

# Males of *Nectarinella* Bequaert (Hymenoptera, Vespidae, Polistinae)

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**RESUMO.** Os machos das duas espécies de vespas sociais do gênero *Nectarinella* Bequaert, *N. xavantinensis* Mateus & Noll e *N. championi* (Dover), são descritos e suas genitálias ilustradas. São feitas comparações com espécies de gêneros estreitamente relacionados, *Chartergellus*, *Leipomeles*, *Marimbonda*, *Parachartergus* e *Pseudopolybia*.

**PALAVRAS-CHAVE.** Epiponini; genitalia; Polistinae; taxonomia; Vespidae.

**ABSTRACT.** The males of both species of the paper wasp genus *Nectarinella* Bequaert, *N. xavantinensis* Mateus & Noll and *N. championi* (Dover), are described, and the genitalia illustrated. These are compared to species in the closely related genera *Chartergellus*, *Leipomeles*, *Marimbonda*, *Parachartergus* and *Pseudopolybia*.

**KEYWORDS.** Epiponini; male genitalia; Polistinae; taxonomy; Vespidae.

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*Nectarinella* was described by BEQUAERT (1938) as a subgenus of *Chartergus*, monotypic for the species *Nectarina championi* Dover, 1925. That species was described from Panama, based on female specimens only. It was subsequently recorded from Costa Rica by SKUTCH (1971), who described the nest, which is astelocytarus, that is with the comb lacking a petiole and built directly on the substrate and covered with an envelope. The nest is remarkable for having numerous fine paper pillars tipped with a sticky secretion on the envelope and surrounding it like a palisade, which evidently function as a guard against ants (SKUTCH 1971:274; SCHREMMER 1977). SCHREMMER (1977) treated *Nectarinella* as a genus, and recorded *championi* from Colombia. In the monograph of New World paper wasps by Richards (1978) *Nectarinella* remained monotypic, and the males unknown. Recently, MATEUS & NOLL (1998) described a second species, *N. xavantinensis*, from Brazil (Mato Grosso); it has a similar nest architecture, with sticky ant guards. Males of that species were unknown, but recently Mateus & Noll collected specimens of that sex.

Males of relatively few species of Polistinae have been adequately described. The descriptions of males in the monograph by RICHARDS (1978) refer mostly to characters that show the same sexual dimorphism throughout Polistinae, e. g. antennae, clypeus, tempora, metasoma, pilosity and coloration. The male genitalia were scarcely discussed, RICHARDS (1978: 5) summarizing an unpublished survey of polistine genera by Vreugdenhil and van der Vecht for just three characters: whether or not the aedeagus was serrate beneath, whether or not the parameral spines are hairy, and relatively anterior or posterior placement of the ventral process of the aedeagus. Based on these characters, the polistine genera were stated to fall into two groups. *Nectarinella* was the only genus for which males were unknown, but it was predicted to fall in group 1, with the aedeagus serrate, parameral spines hairy, and ventral

process of aedeagus anterior and attached to the basal apodeme.

We here describe the male of *N. xavantinensis*, and also the male of *N. championi*, and illustrate their genitalia. For comparison, we also provide illustrations of species of the closely related genera (CARPENTER 1991; WENZEL & CARPENTER 1994) *Chartergellus* Bequaert, 1938, *Leipomeles* Moebius, 1856, *Marimbonda* Richards, 1978, *Parachartergus* Ihering, 1904 and *Pseudopolybia* Dalla Torre, 1894.

## MATERIALS AND METHODS

Male specimens of *N. xavantinensis* were collected in **Brazil**: Mato Grosso, Prefeitura Mutum do Novo Mutum, 17 September 2002 (S. Mateus & F. B. Noll), Nest no. 37. Male specimens of *N. championi* were collected in **Costa Rica**: Rio Grande, 6 km E Atenas, 700 m, 8 December 1990 (J. M. Carpenter & J. W. Wenzel), Nest no. 901208-1. Two males of each species were relaxed and the genital capsule extracted, cleared slightly in warm lactophenol, and examined under glycerin. A male specimen of *Chartergellus punctator* from **Peru**: Oxapampa, 1600 m, 1940 (Weyrauch), borrowed from the U. S. National Museum, was also dissected. The figures of the male genitalia of species of *Parachartergus*, *Leipomeles* and *Marimbonda* (Figs. 4-9) were given to Carpenter by the late J. van der Vecht as part of parcel of unpublished figures of polistine genitalia, drawn as part of the unpublished survey mentioned above. We are pleased to be able to take this opportunity to publish more of van der Vecht's work.

