



## Revision of the black fungus gnat species (Diptera: Sciaridae) described by W.A. Steffan from Micronesia

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### Abstract

On the Micronesian Islands 20 species belonging to ten sciarid genera were detected. The revision resulted in the following three new combinations: *Cratyna brevipalpis* (Steffan) **comb. n.**, *Epidapus jaluitensis* (Steffan) **comb. n.**, and *Epidapus yapensis* (Steffan) **comb. n.** Two species are declared as new synonyms: *B. snyderi* Steffan, 1969 **syn. n.** of *Bradysia kraussi* Steffan, 1969 and *Epidapus nanus* Menzel, 2007 **syn. n.** of *Epidapus jaluitensis* (Steffan, 1969). *Bradysia radicum* (Brunetti, 1912) was misinterpreted by Steffan and is not yet known to occur in Micronesia. All revised species are figured.

**Key words:** *Austrosciara*, Bonin Is., *Bradysia*, Caroline Is., *Corynoptera*, *Cosmosciara*, *Cratyna*, *Epidapus*, Gilbert Is., *Lobosciara*, Mariana Is., Marshall Is., new combinations, new synonyms, *Phytosciara*, *Pseudolycoriella*, *Scythropochroa*, taxonomy, zoogeography

### Introduction

In 1954, the first volume of an ambitious study, *Insects of Micronesia*, was published (Gressitt 1954). The aim was to describe the insect fauna of some 2,400 islands in four major island groups, scattered across more than 8 million square kilometres of the western Pacific Ocean (the Caroline, Gilbert, Mariana and Marshall Islands), as well as the Bonin Islands, Volcano (Iwo) Islands, Marcus Island, Wake Atoll, Ocean Islands and Nauru. The area covered lies roughly between New Guinea and the Solomon Islands to the south, the Philippines to the west, Japan to the northwest, Hawai‘i in the northeast and the Phoenix and Ellice Islands in the southeast (Gressitt 1954). As a part of this study, Wallace A. Steffan (an entomologist at the Bernice P. Bishop Museum in Hawai‘i) described two new genera and 16 new species of Sciaridae, commonly known as black fungus gnats (Steffan 1969). Prior to Steffan’s work, there were few sciarids reported from the region. Unidentified species of *Lycoria* Meigen were reported by Bohart & Gressitt (1951) from Guam, infesting cow manure at the government Farm, and from the Pago garbage dump. Most of the specimens from the garbage dump were *Lobosciara spinipennis* (Sasakawa), (Steffan 1969). Steffan suggested that the Micronesian sciarid fauna is probably derived from the Oriental Region and possibly from the Papuan Subregion, and some of the species that he described would undoubtedly be found elsewhere. As the fauna in adjacent areas had not been studied adequately a detailed zoogeographical analysis would be impossible (Steffan 1969).

Steffan followed the taxonomic classification of Tuomikoski (1960). However, since then a number of new genera have been erected (e.g. *Pseudolycoriella* Menzel & Mohrig, 1998), so a revision of the Micronesian material is needed. In recent years a number of taxonomic studies of the sciarid fauna in adjacent geographical areas have been completed: Papua New Guinea by Mohrig (1999, 2004, 2013, 2016); New Caledonia by Vilkamaa *et al.* (2011, 2012a, 2012b, 2012c, 2012d, 2014, 2015); Hawai‘i and the Galápagos Islands by Mohrig *et al.* (2019); Australia by Broadley *et al.* (2016); Mohrig *et al.* (2016); Mohrig *et al.* (2017a, 2017b); Broadley *et al.* (2018); Mohrig *et al.* (2018); and New Zealand (Mohrig & Jaschhof 1999; Köhler & Mohrig 2016).

Wallace A. Steffan (20<sup>th</sup> of August 1934–30<sup>th</sup> of September 2016), (Figure 1), or Wally as his friends called him, was a notable sciarid taxonomist who worked at a time when the Bernice P. Bishop Museum was transforming into a force in Pacific Basin entomology, under the direction of J. Linsley Gressitt (Radovsky 1983). Steffan wrote numerous papers, including revisions of the Hardy types from Hawai‘i, described a number of new species from Micronesia (Steffan 1969), some subantarctic islands (Steffan 1964, 1970, 1972) and produced a generic revision of the Sciaridae of North America (Steffan 1966). Steffan described two genera and 21 species of Sciaridae from Australasia and Oceania and his work culminated in the publication of a catalogue which is still being used today (Steffan 1989).

In this paper we review the species that Steffan (1969) described from Micronesia.



**FIGURE 1.** Wallace A. Steffan in 1978. Photo courtesy of Neal Evenhuis.

## Materials and methods

The material examined was obtained on loan from the Bernice P. Bishop Museum, Honolulu, Hawai'i (BPBM) and the National Museum of Natural History, Washington DC, USA (USNM). A holotype in the collection of the German Entomological Institute, Müncheberg, Germany (SDEI), was also examined.

Nearly all holotypes, paratypes and further prepared specimens on slides were embedded in Euparal (an artificial resin) and Hoyer's mountant (a water soluble gum-based mountant). The Hoyer's medium in particular has deteriorated by dehydration, turbidity and air inclusion. The entire specimens or their dissected parts are bleached, swollen, depressed and deformed. The sciarid collection from Micronesia is nearly unusable for taxonomic studies. Therefore the identification of the species is possible only based on comparison of the specimens with Steffan's drawings and species descriptions.

Illustrations were obtained on the basis of multilayer digital images using a Keyence VHX-2000 digital microscope and respective software, including size measurements. Photographs obtained were modified using Adobe Photoshop software. Prints were improved in details by hand drawing and simultaneous microscopic control (Olympus microscope). After final scanning and last corrections using Photoshop software they were finalized for publication.

The terminology used herein follows Mohrig *et al.* (2013) and Broadley *et al.* (2016).

**Abbreviations:** l/w-index = length/width of the basal node of the 4<sup>th</sup> flagellomere; c/w = ratio of C (costal vein) and w within the space between R<sub>5</sub> and M<sub>1</sub>; x/y = ratio of wing vein bM and wing vein r-m.

## Museums and collections

BPBM = Bernice P. Bishop Museum, Honolulu, Hawai'i, USA.

PWMP = Private Collection of Werner Mohrig, Puddemin/Rügen, Germany.

SDEI = Senckenberg German Entomological Institute, Müncheberg, Germany.

USNM = National Museum of Natural History, Washington DC, USA.

## Descriptions of species

### *Austrosciara* Schmitz & Mjöberg, 1924

Type species: *Austrosciara termitophila* Schmitz & Mjöberg (1924) [Schmitz & Mjöberg (1924): 1–3, fig. 1].

Common synonym: *Ctenosciara* Tuomikoski, 1960.

Literature: Tuomikoski (1960): 110; Mohrig & Jaschhof (1999): 14–26; Menzel & Mohrig (2000): 293–299; Vilkamaa *et al.* (2012a): 37–51; Mohrig (2013): 124–136 (all as *Ctenosciara*); Mohrig *et al.* (2017b): 357–366.

### *Austrosciara multispinosa* (Steffan, 1969)

(Fig. 2 A–B)

*Ctenosciara multispinosa* Steffan, 1969 [Steffan 1969: 712–714, fig. 17 a–j].

**Material studied: Holotype:** Male. 17.i.1953, Micronesia, Caroline Islands, Ponape I., Mt Temwetemwensekir, 180 m, leg. J.L. Gressitt (BPBM 8225).

Conservation status: Embedded in Euparal. Body (thorax strongly deformed), head (without palpus), hypopygium and wings separated; wings under a separate cover slip. The morphological details needed for determination are in rather good condition but strongly bleached.

**Comments.** The species is characterized by macrotrichia on veins M<sub>1</sub>, M<sub>2</sub> and CuA<sub>1</sub> (CuA<sub>2</sub> without macrotrichia), tarsal claws with a scutellate tooth-like structure, gonostylus short and slender, with a short apical tooth and 7–8 somewhat shorter awl-like spines, 4–5 above the tooth and 3 below in the apical third of the inner side. The body appears to contrast in colour, with a brownish thorax and yellowish abdomen, legs and antennae.

**Distribution.** Caroline Islands (Pohnpei I.).

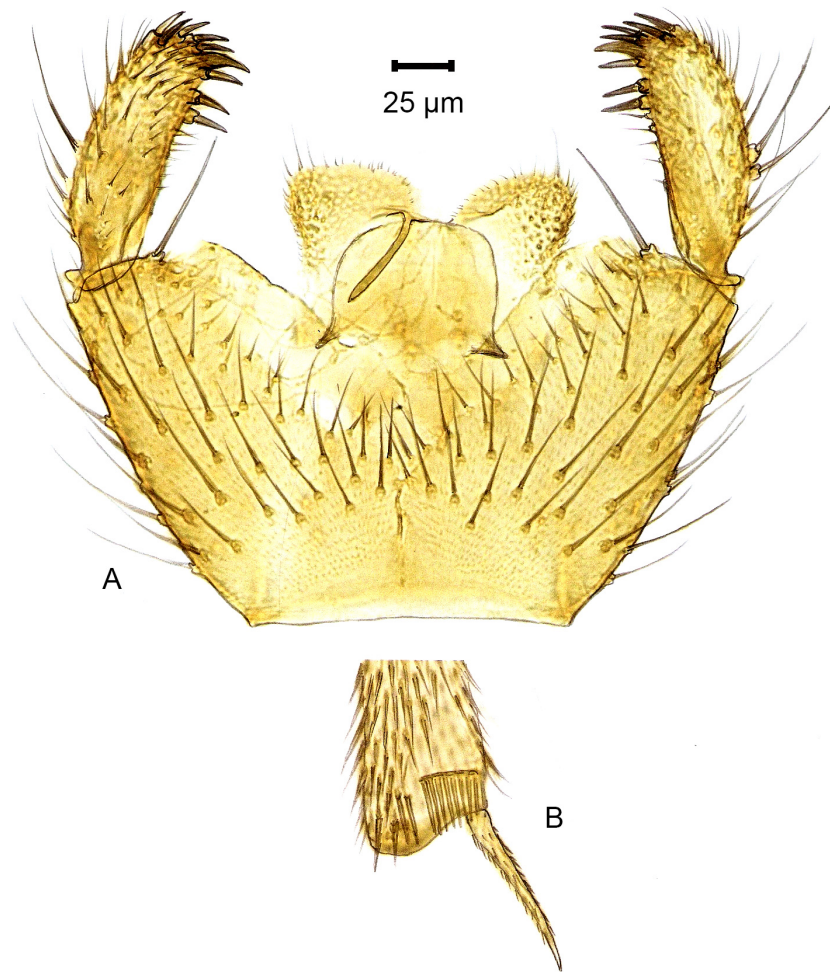


FIGURE 2 A–B. *Austrosciara multispinosa* (Steffan, 1969). Holotype. A. Hypopygium; B. Apex of fore tibia.

### ***Bradysia* Winnertz, 1867**

Type species: *Bradysia angustipennis* Winnertz, 1867 [Winnertz (1867): 180–181, plate, fig. 6 a].  
 Selected literature: Tuomikoski (1960): 110–149; Menzel & Mohrig (2000): 98–185.

### ***Bradysia bishopi* Steffan, 1973**

*Bradysia bishopi* Steffan, 1973 [Steffan (1973): 353–355, fig. 1 a–f].  
 Selected literature: Mohrig *et al.* (2019): 406, fig. 3 A–D.

**Material studied: Holotype:** Male, 11.xi.1968, Hawaiian Islands, O‘ahu I., Kailua, at black light, leg. W.A. Steffan (BPBM 9943). 3 males, same data as holotype (1 in PWMP). 1 male, 9 May 1957, Palau Islands, Kayangel [as “Ngaiangl”] Atoll, at light, leg. C.W. Sabrosky (as “*Bradysia radicum*”). 1 male, 19.xii.1947, Palau Is., Babelthuap I., Ulimang, “Pac. Sci. Bd. Micronesia Surv.”, leg. H.S. Dybas, (as “*Bradysia radicum*”).

Conservation status: Embedded in Euparal. Body and head separated, all details in good condition.

**Distribution.** Widespread in the Southern Hemisphere. Hawai‘i; Australia; New Caledonia; Papua New Guinea; Thailand (Bangkok); Seychelles Islands; Galápagos Islands. The species is very common on all islands in Micronesia.

