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NOTES ON BRAZILIAN LIOPTERIDAE (HYMENOPTERA: CYNIPOIDEA), WITH THE DESCRIPTION OF *PSEUDIBALIA* *ANGELICAE* N. SP.

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ABSTRACT

We describe a new species of Hymenoptera Liopteridae (Pseudibalia angelicae n. sp.) and provide new records for two other species previously known only by the holotypes: Liopteron levilaterale Kerrich and Pseudibalia bifasciata (Westwood). The most important differences between Pseudibalia angelicae n. sp. and other closely related species are discussed.

Keywords: Liopteridae, Cynipoidea, Hymenoptera, *Pseudibalia*

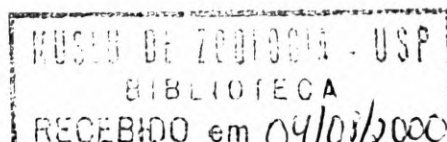
INTRODUCTION

Liopteridae is a small mainly tropical cynipod family (absent in western Palearctic), including some 70 described species, although the material studied by Ronquist (1995) from several museums, comprises 70 undescribed species. Their biology is almost completely unknown, but, at least the Mayrellinae, are parasitoids of wood-boring larvae of different insects: probable hosts cited in the literature are Coleoptera (Busprestidae and Cerambycidae), Lepidoptera

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and Hymenoptera (Siricidae). A world revision of the family, including most of the species described till then, was provided by Hedicke and Kerrich (1940), although they treated in detail only at subfamily level. Liopteridae systematic position has been clarified by Ronquist (1995), who provided also the first comprehensive treatment of the family. In 1994, Ronquist suggested that Liopteridae belongs to the most basal lineages of cynipoids along with Austrocynipidae and Ibaliidae, referring to the three families as “macro cynipoids”.

In this paper we provide new records for two Neotropical species of Liopteridae, previously known only by the holotypes [*Liopteron levilaterale* Kerrich and *Pseudibalia bifasciata* (Westwood)], and describe a new *Pseudibalia* from Brazil, unfortunately also based on a single individual. Liopteridae are rather spectacular wasps but have been seldom collected, as other groups of hymenopterous parasitoids of wood-boring insect larvae.

Liopterinae and Mayrellinae (*Paramblynotus*) have been recorded in the Neotropical region; Liopterinae is a taxon exclusive to this region, except for a few species that extend to the southernmost part of the Nearctic region. It includes three genera, *Liopteron*, *Peras*, and *Pseudibalia*. Ronquist (1995) cites 3 and 13 undescribed species of, respectively, *Peras* and *Pseudibalia*; of these 9 are from Brazil. Out of the 31 described Neotropical Liopterinae species, 24 are cited for Brazil (see also de Santis, 1980).

MATERIAL AND METHODS

We follow throughout this paper the terminology used by Ronquist (1995), but for characters for which Hedicke & Kerrich (1940) used different terms, we present these also between brackets, for comparison. Collection acronyms adopted here are (following Arnett *et al.*, 1993) are: Museu de Zoologia da Universidade de São Paulo (MZSP), Departamento de Biologia da Universidade Federal de São Carlos (DCBU), and Museum für Naturkunde der Humboldt Universität zu Berlin (ZMHU).

The images of *Pseudibalia angelicae* n. sp. and *P. confusa* (Hedicke) (ZMHU) were made with a Leica 360 SEM, without any previous coating and under very low voltage (500 to 600 v) as to not put the specimens under any risk. Drawings were made with *camera lucida*.

***Pseudibalia angelicae* Pujade-Villar & Brandão n. sp.**

(Figs, 1b, 2b, 3b, 4b, 5)

Derivatio nominis: In homage to our colleague and friend, the collector of this new species, Dr. Angélica Penteado-Dias, Universidade Federal de São Carlos, Brasil.

Holotype (unique specimen): female collected in Fazenda Canchim (“mata”), São Carlos, SP, Brasil, 03-16. X.1997 (Malaise), Angélica Penteado-Dias col.; deposited in DCBU.

Biology: unknown.

Length: 7.5 mm.

Coloration. Body in general black; mandibles dark reddish-brown; tarsomeres II, III and IV light reddish-brown, tarsomeres I and V dark reddish; pilosity whitish; infuscated fore wings, bifasciate, dark areas separated by a median hyaline area; hind wings with apical third infuscate, otherwise hyaline; antennae fully black, without a bright yellow spot apically in the last article.

