



***Lamnatibia*, a new genus of the *Polysphincta* group of genera from Colombia (Hymenoptera: Ichneumonidae; Pimplinae)**

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Abstract

A new genus and species of the *Polysphincta* group of genera (Hymenoptera: Ichneumonidae; Pimplinae), *Lamnatibia andina* Palacio & Sääksjärvi, is described from the cloudforests of the Colombian Andes. The new genus can be easily separated from other genera of the *Polysphincta* group by the specialized shape of the fore and middle femora, the presence of a thin, longitudinal ridge in the inner face of the fore and middle tibiae, and the combined absence of occipital and epicnemial carinae. The new genus's potential affinities with other genera of the *Polysphincta* group and its distribution are discussed.

Key words: Colombia, Hymenoptera, Ichneumonidae, *Lamnatibia*, neotropics, new genus, new species, Pimplinae, phylogeny, South America, taxonomy

Resumen

Se describe un nuevo género y una nueva especie, *Lamnatibia andina* Palacio & Sääksjärvi, del grupo de géneros *Polysphincta* (Hymenoptera: Ichneumonidae; Pimplinae), procedente de los bosques nublados de los Andes Colombianos. El nuevo género puede separarse fácilmente de otros géneros del grupo *Polysphincta* por la forma especializada de los fémures anteriores y medios, la presencia de una lamela traslúcida longitudinal en la cara interna de las tibias anterior y media, y la ausencia combinada de carenas occipital y epicnemial. Se discute la distribución del nuevo género así como las afinidades potenciales con otros miembros del grupo *Polysphincta*.

Introduction

The Pimplinae is one of the taxonomically best known ichneumonid subfamilies in tropical America especially due to the studies of Gauld (1991), Gauld *et al.* (1998) and Gauld *et al.* (2002a). However, recent inventories in Colombia and Peru have shown that a considerable proportion of the tropical South American fauna is still undescribed (Sääksjärvi *et al.* 2003; Sääksjärvi *et al.* 2004a). Some of the new forms found in tropical America have yielded to the description of new genera (Sääksjärvi *et al.* 2003) or to the redefinition of the limits of previously described ones (see Gauld & Dubois 2006). This panorama suggests that the generic composition of the subfamily in the neotropics is far from being known.

Porter (1980) recognizes three major centres of diversity for Latin American Ichneumonidae: 1) the Amazonian forests, 2) the Mesoamerican wet forests and 3) the Andean cloudforests. As per the inventories in Costa Rica (Gauld 1991) and Peru (Sääksjärvi *et al.* 2004b) have shown, this appears to be the case for Pim-

plinae in the Mesoamerican and Amazonian forests, respectively. In Colombia, the sampling of several Andean cloudforests has yielded to the discovery of many new forms. In this paper, we describe a new genus within the *Polysphincta* genus-group from the Andean region of Colombia.

The *Polysphincta* group of genera is a monophyletic entity that belongs to the pimpline tribe Ephialtini (Gauld *et al.* 2002b). Due to their particular morphology and life strategies, all the species with known biology are koinobiont ectoparasitoids of subadult and adult spiders, the group was treated as a separate tribe in earlier works (e.g. Townes 1969). More recent studies (Gauld *et al.* 2002b) have shown that the “polysphinctines” are clearly a specialized group of ephialtines that evolved from gregarious species.

In a recently published cladistic analysis of the *Polysphincta* group of genera, Gauld and Dubois (2006) found that some of the genera previously recognized, namely *Flacopimpla*, *Reclinervellus*, *Schizopyga*, *Sinarachna*, *Zabrachypus* and *Zatypota*, were not clearly delimited. Two genera, *Afrosphincta* and *Dreisbachia*, were synonymized under *Schizopyga*, and three new genera – *Brachyzapus*, *Chablisea* and *Megaetaira* – were proposed (two of them based in species already described and previously included in other genera). After a reorganization of the components, Gauld & Dubois (2006) recognized twenty-one genera in the *Polysphincta* group of genera, all of them demonstrably monophyletic, with the exception of *Polysphincta* whose status remains equivocal.