***Bradysia boninensis* Steffan, 1969**

(Fig. 3 A–D)

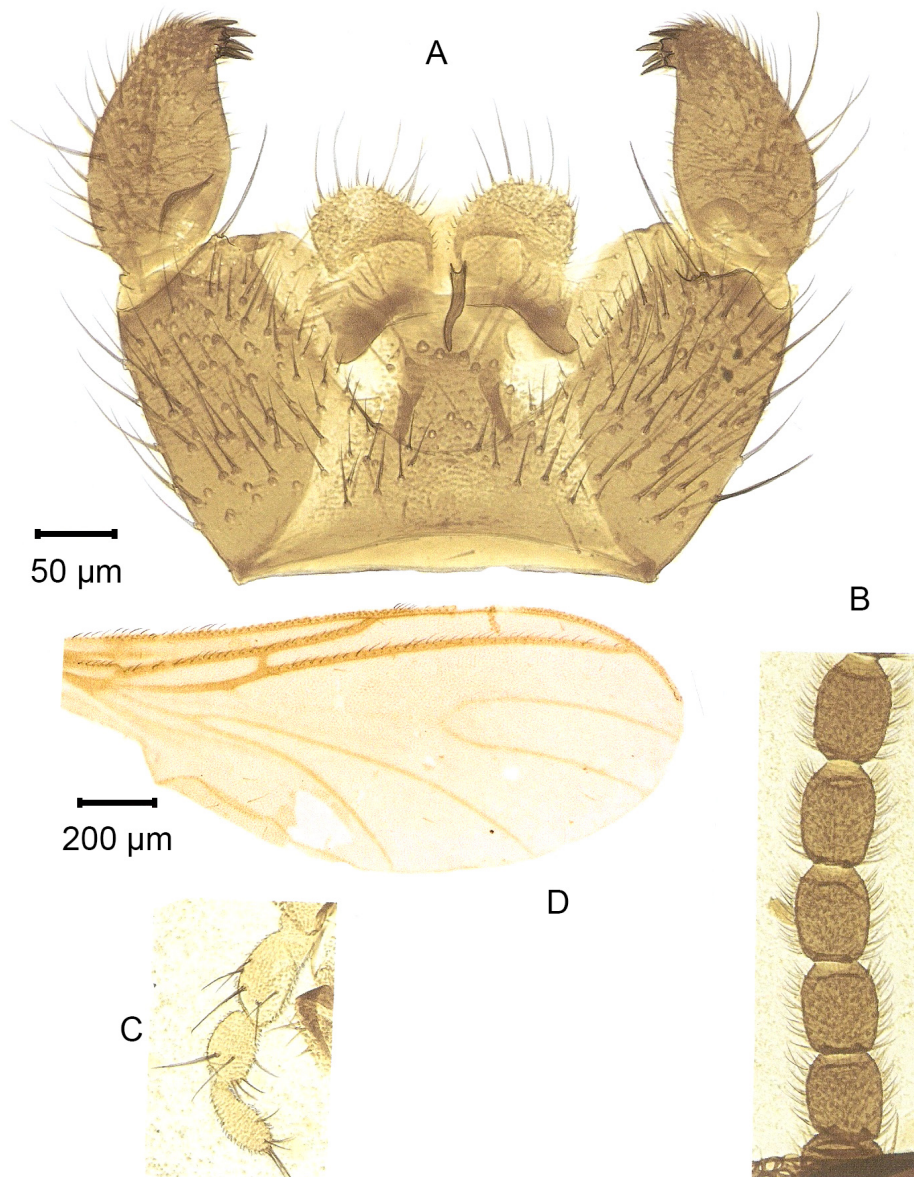
*Bradysia boninensis* Steffan, 1969 [Steffan 1969: 717–718, fig. 18a–f].

**Material studied: Holotype:** Male, 5.v.–9.vi.1958, Micronesia, Bonin Islands, Omura “Camp Beach, Chichi Jima”, leg. P.M. Snyder (USNMENT 2083360).

Conservation status: Body, head, hypopygium and wing separated under a cover slip on the same slide. Hypopygium and head distinctly deformed.

**Comments.** The species is characterized by rather short flagellomeres, a 3-segmented palpus without a sensory pit, wings with a rather short y and without macrotrichia, an eye bridge with two rows of facets, a gonostylus with a short apical tooth and 3 similar awl-like spines, and a short, wider than long tegmen.

**Distribution.** Bonin Islands (Chichijima I.).



**FIGURE 3 A–D.** *Bradysia boninensis* Steffan, 1969. Holotype. A. Hypopygium; B. Flagellomeres 1–5; C. Palpus; D. Wing.

***Bradysia kraussi* Steffan, 1969**

(Fig. 4 A–C)

*Bradysia kraussi* Steffan, 1969 [Steffan (1969): 718–719, fig. 19 a–e].

**Material studied:** **Holotype**, August 1952, Guam, Talofofo, S. Mariana Is., leg. N.L.H. Krauss (USNMENT 2083267).

Conservation status: Head and body with hypopygium isolated, strongly depressed, wings missing. Medium turbid (embedded in Hoyer's medium).

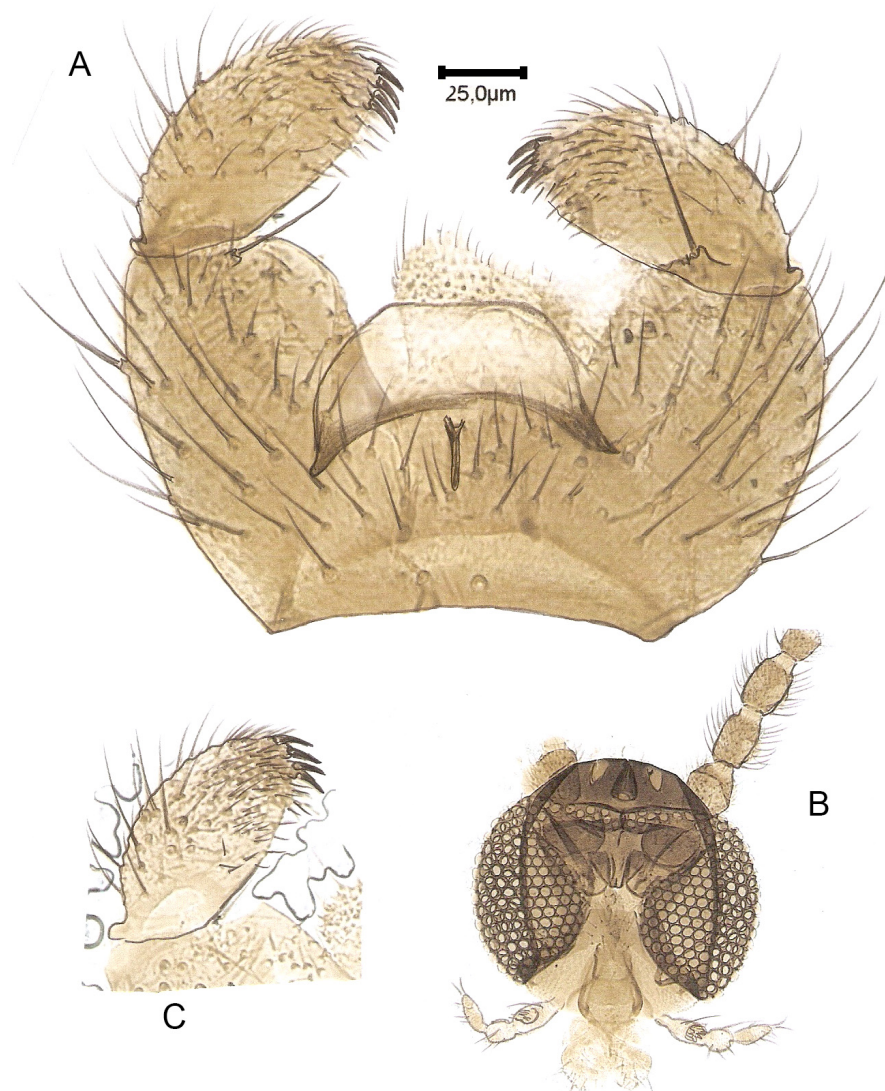
= ***Bradysia snyderi* Steffan, 1969, syn. n.**

(Fig. 4 C)

*Bradysia snyderi* Steffan, 1969 [Steffan (1969): 723, fig. 21 a–g].

**Material studied:** **Holotype**, Male, 26.iv.–9.vi.1958, Bonin Islands, Haha Jima, Okimura, leg. P.M. Snyder (USNMENT 2083267). **Paratype**: 1 female, 26.iv.–9.v.1958, Bonin Is, Haha Jima, Okimura, leg. F.M. Snyder (BPBM).

Conservation status: Body and head separated, thorax and hypopygium rather strongly deformed by dehydration of the Hoyer's medium following air inclusion.



**FIGURE 4 A–C.** *Bradysia kraussi* Steffan, 1969. Holotype. A. Hypopygium; B. Head with palpus and basal segments of flagellomeres; C. Gonostylus from *Bradysia snyderi* Steffan, 1969, syn. n. of *B. kraussi*.

**Comments.** The species is characterized by rather short flagellomeres with long necks, a small eye bridge with 2–3 rows of facets, palpus with a deepened patch of sensillae and a rather short 3<sup>rd</sup> segment, an elongate gonostylus without an apical tooth but with 4 apical spines between the bristle-like apical hairs, one of them more robust and tooth-like, and the tegmen much wider than long. This uniform species could be detected by the unique shape of the tegmen, as shown in figure 19 d of Steffan (1969) and in our figure 4 A.

*B. snyderi* Steffan is identical in the armature of the gonostylus, the wide shape of the tegmen, the palpus with a deepened patch of sensillae and a short 3<sup>rd</sup> segment. The flagellomeres seem to be somewhat longer but this is due to the deformation of the Hoyer's medium. The figures 19 (*B. kraussi*) and 21 (*B. snyderi*) by Steffan (1969) are nearly identical, the specimens are conspecific.

**Distribution.** Mariana Islands (Guam), Bonin Islands (Hahajima I.).

### ***Bradysia ocellaris* (Comstock, 1882)**

*Sciara ocellaris* Comstock, 1882 [Comstock (1882): 202, figs 2–4].

Not studied. Reported from Micronesia by Steffan (1969): 723, 725–727; fig. 22 a–i (as *B. tritici*).

**Distribution.** Cosmopolitan.

### ***Corynoptera Winnertz, 1867***

Type species: *Corynoptera perpusilla* Winnertz, 1867: 177; [preocc., nec *Corynoptera perpusilla* (Walker, 1848); = *Corynoptera fatigans* (Johannsen, 1912)].

Literature: Tuomikoski (1960): 42–73; Mohrig & Jaschhof (1999): 44–87; Menzel & Mohrig (2000): 205–260; Hippa *et al.* (2010): 1–197.

### ***Corynoptera heterochela* Steffan, 1969**

(Fig. 5 A–B, 6 A–E)

*Corynoptera heterochela* Steffan, 1969 [Steffan (1969): 697–699, fig. 11 a–j].

**Material studied: Holotype:** Male. 19.i.1953, Micronesia, Caroline Islands, Ponape I., Mt Temwetemwensekir, 180 m, light trap, leg. J.L. Gressitt (BPBM 8224). **Paratypes:** 3 males, same data as holotype (BPBM); 1 male, 1 female, 12.i.1953, Ponape Island, light trap, leg. J.L. Gressitt (male in PWMP).

Conservation status: Body and head separated, both strongly deformed by dehydration of the Hoyer's medium, air inclusion and turbidities. The paratypes are not so strongly deformed and allow a better interpretation of the morphological characters.

**Comments.** The morphological details are difficult to interpret. We agree with Steffan that the species belongs to the genus *Corynoptera* by one bristle on the basal segment of the 3-segmented palpus, rather long bristles on the scutum, the wing venation and the shape and armature of the gonostylus with 4 strong apical spines, two more dorsally located. The teeth of the claws are not so typical for the genus and are similar to *Corynoptera* species from New Zealand (Mohrig & Jaschhof 1999). It could belong to the *C. spinifera* group according to Menzel & Mohrig (2000). Nevertheless, the taxonomic position of this species is not certain and another interpretation, different to the one given here, might be possible.

