

RESEARCH PAPER

Missing geographic link: minute lady beetles (Coleoptera: Coccinellidae: Microweiseinae) from Mount Wilhelm, New Guinea

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Accepted:
11th June 2018

Published online:
6th July 2018

Abstract. Lady beetle fauna of the New Guinea has been studied by several entomologists but there are still many coccinellid groups that have not been recorded from the island yet. Newly collected materials from “Our Planet Reviewed – Papua New Guinea” expedition revealed three new species belonging to the subfamily Microweiseinae, till now unknown from New Guinea. *Scymnomorphus bimaculatus* sp. nov., *S. papuensis* sp. nov., and *S. kausi* sp. nov. are described, and key characters are illustrated. A key to *Scymnomorphus* species of the Australasian Region is provided.

Key words. Coleoptera, Coccinelloidea, *Scymnomorphus*, new species, taxonomy, Papua New Guinea

<http://zoobank.org/urn:lsid:zoobank.org:pub:39A07336-9822-43B3-AF7E-1E67EFD8F7FC>

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Introduction

The lady beetle fauna of New Guinea is very diverse but poorly known so far. About 200 species of lady beetles have been recorded from this island (CHAZEAU 1983; POORANI & ŚLIPIŃSKI 2009, 2010; POORANI et al. 2008, 2014; SZAWARYN & TOMASZEWSKA 2013) but still many groups present in Southeast Asia and Australia, and potentially occurring in New Guinea, have not been reported.

The coccinellid genus *Scymnomorphus* Weise, 1897 has recently been classified within the subfamily Microweiseinae (ŚLIPIŃSKI 2007, ESCALONA & ŚLIPIŃSKI 2012). This subfamily contains three tribes and 25 genera (ESCALONA & ŚLIPIŃSKI 2012, WANG & REN 2012, JALOSZYŃSKI & ŚLIPIŃSKI 2014). Members of the subfamily are minute beetles, frequently with cryptic coloration, distributed mostly in tropical and subtropical regions. Little is known about their biology, but it has been reported that they prey on armored scale insects of the family Diaspididae (Hemiptera: Coccoidea) (KAMIYA 1960, GORDON 1977, CHAZEAU 1979, VAZIRANI 1982, ŚLIPIŃSKI 2007).

Scymnomorphus is a moderately large genus containing about 40 species worldwide (POPE 1962, GORDON 1977,

HOÀNG 1982, FÜRSCH 1985, ŚLIPIŃSKI & TOMASZEWSKA 2005, ESCALONA & ŚLIPIŃSKI 2012, WANG & REN 2012), but many species, especially from the New World, have uncertain taxonomic status. There are six species known from the Australasian Region: one from Vanuatu (formerly New Hebrides) (CHAZEAU 1979) and five recently described from Australia (ŚLIPIŃSKI & TOMASZEWSKA 2005). Up to the present no species has been recorded from New Guinea. Based on material newly collected in Papua New Guinea during the “Our Planet Reviewed – Papua New Guinea” project, three new species of *Scymnomorphus* are described.

Material and methods

The specimens studied were collected in Wanang Station and along a West-East transect on the slopes of Mount Wilhelm in Papua New Guinea during the project “Our Planet Reviewed IBISCA Niugini 2012–2013” (LEPONCE et al. 2016) and are kept in the Muséum national d’Histoire naturelle in Paris (MNHN).

Measurements were made using an ocular micrometer attached to a Bresser ETD-101 dissecting microscope.



Measurements recorded were as follows: TL – total body length, from the apical margin of clypeus to the apex of elytra; PL – pronotal length, from the middle of the anterior margin to the margin of basal foramen; PW – pronotal width in the widest part; EL – elytral length along the suture, including scutellar shield; EW – elytral width across both elytra in the widest part. Male genitalia were dissected, cleared in 10% KOH solution, and subsequently transferred in glycerol on slide for further study. After examination the genitalia were glued on cards and pinned beneath the specimen or stored in microvials with glycerin. Digital photographs were made using a Leica M205A stereo microscope with a digital camera attached. Terminology used in this paper follows ŚLIPIŃSKI (2007) and LAWRENCE et al. (2011).

Taxonomy

Scymnomorphus Weise, 1897

Scymnomorphus Weise, 1897: 303. Type species: *Scymnomorphus rotundatus* Weise, 1897 (Africa) (designated by POPE 1962: 628). ŚLIPIŃSKI & TOMASZEWSKA (2005: 380); KOVÁŘ (2007: 572); ESCALONA & ŚLIPIŃSKI (2012: 152).

Scotoscymnus Weise, 1901: 458 (unnecessary replacement name, see ŚLIPIŃSKI & TOMASZEWSKA 2005). GORDON (1977: 189); FÜRSCH (1985: 283); MIYATAKE (1994: 235); REN et al. (2009: 44).

Sukunahikona Kamiya, 1960: 22. Type species: *Sukunahikona japonica* Kamiya, 1960 (original designation). Synonymized by FÜRSCH (1985: 283).

Hiconasukuna Sasaji, 1967: 4. Type species: *Hiconasukuna monticola* Sasaji, 1967 (by original designation). FÜRSCH (1985: 287). Synonymized by ESCALONA & ŚLIPIŃSKI (2012: 152).

Orculus Sicard, 1931: 233. Type species *Orculus castaneus* Sicard, 1931 (by monotypy). FÜRSCH (1985: 289). Synonymized by ESCALONA & ŚLIPIŃSKI (2012: 152).

Differential diagnosis. *Scymnomorphus* is similar to *Pharellus* Sicard, 1928 and *Paraphellus* Chazeau, 1981. From *Paraphellus* it can be easily separated by club consisting of two or three antennomeres, in contrast to one antennomere in *Paraphellus*. From *Pharellus* it differs in the following characters: maxillary cardo broad, visible externally (very narrow, partially visible in *Pharellus*), submentum distinctly narrower than mentum (submentum and mentum equally broad in *Pharellus*), mentum deeply emarginate apically (mentum truncate apically in *Pharellus*), male genitalia with parameres bearing setae (parameres reduced, without setae in *Pharellus*).

