY, LOMBARDY: "Oltre il Colle, Bergamo, 20.VI.1976, Leg. Curti M.", 1 ex.; "M. Pora, Italie, Dorea, 20.VI.1976, 1800, Leg. Curti M.", 7 exs; "Oneta, Cantoni, Bergamo, 20.VI.1976", 3 exs – ITALY, VENETO: "Monticchio, Italia, Verona, 30.V.1979, Leg. Curti M.", 1 ex.; "Velo, Verona, Italie, 25.V.1975, Leg. Curti M.", 4 exs; "Velo, Verona, Italie, 28.V.1975, m 1300, Leg. Curti M.", 4 exs; "Velo, Verona, Italie, 30.V.1975, Leg. Curti M." 15 exx, (11 exs MHNG; 2 exs MER; 2 exs OSL); "Velo, Verona, Oltre il Colle cfr.(?)" [*note*: this indication probably refers to a correlation of these specimens with those from Oltre il Colle], 2 exs

REMARKS. *Ubychia leonhardi* is presently known from the Prealps of Lombardy, Val Camonica (type locality) and Val Brembana, where the nominal subspecies is present, and from the Ticino Valley, in Southern Switzerland, with subspecies *U. leonhardi ticinensis* Osella, 1977. The examined material expands the range of the species towards east, up to the Verona Prealps. The specimens from Veneto show very small differences with respect to those of *U. leonhardi leonhardi* from Lombardy: the elytra are slightly more constricted in the apical half and the median expansion of the fore tibiae is usually rounded, seldom sub-angular as in the majority of the specimens from Oltre il Colle, a locality in Val Brembana. No significant differences could be found in the structure of the aedeagus.

SYSTEMATIC REMARKS ON THE GENUS *RAYMONDIONYMUS*

A phylogenetic analysis of the genus *Raymondionymus* is beyond the scope of the present contribution. However, short and preliminary notes allow to recognize apparently monophyletic groups and to underline some aspects of the distribution. Based on the absence or presence of a spine on segment 3 of the ♂ fore tarsi, the species can be included into two groups, the *R. perrisi* and the *R. fossor* groups. This secondary sexual character is very peculiar and does not appear elsewhere in the family Raymondionymidae, so its shared presence should be considered as a synapomorphy for the *R. fossor* group. Secondary sexual characters in the legs are not uncommon in Curculionoidea, but the presence of a tarsal spine is unusual; it appears in some genera of Apionidae, such as *Protapion* Schilsky, 1908; however, morphology of the spine is completely different between these Apionidae, which have usually an expanded and modified segment 1 of the fore tarsi and other significant secondary sexual characters in the legs (see Russell, 2004), and the *Raymondionymus*. So far, this trait has not been described for other taxa of Curculionoidea.

The following species lack the spine and do not show any particular secondary sexual character other than the usual slight depression of the male ventrites and the rostrum weakly shorter in the ♂: *R. laevithorax* (Perris, 1875); *R. laneyriei* Hervé, 1949; *R. lavagnei* Mayet, 1898; *R. ochsi* Hervé, 1949; *R. orientalis* Hervé, 1953; *R. perrisi* (Grenier, 1864); *R. problematicus* Hervé, 1949; *R. stricticollis* (Reitter, 1894). They are spread in southern France and western Liguria and, along the Apennines, reach central Italy, with *R. laevithorax* in Corsica. Based on morphology and distribution, some sub-groups, not yet fully analysed, are identifiable; among these, *R. ochsi* and *R. orientalis* show a high morphological affinity and may be considered as vicariant species adapted to distinct habitats, the xerophyll forest for *R. ochsi* and the more humid and fresh broadleaved forest for *R. orientalis*. No male

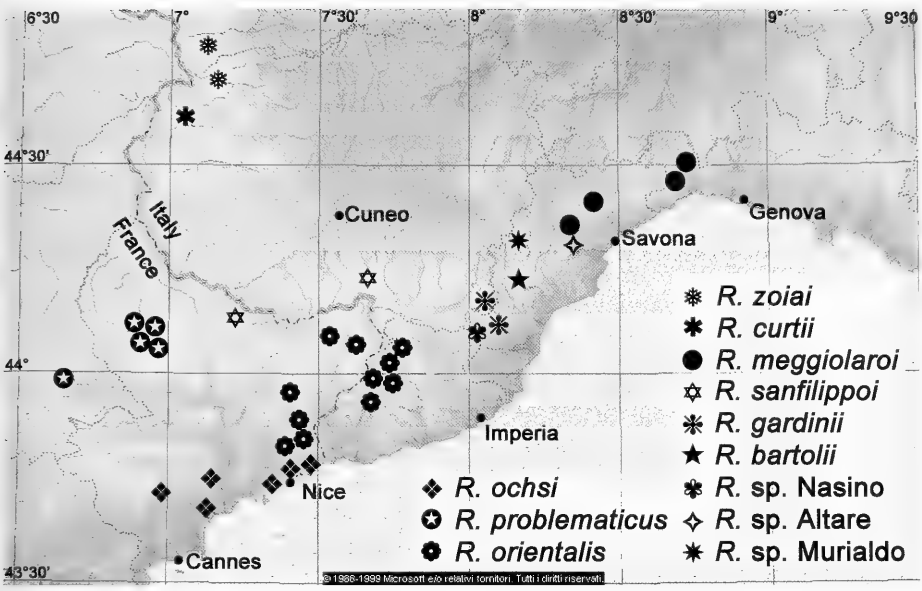


FIG. 72

Distribution of some species of *Raymondionymus* of the Western Alps [map from Encarta World Atlas 2000 (Microsoft Corporation), elaborated with Photoshop 7.0 (Adobe Systems Incorporated)].

specimen surely referable to *R. hoffmanni* Hervé, 1949 was examined, hence this species is not included in either of the groups.

The spine on segment 3 of the ♂ fore tarsi is shared by the Corsican *R. longicollis* Perris, 1869 and several other species: *R. andreinii* (Osella, 1977); *R. bartolii* (Osella, 1977); *R curtii* sp. n.; *R. fossor* (Aubé, 1861); *R. gardinii* (Osella & Giusto 1985); *R. magnificus* (Osella, 1977); *R. meggiolaroi* (Osella, 1977); *R. mingazzinii* (Osella & Abbazzi, 1985); *R. mirabilis* (Osella, 1977); *R. sanfilippoi* (Osella & Giusto, 1985); *R. zoiai* (Osella & Giusto, 1985). The range of this group is thus partially overlapping with that of the previous group, being present in Southern France, central-western Liguria, and central Italy; it expands to the southern Apennines with two species. Monophyly of these species is sustained by other characters, such as habitus, structure of the genitalia, etc. Pronotum, in most of the species, is slightly globose and convex at middle, narrowed apically; usually it has a distinct transversal depression before apex. Each species has a limited distribution, in some cases restricted to a single valley or mountain. Three species (*R. meggiolaroi, R. magnificus* and an undescribed species from Lazio) differ from the other entities of this group for the synapomorphy of a broad pronotum, whose sides are strongly and regularly rounded from base to apex, and whose dorsum shows a deep semicircular or triangular depression on the anterior half. They have broader elytra, with a lower length/width ratio. These three species colonize forested habitats of the central-western Ligurian Alps (*R. meggiolaroi*) and reach southern Italy along the Apennines with *R. magnificus*, with the new

undescribed species in-between. The wide range of this group and the limited morphologic variations among the species which compose it are remarkable, particularly when compared with the usually very restricted range of the other subunits. *R. zoiai* shows a peculiar dimorphism in the secondary sexual characters which is unparalleled in the other species; also the geographical vicariant *R. curtii* may show a strong sexual dimorphism, at least basing on the morphology of the rostrum and fore legs of the holotype ♂; in *R. longicollis* and in the other continental species the secondary sexual characters are limited to the presence of the spine on segment 3 of the ♂ fore tarsi. The *R. fossor* group appears thus to be highly diversified, comprising some possibly monophyletic subgroups, each with its own range. Only the nominal species, *R. fossor*, was recorded from France; this species is strictly localized near the Mediterranean coast and, perhaps not surprising for paleogeological considerations, is morphologically similar to *R. longicollis* from Corsica; no other species have ever been found in the French side of the alpine chain, apart for the very marginal presence of *R. sanfilippoi* in the Mercantour massif. It is impossible to establish with full confidence whether the absence is real because these species are very difficult to sample. However, the absence of species of the *R. fossor* group from the French alpine territories seems at least very probable, particularly for the Maritime Alps, which have been extensively sampled by Curti. The presence of taxa of this group in the Italian side of the Varaita, Po and Pellice valleys is not surprising and was probably determined by the floristic continuity along the foothills between the eastern side of the Cottian and Ligurian Alps and the forests of the Maritime Alps, which occurred during the late Tertiary at least (Zheng, 1990; Martinetto, 1996; Suc *et al.*, 1999); the distribution pattern of these species of *Raymondionymus* is paralleled by the distribution of several other endogeic Coleoptera of the western Alps, such as some Carabidae (Casale & Vigna Taglianti, 1992; Vigna Taglianti, 1969; also Casale, personal communication about the distribution of the species of the genus *Doderotrechus* Vigna Taglianti) and Cholevidae (Giachino & Vailati, 1993). The northern limit of distribution seems to be coincident with the Chisone valley; this limit may have been determined by paleogeological, paleovegetational and paleoclimatical reasons, which may have prevented an expansion towards north, or cancelled any previous presence. The localization of several taxa nearly sympatric in the western Ligurian Apennines and in the Ligurian Alps, and the strong morphological differentiation shown by the specimens from each locality, indicate that this area represented, and probably still represents, an important centre of diversification for this complex (Fig. 72).

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We are indebted to Ivan Löbl (MNHG) for the loan of the specimens ex coll. Curti and Hélène Perrin (Museum national d'histoire naturelle, Paris) for the loan of specimens of *Raymondionymus* of the Hoffmann collection. Consolata Siniscalco (Dept. Plant Biology, University of Turin) and Edoardo Martinetto (Dept. Earth Sciences, University of Torino) supplied useful documentation on paleovegetation of the western Alps.

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Six new species of *Pheidole* Westwood from North Vietnam (Hymenoptera, Formicidae)

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Six new species of *Pheidole* Westwood from North Vietnam (Hymenoptera, Formicidae). - Six new species of *Pheidole* Westwood are described from North Vietnam: *Pheidole colpigaleata* sp. nov., *Pheidole fortis* sp. nov., *Pheidole foveolata* sp. nov., *Pheidole laevicolor* sp. nov., *Pheidole magna* sp. nov. and *Pheidole vulgaris* sp. nov. *Pheidole fortis* was collected also from North Thailand, and *Pheidole vulgaris* is widespread through the Indo-Chinese subregion.

Keywords: Ant - *Pheidole* - new species - Vietnam.

INTRODUCTION

Pheidole Westwood, belonging to the tribe Pheidolini in the subfamily Myrmicinae, is a dominant and hyperdiverse ant genus, having nearly 900 named species (Wilson, 2003). Wilson (2003) recently revised New World species of the genus, while Ogata (1982), Xu (1998), Zhou & Zheng (1999), Eguchi (1999, 2000, 2001a, b, 2003, 2004) and Eguchi *et al.* (2006) have contributed to taxonomy of Oriental species of the genus long after European and American pioneers in late 19th and early 20th.

Taxonomy of *Pheidole* is very poorly studied in Vietnam, one of the key areas for our understanding of biodiversity and biogeography in East and Southeast Asia: three species, *P. dugasi* Forel, *P. planifrons* Santschi and *P. tsailuni* Wheeler (replacement name for *P. concinna* Wheeler), have been described as new species (Forel, 1911; Santschi, 1920; Wheeler, 1928, 1929); and three other named taxa, *P. rhombinoda* Mayr, *P. rhombinoda* var. *micantiventris* Forel and *P. smythiesii* Forel, were reported in early 20th (Santschi, 1920; Wheeler, 1927). However, Yamane *et al.* (2003) reported eleven *Pheidole* species, of which half are undetermined, in their checklist of ants in Cuc Phuong N. P. (Ninh Binh Province). Thus, numerous undescribed species are undoubtedly embedded in Vietnam. Vietnamese and Japanese myrmecologists including me have conducted surveys on ant diversity in various localities in N. Vietnam since 1997 (e.g., Bui & Eguchi, 2003; Yamane *et al.*, 2003; Eguchi *et al.*, 2004). In the present article, as part of the results, I describe 6 new species with their bionomics.

METHODS

The following measurements and indices are frequently used in the present article: head length (HL, maximal length of head capsule); head width (HW, maximal

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width of head capsule excluding eyes); length of gena (LG, distance between mandibular insertion and anterior margin of eye in profile); eye length (EL, length of maximal diameter of eye); scape length (SL, length of antennal scape excluding the basal condylar bulb); length of antennal segment X (LASX); mesosoma length (ML, diagonal length of mesosoma in profile from anterior margin of pronotum to posterior margin of propodeal lobe); length of hind femur (FL); cephalic index (CI = HW / HL x 100); scape index (SI = SL / HW x 100); hind femur index (FI = FL / HW x 100); ratio of length of postpetiole excluding helcium to length of petiole.

The terms "occipital carina", "occipital lobe" and "alitrunk" employed in Eguchi's previous publications (e.g., Eguchi, 1999, 2000, 2001a, b, 2004) are replaced with "preoccipital carina", "vertexal lobe" and "mesosoma" in the present paper.

Colonies collected by K. Eguchi are given a colony code, like Eg00-HK-31; those by Sk. Yamane like TH99-SKY-04; those by T. V. Bui and K. Eguchi like B&E03-8. Abbreviation of collectors are: Eg = Katsuyuki Eguchi; SKY = Seiki Yamane; BTV = Tuan Viet Bui; JRF = John R. Fellowes. Abbreviations of the specimen depositories follow those in Arnett *et al.* (1993), where available: IEBR, Entomological collection of the Institute of Ecology and Biological Resources, Hanoi, Vietnam; MHNG, Muséum d'histoire naturelle, Geneva, Switzerland; MCZC, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA; BMNH, Natural History Museum, London, UK; NHMW, Naturhistorisches Museum, Wien, Austria; FSKU, Entomological collection of Faculty of Science, Kagoshima University, Japan; ACEG, Ant Collection of Katsuyuki Eguchi (ant collection managed by Katsuyuki Eguchi, temporarily housed in FSKU).

DESCRIPTIONS

Pheidole colpigaleata sp. n. Figs 1A-H

Pheidole sp. eg-113: Bui & Eguchi, 2003 (a list of local ant fauna); Eguchi *et al.*, 2004 (ecological study).

HOLOTYPE. - Major from colony Eg01-VN-222 (nesiting in a rotting twig). Type locality: Ba Vi N. P. (21°03'N, 105°22'E, ca. 1100 m alt.), Ha Tay, Vietnam [K. Eguchi leg., 11/xi/2001]. Depository: IEBR. PARATYPES. - 11 majors, 13 minors and 1 dealate queen from the same colony to which the holotype belongs. Depository: IEBR, MHNG, MCZC, BMNH, NHMW, FSKU, ACEG.

NON-TYPE MATERIAL EXAMINED. - Vietnam: *Lao Cai*: Y Linh Ho (a small fragment of forest, ca. 1100 m alt.), Sa Pa [Eg02-VN-219]; *Bac Giang*: W. Yen Tu N. P. (21°10'52.2"N, 106°43'41.3"E, ca. 195 m alt.) [B&E03-04]; *Ha Tay* (misspelled as "Ha Tai" on the labels): Ba Vi N. P. (21°03'N, 105°22'E, 1100-1200 m alt.) [Eg99-VN-130; Eg01-VN-213; Eg02-VN-038, -039]. Eguchi's informal species code "*Pheidole* sp. eg-113" has been applied to these specimens.

DIAGNOSIS. - Dorsal and lateral faces of head and alitrunk punctured and dull (minor); hypostoma with 3 conspicuous median processes in addition to the process just mesal to mandibular base (major); frontal carina well developed horizontally (major); promesonotal dome lacking a conspicuous prominence on its posterior declivity (major and minor).

DESCRIPTION. - Major: TL 2.9-3.5 mm, HL 1.21-1.29 mm, HW 1.16-1.24 mm, SL 0.60-0.63 mm, FL 0.74-0.78 mm, CI 92-96, SI 48-53, FI 61-66 (N=5); body reddish brown; head in full-face view very weakly convex laterad, shallowly and broadly

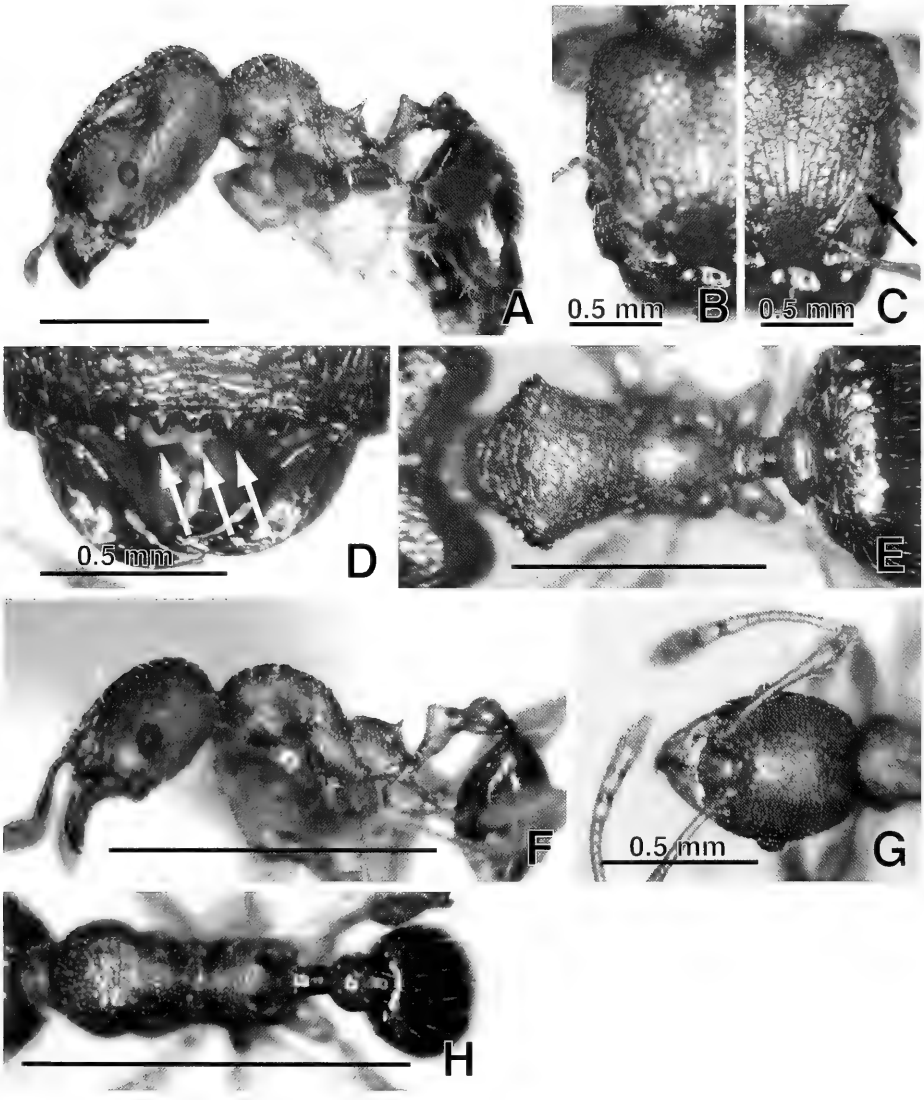

FIG. 1

Pheidole colpigaleata Eguchi sp. nov., type material. A-E, major; F-H, minor. A & F, body in profile; B, C & G, head in full-face view, arrow in C indicating frontal carina; D, median part of hypostoma, arrows indicating median processes; E & H, mesosoma in dorsal view. Scale bars = 1 mm, unless otherwise stated.

concave posteriorly, with an inconspicuous median groove from the concavity to frons, in profile hardly or very weakly impressed on vertex; anterior part of frons longitudinally rugose; posterior part of frons, vertex and dorsal and dorsolateral faces of vertexal lobe reticulate, with enclosures very weakly punctured; frontal carina well developed horizontally, partly overhanging antennal scrobe; median part of clypeus

almost smooth, without a median longitudinal carina; hypostoma with 3 median processes in addition to the process just mesal to each mandibular base (lateral processes); lateral processes well developed, as large as lateral ones of the three median processes; antenna with a 3-segmented club; scape exceeding midlength of head; EL>>LASX; LG 1.5-1.7 times as much as EL; promesonotal dome without a prominence on its posterior declivity; dorsolateral part of the dome weakly produced laterad; dorsum of the dome punctured reticulate, with enclosures very weakly punctured; lateral face of the dome, higher part of mesopleuron and lateral face of propodeum punctured and dull; lower part of mesopleuron punctured (sometimes only very weakly); propodeal spine finger-shaped or elongate-triangular, narrowly or sometimes moderately based; petiole much longer than postpetiole (excluding helcium); petiolar node in anterior view not or very weakly concave dorsally; postpetiole not massive, 1.9-2.2 times as broad as petiolar node; first gastral tergite largely smooth and shining except a weakly punctured area around its articulation with postpetiole.

Minor: TL 1.7-1.8 mm, HL 0.53-0.58 mm, HW 0.50-0.54 mm, SL 0.51-0.56 mm, ML 0.72-0.79 mm, FL 0.53-0.58 mm, CI 91-95, SI 98-106, FI 106-110 (N=5); body deep yellowish-brown; head puncutured and dull dorsally and laterally, except anteromedian part of frons dimly punctured; preoccipital carina evanescent or very weak dorsally; median part of clypeus smooth and shining, without a median longitudinal carina; antenna with a 3-segmented club; scape usually exceeding posterior margin of head by the length of second antennal segment or more; EL≈LASX; mesosoma punctured well and dull over the surface; dorsum of promesonotal dome often overlain by weak rugulae; promesonotal dome in profile without a prominence on its posterior declivity, very weakly produced dorsolaterally; propodeal spine small and thin; petiole longer than postpetiole (excluding helcium); postpetiole somewhat globular, 2.0-2.2 times as broad as petiolar node; first gastral tergite smooth and shining.

REMARKS. - This species is very similar to *Pheidole nodgii* Forel and its relatives, e.g., *P. tjibodana* Forel, *P. magrettii* Emery and *P. retivertex* Eguchi, but is well distinguished from the latter which have hypostoma with only one well-developed process (in *P. colpigaleata* hypostoma with three conspicuous median processes). This species is also similar to *Pheidole rabo* Forel, *P. zoceana*, Santschi and *P. parva* Mayr, but is also well distinguished from the latter which have frontal carinae almost absent or vestigial (in *P. colpigaleata* well developed). *Pheidole colpigaleata* actually has a mixture of characteristics seen in *P. rabo* and *P. nodgii*.

DISTRIBUTION. - N. Vietnam.

BIONOMICS. - This species inhabits forest from lowland to hilly areas (ca. 1100 m alt.), and nests in rotting twigs and small wood fragments. Colony Eg01-VN-222 stored a lot of small seeds inside the nest.

Pheidole fortis sp. n. Figs 2A-I

Pheidole sp. eg-160: Bui & Eguchi, 2003 (a list of local ant fauna).

HOLOTYPE. - Major from colony Eg02-VN-264. Type locality: Cat Cat (a trail to Mt. Phansipan, ca. 1300-1400 m alt.), Sa Pa, Lao Cai, Vietnam [K. Eguchi leg., 3/v/2002]. Depository: IEBR. PARATYPES. - 1 major and 19 minors from the same colony to which the holotype belongs. Depository: IEBR, MHNG, MCZC, BMNH, NHMW, FSKU, ACEG.

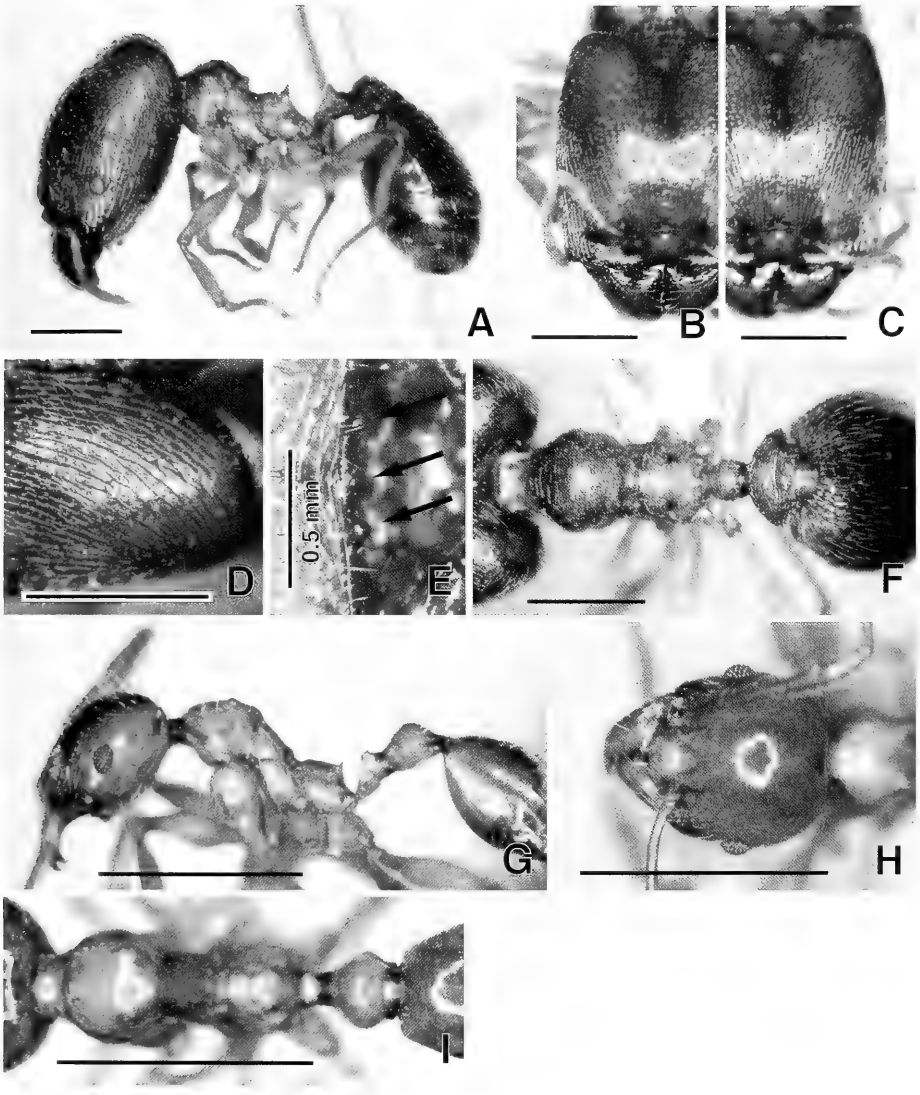

FIG. 2

Pheidole fortis Eguchi sp. nov., type material. A-F, major; G-I, minor. A & G, body in profile; B, C & H, head in full-face view; D, vertexal lobe in dorsolateral view; E, median part of hypostoma, arrows indicating median processes; F & I, mesosoma in dorsal view. Scale bars = 1 mm, unless otherwise stated.

NON-TYPE MATERIAL EXAMINED. - Vietnam: *Vinh Phuc*: Tam Dao N. P., ca. 950 m alt. [SKY, 2001]. Thailand: *Chiang Mai*: Doi Pui, ca. 1200 m alt., Doi Suthep-Pui N. P. [Eg01-TH-113]. Eguchi's informal species code "*Pheidole* sp. eg-160" has been applied to these specimens.

DIAGNOSIS. - Head densely covered with short decumbent to subdecumbent hairs entirely (major); frons with longitudinal rugulae which run toward posterolateral

corner of vertexal lobes (major); promesonotal dome lacking a conspicuous prominence on its posterior declivity (minor); postpetiole massive (major and minor).

DESCRIPTION. - Major: TL 4.4-4.8 mm, HL 2.12-2.23 mm, HW 1.79-2.05, SL 0.90-0.91 mm, FL 1.33-1.39 mm, CI 84-92, SI 44-51, FI 67-78 (N=4); body reddish-brown with paler alitrunk and appendages; head in full-face view very weakly convex laterad, broadly and deeply concave posteromedially, in profile not impressed on vertex, densely covered with short decumbent to subdecumbent hairs entirely; frons with longitudinal rugulae which run toward posterolateral corner of vertexal lobes; frontal carina and antennal scrobe absent; median part of clypeus with a median longitudinal carina; hypostoma with a pair of low processes and an inconspicuous process (a total of three median processes) in addition to the process just mesal to each mandibular base (lateral processes); lateral processes conspicuous, but smaller than lateral ones of the three median processes; antenna with a 3-segmented club; scape just reaching or a little exceeding midlength of head when it laid backward; EL ≥ LASX; LG 1.8-2.2 times as much as EL; promesonotal dome sparsely rugose transversely, with interspaces smooth and shining, with a much reduced prominence on its posterior declivity; lower part of mesopleuron smooth and shining often with several rugulae; lateral face of propodeum with rugulae; propodeal spine short, narrowly based; petiole as long as postpetiole (excluding helcium); petiolar node in anterior view shallowly and broadly concave dorsally; postpetiole massive, 2.2-2.5 times as broad as petiolar node, with an angle laterally; at least anterior 1/3 of first gastral tergite rugoso-punctured.

Minor: TL 2.3-2.8 mm, HL 0.71-0.75 mm, HW 0.64-0.71 mm, SL 0.79-0.87 mm, ML 1.01-1.07 mm, FL 0.92-0.97 mm, CI 90-95, SI 118-124, FI 134-144 (N=5); body yellowish-brown with paler appendages; head in full-face view oval, smooth and shining over the surface; median part of clypeus almost smooth and shining, often with a median longitudinal carina; preoccipital carina complete but weak dorsally; antenna with a 3-segmented club; scape extending far beyond posterolateral margin of head; EL<LASX; promesonotal dome smooth and shining, in profile without a conspicuous prominence on its posterior declivity, with an inconspicuous mound dorsolaterally; lower part of mesopleuron smooth and shining largely; lateral face of propodeum very weakly punctured; propodeal spine small, elongate-triangular, narrowly based; petiole shorter than postpetiole (excluding helcium); postpetiole massive, 2.1-2.5 times as broad as petiolar node.

REMARKS. - This species is similar to *Pheidole wroughtoni* Forel (the type material housed in MHNG was examined), but well distinguished from the latter by the following characteristics: in the major of the latter vertex and dorsum of vertexal lobe in profile forming an obtuse angle; in the minor of the latter EL>LASX; the minor of the latter having a conspicuous prominence on the posterior declivity of promesonotal dome. The minor of this species is similar to that of *Pheidole magna* sp. n. (see below), but the latter has a conspicuous prominence on the posterior declivity of promesonotal dome.

DISTRIBUTION. - N. Vietnam and N. Thailand.

BIONOMICS. - This species inhabits open forests and forest edges in hilly areas (900-1400 m alt. in N. Vietnam). It nests in the soil.

Pheidole foveolata sp. n. Figs 3A-H

Pheidole sp. eg-163: Bui & Eguchi, 2003 (a list of local ant fauna).

HOLOTYPE. - Major from colony Eg02-VN-210 (nesiting in the soil). Type locality: Y Linh Ho (a small fragment of forest, ca. 1100 m alt.), Sa Pa, Lao Cai, Vietnam [K. Eguchi leg., 1/v/2002]. Depository: IEBR. PARATYPES. - 19 majors, 21 minors and 1 dealate queen from the same colony to which the holotype belongs. Depository: IEBR, MHNG, MCZC, BMNH, NHMW, FSKU, ACEG.

NON-TYPE MATERIAL EXAMINED. - Vietnam: *Lao Cai*: Y Linh Ho (a small fragment of forest, ca. 1100 m alt.), Sa Pa [Eg02-VN-220, -227]. Eguchi's informal species code "*Pheidole* sp. eg-163" has been applied to these specimens.

DIAGNOSIS. - Dorsal and lateral faces of head and alitrunk punctured and dull (minor); median part of clypeus smooth and shining (minor); hypostoma with 3 conspicuous median processes in addition to the process just mesal to mandibular base (major); promesonotal dome lacking a conspicuous prominence on its posterior declivity (major and minor); propodeal spine much reduced to a small dent (minor).

DESCRIPTION. - Major: TL 2.1-2.8 mm, HL 0.93-0.97 mm, HW 0.91-0.97 mm, SL 0.46-0.49 mm, FL 0.56-0.58 mm, CI 98-101, SI 48-54, FI 60-62 (N=6); body deep yellowish brown to brown; head in full-face view weakly convex laterad, weakly broady concave posteriorly, with a weak median groove from the concavity to frons, in profile very weakly impressed on vertex; frons longitudinally rugose; vertex and dorsal and lateral faces of vertexal lobe weakly reticulate, with enclosures punctured and dull; frontal carina vestigial just as rugulae; antennal scrobe absent; median part of clypeus almost smooth, without a median longitudinal carina; hypostoma with 3 median processes in addition to the process just mesal to each mandibular base (lateral processes); lateral processes relatively well developed, as large as or a little smaller than lateral ones of the three median processes; antenna with a 3-segmented club; scape a little exceeding midlength of head; EL>LASX; LG 1.4-1.6 times as much as EL; promesonotal dome without a prominence on its posterior declivity; dorsolateral part of the dome weakly produced laterad; dorsum of the dome punctured at least weakly and dull, overlain with weak and irregular rugulae; lateral face of the dome and lower part of mesopleuron almost smooth and shining; lateral face of propodeum dimly or weakly punctured, often with rugulae; propodeal spine elongate-triangular, broadly based; petiole much longer than postpetiole (excluding helcium); petiolar node in anterior view not concave mediodorsally; postpetiole not massive, 1.7-1.8 times as broad as petiolar node; first gastral tergite largely smooth and shining except a weakly punctured area around its articulation with postpetiole.

Minor: TL 1.3-1.7 mm; HL 0.47-0.51 mm; HW 0.42-0.46 mm, SL 0.42-0.45 mm, ML 0.62-0.66 mm, FL 0.42-0.47 mm, CI 89-94, SI 98-102, FI 100-102 (N=6); body light brown to brown; head punctured and dull dorsally and laterally; preoccipital carina absent dorsally; median part of clypeus smooth and shining, usually with a weak or very weak median longitudinal carina; antenna with a 3-segmented club; scape exceeding posterior margin of head by half to full length of second antennal segment; EL a little more than LASX; mesosoma punctured well and dull over the surface; promesonotal dome in profile without a prominence on its posterior declivity; propodeal spine much reduced to a tiny dent (at most as long as maximal diameter of propodeal spiracle); petiole much longer than postpetiole (excluding helcium); post-

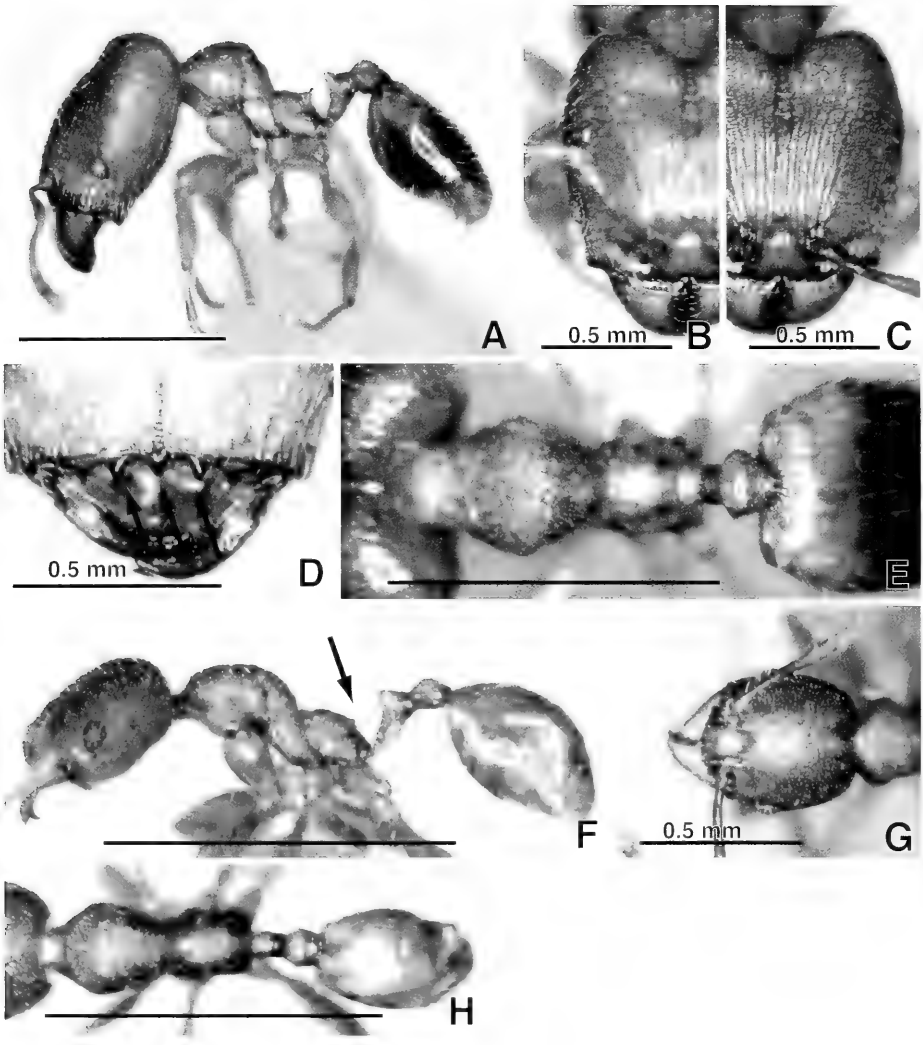

FIG. 3

Pheidole foveolata Eguchi sp. nov., type material. A-E, major; F-H, minor. A & F, body in profile, arrow in F indicating propodeal spine; B, C & G, head in full-face view; D, median part of hypostoma, arrows indicating median processes; E & H, mesosoma in dorsal view. Scale bars = 1 mm, unless otherwise stated.

petiole not massive, 1.4-1.5 times as broad as petiolar node; first gastral tergite smooth and shining.

REMARKS. - This species is similar to *Pheidole mus* Forel and *P. sagei* Forel (the type material of both species housed in MHNG was examined) and *P. parva* Mayr (the type material housed in NHMW was examined) but distinguished from the latter three by the following characteristics: the minor of the latter three having an elongate-trian-

gular propodeal spine which is more developed than in the new species; the minor of *P. mus* having median portion of clypeus which is punctured weakly or dimly and not shining.

DISTRIBUTION. - N. Vietnam.

BIONOMICS. - This species inhabits forest edges (ca. 1100 m alt.), and nests in the soil.

Pheidole laevicolor sp. n. Figs 4A-G

Pheidole sp. eg-114: Eguchi *et al.*, 2004 (ecological study).

HOLOTYPE. - Major from colony Eg01-VN-130. Type locality: Tam Dao N. P. (21°27'N, 105°38'E, ca. 1000 m alt.), Vinh Phuc, Vietnam [K. Eguchi leg., 6/xi/2001]. Depository: IEBR. PARATYPES. - 14 majors and 15 minors from the same colony to which the holotype belongs. Depository: IEBR, MHNG, MCZC, BMNH, NHMW, FSKU, ACEG.

NON-TYPE MATERIAL EXAMINED. - Vietnam: *Thai Nguyen*: My Yen Commune Forest (21°35'N, 105°36'E), Na Hau Village [Eg01-VN-160]; *Bac Giang*: W. Yen Tu N. P. (21°10-11'N, 106°43-44'E, 170-415 m alt.) [B&E03-01, -30, -40]; *Ha Tay* (misspelled as "Ha Tai" on the labels): Ba Vi N. P. (21°03'N, 105°22'E, 1100-1200 m alt.) [Eg99-VN-129, Eg02-VN-033]. Eguchi's informal species code "*Pheidole* sp. eg-114" has been applied to these specimens.

DIAGNOSIS. - Dorsal and lateral faces of head and promesonotal dome smooth and shining (minor); vertex and dorsal and lateral facecs of vertexal lobe reticulate, with enclosures punctured and dull (major); hypostoma with 3 conspicuous median processes in addition to the process just mesal to mandibular base (major); promesonotal dome at most with an inconspicuous prominence on its posterior declivity (major and minor).

DESCRIPTION. - Major: TL 2.5-3.1 mm, HL 1.06-1.20 mm, HW 0.98-1.08 mm, SL 0.49-0.55 mm, FL 0.86-0.76 mm, CI 90-92, SI 50-52, FI 67-72 (N=5); head in full-face view very weakly convex laterad, broady concave posteriorly, in profile weakly or hardly impressed on vertex; frons longitudinally rugose; vertex and dorsal and lateral faces of vertexal lobe reticulate, with enclosures punctured and dull; frontal carina very weak or vestigial just as rugulae; antennal scrobe absent; median part of clypeus almost smooth, sometimes with an inconspicuous median longitudinal carina; hypostoma with 3 median processes in addition to the process just mesal to each mandibular base (lateral processes); lateral processes well developed, as large as lateral ones of the three median processes; antenna with a 3-segmented club; scape exceeding midlength of head to some extent; EL>LASX; LG 1.4-1.7 times as much as EL; promesonotal dome without a prominence on its posterior declivity; dorsolateral part of the dome weakly produced laterad; anterodorsal, mediodorsal and lateral faces of the dome almost smooth and shining, often sparsely with weak rugulae; mesopleuron and lateral face of propodeum weakly punctured, often with a smooth area on the lower part of mesopleuron; propodeal spine elongate-triangular, sometimes with a blunt apex, narrowly or moderately based; petiole much longer than postpetiole (excluding helcium); petiolar node in anterior view weakly or very weakly concave dorsally; postpetiole not massive, in dorsal view usually produced well laterad, 1.7-1.9 times as broad as petiolar node; first gastral tergite weakly punctured on its anterior 1/4-1/3; body deep yellowish brown, with darker gaster and paler appendages.

Minor: TL 1.6-2.1 mm, HL 0.50-0.58 mm, HW 0.42-0.50 mm, SL 0.47-0.58 mm, ML 0.65-0.79 mm, FL 0.49-0.62 mm, CI 84-88, SI 108-116, FI 117-124

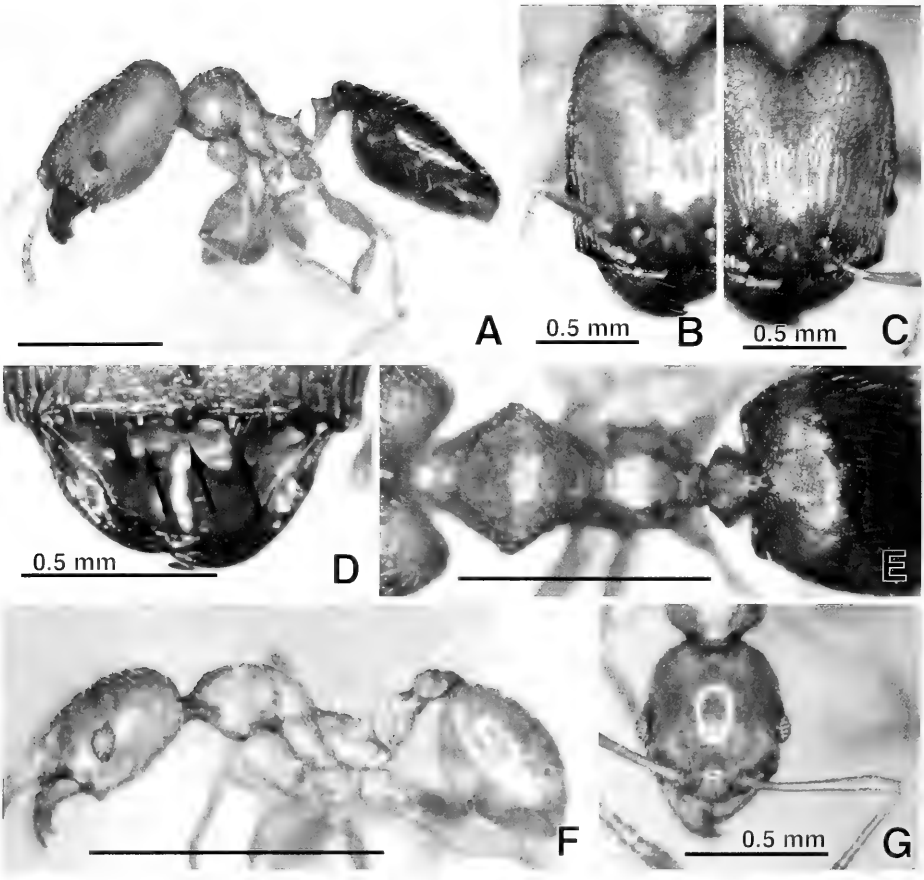

FIG. 4

Pheidole laevicolor Eguchi sp. nov., type material. A-E, major; F & G, minor. A & F, body in profile; B, C & G, head in full-face view; D, median part of hypostoma, arrows indicating median processes; E, mesosoma in dorsal view. Scale bars = 1 mm, unless otherwise stated.

(N=5); body yellowish brown; head smooth and shining; preoccipital carina complete but very weak dorsally; median part of clypeus smooth and shining, without a median longitudinal carina; antenna with a 3-segmented club; scape exceeding posterior margin of head at least by half length of second antennal segment; EL as much as or a little more than LASX; promesonotal dome largely smooth and shining, with several weak rugulae anterodorsally, in profile without or with an inconspicuous prominence on its posterior declivity; mesopleuron and lateral face of propodeum weakly punctured; propodeal spine elongate-triangular, narrowly based; petiole much longer than postpetiole (excluding helcium); postpetiole not massive, 1.5-1.9 times as broad as petiolar node; gaster smooth and shining.

REMARKS. - This species is very similar to *P. rinae taipoana* Wheeler but distinguished from the latter by the following characteristics: the major of the latter

having area in front of a transverse impression on vertex sparsely with weak longitudinal rugulae, with interspaces smooth and shining, and the vertexal impression deep.

DISTRIBUTION. - N. Vietnam.

BIONOMICS. - This species inhabits forests (including forest edges) from lowlands to hilly areas (up to 1200 m alt. in N. Vietnam), and nests in the soil (see also Eguchi *et al.,* 2004).

Pheidole magna sp. n. Figs 5A-I

Pheidole sp. eg-162: Bui & Eguchi, 2003 (a list of local ant fauna).

HOLOTYPE. - Major from colony Eg02-VN-137 (nesting in the soil of shoulder of a road). Type locality: Bang Khoang (Site-A: ca. 1700-1800 m alt.), Sa Pa, Lao Cai, Vietnam [K. Eguchi leg., 27/iv/2002]. Depository: IEBR. PARATYPES. - 34 majors and 35 minors from the same colony to which the holotype belongs. Depository: IEBR, MHNG, MCZC, BMNH, NHMW, FSKU, ACEG.

NON-TYPE MATERIAL EXAMINED. - Vietnam: *Lao Cai*: Sa Pa town [Eg02-VN-087]; Bang Khoang (Site-A: a stream-side secondary forest), ca. 1700-1800 m alt., Sa Pa [Eg02-VN-116, -124, -129]; Bang Khoang (Site-B: a well-developed forest) [Eg02-VN-165, -169, -175]; Sa Seng (a small fragment of limestone forest), Sa Pa [Eg02-VN-280]; *Ha Tay*: Ba Vi N. P. [BTV, 2002]. Eguchi's informal species code "*Pheidole* sp. eg-162" has been applied to these specimens.

DIAGNOSIS. - Vertexal lobe largely smooth and shining (major); promesonotal dome having a conspicuous prominence on its posterior declivity (major and minor); postpetiole relatively massive (major and minor).

