

Insects of Micronesia
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Diptera: Dolichopodidae Part I.
Sciapodinae, Medeterinae and Sympycninae (part)

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Abstract—The Micronesian fauna of 3 subfamilies, Sciapodinae, Medeterinae and Sympycninae (part) (Diptera: Dolichopodidae) comprises 29 species of which 15 are newly described: *Chrysosoma guamense*, *C. yapense*, *C. townesi*, *C. kusaiense*, *C. agrihan*, *C. clarkei*, *C. mariana*, *C. pelagica* (also from the Philippines), *Krakatauia micronesiana*, *Amblypsilopus sabroskyi*, *A. ponapensis*, *A. belauensis*, *A. trukensis*, *Medetera babelthaup*, and *Syntormon boninense*. Keys are provided, and the key to *Chrysosoma* includes all described Micronesian, Polynesian, and eastern Melanesian species.

Introduction

The family Dolichopodidae is well represented in collections from Micronesia, and more than 3,000 specimens are available for study. The fauna is rich and comprises both endemic and widespread species.

Proper study of the Micronesian fauna requires a good knowledge of the described Australasian and Oriental faunas. However, many dolichopodid species cannot be identified without ready access to type material. As well, genera within many subfamilies are poorly defined. For these reasons, the family will not be considered as a whole as is customary for the “Insects of Micronesia.” Only 3 subfamilies (Sciapodinae, Medeterinae, Sympycninae (in part)) are treated here. These have been the subject of recent regional revisions (Bickel 1987, 1994) or comprise well-defined genera in the region (Negrobov, 1975). The remaining Sympycninae and the subfamilies, Diaphorinae, Dolichopodinae, and Hydrophorinae, will be treated in a future work (I have not seen Micronesian Babinellinae).

Materials and Methods

This study is based on Micronesian Sciapodinae, Medeterinae, and Sympycninae housed principally at the Bishop Museum and the National Museum

of Natural History. I have examined the extant primary type material for most described species except where noted.

Label data are condensed. Gressitt's (1954) excellent introduction to this series provides extensive background information and collecting history. Since "Insects of Micronesia" is a faunal series, discussions of nomenclature and higher relationships are confined only to new information. Some Sciapodinae are re-described and figured to establish their identity. I have expanded the *Chrysosoma* key to include related Melanesian and Polynesian species not found in Micronesia. Not only does this key place the Micronesian fauna in a regional context, but it serves as a convenient set of diagnoses for this complex group. Many of these species are keyed here for the first time.

I have followed descriptive procedures and abbreviations used in Bickel (1987). In describing the hypopygium, "dorsal" and "ventral" refer to morphological position prior to genitalic rotation and flexion. Thus, in figures showing a lateral view of the hypopygium, the top of the page is morphologically ventral, while the bottom is dorsal. Measurements are in mm. Podomere ratios for each leg are given in the formula: trochanter + femur; tibia; tarsomere 1/ 2/ 3/ 4/ 5. The abbreviation "MSSC" stands for "male secondary sexual character(s)," (those nongenitalic characters found only on the male body). Similarly, "FSSC" stands for "female secondary sexual character(s)."

Island groups are listed under their modern political affiliation and follow the "The Catalog of Australasian and Oceanian Diptera" (Bickel and Dyte 1989). Localities follow the gazetteer in Gressitt (1954). The term "Micronesia" is used for the entire region covered in this work as delimited by Gressitt, while the term "Federated States of Micronesia" is always used for that group of islands forming the modern political association.

Key to the Subfamilies of Micronesian Dolichopodidae, and the Genera in this Monograph

This key treats the dolichopodid subfamilies known to occur in Micronesia, and the genera included in this monograph. A complete revised key to the dolichopodid subfamilies and genera of Micronesia will be included in the second part of this revision, currently in preparation.

1. Vein M branched; vertex usually strongly excavated laterad of ocellar tubercle; usually bright metallic greenSubfamily Sciapodinae2
- Vein M unbranched; vertex almost flat across top of eyes in anterior view5
- 2(1). Frons highly polished and bare; male scape swollen and vase-like; CI usually with 3-7 strong lateral spine-like setae, especially in females; 1st flagellomere conical with apical arista; male arista with apical flag; lateral scutellars absent*Plagiozopelma* (15. *P. flavipodex*)
- Frons with pruinosity or abundant hairs; male scape normal; CI without strong lateral spine-like setae; other characters various3

Table 1. Distribution of Micronesian Dolichopodidae (Sciapodinae, Medeterinae, Syntormon)

	Micronesian Island Groups										Other Localities	
	Bonin/Volcano	S. Mariana	Palau	Yap	Caroline Atolls	Chuuk	Pohnpei	Kosrae	Marshall	Kiribati		Wake
1. <i>Chrysosoma patelliferum</i>	x											Widesp. Orient, Indian O., E. Africa, Madagascar, New Guinea, New Caledonia, Australia, Pacific Is. east to Marquesas
2. <i>C. guamense</i> *	x											
3. <i>C. leucopogon</i>		x										
4. <i>C. yapense</i> *				x								Fiji, Samoa, Tonga, Tuvalu, Nauru Solomons Solomons, New Guinea Philippines Vanuatu, Tuvalu New Guinea, Australia, widespr. Orient Solomons, Vanuatu, Nauru Bismarck Arch. Midway Atoll Hawaii, Society Is., Taiwan, Seychelles Australia (NT, Qld)
5. <i>C. townesi</i> *						x						
6. <i>C. kusaense</i> *							x					
7. <i>C. agrihan</i> *	x											
8. <i>C. mariana</i> *	x											
9. <i>C. clarkei</i> *							x					
10. <i>C. complicatum</i>					x	x	x	x	x	x	x	
11. <i>C. mutilatum</i>					x							
12. <i>C. ludens</i>								x				
13. <i>C. pelagica</i> *	x											
14. <i>C. molestum</i>									x			
15. <i>Plagiozopelma flavipodex</i>	x											
16. <i>Krakatauia evulgatum</i>			x	x	x	x	x	x	x	x		
17. <i>K. micronesiana</i> *	x	x										
18. <i>Ambypsilopus pallidicornis</i>	x	x										
19. <i>A. biprovincialis</i>						x						
20. <i>A. ponapensis</i> *							x					
21. <i>A. austerus</i>	x											
22. <i>A. belauensis</i> *		x			?							
23. <i>A. sabroskyi</i> *		x										
24. <i>A. trukensis</i> *						x						
25. <i>Medetera salomonis</i>	x	x	x	x	x	x	x	x	x	x		
26. <i>M. grisescens</i>	x	x										
27. <i>M. babelthaup</i> *			x	x	x							
28. <i>Syntormon boninense</i> *	x											
29. <i>S. flexibile</i>	x											

*Described as new

- 3(2). Male frons flattened with dense pale lateral hairs; M_1 and R_{4+5} strongly converging and meeting at apex; TI almost bare of strong setae; arista varying from dorsal to dorsoapical; cercus with large ventral clavate arm and short distal digitiform projection.....*Krakatauia*
Male frons with only few lateral hairs or none; M_1 and R_{4+5} generally join apex separately, but if converging, TI with strong setae4
- 4(3). Arista always apical (except sometimes dorsoapical in females); FI usually with strong pale ventral setae; TI usually with strong dorsal and/or ventral setae; lateral scutellars usually strongly developed; It_1 often flattened, and with pale ventral pile; male arista sometimes with apical flag; crossvein m-cu usually sinuous..... *Chrysosoma*
Arista usually dorsal (if apical, then TI devoid of major setae); femora with only weak ventral hairs; TI bare, without strong setae; lateral scutellars present as weak hairs or absent; It_1 rarely flattened; male arista never with apical flag; crossvein m-cu always straight...*Amblypsilopus*
- 5(1). Femora II and III lacking strong anterior preapical seta6
Femora II and III with distinct anterior preapical seta which stands out from surrounding vestiture.....8
- 6(5). Mesonotum not flattened; male genital capsule relatively small and partially enclosed by posterior abdominal segments.....
.....Subfamily Diaphorinae
Posterior mesonotum distinctly flattened, almost concave; male genital capsule large and external or pedunculate.....7
- 7(6). Dorsal postcranium strongly concave; vein M bowed with respect to vein R_{4+5} ; small, length less than 3.0.... Subfamily Medeterinae.... *Medetera*
Dorsal postcranium convex; distal vein M strongly bent towards vein R_{4+5} , male genitalia large but not as strongly pedunculate; larger, length more than 4.0.....Subfamily Neurigoninae
- 8(5). Antennal scape with dorsal setae; male genitalia large and pedunculate.
.....Subfamily Dolichopodinae
Scape dorsally bare9
- 9(8). Postvertical setae located on occiput, not in line with postocular setae; crossvein m-cu equal to or longer than distal section of vein CuA, and/or abdomen dorsoventrally flattened Subfamily Hydrophorinae
Postvertical setae located on top of vertex, in line with postocular setae; crossvein m-cu shorter than distal section of vein CuA, and abdomen not dorsoventrally flattened..... Subfamily Sympycninae10
- 10(9). Pedicel protruding thumblike onto 1st flagellomere; dorsal postcranium convex *Syntormon*
Pedicel not protruding into 1st flagellomere other Sympycninae

Subfamily SCIAPODINAE

Genus CHRYSOSOMA Guérin-Méneville

Chrysosoma Guérin-Méneville, 1831: pl. 20, fig. 6. Type species; *Chrysosoma fasciata* Guérin-Méneville, 1831, by subsequent designation of Enderlein (1912: 373).

Agonosoma Guérin-Méneville, 1838: 293 (unnecessary new name for *Chrysosoma* Guérin-Méneville, 1831). Type species: *Chrysosoma fasciata* Guérin-Méneville, 1831, automatic. [Preoccupied by Laporte, 1832.]

Chrysosoma is a large genus of the Old World tropics. It is treated extensively in Bickel (1994) where major species groups are defined. Of the Micronesian fauna, 1 species belongs in the *lacteimicans* Group, 1 in the *arrogans* Group with the remaining 12 species in the *leucopogon* Group:

1. The *leucopogon* Group, Assemblage I: *C. patelliferum*, *C. guamense*, *C. leucopogon*, *C. yapense*, *C. townesi*, *C. kusaiense*, *C. agrihan*, *C. mariana*, *C. clarkei*, and *C. complicatum*.
2. The *leucopogon* Group, Assemblage IIA: *C. mutilatum* and *C. ludens*.
3. The *arrogans* Group: *C. pelagica*.
4. The *lacteimicans* Group: *C. molestum*.

The *leucopogon* Group is particularly diverse and well represented in Micronesia. *Chrysosoma leucopogon* itself has an extensive range, from the western Indian Ocean to the eastern Pacific, including many oceanic islands.

Key to Male *Chrysosoma* of Micronesia, Polynesia, and Melanesia (exclusive of New Guinea)

This key includes all described extralimital species (placed in brackets) from the central Pacific, which might be confused with Micronesian species or could potentially occur in Micronesia.

1. Male TIII with distinct swollen callus at 1/5 which is posteriorly excavated.....2
Male TIII unmodified, without callus.....21
- 2(1). Arista with flattened lanceolate or ovate apical flag.....3
Arista simple, without apical flag.....13
- 3(2). Arista flag entirely white.....4
Aristal flag black and white or entirely black.....6
- 4(3). IIt₁ pale yellow but white in distal 1/3, and with row of short crocheted setae; IIt₄ with flattened white hairs forming dorsal crest; TI without subapical pv seta; (Fig. 1b) (Yap Group).....4. *C. yapense*, n. sp.
Tarsus II entirely yellow to brown, without distinct white bands or segments; TII and IIt₁ covered with short erect setae; hypopygium (Fig. 1a).....5
- 5(4). All coxae and femora black; arista flag narrow and lanceolate; TI with 4 dorsal setae to 1/2, increasing in size distally; IIt₁ with loose ventral comb of short black setae (Guam)..... 1. *C. patelliferum* (Thomson)
CI and all femora yellow; arista flag longer, broader and ovate; TI with only short weak dorsal at 1/2; IIt₁ without loose comb (Guam).....
..... 2. *C. guamense*, n. sp.
- 6(3). Arista flag entirely black, large and with hirsute apex; TI with 3 dorsal setae and lacking ventrals; TII and IIt₁ with ventral row of crocheted seta (Vanuatu).....[*C. provocans* Parent]
Aristal flag black basally and white distad7

- 25(24). Arista flag black; II_{t1} with anterior brush of short black hairs in basal 1/5; TI without ventral setae but with 2 subapical pv setae; It₁ dorsally bare and with row of long curved posterior to 1/2; cercus with 3 strong adjacent basoventral bristles (Fig. 4b) (Philippines, Guam)..... 13. *C. pelagica*, n. sp.
 Arista flag black with white tip; II_{t1} bare; TI with ventral seta at 3/5 and 2 subapical pd setae; It₁ with single dorsal seta and with row of long curved posterior setae along entire length; cercus with basoventral projection bearing bladlike apical hooks (Solomon Is, Bougainville)..... [C. *arrogans* Parent]
- 26(23). Arista flag entirely black; palp and proboscis black TII and II_{t1} covered with short porrect setae; cercus (Fig. 2d) (Solomon Is, Caroline Is)..... 11. *C. mutilatum* Parent
 Arista flag black basally with white apex; palp and proboscis yellow; TI with long subapical ventral seta (Society Is)..... [C. *pacificum* Parent]
- 27(22). II_{t2} with single long projecting ad apical seta; TII and II_{t1} covered with short porrect hairs; 4 pairs strong ac present; lateral scutellars absent; CI, femora, tibiae, It₁, and II_{t1} yellow; CII and CIII, CI with 3 black distolateral setae; cercus setose, with long digitiform distal projection and ventral projection (Fig. 4a) (Vanuatu, Kiribati)..... 14. *C. molestum* Parent
 II_{t2} normal.....28
- 28(27). Antenna, coxae and femora black; TI with strong subapical ventral seta; cercus comprising 2 elongate setose parallel arms (Fig. 4c) (Marshall Is, Solomon Is, PNG)..... 12. *C. ludens* Parent
 Antenna, CI and femora yellow; TI bare; M₁ and R₄₊ joined at apex (Solomon Is) [C. *maculiventre* Parent]

1. *Chrysosoma patelliferum* (Thomson)

Psilopus patellifer Thomson 1869: 507.