Head (figs. 1b, 2b, 3b). Strongly transverse in dorsal view (77: 40), transfacial line 1.3 times the height of the compound eye; emargination behind ocelli shallow. Genae sparsely foveate, without smaller punctures; not expanded in relation to compound eyes; laterally marginated, but carina ending before occiput. Margins of antennal foramina raised, striolate; dorsally glabrate with few oblique costulae; sculpture similar to face ventrally. Pubescent patch dorsal to the antennal foramina present. Vertex mostly smooth, sparsely foveate. Face medially with a rounded and continuous weak protuberance, without any noticeable keel; median frontal carina present; triangular lamellate process well differentiate and situated above but between the antennal foramina. Face foveate and superficially obliquely striolate. Clypeus finely transversely striate, pleurostomal lines absent, but epistomal sulcus present and covered by a small longitudinal striae; anterior tentorial pits not visible; anterior margin sinuous. Frons striate over the antennal foramen and with foveae near the ocelli and laterally to the compound eyes; lateral frontal carina not present. Occiput smooth. Malar area 0.68 times the height of the compound eye. Antennae slightly compressed, length of F1: F2: F3 as 16: 19: 18, slightly broader at apex; F3 with a dorsal placodeal sensillum; F4 and the following segments broader, with easily observable placodeal sensilla; relative length of antennal segments F4 to F11 are 15: 14: 13: 12: 12: 12: 17.

Mesosoma (figs. 2b, 3b). Pronotum foveate laterally and with sparse micropunctures, otherwise smooth, posterior and lateral faces smooth; dorsally with a distinct triangular process (tooth); lateral pronotal carinae interrupted dorsally; submedian depressions convergent anteriorly, area between and behind depressions triangular and smooth, latero-external areas to the depressions longitudinally strigate; anterior plate transversely foveate dorsally and punctuate strigate ventrally. Mesoscutum shiny with transverse interrupted ridges and sparse foveae; median mesoscutal impression (furrow) and notaulices percurrent, interrupted by the ridges; anteromedian and parapsidal signa (furrows) visible. Scutellum with foveae (basal pits) almost square, smooth, separated by a conspicuous ridge; a fovea being broader than the adjacent lateral bar (12: 8); sculpture of scutellum foveate-areolate; laterally and posteriorly margined with two visible triangular processes posteriorly; laterodorsal process of scutellum present as a rounded tooth; lateral and posterior surfaces vertically costulate; in lateral view, scutellum extends beyond metanotum. Mesopleura smooth and shiny with impression (longitudinal furrow) well marked, with transverse ridges and broader at both extremes; upper pleuron weakly sculptured; speculum smooth and shiny; mesopleural triangle covered by a dense whitish pubescence; lower pleuron shiny and smooth, with some sparse piliferous punctures; intercoxal process absent. Mesepisternum and metepisternum foveate rugose; calyptra conspicuous and lobelike, polished. Dorsellum coriaceous; lateral depressions small but well differentiated. Propodeum with the lateral carinae flattened, shiny, strongly marked, divided into two branches at nucha, delimiting an almost circular area; one or two transverse carinae between lateral and median carinae: this area is smooth, shiny and glabrous; area at the sides of the lateral propodeal carinae with ridges, densely pubescent. Nucha rugose, dorsally shiny.

Metasoma (fig. 5c). Longer than the rest of the body (173: 145). Petiole longitudinally costate, without a median carina, but with a distinct furrow; petiole 3 times longer than broad at midlength, and one third the remainder of the abdomen. Tergites III and IV subequal. Median dorsal fine carina extending all over the metasoma, but more distinct from the 5th tergite on. Fifth tergite weakly pubescent on postero-superior lateral areas. Tergites VI to VIII more pubescent and with umbelliferous punctures. Tergite IX a little longer than the tergite VIII height (13: 9). Metasoma not truncate posteriorly, that is, eudorsal margins of abdominal terga VI and VII straight, of VIII rounded, but eudorsal margins only slightly angled relative to each other, and forming an angle of some 70° to the horizontal axis of metasoma. Lateral flap of abdominal sternum VII ending at the level of tergite VIII apex. Ventral spine not visible.

Wings.- Fore wings (fig. 5a) with radial cell 3, 1 times longer than broad, Rs + M arising at superior third of basal; areolet not present; fore wing margin not ciliate. $Rs/2r = 5.5$.

