

Sawflies (Hymenoptera: Argidae, Pergidae, Tenthredinidae) from southern Ecuador, with a new record for the country and some ecological data

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Abstract

An illustrated list of species of sawflies collected during 2014 and 2015 in southern Ecuador is given. One genus and species, *Pristiphora fernandezii* Smith (Tenthredinidae), is new for the country. Ecological data are provided for *Lagideus podocarpus* Smith, **sp. n.** (Pergidae) that was observed feeding on *Fuchsia vulcanica* L. (Onagraceae). Three new combinations are proposed: *Bolivius notabilis* (Konow, 1899), *Plau-manniana biclinea* (Konow, 1899), and *Proselandria alvina* (Konow, 1899) (Tenthredinidae: Selandriinae).

Keywords

Species list, páramo, host plant, *Fuchsia*, *Lagideus*, larva, defence behaviour

Introduction

Most sawflies described from South America belong to the Tenthredinidae (Smith 2003a, 2003b), Argidae (Smith 1992), and Pergidae (Smith 1990). Worldwide, the most species-rich family is the Tenthredinidae with over 5700 species (Taeger et al. 2010). The Argidae include ca. 900 species distributed throughout the world but with a greatest number and diversity occurring in the Neotropical Region (Smith 1992). They are mainly associated with angiosperms. The Pergidae include ca. 440 species, occurring in the Australasian, Nearctic, and Neotropical regions (Smith 1990; Schmidt and Smith 2006). They are the most diverse in Australia and the Neotropics.

Related to its size, Ecuador is among the countries with highest biodiversity, which is mainly due to its tropical location as well as the presence of the Andes, Amazon Basin and two major ocean streams. These combined factors lead to a high variety of distinct environments. One typical biotope for tropical highlands is called the ‘páramo’ which occurs in southern Ecuador.

Here, we list the sawflies which were collected mainly in the Podocarpus National Park (NP) that is characterized by the páramo. The collections were performed in the frame of a Global Taxonomy Initiative (GTI) project.

Methods

Sawflies were collected in southern Ecuador, mainly around Loja (e.g., Fig. 1) and during October 2014. Most sawflies were collected as adults using a net, a few being collected in yellow pan traps, while larvae were found only at one location. The specimens were stored in ethanol, but some of the larvae were reared to obtain the adults.

Most pictures were taken by J.-L. Boevé with the following cameras: Pentax Optio W10, Nikon Coolpix P300, and Nikon D7000. Since adult specimens are kept in ethanol, they were slightly dried to take the pictures, which were mainly intended to illustrate the habitus. Pictures were also taken by D. R. Smith (Fig. 10) and Thibaut Delsinne (Fig. 21b, e, f, g).

The sawfly specimens collected as part of the GTI project are stored in the Royal Belgian Institute of Natural Sciences, Brussels, Belgium (RBINS; J.-L. Boevé collection, with specimen reference codes starting with ‘P’), with duplicates located in the National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA (USNM), and Museo de Colecciones Biológicas, Universidad Técnica Particular de Loja, Ecuador (MUTPL). Sawfly specimens from the RBINS, Senckenberg Deutsche Entomologisches Institut, Müncheberg, Germany (SDEI), and USNM were examined. Dates are given by dd.mm.year.

Taxonomic changes presented here are by D.R. Smith. Identifications of Argidae, Pergidae, and Tenthredinidae (Nematinae) are based on Smith (1990, 1992, 2003b). Identifications of Blennocampinae and Selandriinae (Tenthredinidae) are based on Smith (2007) and unpublished manuscripts by D.R. Smith.

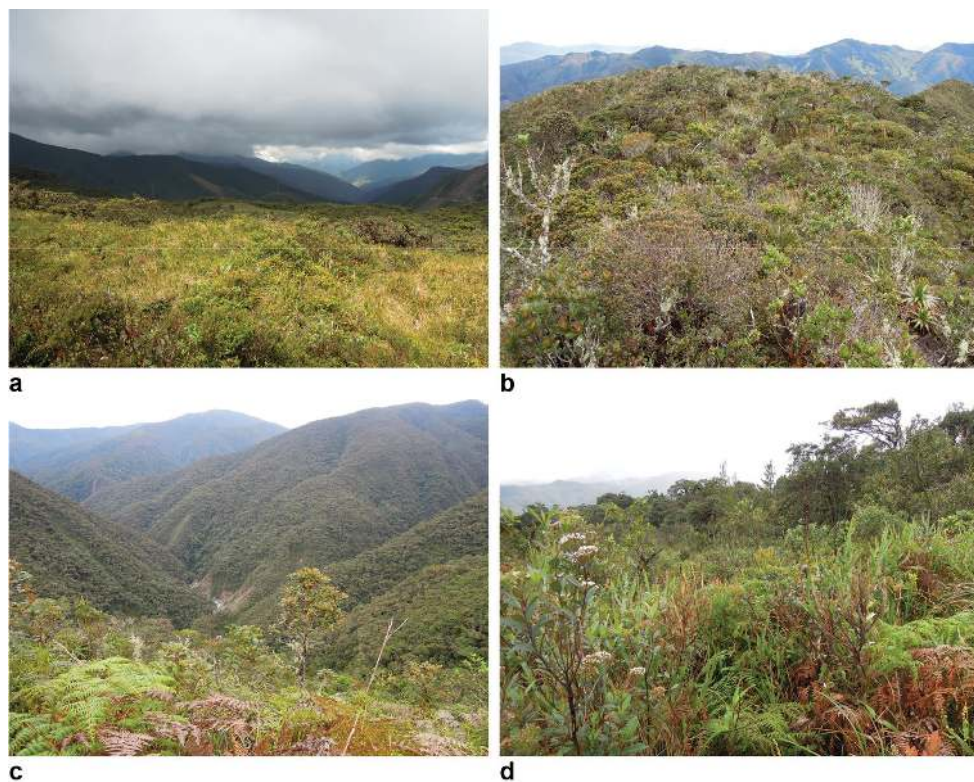


Figure 1. Examples of biotopes in southern Ecuador and where sawflies were collected. **a** El Tiro (altitude 2815 m) **b** Cajanuma “Mirador” (3000 m) **c** Colibrí Station (2170 m) **d** Yangana (ca. 2500 m).

Results

Family Argidae

Scobina bolivari (Konow, 1899)

Fig. 2

Distribution. This species is known from Colombia, Ecuador, Peru, Bolivia, and northern Argentina (Jujuy) (Smith 1992).

Material. Los Geraneos, 04°09'S, 078°38'W, 855m, 18.10.2014, P3944.B (1 ♀), leg. A. Pauly, J.-L. Boevé.

Scobina inculta (Konow, 1906)

Fig. 3

Distribution. Known from Venezuela, Ecuador, Peru, Bolivia, and northern Argentina (Jujuy) (Smith 1992).



Figure 2. *Scobina bolivari*, female (P3944.B), body length 8.0 mm. **a** Dorsal view **b** ventral view.



Figure 3. *Scobina inculta*, female (P4120.A), body length 9.5 mm. **a** Dorsal view **b** ventral view.

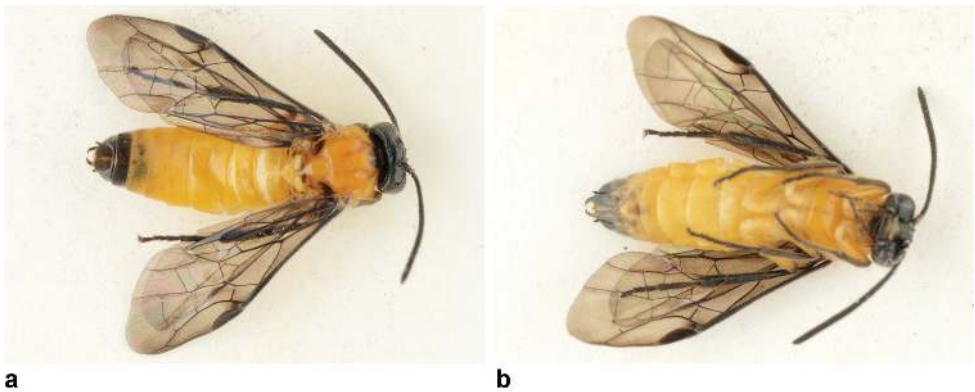


Figure 4. *Scobina notaticollis*, female (P3891), body length 8.5 mm. **a** Dorsal view **b** ventral view.

Material. Bombuscaro, 04°05'S, 078°57'W, 930m, 22.03.2015, P4120.A (1 ♀), leg. T. Delsinne.

***Scobina notaticollis* (Konow, 1899)**

Fig. 4

Distribution. Known from Costa Rica, Panama, Venezuela, Colombia, Ecuador, Peru, and Bolivia (Smith 1992).

Material. Vilcabamba, 04°16'S, 079°13'W, 1570m, 11.10.2014, P3891, P3892 (2 ♀), leg. A. Pauly, J.-L. Boevé.

***Scobina* spp.**

Fig. 5

Material. S. of Yangana, 04°22'S, 079°10'W, 1940m, 09.10.2014, flying, P3890 (1 ♀), leg. A. Pauly, J.-L. Boevé; nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2275m, 21.10.2014, on *Rumex crispus* (Polygonaceae), P3953.B (1 ♂), leg. J.-L. Boevé.

***Sericoceros gibbus* (Klug, 1834)**

Fig. 6

Distribution. A widespread species known from Mexico south to Guyana, Brazil, and Peru.

Material. Bombuscaro, Podocarpus NP, 04°06'S, 078°58'W, 995m, 17.10.2014, flying while crossing footpath, P3937 (1 ♀), leg. A. Pauly, J.-L. Boevé.

Remarks. Larvae have been recorded from *Coccoloba manzinellensis* Beurl. and *C. caracasana* Meisn. in Panama, and *C. guanacastensis* W. C. Biurger (Polygonaceae) in Costa Rica. Notes on the biology were given by Smith and Janzen (2003).

Family Pergidae

***Acordulecera* spp.**

Remarks. Probably four species were found in this study. It is a large genus of perhaps 200 or more species that occurs from Canada to Chile. Smith (1990) listed 45 described species from the Neotropics.

Material. Valle de Quinara, 04°18'S, 079°16'W, 1550m, 09.10.2014, P3888.A, P3888.B (2 ♂), leg. A. Pauly, J.-L. Boevé; Station Colibrí, Podocarpus NP, 03°59'S,

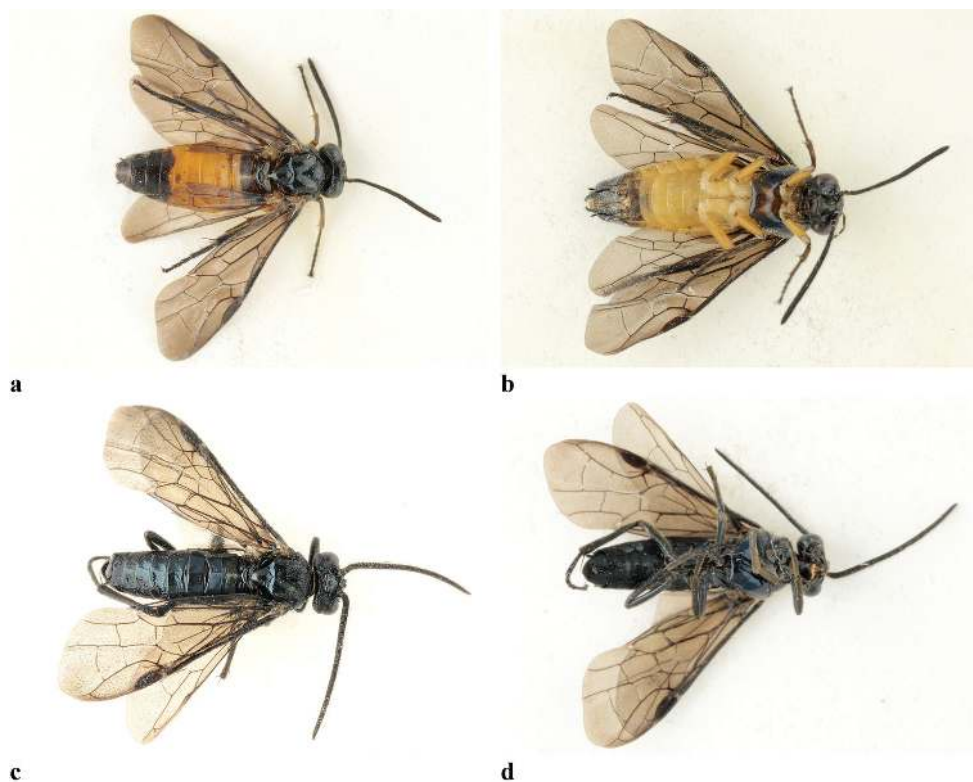


Figure 5. *Scobina* sp. **a, b** Female (P3890), body length 8.0 mm **c, d** male (P3953.B), body length 7.5 mm **a, c** Dorsal views **b, d** ventral views.