DESCRIPTION. - Major: TL 4.6-6.1 mm, HL 2.21-2.39 mm, HW 2.13-2.32 mm, SL 1.04-1.14 mm, FL 1.59-1.66 mm, CI 92-99, SI 45-51, FI 70-75 (N=6); body deep yellowish-brown or reddish-brown, with paler alitrunk and/or appendages; head in full-face view weakly convex laterad, broadly and deeply concave posteromedially, in profile very weakly impressed or not impressed on vertex; frons and vertex longitudinally rugose; vertexal lobe largely smooth and shining; frontal carina and antennal scrobe absent; median part of clypeus with a median longitudinal carina; hypostoma with 2 processes and one very low or vestigial process (a total of 3 median processes) in addition to the process just mesal to each mandibular base (lateral processes); lateral processes much reduced, much smaller than lateral ones of the three median processes; antenna with a 3-segmented club; scape a little exceeding midlength of head when it laid backward; EL a little more than LASX; LG ca. 1.7-2.0 times as much as EL; promesonotal dome sparsely rugose transversely, with interspaces smooth and shining, with a conspicuous prominence on its posterior declivity; the prominence extending as a transverse ridge; lower part of mesopleuron smooth and shining at least medially; lateral face of propodeum weakly punctured, or almost smooth with several rugulae; propodeal spine small, narrowly based; petiole as long as postpetiole (excluding helcium); petiolar node in anterior view not or very shallowly concave dorsally; postpetiole relatively massive, 2.3-2.5 times as broad as petiolar node; first gastral tergite smooth and shining, often with a weakly punctured area just around its articulation with postpetiole.

Minor: TL 2.7-3.3 mm, HL 0.87-0.94 mm, HW 0.79-0.90 mm, SL 0.94-1.03 mm ML 1.15-1.34 mm, FL 1.12-1.22 mm, CI 91-96, SI 113-122, FI 134-143 (N=7); body yellowish-brown or deep yellowish-brown, with paler appendages; head in full-face view oval, smooth and shining over the surface; median part of clypeus smooth

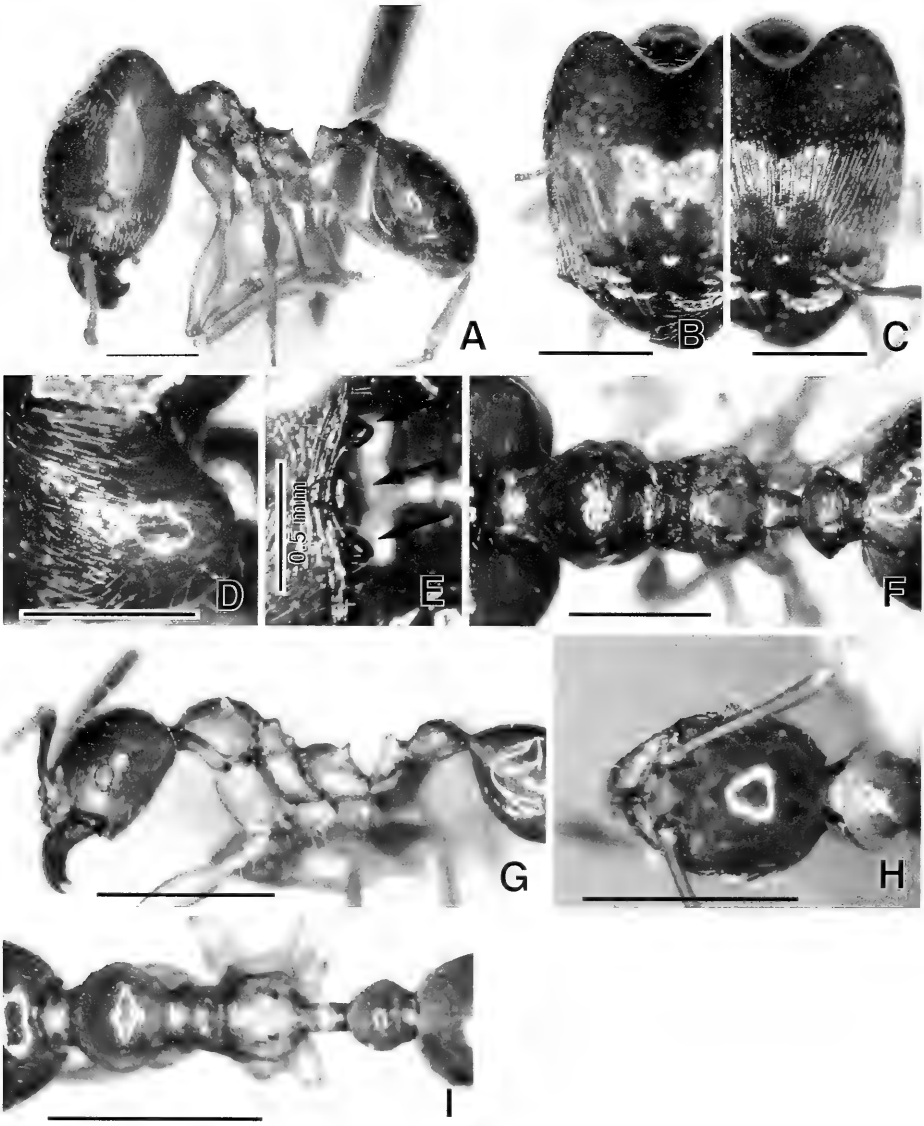

FIG. 5

Pheidole magna Eguchi sp. nov., type material. A-F, major; G-I, minor. A & G, body in profile; B, C & H, head in full-face view; D, vertexal lobe in dorsolateral view; E, median part of hypostoma, arrows indicating median processes; F & I, mesosoma in dorsal view. Scale bars = 1 mm, unless otherwise stated.

and shining, with a median longitudinal carina on its anterior half; preoccipital carina complete but weak dorsally; antenna with a 3-segmented club; scape extending far beyond posterolateral margin of head; EL<LASX; promesonotal dome smooth and

shining, in profile relatively well convex in front of a conspicuous prominence on its posterior declivity, with an inconspicuous mound dorsolaterally; mesopleuron and lateral face of propodeum largely punctured weakly; propodeal spine elongate-triangular, narrowly based; petiole a little shorter than postpetiole (excluding helcium); postpetiole relatively massive, 2.3-2.5 times as broad as petiolar node.

REMARKS. - This large-bodied species is similar to *Pheidole dugasi* Forel, but well distinguished from the latter by the following characteristics: the major of the latter having vertexal lobes distinctly rugose and first gastral tergite entirely rugoso-punctured.

DISTRIBUTION. - N. Vietnam.

BIONOMICS. - This species occurs from relatively open habitats to forests in hilly areas (1000-1800 m alt.), and nests in the soil and rotting logs.

Pheidole vulgaris sp. n. Figs 6A-I

Pheidole sp. eg-111: Yamane *et al.*, 2003 (a list of local ant fauna); Bui & Eguchi, 2003 (a list of local fauna); Eguchi *et al.*, 2004 (ecological study).

HOLOTYPE. - Major from colony Eg01-VN-155. Type locality: My Yen Commune Forest (21°35'N, 105°36'E), Na Hau Village, My Yen Commune, Thai Nguyen, Vietnam [K. Eguchi leg., 8/xi/2001]. Depository: IEBR. PARATYPES. - 19 majors and 20 minors from the same colony to which the holotype belongs. Depository: IEBR, MHNG, MCZC, BMNH, NHMW, FSKU, ACEG.

NON-TYPE MATERIAL EXAMINED. - China: *Guangxi*: Dayaoshan N. R., Jinxiu [JRF, 1998, Bottle #Eg38-36]; *Guangdong*: Dawuling N. R., Maoming [JRF, 1997, Bottle #Eg38-38]; *Hong Kong*: Taipo Kau N. P., New Territories [JRF, 1993, Bottle #Eg38-31]. Vietnam: *Lao Cai*: Y Linh Ho (a small fragment of forest, ca. 1100 m alt.), Sa Pa [Eg02-VN-214, -230]; Cat Cat (a trail to Mt. Phansipan, ca. 1300-1400 m alt.), Sa Pa [Eg02-VN-265]; *Thai Nguyen*: My Yen Commune Forest (21°35'N, 105°36'E), Na Hau Village [Eg01-VN-155]; *Bac Giang*: W. Yen Tu N. P. (21°10'15.6-18.1"N, 106°43'09.6"-16.0E, ca. 370-415 m alt) [B&E03-41, -52, -56, -57]; *Quang Ninh*: Ky Thuong N. R. (21°11'14.9"N, 107°07'08.5"E, ca. 105 m alt.) [B&E03-73]; *Vinh Phuc*: Tam Dao N. P. (21°27'N, 105°38'E, 800-1100 m alt.) [Eg99-VN-002, -034, -043; Eg01-VN-112]; *Ha Tay* (misspelled as "Ha Tai" on the labels excluding those of Eg01-VN-234): Ba Vi N. P. (21?03'N, 105?22'E, 400-800 m alt. [Eg99-VN-085, -089, -093, -103, -120; Eg01-VN-209, -224, -234; Eg02-VN-027, -048]; *Ninh Binh*: Cuc Phuong N. P. (20°14'N, 105°36'E, 320 m alt.) [Eg01-VN-193, -195]. Thailand: *Chiang Mai*: Doi Suthep-Pui N. P., 800-900 m alt. [Eg01-TH-079 (W. Jaitrong leg., 1997)]; *Nakhonratchasima*: Khao Yai N. P. [TH00-SKY-34]. India: *Utter Pradesh*: Rajaji N. P. [A. Schulz & K. Vock leg., 1996]. Eguchi's informal species code "*Pheidole* sp. eg-111" has been applied to these specimens.

DIAGNOSIS. - Vertex and vertexal lobe largely smooth, or with weak and interrupted rugoso-reticulation directing posterolateral corner of the lobes and rarely with interspaces punctured (major); head and promesonotal dome smooth and shining (minor); hypostoma with 2 conspicuous processes and one very low or vestigial process in addition to the process just mesal to mandibular base (major); EL<LASX (minor); promesonotal dome lacking a conspicuous prominence on its posterior declivity (major and minor).

DESCRIPTION. - Major: TL 2.5-3.4 mm, HL 1.18-1.38 mm, HW 1.06-1.21 mm, SL 0.60-0.68 mm, FI 0.81-0.94 mm, CI 86-91, SI 53-59, FI 75-81 (N=11); body deep yellowish brown or brown (rarely dark brown), often with paler alitrunk and or gaster; head in full-face view very weakly convex laterad, broadly concave posteromedially, in profile not impressed on vertex; dorsal surface of head variable in sculpture; frons

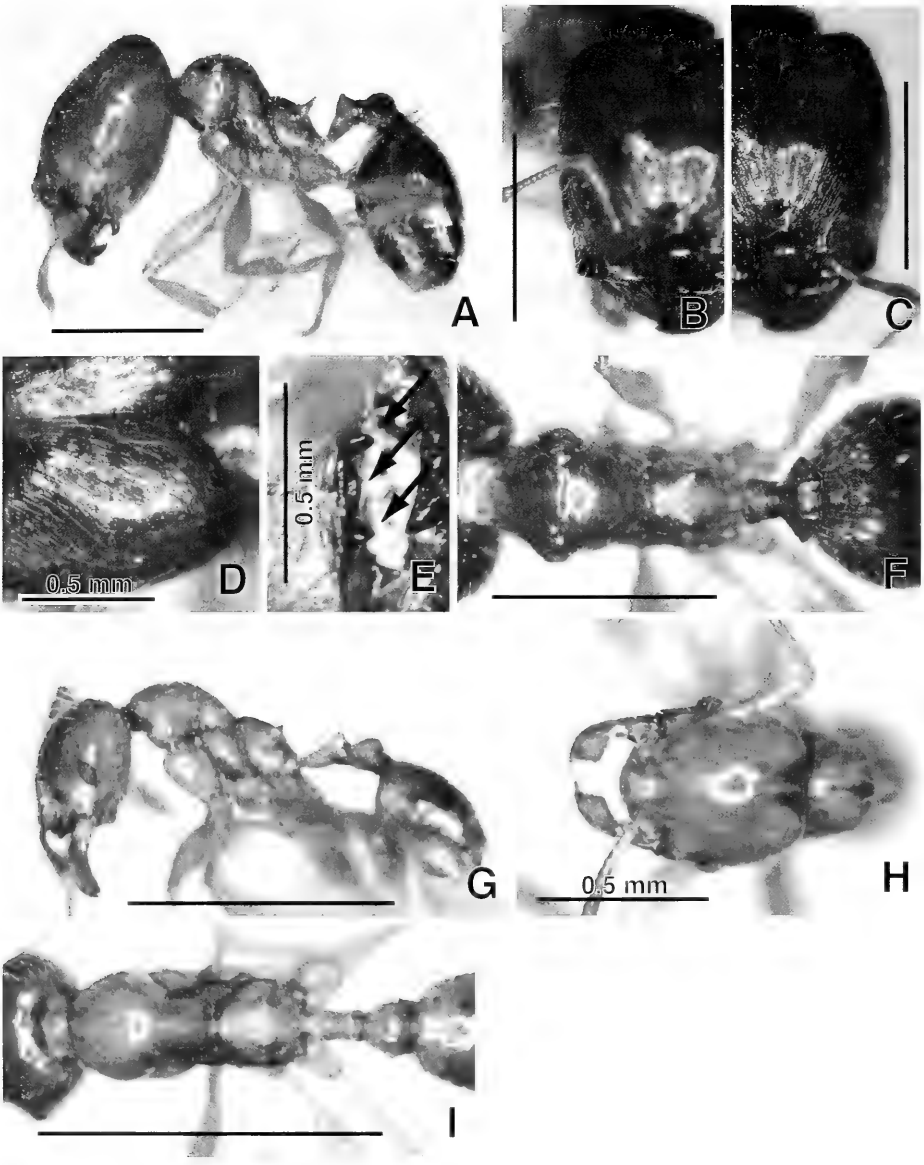

FIG. 6

Pheidole vulgaris Eguchi sp. nov., type material. A-F, major; G-I, minor. A & G, body in profile; B, C & H, head in full-face view; D, vertexal lobe in dorsolateral view; E, median part of hypostoma, arrows indicating median processes; F & I, mesosoma in dorsal view. Scale bars = 1 mm, unless otherwise stated.

obliquely rugose to largely smooth and shining with sparse interrupted and irregular rugulae; vertex and vertexal lobe largely smooth, or weakly and interruptedly rugose/rugoso-reticulate toward posterolateral corner of the lobes and rarely with

interspaces punctured; frontal carina absent or at most vestigial just as rugulae; antennal scrobe absent; median part of clypeus almost smooth and shining, rarely with an evanescent median longitudinal carina; hypostoma with 2 conspicuous processes and one very low or vestigial process (a total of 3 median processes) in addition to the process just mesal to each mandibular base (lateral processes); lateral processes well-developed, as large as lateral ones of the three median processes; antenna with a 3-segmented club; scape exceeding midlength of head; EL≥LASX; LG 1.4-1.9 times as much as EL; promesonotal dome smooth and shining, often with several weak rugulae; the dome at most with an inconspicuous prominence on its posterior declivity; dorsolateral part of the dome only very weakly produced; mesopleuron and lateral face of propodeum weakly punctured, or largely smooth and shining; propodeal spine elongate-triangular, usually with a blunt apex, narrowly based; petiole much longer than postpetiole (excluding helcium); petiolar node in anterior view usually very weakly concave dorsally; postpetiole not massive, 1.6-2.0 times as broad as petiolar node; first gastral tergite very weakly punctured at least around its articulation with postpetiole.

Minor: TL 1.7-2.0 mm, HL 0.54-0.61 mm, HW 0.46-0.53 mm, SL 0.52-0.61 mm, ML 0.75-0.84 mm, FL 0.57-0.67 mm, CI 85-91, SI 108-117, FI 116-127 (N=11); body yellowish brown; head smooth and shining; preoccipital carina complete but weak dorsally; median part of clypeus smooth and shining, without a median longitudinal carina; antenna with a 3-segmented club; scape exceeding posterior margin of head by the length of second antennal segment or more; EL<LASX; promesonotal dome largely smooth and shining, in profile without a prominence on its posterior declivity; mesopleuron punctured; lateral face of propodeum very weakly punctured or almost smooth; propodeal spine small, elongate-triangular, narrowly based; petiole much longer than postpetiole (excluding helcium); postpetiole somewhat globular but not massive, 1.7-2.1 times as broad as petiolar node; gaster smooth and shining.

REMARKS. - This species is very similar to *P. rinae taipoana* Wheeler and *P. laevicolor* sp. n. but well distinguishable from them by the following characteristics: the major of the latter two has a reticulate dorsum of the vertexal lobe; and the minor of the latter two has a maximal diameter of the eye that is as long as or a little longer than the 10th antennal segment. This species is also similar to *P. woodmasoni* (the type material deposited in MHNG was examined; the syntype minors presumably lost), but the major of the former is well distinguished from that of the latter by the following characteristics: head in full-face view only very weakly concave posteriorly, convexity of promesonotal dome relatively weak, and propodeal spine short and relatively broadly based in the latter.

DISTRIBUTION. - Widespread in the Indo-Chinese subregion: S. China, N. Vietnam, N. Thailand and India (Utter Pradesh).

BIONOMICS. - This species ranges from forest edges to well-develop forests, from lowlands to hilly areas (up to 1400 m alt. in N. Vietnam), and nests in the soil (see also Eguchi *et al.*, 2004). Colony Eg01-VN-112 includes dozens of dealate queens. This species probably forms super-colonies at least occasionally.

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New taxa and notes on some previously described species of scaly crickets from South East Asia (Orthoptera, Grylloidea, Mogoplistidae, Mogoplistinae)

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New taxa and notes on some previously described species of scaly crickets from South East Asia (Orthoptera, Grylloidea, Mogoplistidae, Mogoplistinae). - The Mogoplistinae of SE Asia are reviewed. A key to the genera in SE Asia is given. The genera are diagnosed. Two genera are described as new: *Apterornebius* gen. n. and *Terraplistes* gen. n. Keys to the species of the genera *Ornebius* Guérin-Méneville, 1844, *Ectatoderus* Guérin-Méneville, 1847, *Apterornebius* gen. n., *Gotvendia* Bolívar, 1927, *Cycloptiloides* Sjöstedt, 1909, and *Terraplistes* gen. n. are provided. The male phallic complex, male and female supra-anal plate, modification of the paraprocts, the ovipositor apical valves, and the maxillary palps are used as main diagnostic characters. 35 species are described as new: *Ornebius pullus* sp. n. (Brunei); *Ornebius cibodas* sp. n., *Ornebius samudra* sp. n., *Ornebius imitatus* sp. n., *Ornebius bogor* sp. n. (Java); *Ornebius citrus* sp. n. (Sabah); *Ornebius albipalpus* sp. n. (Singapore); *Ornebius dumoga* sp. n., *Ornebius consternus* sp. n. (Sulawesi); *Ornebius aureus* sp. n., *Ornebius serratus* sp. n., *Ornebius angustus sp. n.*, *Ornebius tuberculatus* sp. n., *Ornebius peniculatus* sp. n., *Ornebius brevipalpus* sp. n. (Thailand); *Apterornebius kinabalu* sp. n. (Sabah); *Apterornebius chong* sp. n. (Thailand); *Ectatoderus samui* sp. n., *Ectatoderus argentatus* sp. n. (Thailand); *Gotvendia erawan* sp. n. (Thailand); *Micrornebius lineatus* sp. n. (Sabah); *Micrornebius cylindricus* sp. n. (Singapore); *Micrornebius maninjau* sp. n. (Sumatra); *Micrornebius insularis* sp. n., *Micrornebius laem* sp. n., *Micrornebius inopinatus* sp. n. (Thailand); *Cycloptiloides timah* sp. n. (Singapore); *Cycloptiloides pui* sp. n., *Cycloptiloides pakchong* sp. n., *Cycloptiloides lobicauda* sp. n. (Thailand); *Terraplistes chantri* sp. n., *Terraplistes kradung* sp. n., *Terraplistes erawan* sp. n., *Terraplistes brevicauda* sp. n., and *Terraplistes excisa* sp. n. (Thailand). Four new combinations are proposed: *Micrornebius sandrasagarai* (Fernando, 1957) comb. n. from *Ectatoderus, Micrornebius brevipalpis* (Chopard, 1930) comb. n. from *Ornebius, Micrornebius incertus* (Ingrisch, 1998) comb. n. from *Derectaotus, Terraplistes niger* (Ingrisch, 1987) comb. n. from *Cycloptiloides; [Ectatoderus pallidegeniculatus* Brunner, 1893 probably also belongs to *Micrornebius*]. Types

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of the new species are in the museums in Bonn, Geneva or London. Notes on some previously described species are given. For five species (*Ornebius aureus, O. samudra, Ectatoderus argentatus, Micrornebius inopinatus,* and *M. maninjau*) stridulation is also described.

Keywords: Grylloidea - Mogoplistinae - South East Asia - diagnostic characters - new taxa - keys to genera and species.

INTRODUCTION

The scaly crickets or Mogoplistinae are characterised by the integument being covered by scales. They were given full family status since the phylogenetic studies of Desutter (1987). Apart from the typical subfamily, the family Mogoplistidae includes also the Myrmecophilinae. The Mogoplistinae have the greatest species diversity in the tropics with few species living in temperate climates. They are usually not well represented in collections. 57 valid species are currently listed from the Indo-Malayan region (Otte *et al.*, 2005). However, recent studies showed that the Mogoplistinae are second dominant in individuals of Orthoptera in the canopy layer at the Kinabalu area in Sabah, exceeded in numbers only by the tree crickets (Podoscirtinae) (Floren *et al.*, 2001).

Mogoplistinae live in all strata from the tree canopy to the litter on soil in forests. Some of the tree living species belong to the most colourful crickets while ground dwellers or minute forms are often uniformly black or brown. Mogoplistinae are small crickets with a body length of about between four and thirteen mm. Only in the Myrmecophilinae or Tridactylidae we found smaller Orthopterans. The male genitals differ somewhat from the situation in the true crickets (Desutter, 1987), but they were not extensively studied so far with the exception of the Taiwanese species (Yang & Yen, 2001a). Often the sclerotised structures of the phallus are simpler than in true crickets and in some taxa missing at all. In many Mogoplistinae the paraprocts are modified in the male and less often also in the female. These structures are helpful for identification, but their function is unknown.

The aim of the present paper is to record and describe Mogoplistinae originating from field work by different research groups in South East Asia. Most of the taxa are new to science. As there is no modern revision of the Mogoplistinae, Chopard (1969) was followed as far as possible in generic arrangement. Although some of the species rich and widespread genera as *Ornebius*, *Ectatoderus* or *Cycloptiloides* are probably not monophyletic, to revise them would require a much more comprehensive material than currently available. However for few genera a redefinition becomes necessary together with a re-arrangement of some species. Moreover, two genera had to be described as new to accommodate the species at hand.

MATERIAL AND METHODS

The specimens studied come from four sources (with depositories):

- Studies on the canopy fauna in Sabah; research project of Dr A. Floren, University Wuerzburg; voucher specimens mainly in ZFMK Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany

- Studies of the soil fauna in SE Asia (Sabah, Brunei, Indonesia, Singapore); expeditions by Dr B. Hauser and Dr Ch. Lienhard; voucher specimens in MHNG Muséum d'histoire naturelle, Geneva, Switzerland
- Studies on the canopy fauna in northern Sulawesi; research project of Prof. Nigel Stork; voucher specimens in BMNH, The Natural History Museum, London, U.K.
- Own intermittent expeditions in SE Asia; primary type specimens in ZFMK, others partly in CI Collection Ingrisch

Additional depositories:

EMBT Department of Agriculture, Bangkok, Thailand
MBBJ Museum Zoologicum Bogoriense, Cibinong, Indonesia
MNHN Muséum National d'Histoire Naturelle, Paris, France
SMF Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt, Germany

Measurements were done with a micrometer under a stereo microscope. If not otherwise mentioned, measurements refer to the length of the body parts. Pencil drawings were done using a camera lucida connected to a stereo microscope, scanned into a computer and processed to vector graphics with graphic software.

Recording of sounds were done with caged specimens using a portable cassette recorder or a DAT recorder.

Analysis of stridulation was done using AmadeusII software an Mac computer. Frequency windows are «Blackman» calculated as means of a series of pulses. Terminology of crickets songs follows Otte (1992).

RESULTS

Main differential characters

Supra-anal plate

The tenth abdominal tergite in Mogoplistinae deviates from the preceding tergites in that it is distinctly narrower and more or less modified. It forms a supra-anal plate together with the epiproct. In some species both parts are still identifiable as separate segments while in others tenth abdominal tergite and epiproct are completely fused. In this paper, supra-anal plate refers to the unit of tenth abdominal tergite plus epiproct, while mention them separately refers to its parts. Namely in the genus *Ornebius* shape and colour pattern of the supra-anal plate proved to be a helpful diagnostic character in both sexes. The supra-anal plate carries setose areas, a few very long bristles and in some species brushes of hairs that may be used as diagnostic characters.

Paraproct

In many male Mogoplistinae the paraprocts are modified, possessing an appendage at the internal ventral end. It has been suspected that the process of the male paraproct could have to do with copulation, accordingly the terms «titillator» (Love & Walker, 1979) or «genital process» (Otte & Alexander, 1983) have been applied to it. Here the neutral term «paraproct process» is used.

Also in the female of some species the paraprocts can be modified, carrying a longitudinal carina along its lateral margin. It is possible that the carinae serve as guide bars for the ovipositor.

Male phallic complex

The male phallic complex of Mogoplistinae is still insufficiently studied. Desutter (1987, 1988) in her comprehensive study of the phallic complex in Grylloidea included only a single example from Mogoplistinae (*Arachnocephalus breviceps* [Chopard, 1929]) and describes its phallus very short and schematic. The most comprehensive study so far is that of Yang & Yen (2001a) who describe and figure the phallic complex for all Taiwanese Mogoplistinae. Descriptions and figures for single or few taxa can also be found in other publications (e.g. Gorochov, 1984, 1995, 1996, Ingrisch, 1998, Ichikawa *et al.*, 2000, Gorochov & Marshall, 2001, Bland & Desutter-Grandcolas, 2003). As the terminology differs between authors, I use a pragmatic way to describe the phallic complex. Large parts of the male phallic complex are membranous and as such only well conserved if the specimens are stored in ethanol.

Three major lobes can be observed (Figs 139-146). The dorsal part of the phallus is the epiphallus or epiphallic lobe. This is completely membranous. In a single species I found a minute sclerite on the underside of the epiphallic lobe.

The central lobe comprises the ectophallus and endophallus. It can also be membranous to a large extend, but here is where sclerotisation occurs. The apical area of the central lobe usually consists of a pair of lateral and a pair of medial valves. The lateral valves are membranous but have the internal or external surface sclerotised to a variable extend. Those sclerites are referred to as the external sclerites. The medial valves are usually sclerotised to a large extend. These sclerites are here referred to as internal sclerites. They may stuck in a common membranous sheath or become fused in apical area. These sclerites are elongate and often curved at base to embrace the spermatophore sac. The internal sclerites embrace in between a channel, probably the ejaculatory duct. The ejaculatory duct may be sclerotised of its own thus that an unpaired sclerite appears in between the internal sclerites.

The ventral lobe of the phallic complex is completely membranous. In some species it can be very huge and further differentiated.

The above description applies mainly to the *Ornebius* species studied by myself. Usually the internal sclerites are the most distinct sclerotised parts found in the phallic complex. However, in the genera *Micrornebius* and *Cycloptiloides* the affiliation of the sclerotisation in the phallic complex is not always clear as probably reductions occurred due to their minute size. In two genera, *Gotvendia* and *Terraplistes*, no phallic sclerites were found. As the specimens were dry conserved, the membranous structures were not well conserved either.

For some species which were originally conserved in ethanol, the phallus complex was studied before and after cleaning in KOH solution. As sclerotisation of several structures is rather weak or limited to small areas of otherwise membranous structures, the aspect of the phallus complex before and after cleaning may be quite different. Examples are given for some *Ornebius* species (Figs 139-159).

Ovipositor apical valves

The apical valves of the ovipositor have often smooth margins and an acute apex. In some species, the ventral margin of the ventral or of the dorsal valves may be serrulate, also the dorsal margin may be finely serrulate. In one species, the ventral margin of the dorsal valves is lobular. Additionally, the apical valves carry a series of short or sometimes long hairs of bristles. Their arrangement, length and the place were they rise (e.g. ventral hairs from ventral margin of dorsal valves or from ventral valves) is in some cases helpful for identification.

Maxillary palps

The maxillary palps differ between species by the general length, the relative length of the three apical segments to each other, and the degree of widening of the apical segment.

Colour pattern

Many species of Mogoplistinae show a striking colouration with distinctive pattern, especially when the scales are well preserved. The colour pattern seems to be fairly stable in the few species for which large series of specimens were available for study. Although colouration should not be used as an argument for the description of new species as colour polymorphism might occur, colouration is a helpful character for identification and co-ordination of male and female where more than one species of the same genus occur in the same locality.

Systematic part

Key to the genera of Mogoplistinae in South East Asia

Although the key covers both sexes, it is not possible to separate females of *Ornebius* from *Ectatoderus* and of *Gotvendia* from *Derectaotus* as currently understood.

1 Anterior tibia with internal tympanum. Males with wings reduced to stridulatory apparatus (Figs 31-41) 2
\- Anterior tibia without tympanum. Males without wings (Fig. 43) 8
2 Frontal rostrum about as wide as scapus (varying from slightly wider to slightly narrower; Figs 13-17) 3
\- Frontal rostrum two or three times wider than scapus (Figs 45, 65-66, 71-72) 4
3 Pronotum ♂ moderately produced backwards, usually covering no more than base of mirror (Figs 31-37). If tegmen is almost completely covered (Fig. 38), then male phallic complex with lateral valves sclerotised, almost forming a tube near apex (Figs 175-177) . . . . . *Ornebius* Guérin-Méneville, 1844
\- Pronotum ♂ strongly produced backwards, leaving only the apex of tegmen free (Figs 46-47). Male phallic complex (of species studied) with lateral valves not or only very faintly sclerotised, not forming a tube Figs 224-230) . . . . . *Ectatoderus* Guérin-Méneville, 1847

4 Pronotum ♂ prolonged; tegmen completely concealed under pronotum or only apex free 5
- Pronotum ♂ not prolonged; tegmen free from base (Figs 41, 45). Hind tibia not shortened, more than 2.5 times longer than hind metatartus . . . . . *Gotvendia* Bolívar, 1927
5 Hind tibia shortened, 1.8x to 2.6x longer than hind metatarsus (Figs 82-84). Metatarsus with minute denticles 6
- Hind metatarsus shorter than half the length of hind tibia. Metatarsus with denticles . . . . . *Derectaotus* Chopard, 1936[1]
6 General colour often brown; very small crickets (postfemur 2.3-4.3 mm, pronotum male 2.3-2.9, female 1.2-2.0 mm[2]). Hind tibia normal (Figs 82-83). Maxillary palps either short with apical segment greatly widened, or long with apical segment elongate and hardly widened 7
- General colour black; small to medium sized crickets (postfemur 3.8-5.8 mm, pronotum male 2.3-3.8, female 2.0-2.9 mm). Hind tibia laterally compressed and widened (Fig. 84). Maxillary palps with apical segment distinctly widened but not shortened (Figs 332-340) . . . . . *Terraplistes* gen. n.
7 Maxillary palps short with apical segment greatly widened (Figs 231, 261). Male paraprocts with only a minute process or without any (Figs 233, 259). Male phallus usually with minute sclerites (Figs 263-285). Ovipositor apical valves with short hairs along margins and additionally with long bristles (Figs 286-292) . . . . . *Micrornebius* Chopard, 1969
- Maxillary palps long with apical segment elongate and little widened (Figs 301, 318). Male paraprocts with a distinct or a very small process (Figs 302, 306, 309, 314). Male phallus with sclerotisation indistinct or missing (Figs 323-330). Ovipositor apical valves with few or numerous short hairs or few strong hairs of medium length, rarely with mixed longer and shorter hairs (Figs 293-299) . . . . . *Cycloptiloides* Sjöstedt, 1909
8 Frontal rostrum more than twice as wide as scapus . . . . . *Pachyornebius* Chopard, 1969
- Frontal rostrum one and half times wider than scapus or about as wide as scapus 9
9 Frontal rostrum about as wide as scapus, not strongly projecting in front of antennae. Maxillary palps with last three segments elongate; last segment more than twice as long as greatest width (Figs 207-208). General shape of body as *Ornebius* except for missing wings and tympana (Figs 42-44). Ovipositor apical valves smooth (Figs 193-194) . . . . . *Apterornebius* gen. n.

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[1] Characters taken from Chopard (1969). The genus *Derectaotus* as used in Chopard (1969) is probably a mixture of unrelated species. Its definition overlaps with *Ectatoderus* and *Micrornebius*. A redefinition and a revision of the genus are necessary.

[2] If hind femur up to 5.5 mm and pronotum female 2.8 mm than apical valves of ovipositor lobiform (Fig. 299).

- Frontal rostrum about one and half times wider than scapus, strongly projecting in front of antennae, distinctly furrowed. Maxillary palps with last three segments short; last segment less than twice as long as greatest width. Slender species. Ovipositor apical valves with ventral margin of dorsal valve serrulate. ..... *Arachnocephalus* Costa, 1855[3]

Ornebius Guérin-Méneville, 1844

Ornebius Guérin-Méneville, 1844: 331; Otte *et al.*, 2005.

Type species: Ornebius xanthopterus Guérin-Méneville, 1844, by original designation (sensu OSF).

Diagnosis for SE Asian species. Maxillary palps moderately long; apical segment widened (Figs 85-98). Pronotum ♂ prolonged to a variable degree, usually covering stridulatory vein or base of mirror, in few species more than half of mirror; pronotum ♀ short (Figs 1-29). Wings reduced to stridulatory apparatus in male; female apterous. Anterior tibia with internal tympanum. Hind tibia (2.4-) 2.9-3.8x longer than metatarsus. Tenth abdominal tergite and epiproct more or less fused in both sexes to form a supra-anal plate, but borderline often still clearly visible; tenth tergite at apicolateral angles with an obtuse projection (Figs 99-108, 123-138). Male paraprocts with distinct projections of variable shape (Figs 109-122a). Male phallic complex with epiphallus and ventral lobes entirely membranous; lateral valves sclerotised to a variable degree; internal sclerites always distinctly sclerotised (Figs 139-184). Ovipositor female with apical valves smooth or with minute dentation at ventral margin, occasionally smaller denticles also at dorsal margin (Figs 185-195).

Discussion. 102 extant species of which 94 are currently regarded valid were so far assigned to *Ornebius*, distributed over South and Central America, Africa, South and East Asia, Australia, Indian and Pacific Ocean Islands (Otte *et al.*, 2005). Of those were 33 species from the Indo-Malaysian region including Andaman Islands and Seychelles. The species from Thailand, Malaysia, Brunei, and Indonesia east to Sulawesi are included in the following key (formerly 15 described species). Not all species are known in both sexes.

KEY TO SPECIES OF *ORNEBIUS* FROM THAILAND, MALAYSIA, SINGAPORE, BRUNEI, AND INDONESIA EAST TO SULAWESI

Species not included in key:

Ornebius fasciatus (Brunner von Wattenwyl, 1893) from Myanmar (Carin Cheba) cannot be included in the key as the superficial description agrees with several species. As no information on maxillary palps, supra-anal plate, cerci, or phallic complex are known, it is not clear at which point to include it in the key.

Ornebius komodensis Bei-Bienko, 1966 from Komodo Island cannot be included in the key from the description alone.

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[3] Although there are a few records of *Arachnocephalus* from South-East Asia, it is doubtful whether those species are really congeneric with the type species, *Arachnocephalus vestitus* Costa, 1855 known from South Europe. Characters in the above key are based on the type species *A. vestitus*.

MALES

(Males of *O. albipalpus, O. angustus, O. imitatus, O. nigripes*, and *O. serratus* unknown)

1 Head black with a large, transverse, yellow swelling on vertex (Fig. 16). Northeast Thailand (Loei) . . . . . *O. tuberculatus* sp. n.

- Head without transverse swelling on vertex 2

2 Maxillary palps very short with apical segment strongly widened (Fig. 98). Supra-anal plate very short, simple, apex obtuse-angular (Fig. 108). North Thailand (Lampang) . . . . . *O. brevipalpus* sp. n.

- Maxillary palps of medium length with apical segment widened; sometimes shortened but not as extreme (Figs 85-97). Supra-anal plate longer 3

3 Supra-anal plate with one or two spots of strong short hairs or bristles, standing together as in a brush (Figs 101-103, 106-107) 4

- Supra-anal plate usually setose but without spots where the hairs are standing together as in a brush 7

4 Supra-anal plate with one 'brush of hairs' (Fig. 106). Paraproct process very long, widened in middle, narrow styliform in apical area (Fig. 117). Tegmen without dark band (Fig. 39). West Java (Palabuan Ratu) . . . . . *O. samudra* sp. n.

- Supra-anal plate with two 'brushes of hairs' (Figs 101-103, 107). Paraproct process not so long, of different shape. Tegmen with a dark band along apex (Figs 31-32, 35) 5

5 Subgenital plate bowl-shaped with strongly upcurved lateral and apical margins. Pronotum little or moderately widening posteriorly (Figs 13, 18). Tegmen yellow with a broad black band at apex (Figs 31, 35). Paraproct process upcurved (Figs 109, 111). Phallic complex as in Figs 165-167, 170-171 6

- Subgenital plate with lateral and apical margins moderately upcurved. Pronotum strongly widened posteriorly (Fig. 27). Tegmen brownish transparent with medium brown apical margin (Fig. 32). Paraproct process not so strongly upcurved, straight (Fig. 114). Phallus as in Figs 160-161. West Java (Cibodas) . . . . . *O. cibodas* sp. n.

6 Frons black. Abdomen anterior tergites covered with golden scales, posterior tergites black (Fig. 13). Paraproct process as in Fig. 111. Phallic complex as in Figs 170-171. North Thailand (Chiang Mai) . . . *O. aureus* sp. n.

- Frons of general colour. Abdomen black. Paraproct process as in Fig. 109. Phallic complex as in Figs 165-167. North Thailand (Tak) . . . . . *O. peniculatus* sp. n.

7 Face and frontal rostrum of same colour as remaining head 8

- Face and frontal rostrum black 22

8 Mentawei Islands 20

- Other distribution 9

9 Paraproct process as long as paraproct height or shorter (Figs 112, 119) 10

- Paraproct process markedly longer than paraproct height (Figs 115-116, 118, 120-122) 12

10 Pronotum strongly narrowing in front (Fig. 10). Paraproct process short and wide, compressed, strongly setose (Fig. 119). Tegmen with a narrow dark band at apex, a dark band at baso-lateral angle, and with or without additional dark spots in middle (Fig. 10). Sabah (Kinabalu area) . . . . . *O. marginatus* Ingrisch, 1998

\- Pronotum moderately or little narrowing in front. Paraproct process rounded 11

11 Tegmen dark brown with black apical margin (Fig. 40). Paraproct process short, cylindrical, with few hairs (Fig. 112). Phallic complex with medial valves forming a tube; ejaculatory duct with apex truncate (Figs 147-150). Brunei . . . . . *O. pullus* sp. n.

\- Tegmen white, spotted with brown at apex and towards base. Paraproct process erected, rounded. Sarawak (Mt. Madang) . . . . . *O. angustifrons* (Chopard, 1930)

12 Maxillary palps with apical three segments elongate; fifth segment little widened (Figs 93-94). Phallic complex with external sclerites forming a dorsally and ventrally open tube near apex (Figs 172-177). Sulawesi 13

\- Maxillary palps with apical three segments shorter; fifth segment distinctly widened (Fig. 90). Ectophallus valves of different shape 14

13 Pronotum longer, covering more than half of mirror (Fig. 22). Tegmen with a broad dark band at apex (Fig. 38). Paraproct process as in Fig. 116. Phallic complex as in Fig. 175-177. Sulawesi Utara . . . . . *O. consternus* sp. n.

\- Pronotum shorter, covering only base of mirror (Fig. 24). Tegmen uniformly yellowish transparent (Fig. 37). Paraproct process as in Fig. 115. Phallic complex as in Figs 172-174. Sulawesi Utara . . . . . *O. dumoga* sp. n.

14 Tegmen uniformly yellow, orange, or dark brown (Figs 6, 8) 15

\- Tegmen yellow, orange or brown with a black (or dark brown) band at apex (Figs 3, 34) 17

15 Tegmen yellow or light red. Pronotum reddish brown 16

\- Tegmen dark brown (Fig. 8). Pronotum dark brown with white margin. Paraproct process as in Fig. 120. Phallic complex as in Figs 155-159. Sabah (Kinabalu area) . . . . . *O. vadus* Ingrisch, 1998

16 Tegmen orange to light red. Paraproct process shorter and broad (Fig. 122), apex obtuse. Phallic complex as in Figs 151-154. Sabah (Kinabalu area) . . . . . *O. rubidus* Ingrisch, 1998

\- Tegmen yellow. Paraproct process long and narrow, apex acute (Fig. 122a). South Thailand (Koh Samui) . . . . . *O. rufonigrus* Ingrisch, 1987

17 Tegmen amber coloured, covered by the pronotum to base of mirror; apical margin feebly darkened. Pronotum feebly widening posteriorly, with posterior margin feebly convex. Malaya (Pahang, Fraser's Hill) . . . . . *O. pendleburyi* Chopard, 1969

\- Tegmen of different colour. Pronotum distinctly widening posteriorly (Figs 1, 3) 18

18 Tegmen nearly wholly dark; apical margin little thickened, nearly black, lateral field black. Sarawak (Mt. Poi) . . . . . *O. obscuripennis* (Chopard, 1930)

- Tegmen yellow or light orange with black apical margin 19

19 Tegmen with broad black apical margin (Fig. 3). Paraproct process as in Fig. 121. Phallic complex as in Figs 139-140. Sabah (Kinabalu area) . . . . . *O. flori* Ingrisch, 1998

- Tegmen with narrow black apical margin (Fig. 34). Paraproct process as in Fig. 118. Phallic complex as in Figs 141-146. Sabah (Crocker Range). . . . . *O. citrus* sp. n.

20 Three first abdominal tergites covered with yellow scales, the following ones with grey scales; inferior side of the abdomen silver grey. Tegmen smoky with posterior margin blackish; lateral field blackish with extreme margin white. Maxillary palps black; antennae yellow. Sipora Island, West Sumatra . . . . . *O. fuscipennis* (Chopard, 1929)

- Other combination of characters 21

21 Apical part of supra-anal plate ('supra-anal valve' in Chopard, 1929) much wider than long with a rather short erected yellow process. Tegmen very dark smoky brown with posterior margin nearly black; lateral lobes smoky. Maxillary palps yellow with a few brown spots. Sipora Island . . . . . *O. minusculus* (Chopard, 1929)

- Pronotum elongate, scarcely widened backwards; lateral lobes narrowly lined with yellow. Cheeks yellow, with a very distinct limit behind the eyes. Elytra extending little beyond pronotum, with posterior margin strongly darkened; mirror concealed up to the anterior third; lateral field yellow with a brown band. Sipora Island . . . . . *O. karnyi* Chopard, 1929

22 Tegmen covered almost as far as middle of mirror. Malaysia (Perak) . . . . . *O. nigrifrons* Chopard, 1969

- Tegmen uncovered from base of mirror. Malaysia (Kedah Peak) . . . . . *O. nigrirostris* Chopard, 1969

FEMALES

(Females of *O. angustifrons, O. brevipalpus, O. cibodas, O. pendleburyi, O. peniculatus*, and *O. pullus* unknown)

1 Ovipositor with ventral margin of apical valves dentate (Figs 185-187, 191) 2

- Ovipositor with ventral margin of apical valves smooth (Figs 188-190, 192-193) 5

2 Supra-anal plate with apical part transverse; apex slightly convex (Figs 127-128) 3

- Supra-anal plate with apical part tongue shaped; apex rounded (Figs 126, 130) 4

3 Ovipositor 6.3 mm; hind femur 6.3 mm. Face and lateral area of pronotum black. Supra-anal plate furrowed at base; apical part yellow (Fig. 127; but with a black band on underside). North Thailand (Chiang Mai). . . . . *O. aureus* sp. n.

- Ovipositor 4.9 mm; hind femur 5.5 mm. Face and lateral area of pronotum of same colour as remaining parts of head and pronotum. Supra-anal

plate not furrowed at base; apical part yellow with a broad black band at apex (Fig. 128). North Thailand (Chiang Mai) ..... *O. serratus* sp. n.

4 Supra-anal plate very narrow; base and margin of apical area black (Fig. 126). Ovipositor apical valves with dorsal margin finely serrulate (Fig. 186). North Thailand (Chiang Mai) ..... *O. angustus* sp. n.

- Supra-anal plate little wider; basal dark spot interrupted, apical area almost completely dark brown (Fig. 130). Ovipositor apical valves with dorsal margin smooth (Fig. 191). Northeast Thailand (Loei) ..... *O. tuberculatus* sp. n.

5 Maxillary palps with basal three segments light, apical two segments black. Tibiae black. Krakatau Island ..... *O. nigripes* Chopard, 1927

- Maxillary palps of different colour pattern; if similar also the third segment of the maxillary palps is brown or black and the tibiae are yellow 6

6 Mentawei Islands 17

- Other distribution 7

7 Frons black; head otherwise yellow, white or reddish brown 18

- Frons of same colour as other parts of head (yellow, reddish brown or dark brown) 8

8 Maxillary palps elongate; apical segment little widened (Figs 93-94). Sulawesi 9

- Maxillary palps with apical segment shorter and distinctly widened (Figs 89-92, 95-97). Other areas 10

9 Supra-anal plate much narrower than ninth abdominal tergite (Fig. 132) ..... *O. dumoga* sp. n.

- Supra-anal plate little narrower than ninth abdominal tergite (Fig. 131). ..... *O. consternus* sp. n.