Legs.- Erect hairs. Metafemur without a tooth. Metatibiae apically produced into a subtriangular process (tooth). Metatarsomere I with length similar to the remainder of the tarsus (fig. 5b); distal margin not produced anteroventrally. All tarsal claws with a basal lamellate lobe.

DISCUSSION

Liopteridae was revised by Ronquist in 1995, although the last work to include determination keys to species was that of Hedicke & Kerrich's (1940). Therefore, in this section we provide comments on characters that separate the new species *P. angelicae* from its most close relatives in the genus according to Hedicke & Kerrich keys: *P. tarsalis* (Ashmead, 1895) and *P. rufa* (Ashmead, 1895). However, the species subgroup including these species, to which we compare *P. angelicae* n. sp., still belongs to *Pseudibalia* according to Ronquist (1995). Moreover we discuss the characters that separate *P. angelicae* n. sp. and *P. confusa* (Hedicke, 1940), since both species present certain exclusive morphological characters in regard to other *Pseudibalia* (Ronquist, *com. pers.*).

According to Hedicke & Kerrich's (1940) discussion on *Pseudibalia* species groups, *P. angelicae* n. sp. belongs to a subgroup of species within their bifasciata group; but the species they included in this group belong to two different genera *Pseudibalia* and *Peras* according Ronquist (1995). Following Hedicke & Kerrich's (1940) the bifasciata group is characterized by the sculptured pronotum, which bears a median tooth, irregular and discontinuous carinae on mesoscutum, bilobed scutellum, bifasciate wings, relatively long petiole without dorsal carinae, and 3rd gastral segment almost glabrous dorsally.

Pseudibalia angelicae n. sp. will run out in the couplet including *P. tarsalis* and *P. rufa* in Hedicke & Kerrich's (1940) key, but can be easily distinguished from these two species. It is most similar to *P. rufa* from which it differs by the color being shiny black all over the body, instead of reddish; the median mesoscutal impression in the new species is percurrent (fig. 3b); the scutellar foveae square (fig. 3b); fore wing margin non ciliate in the new species; in both wings the infuscate areas are differently shaped from those in *P. rufa*; the metatarsus III in the new species is relatively larger; metasoma proportionally bigger in the new species (fig. 5b), among other small characteristics. From *P. tarsalis* it can be distinguished by the quadrate scutellar foveae and the apical

triangular process on metatibiae, respectively longer than broad and absent in *P. tarsalis*.

From the generic redescription of *Pseudibalia* in Ronquist (1995) *P. angelicae* n. sp. shares a number of unique features with *P. confusa*: the median keel on the eighth abdominal tergum, the rounded posterior part of the metasoma and the submedian hairy patch on the posterolateral part of metasoma (less densely hairy in *P. angelicae* than in *P. confusa*). Comparing the type of *P. confusa* and the species here proposed we noticed several different characters between them: the median frontal carina process (interantennal tooth) is very big and prominent in *P. angelicae* n. sp. (fig. 1b, 3b) and small in *P. confusa* (fig. 1a, 3a); the foveate sculpture of the head, in anterior view, is bigger in *P. angelicae* n. sp. (fig. 1b) than in *P. confusa* (fig. 1a); the genae are poorly sculptured in *P. confusa* (fig. 2a) and strongly foveate in *P. angelicae* n. sp. (fig. 2a); in *P. confusa* (fig. 1a) there is a conspicuous ridge throughout the face, running from clypeus to median ocellus, while in *P. angelicae* n. sp. (fig. 1b) the ridge is not present but substituted by a wide and scarcely differentiated fringe; the strongest difference is in the pubescence and sculpture pattern over their propodeal carinae since in *P. angelicae* n. sp. (fig. 4b) the sculpture is between alveolate and reticulate and the pubescence is absent while in *P. confusa* (fig. 4a) there is a dense pubescence and the sculpture is weakly rugose with one median carina.

***Liopteron levilaterale* Kierrich, 1940**

Studied material. 1 female, Campos do Jordão (SP, Brasil), III-1952 (J. H. F. Brandão col.), deposited in MZSP.