## RESULTS

These two species differ from one another as summarized for the females by MATEUS & NOLL (1998). The outstanding

differences may be shown in a key, which has not previously been published:

1. Frons elevated above antennae, forming a V-shaped protuberance; humeri produced forward in acute angle in dorsal view; clypeus wider than high; metasomal ground color brownish. BRAZIL: Mato Grosso .....  
..... *N. xavantinensis* Mateus & Noll
- Frons flat above antennae; humeri little produced in dorsal view; clypeus about as wide as high; metasomal ground-color ochraceous. COSTA RICA, PANAMA, COLOMBIA ..... *N. championi* (Dover)

In both species of *Nectarinella* the males, unlike the females, have the clypeus covered with dense silvery pubescence, the tempora narrower, and the terminal metasomal sternum flatter, as well as the antenna with one more article and the metasoma one more visible segment. The males are not notably paler than the females.

The genitalia of *N. xavantinensis* are illustrated in Fig. 1, and of *N. championi* in Fig. 2. The other genera are illustrated in Figs. 3-9.

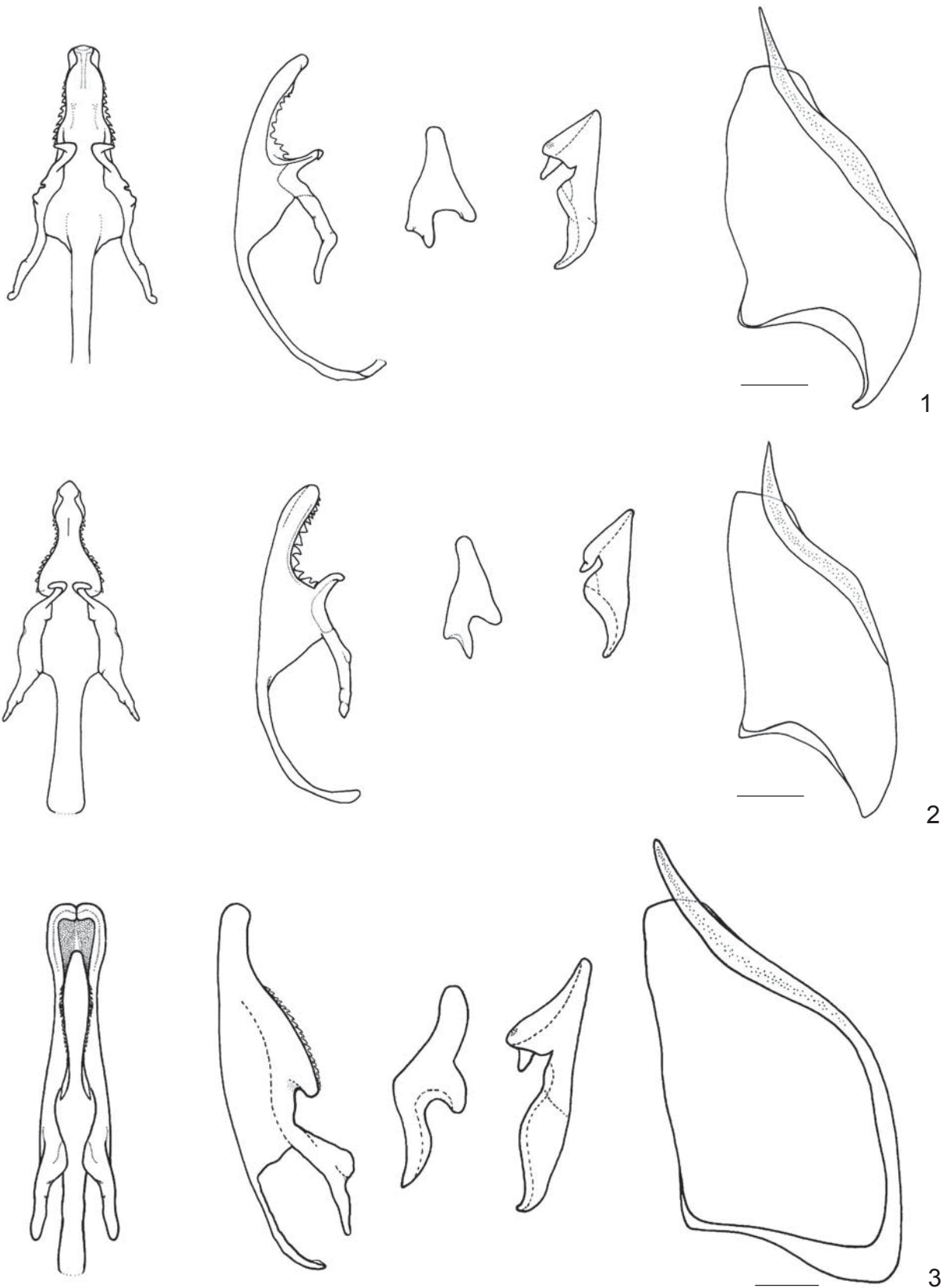
In comparison to each other, the genitalia of the two species of *Nectarinella* show few outstanding differences: both the digitus and cuspis are somewhat more robust in *N. xavantinensis*, and the paramere is more strongly narrowed in its basal angle (cf. Figs. 1 and 2). With respect to the three characters mentioned by RICHARDS (1978: 5), both species have the aedeagus serrate beneath, the parameral spine lacking long hairs, and the