

Enlinia Aldrich, 1933 of Mitaraka, French Guiana (Diptera: Dolichopodidae)

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ABSTRACT

The genus *Enlinia* Aldrich, 1933 is recorded from French Guiana for the first time and six new species are described: *E. loboptera* n. sp., *E. bova* n. sp., *E. colossicornis* n. sp., *E. mitarakensis* n. sp., *E. touroulti* n. sp., and *E. dalensi* n. sp. A seventh unnamed species belonging to the *E. armata* Robinson, 1969 species group, and represented by a single female specimen, is also reported. These species were collected as part of the 2015 "Our Planet Revisited" survey in the Mitaraka Mountain area in far southwestern French Guiana. A key to the seven species known from French Guiana is provided.

RÉSUMÉ

Les Enlinia Aldrich, 1933 du Mitaraka, Guyane (Diptères: Dolichopodidae).

Le genre *Enlinia* Aldrich, 1933 est rapporté pour la première fois de Guyane et six nouvelles espèces sont décrites: *E. loboptera* n. sp., *E. bova* n. sp., *E. colossicornis* n. sp., *E. mitarakensis* n. sp., *E. touroulti* n. sp., et *E. dalensi* n. sp. Une septième espèce, appartenant au groupe d'espèces de *E. armata* Robinson, 1969, représentée par une seule femelle, est également signalée mais non nommée. Ces espèces ont été collectées lors de l'expédition « La Planète Revisitée » de 2015 dans la région montagneuse du Mitaraka au sud-ouest de la Guyane. Une clé des sept espèces connues de Guyane est fournie.

KEY WORDS
Neotropical,
micro-dolichopodids,
South America,
new record,
new species.

MOTS CLÉS
Néotropical,
micro-dolichopodides,
Amérique du Sud,
signalisation nouvelle,
espèces nouvelles.

INTRODUCTION

Enlinia Aldrich, 1933 is a diverse genus of tiny dolichopodid flies with body size of around 1 mm in length (a member of the so-called micro-Dolichopodidae). Species of *Enlinia* can be recognized by the combination of small body size, wing veins that are nearly straight and evenly diverging from wing base (venation modified in some males), the presence of acrostichal setae, and face without setae. The genus is restricted to the New World and presently contains about 80 species (Yang *et al.* 2006), with many species awaiting description and discovery. Most representatives have been described from Mexico (Robinson 1969), but species have been recorded from the United States (seven species) and Canada (two species) in the north, to Chile in the south (one species) (Van Duzee 1930). The genus is also widely distributed in the Caribbean (Cuba, Dominica, Grenada, Jamaica, Saint Vincent) (Robinson 1975). Males of *Enlinia* are often highly ornate with most body parts subject to modification including commonly the wings, legs, and abdominal sternites (Robinson 1969). The relationship of *Enlinia* with other micro-dolichopodid genera is discussed in Robinson (1969), Runyon & Robinson (2010), and Runyon (2015).

In 2015 the “Our Planet Reviewed” or “La Planète revisitée” Guyane 2014-2015 expedition, also known as the “Mitaraka 2015 survey”, was conducted in French Guiana (Pollet *et al.* 2014; Pascal *et al.* 2015; Touroult *et al.* 2018). This was the 5th edition of a large scale biodiversity survey undertaken jointly by the Muséum national d’Histoire naturelle, in Paris and the NGO Pro-Natura international (both in France). The “Our Planet Reviewed” program aims to rehabilitate taxonomic work that focuses on largely neglected components of global biodiversity, i.e., invertebrates (both marine and terrestrial). Basic arthropod taxonomy and species discovery were at the heart of the survey, although forest ecology and biodiversity distribution modelling, were also part of the project. The expedition was conducted in the Mitaraka Mountains, a largely unknown and uninhabited area in the southwestern corner of French Guiana, directly bordering Surinam and Brazil. It is part of the Tumuc Humac mountain chain, extending east in the Amapá region of Brazil and west in southern Surinam. The area consists primarily of tropical lowland rain forest with scattered inselbergs, isolated hills that stand above the forest plains. MP participated in this survey as Diptera coordinator, while focusing his own collecting efforts and methods on Dolichopodidae.

The purpose of this paper is to describe six new species of *Enlinia* collected during the abovementioned survey. This represents just the second record of *Enlinia* occurring in South America with *E. atrata* (Van Duzee, 1930) from Chile being the only previous one. No doubt many species of South American *Enlinia* await discovery, as illustrated by the occurrence of seven species within the 1 km² area sampled at Mitaraka, four of which are represented by a single specimen.

MATERIAL AND METHODS

From 22 February till 11 March 2015, a first team of 32 researchers explored the area, including 12 invertebrate experts. During a second period (11-27 March), a second equal-sized team took over and a third smaller team returned to the site from 12 to 20 August 2015. Invertebrate sampling was carried out near the base camp, on the drop zone (an area near the base camp that had been clear-cut entirely to allow helicopters to land) and, in particular, along four trails of about 3.5 km that started from the base camp in four different directions (see Krolow *et al.* 2017). Details of the collecting methods and sample codes used on labels are described by Pollet *et al.* (in press). Dipteran subsamples (mostly per family) were subsequently disseminated among experts worldwide, in the case of *Enlinia* spp. to JR. The identification of the species was conducted using taxonomic reviews and identification keys, original descriptions, and direct comparison to reliably identified species from the National Museum of Natural History, Smithsonian Institution (Washington, D.C.) and the Montana Entomology Collection, Montana State University (Bozeman, Montana). All collected material was stored in 70% alcohol during the expedition, with representatives being dry mounted on pins using hexamethyldisiloxane (HMDS) or permanently slide mounted about two years later in the laboratory.

This paper generally follows the format used in Robinson (1969) which will assist in comparisons and identifications across species in this large genus since Harold Robinson (USNM) has described nearly all species of *Enlinia* to date. However, we follow Cumming & Wood (2009) for terminology of non-genitalic structures including antennal segments and wing veins. Measurements of body and wing lengths were carried out on at least 10 specimens, if available. Eye height is defined as the vertical diameter (from upper to lower eye margin). In descriptions, the position of features on elongate structures, such as leg segments, is given as fractions of the total length, starting from the base. Permount (Fisher Scientific, Pittsburgh, Pennsylvania) mounting medium was used to create permanent slides. Holotypes are deposited in the MNHN. A label citing the Access and Benefit Sharing agreement number for the expedition, APA 973-1, is included with all specimens.

ABBREVIATIONS

Private collection

Coll. MAPC Marc A. Pollet, Welle (Denderleeuw).

Institutional collections

MNHN	Muséum national d’Histoire naturelle, Paris;
MTEC	Montana Entomology Collection, Montana State University, Bozeman;
USNM	National Museum of Natural History, Smithsonian Institution, Washington, D.C.

RESULTS

DIVERSITY AND ABUNDANCE OF *ENLINIA* IN MITARAKA SAMPLES
A total of 636 *Enlinia* specimens were collected, 96.5% of which with the 6 m long Malaise trap. Pan traps were not very

productive, with only one specimen in white pan traps, and 11 in blue ones. The latter specimens, however, were collected in a site where only blue pan traps were in operation. *Enlinia loboptera* n. sp. was by far the most abundant (553 specimens, 86.9% of all specimens) and widespread species, and large populations were discovered both along the Alama river, on one of the rocky outcrops ('savane roche 2') and even on one of the inselbergs (Borne 1). *Enlinia colossicornis* n. sp. was encountered in the same habitats, though, in lower numbers (62 specimens, 9.7%). All remaining species of *Enlinia* were collected in low numbers (1–2 specimens each). The rocky outcrop 'savane roche 2' housed the richest *Enlinia* fauna, with five species, whereas three species were collected along the Alama river. These were also the only sites where the 6 m Malaise trap had been set up (along the Alama river in March 2015, on 'savane roche 2' in August 2015).

SYSTEMATICS

Family DOLICHOPODIDAE Latreille, 1809
Genus *Enlinia* Aldrich, 1933

Enlinia loboptera n. sp.
(Figs 1–3)

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TYPE MATERIAL. — **Holotype.** ♂, pinned. First label: "GUYANE, Maripasoula, N 2°13'59.8"/ W 54°27'46.5", 471m, Malaise trap (6m), 13.viii.2015–20.viii.2015, P.-H. Dalens leg." Second label: "partially open areas on savane roche 2; La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/230". Third label: "HOLOTYPE ♂ *Enlinia loboptera* Runyon & Pollet 2018" (red label). Deposited at MNHN.

Paratypes. 112 ♂, 218 ♀, same label data as holotype. 40 ♂, 175 ♀, first label: "GUYANE, Maripasoula, N 2°14'11"/ W 54°27'07", 306m, Malaise trap (6m), 24.viii.2015, river, J. Touroult, E. Poirier leg." Second label: "tropical wet forest, La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/193". 1 ♀, same label data as previous, except: 25.viii.2015, sample cd: MITARAKA/189. 1 ♀, first label: "GUYANE, Maripasoula, 1.iii.2015, SLAM, J. Touroult, E. Poirier leg." Second label: "nr base camp/along trails; La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/194". 1 ♀, same label data as previous, except: 1–6.iii.2015, sample cd: MITARAKA/195. 1 ♂, same label data as previous, except: 12–20.viii.2015, P.-H. Dalens leg., sample cd: MITARAKA/229. 3 ♀, first label: "GUYANE, Maripasoula, N 2°12'21.9"/ W 54°26'11.6", SLAM, 26.ii.2015, J. Touroult, E. Poirier leg." Second label: "MITC-Born 1 - rocks, La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/214". Deposited at MNHN, MAPC, MTEC, USNM. Second label: "MITC-Born 1 - rocks, La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/214". Deposited at MNHN, Coll. MAPC, MTEC, USNM.