This species was still known by the single female holotype, collected in Tijuca (RJ, Brasil), deposited in the MNHN (Paris). The only difference we have found in relation to the rather good original description (in Hedicke & Kerrich, 1940) is the relative size of the petiole to the remainder of the gaster; in our specimen both have the same size while in the holotype the petiole is described as being about three-fifths the length of the remainder of gaster. However the very peculiar morphology of this species, in special regarding the size and position of the fore wing yellow spot, and the fact that the difference we noticed in proportion may prove to be intraspecific variation, led us to regard our specimen as conspecific to *L. levilaterale*. Other minor differences from the original description are: median keel on face and continuous interantennal keel as strong and sharp, although the interantennal keel is not as large as the median one: central lateral portion of scutellus with deep coarse punctures at

the sides of the pits and rather smooth in the middle and apex. To the original description we should add that the central area of the clypeus is smooth and shiny and that in the pronotum the punctures are only in the dorsal areas.

Pseudibalia bifasciata (Westwood, 1874)

Studied material. 1 male, Tapuruquara, Rio Negro (AM, Brasil), 26-27-XI.1962 (J. Bachiné leg.). deposited in MZSP.

Also known till now only by the male holotype collected in "Amazonas" by Bates in 1861, in Barra (now Manaus) at the mouth of the Negro River into the Solimões. This species can be separated from all others in Hedicke & Kerrich (1940) *bifasciata* group by the raised pronotum that lacks a median tooth, by the two infuscated spots in the fore wings, and by the relatively large "basal pits" (tentorial pits). However, from this species only males are known, while in other species in the group without median pronotal tooth, only females are known (*P. weldi*, *P. rufipes*, and *P. brevicornis*). Even though, we believe that our specimen belongs to *P. bifasciata*, as males and females are rather similar regarding the size of the tentorial pits in other species of Liopteridae. The good redescription of this species given by Hedicke and Kerrich (1940) coincides in all characters with the specimen we have studied, but we should comment that the clypeus has some not well marked ridges radiating from the anterior margin, intermingled with the punctures described by these authors; that the notaulices are percurrent as they say, but interrupted several times by the very strong ridges; and that the petiole is four times longer than wide, instead of 4.8. The median mesoscutal furrow is percurrent, although in the holotype the pin prevented these authors to be sure of this character state.

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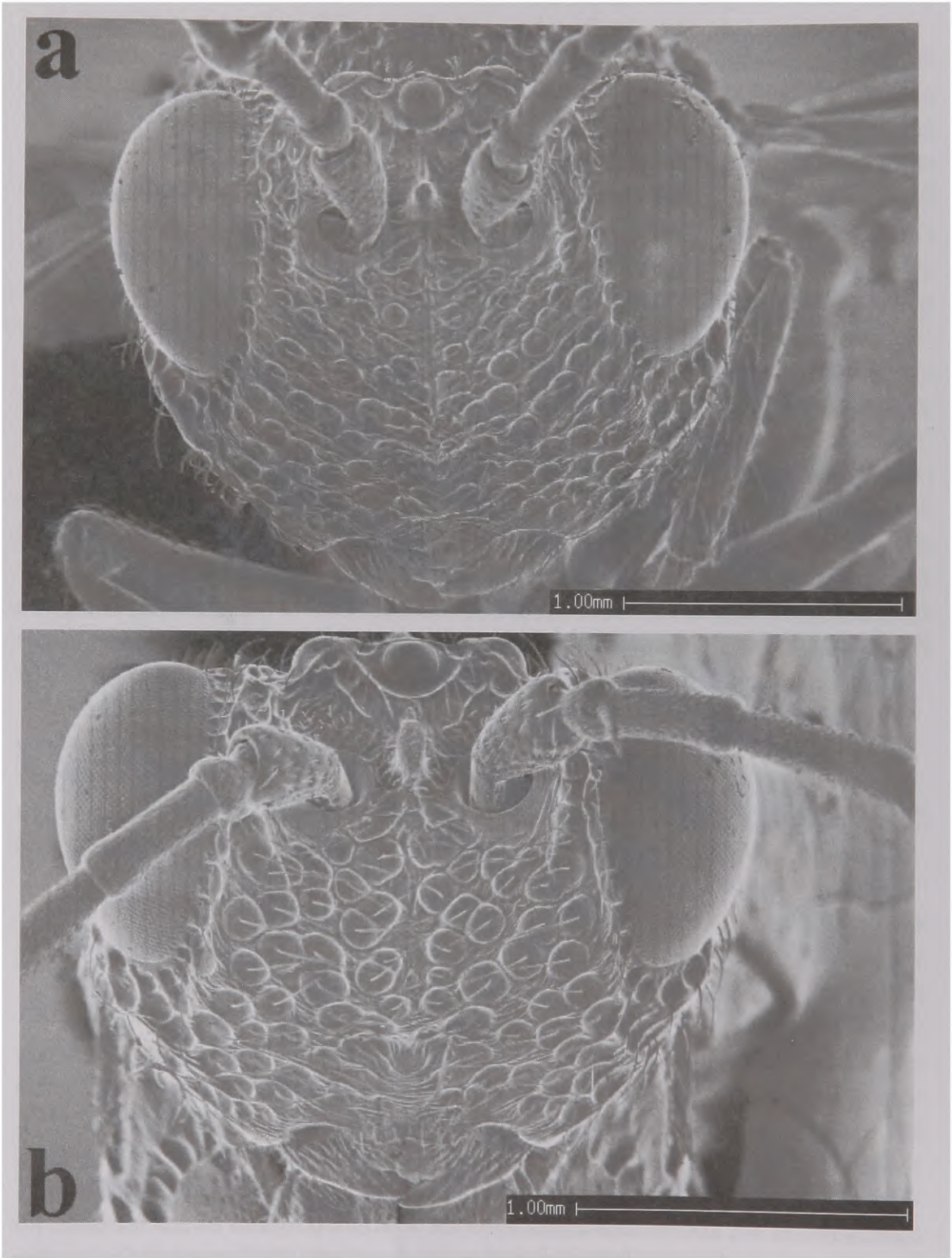