**Distribution.** Caroline Islands (Pohnpei I.).

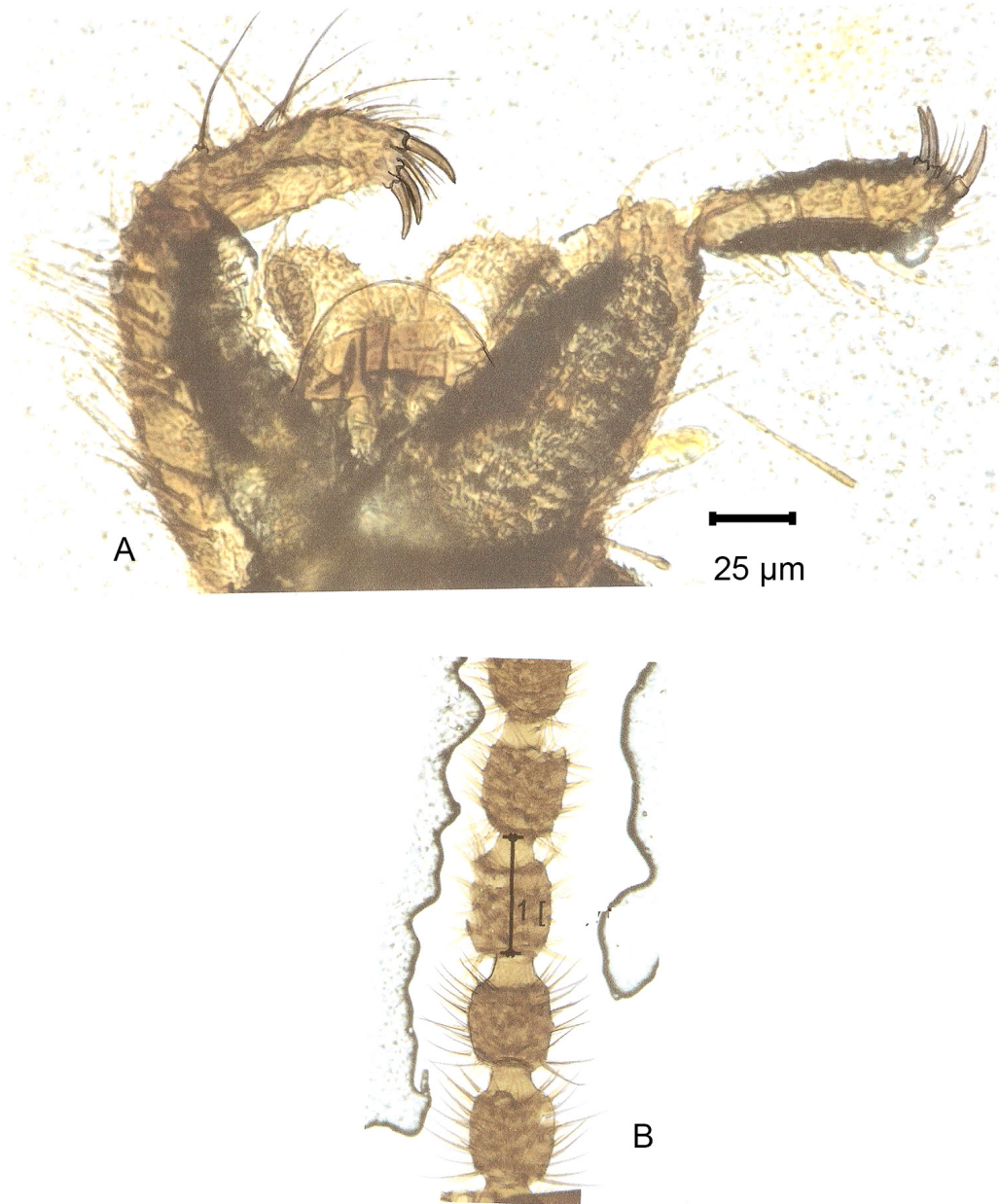
### ***Corynoptera latistylata* (Hardy, 1956)**

*Sciara (Lycoriella) latistylata* Hardy 1956 [Hardy (1956): 82–83, fig. 7 a–d].

Literature: Hardy (1960): 225–226, fig. 73 a–e (as *Sciara (Lycoriella) latistylata*); Steffan (1969): 699–701, fig. 12 a–h; Steffan (1973): 357; Menzel & Heller (2007): 215–216; Menzel & Smith (2009): 30–31, figs 18–20. Mohrig *et al.* (2019): 411, figs 6 A–C, 7.

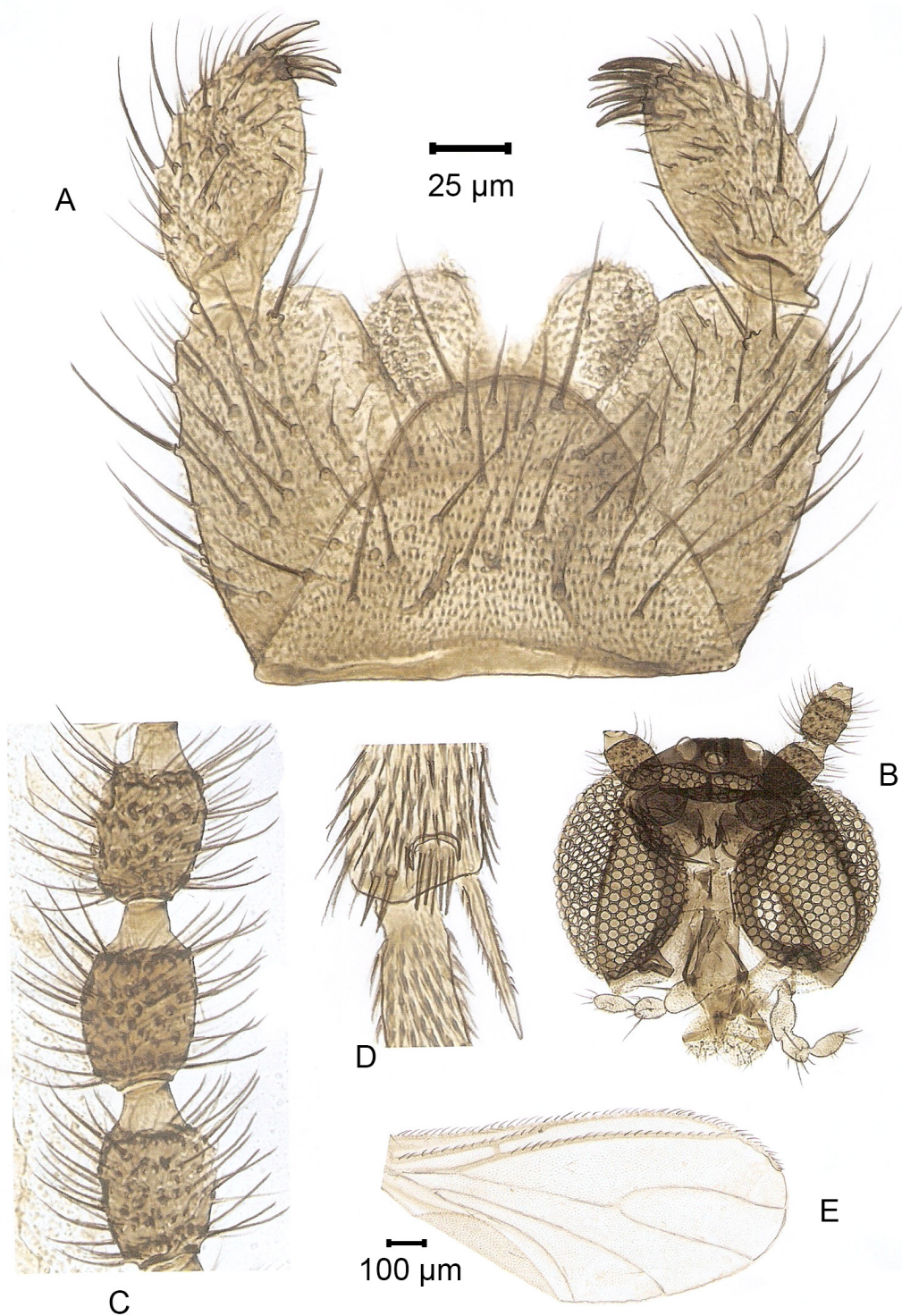
**Comments.** The specimens from Micronesia were identified by Steffan as identical to *C. latistylata* (Hardy) from the Hawaiian Islands. The species is very widely distributed: from Hawai‘i, Micronesia, and the Seychelles Islands. It has also been reported from the United Arab Emirates (Menzel & Smith 2009). For illustrations see Mohrig *et al.* (2019), figs 6 and 7.

**Distribution.** Micronesia; Hawaiian Islands; Seychelles Islands; United Arab Emirates.



**FIGURE 5 A–B.** *Corynoptera heterochela* Steffan, 1969. Holotype. A. Hypopygium; B. Flagellomeres 2-4 (medium turbid and with included air).





**FIGURE 6 A–E.** *Corynoptera heterochela* Steffan, 1969. Paratype. A. Hypopygium dorsal view; B. Head with palpus; C. Flagellomeres 3–5; D. Apex of fore tibia; E. Wing.

***Cosmosciara* Frey, 1942**

Type species: *Plastosciara pernicioso* Edwards, 1922 [Edwards (1922): 160–161].

Selected literature: Frey (1942): 24, 39.

***Cosmosciara hartii* (Johannsen, 1912)**

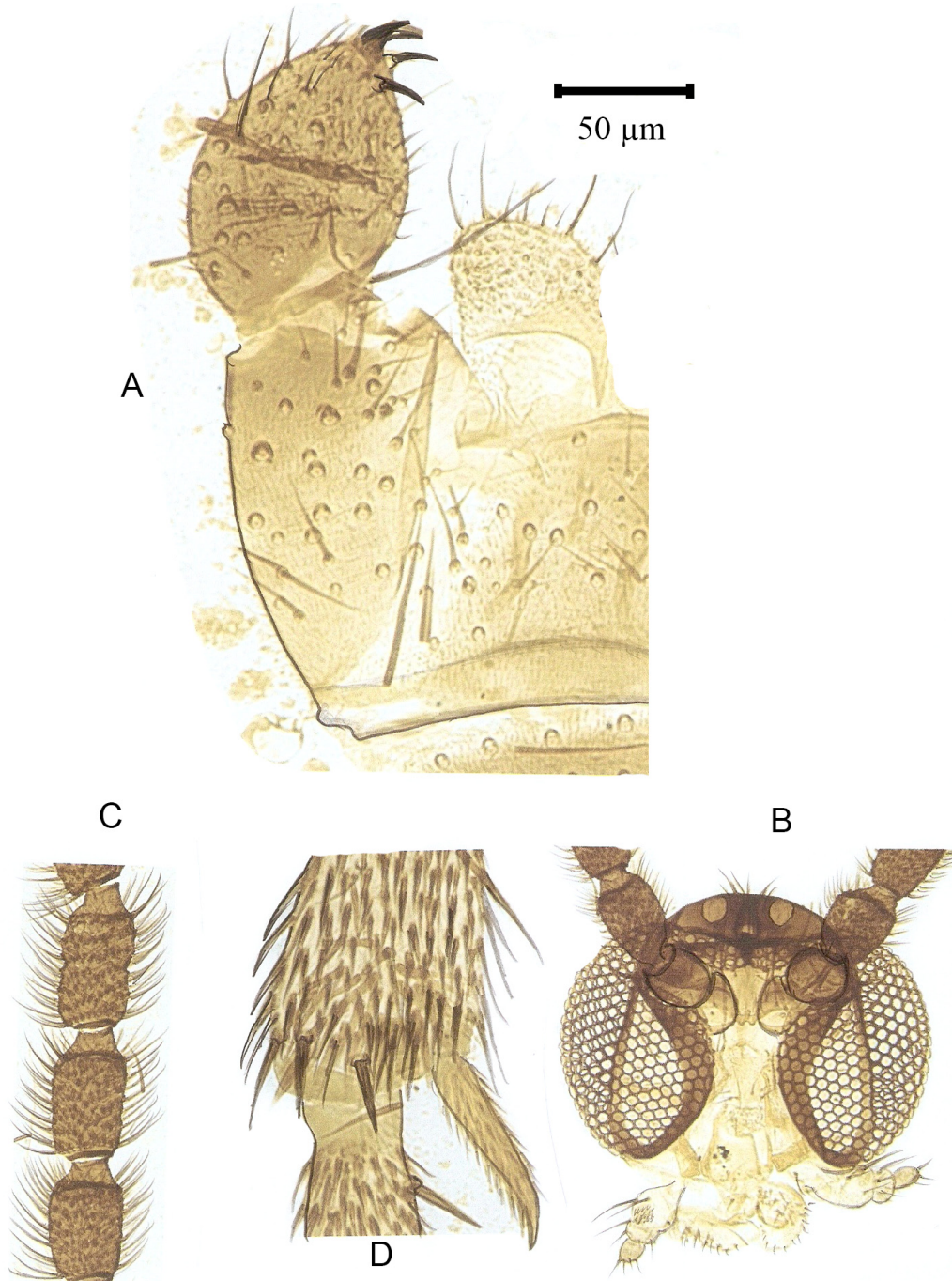
*Sciara hartii* Johannsen, 1912 [Johannsen (1912): 144].

