



***Chalepogenus roitmani* Roig Alsina (Hymenoptera: Apidae: Tapinotaspidini): description of the male and new geographical records for the species**

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Bees of the genus *Chalepogenus* Holmberg collect oils offered as a reward by flowers of a few plant families: Iridaceae, Calceolariaceae (formerly included in Scrophulariaceae, see Olmstead *et al.* 2001), and Solanaceae (Vogel 1974; Cocucci 1991; Roig Alsina 1999; Cocucci *et al.* 2000; Machado 2004). The oil-collecting structures of these bees are situated on the forebasitarsus and show interspecific variation related to the type of flower they visit (Roig Alsina 1997; Cocucci *et al.* 2000).

The genus *Chalepogenus* exclusively occurs in South America, where twenty-one species are currently recognized (Roig Alsina 1999). Most species are known from both sexes, except for *C. roitmani* Roig Alsina, from Argentina, known only from the female, and for *C. bicellularis* Roig Alsina, from Peru, known from the male; the sexes of a third species, *C. crassifasciatus* Roig Alsina, have been associated with some doubts (Roig Alsina 1999). The sexual dichromism and dimorphism of *C. muelleri* (Friese), type species of the genus, misled many authors in the interpretation of the taxonomic limits of *Chalepogenus*, since its females were included in *Tapinotaspis* Holmberg (Roig Alsina 1997). The newly discovered male of *C. roitmani* has an extensive yellow maculation (Figs. 1–2), whereas the female has the integument entirely black (Fig. 3), being *C. roitmani* the second dichromic species in the genus.

Chalepogenus roitmani was included by Roig Alsina (1999) in the *muelleri* species-group, based on the general similarity of its female to that of *C. muelleri*. This group, which also included *C. unicolor* Roig Alsina, is characterized mainly by apomorphies in the males, particularly on the hidden seventh metasomal sternum and the genitalia. The morphological characteristics of the discovered male *C. roitmani* corroborate that this species belongs in the *muelleri* species-group.

In this paper, we report the discovery of the male of *Chalepogenus roitmani* Roig Alsina, and provide its description, as well as new geographical records for the species. Morphological characteristics of the male corroborate that *C. roitmani* belongs in the *C. muelleri* species group.

The material studied is deposited at the Facultad de Agronomía, Universidad de Buenos Aires, Argentina, and at the Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina. The following abbreviations are used in the descriptions: S1–S7, metasomal sterna 1–7, respectively; T1–T8, metasomal terga 1–8, respectively; DF, diameter of flagellum.

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(Figs. 1–5)