Figure 1. Electromicrographs of *Pseudibalia confusa* (a) and *P. angelicae* n. sp. (b) holotypes heads in frontal view.

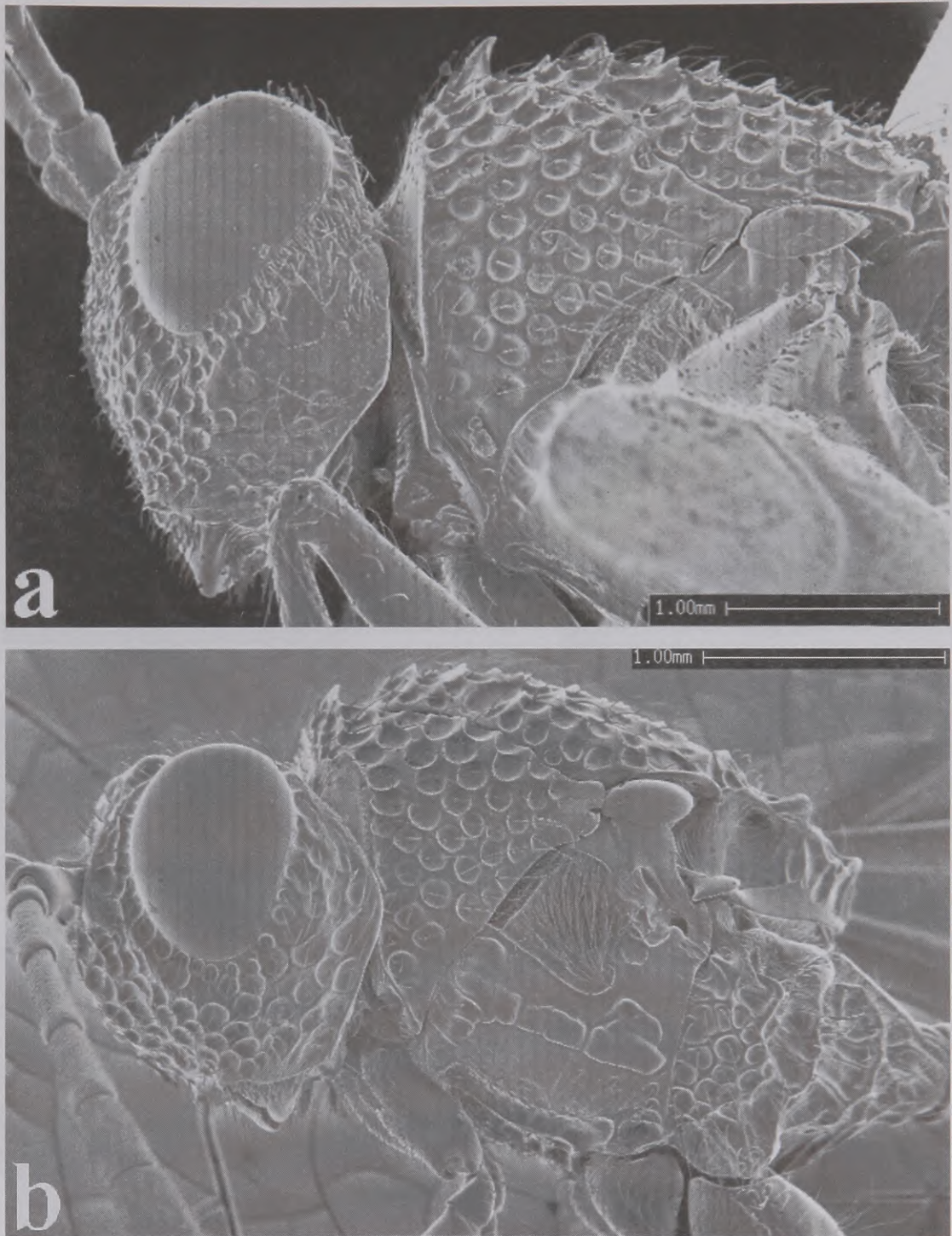


Figure 2. Head and thorax in lateral view of *Pseudibalia confusa* (a) and *P. angelicae* n. sp. (b) holotypes.