Psilopus macropus Thomson, 1869: 508.

Description. Male: length: 4.7; wing: 4.6 × 1.3.

HEAD: vertex, frons, clypeus metallic blue-green with dusting of pruinosity; lateral slope of frons with 2–3 pale hairs (MSSC); face bulging (MSSC); palp yellow with black setae; proboscis yellowish; antenna black; pedicel with strong dorsal and ventral setae; 1st flagellomere tapering; arista black, about 2/3 body length; arista with white narrow lanceolate apical flag (MSSC).

THORAX: metallic blue-green with some pruinosity; 3–4 pairs strong ac present; 2 strong posterior dc, with 4 weak hairlike anterior dc (MSSC); lateral scutellars about 1/3 length of medians.

LEGS: coxae, FI and FII to knees and all leg III dark brown to black; TI, TII and It₁ yellow, remaining tarsomeres dark brown; CI and CII with pale anterior setae; CIII with pale lateral setae; I: 8.5; 8.0; 7.0/ 2.0/ 2.0/ 1.5/ 1.0; FI with 4–5 long pale ventral setae, decreasing distally; TI with 4 dorsal setae, increasing to midlength; It₁ bare of setae but with pale ventral pile (MSSC); II: 10.5; 16.0;

10.0/ 4.0/ 3.0/ 1.5/ 1.0; TII without strong setae; TII and II_{t1} covered with short porrect hairs and II_{t1} also with loose ventral comb of short black setae (MSSC); III: 12.0; 17.5.; 12.0/ 9.0/ 4.0/ 2.0/ 1.0; TIII with black callus at 1/5, smooth but excavated on posterior surface (MSSC); III_{t1} basoventrally with 5–6 pale curled setae (MSSC).

WING: hyaline; R₄₊₅ and M₁ converging at apex; M₂ reaching margin as fold; m-cu sinuous; lower calypter yellow with dark brown rim, with fan of pale setae; halter yellow with dark brown club.

ABDOMEN: metallic blue-green with matte brown bands at tergal overlap and with silvery pruinosity laterally; hypopygium entirely dark brown (as in Fig. 1a); epandrium subrectangular; hypandrial arm arising beyond midlength; 2 epandrial setae present; epandrial lobe with strong apical bristle and shorter subapical bristle; surstylus with dorsoapical hook subtended ventrally by strong apical setae; cercus forked with distal arm bearing long spical seta, with setose arms as figured.

Female: similar but lack MSSC and as noted: 2 strong posterior dc and 3–4 strong but shorter dc anterior; CI, all femora, TI, and TII yellow; TIII brownish; FI with only 2 long basal pale ventral setae; TI with 3 strong black dorsal setae to 1/2, and with strong ventral just beyond 1/2; It₁ with strong dorsal at 1/2; TII with 3 strong av-pv pairs.

Type material. The types of *Psilopus patellifer* and *P. macropus* (both in NRS) are the male and female, respectively, of the same species. *Chrysosoma patelliferum* is endemic to Guam although both Thomson species have been misinterpreted as occurring elsewhere in the Oriental and Australasian regions. Becker (1922) incorrectly figured the arisal flag as black and white (it is entirely white).

Additional material: GUAM: Mt. Lamlam, X.1957, XII.1958; Talofof, VIII.1952 (BPBM); no locale, 1937 (USNM). (4♂, 7♀).

Distribution. Guam.

Remarks. *Chrysosoma patelliferum* and *C. guamense*, n. sp., are closely related Guam endemics and have almost identical hypopygia. The 2 species occur sympatrically, at least on Mt. Lamlam. Females cannot be reliably separated although those of *C. guamense*, n. sp., possibly have more infuscation on the apices of FIII. *C. patelliferum* shows strong leg color sexual dimorphism while the legs of both sexes of *C. guamense*, n. sp., have a similar yellow coloration.

2. *Chrysosoma guamense* Bickel, n. sp.

Fig. 1a

Description. Male: length: 4.7; wing: 4.6 × 1.3; similar to *C. patelliferum* except as noted.

HEAD: white apical arisal flag longer, broader, ovate; apex of flag often curled (MSSC).

LEGS: CI, all femora, TI, and TII yellow; CII and CIII dark brown; TIII yellowish with brown callus; FI with only 2 long basal pale ventral setae; TI with only short weak dorsal at 1/2; It₁ bare but also with pale ventral pile (MSSC); TII and II_{t1} also covered with short porrect hairs (MSSC); II_{t1} without loose

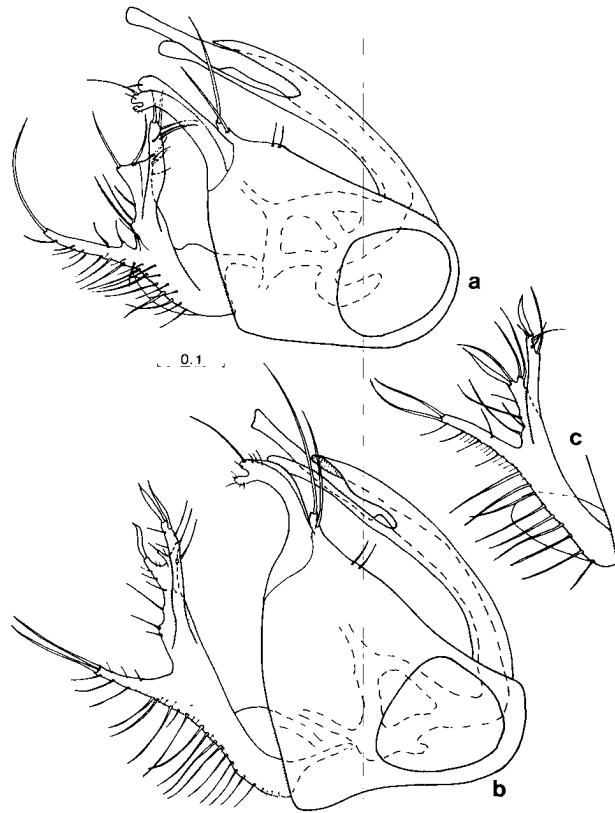


Figure 1. a. *Chrysosoma guamense*, Guam; hypopygium, left lateral. b. *C. yapense*, Yap Group; hypopygium, left lateral. c. *C. clarkei*, Kosrae; cercus, left lateral.

ventral comb of short black setae; TIII also with black callus at 1/5 (MSSC); III_t, basoventrally also with tuft of 5–6 pale curled setae (MSSC).

ABDOMEN: hypopygium and cercus almost identical to that of *C. patelliferum* (Fig. 1a).

Female: similar female *C. patelliferum*.

Type material. Holotype ♂ (BPBM 15,081), paratypes, 3♂, 6♀, GUAM: no locality or date, [1911], Lot No. 1227, D. T. Fullaway (all BPBM).

Additional material. GUAM: Mt Lamlam, X.1957; Talofofo, VIII.1952; Mt Alifan, IV.1946; Mt Santa Rosa, VI.1945; Pt Ritidian, VIII.1945; Pago Bay, VI.1945; Pt Oca, VI.1945 (3♂, 10♀, all BPBM).

Distribution. Guam.

Remarks. See remarks for *C. patelliferum*. The year of collection of the holotype was determined by collecting records in BPBM.

3. *Chrysosoma leucopogon* (Wiedemann)

Dolichopus leucopogon Wiedemann, 1824: 40.

Psilopus apicalis Wiedemann, 1830: 227.

Psilopus conicornis Macquart, 1846: 120.

Psilopus curviseta Thomson, 1869: 508.

Chrysosoma loewi Enderlein, 1912: 378.

Diagnosis. Male: length: 5.9–6.1; wing: 6.0 × 2.0.

HEAD: arista bare.

LEGS: coxae, basal FI, all FII and FIII, It₂₋₅, IIt₂₋₅, and IIIIt black; femoral “knees” I and II, tibiae, It₁, and IIt₂ yellow; TI with 3–4 black dorsal setae, but lacking ventrals (see also remarks below); It₁ with some whitish ventral pile and 1–3 short dorsals (MSSC); IIt₁ mostly yellow but white in distal 1/5 with row of curved av setae; IIt₂₋₃ black, with crocheted setae (MSSC); IIt₄₋₅ distinctive, with flattened white hairs forming distinct dorsal crest (MSSC); TIII with black callus at 1/5 (MSSC); IIIIt, basoventrally with tuft of pale curled hairs.

ABDOMEN: surstylus without strong apical seta; cercus with long base, dorsal and ventral arms subequal; dorsal arm with 2 long apical setae, with dense whitish pubescence; ventral arm with 3 strong apical setae subtended by stout curved apical seta, external seta-bearing prominence, and median projection.

Female: lacks MSSC and as noted: all femora yellow; TI with 3–4 strong dorsal and 2 strong ventral setae; It₁ with 2 strong dorsal setae; TII with 2 strong av and 3 strong ventrals; TIII with offset ad-pd pair at 1/5, strong dorsal at 2/3.

Micronesian material. PALAU: Babelthuap: Ngerathalong, 6.V.1957; SE Ulebsehel I, 24.IV.1957 (USNM). Ngcheangel (=Kayangel), 9.V.1957. Beliliou (=Peleliu): Negeroi (=Garakayo) I (BPBM). (13♂, 17♀).

Distribution. Widespread across Orient, Indian Ocean, and Australasia, including eastern African coast, Madagascar, India, Sri Lanka, SE Asia, Taiwan, Indonesia, Aldabra, Reunion, Mauritius, Rodriguez, Seychelles, Cocos-Keeling I, Christmas I, New Guinea, tropical Australia, New Caledonia, Belau, Samoan Is and Tahiti.

Remarks. *Chrysosoma leucopogon* is a widespread and common paleotropical tramp species, which is fairly constant in morphology across its entire range. However, some intraspecific variation is evident in body size, density of pubescence on the cercus, and length and development of male IIt crocheted hairs. The leg I chaetotaxy is also somewhat variable, with the male TI and It₁ setae varying somewhat in number and strength. However, none of this variation is sufficient to warrant designation of additional species since such variation may be present within a series or even between the right and left legs of the same individual. The following species, *C. yapense*, n. sp., is very close to *C. leucopogon* in its distinctive leg II MSSC.

4. *Chrysosoma yapense* Bickel, n. sp.

Fig. 1b

Description. Male length: 5.0; wing: 4.3 × 1.4; similar to *C. patelliferum* except as noted:

HEAD: arista with narrow white lanceolate apical flag (MSSC).

LEGS: coxae brown, although CI yellowish distally; basal FI, all FII and FIII, It₂₋₅, IIt₂₋₅, and IIIIt brown; femoral “knees” I and II, tibiae, It₁, and IIt₂ yellow, also see following; Fi with 2 long pale basal setae and 3 shorter pale distal

ventral setae; TI with 3 dorsals in basal 1/2, but lacking ventrals; It₁ with some whitish ventral pile and 2 short dorsals (MSSC); TII with strong ad setae at 1/6, 1/2 and with ventrals at 1/5 (long) and 3/4 (short); II₁ pale yellow but white in distal 1/3, with row of short crocheted setae (MSSC); II₂₋₃ dark brown; II₄ with flattened white hairs forming dorsal crest (MSSC); II₅ black; TIII with black callus at 1/5, smooth but excavated on posterior surface (MSSC).

WING: halter pale yellow.

ABDOMEN: hypopygium entirely dark brown (Fig. 1b); epandrium subrectangular; hypandrial arm arising beyond midlength; 2 epandrial setae present; epandrial lobe with strong apical bristle, shorter subapical bristle; surstylus with dorsoapical hook subtended ventrally by strong apical setae; cercus forked with distal arm bearing long spical seta, with ventral arm bearing external bladeliike seta and other setae as figured.

Female: similar but lack MSSC and as noted: with 2 strong posterior dc and 3-4 strong but shorter dc anteriorly; CI, all femora, TI, TII, It₁ and II₁ yellow; TIII and remaining tarsomeres brownish; FI with 2 long basal and 2 shorter distal ventral setae; TI with 3 strong black dorsal setae to 1/2, with strong ventral at 2/5 It₁ also with 2 strong dorsal setae.