Diagnosis. Body minute, round to oval, convex, dorsum pubescent (Figs 1A–L). Head transverse with clypeus and frons usually produced, sometimes rostrate, clypeus bordered laterally (Figs 4G, J). Eyes small, convex, coarsely faceted. Antenna consisting of 10 antennomeres, two (sometimes three) terminal antennomeres forming distinct club (Figs 2B, J, 3A). Maxillary cardo broad and clearly visible externally (Fig. 4C). Terminal palpomere elongate-conical (Figs 3D, 4G, J). Submentum distinctly narrower than mentum, mentum deeply emarginate apically (Figs 3D, 4C). Pronotum with line separating anterior corners from pronotal disc. Prosternum strongly reduced, prosternal process reduced to narrow carina (Fig. 4F). Mesoventrite short and broad, fused in mid part with metaventrite (Figs 4F, I, 5B). Elytra punctured

(Figs 4A, 5A), epipleuron incomplete apically with carina not reaching elytral base (Fig. 4D), associated with pits and pores (Figs 4F, I). Metaventrite without visible discrimen, usually densely punctured with postcoxal lines descending laterally, associated with pits and pores (Figs 4F, I, 5B). Abdomen with six ventrites in both sexes. Abdominal postcoxal lines incomplete or reaching lateral margin, divided into two lines, usually associated with pits and pores (Figs 2A, H, I, P, 3C). Tarsal formula 4-4-4. Male genitalia asymmetrical, with parameres reduced, always bearing setae.

For detailed description of the genus, see ŚLIPIŃSKI & TOMASZEWSKA (2005), ESCALONA & ŚLIPIŃSKI (2012), and WANG & REN (2012).

Distribution. Pantropical: Africa, Australia, Central America, China, Madagascar, Oriental Region, New Guinea, New Hebrides (ESCALONA & ŚLIPIŃSKI 2012).

Key to Australasian species of *Scymnomorphus*

- 1 Mid and hind femora stout and broadened, about 2 times longer than their width (Fig. 5B), antenna with antennomere 3 shorter than pedicel, antennomere 8 very broad, antennomeres 8–10 forming a club (Fig. 2J). *S. kausi* sp. nov.
- Mid and hind femora slender, about 3 times longer than their width (Fig. 4D), antenna with antennomere 3 as long or longer than pedicel (Figs 4D,F), antennomere 8 narrow, antennomeres 9–10 forming a club (Figs 2B, 3A). 2
- 2 Antenna with terminal antennomere elongate, about 3 times longer than the penultimate one (Fig. 3A), body over 1.5 mm long. *S. papuensis* sp. nov.
- Antenna with terminal antennomere only slightly elongate, about 1.5–2.0 times longer than the penultimate one (Fig. 2B), body smaller than 1.5 mm long. 3
- 3 Body yellowish or lightly brown. 4
- Body deep brown to black or with elytra differently colored than pronotum. 5
- 4 Elytra with epipleural carina well separated from elytral margin; male glandular openings in middle of ventrite 5; male genitalia: ŚLIPIŃSKI & TOMASZEWSKA (2005: Figs 45, 46, 48). *S. fulvus* Ślipiński & Tomaszewska, 2005
- Elytra with epipleural carina close to margin; males without glandular openings on ventrite 5; male genitalia: ŚLIPIŃSKI & TOMASZEWSKA (2005: Figs 57, 58). *S. luteus* Ślipiński & Tomaszewska, 2005
- 5 Elytra brown with dark brown or black longitudinal macula on each elytron (Fig. 1A), sometimes black macula covering almost whole dorsal surface of elytron but with lateral margin always brown (Figs 1D, E); males with single large glandular opening on ventrite 5 (Fig. 2H). *S. bimaculatus* sp. nov.
- Elytra uniformly colored; males without glandular openings on ventrite 5. 6
- 6 Elytra brown, pronotum dark brown. 7
- Elytra deep piceous to black; length 1.2 mm or less; male genitalia different from those illustrated by ŚLIPIŃSKI & TOMASZEWSKA (2005: Figs 54–56). 8



Fig.1. Habitus of *Scymnomorphus* species from Mt. Wilhelm, New Guinea. A–F – *S. bimaculatus* sp. nov.; G–I – *S. kausi* sp. nov.; J–L – *S. papuensis* sp. nov. A, D, G, J – dorsal view; B, E, H, K – lateral view; C, F, I, L – frontal view.

- 7 Abdominal postcoxal lines not reaching lateral margin of abdomen, male genitalia: CHAZEAU (1979: Figs. 2–5). *S. prapawan* Chazeau, 1979
- Abdominal postcoxal lines reaching lateral margin of abdomen, male genitalia: ŚLIPIŃSKI & TOMASZEWSKA (2005: Figs 54–56).
..... *S. hirtus* Ślipiński & Tomaszewska, 2005
- 8 Body uniformly deep dark brown to black; epipleural carina very close to lateral margin of elytron; male genitalia: ŚLIPIŃSKI & TOMASZEWSKA (2005: Figs 50–52). *S. storey* Ślipiński & Tomaszewska, 2005
- Pronotum and head lighter than elytra; epipleural carina distinctly separated from elytral margin; male genitalia: ŚLIPIŃSKI & TOMASZEWSKA (2005: Figs 44, 47, 49). *S. ker* Ślipiński & Tomaszewska, 2005

***Scymnomorphus bimaculatus* sp. nov.**

(Figs 1A–F, 2A–H, 4A–C, E–G, 5E)

Type locality. Papua New Guinea, Madang province, E slope of Mt. Wilhelm, Kombunomambuno, 3200 m a.s.l., 5°48'24.1128"S 145°4'22.5228"E.