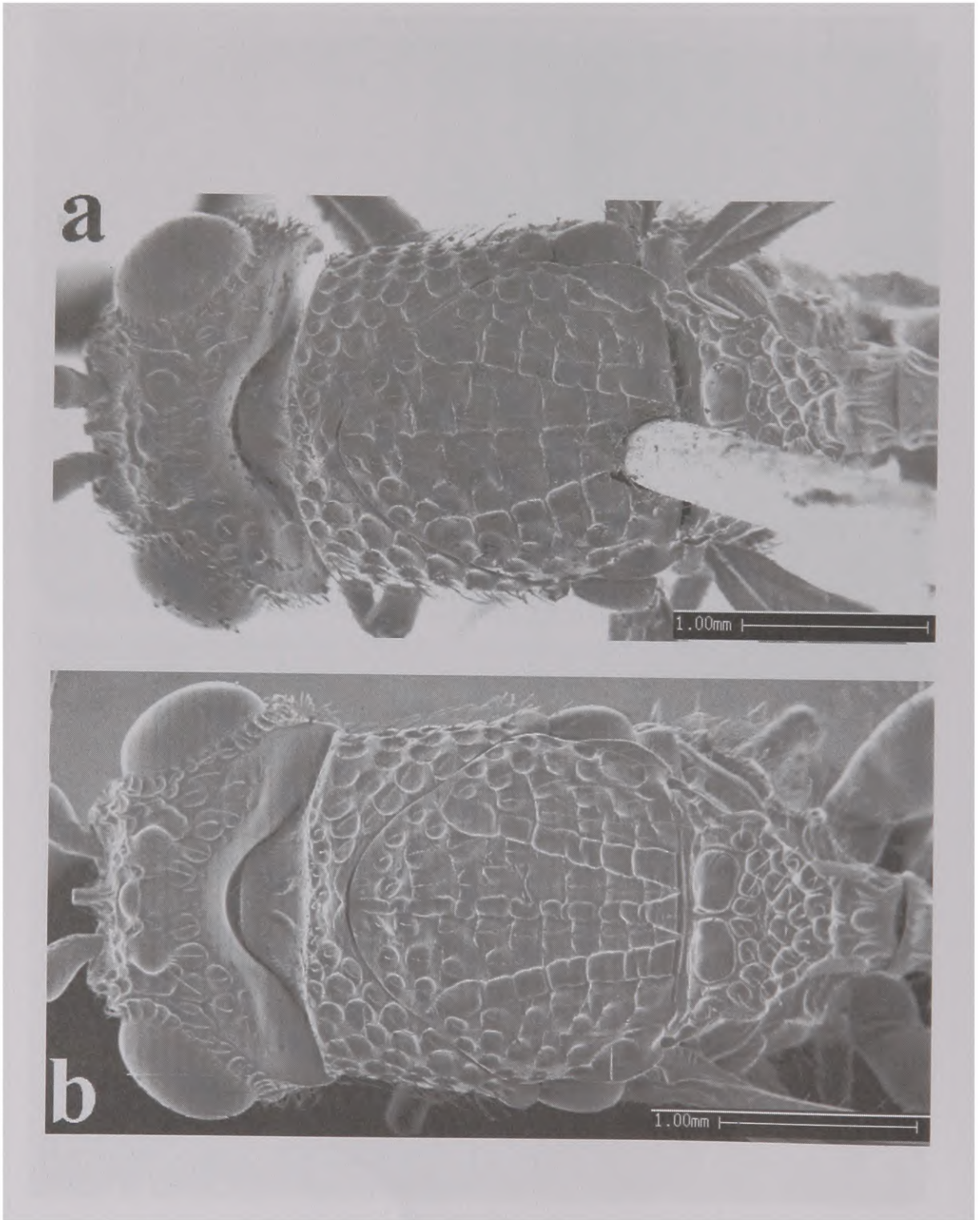


Figure 3. Head and thorax in dorsal view of *Pseudibalia confusa* (a) and *P. angelicae* n. sp. (b) holotypes.