ETYMOLOGY. — This species is named for the distinctly lobed posterior margin of the wing in males (Fig. 3).

DIAGNOSIS. — The shape of the male wing (Fig. 3) and the row of large, modified setae on the hind tibia (Fig. 2) distinguish *E. loboptera* n. sp. from all other known *Enlinia* species, except *E. bova* n. sp. Males of these two species share many unique characteristics (e.g. wing shape and distinct chaetotaxy of fore, mid and hind legs) and form a group that stands apart from other known *Enlinia* species.

Enlinia loboptera n. sp. is distinguished from the latter species by the short cerci with relatively short setae that extend anteriorly only to sternite 4 (Fig. 1E) whereas the cerci of *E. bova* n. sp. possess very long setae that reach the base of the abdomen (Fig. 4E). Females are recognized by the form of the hind basitarsus, the distinct apical ventral seta on fore and mid tibia, and body size less than 1.3 mm.

DESCRIPTION

Male

Body size. Length 1.2–1.3 mm, wing length 1.1–1.2 mm by 0.5 mm (width).

Head. Face and frons dark brown to black with very sparse brown pollen. Eyes essentially contiguous below antennae; anterior facets very enlarged; hairs between facets noticeably longer near mouth. Palpus brown with silvery pollen. Proboscis brown. Antenna (as in *E. bova* n. sp., Fig. 4A) dark brown; first flagellomere about as long as wide, triangular and rather sharply pointed; arista-like stylus apical, about as long as height of eye.

Thorax. Scutum rather arched, dark brown to black with very sparse brown pollen and weak violet to dark green reflections; pleura dark brown to black, slightly lighter brown posteriorly. Setae on dorsum short, brown with pale reflections; 7–9 pairs of small acrostichal setae; 8–10 pairs of dorsocentral setae; scutellum with one pair of widely separated median setae and one pair of very small lateral hairs.

Legs. Brown with mostly dark setae but most setae with very strong pale reflections and appearing yellow in certain views and lights (as in Fig. 2). Fore coxa mostly bare except for a large, black seta on outer anterior surface at apex, most specimens also with a pair of setae on inner anterior surface near ½. Hind trochanter (as in *E. bova* n. sp., Fig. 4B) with a stout black ventrally-directed spine near ½ on anterior surface (length subequal to length of trochanter). Fore femur slightly swollen, with long, slender setae on ventral and anterior surface, those on anterior surface longest and slightly curved apically, with row of about 4 long, slender setae along posteroventral edge (as in *E. bova* n. sp. Fig. 4C). Mid femur with stout ventral seta arising near base, held close to ventral surface of femur and curved apically; with row of three slightly broadened anteroventral setae at apex decreasing in length apically (Fig. 1D). Hind femur with longer anteroventral setae on apical half (longest setae subequal to width of femur). Fore tibia (Fig. 1A) gradually widened toward apex and slightly dorsoventrally flattened, with large ventral setae on apical half (Fig. 1B). Mid tibia (Fig. 1C, D) slightly widened and flattened dorsoventrally, bare dorsally; with one anteroventral row of 10–12 large setae along full-length of tibia; with about 3–4 long, slender posteroventral setae on basal half; with a few long, slender ventral setae near apex. Hind tibia (Fig. 2) somewhat flattened on basal ⅔ and slightly curved with a row of distinct anterior setae that are abruptly narrowed and strongly elbowed near apical ⅔, these setae becoming smaller toward apex of tibia with apical-most seta slightly thickened and hook-like. Fore tarsus (Fig. 1A, B) extremely modified; tarsomere 1 about as wide as long with

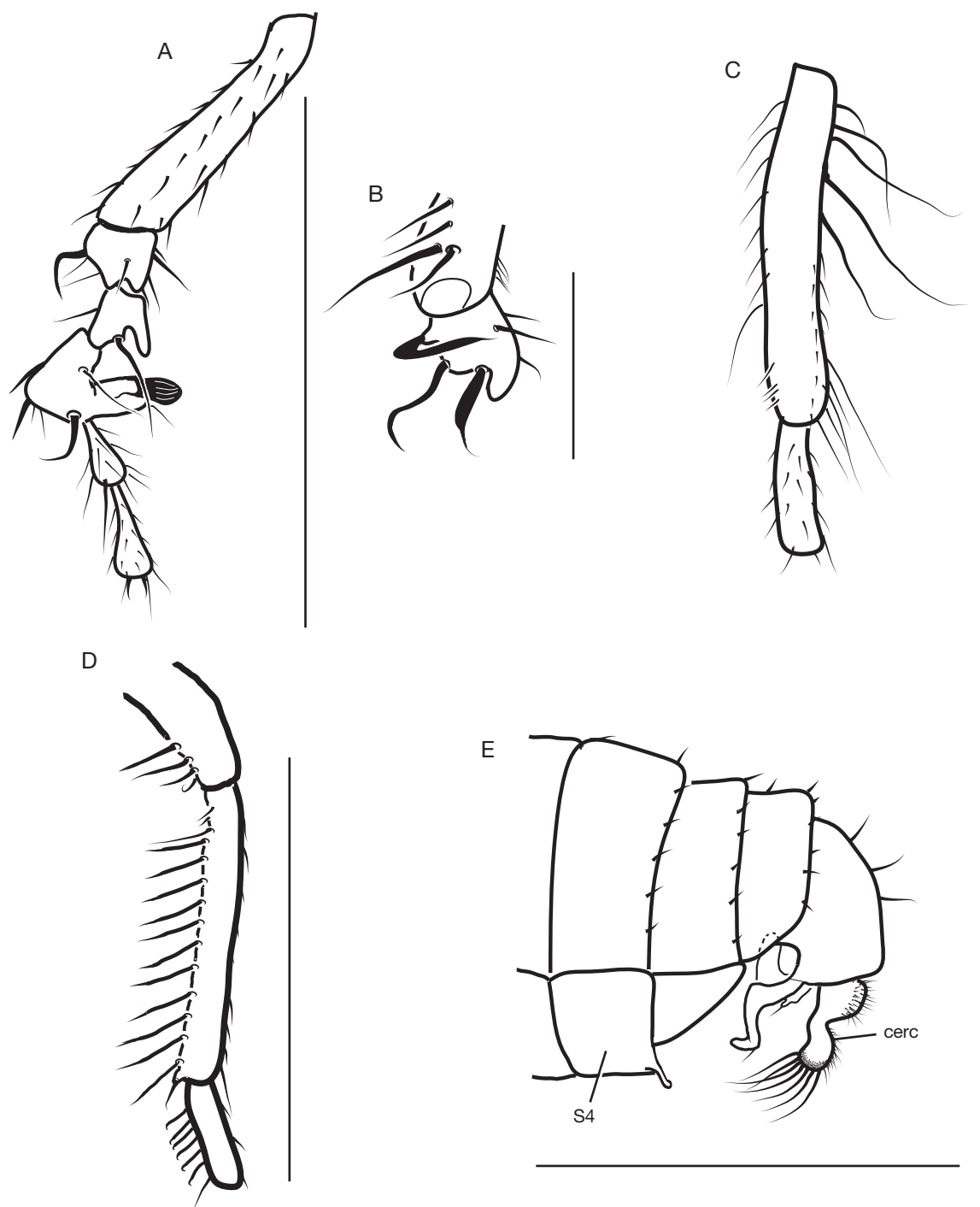


FIG. 1. — *Enlinia loboptera* n. sp., ♂: **A**, fore tibia and tarsus, dorsal view; **B**, apex of fore tibia and tarsomere 1, ventral view; **C**, mid tibia and tarsomere 1, dorsal view; **D**, apex of mid femur, tibia, and tarsomere 1, anterior view; **E**, tip of abdomen and terminalia, left lateral view. Abbreviations: **cerc**, cerci; **S4**, abdominal sternite 4. Scale bars: A, C-E, 0.5 mm; B, 0.1 mm.

3 large, modified setae on flattened ventral surface; tarsomere 2 smaller than tarsomere 1 with short, finger-like posterior lobe bearing a rounded seta, with long dorsal seta, and with small leaf-like, lanceolate posteroventral seta near base; tarsomere 3 somewhat U-shaped with flattened, tongue-shaped, black apical process, with stout, hooked dorsal seta and 3 short, stout setae on anterodorsal edge; tarsomere 4 unmodified with a couple of

larger dorsal setae. Mid tarsus with tarsomere 1 bearing short ventral setae that are hooked at apex (Fig. 1D); tarsomeres 2 and 3 with a slightly larger dorsal seta at apex. Hind tarsus with tarsomere 1 short, slightly longer than wide and slightly flattened. Ratios of tibia:tarsomeres for fore leg (for highly modified tarsomeres, width given in parentheses): 12-4-3-5(8)-4-6; for mid leg: 15-6-2-3-3-3; for hind leg: 22-5-8-5-3-3.

Wing (Fig. 3). Approximately oval with cuneate base and with sinuous hind margin and broad, projecting lobe near apex of vein CuA_1 ; hind margin with slightly longer, straight hairs that become very short and dense on lobe; wing clear; vein R_{2+3} slightly sinuous and close to costa, curved slightly forward at apex; vein R_{4+5} nearly straight, ending before wing tip; vein M_1 nearly straight and evenly diverging from vein R_{4+5} , very slightly arched backwards beyond crossvein; vein CuA_1 arching backwards beyond crossvein $dm-cu$, reaching wing margin and ending near apex of lobe, last part of vein CuA_1 nearly 3 times as long as crossvein $dm-cu$; vein A_1 short and represented by a streak of pigment along and close to anal margin, becoming a brown streak apically, wing otherwise hyaline. Halter brown.

Abdomen (Fig. 1E). Dark brown, usually slightly lighter in color than thorax; setae short and brown with pale reflections. Sternite 4 with short median armature at hind margin. Hypopygium brown; cerci pale brown and becoming darker apically, small, longer than wide, spatulate on apical half with comb of black setae on outer margin.

