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FIJI ARTHROPODS XV

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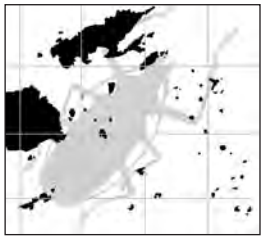

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Cover: *Anaphes fijiensis* Huber, new species (Hymenoptera: Mymaridae).

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FIJI ARTHROPODS XV

Epilogue

We herewith present the fifteenth and final issue of *Fiji Arthropods*, a series offering rapid publication and devoted to studies of terrestrial arthropods of the Fiji Group and nearby Pacific archipelagos. Most papers in this series were the results of collecting and research on the Fijian terrestrial arthropod fauna deriving from the NSF-funded "Terrestrial Arthropods of Fiji" project. Two co-PIs and 15 specialists form the core team of scientists who agreed to publish new taxa that resulted from collecting during this survey.

This issue contains new species of Cerambycidae (Coleoptera) by Hilda Waga and Steve Lingafelter, a review of the Fiji myrmarids (Hymenoptera) by John Huber, and a first Fiji record and new species of the family Dictyopharidae (Hemiptera) by A.F. Emeljanov and Mike Wilson.

With this fifteenth issue, *Fiji Arthropods* draws to a close. During its short 4-year life, *Fiji Arthropods* was home to 51 papers by 44 authors from over a dozen different countries for a total of over 800 pages. On those pages, 12 new genera and 273 new species were described, the majority of which were from Fiji but also included were new taxa from adjacent areas in the Pacific as authors published papers that sought to research the Fijian fauna in context with its biogeographical relationships. Full checklists of species were published of Tipulidae and Limoniidae (Diptera), Auchenorrhyncha(Heteroptera), Formicidae (Hymenoptera), Ichneumonidae (Hymenoptera), and Zorotypidae (Zoraptera); and many keys to species and genera were published in association with taxa being described.

As funding from the U.S. National Science Foundation and the Schlinger Foundation ended, the Fiji Terrestrial Arthropod Survey concurrently ceased all funded operations of the survey. However, results from collections made during the survey will continue to be published, although in venues other than this journal; and the Fiji Arthropod Survey website (http://hbs.bishopmuseum.org/fiji) will continue to provide updates of this information. Authors publishing on Fijian arthopods are encouraged to send us copies of papers and we will enter them into both the contributions list and updated bibliography online and continue to provide updated checklists in html format.

When we began the project, less than 3000 terrestrial arthropod species were known to occur in Fiji. Since then, through descriptions of new taxa, identifications of newly found introduced taxa, and extensive literature searching, we have increased that total to 5227 species. Truly, Fiji is a rich source of biodiversity in the Pacific and will continue to be an important area for further study of its native fauna and interesting and sometimes enigmatic biogeographical relationships.

The editors thank the Government of Fiji (especially the Ministries of Environment and Forestry), the National Science Foundation (DEB 0425970), and the Schlinger Foundation for their support of this project and the opportunity to study the terrestrial arthropods of Fiji. With the close of this journal series, the editors take this opportunity to thank the authors of all the papers in this series. Your participation in this project and publishing your results has helped to significantly increase our knowledge of the terrestrial arthropods of this interesting island archipelago.

All papers in this series are available free of charge as pdf files downloadable from the following url:

http://hbs.bishopmuseum.org/fiji/fiji-arthropods/

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Fiji Arthropods XV. Edited by Neal L. Evenhuis & Daniel J. Bickel. *Bishop Museum Occasional Papers* 106: 3–15 (2009).

New Fijian Callidiopini (Coleoptera: Cerambycidae)

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Abstract: Based on examination of material collected as part of the NSF – Fiji Terrestrial Arthropod Survey, two new species of Callidiopini (Coleoptera: Cerambycidae: Cerambycinae) are described from Fiji: *Ceresium tuberculatum* Waqa & Lingafelter, **n**. **sp**. (type locality: Fiji, Gau Island, 17.98ºS, 179.27ºE) and *Laniferus grandis* Waqa & Lingafelter, **n**. **sp**. (type locality: Fiji, Viti Levu Island, 17.58ºS, 178.08ºE).

INTRODUCTION

In this work we describe two species of Callidiopini from Fiji in the genera *Ceresium* and *Laniferus*. The tribe Callidiopini of the subfamily Cerambycinae contains more than ten genera. The largest of these is the genus *Ceresium*, containing 109 species and subspecies (Encyclopedia of Life, 2008). Most of the diversity of *Ceresium* is found in Asia and the Pacific Islands, but the genus is widespread with some species also occurring in Africa and Australia, and several dubious records from North America and the Caribbean. Including the species described herein, seventeen species are known from Fiji (Dillon & Dillon, 1952; Bigger & Schofield, 1983; Evenhuis, 2007). Contrasting from *Ceresium*, the genus *Laniferus* was known from only one species, *L. uniformis* Dillon & Dillon (1952), prior to this work.

MATERIALS AND METHODS

Much of the material in this work originates from the extensive Malaise trap collections from the NSF – Fiji Terrestrial Arthropod Survey (Evenhuis & Bickel, 2005). Material is deposited in the Smithsonian Institution, Washington, DC (USNM), Bishop Museum, Honolulu, Hawaii (BPBM), and the Fiji National Insect Collection, Suva, Fiji (FNIC), and these acronyms are used hereafter. Label data is verbatim, therefore some information is occasionally presented in inconsistent formats.

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1. Contribution No. 2009-008 to the NSF-Fiji Arthropod Survey.

SYSTEMATICS

Ceresium tuberculatum Waqa & Lingafelter**, new species**

(Figs. 1–4)

Description. Medium size; 14–18 mm long; 3.5–4.5 mm wide at humeri; integument color dark reddish brown (occasionally piceous).

Head with shallow interantennal tubercle region, tubercles only slightly raised; punctate with very sparse ochraceous pubescence on tubercles and throughout frons; vertex and occiput with sparser ochraceous pubescence. Ochraceous pubescence denser around eye margins. Frons and frontal-clypeal margin densely, coarsely punctate with sparse, long, ochraceous hairs.

Antennae long, extending beyond elytra by 2–3 antennomeres (longer in males than females). Antennae with vestiture of short, dense, ochraceous setae (longer at apices of antennomeres). Antennomeres unspined and not expanded at apices; last antennomere about 1.4 times length of penultimate in males (about 1.2 times length of penultimate in females). Antennomeres 3 & 4 each shorter than scape; 5–9 longest except for 11 and subequal in length. Scape long, clavate, extending to apical fifth of pronotum.

Pronotum quadrate, slightly widest anteriorly, and slightly wider than long. Raised tubercles present at middle of sides and anterolaterally. Three poorly-defined calli on disk: 1 medial and 2 anteromedial between middle callus and anterolateral tubercle. Pronotum with patchy ochraceous pubescence, denser at sides and posterior margin, slightly less dense anteriorly; center of disk mostly glabrous. Pronotum with sparse, poorly-defined punctures in males (except on smooth calli), only sparse depressions present in females.

Elytron glabrous except for scattered sparse patches of white (occasionally ochraceous) pubescence. Punctation shallow, sparse, gradually becoming shallower and indistinct towards apex. Elytral apex rounded to suture. Scutellum broadly rounded, covered with dense, ochraceous pubescence.

Legs moderate in length, femora distinctly but gradually clavate, hind femur extending beyond base of fourth ventrite.

Venter of abdomen and thorax with moderately dense, ochraceous pubescence at sides, but mostly glabrous along middle, except for prosternum which is densely pubescent. Prosternal process broad, vertical and acutely declivous, about 1/3 width of procoxa, weakly notched and expanded at apex. Proxocal cavities open posteriorly. Mesocoxae closed laterally to mesepimeron. Mesosternum rather acutely declivous, with small anterior tubercle, and sulcate anteriorly. Apex of terminal ventrite in males with median notch; in females truncate to unevenly rounded, without notch. *Aedeagus* as in Fig. 4b-d. Median lobe parallel sided for most of length, then abruptly narrowing to nipple-like apex. Parameres long, not converging at apices, with long apical setae that converge with those of opposite paramere.

Types. HOLOTYPE (male): FIJI: **Gau**, 4 km SE Navukailagi Village, 29 Jun–11 Jul 2005 Malaise trap, U. Racule, 17.98ºS, 179.275ºE, 496 m, FBA 510997 (BPBM, pending transfer to FNIC). PARATYPES (13 specimens deposited in BPBM, USNM, & FNIC): FIJI: **Gau**, 4 km SE Navukailagi Village, Malaise trap, U. Racule, 17.98ºS, 179.275ºE, 496 m (2 females: 19 Apr–2 May 2005 - FBA 510794; 15–29 Jun 2005 - FBA 512497); 4.0 km SE Navukailagi Village, 17.98ºS, 179.275ºE, 496 m, 27 May–16 Jun 2005, Malaise trap M01, U. Racule, (1 male – FBA 512516); 4 km SE Navukailagi Village, Mt. Delaco, 496 m, 19 Apr–2 May 2005, Malaise 2, U. Racule, 17.98ºS,

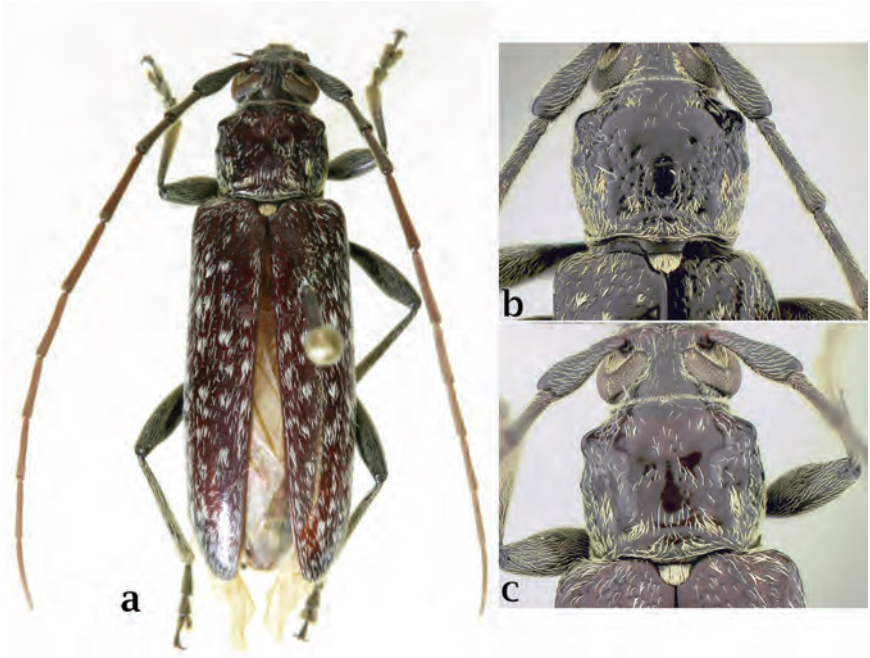

Figure 1. *Ceresium tuberculatum* Waqa & Lingafelter, new species: **a**. dorsal habitus, male paratype; **b.** pronotal detail, male; **c.** pronotal detail, female.

179.275ºE, (1 male – FBA 512158); 4 km SE Navukailagi Village, 2–24 May 2005, Malaise trap, U. Racule, 17.98ºS, 179.275ºE, 496 m a.s.l. FBA 511009, 511007, 511006 (3 [sex indet.]). **Viti Levu**, 0.75 km E. Navai Village, old trail to Mt. Tomaniivi (Victoria), gymnosperm dominated rainforest, -17.621, 177.989, 700 m, 23 Sep–18 Oct 2004, Malaise trap M05, E. Namatalau (1 female - SWL1; 1 male - SWL2); Navai Village. 13 Feb–18 Feb 2004. Malaise trap. M. Irwin, E. Slinger, M. Tokota'a. 17.37ºS, 177.57ºE, 700 m a.s.l. FBA 039518 & FBA 013681 (2 [sex indet.]); 4 km WSW of Colo-i-Suva Village, Mt. Nakobalevu, lowland wet forest, -18.056, 178.422, 325 m, 12 Nov–12 Dec 2004, Malaise trap, M02, Timoci (1 male - SWL3); 3 km SW of Colo-i-suva Village, 23 Sep 1988, hand collection, G. Paulay Coll., BM, 18.03ºS, 178.27ºE, 200 m a.s.l. (1 [sex indet.]).