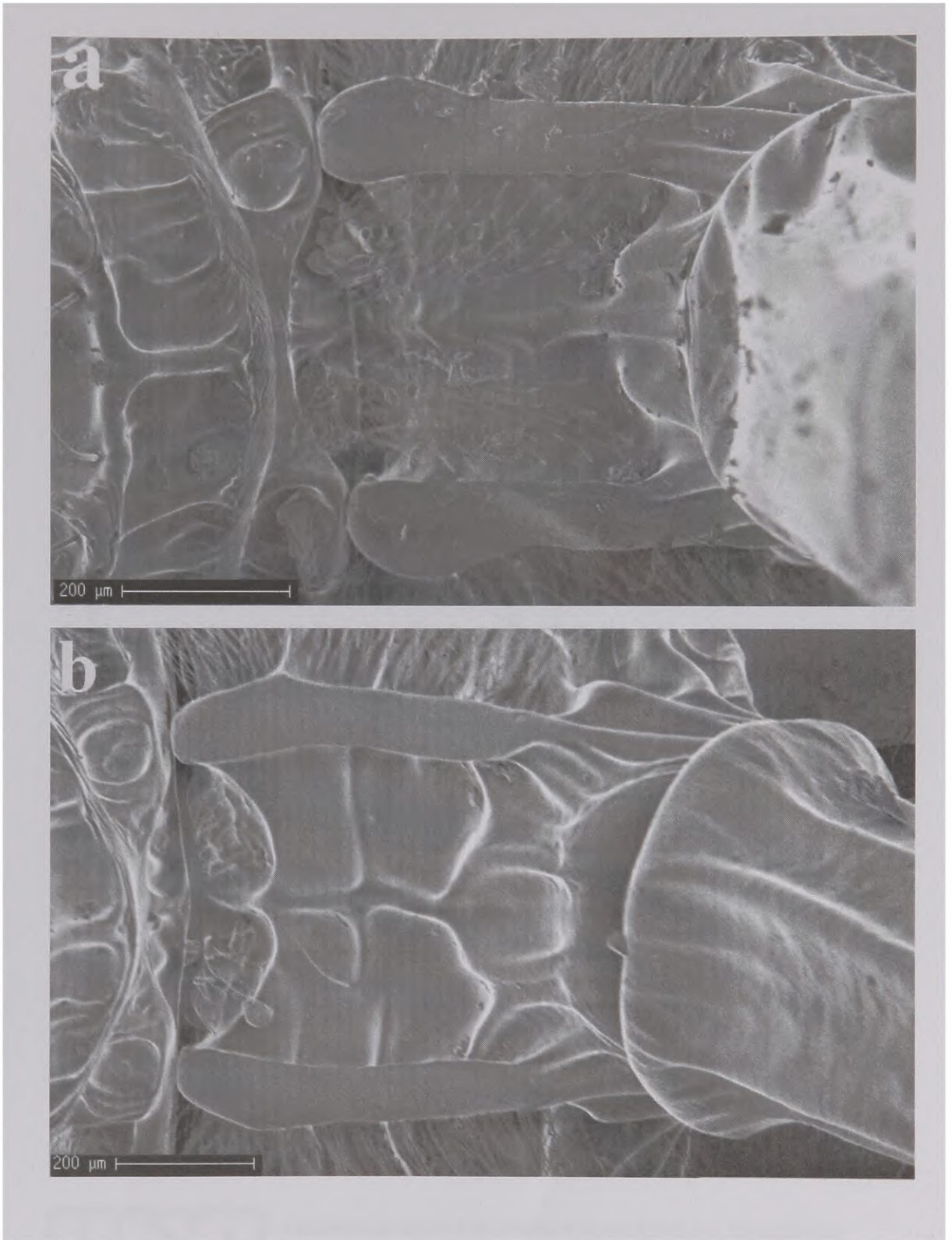


Figure 4. Propodeum of *Pseudibalia confusa* (a) and *P. angelicae* n. sp. (b) holotypes.