10 Ovipositor 3.0-5.5 mm 11

- Ovipositor 6.1-9.0 mm 13

11 Ovipositor slightly curved, 3.1-4.1 mm. Supra-anal plate with apical area transverse (Fig. 135). Sabah (Kinabalu area) .... *O. marginatus* Ingrisch, 1998

- Ovipositor straight, 4.2-5.1 mm 12

12 Ovipositor 4.2 mm. Abdomen brown above, yellow beneath. Sarawak (Mt. Poi) ..... *O. obscuripennis* (Chopard, 1930)

- Ovipositor 4.4-5.1 mm. Abdomen with anterior segments reddish brown, posterior segments black, or almost fully black (Fig. 4). Supra-anal plate with apical area rounded (Fig. 137). Sabah (Kinabalu area) ..... *O. flori* Ingrisch, 1998

13 Supra-anal plate entirely black (only lateral appendages may be less dark); tenth abdominal tergite and epiproct fused. Head and pronotum reddish brown 14

- Supra-anal plate brown with white ornaments; tenth abdominal tergite and epiproct with distinct borderline (Fig. 138). Head and pronotum dark to blackish brown (Fig. 9). Sabah (Kinabalu area) ..... *O. vadus* Ingrisch, 1998

14 Supra-anal plate in basal two thirds with a large matt area with angular apex, remaining apical area smooth (Fig. 123). West Java (Palabuan Ratu) ..... *O. samudra* sp. n.
- Supra-anal plate smooth throughout 15
15 Supra-anal plate with apical area small, triangular or angularly rounded (Figs 125, 136). Ovipositor 6.1-7.5 mm 16
- Supra-anal plate with apical area larger, broadly rounded (Fig. 134). Ovipositor 9 mm. South Thailand (Koh Samui) .. *O. rufonigrus* Ingrisch, 1987
16 Ovipositor 6.1-6.6 mm. Sabah (Crocker Range) ..... *O. citrus* sp. n.
- Ovipositor 6.5-7.5 mm. Sabah (Kinabalu area) ..... *O. rubidus* Ingrisch, 1998
17 Maxillary palps black. Sipora Island ..... *O. fuscipennis* (Chopard, 1929)
- Maxillary palps yellow. Sipora Island ..... *O. minusculus* (Chopard, 1929) [and *O. karnyi* Chopard, 1929 the female of which is only known in the immature state]
18 Maxillary palps pale yellow; apical segment rather short and wide, of equal length with fourth segment, shorter than third segment (Fig. 95). Supra-anal plate bent ventrad in a 90°-angle in about middle of length; black with white apex (Fig. 129). Ovipositor 6.5 mm. West Java (Palabuan Ratu) ..... *O. imitatus* sp. n.
- Maxillary palps and supra-anal plate different. Ovipositor shorter than 6 mm 19
19 Maxillary palps with fourth segment shorter than third. Malaysia (Kedah Peak), female unknown ..... *O. nigrirostris* Chopard, 1969
- Other distribution 20
20 Maxillary palps with fourth segment of equal length with third segment (Fig. 96). Pronotum little longer than wide, 2 mm long (Fig. 26); ovipositor 5.4 mm. Supra-anal plate as in Fig. 124. Singapore .. *O. albipalpus* sp. n.
- Pronotum about one quarter longer than wide, 3 mm long; ovipositor 4 mm. Malaysia (Perak, Larut Hills) ..... *O. nigrifrons* Chopard, 1969

Ornebius albipalpus sp. n. Figs 26, 96, 124, 190, 203

Holotype (♀): Singapore: Island Country Club, between Lower Peirce Reservoir and Windsor Park Estate, 60 m, relics of primary forest within secondary forest, 12.xi.1988, leg. Charles Lienhard (MHNG).

Measurements (1 ♀). Body 9.3; pronotum 1.9; pronotum width 1.8; hind femur 5.4; hind tibia 3.8; hind metatarsus 1.2; ovipositor 5.4 mm. – Ratio pronotum length to width 1.07; ratio hind tibia to metatarsus 3.15.

Description. Frontal rostrum as wide as scapus, without medial furrow. Maxillary palps with apical segment widened; three apical segments of subequal length (Fig. 96). Pronotum ♀ almost as wide as long; scarcely narrowing in front; anterior and posterior margins substraight (Fig. 26). Hind femur 1.4x longer than hind tibia; hind tibia 3.2x longer than metatarsus.

♂ unknown.

♀ abdomen. Ninth abdominal tergite with apex concave. Supra-anal plate with apex subtruncate; fused with epiproct (Fig. 124). Epiproct rounded. Subgenital plate

triangular or semi-circular in general outline; little notched at apex (Fig. 203). Ovipositor long; apical valves with margins smooth; ventral margin of dorsal valves with 4 bristles (Fig. 190).

Colouration. Reddish brown. Head with frontal rostrum and labrum black; antenna with scapus and base of flagellum blackish brown, afterwards yellow with indistinct spaced annulation; maxillary palps light yellow, external area of fourth segment darkened. Pronotum reddish brown. Legs yellow, spotted with brown. Abdomen ♀ with first segments brown, afterwards black with white apical margins; underside paler. Supra-anal plate almost white; brown at base and very apex. Subgenital plate medium brown. Cerci yellowish brown. Ovipositor medium brown, apical valves little darkened.

Discussion. The new species is characterised by the black frons of the otherwise light coloured head. This character it shares with *O. nigrifrons* Chopard, 1969 from Perak and *O. nigrirostris* Chopard, 1969 from Kedah, North-Malaysia. From *O. nigrifrons* it differs by the longer ovipositor and a shorter and comparatively wider pronotum; from *O. nigrirostris* which is only known from the male type it differs by shape of the maxillary palps with the three apical segments being of equal length not the fourth shorter than the third. Otherwise only colouration can be taken as non-sexual characters from the description given in Chopard (1969). With regard to colouration, *O. albipalpus* differs from *O. nigrirostris* by the cheeks and the lateral lobes of the pronotum being of the same colour as the vertex and the disc of pronotum, i.e. reddish to yellowish brown not white, the antennae have the base of the flagellum black not only the two basal segments, the maxillary palps are pale yellow, almost white instead of yellowish brown. Differences to other species are outlined in the key.

Etymology. Named for the light palps.

Ornebius angustus sp. n. Figs 15, 86, 126, 186, 200

Holotype (♀): Thailand: Chiang Mai, Doi Suthep-Pui, 1150-1350 m, 18° 48' N, 98° 55' E, 28.v.1997, leg. S. Ingrisch (ZFMK).

Measurements (1 ♀). Body 9.9; pronotum 2.5; hind femur 6.4; hind tibia 4.7; ovipositor 6.9 mm.

Description. Frontal rostrum slightly wider than scapus, faintly furrowed in midline. Maxillary palps with apical segment distinctly widened; fourth segment little shorter than third and fifth segments (Fig. 86). Pronotum ♀ little longer than wide, scarcely narrowing in front; anterior and posterior margins substraight (Fig. 15). Anterior tibia with internal tympanum. Hind femur 1.3-1.4x longer than hind tibia; hind tibia 3.2x longer than metatarsus.

♂ unknown.

♀ abdomen. Supra-anal plate divided; basal part black with a weak suture in midline; apical part narrow tongue shaped, furrowed in middle (Fig. 126). Subgenital plate triangular, apex notched (Fig. 200). Ovipositor long; apical valves dorsal margin with minute denticles, ventral margin with 6-8 small teeth; ventral margin of dorsal valves with 4-6 bristles (Fig. 186).

Colouration. Head nearly black with silver scales; genae reddish brown; antenna with scapus black, pedicellus brown, flagellum yellow; maxillary palps yellow.

Pronotum reddish brown; lateral area black with yellow margin. Legs yellow with faint marmoration. Abdomen ♀ black; supra-anal plate yellow with base and apex black. Cerci yellow. Ovipositor reddish brown.

Discussion. The new species is close to *O. aureus* and *O. serratus* which live in the same area. It differs distinctly by the female supra-anal plate with the narrow elongate epiproct (Fig. 126). In contras to *O. aureus* but not to *O. serratus,* the ovipositor apical valves show a fine serrulation on both margins not only on the ventral margin. For the recognition of the corresponding male, colouration might be useful as it also differs from both related species. The head is black with reddish brown ganae and yellowish brown palpi, the pronotum reddish brown with black lateral lobes, the abdomen without golden scales, and the apical segments of the tarsi are not darkened. The differences to other species are outlined in the key.

Etymology. The name refers to the narrow supra-anal plate; from Latin angustus = narrow.

Ornebius aureus sp. n. Figs 13-14, 31, 85, 103, 111, 127, 170-171, 185, 198, 357, 365, 372

Holotype (♂): Thailand: Chiang Mai, Doi Suthep-Pui, 1100-1200 m, 18° 48' N, 98° 55' E, 6.iv.1993, leg. S. Ingrisch (ZFMK).

Paratypes: 1 ♂, 1 ♀, same locality as holotype, 13.iv.1995 (♂ CI, ♀ ZFMK).

Measurements (2 ♂, 1 ♀). Body ♂ 9.2-12.4, 10.8±2.3, ♀ 8.7; pronotum ♂ 3.3-3.4, ♀ 2.5; pronotum width ♂ 2.6-2.7, ♀ 2.3; tegmen ♂ 3.3-3.5; tegmen width ♂ 3.0; hind femur ♂ 5.7-5.9, ♀ 6.3; hind tibia ♂ 4.1, ♀ 4.7; hind metatarsus ♂ 1.2, ♀ 1.4; ovipositor ♀ 6.3 mm. – Ratio pronotum length to width ♂ 1.21-1.32, ♀ 1.06; ratio hind tibia to metatarsus ♂ 3.42, ♀ 3.4; ratio tegmen length to width ♂ 1.17.

Description. Frontal rostrum slightly wider than scapus, faintly furrowed in midline. Maxillary palps with apical segment distinctly widened; fourth segment little shorter than third and fifth segments (Fig. 85). Pronotum ♂ with anterior dorsal margin subtruncate; lateral margins very little widening posteriorly; posterior margin convex, covering tegmen to base of mirror (Fig. 13). Pronotum ♀ little longer than wide, scarcely narrowing in front; anterior and posterior margins substraight (Fig. 14). ♂ tegmen slightly wider than posterior area of pronotum; posterior margin convex (Fig. 31). Hind femur 1.3-1.4x longer than hind tibia; hind tibia 3.2-3.4x longer than metatarsus.

♂ abdomen. Supra-anal plate with tenth abdominal tergite clearly separated from epiproct; tenth tergite rhombic, faintly depressed in middle and on both sides; apex broadly convex, with a bunch of long hairs at both sides of middle; apico-lateral area with a compressed projection; epiproct bulging, apex rounded (Fig. 103). Paraproct process compressed in basal half and here with an external furrow; external side and apex black, internal side white; apical area styliform, acute (Fig. 111). Subgenital plate with almost parallel sides; apical margin rounded, upcurved and a little excised in middle. Epiphallus membranous; external sclerites elongate, divided in a basal and an apical part, forming an angle at transient zone; internal sclerites slightly curved, more strongly so at base (Figs 170-171).

♀ abdomen. Ninth abdominal tergite with apex feebly concave. Supra-anal plate divided, basal part with small lateral projections; apical part broad and apex trun-

cate (Fig. 127). Paraprocts simple. Subgenital plate triangular with margins upcurved; apex notched (Fig. 198). Ovipositor long; ventral margin with 6-8 small teeth; ventral margin of dorsal valves with 4-6 bristles (Fig. 185).

Colouration. Colourful. Head with vertex dark reddish brown to dark brown; genae yellowish brown with black spots; frons black; antenna with scapus black, pedicellus brown, flagellum yellow; maxillary palps yellow. Pronotum reddish brown with silver or golden scales; lateral area black with yellow margin. Tegmen bright yellow, at apex with a broad black band; lateral area with a broad black band above, white below. Legs yellow with black and brown marmoration; apical two segments of tarsus black. Abdomen ♂ black; on dorsal side anterior segments with golden scales, apical segments with silver scales; on ventral side with silver scales, subgenital plate black. Cerci yellow. Abdomen ♀ as in ♂; supra-anal plate yellow, basal part black. Subgenital plate brown with silver scales. Cerci yellow. Ovipositor yellowish to reddish brown.

Discussion. The new species can easily be recognised by the characteristic shape of the male and female supra-anal plate. Only three other species have the male supra-anal plate provided with two brushes of short hairs at the end of the basal part. From *O. cibodas* it differs by the shape of the pronotum, the paraproct process and the phallic complex; from *O. tuberculatus* it differs by the absence of a transverse swelling on vertex, different colour pattern, the maxillary palps being yellow instead of dark brown, larger paraproct processes, and minute differences in the phallic complex; from *O. peniculatus* it differs by the golden scales at the anterior segments of abdomen and the phallic complex. The female is characterised by the small teeth at the ventral margins of the ovipositor apical valves. From the other species with similar armature (*O. angustus*, *O. serratus*, *O. tuberculatus*) it differs by shape and colour pattern of the supra-anal plate. The differences to other species are outlined in the key.

As in the Mt. Kinabalu area of Sabah (Ingrisch, 1998), also in the Doi Suthep-Pui area of North Thailand several *Ornebius* species have been found, i.e. *O. aureus, O. angustus*, and *O. serratus*. The *Ornebius* species from Sabah were predominantly collected from the canopy (Floren *et al.*, 2001) while those from Doi Suthep by ground near sampling. Only a few specimens were found by the latter method. All three specimens of *O. aureus* were collected as nymphs in rolled leaves, and bred to adults. A male and a female were collected together at the same place and date which was taken as indication that both belong together, so more as both agree in general characters and colouration. Both other species from the area were collected as single females. They differ however distinctly in the shape of the supra-anal plate that they cannot be regarded as belonging to the same species (Figs 126-128). This is especially true for *O. angustus* which was found in the same forest as *O. aureus* but about 50-100 m higher up on the mountain.

Etymology. The name refers to the shining golden scales covering the anterior abdominal segments; from Latin aureus = made of gold.

Stridulation (Figs 357, 365, 372). The calling song is complex. It consists of an irregular sequence of chirp groups. Both, the number of the chirps per group and the chirp group interval vary. Each chirp consists of three pulses. The first two pulses following immediately after each other while the third follows after a short pause. At

24°C, chirp duration was 145-164 ms (mean 155 ± 6.1, n=25), the pause between the second and third pulse of a chirp 63-75 ms (mean 71 ± 3.0), and the pause between two succeeding chirps 82-122 ms (mean 103 ± 10.4). Frequency maximum was about 6.1-6.4 kHz.

Ornebius bogor sp. n. Figs 12, 92, 133, 188, 204

Holotype (♀): Indonesia: West Java, Bogor, Kebun Raya, 250 m, 6° 35' S, 106° 47' E, 9.ii.1995, leg. S. Ingrisch (ZFMK).

Measurements (1 ♀). Body: 6.6; pronotum: 1.9; pronotum width: 1.6; hind femur: 4.4; hind tibia: 3.0; hind metatarsus: 1.0; ovipositor: 3.3 mm. – Ratio pronotum length to width: 1.2; ratio hind tibia to metatarsus: 3.0.

Description. Frontal rostrum slightly wider than scapus, without medial furrow. Maxillary palps with apical segment strongly widened; all three apical segments of subequal, medium length (Fig. 92). Pronotum ♀ longer than wide; scarcely narrowing in front; anterior and posterior margins feebly convex; lateral lobes nearly angularly inserted to disc (Fig. 12). Anterior tibia with internal tympanum. Hind femur 1.4-1.5x longer than hind tibia; hind tibia 3.0x longer than metatarsus.

♂ unknown.

♀ abdomen. Supra-anal plate triangular with apex rounded, with a shallow groove in middle (Fig. 133). Paraprocts simple. Subgenital plate triangular with margins upcurved; apex broadly rounded (Fig. 204). Ovipositor short; apical valves with margins smooth, dorsal valves with a long hair at base of dorsal margin; ventral margin of dorsal valves with 6 bristles (Fig. 188).

Colouration. Brown. Head with vertex and upper part of genae dark brown with darker spots; frons reddish brown, clypeus white; mouthparts and lower area of genae light brown; antenna yellowish brown with spaced dark annulation; maxillary palps yellowish brown. Pronotum with disc dark brown, along margins black; lateral lobes dirty white. Legs on external side mostly dark brown with irregular light areas; internal side with large areas almost white; tibiae maculated. Abdomen ♀ dark brown above, light brown below, on ventral side with alternating bands of white and brown scales. Subgenital plate light brown. Cerci speckled with light and dark brown scales. Ovipositor yellowish brown, apical valves brown.

Discussion. The new species differs from other *Ornebius* species by its narrow, slender appearance, and the uniform greyish brown colour. The ♀ supra-anal plate has the apex broad angularly rounded but is without striking colours or peculiar shape. This also differs from the situation in other *Ornebius* species. The diagnostic characters against other species are outlined in the key.

Etymology. Named after the type locality; noun in apposition.

Ornebius brevipalpus sp. n. Figs 29, 33, 98, 108, 113, 181-184

Holotype (♂): Thailand: Lampang, Doi Khun Tan, 900-950 m, 18° 29' N, 99° 18' E, 16.-17.ix.1993, leg. S. Ingrisch (ZFMK).

Measurements (1 ♂). Body 6.7; pronotum 2.5; pronotum width 1.7; tegmen 2.8; tegmen width 1.8; hind femur 4.1; hind tibia 2.8; hind metatarsus 0.95 mm. – Ratio

pronotum length to width 1.48; ratio hind tibia to metatarsus 2.9; ratio tegmen length to width 1.51.

Description. Frontal rostrum slightly wider than scapus, with a faint medial suture. Maxillary palps with apical segment strongly widened; the third segment little longer than fourth and fifth segments; all three apical segments together 0.93 mm (Fig. 98). Pronotum ♂ with anterior margin truncate; lateral margins slightly widening posteriorly; posterior margin convex, covering base of mirror (Fig. 29). ♂ tegmen slightly wider than posterior area of pronotum; posterior margin convex (Fig. 33). Hind femur 1.5x longer than hind tibia; hind tibia 2.9x longer than metatarsus.

♂ abdomen. Supra-anal plate completely fused with epiproct; very short, flat, triangular, apex rounded in middle (Fig. 108). Paraproct process compressed on internal, rounded on external side, yellowish brown, darkened towards base; paraproct with a second, dorsal projection forming a small, black hook (Fig. 113). Subgenital plate triangular with margins upcurved; apex notched. Phallic complex broken in specimen at hand; with small, little distinct sclerotisation (Figs 181-184).

♀ unknown.

Colouration. Reddish brown and black. Vertex reddish brown with a black spot in middle; frons, antenna and maxillary palps yellowish brown. Pronotum with disc reddish brown, lateral lobes yellow. Tegmen pale yellow, at apex with hardly visible infumation; lateral area same as disc. Legs pale yellow. Abdomen ♂ black on both sides. Epiproct and subgenital plate black. Cerci pale yellow.

Discussion. The new species is unique for its short maxillary palps with the three apical segments together shorter than 1 mm, in other species they are distinctly longer than 1 mm. Also the male paraprocts having two processes and the phallic complex differs from the situation in other *Ornebius* species from SE Asia. It is not impossible that it represents an undescribed genus. To decide on it would require a more comprehensive study of the genus including species from other faunal regions.

Etymology. The name refers to the short maxillary palps.

Ornebius cibodas sp. n. Figs 27, 32, 89, 102, 114, 160-161

Holotype (♂): Indonesia: West Java, Cibodas, 1300-1400 m, 6° 43' S, 107° 0' E, 25.xi.1987, leg. Charles Lienhard (MHNG).

Measurements (1 ♂). Body ♂ 10.2; pronotum ♂ 3.2; pronotum width ♂ 2.7; tegmen ♂ 3.8; tegmen width ♂ 3.2; hind femur ♂ 5.2; hind tibia ♂ 3.8; hind metatarsus ♂ 1.2 mm. – Ratio pronotum length to width ♂ 1.21; ratio hind tibia to metatarsus ♂ 3.15; ratio tegmen length to width ♂ 1.2.

Description. Frontal rostrum slightly wider than scapus, without medial furrow. Maxillary palps with apical segment widened; three apical segments of subequal length (Fig. 89). Pronotum ♂ with lateral margins strongly widening posteriorly; posterior margin convex, covering stridulatory vein of tegmen (Fig. 27). ♂ tegmen broader than pronotum; posterior margin convex; mirror trapezoidal, slightly wider than long (Fig. 32). Hind femur 1.4x longer than hind tibia; hind tibia 3.2x longer than metatarsus.

♂ abdomen. Supra-anal plate [probably deformed on left side] divided into tenth abdominal tergite and epiproct; tenth tergite with two tubercles at apical margin each carrying a brush of short hairs; epiproct rounded (Fig. 102). Paraproct process

long and narrow, faintly curved, light brown, with separate hairs (Fig. 114). Subgenital plate apical margin rounded and upcurved, notched in middle. Epiphallus membranous, covering central lobe completely. Lateral valves elongate, forming together a stiff tube, terminating in rounded lobes; largely membranous, sclerotisation restricted to oblique plates near apex; internal sclerites elongate; spermatophore sac with sclerotised margin (Figs 160-161).

♀ unknown.

Colouration. Medium brown, underside light brown to almost white. Head with frons medium brown; genae with pale ventral margin; antenna with scapus and pedicellus brown, flagellum yellow with indistinct spaced annulation; maxillary palps brown. Pronotum apical margin with white scales. Tegmen medium brown with slightly darker flecks, at apex with a diffuse blackish brown band; lateral area medium brown. Legs light with dark marmoration; genicular area of femora, dorsal area of hind femur, and wide rings on tibiae with dark scales. Abdomen greyish brown above, almost white below. Subgenital plate black, baso-central area light. Cerci yellowish brown.

Discussion. Although the male supra-anal plate of the specimen at hand is probably malformed, its proper shape can be imagined from the entire right half. *O. cibodas* belongs to the group of species which carry two brushes of short hairs on the male supra-anal plate. It differs from other species of this group (*O. aureus, O. tuberculatus, O. peniculatus*) by the pronotum strongly widening posteriorly, the paraproct process being straight, the phallus with the lateral valves forming a tube around the medial valve, and colouration.

Etymology. The name refers to the type locality; noun in apposition.

Ornebius citrus sp. n. Figs 1-2, 34, 90, 99, 118, 125, 141-146

Holotype (♂): East Malaysia: Sabah, Crocker Range, near village Bandukan-Keningau, 5° 26' N, 116° 8' E, canopy fogging, 18.ii.2001, leg. A. Floren (ZFMK).

Paratypes: East Malaysia: 10 ♂, 3 ♀, Sabah, Crocker Range, near villages Bandukan-Keningau, 5° 26' N, 116° 8' E, canopy fogging, 18.ii.2001, leg. A. Floren (7 ♂, 3 ♀ ZFMK, 3 ♂ CI); 17 ♂, 15 ♀, Crocker Range, near village Ulu Liawan, 5° 24' N, 116° 5' E, canopy fogging, 20.ii.2001, leg. A. Floren (12 ♂, 7 ♀ ZFMK, 4 ♂, 4 ♀ MHNG, 1 ♂, 4 ♀ CI).

Measurements (28 ♂, 18 ♀). Body ♂ 7.9-11.2, 9.5±0.7, ♀ 7.8-10.0, 8.7±0.7; pronotum ♂ 2.2-3.2, 3±0.2, ♀ 2.1-2.3, 2.2±0.1; pronotum width ♂ 2.1-2.8, 2.4±0.1, ♀ 1.9-2.2, 2.1±0.1; tegmen ♂ 3.0-3.5, 3.3±0.1; tegmen width ♂ 3.0-3.3, 3.2±0.1; hind femur ♂ 5.2; ovipositor ♀ 6.1-6.6, 6.3±0.2 mm. – Ratio pronotum length to width ♂ 1.06-1.33, 1.2±0.1, ♀ 1-1.16, 1±0; ratio tegmen length to width ♂ 0.96-1.15, 1.05±0.04. [Hind legs missing with most specimens].

Description. Frontal rostrum as wide as scapus, faintly furrowed in midline. Maxillary palps with apical segment strongly widened; fourth and fifth segments of equal length, shorter than third segment (Fig. 90). Pronotum ♂ with lateral margins widening posteriorly; posterior margin convex, covering stridulatory vein of tegmen (Fig. 1). ♂ tegmen broader than pronotum; posterior margin convex (Fig. 34).

♂ abdomen. Supra-anal plate with a concave suture behind middle; setose along suture; apical margin rounded (Fig. 99). Paraproct process long, compressed, curved, black, ventro-apical area partly white, with single hairs (Fig. 118). Subgenital plate

apical margin rounded. Epiphallic lobe triangular, membranous, apex very faintly excised, covering base of central lobe (Figs 141-142). Lateral valves forming dorso-ventrally compressed, separate lobes; apices of valves obliquely truncate to slightly convex; medial valve curved at base forming a semi-circle, apex pointed (Figs 144-146). Ventral lobe forming two rounded globes (Fig. 143).

♀ abdomen. Ninth abdominal tergite with apex subtruncate. Supra-anal plate with strongly narrowing lateral margins; epiproct triangularly-rounded, elevated in middle (Fig. 125). Subgenital plate transverse, apex truncate. Ovipositor long; apical valves with margins smooth; ventral margin of dorsal valves with 3-6 bristles.

Colouration. Reddish brown. Antenna with scapus and pedicellus brown; base of flagellum black, afterwards brown to yellow with spaced annulation. Maxillary palps brown. Pronotum uniformly reddish brown. Tegmen yellowish transparent; tegmen base same as surface, at apex with a broad dark brown band; lateral area same as disc. Legs reddish brown; hind femur dark brown, marmorated. Abdomen ♂ with tergites black, sternites dark brown to black. Cerci base white, afterwards black, apex light. Abdomen ♀ with tergites usually black, sternites dark brown to black. Cerci with base and very apex white, infumate towards middle. Ovipositor brown.

Discussion. O. citrus is similar to *O. flori*. It differs superficially by a more intense yellow colour of the male tegmen and by the dark brown cerci. Diagnostic characters are in the male the ejaculatory duct having the apex elongate and acute, not truncate as in *O. flori*, and in the female the ovipositor being distinctly longer (6.1-6.6 against 4.6-5.1 mm). The male phallic complex resembles the situation in *O. rubidus* and *O. vadus*. It differs from both by the shape of the supra-anal plate in both sexes, in the male by the paraproct processes and the tegmen with a dark band at apex, in the female by the ovipositor length, and by size and colouration. Differences against other species are outlined in the key. *O. citrus* seems to replace *O. flori* and *O. rubidus* in the more south western parts of the Crocker Range. It was found near the villages Bandukan-Keningau, and Ulu Liawan but not in the Kinabalu area where both other species occur.

Etymology. Named after the intense yellow colour of the male tegmen.

Ornebius consternus sp. n. Figs 22-23, 30, 38, 93, 105, 116, 131, 175-177, 197

Holotype (♂): Indonesia: Sulawesi, Sulawesi Utara, Dumoga-Bone National Park, 400 m, 19.vii.1985, leg. Nigel Stork (BMNH).

Paratypes: 1 ♂, same locality as holotype, 200 m, 5.ii.1985; 2 ♀, same locality 300 m, 8.ii.1985; same locality, 1 ♂, 1 ♀, same locality 400 m, 11.ii.1985; 1 ♀, same locality 300 m, 13.ii.1985; 4 ♂, same locality 200 m, 11.iii.1985; 1 ♀, same locality 200 m, 11.vii.1985; 1 ♂, same locality 200 m, 30.ix.1985; 2 ♂ same locality without date (BMNH).

Measurements (10 ♂, 5 ♀). Body ♂ 9.3-11.1, 10±0.6, ♀ 9.9-12.4, 11.3±1; pronotum ♂ 4.3-4.8, 4.6±0.1, ♀ 2.2-2.4, 2.3±0.1; pronotum width ♂ 2.7-3.0, 2.8±0.1, ♀ 2.1-2.2, 2.1±0; tegmen ♂ 3.3-3.7, 3.5±0.1; tegmen width ♂ 2.8-3.1, 3±0.1; hind femur ♂ 5.2-5.6, 5.4±0.1, ♀ 5.7-6.0, 5.8±0.1; hind tibia ♂ 3.8-4.4, 4.1±0.2, ♀ 4.3-4.6, 4.5±0.1; hind metatarsus ♂ 0.9-1.3, 1.1±0.1, ♀ 1.2-1.3, 1.2±0; ovipositor ♀ 6.3-6.6, 6.5±0.1 mm. – Ratio pronotum length to width ♂ 1.53-1.68; ♀ 1.03-1.15, 1.1±0; ratio hind tibia to metatarsus ♂ 3.3-4.36, 3.7±0.4, ♀ 3.57-3.73, 3.6±0.1; ratio tegmen length to width ♂ 1.08-1.23, 1.2±0.

Description. Frontal rostrum slightly wider than scapus, faintly furrowed in midline. Maxillary palps with apical segment widened and of about same length with third segment; fourth segment little shorter than third (Fig. 93). Pronotum ♂ with lateral margins slightly widening posteriorly; posterior margin convex, covering mirror but leaving apex of tegmen free (Fig. 22). Tegmen of about same width with posterior area of pronotum; posterior margin of tegmen convex (Fig. 38). Pronotum ♀ little longer than wide; lateral margins slightly convex; anterior and posterior margins substraight (Fig. 23). Hind femur 1.2-1.4x longer than hind tibia; hind tibia 3.3-4.3x longer than metatarsus (Fig. 30).

♂ abdomen. Supra-anal plate with tenth abdominal tergite distinctly divided from epiproct by a transverse suture; along suture with a bunch of long hairs at both sides of middle; apex rounded (Fig. 105). Paraproct process long and narrow, faintly compressed, dark brown, with very fine hairs (Fig. 116). Subgenital plate with apical margin rounded and upcurved. Central lobe of phallus with lateral valves elongate, in apical area curved ventrad and together almost forming a tube with dorsal and ventral areas open; external sclerites well developed; medial valve widened and curved at base; internal sclerites elongate (Figs 175-177). Ventral lobe forming two large lobes reaching apex of ectophallus.

♀ abdomen. Ninth abdominal tergite with apex subtruncate. Supra-anal plate with apical area globular, rounded (Fig. 131). Subgenital plate triangular or semicircular in general outline; apex notched (Fig. 197). Ovipositor long; apical valves with margins smooth.

Colouration. Light to medium brown. Head with frons yellowish brown; antenna with scapus and pedicellus brown, flagellum light with spaced dark annulation; maxillary palps usually yellowish brown, apex little darkened. Pronotum at apical margin with white scales. Tegmen transparent, at apex with a broad dark brown band; lateral area dark brown, ventral margin white. Legs light with dark marmoration; hind femur with external area almost uniformly pale. Abdomen ♂ dark to light brown above, light below; apical margin of segments white. Subgenital plate dark brown, baso-central area light. Cerci yellow, darker towards apex. Abdomen ♀ as in ♂. Subgenital plate dark brown. Cerci yellowish brown. Ovipositor yellowish brown, base and apical valves reddish brown.

Discussion. O. consternus is closely related to *O. dumoga* as can be estimated from similarities of the male phallic complex, the male paraprocts, the maxillary palps, and the general morphology of the supra-anal plate in both sexes. It is thus described here under *Ornebius* although species with long male pronotum covering most of the tegmen were usually described under *Ectatoderus*. *O. consternus* differs from *O. dumoga* by the long male pronotum covering the tegmen except for the apex, the internal sclerites of the male phallus little sclerotised and not laterally expanded at base, a wider supra-anal plate especially in the female, and the ovipositor being a little longer.

Etymology. The name refers to the long pronotum covering most of the tegmina; from Latin consternere = to cover.

Ornebius dumoga sp. n. Figs 24-25, 37, 94, 104, 115, 132, 172-174, 192, 196

Holotype (♂): Indonesia: Sulawesi, Sulawesi Utara, Dumoga-Bone National Park, 200 m, 8.ii.1985, leg. Nigel Stork (BMNH).

Paratypes: 1 ♂, 1 ♀, same data as holotype; 1 ♂, 1 ♀, same locality 5.ii.1985; 1 ♀, same locality 11.iii.1985; 3 ♀, same locality 11.vii.1985 (BMNH).

Measurements (3 ♂, 6 ♀). Body ♂ 9.3-10.3, ♀ 9.2-10.5; pronotum ♂ 3.6-4.0, ♀ 2.1-2.3; pronotum width ♂ 2.4-2.8, ♀ 1.9-2.2; tegmen ♂ 3.3-3.7; tegmen width ♂ 2.7-2.9; hind femur ♂ 5.3-5.6, ♀ 5.2-6.0; hind tibia ♂ 3.9-4.2, ♀ 3.9-4.6; hind metatarsus ♂ 1.2, ♀ 1.1-1.3; ovipositor ♀ 5.0-5.9 mm. – Ratio pronotum length to width ♂ 1.39-1.54, ♀ 1.0-1.17; ratio hind tibia to metatarsus ♂ 3.26-3.47, ♀ 3.25-3.65; ratio tegmen length to width ♂ 1.21-1.26.

Description. Frontal rostrum as wide as scapus, without medial furrow. Maxillary palps with apical segment widened and of about same length with third segment; fourth segment little shorter than third (Fig. 94). Pronotum ♂ with lateral margins widening posteriorly; posterior margin convex, covering tegmen to stridulatory vein or base of mirror (Fig. 24). ♂ tegmen of about same width with posterior area of pronotum or slightly wider; posterior margin convex; mirror roughly triangular (Fig. 37). Hind tibia distinctly shorter than hind femur but more than half as long; hind metatarsus shorter than half the length of hind tibia.

♂ abdomen. Supra-anal plate with tenth abdominal tergite distinctly divided from epiproct by a transverse suture; along suture with a bunch of long hairs at both sides of middle; apex rounded (Fig. 104). Paraproct process long and narrow, cylindrical, of general colour, with separate long hairs (Fig. 115). Subgenital plate with apical margin rounded, truncate to faintly concave in middle. Epiphallus membranous. Central lobe of phallus with lateral valves elongate, in apical area bent ventrad and both sides together almost forming a dorsally open tube; external sclerites well developed; medial valve with base widened and strongly curved, almost forming a spiral; internal sclerites at base expanded, afterwards elongate (Figs 172-174). Ventral lobe shorter than lateral valves.

♀ abdomen. Ninth abdominal tergite with apex concave. Supra-anal plate much narrower than ninth tergite; apex rounded (Fig. 132). Subgenital plate triangular in general outline; apex rounded and slightly excised in middle (Fig. 196). Ovipositor long; apical valves with margins smooth (Fig. 192).

Colouration. Medium brown, underside light brown to almost white. Head with frons whitish brown; antenna yellowish brown with indistinct spaced annulation; maxillary palps whitish brown, hardly marmorated. Pronotum with disc reddish brown; lateral lobes almost white. Tegmen yellowish transparent; tegmen at base and apex same as surface; lateral area same as disc. Legs usually light with dark marmoration. Abdomen ♂ dark brown above, almost white below. Subgenital plate dark brown. Cerci yellowish brown. Abdomen ♀ dark brown above, medium brown below. Subgenital plate dark brown. Cerci yellowish brown. Ovipositor yellowish brown; apical valves reddish brown.

Discussion. This and the preceding species are characterised by the male phallus with the external sclerites strongly developed, the lateral valves forming a tube in apical area, and the medial valve with the internal sclerites laterally expanded in the basal spermatophore sac area. Another common character of both species that separates them from other SE Asian *Ornebius* species are the rather long maxillary palps with the apical segment little widened. *O. dumoga* differs from *O. consternus* by the shorter

male pronotum that covers the tegmen only to the base of the mirror, and the narrow supra-anal plate. The latter character is especially striking in the female. Further characters that separate *O. dumoga* from other species are outlined in the key.

Etymology. Named after the type locality; noun in apposition.

Ornebius flori Ingrisch, 1998 Figs 3-4, 121, 139-140

Ornebius flori Ingrisch, 1998: 226. Holotype (♂): East Malaysia: Sabah, Mt. Kinabalu NP, Poring, 500-700 m, 6° 5' N, 116° 33' E, canopy fogging, 27.x.1993 leg. A. Floren (ZFMK).

New material. East Malaysia: 10 ♂, 5 ♀, Sabah, Mt. Kinabalu NP, Poring, 500-700 m, canopy fogging, leg. A. Floren, 19.ii.-24.iii.1996; 10 ♂, 5 ♀, same locality, 11.x.-1.xi.1996; 2 ♂, 1 ♀, same locality, 9.ii.1997; 6 ♂, 4 ♀, same locality, 27.-28.iii.1998; 22 ♂, 31 ♀, Sorinsim, canopy fogging, leg. A. Floren, 27.ii.-12.iii.1997; 2 ♀, Kinabalu area, plantation, leg. A. Floren, 23.i.2001 (42 ♂, 40 ♀ ZFMK, 4 ♂, 4 ♀ MHNG, 4 ♂, 4 ♀ CI).

Discussion. The species is sufficiently described in Ingrisch (1998). New material became available since then. All specimens come from the Kinabalu area in Sabah, and *O. flori* may be restricted to that area. It was fogged from trees in primary and disturbed forests. Illustrations of the male phallic complex (Figs 139-140) are included here for comparison with *O. citrus* sp. n. and *O. pullus* sp. n.

O. flori and *O. citrus* are very similar in general habitus, but *O. flori* has the male tegmen (Fig. 3) dull yellow instead of bright yellow with the dark apical band broader than in *O. citrus*. Distinct differences are in the male the ejaculatory duct which has the apex truncate in *O. flori* but acute in *O. citrus* and in the length of the ovipositor which is 4.6-5.1 mm in *O. flori* against 6.1-6.6 mm in *O. citrus*. Differences against other species are outlined in the key. The medial valves of the male phallic complex of *O. flori* and are similar to that of *O. pullus*; the membranous parts of the phallus are however much more voluminous than in the latter. Both species differ strikingly in the colour of the tegmen. The paraproct process is longer than the main part of the paraproct in *O. flori* (Fig. 121) while of about the same length in *O. pullus* (Fig. 112).

Ornebius imitatus sp. n. Figs 28, 95, 129, 193, 202

Holotype (♀): Indonesia: West Java, Palabuan Ratu, Samudra beach, 6° 58' S, 106° 30' E, relic forest, 6.iii.1995, leg. S. Ingrisch (ZFMK).

Measurements (1 ♀). Body 8.2; pronotum: 2.1; pronotum width: 2.0; hind femur: 5.5; hind tibia: 4.1; hind metatarsus: 1.1; ovipositor: 6.5 mm. – Ratio pronotum length to width: 1.06; ratio hind tibia to metatarsus: 3.83.

Description. Frontal rostrum slightly wider than scapus; faintly furrowed in midline. Maxillary palps with apical segment widened; fourth and fifth segments of equal length, shorter than third segment (Fig. 95). Pronotum ♀ little longer than wide; scarcely narrowing in front; anterior and posterior margins feebly convex (Fig. 28). Hind femur 1.3x longer than hind tibia; hind tibia 3.8x longer than metatarsus.

♂ unknown.

♀ abdomen. Supra-anal plate bend in a 90°-angle ventrad in about middle of length; apical area semicircular; elevated in middle; apex convex and setose (Fig. 129). Paraprocts simple. Subgenital plate triangular; apex rounded (Fig. 202). Ovipositor apical valves with margins smooth (Fig. 193).

Colouration. Head reddish brown; frons black, mouthparts of lighter colour; maxillary palps yellowish brown. Antenna with scapus and pedicellus brown above, black below; flagellum yellowish brown. Pronotum reddish brown. Legs: basal two thirds of femur and metatarsus yellowish brown, apical third of femur and tibia dark brown to black; last joint of tarsus black. Abdomen ♀ black, anterior segments brown. Supra-anal plate black; apical area yellowish white. Subgenital plate black. Cerci yellowish brown, a little darkened towards apex. Ovipositor brown, apical valves dark brown.

Discussion. The new species is superficially similar to *O. samudra*. It differs by the black frons with pale yellow maxillary palps instead of reddish brown frons with black palps, more important however by the shape of the supra-anal plate which is wider at base and black, strongly bent ventrad in middle and almost white near apex. The maxillary palps have the fourth and fifth segments of equal length but both are a little shorter than the third segment. The differences against other species are outlined in the key.

Etymology. Named for the similar appearance to *O. samudra* with which it lives in the same habitat.

Ornebius marginatus Ingrisch, 1998 Figs 10-11, 119, 135, 178-180

Ornebius marginatus Ingrisch, 1998: 226. Holotype (♂): East Malaysia: Sabah, Mt. Kinabalu NP, Poring, 500-700 m, 6° 5' N, 116° 33' E, canopy fogging, 20.01.1992, leg. A. Floren (ZFMK).

New material. East Malaysia: 1 ♂, Sabah, Mt. Kinabalu NP, Poring, 500-700 m, 6° 5' N, 116° 33' E, 1.iv.1994, leg. Hoffmann (ZFMK); 6 ♂, 11 ♀, same locality, canopy fogging, 19.ii.-24.iii.1996, leg. A. Floren; 2 ♀, 6.x.1996; 12 ♂, 11 ♀, 27-30.iii.1998 (13 ♂, 19 ♀, ZFMK, 2 ♂, 2 ♀ MHNG, 3 ♂, 3 ♀, CI); 36 ♂, 53 ♀, Crocker Range, near village Bandukan-Keningau, 5° 26' N, 116° 8' E, canopy fogging, 18.ii.2001, leg. A. Floren; 58 ♂, 97 ♀, Crocker Range, near village Ulu Liawan, 5° 24' N, 116° 5' E, canopy fogging, 20-21.ii.2001, leg. A. Floren (78 ♂, 134 ♀, ZFMK, 8 ♂, 8 ♀ MHNG, 8 ♂, 8 ♀, CI); 1 ♂, 5 ♀, Kinabalu area, plantation, canopy fogging, 23.i.2001, leg. A. Floren (ZFMK); 1 ♂, 1 ♀, Sorinsim, canopy fogging, 9.iii.1997, leg. A. Floren (CI).

Measurements of specimens from Crocker Range (32 ♂, 30 ♀). Body ♂ 6.3-9.3, 7.8±0.7, ♀ 5.9-8.7, 7.2±0.6; pronotum ♂ 2.5-3.2, 2.7±0.1, ♀ 1.7-2.0, 1.9±0.1; pronotum width ♂ 2.0-2.3, 2.1±0.1, ♀ 1.5-1.8, 1.6±0.1; tegmen ♂ 3.3-3.8, 3.6±0.2; tegmen width ♂ 2.6-3.1, 2.9±0.1; hind femur ♂ 3.6-4.5, 4.2±0.3, ♀ 4.2-4.6, 4.4±0.1; hind tibia ♂ 3.0-3.5, 3.2±0.3, ♀ 3.2-3.7, 3.4±0.2; hind metatarsus ♀ 1.0-1.1, 1.1±0; ovipositor ♀ 3.3-4.1, 3.7±0.2 mm. – Ratio pronotum length to width ♂ 1.2-1.51, 1.3±0.1, ♀ 1.02-1.29, 1.1±0.1; ratio hind tibia to metatarsus ♀ 2.99-3.32, 3.2±0.2; ratio tegmen length to width ♂ 1.18-1.31, 1.2±0.

Discussion. The species was described from the Kinabalu area in Sabah. New material became available since then. Most of the new specimens were collected near the villages Bandukan-Keningau and Ulu Liawan in the Crocker Range. These

specimens from Crocker Range are in the mean little but distinctly smaller than those from Poring where the original type series came from. The differences concern pronotum, male tegmen, and hind legs, but not the ovipositor. Colouration is more variable than in specimens from Poring: The black band at the hind margin of the male tegmen can be more or less reduced to dark spots at both lateral angles; the dark spots at both basal angles and in the centre of the disc can be present or not, often the disc is suffused with pale brown flecks or the veins are dark brown and the membrane almost white. The male genitalia as the paraproct process and the phallus agree with those of specimens from Poring.

O. marginatus is unique for the paraproct processes in male which are not longer than the paraproct height, compressed, in lateral view nearly ovoid, and strongly setose. In other species with similar short paraproct processes as *O. pullus, O. angustifrons*, or *O. brevipalpus* they are rounded. The medial valves of the male phallic complex form an unpaired, roughly triangular sclerite that covers the apical areas of the internal sclerites and the ejaculatory duct (Fig. 178). A character not found so far in other *Ornebius* species. The female can be recognised by the short ovipositor (3.1-4.1 mm) with smooth apical valves and the supra-anal plate with the apical area transverse (Fig. 135).

Ornebius peniculatus sp. n. Figs 18, 35, 91, 101, 109, 165-167

Holotype (♂): Thailand: Tak prov., Mae Salit, Monkrating, trek over Doi Kathing, 700-1250 m, 17° 30' N, 98° 5' E, 15.v.1988, leg. S. Ingrisch (ZFMK).

Measurements (1 ♂). Body 9.1; pronotum 2.8; pronotum width 2.3; tegmen 2.5; tegmen width 2.5; hind femur 5.0; hind tibia 3.6; hind metatarsus 1.1 mm. – Ratio pronotum length to width 1.22; ratio hind tibia to metatarsus 3.36; ratio tegmen length to width 1.0.

Description. Frontal rostrum slightly wider than scapus, faintly furrowed in midline; vertex plain. Maxillary palps with apical segment distinctly widened; all three apical segments of subequal, medium length (Fig. 91). Pronotum ♂ with anterior dorsal margin feebly concave; lateral margins slightly widening posteriorly; posterior margin convex, covering base of mirror (Fig. 18). ♂ tegmen slightly wider than posterior area of pronotum; posterior margin convex (Fig. 35). Hind femur 1.4x longer than hind tibia; hind tibia 3.4x longer than metatarsus.

♂ abdomen. Supra-anal plate with strongly converging margins in basal two thirds, faintly converging margins in apical third; both areas separated by a fold; basal area grooved in middle and with two bunches of hairs at the end of the groove; apical area swollen in middle; apex convex (Fig. 101). Paraproct process long and narrow, cylindrical, black, on proximo-internal margin attached to a white membrane, a little compressed at base and furrowed on external side (Fig. 109). Subgenital plate basal half with parallel margins, apical half broadly rounded and with upcurved margins; apex notched. Phallus with external sclerites forming compressed, elongate plates, that are less sclerotised than in *O. tuberculatus*; bent somewhat ventrad in middle of length (Fig. 167). Medial valve thin, with a small, hyaline projection at base; internal sclerites distinctly curved (Figs 165-167).

♀ unknown.

Colouration. Reddish brown and black. Head reddish brown; tip of frontal rostrum faintly infumate; antenna with scapus and pedicellus brown, flagellum light brown; maxillary palps light brown. Pronotum reddish brown. Tegmen yellowish transparent, at apex with a broad black band; lateral area same as disc. Legs pale yellow with medium and dark brown scales; last two joints of tarsi darkened. Abdomen including supra-anal and subgenital plates black. Cerci yellowish brown with black infumation.

Discussion. The new species is closely related to *O. tuberculatus*. It differs by the absence of a transverse swelling on vertex and by details of the male genitalia. The differences to other species are outlined in the key.

Etymology. The name refers to the brushes of hairs on the supra-anal plate; from Latin peniculus = brush.

Ornebius pullus sp. n. Figs 5, 40, 100, 112, 147-150

Holotype (♂): Brunei: Brunei-Muara District, near the bridge over the river Sungai Lubang Barus on the road coming from Tutong, 33 km from Bandar Sen Begawan, 20 m, 16.xi.1988, leg. Charles Lienhard (MHNG).

Measurements (1 ♂). Body 7.8; pronotum 2.4; pronotum width 2.0; tegmen 2.4; tegmen width 2.2; hind femur 4.2; hind tibia 2.8; hind metatarsus 1.2 mm. – Ratio pronotum length to width 1.23; ratio hind tibia to metatarsus 2.37; ratio tegmen length to width 1.08.

Description. Frontal rostrum slightly wider than scapus, without medial furrow. Pronotum ♂ with lateral margins slightly widening posteriorly; posterior margin convex, covering tegmen to base of mirror (Fig. 5). ♂ tegmen broader than pronotum; posterior margin convex; mirror roughly triangular, as long as wide (Fig. 40). Hind femur 1.5x longer than hind tibia; hind tibia 2.4x longer than metatarsus.

♂ abdomen. Supra-anal plate with tenth abdominal tergite distinctly delimited from epiproct; tenth tergite slightly grooved in middle; apical margin very little concave with a bunch of long hairs at both sides of middle; epiproct much narrower than tenth tergite, rounded (Fig. 100). Paraproct process long, compressed, curved, of light colour, with separate long hairs (Fig. 112). Subgenital plate apical margin rounded and notched in middle. Epiphallus membranous, tongue-shaped, covering most of central lobe. Central lobe of phallus with lateral valves dorso-ventrally compressed with acute apex, completely hyaline; medial valve with internal sclerites almost forming a tube; ejaculatory duct with apex truncate and a little notched (Figs 147-150).

♀ unknown.

Colouration. Medium brown, underside light brown to almost white. Frons yellowish brown with dark ornaments. Antenna with scapus and pedicellus brown; flagellum light with spaced dark annulation. Labial palps almost white; [maxillary palps missing]. Pronotum apical margin with white scales. Tegmen transparent dark brown, at apex with a diffuse blackish brown band; lateral area same as disc. Legs light with dark marmoration; fore and mid tibiae with dark rings. Abdomen ♂ brown above, almost white below. Cerci yellowish brown.