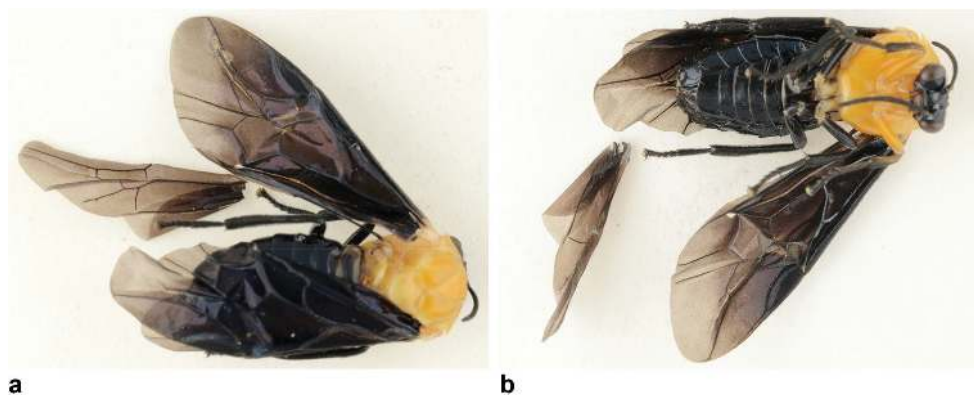


Figure 6. *Sericoceros gibbus*, female (P3937), body length 9.5 mm. **a** Dorsal view **b** ventral view.

079°06'W, 2170m, 13.10.2014, by sweeping, P3902 (1 ♂), leg. A. Pauly, J.-L. Boevé; Bombuscaro, Podocarpus NP, 04°07'S, 078°58'W, 995m, 16.10.2014, P3934 (1 ♀), leg. A. Pauly, J.-L. Boevé; nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2275m,

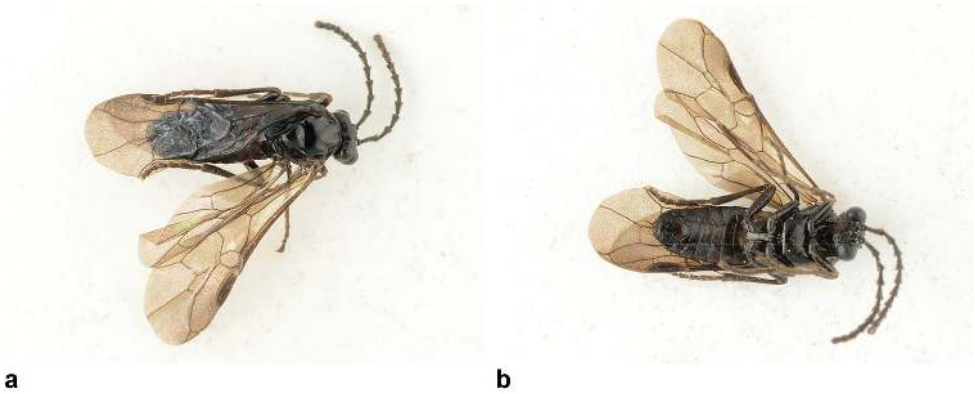


Figure 7. *Decameria varipes*, male (P3956.B), body length 4.0 mm. **a** Dorsal view **b** ventral view.

21.10.2014, near rivulet, P3956.G (1 ♀), P3956.H, P3956.I, P3956.J (3 ♂), leg. T. Delsinne, J.-L. Boevé; Cajanuma, Podocarpus NP, 04°07'S, 079°10'W, 2810m, 23.10.2014, on leaf, P3971 (1 ♀), leg. T. Delsinne, J.-L. Boevé.

***Decameria varipes* Cameron, 1883**

Fig. 7

Distribution. This species occurs from Guatemala south to Ecuador (Smith 1990).

Material. nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2275m, 21.10.2014, near rivulet, P3956.A, P3956.B, P3956.C, P3956.D, P3956.E, P3956.F (6 ♂), leg. T. Delsinne, J.-L. Boevé, on leaf of *Rubus* sp. (Rosaceae), P3950 (1 ♂), leg. J.-L. Boevé.

Remarks. The thorax is typically partly red in most specimens; however melanic forms are occasionally found. The specimens collected here are entirely black but agree in all structural features with the red form. Colour variation is common in some Perreyiinae.

***Decameria* sp.**

Fig. 8

Material. Loja, Reinaldo Espinosa Botanical Garden, 04°02'S, 079°12'W, 2145m, 14.10.2014, P3915 (1 ♂), leg. J.-L. Boevé.

***Lagideus podocarpus* Smith, sp. n.**

<http://zoobank.org/A9FD9A79-348D-42A2-8176-AAF8A2C0DA07>

Figs 9–11

Description. Female. Unknown.



Figure 8. *Decameria* sp., male (P3915), body length 5.5 mm. **a** Dorsal view **b** ventral view.

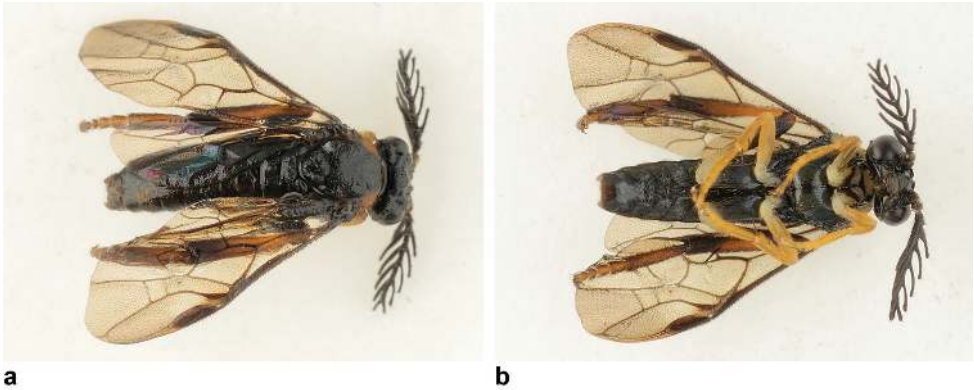


Figure 9. *Lagideus podocarpus*, male (P3898.etc>13), body length 6.0 mm. **a** Dorsal view **b** ventral view.

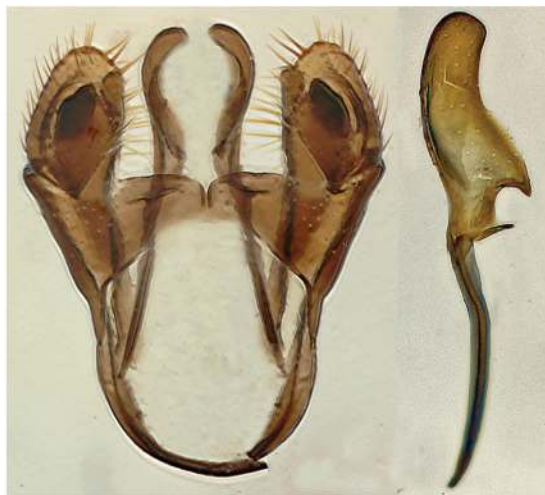


Figure 10. Male genitalia of *Lagideus podocarpus*. At left, genital capsule, ventral view; at right, penis valve, lateral view with dorsal margin to right.

Male. Length 7.0 mm. Antenna and head black; labrum and mouthparts white; mandible dark red brown. Thorax black with posterior corners of pronotum orange. Fore and midlegs light orange; fore coxa black with white stripe on outer surface and extreme apex white; mid coxa black with extreme apex white. Hind legs black with extreme apex of coxa, trochanters, and extreme base of femur white and about basal half of tibia light orange. Wings hyaline; veins and stigma black.

Head with vertex and frons shiny, very few widely scattered punctures; area adjacent to inner orbits slightly dull, micropunctured; with long golden hairs, as long as or longer than second antennomere. Antenna 1.5× head width; antennomeres 4-8 bipectinate, antennomere 3 unipectinate with inner ramus absent to very slightly indicated (Smith 2012: fig. 25); apical antennomere with rami less than half length of stem. Malar space linear. Thorax shiny; mesonotum with distinct punctures, separated by flat shiny interspaces more than puncture diameters; with long golden hair on dorsum and grey to white hair on pleurae and sterna. Hindbasitarsomere slightly longer than length of remaining tarsomeres combined; inner hind tibial spur about 0.6× length of basitarsomere. Genitalia in Fig. 10; parapenis uniformly broad, not distinctly indented on posterior margin; valviceps of penis valve with dorsal margin concave.

Type material. Holotype labelled “Ad.M, ex-larva,” “ECUADOR: Cajanuma, Podocarpus NP, 04°07'S, 079°10'W, 2810 m, X.2014, on *Fuchsia vulcanica*, JLBoevé leg. RBINS, EtOH100%, P3898.etc>10” (RBINS). Paratypes: Same data as for holotype except P3898.etc>01 (1 ♂), P3898.etc>02 (1 ♂), P3898.etc>03 (1 ♂), P3898.etc>04 (1 ♂), P3898.etc>05 (1 ♂), P3898.etc>06 (1 ♂), P3898.etc>07 (1 ♂), P3898.etc>08 (1 ♂), P3898.etc>09 (1 ♂), P3898.etc>11 (1 ♂), P3898.etc>12 (1 ♂), P3898.etc>14 (1 ♂); these specimens are in RBINS, USNM and MUTPL.

Other material. Cajanuma, Podocarpus NP, 04°07'S, 079°10'W, 2810m, 11.10.2014, on *Fuchsia vulcanica* (Onagraceae), P3898 (6 larvae), 14.10.2014, on *F. vulcanica*, P3917 (4 larvae), P3919 (20–30 larvae), 23.10.2014, on *F. vulcanica*, P3968 (>30 larvae), P3969 (6 larvae), P3970 (6 larvae), P3976 (4 larvae), leg. J.-L. Boevé.

Etymology. Named for Podocarpus National Park, Ecuador, where the collections were made; a noun in apposition.

Comments. Although only the male is known, it differs from described species, and we prefer to have a name since it was reared and the life history and host plant are known. Only females are known for most species of *Lagideus*, and this could be the opposite sex of one of those. However, this won't be known until the sexes are associated.

The bipectinate antennomeres 4-8 and unipectinate antennomere 3 will take this species to couplet 17c in Smith (2012) which includes *L. longicus* Smith and *L. tapanti* Smith, both known from Costa Rica. The black antenna and similarity of genitalia will put it closest to *L. longicus*.

Lagideus tapanti has white hairs on the head and body, antennomeres 1-3 or 4 yellowish, thorax black, and legs black with the base of the femora white; the antenna (Smith 2012: fig. 25) has the rami of the apical antennomere much longer than the stem;



Figure 11. Life history traits of *Lagideus podocarpus*. **a** A patch of the host plant *Fuchsia vulcanica* **b** a plant with feeding damage, seen from above **c–e** larvae attached to the underside of leaves, seen from below **f** a larva that just molted with exuvia visible.

and the parapenis of the male genitalia are lobed posteriorly with a central, shallow posterior emargination (Smith 2012: fig. 28). *Lagideus longicus* is entirely black and the apical antennomere has long rami as in *L. tapanti*; the parapenis of the genitalia is distinctly indented posteriorly for at least a third of its medial length (Smith 2012: fig. 29); and the valviceps of the penis valve have a straight dorsal margin (Smith 2012: fig. 33).

Lagideus podocarpus can be distinguished from both these species by light orange posterior corners of the pronotum; the light orange fore and mid legs (except the partly black coxae); basal half of the hind tibia light orange; the antennae, similar to *L. longicus* (Smith 2012: fig. 25) except the rami of the apical antennomere are short, less than half the length of the stem; and the male genitalia (Fig. 10) which has the parapenis nearly uniformly broad, without a central posterior emargination and the valvceps of the penis valve distinctly concave dorsally.

The length varies slightly 6.0–7.5 mm. The tegulae may be black to brown or partly light orange as are posterior corners of the pronotum.