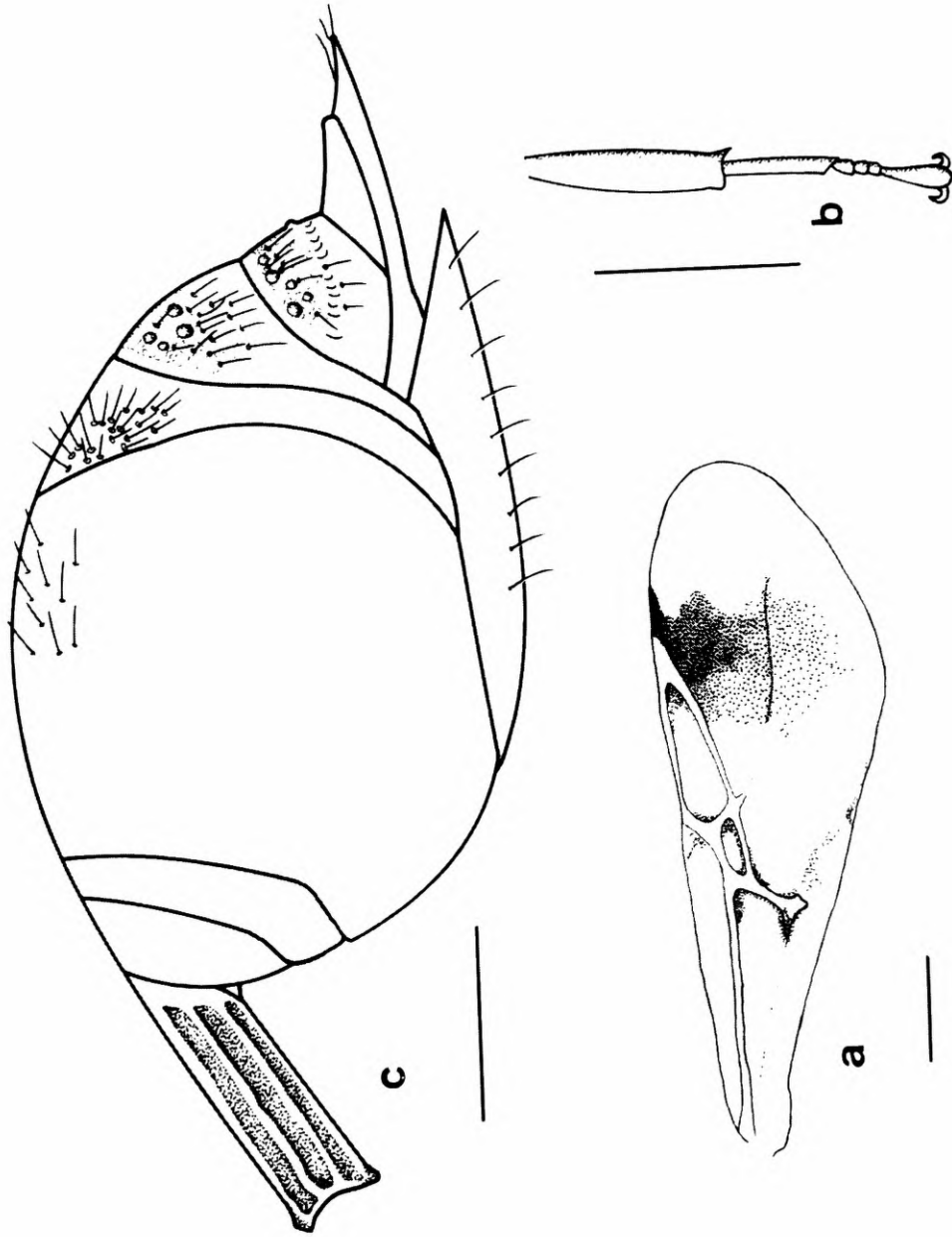


Figure 5. *Pseudibalia angelicae* n. sp. holotype (a) Forcing (pubescence omitted); (b) tibia and tarsus of 3rd leg (hairs omitted); (c) metasoma in lateral view. Scale bars = 1 mm.

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