Type material. Holotype ♂ (USNM), paratypes, 4♂, 11♀, FEDERATED STATES OF MICRONESIA: Yap Group: Giliman, 10 to 12.VII.1957, C. W. Sabrosky (BPBM).

Additional material. Yap Group: Giliman, Kolonia, Dugor, Mt Madaade, North and South Map, Gadgil, Tomil, Ruul, VII to VIII.1950, XI to XII.1952, III.1954, VI.1957 (7♂, 11♀, all BPBM).

Distribution. Yap Group.

Remarks. *Chrysosoma yapense* is very close to *C. patelliferum* and *C. guamense* in cercal structure and in sharing a white apical flag, but is close to *C. leucopogon* in leg II MSSC.

5. *Chrysosoma townesi* Bickel, n. sp.

Fig. 2f

Description. Male: length: 6.5; wing: 6.0 × 2.0; similar to *C. patelliferum* except as noted:

HEAD: vertex, frons, clypeus metallic blue with dusting of pruinosity; arista simple.

THORAX: dark metallic blue with silvery pruinosity on pleura.

LEGS: coxae, femora and all leg III black; femoral knees and tibiae I and II, It₁, and II₁ yellow; distal tarsomeres I and II most black but for leg II, also see below; FI with 2 long pale basoventral setae; TI with 2-3 short dorsals basally, 2 stronger dorsal setae at 2/5 and 3/5, without ventral setae; It₁ not strongly flattened, with whitish ventral pile and posterior row of black curved setae (MSSC), with 2 dorsal setae; TII with 4 short dorsal setae; TII yellow but white in distal 1/4; II₁ brown but white in distal 1/4; II₁ covered with short porrect hairs (MSSC), with row of about 30 outstanding curved av setae (MSSC); II₂₋₃ black; II₄ with white hairs forming flattened posterior crest (MSSC); II₅ yellow-

ish; TIII with excavated callus at 1/5 (MSSC); III_{t1} with basoventral tuft of 5–6 pale curled setae (MSSC).

WING: with anterior membrane darkened and smoky; halter yellow with brown club.

ABDOMEN: distal margin of tergum 7 with pair of long black setae; hypopygium dark brown (Fig. 2f); cercus elongate with shallow fork at 3/4, with apical arms bearing long curved setae.

Female: similar but lacks MSSC and as noted: CI black, becoming yellowish distad; CII and CIII black; all femora, TI, TII, It₁, and II_{t1} yellow; TIII reddish brown; remaining tarsomeres dark brown; TI with 3 strong black dorsals to 1/2, with strong ventral at 1/2; It₁ with 2 strong dorsals; TII with 4 strong ad, strong ventrals at 1/5 and 4/5; wing membrane also smokey.

Type material. Holotype ♂: FEDERATED STATES OF MICRONESIA. Pohnpei: Mt Dolokatar, 1700–1900 ft, 13.VIII.1946, H. K. Townes (USNM); Paratypes, 2♀: Colonia, hydroelectric plant, 9.VII.1949 (USNM).

Distribution. Pohnpei.

Remarks. *Chrysosoma townesi* is a relatively large species with darkened wings. TII and II_{t1} are white in the distal 1/4 (MSSC), giving an effect of 2 white leg bands. A similar double banding occurs on *C. tuberculicorne* from French Polynesia, but with both bands on TII.

6. *Chrysosoma kusaiense* Bickel, n. sp.

Fig. 2a

Description. Male: length: 5.4–5.6; wing: 4.7 × 1.6; similar to *C. patelliferum* except as noted:

HEAD: vertex and frons bright metallic blue-green; lateral slope of frons with pale hairs (MSSC); 1st flagellomere elongate, tapering; arista long, about 2/3 body length, with apical lanceolate flag, black with white tip (MSSC).

LEGS: coxae, FI and FII to “knees” and all of FIII black; femoral “knees” I and II, tibiae, and basal tarsomeres I and II yellow; all III_t dark brown (also see below); CI and CII with pale anterior hairs; CIII with tuft of pale lateral hairs; femora with pale ventral hairs; I: 9.0; 9.0; 7.0/ 1.0/ 1.0/ 0.5/ 0.5; FI with long pale ventral setae decreasing in size distad; TI with 3 black dorsals, long pv at 9/10, which is more than 1/2 length of TI (MSSC); It₁ swollen with pale ventral pile (MSSC), and with 2 dorsal setae; II 9.0; 13.0; 12.0/ 3.0/ 2.0/ 1.0/ 0.5; TII with dorsals at 1/8 and 5/6, and strong ventral at 1/5; II_{t1} yellow but white in distal 1/4 (MSSC); II_{t2-3} black; II_{t4-5} covered with white hairs, not unlike that of *C. leucopogon* (MSSC); III 13.0; 19.0 12.0/ 3.0/ 2.0/ 1.0/ 1.0; TIII with strong dorsal at 3/4; TIII with callus at 1/5 (MSSC).

WING: halter yellowish with brown club.

ABDOMEN: hypopygium dark brown (Fig. 2a); epandrium subtriangular; cercus with apical spatulate pedunculate seta and with longer lateral arm which bears 2 short apical bladlike setae.

Female: similar but lack MSSC and as noted: all coxae and femora brown; tibiae yellowish and tarsi brownish to dark brown; FI with 2 long basal pale ventral setae; TI with 3–4 strong dorsal setae to 1/2, and with 2 strong ventrals,

and II_t, covered with short porrect hairs (MSSC); TIII with black callus at 1/5, excavated on posterior surface (MSSC).

WING: halter yellow with brown club.

ABDOMEN: hypopygium dark brown (Fig. 2c); cercus tapering, setose, with short distal projection with long apical setae and median arm with apical seta.

Female: similar but lacks MSSC and as noted: CI, trochanter I, all femora, TI, TII, It₁, and II_t, yellow; TIII brownish; CII, CIII, and remaining tarsomeres dark brown; TI with 3 strong black dorsal setae to 1/2, with strong ventral at 1/3; It₁ with strong dorsal at 1/2; TII with 2 strong ad and 1 short pd setae.

Type material. Holotype ♂ (BPBM 15,082), paratypes, 2♂, 1♀, NORTHERN MARIANAS ISLANDS: Saipan, Afetua Point, 1.VIII.1946 (BPBM). Paratype: ♂, Papago area, 7.I.1945. Additional material. NORTHERN MARIANAS ISLANDS: Saipan, Medical Branch, 2nd Marine Div., Officer's Mess, 3.IX.1944 (USNM); Garapan, 29.XII.1937. Pagan, Songsong-Regusa, 24.IV.1940. (7♀, BPBM except where noted).

Distribution. Marianas Islands.

Remarks. *Chrysosoma mariana* is close to *C. agrihan* and also shows strong sexual dimorphism in leg color.

9. *Chrysosoma clarkei* Bickel, n. sp.

Fig. 1c

Description. Male: length: 5.0; wing: 4.7 × 1.6; similar to *C. patelliferum* except as noted:

HEAD: arista simple, without apical flag.

LEGS: coxae, FI, and FII to knees and all FIII dark brown; tibiae yellow, although TIII becoming infuscated distally; tarsi brown (but see also below); I: 9.0; 9.0; 8.5/ 2.0/ 2.0/ 1.5/ 1.0; FI with 2 long distal pale basoventral setae; TI with 3 dorsal setae, increasing in size to 1/2; It₁ relatively long and slightly flattened with whitish ventral pile (MSSC), without dorsal setae; II: 10.5; 16.0; 11.0/ 4.5/ 2.5/ 1.5/ 1.0; TII with dorsal seta at 1/10, otherwise bare; TII and II_t, covered with short porrect hairs (MSSC); II_t, white in distal 1/4 (MSSC); It₄ gray-white (not strong white as in *C. leucopogon*); III: 14.0; 18.5.; 9.0/ 4.0/ 2.5/ 1.0/ 1.0; TIII with black callus at 1/5, smooth but excavated on posterior surface (MSSC).

WING: halter yellow with brown club.

ABDOMEN: hypopygium entirely dark brown (Fig. 1c); cercus forked with short distal arm bearing long spical setae, with 2 ventral arms, each bearing apical bladelike seta.

Female: similar but lacks MSSC and as noted: CI brownish, becoming yellow distally; femora and tibiae mostly yellow, tarsi brownish; FI with 2 pale ventral setae; TI with 3 strong black dorsal setae to 1/2, with strong ventral at 1/2; It₁ with single strong dorsal at 1/2; TII with 3 strong av-pv pairs.

Type material. FEDERATED STATES OF MICRONESIA: Kosrae: Holotype ♂ (BPBM 15,079), paratype ♀, Mutunlik, 22m, 6.II.1953, J.F.G. Clarke. Paratypes, 2♂, 9♀, Hill 1010, 300 m, 13.IV.1953; Lele I, 160m, 2.II.1953; Wakap, 390 m, 13.IV.1953; Mt Matante, 11.II.1953 (all BPBM).

Additional material: Kosrae: Mt Tafeyat, 500–800 ft.; Mt Buache, 19.VII.1946 (16♀, all BPBM).

Distribution. Caroline Islands: Kosrae.

Remarks. Female *Chrysosoma clarkei* have a ventral seta on TI and a dorsal on It₁, both of which are lacking on males. *C. clarkei* is close to the sympatrically occurring *C. kusaiense*, but also shows genitalic similarity to the larger and darker Solomon Islands *C. disparitarse*.

10. *Chrysosoma complicatum* Becker

Figs. 2e, 3

Chrysosoma complicatum Becker, 1922; 159.

Chrysosoma leucochirum Bezzi, 1928; 64.

Diagnosis. Male: length: 5.0–5.3; wing: 4.3 × 1.3.

HEAD: arista with apical flag, black basally, with distinctly narrower digitiform white apex, usually deflexed.

THORAX: metallic green with bronze reflections; 4 pairs strong ac present; lateral scutellars weak, about 1/4 length of medians.

LEGS: CI, all femora, tibiae, It, and IIt₁, yellow; coxae and trochanters II and III, distal tarsomeres II (see also below) and IIIIt dark brown; FI with 3 pale ventral setae; TI with 3–4 dorsal setae, increasing in size to 1/2; It₁ with pale ventral pile (MSSC) and 2 strong dorsal setae; TII with strong subapical ventral seta; IIt₁ pale yellow, IIt_{2,3} black, IIt₄ with white hairs forming dorsal crest (MSSC), IIt₅ pale yellow; TIII with black callus at 1/5.

ABDOMEN: hypopygium dark brown; cercus (Fig. 2e) forked, with distal arm bearing long apical setae, flattened median projection with long curved seta and bladeli-like seta, ventral projection bears long apical setae.

Female: similar but lacks MSSC and as noted: with similar leg coloration but IIt entirely brown; TI also with 3 black dorsal setae and It, also with 2 dorsals.

Type material. The types of *Chrysosoma complicatum* from Jaluit, Marshall Islands (ZMHB, examined) and *C. leucochirum* from Fiji (BMNH, examined) are identical.

Additional Micronesia material. FEDERATED STATES OF MICRONESIA: Chuuk Group: Wela, 29.VII.1939; Moen, 4.III.1949. Pohnpei: Colonia, 17.VII.1949. Kosrae: Lale, Mt Buache (1500–1930 ft), Mt Tafeyate, 19–21.VIII.1946 (USNM). Caroline Atolls: Elato Atoll, 5.II.1953. WAKE I: 16.II.1957. MARSHALL IS: Ralik Chain: Kwajalein Atoll, 13.X.1953, 28.X–4.XI.1964; Lae Lae Atoll, 14.X.1953; Ujelang Atoll, 18–20.X.1953; Wotho Atoll, 20.X.1953; Eniwetok Atoll (Japtan, Aniyaanii, Igorin Is); Namorik Atoll, 30.X.1953; Ebon Atoll, 7.X.1953; Kili I, 2.X.1953; Jaluit (ZMHB); Bikini Atoll, vii–viii.1947 (USNM). Ratak Chain: Arno Atoll, 14.VI.1950; Wotje Atoll, 24.XI.1937; Likiep Atoll, 29.VIII.1946 (USNM); Majuro Atoll, 27.VIII.1946 (USNM), Uliga I, 31.X.1953. KIRIBATI (GILBERT IS): Tarawa Atoll (Belio, Marenanuka, Naanikai, Bikenibeu, Bairiki Is), 15.VIII.1956, XI to XII.1957, I.1970; Butaritari Atoll, XII.1957; Onotoa Atoll, 18.VII.1951; Abemana Atoll (Tebanga I), I.1970; Banaba (Ocean I), XII.1957. NAURU. Kagineu I, 25.X.1953; [no date] (ANIC). (64♂, 88♀, all BPBM except where noted).