Discussion. As in other *Ornebius* species from North Borneo (*O. flori*, *O. citrus*, *O. rubidus*, *O. vadus*), *O. pullus* has the lateral valves of the male phallic complex

completely membranous. It differs from all but *O. flori* by the shape of the medial valve. While *O. citrus*, *O. rubidus*, *O. vadus* have the internal sclerites dorso-ventrally compressed and the ejaculatory duct with acute apex, in *O. flori* and *O. pullus* the internal sclerites forming together a narrow tube and the ejaculatory duct has the apex faintly widened and truncate; the membranous parts of the phallic complex differ however considerably between both species. Apart from colouration, *O. pullus* differs from *O. flori* by the narrow epiproct. The latter character resembles the situation in *O. marginatus*. This species has however a completely different shaped body and colouration, and differs also by the phallic complex and the short and wide paraproct process. Differences to other species are outlined in the key.

Etymology. The name refers to the dark brown colour of the tegmina; from Latin pullus = blackish-brown.

Ornebius rubidus Ingrisch, 1998 Figs 6-7, 122, 136, 151-154

Ornebius rubidus Ingrisch, 1998: 228. Holotype (♂): East Malaysia: Sabah, Mt. Kinabalu NP, Poring, 500-700 m, 6° 5' N, 116° 33' E, canopy fogging, leg. A. Floren, 3.iv.1993 (ZFMK).

New material. East Malaysia: 2 ♀, Sabah, Mt. Kinabalu NP, Poring, 500-700 m, canopy fogging, leg. A. Floren, 18.-19.iii.1996; 1 ♂, 3 ♀, 6.x.1996-7.xi.1996 (4 ♀, ZFMK; 1 ♂, 1 ♀, CI).

Additional description. ♂ abdomen. Epiphallus triangular, membranous, covering ectophallus completely (Fig. 151). Central lobe with lateral valves terminating into semi-hyaline, compressed lobes; apices of lobes obliquely truncate; medial valve curved at base; internal sclerites distinct, flattened (Figs 152-154).

Discussion. O. rubidus is so far only known from canopy fogging in the Poring area of Mt. Kinabalu. Few new specimens became available since the original description, all from the type locality. The species is sufficiently described in Ingrisch (1998). Illustrations of the phallic complex before (Fig. 151) and after cleaning in KOH solution (Figs 152-154) are included to show the difference between the outline of the membranous parts of alcohol conserved preparation and the sclerotised parts.

O. rubidus belongs together with *O. vadus* and *O. citrus* to a group of species in which the medial valves of the male phallic complex have strongly sclerotised, compressed internal sclerites with acute apex and the base bent dorsad to support the spermatophore sac, while the lateral valves are largely membranous. *O. rufonigrus* has similar internal sclerites while the lateral valves show stronger sclerotisation. The species differ from each other by the shapes of the supra-anal plate in both sexes, the paraproct processes in male, ovipositor length in female, and by size and colouration.

Ornebius rufonigrus Ingrisch, 1987 Figs 122a, 134

Ornebius rufonigrus Ingrisch, 1987: 173. Holotype (♂): Thailand: Nakhon Si Thammarat, Koh Samui, Hin Lad Falls, 9° 31' N, 98° 58' E, 8.x.1985, leg. S. Ingrisch (SMF).

Measurements (1 ♂, 2 ♀). Body ♂ 10, ♀ 12-12.5, 12.3±0.4; pronotum ♂ 4, ♀ 2.7-2.9; tegmen ♂ 3.8; hind femur ♂ 6.8, ♀ 7-8; hind tibia ♂ 5.3, ♀ 5.1-6.3; hind metatarsus ♂ 1.6, ♀ 1.4-1.8; ovipositor ♀ 9 mm. – Ratio hind tibia to metatarsus ♂ 3.31 ♀ 3.5-3.64.

Redescription. Frontal rostrum as wide as scapus, indistinctly furrowed in midline. Maxillary palps with apical segment slightly widened; fourth segment shorter than third and fifth segments. Pronotum ♂ with anterior margin subtruncate; lateral margins widening posteriorly; posterior margin convex, covering stridulatory vein of tegmen; Pronotum ♀ narrowing in front; anterior and posterior margins substraight. Anterior tibia with small internal tympanum. Hind femur 1.3-1.4x longer than hind tibia; hind tibia 3.3-3.6x longer than metatarsus.

♂ abdomen. Supra-anal plate with apical margin truncate. Paraproct process long and narrow, cylindrical, black, slightly curved, apex acute (Fig. 122a). Subgenital plate triangular with margins upcurved, apex rounded. Lateral valves weakly sclerotised, hyaline; little sinuate, apex acute; medial valve elongate, with spear-like internal sclerites.

♀ abdomen. Supra-anal plate with strongly narrowing lateral margins; epiproct with converging margins, apex rounded (Fig. 134). Subgenital plate rounded with lateral margins upcurved, little notched at apex. Ovipositor long; apical valves with margins smooth.

Colouration. Reddish brown and black. Head reddish brown; mouthparts, maxillary palps and antenna yellowish brown. Pronotum reddish brown. Tegmen yellowish transparent. Legs yellowish brown. Abdomen ♂ black. Abdomen ♀ black, anterior segments brown. Cerci yellowish brown.

Discussion. As the species was originally described in German, a short redescription is given here. Only the type series (1 ♂, 2 ♀) is known so far. The male phallic complex has the internal sclerites strongly sclerotised as in *O. flori, O. citrus, O. rubidus,* and *O. vadus*. Apart from details, it differs in that also the lateral valves bear a distinct sclerotisation. The latter character resembles the situation in *O. aureus, O. cibodas, O. peniculatus, O. samudra, and O. tuberculatus. O. rufonigrus* differs by the strongly sclerotised internal sclerites and details of different part of the phallic complex. General differences to other species are outlined in the key.

Ornebius samudra sp. n. Figs 19-20, 39, 97, 106, 117, 123, 168-169, 189, 199, 358-359, 366, 373-374

Holotype (♂): Indonesia: West Java, Palabuan Ratu, Samudra beach, relic forest, 6° 58' S, 106° 30' E, 5.iii.1995, leg. S. Ingrisch (ZFMK).

Paratypes: 3 ♂, 2 ♀, same locality as holotype, 12.ii.1995; 1 ♂, 3.-6.iii.1995 (1 ♀, ZFMK; 3 ♂, CI; 1 ♂, MBBJ).

Measurements (4 ♂, 2 ♀). Body ♂ 9.9-11.1, ♀ 9.6-11.2; pronotum ♂ 3.5-3.6, ♀ 2.3-2.4; pronotum width ♂ 2.6-2.7, ♀ 2.1-2.2; tegmen ♂ 2.8-3.0; tegmen width ♂ 2.8-3.0; hind femur ♂ 5.6-6.1, ♀ 5.9-6.4; hind tibia ♂ 4.3-4.7, ♀ 4.7-4.8; hind metatarsus ♂ 1.2-1.3, ♀ 1.26; ovipositor ♀ 6.2 mm. – Ratio pronotum length to width ♂ 1.28-1.39; ♀ 1.08-1.09; ratio hind tibia to metatarsus ♂ 3.58-3.68; ♀ 3.70-3.80; ratio tegmen length to width ♂ 0.98-1.09.

Description. Frontal rostrum as wide as scapus, faintly furrowed in midline. Maxillary palps with apical segment widened; fourth segment little shorter than third and fifth segments (Fig. 97). Pronotum ♂ with anterior dorsal margin feebly concave; lateral margins widening posteriorly; posterior margin convex, covering tegmen to

base of mirror (Fig. 19). Pronotum ♀ little longer than wide; scarcely narrowing in front; anterior margin feebly convex; posterior margin substraight (Fig. 20). ♂ tegmen slightly wider than posterior area of pronotum; posterior margin convex (Fig. 39). Hind femur 1.2-1.4x longer than hind tibia; hind tibia 3.6-3.8x longer than metatarsus.

♂ abdomen. Supra-anal plate with a single brush of short hairs behind middle arising from behind a small fold; surface matt with few smooth spots; apex subtruncate (Fig. 106). Paraproct process black, compressed in basal area, faintly widened in middle, apical area styliform (Fig. 117). Subgenital plate rounded with margins upcurved and apex excised. Epiphallus membranous. Medial lobe of phallus with lateral valves compressed, forming together a ventrally open, elongate tube; external sclerites angularly bent in middle. Medial valve forming at base an irregular frame that embraces the hyaline spermatophore sac; internal sclerites narrow, hardly curved at base (Figs 168-169). Ventral lobe forming two rounded lobes.

♀ abdomen. Supra-anal plate with parallel lateral margins in apical half; elevated in middle; apex convex and setose (Fig. 123). Paraprocts simple. Subgenital plate roof-shaped; apex truncate and little notched (Fig. 199). Ovipositor of medium length; apical valves with margins smooth; ventral margin of dorsal valves with 4-6 bristles (Fig. 189).

Colouration. Reddish brown. Frons reddish brown; antenna with scapus and pedicellus reddish brown, flagellum yellowish brown; maxillary palps with basal two segments orange, third segment brown or black, apical two segments black. Pronotum reddish brown. Tegmen bright orange; lateral area same as disc. Legs light with dark marmoration; usually last joint of tarsi black. Abdomen ♂ brown with black scales from above, light brown below. Subgenital plate black. Cerci yellow, darker towards apex. Abdomen ♀ black, anterior segments brown. Supra-anal plate black, about basal two thirds matt with matt area angular behind, apical area smooth; lateral appendages brown. Subgenital plate black. Cerci as in male. Ovipositor yellowish brown.

Discussion. The new species is well characterised in the male by the supra-anal plate carrying a single brush of short hairs and by the very long paraproct process which is widened in middle and with styliform apex. The male phallic complex resembles the situation in *O. aureus, O. tuberculatus, O. peniculatus*, *O. cibodas*. *O. samudra* differs by the before mentioned characters and the uniform colour of the tegmen. The female is characterised by the matt surface of about basal two thirds of the supra-anal plate. It is similar to *O. nigripes* Chopard, 1927. It differs by the tibia being yellow instead of black, by larger size (hind femur mean 6.1 against 5.0 mm), and by the longer ovipositor (mean 6.2 against 4.5 mm). Differences to other species are outlined in the key.

Etymology. Named after the type locality; noun in apposition.

Stridulation. The calling song consists of an irregular sequence of chirp groups. Both, the number of the chirps per group and the chirp group interval vary. Each chirp consists of three to seven pulses (mean 5 ± 1.1, n=25). All except the last puls of a chirp following immediately after each other while the last pulse follows after a short pause with this pause being longer than the pause between two succeeding chirps. In the evening (22:00 h) at 25.5°C (Figs 359, 366, 374), chirp duration was 370-486 ms (mean 425 ± 35.6, n=25), the pause between the penultimate and last pulse of a chirp

149-235 ms (mean 191 ± 19.9), and the pause between two succeeding chirps 86-157 ms (mean 115 ± 17.6). Frequency maximum was about 6.2-6.8 kHz. In the morning (6:30 h, 25°C, Figs 358, 373), the chirp structure was principally the same but the chirp sequences were reduced to 2 chirps with the second chirp often reduced, missing the last pulse. Frequency maximum was a little lower 5.8-6.4 kHz; but this could have been due to a different substratum on which the singing cricket was sitting.

Ornebius serratus sp. n. Figs 21, 88, 128, 187, 201

Holotype (♀): Thailand: Chiang Mai prov., 11 km NE Samoeng, 1100-1200 m, 18° 52' N, 98° 48' E, 29.v.1997, leg. S. Ingrisch (ZFMK).

Measurements (1 ♀). Body 8.9; pronotum 2.1; pronotum width 1.8; hind femur 5.5; hind tibia 3.6; hind metatarsus 1.2; ovipositor 4.9 mm. – Ratio pronotum length to width 1.18; ratio hind tibia to metatarsus 2.99.

Description. Frontal rostrum slightly wider than scapus, with a faint medial suture. Maxillary palps with apical segment widened and of about same length with third segment; fourth segment shorter than third and fifth segments (Fig. 88). Pronotum ♀ little longer than wide; scarcely narrowing in front; anterior and posterior margins feebly convex (Fig. 21). Hind femur 1.5-1.6x longer than hind tibia; hind tibia 3x longer than metatarsus.

♂ unknown.

♀ abdomen. Ninth abdominal tergite with apex feebly concave. Supra-anal plate small, with apex subtruncate; with small lateral projections. Epiproct almost rectangular; with an apical swelling; apex slightly convex and setose (Fig. 128). Paraprocts with a vertical swelling but not forming a carina. Subgenital plate triangular with margins upcurved; apex notched (Fig. 201). Ovipositor of medium length; apical valves on dorsal margin with hardly visible minute denticles, ventral margin with 6-8 small teeth; ventral margin of dorsal valves with 4-6 bristles (Fig. 187).

Colouration. Reddish brown and black. Head with vertex and frons reddish brown; genae, antennae and maxillary palps yellowish brown. Pronotum reddish brown, lateral lobes yellowish brown. Legs yellow with black and brown marmoration. Abdomen dorsal side black with shining scales, ventral side dark grey and segments with white posterior margin. Supra-anal plate with base and apex black, otherwise yellow. Subgenital plate black. Cerci yellow, suffused with black scales except at base. Ovipositor reddish brown.

Discussion. Although the new species is known by a single female, it is described as new, because morphology and colour pattern of the supra-anal plate readily allow to separate it from related species. It belongs to the few species in which the ovipositor apical valves are dentate. It is close to *O. aureus* and *O. angustus*. It differs from both by the shape of the supra-anal plate (Figs 126-128) and shorter ovipositor (4.9 mm against 6.3-6.9 mm). For the recognition of the corresponding male, colouration of head and pronotum might be useful. Both are reddish brown from above while the genae, maxillary palps and lateral lobes of pronotum are yellowish brown. Differences to other species are lined out in the key.

Etymology. The name refers to the serration of the ventral margin of the ovipositor apical valves; from Latin serra = saw.

Ornebius tuberculatus sp. n. Figs 16-17, 36, 87, 107, 110, 130, 162-164, 191

Holotype (♂): Thailand: Loei prov., Phu Kradung, 1500 m, 16° 55' N, 101° 47' E, 27.-29.v.1988, leg. S. Ingrisch (ZFMK).

Paratype: 1 ♀, same data as holotype: (ZFMK).

Measurements (1 ♂, 1 ♀). Body ♂ 9.9, ♀ 9.6; pronotum ♂ 3.2, ♀ 2.0; pronotum width ♂ 2.3, ♀ 1.8; tegmen ♂ 3.0; tegmen width ♂ 2.5; hind femur ♂ 5.0, ♀ 5.1; hind tibia ♂ 3.7, ♀ 3.7; hind metatarsus ♂ 1.2, ♀ 1.2; ovipositor ♀ 6.6 mm. – Ratio pronotum length to width ♂ 1.38, ♀ 1.07; ratio hind tibia to metatarsus ♂ 3.1, ♀ 3.04; ratio tegmen length to width ♂ 1.2.

Description. Frontal rostrum slightly wider than scapus, faintly furrowed in midline; vertex in male with a transverse carina (Fig. 16, arrow). Maxillary palps with apical segment distinctly widened; all three apical segments of subequal, medium length (Fig. 87). Pronotum ♂ with anterior dorsal margin subtruncate; lateral margins widening posteriorly; posterior margin convex, covering tegmen to base of mirror (Fig. 16). Pronotum ♀ almost as wide as long; scarcely narrowing in front; anterior and posterior margins feebly convex (Fig. 17). ♂ tegmen slightly wider than posterior area of pronotum; posterior margin convex (Fig. 36). Hind femur 1.3-1.4x longer than hind tibia; hind tibia 3.1x longer than metatarsus.

♂ abdomen. Supra-anal plate divided by a straight transverse fold; shallowly grooved in middle; setose along transverse fold and with two brushes of dense short hairs; apical area small, bulging, wider than long; apex convex and setose (Fig. 107). Paraproct process long, compressed, curved, black; basal area laterally furrowed, apical area styliform (Fig. 110). Subgenital plate triangular with margins upcurved; apex notched. Phallus with external sclerites forming compressed, elongate plates; bent somewhat ventrad in middle of length (Fig. 164). Medial valve thin, internal sclerites flattened, little curved (Figs 162-164).

♀ abdomen. Ninth abdominal tergite with apex concave. Supra-anal plate in basal part with two black triangular plates and the lateral projections; apical part rounded, surface swollen, convex; apex convex and setose (Fig. 130). Paraprocts simple. Subgenital plate triangular with margins upcurved; apex rounded. Ovipositor of medium length; apical valves with dorsal margin smooth, ventral margin with 6-8 small teeth; ventral margin of dorsal valves with 4-6 bristles (Fig. 191).

Colouration. Reddish brown and black. Head black; antenna with scapus and pedicellus black, flagellum medium brown; maxillary palps dark brown. Tegmen yellowish transparent, at apex with a broad black band; lateral area same as disc. Legs pale yellow; tibiae and hind knees infumate; last two joints of tarsi black. Abdomen ♂ including supra-anal and subgenital plates black. Cerci yellow, darker towards apex. Abdomen ♀ including subgenital plate black. Supra-anal plate blackish brown with an inverse T-shaped yellowish brown band in basal half. Cerci as in male. Ovipositor brown.

Discussion. The new species is unique for the transverse swelling on the vertex of the male. Otherwise it is close to *O. peniculatus*. It differs, apart from the vertex, by the head being black instead of reddish brown, the supra-anal plate with the margin between the tenth tergite and epiproct straight instead of curved, the internal sclerites of the phallus only faintly curved, and the spermatophore sac with sclerotised margins.

The species *O. cibodas* and *O. aureus* are also close. *O. tuberculatus* differs from *O. cibodas* by the black head and abdomen, the male pronotum not strongly widened posteriorly, the brushes of hairs on the supra-anal plate not standing on papillae, the paraproct process upcurved, and the external sclerites of the phallus more distinct. From *O. aureus* it differs by the colour pattern, and smaller differences in the supra-anal plate, paraprocts and phallic complex. The female is similar to *O. angustus*. It differs by different shape and colour pattern of the supra-anal plate, the dorsal margin of the ovipositor apical valves being smooth, and the body narrower. Differences to other species are outlined in the key.

Etymology. The name refers to the transverse swelling on the male vertex; from Latin tuber = swelling.

Ornebius vadus Ingrisch, 1998 Figs 8-9, 120, 138, 155-159

Ornebius vadus Ingrisch, 1998: 228. Holotype (♂): East Malaysia: Sabah, Mt. Kinabalu NP, Poring, 500-700 m, 6° 5' N, 116° 33' E, canopy fogging, 1.ii.-30.xi.1993, leg. A. Floren (ZFMK).

New material. East Malaysia: 2 ♀, Sabah, Mt. Kinabalu NP, Poring, 500-700 m, canopy fogging, 19.-26.ii.1996; 1 ♂, 2 ♀, 6.x.-7.xi.1996; 1 ♀, 30.iii.1998; 4 ♂, 3 ♀, Sorinsim, canopy fogging, 27.ii.-8.iii.1997, leg. A. Floren (4 ♂, 6 ♀ ZFMK, 1 ♂, 2 ♀ CI).

Discussion. The species is sufficiently described in Ingrisch (1998). Illustrations of the cleaned phallic sclerites (Figs 157-159) are included here and compared to the external shape of the membranous parts of the phallus (Figs 155-156). O. vadus has the internal sclerites of the male phallic complex similar to the situation in *O. rubidus, O. rufonigrus* and *O. citrus,* although with the dark brown colour of head, pronotum and tegmen it looks quite different (Fig. 8). Distinctive characters against those species are the shape of the basal area of the internal sclerites (Fig. 158), the paraproct processes in the male which are about twice as long as the paraproct height and have a subapical swelling (Fig. 120), and the shapes of the supra anal plate in both sexes.

Apterornebius gen. n.

Type species: Apterornebius kinabalu sp. n., here designated.

Description. Medium sized Mogoplistinae crickets with dorso-ventrally compressed, ovoid body (Figs 42-44). Frontal rostrum of subequal width with scapus. Maxillary palps with apical segment moderately widened, third and fifth segments longer than fourth segment (Figs 207-208). Pronotum similar in both sexes, not prolonged; posterior margin subtruncate. Both sexes apterous. Fore tibiae without tympana. Hind tibiae little shorter than hind femur, three to four times longer than metatarsus.

♂ abdomen. Supra-anal plate still with a distinct borderline between tenth abdominal tergite and epiproct (Fig. 213). Paraprocts with process (Fig. 212). Phallic complex largely membranous, but internal sclerites well sclerotised (Figs 221-222).

♀ abdomen. Tenth abdominal tergite fused with epiproct (Figs 214-215). Ovipositor apical valves with margins smooth (Figs 194-195).

Discussion. The new genus is characterised by its apterous condition, lack of tibial tympana, the frontal rostrum being about as wide as scapus, and a compressed,

ovoid body. The first two characters it shares with *Arachnocephalus* Costa, 1855. The type species of this genus, *A. vestitus* Costa, 1855, however has a narrow, cylindrical body, the frontal rostrum about one and half times wider than scapus, the maxillary palps short instead of elongate, and the ovipositor apical valves have the ventral margin of the dorsal valves serrulate. In general habitus, *Apterornebius* resembles *Ornebius* Guerin, 1844. It differs, apart from the lack of wings and tibial tympana, by the short pronotum in the male and different structure of the male phallic complex. The short male pronotum resembles the condition in *Gotvendia* Bolívar, 1927. This genus however has a wide frontal rostrum, tibial tympana, wings, and the male phallus not sclerotised.

Etymology. The name is composed of the prefix apter- and the generic name *Ornebius*, reflecting the similarity to the latter genus plus its apterous condition.

KEY TO SPECIES

1 Maxillary palps of normal length (Fig. 207). Ovipositor gently curved (Fig. 195). Subgenital plate broad (Fig. 206). ♀ supra-anal plate with basal part shorter and baso-lateral appendages longer (Fig. 214). ♂ phallic complex as in Figs 221-222. Sabah (Kinabalu area) . . *A. kinabalu* sp. n.

\- Maxillary palps with prolonged segments (Fig. 208). Ovipositor straight (Fig. 194). Subgenital plate triangular (Fig. 205). ♀ supra-anal plate with basal part longer and baso-lateral appendages shorter (Fig. 215). South Thailand (Trang) . . . . . *A. chong* sp. n.

Apterornebius chong sp. n. Figs 42, 194, 205, 208, 215

Holotype (♀): Thailand: Trang, Khao Chong, 7° 30' N, 99° 50' E, 23.-24.x.1991, leg. S. Ingrisch (ZFMK).

Measurements (1 ♀). Body 9.2; pronotum 2.5; pronotum width 2.4; hind femur 6.6; hind tibia 5.4; hind metatarsus 1.4; ovipositor 4.0 mm. – Ratio pronotum length to width 1.05; ratio hind tibia to metatarsus 3.9.

Description. Frontal rostrum as wide as scapus, with a faint medial suture. Maxillary palps long with apical segment slightly widened; fourth segment little shorter than third and fifth segment (Fig. 208). Pronotum ♀ almost as wide as long; scarcely narrowing in front; anterior and posterior margins substraight (Fig. 42). Anterior tibia without open tympanum. Hind femur 1.2x longer than hind tibia; hind tibia 3.9x longer than metatarsus.

♂ unknown.

♀ abdomen. Ninth abdominal tergite shortened. Tenth abdominal tergite hidden under ninth tergite; apex truncate and with small lateral projections; epiproct small, rounded (Fig. 215). Paraprocts simple. Subgenital plate triangular with margins upcurved; apex notched (Fig. 205). Ovipositor of medium length, slightly curved; apical valves with margins smooth, ventral margin of dorsal valves with 4-6 bristles (Fig. 194).

Colouration. Dark reddish brown and black. Head dark reddish brown; vertex and genae with black scales; antenna with scapus and pedicellus brown, base of flagellum black, afterwards brown; maxillary palps brown. Pronotum dark reddish brown; disc with black scales; lateral lobes and apex with white scales. Legs brown

with areas of black scales and of white scales; last joint of tarsi darkened. Abdomen ♀ with first segments brown, afterwards black covered with brown scales mixed with white scales mainly on underside of abdomen. Supra-anal plate dark brown along margins, whitish brown towards middle. Subgenital plate black. Cerci yellow, becoming black behind basal third. Ovipositor reddish brown.

Discussion. A. chong differs from *A. kinabalu* by the very long maxillary palps (Fig. 208), the female supra-anal plate (Fig. 215), and colouration.

Etymology. Named after the type locality; noun in apposition.

Apterornebius kinabalu sp. n. Figs 43-44, 195, 206-207, 212-214, 221-222

Holotype (♂): East Malaysia: Sabah, Sorinsim, canopy fogging, 2.iii.1997, leg. A. Floren (ZFMK).

Paratypes: 1 ♂, same data as holotype (ZFMK); 1 ♂, 1 ♀, same locality 27.ii.1997 (CI); 1 ♀, Sorinsim [Bergil], 7.iii.1997, leg. A. Floren (ZFMK).

Measurements (3 ♂, 2 ♀). Body ♂ 8.8-10.3, ♀ 9.4-10.2; pronotum ♂ 2.3-2.7, ♀ 1.9-2.3; pronotum width ♂ 2.0-2.3, ♀ 2.0-2.1; hind femur ♂ 5.1-5.7, ♀ 5.3-5.6; hind tibia ♂ 3.8-4.8, ♀ 4.4-4.7; hind metatarsus ♂ 1.1, ♀ 1.1-1.4; ovipositor ♀ 3.8-4.1 mm. – Ratio pronotum length to width ♂ 1.09-1.17, ♀ 0.94-1.12; ratio hind tibia to metatarsus ♂ 3.43-4.3, ♀ 3.46-3.98.

Description. Frontal rostrum slightly wider than scapus or of subequal width; faintly furrowed in midline and of about same length as third segment; fourth segment shorter than apical or third segments. Pronotum ♂ with lateral margins very little widening posteriorly; posterior margin subtruncate (Fig. 43). Pronotum ♀ as long as wide; lateral margins slightly convex; anterior margin straight; posterior margin subtruncate (Fig. 44). Both sexes apterous. Fore tibia without open tympanum; hind tibia little shorter than hind femur; dorsal margins serrate with 27-36 denticles and with single bristles; hind metatarsus much shorter than half the length of hind tibia.

♂ abdomen. Supra-anal plate with lateral areas reduced; central area rhombic; borderline between tenth abdominal tergite and epiproct concave, setose; epiproct large, rounded (Fig. 213). Paraproct process conical but compressed, curved, apex acute; dark brown; with single hairs (Fig. 212). Subgenital plate apical margin rounded and notched in middle. Epiphallus membranous; lateral valves forming membranous sacculi with internal margins sclerotised; medial valve with sclerites forming a spear-like structure (Figs 221-222).

♀ abdomen. Epiproct rounded (Fig. 214). Subgenital plate triangular; apex notched (Fig. 206). Ovipositor of medium length, slightly curved; apical valves with margins smooth (Fig. 195).

Colouration. Dark brown, pubescent. Vertex with 4 small black spots between antennae; antenna brown; maxillary palps yellowish brown. Pronotum dark reddish brown. Legs dark reddish brown; hind femur marmorated. Abdomen ♂ black, anterior segments brown. Cerci yellowish brown. Abdomen ♀ black, anterior segments brown. Ovipositor brown.

Discussion. A. kinabalu differs from *A. chong* by the shorter maxillary palps (Fig. 207), the gently curved ovipositor (Fig. 195) and the female supra-anal plate (Fig. 214).

Etymology. Named after the type locality; noun in apposition.

Ectatoderus Guérin-Méneville, 1847

Ectatoderus Guérin-Méneville, 1847: 336; Otte *et al.*, 2005.

Type species: Ectatoderus nigriventris Guérin-Méneville, 1847, by monotypy

Diagnosis. Frontal rostrum about as wide as scapus. Anterior tibia with internal tympanum. Males with wings reduced to stridulatory apparatus. Pronotum prolonged, covering tegmen almost completely (Figs 46-47).

Discussion. 35 species were currently assigned to *Ectatoderus*, occurring in all continents except Australia and Europe. It is however probable that they do not form a natural, monophyletic group but they are placed in the same genus because of some superficial similarity. This even applies to the Asian species alone. Two of them (*E. pallidegeniculatus* Brunner, 1893 and *E. sandrasagarai* Fernando, 1957) are probably better assigned to *Micrornebius*, but I have not seen the types. They are not included in the key.

The Asian species of *Ectatoderus* differ from *Ornebius* mainly by the prolonged pronotum. Two of the three species with prolonged pronotum studied in this paper, differ in the male phallic complex from the Asian *Ornebius* species. They are described under *Ectatoderus* as currently understood. The third species however, from Sulawesi, has the male phallic complex similar to an *Ornebius* species with shorter pronotum from the same area. This is described as *O. consternus* (see above).

KEY TO SE ASIAN SPECIES (MALES ONLY)

Notes. Species from Taiwan are not included in the key. They are well described and illustrated in Yang & Yen (2001a).

According to the original publication of Fernando (1957), *Ectatoderus sandrasagarai* Fernando, 1957 is of very small size, has a wide frontal rostrum, and the maxillary palps have the fifth segment short and strongly widened; these characters agree with *Micrornebius*. It is thus treated here as *Micrornebius sandrasagarai* (Fernando, 1957) comb. n.

1 Frontal rostrum about twice as wide as scapus. Maxillary palps with apical three segments long and narrow. Paraproct process narrow, almost straight. Sri Lanka. [According to the generic descriptions in Chopard (1969) this is probably a *Derectaotus* as it has a wide frontal rostrum] ..... *E. ceylonicus* Chopard, 1928

\- Frontal rostrum about as wide as scapus or little wider 2

2 Pronotum very little widening apicad, almost parallel-sided; apical margin truncate ..... *E. apterus* Chopard, 1925

\- Pronotum moderately or strongly widening apicad; apical margin rounded (Figs 46-47). Maxillary palps with apical three segments long but not very narrow; apical segment moderately but distinctly widened 3

3 Pronotum moderately narrowed in front (Fig. 46) 4

\- Pronotum strongly narrowed in front (Fig. 47) 5

4 Smaller species: pronotum 2.8 mm, hind femur 3 mm. Komodo ..... *E. marginatus* Bei-Bienko, 1966

- Larger species: pronotum 4.9 mm, hind femur 6.2 mm. South Thailand (Koh Samui) ..... *E. samui* sp. n.

5 Head and pronotum reddish brown with silky white pubescence; frons reddish brown; abdomen black above. Supra-anal plate transverse with posterior margin feebly notched. Paraprocts without process ..... *E. angusticollis* Chopard, 1969

- Head, pronotum and abdomen shining ochre, frons black. Supra-anal plate transverse with posterior margin rounded (Fig. 220). Paraprocts with obtuse erected process (Fig. 219) ..... *E. argentatus* sp. n.

Ectatoderus argentatus sp. n. Figs 47, 209, 219-220, 226-230, 360-362, 367-368, 375-376

Holotype (♂): Thailand: Nakhon Ratchasima, Khao Yai, Nam Tok Pakluai Mai [Orchid waterfall], 650 m, 14° 20' N, 101° 35' E, 6.-8.iv.1995, leg. S. Ingrisch (ZFMK).
Paratypes: 3 ♂, same data as holotype but ex larvae (1 CI, 1 MHNG, 1 EMBT).

Measurements (4 ♂). Body 8.2-9.7; pronotum 4.7-5.4; pronotum width 2.9-3.4; tegmen 3.6-4.3; hind femur 4.9-6.2; hind tibia 4.2-4.8; tegmen width 2.8-3.2; hind metatarsus 1.2-1.4 mm. – Ratio pronotum length to width 1.48-1.83; ratio hind tibia to metatarsus 3.45-3.99; ratio tegmen length to width 1.29-1.42.

Description. Frontal rostrum slightly wider than scapus; with a faint medial suture. Maxillary palps with apical segment slightly widened; fourth segment shorter than third and fifth segments (Fig. 209). Pronotum ♂ with anterior dorsal margin subtruncate; lateral margins widening posteriorly; posterior margin convex, covering mirror but leaving apex of tegmen free (Fig. 47). Posterior margin of tegmen convex. Anterior tibia with small internal tympanum. Hind femur 1.1-1.3x longer than hind tibia; hind tibia 3.5-4.0x longer than metatarsus.

♂ abdomen. Tenth abdominal tergite fused with epiproct; resulting supra-anal plate short, wider than long; apex rounded (Fig. 220). Paraproct process long and narrow, cylindrical, black (Fig. 219). Subgenital plate triangular; apex broadly rounded and upcurved. Phallic complex with lateral valves weakly sclerotised; forming together a wide tube with a central elevation; medial valve elongate (Figs 226-230).

♀ unknown.

Colouration. Ochre (reddish brown when scales are removed). Head with vertex dark reddish brown with yellowish white scales; frons black; antenna yellowish brown with spaced annulation; maxillary palps yellowish brown. Pronotum reddish brown with yellowish white scales. Tegmen whitish or yellowish transparent, at apex with a broad blackish brown band; lateral area black above, white below. Legs yellow with brown marmoration; anterior margin of fore and mid tibia with black scales; apical two segments of tarsus black. Abdomen ♂ reddish brown; with silver or golden scales. Subgenital plate black. Cerci yellow.

Discussion. The new species is similar to *E. angusticollis* Chopard, 1969 from Singapore. Both have the male pronotum strongly narrowing in front. The latter species however is described as having the paraprocts without process. Further differences between both species concern the colour pattern and the shape of the supra-anal plate. The phallic complex is also characteristic for the new species. It resembles the situation

in *E. annulipedus* (Shiraki, 1911) and *E. leuctisonus* Yang & Yen, 2001 in that sclerotisation is largely restricted to the medial valve. The medial valve has almost hyaline lateral projections in basal area. The shape of these structures differ between the three species. The differences to other species are outlined in the key.

Etymology. Named after the silver brown shining scales covering the body.

Stridulation. The calling song consists of chirps that may be repeated as single chirps at irregular intervals or compiled to short chirp sequences. Recordings were taken from two specimens. The first male, collected as an adult and with only two short recordings available, had a tendency to produce single or paired chirps at irregular intervals, but once it produced a sequence of chirps (Figs 360-361). The second male, collected as a nymph and bred to adult, always produced short sequences of chirps (Fig. 362). The chirps consisted of two pulses (Figs 367-368). Chirp duration in sequences was 55-59 ms at 23°C (57 ± 1.2, n=15), 58-66 ms at 20°C (62 ± 2.8, n=23), and 68-72 ms at 18°C (70 ± 1.1, n=16). The corresponding pauses between two succeeding chirps were 301-354 ms at 23°C (334 ± 12,8), 372-405 ms at 20°C (387 ± 12.0), and 442-479 ms at 18°C (463 ± 12.4). The chirp sequences comprised between two and 24 chirps. The pause between two succeeding chirp sequences in the second male varied between 5 and 12 s. The duration of single chirps of the first male was 46-54 ms at 21°C (52 ± 2.4, n=13). They were thus little shorter than in the chirp sequence of the same male at 23°C. Frequency maximum was 6.0-6.5 kHz with the first male, but 5.0-5.5 kHz with the second (Figs 375-376).

Ectatoderus samui sp. n. Figs 46, 210, 217-218, 224-225

Holotype (♂): Thailand: Nakhon Si Thammarat, Koh Samui, Hin Lad Falls, 9° 31' N, 98° 58' E, 26.-27.ix.1989, leg. S. Ingrisch (ZFMK).

Measurements (1 ♂). Body 9.3; pronotum 4.9; pronotum width 3.0; tegmen 3.2; hind femur 6.2; hind tibia 5.2; tegmen width 2.8; hind metatarsus 1.3 mm. – Ratio pronotum length to width 1.66; ratio hind tibia to metatarsus 3.92; ratio tegmen length to width 1.14.

Description. Frontal rostrum slightly wider than scapus, without medial furrow; vertex with two pits just behind furrow that separates frontal rostrum from vertex. Maxillary palps with apical segment slightly widened; fourth segment little shorter than third and fifth segments (Fig. 210). Pronotum ♂ with anterior margin subtruncate; lateral margins slightly widening posteriorly; posterior margin convex, covering mirror but leaving apex of tegmen free (Fig. 46). Hind femur 1.2x longer than hind tibia; hind tibia 3.9x longer than metatarsus.

♂ abdomen. Tenth abdominal tergite fused with epiproct; resulting supra-anal plate short, wider than long; apical margin obtuse-angular (Fig. 217). Paraproct process short, curved, dark brown, densely covered with short hairs (Fig. 218). Subgenital plate triangular with margins upcurved. Male phallic complex with medial valve curved to a spiral; its base forming an axis in centre (Figs 224-225).

Colouration. Dark brown and black. Head dark brown; frons brown with black ornaments; antenna yellowish brown with indistinct spaced annulation; maxillary palps yellowish brown with indistinct darker ornaments. Pronotum dark brown; apical margin with yellowish white scales. Tegmen whitish transparent, at apex with a black

band; lateral area black above, white below. Legs light brown with white and brown scales; anterior margin of fore and mid tibia with black scales. Abdomen ♂ black, apex of segments with whitish brown scales. Subgenital plate with base brown, apex black. Cerci yellowish brown.

Discussion. Differences to other species are lined out in the key. The shape of the pronotum of the new species resembles *Ectatoderus marginatus* Bei-Bienko, 1966 from Komodo. It is however much larger than the latter species. Characteristic for the new species is the male phallic complex with the medial valve curved to a spiral in basal part with its base forming an axis in the centre of the spiral. A similar structure of the male genitals was so far known from *Ornebius formosanus* (Shiraki, 1911) from Taiwan (see Yang & Yen, 2001a) and from *Arachnocephalus steini* Saussure, 1877 from Luzon, Philippines (images in DORSA, 2005). If the structure of the male phallic complex ever proves to be in conformance with the phylogenetic relationships of the species, the genera *Ectatoderus*, *Ornebius* and *Arachnocephalus* require new outlines.

Etymology. Named after the type locality; noun in apposition.

Gotvendia Bolívar, 1927

Gotvendia Bolívar, 1927: 247; Otte *et al.*, 2005.

Type species: *Gotvendia dispar* Bolívar, 1927, by original designation.

Diagnosis. Frontal rostrum much wider than scapus. Pronotum ♂ not prolonged behind, leaving most of the tegmen free (Fig. 45). Females apterous.

Abdomen ♂ with tenth tergite and epiproct fused (Fig. 216). Paraprocts simple, without projection. Phallic complex membranous without sclerites (Fig. 223; only known for *G. erawan*).

Discussion. The genus was previously known to contain two species, *G. dispar* Bolívar, 1927 from Iran and *G. albipennis* Chopard, 1969 from Pakistan.

KEY TO SPECIES (MALES ONLY)

1 Tegmen shorter than pronotum; white. Hind tibiae widening towards apex . . 2
- Tegmen longer than pronotum; pale yellow with a black band at apex (Fig. 45). Hind tibiae not widening towards apex. Thailand (Kanchanaburi) . . . . . *G. erawan* sp. n.
2 Smaller (pronotum 2, tegmen 1.4, hind femur 3.8 mm, from Bolívar, 1927). Pronotum almost parallel-sided. Iran (Zagros Mts) . . . . . *G. dispar* Bolívar, 1927
- Larger (pronotum 3.1, tegmen 1.5, hind femur 4.2 mm, from Chopard, 1969). Pronotum narrowing little more in front. Pakistan (Karachi) . . . . . *G. albipennis* Chopard, 1969

Gotvendia erawan sp. n. Figs 41, 45, 211, 216, 223

Holotype (♂): Thailand: Kanchanaburi, Nam Tok Erawan, 14° 20' N, 99° 8' E, 9.iv.1994, leg. S. Ingrisch (ZFMK).

Paratype: 1 ♂, same data as holotype (CI).

Measurements (2 ♂). Body 8.4-8.8; pronotum 2.5-2.7; pronotum width 2.6-2.7; tegmen 3.15; tegmen width 2.9-3.0; hind femur 5.3-5.6; hind tibia 3.8; hind metatarsus

1.4-1.6 mm. – Ratio pronotum length to width 0.91-1.00; ratio hind tibia to metatarsus 2.43-2.72; ratio tegmen length to width 1.04-1.06.

Description. Frontal rostrum about two times broader than scapus; without medial furrow. Maxillary palps with apical segment little widened, as long as fourth segment; fourth and fifth segments longer than third segment (Fig. 211). Pronotum ♂ with anterior dorsal margin concave; lateral margins hardly narrowed in front; posterior margin subtruncate, covering tegmen to stridulatory vein (Fig. 45). ♂ tegmen broader than pronotum; posterior margin convex; mirror oval, wider than long (Fig. 41). Anterior tibia with internal tympanum. Hind femur 1.4-1.5x longer than hind tibia; hind tibia 2.4-2.7x longer than metatarsus.

♂ abdomen. Tenth abdominal tergite completely fused with epiproct; resulting supra-anal plate with a pair of irregular carinae from base to apex; curved lateral appendages (of tenth tergite) arising from this carina; apex convex and setose (Fig. 216). Paraprocts simple. Subgenital plate wider than long; apical margin rounded, truncate in middle. Ectophallus valves membranous with indistinct sclerotisation (Fig. 223).

Colouration. Black with yellow wings. Head dark reddish brown; frons medium reddish brown; clypeus yellow; antenna unicoloured; dark reddish brown; maxillary palps dark brown. Pronotum dark reddish brown with black scales. Tegmen pale yellow, at apex with a broad blackish brown band; lateral area same as disc. Legs medium brown with dark brown scales. Abdomen ♂ dark brown with black scales; ventral surface with brown scales. Subgenital plate black. Cerci medium brown, yellow at very base and apex.

Discussion. The new species agrees with the generic characters of *Gotvendia* as wide frontal rostrum, shape of maxillary palps, tibial tympana, and the short pronotum. It differs from both other species by longer wings and the hind tibiae not widened towards apex. From *G. dispar* it also differs by the pronotum with the lateral margins moderately narrowing in front instead of almost parallel-sided except near the very fore margin.

Etymology. Named after the type locality; noun in apposition.

Micrornebius Chopard, 1969

Micrornebius Chopard, 1969: 203; Otte *et al.*, 2005.

Type species: Micrornebius gracilicornis Chopard, 1969 by original designation

Diagnosis. Small (body 4.3-7.5 mm, hind femur 2.3-3.7 mm) Mogoplistinae crickets (Figs 48-61). Maxillary palps with short segments and apical segment considerably widened (Figs 231-261 partim). Pronotum ♂ prolonged, covering tegmen completely. Females apterous. Anterior tibia with internal tympanum. Hind tibia 1.8-2.6x longer than metatarsus (Fig. 82). Tenth abdominal tergite in both sexes fused with epiproct to form a supra-anal plate (Figs 232-262 partim). ♂ supra-anal plate usually truncate. Paraprocts without or with only short projections (Figs 233-259 partim). Phallic complex sclerotised to a variable degree (Figs 263-285). ♀ supra-anal plate truncate, rounded, or triangularly rounded. Ovipositor apical valves always provided with short and long hairs (Figs 286-292).

Discussion. Seven species were so far combined with *Micrornebius*: *M. gracilicornis* Chopard, 1969 from Java, Depok, *M. annandalei* (Chopard, 1928) from India, Orissa, Barkuda Island, *M. lesnei* (Chopard, 1935) from Mozambique, Nova Choupanga, *M. aquilus* Gorochov, 1992 from Vietnam, *M. spadiceus* Gorochov, 1994 from Vietnam, *M. perrarus* Yang & Yen, 2001 from Taiwan, and *M. hainanensis* Yin, 1998 from China, Hainan. Three more species are transferred to *Micrornebius* in this paper: *Micrornebius brevipalpis* (Chopard, 1930) comb. n. from *Ornebius* described from a single female from Sarawak, Mt. Poi, that agrees in all respects with the generic diagnosis of *Micrornebius* as short maxillary palps with widened apical segment and the ovipositor apical valves provided with few long hairs, *Micrornebius sandrasagarai* (Fernando, 1957) comb. n. (see above under *Ectatoderus*), and *Micrornebius incertus* (Ingrisch, 1998) comb. n. from *Derectaotus* (see discussion under the species). A further species, *Ectatoderus pallidegeniculatus* Brunner, 1893, from Bhamo, Myanmar, probably also belongs to *Micrornebius*; however the description also allows a combination with *Cycloptiloides*. Unfortunately, Brunner (1893) did not describe the shape of the maxillary palps nor the apical valves of the ovipositor. Thus the generic affinity remains doubtful.

To the genus *Micrornebius* belong some of the smallest crickets found in Mogoplistinae. The overall similarity between species is high although the colour pattern may prove helpful for diagnosis if the scales are well preserved (see Gorochov, 1992, Yang & Yen, 2001b). But this is often not the case with specimens kept in alcohol. The material at hand contains six new species that differ strikingly by the male phallus which possesses minute sclerites. This is probably the best diagnostic character as with other crickets. The male phallus was previously only described by Yang & Yen (2001a) for *M. perrarus*. The new taxa come from Sabah (1 species), Singapore (1 species), West Sumatra (1 species), and Thailand (3 species).

No key to species is given as it is expected that several new local species may be discovered in the future, and because most of the previous descriptions do not allow to differentiate between species. The species described here can be readily recognised by the specific male phallus.

Micrornebius cylindricus sp. n. Figs 55-56, 77, 246-249, 277-278, 288

Holotype (♂): Singapore: Botanical garden, in the Jungle area, 25 m, 16 December 1987, leg. Charles Lienhard (MHNG).

Paratypes: 1 ♂, 1 ♀, same data as holotype (MHNG).

Measurements (2 ♂, 1 ♀). Body ♂ 4.4-5.0, ♀ 5.6; pronotum ♂ 2.5-2.7, ♀ 1.3; pronotum width ♂ 1.6, ♀ 1.3; tegmen ♂ 2.1; tegmen width ♂ 1.8; hind femur ♂ 2.5-2.6; ♀ 2.5; hind tibia ♂ 1.6-1.7, ♀ 1.6; hind metatarsus ♂ 0.9-1.0, ♀ 0.9; ovipositor ♀ 1.6 mm. – Ratio pronotum length to width ♂ 1.54-1.62, ♀ 1.0; ratio hind tibia to metatarsus ♂ 1.79-1.8; ♀ 1.8; ratio tegmen length to width ♂ 1.18.

Description. Frontal rostrum about two times broader than scapus, indistinctly furrowed in midline. Maxillary palps with apical segment strongly widened; fourth segment slightly widened and shorter than apical or third segment (Fig. 246). Pronotum ♂ with anterior dorsal margin feebly concave; lateral margins slightly widening posteriorly; posterior margin feebly convex, covering tegmen completely (Fig. 55).

Pronotum ♀ as long as wide; scarcely narrowing in front; anterior margin slightly concave; posterior margin straight (Fig. 56). Hind femur 1.5-1.6x longer than hind tibia; hind tibia 1.8x longer than metatarsus.

♂ abdomen. Supra-anal plate apical margin with central area projecting and truncate, on both sides concave and with a short projection, with long hairs at both apical angles (Fig. 247). Paraprocts with a short, obtuse projection (Fig. 248). Subgenital plate apical margin rounded and upcurved. Phallus forming a membranous cylinder, narrowing towards apex and with a circular hole at apex through which the medial valves are little projecting; medial valves elongate, mostly membranous and not very distinct except at base and apex (Figs 277-278).

♀ abdomen. Ninth abdominal tergite with apex feebly convex. Supra-anal plate rounded (Fig. 249). Paraprocts with a low setose carina at base. Subgenital plate rhomboid, apex truncate. Ovipositor short, slightly curved; apical valves with margins smooth, narrow, with long hairs at apex (Fig. 288).