Selected literature: Hardy (1956): 73–75, fig. 2 a–e; Hardy (1960): 214, fig. d–g (both as *Plastosciara* (*Cosmosciara*) *brevicalcarata*); Hardy (1956): 77, fig. 4 a–d; Hardy (1960): 217, fig. 68 a–d; Steffan (1969): 690–692, fig. 8 a–h (all as *Plastosciara* (*Plastosciara*) *latipons*); Menzel & Smith (2009): 32–33, fig. 21–25 (as *Cosmosciara perniciososa*); Mohrig *et al.* (2013): 223–224, fig. 43 a–c (as *Pnyxia hartii*); Broadley *et al.* (2018): 213–214, figs 7 A–B, 8 A–C, 9 A–D; Mohrig *et al.* (2019): 414, fig. 9 A–B.

Common synonyms: *Cosmosciara perniciososa* (Edwards); *Plastosciara latipons* Hardy; *Plastosciara brevicalcarata* Hardy.

**Comments.** *Plastosciara latipons* Hardy, 1956 was identified as conspecific with *Cosmosciara hartii* (Johannsen) by Mohrig *et al.* (2019).

**Distribution.** Cosmopolitan.



**FIGURE 7 A–D.** *Cratyna brevivalpis* (Steffan, 1969). Paratype. A. Hypopygium; B. Head; C. Flagellomeres 3–5; D. Apex of fore tibia (embedding medium turbid and the structures slightly depressed).

## *Cratyna* Winnertz, 1867

Type species: *Cratyna atra* Winnertz, 1867: 176, fig. 7.

Literature: Tuomikoski (1960): 31–41 (as *Plastosciara*); Hippa *et al.* (1998): 1–86 (as *Pseudozygoneura* Steffan, 1969); Menzel & Mohrig (1998): 362–363 (as *Cratyna* Winnertz); Mohrig (1999): 167–182; Menzel & Mohrig (2000): 261–292; Mohrig (2004): 141–144; Vilkamaa & Hippa (2005): 457–480; Mohrig & Menzel (2014), (as *Pseudozygoneura*): 138–143; Shin *et al.* (2014): 344–354; Huang *et al.* (2015): 77–95 (as *Pseudozygoneura*).

### *Cratyna (Pictosciara) brevipalpis* (Steffan, 1969), comb. n.

(Fig. 7 A–D)

*Corynoptera brevipalpis* Steffan, 1969 [Steffan (1969): 695–697, fig. 10 a–h].

Literature: Steffan (1974): 45–46 (as *Corynoptera brevipalpis*).

**Material studied: Holotype:** Male, 5.vi.1957, Micronesia, Caroline Islands, Palau Is., Babelthuap I., Imeliik, Netkeng, leg. C.W. Sabrosky (USNMENT 2083267).

**Paratype,** male, same data as the holotype, except 6.vi.1957 (BPBM, without registration number).

Conservation status: Embedded in Hoyer's medium. Head, body and a wing isolated under cover slip. Thorax and hypopygium are depressed and deformed.

**Comments.** The species is characterized by a very short 3-segmented palpus, the first two segments swollen; a short gonostylus, pointed to the apex, with a very short apical tooth and 3–4 short and thin hyaline spines. The species belongs to the subgenus *Pictosciara* Mohrig and it is very similar (maybe identical) to *Cr. adrostylata* Hardy from the Hawaiian Islands. The unique differences are the short and nearly quadratic flagellomeres of *Cr. adrostylata* Hardy, whereas these of *Cr. brevipalpis* Steffan are distinctly longer than wide. All other details seem to be identical but we cannot be certain because of the deformed morphological structures. The body is bleached but it seems that the gonostylus is somewhat darker than the gonocoxites, typical for *Cratyna (Pictosciara) vera* Mohrig, 2004.

**Distribution.** Caroline Islands (Babelthuap I.).

### *Cratyna (Cratyna) musicola* (Steffan, 1969)

(Fig. 8 A–B)

*Pseudozygoneura musicola* Steffan, 1969 [Steffan (1969): 676–679, fig. 3 a–f].

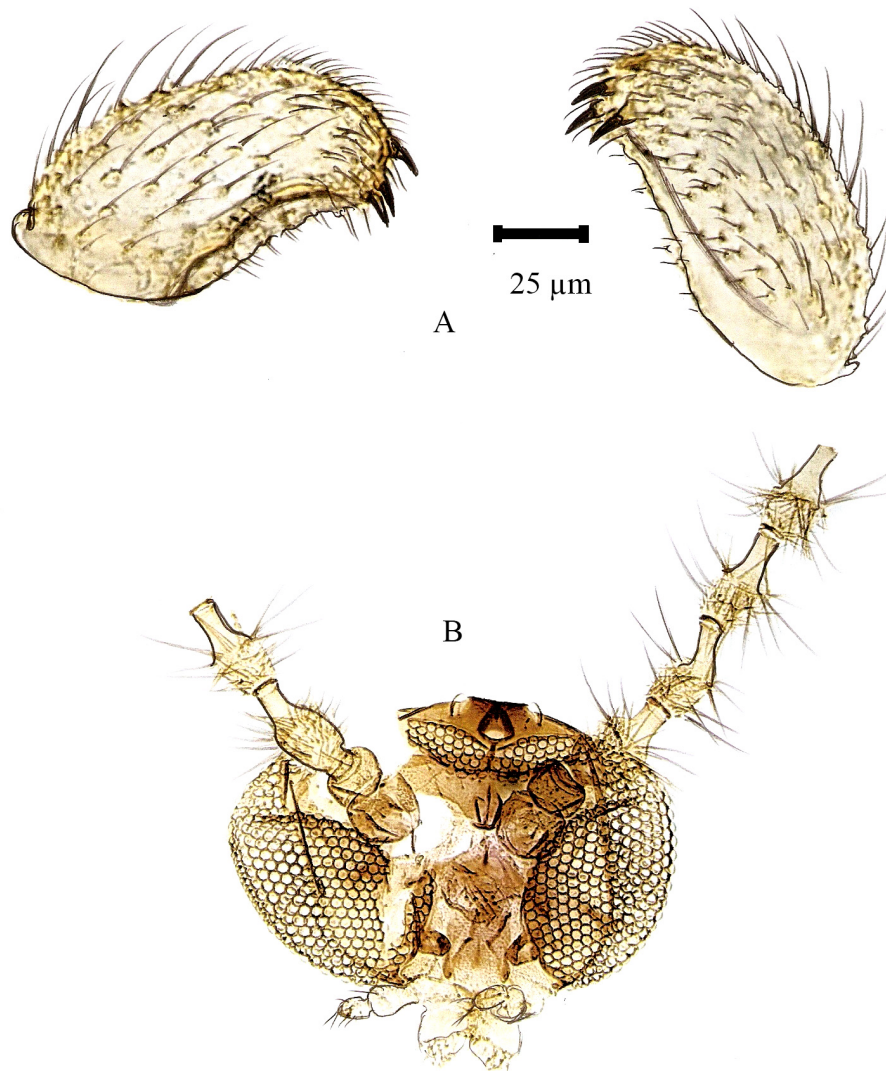
Literature: Hippa *et al.* (1998): (as *Pseudozygoneura*); Mohrig & Menzel (2014): 138.

**Material studied: Holotype,** male, 15.xii.1947, Caroline Islands, Palau Islands, Babelthuap I., Ulimang, dead banana leaves, leg. H.S. Dybas (USNM 70555).

Conservation status: Embedded in Hoyer's medium. Head, body, hypopygium and wings are separate; wings under a separate cover slip on the same slide, totally destroyed. Thorax and hypopygium are depressed, deformed and extremely bleached.

**Comments.** The species is characterized by cecidomyiid-like flagellomeres with extremely long bristles and long necks. With the exception of the genus *Zygoneura*, these characters were unknown for sciarids at that time. A lot of species belonging to the genus *Cratyna* (Hippa *et al.* (1998) [as *Pseudozygoneura*], Mohrig 2004, Mohrig *et al.* 2017a) and other genera with long necks and cecidomyiid-like flagellomeres (e.g. see Mohrig *et al.* 2018) are now known. Mohrig & Menzel (2014) synonymised *Pseudozygoneura* Steffan with *Cratyna* and all species were combined in the latter genus. *Cratyna musicola* (Steffan) is characterized by the three short awl-like spines at the apex of the gonostylus.

**Distribution.** Caroline Islands: Palau Islands (Babelthuap I.), Chuuk (Truk), Pohnpei Island.



**FIGURE 8 A–B.** *Cratyna musicola* (Steffan, 1969). Holotype. A. Gonostylus; B. Head with palpus and basal flagellomeres (specimen deformed and strongly bleached).

### *Epidapus* Haliday, 1851

Type species: *Epidapus venaticus* Haliday, 1856 [Haliday in Walker (1856): 56]; monotypy [= *Tipula atomaria* De Geer, 1778].

Selected literature: Tuomikoski (1960): 96–100; Mohrig & Jaschhof (1999): 29–36; Menzel & Mohrig (2000): 299–339; Mohrig (2004): 150–159; Vilkamaa *et al.* (2014): 429–436.

### *Epidapus (Zuhalia) jaluitensis* (Steffan, 1969), comb. n.

(Fig. 9 A–D)