Female

Body size. Length 1.1–1.3 mm, wing length 0.9–1.0 mm by 0.4–0.5 mm (width). As in male except lacking modified wing, legs, and abdominal sternites. Face wider and distinct to mouth (width of face subequal to width of first flagellomere). Antenna with first flagellomere slightly less pointed apically. General form of basitarsus present in females (as in *E. bova* n. sp., Fig. 4B) and also one large ventral seta at apex of fore and mid tibiae. Wing margin evenly rounded.

REMARKS

Enlinia loboptera n. sp. was by far the most abundant species taken at Mitaraka, and the sex ratio was distinctly female-biased (154 males: 396 females). To separate females of *E. loboptera* n. sp. from those of the related species, *E. bova* n. sp., we primarily used body size since females of *E. bova* n. sp. should be noticeably larger since the male is larger.

Enlinia bova n. sp. (Fig. 4)

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TYPE MATERIAL. — **Holotype.** ♂, pinned. First label: “GUYANE, Maripasoula, N 2°13'59.8" / W 54°27'46.5", 471m, Malaise trap (6m), 13.viii.2015–20.viii.2015, P.-H. Dalens leg.” Second label: “partially open areas on savane roche 2; La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/230”. Third label: “HOLOTYPE ♂ *Enlinia bova* Runyon & Pollet 2018” (red label). Deposited at MNHN.

ETYMOLOGY. — The specific epithet is from the Latin *bova* = “swelling of the legs” in reference to the swollen front legs of the male (Fig. 4C).



FIG. 2. — *Enlinia loboptera* n. sp., ♂: hind tibia and hind tarsus, dorsal view. Scale bar: 0.5 mm.

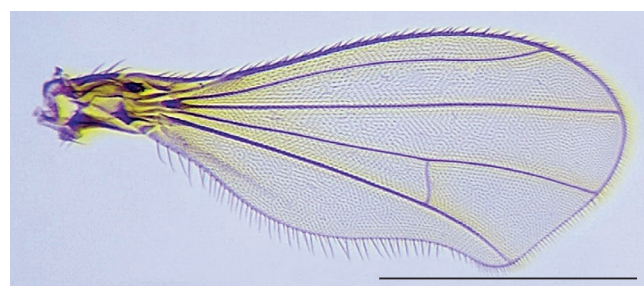


FIG. 3. — *Enlinia loboptera* n. sp., ♂ wing. Scale bar: 0.5 mm.

DIAGNOSIS. — The shape of the male wing (as in Fig. 3) and the row of large, modified setae on the hind tibia (Fig. 4B) distinguish *E. bova* n. sp. from other known *Enlinia* species, except *E. loboptera* n. sp. These two species are closely related and males share many unique characteristics most notably the shape of the wing and the anterior row of distinct setae on hind tibia, but their differences are also marked. The large cerci bearing long apical setae that reach the base of the abdomen (Fig. 4E) and the very swollen front legs (Fig. 4C) easily distinguish *E. bova* n. sp.

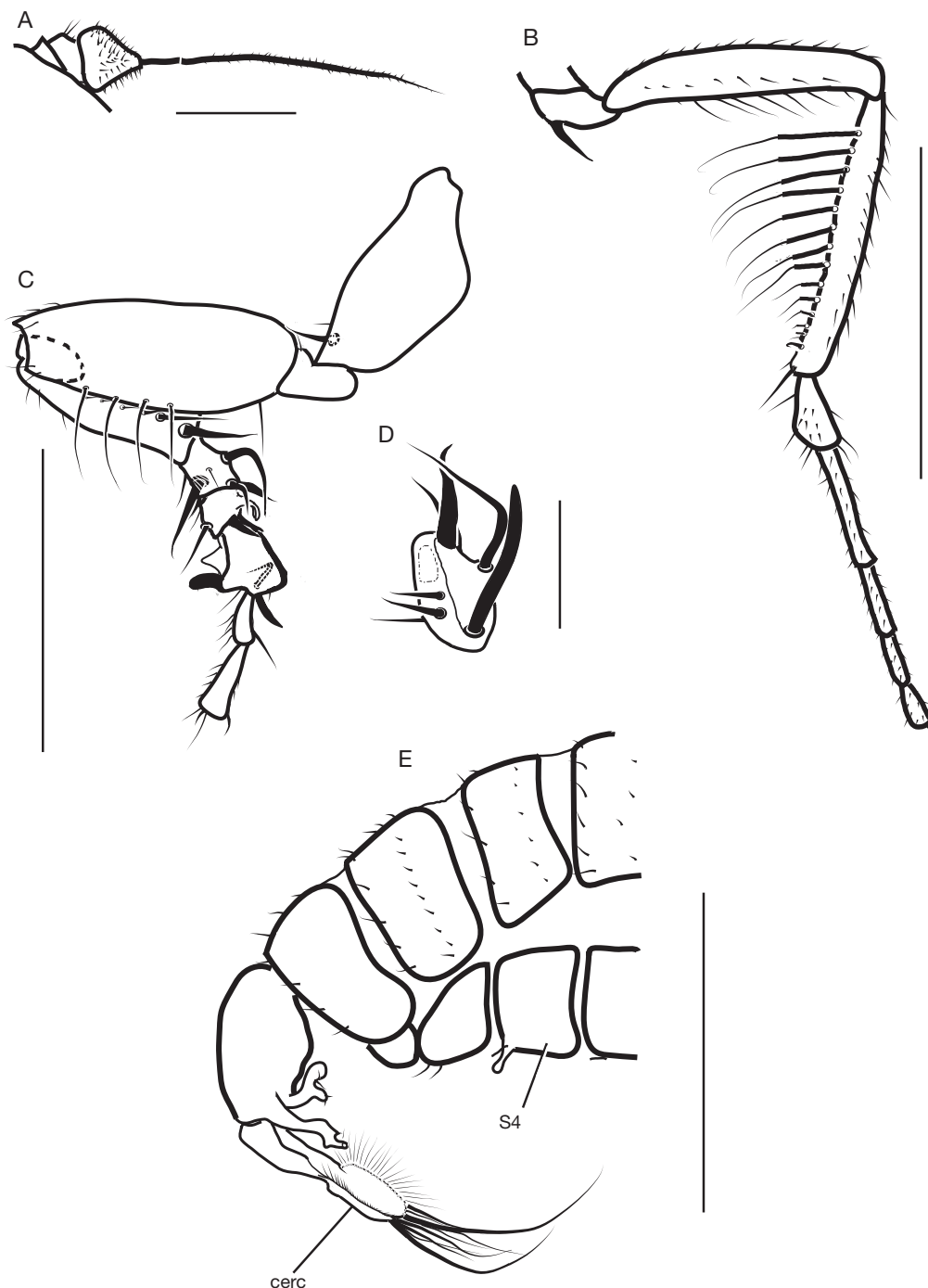


FIG. 4. — *Enlinia bova* n. sp., ♂: **A**, antenna, lateral view; **B**, hind leg from tip of coxa, anterior view; **C**, fore leg, posterior view; **D**, tarsomere 1 of fore leg, ventral view (anterior is toward bottom of page); **E**, tip abdomen and terminalia, right lateral view. Abbreviations: **cerc**, cerci; **S4**, abdominal sternite 4. Scale bars: A, D, 0.1 mm; B, C, E, 0.5 mm.

DESCRIPTION

Male

Body size. Length. 1.5 mm, wing length 1.1 mm by 0.5 mm (width).

Head. Face and frons dark brown to black with very sparse brown pollen. Eyes essentially contiguous below antennae; anterior facets very enlarged; hairs between facets noticeably

longer near mouth. Palpus not visible. Proboscis brown. Antenna (Fig. 4A) dark brown; first flagellomere about as long as wide, conical and rather sharply pointed apically; arista-like stylus apical, slightly longer than height of eye.

Thorax. Mesoscutum strongly arched with posterior slope distinctly flattened, dark brown to black with very sparse brown pollen and with weak dark green reflections; pleura

dark brown to black, slightly lighter than scutum. Setae on dorsum short, brown with strong pale reflections; 9–10 pairs of small acrostichal setae; 10–11 pairs of dorsocentral setae, the posterior-most distinctly larger; one pair of widely separated scutellar setae and one pair of very small lateral hairs.

Legs. Brown with dark setae. Fore leg (Fig. 4C) enlarged and somewhat raptorial. Fore coxa enlarged, mostly bare except for a large, black seta on outer anterior surface at apex and a very small lateral hair just basal to large seta. Hind trochanter (Fig. 4B) with stout black ventrally-directed spine near $\frac{1}{2}$ on anterior surface (length subequal to length of trochanter). Fore femur (Fig. 4C) greatly swollen, excavated anteroventrally at apex, with an erect ventral seta near base, one row of about 4–5 long, slender anterodorsal setae and a similar row of about 5 long, slender setae along posteroventral edge. Mid femur with stout ventral seta arising near base that is held close to ventral surface of femur and curved apically. Hind femur (Fig. 4B) with two rows of anteroventral setae on apical $\frac{2}{3}$ (longest setae subequal to width of femur). Fore tibia (Fig. 4C) slightly thickened and distinctly shorter than fore femur, gradually widened toward apex and slightly dorsoventrally flattened, with one row of ventral setae nearly full-length, and a large apical seta at posteroventral corner. Mid tibia flattened dorsoventrally, bare dorsally; with ventral row of 10–12 stout setae along full-length of tibia (as in *E. loboptera* n. sp. Fig. 1D); fringed with long posteroventral setae along most of its length and a few long anteroventral setae on basal half and apical $\frac{2}{3}$. Hind tibia (Fig. 4B) with anterior surface somewhat flattened on basal half, with a row of distinct anteroventral setae that are abruptly narrowed and slightly elbowed near or just beyond $\frac{1}{2}$, these setae becoming smaller toward apex of tibia with apical-most seta slightly thickened and hook-like, with stout anteroventral seta at apex of tibia. Fore tarsus (Fig. 4C) extremely modified; tarsomere 1 (Fig. 4D) subquadrate, with 3 very large ventral setae one of which is hooked; tarsomere 2 slightly smaller than tarsomere 1 with finger-like posterior lobe near base and with dorsal setae near apex; tarsomere 3 expanded and rather thin, with large, darkened posterior lobe and with stout black dorsal seta and a “V”-shaped brown ventral seta near apex; tarsomere 4 nearly normal in shape, with large anterodorsal seta near apex. Mid tarsus with tarsomere 1 bearing short ventral setae that are hooked at apex; tarsomeres 2–4 with a slightly larger dorsal seta at apex. Hind tarsus (Fig. 4B) with tarsomere 1 short, slightly longer than wide and slightly flattened, with 3–4 setae along ventral edge and a couple setae dorsally at apex. Ratios of tibia:tarsomeres for fore leg (for highly modified tarsomeres, width given in parentheses): 12–4–4–6(8)–4–6; for mid leg: 15–6–2–3–3–3; for hind leg: 25–4–9–6–4–3.