Colouration. Dark brown. Head with frons dark brown; antenna with scapus and pedicellus dark brown, flagellum medium brown; maxillary palps dark brown with apex of each joint white. Pronotum dark brown. Tegmen transparent; lateral area faintly infumate. Fore and mid femora dark brown with white apex; fore and mid tibiae with light and dark rings; hind femur light brown covered with dark brown scales to a variable extend. Abdomen ♂ dark brown above, light brown below. Cerci dark brown. Abdomen ♀ as in ♂. Subgenital plate light. Cerci dark brown. Ovipositor yellowish brown.

Discussion. The new species is characterised in the male by the membranous, cylindrical phallus which embraces the medial valves completely. This differs from the situation in all other *Micrornebius* species for which the phallic complex is known so far.

Etymology. The name refers to the characteristic shape of the male phallic complex.

Micrornebius gracilicornis Chopard, 1969 Figs 50-51, 231-234, 270-272, 287

Micrornebius gracilicornis Chopard, 1969: 204. Holotype (♂): Indonesia: West Java, Depok (MNHN; not seen).

Material studied. Indonesia: 1 ♂, 1 ♀, West Java, Palabuan Ratu, Samudra beach, relic forest, 6° 58' S, 106° 30' E, 12.ii.1995, leg. S. Ingrisch (CI).

Measurements (1 ♂, 1 ♀). Body ♂ 4.7, ♀ 4.9; pronotum ♂ 3.2, ♀ 1.5; pronotum width ♂ 1.8, ♀ 1.6; tegmen ♂ 1.9; hind femur ♂ 3.1, ♀ 3.2; hind tibia ♂ 2.0, ♀ 2.0; hind metatarsus ♂ 0.9, ♀ 1.0; ovipositor ♀ 2.0 mm. – Ratio pronotum length to width ♂ 1.75, ♀ 0.92; ratio hind tibia to metatarsus ♂ 2.22, ♀ 1.93.

Additional description. ♂ abdomen. Supra-anal plate wider than long; shallowly grooved; apex subtruncate, setose (Fig. 232). Paraprocts with a short, obtuse projection (Fig. 233). Phallic complex with lateral valves membranous but stiffened and with distinct structure as in Fig. 270; internal sclerites as in Figs 270-272. Subgenital plate with apical margin truncate and slightly upcurved.

♀ abdomen. Supra-anal plate strongly narrowed at apex, obtuse; epiproct triangular with apex rounded (Fig. 234). Subgenital plate triangular in general outline; apex

broad, slightly concave. Ovipositor with apical valves narrow, with few long hairs at apex (Fig. 287).

Discussion. The type of *M. gracilicornis* was collected in Depok (West Java) which is now urban area. The specimens at hand are also from West Java but from the south coast. They agree with the description given by Chopard (1969). The phallic complex is described here for the first time.

Micrornebius incertus (Ingrisch, 1998) **comb. n.** Figs 48-49, 78-79, 238-240, 263-266, 291

Derectaotus incertus Ingrisch, 1998: 232; Otte *et al.*, 2005. Holotype (♂): East Malaysia, Sabah, Mt. Kinabalu NP, Poring, 500-700 m, 6° 5' N, 116° 33' E, 4.ii.1994, leg. A. Floren (ZFMK).

New material: 5 ♂, 12 ♀, Sabah, Sorinsim, canopy fogging, 16.ii.-12.iii.1997, leg. A. Floren (3 ♂, 8 ♀, ZFMK, 1 ♂, 1 ♀ MHNG, 1 ♂, 3 ♀, CI).

Measurements of specimens from Sorinsim (6 ♂, 13 ♀). Body ♂ 4.4-5.3, ♀ 4.4-5.9; pronotum ♂ 2.4-2.6, ♀ 1.2-1.4; pronotum width ♂ 1.4-1.6, ♀ 1.1-1.4; tegmen ♂ 1.4-1.8, ♀ 0; hind femur ♂ 2.3-2.7, ♀ 2.4-2.8; hind tibia ♂ 1.6-1.8, ♀ 1.6-1.8; hind metatarsus ♂ 0.7-0.9, ♀ 0.8; ovipositor ♀ 1.4-1.6 mm; ratio pronotum length to width ♂ 1.58-1.73, ♀ 0.98-1.12, 1±0; ratio hind tibia to metatarsus ♂ 2.0-2.16, ♀ 2.0-2.32.

Additional description. Frontal rostrum about two times broader than scapus, indistinctly furrowed in midline. Maxillary palps with apical segment widened and of about same length with third segment; fourth segment slightly widened and shorter than apical or third segment (Fig. 239). Pronotum ♂ with lateral margins widening posteriorly (Fig. 48). Pronotum ♀ as long as wide or little longer; slightly widening posteriorly; anterior and posterior margins straight (Fig. 49). Hind femur 1.4-1.6 x longer than hind tibia; hind tibia 2.0-2.3 x longer than hind metatarsus.

♂ abdomen. Supra-anal plate rhombic; apico-lateral area little projecting (Fig. 238). Paraprocts with a short, obtuse, transverse projection; paraproct process strongly setose (Fig. 238). Subgenital plate with apical margin rounded. Phallic complex with medial valve with a distinct minute sclerite forming three longitudinal branches connected in baso-dorsal area by a V-shaped bar (Figs 263-266).

♀ abdomen. Supra-anal plate with apex rounded, setose (Fig. 240). Subgenital plate parallel-sided at base, triangular afterwards; apex truncate. Ovipositor short, straight; apical valves with margins smooth, with few long bristles (Figs 79, 291).

Colouration. Medium to dark brown; maxillary palps brown; very base and apex of each joint white. Tegmen transparent. Legs brown, apices of articles white. Cerci white, apical half blackish brown, very apex white (Fig. 79). Abdomen ♀ with fifth to ninth or all tergites dark brown. Cerci white, apical third dark brown, tip white. Ovipositor yellowish brown.

Discussion. The species was originally described from three males (holotype and two paratypes) and one female that was not included in the type series because of uncertainty that it really belongs to the same species. After more specimens were available it became clear that this female really belongs to another species. Moreover regarding the generic outlines as used in the present paper, the males should be transferred to *Micrornebius*, while the female belongs to *Cycloptiloides*.

In the above description of *M. incertus*, the descriptions of the female and of the male phallic complex are new adds. The male of *M. incertus* is well characterised by its phallic complex. The distinct colouration of the cerci is also a diagnostic character for both sexes. The female is similar to *Micrornebius brevipalpis* (Chopard, 1930) described from a single female. The females of *Micrornebius* are all very similar and it is difficult to find any reliable differences. The female of *M. incertus* differs from *M. brevipalpis* by the pronotum with the lateral margins more strongly diverging towards apex, the palps with base and apex of each joint white (not only the base), and by the subgenital plate with parallel-sided base.

Micrornebius inopinatus sp. n. Figs 54, 235-237, 273-275, 363, 369-370, 378

Holotype (♂): Thailand: Chiang Mai, city district, with fruit from local market, 18° 47' N, 99° 0' E, 17.ix.1993, leg. S. Ingrisch (ZFMK).

Measurements (1 ♂). Body 4.5; pronotum 2.8; pronotum width 2.0; tegmen 2.0; hind femur 3.0; hind tibia 1.8; hind metatarsus 0.9 mm. – Ratio pronotum length to width 1.46; ratio hind tibia to metatarsus 2.01.

Description. Frontal rostrum about two times broader than scapus, without medial furrow. Maxillary palps with apical segment strongly widened and little longer than third and fourth segments (Fig. 235). Pronotum ♂ with anterior dorsal margin concave; lateral margins slightly widening posteriorly; posterior margin convex, covering tegmen completely (Fig. 54). Hind femur 1.4x longer than hind tibia; hind tibia 2.4x longer than metatarsus.

♂ abdomen. Supra-anal plate short and wide; apex faintly convex, setose (Fig. 236). Paraprocts with a curved, horizontal, blackened swelling (Fig. 237). Subgenital plate wider than long, apical margin rounded and upcurved. Phallic complex with small sclerite, probably at base of medial valve (Figs 273-275).

♀ unknown.

Colouration. Brown. Head with vertex dark reddish brown; frons, genae and mouthparts black; antenna with scapus and pedicellus dark brown above, black below, flagellum light brown; maxillary palps blackish brown. Pronotum dark reddish brown, lateral lobes with black ventral margin. Tegmen whitish transparent, at apex with a broad black band; lateral area black above, white below. Legs yellowish white with dark marmoration; apical two segments of tarsus black. Abdomen ♂ mostly black on dorsal, dark brown on ventral side. Cerci with brownish white scales.

Discussion. The new species is similar to *M. insularis* and *M. laem*, differs however by the male phallic complex. Moreover it differs from other *Micrornebius* species by the supra-anal plate which is widely rounded instead of truncate or faintly concave.

Etymology. The name reflects the surprise to hear cricket sound out of local fruit; derived from inopinatus (Lat.) = surprised.

Stridulation. The calling song is a regular continuous repetition of short trills (Fig. 363). At 25°C, four trills were repeated within ten seconds. Trill duration varied between 1030 and 1170 ms. Each trill contained 60-67 pulses (Fig. 370). Usually between one and three short interruptions (missing pulses) occurred in each trill. Frequency maximum was at 7.4-7.8 kHz (Fig. 378).

Micrornebius insularis sp. n. Figs 59-60, 250-253, 279-281, 289

Holotype (♂): Thailand: Nakhon Si Thammarat, Koh Samui, Hin Lad Falls, 9° 31' N, 98° 58' E, 26.-27.ix.1989, leg. S. Ingrisch (ZFMK).

Paratypes: 1 ♂, 1 ♀, same data as holotype (1 ♂, CI; 1 ♀, ZFMK); 1 ♀, Surat Thani, Koh Ang Thong, 9° 37' N, 99° 40' E, 9.x.1985, leg. S. Ingrisch (CI).

Measurements (2 ♂, 2 ♀). Body ♂ 4.5-5.1, ♀ 4.3-4.7; pronotum ♂ 2.7-2.8; ♀ 1.3-1.6; pronotum width ♂ 1.7-1.8; ♀ 1.4-1.7; tegmen ♂ 2.8-2.9; hind femur ♂ 3.2, ♀ 2.9-3.3; hind tibia ♂ 2.2, ♀ 2.0-2.3; hind metatarsus ♂ 0.9, ♀ 0.9; ovipositor ♀ 1.6-1.8 mm. – Ratio pronotum length to width ♂ 1.51-1.54; ♀ 0.91-1.0; ratio hind tibia to metatarsus ♂ 2.51; ♀ 2.3-2.58.

Description. Frontal rostrum about two times broader than scapus; without medial furrow. Maxillary palps with apical segment strongly widened; fourth segment shorter than third and fifth segments (Fig. 250). Pronotum ♂ with anterior dorsal margin feebly concave; lateral margins slightly widening posteriorly; posterior margin convex, covering tegmen completely (Fig. 59). Pronotum ♀ as wide as long; slightly narrowing in front; anterior margin feebly concave, posterior margin feebly convex (Fig. 60). Hind femur 1.4-1.5x longer than hind tibia; hind tibia 2.3-2.6x longer than metatarsus.

♂ abdomen. Supra-anal plate wider than long, apex feebly concave; shallowly grooved in middle (Fig. 251). Paraprocts simple (Fig. 252). Subgenital plate apical margin rounded and upcurved. Epiphallus with a small, triangular, denticulate sclerite (Fig. 281); lateral valves of phallus hyaline, membranous; internal sclerites compressed, elongate, with curved apex (Figs 279-280).

♀ abdomen. Ninth abdominal tergite with apex subtruncate. Supra-anal plate triangular with apex broadly rounded, furrowed in middle (Fig. 253). Paraprocts with a vertical swelling but not forming a carina. Subgenital plate triangular with sloping lateral margins, apex truncate. Ovipositor of medium length; apical valves narrow, with few long hairs at apex (Fig. 289).

Colouration. Dark brown. Head with frons dark brown; antenna with scapus and pedicellus dark brown, flagellum medium brown with spaced annulation; maxillary palps dark brown. Pronotum dark reddish brown, lateral lobes black. Tegmen white; lateral area dark brown with margin and one vein white. Legs yellowish white with medium and dark brown scales; tibiae with alternating light and dark bands. Abdomen ♂ blackish brown above, brown below. Cerci with mixed light and dark brown scales; base and a preapical ring white, apex black. Abdomen and cerci female as in male. Subgenital plate brown with silver scales. Ovipositor yellowish brown, apical valves reddish brown.

Discussion. The new species can be recognised by the strong and rather long internal sclerites of phallus and the large membranous lateral valves; moreover the epiphallus carries a small triangular sclerite on the underside.

Etymology. Named after the type locality; insularis = living on islands.

Micrornebius laem sp. n. Figs 58, 254-256, 276

Holotype (♂): Thailand: Kanchanaburi, Thong Pha Phum to Khao Laem Dam, near northern border of village Thong Pha Phum, 14° 45' N, 98° 39' E, 15.vi.1986, leg. S. Ingrisch (ZFMK).

Measurements (1 ♂). Body 4.3; pronotum 2.9; pronotum width 1.6; tegmen 3.1; hind femur 2.8; hind tibia 1.9; hind metatarsus 0.9 mm. – Ratio pronotum length to width 1.8; ratio hind tibia to metatarsus 2.15.

Description. Frontal rostrum about two times broader than scapus, with a faint medial suture. Maxillary palps with apical segment distinctly widened; fourth segment slightly widened and shorter than apical or third segments (Fig. 254). Pronotum ♂ with anterior dorsal margin feebly concave; lateral margins slightly widening posteriorly; posterior margin convex, covering tegmen completely (Fig. 58). Hind femur 1.5x longer than hind tibia; hind tibia 2.1x longer than metatarsus; hind femur with few long bristles.

♂ abdomen. Supra-anal plate wide, rectangular, finely furrowed in middle, apex broadly truncate (Fig. 255). Paraprocts with a weak, horizontal carina (Fig. 256). Subgenital plate with apical margin broadly concave and setose. Lateral valves of phallus with a short sclerite near apex; medial valve with a single, rather strong sclerite; curved at base (Fig. 276).

♀ unknown.

Colouration. Medium brown. Head with frons medium brown; antenna with scapus and pedicellus brown; flagellum yellowish brown, darkened towards apex; maxillary palps dark brown. Pronotum medium brown, lateral lobes with black ventral margin. Tegmen whitish transparent with white veins, apex little infumate; lateral area same as disc. Legs yellowish white with medium and dark brown scales; tibiae with black scales and three white bands; metatarsi black, apex white; hind metatarsus also white at base. Abdomen ♂ dark brown above, light brown below. Cerci yellow with silver and dark brown scales and black apex.

Discussion. The new species is very similar to *M. insularis*, differs however strikingly by the male phallic complex.

Etymology. Named after the type locality; noun in apposition.

Micrornebius lineatus sp. n. Figs 57, 80, 257-260, 267-269, 292

Holotype (♂): East Malaysia, Sabah, Crocker Range I, canopy fogging, 5° 26' N, 116° 8' E, 19.ii.2001, leg. A. Floren (ZFMK).

Paratypes: 2 ♂, 1 ♀, same data as holotype; 1 ♀, Crocker Range III, near village Ulu Liawan, canopy fogging, 5° 24' N, 116° 5' E, 20.ii.2001, leg. A. Floren (1 ♂, 1 ♀, ZFMK; 1 ♂, 1 ♀, CI).

Measurements (3 ♂, 2 ♀). Body ♂ 4.7-5.1, ♀ 5.0-5.2; pronotum ♂ 3.1-3.3, ♀ 1.4; pronotum width ♂ 1.8-2.0, ♀ 1.4; tegmen ♂ 1.9-2.0; ovipositor ♀ 1.6 mm; ratio pronotum length to width ♂ 1.7, ♀ 1.0. [Hind legs missing in specimens at hand].

Description. Frontal rostrum about two times broader than scapus; indistinctly furrowed in midline. Maxillary palps with apical segment widened and of about same length with third segment; fourth segment slightly widened and shorter than apical or third segments (Fig. 257). Pronotum ♂ with lateral margins widening posteriorly, posterior margin prolonged; covering tegmen completely (Fig. 57). Pronotum ♀ as wide as long; slightly widening posteriorly; anterior and posterior margins straight.

♂ abdomen. Supra-anal plate rhombic; apex setose (Fig. 258). Paraprocts with a short, obtuse, strongly setose, transverse projection (Fig. 259). Subgenital plate with

apical margin rounded. Phallic complex with two large, angular, brown, apical plates (Fig. 269); below those plates with two smaller discs which are largely hyaline except for external margin and two knob-like structures. Medial valves hyaline except for a minute sclerite at base (Figs 267-268).

♀ abdomen. Supra-anal plate with apex rounded; shallowly grooved in middle; setose (Fig. 260). Subgenital plate rather long with sloping lateral margins; apex truncate. Ovipositor short, straight; apical valves with margins smooth; with few long bristles (Fig. 292).

Colouration. Medium to dark brown. Head dark brown; frons blackish brown; antenna with scapus and pedicellus dark brown; flagellum light with spaced dark annulation; maxillary palps blackish brown with very base and apex of each joint white, apical segment fully dark. Pronotum dark brown. Tegmen whitish transparent, apex infumate; lateral area white with 2 longitudinal brown bands (Fig. 80). Fore leg dark brown, apex of femur, base and apex of tibia and apex of metatarsus white [other legs missing]. Abdomen ♂ dark brown; apical margin of segments white; cerci brown at base, lighter towards apex. Abdomen ♀ as in ♂. Supra-anal plate dark brown (scales removed). Subgenital plate dark brown. Ovipositor yellowish brown.

Discussion. M. lineatus is similar to *M. incertus*. The male phallic complex is however completely different. Another diagnostic character is the colour of the cerci which are brown, not white at base. Less obvious differences are the slightly lager size, a bigger head, longer lateral area of tegmen with the brown bands more expressed, and a little longer ovipositor.

Etymology. Named for the two brown bands on the lateral area of male tegmen.

Micrornebius maninjau sp. n. Figs 52-53, 82, 241-245, 282-286, 364, 371, 377

Holotype (♂): Indonesia: West Sumatra, Maninjau, 500-700 m, 0° 18' S, 100° 15' E, in hollow plant stem, 15.iii.1995, leg. S. Ingrisch (ZFMK).

Paratypes: 1 ♀, same locality as holotype, 14.iii.1995 (ZFMK); 1 ♀, Maninjau - Puncak Lawang, 600-950 m, 0° 17' S, 100° 15' E, 15-17.iii.1995, leg. S. Ingrisch (CI); 1 ♂, Lake Maninjau, border of lake at southern limits of village Maninjau, 380 m, 25.xi.1985, leg. Charles Lienhard (MHNG).

Measurements (2 ♂, 2 ♀). Body ♂ 6.1-7.4, ♀ 4.5-4.9; pronotum ♂ 3.3-4.0, ♀ 1.6-1.8; pronotum width ♂ 2.1-2.3, ♀ 1.6-1.8; hind femur ♂ 2.8-3.5, ♀ 3.6-3.7; hind tibia ♂ 2.0-2.6, ♀ 2.5; hind metatarsus ♂ 1.0-1.1, ♀ 1.0-1.1; ovipositor ♀ 2.0-2.4 mm. – Ratio pronotum length to width ♂ 1.58-1.75, ♀ 1-1.04; ratio hind tibia to metatarsus ♂ 2.05-2.41, ♀ 2.30-2.65.

Description. Frontal rostrum about two times broader than scapus, indistinctly furrowed in midline or without medial furrow. Maxillary palps with apical segment strongly widened; fourth and fifth segments of equal length, hardly shorter than third segment (Fig. 241). Pronotum ♂ with anterior dorsal margin feebly concave; lateral margins widening posteriorly; posterior margin convex, covering tegmen completely (Fig. 52). Pronotum ♀ as long as wide; slightly widening posteriorly; anterior margin substraight; posterior margin feebly convex (Fig. 53). Hind femur 1.3-1.5x longer than hind tibia; hind tibia 2.1-2.7x longer than metatarsus (Fig. 82).

♂ abdomen. Supra-anal plate with lateral margins of central part slightly swollen, apex faintly concave (Fig. 242). Paraprocts with a short, obtuse projection

(Fig 243-244). Subgenital plate with apical margin truncate and slightly upcurved. Epiphallus membranous; medial valves of phallus with little curved, elongate sclerites with widened base (Figs 282-285).

♀ abdomen. Ninth abdominal tergite with apex subtruncate. Supra-anal plate rounded, grooved in middle; with long hairs at apical margin (Fig. 245). Paraprocts laterally elevated. Subgenital plate rather long with sloping lateral margins; apex truncate to slightly concave. Ovipositor short; apical valves with margins smooth, narrow, with few long hairs at apex (Fig. 286).

Colouration. Covered with blackish brown scales. Head with frons blackish brown; antenna with scapus and pedicellus blackish brown, flagellum yellow with spaced dark annulation; maxillary palps blackish brown. Pronotum black. Legs black; tibiae with a white band in middle and at apex and a white ring near base. Abdomen ♂ black. Subgenital plate black. Cerci yellow, suffused with black scales except at base. Abdomen ♀ dark to medium brown to black, apex of segments with or without white scales. Subgenital plate brown or black. Cerci as in male. Ovipositor yellowish brown.

Discussion. The new species differs from other *Micrornebius* species by the rather long pronotum in male, its dark colouration, and especially by the characteristic internal sclerites of phallus. The male holotype was found in a hollow plant stem, the females in forest litter.

A second male from Lake Maninjau [conserved in ethanol but dried out once] is slightly smaller and the pronotum with artificially curved apex shorter. As the phallic complex is identical with that of the holotype there is no doubt that it belongs to the same species.

Etymology. Named after the type locality; noun in apposition.

Stridulation. The calling song is a continuous trill of pulses with short interruptions at irregular intervals (Fig. 364). Repetition rate at 25°C was 5.4 pulses per seconds (Fig. 371). The frequency maximum is between 4.9 and 5.4 kHz (Fig. 377).

Micrornebius sp. Figs 61, 261-262, 290

Singapore: 1 ♀, Bukit Timah Nature Reserve, Taban Valley, 30-110 m, 6.xi.1985, leg. Bernd Hauser (début du sentier Jalan Jambul) (MHNG).

Measurements (1 ♀). Body: 5.6; pronotum: 1.5; pronotum width: 1.5; hind femur: 3.3; hind tibia: 2.5; hind metatarsus: 1.0; ovipositor: 2.1 mm. – Ratio pronotum length to width: 0.96; ratio hind tibia to metatarsus: 2.44.

Description. Frontal rostrum about two times broader than scapus, indistinctly furrowed in midline. Maxillary palps with apical segment strongly widened; fourth segment slightly widened and shorter than apical or third segments (Fig. 261). Pronotum ♀ as long as wide, widening posteriorly; anterior and posterior margins straight (Fig. 61). Hind femur 1.4x longer than hind tibia; hind tibia 2.4x longer than metatarsus.

♀ abdomen. Ninth and eigth abdominal tergites slightly projecting in middle. Supra-anal plate rounded (Fig. 262). Paraprocts with a vertical carina carrying long hairs. Subgenital plate rounded. Ovipositor of medium length; apical valves with margins smooth, narrow, with few long hairs at apex (Fig. 290).

Colouration. Dark brown. Head with frons dark brown; antenna with scapus and pedicellus brown, flagellum yellow; maxillary palps dark brown. Pronotum dark brown. Legs yellow, spotted with brown; fore and mid tibia with dark rings. Abdomen ♀ brown. Subgenital plate brown. Ovipositor yellowish brown.

Discussion. The single female is similar to *O. cylindricus* which also comes from Singapore. It differs however by a longer ovipositor with the hairs at the apical valves of the ovipositor being less numerous. It probably represents another species, but without corresponding male this is not certain.

Cycloptiloides Sjöstedt, 1909

Cycloptiloides Sjöstedt, 1909: 110; Otte *et al.*, 2005.

Type species: *Cycloptiloides meruensis* Sjöstedt, 1909, by monotypy.

Remark. Species from Africa, America, and Asia are currently assigned to this genus. From south east Asia, there was so far a single species known, *C. orientalis* Chopard, 1925 with the synonym *C. ceylonicus* Chopard, 1925. *C. niger* Ingrisch, 1978 belongs to the new genus *Terraplistes* (see below).

Diagnosis (for SE Asian species only, not necessarily applies to species from other regions). Small (body 4.8-8.1 mm, hind femur 3.2-4.3 mm, in a single species 5.5mm) Mogoplistinae crickets (Figs 62-69). Maxillary palps elongate with apical segment only little widened or hardly widened at all (Figs 301-321 partim). Pronotum ♂ projecting behind, covering tegmen completely. ♀ apterous. Fore tibia with internal tympanum. Hind tibia 2.1-2.4x longer than metatarsus (Fig. 83). Tenth abdominal tergite in both sexes fused with epiproct to form a supra-anal plate (Figs 305-320 partim). ♂ paraprocts with a long process or only short projection (Figs 302, 306, 309, 314). ♂ phallic complex largely membranous with or without minute sclerites of variable shape (Figs 323-330). ♀ paraprocts almost lying on underside of body, prolonged, with a longitudinal, setose carina (Fig. 81). The carinae of both paraprocts together possible serve as guide bars for the ovipositor. Ovipositor apical valves usually narrow, either with three rows of short hairs, with few short and long hairs or (mostly) with few stout but short hairs (Figs 293-297), but sometimes lobiform (Fig. 299).

KEY TO SE ASIAN SPECIES

MALES

1 Paraprocts with a long upcurved process (Figs 302, 309) 2
- Paraprocts with a short transverse projection (Figs 306, 314) 3
2 Maxillary palps with apex of last segment strongly oblique (Fig. 301). Paraproct process long-cylindrical, curved (Fig. 302). Supra-anal plate with two short obtuse projections (Fig. 302). West Sumatra (Bukittinggi) . . . . . *C. orientalis* Chopard, 1925[1]
- Maxillary palps with apex of last segment not so strongly oblique (Fig. 307). Paraproct process conical (Fig. 309). Supra-anal plate with apex

[1] check also *C. ceylonicus* Chopard, 1925, from Sri Lanka which is probably a separate species.

faintly concave (Fig. 308). Phallic complex with three minute sclerites and two even smaller hooks (Figs 325-328). North Thailand (Chiang Mai) . . . . . *C. pui* sp. n.

3 Paraprocts with a small projection pointing mediad (Fig. 314). Supra-anal plate broadly rounded (Fig. 313). Phallic complex at apex roughly cylindrical with minute indistinct sclerotisation inside (Figs 323-324). Singapore . . . . . *C. timah* sp. n.

- Paraprocts spoon-shaped with minute, obtuse, curved projection (Fig. 306). Male supra-anal plate triangularly rounded (Fig. 305). Male phallus bilobate with minute indistinct sclerotisation near apex (Figs 329-330). Central Thailand (Nakhon Ratchasima) . . . . . *C. pakchong* sp. n.

FEMALES

1 Ovipositor apical valves with acute or subacute apex (Figs 293-297) 2

- Ovipositor apical valves lobular (Fig. 299). Thailand (Kanchanaburi) . . . . . *C. lobicauda* sp. n.

2 Ovipositor apical valves in lateral view either with three rows of regular short hairs or with mixed long and short hairs (Figs 293, 297) 3

- Ovipositor apical valves with few short hairs or short strong bristles (Figs 294-296) 4

3 Maxillary palps with apex of last segment strongly oblique. Ovipositor apical valves with three rows of short hairs (Fig. 293). West Sumatra (Bukittinggi) . . . . . *C. orientalis* Chopard, 1925

- Maxillary palps with apex of last segment not so strongly oblique. Supra-anal plate rounded with two bunches of long hairs at apex (Fig. 311). Ovipositor apical valves with few mixed short and long hairs (Fig. 297). North Thailand (Chiang Mai) . . . . . *C. pui* sp. n.

4 Supra-anal plate triangular with apex rather narrowly rounded (Fig. 315). Singapore . . . . . *C. timah* sp. n.

- Supra-anal plate tongue shaped with apex broadly rounded (Figs 317, 319-320) 5

5 Maxillary palps with apical segment 3.0-3.5 x longer than wide (Fig. 318). Supra-anal plate with basal part longer; shallowly furrowed in middle (Figs 319-320). Ovipositor 2.5-2.6 mm (Fig. 295). Sabah . . . . . *C.* sp. 1

- Maxillary palps with apical segment 4.0-4.5 x longer than wide (Fig. 316). Supra-anal plate with basal part shorter (Fig. 317). Ovipositor 2.8 mm (Fig. 294). South Thailand (Phuket) . . . . . *C.* sp. 2

Cycloptiloides lobicauda sp. n. Figs 64, 299-300, 321-322

Holotype (♀): Thailand: Kanchanaburi, near Erawan Waterfall, 14° 22' N, 99° 4' E, 31.i.-1.ii.1987, leg. S. Ingrisch (ZFMK).

Measurements (1 ♀). Body 7.1; pronotum 2.8; pronotum width 2.8; hind femur 5.5; hind tibia 3.9; hind metatarsus 1.5; ovipositor 3.0 mm. - Ratio pronotum length to width 1.0; ratio hind tibia to metatarsus 2.59.

Description. Frontal rostrum about three times wider than scapus; indistinctly furrowed in midline. Maxillary palps with apical segment slightly widened; apical segment a little longer than third and fourth segments (Fig. 321). Pronotum ♀ as wide as long; little narrowing in front; anterior margin substraight, posterior margin feebly convex; disc rounded into paranota (Fig. 64). Hind femur 1.4x longer than hind tibia; hind tibia 2.6x longer than metatarsus.

♂ unknown.

♀ abdomen. Ninth abdominal tergite with apex subtruncate. Supra-anal plate triangular (Fig. 322). Paraprocts prolonged, with a longitudinal setose carina. Subgenital plate rather long with sloping lateral margins; apex notched (Fig. 300). Ovipositor short; apical valves with margins smooth, dorsal margin setose, ventral margin with sparse hairs; apex obtuse, ventral margin of dorsal valve with 2 rounded lobes (Fig. 299).

Colouration. Mixed dark and light brown. Head black; mouthparts dark brown; maxillary palps blackish brown; antenna with scapus and pedicellus blackish brown; flagellum yellowish brown, darkened towards apex. Pronotum black with brown scales. Legs with alternating dark brown and whitish brown flecks or rings; hind femur whitish brown with dark marmoration. Abdomen ♀ with alternating dark brown and light brown scales. Supra-anal plate dark brown, covered with whitish brown scales. Subgenital plate dark brown. Cerci light brown, darkened at apex. Ovipositor medium brown, apical valves little darkened.

Discussion. C. lobicauda agrees with most of the characters of *Cycloptiloides* species from Asia including the female paraproct provided with a longitudinal carina. It differs by the large size, and the apex of the ovipositor which is not acute but obtuse and has the ventral margin of the dorsal apical valve lobular.

Etymology. The name refers to the lobular shape of the ovipositor apical valves.

Cycloptiloides orientalis Chopard, 1925 Figs 293, 301-303

Cycloptiloides orientalis Chopard, 1925: 301; Otte *et al.*, 2005. Syntypes (1 ♂, 1 ♀). Indonesia: West Sumatra, Fort de Kock [Bukittinggi], 920 m, 1.-31.x.1920, leg. E. Jacobson (MNHN, not seen).

Measurements after Chopard (1925) (1 ♂, 1 ♀). Body ♂ 5, ♀ 5.5; pronotum ♂ 2.7, ♀ 1.9; hind femur ♂ 3.5, ♀ 4; ovipositor ♀ 2.5 mm.

Diagnosis (after descriptions and drawings in Chopard, 1925). Frontal rostrum faintly furrowed in midline. Maxillary palps with apical segment prolonged and only slightly widened; fourth segment longer than third (Fig. 301). Pronotum ♂ with lateral margins very little widening posteriorly; posterior margin convex, covering tegmen completely. Pronotum ♀ as long as wide; lateral margins convex, anterior area narrowed; anterior and posterior margins straight. Hind metatarsus as in Fig. 303.

♂ abdomen. «Tenth abdominal tergite» with apical margin convex, excised in middle; apico-lateral area with a short projection (Fig. 302); «epiproct» large, triangular. Paraproct process long, rounded, curved, densely covered with short hairs (Fig. 302). Subgenital plate large, rounded.

♀ abdomen. Subgenital plate triangular; apex truncate or faintly rounded. Ovipositor short, straight; apical valves little marked, with three rows of short hairs (Fig. 293).

Colouration. Greyish brown; antenna light brown; maxillary palps almost white. Abdomen ♂ grey. Supra-anal plate white. Cerci white at base.

Discussion. The species was originally described from a single pair from West Sumatra and well illustrated in both sexes (Chopard, 1925). Later it was also reported from India (Assam), Sri Lanka, and Malaysia (Chopard, 1969), recently recorded from Taiwan (Yang & Yen, 2001a) and as introduced to Finland (Ekbom, 1972). It is however questionable if all those records really refer to the same species. The description of *C. orientalis* in Chopard (1969) refer partly to his *C. ceylonicus* Chopard, 1925, described from a single male, which he later synonymized with *C. orientalis* (Chopard, 1968). The original descriptions of *C. orientalis* and *C. ceylonicus* differ with regard to colouration, maxillary palps, and abdominal terminalia, although in both long paraproct processes are mentioned. A re-examination of the types or topotypic specimens and study of their phallic complex would be necessary to verify if both taxa are really synonyms or separate species.

Diagnostic features of *C. orientalis* as can be taken from the original description are the elongate maxillary palps with the apex of the last segment strongly oblique, two short obtuse projections of the upper part of the male supra-anal plate («tenth tergite» in Chopard, 1925), and the long, erected, curved paraproct process in male. The female ovipositor apical valves are provided with three rows of hairs: at dorsal and ventral margins, and at ventral margin of the dorsal valves.

Cycloptiloides pakchong sp. n. Figs 67, 304-306, 329-330

Holotype (♂): Thailand: Nakhon Ratchasima prov., Pak Chong, Wat Khao Chantree, 350 m, 14° 43' N, 101° 20' E, 9.iv.1995, leg. S. Ingrisch (ZFMK).

Measurements (1 ♂). Body 4.9; pronotum 3.0; tegmen 1.8; hind femur 3.2; hind tibia 2.3; pronotum width 1.9; hind metatarsus 1.0 mm. – Ratio pronotum length to width 1.61; ratio hind tibia to metatarsus 2.31.

Description. Frontal rostrum about two times broader than scapus, without medial furrow. Maxillary palps with apical segment prolonged and only slightly widened; fourth and fifth segments of equal length, little longer than third segment (Fig. 304). Pronotum ♂ with anterior dorsal margin concave; lateral margins slightly widening posteriorly; posterior margin convex, covering tegmen completely (Fig. 67). Hind femur 1.4x longer than hind tibia; hind tibia 2.3x longer than metatarsus.

♂ abdomen. Supra-anal plate wide-triangular; shallowly grooved in middle (Fig. 305). Paraproct process short, compressed, curved, setose (Fig. 306). Subgenital plate with apical margin rounded and upcurved. Phallic complex with apex bilobate, hyaline; with indistinct minute sclerotisation near apex (Figs 329-330).

♀ unknown.

Colouration. Brown. Head with frons dark brown; antenna with scapus and pedicellus dark brown, flagellum medium brown; darkened towards apex; maxillary palps dark brown. Pronotum blackish brown in front, dark reddish brown behind; lateral lobes with black ventral margin. Tegmen whitish transparent, at apex darkened; lateral area black above, white below. Legs with blackish brown scales. Abdomen ♂ blackish brown above, brown below. Cerci yellow with silver and dark brown scales.

Discussion. Differs from all other *Cycloptiloides* species of SE Asia by the small paraprocts with a minute process and by the specific phallic complex.

Etymology. Named after the type locality, noun in apposition.

Cycloptiloides pui sp. n. Figs 65-66, 83, 297-298, 307-311, 325-328

Holotype (♂): Thailand: Chiang Mai, Doi Suthep-Pui, 1150-1350 m, 18° 48' N, 98° 55' E, 28.v.1997, leg. S. Ingrisch (ZFMK).

Paratypes: 1 ♂, same data as holotype (CI); 1 ♀, same locality, 1100-1200 m, 4.v.1988, leg. S. Ingrisch (ZFMK).

Measurements (2 ♂, 1 ♀). Body ♂ 7.4-8.1, ♀ 6.6; pronotum ♂ 3.1-3.3, ♀ 2.0; pronotum width ♂ 2.4, ♀ 2.1; tegmen ♂ 1.8-2.1; hind femur ♂ 4.1-4.3, ♀ 4.2; hind tibia ♂ 2.8-3.0, ♀ 3.0; hind metatarsus ♂ 1.2-1.3, ♀ 1.5; ovipositor ♀ 3.2 mm. – Ratio pronotum length to width ♂ 1.32-1.37, ♀ 0.91; ratio hind tibia to metatarsus ♂ 2.15-2.4, ♀ 2.04.

Description. Frontal rostrum about two times (♂) to three times (♀) broader than scapus; with or without a faint medial suture. Maxillary palps with apical segment prolonged and only slightly widened; three apical segments of subequal length (♂, Fig. 307) or fourth and fifth segments little longer than third (♀, Fig. 310). Pronotum ♂ with anterior dorsal margin concave; lateral margins slightly widening posteriorly; posterior margin convex, covering tegmen completely (Fig. 65). Pronotum ♀ little wider than long, scarcely narrowing in front; anterior margin concave; posterior margin feebly convex; lateral lobes nearly angularly inserted to disc (Fig. 66). Hind femur 1.4-1.5x longer than hind tibia; hind tibia 2.0-2.4x longer than metatarsus (Fig. 83).

♂ abdomen. Supra-anal plate wider than long, apex convex; furrowed in middle, with tufts of long hair on both sides (Fig. 308). Paraproct process long, compressed, curved, dark brown, densely covered with short hairs (Fig. 309). Subgenital plate apical margin rounded and setose. Ectophallus with three dark brown sclerites (one pair and one unpaired sclerite) and with a pair of minute hooks (Figs 325-328).

♀ abdomen. Ninth abdominal tergite with apex feebly concave. Supra-anal plate triangular with apex broadly rounded; shallowly grooved in middle; lateral areas and apex setose (Fig. 311). Paraprocts prolonged, with a longitudinal setose carina. Subgenital plate triangular with margins upcurved; apex little concave (Fig. 298). Ovipositor of medium length; apical valves with margins smooth; with few long hairs near apex and dorsal and ventral margins with a row of short hairs (Fig. 297).

Colouration. Mostly blackish brown. Head with vertex blackish brown; frons dark reddish brown, labrum yellowish brown; antenna with scapus and pedicellus blackish brown, flagellum yellowish brown, darkened towards apex; maxillary palps dark brown. Pronotum dark reddish brown with shining black scales; lateral lobes with black ventral margin. Tegmen white, at apex darkened; lateral area white in anterior, darkened in posterior area. Legs with shining blackish brown scales, light brown when removed; hind femur dark reddish brown with shining brown scales, in dorsal area with black scales. Abdomen ♂ blackish brown, less dark from below. Cerci with blackish brown and few light scales, light brown when removed. Abdomen ♀ dark reddish

brown with shining black scales, on ventral side with brown scales. Subgenital plate brown. Cerci black, very base and very apex light brown. Ovipositor yellowish brown, apical valves brown.

Discussion. The new species comes close to *C. orientalis*, differs in ♂ by the paraproct process which is compressed, laterally widened, and shorter, and by the absence of projections on the upper area of the supra-anal plate. The characteristic phallic complex probably also differs but is not described for *C. orientalis* from the type locality. It clearly differs from the phallic complex described and figured by Yang & Yen (2001a) under *C. orientalis* from Taiwan. The ♀ differs by the ovipositor apical valves which carry few mixed short and long hairs.

Etymology. Named after the type locality, noun in apposition.

Cycloptiloides timah sp. n. Figs 62-63, 81, 296, 312-315, 323-324

Holotype (♂): Singapore: Bukit Timah, 1° 20' N, 103° 47' E, 1.-2.iii.1993, leg. S. Ingrisch (ZFMK).

Paratypes: 2 ♂, 1 ♀, same data as holotype (2 ♂ CI; 1 ♀, ZFMK).

Measurements (3 ♂, 1 ♀). Body ♂ 5.2-5.4, ♀ 6.2; pronotum ♂ 3.0-3.2, ♀ 1.9; pronotum width ♂ 1.9-2.0, ♀ 1.9; hind femur ♂ 3.5-3.7, ♀ 3.9; hind tibia ♂ 2.6-2.9, ♀ 2.8; hind metatarsus ♂ 0.9-1.3, ♀ 1.2; ovipositor ♀ 2.8 mm. – Ratio pronotum length to width ♂ 1.52-1.63, ♀ 1; ratio hind tibia to metatarsus ♂ 2.15-3.05, ♀ 2.31.

Description. Frontal rostrum about one and a half time wider than scapus; without medial furrow. Maxillary palps with apical segment prolonged and only slightly widened; apical segment a little longer than third and fourth segments (Fig. 312). Pronotum ♂ with anterior dorsal margin concave; lateral margins very little widening posteriorly; posterior margin convex, covering tegmen completely (Fig. 62). Pronotum ♀ as wide as long, slightly narrowing in front; anterior margin concave; posterior margin feebly convex (Fig. 63). Hind femur 1.2-1.4x longer than hind tibia; hind tibia 2.1-2.4x longer than metatarsus.

♂ abdomen. Supra-anal plate large, grooved; apex subtruncate (Fig. 313). Paraproct process short, compressed, not curved up, dark brown, setose (Fig. 314). Subgenital plate rounded, apex truncate. Phallus cylindrical, hyaline; lateral valves with indistinct minute sclerotisation at apex (Figs 323-324).

♀ abdomen. Supra-anal plate large, triangular with apex rounded, furrowed in middle; with long hairs along margins (Fig. 315). Paraprocts prolonged, with a longitudinal setose carina (Fig. 81). Subgenital plate triangular; apex truncate. Ovipositor of medium length; apical valves narrow, dorsal margin of ventral valves with two bristles (Fig. 296).

Colouration. Dark brown. Head with frons dark brown; antenna unicoloured, brown; maxillary palps not very conspicuous brown, last two segments black. Pronotum dark reddish brown. Tegmen whitish transparent, at apex with a black band; lateral area black above, white below. Legs yellow with black and brown marmoration; usually tibiae with shining black scales. Abdomen ♂ dark brown above, light brown below. Cerci yellow, suffused with black scales except at base. Abdomen ♀ with black scales above, silver scales below. Subgenital plate with silver scales. Cerci yellow, suffused with black scales except at base. Ovipositor yellowish brown, apical valves reddish brown.

Discussion. The male of the new species can readily be distinguished from *C. orientalis*, *C. pui* and *C. pakchong* by the short paraproct process which is not upcurved and by the phallic complex. From *C. orientalis* it also differs by the maxillary palps with the apical segment being hardly widened. The female differs from *C. orientalis* and *C. pui* by the ovipositor apical valves which carry only a few short stout hairs.

Etymology. Named after the type locality Bukit Timah, noun in apposition.

Cycloptiloides sp. 1 Figs 68, 295, 318-320

Derectaotus incertus Ingrisch, 1998: 232 partim [♀ not a type].

Material studied: 1 ♀, East Malaysia: Sabah, Mt. Kinabalu NP, Poring, 6° 5' N, 116° 33' E, 500-700 m, canopy fogging, 6° 5' N, 116° 33' E, 28.iii.1998, leg. A. Floren (ZFMK); 1 ♀ (*Derectaotus incertus* Ingrisch, 1998, misidentification), same locality, 16.ii.1994, leg. A. Floren (CI); 1 ♀, Sabah, Sandakan residency, Sepilok, Kabili-Sepilok Forest Reserve, forêt près du pond, 10.v.1982, leg. Bernd Hauser (MHNG).

Measurements (3 ♀). Body 5.6-7.4; pronotum 1.8; pronotum width 1.9; hind femur 4.0-4.1; hind tibia 2.8-2.9; hind metatarsus 1.3; ovipositor 2.5-2.6 mm. – Ratio pronotum length to width 0.93; ratio hind tibia to metatarsus 2.25.

Description. Frontal rostrum about two times broader than scapus, without medial furrow. Maxillary palps with apical segment little widened and little longer than third and fourth segments; third and fourth segments of equal length (Fig. 318). Pronotum ♀ little wider than long or as long as wide, scarcely narrowing in front; anterior margin slightly concave; posterior margin straight (Fig. 68). Hind femur 1.4x longer than hind tibia; hind tibia 2.2-2.3x longer than metatarsus.

♂ unknown.

♀ abdomen. Supra-anal plate rounded; furrowed in middle; with long hairs at lateral margins (Figs 319-320). Paraprocts prolonged, with a longitudinal setose carina. Subgenital plate triangular in general outline; apex truncate or little notched. Ovipositor of medium length, slightly curved; apical valves with margins smooth, with few short stout hairs (Fig. 295).

Colouration. Dark brown. Head with frons brown, labrum almost white; antenna with scapus and pedicellus brown, flagellum light to medium brown; maxillary palps brown. Pronotum dark reddish brown. Legs [scales largely removed] light brown or almost white; where scales are left dark brown. Abdomen ♀ [scales largely removed] brown or almost white. Subgenital plate medium brown. Cerci [scales largely removed] white. Ovipositor yellowish brown.

Discussion. The three females at hand are similar to *C. timah* and *C.* sp. 2. They differs from both by the shorter ovipositor and the maxillary palps with the apical segment wider. From *C. timah* they also differs by the wider apex of the supra-anal plate. They probably represent an undescribed species, but without corresponding male it is difficult to find veritable differential characters.

One of the females was erroneously described under *D. incertus* in Ingrisch (1998) without giving it type status (see above under *M. incertus*).

Cycloptiloides sp. 2 Figs 69, 294, 316-317

Material studied: 2 ♀, Thailand: Phuket, Khao Pra Taew, near Bangbae and Tone Sai Waterfalls, 8° 1' N, 98° 22' E, 11.vi.1986, leg. S. Ingrisch (1 ♀, ZFMK; 1 ♀, CI).

Measurements (2 ♀). Body 5.3-5.6; pronotum 1.9-2.0; pronotum width 2.1; hind femur 3.9-4.1; hind tibia 2.7-2.8; hind metatarsus 1.2-1.4; ovipositor 2.8 mm. – Ratio pronotum length to width 0.94-0.97; ratio hind tibia to metatarsus 2.10-2.15.

Description. Frontal rostrum about two times broader than scapus; without medial furrow. Maxillary palps with apical segment little widened and little longer than third and fourth segments (Fig. 316). Pronotum ♀ as wide as long; slightly narrowing in front; anterior margin concave, posterior margin feebly convex (Fig. 69). Hind femur 1.4-1.5x longer than hind tibia; hind tibia 2.1x longer than metatarsus.

♂ unknown.

♀ abdomen. Supra-anal plate large, triangular with apex rounded; with long hairs along margins (Fig. 317). Paraprocts prolonged, with a longitudinal setose carina. Subgenital plate triangular in general outline; apex truncate. Ovipositor of medium length; apical valves narrow; dorsal margin of ventral valves with 2-3 bristles (Fig. 294).

Colouration. Brown. Head with frons dark brown; antenna unicoloured brown; maxillary palps not very conspicuous brown, last two segments black. Pronotum dark reddish brown. Legs with silver, brown and black scales. Abdomen ♀ dark with shining scales. Subgenital plate brown. Cerci yellow, suffused with black scales except at base. Ovipositor yellowish brown, apical valves reddish brown.