Several new polysphinctine taxa have been recently discovered in tropical South America and it is possible that some of them constitute new genera waiting to be described. However, as it has been illustrated above, delimiting discrete natural groups within the polysphinctines can be rather difficult and the description of new taxa should be done with caution. Taking into account this situation, we include the new Colombian form in the data matrix of Gauld and Dubois (2006) to obtain a phylogeny that allow us to determine more precisely its identity, and so avoid the risk of describing a nonmonophyletic taxon.

Material and methods

The specimens examined in this study were all collected in a Malaise trap inventory made in Colombia between 2001 and 2003 in several natural parks of the country. This inventory is part of the Diversidad de Insectos en Áreas Protegidas Project, developed jointly by the Instituto von Humboldt (Colombia), the special administrative unit of the Colombian natural park system (UAESPNN) and the University of Kentucky, with the support of the National Science Foundation (NSF).

Morphological terminology and form of description used in the study largely follows that of Gauld (1991). The specimens are deposited in the following collections: the entomological collection of the Instituto Alexander von Humboldt, Villa de Leyva, Colombia (IAVH) and Department of Biology, The Zoological Museum, University of Turku, Finland (ZMUT). One specimen has been sent to The Natural History Museum, London, U.K. earlier.

The specimens were examined following the character list presented in Gauld and Dubois (2006) and the corresponding character states were assigned. No new characters were added, including the possible autapomorphies of *Lamnatibia*, due to the lack of material to code those characters for the other taxa. A cladistic analysis of the new morphological matrix was conducted using the software package NONA (Goloboff 1993) spawned in WinClada (Nixon 2002). We conducted a heuristic search with 200 replications (mult*N) using one starting tree per replication (hold/), setting the number of maximum trees to keep (hold) to 10 000, and using the multiple TBR+TBR (mult*max*) branch swapping as search strategy. All characters were equally weighted and unordered. Nodal support was evaluated in WinClada using Jackknife resampling (Farris *et al.* 1996). The number of pseudoreplicates was set to 1000, number of search replications (mult*N) was 10 and one starting tree per replication (hold/) was used. The matrix line of *Lamnatibia* is: 21000011001010021001010100300100200000111001010001110000110110000011121010100010?000110011020010.

Results

The strict consensus of the 5200 equally parsimonious trees with a length of 381 steps (CI = 0.34; RI = 0.76) is presented in Figure 1. The obtained trees are largely congruent with those presented by Gauld and Dubois (2006) as far as it shows the seven groups of genera recognized in their analysis, and supports their reclassification of the *Polysphincta* group of genera. *Lamnatibia* appears as part of the species group G of Gauld & Dubois (2006) (the *Eruga/Acrydactyla/Zatypota* genus-complex) that includes *Pterinopus*, *Megaetaira*, *Eruga*, *Acrodactyla*, *Zatypota*, *Longitibia*, *Flacopimpla* and *Eriostethus*. *Lamnatibia* and *Eruga* form together a clade supported by four synapomorphies. *Lamnatibia* is supported by 9 apomorphies, of which none is unique, however. We would like to address that despite of individual characters being non-unique, the combination of them in *Lamnatibia* is very special. The jackknife value for the *Lamnatibia* – *Eruga* clade is rather low, 60. However, this is not surprising since the re-sampling methods commonly give low values to morphological data sets.