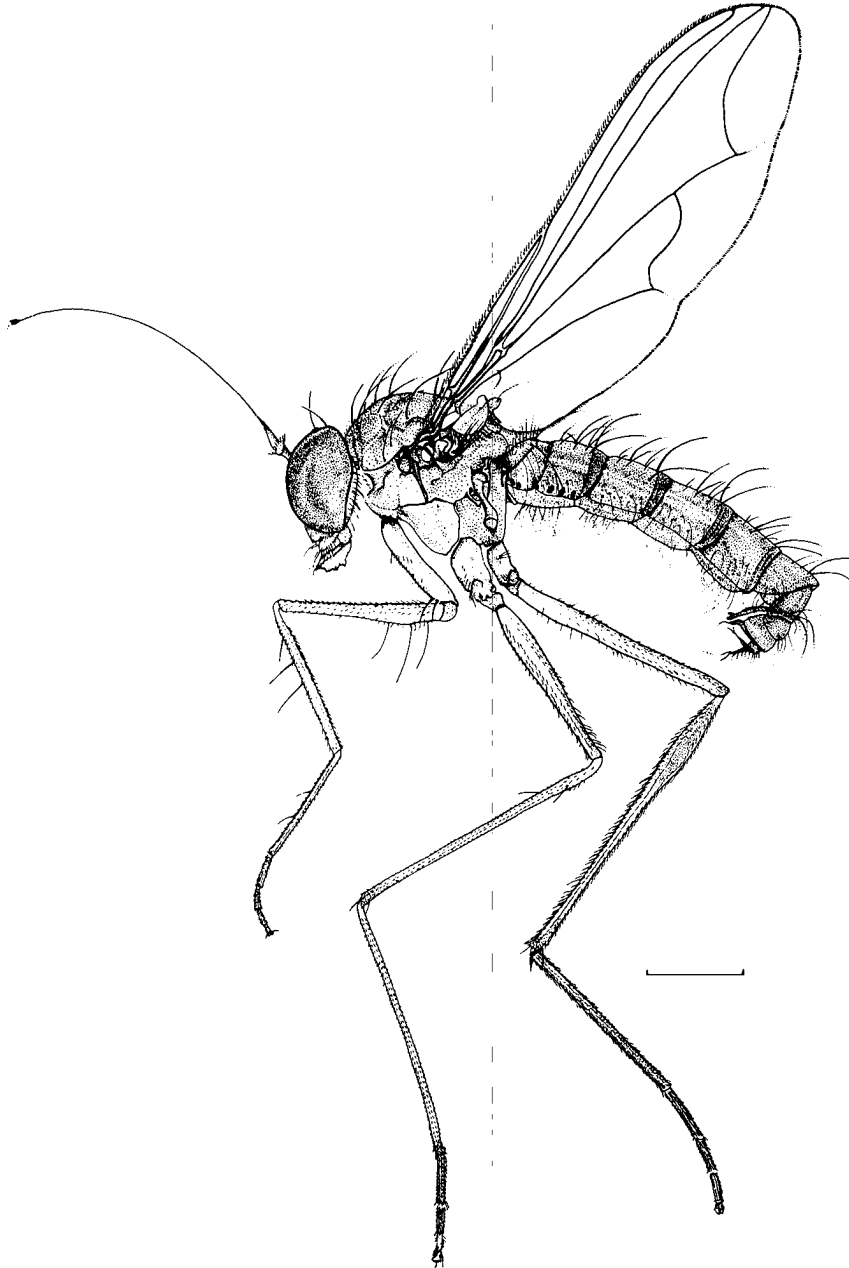


Figure 3. *Chrysosoma complicatum* Becker, Likiep Atoll, Caroline Is. Scale = 1 mm.

Additional extralimital material. TUVALU: Funafuti, 7-vii-1956 (BMNH); 3.VII.1987 (ANIC). AMERICAN SAMOA: Swains I, 4.V.1939 (USNM). PALMYRA ATOLL: 18.V.1949 (BPBM).

Distribution. American Samoa, Western Samoa, Tonga, Fiji, the Caroline, Marshall, and Gilbert groups, Tuvalu, Nauru, Wake I, and Palmyra Atoll.

Remarks. *Chrysosoma complicatum* is a characteristic element of the Micronesia-western Polynesian fauna and is found on many isolated atolls. The leg coloration and bent digitiform apex of the arista flag (MSSC) are distinctive.

11. *Chrysosoma mutilatum* Parent

Fig. 2d

Chrysosoma mutilatum Parent, 1935b: 72.

Description. Male: length: 5.0; wing: 4.8×1.4 ; similar to *C. patelliferum* except as noted:

HEAD: vertex, frons, and clypeus dark metallic blue; lateral slope of frons with 2-3 black hairs (MSSC); palp brown with black setae; proboscis brown; arista black, about 1/2 body length; arista with black lanceolate apical flag (MSSC).

THORAX: metallic blue-green with some pruinosity.

LEGS: all coxae, femora, and entire leg III black; tibiae and tarsi I and II reddish brown; CI and CII with pale anterior setae; CIII with tuft of pale lateral setae; I: 9.0; 8.5; 7.0/ 2.0/ 1.5/ 0.8/ 0.8; FI with 4 long pale basoventral setae; TI with 3 dorsal setae at 1/8, 1/4, and 3/5; It₁ slightly flattened but with pale ventral pile in basal 1/2 and with posterior row of black setae (MSSC), without dorsal setae; II: 11.5; 13.5; 10.0/ 5.5/ 3.0/ 1.5/ 1.0; TII with dorsal seta at 1/10; TII and II_t covered with short porrect setae; (MSSC); III: 13.0; 18.0; 8.5/ 4.0/ 2.5/ 1.5/ 0.8; TIII without callus; TIII with strong subapical ad seta; III_t with basoventral seta.

WING: hyaline; R₄₊₅ and M₁ joining subapically; halter dark brown.

ABDOMEN: hypopygium entirely dark brown (Fig. 2d); epandrium subtriangular; hypandrial arm arising beyond midlength; surstylus with dorsoapical hook subtended ventrally by strong apical setae; cercus with digitiform projection, distally with median arm forked, outer arm bearing bladlike seta, inner arm bearing 2 long apical seta, with lateral arms bearing apical bladlike seta and subapical broad seta.

Female: similar but lacks MSSC and as noted: legs entirely dark brown-black; FI also with 4 long pale basoventral setae; TI with 3 strong black dorsal setae to 1/2, and with strong ventral just beyond 1/2; It₁ with strong dorsal at 1/2; TII with 4 strong ad and with ventrals at 1/8 and subapically; TIII also with strong subapical ad seta; III_t also with subapical ventral seta.

Type material. The male holotype from the Solomons (BMNH, examined) is missing its postabdomen and both distal legs III.

Additional material. FEDERATED STATES OF MICRONESIA: Caroline Islands, Kapingamarangi Atoll (Ringutoru I, 25.VIII.1954, on taro leaves along lagoon; on *Ipomaea*, nr beach (1♂, 2♀, BPBM).

Distribution. Solomon Is (Guadalcanal, Neal I) and Kapingamarangi.

Remarks. *Chrysosoma mutilatum* probably originated on the Solomon Islands and dispersed to Kapingamarangi, an isolated atoll to the northwest.

12. *Chrysosoma ludens* Parent
Chrysosoma ludens Parent, 1935b: 70.

Fig. 4c

Diagnosis. Male: length: 5.5–6.2; wing: 4.6 × 1.3.

HEAD: frons, face, and clypeus blue-green with dusting of pruinosity; lateral frons with 4–5 pale hairs (MSSC); palp and proboscis black; pedicel with strong dorsal and ventral setae; arista black, simple, length about 2/3 that of body.

THORAX: metallic blue-green with some pruinosity; 3 pairs strong ac present; 2 strong posterior dc, with 4 weak hairlike anterior dc (MSSC); lateral scutellars about 1/3 length of medians.

LEGS: coxae and femora black; TI and TII reddish yellow; TIII reddish yellow basally, becoming dark brown distad; tarsomeres dark brown to black; CI and CII with pale anterior setae; CIII with tuft of pale lateral setae; femora with pale ventral hairs; FI with 2–3 long pale basoventral setae; TI with 3 dorsal setae,

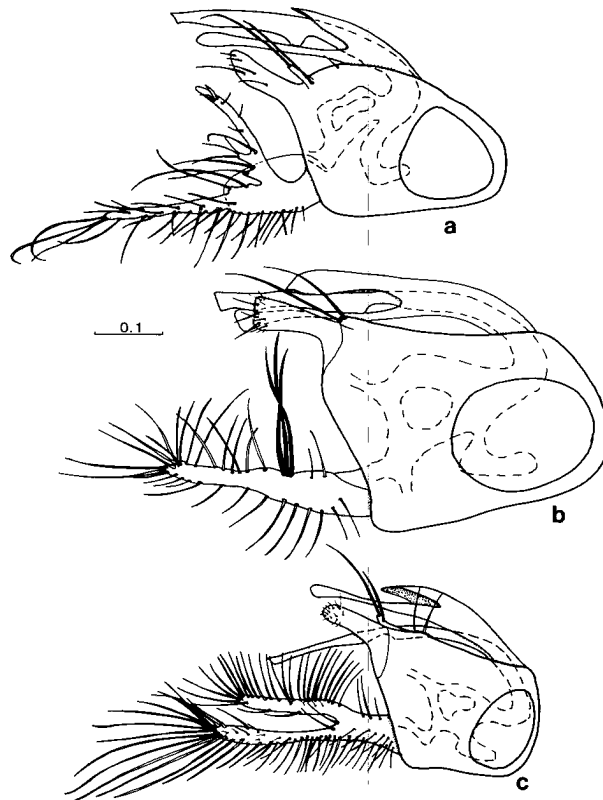


Figure 4. a. *Chrysosoma molestum*, Tarawa Atoll, Kiribati; hypopygium, left lateral. b. *C. pelagica*, Guam; hypopygium, left lateral. c. *C. ludens*, Jaluit, Marshall Is; hypopygium, left lateral.

at 1/8, 2/5 and just beyond 1/2, increasing in size distally; TI with strong subapical ventral seta (MSSC); It₁ dorsally bare, slightly flattened with whitish ventral pile (MSSC); TII with 3 strong ad, single av at 1/4; TII with strong subapical ventral seta (MSSC); TIII without callus.

WING: hyaline; M₁ gradually arching to apex, almost meeting R₄₊₅ at apex; m-cu sinuous; lower calypter yellow with fan of pale setae; halter brown.

ABDOMEN: hypopygium entirely black (Fig. 4c); epandrium subrectangular; hypandrial arm arising at 2/3, extending well beyond hood; 2 long epandrial setae; epandrial lobe with strong apical bristle, shorter subapical bristle; surstylus digitiform, lobate, with setae as figured; cercus forked with 2 elongate parallel arms covered with long pale hairs.

Female: similar but lacks MSSC and as noted: with 2 strong posterior dc and 3–4 strong but shorter dc anterior; legs entirely brown; TI with 3 strong black dorsal setae to 1/2, with strong ventral at 2/3; It₁ with strong unflattened dorsal seta; TII with 2 strong ad in basal 1/3, 2 ventrals, strong subapical ventral seta.

Type material. The male holotype of *Chrysosoma ludens* is from the Solomon Islands (BMNH, examined).

Additional material. MARSHALL ISLANDS: Ralik Chain: Jaluit Atoll (Marjireke, 26.IV.1958 (BPBM); Medyado, Imrodj, 24.VIII.1946). Ratak Chain: Likiep Atoll, 30.VIII.1946. (5♂, 2♀, all USNM except where noted).

Distribution. Solomon Is (Guadalcanal), Papua New Guinea (Loloata I, Central Prov; Torricelli Mts), and Marshall Is.

Remarks. *Chrysosoma ludens* has a distinctive cercus comprising 2 setose parallel arms.

13. *Chrysosoma pelagica* Bickel, n. sp.

Fig. 4b

Description. Male: Length: 5.0; wing: 4.6 × 1.3.

HEAD: vertex, frons, face and clypeus metallic blue-green; face and clypeus with gray pruinosity; lateral scope of frons with single pale hair (MSSC); face bulging (MSSC); palp yellow with black setae; proboscis yellow; antenna black; pedicel with strong dorsal and weaker ventral setae; 1st flagellomere tapering; arista black, about 2/3 body length; arista with black narrow lanceolate apical flag (MSSC).

THORAX: metallic blue-green with some pruinosity; setae black; 3 pairs strong ac present; 2 strong posterior dc, with 4 weak hairlike anterior dc (MSSC); lateral scutellars reduced to tiny pale hairs.

LEGS: CI, trochanter I, femora, tibiae and It₁, yellow; coxae and trochanters II and III dark brown; remaining tarsomeres yellowish, becoming brown distally; CI and CII with pale anterior setae; CIII with pale lateral setae; femora with pale ventral hairs; I: 8.5; 8.0; 6.0/ 2.0/ 1.5/ 1.0/ 0.8; FI with 2 strong pale ventral setae; TI with 3 dorsal setae, at 1/8, 1/4, and 1/2; TI with 2 subapical pv setae (MSSC); It₁ dorsally bare, slightly flattened with whitish ventral pile in basal 1/2 (MSSC); It₁ with row of long curved posterior setae to 1/2 which then continues as short posterior row along entire It (MSSC). II: 9.0; 12.0; 8.0/ 3.0/ 2.0/ 1.0/ 0.8; TII

with strong ad setae at 1/10, 1/2, and subapically, and with 5 short ventral setae; IIt₁ with anterior brush of short black hairs in basal 1/5 (MSSC); III: 17.0; 11.0; 6.5/ 4.0/ 2.0/ 1.5/ 1.0; TIII without callus.

