

## A revision of the genus *Xenochilicola* (Hymenoptera: Apoidea, Colletidae), with the description of a new species

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### Abstract

The bee genus *Xenochilicola* (Colletidae: Xeromelissinae) is revised. Three species are recognized, with one described as new: *X. haroldotoroi*, only known from males. *Xenochilicola fulva* is proposed as a new junior synonym of *X. diminuta*. A key to species is provided.

**Key words.** Hymenoptera, bee, *Xenochilicola*, new species, synonymy, key, Chile.

### Resumen

Se revisa el género de abejas *Xenochilicola* (Colletidae: Xeromelissinae). Se reconocen tres especies y se describe una nueva: *X. haroldotoroi*, conocida sólo por los machos. Se propone *Xenochilicola fulva* como sinonimia menor de *X. diminuta*. Se presenta una clave para separar los machos.

**Palabras clave.** Hymenoptera, abejas, *Xenochilicola*, especie nueva, sinonimia, clave, Chile.

### Introduction

*Xenochilicola* is a genus of minute bees (Figs. 1–9), endemic to Chile (Michener, 2000). Toro and Moldenke (1979) described the genus, assigning to it three new species: *X. mamigna*, *X. diminuta* and *X. fulva*, and providing a key to separate them. The last two species were only known from one sex: male and female, respectively. Toro and Magunacelaya (1987) studied the femoral musculature of Xeromelissinae including *X.*

*mamigna*. Until now, nothing new has been added to the knowledge of these bees, although Moure and Urban's (2002) catalogue of Xeromelissinae repeated the information from Toro and Moldenke (1979).

The aim of the present study is to revise the genus, describe a new species; designate *Xenochilicola fulva* as a junior synonym of *X. diminuta* and present a key to separate the species.

### Methods and materials

Primary types of all known species of the genus were studied, as well as material from the L. Packer collection, Department of Biology, York University, Canada; Universidad Católica de Valparaíso, Chile, and American Museum of Natural History, New York, USA (AMNH, which now holds the former Toro collection). The following abbreviations are used: OOC-ocellocular distance, IOC- interocellar distance, UOD-upper interocular distance, LOD-lower interocular distance, LMA-length of malar area, MW- mandible width at base, metasomal terga and sterna are referred as T and S respectively, followed by a number. Head length was measured from the ventral margin of the clypeus to the top of the vertex, in frontal view; head width was measured at the widest point of the head across the compound eyes, in frontal view. Length of malar area was the shortest distance from the eye to the mandible base. The term imbricate is used in the sense of Harris (1979): partly overlapping microsculpture that appears like shingles on a roof or scales on a fish.

All measurements were made using a Leica MZ 125 microscope fitted with an ocular micrometer. Puncture density is given in terms of relationship between puncture diameter (d) and the spaces between them (i), such as  $i=2d$ . Measurements of pubescence are given relative to the width of the median ocellus (MOD). The descriptive format loosely follows that of Toro and Moldenke (1979).

### SYSTEMATICS

Genus *Xenochilicola* Toro and Moldenke, 1979. An. Mus. Hist. Nat. Valparaíso 12: 145. Type species: *Xenochilicola mamigna* Toro and Moldenke, 1979, by original designation.

The following combination of features of the genus were noted by Toro and Moldenke (1979) and Michener (2000), as being diagnostic among Chilean Xeromelissinae, the character unique to *Xenochilicola* among all Xeromelissinae is italicized: maxillary palpomeres about equal in length, except second shorter, progressively narrower from 1 to 6; labial palpomere 2 shorter than the rest; malar line present; inner orbits of eyes nearly straight; mesosoma robust with propodeum largely vertical in profile and pronotum short with dorsomedian part declivous in profile, lacking a horizontal surface at the level of the

mesoscutum; and *metasomal sternum 5 of male with the apical margin concave and hirsute laterally*, the lateral margin of S5 is developed into an elongate process in one species.

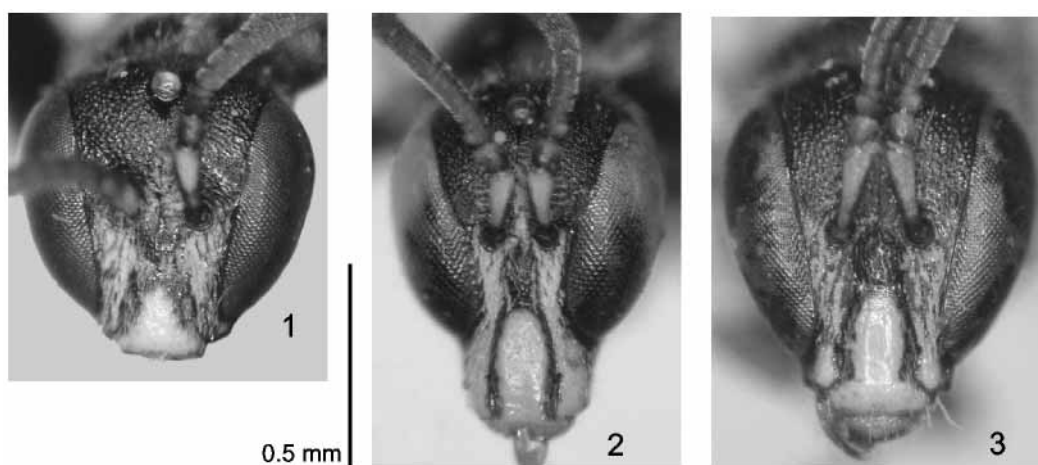
***Xenochilicola mamigna* Toro and Moldenke**

(Figs. 1, 4, 10–12)

*Xenochilicola mamigna* Toro and Moldenke, 1979. An. Mus. Hist. Nat. Valparaíso 12: 145. Female and male.