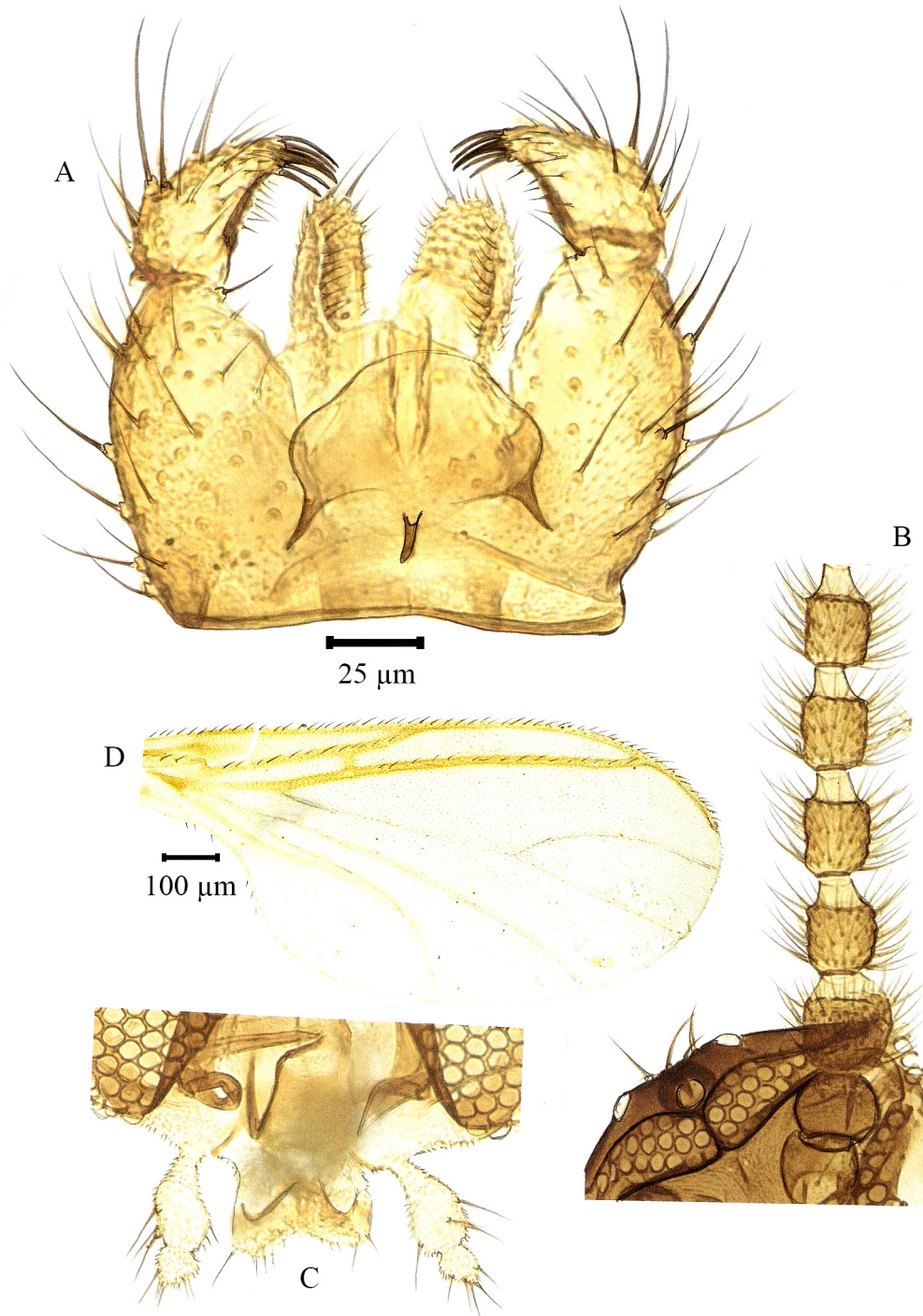
*Plastosciara jaluitensis* Steffan, 1969 [Steffan 1969: 688–689, fig. 7 a–f]

**Material studied: Holotype:** Male, 10.–12.xi.1964, Micronesia, Marshall Islands, Jaluit Atoll, Enybor Island, Malaise trap, leg. B.D. Perkins (BPBM 8223).

Conservation status: Body, head and hypopygium isolated, wings separated under a second cover slip on the same slide. All details in good condition.

= *Epidapus (Macrotarsus) nanus* Menzel, 2007, syn. n.

*Epidapus (Macrotarsus) nanus* Menzel, 2007 [Menzel & Smith (2007): 68–70; fig. 5–10].  
Literature: Menzel & Smith (2009): 35–37, fig. 30–35.



**FIGURE 9 A–D.** *Epidapus jahuitensis* (Steffan, 1969). Holotype. A. Hypopygium; B. Eye bridge and basal segments of antennae; C. Palpus; D. Wing.

**Material studied: Holotype:** Male, 30.vii.–1.viii.2000, Seychelles, North Island, Malaise trap (M11), on *Lantana camara*, leg. J. Gerlach (SDEI).

**Comments.** The species is characterized by short antennae, 4<sup>th</sup> flagellomere with a l/w index of 1.2, hairs longer than the width of the basal node; a 2-segmented palpus; wings short and broad; haltere short, gonostylus short and

strongly pointed to the apex, with a long and slender apical tooth and 4 nearly as long apical spines, two above the tooth and two below. The species belongs by the characters of the hypopygium (short and pointed gonostylus with an apical tooth and 4 nearly as long spines and a large, wider than long tegmen with shouldered lateral sides) to the genus *Epidapus*, although all the other characters like the short halteres, short wings and short flagellomeres differ from the usual *Epidapus* characters. It is identical to *Epidapus nanus* Menzel, 2007 (holotypes compared), described from the Seychelles, so the latter is a new junior synonym. The name *Macrotarsus* was established by Mohrig (2004) as a subgenus of *Epidapus* but the name was later declared a junior homonym of *Macrotarsus* Link, 1795 (Mammalia) and a replacement name, *Zuhalia*, was proposed to be used instead (Koçak & Hüseyinoğlu 2008).

**Distribution.** Micronesia (Marshall Islands); Seychelles.

***Epidapus yapensis* (Steffan, 1969) comb. n.**

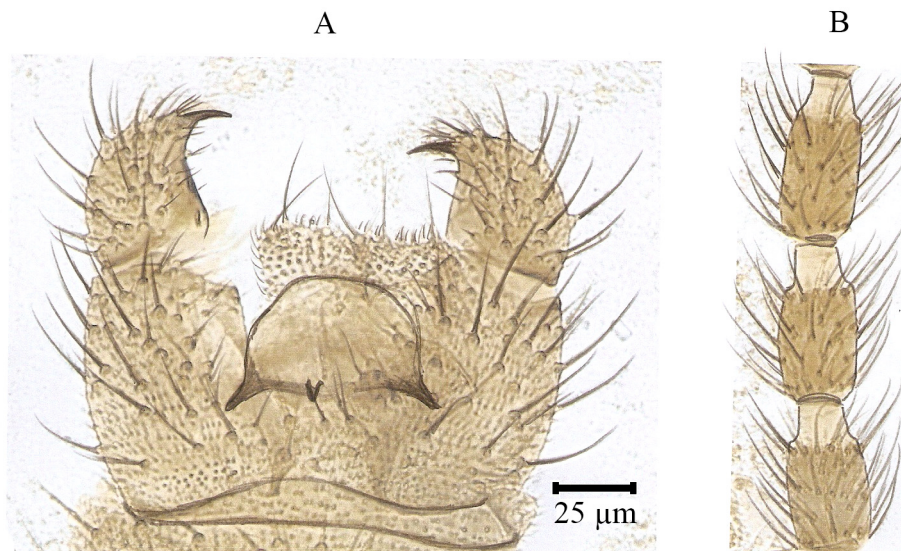
(Fig. 10 A–B)

*Plastosciara yapensis* Steffan, 1969 [Steffan (1969): 692–693, fig. 9 a–f].

**Material studied: Paratypes:** 3 males, 1.xii.1952, Yap Island, Yap hill behind Yaptown, Light trap, leg. J.L. Gressitt (2 in BPBM, 1 in PWMP).

**Comments.** The holotype (stated as deposited in USNM) and one of the paratypes could not be found in the USNM or the Bishop Museum. However, within the material of the Bishop Museum, three slides without determination or type labels were found which are identical to figure 9 a–f of Steffan (1969). The collection and locality label data also fit the details of the 3 male paratypes in the original description and are no doubt these paratypes. We do not agree on the opinion of Steffan that the species belongs to the *Cratyna* complex. The 2-segmented palpus, the short and broad M-fork, the wider than long tegmen with lateral shoulders, the short spurs on the tibiae and the short gonostylus, strongly pointed to the apex are consistent with characters of the genus *Epidapus*.

**Distribution.** Caroline Islands (Yap Island).



**FIGURE 10 A–B.** *Epidapus yapensis* (Steffan, 1969). Holotype. A. Hypopygium; B. Flagellomeres 3–5.

***Lobosciara* Steffan, 1969**

Type species: *Bradysia spinipennis* Sasakawa, 1962 [Sasakawa (1962): 130–132, fig. 5 A–E].

***Lobosciara spinipennis* (Sasakawa, 1962)**

(Fig. 11)

Literature: Steffan (1969): 727–731, fig. 23 a–j; Vilkamaa & Hippa (1994): 48, fig. 3 A–D.

**Material studied:** 3 males, 16.vii.1945, “No. 6”, “No. 7” & “No. 8” collected from Guam: Pt. Oca, light trap, leg. G.E. Bohart & J.L. Gressitt; 1 female, same data (no specimen number); 1 male, 5.viii.1945, Guam: Pti. Ritidian, light trap, leg. J.L. Gressitt (BPBM).

**Comments.** This is the type species of the genus *Lobosciara* Steffan, 1969. *Lobosciara spinipennis* (along with *B. bishopi*), are common on the islands of Micronesia. They comprised 90% of the specimens that Steffan identified during his Micronesia study (Steffan 1969).

It is interesting to note that in late 1992, there was an outbreak of sciarids following severe defoliation of trees on Guam caused by typhoon Gay, with windrows of the dead flies (presumed to be *L. spinipennis*) found along the shoreline and around buildings for weeks after the storm (Kerr 2000).

**Distribution.** Micronesia, Thailand.

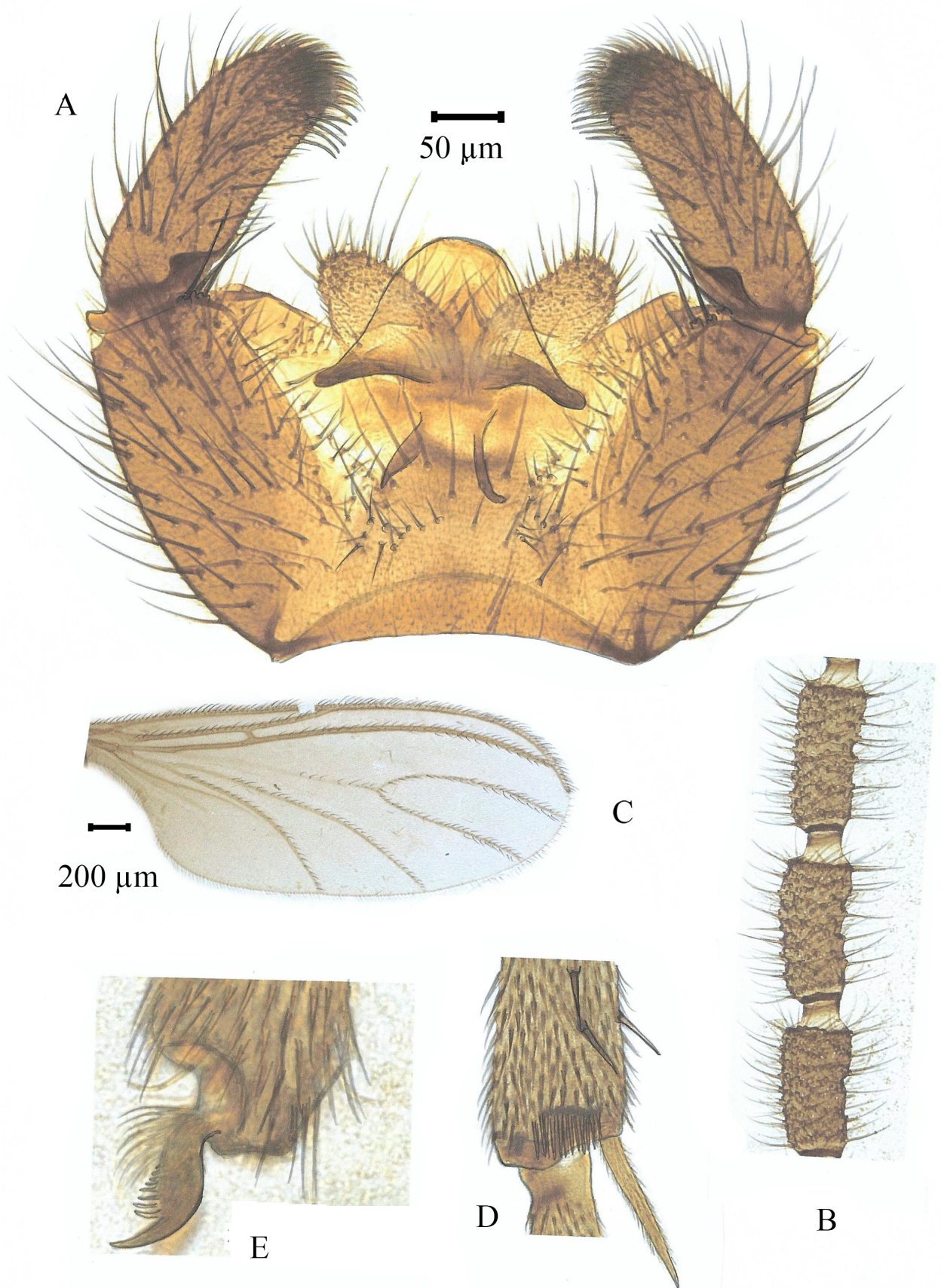


**FIGURE 11.** *Lobosciara spinipennis* (Sasakawa, 1962). Male hypopygium. Photograph courtesy of Neal Evenhuis, Bishop Museum.