Diagnosis and Discussion. This species of *Ceresium* is easily recognized by the prominent anterolateral pronotal tubercles making the pronotum wider anteriorly than posteriorly (almost all species of *Ceresium* have the pronotum broader posteriorly or subequal in width at posterior and anterior margins); the prominent, broad, ventrally projecting, acutely declivous prosternal process (nearly all *Ceresium* have a very narrow, gradually declivous prosternal processes); prominent, anteriorly right-angled mesosternal process; sparsely pubescent, shiny elytra with sparse, widely separated punctures and scattered pubescent aggregations (most *Ceresium* have elytral pubescence denser and more uniform). With regards to the pronotal proportions, *C. tuberculatum* is most similar to *C. guttaticolle*, but in that species the pronotum has dense patches of pubescence anteriorly and posteriorly.

Figure 2. Sexual dimorphism of terminal abdominal ventrite of *Ceresium tuberculatum* Waqa & Lingafelter: **a.** male; **b.** female.

Figure 3. Thorax of *Ceresium tuberculatum* Waqa & Lingafelter: **a.** lateral view showing acutely declivous prosternal process, weakly tuberculate, acutely declivous mesosternal process, and laterally closed mesocoxa; **b.** ventral view showing width of prosternal and mesosternal intercoxal processes, along with pubescence distribution.

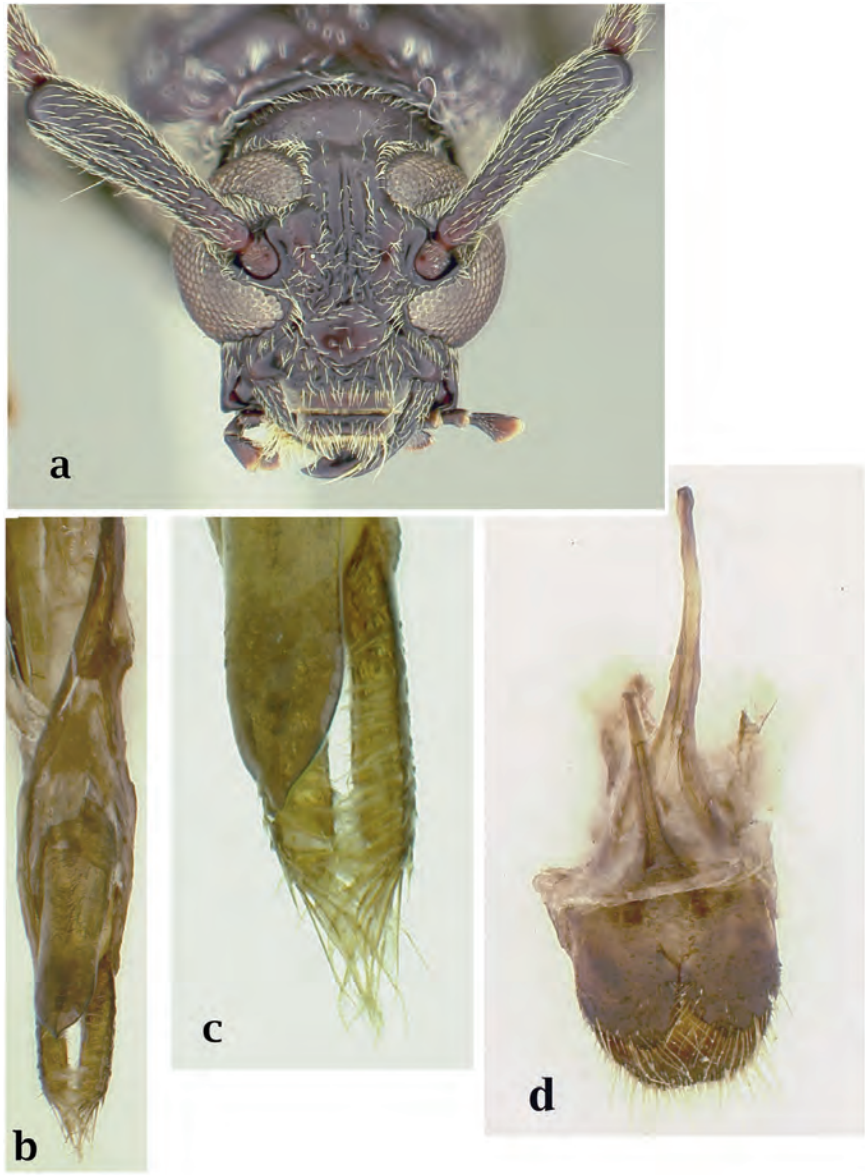

Figure 4. *Ceresium tuberculatum* Waqa & Lingafelter: **a.** anterior view of head; **b.** median lobe and parameres of aedeagus; **c.** closeup of apex of median lobe and parameres of holotype showing apical setae; **d**. sternite 8 and apodeme of aedeagus of holotype.

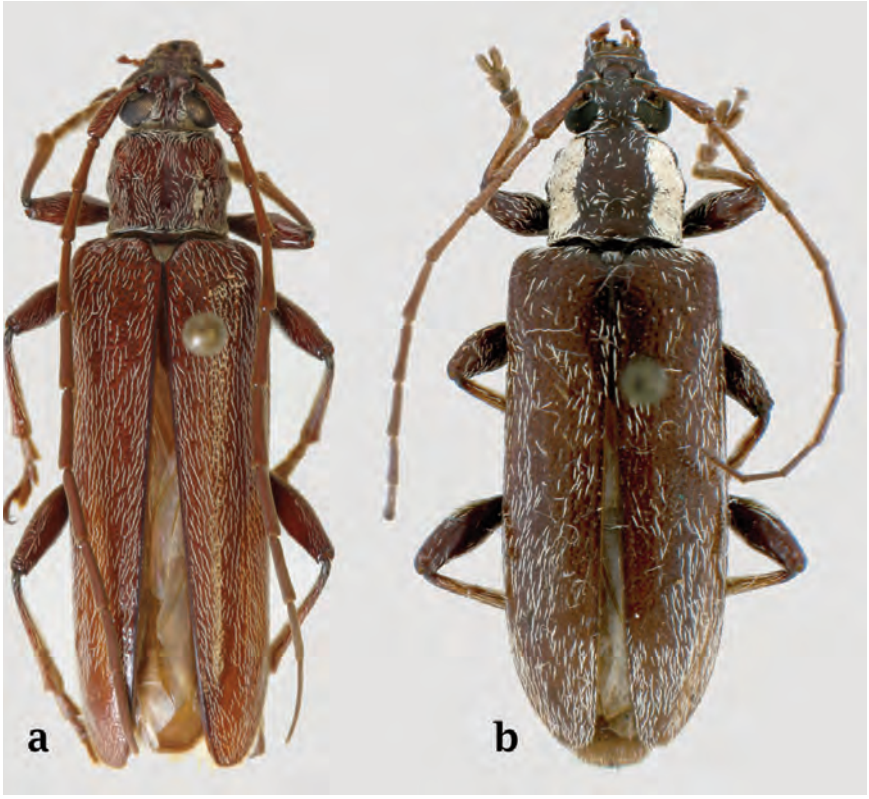

Figure 5. Dorsal habitus of *Laniferus* species: **a**. *Laniferus grandis* Waqa & Lingafelter, male paratype; **b**. *Laniferus uniformis* Dillon & Dillon, male holotype.

Etymology. The specific epithet, *tuberculatum*, is a Latin adjective referring to the tuberculate pronotum that is characteristic of this species.

Laniferus grandis Waqa & Lingafelter**, new species**

(Figs. 5–9)

Description. Medium to large size; 20–27 mm long; 5.0–7.5 mm wide at humeri; integument color orange-brown with elytral suture, base and apical margin of pronotum and scutellum dark reddish-brown to piceous.

Head with shallow interantennal tubercle region, tubercles barely raised above level of eye. White or ochraceous pubescence sparsely distributed on head, denser around margins of eye and base of head. Frons and frontal-clypeal margin sparsely punctate.

Antennae slightly longer than body in males, not attaining elytral apex in females;

covered with vestiture of short, dense, ochraceous setae with longer setae towards apex of most antennomeres and ventrally. Antennomeres unspined and weakly expanded at apices on 7-9. Last antennomere slightly longer than penultimate, with a small constriction at apical third. Antennomeres 3 & 4 each shorter than scape; scape and 5-11 subequal in length. Scape moderate in length, clavate, extending almost to apical fifth of pronotum.

Pronotum subquadrate, widest across middle, narrower anteriorly than posteriorly; wider than long; without subbasal and apical constrictions. Pronotum with small acute tubercle just before middle at sides and a larger, broader tubercle anterolaterally. Disk of pronotum aside from these tubercles mostly flat. Pronotum with sparse white or ochraceous pubescence, more abundant at sides and posterior margin; mostly glabrous and impunctate or indistinctly punctate on disk.

Elytron with sparse but regularly distributed white or ochraceous pubescence throughout. Moderately dense but separate and shallow punctures throughout, gradually becoming shallower and smaller in size towards apex. Elytral apex rounded to suture. Scutellum narrowly rounded, covered with moderately dense, ochraceous pubescence.

Legs moderate in length, femora distinctly but gradually clavate, hind femora extending to third ventrite.

Venter of abdomen and thorax with sparse white or ochraceous pubescence at sides, but mostly glabrous along middle. Prosternum with denser pubescence throughout and on sides. Prosternal process broad, vertical and acutely declivous, about 1/3 width of procoxa, weakly notched and slightly expanded at apex. Proxocal cavities open posteriorly. Mesocoxae closed laterally to mesepimeron. Mesosternum acutely declivous, with small anterior tubercle projecting anteriorly, and sulcate anteriorly. Apex of terminal ventrite in males variable: some with distinct middle notch or indentation, others nearly truncate. *Aedeagus* as in Fig. 9a-b. Median lobe gradually, evenly narrowed to apex. Parameres moderate in length, converging at apices, with long apical setae that converge with those of opposite paramere. Females unknown.

Types. HOLOTYPE (male): FIJI: **Viti Levu**. PABITRA Wabu Baseline Survey, 1034 m, 17 Nov–20 Nov 2003, Malaise samples collected from Delena Vekovi -17.5833, 178.0833, FBA 053324 (BPBM, pending transfer to FNIC). PARATYPES (3 specimens, all males, deposited in BPBM & USNM): FIJI: **Viti Levu**. PABITRA Wabu Baseline Survey, 1034 m, 17 Nov–20 Nov 2003, Malaise samples collected from Delena Vekovi - 17.5833, 178.0833 (2 specimens: FBA 053317 & 053318); Korobasabasaga Rng. 5.4 km NE Namosi Vlg., 21 Jun 2005, 17º59'31", 178º08'43"E, 600 m, CF, Hilda Waqa (1 specimen: HW1).

Diagnosis and Discussion. The only other species of *Laniferus*, *L. uniformis* Dillon & Dillon (Fig. 5b), is easily distinguished by the prominent, broad, lateral pubescent fasciae on the pronotum and the overall darker color and smaller size. In *L. grandis*, the pronotum has only sparse pubescence, not forming dense lateral fasciae. Further, *L. grandis* has very large eyes, particularly evident from lateral view. *Laniferus uniformis* is known only from Ovalau Island while *L. grandis* is known only from Viti Levu Island.