The topology obtained in the analysis shows that *Lamnatibia* and *Eruga* constitute a monophyletic clade. This result may lead to two different conclusions: 1) to treat *Lamnatibia* as part of *Eruga* or 2) to consider *Lamnatibia* as a new, distinct genus. Including *Lamnatibia* in *Eruga* implies that this new form constitutes a specialized variant of the latter, in a similar way to what occurs with the *quadrisculpta* species group of *Acrodactyla* (Gauld & Dubois 2006). This treatment, however, could yield to a more diffuse definition of *Eruga*, taking into account that this genus differs from *Lamnatibia* in three fundamental characteristics: the very long maxillary palp, the presence of occipital carina, and the presence of epicnemial carina. Consequently, we opted for the second decision taking into account, besides, that the combined absence of occipital and epicnemial carinae is very useful to define *Lamnatibia* as a distinct genus because this combination is unique within the *Polysphincta* group of genera. Finally, and for practical purposes, *Lamnatibia* is very easily separated from all other neotropical polysphinctine genera by the specialization of front and middle legs.

Genus *Lamnatibia* Palacio & Sääksjärvi gen.n.

(Fig. 2)

Type-species: *Lamnatibia andina* sp.n.

Description. Small sized insects (fore wing length 4.0–5.2 mm) which are patterned orange yellow, black and white. Mandibles slender strongly tapered from base to apex, with upper tooth quite straight and distinctly longer than lower tooth. Clypeus not divided into basal and apical parts; in profile moderately convex; apical margin slightly concave. Maxillary palp 5-segmented, not exceptionally long reaching back as far as fore coxa. Labial palp 4-segmented. Occipital carina completely absent. Subocular sulcus absent. Pronotum rather short, with anterior margin reflexed and curved backwards in a point, without a mediodorsal longitudinal crest, and with a shallow transverse furrow. Epomia indistinct, discernible only in the lower horizontal part, or completely absent in smaller individuals. Mesoscutum simple, without crestlike carinae in front of each notaulus. Notauli weakly impressed anteriorly. Epicnemial carina completely absent. Mesopleural suture weakly angled centrally. Submetapleural carina complete. Propodeum quite long and evenly declivous, without posterolateral swellings; dorsally without carinae enclosing any area. Pleural carina complete. Propodeal spiracle subcircular. Fore and middle femora basally swollen and ventrally expanded to form a longitudinal lamelliform tooth-like projection. Fore and middle tibia with a longitudinal lamelliform ridge extending from base to apex on ventral surface. Hind tibia without a glabrous longitudinal furrow on inner surface. Claws of females with a very large basal lobe and without a fringe of closely spaced hairs. Fore wing with vein 3rs-m absent. Hind wing with first abscissa of M + Cu1 strongly bowed well distal to its centre; distal abscissa of