***Phytosciara* Frey, 1942**

Type species: *Sciara halterata* Lengersdorf, 1926 [Lengersdorf (1926): 250, fig. 12].

Literature: Tuomikoski (1960): 103–110; Hippa & Vilkamaa (1991): 113–155; Mohrig & Menzel (1994): 167–210; Menzel & Mohrig (2000): 429–451.



**FIGURE 12 A–E.** *Phytosciara brachygaster* Steffan, 1969. Paratype. A. Hypopygium; B. Flagellomeres 3–5; C. Wing; D. Apex of fore tibia; E. Toothed claw.



*Phytosciara (Dolichosciara) brachygaster* Steffan, 1969

(Fig. 12 A–E, 13 A–B)

*Phytosciara brachygaster* Steffan, 1969 [Steffan 1969: 709–711, fig. 16 a–j].

**Material studied: Holotype:** Male, 26.v.1957, Micronesia, Palau Is., Airai, Ngerimal R., Babelthuap I., tree fern ravine, sweeping, leg. C.W. Sabrosky (USNM 70562). **Paratypes:** 1 male, September 1952, Micronesia, Palau Is., Aluptagel (Aurapushekaru), leg. N.L.H. Krauss (USNMENT 2083360); 1 male, 19.i.1953, Tamatamanakir, light trap, leg. J.L. Gressitt (BPBM); 1 male, 2.v.1957, Palau Is., Malakal, leg. C.W. Sabrosky; 1 male, 6.i.1953, Ponape, Colonia, Agriculture Experiment Station, light trap, leg. J.L. Gressitt; 1 male, 13.xii.1952, Palau Is., Ngarmalk (Auluptagal), leg. J.L. Gressitt (BPBM).

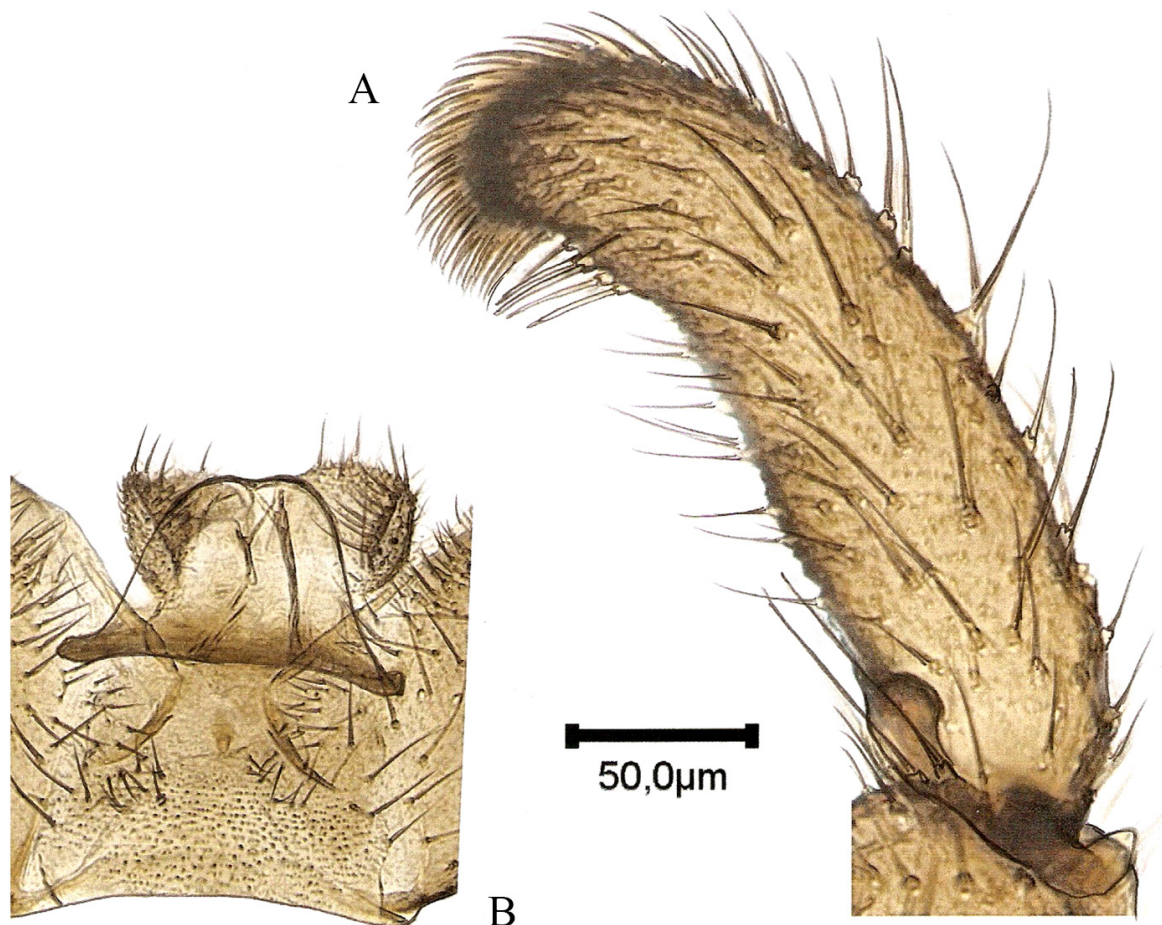


FIGURE 13. *Phytosciara brachygaster* Steffan, 1969. Holotype. A. Gonostylus; B. Ventral base of hypopygium.

**Further material:** 1 male, 26.v.1957, Micronesia, Palau Is., Airai, Ngerimal R., Babelthuap I., sweeping, leg. C.W. Sabrosky (PWMP); 1 male, 22.i.1948, Micronesia, Palau Is., Koror Island, limestone ridge, H.S. Dybas; 1 female, 26.iv.1957, Micronesia, Palau Is., Koror Island, limestone ridge, leg. C.W. Sabrosky; 1 female, 8.xii.1952, Micronesia, Palau Is., Babelthuap I., sweeping, leg. J.L. Gressitt (all in BPBM).

Conservation status: All specimens embedded in Hoyer's medium are somewhat depressed and the medium is more or less turbid. The main structures for determination are slightly deformed.

**Comments.** The species is characterized by a few bristles on the front (forehead) before the eye bridge, brownish antennae with bicoloured necks; 4<sup>th</sup> flagellomere with a l/w index of 2.5; short C, a long y without macrotrichia, strongly toothed claws, darkened distal parts of the meso and metacoxae, hypopygium without an intergonocoxal lobe or bristle-patch, gonocoxites with 2 macrosetae, an elongate gonostylus, densely covered with short bristle-like hairs at the apex and 4–5 short and fine hyaline spines at the end of the apical hair on the inner side, tegmen short and simple. Body size: 3.5 mm.

**Distribution.** Caroline Islands (Palau, Pohnpei).

***Pseudolycoriella* Menzel & Mohrig, 1998**

Type species: *Sciara bruckii* Winnertz, 1867 [Winnertz (1867): 38–39].

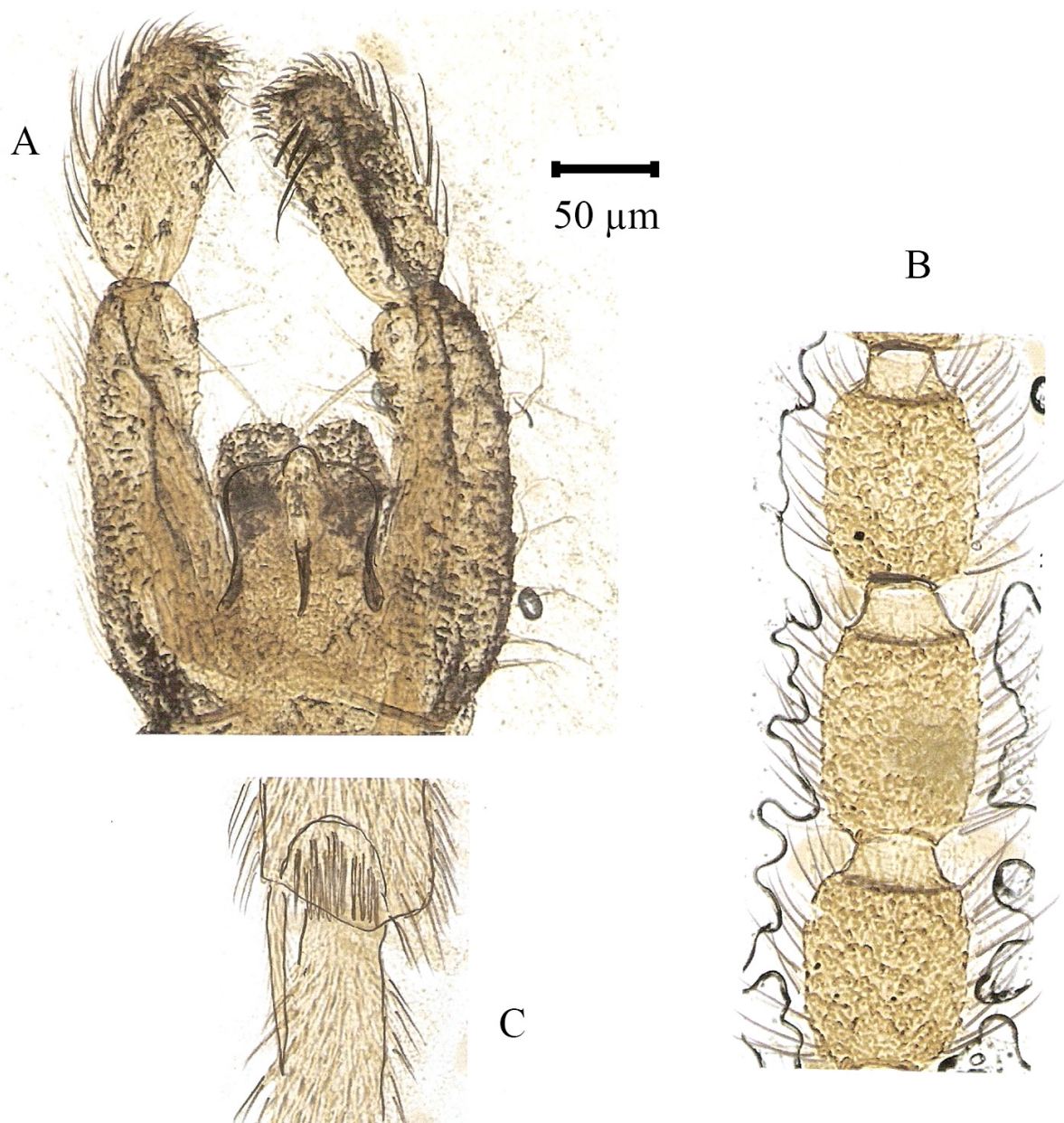
Selected literature: Menzel & Mohrig (1998); Mohrig & Jaschhof (1999): 36–43; Menzel & Mohrig (2000): 464–480; Mohrig (2003): 136–167; Rudzinski (2000); Rudzinski (2003); Mohrig *et al.* (2004): 277–287; Vilkamaa *et al.* (2012c): 1–21; Mohrig *et al.* (2013): 225–231; Köhler & Mohrig (2016): 101–106.

***Pseudolycoriella ponapensis* (Steffan, 1969)**

(Fig. 14 A–C)

*Corynoptera ponapensis* Steffan, 1969 [Steffan (1969): 701–703, fig. 13 a–i].

Literature: Rudzinski (2000): 183.



**FIGURE 14 A–C.** *Pseudolycoriella ponapensis* (Steffan, 1969). Holotype. A. Hypopygium; B. Flagellomeres 3–5; C. Apex of fore tibia (specimen strong deformed by turbidity of the medium and included air).

**Material studied: Holotype:** Male, 11.iii.1948, Ponape Island, north slope, Kupwuriso Mt. (Kupuriso), 1000–1500 ft, sweeping vegetation, leg. H.S. Dybas (USNMENT 2083267).

Conservation status: Embedded in Hoyer's medium, body with hypopygium and head isolated, both badly damaged.