Wing. As in *E. loboptera* n. sp. (Fig. 3) but vein R_{2+3} not as sinuous. Halter dark brown.

Abdomen (Fig. 4E). Dark brown, slightly lighter in color than thorax; setae short and black. Sternite 4 with short median armature at hind margin that is rounded apically; tergite 6 about half width of sternite 5, and hidden beneath latter; sternite 6



FIG. 5. — *Enlinia colossicornis* n. sp., ♂ head and antenna, lateral view. Scale bar: 0.3 mm.

wishbone-shaped. Hypopygium brown, relatively large; cerci brown, elongate and slender, ending in an oval disk with marginal setae along ventral edge and very long, stout black apical setae.

Female

Unknown, but likely similar to females of *E. loboptera* n. sp. and probably larger.

REMARKS

Enlinia bova n. sp. is one of the more ornate species of *Enlinia* and males have most body parts modified, sometimes exceptionally so (i.e., front legs and genitalia). This species is also perhaps the largest known in the genus thus far surpassing *E. maxima* which has a body size of 1.4 mm (Robinson 1975).

Enlinia colossicornis n. sp. (Figs 5–7)

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TYPE MATERIAL. — **Holotype.** ♂, pinned. First label: “GUYANE, Maripasoula, N 2°13'59.8"/W 54°27'46.5", 471m, Malaise trap (6m), 13.viii.2015–20.viii.2015, P.-H. Dalens leg.” Second label: “partially open areas on savane roche 2; La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/230”. Third label: “HOLOTYPE ♂ *Enlinia colossicornis* Runyon & Pollet 2018” (red label). Deposited at MNHN. **Paratypes.** 17 ♂, 19 ♀, same label data as holotype. 10 ♂, 14 ♀, first label: “GUYANE, Maripasoula, N 2°14'11", W 54°27'07", 306 m, Malaise trap (6 m), 24.VIII.2015, river, J. Touroult, E. Poirier leg.” Second label: “tropical wet forest, La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/193”. 2 ♀, same label data as previous, except: 25.VIII.2015, sample cd: MITARAKA/189. Deposited at MNHN, Coll. MAPC, MTEC, USNM.

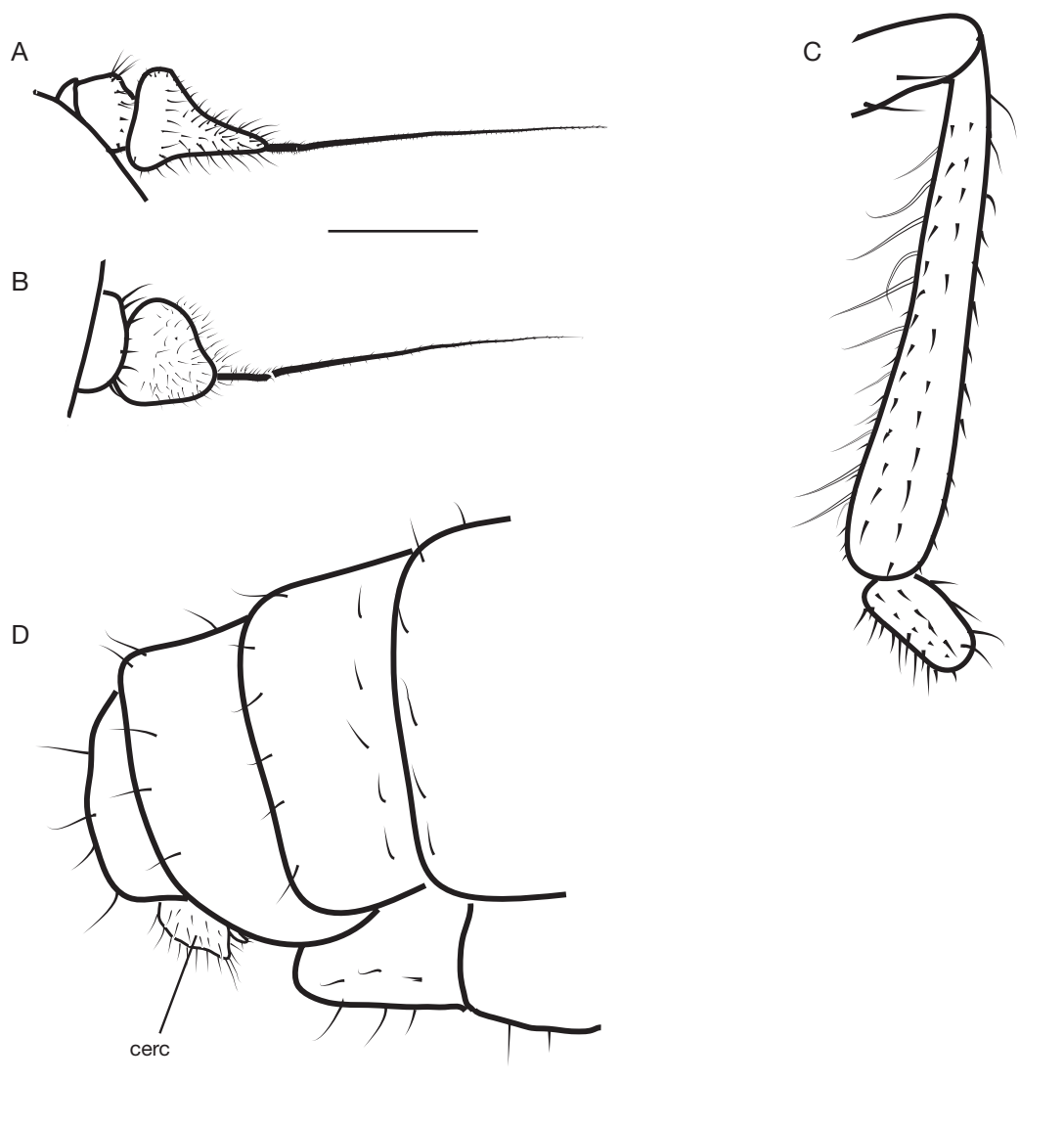


FIG. 6. — *Enlinia colossicornis* n. sp.: **A**, ♂ antenna, lateral view; **B**, ♀ antenna, lateral view; **C**, ♂ apex of hind femur, tibia, and hind tarsomere 1, anterior view; **D**, tip of ♂ abdomen and terminalia, right lateral view. Abbreviations: **cerc**, cerci. Scale bars: A, B, 0.1 mm; C, 0.5 mm; D, 0.3 mm.

ETYMOLOGY. — The species name is in reference to the relatively large first flagellomere of the antenna (Figs 5, 6A) which is unusual for the genus (compare with e.g. Figs 4A, 8A, 10A).

DIAGNOSIS. — The enlarged size and shape of the male antenna of *E. colossicornis* n. sp. (Figs 5, 6A) will separate this species from all other known species of *Enlinia*. The shape and size of the antennal segments is very uniform within the genus, with the first flagellomere typically small and blunt (as in Figs 8A, 10A). Only *E. magnicornis* Robinson, 1969 from Mexico has a similarly enlarged antenna, but has a very short arista that is only about as long as the first flagellomere (arista in *E. colossicornis* n. sp. is twice as long as first flagellomere), modified male front tarsi (unmodified in male *E. colossicornis* n. sp.), and erect setae along ventral edge of mid femur (mid femur essentially bare in *E. colossicornis* n. sp.). Males of *E. colossicornis* n. sp. are also unique among known species of *Enlinia* in possessing fore tarsi that are unmodified whereas the fore tarsus is modified in males of every other known species of the genus.

DESCRIPTION

Male

Body size. Length. 0.9–1.0 mm, wing length 1.0 mm by 0.4 mm (width).

Head. Face and frons dark brown to black. Face narrowed below but distinct to mouth; anterior eye facets only slightly enlarged. Palpus brown; proboscis yellow-brown. Antenna (Figs 5, 6A) dark brown; first flagellomere longer than scape and pedicel combined, narrowed to narrowly rounded point apically, nearly straight along ventral edge and slightly concave dorsally, with relatively long pale pubescence; arista-like stylus apical, about twice as long as first flagellomere, with basal article very short and about 1/10 length of apical article.

Thorax. Scutum dark brown with very sparse gray pollen; pleura lighter brown than scutum. Setae brown with pale reflections; 6–8 pairs of small acrostichal setae; 6–8 pairs of dorsocentral setae; one pair of relatively closely spaced scutellar setae (insertion closer to middle than sides) and one pair of very small lateral hairs.