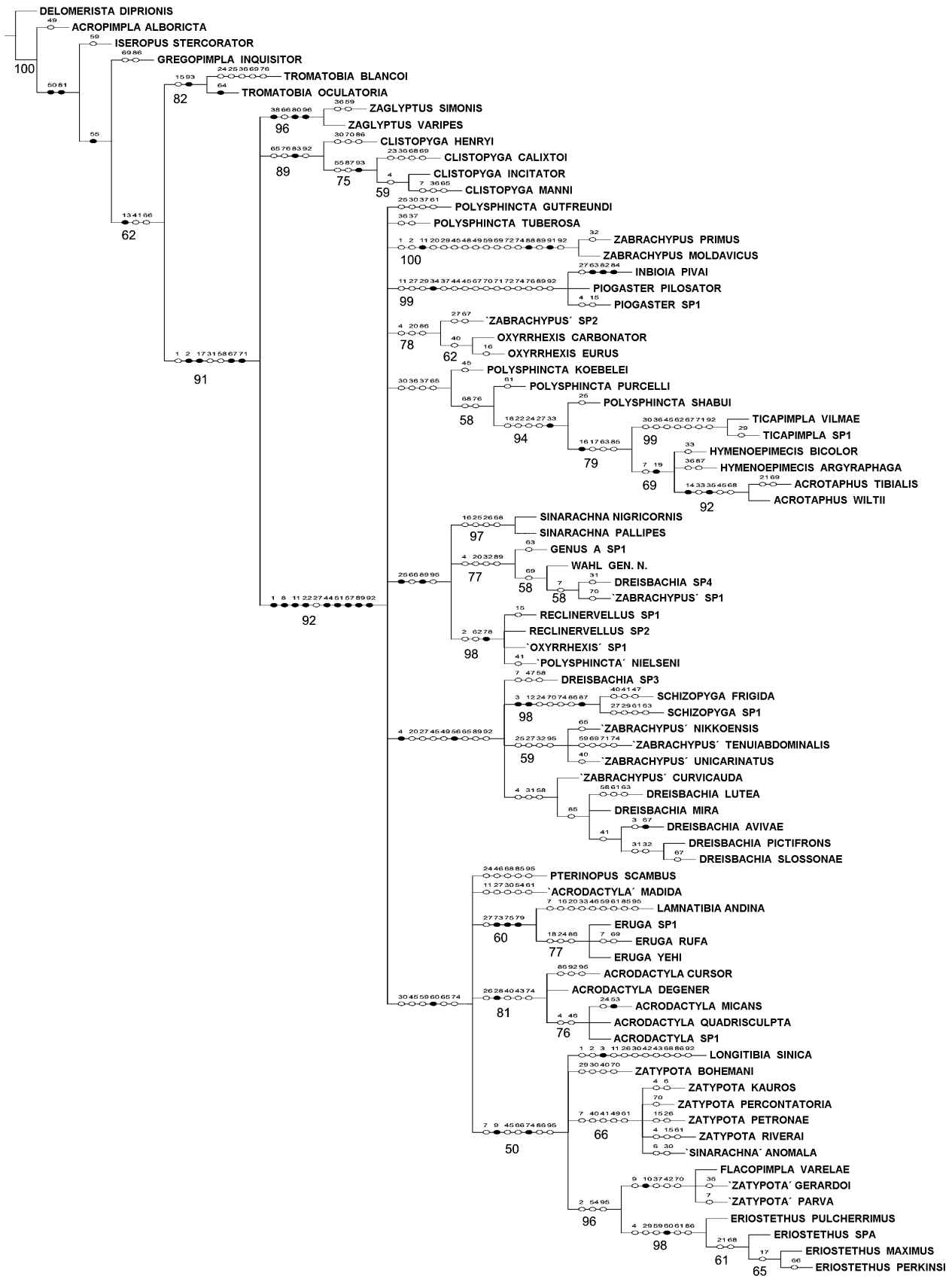


FIGURE 1. Strict consensus tree of 5200 equally parsimonious trees with character distribution mapped onto the tree (character numbers shown above branches). Unique changes are indicated with filled, and non-unique with open circles. Numbers below branches show jackknife support values. *Delomerista diprionis* was used as outgroup.

Cu1 absent, its position indicated by a very weak angulation of cu-a. Metasoma with tergite 1 moderately slender; remainder tergites stout. Tergite 2 with shallow oblique grooves cutting off depressed triangular areas anterolaterally; tergite 3 almost smooth and convex; remainder tergites smooth and convex. Female with subgenital plate uniformly but weakly sclerotized. Ovipositor very weakly curved upwards at the apex, 0.85 times the length of the hind tibia, and with apex tapered to sharp point; apical teeth indistinct.

Diagnosis. *Lamnatibia* is a very distinctive genus. It can be easily separated from other genera of the *Polysphincta* group by the specialized shape of the fore and middle femora, the presence of a thin, longitudinal ridge in the inner face of the fore and middle tibiae, and the combined absence of occipital and epicnemial carinae.

Male. Unknown.

Etymology. The generic name is from the Latin *lamnae* (lamella) referring to the longitudinal lamelliform ridge of the fore and middle tibia.