Etymology. The specific epithet, *grandis*, is a Latin adjective referring to the large size of this species.

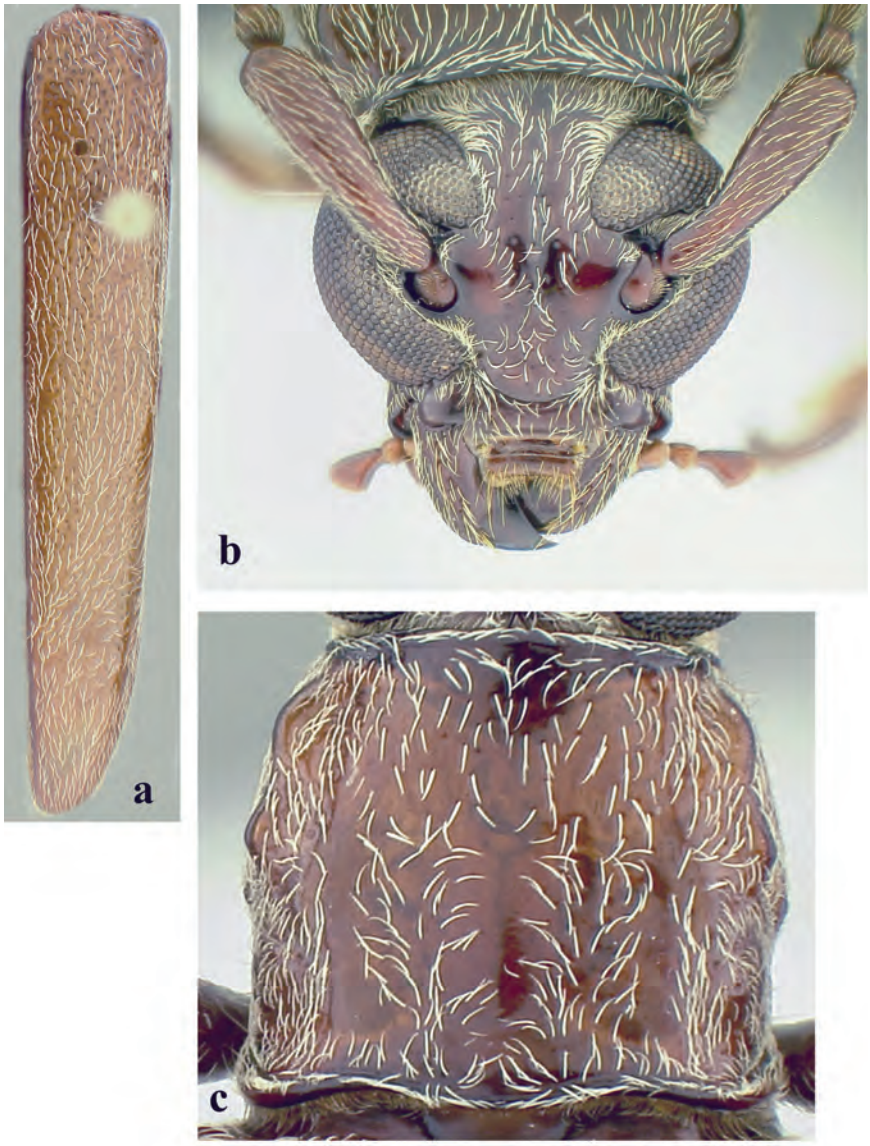

Figure 6. *Laniferus grandis* Waqa & Lingafelter: **a.** elytron; **b.** anterodorsal view of head; **c.** pronotum.

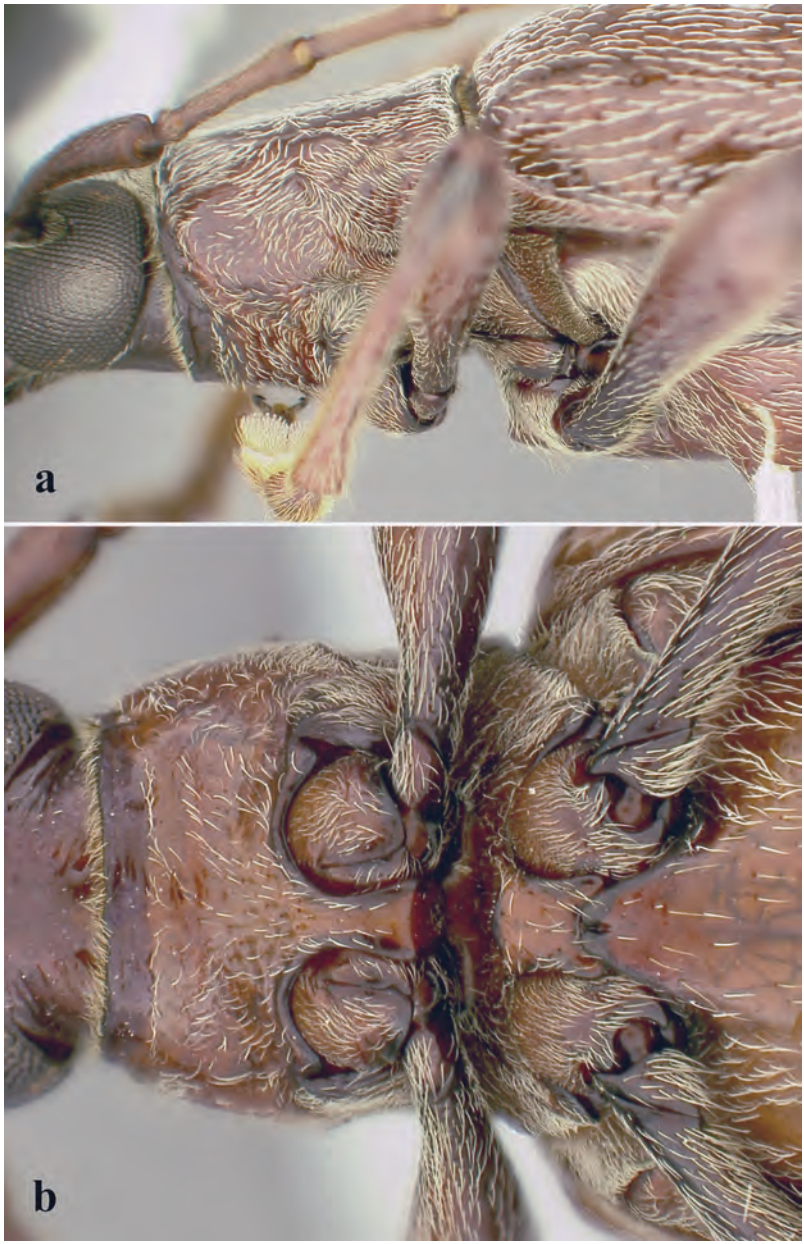

Figure 7. Thorax of *Laniferus grandis* Waqa & Lingafelter: **a.** lateral view showing acutely declivous prosternal process, weakly tuberculate, acutely declivous mesosternal process, and laterally closed mesocoxa; **b.** ventral view showing width of prosternal and mesosternal intercoxal processes, along with pubescence distribution.

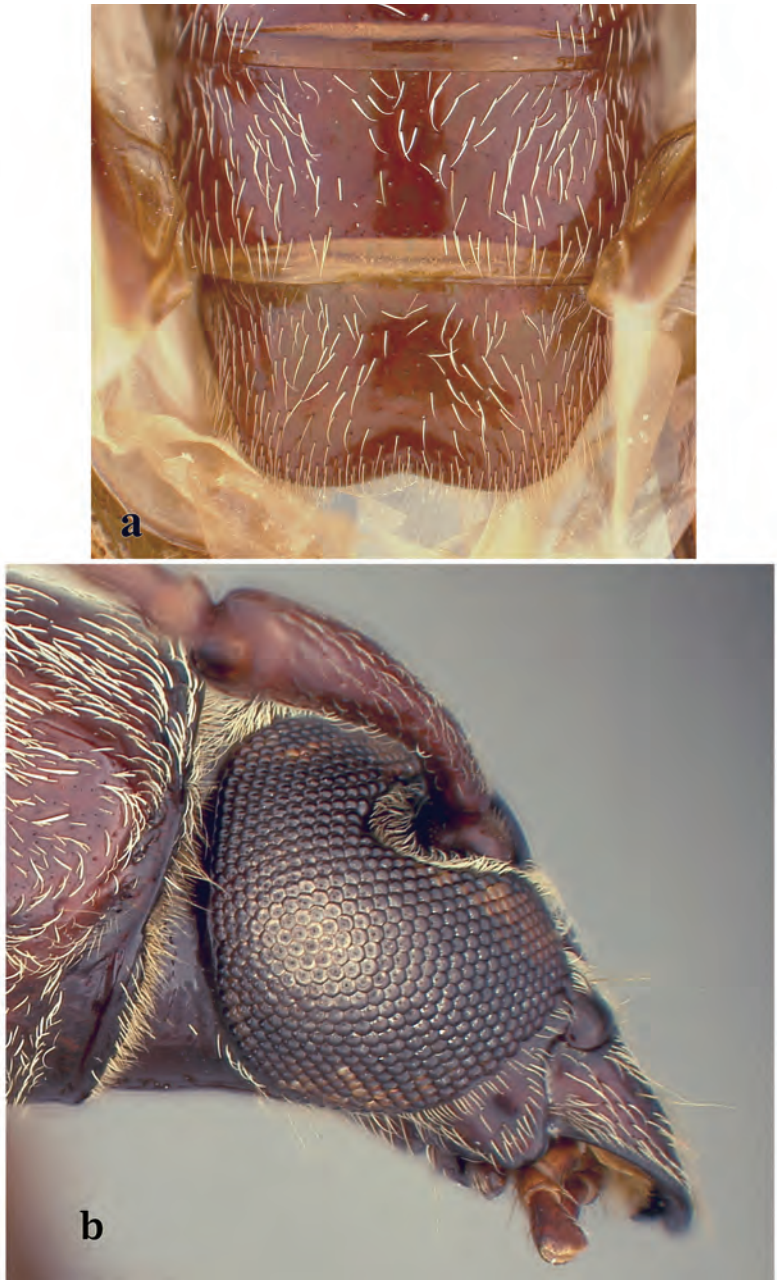

Figure 8. *Laniferus grandis* Waqa & Lingafelter: **a.** terminal abdominal ventrite of male, showing notched form; **b.** lateral view of head.

Figure 9. *Laniferus grandis* Waqa & Lingafelter: aedeagus of holotype: **a.** ventral view of apex showing parameres and middle lobe; **b**. slightly rotated view of apex showing less-obstructed apical setae.

ACKNOWLEDGMENTS

Funds from this study came in part from USDA, the Schlinger Foundation, Bishop Museum, National Science Foundation (DEB 0425790), and the Darwin Initiative. The Fiji Ministries of Environment and Forestry are thanked for their support of the project. David Olson, Al Samuelson, Moala Tokota'a, and Akinisi (Cagi) Caginitoba handled the Fiji travel and collecting logistics. Tokasaya Cakacaka and Alivereti Naikatini (USP, Fiji) helped with fieldwork. Thanks to Alistair Ramsdale and Terry Lopez (BPBM, Honolulu, Hawaii) and Leah Brorstrom and Chris Grinter (The World Spider-Endoparasitoid Lab, Santa Ynez, California) for their work in sorting and distributing specimens on which this study and others are based. Thanks to Gail Kampmeier (Illinois Natural History Survey) for assisting with locality information for many records in the Fiji Bioinventory of Arthropods Database. Elisabeth Roberts (USDA) prepared automontage photos of the anatomical details. Gérard Tavakilian (Muséum National d'Historie Naturelle, Paris, France) and Alain Drumont (Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium) prepared photos and a loan of type material, respectively, from their institutions. Thanks to Eduard Vives (Museu de Zoologia, Barcelona, Spain), Norman Woodley (USDA – SEL), and Allen Norrbom (USDA – SEL) for their reviews of the manuscript.

