

New *Chrysopilus* Macquart (Diptera: Rhagionidae) from Fiji, with notes on described species

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Abstract. Two new species of *Chrysopilus* Macquart, *C. fijiensis*, **n. sp.**, and *C. schlinger*, **n. sp.** (Diptera: Rhagionidae) are described from Fiji with illustrations of the male and female heads, the wings, and male genitalia. Keys are provided to identify the species from Fiji.

INTRODUCTION

Specimens of the genus *Chrysopilus* Macquart (Diptera: Rhagionidae) have been studied as part of the NSF-funded Fiji Arthropod Survey. This material represents two species of *Chrysopilus* new to science. Historically, only one species of *Chrysopilus* has been described from Fiji, *Chrysopilus coeruleothorax* Lindner, based on a single female.

Thirty-two species of *Chrysopilus* have been described from the Australasian/Oceanian Regions (Nagatomi & Evenhuis 1989). From the original descriptions of these species, none displayed a close similarity to the two new species from Fiji. Twenty-one species occur in Australia (Paramanov 1962) with only *Chrysopilus howei* Paramonov having a yellow body and patterned wings. *Chrysopilus howei* differs from the two new species from Fiji in being large (11 mm), the male eyes holoptic, and the wings with a brown spot at the bifurcation of R_{4+5} and the apex of the discal cell. Two species of *Chrysopilus* have been reported from New Caledonia (Nagatomi & Evenhuis 1989). Only *Chrysopilus androgynus* Paramonov has the male eyes dichoptic and is the same size as the new species from Fiji, but the wings are hyaline and without markings, the femora brown, and the abdomen lacks dark brown markings. No species of *Chrysopilus* have been described from Vanuatu, Tonga, the Samoan islands, or the Solomon Islands. Nine species of *Chrysopilus* have been described from Irian Jaya, Maluku, and Papua New Guinea. Most of these species are known only from only single locations and only *Chrysopilus ferruginous* (Wiedemann) is widely distributed in the Oriental and Australasian Regions. This is a large (9–11 mm), reddish yellow species, with clear wings and a dark brown perostigma.

MATERIALS AND METHODS

Material was borrowed from the Bishop Museum, Honolulu (BPBM). Holotypes of new species will be deposited in the Fiji National Insect Collection, Suva (FNIC); paratypes will be vouchered in the FNIC, BPBM, and the Illinois Natural History Survey, Champaign, Illinois, USA.

Morphological terminology follows McAlpine (1981). When more than one specimen was examined, lengths are given in parentheses as a range, followed by the mean. Ratios of the female frons are as follows: head/frons width, obtained by dividing the greatest width of the head by the narrowest width of the frons; width/length, obtained by dividing the narrowest width of the frons by the distance from the median ocellus to the dorsal edge of the antennal sockets. Setae described as elongate have a length equal to or greater than the width of the scape; those described as short have a length less than the width of the scape. All material examined is listed after the description and the depository collection is given within parentheses. Georeferences are cited as [latitudes/longitudes].

SYSTEMATICS

KEY TO SPECIES OF *CHRYSOPILUS* OF FIJI

1. Mesonotum with turquoise hue. Wing membrane hyaline. Halter brown **coeruleothorax** Lindner
- Mesonotum dark yellow, glossy. Wing membrane pale brown with brown markings. Halter yellow 2
2. Wing (Fig. 3) with diffuse brown band from pterostigma to basal angle of R_4 and along apical margin of *dc*; pterostigma dark brown, diffuse, not extending to costa. Male abdomen dark yellow, glossy and tergites 2–7 dark reddish brown anterolaterally. The male eyes separated by distance greater than width of ocellar tubercle (Fig. 1). The gonostyle (Fig. 4) broad apically. Female abdomen dark yellow, glossy with anterior half of tergites 1–3 dark reddish brown, remaining tergites and terminalia entirely brown **fijiensis** Webb, n. sp.
- Wing (Fig. 8) with dark brown band from pterostigma to basal angle of R_4 , along apical margin of *dc*, and along CuA_1 ; pterostigma dark brown, extending to costa. Male abdomen dark yellow, glossy and tergites 5–8 dark brown. The male eyes separated by distance less than width of ocellar tubercle (Fig. 6). The gonostyle (Fig. 9) pointed apically. Female abdomen dark yellow, glossy with tergites 4–9 and terminalia dark brown **schlingeri** Webb, n. sp.