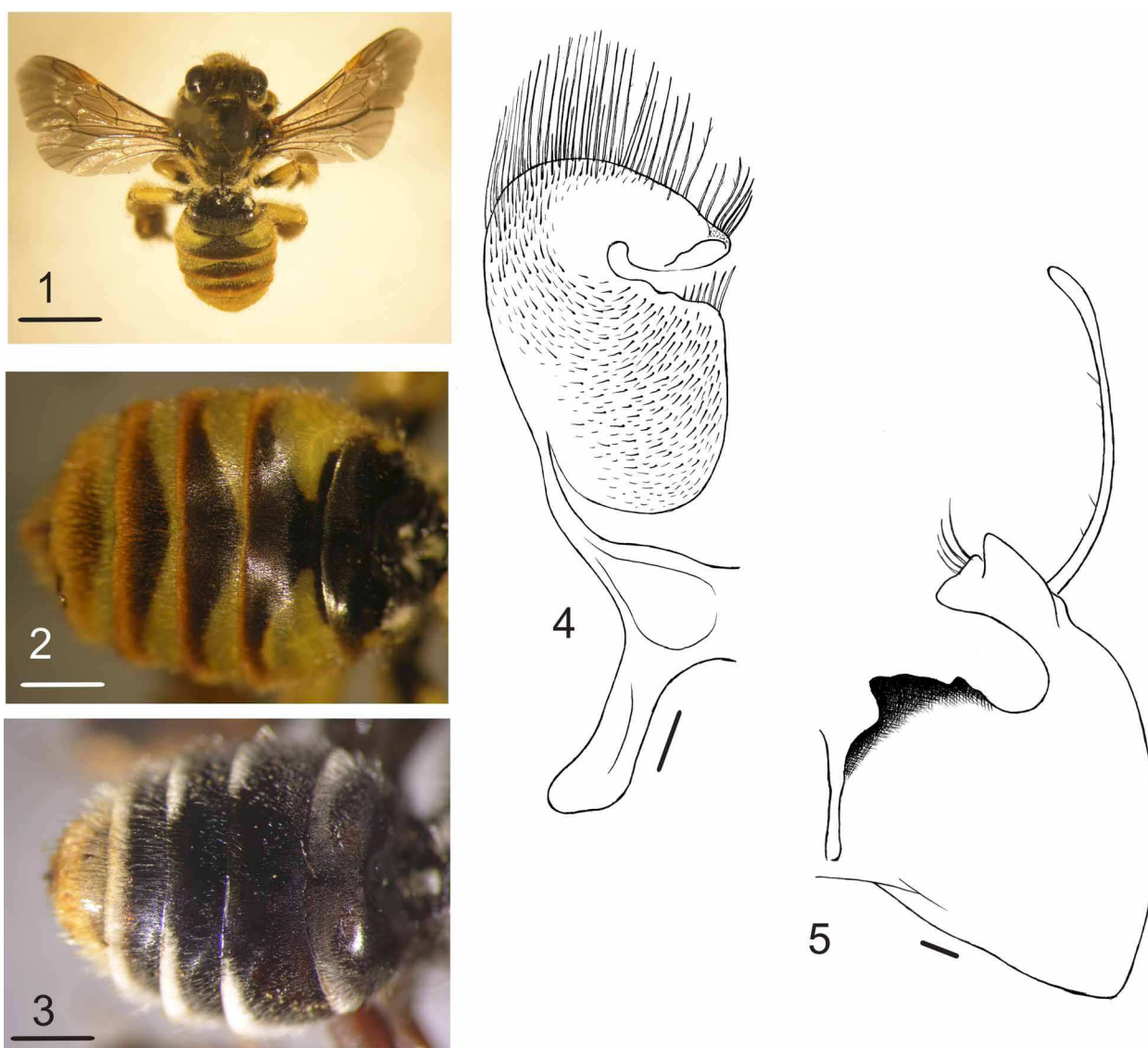
Chalepogenus roitmani Roig Alsina, 1999: 77

Description. *Male.* Total length 8.7–9.5 mm (n=5), forewing length 7.0–7.8 mm (n=5).

Coloration. Head black, with following yellow marks: labrum, clypeus (except tentorial pits), lower paraocular area (from clypeus to level of antennal socket), supraclypeal area (varying from central mark to band between subantennal sutures), small median mark on malar area, scape, except longitudinal dark band on inner surface, and basal mark on mandible. Pedicel dark; flagellum dark brown with yellowish-brown lower surface. Thorax and propodeum blackish, except anterior yellow mark on tegula and in some specimens small yellow spot on pronotal lobe. Coxae and trochanters

blackish, forefemur blackish with yellow apex, middle femur with basal half blackish and yellow apex, and hind femur yellow with basal fifth or less blackish. Tibiae and tarsi yellow, except foretibia with inner longitudinal dark band, hind tibia with dorso-apical dark area, and hind tarsus brown. Metasoma blackish with discal yellow marks broadened laterally on T1–T7, as follows: T1 and T2 with lateral mark, marks on T2 larger, confluent in some specimens, T3–T7, with transverse bands. S6 with yellow lateral mark. Wings membrane strongly infuscate; veins dark brown and pterostigma yellowish brown.