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Introduction to the Mymaridae (Hymenoptera) of Fiji, with description of two new species and comparison with the fairyflies of other Pacific islands

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Abstract . Twenty-one genera of Mymaridae and about sixty-five species are identified from Fiji. Two new species are described: *Anaphes fijiensis* Huber, **sp**. **nov**. and *Palaeoneura gloriosa* Huber, **sp**. **nov**. The male of *Palaeoneura eucharis* (Perkins), **comb**. **nov**. from *Polynema* Haliday, is reported from specimens collected on Viti Levu. The Fijian fauna is compared to that of other Pacific islands.

INTRODUCTION

Because of their small size, Mymaridae (Hymenoptera) are usually overlooked and, consequently, are poorly represented in insect collections. Yet, they are abundant in most terrestrial and some freshwater habitats where they parasitize eggs of other insects (Huber 1986), with only two known exceptions (Huber *et al.* 2006). Mymaridae or fairyflies are important in the natural control of many insects. In the Pacific region they were used for biological control of invasive alien species*, e.g.,* the planthopper *Perkinsiella saccharicida* Kirkaldy (Delphacidae) on sugarcane (Perkins 1905, Sweezey 1936, Triapitsyn & Beardsley 2000), and two leafhopper species (Cicadellidae), *Sophonia rufofascia* (Kuoh & Kuoh) in the Hawaiian Islands (Alyokhin *et al.* 2001, Johnson *et al.* 2001, Yang *et al.* 2002) and *Homalodisca vitripennis* (Germar) in French Polynesia (Triapitsyn 2006, Grandgirard *et al.* 2007, 2008, 2009). *Palaeoneura sophoniae* (Huber) (as *Chaetomymar* Ogloblin) was inadvertently introduced from Asia into the Hawaiian Islands about the same time as its host*, S. rufofascia* whereas *Gonatocerus ashmeadi* Girault on *H. vitripennis* was deliberately introduced from the USA into French Polynesia. Interestingly, surveys prior to introduction of the latter species of fairyfly revealed, unexpectedly, a different, accidentally introduced species—*Gonatocerus dolichocerus* Ashmead—that parasitizes yet other introduced pest Cicadellidae in French Polynesia. In the Hawaiian Islands, Swezey (1954) recorded other associations of Mymaridae. One was a native species on a native host, namely, *Polynema ciliata* Perkins on *Aloha dubautiae* (Kirkaldy) (Delphacidae); one was a deliberately introduced immigrant species (from Fiji or Australia) on a native host (not the intended target), namely, *Anagrus frequens* Perkins on *Kelisia sporobolicola* Kirkaldy (Delphacidae); one was an immigrant species (from Mexico or USA) probably accidentally introduced on an immigrant host, namely *Gonatocerus mexicanus* Perkins on *Draculaecephala minerva* Ball (Cicadellidae); and one may be an immigrant species on a native host, namely, *Stephanodes reduvioli* (Perkins) on *Nabis capsiformis* (Nabidae). Such diverse associations—alien or native parasitoids on native or alien hosts—may be found to occur in Fiji once the fauna is better known biologically.

1. Contribution No. 2009-009 to the NSF-Fiji Arthropod Survey.

The fairyflies of Fiji have barely been studied. Fullaway (1957) included five species of Mymaridae in his list of Chalcididae (*s.l.*) and Evenhuis (2007) listed the genera, including seven previously reported species. No other information is available on this family of small wasps in Fiji. It was therefore interesting to receive for study over 400 specimens of Mymaridae collected as part of an important biodiversity survey of the country. The results presented here provide a more complete picture of the diversity of Fijian Mymaridae.

Lin *et al.* (2007) may be used to identify the genera in Fiji because its fauna represents a subset of the Australian fauna, except for *Stephanocampta* Mathot and ?*Callodicopus* Ogloblin, which have not yet been reported from Australia. Two species are described as new to science, one *Anaphes* Haliday and one *Palaeoneura* Waterhouse, and the Fijian fauna is compared with other island groups of the Pacific Ocean.

MATERIALS AND METHODS

Microhymenoptera (mostly Chalcidoidea), collected mainly in Malaise traps in Fiji by E. Schlinger and parataxonomists, were sent to the Canadian National Collection of Insects, Ottawa (CNC). Some were collected by A. Bennett (CNC) using water-filled yellow pan traps. Over 430 specimens of Mymaridae were extracted, critical point dried, glued to card mounts with shellac gel, and the cards pinned. A few specimens of *Anaphes* and *Palaeoneura* were slide mounted in Canada balsam using the method described by Noyes (1982). Measurements are given in micrometers (µm). Photographs were taken with a ProgRes C14^{plus} digital camera attached to a Nikon Eclipse E800 compound microscope, and the resulting layers combined electronically using Auto-Montage® and retouched as needed with Adobe® Photoshop CS3®. Abbreviations used in the description are: fl_x for funicular (in females) or flagellar (in males) segment and gt_x for gastral tergum. Primary types are currently held in trust at the Bishop Museum, Honolulu (BPBM) but will ultimately be deposited in the Fiji National Insect Collection, Suva (FNIC). Other specimens are deposited in the CNC and BPBM.

GENERA OF MYMARIDAE

Representatives of 21 genera of Mymaridae have been collected so far in Fiji. Host summaries for each genus are from Huber (1986) and Noyes (2002). Lin *et al.* (2007) gave separate keys to the Australian genera of females and males, diagnoses, complete generic synonymies, distributions, and photographs. The keys may also be used to identify the genera in Fiji (except *Stephanocampta* and *Callodicopus*). Recent generic keys for identification of certain groups of genera are: Huber & Lin (1999) for *Camptoptera, Campto - pteroides, Callodicopus, Stephanocampta* and Huber (2009) for *Alaptus, Dicopomorpha, Dicopus*. The diagnostic combination of features given for each genus below applies to the species (females only) collected so far in Fiji.

***Alaptus* Westwood**

Diagnosis. Tarsi 5-segmented, female funicle 5-segmented and clava 1-segmented, fore wing with posterior margin deeply excised behind venation, scutellum separated from frenum (= posterior scutellum, of authors) by a transverse suture.

Seven specimens from Viti Levu representing perhaps only one species were seen. Hosts are eggs of Psocoptera.

***Allanagrus* Noyes & Valentine**

Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 3-segmented with the sutures between the segments often oblique, frenum divided medially by a longitudinal suture, fore wing with posterior margin at most slightly lobed behind venation.

Eleven specimens from Viti Levu representing at least three species were seen but the generic limits are unclear and placement of one of the species in *Allanagrus* is uncertain. Although it has the basic diagnostic features of the genus it looks very different because of its unusual colour pattern. Hosts are unknown.

***Anagrus* Haliday**

Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 1-segmented, in lateral view the clava with straight ventral margin and curved dorsal margin, frenum divided medially by a longitudinal suture and each half shorter than wide.

Three specimens from Viti Levu and Taveuni were seen. The single female appears to be *A. frequens* Perkins (Perkins 1905, Triapitsyn & Beardsley 2000). Perkins (1905) also described *A. optabilis* (Perkins) and *A. perforator* (Perkins), and Girault (1913) incorrectly recorded *A. armatus* (Ashmead). Hosts are eggs of Cicadellidae, Delphacidae, and Odonata. Several species have been used in biological control of sugarcane pests.

***Anaphes* Haliday** (Figs. 1–4)

Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 1-segmented (Fig. 1), fore wing wide and apically truncate (Fig. 2), propodeum with longitudinal median groove.

Six specimens were seen, representing two species, one of which is described below. The second species, represented by only one specimen from Taveuni, is not described until more specimens become available. The species from Fiji belong to the Southern Hemisphere subgenus *Anaphes* (*Yungaburra* Girault). In contrast, *A. calendrae* (Gahan), the species introduced into the Hawaiian Islands to control species of *Sphenophorus* (Curculionidae) (Beardsley 2000), belongs to *A.* (*Anaphes*). Hosts are eggs of Curculionidae and Chrysomelidae, mainly.

***Arescon* Walker**

Diagnosis. Tarsi 5-segmented, female funicle 5-segmented and clava 1-segmented, fore wing with venation extending well over half wing length.

Three specimens were seen. They may well be *A. clarkae* Doutt, described from the Caroline Islands (Doutt 1955), differing only in having a slightly less exserted ovipositor. Hosts are unknown.

***Australomymar* Girault**

Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 1-segmented, fore wing with venation extending almost half the wing length and a line of microtrichia extending from stigmal vein obliquely towards posteroapical angle of wing; ovipositor distinctly exserted and the sheaths setose.

Eight-five specimens representing at least seven species were seen from Kadavu, Vanua Levu, Viti Levu, and Taveuni. One of the species is very similar to, if not the same as, *A. gressitti* (Doutt) from Truk Island (Micronesia). The single host record is Tettigoniidae (in Chile).

***Camptoptera* Förster**

Diagnosis. Tarsi 5-segmented, female funicle 7-segmented (fl_2 sometimes very short) and clava 1-segmented, fore wing relatively narrow, apically curved, and usually with only 1 median longitudinal row of microtrichia, petiole narrow, short but distinct.

Twenty specimens representing three species were seen, all from Viti Levu. Apparently reliable host records are eggs of Cicadellidae, Thripidae, and Scolytinae (Curculionidae).

***Camptopteroides* Viggiani**

Diagnosis. Tarsi 5-segmented, female funicle 6-segmented and clava 1-segmented, fore wing with dark suffusion except at apex, propodeum uniformly and strongly reticulate, petiole narrow, short but distinct.

Nine specimens representing apparently two species were seen from Vanua Levu, Viti Levu, and Taveuni. Hosts are unknown.

?*Callodicopus* Ogloblin

Diagnosis. Tarsi 5-segmented, female funicle 7-segmented (fl_2 very short) and clava 1-segmented, fore wing with posterior margin straight at apex, gastral petiole relatively wide and indistinct. *Callodicopus* would key to *Dicopomorpha* in Lin *et al.* (2007). but differs in having an entire scutellum, without a frenal line separating the scutellum from the frenum (Fig. 73 in Huber & Lin 1999).

Five specimens representing one species were seen. The three females were from Viti Levu whereas the two males were from Taveuni, so the association is uncertain. Perhaps two species are represented. Hosts are unknown.

***Dicopomorpha* Ogloblin**

Diagnosis. Tarsi 5-segmented, female funicle 7-segmented and clava 1-segmented, mandibles directed medially, overlapping when closed, scutellum separated from frenum by a transverse suture, gastral petiole relatively wide and indistinct.

Five specimens representing three species were seen, all from Viti Levu. Hosts are unknown.

***Dicopus* Enock**

Diagnosis. Tarsi 5-segmented, female funicle 7-segmented and clava 1-segmented, mandibles directed ventrally, not overlapping when closed, fore wing extremely narrow for much of its length, scutellum separated from frenum by a transverse suture, gastral petiole relatively wide and indistinct.

No specimens were seen. The presence of *Dicopus* in Fiji is based on a single male of *D. psyche* Girault collected on a window pane in Suva (Girault 1912). Hosts are unknown.

***Dorya* Noyes & Valentine**
Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 1-segmented, the clava gradually tapering to a point and about as long as entire funicle, scape basally abruptly and distinctly wider than apex of radicle.
Eight specimens representing one species from Viti Levu, Vanua Levu, Kadavu and Taveuni were seen. Hosts are unknown.

***Erythmelus* Enock**
Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 1-segmented, head in lateral view thin, with eye extending to back of head so gena absent; mandibles reduced to minute stubs, not capable of meeting medially, hypopygium distinct, extending to apex of gaster.

One male specimen of *Erythmelus* was seen. Hosts are eggs of Miridae and Tingidae.