Legs. Yellow-brown and slightly lighter than pleura, with mid and hind femora sometimes darker. Fore femur mostly bare, with slender erect ventral seta near base (length subequal to width of femur). Mid femur rather slender and with about 2–3 short, slightly stout, ventral setae at base (length < width of femur). Mid tibia slightly arched on basal $\frac{1}{3}$ and slightly thickened on apical $\frac{2}{3}$, with mostly yellow hairs. Hind tibia (Fig. 6C) gradually and slightly widened toward apex, with longer yellow hairs on ventral surface (longest hairs subequal width of tibia). Tarsi unmodified except tarsomere 1 of hind tarsus slightly broadened with row of ventral setae (length $\leq$ width of tarsomere). Ratios of tibia:tarsomeres for foreleg: 10–4–2–2–3; for middle leg: 15–5–3–2–2–3; for hind leg: 17–4–4–4–4–4.

Wing (Fig. 7). Hyaline but with slight brown tinge, narrowly elliptical with short-fringed hind margin; vein R_{2+3} slightly arching and slightly curved forward at tip; veins R_{4+5} , M_1 , and CuA_1 nearly straight and evenly diverging from wing base; vein R_{4+5} ending at or just before wing apex; last part of vein CuA_1 about 2 times as long as cross-vein $dm-cu$; vein A_1 present as a streak of brown pigment. Halter brown.

Abdomen (Fig. 6D). Dark brown with sparse, short, stiff, black setae. Sternites unmodified and without armatures, but sternite 4 more sclerotized medially at apex. Hypopygium small, brown, capping tip of preabdomen; cerci brown, small, slightly longer than wide and pointed apically, covered with short hairs.

Female

Body length. 0.9–1.1 mm, wing length 1.0–1.1 mm by 0.4–0.5 mm (width). Similar to male, but face wider (about as wide as width of first flagellomere) and narrowest at mouth; antenna (Fig. 6B) smaller, but still somewhat enlarged, globular and reflecting the same general shape as in male; legs without outstanding setae or hairs. Wing essentially as in the male (Fig. 7).

REMARKS

This species resembles the *E. magnicornis* species group established by Robinson (1975) for species having males with an enlarged antenna and broad face. However, *E. colossicornis* n. sp. is distinct in having the male face not as wide and males with fore tarsus unmodified. The shape and size of the male antenna and the uniquely plain male fore tarsus suggests that *E. colossicornis* n. sp. might be a basal species within *Enlinia*.

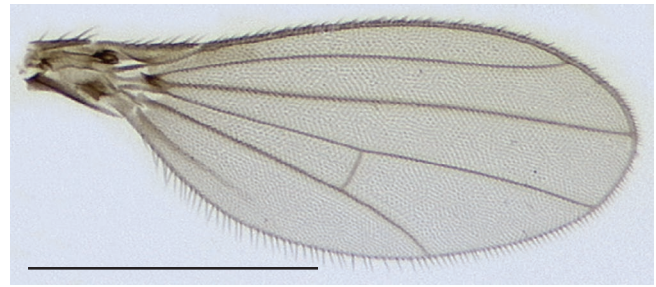


Fig. 7. — *Enlinia colossicornis* n. sp., ♂ wing. Scale bar: 0.5 mm.

Enlinia mitarakensis n. sp. (Figs 8, 9)

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TYPE MATERIAL. — **Holotype.** ♂, slide mounted. First label: “GUYANE, Maripasoula, N 2°13'59.8" / W 54°27'46.5", 471m, Malaise trap (6m), 13.viii.2015–20.viii.2015, P.-H. Dalens leg.” Second label: “partially open areas on savane roche 2; La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/230”. Third label: “HOLOTYPE ♂ *Enlinia mitarakensis* Runyon & Pollet 2018” (red label). Deposited at MNHN.

ETYMOLOGY. — Named after the Mitaraka Massif in southwestern French Guiana, where the type specimen was collected.

DIAGNOSIS. — The form of the male wing (Fig. 9) with a brown spot or streak midway between veins R_{4+5} and M_1 will distinguish this species from all other known *Enlinia*. This is also the only known species in the genus with males having an armature on abdominal sternite 2 (Fig. 8D); males of other known species often have sternites 3 and/or 4 modified, but not sternite 2.

DESCRIPTION

Male

Body size. Length. 1.2 mm, wing length 1.0 mm by 0.4 mm (width).

Head. Face and frons dark brown to black. Eyes essentially contiguous below antennae; anterior eye facets distinctly enlarged. Palpus dark brown; proboscis yellow-brown. Antenna (Fig. 8A) brown; first flagellomere short, blunt, wider than long; arista-like stylus apical, about as long as height of eye.

Thorax. Scutum dark brown with very sparse gray pollen; pleura dark brown. Setae brown with pale reflections; 6–7 pairs of small acrostichal setae; 9–10 pairs of dorsocentral setae, posterior-most distinctly larger; one pair of widely separated scutellar setae and one pair of minute small lateral hairs.

Legs. Yellow-brown, with coxae and hind femora darker brown. Fore coxa with 3 fine upcurved hairs near apex anteriorly. Mid coxa with 2 short, stout ventrally-directed setae near apex. Mid trochanter (Fig. 8C) with rather large black ventral seta (in line with row of ventral setae on middle femur). Fore femur with one erect ventral seta near base (length subequal in width of femur). Mid femur (Fig. 8C) ventrally with stout

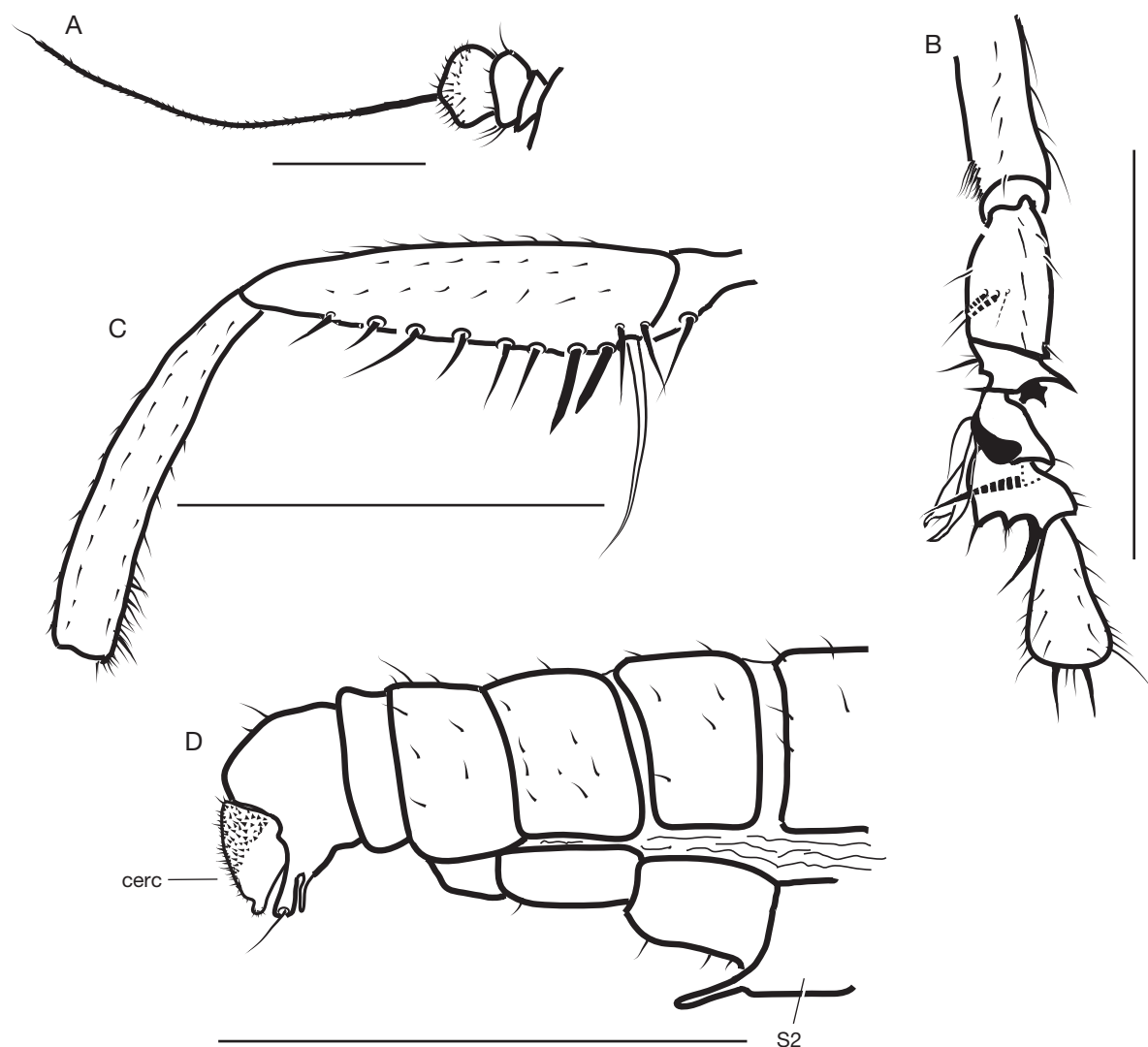


FIG. 8. — *Enlinia mitarakensis* n. sp., ♂: **A**, antenna, lateral view; **B**, apex of fore tibia and tarsus, ventral view; **C**, mid trochanter, femur, and tibia, anterior view; **D**, abdomen and terminalia, right lateral view. Abbreviations: **cerc**, cerci; **S2**, abdominal sternite 2. Scale bars: A, 0.1 mm; B, 0.3 mm; C, 0.4 mm; D, 0.5 mm.

setae nearly full-length; basal-most seta pale, very long, and slightly curved; the two setae distal to this large pale seta stouter than remaining setae. Fore tibia with posteroventral row of short black setae running nearly full-length. Mid tibia (Fig. 8C) slightly arched and with very short, erect ventral setae on apical $\frac{1}{3}$. Hind tibia with distinct subapical dorsal seta. Fore tarsus (Fig. 8B) highly modified, with numerous small, darkened/sclerotized lobes and processes; tarsomere 1 slightly thickened, flattened on ventral surface, with 3 setae in a row on anterodorsal surface; tarsomere 2 small, wider than long, with minute black process near apex; tarsomere 3 narrow at base, with black sclerotized and rounded ventral lobe, with 2 thin flattened nearly hyaline lobes along posterior edge (one lobe brown), and with a large black ventrally-directed seta near apex; tarsomere 4 with 3-4 setae along apical edge, the largest seta arising near insertion of tarsomere 5; tarsomere 5 narrow at base and evenly widening to apex, about as long as

tarsomeres 3 and 4 combined. Ratios of tibia:tarsomeres for fore leg: 14-5-2-3-3-5; for mid leg: 16-6-4-3-2-3; for hind leg: 24-8-7-6-4-4.