WING: hyaline; R₄₊₅ and M₁ converging at apex; M₂ reaching margin as fold; m-cu slightly sinuous; lower calypter yellow with dark brown rim, with fan of pale setae; halter yellow.

ABDOMEN: metallic blue-green with matte brown bands at tergal overlap, silvery pruinosity laterally; tergum 7 with external row of strong marginal setae; hypopygium entirely brown (Fig. 4b); epandrium subrectangular; hypandrial arm arising beyond midlength; epandrial lobe with 2 strong bristles; surstylus lobate, truncate, with setae as figured; cercus digitiform, tapering, with 3 distinctive strong adjacent basoventral bristles.

Female: similar but lacks MSSC and as noted: with 2 strong posterior dc and 3–4 strong but shorter dc anteriorly; FI also with 2 strong basoventral setae; TI only with 3 dorsal setae, but lacking subapical pv setae; It₁ only with 2 dorsal setae.

Type material. Holotype ♂, paratypes, 2♂, 2♀, PHILIPPINE IS: Manilla, XII.1924, R. C. McGregor (USNM).

Additional material. GUAM: ♂, Piti, 12.IX.1936, swept from *Pithecolbium*: ♀, no locale or date; ♀, Cocos I, X.1957 (BPBM).

Distribution. Philippine Is, Guam.

Remarks. The Philippine Is and Guam specimens of *Chrysosoma pelagica* are identical, especially noting the distinctive IIt₁ MSSC. This species is close to *C. arrogans* from the Solomons and Bougainville I and the 2 species are separated in the text key.

14. *Chrysosoma molestum* Parent

Fig. 4a

Chrysosoma molestum Parent, 1934b: 288.

Description. Male: length: 4.7; wing: 4.2 × 1.3; similar to *C. patelliferum* except as noted:

HEAD: frons metallic green with dusting of pruinosity; lateral frons bare; face and clypeus with dense silvery pruinosity; palp and proboscis black; antenna black; pedicel with only short dorsal and ventral setae; 1st flagellomere short, triangular; arista black, apical, about 1/2 body length, simple.

THORAX: 4 pairs strong ac present; lateral scutellars absent.

LEGS: CI, femora, tibiae, It₁, and IIt, yellow; CII and CIII, distal tarsomeres I and II, and all III dark brown; CI and CII with pale anterior setae; CI also with 3 black distolateral setae; I: 7.0; 7.0; 6.0/ 1.5/ 1.0/ 0.5/ 0.5; leg I devoid of significant setae; II: 8.5; 11.0; 7.0/ 4.0/ 2.0/ 1.5/ 1.0; TII with strong ad and weaker pd at 1/10; TII and IIt₁ covered with short porrect hairs (MSSC); IIt₂ with single long projecting ad apical seta (MSSC); IIt₃ and IIt₄ each with short dorsoapical seta; III: 11.0; 14.0; 6.0/ 2.5/ 1.5/ 1.0/ 0.8; TIII without callus.

WING: hyaline; R₄₊₅ and M₁ subparallel at apex; m-cu only slightly sinuous; lower calypter yellow with dark brown rim, with fan of black setae; halter yellow.

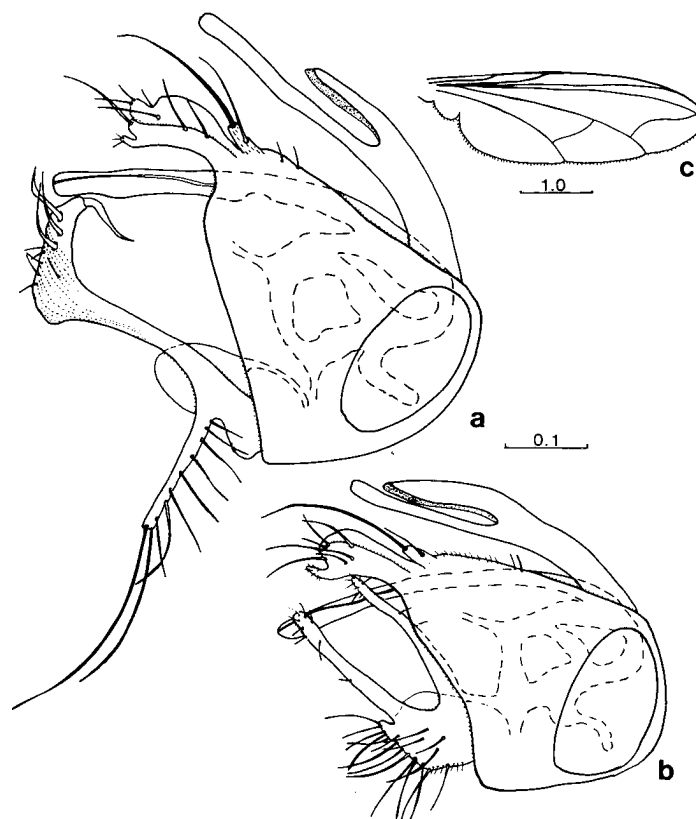


Figure 5. a. *Krakatauia evulgatum*, Pohnpei; hypopygium, left lateral. b-c. *K. mi-cronesiana*, Guam; b. hypopygium, left lateral; c. male wing, dorsal.

anterior hairs; CIII with pale lateral hairs; femora with pale ventral hairs only; I: 8.0; 8.5; 6.5/ 1.5/ 1.0/ 1.0/ 0.5; TI with dorsal at 1/5 and ventral apical seta; It_1 relatively long, slightly flattened, and with pale ventral pile along entire length (MSSC); II: 9.0; 11.0; 8.5/ 3.0/ 2.0/ 1.0/ 0.5; TII with short dorsals and ventrals strong av-pv apical pair; III: 12.0; 15.0; 8.0/ 3.5/ 2.5/ 1.5/ 1.0.

WING: hyaline; M_1 approaches R_{4+5} in broad arc, but is separate from it at wing margin; m-cu slightly sinuous; CuAx ratio: 2.2; lower calypter brown with fan of pale setae; halter yellowish to brownish.

ABDOMEN: metallic blue-violet with wide matte brown bands around areas of tergal overlap; hypopygium entirely dark brown (Fig. 5a); epandrium subtriangular; hypandrial arm arising at midlength and extending well beyond hypandrial hood; aedeagus elongate and wide, extending beyond apex of surstylus; surstylus lobate with lateral setae, with ventral lobe and dorsal curved digitiform projection; cercus with short distal setose projection bearing long curved apical setae and clavate ventral arm bearing apical hooked seta and other strong setae as figured.

Female: similar to male except lacks MSSC and as noted: frons without lateral hairs; FI black in basal 1/3 1/2, yellow distad; FIII black to 3/4, yellow distad; TI with 2 short dorsal and 2 short pv setae, but lacking ventral apical seta; It₁ unmodified.

Type material. The type material and synonymies are discussed in Bickel (1994).

Micronesian material. NORTHERN MARIANAS ISLANDS: Agrihan I, 26.VII.1951. FEDERATED STATES OF MICRONESIA. Yap Group: Giliman, Yaptown, Dugor, Mt Mataade, North and South Map, Gadgil, Tomil, Ruul, Ruming, VII-VIII.1950, XI-XII.1952, III.1954, VI.1957 (BPBM & USNM). Caroline Atolls: Elato Atoll, 5.II.1953. Nomwin Atoll (Nomwin I, Fananu I), 17-18.II.1954; Ifaluk Atoll, 6.IX.1953 (BPBM & USNM), and Ella I, washed from alga *Liagara*, on boulder flat, 20.X.1953. Lamotrek Atoll, 5.II.1953. Ulithi Atoll (Falalop, Passara, Utagal, Mogmog, Potangeras Is), XII.1944, 10.XI.1947, 6.X.1952, 26.IX.1958 (BPBM, USNM). Woleai Atoll (Woleai, Utagal, Falalis Is), II, IX.1953. Puluwat Atoll, 8.VIII.1939. Pingelap Atoll, 22.VIII.1939. Satawan I (More), no date. Fais I, 5.X.1952. Mokil Atoll, 27.I.1953. Kapingamarangi Atoll (Hare, Machiro, Werua, Nunakita Is), 3.VIII.1946, 25.VIII.1954 (BPBM, USNM). Chuuk Group: Pis, Udot, Dublon, Pata, Wela, Moen Is, 29.VII.1939, 26-27.V.1946, 4.III.1949, 17.X.1952 (BPBM, USNM). Pohnpei: Colonia, Sokehs, 26.II.1948, 17.VII.1949, VI-IX.1950 (BPBM, USNM). MARSHALL IS: Ralik Chain: Kwajalein Atoll, 13.X.1953, 28.X-4.XI.1964; Lae Lae Atoll, 14.X.1953; Ujelang Atoll, 18-20.X.1953; Wotho Atoll, 20.X.1953; Eniwetok Atoll (Japtan, Aniyaanii, Igorin Is); Namorik Atoll, 30.X.1953, 30.IX.1957; Ebon Atoll, 7.X.1953; Kili I, 2.X.1953; Jaluit Atoll (Mejetto, Imeg, Imroj) 24.VIII.1946, 11.XI.1964; Bikini Atoll, VII-VIII.1947 (USNM); Ailinglapalap Atoll, Ailinglapalap, Airek, Woja Is, 28.VIII.1948: X.1953; Namu Atoll, 24.X.1953. Ratak Chain: Arno Atoll, Ine, 14.VI.1950; Wotje Atoll, 24.XI.1937; Likiep Atoll, 29.VIII.1946 (USNM); Majuro Atoll, Uliga, Dalap Is, 27.VIII.1946 (USNM); Uliga I, X-XI.1953. KIRIBATI: Tarawa Atoll (Belio, Bairiki Is), XI-XII.1957, I.1970; Butaritari Atoll, XII.1957. NAURU: no date (ANIC). (88♂, 154♀, all BPBM except where noted).

Distribution. Bismark Arch, Caroline Is (Chuuk, Yap, Pohnpei, Caroline Atolls), Marshall Is, Solomon Is (incl. Ontong Java Atoll), Trobriand Is, Nauru, and Vanuatu.

Remarks. *Krakatauia evulgatum* is a common and widely distributed tramp species throughout the western tropical Pacific. In Micronesia, it is found throughout the Caroline, Marshall, and Kiribati groups, including many low and isolated atolls. No specimens were seen from Belau, although it might be expected there, considering it occurs on nearby Yap.

The clavate ventral cercal arm, abundant pale hairs on the frons, and coloration are distinctive. Some intraspecific variation is evident in size, haltere color (from yellow to brown) and the extent of black coloration on basal FI.

Two related undescribed species occur in Melanesia.

17. *Krakatauia micronesiana* Bickel, n. sp.

Figs 5b-c

Description: Male: length 3.8; wing: 3.0×1.2 .

HEAD: vertex, frons, face, and clypeus bright emerald green with little pruinosity; frons broad and flat with abundant fine pale hairs on lateral slope (MSSC); face bulging; clypeus free from eye margin; eyes ventrally with pale setae between facets; palp black with long pale setae; proboscis yellow; antenna black; scape with median extension (MSSC); 1st flagellomere subrectangular; arista dorsal, as long as head height; postcranium with abundant pale setae.

THORAX: metallic emerald green, scutellum blue; setae black; pleura and coxae with silvery pruinosity; 3 pairs long ac present; lateral scutellars weak, about 1/5 length of medians.

LEGS: coxae, trochanters, and femora black; tibiae, It_1 , and IIt_1 yellow; all $IIIIt$ and distal tarsomeres brown; CI and CII with pale anterior hairs; $CIII$ with pale lateral hairs; femora with pale ventral hairs; I: 6.0; 6.0; 4.0/ 1.0/ 0.8/ 0.5/ 0.5; TI bare; II: 6.5; 7.5; 5.5/ 2.0/ 1.5/ 0.8/ 0.5; TII with ad at 1/5 and subapically; III: 8.0; 10.5; 5.0/ 2.0/ 1.2/ 1.0/ 0.8.

WING: hyaline; M in gentle arc joining R_{4+5} internally, closing cell R_5 before wing apex by short stalk (Fig. 5c); $m-cu$ slightly sinuous; $CuAx$ ratio: 2.3; lower calypter brown with fan of pale setae; halter brownish.

ABDOMEN: metallic blue-violet with wide matte brown bands around areas of tergal overlap; hypopygium entirely dark brown (Fig. 5b); epandrium subtriangular; hypandrial arm arising at midlength and extending just beyond apex of hypandrial hood; surstylus lobate with lateral setae, with ventral lobe and dorsal curved digitiform projection; cercus densely setose distobasally, with 2 long subparallel ventral arms, basal arm usually hidden from view within epandrium.

Female: similar to male except lacks MSSC and as noted: also with pale setae on palp; frons without lateral hairs, not as flattened; TI with short dorsal at 1/2; wing also with cell R_5 closed; but M_1 more strongly curved.

Type material. Holotype ♂ (FMNH), paratypes, 10♂, 11♀, GUAM: Pago Bay, 2.VI.1945, H. S. Dybas (FMNH, BPBM).