***Eubroncus* Yoshimoto, Kozlov & Trjapitzin**
Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 1-segmented, head in lateral view distinctly triangular and mandibles projecting ventrally, about as long as head height.

Sixteen specimens of one species were seen from Vanua Levu, Viti Levu, and Taveuni. Hosts are unknown.

***Gonatocerus* Nees**
Diagnosis. Tarsi 5-segmented, female funicle 8-segmented and clava 1-segmented, petiole narrow, short but distinct, gastral tergum 1 about same length as each of the following terga and gastral sclerites weakly sclerotized.

Thirty-six specimens of the *litoralis* and *sulphuripes* species groups were collected from Viti Levu, Taveuni, and Kadavu. About five species of the *litoralis* group and one of the *sulphuripes* group were recognized (Huber *et al.* 2009 illustrated these two species groups). Hosts are mainly eggs of Cicadellidae.

***Omyomymar* Schauff**
Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 2-segmented, ovipositor distinctly exserted beyond gastral apex by at least half the gaster length and often considerably more.

Ten specimens representing five species were seen from Kadavu, Viti Levu, and Taveuni. Hosts are unknown.

***Palaeoneura* Waterhouse**
Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 1-segmented, face without pits between toruli, propleura abutting anteriorly (thus enclosing the sternum anteriorly), gastral petiole much longer than wide, tube-like, and apparently attached to gastral tergum.

About 145 specimens representing about 20 species were seen from Vanua Levu, Viti Levu, Kadavu, and Taveuni. So far, this is the most speciose and commmonly collected genus in Fiji. Perkins (1912) described one species — *Palaeoneura eucharis*

(Perkins), **comb**. **nov**. from *Polynema* — a series of which were collected during this survey. An even more beautiful *Palaeoneura*, and one of the loveliest of Mymaridae, is described below. Hosts are unknown.

***Pseudanaphes* Noyes & Valentine**
Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 3-segmented, with the sutures between the segments perpendicular to long axis of the clava, fore wing scarcely lobed behind venation, with venation about 0.4 times wing length, and with membrane behind venation light to dark brown.

Twenty specimens representing two species from Kadavu, Vanua Levu, Viti Levu, and Taveuni were seen. Hosts are unknown.

***Schizophragma* Ogloblin**
Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 2-segmented, mesophragma deeply incised apically (only visible in cleared and slide mounted specimens), ovipositor barely exserted.

One specimen from Vanua Levu was seen. It may be *S. bicolor* (Dozier), reported from Hawaii (Beardsley & Huber 2000, Alyokhin *et al.* 2001, Yang *et al.* 2002). Hosts are Membracidae.

***Stephanodes* Enock**
Diagnosis. Tarsi 4-segmented, female funicle 6-segmented and clava 1-segmented, scape with inner surface rasp-like, vertex with large shallow pits outside each ocellus, gastral petiole much longer than wide, tube-like, and attached to gastral sternum.Two specimens from Viti Levu were seen. The species is *S. reduvioli* (Perkins), incorrectly given as *S. similis* Förster in Huber & Fidalgo (1997), though I have some doubts as to whether they are distinct species. Hosts are Nabidae and Cicadellidae.

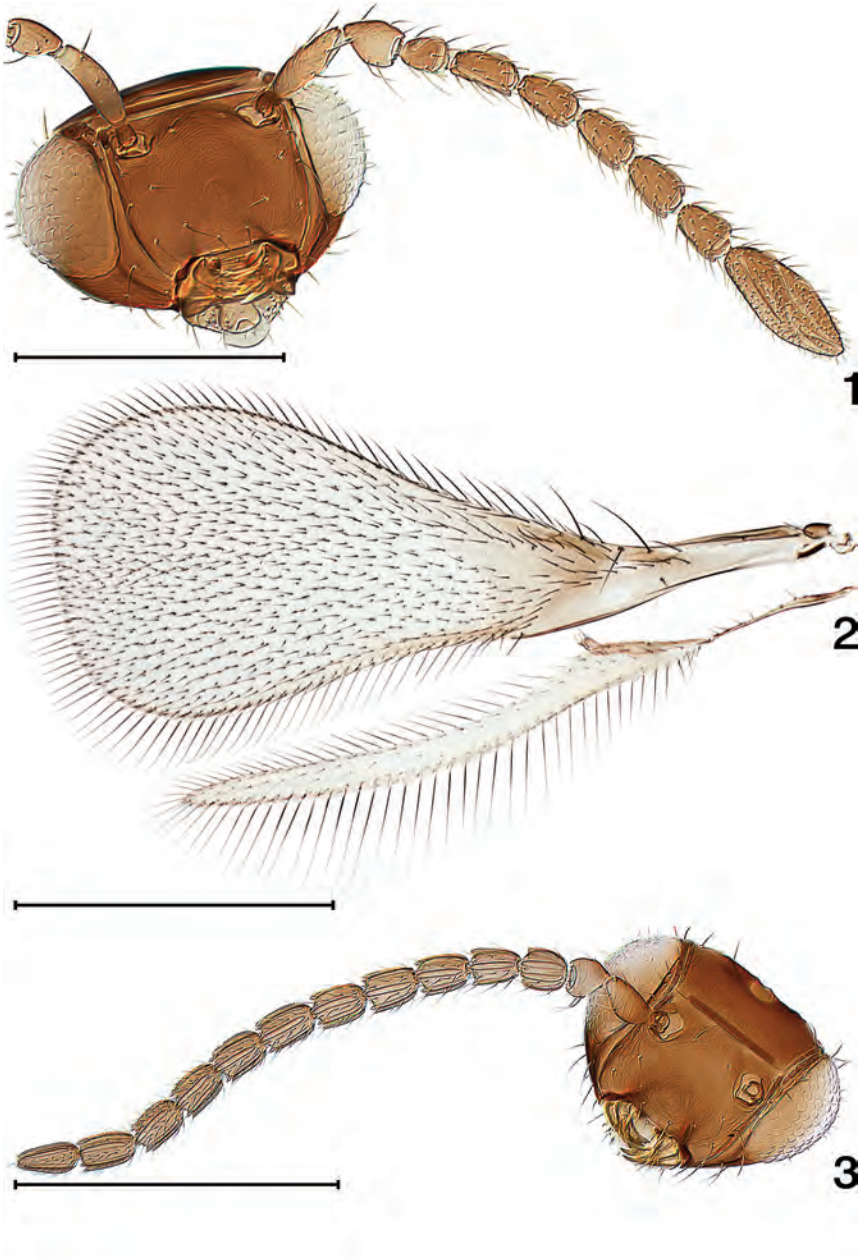
***Stephanocampta* Mathot**
Diagnosis. Tarsi 5-segmented, female funicle 7-segmented and clava 1-segmented, fore wing relatively wide and evenly setose, propodeum with translucent, mesh-like lamellae (Figs. 122, 114, and 61, respectively, in Huber & Lin 1999). *Stephanocampta* would key to *Camptoptera* in Lin *et al.* (2007) but differs by the fore wing and propodeal features given here.

Stephanocampta occurs from Central Africa to south-east Asia so the Fijian record is a considerable eastward extension in range. Three specimens from Viti Levu representing one species were seen. Hosts are unknown.

SPECIES DESCRIPTIONS

Anaphes fijiensis Huber, **sp**. **nov**.
(Figs. 1–3, 10)

Holotype ♀ on slide (Fig. 9) labelled: 1."Fiji: Vanua Levu Island. Bua Prov. Kilaka. FJ-58D. 28.VI.–2.VII.04, 178º59'017"E, 16º48'412"S, M.E. Irwin, E. Schlinger, M. Tokota'a, 154m Malaise. FBA 047862". 2."Anaphes fijiensis Huber ♀ dorsal holotype". Paratypes: 2♀ and 2♂. FIJI. **Vanua Levu**: Bua, Kilaka, 146m, 3.vi–2.vii.2004, 16º48'927"S 178º59'110"E,



Figures 1–3. *Anaphes fijiensis*. 1, holotype head and antenna; 2, holotype wings; 3, paratype male, head and antenna. Scale lines = 0.25 mm.

M.E. Irwin, E. Schlinger, M. Tokota'a, MT, FBA 040445 (1♂ on slide), same data but 3–10.vi.2004, FBA 040443 (1♀), 6 km NW. Kilaka, 15–26.vi.2004, Batiqere Range, 146m, M.E. Irwin, E. Schlinger, M. Tokota'a, MT, FBA 072053 (1♂). **Viti Levu**: Vuda, Koroyanitu Park, 1 mi. E. Abaca village, Savuione trail, 17.667ºS 177.55ºE, 800m, 22.iv–6.v.2003, E. Schlinger, M. Tokota'a, MT, FBA 180142 (1♀).

Diagnosis. *Anaphes fijiensis* belongs to the *amplipennis* group (female with clava 1-segmented) of subgenus *Yungaburra* (male with 11 flagellomeres, the first one bearing longitudinal sensilla and as long as the second). *Anaphes fijiensis* keys to couplet 2 (*A. amplipennis)* in Huber (1992) but differs from *A. amplipennis* in having a wider (length/width about 2.3) and apically more truncate fore wing as well as fl_1 with one longitudinal sensilla (fore wing narrower and less truncate, and fl_1 without longitudinal sensilla in *A. amplipennis*). The small body size, distinctly truncate fore wing apex (Fig. 2), short funicle segments each with one J-shaped and one straight longitudinal sensillum (Fig. 1), and occipital suture slightly angled towards foramen magnum identify the species. The other described species of the *amplipennis* group occurs in South America but several undescribed ones occur in the Australian region. A very similar species occurs in New Caledonia (1♀, CNC) but its antenna has slightly longer funicle segments.

Description. **Female**. Body length 366–386 µm (n=2, critical point dried paratypes). Body dark brown; antennae, especially scape and pedicel laterally, lighter brown, and legs except for brown coxae, femora, and metatibia yellowish. Fore wing (Fig. 2) with distinct brown suffusion in basal third and hind wing with slight brown suffusion behind venation.

Head. Head width 225 µm, with scattered erect setae on face between and below toruli (Fig. 1), on malar space, on gena, and along posterior margin of vertex; occipital suture slightly angled inwards towards foramen magnum; eye moderately setose.

Antenna. Scape with coarse, faint transverse striations on inner surface. Each funicular segment distinctly less than 2.0 times as long as wide, with 2 longitudinal sensilla, one straight and one J-shaped (Fig. 1). Clava 1–segmented, with 6 longitudinal sensilla. Measurements (length/width in µm) of antennal segments (holotype): scape 77/21, pedicel 39/29, fl_1 33/23, fl_2 44/25, fl_3 43/25, fl_4 44/28, fl_5 44/27, fl_6 40/26, clava 96/38.

Mesosoma. Width 183 µm, length 255 µm, normal for the genus.

Wings. Fore wing wide and distinctly truncate apically (Fig. 2), densely setose to base of marginal vein except for a short marginal space and longer, oval medial space. Fore wing length/width 583/250 µm, ratio 2.33, longest marginal setae 47 µm, about 0.19 times wing width. Hind wing length/width 565/29 µm, longest marginal setae 89 µm.

Metasoma. Ovipositor length 349 µm, 1.9 times as long as metatibia, extending forward under mesosoma to base of mesocoxa.

Male. Similar to female. Body length 465 µm (n=1, critical point dried paratype). Antenna relatively short (Fig. 3). Measurements (length/width in µm) of antennal segments: scape 57/23, pedicel 33/30, fl_1 37/32, fl_2 39/27, fl_3 39/29, fl_4 38/30, fl_5 41/29, fl_6 44/27, fl_7 41/28, fl_8 45/27, fl_9 45/27, fl_{10} 44/26, fl_{11} 48/24. Most flagellomeres less than 1.5 times as long as wide, apical flagellomere 2.0 times as long as wide, and with 6–8 longitudinal sensilla (number difficult to determine).