Type material. HOLOTYPE: ♂, 'New Guinea, Mt. Wilhelm, P3139-CoCocc Ibisca Niugini 2012/ FIT-MW3200-L-4/8-d08, plot 12, start date 23-Oct-12, end date 25-Oct-12, order 17341, elevation 3200m' (MNHN). PARATYPES: 1 spec., 'New Guinea, Mt. Wilhelm, Ibisca Niugini 2012/ P3136 FIT-MW3200-L-1/8-d02, plot 12, 17-Oct-12 – 19-Oct-12, order 17520, elevation 3200m' (MNHN); 1 ♂, 'P3113-06663 FIT-MW-3200-L-2/8-d03, plot 9, 18-Oct-12 – 20-Oct-12, order 8402, elevation 3200m' (MNHN); 1 ♂ 1 ♀, 'P3201 FIT-MW3200-T-2/8-d04, plot 20, 19-Oct-12 – 21-Oct-12, order 17192, elevation 3200m' (MNHN); 1 ♂, 'P3170 FIT-MW3200-P-3/8-d06, plot 16, 21-Oct-12 – 23-Oct-12, order 17454, elevation 3200m' (MNHN); 1 ♂, 'P3194 FIT-MW3200-S-3/8-d06, plot 19, 21-Oct-12 – 23-Oct-12, order 17908, elevation 3200m' (MNHN); 1 ♀, 'P3083 FIT-MW3200-E-4/8-d07, plot 5, 22-Oct-12 – 24-Oct-12, order 17469, elevation 3200m' (MNHN); 1 ♂, 'P3116-06190 FIT-MW3200-L-5/8-d09, plot 9, 24-Oct-12 – 26-Oct-12, order 8413, elevation 3200m' (MNHN); 1 ♀, 'P3204 FIT-MW3200-T-5/8-d10, plot 20, 25-Oct-12 – 27-Oct-12, order 18003, elevation 3200m' (MNHN); 1 ♀, 'P3133-06010 FIT-MW3200-K-6/8-d12, plot 11, 27-Oct-12 – 29-Oct-12, order 8453, elevation 3200m' (MNHN); 1 ♀, 'P3094 FIT-MW3200-F-7/8-d13, plot 6, 28-Oct-12 – 30-Oct-12, order 17760, elevation 3200m' (MNHN); 1 ♀, 'P3572 FIT-MW3700-Q-7/8-d14, plot 17, 29-Oct-12 – 31-Oct-12, order 16831, elevation 3700m' (MNHN); 1 ♂, 'P3182 FIT-MW3200-Q-7/8-d14, plot 17, 29-Oct-12 – 31-Oct-12, order 17107, elevation 3200m' (MNHN); 1 ♂, 'P3191 FIT-MW3200-R-8/8-d16, plot 18, 31-Oct-12 – 2-Nov-12, order 17416, elevation 3200m' (MNHN); 1 ♀, 'P2419 FIT-MW2200-S-8/8-d16, plot 19, 31-Oct-12 – 2-Nov-12, order 20271, elevation 2200m'.

Diagnosis. *Scymnomorphus bimaculatus* sp. nov. can be easily distinguished from congeners by its characteristic coloration with black, longitudinal macula on each elytron (sometimes covering most of the elytral surface), and male abdominal ventrite 5 with one large glandular opening, a unique character within the genus.

Description. TL: 1.25–1.53, TW: 0.82–0.96, TL/TW: 1.45–1.54, PL/PW: 0.36–0.39, EL/EW: 1.18–1.27.

Body light brown with one, longitudinal black macula in middle part of each elytron (Figs 1A–C). In some specimens dark maculae are extended and cover most of elytral surface (Figs 1D–F). Underside light brown except mesoventrite reddish brown. Legs and antennae yellow.

Body minute, elongate oval, convex, dorsum pubescent. Head small, punctures on frons larger than eye facets

and bearing seta, separated by 1–2 times their diameter. Clypeus prominent, distinctly bordered laterally, weakly arcuate anteriorly (Fig. 4G). Eyes small and coarsely faceted. Antenna consisting of 10 antennomeres (Fig. 2B); pedicel swollen, about as long as antennomere 3; antennomere 3 narrow, elongate; antennomere 4 slightly elongate; antennomere 5 about as long as antennomere 4 but distinctly broader; antennomere 6 small, shorter than antennomere 4 and 5; antennomeres 7 and 8 transverse, broadening anteriorly; antennomeres 9 and 10 forming 2-antennomere club, antennomeres 9 and 10 sub-equal in length. Pronotum widest at base and distinctly narrowing anteriorly. Pronotal disc convex, coarsely punctate, punctures smaller than those on head, separated by 1–2 times their diameter. Scutellar shield triangular, glabrous (Fig. 4A). Elytron shiny, densely coarsely punctured, punctures dual, smaller punctures irregular except for sutural and lateral rows, each bearing short seta; on disc setae directed into suture, on lateral sides directed posteriorly; larger punctures triangular in shape, irregularly distributed (Fig. 4B). Elytral margins narrow, hardly visible from above. Lateral part with elytral carina distinctly separated from margin, forming double, thickened border of epipleuron and extending to level of abdominal ventrite 3 (Fig. 1B). Mesoventrite short and broad, distinctly bordered anteriorly, fused with metaventrite medially (Fig. 4F). Metaventrite and abdomen densely covered with large, transversely oval pores, with smaller puncture bearing short seta above each pore (Fig. 4E). Metaventral postcoxal lines joined on metaventral process forming narrow arc, straight, laterally descending (Fig. 4F). Abdominal postcoxal lines incomplete, not divided into two lines, not reaching posterior margin of abdominal ventrite 1 nor lateral margin (Figs 2A, H). In males abdominal ventrite 5 with single large glandular opening in middle part (Figs 2H, 5E).

Male genitalia (Figs 2E–G). Penis simple and slender, curved and narrowing towards apex; penis capsule with short and stout outer arm and small and narrow inner one. Tegmen with penis guide long and slightly broadened in middle in lateral view, with apex pointed, in ventral view broadened at base then narrowing towards apex, apical part pointed and strongly roundly bent; parameres reduced, ventral paramere (as situated in abdomen) bearing two setae and dorsal paramere five setae.