**Diagnosis.** This species is easily separated from the other two by its linear malar space, this gives the head a rounded shape in anterior view such that the greatest length is slightly less than the greatest width. It differs from *X. diminuta* in lacking yellow bands on the metasoma in the male and by the absence of extensive areas of yellow, orange or red on the metasoma in the female. It can be differentiated from *X. haroldotoroi* n. sp. by the malar space character noted above, denser punctation on the mesoscutum and the genitalic characters noted in the key.

**Description. Male.** Body length 2.40–2.60 mm, forewing length 2.00–2.04 mm (Fig. 4).



**FIGURES. 1–3.** *Xenochilicola* male heads in frontal view: **1.** *X. mamigna*; **2.** *X. diminuta*; **3.** *X. haroldotoroi* n. sp.

**Colouration.** Black, with yellow as follows: labrum, mandible (except apex brown), clypeus, anterior spot on malar area which is variable in size, scape (ventrally), spot on tegula and pronotal lobe, apical 1/4 of all femora, dorsal surface and apex of foretibia, apices of mid and hind tibiae, tarsi (except last tarsomeres of mid and hind legs, brown).

Following parts brown: antenna (except scape ventrally), wing veins, marginal zones of terga and apical margins of sterna.

*Surface sculpture.* Microsculpture imbricate throughout except: labrum, clypeus, supraclypeal area, frons and vertex shiny, lacking microsculpture. Labrum densely punctured ( $i < d$ ); frons, upper paraocular area and vertex with sparse punctures ( $i = 1-4d$ ), clypeus with denser punctures towards apex ( $i < d$ ); lower paraocular area with small, more evenly spaced punctures ( $i \sim d$ ); supraclypeal area with dense small punctures ( $i < d$ ), gena with punctures longitudinally effaced ( $i > d$ ); mesoscutum densely punctate-reticulate ( $i < d$ , on disk,  $i < d$  laterally); mesoscutellum irregularly punctate ( $i \leq d$ ); propodeum with basal area reticulate, posterior surface reticulate lateroventrally, imbricate with sparse irregular punctures elsewhere; hypoepimeral area rugulose with sparse punctures ( $i > 2d$ ); preepisternum and mesepisternum sparsely punctured ( $i > d$ ); metepisternum reticulate-punctate. T1 irregularly punctate on disc ( $i = 0.5-3d$ ), punctures large and dense laterally ( $i < d$ ), acarinarium impunctate; T2 with sparse punctures,  $i > d$ , those on T3-T6 and S2 small and very sparse, remaining sterna impunctate.

*Pubescence.* White. Dense and appressed on paraocular area, dorsal surface of pronotum and anterior margin of mesoscutum ( $< \text{MOD}$ ); long sparse hairs on clypeus, frons and vertex ( $> 1.5\text{MOD}$ ); shorter and denser on gena and sides of T1 ( $< \text{MOD}$ ); short and sparse on metasomal terga and legs ( $< \text{MOD}$ ). Lateral brushes of long hairs on apical margin of S5 ( $\sim 2\text{MOD}$ ).

*Structure.* Head almost as long as broad (0.92–0.97 mm: 0.90–0.95 mm). Labrum transverse, width:length 3:1, lateral margin almost straight, apical margin convex; stipes and cardo very long ( $\sim 5.5-6.0 \text{MOD}$ ), stipes slightly longer; clypeus convex, projecting approximately 0.4 of its length below lower ocular tangent (Fig. 1), apical margin weakly concave, lacking median longitudinal sulcus; antennal flagellomere I slightly expanded apicoventrally, remaining flagellomeres unmodified, length and breadth increasing proportionally from flagellomere II to XI; eye wider than gena in lateral view (2.7:2.0). OOC: IOC (1:2), UOD:LOD (5:3). Malar space short LMA:MW (1:2). Basal area of propodeum as long as metanotum half as long as mesoscutellum, in dorsal view (1:1:2). S5 with posterior margin concave, lateral margins angulate and hirsute; S6 produced medially.

*Terminalia.* S7 with large disc bearing one pair of broad apical lobes, apodemal arms triangular (Fig. 10). S8 broad, abruptly narrowed towards base, apical process slender, hairy at apex; lateral apodeme slender, expanded anterolaterally (Fig. 11). Genital capsule as in Fig. 12. Digitus of volsella does not extend posteriorly beyond cuspis.