Discussion. The two females at hand are similar to *C. timah* but differ by a wider supra-anal plate. From *C.* sp. 1 which is also similar, they differ by the narrow apical segment of the maxillary palps, the shape of the supra-anal plate and a longer ovipositor. Although the differences to both other taxa are gradual, the two females probably belong to another undescribed species. Probably the correcponding male will show clear differential characters when it is found.

Terraplistes gen. n.

Type species: Terraplistes chantri sp. n.; here designated.

Description. Small to medium sized (body 6.8-11.2 mm, hind femur 3.8-5.8 mm) Mogoplistinae; black or with few white ornaments (Figs 70-76). Body dorso-ventrally compressed. Maxillary palps of variable shape; apical segment moderately widened (Figs 332, 336, 340, 343-344). Pronotum with lateral lobes nearly angularly inserted to disc; in male prolonged and covering tegmen completely, in female of normal length. Tegmen male reduced to stridulatory apparatus; females apterous. Fore tibia with internal tympanum almost moved to anterior surface. Hind tibia shortened, less than twice as long as metatarsus, in lateral view behind base suddenly widened and compressed; dorsal margins serrulate (Fig. 84). Hind metatarsus with dorsal margins serrulate and with a row of short, stout spines in middle.

♂ abdomen. Supra-anal plate and epiproct completely fused (Figs 331, 335). Paraprocts with a short club-shaped projection pointing mediad, largely hidden under the supra-anal plate (Figs 333, 337, 345). Phallic comples: no sclerotised parts found. Subgenital plate wider than long.

♀ abdomen. Supra-anal plate completely fused with epiproct (Figs 334, 338-339, 341-342). Subgenital plate wider than long or elongate with lateral margins

upcurved; apex truncate or excised (Figs 348-356). Ovipositor apical valves acute, with few short hairs (Figs 346-347, 349, 351, 353, 355).

Discussion. The new genus comes close to *Cycloptiloides* and *Micrornebius*. It differs from both by the dorso-ventrally compressed body, the pronotum which is almost angularly bent to the lateral lobes, the compressed and widened hind tibiae, the absence of sclerotised structures of the male phallic complex, and the acute apical valves of the ovipositor. Additionally, it differs from *Cycloptiloides* by the maxillary palps which are less narrow and have the apical segment widened, and the female paraprocts are short and without longitudinal carina; from *Micrornebius* it also differs by the maxillary palps which are longer and the apical segment less strongly widened, and the apical valves of the ovipositor carry only a few short hairs. Six species are assigned here with *Terraplistes, T. niger* (Ingrisch, 1987) comb. n. and five species described as new. They can be differentiated by the shape and colour pattern in both sexes, by the paraproct and its appendage in the male, and by the shape of the subgenital plate and the relative length of the ovipositor in the female.

Distribution. Terraplistes is so far only known from Thailand. All species were found in the litter of primary or secondary forests or scrubland.

Etymology. Composed of «terra» [here: living on the soil] and the stem «plistes» from the genus *Mogoplistes*.

KEY TO SPECIES

MALES

1 Maxillary palps fully black; third to fifth segments rather long (Fig. 336). Paraprocts with a short, club-shaped projection, separated by a wide gap from base (Fig. 337). North East Thailand (Loei) . . *T. kradung* sp. n. (compare also *T. excisa*, *T. erawan*, *T. brevicauda* for which the males are unknown)

- Maxillary palps with apical two segments white. Paraprocts different 2

2 Maxillary palps with third segment black (Fig. 344). Paraprocts with a club-shaped projection, with the club higher than the paraproct base (Fig. 345). Larger species: pronotum 3.6 mm, hind femur 4.5 mm. Central Thailand (Chon Buri) . . . . . *T. niger* (Ingrisch, 1987)

- Maxillary palps with at least apical half of third segment white (Fig. 332). Paraprocts with a small club-shaped projection, separated by a narrow gap from base (Fig. 333). Smaller species: pronotum 3.3-3.4 mm, hind femur 4.1-4.2 mm. Central Thailand (Nakhon Ratchasima) . . . . . *T. chantri* sp. n.

FEMALES

1 Large for the genus (Fig. 72), pronotum 2.9 mm, hind femur 5.8 mm. Maxillary palps black with apices of first and second segments white; fifth segment with apex moderately oblique (Fig. 343). Subgenital plate transverse, apex angularly excised (Fig. 352). Ovipositor 2.5 mm (Fig. 351). South Thailand (Prachuap Khiri Khan) . . . . . *T. excisa* sp. n.

- Smaller: pronotum 2.0-2.5 mm, hind femur 3.8-4.5 mm. Maxillary palps either completely black or apical segments white; fifth segment with

apex strongly oblique (Figs 332, 336, 340). Subgenital plate elongate, apex truncate or faintly concave (Figs 348, 350, 354, 356) 2

2 Ovipositor less than twice the length of the subgenital plate (1.4 mm; Fig. 355). Pronotum along lateral margins with a band of white scales (Fig. 76). Central Thailand (Saraburi) . . . . . *T. brevicauda* sp. n.

- Ovipositor double the length of the subgenital plate or longer (1.6-2.5 mm). Pronotum black 3

3 Maxillary palps with half of third segment and apical two segments white (Fig. 332). Ovipositor 1.9-2.5 mm (Fig. 346). Central Thailand (Nakhon Ratchasima) . . . . . *T. chantri* sp. n.

- Maxillary palps completely black (Figs 336, 340) 4

4 Maxillary palps with three last segments rather elongate (Fig. 336). Ovipositor 2.3 mm (Fig. 349). North East Thailand (Loei) . . . *T. kradung* sp. n.

- Maxillary palps with three last segments rather short, apical segment triangular (Fig. 340). Ovipositor 1.6-1.9 mm (Fig. 353). Central Thailand (Kanchanaburi) . . . . . *T. erawan* sp. n.

Terraplistes brevicauda sp. n. Figs 76, 341, 355-356

Holotype (♀): Thailand: Saraburi, Nam Tok Muak Lek, 14° 43' N, 101° 13' E, 7.ix.1993, leg. S. Ingrisch (ZFMK).

Measurements (1 ♀). Body 7.4; pronotum 2.5; pronotum width 2.5; hind femur 4.5; hind tibia 2.9; hind metatarsus 1.5; ovipositor 1.4 mm. – Ratio pronotum length to width 1; ratio hind tibia to metatarsus 1.92.

Description. Frontal rostrum about three times wider than scapus, without medial furrow. Pronotum ♀ as wide as long; lateral margins slightly convex; anterior margin concave; posterior margin truncate (Fig. 76). Hind femur 1.5-1.6x longer than hind tibia; hind tibia 1.9x longer than metatarsus.

♂ unknown.

♀ abdomen. Ninth abdominal tergite with apex subtruncate. Supra-anal plate rounded; margins carinate and provided with long bristles (Fig. 341). Paraprocts simple, setose. Subgenital plate with little converging, upcurved lateral margins; apex broad, slightly concave in middle, convex at both sides (Fig. 356). Ovipositor only 1.8x the length of the subgenital plate; apical valves narrow (Fig. 355).

Colouration. Black. Head black; vertex ornated with lateral bands of white scales from top of rostrum, along internal margin of eyes to occiput; antenna with scapus and pedicellus black; [flagellum broken]. Pronotum ♀ black; lateral margins of disc ornated with a band of white scales. Legs dark reddish brown covered with black scales; hind femur of lighter colour, dorsal area also black. Abdomen ♀ black; ventral side black covered with white scales. Subgenital plate black. Cerci yellowish brown. Ovipositor brown.

Discussion. T. brevicauda differs from all other *Terraplistes* species by the white lateral bands from frontal rostrum to occiput, continued on lateral margins of disc of pronotum, and by the very short ovipositor measuring less than twice the length of the subgenital plate.

Etymology. Named after the short ovipositor.

Terraplistes chantri sp. n. Figs 70-71, 331-334, 346-348

Holotype (♂): Thailand: Nakhon Ratchasima, Pak Chong, Wat Khao Chantree, 350 m, 14° 43' N, 101° 20' E, 9.iv.1995, leg. S. Ingrisch (ZFMK).

Paratypes: 1 ♂, 2 ♀, same data as holotype (1 ♂, 1 ♀, CI; 1 ♀, ZFMK).

Measurements (2 ♂, 2 ♀). Body ♂ 7.3-7.8, ♀ 7.5-7.7; pronotum ♂ 3.3-3.4, ♀ 2.2-2.3; pronotum width ♂ 2.4, ♀ 2.3-2.4; hind femur ♂ 4.1-4.2; ♀ 4.4; hind tibia ♂ 2.6-2.7, ♀ 2.7-2.8; hind metatarsus ♂ 1.4-1.5, ♀ 1.4-1.6; ovipositor ♀ 1.9-2.5 mm. – Ratio pronotum length to width ♂ 1.37-1.42; ♀ 0.95-0.97; ratio hind tibia to metatarsus ♂ 1.79-1.86; ♀ 1.80-1.87.

Description. Frontal rostrum about three and half times wider than scapus, without medial furrow. Maxillary palps with apical segment moderately widened, apex strongly oblique; fourth and fifth segments longer than third segment (Fig. 332). Pronotum ♂ with anterior margin concave; lateral margins hardly narrowed in front; posterior margin convex, covering tegmen completely (Fig. 70). Pronotum ♀ as wide as long; scarcely narrowing in front; anterior margin feebly concave, posterior margin feebly convex (Fig. 71). Hind femur 1.5-1.6x longer than hind tibia; hind tibia 1.8-1.9x longer than metatarsus.

♂ abdomen. Supra-anal plate with a pair of sinuate lateral carinae; apex convex (Fig. 331). Paraprocts with a club-shaped projection, separated by a narrow gap from base (Fig. 333). Subgenital plate wider than long; apex convex and setose, faintly convex or faintly concave in middle.

♀ abdomen. Ninth abdominal tergite with apex feebly convex. Supra-anal plate with V-shaped, sublateral carina; carina provided with long bristles; apex convex and setose (Fig. 334). Paraprocts simple, setose. Subgenital plate with lateral margins convex and upcurved; apex truncate (Fig. 348). Ovipositor short; apical valves on dorsal and ventral margins with few short hairs (Figs 346-347).

Colouration. Black to blackish brown, covered with black scales. Head black; frons blackish brown; antenna with scapus black, flagellum yellowish brown with spaced dark annulation; maxillary palps to base of third segment black, apical segments white. Pronotum black. Tegmen white, at apex with hardly visible infumation; lateral area white. Legs dark reddish brown covered with black scales. Abdomen ♂ dark brown with black scales, ventral surface less dark. Subgenital plate dark brown with black scales. Cerci black. Abdomen ♀ as in ♂. Subgenital plate dark brown with black scales. Cerci black. Ovipositor brown.

Discussion. T. chantri can readily be distinguished from all other *Terraplistes* species by the colour pattern of the maxillary palps which are black at base and white from the middle of the third segment. The male paraprocts are similar to that of *T. kradung* but the gap between the apical club and the base of the paraproct is narrower. In the female, *T. chantri* has the ovipositor more than twice as long as the subgenital plate which separates it from *T. brevicauda*; from *T. erawan* it differs by the longer ovipositor (1.9-2.5 mm against 1.6-1.9 mm) and the narrow subgenital plate, and from *T. kradung* by the narrow subgenital plate and the fifth segment of the maxillary palps which is in lateral view triangular not elongate. The latter character applies to both sexes.

Etymology. Named after the type locality Khao Chantree [Chantree mountain]; noun in apposition with the English vowal «ee» Latinized to «i».

Terraplistes erawan sp. n. Figs 75, 339-340, 353-354

Holotype (♀): Thailand: Kanchanaburi, Nam Tok Erawan, 14° 20' N, 99° 8' E, 9.iv.1994, leg. S. Ingrisch (ZFMK).

Paratypes: 3 ♀, same data as holotype (1 ♀, CI, 1 ♀ MHNG, 1 ♀, EMBT).

Measurements (4 ♀). Body 6.8-7.3; pronotum 2.1-2.2; pronotum width 2.3-2.5; hind femur 3.8-4.1; hind tibia 2.4-2.6; hind metatarsus 1.1-1.4; ovipositor 1.6-1.9 mm. – Ratio pronotum length to width 0.85-0.97; ratio hind tibia to metatarsus 1.86-2.23.

Description. Frontal rostrum about three times wider than scapus, without medial furrow. Maxillary palps with apical segment moderately widened, apex strongly oblique; fourth and fifth segments longer than third segment (Fig. 340). Pronotum ♀ little wider than long; little narrowing in front; anterior margin concave, posterior margin feebly convex (Fig. 75). Hind femur 1.5-1.6x longer than hind tibia; hind tibia 1.9-2.2x longer than metatarsus.

♂ unknown.

♀ abdomen. Supra-anal plate grooved in middle; apex rounded and setose (Fig. 339). Paraprocts simple, setose. Subgenital plate with little converging upcurved lateral margins; apex truncate (Fig. 354). Ovipositor short; apical valves narrow, dorsal and ventral margins with few short hairs (Fig. 353).

Colouration. Black. Head black; antenna with scapus black, flagellum yellowish brown, darkened towards apex; maxillary palps black. Pronotum black. Legs black; hind femur dark brown with dorsal and apical areas black. Abdomen ♀ black from above, brown from below. Subgenital plate black in basal half, brown in apical half and along margins. Cerci yellowish brown to blackish brown, infumate. Ovipositor brown.

Discussion. T. erawan differs from *T. excisa*, *T. chantri* and *T. niger* by the uniformly black maxillary palps, from *T. excisa* and *T. kradung* by the maxillary palps having shorter segments and the apical segment being distinctly widened in middle make it looking triangular in lateral view. The ovipositor is shorter than in *T. excisa*, *T. chantri* and *T. kradung*, but longer than in *T. brevicauda*. It is so far the smallest species of the genus, but the differences in size to *T. brevicauda* are negligible.

Etymology. Named after the type locality, Erawan waterfall; noun in apposition.

Terraplistes excisa sp. n. Figs 72, 342-343, 351-352

Holotype (♀): Thailand: Prachuap Khiri Khan, Kaeng Krachan area, near Pala-U waterfall, 12° 35' N, 99° 32' E, 2.iv.1993, leg. S. Ingrisch (ZFMK).

Measurements (1 ♀). Body 11.2; pronotum 2.9; pronotum width 3.1; hind femur 5.8; hind tibia 3.5; hind metatarsus 1.6; ovipositor 2.5 mm. – Ratio pronotum length to width 0.94; ratio hind tibia to metatarsus 2.15.

Description. Frontal rostrum about three times wider than scapus, faintly furrowed in midline; maxillary palps with fourth and fifth segments slightly widened, of equal length; fourth segment longer than third (Fig. 343). Pronotum ♀ little wider than long, scarcely narrowing in front; anterior margin concave; posterior margin truncate (Fig. 72). Hind femur 1.6x longer than hind tibia; hind tibia 2.4x longer than metatarsus.

♂ unknown.

♀ abdomen. Ninth abdominal tergite with apex subtruncate. Supra-anal plate wider than long; apex convex with a bunch of long hairs at both sides of middle

(Fig. 342). Paraprocts simple. Subgenital plate with almost parallel margins in basal half; apex bilobate (Fig. 352). Ovipositor short; apical valves with margins smooth (Fig. 351).

Colouration. Black, covered with black scales and light brown hairs. Head black; frons reddish brown; antenna with scapus reddish brown, flagellum yellowish brown with spaced dark annulation; maxillary palps black. Pronotum black; disc marginated with white scales. Legs black; inner side of hind femur brown. Abdomen ♀ black, on ventral side black and covered with white scales. Subgenital plate black. Cerci changing from light brown at base to almost black at apex. Ovipositor dark brown.

Discussion. T. excisa differs from all other *Terraplistes* species by larger size, the maxillary palps having the apices of the first two segments white while the last three are uniformly black and the apical segment is hardly widened, and by the subgenital plate which is transverse instead of elongate and has the apex triangularly excised.

Etymology. Named after the excised subgenital plate.

Terraplistes kradung sp. n. Figs 73-74, 84, 335-338, 349-350

Holotype (♂): Thailand: Loei prov., Phu Kradung, 1500 m, 16° 55' N, 101° 47' E, 27.v.1988, leg. S. Ingrisch (ZFMK).

Paratypes: 1 ♂, 1 ♀, same data as holotype (1 ♂, CI; 1 ♀, ZFMK).

Measurements (2 ♂, 1 ♀). Body ♂ 8.4-8.6, ♀ 8.1; pronotum ♂ 3.6-3.8, ♀ 2.5; pronotum width ♂ 2.9-3.0; hind femur ♂ 4.7, ♀ 4.5; hind tibia ♂ 3.0-3.2, ♀ 2.7; ♀ 2.8; hind metatarsus ♂ 1.6, ♀ 1.4; ovipositor ♀ 2.3 mm. – Ratio pronotum length to width ♂ 1.26-1.28; ♀ 0.91; ratio hind tibia to metatarsus ♂ 1.87-1.99, ♀ 1.95.

Description. Frontal rostrum about three times wider than scapus, without medial furrow. Maxillary palps with apical segment moderately widened, apex strongly oblique; segments increasing in length from third to fifth segment (Fig. 336). Pronotum ♂ with anterior dorsal margin concave; lateral margins convex; posterior margin convex, covering tegmen completely (Fig. 73). Pronotum ♀ longer than wide; lateral margins slightly convex; anterior margin concave, posterior margin feebly convex (Fig. 74). Hind femur 1.5-1.7x longer than hind tibia; hind tibia 1.9-2.0x longer than metatarsus (Fig. 84).

♂ abdomen. Supra-anal plate completely fused with epiproct. Supra-anal plate with a pair of substraight, oblique, sublateral carinae carrying long bristles; remnants of lateral appendages of terminal tergite appear as lateral appendages of base of carina; apex convex (Fig. 335). Paraprocts triangular at both sides, narrowed in between, internal and dorsal margins setose (Fig. 337). Subgenital plate wider than long; apical margin convex at both sides, slightly concave in middle.

♀ abdomen. Ninth abdominal tergite with apex subtruncate. Supra-anal plate with slightly curved, sublateral carina; carina provided with long bristles; apex convex and setose (Fig. 338). Paraprocts simple, setose. Subgenital plate with lateral margins convex and upcurved; apex truncate (Fig. 350). Ovipositor of medium length; apical valves with margins smooth; dorsal and ventral margins with few short hairs (Fig. 349).

Colouration. Black. Head black; frons blackish brown; clypeus white; mandibles reddish brown; antenna with scapus and part of pedicellus dark brown,

flagellum yellowish brown with spaced dark annulation; maxillary palps black. Pronotum black with dark reddish brown scales; in one male only lateral margins of disc ornated with a band of white scales. Tegmen white. Legs black; hind femur dark reddish brown with black scales. Abdomen ♂ black or very dark reddish brown with black scales; underside dark reddish brown. Subgenital plate black. Cerci reddish brown, darkened or black towards apex. Abdomen ♀ as in ♂. Subgenital plate black, apex brown. Cerci as in male. Ovipositor brown.

Discussion. T. kradung is close to *T. chantri*. It differs by the maxillary palps which are completely black and have the fifth segment elongate. The male paraprocts have the club-shaped projection separated from the paraproct base by a wide gap. The female subgenital plate is wider.

Etymology. Named after the type locality Phu Kradung [Mount Kradung]; noun in apposition.

Terraplistes niger (Ingrisch, 1987) **comb. n.** Figs 344-345

Cycloptiloides niger Ingrisch, 1987: 174; Otte *et al.*, 2005. Holotype (♂): Thailand: Chon Buri, south of Pattaya, 12° 52' N, 100° 53' E, 1.-4.iv.1985, leg. S. Ingrisch (SMF).

Measurements (1 ♂). Body male 7.3; pronotum male 3.6; hind femur male 4.5; hind tibia male 2.9; hind metatarsus male 1.6 mm. – Ratio hind tibia to metatarsus male 1.81.

Diagnosis. Frontal rostrum almost four times wider than long. Maxillary palps with apical segment moderately widened, apex strongly oblique; fourth and fifth segments longer than third segment (Fig. 344). Hind femur 1.5-1.6x longer than hind tibia; hind tibia 1.8x longer than metatarsus.

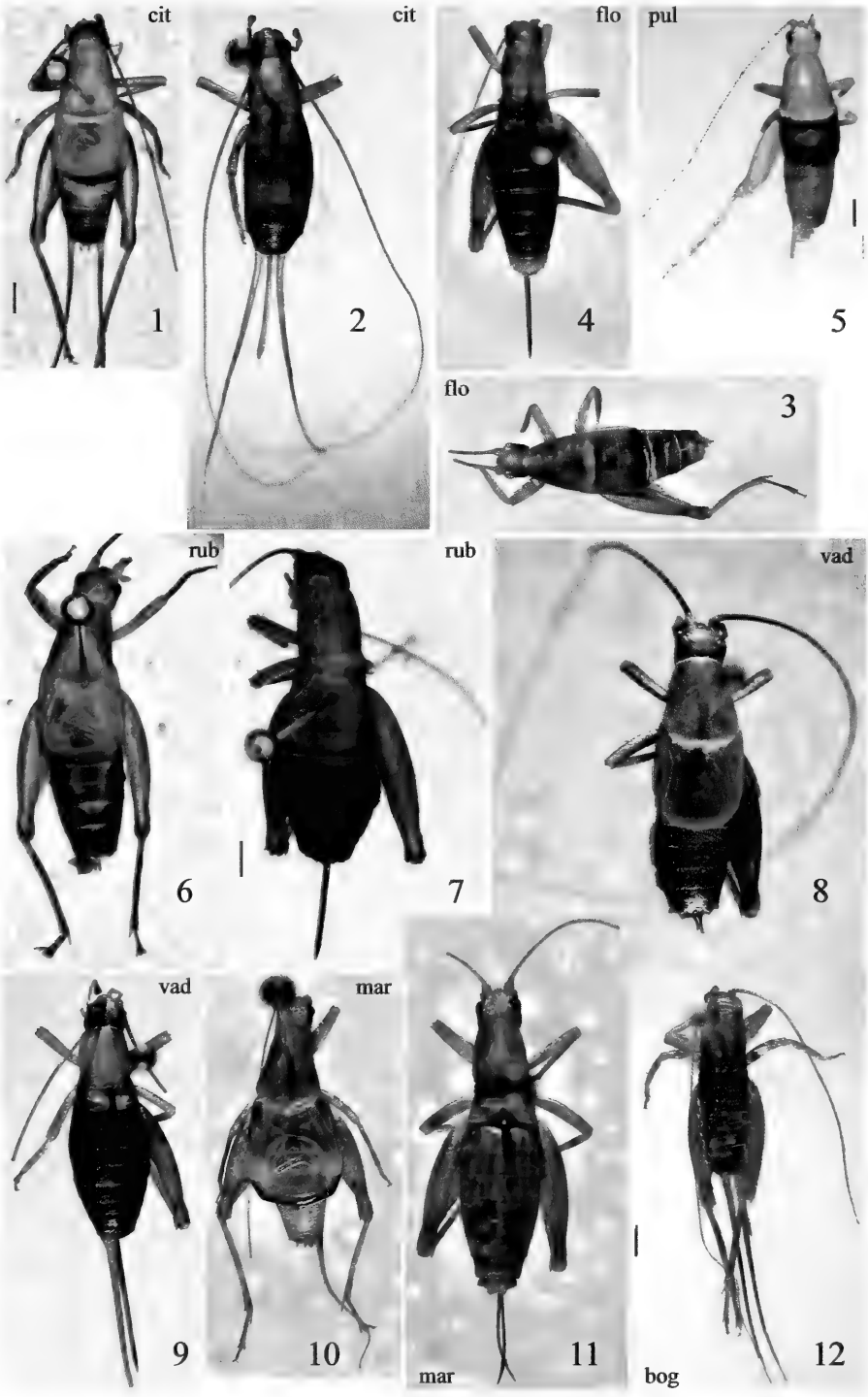
♂ abdomen. Paraprocts with a club-shaped projection, with the club larger than the paraproct base, and densely covered by long hairs at internal margin (Fig. 345).

♀ unknown.

Colouration. Head black; frons dark brown; mouthparts dark brown; antenna dark brown; maxillary palps with basal three segments dark brown, apical two segments white. Pronotum black. Tegmen white. Legs black; hind femur towards ventral area dark brown, on internal side with light brown or silver scales. Abdomen ♂ black; ventral surface dark brown. Cerci brown (damaged). Body and legs covered with shining black scales, 4. and 5. joint of maxillary palps and elytra contrasting white; fifth segment of maxillary palps less slender than in other *Cycloptiloides* species, triangular.

Discussion. The species was originally described under *Cycloptiloides*. It possesses however all the characters that separate *Terraplistes* from *Cycloptiloides*. It is readily recognisable by the maxillary palps with the basal three segments black and the apical two segments white. The club-shaped projections of the paraprocts are larger than the paraproct base which is not so in other *Terraplistes* species of which the males are known. As the original description was in German, a short diagnosis is given here.

Figs 1-12. Habitus of *Ornebius* species: 1, *O. citrus* sp. n. ♂ HT; 2, do. ♀ PT; 3, *O. flori* Ingrisch, 1998 ♂ (Poring); 4, do. ♀; 5, *O. pullus* sp. n. ♂ HT; 6, *O. rubidus* Ingrisch, 1998 ♂ (Poring); 7, do. ♀; 8, *O. vadus* Ingrisch, 1998 ♂ (Poring); 9, do. ♀; 10, *O. marginatus* Ingrisch, 1998 (Poring); 11, do. ♀; 12, *O. bogor* sp. n. ♀ HT. Scales = 1 mm.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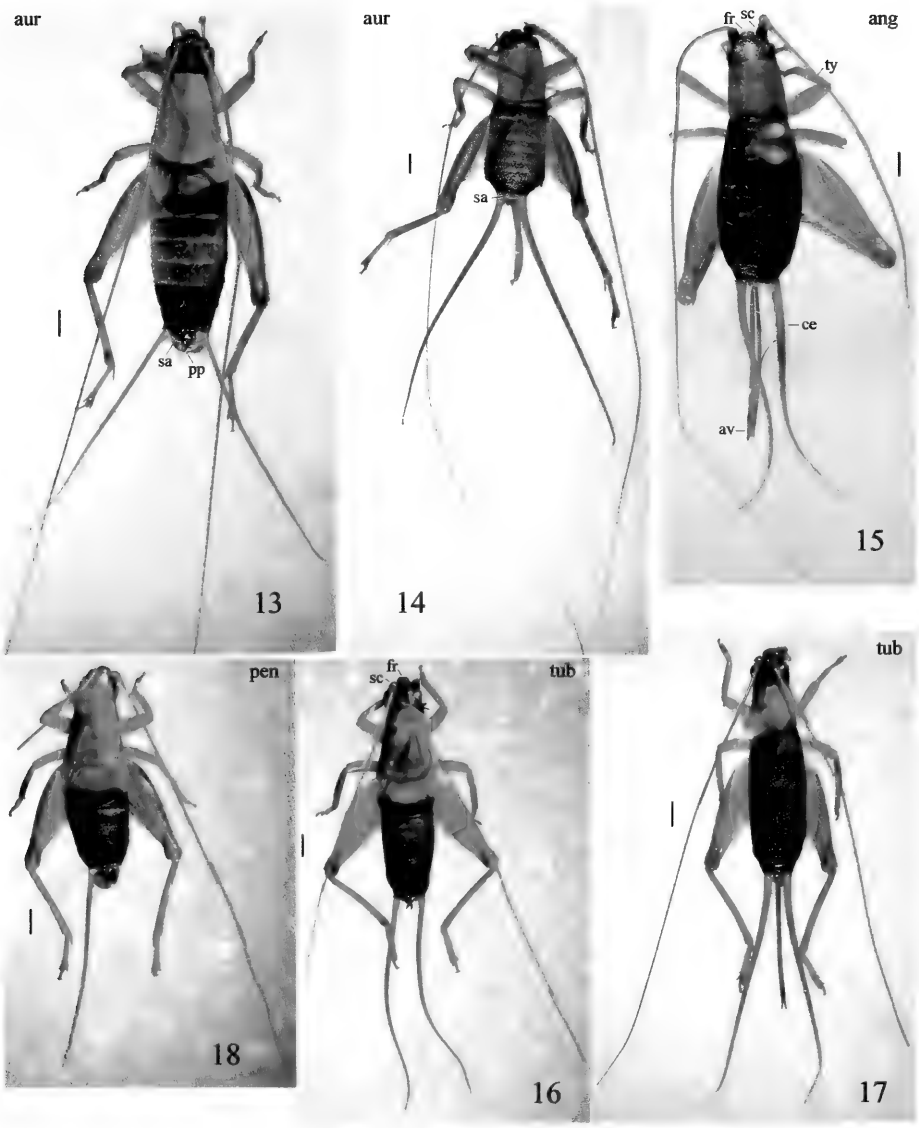
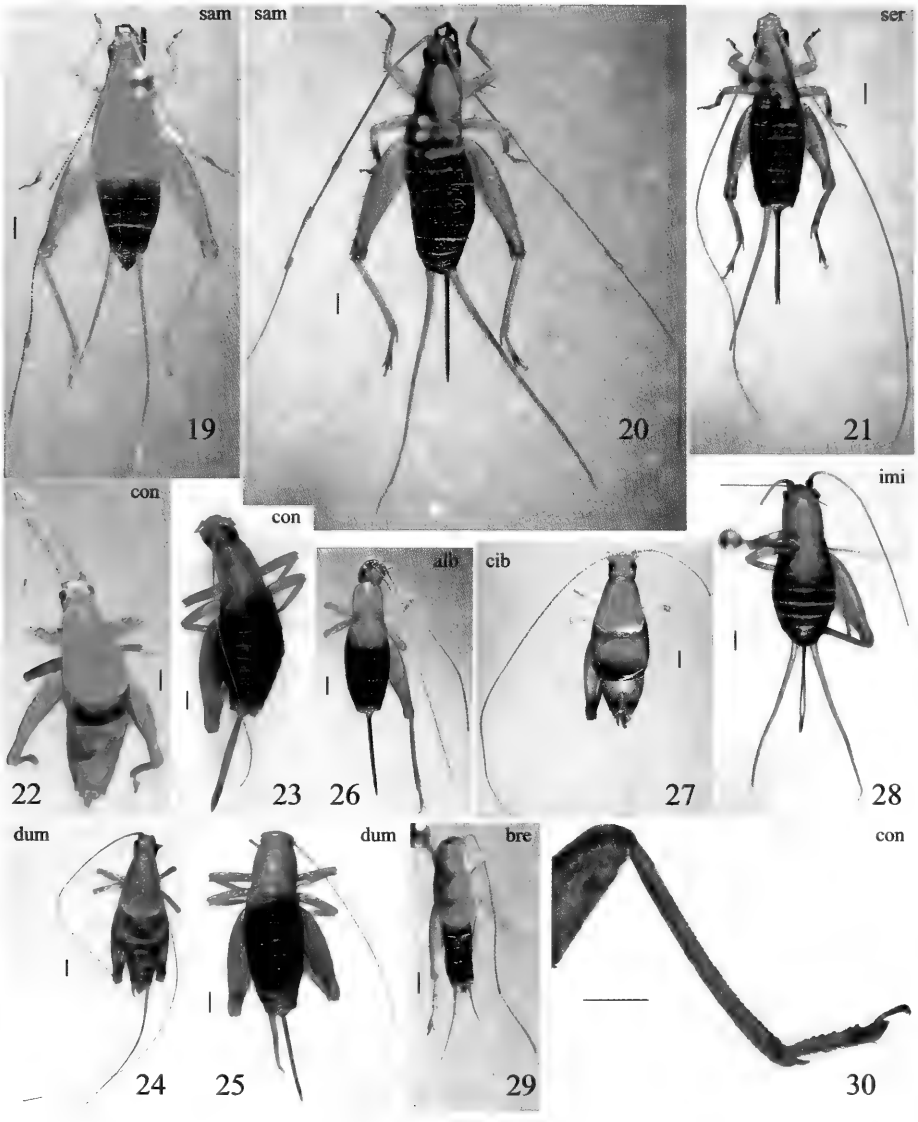
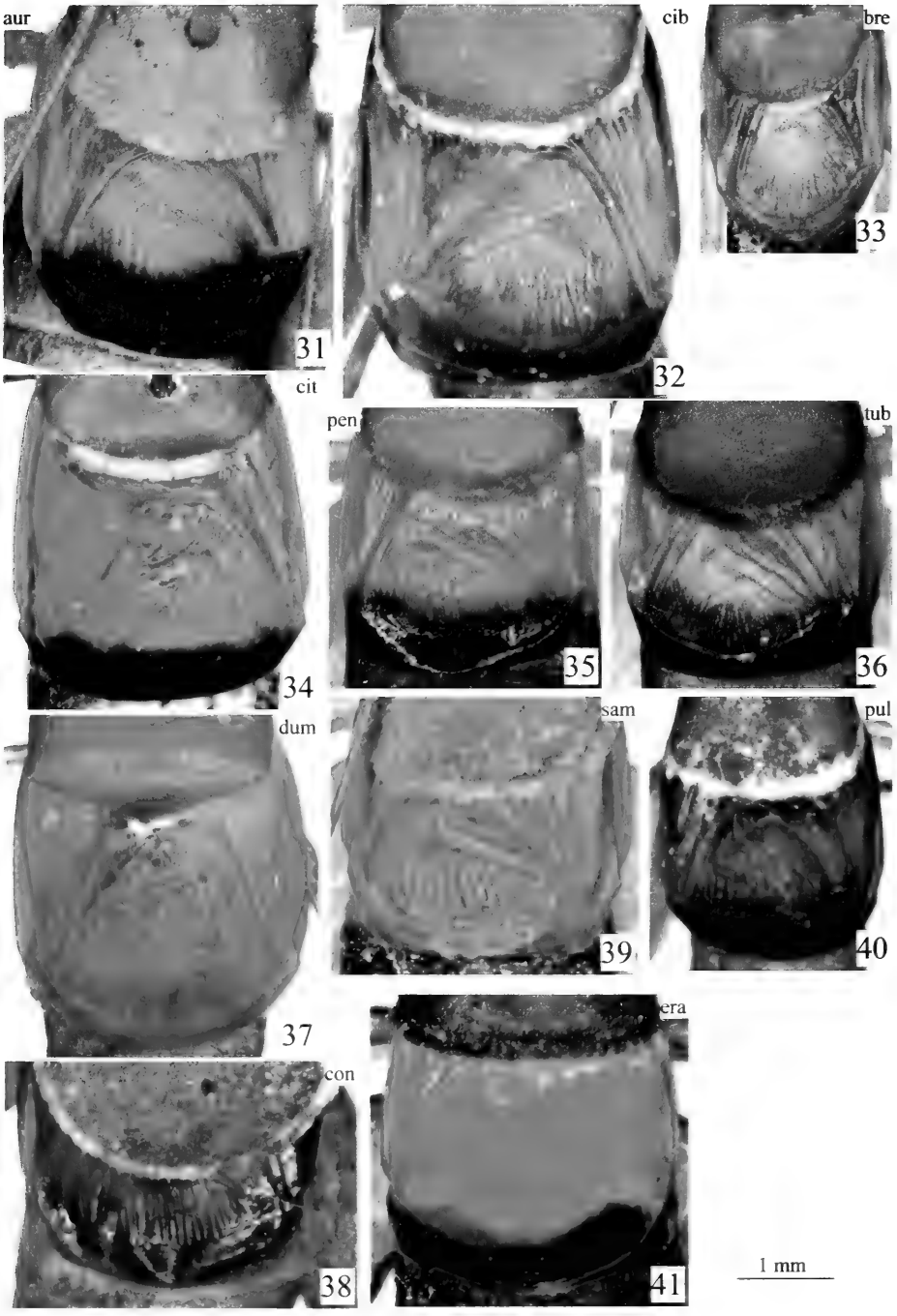


FIGS 13-18. Habitus of *Ornebius* species: 13, *O. aureus* sp. n. ♂ HT; 14, do. ♀ PT; 15, *O. angustus* sp. n. ♀ HT; 16, *O. tuberculatus* sp. n. ♂ HT; 17, do. ♀ PT; 18, *O. peniculatus* sp. n. ♂ HT. The arrow in fig. 16 points to the transverse swelling of the vertex. Scales = 1 mm.



FIGS 19-30. Habitus of *Ornebius* species: 19, *O. samudra* sp. n. ♂ PT; 20, do. ♀ PT; 21, *O. serratus* sp. n. ♀ HT; 22, *O. consternus* sp. n. ♂ HT; 23, do. ♀ PT; 24, *O. dumoga* sp. n. ♂ HT; 25, do. ♀ PT; 26, *O. albipalpus* sp. n. ♀ HT; 27, *O. cibodas* sp. n. ♂ HT; 28, *O. imitatus* sp. n. ♀ HT; 29, *O. brevipalpus* sp. n. ♂ HT; 30, left hind leg of *O. consternus*. Scales = 1 mm.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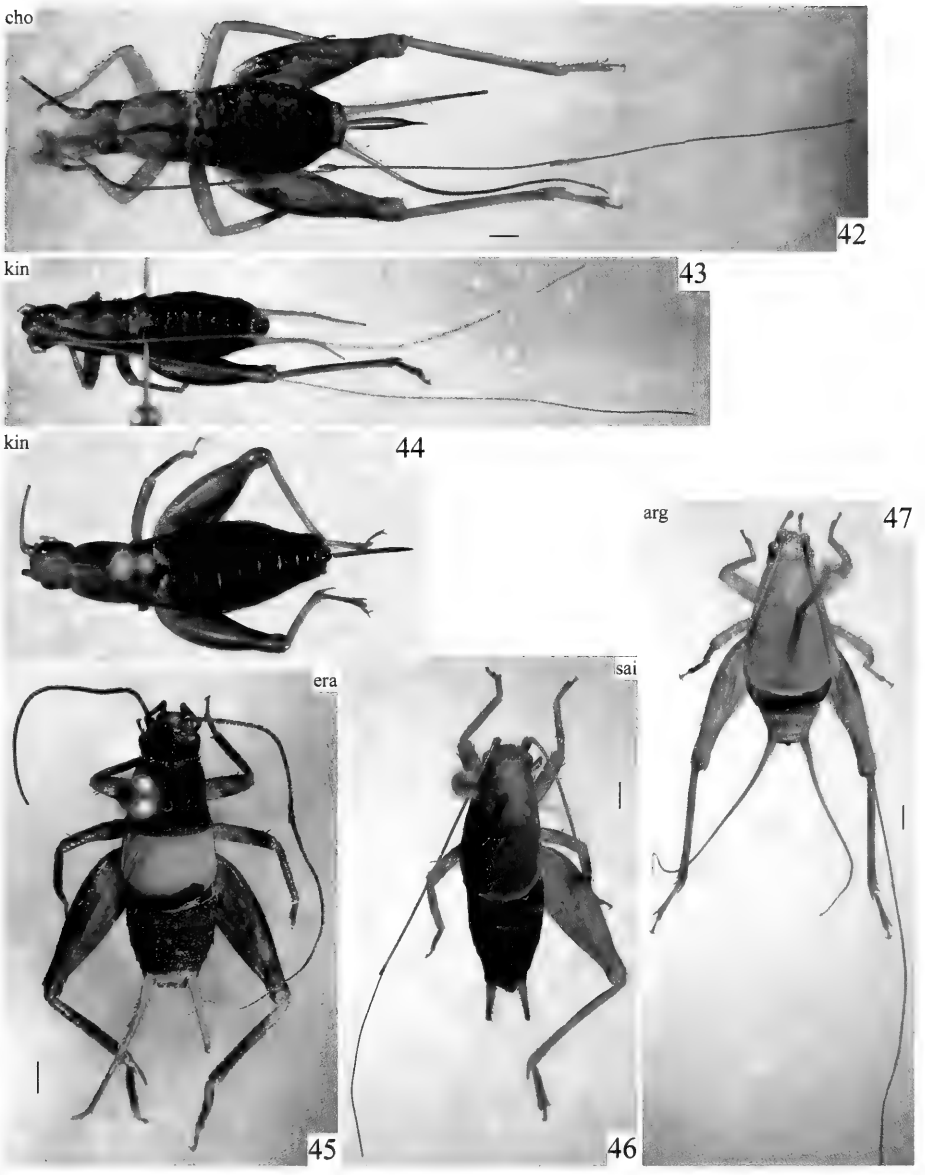
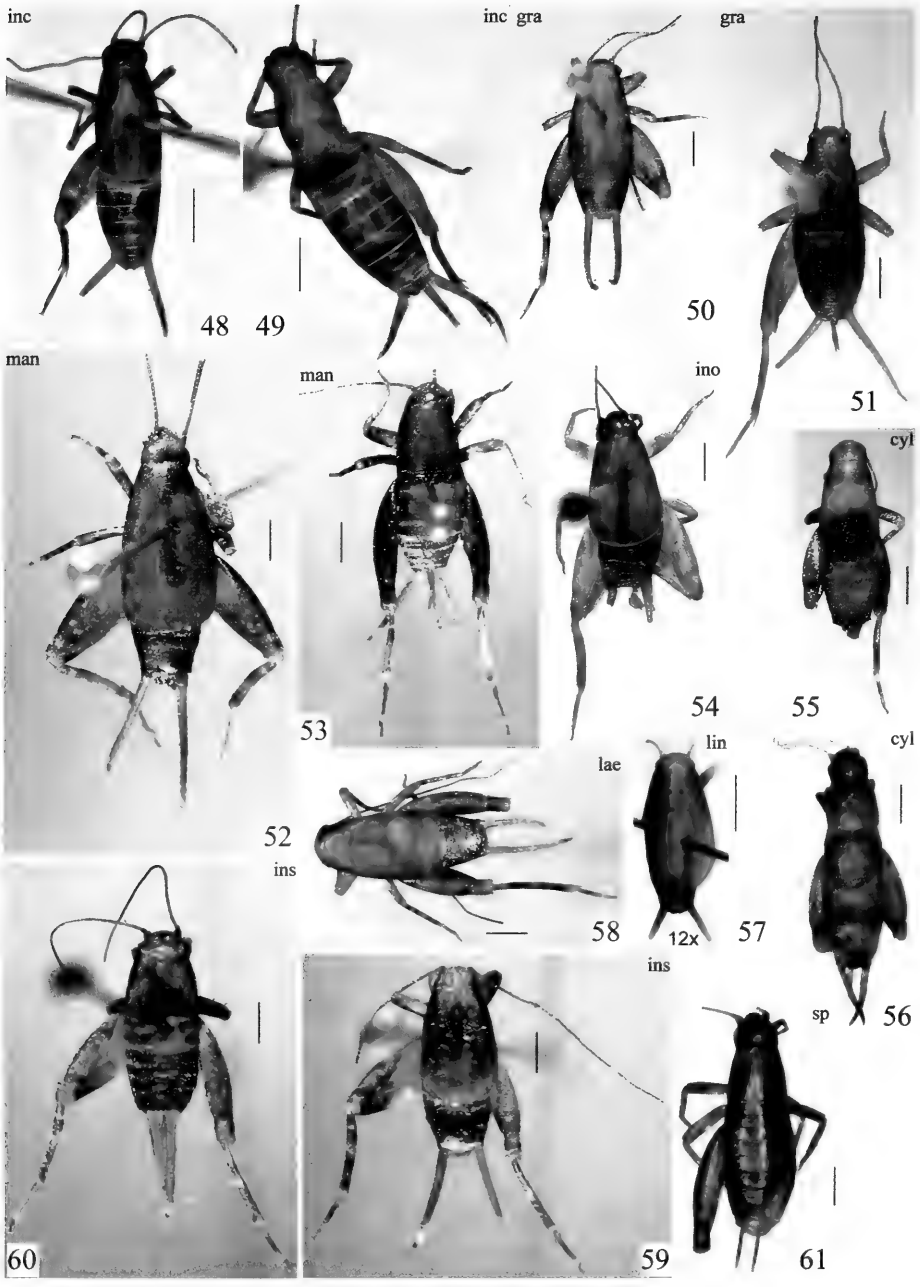
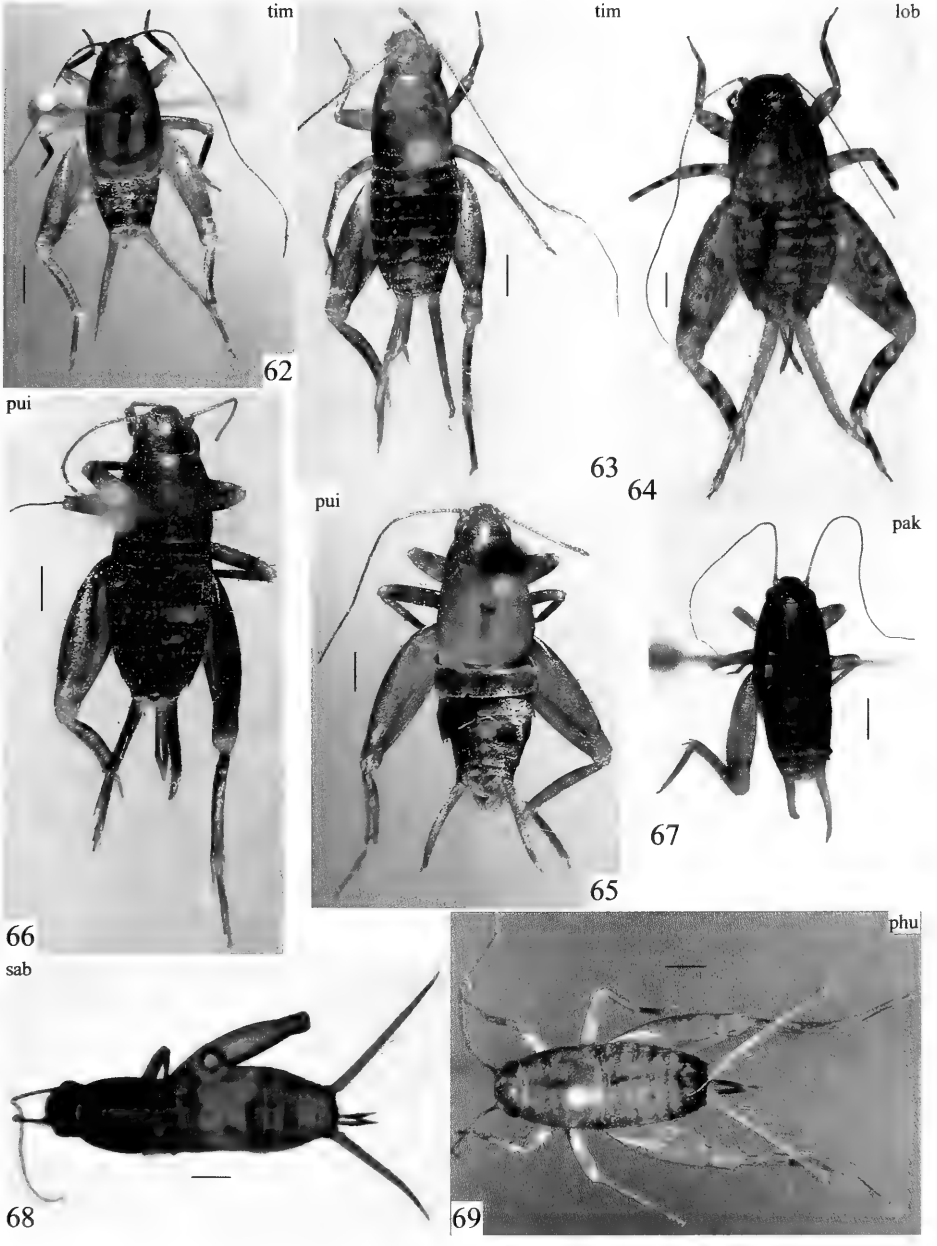


FIGS 42-47. Habitus of *Apterornebius, Gotvendia* and *Ectatoderus* species: 42, *A. chong* sp. n. ♀ HT; 43, *A. kinabalu* sp. n. ♂ HT; 44, do. ♀ PT; 45, *G. erawan* sp. n. ♂ HT; 46, *E. samui* sp. n. ♂ HT; 47, *E. argentatus* sp. n. ♂ HT. Scales = 1 mm.