Wing (Fig. 9). Elliptical with cuneate base and slightly sinuous, long-fringed hind margin; with a small elongate brown spot near apical $\frac{2}{3}$ midway between veins R_{4+5} and M_1 and a second small brown area along hind margin just basal to apex of vein CuA_1 ; vein R_{2+3} close to and parallel with costa basally and only slightly curved on apical half; vein R_{4+5} nearly straight, ending near or just before wing apex; vein M_1 curving toward vein R_{4+5} and then backwards beyond crossvein $dm-cu$; last part of vein CuA_1 not reaching wing margin, about 1.5 times as long as crossvein $dm-cu$; vein A_1 present as a short streak of brown pigment near wing base and along anal margin which is narrowly brown. Halter brown.

Abdomen (Fig. 8D). Brown with scattered short, stiff, brown setae; sternite 2 with linear, rod-like brown median armature projecting from hind margin. Hypopygium small, brown; cerci brown, small, about twice as long as wide, with approximately dorsal half covered in minute, stiff setae; epandrium with finger-like apical lobe bearing seta near apex.

Female

Unknown.

REMARKS

This species belongs to the *E. magistri* (Aldrich, 1932) species group established by Robinson (1975) for species with males featuring a sinuous, long-fringed hind wing margin and specialized setae or hairs on the fore coxa.

Enlinia touroulti n. sp. (Fig. 10)

[urn:lsid:zoobank.org:act:190DD118-10FB-47AB-9922-7B8CC4F4AFB1](https://zoobank.org/act:190DD118-10FB-47AB-9922-7B8CC4F4AFB1)

TYPE MATERIAL. — **Holotype.** ♂, slide mounted. First label: "GUYANE, Maripasoula, N 2°13'59.1" / W 54°26'37.9", 433m, white pan trap, tropical moist forest (plateau), 24.ii.2015–2.iii.2015, sample cd: MITARAKA/117, M. Pollet leg.". Second label: "HOLOTYPE ♂ *Enlinia touroulti* Runyon & Pollet 2018" (red label). Deposited at MNHN. **Paratype.** ♂, slide mounted. First label: "GUYANE, Maripasoula, MIT-C-RBF2, N 2°14'03.4" / W 54°26'53.0", 299m, on vegetation along muddy trail and in swamp, 11.iii.2015, sweep net, sample cd: MITARAKA/106, M. Pollet leg." Deposited at USNM.

ETYMOLOGY. — This species is named in honor of, and out of respect to, Julien Touroult, the leader of the entomological team at Mitaraka who managed to have a wide array of traps operational during the survey and as such contributed considerably to the discovery of some of the new *Enlinia* species.

DIAGNOSIS. — This species belongs to the *E. simplex* species group (Robinson 1975) that presently contains 11 relatively inornate species with unarmed abdominal sternites, relatively simple hypopygial appendages, and wing vein R_{2+3} bulging slightly inward from costa on apical half. Species in this group are also relatively small in comparison to other *Enlinia* species (1 mm or less) and have characteristically modified fore tarsi with compressed and broadened tarsomeres 1–2 and tarsomere 3 bearing a small but often stouter seta (as in Fig. 10B). The shape of the subquadrate cerci and hypopygial appendages in *E. touroulti* n. sp. are distinctive. Details in the form of the male foretarsus, the arrangement of slender ventral setae on femora, and the form of the middle tibia also differ from the other known species in the *E. simplex* group.

DESCRIPTION

Male

Body size. Length. 0.8 mm, wing length 0.8 mm by 0.3 mm (width).

Head. Face and frons dark metallic green. Face narrowed below, eyes essentially contiguous on lower half; anterior eye facets distinctly enlarged. Palpus brown; proboscis brown. Antenna (Fig. 10A) dark brown; first flagellomere short and blunt, about twice as wide as long, nearly square in lateral view and round in anterior view; arista-like stylus apical, about as long as height of eye.

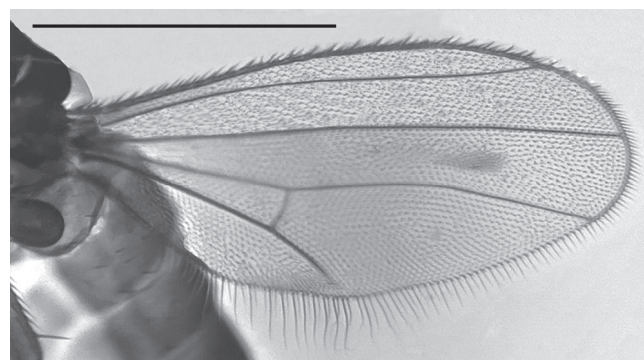


FIG. 9. — *Enlinia mitarakensis* n. sp., ♂ wing. Scale bar: 0.5 mm.

Thorax. Scutum dark brown with slight metallic green reflections and very sparse pollen; setae brown with weak pale reflections; 6 pairs of small acrostichal setae; 6–7 pairs of dorsocentral setae; one pair of relatively widely spaced scutellar setae and one pair of very small lateral hairs.

Legs. Yellow-brown with trochanters and basal tarsomeres paler. Fore coxa with about 5 short anterior hairs on apical half. Fore femur with a very slender, erect ventral seta near base (length less than width of femur) and 3–4 smaller anteroventral setae on apical half. Mid femur with 3 very slender erect ventral setae on basal 1/3 (length less than width of femur) and row of 3–4 very small erect anteroventral setae on apical half. Mid tibia (Fig. 10C) flattened dorsoventrally and slightly expanded, with row of short, somewhat stout anteroventral setae that are longest distally. Hind tibia with 1–2 dorsal setae near base. Fore tarsus (Fig. 10B) with tarsomere 1 slightly expanded and flattened dorsoventrally, about twice as long as wide; tarsomere 2 flattened dorsoventrally and slightly concave ventrally, about as long as wide, with 2–3 longer hairs near apex; tarsomere 3 small, nearly round, slightly concave ventrally, inserted to one side in small notch of tarsomere 2, with distinct short black marginal seta just beyond 1/2. Basal 2–3 tarsomeres of mid and hind tarsus distinctly light yellow to nearly white. Ratios of tibia:tarsomeres for fore leg: 9-3-2-2-1-3; for mid leg: 14-4-2-2-1-3; for hind leg: 15-4-3-2-2-3.

Wing (Fig. 10E). Hyaline, elongate-oval, hind margin evenly rounded and short-fringed; vein R_{2+3} slightly and evenly arched and curving slightly but distinctly forward at apex; vein R_{4+5} and M_1 nearly straight, diverging from near base, with M_1 very slightly arching backwards beyond crossvein dm-cu; crossvein dm-cu perpendicular to vein M_1 , less than half the length of apical part of vein CuA_1 ; vein A_1 represented as a short brown streak close to anal margin. Halter brown.

Abdomen (Fig. 10D). dark brown with sparse, very short, stiff, black setae. Sternites plain, without armatures; sternite 5 with 2 distinct setae near apex. Hypopygium capping tip of preabdomen, brown; cerci subquadrate, light brown with margin thinly darkened, with a few slender pale hairs; inner appendages larger than cerci, somewhat triangular, thin and translucent with a minute dorsal hair just beyond 1/2.