Chrysopilus coeruleothorax Lindner

Lindner (1925: 21) described *Chrysopilus coeruleothorax* based on a single female deposited in the Universität von Hamburg, Zoologisches Institut und Museum, Hamburg, Germany. The holotype female was destroyed by fire in 1943 (Dr. H. Struempel, pers. comm.). Translation of original description:

This species stands out because of its wing venation with the conspicuously large R_3 , because of the clearly setose arista and in the female the turquoise-blue mesonotum.

Female: Occiput gray, frons and face brown-yellow, antenna yellow, small, with long setose arista. Palpus slightly up-curved, yellow. Proboscis brownish. Thorax brownish, mesonotum turquoise-blue. Like the scutellum with only a few dark, longer setae in between. Tarsi brownish, midtarsi with two apical spurs, hindtarsi with one apical spur and covered the whole length with small black setulae. Abdomen dirty brown, with broad,

dark-brown, front margins of the tergites; wing venation brown, wing transparent, iridescent, with dark-brown stigma in and around cavity of R_{2+3} . R_3 conspicuously big and broad. Inside beneath the stigma is a light, brownish shadow. Cu closed at the margin. Halter brown, with light stalk. 4.5 mm.

One female in Museum in Hamburg. Viti Levu.

Diagnosis. *Chrysopilus coeruleothorax* differs from *C. fijiensis* and *C. schlingeri* in having the mesonotum with a turquoise hue, the wing membrane hyaline, and the halter brown.

Chrysopilus fijiensis Webb, new species

(Figs. 1–5)

Etymology. *-ensis* (Latin) = a suffix denoting place, locality or country. This species is named after the country of Fiji from where all of the specimens have been collected. This name is treated as a noun in apposition.

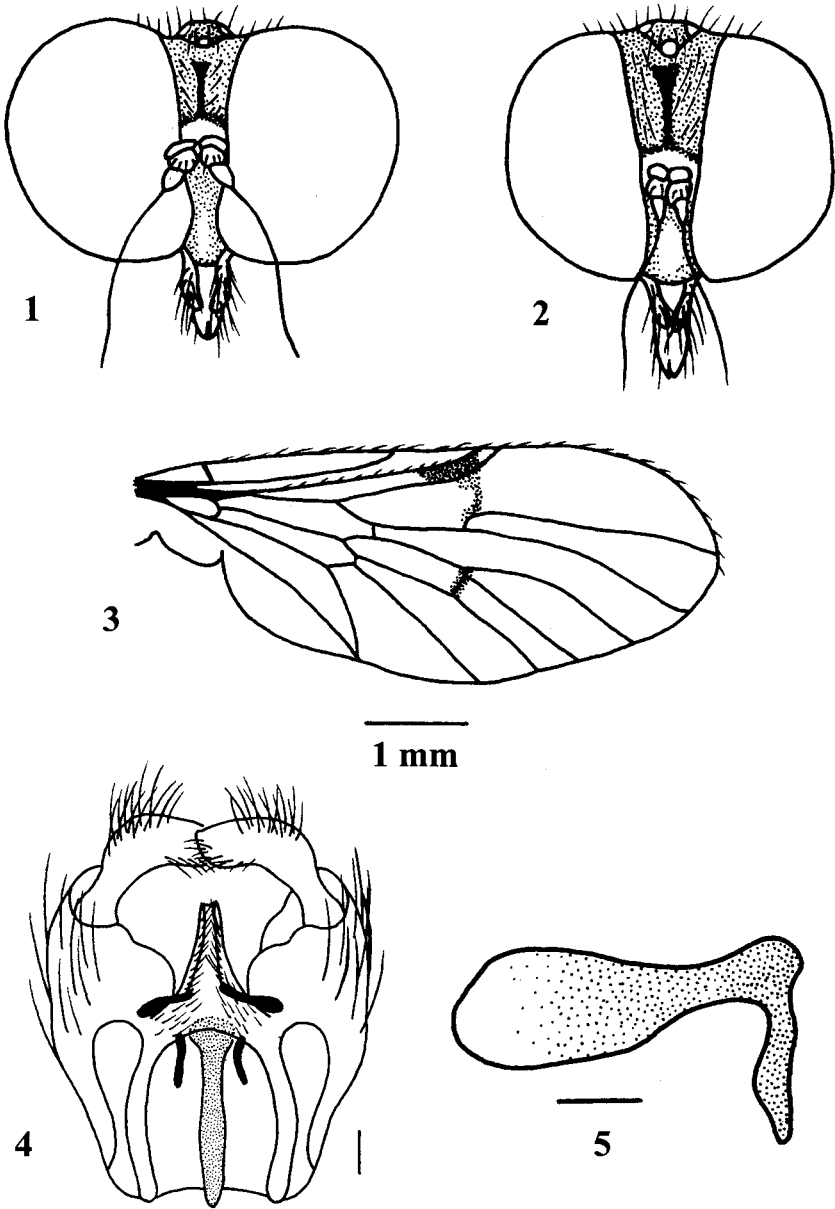
Diagnosis. *Chrysopilus fijiensis* is similar to *C. schlingeri* in having the thorax dark yellow and glossy. It differs from *C. schlingeri* in having the male eyes separated by a distance greater than the width of the ocellar tubercle; the wing (Fig. 3) pale brown, darker brown in narrow, diffuse band from pterostigma to basal angle of R_4 and along apical margin of *dc*, pterostigma dark brown, diffuse, not extending to costa; the male abdomen dark yellow, glossy and tergites 2–7 dark reddish brown anterolaterally; the gonostyle (Fig. 4) broad, rounded apically; the ejaculatory apodeme (Fig. 4) expanded posteriorly and in lateral view (Fig. 5) bent ventrally at 90° angle; and the female abdomen is dark yellow, glossy with the anterior margin of tergite 1 dark reddish brown, the anterior half of tergites 2–3 dark reddish brown and the remaining tergites and terminalia brown.