Female genitalia (Figs 2C, D). Ovipositor triangular, narrow, elongate, bearing long styli with one seta on apex of each stylus; spermatheca composed of small basal bulge, narrow channel in middle and large spherical bulge apically.

Etymology. The species name is Latin adjective *bimaculatus* (-a, -um) referring to the characteristic two dark maculae on elytra.

Habitat. Most of the specimens were collected at the elevation of 3200 m a.s.l., and according to LEPONCE et al. (2016) this type of forest was classified as "upper montane forest" and was characterized by presence of *Dacrycarpus*, *Papuacedrus* and *Amaracarpus* trees, with *Myrsine*, *Pittosporum*, *Ascarina*, *Decaspermum*, and *Elaeocarpus* in

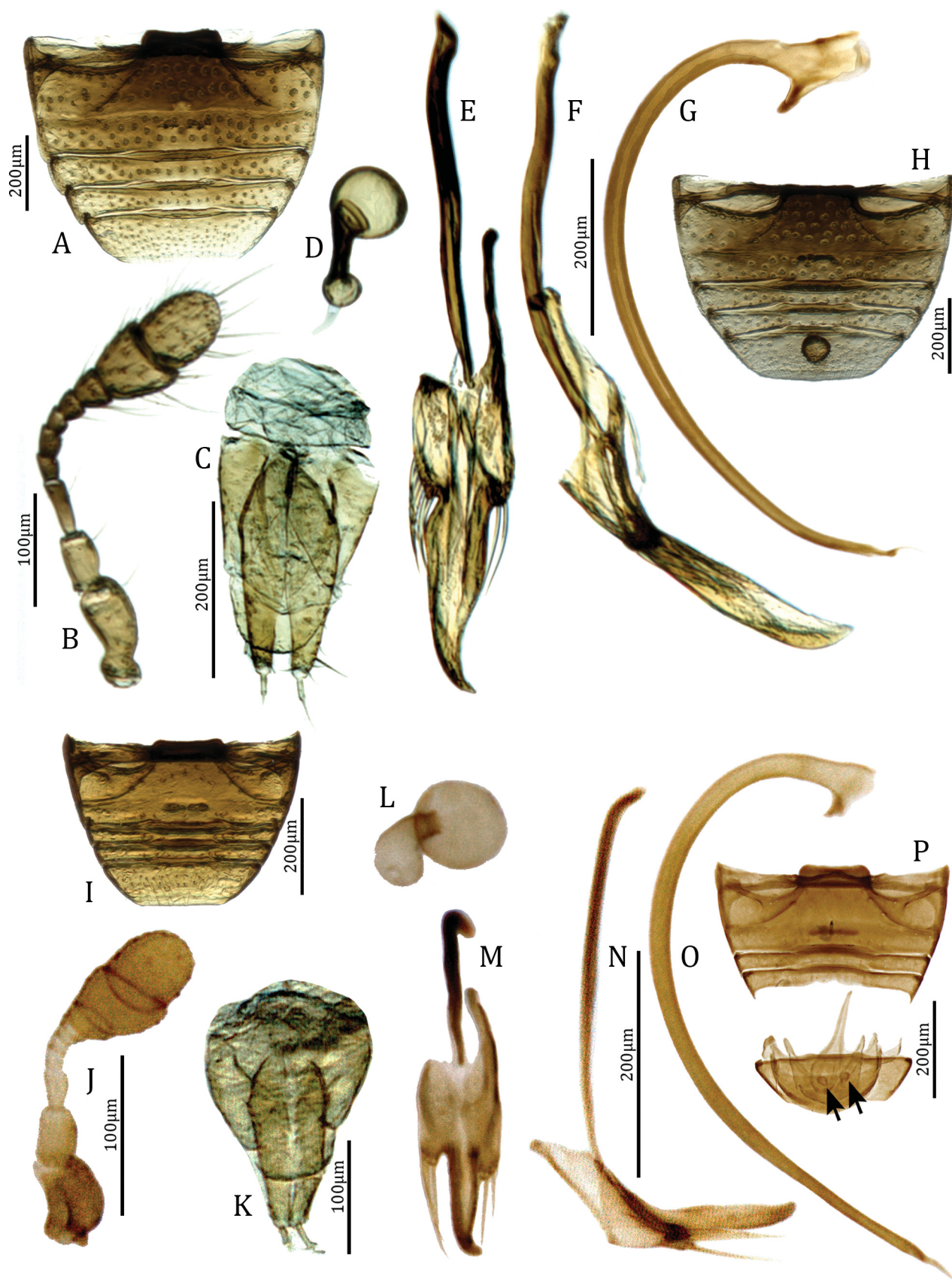


Fig. 2. Morphology of *Scymnomorphus* species. A–H – *S. bimaculatus* sp. nov.: A – abdomen, female; B – antenna; C – ovipositor; D – spermatheca; E – tegmen, inner view; F – tegmen, lateral view; G – penis, lateral view; H – abdomen, male. I–P – *S. kausi* sp. nov.: I – abdomen, female; J – antenna; K – ovipositor; L – spermatheca; M – tegmen, inner view; N – tegmen, lateral view; O – penis, lateral view; P – abdomen, male (arrows indicate glandular opening pores).

the understorey. One specimen was collected at the elevation of 2200 m a.s.l. "mid montane forest" and one at 3700 m a.s.l. "sub-alpine forest".

Distribution. Papua New Guinea, Mt. Wilhelm.

***Scymnomorphus kausi* sp. nov.**

(Figs 1G–I, 2I–P, 3D, 5A–D,F)

Type locality. Papua New Guinea, Madang province, E slope of Mt. Wilhelm, Kausi, 200 m a.s.l., 5°44'23.6292"S 145°19'47.0712"E.