Remarks. *Lamnatibia* belongs in the *Polysphincta* group of genera (Gauld *et al.*, 2002) as it has the mandibles slender and very strongly tapered, lobe of maxilla enlarged to occlude oral fossa, pedicel strongly inflated, fifth tarsomere of fore leg of female very swollen, and hind tarsus with pulvillus enlarged, projected conspicuously beyond apex of claw (Gauld *et al.* 2002; Gauld & Dubois 2006). In appearance, *Lamnatibia* resembles the genera *Flacopimpla*, *Eruga* and *Zatypota*, but can be easily distinguished from them, and all the other neotropical members of the *Polysphincta* complex, by the specialized shape of fore and middle femora (Table 1). Nothing is known about the biology of the genus.

TABLE 1. Comparison of the diagnostic features of *Eruga*, *Flacopimpla*, *Lamnatibia* and *Zatypota*.

<i>Eruga</i>	<i>Flacopimpla</i>	<i>Lamnatibia</i>	<i>Zatypota</i>
Upper tooth of mandible unspecialized	Upper tooth of mandible unusually long and up-curved	Upper tooth of mandible unspecialized	Upper tooth of mandible unspecialized
Maxillary palpi 5-segmented, very long, reaching back to epicnemium	Maxillary palpi 5-segmented, not exceptionally long	Maxillary palpi 5-segmented, not exceptionally long	Maxillary palpi usually 4-segmented, not exceptionally long
Labial palpi 4-segmented	Labial palpi 4-segmented	Labial palpi 4-segmented	Labial palpi 3-segmented
Occipital carina complete	Occipital carina complete	Occipital carina entirely absent	Occipital carina present (at least laterally) or absent
Epomia usually absent	Epomia vestigial to strong	Epomia vestigial	Epomia well developed, long
Epicnemial carina strong	Epicnemial carina strong	Epicnemial carina absent	Epicnemial carina strong
Fore and middle femora not specialized	Fore and middle femora not specialized	Fore and middle femora basally swollen and ventrally expanded to form a tooth-like projection	Fore and middle femora not specialized
Fore and middle tibia without a longitudinal ventral ridge	Fore and middle tibia without a longitudinal ventral ridge	Fore and middle tibia with a thin longitudinal ventral ridge	Fore and middle tibia without a longitudinal ventral ridge
Hind tibia without a hairless longitudinal groove internally	Hind tibia with a hairless longitudinal groove internally	Hind tibia without a hairless longitudinal groove internally	Hind tibia without a hairless longitudinal groove internally

***Lamnatibia andina* Palacio & Sääksjärvi sp.n.**

(Fig. 2)

Holotype female. Mandibles strongly narrowed; malar space 1.25 times as long as basal mandibular width, with a band of fine coriaceous sculpture extending from eye margin to mandibular base; clypeus large, polished and with scattered setiferous punctures; lower face more or less transverse, about 1.3 times as broad as high (from supraclypeal suture to level of insertion of antenna) and polished; genae rather wide behind eyes; lateral ocellus separated from eye margin by about 1.2 times its own diameter. Occipital carina completely absent. Mesoscutum smooth and polished, with isolated hairs on median lobe centrally; mesopleuron smooth and polished, glabrous, except for ventral part and mesosternum which are densely pubescent; metapleuron smooth and polished. Propodeum fairly evenly rounded, slightly declivous posteriorly, smooth and polished, except for scattered punctures behind the spiracle just above the metapleural carina. Fore wing *cu-a* opposed to base of *Rs* & *M*; base of *Im-cu* separated from *Cu1a* by a distance slightly greater than length of *Cu1b*. Tergite 1 approximately 1.78 times longer than their maximum width, with a weak longitudinal impression in middle dorsum, lateromedian longitudinal carinae present on anterior 0.2 of segment, and with lateral carina weak but discernible more or less its entire length; tergites 2–4 smooth and polished, with some shagreening centrally.