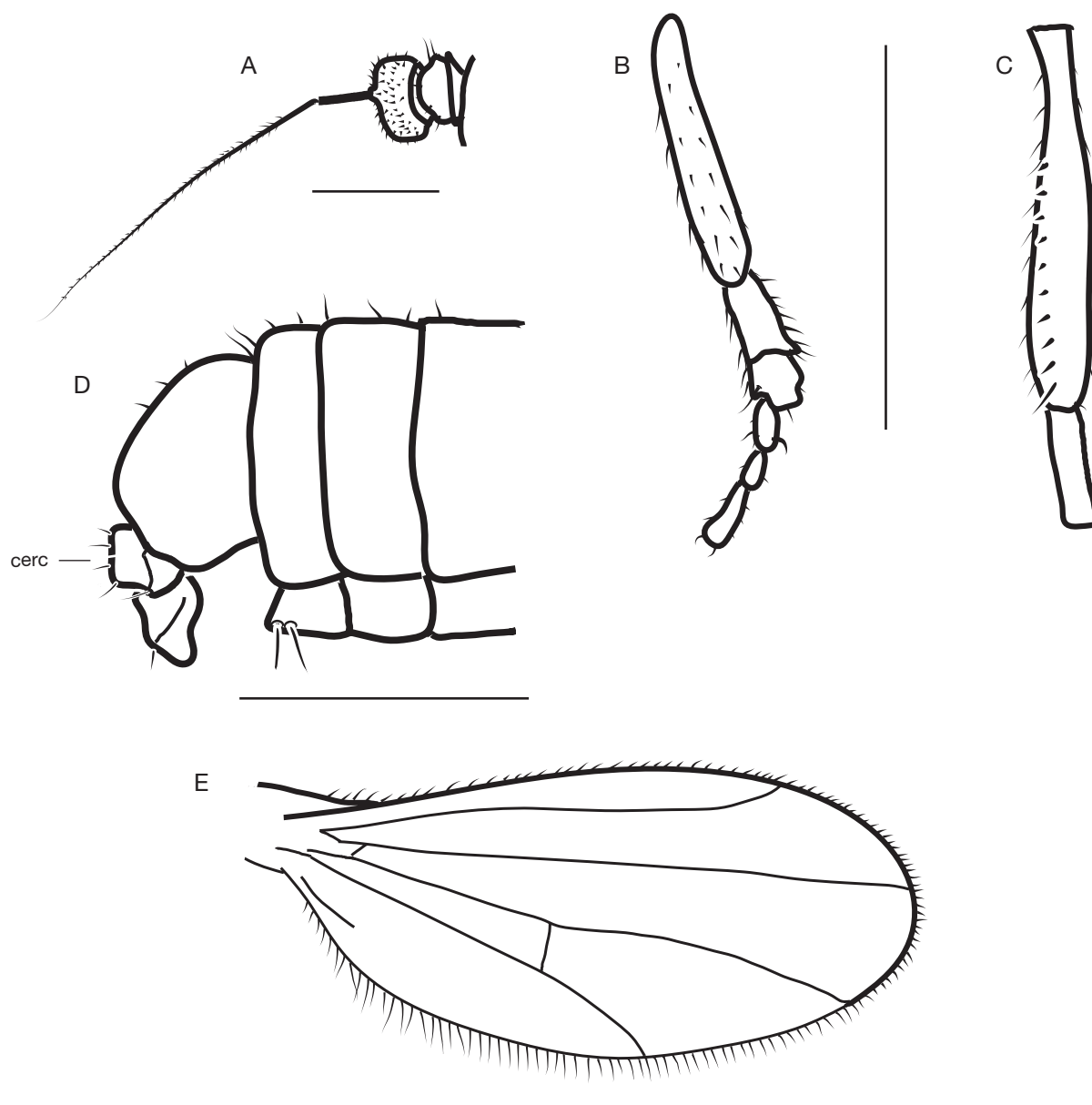


FIG. 10. — *Enlinia touroulti* n. sp., ♂: **A**, antenna, lateral view; **B**, fore tibia and tarsus, ventral view; **C**, mid tibia and tarsomere 1, ventral view (anterior is to the left); **D**, abdomen and terminalia, right lateral view; **E**, wing. Abbreviations: **cerc**, cerci. Scale bars: A, 0.1 mm; B-D, 0.25 mm; E, 0.5 mm.

Female
Unknown.

Enlinia dalensi n. sp.
(Figs 11, 12)

[urn:lsid:zoobank.org:act:F079FB9D-54F0-4458-B515-9E3AEA024AF1](https://doi.org/10.21203/rs.3.rs-1000000/v1)

TYPE MATERIAL. — **Holotype**. ♂, slide mounted. First label: “GUY-ANE, Maripasoula, N 2°13'59.8" / W 54°27'46.5", 471 m, Malaise trap (6 m), 13.viii.2015-20.viii.2015, P.-H. Dalens leg.” Second label: “partially open areas on savane roche 2; La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/230”. Third label: “HOLOTYPE ♂ *Enlinia dalensi* Runyon & Pollet 2018” (red label). Deposited at MNHN.

ETYMOLOGY. — This species is named in honor of, and out of respect to, Pierre-Henri Dalens, président de la Société entomologique Antilles-Guyane (SEAG), who led the Mitaraka entomological team during periods 2 and 3 of the expedition. Thanks to him, the 6 m Malaise trap was installed on ‘savane roche 2’ which led to the discovery of an unprecedented rich *Enlinia* fauna on this rocky outcrop.

DIAGNOSIS. — *Enlinia dalensi* n. sp. can be recognized by the form of the modified fore tarsus (Fig. 11A), the ventral setae on middle femur (Fig. 11C), the shape of the wing and wing veins (Fig. 12), and modifications of abdominal sternites (Fig. 11D, E). This species is closely related and quite similar to *E. bredini* Robinson, 1975 from Dominica, to which it keys in Robinson (1975). Both species have similarly modified fore tarsi (Fig. 11A), similar modifications in shape and armature on abdominal sternites 3 and 4 (Fig. 11D, E), and

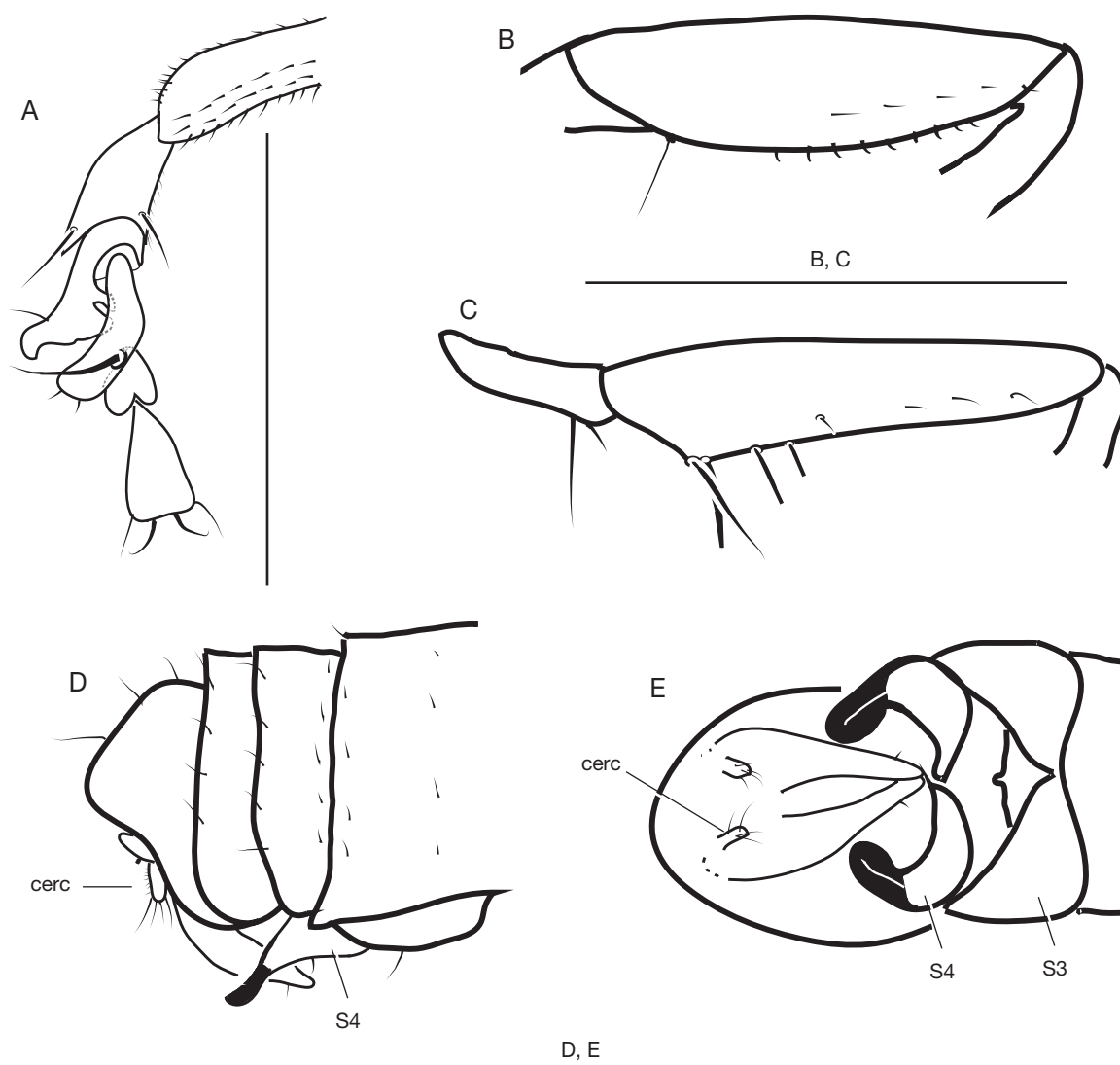


FIG. 11. — *Enlinia dalensi* n. sp., ♂: **A**, tip of fore tibia and tarsus, dorsal view; **B**, fore femur, anterior view; **C**, mid trochanter and femur, posterior view; **D**, tip of abdomen and terminalia, right lateral view; **E**, tip of abdomen and terminalia, ventral view. Abbreviations: **cerc**, cerci; **S3**, abdominal sternite 3; **S4**, abdominal sternite 4. Scale bars: 0.25 mm.

similar blunt setae on middle femur (Fig. 11C), among other characteristics. *Enlinia dalensi* is most readily distinguished by a distinctly sinuous wing vein R_{4+5} that is bent backwards at apex (straight in *E. bredini*), a wing with a less sinuous posterior margin, and larger anal area, and epandrial lobes that lack plumose hairs and feature large prong or hook on inner surface near base.

DESCRIPTION

Male

Body size. Length. 0.9 mm, wing length 0.9 mm by 0.4 mm (width).

Head. Face very narrow on ventral half but still distinct to mouth; anterior facets distinctly enlarged. Upper face and frons dark brown. Palpus small, yellow, nearly round with anterior surface truncate and fringed with minute black hairs;

proboscis brown. Antenna brown; first flagellomere very short and blunt, about twice as wide as long; arista-like stylus apical, about 1.5 times as long as face.

Thorax. Scutum dark brown with weak violet reflections, pleura brown. Setae brown with pale reflections; 6-7 pairs of small acrostichal setae; 7-8 pairs of dorsocentral setae; one pair of widely separated scutellar setae.