**Female.** Body length 3.32–3.48 mm, forewing length 2.44–2.60 mm.

*Colouration.* Black, except yellow as follows: spot on margin of pronotal lobe and tegula, apices of femora, foretibia dorsally and apicoventrally, apical 1/4 of mid- and hind tibia, tarsi; variable amounts of yellow on mandibles, labrum and ventral surface of scape and flagellum; following parts brown: dorsal surface of flagellum, spot on disc of pronotal

lobe, wing veins, marginal zones of terga. Sterna variable, generally reddish-brown, apical impressed areas translucent.

*Pubescence.* Similar to male except: appressed pubescence on paraocular area sparser; without lateral brushes of long hairs on S5, sterna with long hairs forming scopa on S1–S3 (>2.5 MOD). Hind leg scopa not developed, with sparse hairs ~1 MOD.

*Surface sculpture.* Similar to that of male except: clypeus variably punctate-reticulate. Sterna with large, sparse punctures, each bearing a scopal hair.

*Structure.* As in male except as follows: clypeus projecting approximately 0.5–0.6 of its length below lower margin of eyes; basal width of mandible longer than length of malar area LMA:MW 8.5:13.0. OOC:IOC (11:21), UOD:LOD (55:41). Antennal flagellomere I not expanded.

Holotype: CHILE, Tarapacá, Mamiña, 30.i.1972, coll. H. Toro, male, in collection H. Toro (AMNH).

*Other Material Examined:* (Fig. 13). In addition to the holotype, the type series included additional specimens from the type locality as well as: **CHILE, Región II:** Tarapacá (Mamiña) and Antofagasta (Chiu-Chiu). Additional records are as follows: **Región I,** Hwy 687–50.5 km, 83.5 km ESE of Pozo Almonte, S20° 18'21 W69° 03'13, 3930 m, pans, 8–20, iv.2004, coll. L. Packer (50 females; 5 males); Hwy 687–46.8 km, 79.8 km ESE of Pozo Almonte, pans, 8–21, iv.2004, coll. L. Packer (7 females; 4 males); 12 km N of Belen, S18°24'62 W69°30'83 3735 m, 15.iv.2004, coll. L. Packer (1 female); Hwy 1, 111 km marker, S of Putre, S18°16'18 W69°34'21 3530 m, 14.iv.2004, coll. L. Packer (2 females); Tambo, 4 km W of Zapahuira, 4.iv.2000, coll. L. Packer (3 females); Pukara de Copaquilla, SW of Zapahuira, iv.2004, coll. L. Packer, pans (3 females); W of Zapahuira, 83 km mkr Hwy 11, iv.2004, coll. L. Packer, pans (1 female); **Región II,** 30 km E of San Pedro de Atacama, 3200 m, 24.iii.2000, coll. L. Packer, pans (3 females) and Gautín, near San Pedro de Atacama, S22° 45 W06°804, 3255 m, pan traps, iv.2004, coll. L. Packer (3 females). This material is in the AMNH and Packer bee collection at York University, Canada, most of the paratype series remains at the Universidad Católica de Valparaíso, Chile.

*Comments.* The sculpture of the disc of the clypeus in females is variable; in some specimens the reticulation is stronger, others have sparser punctation ( $i=1-1.5d$ ) sometimes even with an impunctate area medially. This species has the weakest microsculpture of the mesoscutum and mesoscutellum in the genus. This small bee seems to be most easily collected using pan traps (for pan trap methodology see Droege, 2005).