Head black with clypeus whitish; mandibles whitish with apex blackish; antennae blackish brown at base, becoming darker towards apex. Mesosoma predominantly orange yellow, with most of propodeum black; metapleuron and apex of propodeum whitish. Front and middle legs with coxae and trochanters whitish, femur a little more yellowish with a longitudinal blackish stripe on ventral surface, tibiae yellowish with a brownish staining at base, tarsus brownish black; hind legs with coxa brownish yellow with apex whitish, femur and tibia brownish, tarsus brownish black. Wings hyaline, pterostigma blackish. Metasoma black with white bands, tergites 1 to 6 with apical and lateral bands, tergites 7 and 8 whit white only laterally. Ovipositor brownish, sheaths black.

Variation. The paratype specimens differ basically in the coloration of hind legs; the hind coxa, femur and tibia ranges from yellowish brown to almost black, and the hind coxa sometimes has a dorsal whitish spot. Such variation apparently is not correlated with the geographic distribution of specimens.

Male. Unknown.

Etymology. The specific name refers to the Andean distribution of the species.

Material examined. Holotype female: COLOMBIA, Nariño, Reserva Natural Privada La Planada, Vía Hondón, 1°15'N, 78°15'W, 1930m., Malaise trap, 2–16.X.2000, G.Oliva leg. (IAVH). Paratypes: one female Nariño, Reserva Natural Privada La Planada, Vía Hondón, 1930m., Malaise trap, 16.X–2.XI.2000, G.Oliva leg. (IAVH); one female Nariño, Reserva Natural Privada La Planada, Parcela Olga, 1850m., Malaise trap, 16.X–2.XI.2000, G.Oliva leg. (IAVH); one female Nariño, Reserva Natural Privada La Planada, Parcela Olga, 1850m., Malaise trap, 2–16.XI.2000, G.Oliva leg. (IAVH); one female one female Nariño, Reserva Natural Privada La Planada, Parcela Olga, 1850m., Malaise trap, 16.XI–2.XII.2000, G.Oliva leg. (IAVH); one female Nariño, Reserva Natural Privada La Planada, Parcela Permanente, 1885m., Malaise trap, 2–16.XII.2000, G.Oliva leg. (IAVH); one female Nariño, Reserva Natural Privada La Planada, Parcela Olga, 1850m., Malaise trap, 16.I–2.II.2001, G.Oliva leg. (IAVH); one female Nariño, Reserva Natural Privada La Planada, Parcela Olga, 1850m., Malaise trap, 16.IV–2.V.2001, G.Oliva leg. (IAVH); one female Nariño, Reserva Natural Privada La Planada, Parcela Olga, 1850m., Malaise trap, 16V–2.VI.2001, G.Oliva leg. (IAVH); one female Nariño, Reserva Natural Privada La Planada, Parcela Olga, 1850m., Malaise trap, 16.VI–2.VII.2001, G.Oliva leg. (IAVH); one female Nariño, Reserva Natural Privada La Planada, Parcela Olga, 1850m., Malaise trap, 2–16.VII.2001, G.Oliva leg. (IAVH); one female Risaralda, Santuario de Flora y Fauna Otún Quimbaya, Cuchilla Camino, 4°43'N, 75°35'W, 2050m., Malaise trap, 25.XI–3.XII.2002, D. Campos leg. (IAVH); one female Risaralda, Santuario de Flora y Fauna Otún Quimbaya, Cuchilla Camino, 2050m., Malaise trap, 17.II–