Palaeoneura gloriosa Huber, **sp**. **nov**.
(Figs. 4, 6, 8, 11)

Holotype ♀ on slide (Fig. 11) labelled: 1."Fiji: Viti Levu, Vuda Prov., Koroyanitu Pk., 1 km E Abaca Vlg. 800m, 22.IV-6.V.2003, Malaise 1, coll. Schlinger, Tokota'a. 17.667'S 177.55 E. FBA 100337". 2."Palaeoneura gloriosa Huber holotype ♀ dorsal". Paratypes. Two ♀. FIJI: **Viti Levu**: Vuda, Koroyanitu Nat. Park, 1 km E. Abaca, 17.667ºS 177.55ºE, 800m, 22.iv–6.v.2003, E. Schlinger, M. Tokota'a, MT, FBA100398 (1♀), Koroyanitu Nat. Park, Savuione trail, 17º40'S 177º33'E, 450m, 21.x–18.xi.2003, M. Irwin, E. Schlinger, M. Tokota'a, MT, FBA049318 (1♀).

Additional material. FIJI: **Viti Levu**: Naitasiri, 4 km WSW. Colo-i-Suva, Mt. Nakobalevu, 18.057ºS 178.42ºE, 12.iv.2004, 300m, E. Schlinger, Timoci, MT, FBA 223698 (1♀), Navai, Eteni, 17º37'S 177º59'E, 700m, 24.x–8.xi.2003, M.E. Irwin, E. Schlinger, M. Tokota'a, MT, FBA 036938 (1♀), 1.8 km E. Navai, old trail to Mt. Tomaniivi, 17.621ºS 177.998ºE, 700m, 9–20.xii.2003, E. Schlinger, M. Tokota'a, FBA 173074 (1♀).

Diagnosis. The intricately and beautifully patterned fore wing (Figs. 4, 6) serves to identify the species. *Palaeoneura gloriosa* is most similar to *P. eucharis* (Perkins) (Fig. 5), but differs from the latter by the fore wing having at least five (seven in paratypes) clear areas separated by brown markings instead of four such areas.

Description. **Female**. Body length 1613–1638 μm (n=2). Body yellow except for brown trabeculae, mandibular teeth, posteroventral apex of mesopleuron and, narrowly, of metapleuron, and exserted part of ovipositor sheath; antenna yellow except fl_2–fl_4 increasingly darker to same brown colour as fl_5 and fl_6, base of fl_2–fl_5 narrowly dark brown, clava creamy yellow except for slightly brown dorsal surface of apex; legs yellow except for brown tarsi. Fore wing (Fig. 2) with intricate pattern of brown bands separating at least 5 distinct clear areas; hind wing with distinct brown suffusion behind and just beyond hamuli, and in apical two-thirds beyond venation, except for extreme apex.
Head. Head width 260 μm. Face below toruli with 2 rows of inwardly directed and pointed setae on each side, those of the submedian row longer and thicker than those of the sublateral row; vertex and occiput with numerous truncate setae.
Antenna (Fig. 8). Scape with about 20 short thick setae on inner surface. Funicular segments without longitudinal sensilla. Clava 1-segmented, with 8 longitudinal sensilla. Measurements (length/width in μm) of antennal segments (holotype): scape 101/53, pedicel 67/34, fl_1 102/18, fl_2 226/17, fl_3 260/19, fl_4 186/21, fl_5 180/27, fl_6 152/36, clava 283/89.
Mesosoma. Width at mesoscutum 222 μm, length 603. Pronotum with 8 thick, apically truncate setae on each side; mesoscutum without setae on midlobe, with 1 seta on lateral margin of each lateral lobe; notauli wide, ending as pits at junction with pronotum; prosternum with 1 thin setae anteriorly on each side of midline; scutellum with placoid sensilla in anterior fifth of sclerite, separated by 3 times their own diameter from each other; axilla with 1 long posteromedially directed seta on dorsal surface and 1 short seta on lateral surface; frenum narrow, and frenal line not evident; dorsellum narrow; propodeum with 1 long submedian setae anteriorly, and 1 shorter, sublateral setae posteriorly on each side, both pairs directed laterally.
Wings. Fore wing (Fig. 6) with intricate pattern of brown marks enclosing 7 white areas and short, narrow but distinct dark streak extending apically from stigmal vein, wing distinctly truncate apically, length/width 1885/627 μm, ratio 3.0, longest marginal setae 119 μm, just under 0.2 times wing width. Hind wing unusually narrow, its length/width 1433/26 μm, longest marginal setae 230 μm, about 8.8 times maximum width of wing.

Figure 4. *Palaeoneura gloriosa,* paratype, habitus, lateral. Scale line = 1.0 mm.

Metasoma. Petiole length 335 μm, distinctly longer than long metacoxa and almost half length of gaster; ovipositor length 650 μm, extending beyond apex of gaster by almost 0.1 times its length, only slightly longer than metatibia.

Variation. The holotype and two paratypes have almost identical wing patterns, with seven or eight white areas of varying size separated by brown areas. Two additional specimens, with exactly the same body lengths as the paratypes, have only 5 white spaces, the median three white areas coalescing into one white band extending across the wing, and the clava is uniformly pale yellow, without brown apex. These differences are treated here as infraspecific variation but more specimens may show that there are no intermediates and two very similar species may be involved. Therefore, these two specimens are not treated as paratypes.

Palaeoneura eucharis (Perkins), **comb**. **nov**.
(Figs. 5, 7, 9)

Polynema eucharis Perkins 1912: 25. Type locality: Viti Levu, Suva.

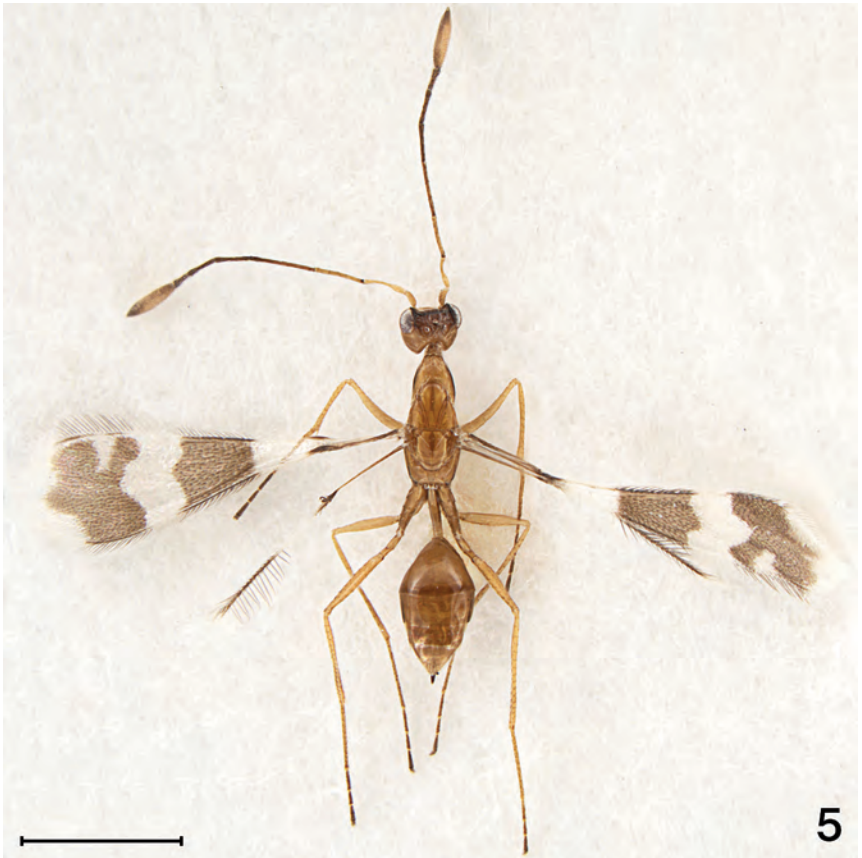


Figure 5. *Palaeoneura eucharis*, habitus, dorsal. Scale line = 1.0 mm.

The holotype female of *Polynema eucharis* (BPBM) was not examined but the original description is sufficient to identify the species. The specimens listed below are the first collected since the original description.

FIJI. **Viti Levu**: Naitasiri, Navai, Eteni, 17º37'S 177º59'E, 700m, 24.x–8.xi.2003, M.E. Irwin, E. Schlinger, M. Tokota'a, MT, FBA 036936, 036937, and 021046 (1♀, 2♂), 1.8 km E. Navai, old trail to Mt. Tomaniivi, 17.621ºS 177.998ºE, 700m, 9–20.xii.2003, E. Schlinger, M. Tokota'a, FBA 173075 (1♀), 2 km E. Navai village, old trail to Mt. Tomaniivi, 17.621ºS 178.000ºE, 700m, 24.xi–9.xii.2003, E. Schlinger, M. Tokota'a, FBA 204544 (1♂), 4 km WSW. Colo-i-Suva, Mt. Nakobalevu, 18.057ºS 178.42ºE, 12.iv.2004, 300m, E. Schlinger, M. Tokota'a, MT, FBA188658 (1♂); Vuda, 1 km E. Abaca, Koroyanitu Nat. Park, Kokabula trail, 17º40'S 177º33'E, 800m, 12–19.xi.2002, E. Schlinger, M. Tokota'a, MT, FBA086834 and 086835 (2♂), Koroyanitu Nat. Park, 800m 17.667ºS 177.55ºE, 800m, 10–17.xii.2003, FBA 185979 (1♂).

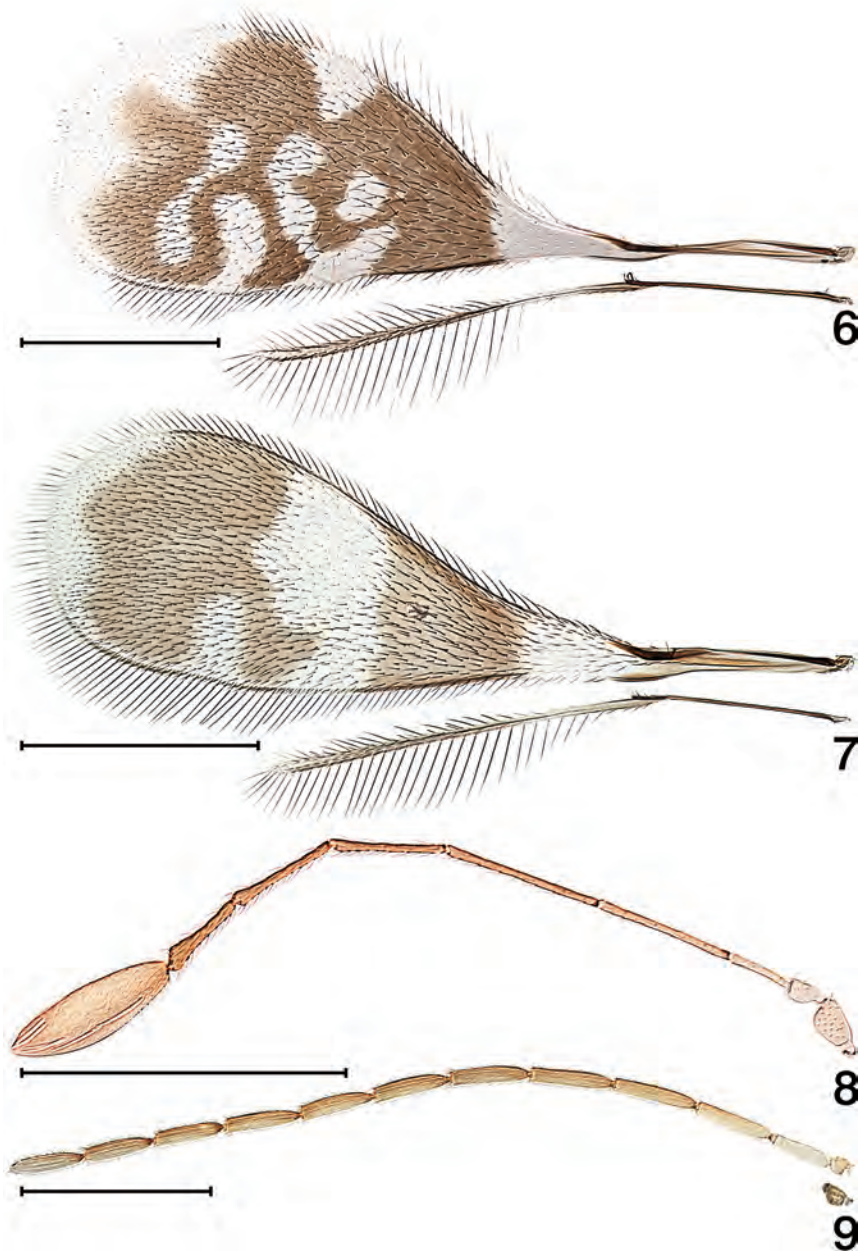
Two females (body length 1536 μm) and 5 males (body length 1254–1404 μm) were examined. A female habitus (Fig. 5), and the fore wing (Fig. 7) and antenna (Fig. 9) of the previously unknown male are illustrated here. Measurements (length/width in μm) of antennal segments (n=1): scape 42/-, pedicel 29/19, fl_1 80/15, fl_2 105/15, fl_3 113/14, fl_4 108/15, fl_5 103/15, fl_6 103/17, fl_7 100/15, fl_8 97/16, fl_9 92/15, fl_{10} 89/15, fl_{11} 96/18. Fl_6 length/width 6.1. Fl_1 with about 5 longitudinal sensilla, fl_2–fl_{11} each with about 8 longitudinal sensilla.