Male. Body length 3.3–4.5, 3.6 mm (n = 5).

Head. Ocellar tubercle dark brown, pruinescence yellowish brown, dense; setae black, short. Eyes dark brown; ommatidia of equal size; dichoptic (Fig. 1), separated by distance 0.9–1.6, 1.2 times width of ocellar tubercle. Frons pubescence brownish gray, dense, dark yellow dorsal of antennal base; median dorsoventral groove deep, dark brown; setae black. Antenna dark yellow, arista dark brown; scape shorter than pedicel and flagellum, wider than flagellum, setae absent; pedicel slightly wider than long, setae black, short; flagellum cone-shaped, tapered posteriorly to an elongate arista. Parafacial not visible. Clypeus dark yellow; setae absent. Maxillary palpus yellow, slightly clavate apically, about 4.0 times longer than wide; setae yellow with scattered apical dark brown setae. Genal setae yellowish brown, elongate. Occipital setae yellowish brown becoming sparse dorsally.

Thorax. Mesonotum dark yellow, glossy; vittae indistinct; setae dark brown, short with thicker dark brown, elongate setae on notopleuron, supraalar area, and postalar callus. Postpronotal lobe concolorous with mesonotum. Pleuron dark yellow, glossy; setae dark brown across dorsal margin of anepisternum, dark yellow across ventral margin of katepisternum and on anterior, middle and posterior tufts of laterotergite. Scutellum yellow; setae dark brown, short, erect with thicker dark brown setae across posterior margin. **Wing.** Length 4.2–4.7, 4.4 mm (n = 5). Membrane (Fig. 3) pale brown with diffuse brown band from pterostigma to basal angle of R_4 and along apical margin of *dc*; pterostigma dark brown, diffuse, not extending to costa. Cell r_4 with basal half narrow, dorsal half expanded, enclosing apex of wing; basal angle of R_4 right-angled; R_4 ends slightly anterior to apex of wing; *cup* closed. Halter dark yellow to yellowish brown. **Legs.** Dark yellow.

Abdomen. Dark yellow, glossy, tergite 1 with anterior margin brown, tergites 2–7 with broad



Figures 1–5. *Chrysopilus fijiensis*. 1. Male head. 2. Female head. 3. Wing. 4. Male gonocoxite. 5. Male ejaculatory apodeme, lateral view. Scale 0.1 mm unless otherwise indicated.

anterolateral area dark reddish brown; dorsal setae dark reddish brown, short, appressed. *Terminalia*. Dark yellow. Gonostyle (Fig. 4) with apical margin broad, rounded. Ejaculatory apodeme (Fig. 4) expanded posteriorly, tapered to point anteriorly; lateral view (Fig. 5), anterior half expanded dorsoventrally, apical half narrow, bent ventrally at 90° angle.

Female. Similar to male except as follows.

Body length 3.2–4.8, 4.0 mm (n = 10).

Head. Vertex (Fig. 2) not emarginate lateral to ocellar tubercle. Head/frons width 4.3–5.6, 5.0 (n = 10); frons width/length 0.48–0.65, 0.56 (n = 10).