4.III.2003, G. López leg. (IAVH); one female Valle del Cauca, Parque Nacional Natural Farallones de Cali, Cgto La Meseta, 3°26'N, 76°48'W, 2080m., Malaise trap, 27.VIII–10.IX.2003, S. Sarria leg. (IAVH); one female Valle del Cauca, Parque Nacional Natural Farallones de Cali, Cgto La Meseta, 2080m., Malaise trap, 9.X–26.X.2003, S. Sarria leg. (IAVH); one female Valle del Cauca, Parque Nacional Natural Farallones de Cali, Cgto La Meseta, 2080m., Malaise trap, 26.XI–10.XII.2003, S. Sarria leg. (IAVH); one female Norte de Santander, Area Natural Única Los Estoraques, sector Platanillo, 8°14'N, 73°14'W, 1516m., Malaise trap, 15.X–2.XII.2003, J. Vargas leg (IAVH); one female Norte de Santander, Area Natural Única Los Estoraques, sector Platanillo, 1516m., Malaise trap, 28.XI–13.XII.2003, E. Bayona leg (IAVH); one female Nariño R.N. La Planada Parcela Olga, 1°15'N, 78°15'W, 1850m., Malaise trap 2–16.xi.2000, G. Oliva leg. (ZMUT).

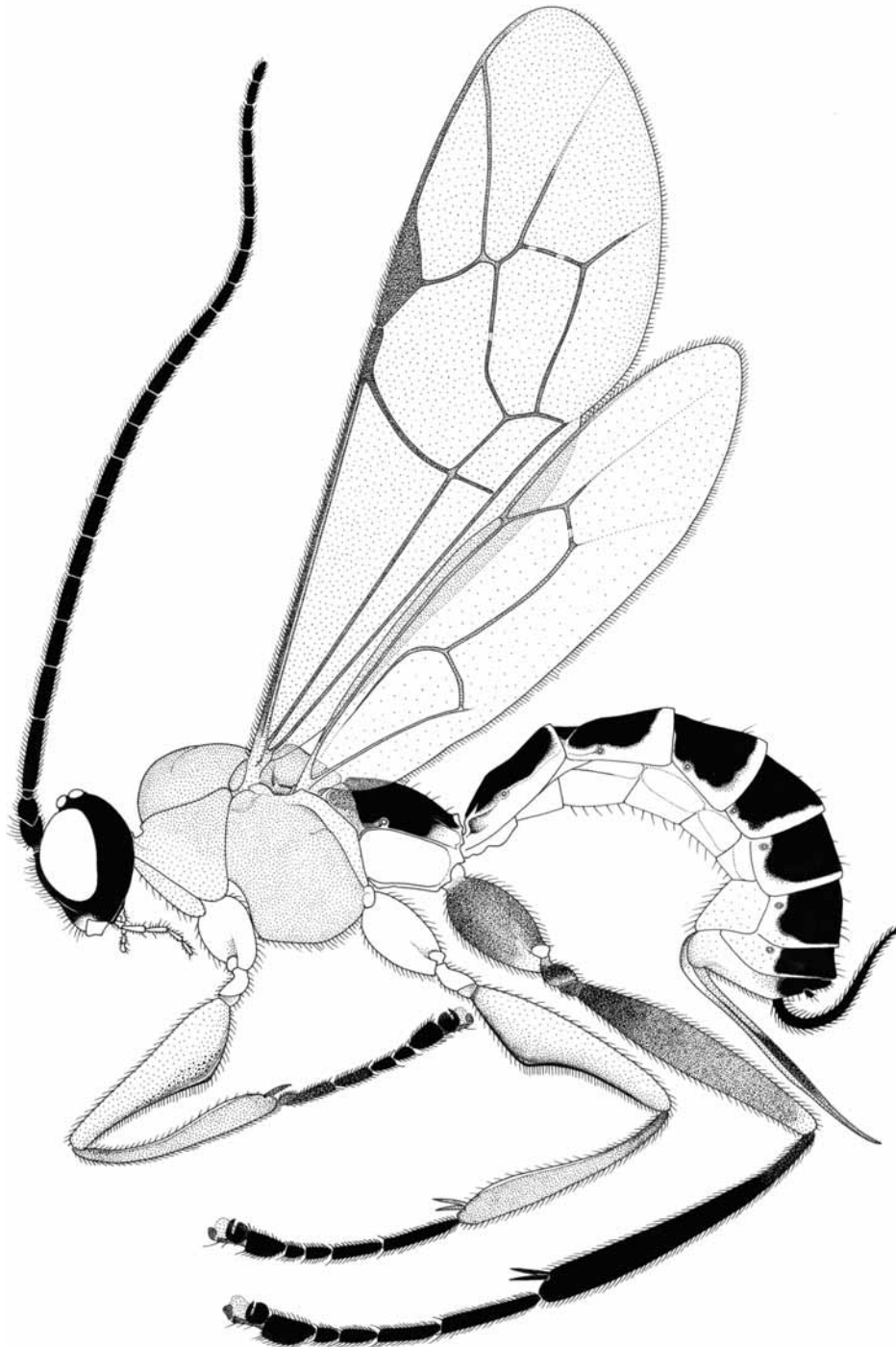


FIGURE 2. Habitus of *Lamnatibia andina* Palacio & Sääksjärvi **sp.n.** Holotype female.

Discussion

Lamnatibia andina is the only known species of the genus at the moment but, as it happens with another previously monotypic pimpline genera such as *Flacopimpla* (see Graf & Kumagai 1997) and *Ticapimpla* (Sääksjärvi and Palacio, unpublished data), a more extensive sampling of the still unknown tropical places can lead to the discovery of many new species. The available data suggest that the distribution of this species ranges from the northernmost to the southernmost parts of the Colombian Andes, and it wouldn't be a surprise to find *Lamnatibia* also from Ecuador, Venezuela, and eventually from Peru and Bolivia.

The trees obtained in the present study show that the closest relatives of *Lamnatibia* in the neotropics are *Eruga*, *Zatypota* and *Flacopimpla*. This result confirms our previous suspects since that *Lamnatibia* closely resembles Colombian species of *Eruga*, *Zatypota* and *Flacopimpla* in general structure and coloration. In the Table 1. there is a comparison of the diagnostic features of *Lamnatibia* and the closest neotropical genera.