Life history. The population of *L. podocarpus* at Cajanuma (Fig. 11) consisted of larvae found within a circumference of ca. 100 m, on several patches of the host plant, *F. vulcanica* L. (Onagraceae). The larvae were attached to the underside of a leaf and they were generally aggregated in that one or a few individuals occurred per leaf. Younger larvae skeletonised the leaves and made holes in the leaf, whereas larvae of later instars attacked the leaf up to its edge. Larvae fed on both younger and older leaves. One large patch of flowering plants clearly harboured fewer larvae than the smaller and more numerous spots of non-flowering plants. The larvae being kept in rearing still appeared as healthy, despite the fact that the offered leaves (during November 2014) were less fresh and rather decaying. A couple of plant species and varieties were also offered to them to roughly establish their diet breadth. *Fuchsia* ‘Koralle’ was rather accepted, whereas only very few small holes were made on leaves of *Fuchsia* ‘Gartenmeister Bonstedt’. These two varieties are cultivars of *Fuchsia triphylla* that is related to *F. vulcanica* (Marc Reynnders, personal communication). A leaf of *Oenothera* sp. (Onagraceae) was also tested, but not accepted.

Larvae of nearly all instars were found in the field, but no adults were collected by sweeping. Among the larvae kept in rearing, several individuals reached the eonymph stage (Fig. 11g–h), during the first ten days of October 2014. They formed a cocoon between fresh or rather decaying leaves (Fig. 11i), or in an offered layer of moistened sand. At the end of October, prepupae and cocoons occurred in the rearing. A total of 14 adults, all males, emerged from 20.11 to 12.12.2014.

Once disturbed, a larva of *L. podocarpus* reacted immediately by raising its abdomen (Fig. 11j), then slowly lowering it. This reaction could be repeated several times, under successive disturbances. After several such behaviours, the larva tended to slightly walk backwards. The prepupa reacted under disturbance by curling its body and making some slow movements. To further investigate the larval defensive behaviour, a dozen workers of the ant species *Eciton burchellii* Westwood (Formicidae) were collected in the field (Pueblo Viela, 15.10.2016), held without feeding, and used ca. 36 h later. The bioassay consisted of placing seven ant workers and one larva settled on a host plant leaf in an open box, the interactions being then filmed. As far as no ant contacted the larva, the latter remained merely immobile. But once contacted, the larva instantly raised its abdomen and directed the apical filaments towards the aggressor (Fig. 11k–l). Thus, these filaments seem to play a major role in defence. Their size is impressive, with a length of 13 mm for a remaining body size of 16 mm. The

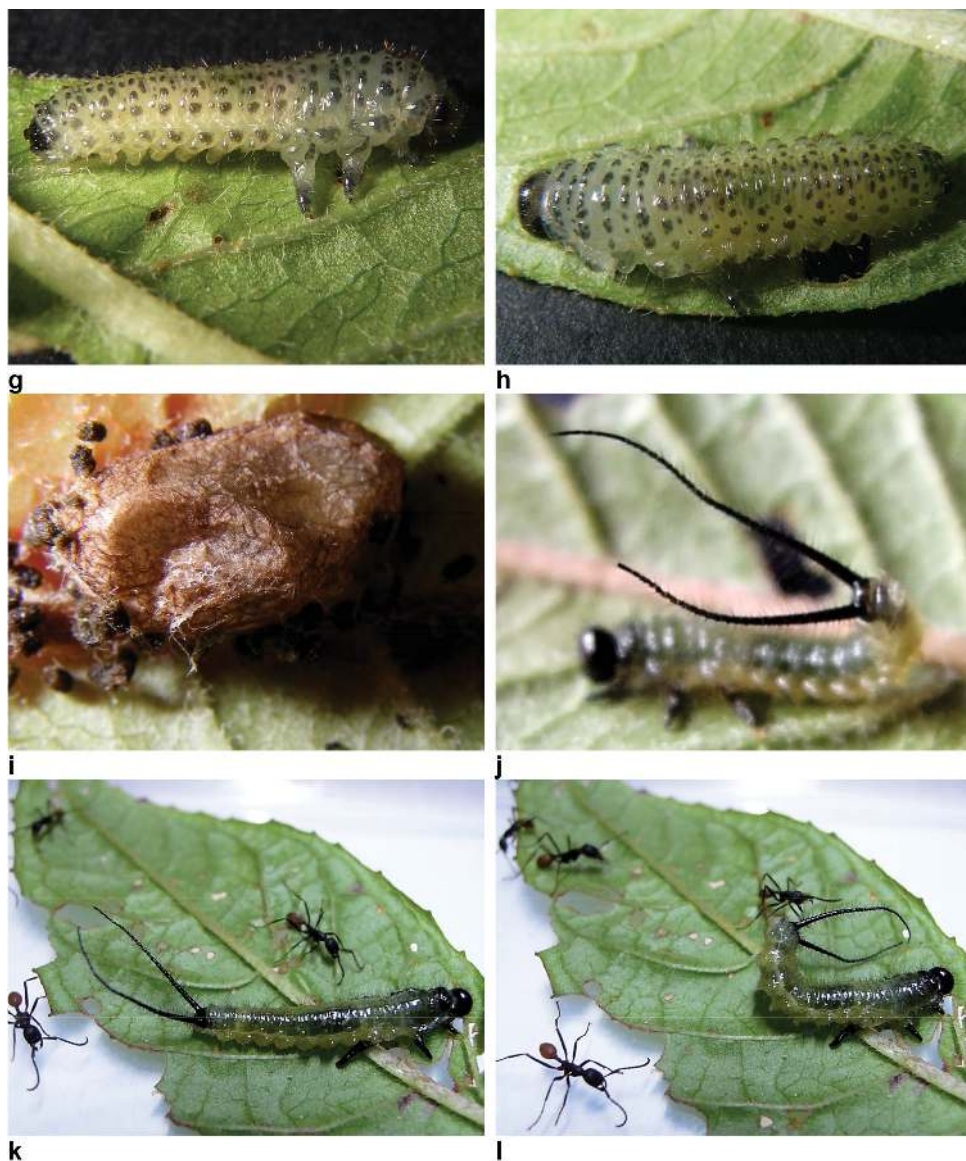


Figure 11. Continue. **g, h** prepupal stage **i** cocoon **j** screenshot of a video clip, the thorax of the larva was touched with flexible forceps a second before **k, l** two screenshots of a video clip performed during a bioassay, both being spaced by 1 sec: an ant is approaching the larva (first screenshot), then touching it, which immediately provokes the defensive behaviour of the larva that directs its caudal filaments towards its aggressor (second screenshot).

filaments resemble those of the larvae of *Philomastix*; the two genera are sister-groups (Schmidt and Walter 2014). However, the filaments protrude from the apical segment in *Lagideus* and the ninth one in *Philomastix* (Smith and Bado 2004). Moreover, it

seems that they are clearly covered with spines in *Lagideus* only (Fig. 11; Smith and Bado 2004). It is unclear whether the defence is only physical, or includes chemical compounds. Larvae of Pergidae contain toxic peptides which are active against vertebrates and invertebrates (Boevé et al. 2014), but whether *Lagideus* sp. contains such compounds remains unknown.

Note that another sawfly species (Tenthredinidae) was found among the collected leaves (and stems) of *F. vulcanica*, but in much lower numbers (2 individuals: 11.10.2014, P3899, and 14.10.2014, P3919.C1) than *Lagideus* sp. (>90 in total). This plant constitutes a host plant, since a larva of the tenthredinid was placed on an intact leaf and the larva ingested significant parts of it.

***Perreyia picea* (Westwood, 1874)**

Fig. 12

Distribution. This species is known from Colombia, Ecuador, Peru, and Brazil (Smith 1990).

Material. nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2270m, 21.10.2014, P3957.E (1 ♂), leg. A. Pauly, J.-L. Boevé.

Family Tenthredinidae
Subfamily Blennocampinae

***Metapedias* sp.**

Fig. 13

Distribution. This Neotropical genus occurs from Mexico to Argentina and includes about 25 species.

Material. Bombuscaro, Podocarpus NP, 04°07'S, 078°58'W, 995m, 16.10.2014, flying just above the ground, P3935 (1 ♀), leg. J.-L. Boevé; N. of Pachicutza, 04°04'S, 078°38'W, 900m, 18.10.2014, P3942.C (1 ♂), leg. A. Pauly, J.-L. Boevé; Loja, Estación Científica San Francisco, 03°58'S, 079°05'W, 1820m, 24.03.2015, P4121.B (1 ♀), leg. T. Delsinne.

***Waldheimia atripennis* (Fabricius, 1804)**

Fig. 14

Distribution. This is a relatively common species occurring from Costa Rica to Brazil and Argentina.

Material. Bombuscaro, road to Podocarpus NP, 04°06'S, 078°58'W, 975m, 08.10.2014, P3883 (1 ♂), leg. A. Pauly, J.-L. Boevé; Bombuscaro, Podocarpus NP,

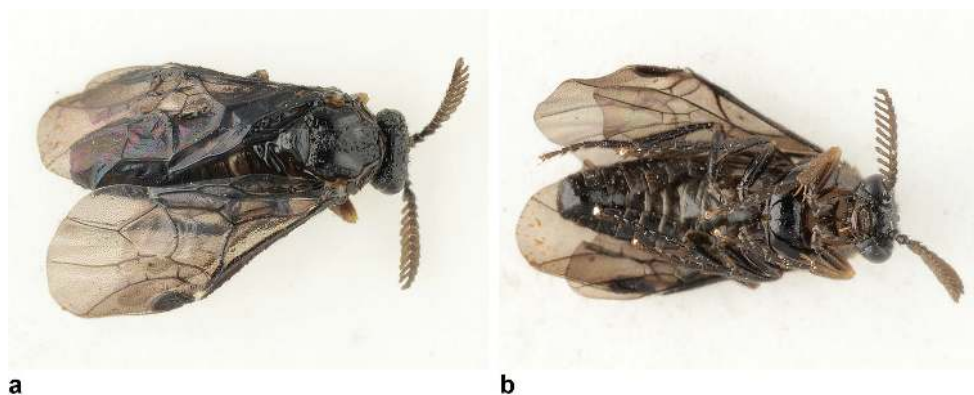


Figure 12. *Perreyia picea*, male (P3957.E), body length 6.5 mm. **a** Dorsal view **b** ventral view.



Figure 13. *Metapedias* sp. **a, b** Female (P4121.B), body length 6.0 mm **c, d** male (P3942.C), body length 6.5 mm. **a, c** Dorsal views **b, d** ventral views.

04°06'S, 078°58'W, 995m, 16.10.2014, P3936.D (1 ♂), leg. A. Pauly, J.-L. Boevé; Los Geraneos, 04°09'S, 078°38'W, 855m, 18.10.2014, P3944.A (1 ♀), leg. A. Pauly, J.-L. Boevé, P3941 (1 ♂), leg. J.-L. Boevé; Miasi, 04°15'S, 078°20'W, 875m, 19.10.2014,

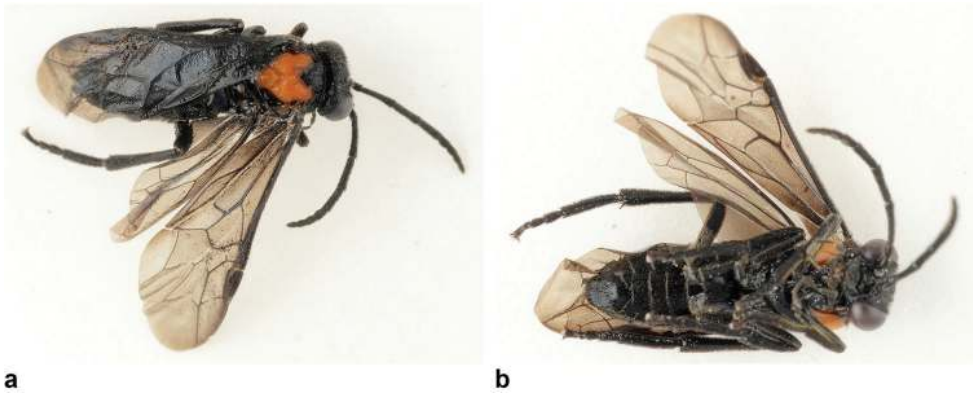


Figure 14. *Waldheimia atripennis*, male (P3967.U), body length 7.0 mm. **a** Dorsal view **b** ventral view.

P3945 (1 ♂), leg. A. Pauly, J.-L. Boevé, on/around leaf of *Anthurium* sp. (Araceae), P3946.A, P3946.B, P3946.C (3 ♂), leg. J.-L. Boevé; Romerillos, nr Podocarpus NP, 04°09'S, 078°56'W, 1100m, 22.10.2014, P3967.O (1 ♀), P3967.U, P3967.W (2 ♂), leg. A. Pauly, J.-L. Boevé.

***Waldheimia erebus* (W.F. Kirby, 1882)**

Fig. 15

Distribution. This species is known from Guyana, Brazil, Colombia, Ecuador, and Peru.