Legs. Yellow with coxae brownish, with dark setae. Fore coxa with a large seta on inner anterior surface near apex. Mid trochanter (Fig. 11C) with long black ventral seta (in line with row of ventral setae on mid femur). Fore femur (Fig. 11B) with a slender erect ventral seta at base (length subequal to width of femur) and anteroventral row of about 10 minute peg-like setae on apical half; mid femur (Fig. 11C)

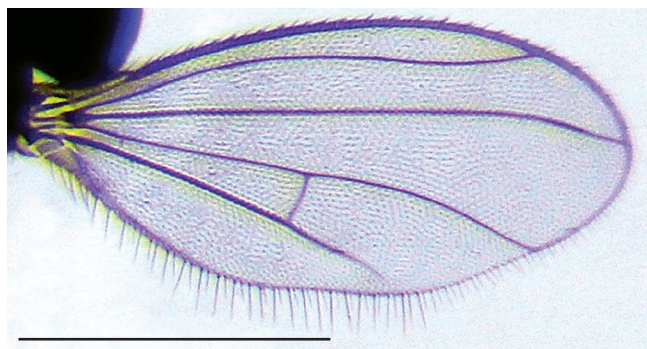


FIG. 12. — *Enlinia dalensi* n. sp., ♂ wing. Scale bar: 0.5 mm.

with ventral row of 4 large setae on basal half which become larger towards base of femur, these setae blunt apically except basal-most seta which is normal (sharply pointed); femur thickest at insertion of basal-most setae. Fore tibia with ventral surface slightly flattened; mid tibia with a brush of very short, erect ventral setae on apical $\frac{1}{3}$; hind tibia gradually and slightly widened toward apex, with a dorsal seta near base, a smaller dorsal seta near $\frac{1}{3}$, and a larger dorsal seta near apex. Fore tarsus (Fig. 11A) highly modified, tarsomere 1 broad with 2 dorsal setae near apex; tarsomere 2 apically projecting alongside and partly overlapping tarsomere 3 with two lobes near apex and ventrally with a small darker, more sclerotized area that includes a minute spicule; tarsomere 3 long and slender, slightly bent just before middle, with large arched dorsal seta near middle; tarsomere 4 short, rounded to heart-shaped, arising from near middle of tarsomere 3; tarsomere 5 expanding from a very narrow base. Ratios of tibia:tarsomeres for fore leg: 10-4-4-4-2-4; for mid leg: 12-6-3-2-2-3; for hind leg: 16-6-4-3-2-3.

Wing (Fig. 12). Elliptical with hind margin slightly sinuous and nearly straight basad to apex of CuA_1 , long-fringed with hairs; hyaline. Vein R_{2+3} close to and parallel with costa on about basal half, curving slightly towards vein R_{4+5} in distal half before curving slightly forward to costa; vein R_{4+5} mostly straight but distinctly curving backwards at apex; vein M_1 slightly sinuous beyond crossvein, curving slightly forward at apex; crossvein $dm-cu$ about half as long as apical part of vein CuA_1 ; vein CuA_1 not reaching wing margin, slightly bowed beyond crossvein; vein A_1 represented by indistinct thickening along anal margin. Halter brown.

Abdomen (Fig. 11D, E). Brown, with very sparse, short brown setae. Sternite 3 more strongly sclerotized laterally and less so medially and apically, with minute median armature at hind margin; sternite 4 highly modified, medially divided into pair of C-shaped lobes with a brown setiferous papilla at each hind corner that is projecting posteroventrally. Hypopygium small, brown, capping tip of preabdomen; cerci very small, slightly longer than wide with small marginal

hairs; epandrium with thin, nearly transparent, tapering lobes that project forward beneath abdomen and between papillae of sternite 4.

Female
Unknown.

REMARKS

The setiferous papillae on abdominal sternite 4 in males of *E. dalensi* n. sp. (Fig. 11D, E) appear homologous to the “brown projection composed of a loop of twisted, finely striate chitin” of *E. bredini* (Robinson 1975: 47). We have seen an undescribed species from Dominica that belongs to the species group containing *E. bredini* and *E. dalensi* n. sp. and possesses a similarly modified fore tarsus, ventral setae on middle femur, and shape of the wing and modifications on abdominal sternites. *Enlinia anomalipennis* Robinson, 1969 from Mexico, also appears to belong to this group based on the similarly modified fore tarsus, ventral setae on middle femur, and shape of the wing and hypopygium.

OTHER SPECIMENS

A female specimen representing a seventh *Enlinia* species occurring at Mitaraka was taken during the expedition (‘sp. GF-007’). This specimen belongs to the distinct *E. armata* group whose members possess a row of very short ventral setae on the fore femur and strong dorsal setae on the hind tibia in both sexes (Robinson 1969) but cannot be confidently assigned to any of the described species. Although this species is likely new, males will need to be collected before it can be formally described. This specimen is briefly characterized below.

Specimen examined

Enlinia ‘sp. GF-007’, one female, “GUYANE, Maripasoula, N 2°14’11”, W 54°27’07”, 306 m, Malaise trap (6 m), 25.VIII.2015, river, J. Touroult, E. Poirier leg.” Second label: “tropical wet forest, La Planète Revisitée Guyane 2015, MNHN PNI, sample cd: MITARAKA/189”. This specimen is deposited at MNHN.

Body size 1.2 mm. Antenna, thorax, abdomen and legs brown with brown setae and hairs. Scutum with 4-5 pairs of acrostichal setae; six pairs of dorsocentral setae. Fore femur with anteroventral row of small setae that get stouter and slightly longer towards apex of tibia; with two posteroventral setae near apex. Fore tibia with dorsal seta near $\frac{1}{3}$ and one dorsal row of short, closely-spaced setae (length about half width of tibia) along nearly full-length. Mid tibia with 2 dorsal setae near $\frac{1}{4}$, one seta at $\frac{1}{2}$, and one near apex; with one larger ventral seta at apex. Hind tibia with one anterodorsal seta at $\frac{1}{4}$, at $\frac{1}{2}$, and near apex; with one row of five rather stout posterodorsal setae along full-length of tibia; with one ventral seta at apex. Wing narrowly oval and with slight brown tinge and evenly rounded margins; veins nearly straight and evenly diverging from base. Halter brown.

KEY TO SPECIES OF *ENLINIA* ALDRICH, 1933 FROM FRENCH GUIANA (MALES)

1. Hind margin of wing with distinct, projecting lobe near apex of vein CuA₁ (Fig. 3); hind tibia with anteroventral row of large, modified setae (Figs 2, 4B) 2
 — Wing without distinct, projecting lobe near apex of vein CuA₁; hind tibia without row of large, modified setae 3
2. Cerci long with large setae at apex that extend anteriorly to base of abdomen (Fig. 4E) *E. bova* n. sp.
 — Cerci short, extending anteriorly only to sternite 4 (Fig. 1E) *E. loboptera* n. sp.
3. Hind tibia with 5 stout posterodorsal setae (length greater than width of tibia) along full-length (known from female, but males should key here too) *Enlinia*. sp. GF-007 (*E. armata* group)
 — Hind tibia with at most 2 weak dorsal setae 4
4. Wing with a small brown spot midway between veins R₄₊₅ and M₁ (Fig. 9); abdominal sternite 2 with linear rod-like armature (Fig. 8D) *E. mitarakensis* n. sp.
 — Wing without brown spot; abdominal sternite 2 without armature (armatures, if present, on sternites 3 and 4) 5
5. Antenna with first flagellomere relatively enlarged and drawn out to narrow point (Figs 5, 6A); front tarsus unmodified *E. colossicornis* n. sp.
 — Antenna with first flagellomere short and blunt (as in Fig. 10A); front tarsus modified 6
6. Wing with hind margin sinuous and fringed with slightly longer than normal hairs (Fig. 12); mid femur with 4 large, black ventral setae near base (Fig. 11C); abdominal sternite 4 with accessory lobes (Fig. 11D, E) *E. dalensi* n. sp.
 — Wing with hind margin evenly rounded and without long hairs (Fig. 10E); mid femur without large, black ventral setae; abdominal sternites unmodified, without accessory lobes (Fig. 10D) *E. touroulti* n. sp.



FIG. 13. — Wet rocks and vegetation at base of the inselberg Sommet-en-Cloche, 02°13'44.4"N, 54°27'57.9"W, 499 m, Mitaraka (French Guiana) (photo Marc Pollet). Similar microhabitat conditions were also present on the lower rocky outcrops ('savanes roches') in the same area.

DISCUSSION

Five of the seven species of *Enlinia* found at Mitaraka were collected on an isolated, rocky outcrop with seeps ('savane roche 2', similar to Fig. 13), and three along the river Alama, at both sites with a single 6 m Malaise trap. Adults of most species of *Enlinia* occur on rock, and almost always near rivers, streams or seeps (Robinson 1969), thus these habitats are ideal for *Enlinia*. Although multiple species of *Enlinia* are documented to co-occur at a single locality (Robinson 1969, 1975), the collection of five species on such a remote rocky habitat well away from streams, and in such a short time period (8 days, 13-20.VIII.2015) is surprising. Microhabitat and substrate specialization might in part explain this sympatric diversity – species of *Enlinia* are known to prefer sun versus shade and different species can even be found on the wet versus dry surfaces of the same rock (Robinson 1969). There can even be an ecological progression among those species that prefer wet rock surfaces, in which some species are found only on slightly moist surfaces and other species found hovering over surfaces constantly washed by running water (Robinson 1975). In fact, *Enlinia* species were encountered on two of the three "savanes roches" and both inselbergs investigated during the Mitaraka survey. As multiple species and high numbers were only obtained with a Malaise trap that was operational in one of these sites, there is little doubt that *Enlinia* occurs on most rocky outcrops with seeps in this part of Amazonia.

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