Type material. HOLOTYPE: ♂, 'New Guinea, IBISCA Niugini PNG, Mt. Wilhelm, bark spray 9.2012, J. Schmidl sort/ P1084 MW0200-23 (revers, hand writing) // COPNG, COCC008, sort J Schmidl & A Zech' (MNHN). PARATYPES: 1 ♂, 'IBISCA Niugini PNG, Mt. Wilhelm, bark spray 9.2012, J. Schmidl sort / P1067 MW0200-05 (revers, hand writing) // COPNG, COCC007, sort J Schmidl & A Zech' (MNHN); 1 ♀, 'IBISCA Niugini PNG, Wanang, bark spray 9.2012, J. Schmidl sort / P0323 WAN02-05 (revers, hand writing) // COPNG, COCC007, sort J Schmidl & A Zech' (MNHN).

Diagnosis. *Scymnomorphus kausi* sp. nov. is externally similar to species of the genus *Pharellus*, but it can be distinguished by the presence of well-developed epipleural carina along elytral edge distinctly separated from elytral margin, mentum deeply emarginate apically (Fig. 3D), and large sparse punctures on elytra arranged in several rows. From other species of New Guinean *Scymnomorphus* it can be separated by the structure of male abdominal ventrite 5 with two small glandular openings (Fig. 2P) (only *S. fulvus* from Australia possesses similar openings; it can be distinguished by the morphology of male genitalia). Within the genus, *S. kausi* sp. nov. can be identified by very small globular body, antenna with antennomere 3 shorter than pedicel, club composed of 3 antennomeres, and stout and broad mid and hind femora.

Description. TL: 0.86–0.88, TW: 0.60–0.66, TL/TW: 1.30–1.32, PL/PW: 0.40–0.41, EL/EW: 1.06–1.08.

Body uniformly brown (Figs 1 G–I). Underside dark brown with legs pale brown.

Body minute, round oval, convex, dorsum distinctly pubescent. Head small, punctures on frons smaller than eye facets and bearing seta, sparsely distributed. Clypeus prominent, distinctly bordered laterally, weakly arcuate anteriorly (Fig. 5F). Eyes small and coarsely faceted. Antenna consisting of 10 antennomeres (Fig. 2J); pedicel swollen, longer than antennomere 3; antennomere 3 about 1.5 times as long as broad; antennomere 4 sub-quadrate, about two times shorter than antennomere 3; antennomeres 5–7 very short and transverse; antennomeres 8–10 forming 3-antennomere club, antennomere 8 short, transverse, about 3 times broader than its length; antennomere 9 transverse, shorter than antennomere 10; antennomere 10 about as broad as long. Pronotum widest at base and distinctly narrowing anteriorly. Pronotal disc convex, sparsely punctate, punctures smaller than those on head, bearing long setae. Scutellar shield triangular, glabrous (Fig. 5A). Elytron shiny (Figs 1G, 5A), sparsely and coarsely punctured, punctures separated by more than 3 times their diameter, dual, each larger puncture bearing long seta with smaller puncture at its base (Fig. 5C), punctures irregular except for sutural and lateral rows; on anterior half setae directed anteriorly, on posterior half directed laterally. Elytral margins narrow, but clearly visible from above except apex. Lateral part with elytral carina distinctly separated from margin, forming double, thick border of epipleuron and extending to level of abdominal ventrite 3 (Fig. 1H). Mesoventrite short and broad, distinctly bordered anteriorly, fused with metaventrite medially (Fig. 5B). Metaventrite and abdomen sparsely setose, with small round puncture at base of each seta (Fig. 5B). Metaventral postcoxal lines joined on metaventral process forming narrow arc, straight, laterally descending, associated with four pores on each side of metaventrite; additional pores situated on arcuate lines above metacoxae (Fig. 5B). Abdominal postcoxal

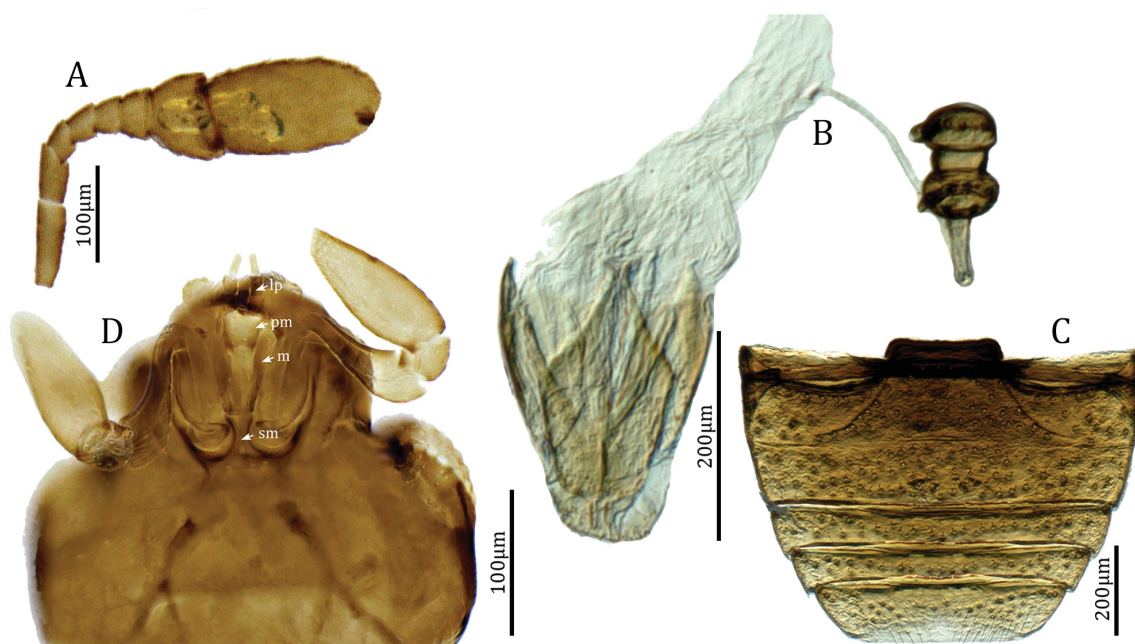


Fig. 3. Morphology of *Scymnomorphus* species. A–C – *S. papuensis* sp. nov.: A – antenna; B – female genitalia; C – abdomen, female. D – *S. kausi* sp. nov., head and mouthparts, ventral (lp – labial palp, m – mentum, pm – prementum, sm – submentum).

lines complete laterally, straight, divided into two lines, reaching posterior margin of first abdominal ventrite and lateral margin (Figs 2I, P). In males abdominal ventrite 5 with two glandular openings in middle part (Figs 2P, 5D).