ventral process of the aedeagus could be said to be "more anterior [i. e., towards the head, that is basal in Figs. 1-2] and more or less attached to the basal apodeme." Two of these characters correspond to group 1 of RICHARDS (1978), but the parameral spines lacking long hairs does not. However, although *Chartergellus*, *Leipomeles*, *Parachartergus* and *Pseudopolybia* were stated to belong to the group with long hairs, as seen in Figs. 3-4, 6-7 and 8-9, this state is only found in *Pseudopolybia*. RICHARDS (1978: 5) qualified the group description for *Parachartergus*, saying "Parameral spines usually with long hairs but at least (*Parachartergus*) some short ones," which is true for the species illustrated in Figs. 6-7. But even RICHARDS' (1978: fig. 88a) own figure of the genitalia of *Chartergellus* does not show long hairs on the paramere. On the other hand, *Leipomeles* and *Marimbonda* were both placed by RICHARDS (1978: 5) in group 2, with the "Aedeagus very rarely serrate beneath and then only on one edge of the ventral process (*Leipomeles*)." *Leipomeles* was thus placed in both groups, although the placement in group 2 may have been some sort of typographical error, for as Fig. 4 shows the aedeagus is serrate beneath on both edges. This is also true for *Marimbonda*, however. Moreover, the ventral process cannot be said to be "more posterior, attached to a ventral extension of the posterior expansion rather than to the apodemes" in either *Leipomeles* or *Marimbonda*. Thus, two out of three characters would argue for placement of both genera in group