Additional material. NORTHERN MARIANAS ISLANDS: Saipan, Gapan, III.1940; Chalan Kanoa, [no date]; Chalan Laulau, VIII.1944; Achugau area, VII.1945 (USNM & BPBM). Rota (Rota, VII.1967; Teteto, XI-1967). GUAM: Agana, X.1952; Mt Alifan, VIII.1952; Santa Rita, X.1952; Talofofu, VIII.1952; Tumon Bay, II.1946; Pt Oca, XI.1952, V.1945; 3.VI.1945; Yona, X.1952; Tutujan, XI.1952; Yigo, VIII.1936; Fadang, VI.1945; Barrigada, XI.1952, X.1957; Umatac, V.1936; Anderson Air Base, VIII.1952; [no locale], I, II.1945 (USNM 7 BPBM). PALAU: Tobi I, VIII.1952. WAKE ATOLL: Wake I, VIII.1940, XI.1953; Peale I, VI.1940. MIDWAY ATOLL: Sand I, 11-13.V.1973, sweeping Coccoloba; Sand I, 13-17.XII.1970, Malaise trap. (46♂, 31♀, all BPBM except where noted).

Distribution. Guam, Palau, Northern Marianas, Wake Atoll, and Midway Atoll.

Remarks. *Krakatauia micronesiana* is known from Micronesia and Midway Atoll. The closely related *K. rectum* has a similar habitus and hypopygium, but a more modified wing: M_1 still joins R_{4+5} before the apex, but is almost straight

(MSSC) and the wing has a distinct brown apical spot with a white external border (MSSC). *K. rectum* is known for Sumatra, Borneo, Lesser Sundas, Taiwan, Philippine Is, Sri Lanka, and New Guinea, and the ranges of the 2 species appear to be mutually exclusive. Possibly *K. rectum* is derived from an ancestor similar to *K. micronesiana*.

Genus AMBLYPSILOPUS Bigot

Amblypsilopus Bigot, 1888a: xxiv [1888b: xxiv]. Type species: *Psilopus psittacinus* Loew, 1861 (as "*psitacinus* Fabricius"), by original designation.

Amblypsilopus is a diverse and complex genus of cosmopolitan distribution. It is treated in Bickel (1994) where major groups of species are defined. The Micronesian species are placed in the following groups:

1. The *pallidicornis* Group: *A. pallidicornis*, and *A. biprovincialis*.
2. The *abruptus* Group: *A. ponapensis*, *A. austerus*, and *A. belauensis*.
3. The *flaviappendiculatus* Group: *A. sabroskyi*.
4. Unplaced: *A. trukensis*.

Key to Male Micronesian *Amblypsilopus*

1. Thoracic pleura, all coxae, and abdomen mostly yellow; wing with brown anteroapical cloud; antenna yellow; arista apical; TI with curved posterior seta at 9/10; cercus elongate with distinctive ventral capitate setae....(Guam, Palau, Hawaiian Is, Society Is, Taiwan, Seychelles)..... 18. *A. pallidicornis* (Grimshaw)
- Thoracic pleura, at least CII and CIII, and abdomen black; wing hyaline2
- 2(1). CI and femora mostly yellow; TII and II_t without short erect hairs3
- CI and femora black; TII and II_t covered with short erect hairs.....6
- 3(2). II_t₃₋₅ with flattened ventral padlike surface; abdominal tergum 5 ventrally with pair of 2-3 short black spinelike setae; 1st flagellomere either bright yellow or black; TI elongate, with pale ventral pile and with curved pale setae along posterior margin from 1/4 to 3/4; cercus long and flagelliform (Fig. 7b) (Palau).....23. *A. sabroskyi*, n. sp.
- III_t not flattened; tergum 5 without ventral spinelike setae.....4
- 4(3). Hypopygium large and entirely yellow, with elongate cercus which bears expanded complex apical club (Fig. 7a); legs without significant MSSC (Chuuk)..... 24. *A. trukensis*, n. sp.
- Hypopygium with epandrium black; cercus digitiform, not apically expanded; TI with curved posterior seta at 7/85
- 5(4). Antenna black; It₅ not flattened; abdominal tergum 1 with orientated silvery pruinosity, evident in anterior view; cercus short digitiform, setose (Fig. 6a) (Pohnpei)..... 20. *A. ponapensis*, n. sp.
- Antenna yellow; It₅ flattened into black pinnate apical flag (MSSC); abdominal terga 1 and 2 yellow laterally and ventrally; cercus elongate,

- with 3 long somewhat crooked midventral setae (Australia, Chuuk) ...
 19. *A. biprovincialis*, n. sp.
- 6(2). Halter black; cercus digitiform, with strong outstanding ventral setae at
 4/5 and subapically (Fig. 6b) (Sabah, Guam, Saipan)
 21. *A. austerus* (Parent)
- Halter yellow; cercus tapering, subtriangular and setose (Fig. 6c) (Palau)
 22. *A. belauensis*, n. sp.

18. *Amblypsilopus pallidicornis* (Grimshaw)
Gnamptopsilopus pallidicornis Grimshaw, 1901: 12.

Diagnosis. Male. length 3.0–3.5.

HEAD: vertex, frons, and face metallic blue with dusting of silvery pruinosity; clypeus protruding, with dense silvery pruinosity; palp and proboscis yellow; antenna yellow; 1st flagellomere short, triangular; arista apical, long.

THORAX: dorsum metallic green-bronze with some silvery pruinosity; pleura including metepimeron yellow; 2 pairs long ac present; 5 dc present: 2 strong posterior and 3–4 weak anterior setae.

LEGS: all coxae and legs yellow except as noted; CI with 3 yellow distolateral setae; CIII with black lateral seta; TI with long curved posterior seta at 9/10 (MSSC).

WING: hyaline but with faint brown clouding anteroapically.

ABDOMEN: yellow, but segments 1–5 each with distal brown band near tergal overlap; cercus elongate with distinctive ventral capitate setae (see Fig. 61h, Hardy and Kohn, 1964).

Female: similar to male except lacking MSSC and as noted: clypeus with dense silvery pruinosity; thorax entirely yellow with some blue metallic reflections; wing also with faint anteroapical cloud; abdomen also yellow with brown bands at tergal overlap.

Micronesian material. GUAM: Agat, 31.V.1936; Pago Bay, VI.1945. PALAU: Babelthuap: Ngerhelong, 6.V.1957. Oreor (= Koror): 22.VII.1946 (USNM); 23.IV.1957. Ngcheangel (= Kayangel) Atoll, [no date]. Beliliou: 27.I.1948. (10♂, 8♀, all BPBM except where noted).

Distribution. Hawaiian Is, Society Is, Taiwan, Seychelles, Guam, and Palau.

Remarks. *Amblypsilopus pallidicornis* is widespread through the tropical Pacific and Indian Oceans.

19. *Amblypsilopus biprovincialis* Bickel
Amblypsilopus biprovincialis Bickel (1994:309)

Diagnosis: Male.

HEAD: proboscis and antenna yellow; arista dorsoapical, about 2 × head height.

THORAX: dorsum metallic blue-green with brown-gray pruinosity; setae black; 2 pairs long ac present; lateral scutellar setae absent.

LEGS: CI, femora, tibiae, and tarsi yellow, except as noted; CII and CIII and distalmost tarsomeres dark brown; CI with 3 strong pale distolateral setae; TI with long curved posterior pale seta at 7/8, with subapical pale pile (MSSC); It_1 longer than TI, slightly curved, with fine white pile ventrally (MSSC); It_5 flattened into black pinnate apical flag (MSSC).

WING: hyaline; lower calypter yellow with brown rim and fan of pale setae; halter yellow.

ABDOMEN: bristles of epandrial lobe developed separately, each on short pedicel; surstylus lobate, with 2 strong curved apical setae; cercus elongate, with 3 long somewhat crooked midventral setae, with few dorsal setae.

Type material. See Bickel (1994) for figures and complete description.

Micronesian material. FEDERATED STATES OF MICRONESIA: Chuuk Group, Moen, Civil Administration Area, 15.IV.1947 (2♂, BPBM).

Distribution. Australia (NT, Qld) and Chuuk Group.

Remarks: *Amblypsilopus biprovincialis* was first described from Cape York Peninsula and Arnhem Land. Australian and Chuuk specimens are almost identical, especially the appearance of the surstylus and setation of the cercus. The only obvious difference is that It_5 is not as strongly developed into a black pinnate flag (MSSC) on Chuuk males. This species possibly occurs on islands between northern Australia and Micronesia.

20. *Amblypsilopus ponapensis* Bickel. n. sp.

Fig. 6a

Description. Male: length: 4.0; wing: 3.3×1.2 .

HEAD: vertex, frons, and face below antenna metallic blue; lateral slope of vertex with 2 black setae; lower face and clypeus with silvery pruinosity; palp and proboscis yellowish; antenna black; pedicel with single dorsal and ventral setae; 1st flagellomere subtriangular; arista short, about as long as head width.

THORAX: metallic blue-green with bronze reflections; pleura with gray pruinosity; setae black; 2 pairs long ac present; 2 strong posterior dc, with 4 short, weak hairlike dc anteriorly (MSSC); lateral scutellars absent.

LEGS: CI yellow but infuscated basally; trochanter I, femora, tibiae, and all t_1 yellow; coxae, trochanters II and III, and distal tarsomeres black; CI with pale anterior hairs, with 3 strong pale setae distolaterally; CIII laterally with tuft of pale hairs; femora with pale ventral hairs; legs devoid of major setae; I: 5.0; 6.5; 5.5/ 2.2/ 1.9/ 1.0/ 1.0; TI elongate with weak curved pale posterior setae at 7/8 (MSSC); It_5 not flattened; II: 6.5; 7.5; 7.0/ 2.5/ 2.0/ 1.0/ 0.5; $III t_1$ relatively long; III: 8.5; 12.5; 5.5/ 2.5/ 2.0/ 1.0/ 0.5; $III t_{3-5}$ not flattened (MSSC).

WING: hyaline; M_1 with elbow-shaped bend; m-cu straight; CuAx ratio: 2.7; lower calypter yellow with black rim and black setae; halter yellow.

ABDOMEN: metallic green; basal 1/2 of each tergum 2-6 and narrow band on adjacent tergum matte brown; tergum 1 with oriented silvery pruinosity, evident in anterior view (MSSC); hypopygium brown (Fig. 6a); hypandrial arm relatively short; 2 short epandrial seta present on mound; epandrial lobe with 2

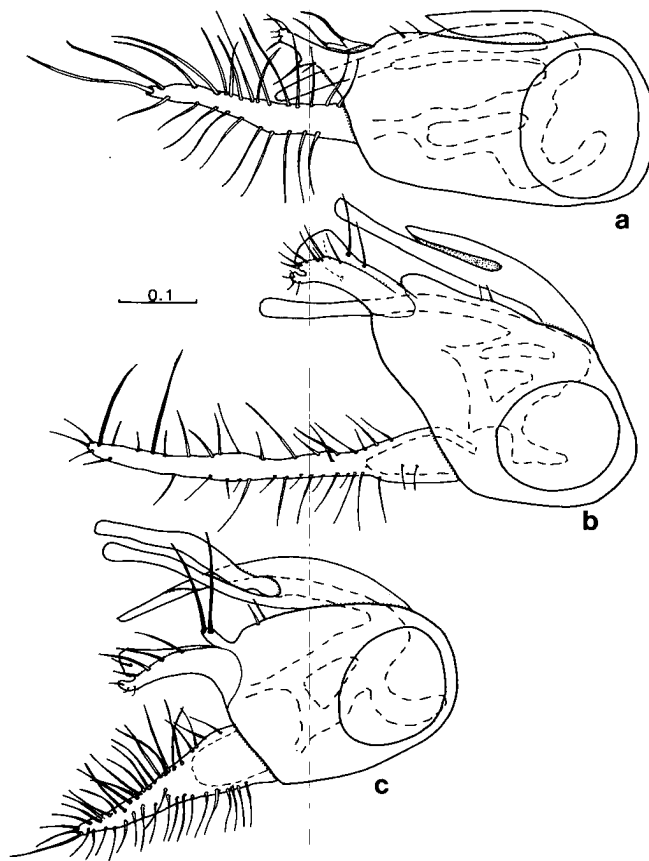


Figure 6. a. *Amblypsilopus ponapensis*, Pohnpei; hypopygium, left lateral. b. *A. austerus*, Guam; hypopygium, left lateral. c. *A. belauensis*, Babelthaup, Palau, hypopygium, left lateral.

pedunculate bristles with membranous connection to epandrium; surstylus simple with strong dorsal seta; cercus digitiform, setose.

Female: similar to male except lacking MSSC.

Type material. Holotype ♂ (USNM), 2 paratype ♂, FEDERATED STATES OF MICRONESIA: Pohnpei, Colonia, 5.VII.1946, H. K. Townes (USNM); Paratype ♀, Agricultural Experiment Station, VI to IX.1950 (BPBM).

Distribution. Caroline Is: Pohnpei.

Remarks. *Amblypsilopus ponapensis* is possibly conspecific with *A. superans* from New Guinea. Both species have oriented silvery pruinosity on the 1st abdominal tergum and have similar hypopygia. However, It_2 is distinctly flattened on *A. superans* (MSSC), while it is unmodified on *A. ponapensis*. A number of undescribed Melanesian species, all with simple digitiform cerci, are close to *A. superans* and this complex requires further study.