**Comments.** The species is characterized by short flagellomeres (4<sup>th</sup> flagellomere with a l/w index of 1.8), a small patch of bristles on the fore tibia, distinctly bordered, strongly toothed claws and an elongate gonostylus with 2 subapical spines and a much longer whiplash hair. The holotype is not suitable to identify the species. An identification of the species is possible just based on figures 13 a–i in Steffan (1969).

**Distribution.** Caroline Islands (Pohnpei).

### ***Pseudolycoriella sabroskyi* (Steffan, 1969)**

*Corynoptera sabroskyi* Steffan, 1969 [Steffan (1969): 703–705, fig. 14 a–f].

Literature: Rudzinski (2000): 183.

**Material studied: Holotype:** Male, 26.v.1957, Caroline Islands, Palau Is., Babelthuap I. Airai, Ngerimal R., leg. C.W. Sabrosky (USNMENT 2083267).

Conservation status: Embedded in Hoyer's medium, body and head isolated, badly damaged, hypopygium strongly destroyed, and no details are detectable. It does not make sense to show any figures.

**Comments.** We agree with Rudzinski (2000), that the species belongs to the genus *Pseudolycoriella*, because, despite the strongly destroyed hypopygium, we were still able to observe the 2 subapical spines and a somewhat longer whiplash hair. This opinion is supported by the toothed claws and a bordered patch of bristles at the apex of the fore tibia. Maybe the species could be identified based only on the figures of Steffan (1969).

### ***Pseudolycoriella sylviae* (Steffan, 1969)**

(Fig. 15 A–D)

*Corynoptera sylviae* Steffan, 1969 [Steffan (1969): 705–707, fig. 15 a–i].

Literature: Rudzinski (2000): 183.

**Material studied: Holotype:** Male, Caroline Islands, Palau Is., N.W. Ulebsehel (Auluaptagel) I., 13.xii.1952, light trap, 25 m., leg. J.L. Gressitt (USNMENT 2083267). **Paratypes:** 2 females, same locality as holotype, Dec. 1952, leg. L.H. Krauss; 1 female, 12.xii.1952, NW Auluaptagel, leg. J.L. Gressitt (BPBM).

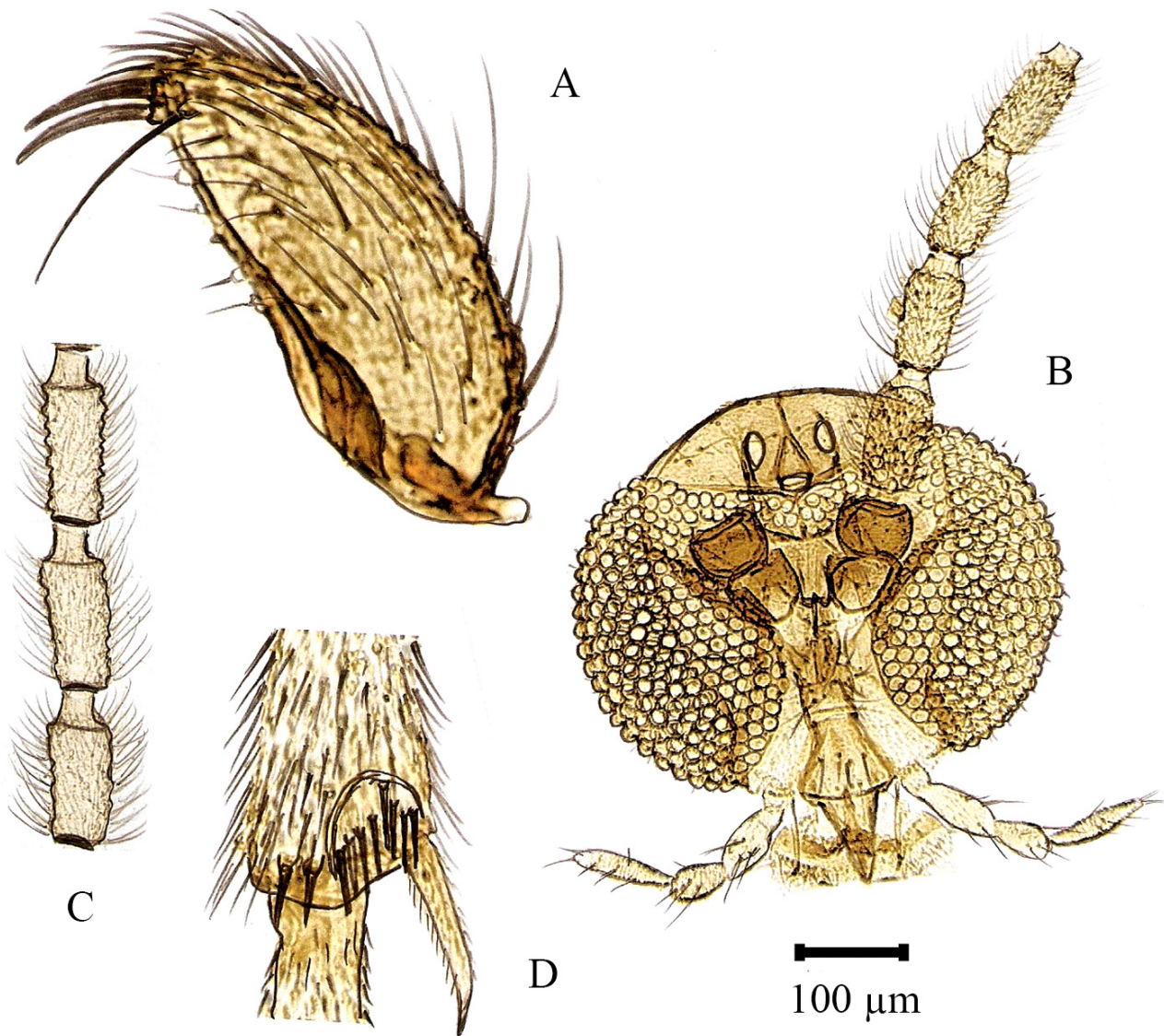
Conservation status: Holotype originally mounted in Hoyer's medium and remounted in Euparal in 1979. Body, head, hypopygium and wings separated, wings under a separate cover slip. Head and thorax deformed, strongly bleached.

**Comments.** The species is characterized by rather long flagellomeres (l/w index of 2.2), fore tibia with a small distinctly bordered bristle patch, and gonostylus with two rather long spines and a long whiplash hair. It is very similar to *Pseudolycoriella bisulca* Vilkamaa, Hipka & Mohrig from New Caledonia.

**Distribution.** Caroline Islands (Palau, Pohnpei).

### ***Scythropochroa* Enderlein, 1911**

Type species: *Scythropochroa latefurcata* Enderlein, 1911 [Enderlein (1911): 138–139, fig. 7–8]



**FIGURE 15 A–D.** *Pseudolykoriella sylviae* (Steffan, 1969). Holotype. A. Gonostylus; B. Head with palpus and basal flagellomeres; C. Flagellomeres 3–5; D. Apex of fore tibia.

***Scythropochroa gressitti* Steffan, 1969.**

(Fig. 16 A–D)

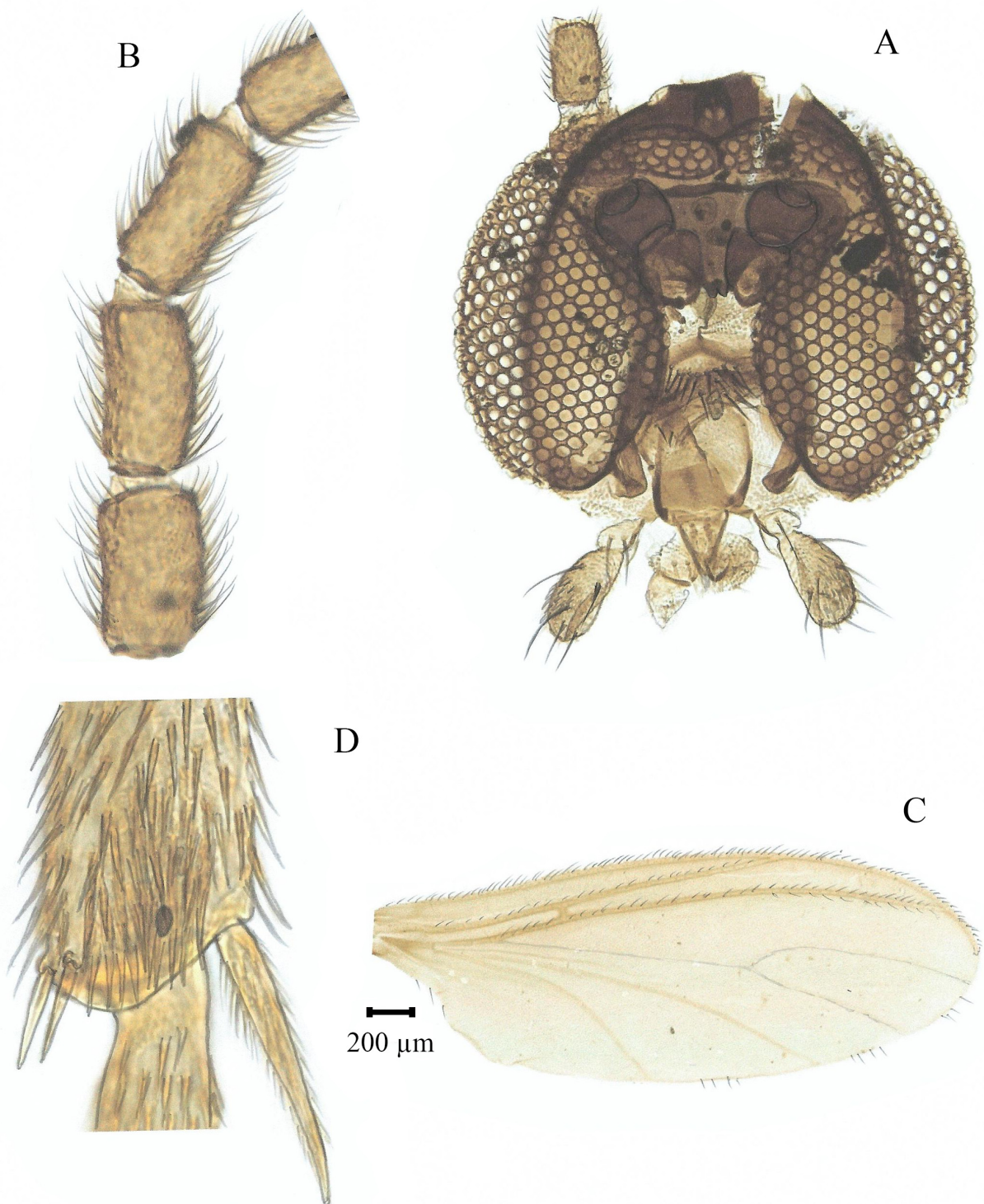
[Steffan 1969: 680–682, fig. 4 a–f].

**Material studied: Holotype:** Female, 2.i.1953, Micronesia, Caroline Islands, Truk Is., Tol Island (Tol), Mt. Unibot, 390 m, leg. J. L. Gressitt (BPBM 8221).

Conservation status: Embedded in Euparal. Body, head and wings separated; wings under a separate cover slip. The morphological details are in rather good condition.

**Comments.** This medium-sized species is characterized by a large and club-shaped 1-segmented palpus, rather long flagellomeres, large wings with a long  $R_1$ , long  $R_5$ , macrotrichia on y and a few bristles on the mediotergite. The species appears similar to *Scythropochroa latefurcata* Enderlein from the Seychelles Islands however the relative lengths of the CuA-stem and fourth flagellomeres differ.

**Distribution.** Micronesia (Caroline Islands).



**FIGURE 16 A–D.** *Scythropochroa gressitti* Steffan, 1969. Holotype female. A. Head; B. Flagellomeres 2–4; C. Wing; D. Apex of fore tibia.

***Scythropochroa quadrispinosa* Steffan, 1969**  
(Fig. 17 A–B)

*Scythropochroa quadrispinosa* Steffan, 1969 [Steffan (1969): 682, fig. 5 a–e].