DISCUSSION

The collection method (Malaise traps) that yielded most of the material examined was clearly biased in that more robust mymarid species with a relatively longer body length tended to be collected (or, at least, extracted) from the resulting samples; *Australomymar* and *Palaeoneura* constituted just over half the specimens collected. Even so, a few specimens of genera that include some of the smallest fairyflies (e.g., *Alaptus*, *Anagrus, Camptoptera*, *Dicopomorpha*) were collected, indicating that Malaise trapping still was moderately effective at sampling the generic diversity. Intensive use of other collecting methods, such as yellow pan trapping or screen sweeping in a diversity of localities and habitats, including urbanized or agricultural ones, would certainly result in many more representatives of these genera being collected and would likely increase the number of species. Collecting in urban gardens might well yield more Pacific-wide or worldwide species of genera not yet recorded from Fiji.

The 21 genera of Mymaridae collected so far in Fiji represent about half the number reported by Lin *et al.* (2007) for Australia or Noyes & Valentine (1989) for New Zealand but more than the 17 genera reported for the Hawaiian Islands (Beardsley & Huber 2000, Huber & Beardsley 2000), a slightly smaller (by about 2000 km^2) land area than Fiji and the only other area of the Pacific for which the fairyfly fauna has been moderately well surveyed. A few more genera are to be expected in Fiji, based on their widespread (often worldwide) distribution, including presence in other Pacific islands, e.g. *Acmopolynema* Ogloblin, *Kikiki* Huber & Beardsley, *Mymar* Curtis, and *Stethynium* Enock in the Hawaiian Islands (Beardsley & Huber 2000, Huber & Beardsley 2000), and *Anagroidea* Girault in New Caledonia (Triapitsyn & Berezovskiy 2002a). *Kalopolynema* Ogloblin, in the Hawaiian Islands, is perhaps less likely to occur in Fiji as it is a Western Hemisphere genus (Triapitsyn & Berezovskiy 2002b).

Despite having fewer genera and species compared to the much larger land masses of Australia or New Zealand, the Fijian fauna is evidently richer in absolute terms and almost certainly in endemic species than the younger, oceanic islands of Micronesia and Polynesia. Until slides of representatives of each species enumerated for Fiji are prepared, the number of species estimated for each genus is approximate but many of the 65 species enumerated above appear to be undescribed. The proportion of species unique (endemic) to Fiji can only be determined once Mymaridae from other Pacific islands, particularly the continental ones such as New Caledonia and Vanuatu, are well collected and studied, but it is evident that some of the species are shared with other Pacific islands. At present, the Hawaiian fairyfly fauna is the best known among the Pacific islands, excluding New Zealand. Compared to Fiji, now the second best studied Pacific island group, some



Figures 6–9. **6**, *Palaeoneura gloriosa*, wings, holotype; **7**, *P. eucharis*, wings; **8**, *P. gloriosa*, antenna, holotype; **9**, *P. eucharis*, male antenna. Scale lines = 0.5 mm.

notable similarities and differences occur. With about 55–60 species (about 45 named, Noyes 2002) the Hawaiian fairyfly fauna is somewhat smaller than that of Fiji and their origins are different. Although both island groups have a distinct, apparently endemic fauna—principally *Palaeoneura* in Fiji and *Polynema* (Perkins 1910) in the Hawaiian Islands—the Fijian fauna is clearly Australasian in origin whereas the Hawaiian fauna apparently originated mostly from the Western Hemisphere, probably due to multiple inadvertent introductions as a result of trade and tourism. Both Fiji and the Hawaiian Islands share species spread accidentally or deliberately for biological control of invasive alien pests. *Anagrus* species in particular occur in both island groups as well as other Pacific islands, as listed below.

Other than Fiji and the Hawaiian Islands, seven Pacific islands or island groups west of 120º longitude have recorded Mymaridae. Pacific islands east of 120º longitude, e.g., Easter Island and Juan Fernández Islands, which are politically part of various Latin American countries or France and whose fauna is clearly South American in origin, also have Mymaridae reported from them but they are not listed here. Regardless of the island group, the numbers of species are small, reflecting the lack of published studies. From the small numbers of species per island or island group listed below it is evident that most Pacific islands are very poorly sampled. Comparisons among them cannot reliably be made until all of them are surveyed much more intensively.

American Samoa (1): *Anagrus frequens* Girault (Triapitsyn & Berezovskiy 2004).

French Polynesia (9): *Anagrus baeri* Girault, *A. frequens*, *A. nilaparvatae* Pang & Wang, *A.* sp., *Gonatocerus ashmeadi* Girault, *G. dolichocerus* Ashmead, *Stephanodes reduvioli*, *Palaeoneura* sp. (Huber & Fidalgo 1997, Triapitsyn 2001, 2006, Triapitsyn & Berezovskiy 2004, Grandgirard *et al.* 2007).

Guam (6): *Alaptus caecilii* Girault, *Anagrus flaveolus* Waterhouse (almost certainly a misidentification), *A. frequens*, *A. nilaparvatae*, *A. optabilis*, *Mymar taprobanicum* Ward (as *tyndalli* Girault) (Swezey 1946, Annecke 1961, Triapitsyn & Berezovskiy 2004).

Micronesia (5): *Anagrus frequens*, *Arescon clarkei* Doutt, *Australomymar gressitti* (Doutt), *Gonatocerus saipanensis* Doutt, *Stephanodes reduvioli* (Doutt 1955).

New Caledonia (1): *Anagroidea dubia* (Girault) (Triapitsyn & Berezovskiy 2002a).

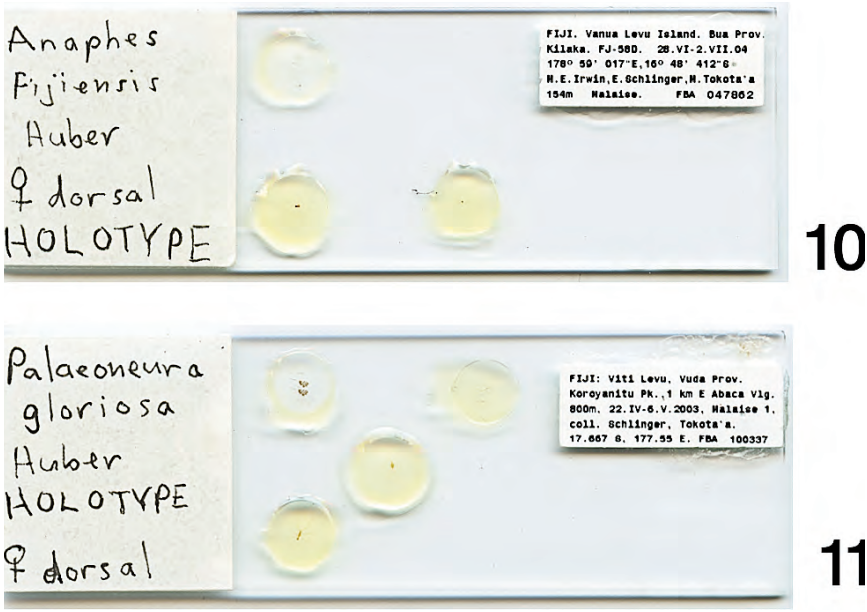
Norfolk Island (1): *Anagrus frequens* (Triapitsyn 2001).

Western Samoa (1): *Anagrus optabilis* (Triapitzyn 1996).

For comparison, Papua New Guinea has only 9 recorded species: *Acmopolynema neznakomka* S. Triapitsyn & Berezovskiy, *Anagrus frequens*, *A. japonicus* Sahad, *A. optabilis*, *A. perforator*, *A. quasibrevis* S. Triapitsyn, *Anneckia oophaga* Subba Rao, *Palaeoneura dei* (Girault), and *P. unimaculata* (Hayat & Anis) (Huber 2002, Subba Rao 1970, Triapitsyn 2001, Triapitsyn & Berezovskiy 2007).

CONCLUSIONS

It is important to continue surveys in Fiji, not only to understand the biodiversity of the country better but especially to detect potential pests and their parasitoids that may be introduced in future, perhaps from other Pacific islands. Particular emphasis should be placed on collecting eggs of and rearing Auchenorrhyncha (Hemiptera) as this group seems to contain some of the most easily spread plant pests in the Pacific region. Once the fairyfly fauna is better surveyed, generic revisions based on slide-mounted specimens as well as critical point dried (or chemically dried), card mounted specimens will provide a more accurate estimate of species numbers.



Figures 10–11. **10**, *Anaphes fijiensis*, holotype slide; **11**, *Palaeoneura gloriosa*, holotype slide.

ACKNOWLEDGEMENTS

I am grateful to E. Schlinger for coordinating the collecting and sorting of Fijian Microhymenoptera and sending the Chalcidoidea to the CNC for further sorting, preparation and study; also for forwarding to other institutions the families of interest to other researchers. N. Evenhuis (BPBM, Honolulu) invited me to participate in the Fiji biodiversity project (which I had to decline, unfortunately); also for providing a forum for publications on Fiji's insects. J. Read (CNC, Ottawa) is thanked for preparing the digital images, compiling the plates for the species descriptions, and proofreading. S. Triapitsyn (University of California, Riverside) kindly checked the fore wing image of *P. eucharis* against the holotype on loan to him to confirm my identification. Finally, J. Noyes (The Natural History Museum, London) is gratefully acknowledged for his magnificent contribution of inestimable value to anyone interested in obtaining information on Chalcidoidea. His "Universal Chalcidoidea Database", referenced below, saved the author weeks of work searching for the relevant literature on Mymaridae for the Pacific region. This database, programmed by D. Yu (presently at University of Kentucky, Lexington) and populated by J. Noyes, with information from over 39,000 chalcidoid references has undoubtedly saved many researchers thousands of hours of tedious work searching for information on chalcids wasps, thus greatly facilitating their own research.

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First record of the family Dictyopharidae (Hemiptera, Fulgoromorpha) from Fiji, with the description of a new species of the genus *Anasta* Emeljanov

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Abstract. A new species, *Anasta vitiensis* Emeljanov & Wilson (Dictyopharidae), is described from Fiji (Viti Levu). This is the first record of the family Dictyopharidae in Fiji.