Male genitalia (Figs 2M–O). Penis simple and slender, curved and narrowing towards apex; penis capsule with reduced outer arm and small and narrow inner one. Tegmen with penis guide short and stout in lateral view, with

apex rounded; penis guide in ventral view short with sides parallel in basal half then distinctly bent with pointed apex; parameres short, rounded, with several long setae.

Female genitalia (Figs 2K, L). Ovipositor triangular, narrow, elongate, bearing long styli, each with one seta apically; spermatheca composed of two elements, basal elongate part broadened at base narrowing apically, and large spherical bulge at apex.

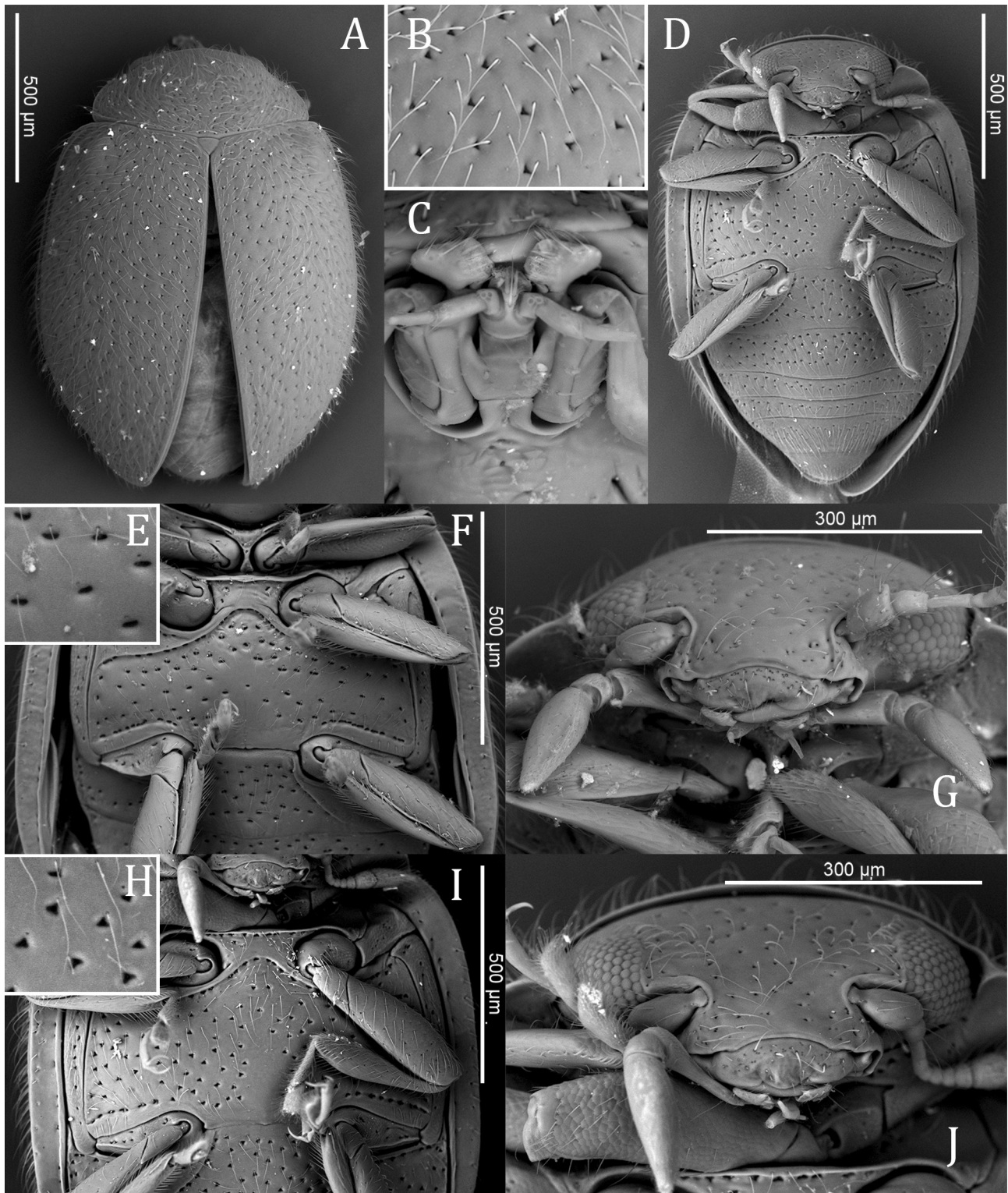


Fig. 4. Morphology of *Scymnomorphus* species. A–C, E–G – *S. bimaculatus* sp. nov.: A – habitus, dorsal; B – magnification of the elytral punctures; C – mouthparts, ventral; E – magnification of the metaventral punctures; F – meso- and metaventrite; G – head, anterior view. D, H–J – *S. papuensis* sp. nov.: D – habitus, ventral; H – magnification of the metaventral punctures; I – meso- and metaventrite; J – head, anterior view.