Although *Lamnatibia* is easily distinguishable from all the neotropical genera in the *Polysphincta* group of genera, their identity is not so clear when we take into account the genus *Pterinopus*, from Madagascar, and the *Acrodactyla* species belonging to the *quadrisculpta* species-group. The latter group was treated as a separate genus, *Colpomeria*, by several authors (e.g. Aubert 1969; Carlson 1979), but Gauld (1984) treated it as part of *Acrodactyla*. In their cladistic re-evaluation of the suprageneric groups of Pimplinae, Gauld *et al.* (2002b) found that both *Pterinopus* and *Acrodactyla* are monophyletic taxa, despite their similarly specialized fore and middle femora. This result is supported by Gauld and Dubois (2006), who also corroborate the synonymy of *Colpomeria* proposed by Gauld (1984). Both genera differ from *Lamnatibia* mainly in having a complete occipital and epicnemial carinae and a distinct, strong, epomia. *Acrodactyla* also differs from *Lamnatibia* by the possession of a crest near anterior end of notaulus. *Pterinopus* can also be distinguished from *Lamnatibia* by the possession of a fringe of long hairlike projections in the edge of basal lobe on tarsal claws of female, a well defined lateromedian longitudinal carina on propodeum, and a distinct distal abscissa of Cu1 in hind wing.

One of the most distinctive features of *Lamnatibia* is the possession of a longitudinal ridge in the ventral surface of front and middle tibia. This feature, that was not included in the Gauld and Dubois (2006) analysis, is also present in species of the *quadrisculpta* group of *Acrodactyla*, but in this genus the ridge is usually short and inconspicuous, and apparently is restricted to the fore tibia.

As far as we know, the longitudinal ridge of the middle tibia that characterizes *Lamnatibia* is absent in all the other pimpline genera but we could not include it in the new data matrix because we did not have rapid access to the material examined by Gauld and Dubois (2006). However, we propose that the strong longitudinal ridge of the middle tibia could be an autapomorphic feature of the genus.

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