INTRODUCTION

The Auchenorrhyncha fauna of Fiji contains representatives from the majority of families but with some surprising gaps. For example there are no Membracidae (treehoppers). A checklist of the Fiji Auchenorrhyncha has been compiled (Wilson, 2009). At the time of preparation of this list there were no decsribed members of the planthopper (Fulgoromorpha) families Dictyopharidae and Fulgoridae known from the Fiji islands. Fieldwork (by MRW) on Viti Levu in April 2007 produced adults of an unknown dictyopharid species, the first record of the family in Fiji. This species is described in this paper. Since then, samples examined from the NSF-funded terrestrial survey in Fiji have shown that the family Fulgoridae is also present with a single specimen from a Malaise trap (Constant & Wilson, in prep.).

The type specimens of the species described below are deposited in the Bishop Museum, Honolulu, USA (BPBM), National Museum of Wales (Cardiff, UK) (NMWC) and Zoological Institute of the Russian Academy of Sciences (St. Petersburg, Russia) (ZIN).

TAXONOMY

Anasta Emeljanov

Anasta Emeljanov, 2008: 305. Type species *Dictyophara prognatha* Distant, 1906: 352 [Queensland]

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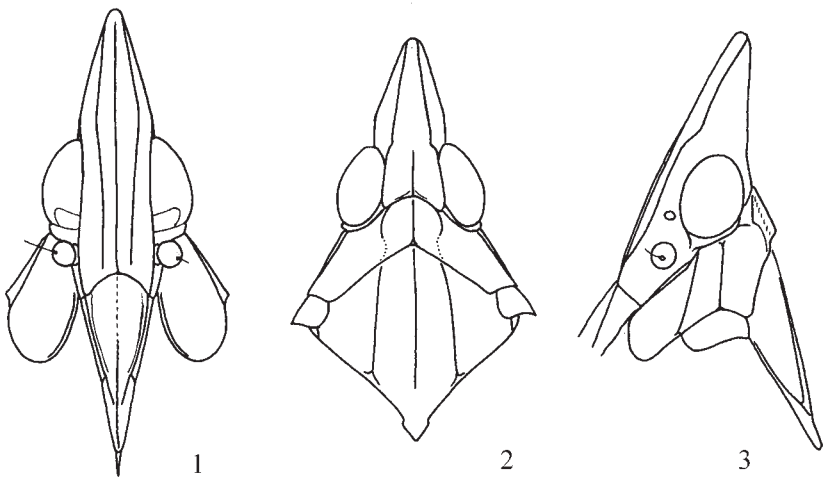
1. Contribution No. 2009-010 to the NSF-Fiji Arthropod Survey.



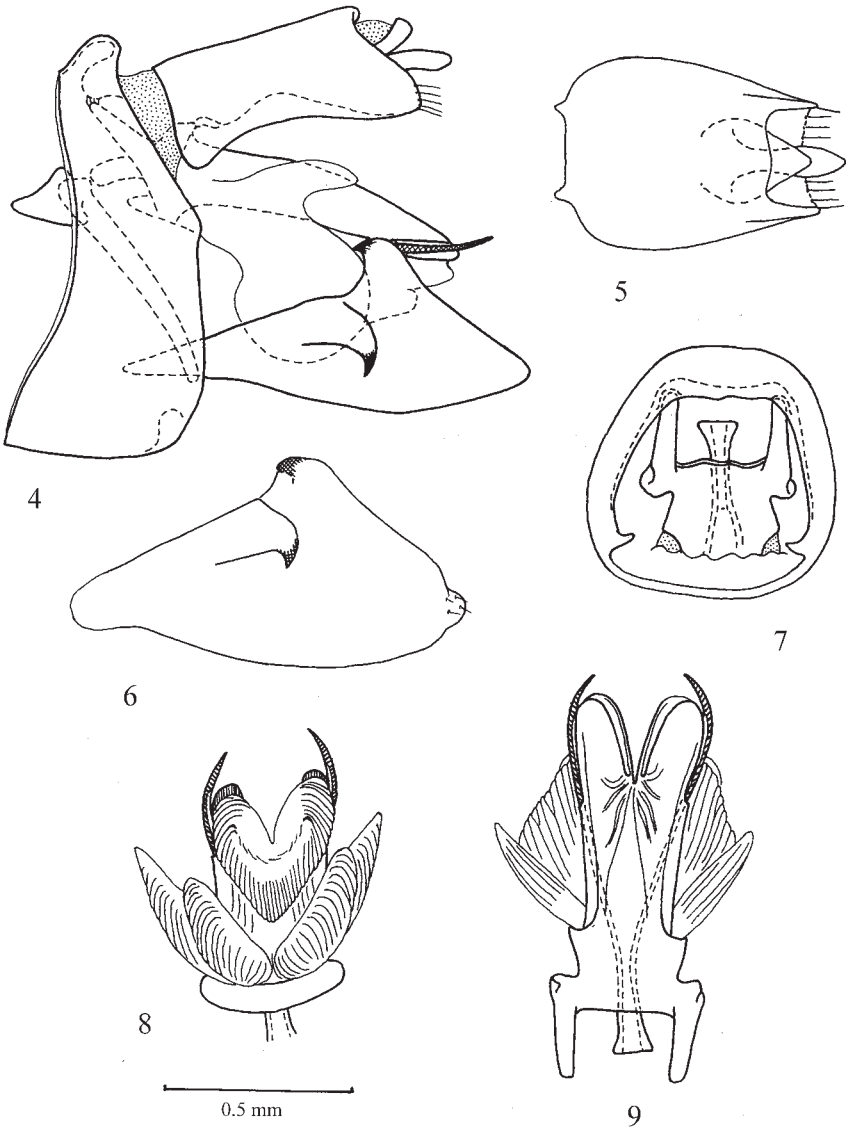
Figures 1–3. *Anasta vitiensis* sp.n. Fore body. **1** – face view (anteroventral), **2** – dorsal view, **3** – lateral view (left).

Anasta vitiensis Emeljanov & Wilson, **sp**. **n**.
(Figs. 1–12)

Type material. Holotype ♂, Fiji Islands, Viti Levu, Sigatoka, IV.2007, M.R. Wilson leg. (BPBM). Paratypes: 1♂, 1♀, same data (NMWC); 1♂, 1♀, same data (ZIN).

Description. Cephalic process acutely angulate, pyramidal (Figs. 1–3, 11). Anterior part of coryphe from contraction to apex only twice as long as interocular part of coryphe. Lateral carinae of coryphe weakly converge forward between eyes and up to contraction and run cuneiform to narrow apex after contraction. Coryphe with median carina only in posterior part and weakly concave in lateral view. Metope nearly straight in lateral view except weakly convex apically. Apex of cephalic process narrow rounded in lateral view. Metope from clypeus to anterior margins of eyes parallel-sided and cuneiform apically (Fig. 12). All metopial carinae sharp, intermediate carinae closer to median carina than to lateral ones. Median carina weak apically and invisible at apex. Clypeal margin of metope weakly concave. Metope more than 4 times as long as wide. Pronotum with strong median carina, lateral carinae much more weak; hind margin weakly concave (Fig. 2). Scutellum (Fig. 2) with 3 sharp carinae (lateral carinae weakly turned to median one apically). Pterostigma narrow, with 1–2 transverse veins. Legs of medium length, comparatively thin.

Coloration. Green, anterior part of body yellowish between carinae. (Fig. 10) Head with concolorous carinae and interspaces. Pronotum and scutellum with whitish carinae. Ocelli and antennae green blueish. Fore and hind wings transparent, colourless, majority of veins yellowish excluding green blueish claval veins and some veins of membrane. Legs green blueish except green yellowish hind femora. Apices of hind femora with dark spot anterodorsally. Tibiae with black spot basally and unclear dark spot on posterolateral side.



Figures 4–9. *Anasta vitiensis* sp.n. Male genitalia. **4** – genital block, lateral view (left side), **5** – anal tube, dorsal view, **6** – stylus (left), **7** – pygofer and base of phallotheca, articulation, **8–9** – aedeagus; membraneous parts semi-inflated: **8** – ventrocaudal view, **9** – dorsal view.

Figure 10. *Anasta vitiensis* sp.n., dorsal view.

Figure 11. *Anasta vitiensis* sp.n., lateral view.

Figure 12. *Anasta vitiensis* sp.n. , view of face

Male genitalia (Figs 4–9). Pygofer slightly compressed, dorsal wall short, ventral wall longer, hind margin of lateral walls weakly obtuse-angularly produced. Anal tube comparatively small, moderately elongate (Fig. 5), with obtuse projections anterobasally directed ventrad. Styli (Fig. 6) rather large, comparatively short and high, with posterodorsal margin slightly oblique, nearly straight; apical end in form of small rounded lobe; lateral tooth lies under upper tooth, apex directed ventrally,

both teeth equidistant from apex and base of free part of stylus. Posterodorsal margin of pygofer with thick edge, lateral ends of the edge serve to articulation with suspensorial apophyses of phallotheca. Suspensorium of phallotheca in form of pair of apophyses articulated to pygofer border. Anal tube (its ventrobasal margin) having articulation with phallotheca between bases of suspensorial apophyses. Phallotheca oblong, with entire dorsal wall sclerotized, apex deeply incised medially, apices of paired lobes rounded. Lateral walls of theca also deeply incised, outward of lateral incisions caudally-directed with apical processes of penis exposed, their apices slightly bent mediodorsally. Ventral wall of phallotheca membranous and inflatable, with fore and hind parts divided by arcuate transverse furrow; fore (basal) part also divided into right and left halves by median furrow, bearing pair of dorsolateral horns and pair of large ventral sacs; hind part V-shaped, with posterolateral ends situated under apical sclerotized lobe of phallotheca; ventral wall forming rounded ledge on both halves. Membranous wall of theca devoid of spicules or denticles.

Diagnosis. *Anasta vitiensis* sp. n. is the third species of the genus *Anasta* Emeljanov and differs from the very similar *A. prognatha* (Walker) and *A. timorina* (Lallemand) in the shorter cephalic process, narrower after contraction coryphe (in *A. prognatha* and *A. timorina* the coryphe is nearly equally wide before and after contraction), and with a gentle ledge of lateral margin of the metope in lateral view (the lateral margin is straight in *A. prognatha* and *A. timorina*). The suspensorium of the phallotheca is made as a pair of the apophyses articulated with the pygofer, but not with the anal tube only, and the anal tube is articulated with the base of the phallotheca but not with the pygofer. These peculiarities are probably synapomorphies of the tribe Hastini, such a construction being present also in *Hasta* Kirkaldy and *Thanatodictya* Kirkaldy. The male genitalia of other species of *Anasta* have not been dissected and their internal structure remains unknown.

Body length. Males – 11.5–12.4 mm, females – 13.7–13.8 mm.

Comparison. Cephalic process (Figs. 1–3) of *Anasta vitiensis* sp. n. is shorter than the processes of *A. prognatha* Distant and *A. timorina* Lallemand. In *A. prognatha* the anterior part of coryphe from contraction to apex three times is longer than interocular part of coryphe.

DISCUSSION

Members of the planthopper family Dictyopharidae have low distributive capacity across marine barriers and are practically absent on all oceanic Pacific islands and are still not known from New Caledonia which is faunistically rich and situated between Australia and Fiji. One species, *Raivuna graminea* F., is known from some oceanic islands (Western Caroline, Southern Mariana) (Fennah, 1956), which are closer to the Asian region where the species has a wide distribution. Thus the finding of Dictyopharidae on Fiji is very interesting. A new species from Fiji belongs to the Notogean genus *Anasta* Emeljanov, 2008 which is known from Australia (Queensland) and Timor (Emeljanov, 2008). The genus *Anasta* belongs to the tribe Hastini, which has Holantarctic distribution.

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