1 of Richards. But in view of the contradiction of the state of the hairs on the parameral spine for all of these genera aside from *Pseudopolybia*, it seems better to abandon groupings based on the combination of character states cited by Richards.

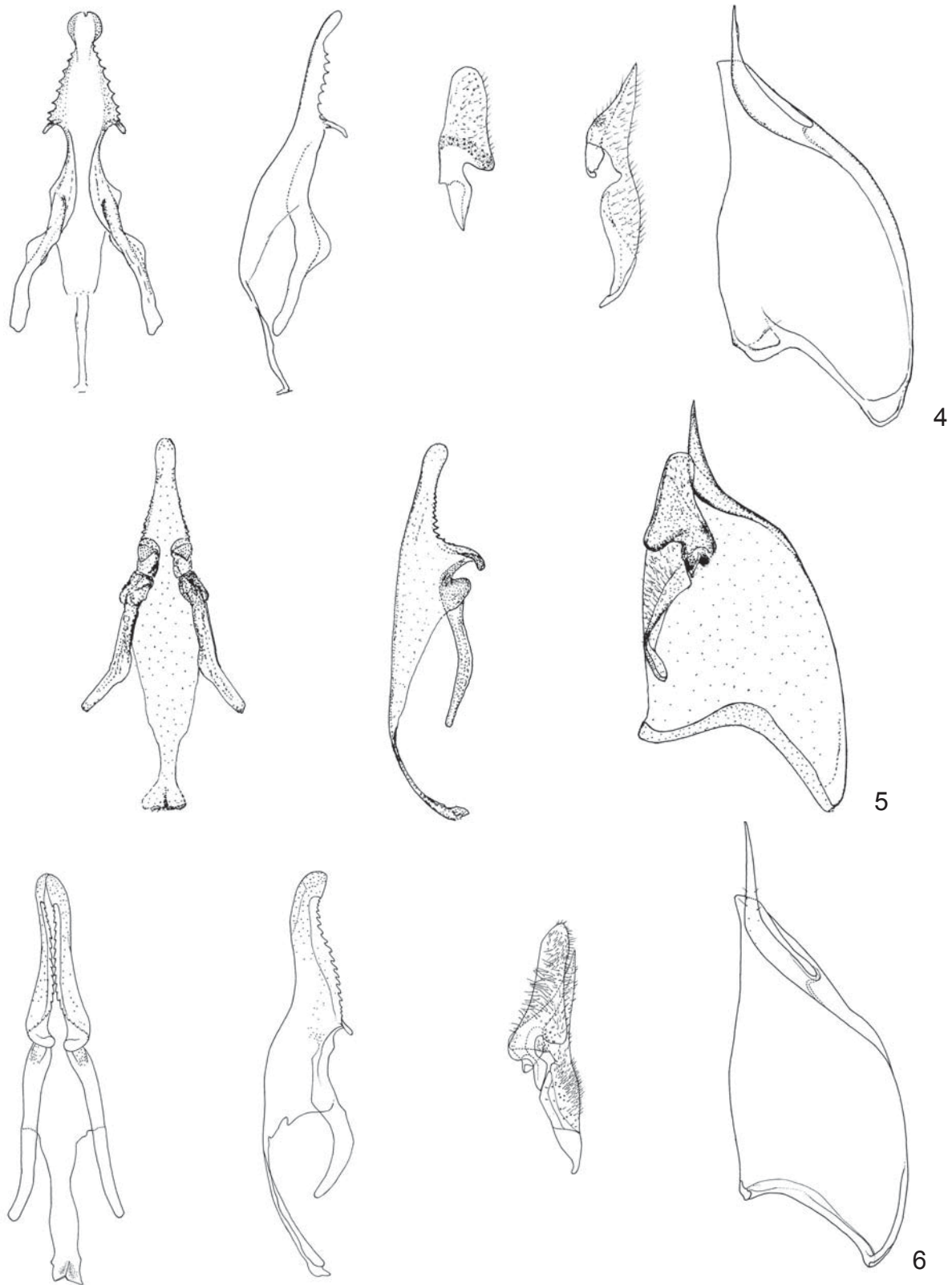
The six genera discussed in this paper are supported as a monophyletic group by shared possession of a stout, recurved bristle on the third labial palpomere (CARPENTER 1991). The remaining genera aside from *Pseudopolybia* are supported as a group by reduction in labial palpomere number, from four to three. The four genera aside from *Parachartergus* and *Pseudopolybia* are supported as a group by reduction in the maxillary palpomere number, from six to five. *Leipomeles* and *Marimbonda* are supported as sister-groups by the similar form of the first metasomal segment (conically petiolate), while a possible synapomorphy in nest architecture is the central furrow built in the lines of construction of the envelope (WENZEL & CARPENTER 1994). *Chartergellus* and *Nectarinella* are supported as sister-groups by loss of the occipital carina - a state also found in *Pseudopolybia* (as well as some other polistine genera). With that framework in mind, we turn to consideration of the similarities illustrated in the genitalia studied here.

*Pseudopolybia* (Figs. 8-9) is the only genus with long hairs on the parameral spine. If that is in fact the primitive condition for a larger group of genera, then loss of such hairs supports the grouping of the five genera that have lost the fourth labial palpomere. Study of additional genera besides those considered here is required to settle this. All of these genera have the aedeagus serrate beneath, which is clearly primitive for a large number of polistine genera. Placement of the ventral process of the aedeagus as such does not seem offer evidence on phylogenetic relationship in the genera considered here, but shape may: the very narrow, reduced, almost hooking shape in most of these genera (Figs. 1-2, 4-7) contrasts with the short angular process in *Pseudopolybia* (Figs. 8-9) - but this is also the condition in *Chartergellus* (Fig. 3), and see Richards (1978: figs. 88-90). If the narrow reduced shape is apomorphic, then *Chartergellus* either shows a reversal or is misplaced.