Thorax. *Wing.* Length 4.5–5.3, 4.8 mm (n = 10).

Abdomen. Tergite 1 dark yellow, glossy with anterior margin dark reddish brown; tergites 2–3 dark yellow with anterior half dark reddish brown; tergite 4 dark reddish brown; tergites 5–9 and terminalia pale brown.

Immature stages. Unknown.

Distribution. *Chrysopilus fijiensis* is recorded from the Fiji islands of Taveuni and Viti Levu.

Temporal Phenology. *Chrysopilus fijiensis* has been collected in Malaise traps in November, December, and January.

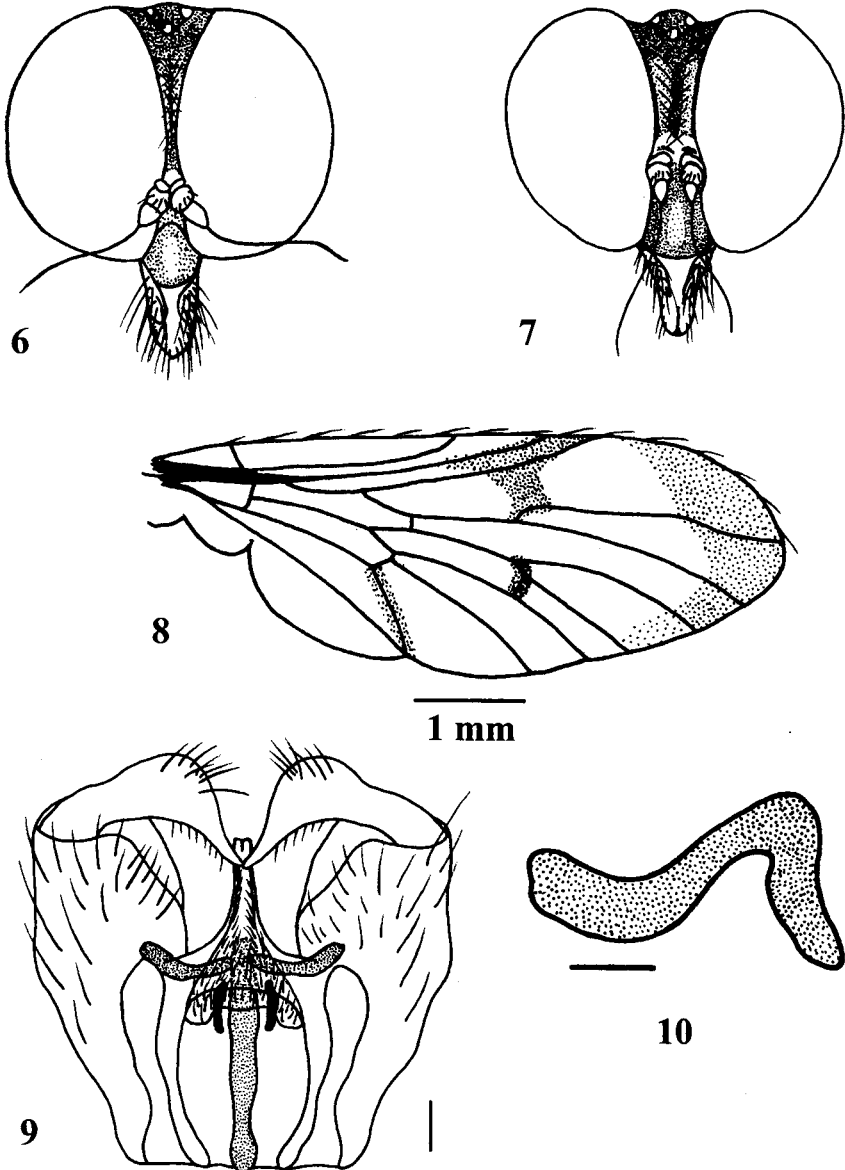
Type specimens. The holotype ♂ of *Chrysopilus fijiensis* is labeled “FIJI, Taveuni Isl., Cakaudrove Prov., Devo Forest Reserve, 3.I–10.I.2003, FJ-9 malaise, M. Irwin, E. Schlinger, M. Tokota’a, 179°59’E, 16°50’S, 800 m, FBA042905” and will be deposited in FNIC. *Paratypes:* FIJI. **Taveuni:** 1♂, 1♀, Devo Forest Reserve, -16.85, 179.9667, 800 m, 14–21 Nov 2002, Irwin, M.E., Schlinger E.I., Tokota’a M., Malaise (FBA005828–005829); 1♀, same data except: 10–16 Jan 2003, Irwin, M.E., Schlinger E.I., Tokota’a M., Malaise (FBA041333); 1♂, 1♀, Devo Peak Radio Tower, -16.85, 179.9667, 1200 m, 21 Nov–13 Dec 2002, Irwin, M.E., Schlinger, E.I., Tokota’a, M., Malaise (FBA005825–005826); 1♀, same data except: 13–20 Dec 2002, Irwin, M.E., Schlinger, E.I., Tokota’a, M., Malaise (FBA019793); 2♀, same data except: 20–27 Dec 2002, Irwin, M.E., Schlinger E.I., Tokota’a M., Malaise (FBA005830–005831). **Viti Levu:** 1♂, 8♀, Koroyanitu National Heritage Park, Savuione Trail, -17.667, 177.55, 800 m, 12–19 Dec 2002, Schlinger, E.I., Tokota’a, M., Malaise (FBA090001–090005, 090007–090010); 7♀, Koroyanitu National Heritage Park, Savuione Trail, -17.667, 177.55, 450 m, 12–19 Nov 2002 Irwin, M.E., Schlinger, E.I., Tokota’a, M., Malaise in montane forest (FBA005818–005824); 2♀, Koroyanitu National Heritage Park, 1 km E Abaca Village, Savuione Trail, -17.667, 177.55, 800 m, 7–12 Oct 2002, Schlinger, E.I., Tokota’a, M., Malaise (FBA081711–081712); 1♀, same data except: 12–19 Oct 2002, Schlinger, E.I., Tokota’a, M., Malaise (FBA083761); 1♂, 1♀, same data except: 19–26 Oct 2002, Schlinger, E.I., Tokota’a, M., Malaise (FBA088613); 1♂, 1♀, 26 Oct–5 Nov 2002, Schlinger, E.I., Tokota’a, M., Malaise (FBA083154).