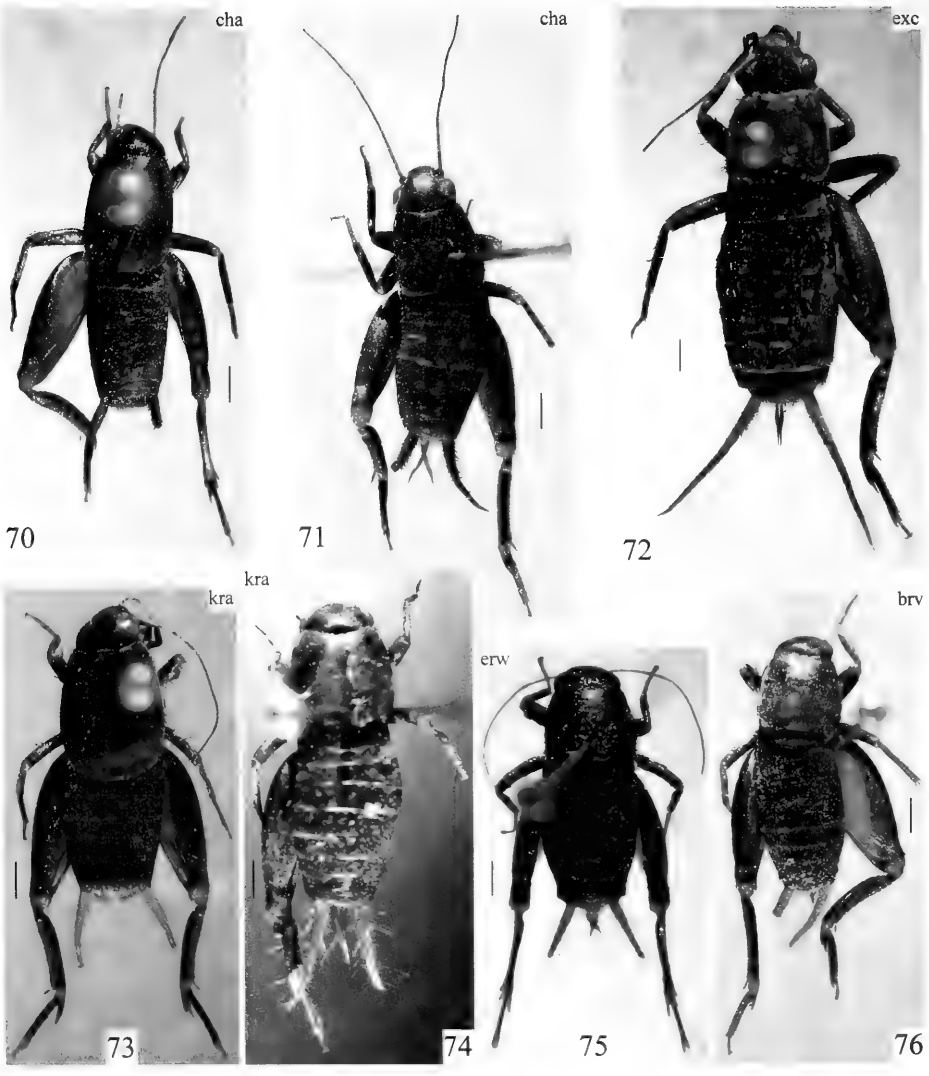
FIGS 31-41. Male tegmen of *Ornebius* and *Gotvendia* species: 31, *O. aureus* sp. n. HT; 32, *O. cibodas* sp. n. HT; 33, *O. brevipalpus* sp. n. HT; 34, *O. citrus* sp. n. PT; 35, *O. peniculatus* sp. n. HT; 36, *O. tuberculatus* sp. n. HT; 37, *O. dumoga* sp. n. PT; 38, *O. consternus* sp. n. ♂ HT; 39, *O. samudra* sp. n. HT; 40, *O. pullus* sp. n. HT; 41, *G. erawan* sp. n. HT.



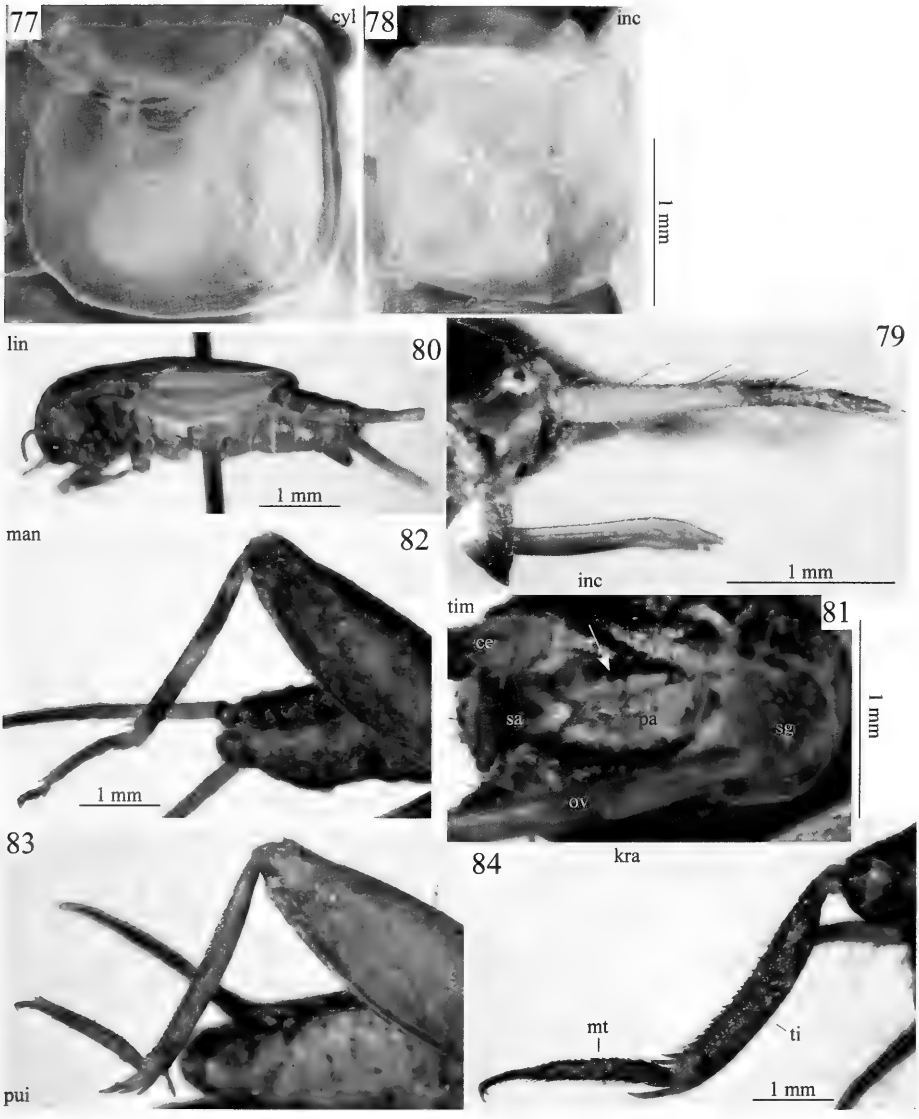
FIGS 48-61. Habitus of *Micrornebius* species: 48, *M. incertus* (Ingrisch, 1998) ♂ (Sorinsim); 49, do. ♀; 50, *M. gracilicornis* (Chopard, 1969) ♂ (Palabuan Ratu); 51, do. ♀; 52, *M. maninjau* sp. n. ♂ HT; 53, do. ♀ PT; 54, *M. inopinatus* sp. n. ♂ HT; 55, *M. cylindricus* sp. n. ♂ HT; 56, do. ♀ PT; 57, *M. lineatus* sp. n. ♂ HT; 58, *M. laem* sp. n. ♂ HT; 59, *M. insularis* sp. n. ♂ HT; 60, do. ♀ PT; 61, *M.* spec. ♀ (Bukit Timah). Scales = 1 mm.



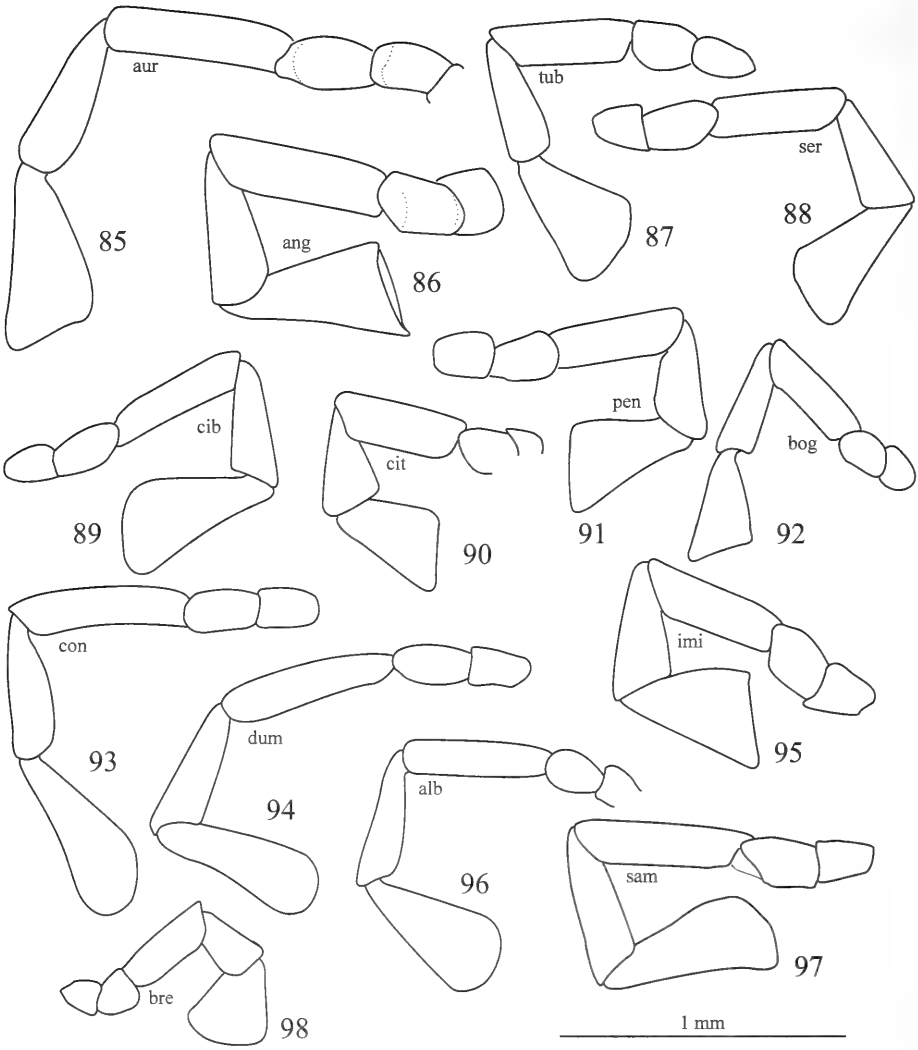
FIGS 62-69. Habitus of *Cycloptiloides* species: 62, *C. timah* sp. n. ♂ HT; 63, do. ♀ PT; 64, *C. lobicauda* sp. n. ♀ HT; 65, *C. pui* sp. n. ♂ HT; 66, do. ♀ PT; 67, *C. pakchong* sp. n. ♂ HT; 68, *C.* sp. 1 ♀; 69, *C.* sp. 2 ♀. Scales = 1 mm.



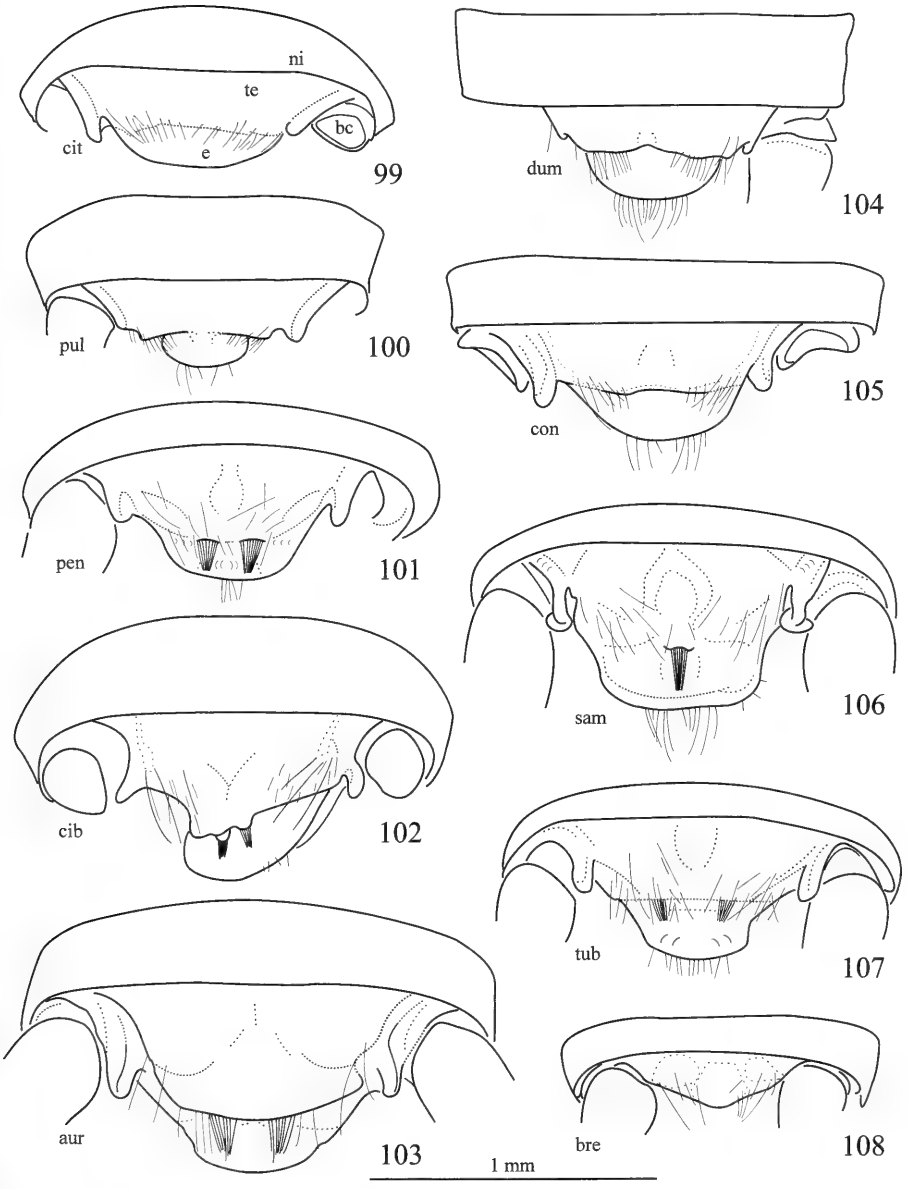
FIGS 70-76. Habitus of *Terraplistes* species: 70, *T. chantri* sp. n. ♂ HT; 71, do. ♀ PT; 72, *T. excisa* sp. n. ♀ HT; 73, *T. kradung* sp. n. ♂ HT; 74, do. ♀ PT; 75, *T. erawan* sp. n. ♀ HT; 76, *T. brevicauda* sp. n. ♀ HT. Scales = 1 mm.



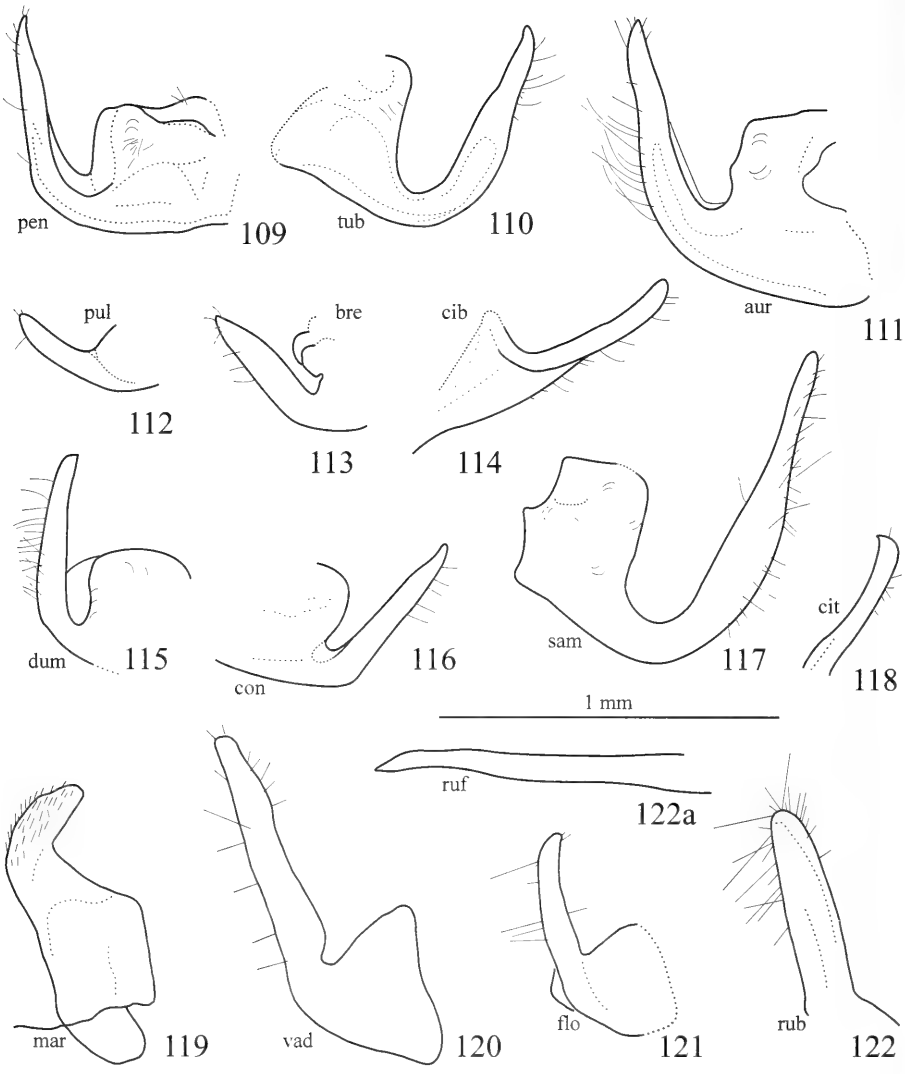
FIGS 77-84. Details of *Microrhebius, Cycloptiloides* and *Terraplistes* species: 77, Tegmen of *M. cylindricus* sp. n. ♂ PT; 78, do. of *M. incertus* (Ingrisch, 1998) ♂ PT; 79, abdominal apex in lateral view of *M. incertus* ♀ (Sorinsim); 80, habitus lateral view of *M. lineatus* sp. n. ♂ HT; 81, abdominal apex in ventral view of *C. timah* sp. n. ♀ PT, the arrow points at the carina of the paraproct; 82, right hind leg of *M. maninjau* sp. n. ♂ HT; 83, do. of *C. pui* sp. n. ♂ HT; 84, do. of *T. kradung* sp. n. ♂ HT.



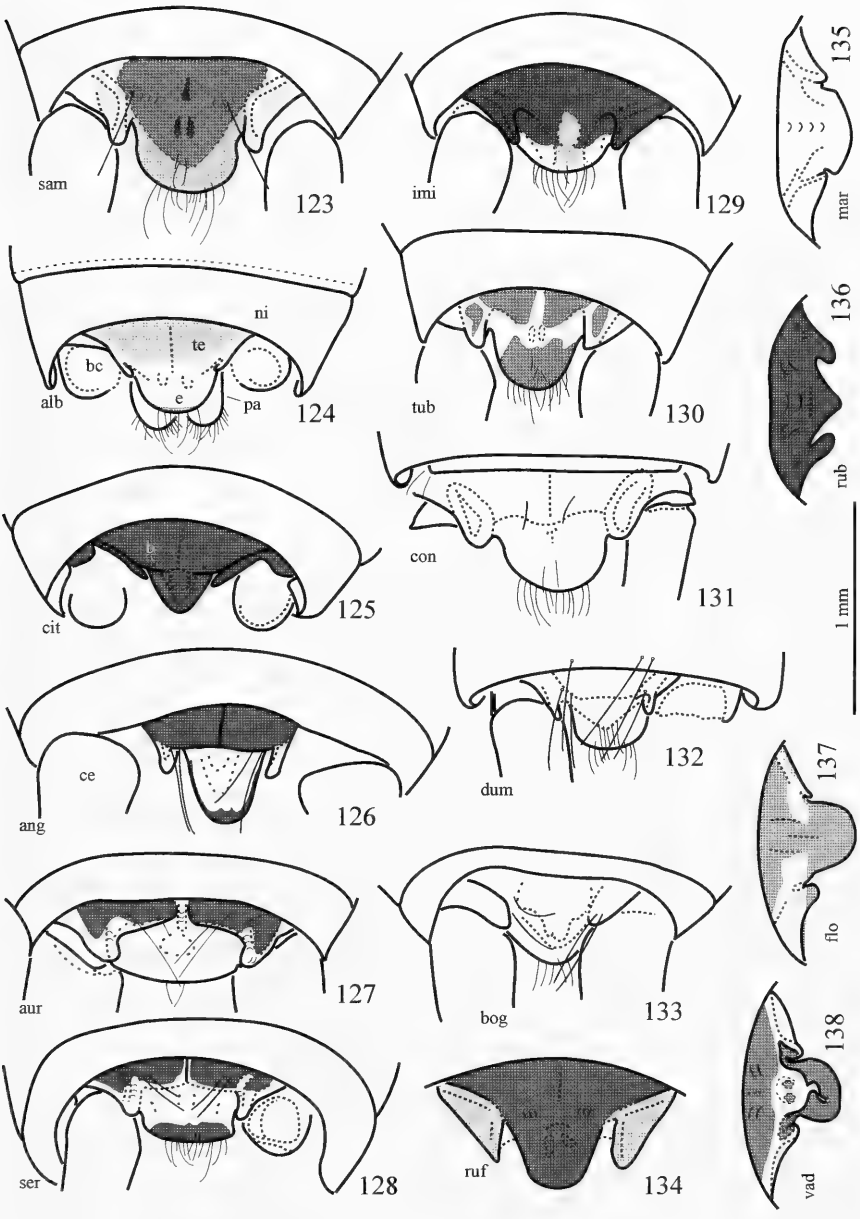
FIGS 85-98. Maxillary palps of *Ornebius* species: 85, *O. aureus* sp. n. ♂ HT; 86, *O. angustus* sp. n. ♀ HT; 87, *O. tuberculatus* sp. n. ♂ HT; 88, *O. serratus* sp. n. ♀ HT; 89, *O. cibodas* sp. n. ♂ HT; 90, *O. citrus* sp. n. ♂ PT; 91, *O. peniculatus* sp. n. ♂ HT; 92, *O. bogor* sp. n. ♀ HT; 93, *O. consternus* sp. n. ♂ PT; 94, *O. dumoga* sp. n. ♂ HT; 95, *O. imitatus* sp. n. ♀ HT; 96, *O. albipalpus* sp. n. ♀ HT; 97, *O. samudra* sp. n. ♂ HT; 98, *O. brevipalpus* sp. n. ♂ HT.



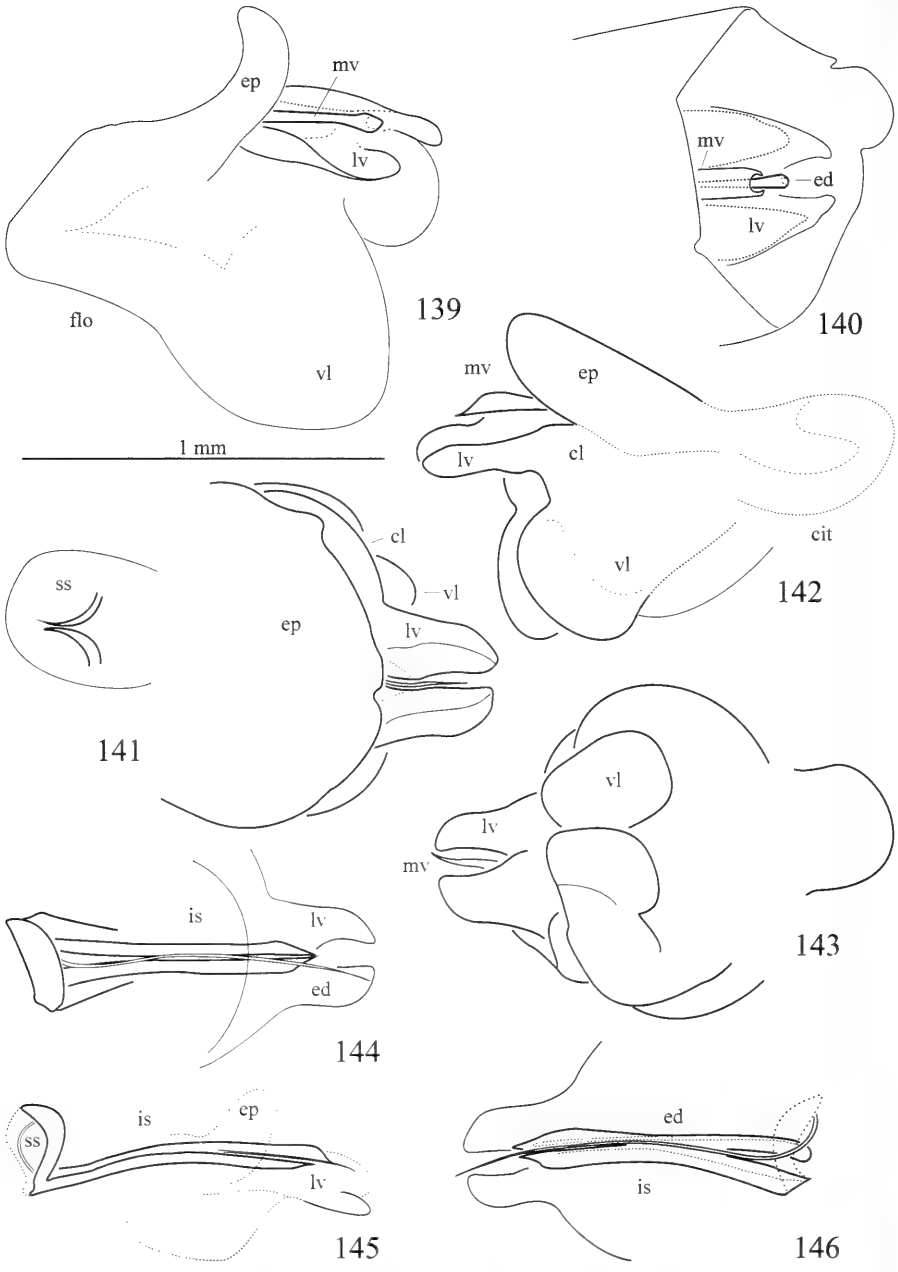
FIGS 99-108. Abdominal apex with supra-anal plate of *Ornebius* males: 99, *O. citrus* sp. n. PT; 100, *O. pullus* sp. n. HT; 101, *O. peniculatus* sp. n. HT; 102, *O. cibodas* sp. n. HT; 103, *O. aureus* sp. n. HT; 104, *O. dumoga* sp. n. HT; 105, *O. consternus* sp. n. PT; 106, *O. samudra* sp. n. HT; 107, *O. tuberculatus* sp. n. HT; 108, *O. brevipalpus* sp. n. HT.



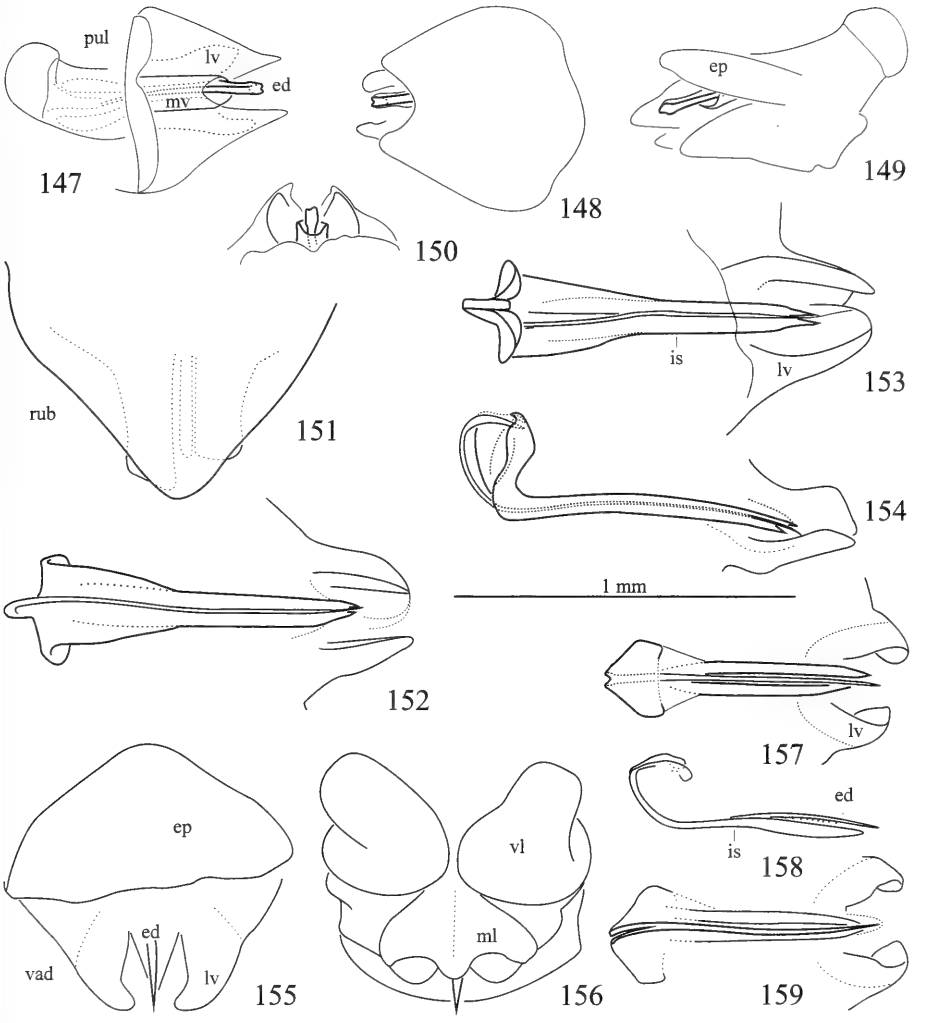
FIGS 109-122. Male paraproct (112-113, 118, 122, process only) of *Ornebius* species: 109, *O. peniculatus* sp. n. HT; 110, *O. tuberculatus* sp. n. HT; 111, *O. aureus* sp. n. HT; 112, *O. pullus* sp. n. HT; 113, *O. brevipalpus* sp. n. HT; 114, *O. cibodas* sp. n. HT; 115, *O. dumoga* sp. n. HT; 116, *O. consternus* sp. n. PT; 117, *O. samudra* sp. n. HT; 118, *O. citrus* sp. n. PT; 119, *O. marginatus* Ingrisch, 1998; 120, *O. vadus* Ingrisch, 1998; 121, *O. flori* Ingrisch, 1998; 122, *O. rubidus* Ingrisch, 1998; 122a, *O. rufonigrus* Ingrisch, 1987.



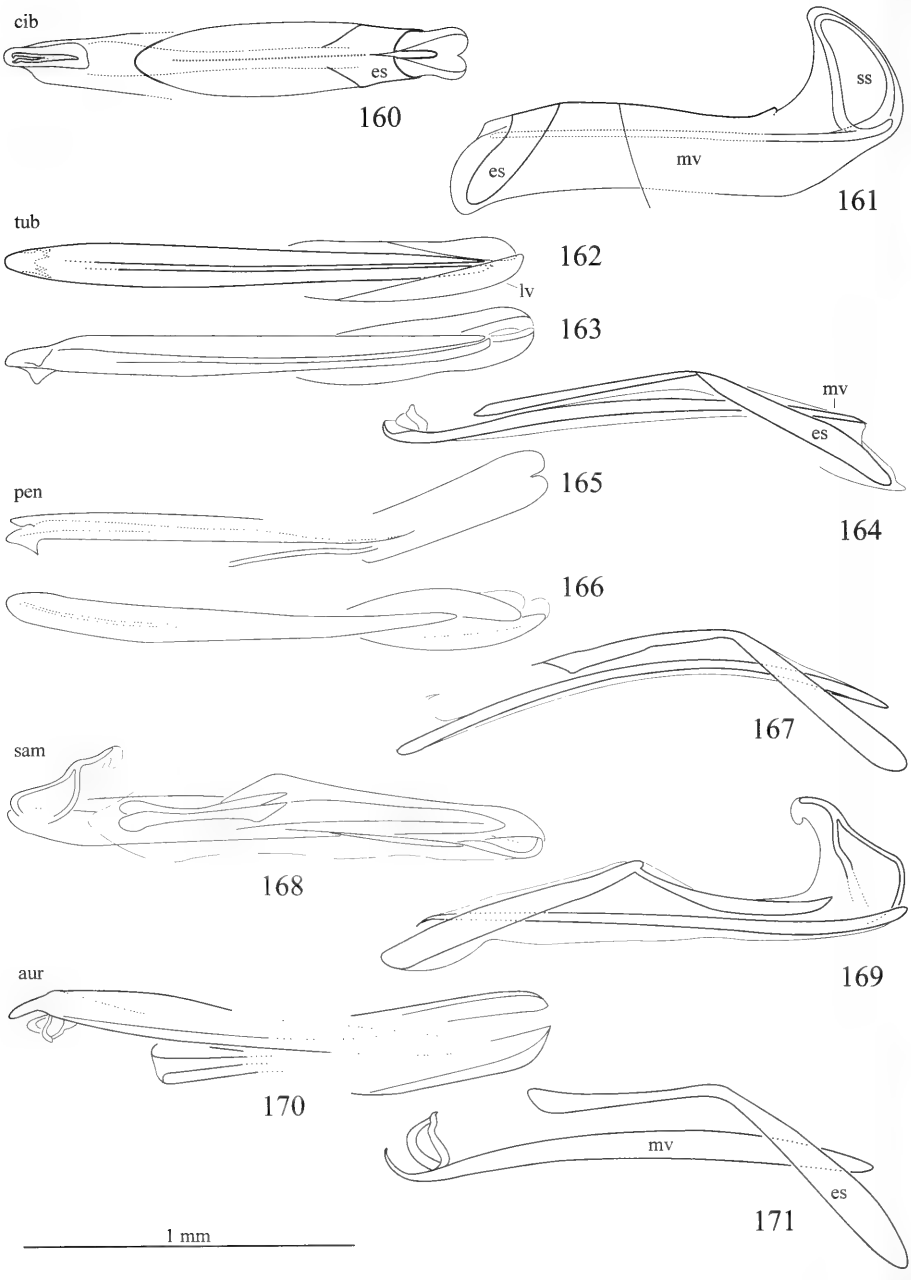
FIGS 123-138. Abdominal apex with supra-anal plate (134-138 supra-anal plate only) of *Ornebius* females: 123, *O. samudra* sp. n. PT; 124, *O. albipalpus* sp. n. HT; 125, *O. citrus* sp. n. PT (hairs broken, not drawn); 126, *O. angustus* sp. n. HT; 127, *O. aureus* sp. n. PT; 128, *O. serratus* sp. n. HT; 129, *O. imitatus* sp. n. HT; 130, *O. tuberculatus* sp. n. PT; 131, *O. consternus* sp. n. PT; 132, *O. dumoga* sp. n. PT; 133, *O. bogor* sp. n. HT; 134, *O. rufonigrus* Ingrisch, 1987 PT; 135, *O. marginatus* Ingrisch, 1998 PT; 136, *O. rubidus* Ingrisch, 1998 PT; 137, *O. flori* Ingrisch, 1998 PT; 138, *O. vadus* Ingrisch, 1998 PT. Colour pattern is indicated for the supra-anal plate only.



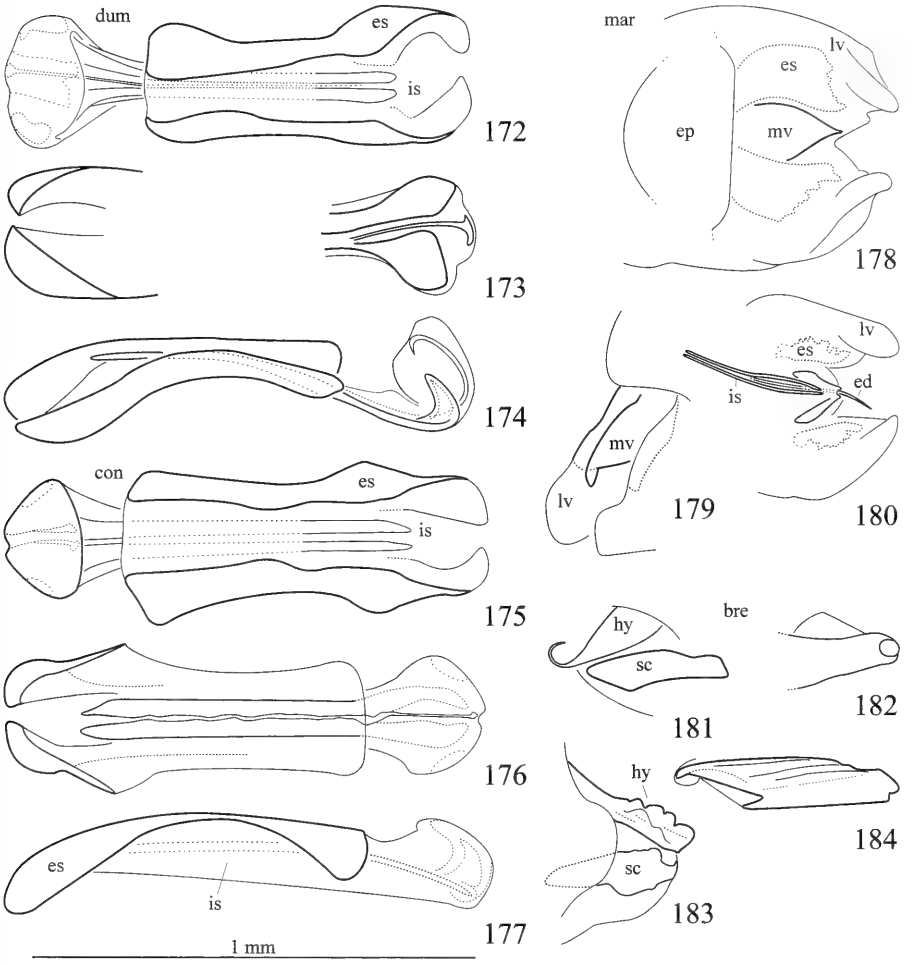
FIGS 139-146. Male phallic complex of *Ornebius* species: 139-140, *O. flori* Ingrisch, 1998 (Poring, Sorinsim); 141-146, *O. citrus* sp. n. PT. – 139-143, In situ of ethanol conserved specimens showing huge membranous parts; 144-146, after cleaning in KOH mainly sclerotised structures remain. – 139, 142, 145, Lateral view; 140, 141, 144, dorsal view; 143, 146, ventral view.



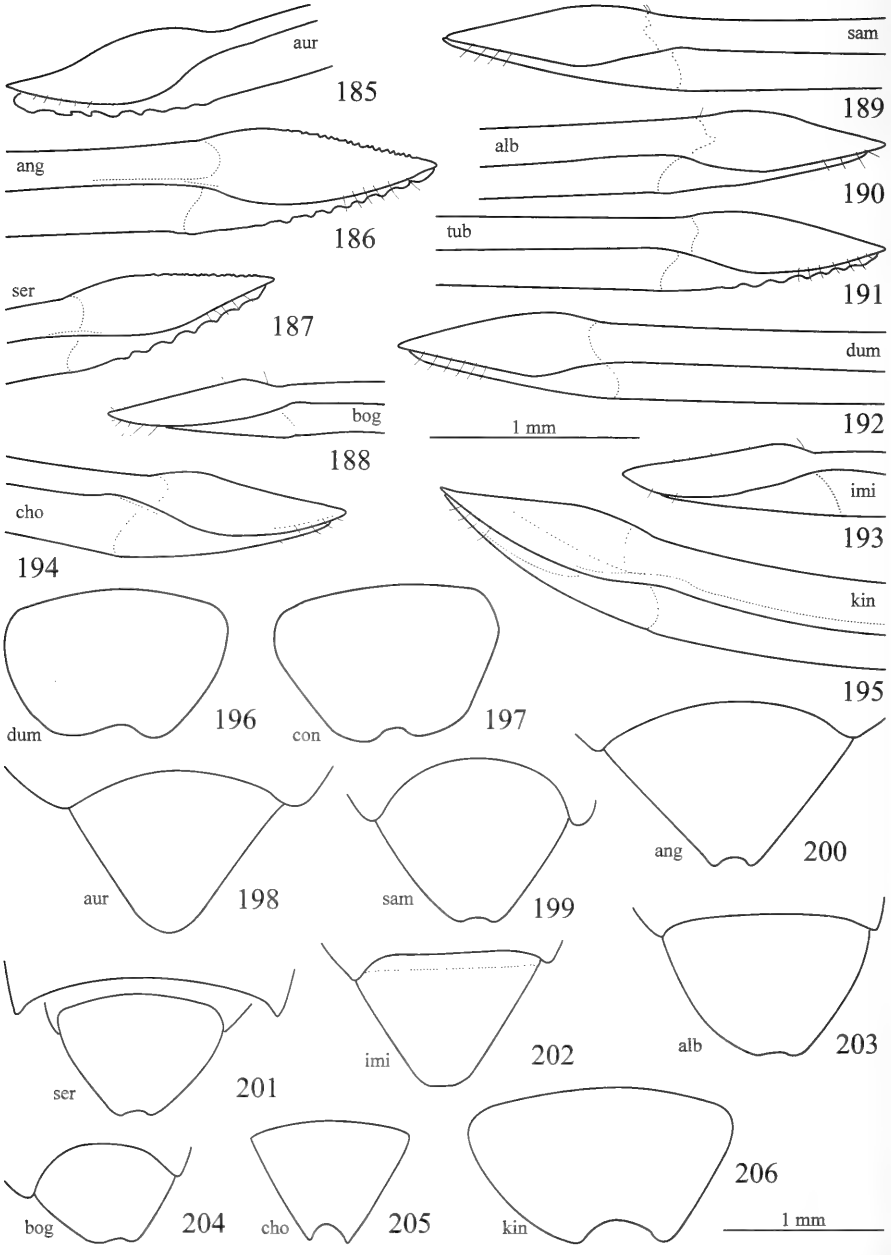
FIGS 147-159. Male phallic complex of *Ornebius* species: 147-150, *O. pullus* sp. n. HT; 151-154, *O. rubidus* Ingrisch, 1998 (Poring); 155-159, *O. vadus* Ingrisch, 1998 (Poring). – 147-151, 155-156, In situ of ethanol conserved specimens; 152-154, 157-159, after cleaning in KOH. – 147, 153, 155, 157, Dorsal view; 148, 151-152, 156, 159, ventral view; 149, latero-apical view; 150, apical view; 154, 158, lateral view.



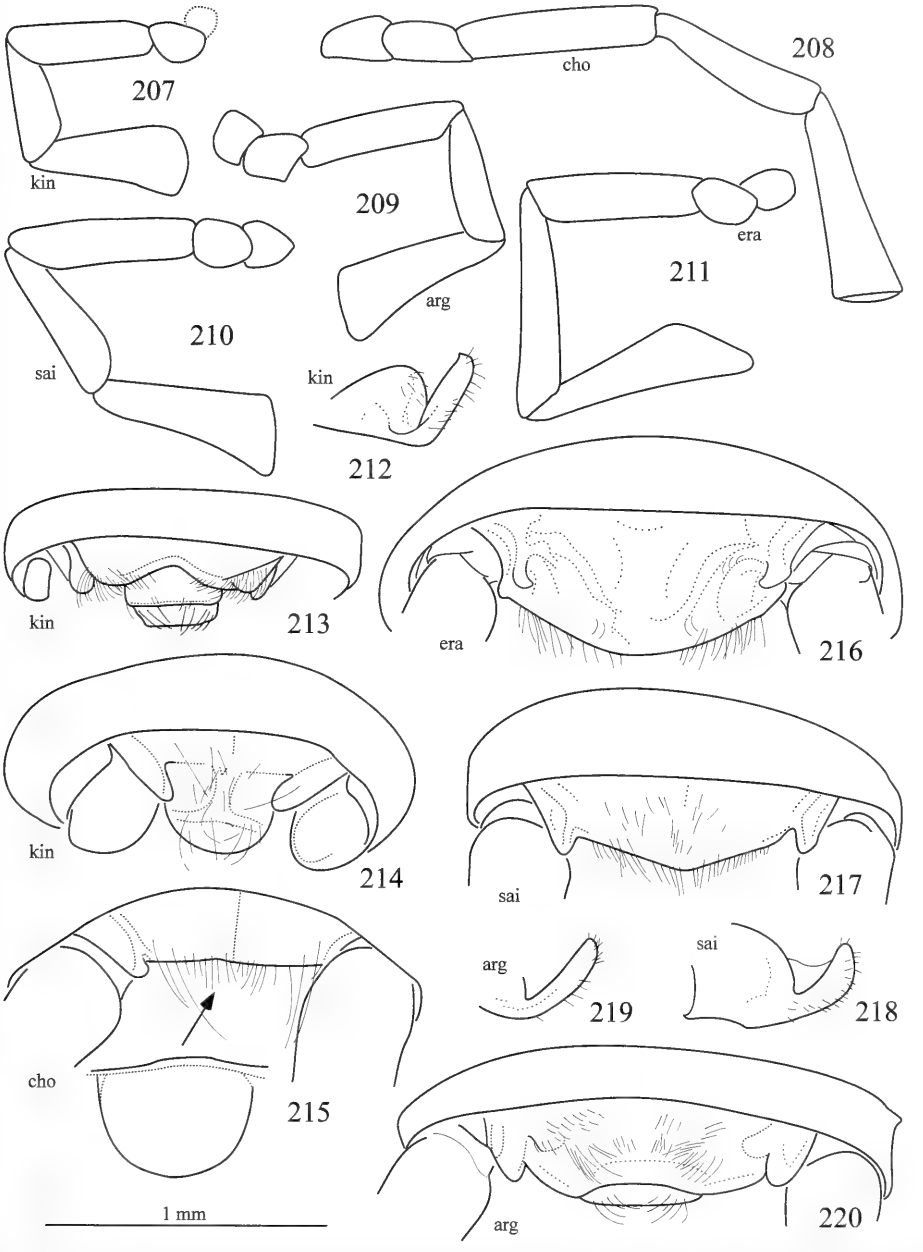
FIGS 160-171. Male phallic complex of *Ornebius* species: 160-161, *O. cibodas* sp. n. HT; 162-164, *O. tuberculatus* sp. n. HT; 165-167, *O. peniculatus* sp. n. HT; 168-169, *O. samudra* sp. n. HT; 170-171, *O. aureus* sp. n. HT. – All after cleaning in KOH. – 160, 162, 165, 168, Dorsal view; 163, 166, 170, ventral view; 161, 164, 167, 169, 171, lateral view.