Material. Bombuscaro, road to Podocarpus NP, 04°06'S, 078°58'W, 955–975m, 08.10.2014, flying around plants of *Sticherus* sp. (Gleicheniaceae), P3866, P3867, P3868, P3869 (4 ♂), leg. J.-L. Boevé, P3880, P3881, P3882, (3 ♂), leg. A. Pauly, J.-L. Boevé; Pueblo Viela, 04°38'S, 079°08'W, 1060m, 15.10.2014, on leaf of *Anthurium* sp., P3926.B (1 ♀), P3926.A, P3926.C, P3926.D, P3926.E, P3926.F, P3926.H (6 ♂), leg. A. Pauly, J.-L. Boevé; Bombuscaro, Podocarpus NP, 04°06'S, 078°58'W, 995m, 16.10.2014, P3936.B, P3936.C, P3936.E (3 ♂), leg. A. Pauly, J.-L. Boevé; Romerillos, nr Podocarpus NP, 04°09'S, 078°56'W, 1100m, 22.10.2014, P3967.V (1 ♀), leg. A. Pauly, J.-L. Boevé, P3962.B, P3962.C, P3962.D, P3962.E (4 ♂), leg. J.-L. Boevé, P3967.Q, P3967.R, P3967.S, P3967.T, P3967.X, P3967.Y (6 ♂), leg. A. Pauly, J.-L. Boevé, flying, P3959, P3961, P3963.I, P3963.J, P3963.K, P3963.L, P3963.M, P3963.N, P3963.O (9 ♂), on leaf of *Hedychium coronarium* (Zingiberaceae), P3960.C, P3960.D (2 ♂), on leaf of *Anthurium* sp., P3958.F, P3958.G (2 ♂), leg. J.-L. Boevé; Bombuscaro, 04°05'S, 078°57'W, 930m, 22.03.2015, P4120.D, P4120.E, P4120.G (3 ♂), leg. T. Delsinne; Zamora, Copalinga, 04°05'S, 078°57'W, 1000m, 21.07.2015, P4125 (1 ♂), leg. T. Delsinne.

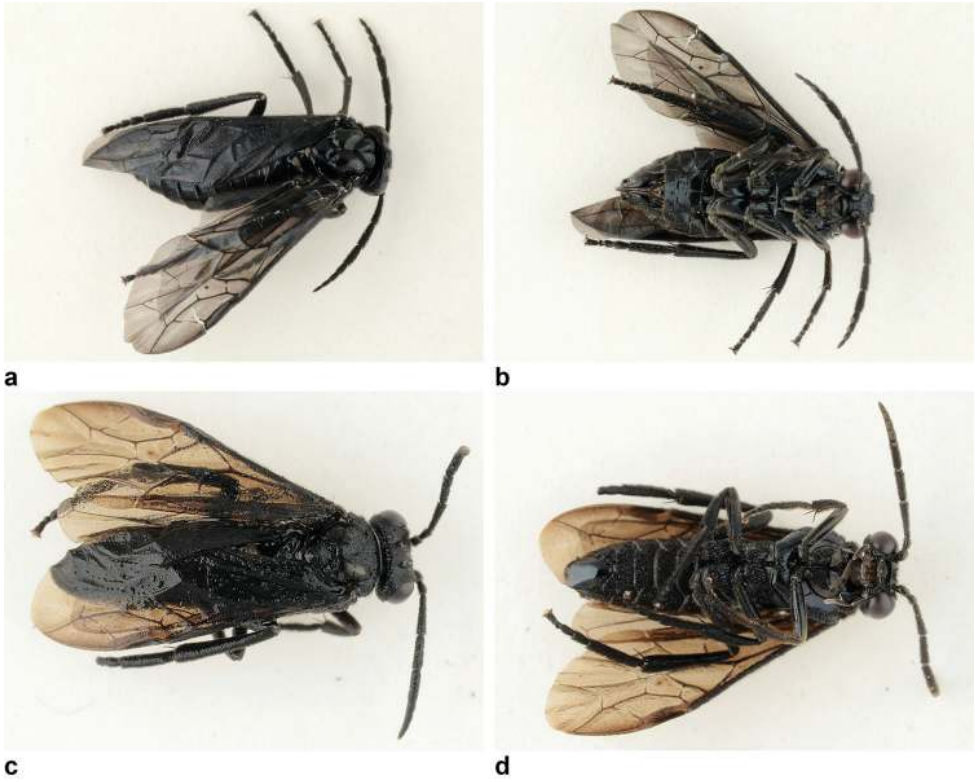


Figure 15. *Waldheimia erebus*. **a, b** Female (P3926.B), body length 7.5 mm **c, d** male (P3967.R), body length 8.0 mm. **a, c** Dorsal views **b, d** ventral views.



Figure 16. *Waldheimia pellucida*, male (P3958.D), body length 6.5 mm. **a** Dorsal view **b** ventral view.

***Waldheimia pellucida* Konow, 1904**

Fig. 16

Distribution. Known from Colombia, Ecuador, Peru, and Bolivia.

Material. Bombuscaro, road to Podocarpus NP, 04°06'S, 078°58'W, 955m, 08.10.2014, flying, P3865 (1 ♂), leg. J.-L. Boevé, P3875, P3876, P3877 (3 ♂), leg. A. Pauly, J.-L. Boevé; Pueblo Viela, 04°38'S, 079°08'W, 1060m, 15.10.2014, on leaf of *Anthurium* sp., P3928.A (1 ♀), leg. A. Pauly, J.-L. Boevé; N. of Pachicutza, 04°04'S, 078°38'W, 900m, 18.10.2014, P3942.B (1 ♂), leg. A. Pauly, J.-L. Boevé; Miasi, 04°15'S, 078°20'W, 875m, 19.10.2014, on/around leaf of *Anthurium* sp., P3946.E, P3946.F, P3946.G (3 ♂), leg. J.-L. Boevé; Romerillos, nr Podocarpus NP, 04°06'S, 078°57'W, 995m, 22.10.2014, on leaf of *Anthurium* sp., P3958.D (1 ♂), leg. J.-L. Boevé.

Waldheimia sp.

Fig. 17

Material. nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2270m, 21.10.2014, P3957.A (1 ♂), leg. A. Pauly, J.-L. Boevé.

Subfamily Nematinae

Pristiphora fernandezi D.R. Smith, 2003

Fig. 18

Distribution. *Pristiphora* is the only native genus of Nematinae in the Neotropics. Nine species were recorded by Smith (2003), from Mexico to Brazil. *Pristiphora fernandezi* was described from Colombia, and the specimen from the Podocarpus NP is the first record of both the species and genus from Ecuador.

Material. Station Colibrí, Podocarpus NP, 03°59'S, 079°06'W, 2170m, 17–20.10.2014, with yellow pan trap, P3948 (1 ♀), leg. A. Pauly, J.-L. Boevé.

Subfamily Selandriinae

Neotropical Selandriinae are poorly studied. Identifications below are based on a key to genera in Smith (2007). Correct combinations of many of the described species have not been published, including three species collected in this study. To apply the correct name to them, the new combinations are presented here.

Adiaclema sp.

Fig. 19

Remarks. A large genus of about 30 species which occur from Mexico to Argentina.

Material. Romerillos, nr Podocarpus NP, 04°09'S, 078°57'W, 1135m, 22.10.2014, flying near rivulet, P3964.B (1 ♀), leg. J.-L. Boevé.



Figure 17. *Waldheimia* sp., male (P3957.A), 9.5 mm. **a** Dorsal view **b** ventral view.

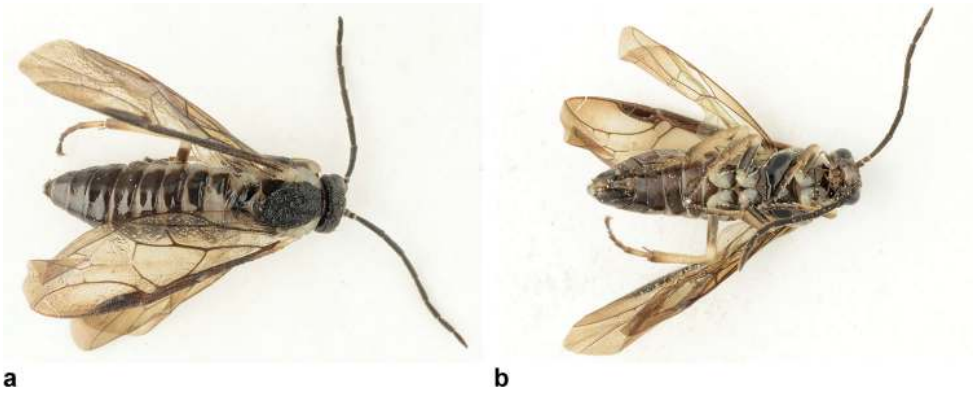


Figure 18. *Pristiphora fernandezi*, female (P3948), body length 8.0 mm. **a** Dorsal view **b** ventral view.

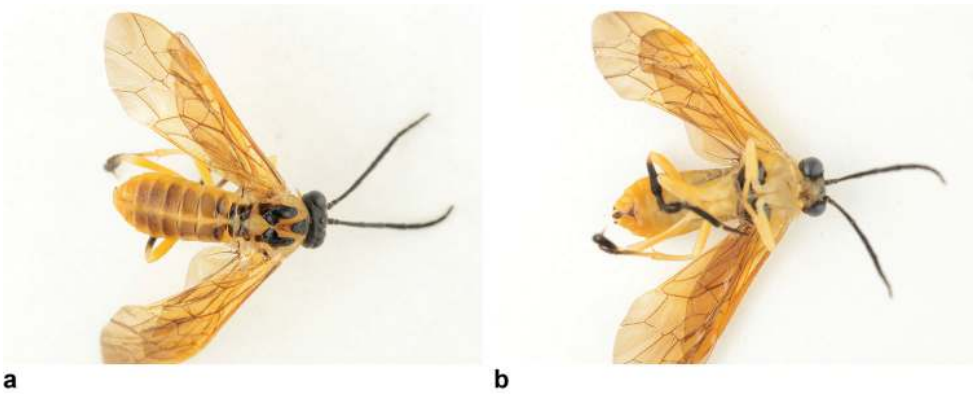


Figure 19. *Adiaclema* sp., female (P3964.B), body length 9.0 mm. **a** Dorsal view **b** ventral view.

Andeana farcta (Konow, 1900)

Figs 20, 21a–c

Distribution. This species is known from Venezuela, Colombia, Ecuador, and Peru.

Material. Yangana, 04°25'S, 079°09'W, 2450m, 09.10.2014, P3889 (1 ♂), leg. D. Domínguez, J.-L. Boevé; Cajanuma, Podocarpus NP, 04°07'S, 079°11'W, 2700m, 11.10.2014, by sweeping herbs, P3893, P3894, P3895, P3896 (4 ♂), leg. J.-L. Boevé, P3897 (1 ♂), leg. Carlos R. Carreira, J.-L. Boevé; N. of Santiago, 03°48'S, 079°16'W, 2550m, 12.10.2014, under a leaf, P3900.A (1 ♂), leg. J.-L. Boevé, P3900.B (1 ♂), leg. A. Pauly, J.-L. Boevé; Cajanuma, Podocarpus NP, 04°07'S, 079°10'W, 2750m, 14.10.2014, P3921 (1 ♂), leg. A. Pauly, J.-L. Boevé; Loja, Reinaldo Espinosa Botanical Garden, 04°02'S, 079°12'W, 2145m, 14.10.2014, by sweeping grass, P3911 (1 ♂), leg. J.-L. Boevé; S. of Yangana, 04°25'S, 079°09'W, 2515m, 15.10.2014, P3932 (1 ♂), leg. A. Pauly, J.-L. Boevé; Valladolid, along river, 04°33'S, 079°08'S, 1605m, by sweeping grass, P3929 (1 ♀), leg. J.-L. Boevé; Vilcabamba (in the car), P3933 (1 ♂), leg. J.-L. Boevé; nr Loja, Reserva El Madrigal,

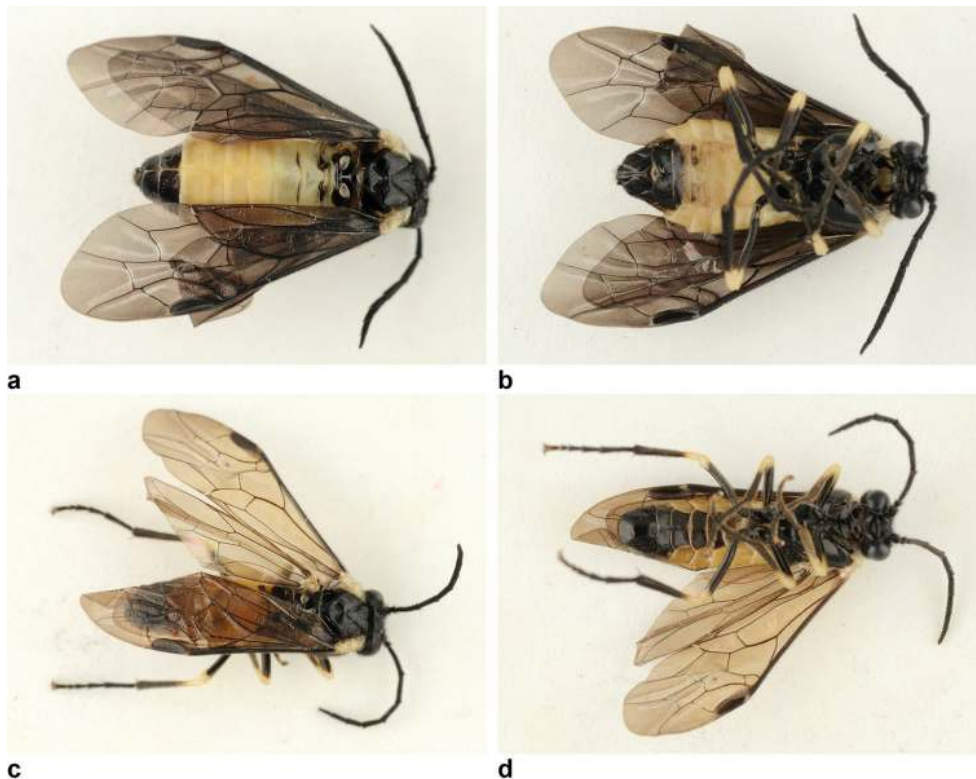


Figure 20. *Andeana farcta*. **a, b** Female (P3929), body length 10.0 mm **c, d** male (P3894), body length 8.5 mm. **a, c** Dorsal views **b, d** ventral views.