Chrysopilus schlingeri Webb, new species

(Figs. 6–10)

Etymology. This species is named in honor of Evert I. Schlinger for his support and development of the Fiji Terrestrial Arthropod Survey.

Diagnosis. *Chrysopilus schlingeri* is similar to *C. fijiensis* in having the thorax dark yellow and glossy. It differs from *C. fijiensis* in having the male eyes separated by a distance less than the width of the ocellar tubercle, wing (Fig. 8) pale brown, darker brown apically and in band from pterostigma to basal angle of R₄, along apical margin of *dc*, and along CuA₁; pterostigma dark brown, extending to costa; male abdomen dark yellow,



Figures 6–10. *Chrysopilus schlingeri*. 6. Male head. 7. Female head. 8. Wing. 9. Male gonocoxite. 10. Male ejaculatory apodeme, lateral view. Scale 0.1 mm unless otherwise indicated.

glossy and tergites 5–8 dark brown; the gonostyle (Fig. 9) pointed apically; the ejaculatory apodeme (Fig. 9) not expanded posteriorly and in lateral view (Fig. 10) cylindrical, sinuate; and in the female the abdomen is dark yellow, glossy with tergites 4–9 and terminalia dark brown.

Male. Body length 4.2–6.2, 5.0 mm (n = 7).

Head (Fig. 6). Ocellar tubercle dark brown, pruinescence yellowish brown; not raised above level of vertex; setae black, moderately long. Eyes dark brown; glabrous; ommatidia of equal size; dichoptic, separated by distance 0.5–0.9, 0.7 (n = 7) times width of ocellar tubercle. Frons dark brown, pubescence pale brown, dark yellow ventrally; diverging dorsally; setae black, elongate. Antenna dark yellowish brown to pale brown; scape quadrate, shorter than pedicel and flagellum, narrower than width of flagellum, setae absent; pedicel quadrate, length subequal to width, setae black, short; flagellum cone-shaped, tapered posteriorly with elongate arista, length subequal to width, longer than scape, subequal in length to pedicel. Parafacial not visible. Clypeus dark reddish brown, glossy; setae absent. Maxillary palpus brown, cylindrical, slightly clavate apically; about 3.0 times longer than wide; setae dark brown, elongate. Genal setae white, elongate. Occipital setae white, becoming sparse dorsally.