Additional characters to those previously considered are evident. All six of these genera show a basal angular process on the digitus (Figs. 1-9), which may support them as a monophyletic group; the condition is not general in Polistinae. This process is least well developed in the *Chartergellus punctator* Richards, 1978 studied here, and may be variable in the genus (see RICHARDS 1978: fig. 88c for *C. communis* Richards and 89c for *C. atectus* Richards; but cf. also Fig. 3 with fig. 90c for *C. punctator*). The shape of the digitus is otherwise rather variable in these genera: it is apically pointed in *Nectarinella* (Figs. 1-2), *Chartergellus* (Fig. 3) and *Pseudopolybia compressa* Saussure, 1854 (Fig. 8); it is more rounded in the remaining taxa. Based on the relationships mentioned above, this is not a readily interpretable pattern. In the two species of *Nectarinella* (Figs. 1-2), the cuspis appears apically shorter than the remaining genera (Figs. 3-9), which may be apomorphic. Most of these genera show a very acute

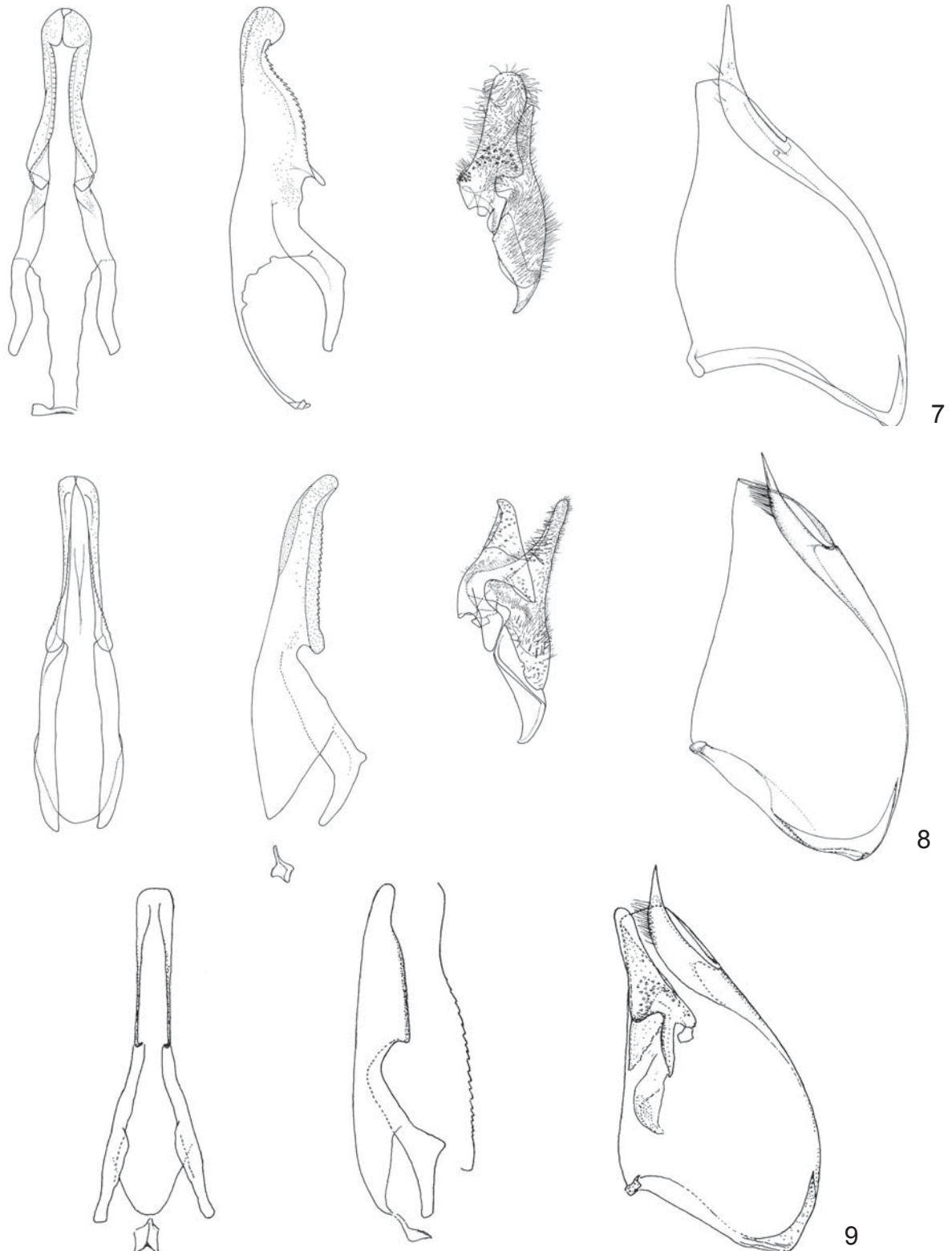


**Figs. 1-3.** 1, male genitalia of *Nectarinella xavatinensis* Mateus & Noll. From left to right, aedeagus in ventral view, aedeagus in lateral view, digitus, cuspis, paramere; 2, male genitalia of *N. championi* (Dover). From left to right, aedeagus in ventral view, aedeagus in lateral view, digitus, cuspis, paramere; 3, male genitalia of *Chartergellus punctatior* Richards. From left to right, aedeagus in ventral view, aedeagus in lateral view, digitus, cuspis, paramere. Setae on the volsellae have been omitted for clarity. Scale bars = 1 mm.