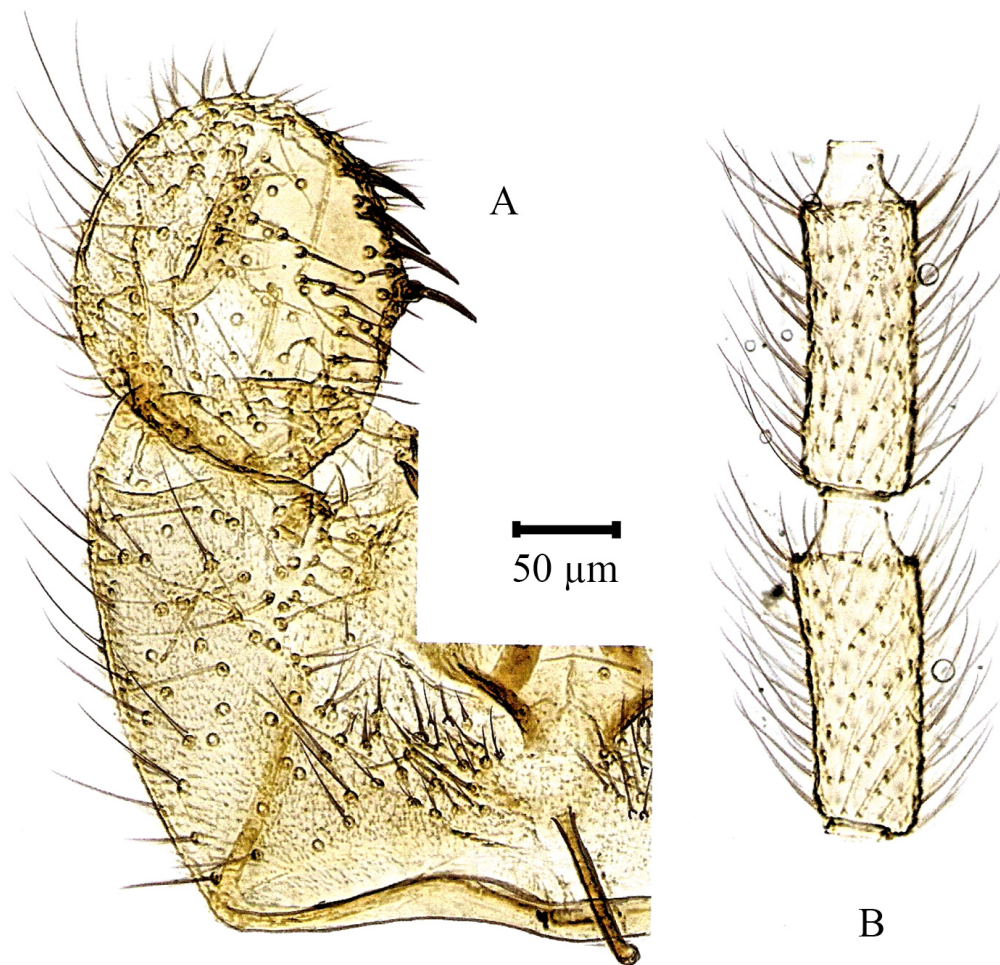
**Material studied: Holotype:** Male, 19.v.1957 (not 21.v. as given by Steffan), Caroline Islands, Palau Is., Babelth-

uap I., Ngiwal, at light, leg. C.W. Sabrosky (USNMENT 2083267). **Paratype:** 1 male, same data as the holotype (BPBM, without registration number).

Conservation status: Originally mounted in Hoyer's medium and remounted in Euparal. Head, body, hypopygium and wings separated, wings under a separate cover slip on the same slide, destroyed. Thorax and hypopygium are depressed and deformed and the embedding medium turbid.

**Comments.** The species is characterized by rather long flagellomeres, a 1-segmented palpus, an undifferentiated patch of bristles on the apex of the fore tibia, a large ovoid gonostylus with 4 hyaline spines on the inner side and a dense bristle area at the inner basal corner of the gonocoxites. It should be mentioned that 4 spines, arranged in two pairs, represent the typical armature of the gonostylus in the genus *Cratyna*, subgenus *Cratyna* s. str. within the subfamily Cratyninae. However, Shin *et al.* (2019) showed that the genus *Scythropochroa* (along with the genera *Chaetosciara*, *Mouffetina* and *Schwenckfeldina*) belongs to a new subfamily, the Chaetosciarinae, which differ from the Cratyninae by having a wing with a long  $R_1$  that meets C at least (usually beyond) the base of the M-fork (in Cratyninae the  $R_1$  is much shorter). As Steffan (1969) noted, the wings of the type specimens are destroyed or missing. It is therefore not possible to conclusively assign the species to either genus at present.

**Distribution.** Caroline Islands: Palau Islands (Babelthuap Island). Also reported from Pagan Island (Northern Mariana Islands) by Evenhuis *et al.* (2010).



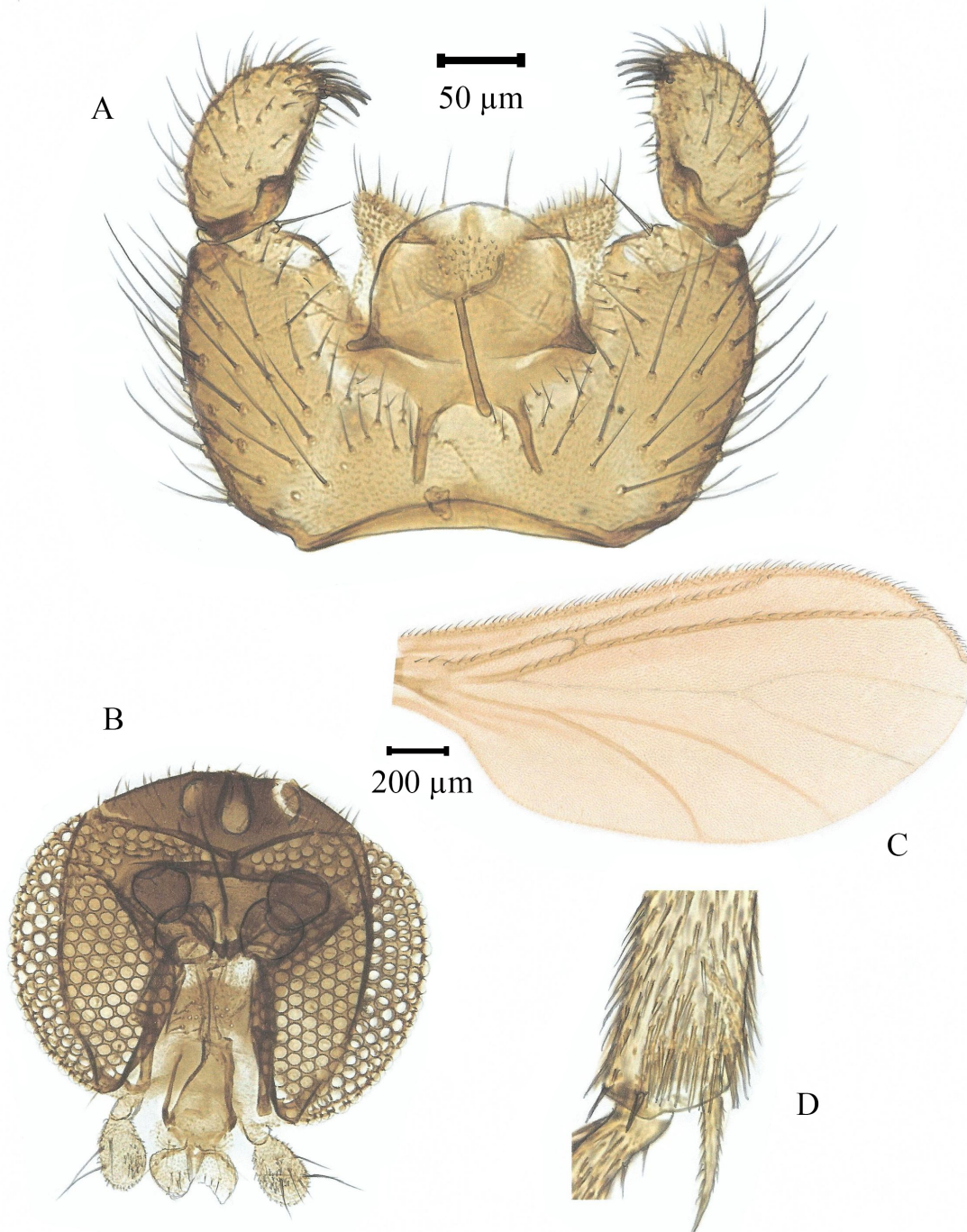
**FIGURE 17 A–B.** *Scythropochroa quadrispinosa* Steffan, 1969. Holotype. A. Hypopygium, left side; B. Flagellomeres 4–5 (specimen deformed and strongly bleached).

***Scythropochroa trispinosa* Steffan, 1969**  
(Fig. 18 A–D)

*Scythropochroa trispinosa* Steffan, 1969 [Steffan, 1969: 682–685, fig. 6 a–f].

**Material studied: Holotype:** Male. 31.x.–4.xi.1964, Marshall Islands, Kwajalein Atoll, Carlson Island, Malaise trap, leg. B.D. Perkins (BPBM 8222).

Conservation status: Body, head (without antennae), hypopygium and wings separated; wings under an isolated cover slip. The morphological details needed for determination are in rather good condition.



**FIGURE 18 A–D.** *Scythropochroa trispinosa* Steffan, 1969. Holotype. A. Hypopygium; B. Head; C. Wing; D. Apex of fore tibia.

**Comments.** The species is characterized by a 1-segmented palpus, short and broad wings with a long  $R_1$ , y with macrotrichia,  $R_5$  along the whole length with both dorsal and ventral macrotrichia; veins of the M-fork very indistinct, Cu-stem long, mediotergite with 3-5 short bristles, fore tibia at the inner apex with an indistinct patch of bristles, gonostylus short and with 3 apical spines.

The bristles on the mediotergite in connection with a 1-segmented palpus, long  $R_1$  and an indifferent bristle

patch on the apex of the fore tibia confirms that Steffan's assignment of the species into the genus *Scythropochroa* is correct. Bristles on the mediotergite are a good character for the identification of species of this genus (Mohrig 2004).

**Distribution.** Marshall Islands.

## Species list

**Bold** = valid species.

**bishopi** Steffan, 1973 (*Bradysia*)  
**boninensis** Steffan, 1969 (*Bradysia*)  
**brachygaster** Steffan, 1969 (*Phytosciara*)  
*brevicalcarata* (Hardy, 1956) syn. of *hartii* (Johannsen) (*Cosmosciara*)  
**brevipalpis** (Steffan, 1969) **comb. n.** (*Cratyna*)  
**gressitti** Steffan, 1969 (*Scythropochroa*)  
**hartii** (Johannsen, 1912) (*Cosmosciara*)  
**heterochela** Steffan, 1969 (*Corynoptera*)  
**jaluitensis** (Steffan, 1969) **comb. n.** (*Epidapus*)  
**kraussi** Steffan, 1969 (*Bradysia*)  
**latistylata** (Hardy, 1956) (*Corynoptera*)  
*latipons* (Hardy, 1956) syn. of *hartii* (Johannsen) (*Cosmosciara*)  
**multispinosa** (Steffan, 1969) (*Austrosociara*)  
**musicola** (Steffan, 1969) (*Cratyna*)  
*nanus* Menzel, 2007, **syn. n.** of *jaluitensis* (Steffan) (*Epidapus*)  
**ocellaris** (Comstock, 1882) (*Bradysia*)  
*perniciosa* (Edwards, 1922), syn. of *hartii* (Johannsen) (*Cosmosciara*)  
**ponapensis** (Steffan, 1969) (*Pseudolykoriella*)  
**quadrspinosa** Steffan, 1969 (*Scythropochroa*)  
**sabroskyi** (Steffan, 1969) (*Pseudolykoriella*)  
*snyderi* Steffan, 1969, **syn. n.** of *kraussi* Steffan (*Bradysia*)  
**spinipennis** (Sasakawa, 1962) (*Lobosciara*)  
**sylviae** (Steffan, 1969) (*Pseudolykoriella*)  
**trispinosa** Steffan, 1969 (*Scythropochroa*)  
*tritici* (Coculle, 1895), syn. of *ocellaris* (Comstock) (*Bradysia*)  
**yapensis** (Steffan, 1969) **comb. n.** (*Epidapus*)

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