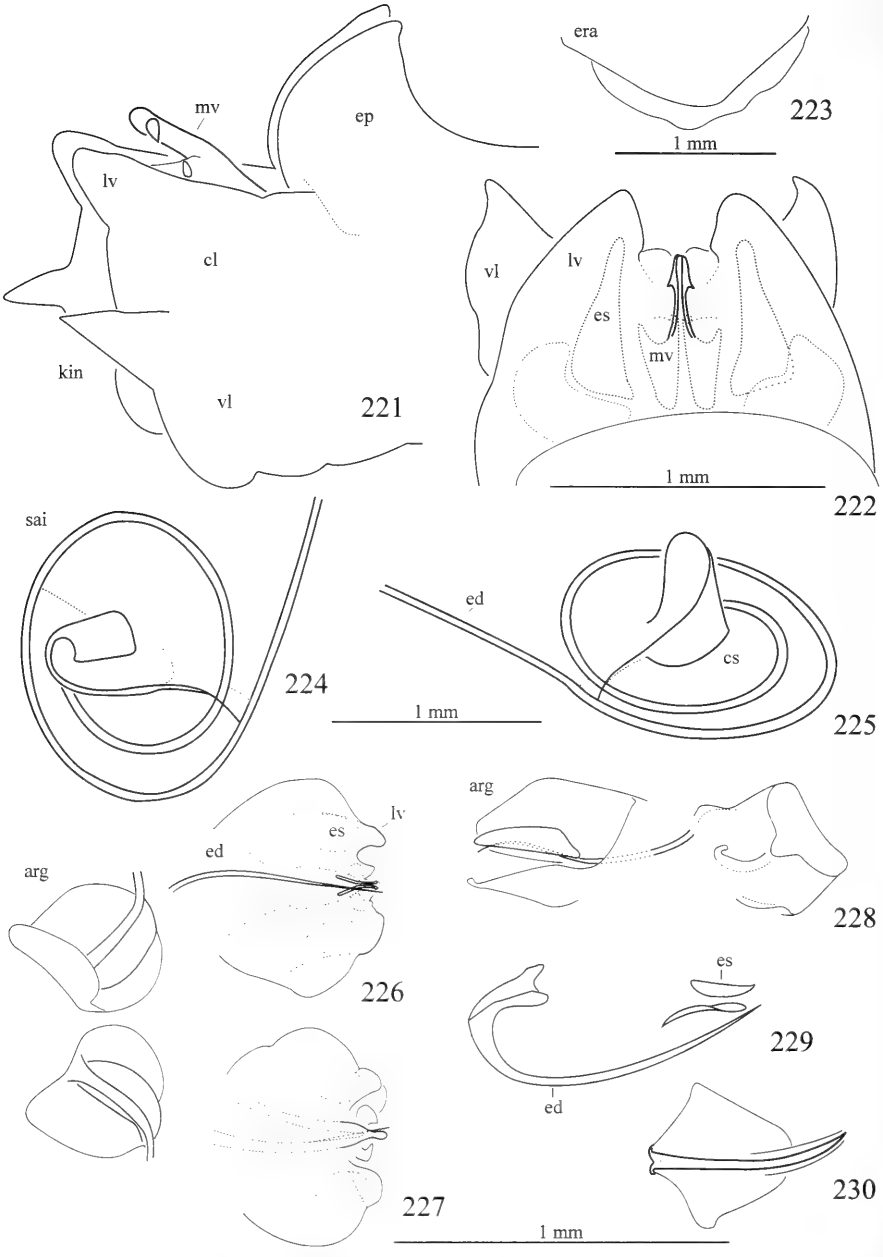
FIGS 172-184. Male phallic complex of *Ornebius* species: 172-174, *O. dumoga* sp. n. PT; 175-177, *O. consternus* sp. n. PT; 178-180, *O. marginatus* Ingrisch, 1998 (178-179, Poring; 180, Crocker Range); 181-184, *O. brevipalpus* sp. n. HT. – 178-179, In situ of ethanol conserved specimens; 172-177, 180-184, after cleaning in KOH. – 172, 175, 178, 180, 181, Dorsal view; 173, 176, 183, ventral view; 174, 177, 179, 182, lateral view; 184, separate right sclerite.



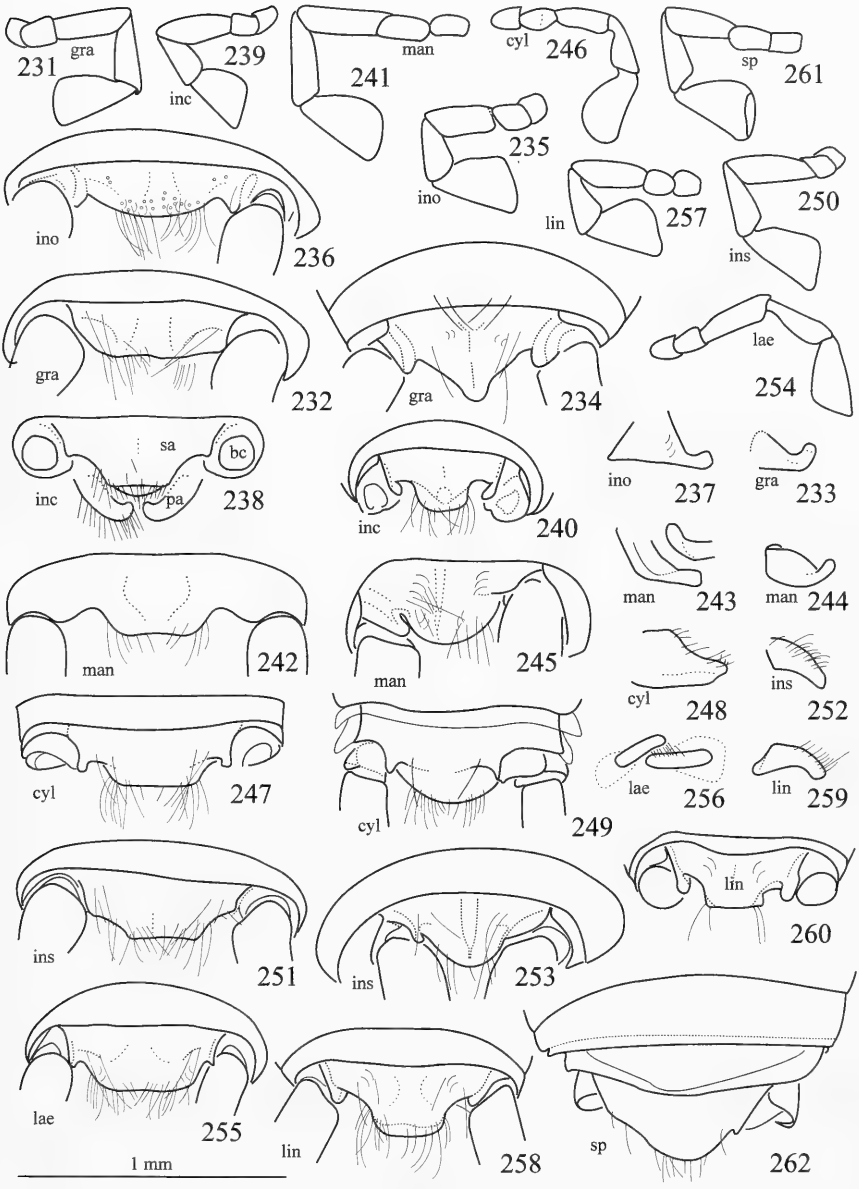
FIGS 185-206. Apical area of ovipositor (185-195) and subgenital plate (196-206) of *Ornebius* and *Apterornebius* females: 185, 198, *O. aureus* sp. n. PT; 186, 200, *O. angustus* sp. n. HT; 187, 201, *O. serratus* sp. n. HT; 188, 204, *O. bogor* sp. n. HT; 189, 199, *O. samudra* sp. n. PT; 190, 203, *O. albipalpus* sp. n. HT; 191, *O. tuberculatus* sp. n. PT; 192, 196, *O. dumoga* sp. n. PT; 193, 202, *O. imitatus* sp. n. HT; 194, 205, *A. chong* sp. n. HT; 195, 206, *A. kinabalu* sp. n. PT; 197, *O. consternus* sp. n. PT.



FIGS 207-220. Maxillary palps (207-211), abdominal apex with supra-anal plate (213-217, 220) and male paraproct (212, 218-219) of *Apterornebius, Ectatoderus* and *Gotvendia* species: 207, 212-213, *A. kinabalu* sp. n. ♂ PT; 214, do. ♀ PT; 208, 215, *A. chong* sp. n. ♀ HT (in 215 epiproct strongly bent downwards and drawn separately); 209, 219-220, *E. argentatus* sp. n. ♂ PT (220, apex of supra-anal plate artificially upcurved in preparation); 210, 217-218, *E. samui* sp. n. ♂ HT; 211, 216, *G. erawan* sp. n. ♂ HT.



FIGS 221-230. Male phallic complex of *Apterornebius, Gotvendia* and *Ectatoderus* species: 221-222, *A. kinabalu* sp. n. PT; 223, *G. erawan* sp. n. PT; 224-225, *E. samui* sp. n. HT; 226-230, *E. argentatus* sp. n. ♂ PT. – 221-223, 226-228, In situ of ethanol conserved specimens; 224-225, 229-230, after cleaning in KOH. – 221, 228-229, Lateral view; 222-223, 226, dorsal view; 224, left side; 225, right side; 227, ventral view [226-228, basal part of phallic complex broken off during preparation and not in same orientation as remainder of phallus]; 230, ventro-basal view.



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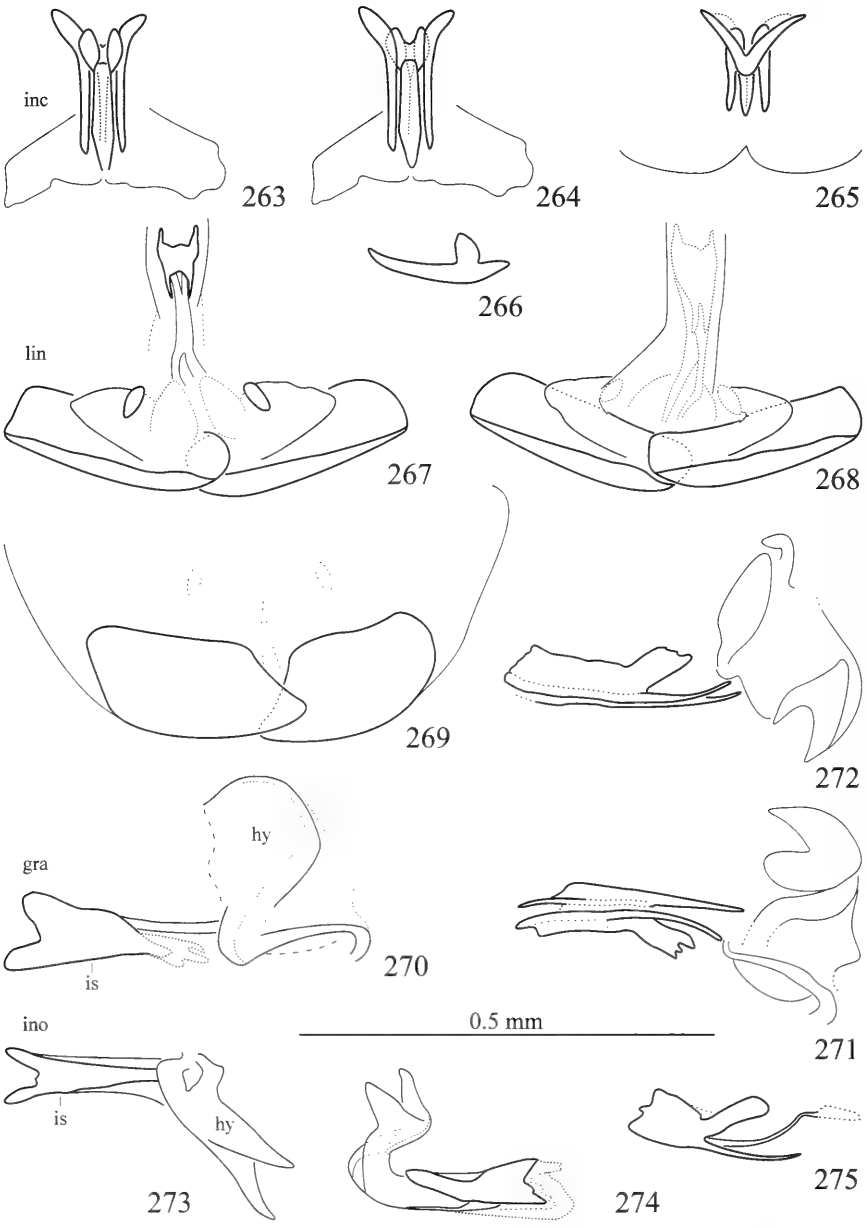
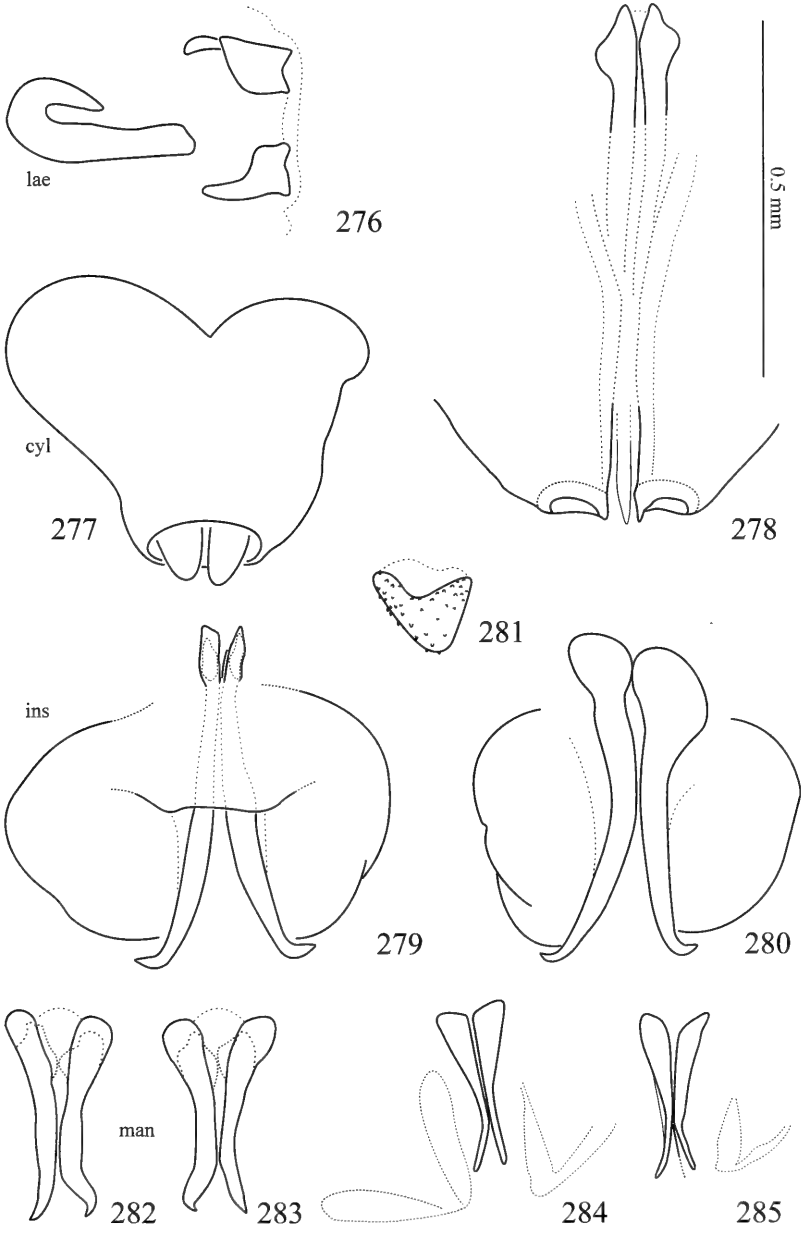
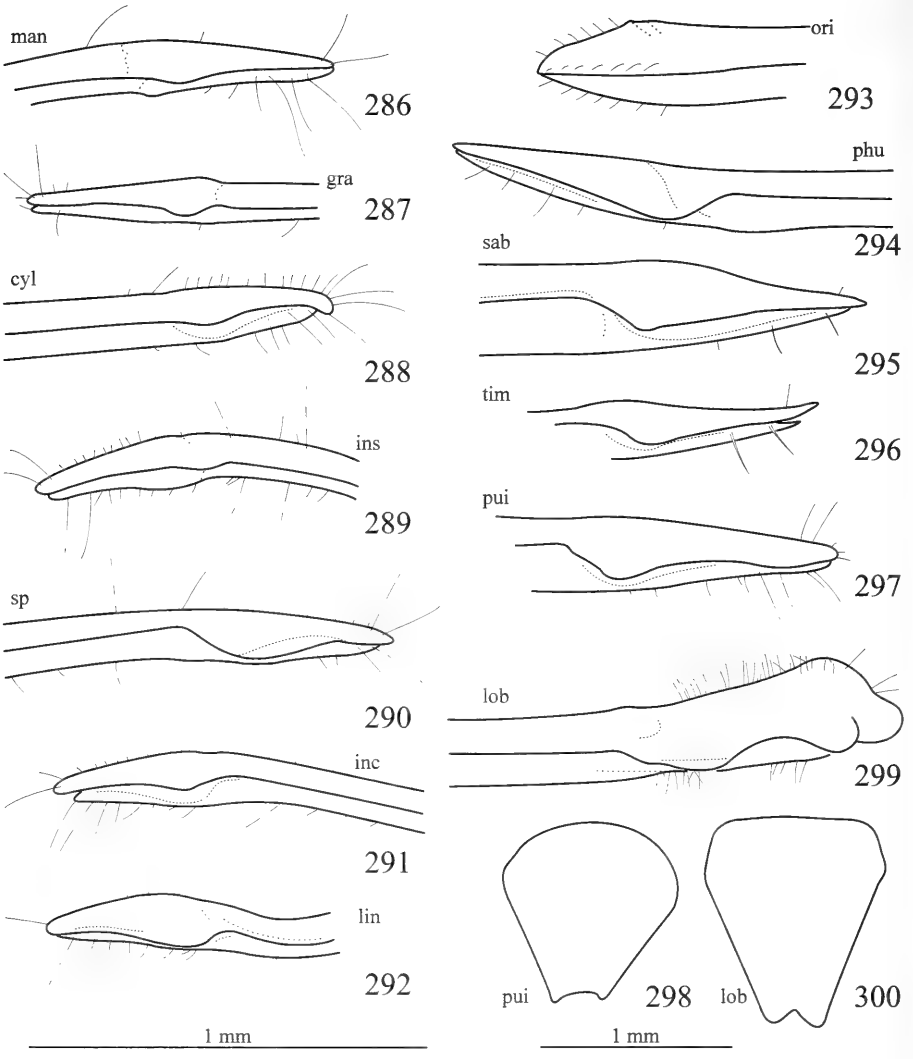


FIGS 263-275. Male phallic complex of *Micrornebius* species: 263-266, *M. incertus* (Ingrisch, 1998) HT; 267-268, *M. lineatus* sp. n. HT; 269, do. PT; 270-272, *M. gracilicornis* (Chopard, 1969) (Palabuan Ratu); 273-275, *M. inopinatus* sp. n. HT. – 269 in situ of ethanol conserved specimen, others after cleaning in KOH. – 263, 267, 270, 273, dorsal view; 264, 268, ventral view; 265, dorso-anterior view; 266, 272, 275, lateral view; 269, oblique apical view; 271, ventro-lateral view; 274, dorso-lateral view.



FIGS 276-285. Male phallic complex of *Micrornebius* species: 276, *M. laem* sp. n. HT; 277-278, *M. cylindricus* sp. n. HT; 279-281, *M. insularis* sp. n. HT; 282-283, *M. maninjau* sp. n. HT; 284-285, do. PT. All after cleaning in KOH. – 276, Dorso-lateral view; 277, cylindrical shape of external membranous phallus; 278, external membranous structure cut and opened; 279, 282, 284, dorsal view; 280, 283, 285, ventral view; 281, epiphallus sclerite.



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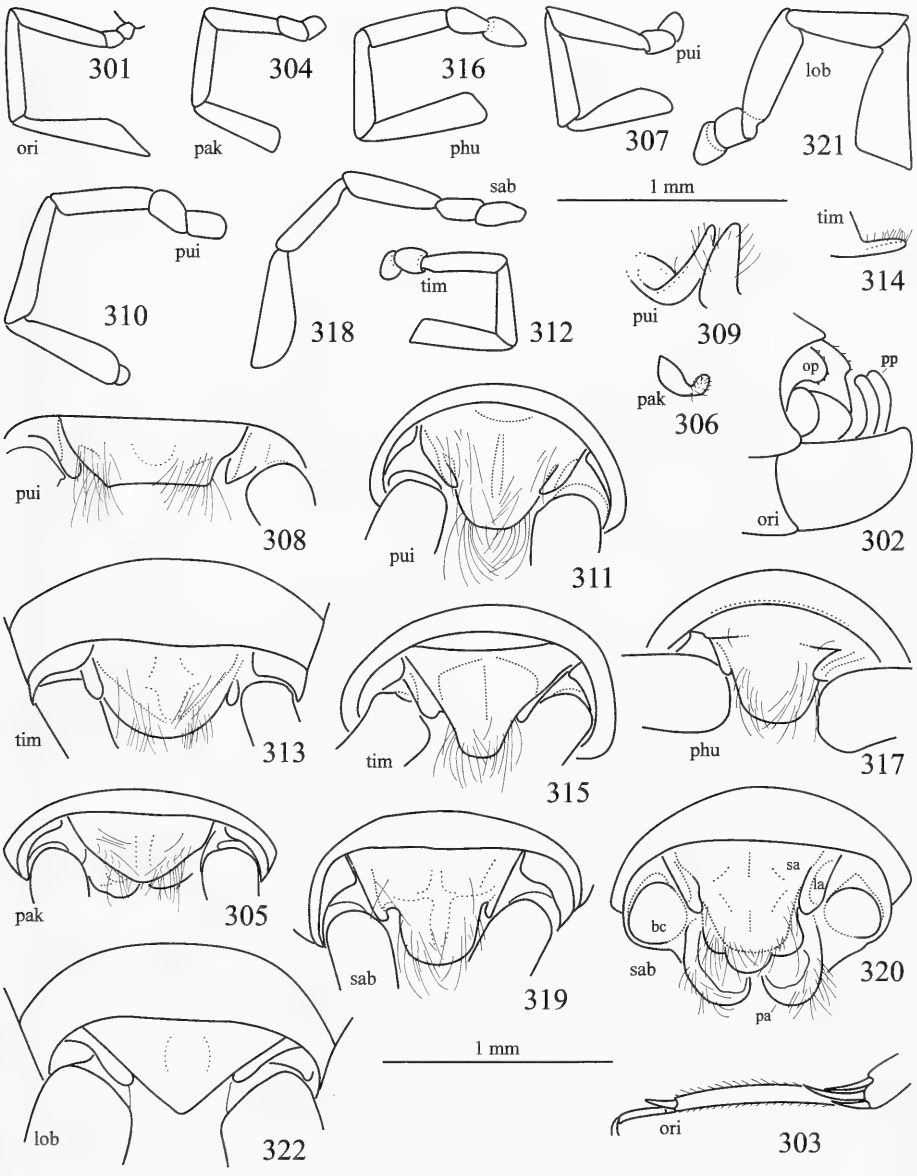

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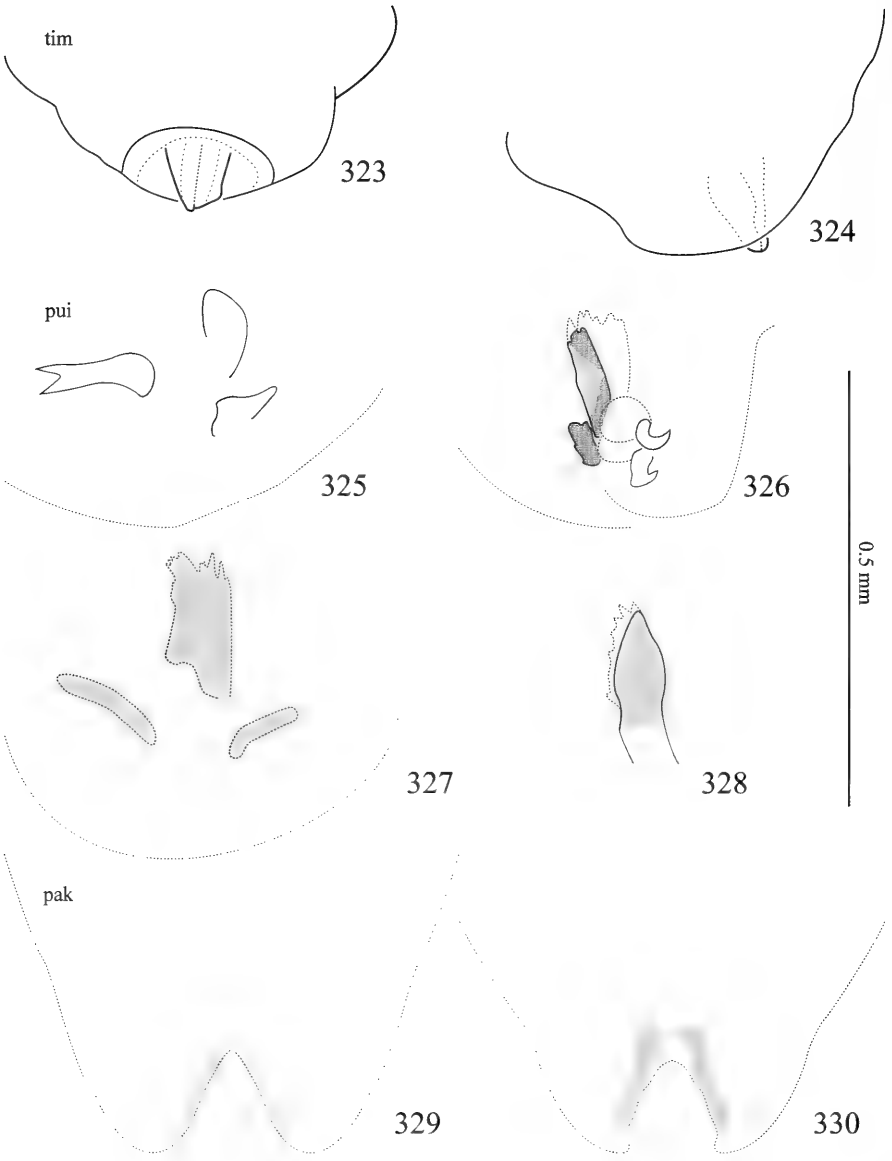

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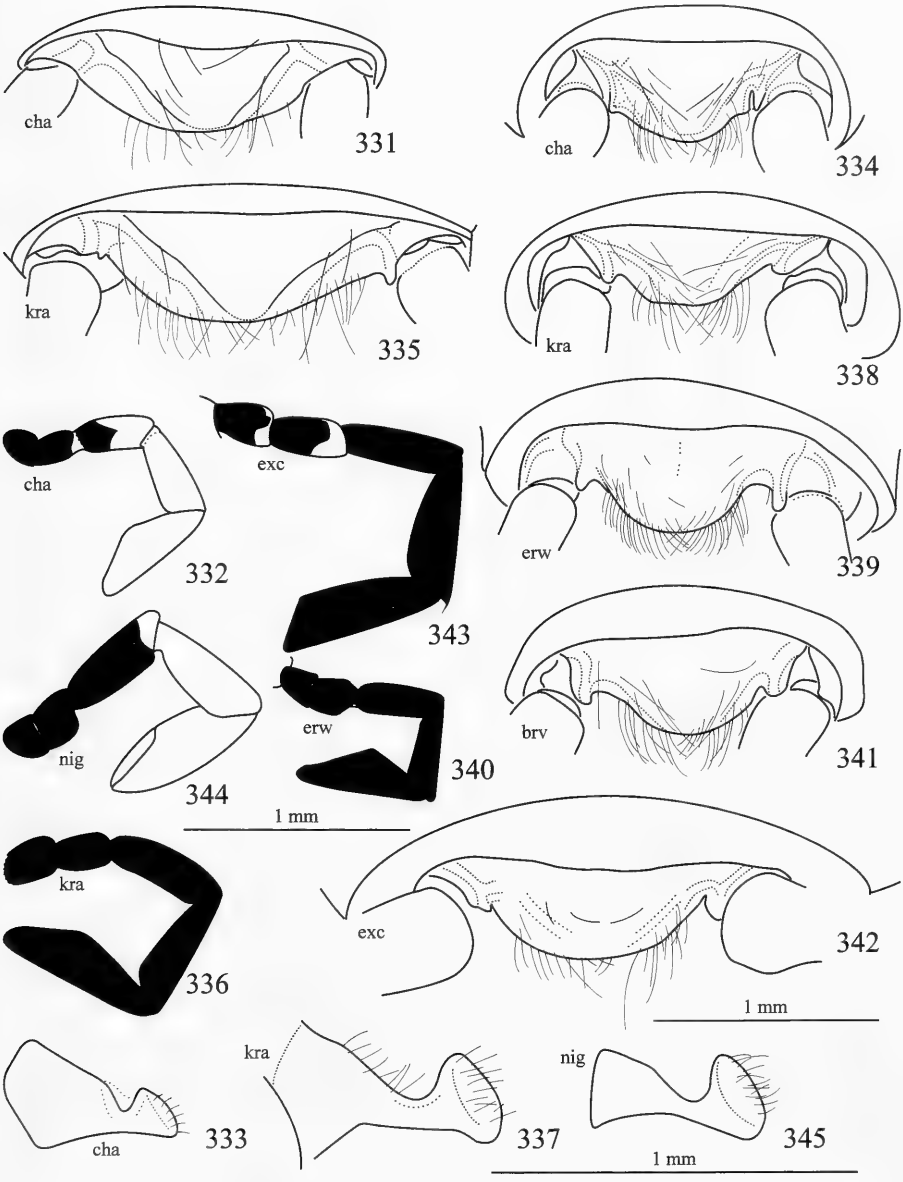

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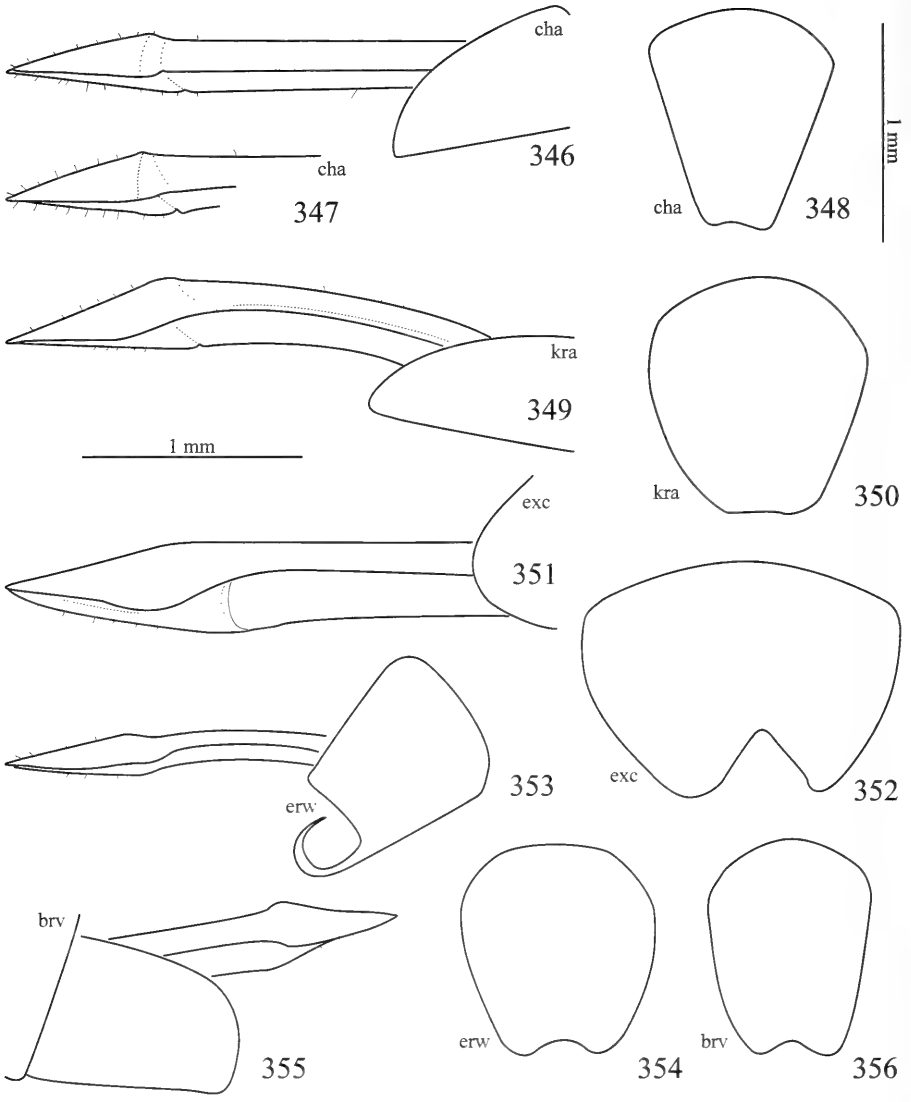

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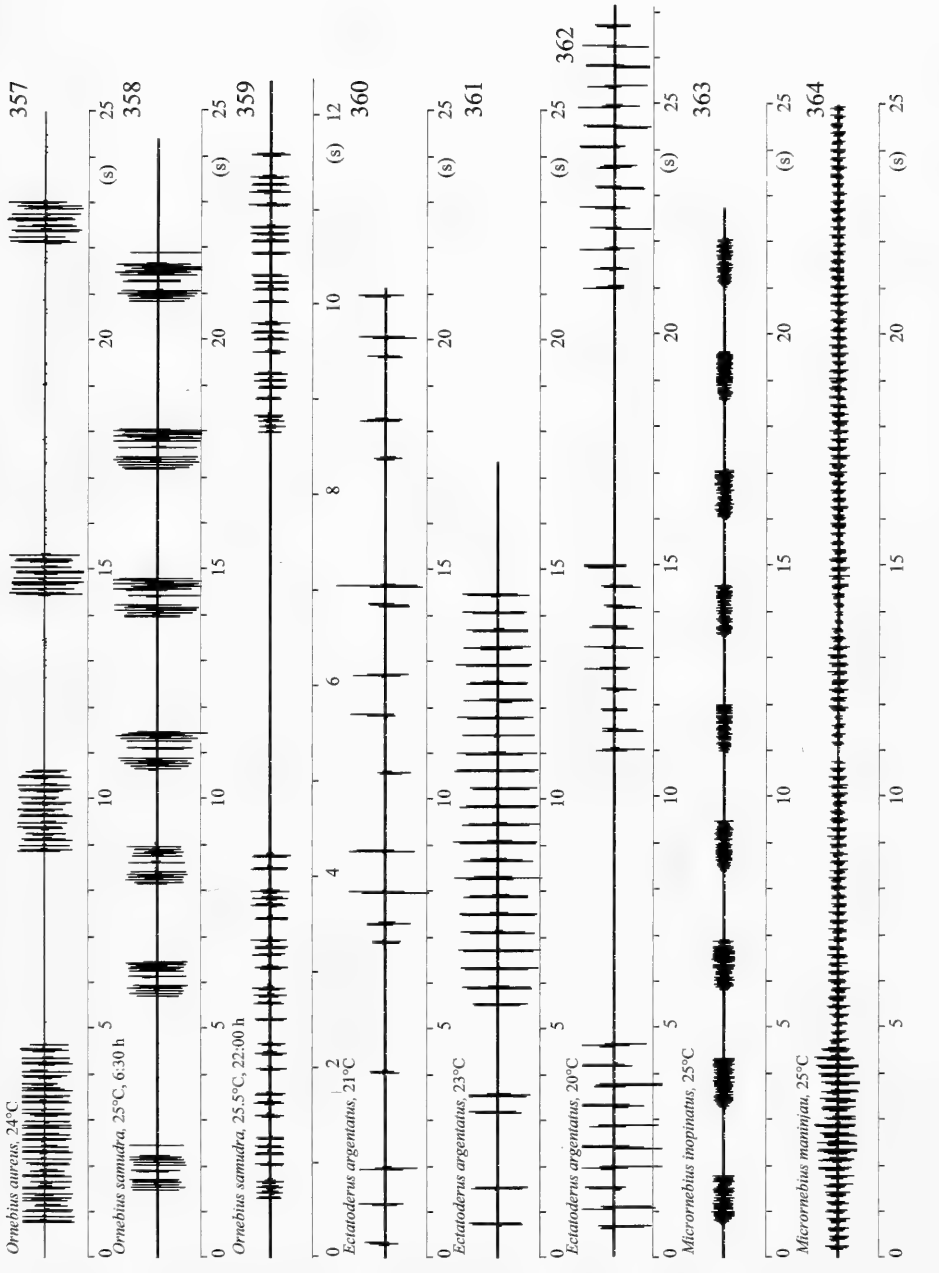

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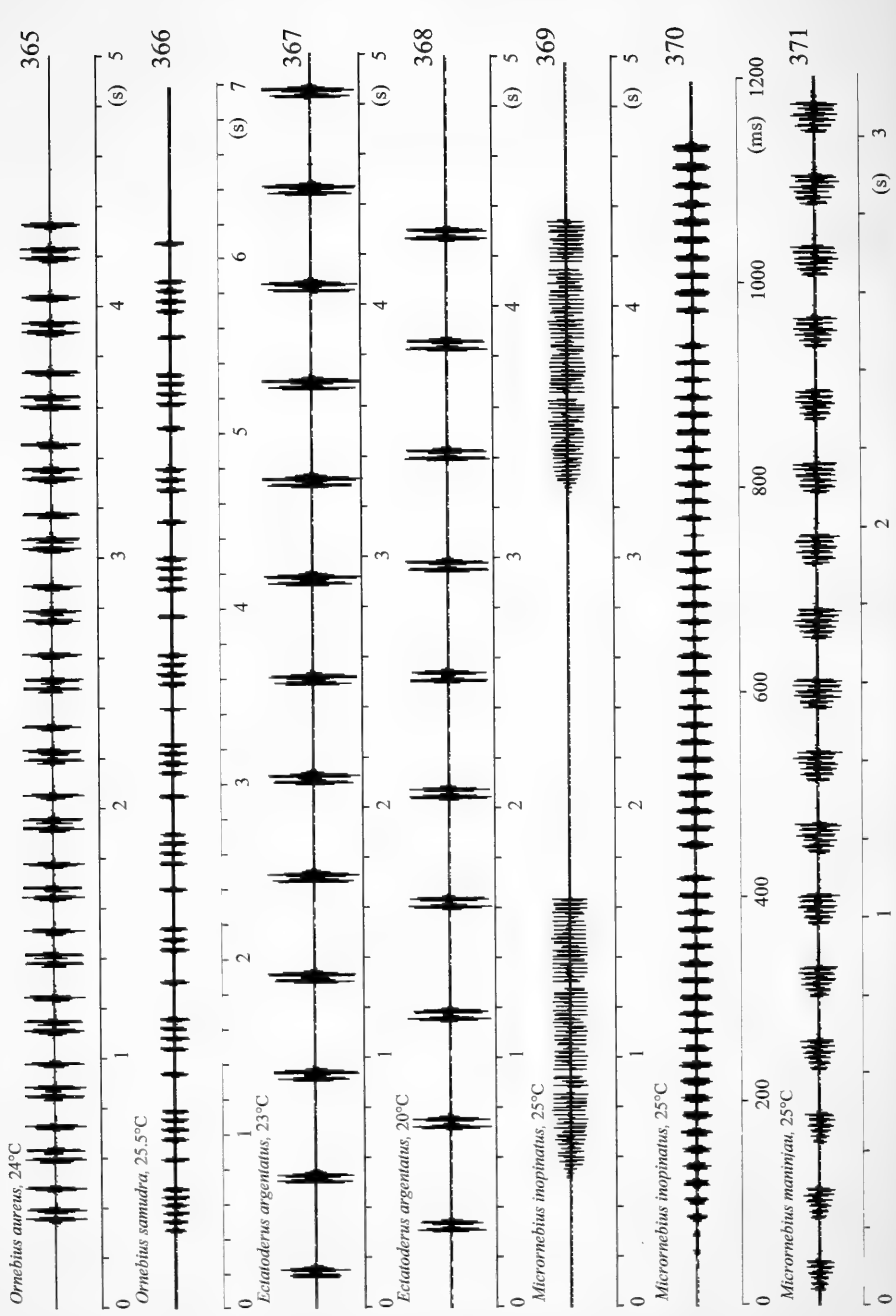

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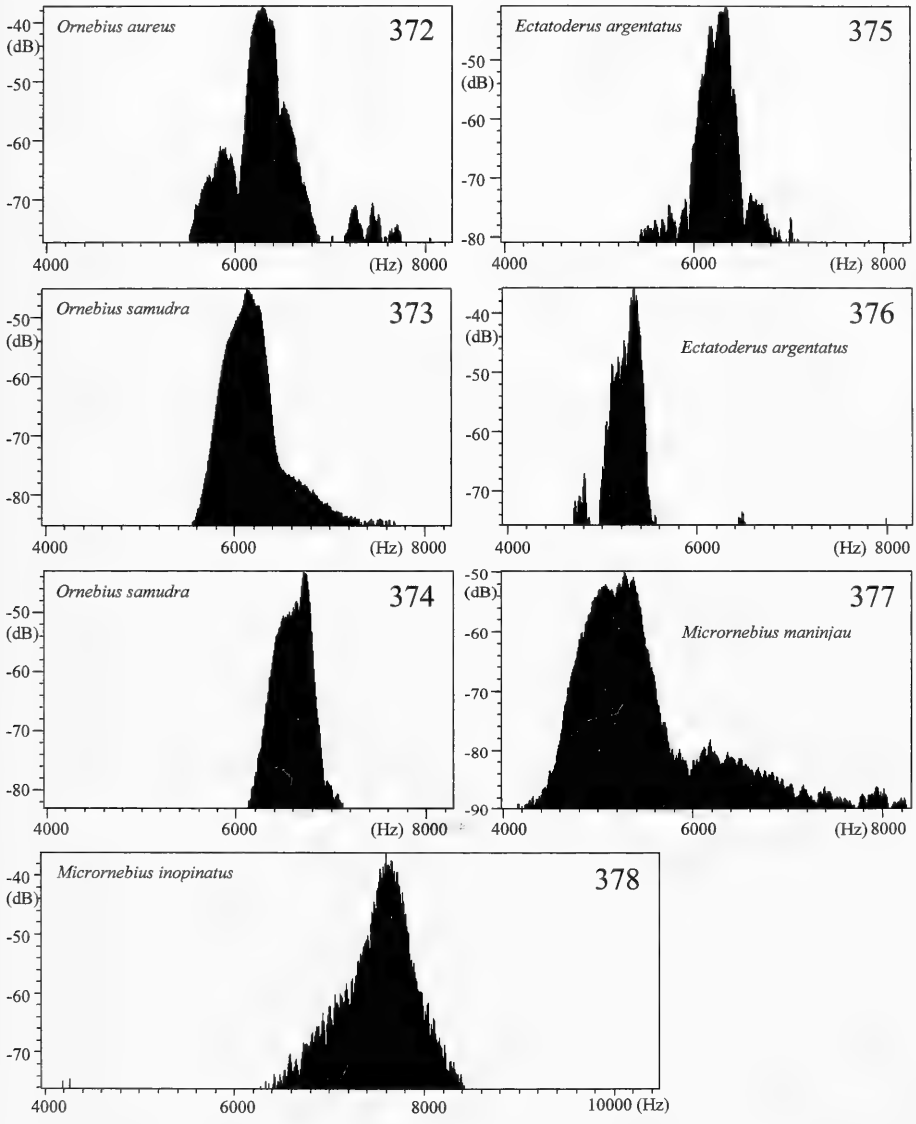

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ABBREVIATIONS USED IN FIGURES:

av	apical valves of ovipositor	mt	hind metatarsus
b	base of broken bristle	mv	medial valve of central phallic lobe
bc	base of cercus	ni	ninth abdominal tergite
ce	cercus	op	obtuse projection
cl	central lobe of phallic complex	ov	ovipositor
cs	central spiral of medial valve	pa	paraproct
e	epiproct	pp	paraproct process
ed	ejaculatory duct	PT	paratype
ep	epiphallus	sa	supra anal plate
es	external sclerite of lateral valve	sc	scapus (Figs 15-16)
fr	frontal rostrum	sc	sclerotised structure (Figs 181-183)
HT	holotype	sg	subgenital plate
hy	hyaline structure	ss	spermatophore sac
is	internal sclerite of medial valve	te	tenth abdominal tergite
la	lateral appendage of tenth abdominal tergite	ti	hind tibia
		ty	tibial tympanum
lv	lateral valve of central phallic lobe	vl	ventral lobe of phallic complex

SPECIES ACRONYMS:

alb	*Ornebius albipalpus* sp. n.
ang	*Ornebius angustus* sp. n.
arg	*Ectatoderus argentatus* sp. n.
aur	*Ornebius aureus* sp. n.
bog	*Ornebius bogor* sp. n.
bre	*Ornebius brevipalpus* sp. n.
brv	*Terraplistes brevicauda* sp. n.
cha	*Terraplistes chantri* sp. n.
cho	*Apterornebius chong* sp. n.
cib	*Ornebius cibodas* sp. n.
cit	*Ornebius citrus* sp. n.
con	*Ornebius consternus* sp. n.
cyl	*Micrornebius cylindricus* sp. n.
dum	*Ornebius dumoga* sp. n.
era	*Gotvendia erawan* sp. n.
erw	*Terraplistes erawan* sp. n.
exc	*Terraplistes excisa* sp. n.
flo	*Ornebius flori* Ingrisch, 1998
gra	*Micrornebius gracilicornis* Chopard, 1969
imi	*Ornebius imitatus* sp. n.
inc	*Micrornebius incertus* (Ingrisch, 1998)
ino	*Micrornebius inopinatus* sp. n.
ins	*Micrornebius insularis* sp. n.
kin	*Apterornebius kinabalu* sp. n.
kra	*Terraplistes kradung* sp. n.
lae	*Micrornebius laem* sp. n.
lin	*Micrornebius lineatus* sp. n.
lob	*Cycloptiloides lobicauda* sp. n.
man	*Micrornebius maninjau* sp. n.
mar	*Ornebius marginatus* Ingrisch, 1998
nig	*Terraplistes niger* (Ingrisch, 1987)
ori	*Cycloptiloides orientalis* Chopard, 1925
pak	*Cycloptiloides pakchong* sp. n.
pen	*Ornebius peniculatus* sp. n.
phu	*Cycloptiloides* sp. 2
pui	*Cycloptiloides pui* sp. n.
pul	*Ornebius pullus* sp. n.
rub	*Ornebius rubidus* Ingrisch, 1998
ruf	*Ornebius rufonigrus* Ingrisch, 1987
sab	*Cycloptiloides* sp. 1
sai	*Ectatoderus samui* sp. n.
sam	*Ornebius samudra* sp. n.
ser	*Ornebius serratus* sp. n.
sp	*Micrornebius* sp.
tim	*Cycloptiloides timah* sp. n.
tub	*Ornebius tuberculatus* sp. n.
vad	*Ornebius vadus* Ingrisch, 1998

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MERTENS, R. & WERMUTH, H. 1960. Die Amphibien und Reptilien Europas. *Kramer, Frankfurt am Main*, XI + 264 pp.

HANDLEY, C. O. Jr 1966. Checklist of the mammals of Panama (pp. 753-795). *In:* WENZEL, R. L. & TIPTON, V. J. (eds). Ectoparasites of Panama. *Field Museum of Natural History, Chicago*, XII + 861 pp.

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