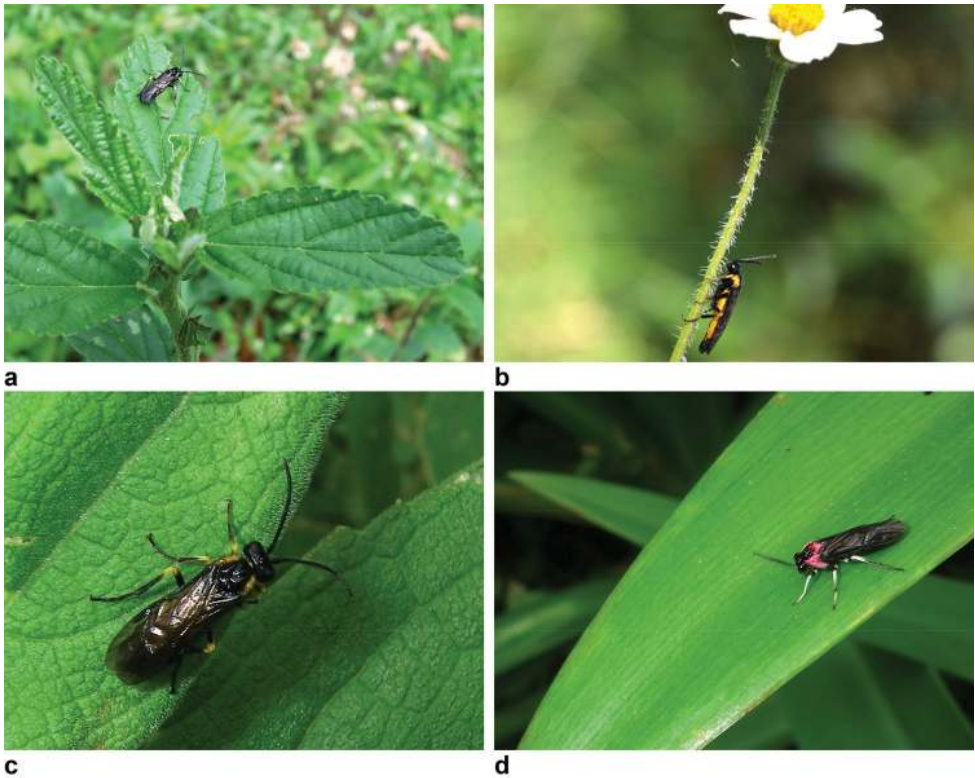


Figure 21. Pictures of sawfly adults taken in the field. **a, c** *Andeana farcta* (P3952 or P3954) **b** *A. farcta* (Reserva El Madrigal, 27.03.2015) **d** *Proselandria* sp. (P3905).

04°02'S, 079°11'W, 2270m, 21.10.2014, P3955.A (1 ♂), leg. T. Delsinne, J.-L. Boevé, P3957.B, P3957.C (2 ♂), leg. A. Pauly, J.-L. Boevé, P3954.A, P3954.B, P3954.C (3 ♂), leg. J.-L. Boevé, on *Sida* sp. (Malvaceae), P3952.A, P3952.B, P3952.C (3 ♂), leg. J.-L. Boevé; Loja, La Argelia, 04°01'S, 079°12'W, 2130m, 25.10.2014, landing on the ground, P3977 (1 ♀), leg. A. Pauly, J.-L. Boevé; nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2270m, 27.03.2015, one specimen on *Bidens pilosa* (Asteraceae), P4123.A, P4123.B (2 ♂), leg. T. Delsinne.

Andeana sp.

Fig. 22

Remarks. A genus of about 15 species in the Neotropics.

Material. N. of Pachicutza, 04°04'S, 078°38'W, 900m, 18.10.2014, P3940.D (1 ♀), leg. J.-L. Boevé; Loja, Estación Científica San Francisco, 03°58'S, 079°05'W, 1820m, 26.03.2015, P4122 (1 ♀), leg. T. Delsinne.

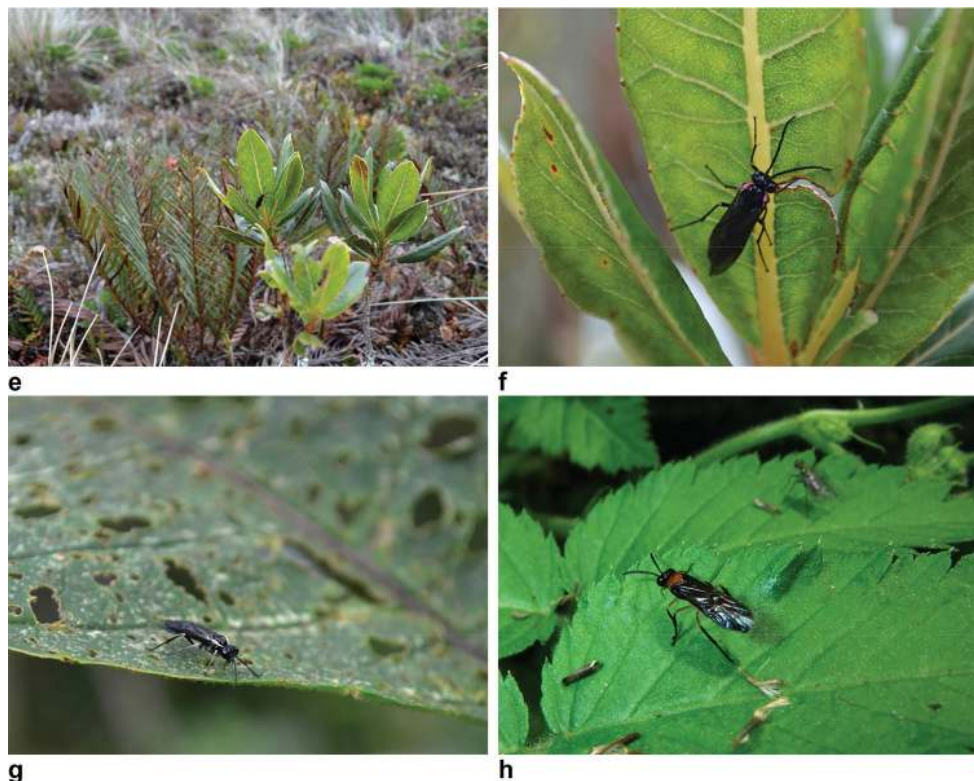


Figure 21. Continue. Pictures of sawfly adults taken in the field. **e, f** *Neonapeptamena* sp. (P3973.B) **g** *Stromboceridea albilabris* (Reserva El Madrigal, 27.03.2015) **h** *Bolivius notabilis* (P3966).

***Aneugmenus* sp.**

Fig. 23

Remarks. Smith (2005) recorded two species in northern South America, Venezuela, Colombia, and Ecuador, the southern extent of this Holarctic genus. One species, *A. merida* Smith, was reared from bracken fern, *Pteridium aquilinum* (L.) in Venezuela. The specimen collected here is a male and could be either of the two species; the male is not known for *A. colombia* Smith.

Material. nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2280m, 21.10.2014, by sweeping on *Pteridium* sp. (Dennstaedtiaceae), P3949 (1 ♂), leg. J.-L. Boevé.

***Bolivius notabilis* (Konow, 1899), comb. n.**

Figs 21h, 24

Stromboceros notabilis Konow 1899: 294; Konow 1903: 148 (female); Konow 1905: 98; Oehlke and Wudowenz 1984: 399; Taeger et al. 2010: 534.

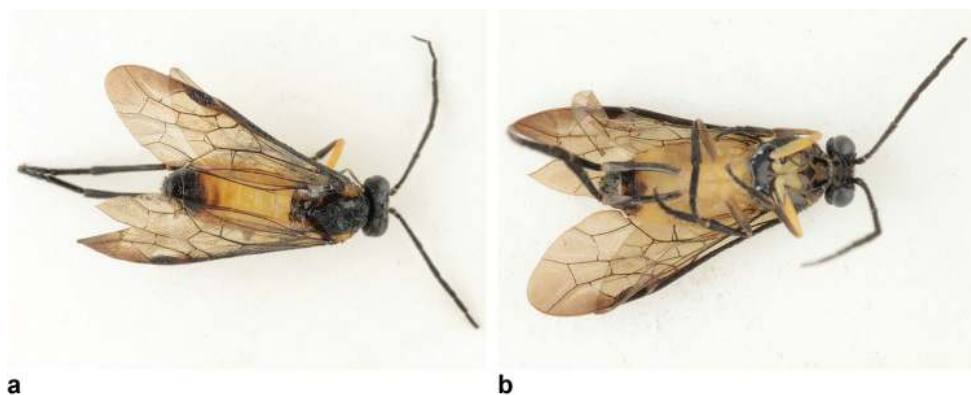


Figure 22. *Andeana* sp., female (P3940.D), body length 8.5 mm. **a** Dorsal view **b** ventral view.



Figure 23. *Aneugmenus* sp., male (P3949), body length 6.0 mm. **a** Dorsal view **b** ventral view.

Remarks. The male holotype cited by Oehlke and Wudowenz (1984) at SDEI is here considered a lectotype designation. Konow did not give the number of specimens available, but it was the only one found at SDEI. It is labelled “Callanga, Cuczo, Peru,” “Coll. Konow,” “TYPE,” “*Stromboeros notabilis* Knw., Peru.”

Distribution. This species is now known from Ecuador, Peru, and Bolivia.