21. *Amblypsilopus austerus* (Parent)

Fig. 6b

Chrysosoma austerum Parent, 1935a: 363.**Description.** Male: length: 3.5; wing: 3.3×1.2 .

HEAD: vertex and frons metallic blue-green; lateral slope of vertex with 2–3 black hairs; face and clypeus green with silvery pruinosity; palp and proboscis brownish; antenna black; 1st flagellomere subtriangular; arista dorsoapical, about as long as head width.

THORAX: metallic blue-green; pleura with silvery pruinosity, especially evident on notopleuron in dorsal view; setae black; 3–4 pairs ac present; 2 strong posterior dc, with 4 short, weak hairlike dc anterior (MSSC); lateral scutellars absent.

LEGS: coxae, femora, tarsi dark brown to black; tibiae yellow to red-brown; CI and CII with pale anterior hairs; CIII with lateral tuft of pale hairs; femora with only weak ventral hairs; tibiae without major setae; I: 6.5; 6.0; 4.5/ 2.0/ 1.2/ 0.8/ 0.5; II: 7.5; 9.0; 6.0/ 2.5/ 1.5/ 1.0/ 0.5; TII and II_t covered with short erect hairs (MSSC); III: 8.5; 11.0; 5.5/ 3.0/ 2.0/ 1.0/ 0.5.

WING: hyaline; M₁ with elbow-shaped bend; M₂ weak; m-cu straight; CuAx ratio: 1.3; lower calypter black with black setae; halter black.

ABDOMEN: metallic green, basal 1/2 of each tergum 2–6 and narrow band on adjacent tergum matte brown; hypopygium dark brown. (Fig. 6b); hypandrial arm arising at midlength and extending beyond hood; 2 short epandrial setae present; epandrial lobe apparently absent (possibly fused with surstylus); dorsal arm overlying larger ventral arm, with 2 ventral setae; cercus digitiform, with 2 strong outstanding ventral setae at 4/5 and subapically.

Female: similar to male except lacks MSSC and as noted: with 5 strong dc; leg II without short erect hairs; halter yellow.

Type material. Parent described *Chrysosoma austerum* (BMNH, examined) from Malaysia (Sabah). A male paratype (AMNH) was compared directly with the Guam specimens and they are identical in all respects.

Additional material. GUAM: Piti, X.1936; Pago Bay, V.1945; Pt Oca, XI.1952; Umtac, V.1936; Agat, X.1936. NORTHERN MARIANAS ISLANDS: Saipan, VI.1945 (5♂, 4♀, BPBM).

Distribution. Malaysia (Sabah), Guam, Saipan.

Remarks. *Amblypsilopus austerus* has a distinctive cercus with 2 strong ventral setae. A record by Parent of this species from the Punjab, India (specimen in BMNH, examined) is in fact the closely related *A. pusillus* Macquart. The epandrial lobe of *A. austerus* is apparently fused with the surstylus.

22. *Amblypsilopus belauensis* Bickel, n. sp.

Fig. 6c

Description. Male: length: 4.3; wing: 3.4×1.2 .

HEAD: vertex, frons and face below antenna shining metallic blue-green; lateral slope of vertex bare; lower face and clypeus with silvery pruinosity; palp dark brown; proboscis brownish; antenna black; 1st flagellomere subrectangular, arista short, dorsal, about as long as head width.

THORAX: metallic blue-green with bronze reflections; setae black; 3 pairs strong ac present; 2 strong posterior dc, with 4 weak hairlike dc anterior (MSSC); lateral scutellars absent.

LEGS: coxa and femora dark brown to knees; TI and TII yellow; TIII yellowish; tarsi brown; CI and CII with pale anterior hairs; CIII with tuft of pale lateral setae; I: 7.5; 7.0; 5.0/ 1.5/ 1.0/ 0.8/ 0.5; It covered with short erect hairs (MSSC); II: 7.0; 10.0; 6.5/ 3.0/ 1.5/ 1.0/ 0.5; TII with ad at 1/10; TII and Iit covered with short erect hairs (MSSC); III: 10.0; 12.0; 6.0/ 3.0/ 2.0/ 1.0/ 0.8; IIIit not flattened.

WING: hyaline; M_1 with moderate elbow-shaped bend; m-cu straight; CuAx ratio: 2.6; lower calypter yellow with black rim and pale setae; halter yellow.

ABDOMEN: metallic green, basal 1/2 of each tergum 2–6 and narrow band on adjacent tergum matte brown; hypopygium dark brown with yellow cerci (Fig. 6c); both hypandrial hood and hypandrial arm extending to apex of aedeagus; epandrial lobe with 2 bristles; surstylus with dorsoapical digitiform projection and with 3 strong lateral setae as figured; cercus tapering, subtriangular, setose.

Female: similar to male except lacks MSSC, otherwise as noted: anterior dc shorter than posterior dc, strong, not hairlike; FI dark brown only to 2/3.

Type material. PALAU: Babelthuap: Holotype ♂ (USNM), Ngaremlangui, 3.VI.1957, C. W. Sabrosky. Paratypes: ♂, Imeliik Netkeng, 5.VI.1957; ♀, Nger-ehelong, 5.V.1957; ♀, Airai Ngarsung, 16.V.1957; 2♀, Malekelok, 23.V.1957; ♀, Ngardmau, V.1957 (all BPBM).

Additional material. PALAU. Oreor (= Koror): limestone ridge, 14.XII.1952; at light, I, III, IV, VI, and VII.1953. Beliliou (= Peleliu): West coast, 2.II.1948. Ngeaur: Angaur I, 30.IV.1947; Ngerkabesang, 18.VII.1946 (USNM). (8♂, 11♀, all BPBM except where noted). Possible ♀ of this species, FEDERATED STATES OF MICRONESIA: Caroline Atolls: Ulithi Atoll, Potangeras Is, 10.XI.1947.

Distribution. Palau Group and possibly Caroline Atolls.

Remarks. *Amblypsilopus belauensis* displays few distinctive MSSC, except for the short erect hairs on legs I and II. Tarsus III is not flattened. This species is placed in the *Amblypsilopus abruptus* Group, Assemblage II.

23. *Amblypsilopus sabroskyi* Bickel, n. sp.

Fig. 7b

Description. Male: length: 3.7; wing: 3.4×1.2 .

HEAD: vertex, frons, and face below antenna metallic green-brown; lateral slope of vertex bare; lower face and clypeus with silvery pruinosity; palp and proboscis yellowish; scape and pedicel black; 1st flagellomere either bright yellow or black (see remarks below); 1st flagellomere subrectangular, arista short, about as long as head width.

THORAX: metallic blue-green with bronze reflections; pleura with gray pruinosity; setae black; 2 pairs strong anterior ac; 2 strong posterior dc and 4 short, weak hairlike dc anterior (MSSC); lateral scutellars reduced to tiny weak hairs.

LEGS: CI, femora, tibiae, and basal tarsomeres yellow; CII, CIII, and distal-most tarsomeres black; CI with pale anterior hairs; CIII laterally with tuft of pale setae; I: 7.0; 7.5; 4.0/ 1.8/ 1.2/ 0.8/ 0.5; TI slightly flattened with some ventral

with ventrobasal thumblike projection with apical bladelike seta and long seta, distal arm with complex setose apical club.

Female: similar to male except lacks MSSC, otherwise as noted: arista also dorsoapical; 4 strong dc present.

Type material. FEDERATED STATES OF MICRONESIA: Chuuk Group: Moen I: Holotype ♂ (CAS), paratypes, 3♂, 10♀, 5.III.1949 (holotype), and variously 1.III–5.IV.1949, R. W. L. Potts. Paratypes, 5♂, 4♀, Mt Teroken, 70–180m, Tonachau, 1.II.1953, 28.XII.1952–1.II.1953 (all BPBM).

Additional material. FEDERATED STATES OF MICRONESIA: Chuuk Group: Tol I, Mt Unibot, 25–390m, 24–27.V.1946 and XII.1952–I.1953; Fefan I, Mt Iron, 180m, V.1946 and XII.1953; Pata Sabote I, Olej-Foup, IV.1940; Udot I, Dublon I, and Moen I, 24.V–31.VII.1946 (22♂, 23♀, BPBM and USNM).

Distribution: Chuuk Group.

Remarks. *Amblypsilopus trukensis* is endemic to Chuuk and appears morphologically isolated from all other described Australasian *Amblypsilopus*. The hypopygium is very large and the cercus is unusually modified. Also of interest is the development of a dorsoapical arista, not unlike that of *A. pallidicornis*.

Subfamily MEDETERINAE

Genus MEDETERA Fischer von Waldheim

Medetera Fischer von Waldheim, 1819: 7. Type species: *Medetera carnivora* Fischer von Waldheim, 1819 [= *Musca diadema* Linnaeus, 1767], by monotypy.

Medetera is the only genus of Medeterinae found in Micronesia. The genus is cosmopolitan, with more than 300 described species. Adults are often found on tree trunks where they adopt a characteristic vertical upright posture, leaning out from the trunk, a life stance easily recognized by the unaided eye. In the Holarctic Region, the larvae of some *Medetera* species are predators of scolytid bark beetle larvae within their galleries, and thus important biological control agents of these forest pests.

In Micronesia, the genus is represented by 3 species, 2 wide-ranging tramp species and 1 newly described endemic. Bickel (1987) treats all previously described Oriental and Australasian species.

Key to Micronesian *Medetera*

1. Scape and pedicel yellow; 1st flagellomere black; vein M bowed posteriorly; cercus divided into articulating basal and distal sections, distal cercus expanded; TIII with strong subapical dorsal seta 25. *M. salomonis* Parent
- Antenna entirely black; vein M bowed anteriorly; cercus undivided; TIII without strong subapical dorsal seta 2

2. Lateral scutellars about 2/3 length of medians; thorax with 3 bronze vittae; large, length > 2.5; 4-6 strong dorsoventrals (dc) present, decreasing in size anteriorly; male III_{t1} with distinct basal tooth; hypopygium pyriform, inflated basally; epandrial lobe bases fused, forming elongate collar from which the 2 setae arise; epandrial seta absent.....
 26. *M. grisescens* de Meijere
- Lateral scutellars about 1/3 length of medians; thorax unicolorous dark green; small, length < 1.8; 2 strong posterior dc border mesoscutal depression, with anterior dc short; male III_{t1} without tooth; hypopygium flattened; epandrial lobes free; epandrial seta present27
 *M. babelthaup* n. sp.

25. *Medetera salomonis* Parent

Medetera salomonis Parent 1941: 233.

Micronesian material. GUAM: Pt Oca, 3.VI.1945. PALAU: Babelthuap, Ngiwal, 20.V.1957; Oreor (=Koror), 17.VI.1953; Ngcheangel (=Kayangel), 15.XII.1952; FEDERATED STATES OF MICRONESIA: Yap Group: Yap I: Gagil, 19.VI.1957; Rumung, [no date]. Truk Group: Tol Oleg, 12.IV.1940. Pohnpei: Colonia, 7.I.1957. Kosrae: Mutunlik, 6.II.1953. MARSHALL IS: Ralik Chain: Kwajalein Atoll, 31.X-4.XI.1964; Lae Lae Atoll, 14.X.1953. Ratak Chain: Mili Atoll, 3.X.1953. (20♂, 12♀, all BPBM).

Additional Records. CHRISTMAS I: various locales, IV.1989 (ANIC).

Distribution. Solomon Is, New Guinea, Christmas I, Australia (Qld, NSW), Philippines, Vanuatu, Fiji, Samoa, French Polynesia, Tokelau, Guam, Palau, Caroline Is, and Marshall Is.

Remarks: *Medetera salomonis* is a widely distributed and distinctive Pacific species found on many isolated atolls. It also occurs on Christmas Island in the Indian Ocean, but has not been recorded from the Sunda Archipelago, the usual source area for this insular fauna.

26. *Medetera grisescens* de Meijere

Medetera grisescens de Meijere 1916: 259.

Micronesian material. BONIN IS: Chichi Jima, Omura, 2 to 25.V.1958; VOLCANO IS: Iwo Jima: 1-5.IX.1945. NORTHERN MARIANA IS: Saipan, Garapan, 29.III.1946. (8♂, 5♀, all BPBM).

Distribution. Seychelles, and widely across Oriental and Australasian regions, including eastern Australia, New Caledonia, Fiji, Samoan Is, Hawaiian Is, Ryukyu Is, Bonin Is, Volcano Is, and Saipan.

Remarks. *Medetera grisescens* is found only on the most northwestern Micronesian archipelagos, and probably originated from a western source area such as the Ryukyus.

27. *Medetera babelthaup* Bickel, n. sp.

Fig. 8a

Description: Male. Length: 1.6; wing dimensions: 1.2 × 0.5.

HEAD: frons, face, and clypeus dark metallic green with brownish pruinosity; proboscis dark brown; antenna black; arista about as long as head height.

The 2 species considered here occur only in the Bonin Islands, the north-westernmost Micronesian archipelago, and close to a Palearctic-northern Oriental influence. *S. flexible* has a far-flung distribution, and is probably the ancestral species from which the endemic *S. boninense* was derived. The 2 species share the following characters: It_1 with ventroapical swelling, FII with long anteroventral setae, and III_t_2 with ventral digitiform projection (all MSSC).