**Figs. 4-6.** 4, male genitalia of *Leipomeles dorsata* (Fabricius). From left to right, aedeagus in ventral view, aedeagus in lateral view, digitus, cuspis, paramere. The specimen drawn was from Panama: Bugaba, 800-1500 ft. (Godman-Salvin), determined by Richards, and deposited in the Natural History Museum. No scale was provided; 5, male genitalia of *Marimbonda albogrisea* Richards. From left to right, aedeagus in ventral view, aedeagus in lateral view, volsella + paramere. The specimen drawn was a paratype; no scale was provided; 6, male genitalia of *Parachartergus griseus* (Fox). From left to right, aedeagus in ventral view, aedeagus in lateral view, volsella, paramere. No provenance on the specimen was provided, nor scale, but the drawing was stated to have been made at 75x.





**Figs. 7-9.** 7, male genitalia of *Parachartergus apicalis* (Fabricius). From left to right, aedeagus in ventral view, aedeagus in lateral view, volsella, paramere. The specimen drawn was from Mexico: Orizaba, March 1975. No scale was provided, but the drawing was stated to have been made at 75x; 8, male genitalia of *Pseudopolybia compressa* (de Saussure). From left to right, aedeagus in ventral view, aedeagus in lateral view, volsella, paramere. No provenance on the specimen was provided, nor scale, but the drawing was stated to have been made at 75x, and the following dimensions (presumably length) given: paramere 2.25 mm, aedeagus 2.15 mm, volsella 1.45 mm; 9, male genitalia of *Pseudopolybia difficilis* (Ducke). From left to right, aedeagus in ventral view, aedeagus in lateral view, closeup of ventral teeth of aedeagus, volsella + paramere. The specimen drawn was from Brazil: Peixe-Boi, June 1909 (E. F. Bragança), determined by Ducke and confirmed by Richards, and deposited in the Natural History Museum. No scale was provided.

basal angle on the paramere (Figs. 1-2, 4-7), which may be apomorphic - but in this case, again, *Chartergellus* (Fig. 3) is more similar to *Pseudopolybia* (Figs. 8-9) in its obtuse basal angle. The apical angle of the paramere is narrow in *Leipomeles* (Fig. 4), *Parachartergus griseus* (Fox, 1898) (Fig. 6), and to some extent *Marimbonda* (not readily seen in Fig. 5) and *P. apicalis* (Fabricius, 1804) (Fig. 7); the other genera have this angle broad (Figs. 1-3, 8-9). This pattern is not in accord with the relationships mentioned above either, but as the variation is evidently at the level of genera, may be interpretable as homoplastic at this level. *Leipomeles* (Fig. 4) has a broad angular expansion on the basal apodeme. *Marimbonda* (Fig. 5) has one as well, but smaller and more posterior (i. e., apical). *Pseudopolybia* (Figs. 8-9) presents more pointed expansions, placed about as in *Leipomeles*. *Nectarinella* (Figs. 1-2) and *Chartergellus* (Fig. 3) appear to have very small expansions or angles. *Parachartergus apicalis* (Fig. 7) has a slight expansion - but *P. griseus* (Fig. 6) has none. As this character appears general in the taxa studied here, it may be apomorphically lost in *Parachartergus griseus*. RICHARDS (1978) recognized two species groups in *Parachartergus*, one corresponding to *P. apicalis* and one to *P. griseus*; comparison of additional species is desirable to test whether the inferred loss of the expansion is a group character. Finally, the two species of *Pseudopolybia* are alike in possessing the small sclerite basad of the aedeagus depicted in Figs. 8-9. This may be a synapomorphy for the genus, but will have to be studied in the two species of the genus not considered here.

Various unique states are also apparent in some of these illustrations. Studies of additional taxa in some of these genera

are required to establish, e. g. whether the shape of the ventral process of the aedeagus in *Marimbonda albogrisea* Richards, 1978 (Fig. 5) is an autapomorphy, or synapomorphy for the genus. It is our hope that this study will stimulate such investigations in the future.

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