Material. Bombuscaro, road to Podocarpus NP, 04°06'S, 078°58'W, 975m, 08.10.2014, P3873, P3874, P3878 (3 ♂), leg. A. Pauly, J.-L. Boevé; Bombuscaro, Podocarpus NP, 04°06'S, 078°58'W, 995m, 16.10.2014, P3936.A (1 ♂), leg. A. Pauly, J.-L. Boevé; N. of Pachicutza, 04°04'S, 078°38'W, 900m, 18.10.2014, P3940.C (1 ♀), leg. J.-L. Boevé, P3940.B (1 ♂), leg. J.-L. Boevé, P3942.A (1 ♂), leg. A. Pauly, J.-L. Boevé; Romerillos, nr Podocarpus NP, 04°09'S, 078°56'W, 1100m, 22.10.2014, P3962.A (1 ♂), leg. J.-L. Boevé, P3967.B, P3967.C, P3967.D, P3967.E, P3967.F, P3967.G, P3967.H, P3967.K, P3967.L, P3967.P (10 ♂), leg. A. Pauly, J.-L. Boevé, flying, P3963.A (1 ♀), P3963.B, P3963.C, P3963.D, P3963.E, P3963.F, P3963.G, P3963.H (7 ♂), flying near rivulet, P3964.A (1 ♀), P3965,

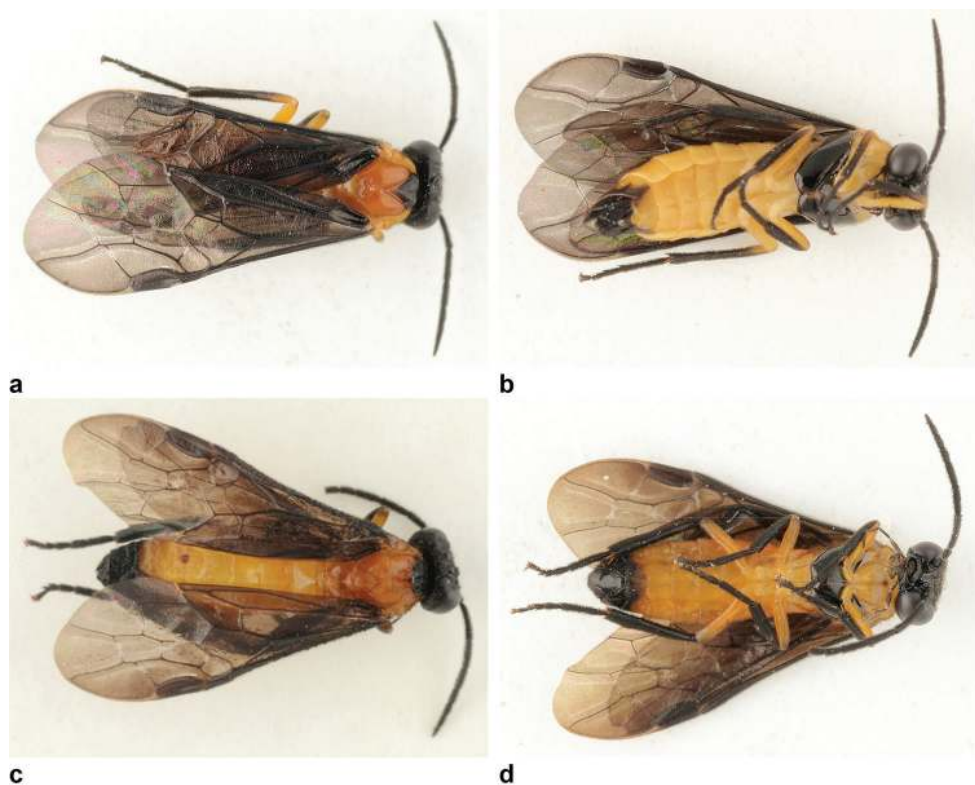


Figure 24. *Bolivius notabilis*. **a, b** Female (P3940.C), body length 6.5 mm **c, d** male (P3940.B), body length 7.0 mm. **a, c** Dorsal views **b, d** ventral views.

P3966 (2 ♂), leg. J.-L. Boevé; Bombuscaro, 04°05'S, 078°57'W, 930m, 22.03.2015, P4120.C (1 ♀), leg. T. Delsinne.

***Dochmioglene* sp.**

Fig. 25

Remarks. A genus of about 10 species in Central and South America.

Material. Loja, Estación Científica San Francisco, 03°58'S, 079°05'W, 1820m, 24.03.2015, P4121.A (1 ♀), leg. T. Delsinne.

***Inea* sp.**

Fig. 26

Remarks. A genus of about 20 species in Mexico, Central America, and northern South America.



Figure 25. *Dochmioglene* sp., female (P4121.A), body length 8.0 mm. **a** Dorsal view **b** ventral view.

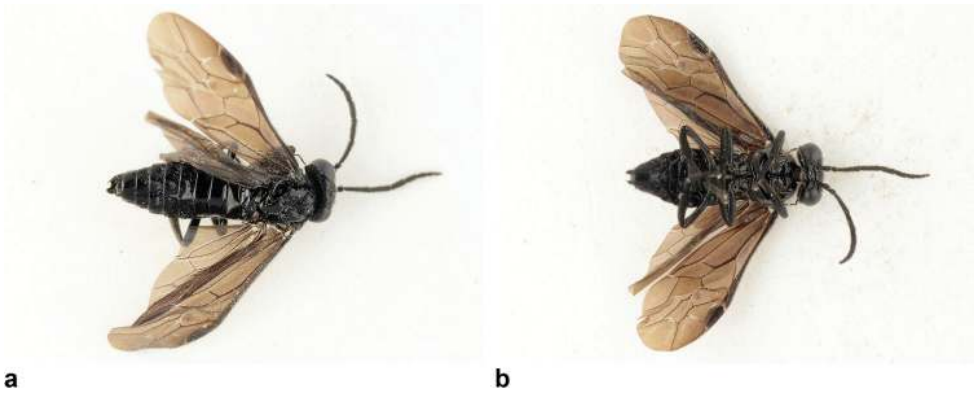


Figure 26. *Inea* sp., male (P3943.A), body length 5.5 mm. **a** Dorsal view **b** ventral view.

Material. Bombuscaro, Podocarpus NP, 04°06'S, 078°58'W, 955m, 08.10.2014, flying, P3870, P3871, P3872 (3 ♂), leg. J.-L. Boevé; Pueblo Viela, 04°38'S, 079°08'W, 1060m, 15.10.2014, on leaf of *Anthurium* sp., P3926.G (1 ♂), leg. A. Pauly, J.-L. Boevé; Bombuscaro, Podocarpus NP, 04°06'S, 078°58'W, 995m, 16.10.2014, P3936.F (1 ♂), leg. A. Pauly, J.-L. Boevé; Los Geraneos, 04°09'S, 078°38'W, 855m, 18.10.2014, P3944.C (1 ♀), leg. A. Pauly, J.-L. Boevé, P3943.A, P3943.B (2 ♂), leg. J.-L. Boevé; Bombuscaro, 04°05'S, 078°57'W, 930m, 22.03.2015, P4120.F (1 ♂), leg. T. Delsinne; Romerillos, nr Podocarpus NP, 04°06'S, 078°57'W, 995m, 22.10.2014, on leaf of *Anthurium* sp., P3958.E (1 ♀), leg. J.-L. Boevé.

Neonanapeptamena sp.

Figs 21e–f, 27

Remarks. This genus includes about three species and occurs only in Colombia, Ecuador, and Peru.

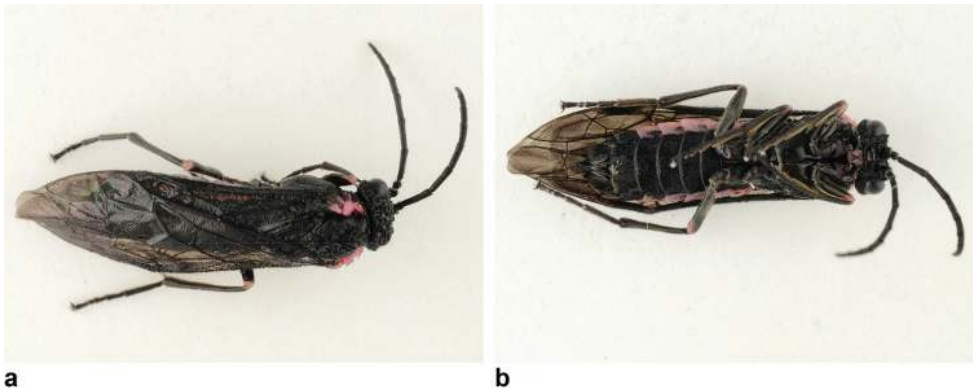


Figure 27. *Neoanapeptamena* sp., female (P3973.B), body length 9.0 mm. **a** Dorsal view **b** ventral view.

Material. Cajanuma “Mirador”, Podocarpus NP, 04°07'S, 079°11'W, 3000m, 14.10.2014, on leaf of *Macrocarpaea arborescens* (Gentianaceae), P3918 (1 ♂), leg. J.-L. Boevé, 23.10.2014, P3973.A, P3973.B (2 ♀), leg. T. Delsinne, J.-L. Boevé; Cajanuma, Podocarpus NP, 04°07'S, 079°10'W, 2750m, 14.10.2014, P3920 (1 ♀), leg. A. Pauly, J.-L. Boevé, 2810m, 23.10.2014, P3972.A, P3972.B (2 ♀), leg. T. Delsinne, J.-L. Boevé.

***Plaumanniana biclinea* (Konow, 1899), comb. n.**

Fig. 28

Stromboceros biclinius Konow 1899: 293; Konow 1905: 97; Oehlke and Wudowenz 1984: 369; Taeger et al. 2010: 532.

Strongylogaster biclinius: Enderlein 1920: 361.

Remarks. Two males and four females at SDEI are labelled “Callanga, Cuczo, Peru,” “Coll. Konow,” “TYPUS”, and one male has the label “*Stromboceros biclinius* Konow, Peru.” The male with Konow's, determination label is hereby designated lectotype. The other specimens are paralectotypes.

This species is now known from Colombia, Ecuador, and Peru.

Material. Pueblo Viela, 04°38'S, 079°08'W, 1060m, 15.10.2014, on leaf of *Anthurium* sp., P3927.A, P3927.B, P3927.C, P3927.D, P3927.E, P3927.F, P3927.G, P3927.H (8 ♂), leg. A. Pauly, J.-L. Boevé; Romerillos, nr Podocarpus NP, 04°06'S, 078°57'W, 995m, 22.10.2014, on leaf of *Anthurium* sp., P3958.C (1 ♀), leg. J.-L. Boevé.

***Plaumanniana* sp.**

Fig. 29

Remarks. About 20 species are included in this genus which occurs from Central America to Argentina.

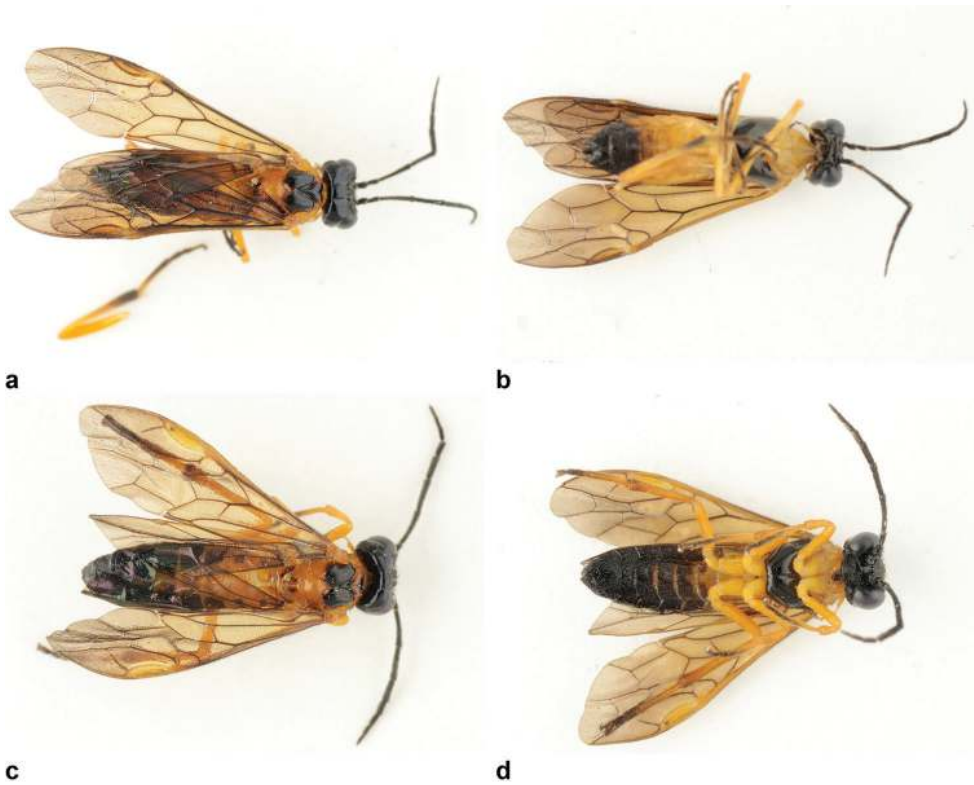


Figure 28. *Plaumanniana biclinea*. **a, b** Female (P3958.C), body length 9.0 mm **c, d** male (P3927.B), body length 8.5 mm. **a, c** Dorsal views **b, d** ventral views.

Material. Miasi, 04°15'S, 078°20'W, 875m, 19.10.2014, flying under leaf of *Anthurium* sp., P3946.H (1 ♀), leg. T. Delsinne, J.-L. Boevé; Bombuscaro, 04°05'S, 078°57'W, 930m, 22.03.2015, P4120.B (1 ♀), leg. T. Delsinne; Romerillos, nr Podocarpus NP, 04°09'S, 078°56'W, 1100m, 22.10.2014, P3967.A (1 ♀), leg. A. Pauly, J.-L. Boevé, P3967.I, P3967.J, P3967.M, P3967.N (4 ♂), leg. A. Pauly, J.-L. Boevé, on leaf of *Hedychium coronarium*, P3960.A, P3960.B (2 ♂), leg. J.-L. Boevé, on leaf of *Anthurium* sp., P3958.A, P3958.B (2 ♂), leg. J.-L. Boevé.