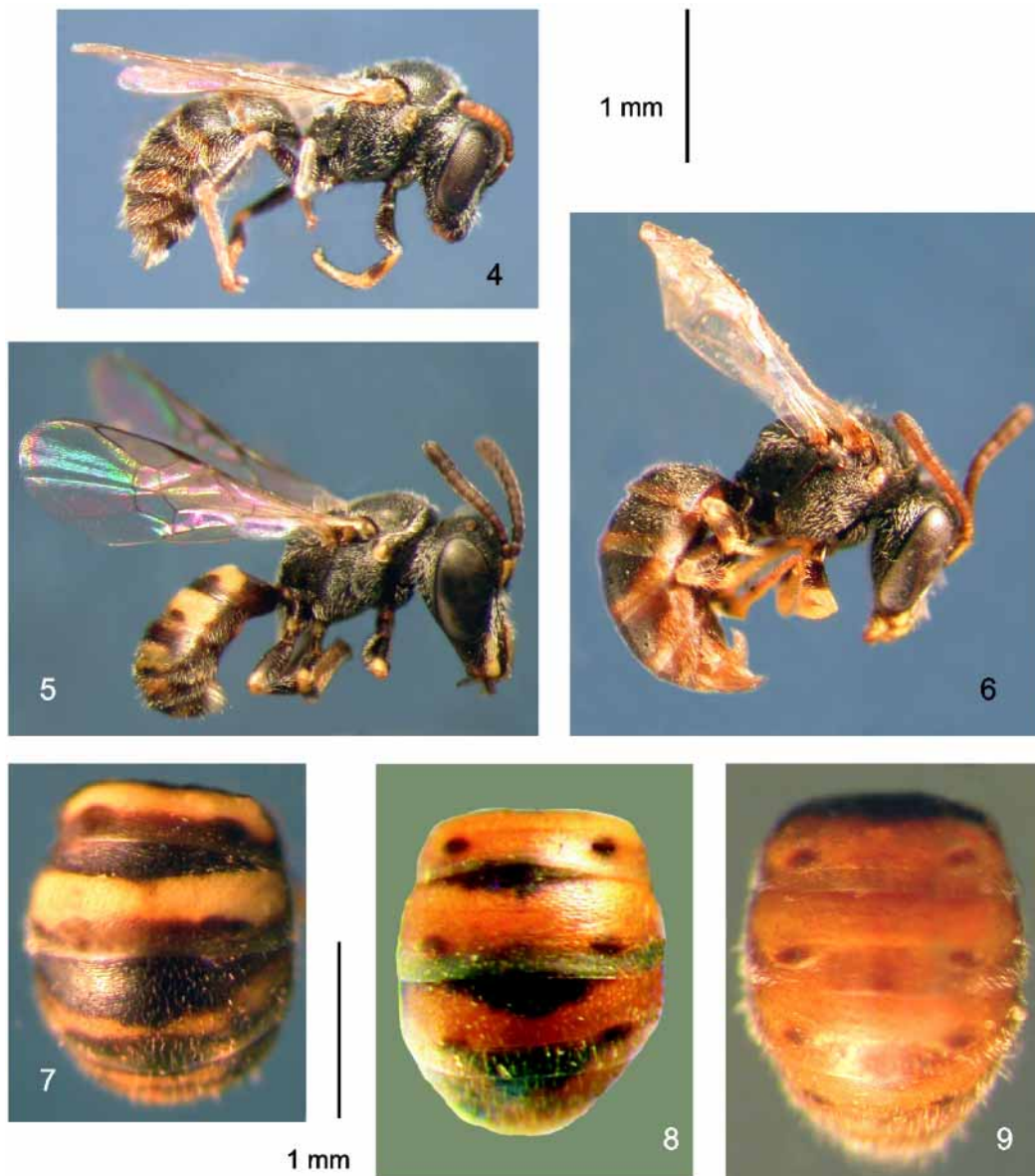
### ***Xenochilicola diminuta* Toro and Moldenke**

(Figs. 2, 5, 7–9, 14–17)

*Xenochilicola diminuta* Toro and Moldenke, 1979. An. Mus. Hist. Nat. Valparaíso 12: 147. Male.

*Xenochilicola fulva* Toro and Moldenke, 1979. An. Mus. Hist. Nat. Valparaíso 12: 148. Female.

**New synonymy.**



**FIGURES. 4–9.** *Xenochilicola* species. **4–6,** Lateral habitus of: **4.** *X. mamigna*; **5.** *X. diminuta*; **6.** *X. haroldotoroi* n. sp. **7–9,** Metasoma in dorsal view of: **7.** male, *X. diminuta*; **8, 9** female of *X. diminuta*. Top scale for Figs 4–6, bottom scale for Figs 7–9.

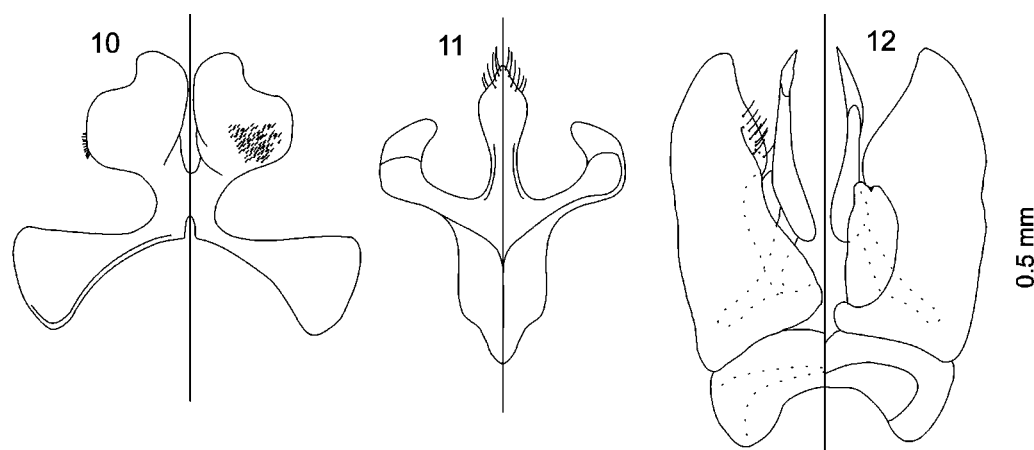
**Diagnosis.** The metasomal colour pattern is variable in females (Figs. 8 and 9) but always mostly red, orange or yellowish whereas other species in the genus have the terga almost entirely black. The males are unique in having metasomal terga with yellow bands (Fig. 7) and S5 with a distinct, posteriorly directed, lateral process on each side (Fig. 14) whereas the other species have the posterior margin of S5 merely concave and hairy laterally. Mesoscutellum with dense punctures ( $i < d$ ) around margins, sparse punctures ( $i = 1-2.5d$ )

on disk. This species has the eyes most strongly convergent below and the longest head and malar space in the genus (Fig. 2).