Additionally, females of both species have a pair of setae projecting from the face near the flexion of the clypeus (FSSC) (Fig. 8h). The key in Negrobov (1975) indicates that females of the following Palearctic species also have such facial setae: *S. tabarcae* Becker, *S. mikii* Strobl, *S. macula* Oldenberg, and *S. setosus* Parent. The tiny *Nanomyia barbata* (Aldrich) (Sympycninae, from coastal eastern North America) has 2 rows of facial setae, but in both sexes.

Key to Male Micronesian *Syntormon*

1. First flagellomere short; arista length about 1 1/2 head height, with distinct flattened nodes at 1/2 and apex (Fig. 8f); hypopygium (Fig. 8e)..... 28. *S. boninense* n. sp.
 First flagellomere elongate, 4 × as long as basal width; arista simple, short, length about 1/2 head height (Fig. 8d); hypopygium (Fig. 8b) ...
 29. *S. flexible* Becker

28. *Syntormon boninense* Bickel, n. sp.

Figs 8e-h

Description. Male: length: 3.0; wing: 2.0 × 1.0.

HEAD: frons metallic blue-black with lateral slope bare; eyes joined anteriorly along face and clypeus, face reduced to small silvery triangle beneath antennae (MSSC); palp and proboscis brown; antenna black; pedicel with long projection into center of 1st flagellomere (MSSC); 1st flagellomere short, subtriangular, with elongate arista, length about 1 1/2 head height; arista with distinct flattened nodes at 1/2 and apex (Fig. 8f)(MSSC); ventral postorbitals pale, becoming black dorsad.

THORAX: dull metallic green with dusting of gray pruinosity; posterior mesonotum slightly flattened; setae black; single row of 15 short ac; 6 strong dc, posteriormost pair laterally offset; median scutellars strong, laterals as weak side hairs.

LEGS: CI yellow with 3 short black apical setae; CII and CIII yellowish; femora, tibiae, and It and III_t yellow; III_t yellow to brownish; I: 6.5; 5.0; 2.5/ 1.5/ 1.0/ 0.8/ 0.5; TI with dorsal seta and 1/2 and subapically; It_1 with ventroapical swelling with whitish ventral pile (MSSC); II: 6.5; 7.0; 3.1/ 1.5/ 1.0/ 1.0/ 0.5; FII with 5 strong pale anteroventral setae from 1/3 to 1/2, 1 of which is much longer than others (MSSC), and with anterior subapical seta; TII with dorsals at 1/4 and 4/5, ventrals at 1/2 and apically; III: 7.5; 9.0; 2.0/ 1.0/ 1.5/ 1.0/ 0.5; FIII with anterior subapical seta; III_t gradually expanding distad, with strong subapical dorsal seta; III_t_1 swollen, black, with pale ventral crocheted hairs (MSSC); III_t_2

with ventral digitiform projection, with strong black anteroapical seta (MSSC); IIIIt₃ with pale ventral crocheted hairs.

WING: hyaline; CuAx ratio: 0.8; lower calypter yellow with fan of pale setae; halter yellow.

ABDOMEN: somewhat dorsoventrally flattened; metallic blue-green with gray pruinosity; hypopygium dark brown (Fig. 8e); epandrium subrectangular; hypandrium simple; surstylus with faint suture at joining with epandrium; surstylus with 2 distinct arms, slightly weaker dorsal arm with strong external seta, larger ventral arm with setae as figured; cercus short, blunt and setose.

Female: similar to male but lacks MSSC and as noted: face wider, with distinctive pair of strong projecting black setae (Fig. 8h) (FSSC); pedicel with weaker intrusion into 1st flagellomere; 1st flagellomere shorter, arista setose (Fig. 8g); CII and CIII yellowish to brownish; It₁, FII, and IIIIt unmodified [Females of *S. flexible* and *S. boninense* are not clearly separable; in view of the small number of *S. flexible* males, I consider all females to be *S. boninense* and have based this description on a female preserved *in copula* with male *S. boninense*].

Type material: BONIN IS: Holotype ♂ (USNM), Paratypes, 20♂, 9♀, Hara Jima: Okimura, 26.IV–9.VI.1958, F. H. Snyder (BPBM, USNM).

PARATYPES: Chichi Jima: 4♂, 2♀, Omura, Camp beach, 5.V–9.VI, 1958; 4♂, 1♀, Sakai-ura, Bull beach, 5–25.V.1958; ♂, ♀, Yatsuse R. (Minato-ko), Gen's beach, 10–22.V.1958. Ani Jima: ♀, Southwest Bay, 17.V.1958; ♂, Commander Beach, 22.IV.1958 (BPBM, USNM).

Distribution. Bonin Is.

Remarks. *Syntormon boninense* is confined to the Bonin Islands where it seems abundant. It probably derived from the more widespread but sympatrically-occurring *S. flexible* (they were collected together at the same site). The 2 species have similar leg MSSC and hypopygia, but *S. boninense* has a more derived male antenna.

The diagnostic male arista of *S. boninense*, with its flattened flags at midpoint and the apex, has not been recorded for any other *Syntormon* species. However, similar modifications occur in the Neotropical *Sympycnus andicola* Van Duzee as well as some undescribed Australian sympycninae species.

29. *Syntormon flexible* Becker

Figs 8b–d

Syntormon flexibilis Becker, 1922: 55.

Syntormon miritarsus Parent, 1926: 133, **n. syn.**

Syntormon miritarsus var. *flavomaculatus* Parent, 1926: 134, **n. syn.**

Syntormon distortitarsis Van Duzee, 1933: 338.

Syntormon mycklebusti Harmston and Miller, 1966: 90, **n. syn.**

Syntormon lindneri Negrobov, 1975: 660, **n. syn.**

Description. Male: length: 3.0; wing: 2.0 × 1.0; similar to *S. boninense* except as noted:

HEAD: face slightly narrowed beneath antenna; face and clypeus with dense silvery pruinosity; palp and proboscis brown; antenna black; pedicel with long projection into center of 1st flagellomere (MSSC); 1st flagellomere tapering, elon-

gate, 4× as long as basal width (Fig. 8d) (MSSC); arista dorsoapical, simple, bare, short, about 1/2 head height; ventral postorbitals pale, becoming black dorsad.

LEGS: CI yellow with 3 short black apical setae; CII and CIII dark green; CIII with black lateral seta; femora, tibiae, and It and IIt yellow; IIIIt yellowish to brownish podomere ratios similar; FI with posterior subapical seta; TI with dorsal seta and 1/2 and subapically; It₁ with ventroapical swelling with whitish ventral pile (MSSC); FII with 3 strong yellowish anteroventral setae from 1/3 to 1/2 (MSSC); FII with anterior subapical seta; TII with dorsals at 1/4 and 4/5, ventrals at 1/2 and apically; FIII with anterior subapical seta; TIII gradually expanding distad, with weak subapical and dorsal setae; IIIIt₁ swollen, flattened with subapical posterior crest (MSSC); IIIIt₂ with ventral digitiform projection (MSSC).

ABDOMEN: metallic blue-green with gray pruinosity; hypopygium dark brown (Fig. 8b); epandrium subrectangular; hypandrium with lateral and dorsal weakly sclerotized area appearing leaflike in ventral view (Fig. 8c); surstylus with faint suture at joining with epandrium; surstylus with 2 arms, weaker dorsal arm often resting internal of larger ventral arm, setae as figured; cercus short, simple, setose.

Female: see under *S. boninense*.

Type material. The types of *Syntormon flexible* are from Taiwan (DEI, not seen).

Parent described *Syntormon miritarsus* and a color form, var. *flavomaculatus*, from specimens collected at the mouth of the Yangtze River, China (NHMV, examined). The species (*miritarsus*) is conspecific with *S. flexible*, and *flavomaculatus* is within the limits of intraspecific variation for *flexibile*. C. E. Dytte alerted me to these taxa.

Harmston and Miller (1966) described *Syntormon mycklebusti* from 2 males and a female collected at Ilwaco, Washington (CAS, examined). The male was described as having the middle tibia with a "row of three long, slender black bristles at the middle on lower edge." These are in fact on the middle femur and are brownish rather than black (P. A. Arnaud, Jr., pers. comm.). This species is here regarded as a new synonym of *S. flexible*.

Negrobov described *Syntormon lindneri* from specimens collected in the Amur and Maritime Provinces of the Soviet Far East (Zoological Institute, Leningrad, not seen). His description and figures are identical with *S. flexible* and I thus regard *lindneri* as a junior synonym.

Micronesian material: BONIN IS: Chichi Jima: Omura, Camp beach, 2 to 25.IV.1958 (3♂, BPBM).

Additional records: AUSTRALIA: NSW: McMasters Beach nr. Terrigal, 25.XI.1987; Sydney, Mrs Macquaries Chair, 23.II.1986 (AMS). CANADA: British Columbia: Vancouver, Wreck Beach, 3-14.VIII.1989, salt-marsh (C. E. Dytte Coll). NEW CALEDONIA: Nouméa, wet bank (BPBM).

Distribution. Taiwan, coastal China, USSR [former] (Amur and Maritime Provinces), Bonin Is, Hawaiian Is, Canada (B.C.), U.S.A. (Wash.), Australia (NSW), New Caledonia, and St. Helena I.

Remarks. *Syntormon flexible* is widespread around the Pacific Basin, including oceanic islands, and also the South Atlantic Ocean. Searches for this species in littoral habitats will probably show it to be even more widespread, possibly cosmopolitan. *S. flexible* is very close to *S. boninense* (q.v.).

Zoogeography

The 3 dolichopodid subfamilies considered here comprise 29 species, of which 14 have extralimital distributions.

I. The extralimital species show the following affinities and distribution patterns:

A. Widespread tropical Pacific. *Medetera salomonis* and *Amblypsilopus pallidicornis* are tropical Australasian species, which are found in a broad band across southern Micronesia as part of a wider east-west distribution.

B. Northern Oriental-eastern Palearctic. *Syntormon flexible* has reached the Bonin Islands but has been unable to penetrate further into Micronesia. Although *Medetera grisescens* is a common Oriental-Australasian species whose distribution includes many Indian and Pacific oceanic islands, it also only reached Saipan and the Bonin Islands from the North, probably from the Ryukyus, where it also occurs.

C. Tropical Oriental. *Amblypsilopus austerus* is found in Sabah, Guam, and Saipan, while *Chrysosoma pelagica* occurs in the Philippines and Guam. The widespread Oriental-Australasian *C. leucopogon* probably reached Belau from the Orient or Wallacea.

D. Papuan-northern Australia. The widespread *Plagiozopelma flavipodex* probably entered Micronesia from New Guinea. *Amblypsilopus biprovincialis* has the unusual disjunct distribution of northern Australia and Truk, but possibly occurs in intervening areas.

E. Eastern Melanesia. *Chrysosoma mutilatum* and *C. ludens* entered the Carolines directly from the Solomons-Bismark Archipelago region. *C. molestum* probably reached eastern Micronesia (Kiribati) from Vanuatu. *Krakatauia evulgatum* is found throughout Melanesia and Micronesia, as far north as the Northern Marianas.

F. Western Polynesia. *Chrysosoma complicatum* appears to have spread across Micronesia from an eastern Fijian-Samoan source. Although extraordinarily widespread, common and found on many isolated atolls, it does not appear to have reached Belau.

II. The endemic Micronesian species show the following patterns:

A. Widespread within Micronesia. *Krakatauia micronesia* is found in tropical western Micronesia, and Wake and Midway atolls.

B. Insular endemics. Most endemic Micronesian species are confined to the high islands, with Guam and Babelthaupt having the richest faunas. Chuuk, Kosrae, Yap, Pohnpei, Agrihan, and the Bonin Group also have insular endemics.

Of particular interest is *Amblypsilopus trukensis* from Truk, which appears to have no close relatives in the Australasian and Oriental faunas.

C. The Micronesian low islands and atolls have no endemic species, and only maintain widespread tramp species which presumably dispersed there from more diverse habitats.

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Reference to the location of material cited in the text uses the institutional abbreviations designated below. I would like to thank the respective curators of these institutions (listed below) for information and the loan of specimens. American Museum of Natural History, New York; D. Grimaldi (AMNH); Australian Museum, Sydney; D. K. McAlpine (AMS); Australian National Insect Collection, CSIRO, Canberra; D. H. Colless, Z. Liepa (ANIC); The Natural History Museum, London; A. Pont, J. Chainey (BMNH); Bishop Museum, Honolulu; N. Evenhuis (BPBM); California Academy of Sciences, San Francisco; P. Arnaud (CAS); Deutsche Entomologische Institut, Eberswalde-Finow; B. Ewald (DEI); Field Museum of Natural History, Chicago (FMNH); Naturhistoriska Riksmuseet, Stockholm; P. Persson (NRS); Naturhistorisches Museum, Vienna; R. Contreras-Lichtenberg (NHMV); National Museum of Natural History, Smithsonian Institution, Washington, D.C.; F. C. Thompson (USNM); Zoologisches Museum, Humboldt Universität, Berlin; H. Schumann (ZMHB); Zoologisk Museum Universitets Copenhagen; V. Michelsen (ZMUC).

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