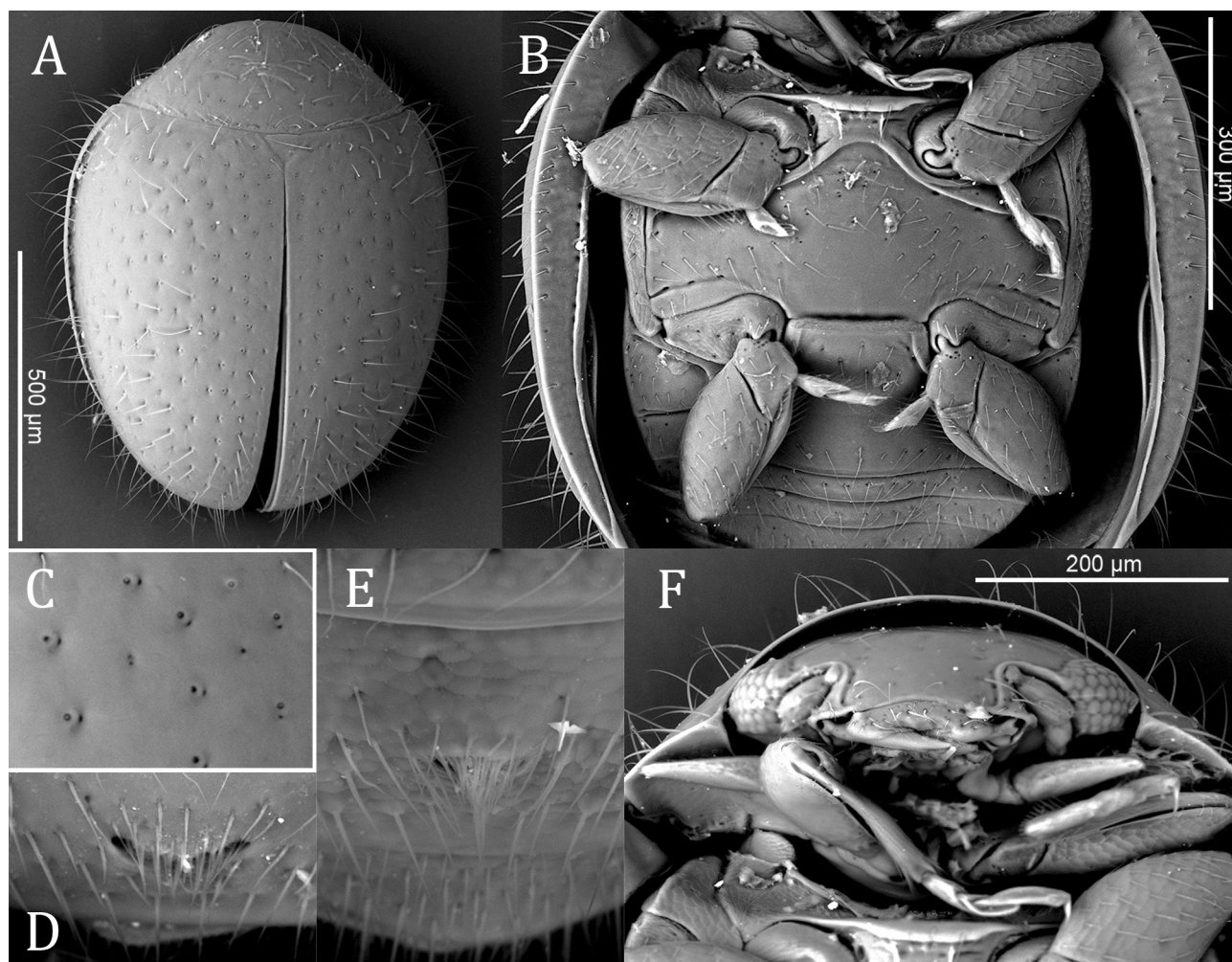


Fig. 5. Morphology of *Scymnomorphus* species. A–D, F – *S. kausi* sp. nov.: A – habitus, dorsal; B – ventral view; C – magnification of metaventral punctures; D – glandular openings on abdominal ventrite 5 in male; F – head, anterior view. E – *S. bimaculatus* sp. nov., glandular opening on abdominal ventrite 5 in male.

Etymology. The name refers to Kausi village where the holotype specimen was collected; noun in apposition.

Habitat. Specimens were collected at the elevation of 200 m a.s.l., and according to LEPONCE et al. (2016) this type of forest could be classified either as “mixed lowland rainforest” or “mixed alluvium forest of plains and fans” with a large diversity of plants belonging to the Fagaceae, Nothofagaceae, Lauraceae, Cunoniaceae, Myristicaceae, Aquifoliaceae, etc.

Distribution. Papua New Guinea, Eastern slope of Mt. Wilhelm near Kausi village and Wanang.

***Scymnomorphus papuensis* sp. nov.**

(Figs 1J–L; 3A–C; 4D, H–J)

Type locality. Papua New Guinea, Madang province, E slope of Mt. Wilhelm, Kombunomambuno, 3200 m a.s.l., 5°48'24.1128"S 145°04'22.5228"E.

Type material. HOLOTYPE: ♀, ‘New Guinea, Mt. Wilhelm “P3048-06207-CoCocc Ibisca Niugini 2012/FIT-MW3200-A-1/8-d01, plot 1, start date 16-Oct-12, end date 18-Oct-12, order 7375, elevation 3200m’ (MNHN).

Diagnosis. *Scymnomorphus papuensis* sp. nov. is similar to the other brown colored species but its comparatively

large body size exceeding 1.5 mm in length, and very elongate antennomere 10 are its most distinguishing characters (antennomere 10 about 3 times longer than the penultimate one is unique among other congeners from the Australasian Region. Moreover, lateral margins of clypeus are not bordered.

Description. TL: 1.56, TW: 1.08, TL/TW: 1.50, PL/PW: 0.36, EL/EW: 1.25.

Body uniformly light brown (Figs 1J–L). Underside dark brown with legs and abdomen more yellow brown.