**Description. Male.** Body length 2.40–2.60 mm, forewing length 1.96–2.04mm (Fig. 5).

*Colouration* (Fig. 5). Black, except: yellow on mandibles (except apex brown), labrum, clypeus, spot on malar space variable in size; spots on pronotal lobe and tegula, ventral surface of scape, apex of all femora, dorsal surface and apex of fore tibia, apices of mid and hind tibia, tarsi, broad median band on terga (occupying much of the disc, but variable in extent on T3–T6); flagellum brown, background colouration of metasoma from black-brown to red-brown (particularly in *X. diminuta* holotype). Two small lateral dark brown to red-brown spots on terga (Fig. 7).

*Surface sculpture.* Microsculpture imbricate throughout except: labrum, supraclypeal area, frons and vertex shiny. Clypeus and malar space with sparse punctures; frons, paraocular area and vertex punctate-reticulate; gena with punctures longitudinally effaced, sparse ( $i \gg d$ ); irregularly punctate on mesoscutum ( $i \sim d$  on disk,  $i < d$  medially), mesoscutellum and metanotum both ( $i > d$ ); hypoepimeral area and metepisternum rugulose with sparse punctures; preepisternum and mesepisternum with denser punctures ( $i < d$ ); basal area of propodeum reticulate or striate, latero-dorsal area of posterior surface of propodeum with sparse punctures ( $i > d$ ); T1 irregularly punctate ( $i = 0.5\text{--}3d$  on disc,  $i < d$  laterally), smaller and sparser on marginal area, acarinarium impunctate; T2 with shallow, irregular punctures on disc ( $i = 1\text{--}2d$ ), few sparse punctures on apical margin; T3–T6 and sterna with few, small, sparse punctures.



**FIGURES 10–12.** Male of *Xenochilicola mamigna*: **10.** S7; **11.** S8; **12.** genitalia. Dorsal views to left, ventral to right.

*Pubescence.* White appressed pubescence dense on lower paraocular area, apical margin of pronotum, basal margin of mesoscutum ( $< \text{MOD}$ ), appressed pubescence shorter ( $\ll \text{MOD}$ ) on posterior margin of mesoscutum; short, sparse erect hairs ( $< \text{MOD}$ ) on clypeus and malar space, longer ( $\sim \text{MOD}$ ) on frons and vertex, those of gena of similar

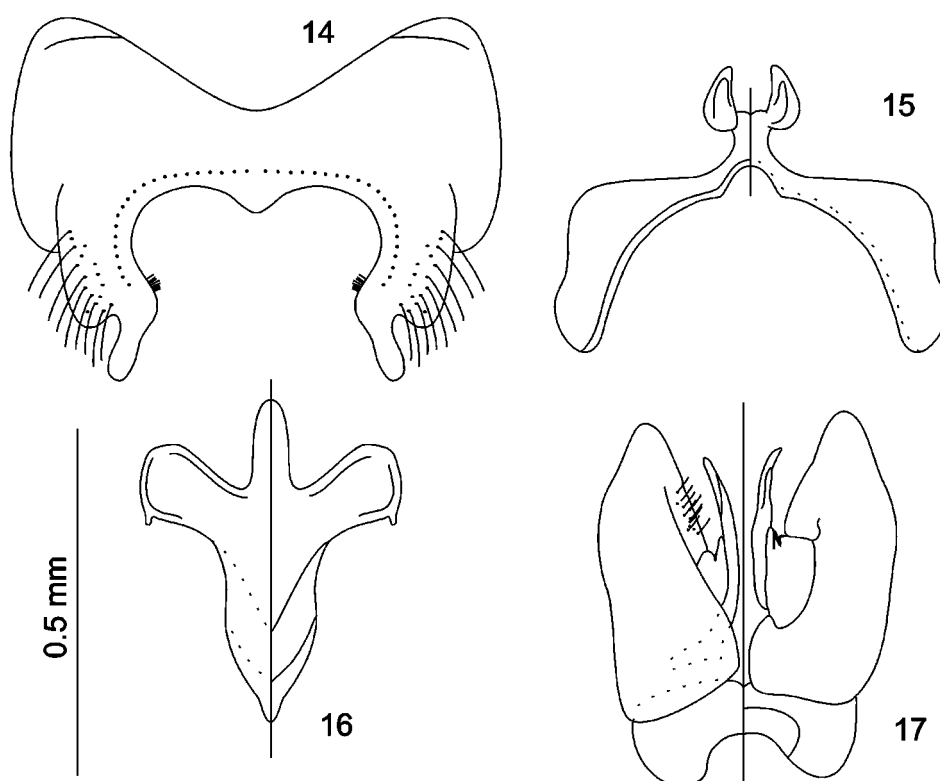
length but denser; sparse erect hairs on mesoscutellum and mesepisternum (=MOD), shorter on preepisternum, mesepisternum and legs; short and dense on basal area of propodeum; short, sparse on terga (slightly denser laterally) and sterna (<MOD); brush of hairs (~MOD) at apex of lateral process of S5.