Thorax. Mesonotum dark yellow, glossy; vittae indistinct; setae dark brown, short with thicker, dark brown setae on notopleuron, supraalar area, postalar callus, and scattered anteriorly on mesonotum. Postpronotal lobe concolorous with mesonotum, setae dark brown, short. Pleuron dark yellow, glossy; setae dark brown across dorsal margin of anepisternum, yellow across ventral margin of katepisternum, and varying from dark yellow to brown on anterior, middle and posterior tufts on laterotergite. Scutellum pale brown, posterior margin yellow; setae dark brown, short, erect with numerous thicker dark brown setae across posterior margin. *Wing.* Length 4.6–6.2, 5.3 mm (n = 6) mm. Membrane (Fig. 8) pale brown, slightly darker apically, brown band from pterostigma to basal angle of R_4 , along apical margin of *dc*, and along CuA_1 ; pterostigma dark brown, extending to costa. Cell r_4 narrow, elongate, expanded posteriorly, enclosing apex of wing; basal angle of R_4 right-angled; R_4 ends slightly anterior to apex of wing. Cell *cup* closed. Halter pale yellowish brown. *Legs.* Dark yellow, glossy; coxal setae yellow intermixed with dark brown setae.

Abdomen. Dark yellow, glossy, tergites 5–8 dark brown (occasionally some dark brown markings on tergite 4); dorsal setae dark brown, short, appressed. *Terminalia.* Dark brown. Gonostyle (Fig. 9) tapered apically to point. Ejaculatory apodeme (Fig. 9) narrow, cylindrical, not expanded posteriorly; lateral view (Fig. 10) cylindrical, sinuate.

Female. Similar to male except as follows.

Body length 4.0–5.7, 4.9 mm (n = 10).

Head (Fig. 7). Vertex (Fig.) slightly emarginate lateral to ocellar tubercle. Head/frons width 5.2–12.2, 8.4 (n = 10); frons width/length 0.20–0.52, 0.32 (n = 10).

Thorax. Wing. Length 5.0–6.7 mm, 5.9 mm (n = 10).

Abdomen. Dark yellow, glossy, tergites 4–9 and terminalia dark brown.

Immature stages. Unknown.

Distribution. *Chrysopilus schlingeri* is recorded from the Fiji islands of Taveuni and Vanua Levu.

Temporal Phenology. *Chrysopilus schlingeri* has been collected in Malaise traps from June–August and October–December.

Type specimens. The holotype ♂ *Chrysopilus schlingeri* is labeled “FIJI, Vanua Levu Island, Bua Prov., 6 km NW Kilaka, 3.VI–15.VI.[20]04, Batiqere Range, Malaise, 113m, Schlinger, Tokota’a, -16.7317, 178.9997, FJVN58c_M02_06, FBA069281” and will be deposited in FNIC. *Paratypes:* Same data as holotype, 2♂, 1♀ (FBA069278–069280). FIJI: **Vanua Levu:** Kilaka, -16.80, 178.9833, 146 m, 3–10 June 2004, Irwin, M.E., Schlinger, E.I., Tokota’a, M., 1♂ (FBA040923), Malaise; 1♀, same data

except: 28 June–2 July 2004, Irwin, M.E., Schlinger, E.I., Tokota'a, M. (FBA041333), Malaise. **Taveuni:** Devo Forest Reserve, -16.85, 179.9667, 800m, 3–10 Jan 2003, Irwin, M.E., Schlinger, E.I., Tokota'a, M., 2♂, 1♀ (FBA042903–042904, 042906), Malaise; 5♀, same data except: 10–16 Jan 2003, Irwin, M.E., Schlinger, E.I., Tokota'a, M. (FBA041331–041332, 041334–041336); Devo Peak Radio Tower, -16.85, 179.9667, 1200m, 2–10 Oct 2002, Irwin, M.E., Schlinger E.I., Tokota'a, M., 1♂ (FBA021453), Malaise; 1♀, same data except: 21 Nov–13 Dec 2002, Irwin, M.E., Schlinger, E.I., Tokota'a, M. (FBA005827); 3♀, same data except: 13–20 Dec 2002, Irwin, M.E., Schlinger, E.I., Tokota'a, M. (FBA019791–019792, 019794); Tavuki Village, Mt Devo, -16.831 -179.88, 30 June–14 Aug 2004, Schlinger, E.I., Tokota'a, M., 1♂ (FBA071223), Malaise; 5.3 km SE Tavuki Village, Mt Devo, -16.841 -179.9678, 31 Oct–14 Nov 2002, Schlinger, E.I., Tokota'a, M., 1♀ (FBA089391), Malaise.

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