Vestiture. Hairs whitish on labrum, clypeus and supraclypeal area, yellowish-brown on rest of head. Labrum and apical half of clypeus with dense, plumose hairs, basal part of clypeus, face and vertex with mixed plumose and simple long hairs, denser around antennal sockets, longer ones 2.2–2.5 times as long as DF. Thorax, propodeum and metasoma with light yellowish-brown hairs. Scutum with two types of hairs: with very short, homogeneous, dense, felt-like hairs, and with intermixed erect, simple, long hairs, as long as 0.7–1.2 times DF. Scutellum with similar pubescence, but with distinct lateral tuft. Hairs long on pleura, 2.2 times DF, shorter on propodeum and metapostnotum (1.5 times DF). Terga hairy, without glabrous areas, T2–T3 with short lateral hair-bands; T4–T6 with dense apical hair-bands. S2–S6 with median bands of very dense hairs, occupying most of visible part of sternum, except base and narrow apex, that on S2 extended on central two thirds, and those on S3–S5 more extended laterally; hairs of bands longer laterally and curved towards middle; S6 with hairs shorter, restricted to apex.



FIGURES 1–5. *Chalepogenus roitmani*. 1. Male, habitus, dorsal view. 2. Male, metasoma, dorsal view. 3. Female, metasoma, dorsal view. 4. Male, S7, ventral view (right half). 5. Male, genital capsule, dorsal view (left half). Scale lines. Fig. 1: 3 mm; Figs. 2–3: 1 mm; Figs. 4–5: 0.1 mm.

Structure. Median ocellus in frontal view at level of line uniting top of eyes. Vertex not elevated behind ocelli. Proportion of scape, pedicel and first three flagellomeres, 2.7:0.7:1:0.5:0.8. Preapical tooth of mandible with rounded apex. Pygidial plate with well defined, carinate margins. S7 with single lateral lobe, bearing rounded apico-mesial projection (Fig. 4). S8 between apical lobes not membranous. Genital capsule (Fig. 5) with median dorsal sinus narrow, apical projection of parapennial lobe absent, gonostylus 0.7 times as long as gonocoxite.

Material studied. New records: ARGENTINA. Buenos Aires, 5 females, Chascomús, 19-XI-2002, M. Devoto (on *Cypella herbertii*). 5 females, Chascomús, 9-XII-2002, M. Devoto (on *Cypella herbertii* and *Sisyrrinchium platense*). 1 female, Ea. Las Chilcas, Pila, 25-XI-2008, H. J. Marrero (on *Lotus glaber*). 1 female, Ea. San Claudio, Carlos Casares, 3-XII-2008, G. Cilla (on *Taraxacum officinale*), 1 male, Ea. Las Chilcas, Pila, 2-II-2008, H. J. Marrero (on *Sisyrrinchium platense*), 1 male, Ea. Las Chilcas, Pila, 30-XI-2008, H. J. Marrero (on *Vernonia* sp.), 1 male, Ea. Las Chilcas, Pila, 10-XII-2009, H. J. Marrero (on *Acmella decumbens*). 1 female, Ea. Las Chilcas, Pila, 10-XII-2009, H. J. Marrero (on *Cypella herbertii*). 1 male, Ea. Las Chilcas, Pila, 11-XII-2009, H. J. Marrero (on *Lotus glaber*). 1 female, Ea. Las Chilcas, Pila, 10-XII-2009, H. J. Marrero (on *Cypella herbertii*). 1 male, Ea. Las Chilcas, Pila, 7-I-2010, H. J. Marrero (on *Cypella herbertii*). 4 males, Ea. Las Chilcas, Pila, 28-XI-2010, J.P. Torretta (on *Sisyrrinchium platense*, *Lotus glaber*, *Acmella decumbens*).