**FIGURE 13.** Distribution of *Xenochilicola* species. ● *X. mamigna*; △ *X. diminuta*; ☆ *X. haroldotoroi* n. sp.



**Structure.** Head much longer than broad (0.98–1.04 mm: 0.80–0.88 mm). Stipes and cardo very long (~ 7–9MOD); clypeus convex, projecting 0.7–0.8 of its length below lower ocular tangent of eyes (Fig. 2), apical margin of clypeus slightly concave; clypeal surface with shallow median longitudinal sulcus variable in depth; labrum wider than long (21:10), apical margin convex; eye twice the diameter of gena, in lateral view (2:1). OOC:IOC (1.1:1.7), UOD:LOD (5.2:2.3), LMA:MW (19:7). Basal area of propodeum same length as metanotum and half as long as mesoscutellum, in dorsal view (1:1:2). Apical margin of S5 deeply concave, with median obtuse process and elongate, posteriorly directed, somewhat bilobed, lateral process on each side, outer lobe hairy, inner lobe longer and glabrous (Fig. 14).



**FIGURES 14–17.** *Xenochilicola diminuta* male: **14.** ventral surface of S5; **15.** S7; **16.** S8; **17.** genitalia. Dorsal views to left, ventral to right.

**Terminalia.** S7 with a small triangular disc, apodemal arms expanded posterolaterally and considerably extended anteriorly (Fig. 15). S8 gradually narrowing to base, median apical process slender not enlarged towards apex; lateral lobe with angulate apodeme on anterolateral margin (Fig. 16). Genital capsule as in Fig. 17. Digitus extends posteriorly beyond cuspis.

**Female.** Body length 2.80–3.04 mm, forewing length 1.92–2.00 mm.

*Colouration.* Black, with variable (pale, bright or dusky) yellow marks on labrum, clypeus and malar space (those on clypeus and malar space absent in some specimens, including the holotype of *X. fulva*), mandible (except apex), spot on pronotal lobe and tegula; legs as in male. Flagellum and wing veins, brown. Metasoma variable in colouration (Figs. 8 and 9), usually yellow to amber, with red brown to brown on anterior face of T1, dark spot laterally on each side of T1–T5 (these are occasionally absent in the most pale-coloured specimens). a broad dark band is found anteriorly on T2–T6 particularly in those specimens marked with yellow rather than amber or red, this band widest medially (in one specimen that on T2 completely divides the yellow transverse band). Sterna variable, from yellow to brown correlating with colour of terga; females with light terga have sterna of the same color.

*Surface sculpture.* Microsculpture as in male. Labrum, clypeus and vertex with sparse punctures; paraocular area with dense punctures ( $i < d$ ; near antennal socket  $i = d$ ), supraclypeal area and frons with dense punctures ( $i < d$ ), malar area irregularly punctate ( $i = 1-1.5d$ ); mesoscutum irregularly punctate ( $i < d$  on disk;  $i \sim d$  towards margins), mesoscutellum and metanotum more sparsely punctate,  $i > d$ . Basal area of propodeum reticulate (in some specimens with subparallel striae, not attaining posterior margin).

*Pubescence.* Similar to that of male except as follows: appressed pubescence on paraocular area slightly sparser, hairs on hind leg scopa  $\sim$ MOD; sternal scopa of long hairs on S1–S3 ( $\sim 2.5$  MOD); no lateral brushes of hairs on S5.

*Structure.* As in male except as follows: Clypeus with shallow median longitudinal sulcus, apical margin of clypeus concave, clypeus projecting 0.8–0.9 of its length below lower margin of eyes; malar area very long, about twice as long as the width of mandible at base (2.0:1.1). OOC:IOC (1:2), UOD:LOD (5:3). Gena narrower than eye (1:2).

Holotype of *X. diminuta*: CHILE, Santiago, Quebrada La Plata, 11.x.1996, colls. Schlinger and Irwin, male, in collection Toro (AMNH). Holotype of *X. fulva*: CHILE, Antofagasta, Taltal, 30.ix.1972, coll. J. Neff, female, in collection Toro (AMNH).

*Material Examined:* (Fig. 13). Type series localities: **CHILE, Región Metropolitana**, Quebrada de La Plata and **Región II**, Antofagasta (Taltal). Additional records: **Región II**: 23–27 km NW of San Pedro de Atacama, Hwy 23, 15.x.2001, colls. L. Packer and G. Fraser (9 females; 1 male); Q[uebrada]. Taltal, 20 and 31x.1993, colls. H. Toro and E. Chiappa, on *Calandrinia salsoloides* Barn., Portulacaceae (37 females; 4 males). ESE of Calama, km 39, Hwy 23, 11.x.2001, colls. L. Packer and G. Fraser (1 female); **Región III**: Travesía, 29.ix.1983, coll. F. Rodríguez (5 females); E of Chañaral, Pan American km 1012–17, 10.x. 2001, colls. L. Packer and G. Fraser (3 females). **Región IV**: *Limari Province*, Chañar, S30° 16' 49.4", W 70° 38' 24.8", 11/30.ix.2004, coll. A. Ugarte Peña (1 female); *Elqui Province*, Pangué, S30° 09' 14.2", W 70° 39' 50.6", 11/30.ix.2004, coll. A. Ugarte Peña (1 female). **Región Metropolitana**: Cerro Roble near Til–Til, 19.xi.2001, coll. L. Packer (1 female); same data but collected 17.xi.2001 (1 female, 1 male). These specimens are at the AMNH, Universidad Católica de Valparaíso, Chile or Packer collection at York University, Canada.