***Proselandria alvina* (Konow, 1899), comb. n.**

Fig. 30

Stromboceros alvinus Konow, 1899: 292; Oehlke and Wudowenz 1984: 366; Taeger et al. 2010: 532.

Remarks. Konow described both sexes of this species from “Peru (Callanga, Cuczo)”. Two males and one female labelled as types are at SDEI. The lectotype, here designated, is a male labelled “Callanga, Cuczo, Peru,” “coll. Konow,” “TYPE”, “Strom-

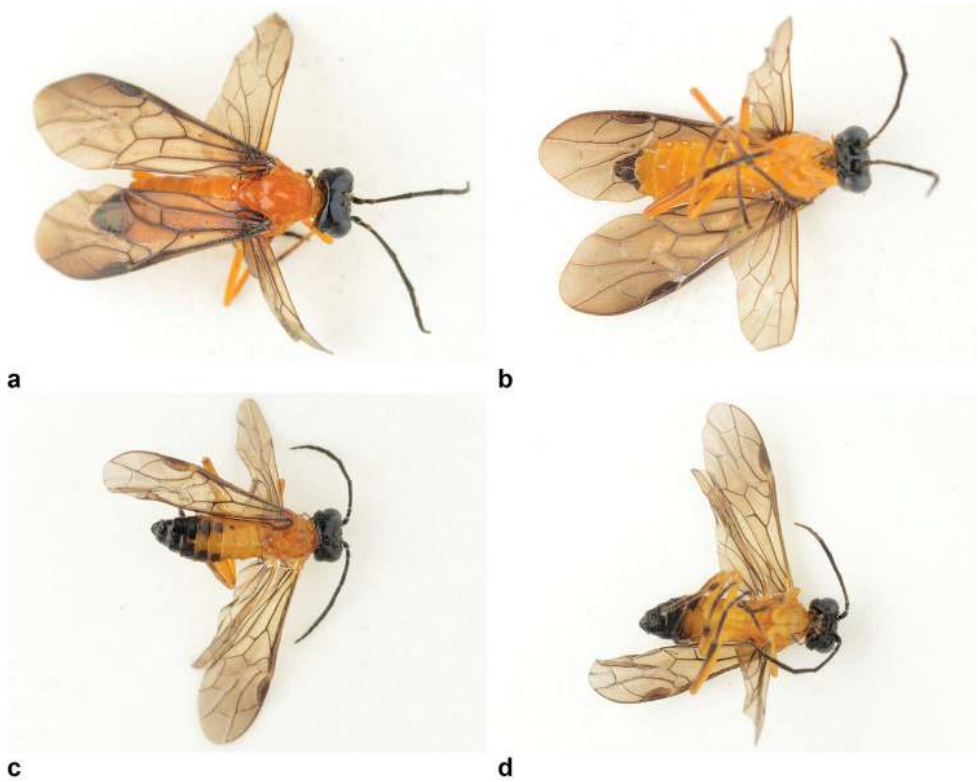


Figure 29. *Plaumanniana* sp. **a, b** Female (P3946.H), body length 9.0 mm **c, d** male (P3960.A), body length 7.5 mm. **a, c** Dorsal views **b, d** ventral views.

boceros alvinus Knw, Peru.” The female and other male have the same data but lack a determination label. The female is a paralectotype, but the male belongs to the genus *Bolivius*. D. R. Smith did not designate a lectotype prior to Oehlke and Wudowenz (1984) who stated one was designated by D. R. Smith in 1976.

Distribution. This species is now known from Colombia, Ecuador, and Peru.

Material. Pueblo Viela, 04°38'S, 079°08'W, 1060m, 15.10.2014, on leaf of *Anthurium* sp., P3928.C (1 ♂), leg. A. Pauly, J.-L. Boevé; Bombuscaro, Podocarpus NP, 04°06'S, 078°58'W, 995m, 17.10.2014, P3938 (1 ♀), leg. A. Pauly, J.-L. Boevé; N. of Pachicutza, 04°04'S, 078°38'W, 900m, 18.10.2014, P3940.A (1 ♂), leg. J.-L. Boevé.

Proselandria carminea (Jørgensen, 1913)

Fig. 31

Remarks. This species occurs only in western South America from Colombia to northern Argentina.

Material. nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2270m, 27.03.2015, P4123.O, P4123.P (2 ♂), leg. T. Delsinne.

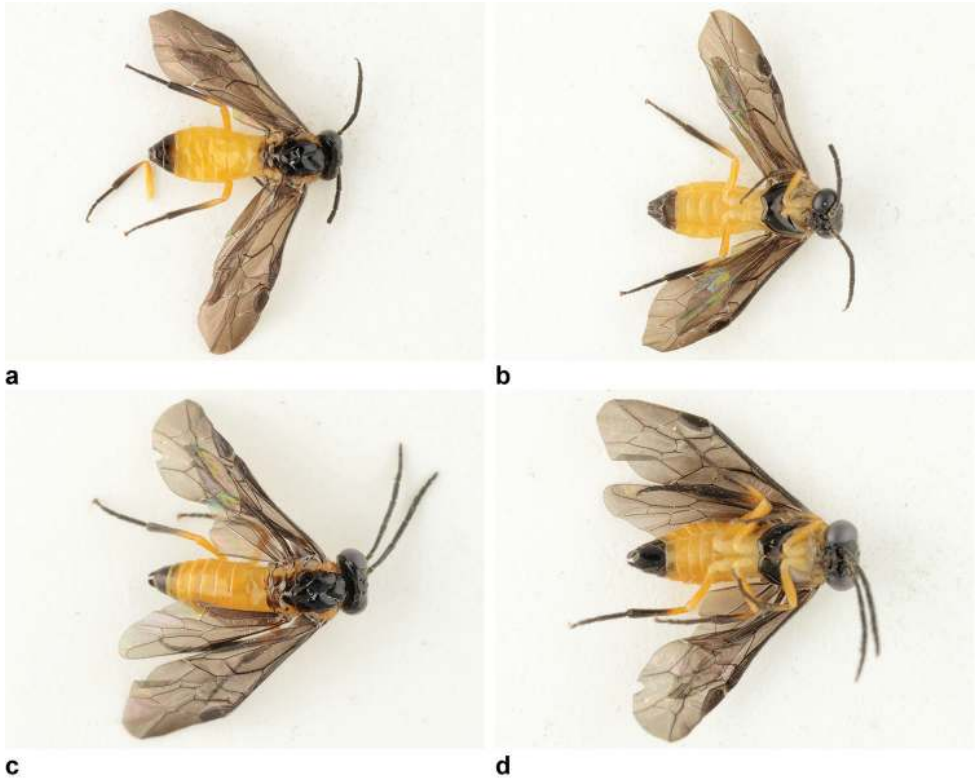


Figure 30. *Proselandria alvina*. **a, b** Female (P3938), body length 5.5 mm **c, d** male (P3928.C), body length 5.5 mm. **a, c** Dorsal views **b, d** ventral views.



Figure 31. *Proselandria carminea*, male (P4123.O), body length 5.5 mm, lateral view.

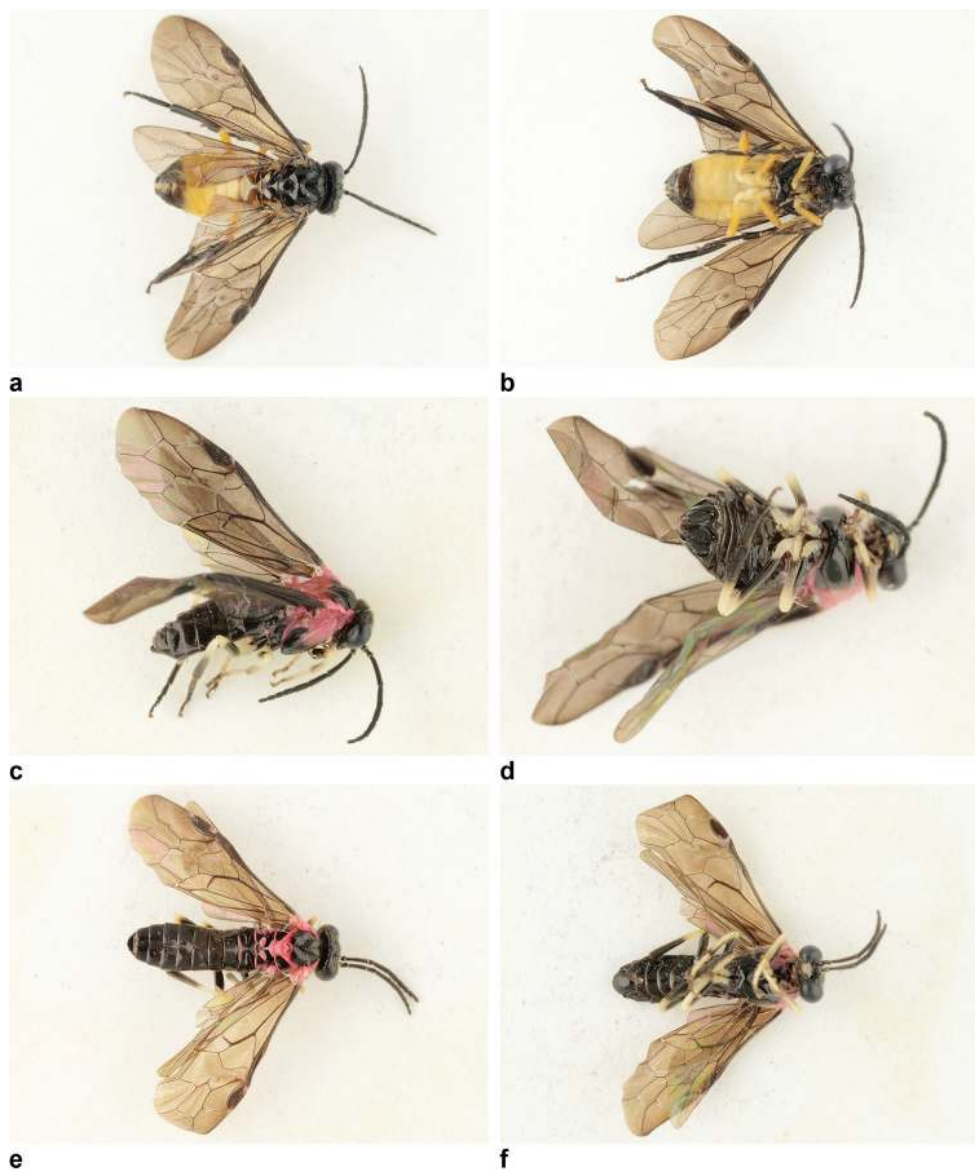


Figure 32. *Proselandria* sp. **a, b** Female (P3928.B), body length 6.0 mm **c, d** female (P3903), body length 6.0 mm **e, f** male (P3904), body length 6.0 mm. **a, e** Dorsal views **b, d, f** ventral views, **c** lateral view.

***Proselandria* spp.**

Figs 21d, 32

Remarks. About 20 species are known, from Mexico to Argentina.

Material. Loja, Reinaldo Espinosa Botanical Garden, 04°02'S, 079°12'W, 2145m, 14.10.2014, P3903 (1 ♀), leg. J.-L. Boevé, P3904, P3909, P3910 (3 ♂), leg. J.-L. Bo-

evé, P3916 (1 ♂), leg. A. Pauly, J.-L. Boevé, flying, P3908 (1 ♂), by sweeping grass, P3912 (1 ♀), on leaf of *Ismene longipetala* (Amaryllidaceae), P3905, P3907 (2 ♀), P3906 (1 ♂), leg. J.-L. Boevé; Pueblo Viela, 04°38'S, 079°08'W, 1060m, 15.10.2014, on leaf of *Anthurium* sp., P3928.B (1 ♀), leg. A. Pauly, J.-L. Boevé; Miasi, 04°15'S, 078°20'W, 875m, 19.10.2014, on/around leaf of *Anthurium* sp., P3946.D (1 ♀), leg. J.-L. Boevé.

***Stromboceridea albilabris* (Konow, 1885)**

Figs 21g, 33

Distribution. *Stromboceridea* occurs from southwestern United States through western South America to northern Argentina. This species is known from Colombia, Ecuador, Peru and Bolivia.