In the key to species of *Chalepogenus* of Roig Alsina (1999), males of *C. roitmani* run to couplet three, agreeing with the characteristics indicated for the male of *C. muelleri*. The key can be amended in the following way:

- 3 Pubescence of scutum very short, squamiform, felt-like, with scattered long hairs. Lower paraocular area with yellow mark from clypeus to antennal socket 3'
- Pubescence of scutum long and dense. Lower paraocular area dark or, at most, with small yellow mark next to clypeus 4
- 3' Smaller species (5.5–6.2 mm long). Legs dark reddish-brown, without yellow marks. T1–T2 without yellow marks. Scape dark *muelleri*
- Larger species (8.7–9.5 mm long). Femora and tibiae extensively marked with yellow. T1–T2 with yellow marks. Scape extensively yellow *roitmani*

Bionomical observations. Males and females were observed copulating on the flower heads of *Acmella decumbens* [Asteraceae], corroborating the sex association based on the morphology. Females of *C. roitmani* were observed collecting oils on flowers of *Cypella herbertii* and *Sisyrrinchium platense* [Iridaceae] in the Estancia Las Chilcas, Department of Pila in the province of Buenos Aires.

Discussion. The *muelleri* species-group of *Chalepogenus* is supported by two apomorphic characters of the males: the seventh sternum has a single lateral lobe, which bears an apico-mesial projection, and the parapennial lobe of the gonocoxite is reduced (Roig-Alsina 1999). The male of *C. roitmani* presents both features, indicating that the species belongs in the group, being closely related to *C. unicolor* and *C. muelleri*. Moreover, *C. roitmani* and *C. muelleri* share strongly dichromic sexes, not known in other Tapinotaspidini, suggesting that they are sister species within the group. The pygidial plate of the male *C. roitmani* is margined by a distinct carina, both apically and laterally, as in the other two species of the *muelleri* group. The lack of defined lateral margins on the pygidial plate has been indicated by Roig Alsina (1999) as one of several apomorphic features that unite all other species of *Chalepogenus*, suggesting that the *muelleri* group represents the basal lineage of the genus.

The new flower records and observations corroborate the previous association (Roig Alsina 1999) of this oil-collecting bee with plants of the family Iridaceae as oil sources.

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References

- Cocucci, A.A. (1991) Pollination biology of *Nierembergia* (Solanaceae). *Plant Systematics and Evolution*, 174, 17–35.
- Cocucci, A.A., Sérsic, A. & Roig Alsina, A. (2000) Oil-collecting structures in Tapinotaspidini: their diversity, function

- and probable origin. *Mitteilungen Muenchener Entomologischen Gesellschaft*, 90, 51–74.
- Machado, I.C. (2004) Oil-collecting bees and related plants: a review of the studies in the last twenty years and case histories of plants occurring in NE Brazil. In: Freitas, B.M. & Pereira, J.O.P. (Eds.), *Solitary Bees. Conservation, Rearing and Management for Pollination*. Imprensa Universitária, Fortaleza, pp. 255–280.
- Olmstead, R.G., DePamphilis, C.W., Wolfe, A.D., Young, N.D., Elisons, W.J. & Reeves, P.A. (2001) Disintegration of the Scrophulariaceae. *American Journal of Botany*, 88, 348–361.
- Roig Alsina, A. (1997) A generic study of the bees of the tribe Tapinotaspidini, with notes on the evolution of their oil-collecting structures (Hymenoptera, Apidae). *Mitteilungen Muenchener Entomologischen Gesellschaft*, 87, 3–21.
- Roig Alsina, A. (1999) Revisión de las abejas colectoras de aceites del género *Chalepogenus* Holmberg (Hymenoptera, Apidae, Tapinotaspidini). *Revista del Museo Argentino de Ciencias Naturales, n.s.*, 1, 67–101.
- Vogel, S. (1974) Ölblumen und ölsammelnde Bienen. *Tropical und Subtropical Pflanzenwelt*, 7, 285–547.