*Comments.* *Xenochilicola diminuta* was described from four males. The female was described in the same paper, as *X. fulva* (known only from females). The collection and study of a larger sample of females and males taken together, in the same localities, allows us to synonymise *X. fulva* with *X. diminuta*

Variation is as follows for the male: spot on malar space sometimes extending to the eye margin anteriorly and beyond the ventral margin of the eye posteriorly. Yellow metasomal bands variable on T3–T6: interrupted medially in some specimens, narrower than those on T1–T2, irregular in shape.

Female with metasomal colour pattern variable in extent of pale background markings and also in colouration; yellow, amber, brown and red brown. The type of *X. fulva* has the base of T1 red brown but the terga are otherwise amber. In general, variation in colour pattern was not associated with geographic distribution.

The junior author saw large numbers of males and females of this species on flowers of *Cistanthe* sp. (Portulacaceae), between the Pan American Highway and the town of Diego de Almagro, Región III, in October 2001.

***Xenochilicola haroldotoroi* Genaro and Packer, n. sp.**

(Figs. 3, 6, 18–21)

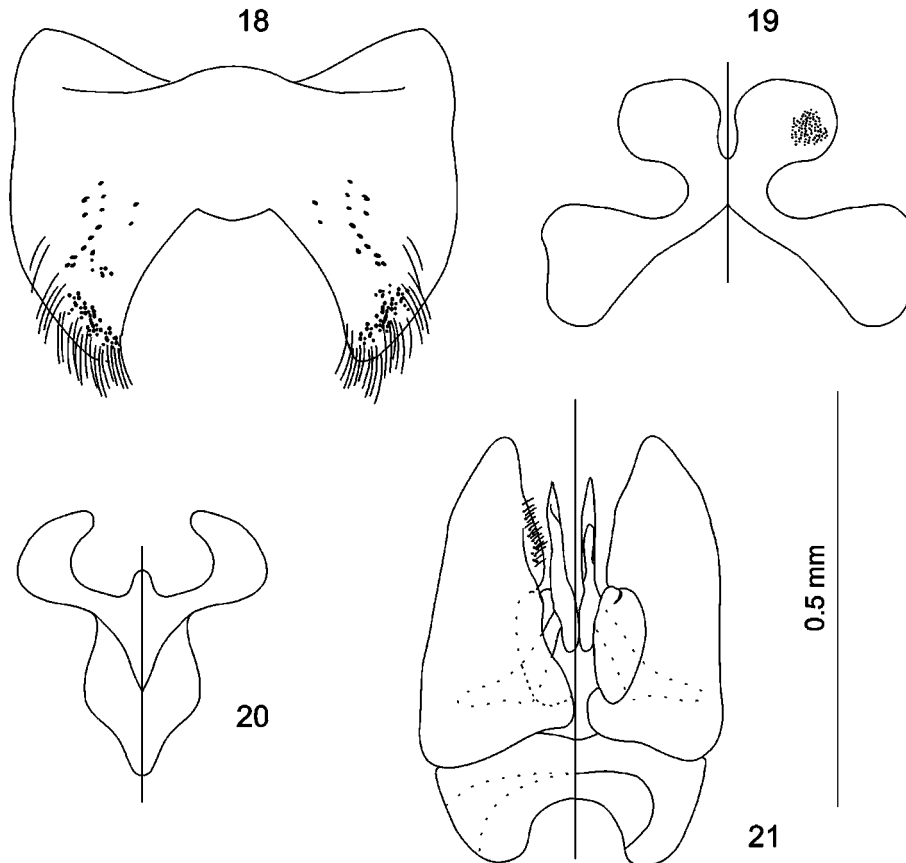
**Diagnosis. Male.** The dark metasoma with brown marginal zones differentiates the new species from *X. diminuta*. The length:width ratio of the face, in frontal view is (1.12:1.01), intermediate between *X. mamigna* (0.92:0.90) and *X. diminuta* (1.01:0.84). Mesoscutellum densely punctured ( $i \leq d$ ). S5 with lateral brushes of hair (Fig. 18), as in *X. mamigna* (*X. diminuta* has a distinct lateral hairy process, Fig. 14). S7 with large disc (in *X. diminuta* it is small) and without lobes; the form of the apodemal arms differ from the other species (Figs. 10, 15 and 19). S8 with the median apical process shorter than in other species (compare Figs. 11, 16 and 20). Males are larger than those of the other two species.

**Description. Male.** Body length 3.10–3.50 mm, forewing length 2.10–2.30 mm (Fig. 6).

*Colouration.* Black with yellow on mandible (except apex dark brown), labrum, clypeus, and spot on malar space, scape and pedicel ventrally, spot on pronotal lobe and tegula; apices of femora (on forefemur reaching midlength ventrally), whole foretibia, mid and hind tibia dorsally, all tarsi; following parts brown: antennal flagellum, wing veins, marginal zone on metasomal T1–T5 (in some specimens whole T5), T6, median areas on apical margins of sterna.