Material. Bosque “El Sayo”, 03°49'S, 079°17'W, 2760m, 12.10.2014, under leaf of bamboo (Poaceae), P3901 (1 ♂), leg. J.-L. Boevé; Cajanuma, Podocarpus NP, 04°07'S, 079°10'W, 2750m, 14.10.2014, P3922, P3923, P3924 (3 ♂), 2810m, 23.10.2014,

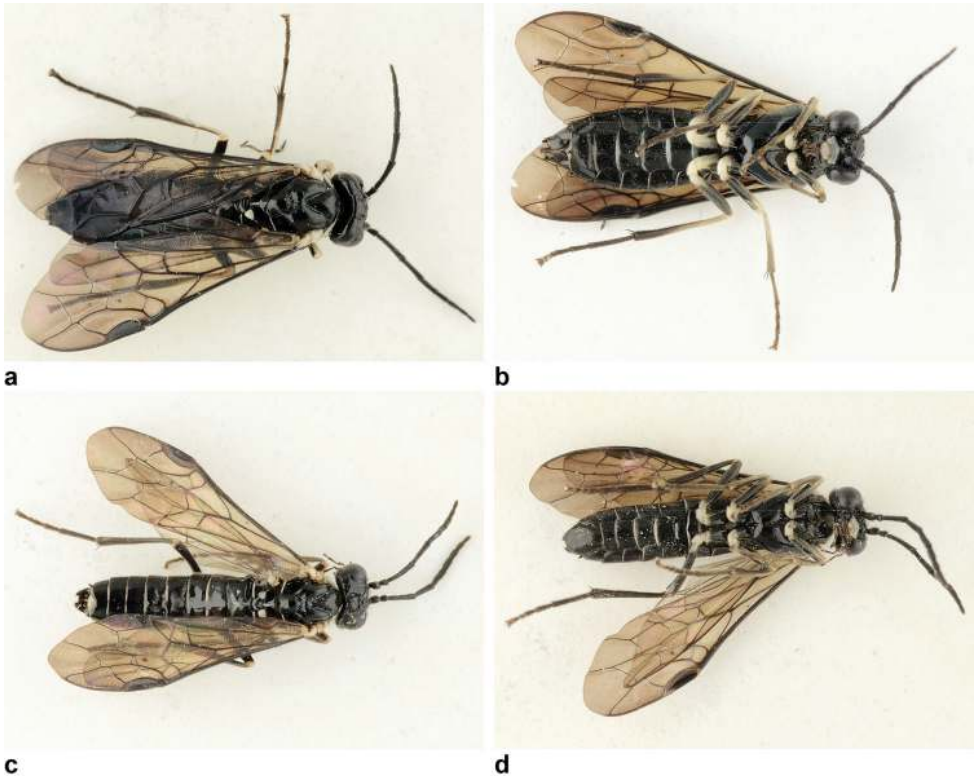


Figure 33. *Stromboceridea albilabris*. **a, b** Female (P3957.D), body length 9.5 mm **c, d** male (P3922), body length 7.5 mm. **a, c** Dorsal views **b, d** ventral views.

P3975.A, P3975.B, P3975.C, P3975.D, P3975.E, P3975.F (6 ♂), leg. A. Pauly, J.-L. Boevé; Loja, Reinaldo Espinosa Botanical Garden, 04°02'S, 079°12'W, 2145m, 14.10.2014, by sweeping grass, P3914 (1 ♀), leg. J.-L. Boevé; S. of Yangana, 04°32'S, 079°08'W, 1880m, 15.10.2014, on leaf of *Anthurium* sp., P3930.A, P3930.B, P3930.C, P3930.D, P3930.E (5 ♂), leg. J.-L. Boevé, P3931.A, P3931.B, P3931.C, P3931.D (4 ♂), leg. A. Pauly, J.-L. Boevé; nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2270m, 21.10.2014, P3957.D (1 ♀), leg. A. Pauly, J.-L. Boevé, P3955.B (1 ♂), leg. T. Delsinne, J.-L. Boevé, on *Rumex crispus*, P3953.A (1 ♂), leg. J.-L. Boevé; Cajanuma "Mirador", Podocarpus NP, 04°07'S, 079°10'W, 2810m, 23.10.2014, P3974 (1 ♂), leg. T. Delsinne, J.-L. Boevé; nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2270m, 27.03.2015, P4123.E (1 ♀), leg. T. Delsinne, P4123.C, P4123.D, P4123.I, P4123.J, P4123.K, P4123.L, P4123.M, P4123.N (8 ♂), leg. T. Delsinne.

Stromboceridea sp.

Fig. 34

Remarks. About 20 species are known.

Material. Loja, Reinaldo Espinosa Botanical Garden, 04°02'S, 079°12'W, 2145m, 14.10.2014, by sweeping grass, P3913 (1 ♀), leg. J.-L. Boevé; nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2280m, 21.10.2014, near rivulet, P3951 (1 ♂), leg. J.-L. Boevé; nr Loja, Reserva El Madrigal, 04°02'S, 079°11'W, 2270m, 27.03.2015, P4123.F, P4123.G, P4123.H (3 ♀), leg. T. Delsinne, P4123.Q, P4123.R (2 ♂), leg. T. Delsinne.

Tioloma nigrita Strand, 1911

Fig. 35

Distribution. Known only from Ecuador.

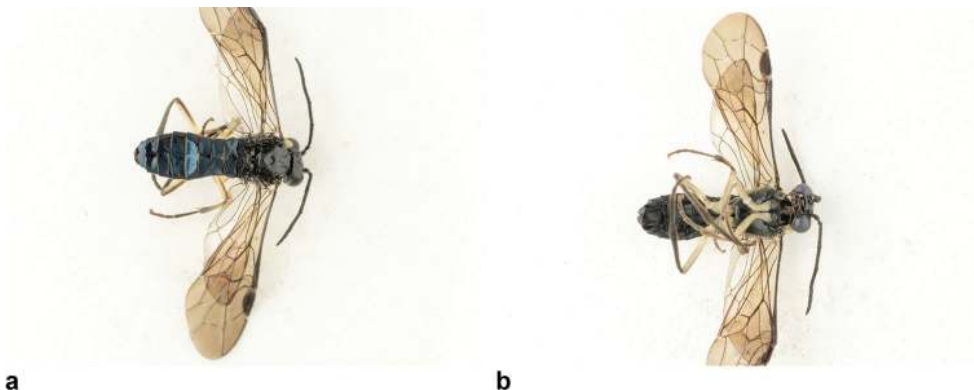


Figure 34. *Stromboceridea* sp., male (P3951), body length 5.5 mm. **a** Dorsal view **b** ventral view.

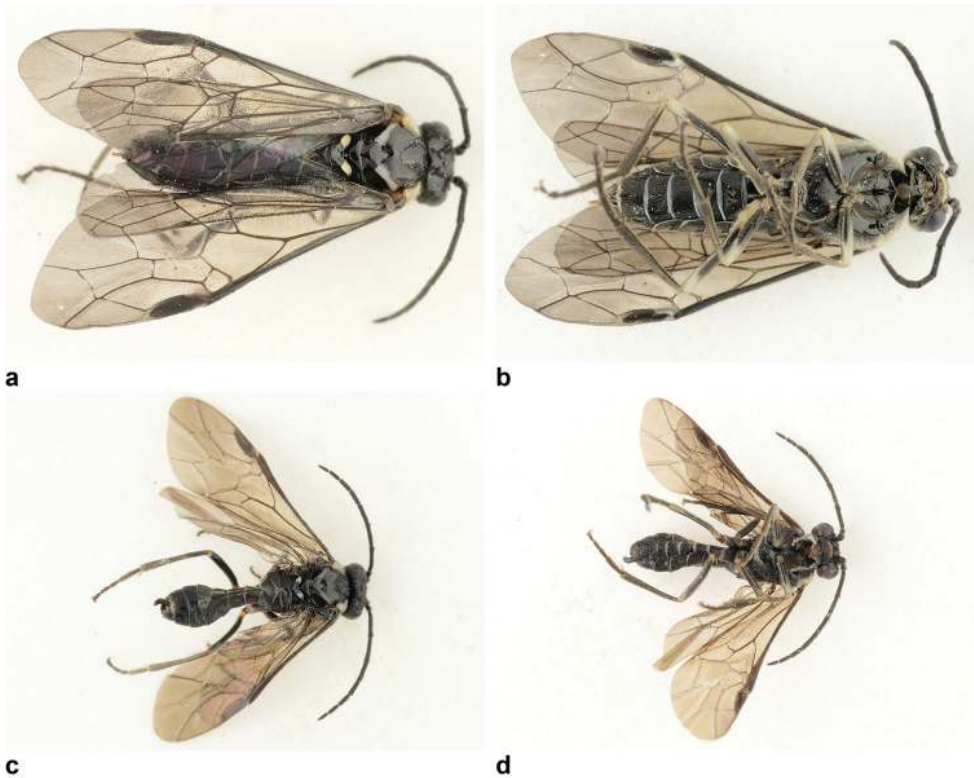


Figure 35. *Tioloma nigrita*. **a, b** Female (P3939), body length 8.5 mm **c, d** male (P3947), body length 7.0 mm. **a, c** Dorsal views **b, d** ventral views.

Material. El Tiro, road Loja - Zamora, 03°59'S, 079°09'W, 2815m, 08.10.2014, P3884 (1 ♀), leg. J.-L. Boevé, P3886 (1 ♀), leg. A. Pauly, J.-L. Boevé, P3885, P3887 (2 ♂), leg. A. Pauly, J.-L. Boevé; El Tiro, road Loja - Zamora, 03°59'S, 079°09'W, 2815m, 17.10.2014, with yellow pan trap, P3939 (1 ♀), 17–20.10.2014, with yellow pan trap, P3947 (1 ♂), leg. A. Pauly, J.-L. Boevé.

Altitudinal distribution

Sawflies were collected in the field at altitudes ranging from ca. 900 to 3000 m (Fig. 36). Some trends can be deduced from this figure, although with caution because, first, for several species only one or a couple of specimens could be collected, and, second, no systematic (e.g., trapping) methodology was used. At all collection sites, however, no specimens were discarded a priori. Thus, conclusions drawn from this figure may become pertinent by considering relatively common species, and/or when these were collected at several sites far from each other.

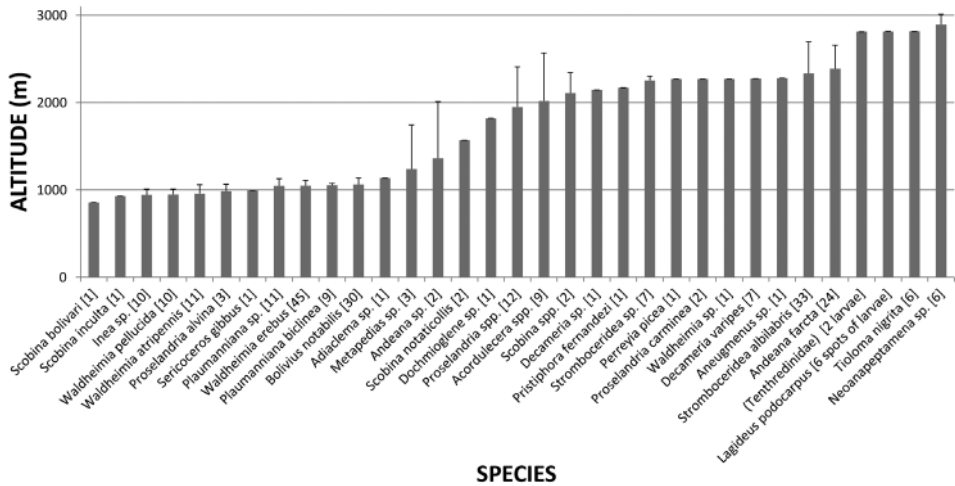


Figure 36. Distribution of collected sawfly species in function of the altitude. The histogram shows mean values with standard deviations; numbers of individuals are given between square brackets.

Among species with more than eight exemplars, *Inea* sp., the three identified *Waldheimia* species, the two *Plaumanniana* species, and *Bolivius notabilis* occurred at an altitude of ca. 1000 m. In contrast, *Stromboceridea albilabris* and *Andeana farcta* were collected above 2000 m. The variation in specific altitudes is rather low (Fig. 36) and most of these nine species were collected at different sites, which suggests that each species is indeed restricted to a given altitude. Three other species, *Lagideus podocarpus*, *Tioloma nigrita*, and *Neonanapeptamena* sp., were collected at an altitude of 2500–3000 m, the two latter taxa being known to occur at high altitudes (Malaise 1963, Strand 1913).

The ‘altitudinal slots’ of the sawfly species are probably linked to those of their host plants and/or to abiotic factors. However, such ecological data are still missing for most South American sawflies, and the present identification and description of *L. podocarpus* is just one example of a species that has remained unknown, and which are living at a high altitude. It emphasizes the importance of preserving a diversity of biotopes. In the case of a country such as Ecuador, the páramo clearly belongs to such valuable natural environments characterized by both a high altitude and very high biological value.

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