Body minute, elongate oval, convex, dorsum distinctly pubescent. Head small, punctures on frons about the same size as eye facets, bearing seta, separated by 1–2 times their diameter. Clypeus short, without lateral bordering, weakly arcuate anteriorly (Fig. 4J). Eyes small and coarsely faceted. Antenna consisting of 10 antennomeres (Fig. 3A); pedicel swollen, shorter than antennomere 3; antennomere 3 narrow, elongate about 1½ longer than antennomere 4; antennomere 4 elongate; antennomere 5 and 6 subequal in length, about as broad as long; antennomere 7 slightly transverse; antennomere 8 transverse, almost twice as broad as long; antennomeres 9 and 10 forming 2-antennomere club; antennomere 10 elongate, about 3 times

longer than penultimate one. Pronotum widest at base and distinctly narrowing anteriorly. Anterior corners of pronotum produced and pointed, coarsely punctured. Pronotal disc convex, coarsely punctured, punctures about the same size as those on head, bearing long setae, separated by 1–2 times their diameter. Scutellar shield triangular, glabrous. Elytron shiny, densely and coarsely punctured, punctures dual, smaller punctures irregular except for sutural and lateral rows, each bearing long seta, setae directed posteriorly; larger punctures triangular in shape, irregular. Elytral margins narrow, not visible from above. Lateral part with elytral carina distinctly separated from margin, forming double, thickened border of epipleuron and extending to level of abdominal ventrite 3 (Fig. 1K). Mesoventrite short and broad, distinctly bordered anteriorly, fused with metaventrite medially (Fig. 4I). Metaventrite and abdomen densely covered with large, subtriangular pores, with smaller puncture bearing short seta above each pore (Fig. 4H). Metaventral postcoxal lines joined on metaventral process forming arc, straight, reaching lateral margin (Fig. 4I). Abdominal postcoxal lines incomplete, not divided into two lines, not reaching posterior margin of abdominal ventrite 1 nor lateral margin (Fig. 3C).

Female genitalia (Fig. 3B). Ovipositor triangular, broad, elongate, bearing long styli, each with one apical seta; spermatheca large, composed of three elements, wide, short and flattened basal bulge, wide and short channel in middle, and apical bulge equal to basal one.

Male genitalia. Unknown.

Etymology. The name is latinized adjective *papuensis* (-is, -e) derived from the name of Papua New Guinea, the country of origin of the type specimen.

Habitat. The type specimen was collected at the elevation of 3700 m a.s.l., and according to LEPONCE et al. (2016) this type of forest was classified as “subalpine forest” and was dominated by shrubs (e.g. Primulaceae, Ericaceae, Astera-ceae) and tree-ferns (e.g. *Cyathea*), with a few emerging gymnosperms (Podocarpaceae).

Distribution. Papua New Guinea, Mt. Wilhelm.

Discussion

WANG & REN (2012) described variety of species of *Scymnomorphus* from China. Asian and Australasian representatives of this genus are also known from Australia (ŚLIPIŃSKI & TOMASZEWSKA 2005), India (VAZIRANI 1982), Japan (KAMIYA 1960, SASAJI 1967), Vanuatu (CHAZEAU 1979), and Vietnam (HOÀNG 1982). New Guinea that lies between these regions was a blank area in the distribution of the genus *Scymnomorphus*, and Microweiseinae in general. As New Guinean fauna is still poorly studied it is expected that there should be quite a diverse fauna of Microweiseinae on this island.

Most of the Asian and Australasian species inhabit rather mountainous habitats and were found at higher altitudes between 1000–2800 m (*S. isolateralis* Wang & Ren, 2012, *S. yadongiensis* Wang & Ren, 2012, *S. cuspidatus* Wang & Ren, 2012, *S. magnopunctata* Wang & Ren, 2012, *S. monticola* Sasaji, 1967, *S. fulvus*, *S. ker*). Nonetheless, several species were recorded from lowlands like *S. popei*

Vazirani, 1982, *S. prapawan* or *S. luteus*. Three newly described species from New Guinea have separated vertical distributions, *S. kausi* sp. nov. is a lowland species, and the two other species inhabit much higher altitudes above 3000 m a.s.l.: *S. bimaculatus* sp. nov. high montane forest and *S. papuensis* subalpine forest (according to LEPONCE et al. 2016). Surprisingly, no specimens were collected at middle altitudes. This gap may suggest that New Guinean fauna is more diverse, and new species in mid-elevations can be found, as the highest species diversity of invertebrates occurs at these altitudes (BECK et al. 2016, SZCZEPAŃSKI et al. 2018). Distribution of Papuan species shows that *Scymnomorphus* is not related to any specific type of vegetation, and probably as most Coccinellidae is more connected to the distribution of the prey. New Guinea provides quite a diverse food source for *Scymnomorphus* lady beetles; 71 species of armored scale insects (Diaspididae) have been encountered in Irian Jaya and Papua New Guinea (GARCIA MORALES et al. 2016).

Acknowledgments

I would like to thank Carl Wardhaugh for a loan of the material for this study. Magdalena Kowalewska-Groszkowska (MIZ) is acknowledged for help with SEM images. Special thanks to Wioletta Tomaszewska (MIZ) and Adam Ślipiński (CSIRO) for reviewing and improving this manuscript.

This study was conducted in the framework of “Our Planet Reviewed Papua-New-Guinea 2012-2013” set up by Pro-Natura International, the National Museum of Natural History (MNHN, France), the Institut de Recherche pour le Développement (IRD, France) in partnership with the Royal Belgian Institute of Natural Sciences, the New Guinea Binatang Research Center, the University of Papua New Guinea, and the Divine Word University of Madang and with core funding of Prince Albert II of Monaco Foundation, the Stavros Niarchos Foundation, the Total Foundation, the Fondation d’entreprise EDF, the Fonds Pacifique, Spiecapag, Entrepouse Contracting, the New-Caledonia Government, the Reef Foundation, FNRS (Belgium) and the Belgian National Lottery. All participants to this collective project, part of the IBISCA experts network patronned here by Prof. R. K. Kitching, are thanked for their contribution.

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