*Surface sculpture.* Microsculpture imbricate except: labrum, supraclypeal area, frons and vertex with surface shiny. Labrum with dense, coarse punctures, clypeus with sparse shallow large punctures, gena with punctures longitudinally effaced ( $i > d$ ). Frons, paraocular area and vertex punctate-reticulate; supraclypeal area irregularly punctate, mesoscutum irregularly punctate ( $i \sim d$  on disk,  $i < d$  medially), mesoscutellum ( $i \leq d$ ) and

mesepisternum ( $i < d$ ), metanotum coarsely punctate; preepisternum reticulate-punctate, hypopimeral area with longitudinal striae, becoming reticulate above, irregularly punctate ( $i < d$ ;  $i = 1-2d$  on disk); propodeum with dorsal and lateral surfaces reticulate, lateral surface irregularly punctate on dorsal half ( $i = 1-2d$ ); T1 irregularly punctate ( $i = 0.5-3d$  on disk;  $i < d$  at sides; acarinarium impunctate); T2 weakly punctate, T5-T6 with few sparse punctures.



**FIGURES 18–21.** *Xenochilicola haroldotoroi* n. sp. male: **18.** ventral surface of S5; **19.** S7; **20.** S8; **21.** genitalia. Dorsal views to left, ventral to right.

*Pubescence.* White, short and appressed on lower paraocular area, posterior margin of pronotum and anterior margin of mesoscutum; long sparse hairs ( $>1\text{MOD}$ ) on clypeus, frons and vertex; shorter and denser on gena, pronotum, mesoscutum and mesoscutellum ( $>\text{MOD}$ ); denser, shorter hairs on mesepisternum and propodeum ( $\sim\text{MOD}$ ); legs with short hairs, sparse on femur and tibia ( $<\text{MOD}$ ); metasomal terga with short sparse hairs ( $=0.3\text{MOD}$ ), longer on anterior margin of T1, and apical margin of T6 ( $\sim 1\text{MOD}$ ); lateral brushes of long hairs on apical margin of S5 ( $\sim 2\text{MOD}$ ).

*Structure.* Head slightly longer than broad (1.10–1.14 mm long; 1.00–1.02 mm broad,

N=4, Fig. 3); stipes and cardo very long (~ 6.5 MOD), stipes slightly longer; clypeus convex, projecting 0.4–0.5 of its length below lower margin of eyes, apical margin of clypeus slightly concave; labrum transverse width:length (4:1), with apical margin slightly more convex than in previous species, gena narrower than eye width, in lateral view (2.0:2.3). OOC:IOC (11:19), UOD:LOD (57:38), LMA:MW (7:10). Basal area of propodeum same length as metanotum and about one third as long as mesoscutellum, in dorsal view (10:10:27). S5 with posterior margin deeply concave with central portion convex (Fig. 18); medio-apical protuberance on S6.

*Terminalia.* S7 with disc large, without apical lobes; apodemal arms rounded (Fig. 19). S8 similar to *X. mamigna* except the apical process short, not hairy (Fig. 20). Genital capsule as in Fig. 21; volsella with digitus not extending beyond cuspis.

**Female:** unknown.

*Comments.* *X. haroldotoroi* n. sp. is intermediate between the other two species of the genus in several features: the ratio of length to width of the head and the relative length of the malar area; antenna with flagellomere I modified, expanded at apical margin on outer side, as in *X. diminuta*; mesoscutellum slightly longer in this species than in the others.

*Etymology.* We take pleasure in naming this species after the collector of the holotype, the late Dr. Haroldo Toro, who made such a large contribution to our understanding of the systematics of South American bees.

*Material Examined:* (Fig. 13) Holotype male. **CHILE, Región II**, [Pan American Highway], Km 1680, 4.x.1997, H. Toro coll. (AMNH). Paratypes: same data as holotype, except one specimen collected by M. Hormazábal. Holotype and one paratype at AMNH, one paratype each at Universidad Católica de Valparaíso, Chile and York University, Canada. All specimens collected at *Prosopis tamarugo* Philippi (Mimosaceae). The junior author could find no *P. tamarugo* at the type locality when he visited the area in April 2004.

### Key to the males of *Xenochilicola*

1. Metasomal terga with yellow bands (Fig. 5 and 7) (may be interrupted at middle, and may be narrow and not reaching the lateral margins on the more posterior terga); S5 with long apical bilobed process on each side, outer lobe shorter and hairy, inner lobe longer and glabrous (Fig. 14); malar area longer than mandible width at base (Fig. 2)  
..... *X. diminuta*
- Metasomal terga without yellow bands (Figs. 4 and 6) (marginal zones of terga with brown band); S5 with apical margin hairy and concave but without apical process on each side (Fig. 18); malar area not longer than mandible width at base (Figs. 1 and 3)..  
..... 2
2. Head in frontal view nearly as long as wide (1:1, Fig. 1); mesoscutum and mesoscutellum punctate-reticulate (i<<d); S7 with postero-lateral margin of apical lobe concave

- (Fig. 10); S8 with strong, slender apical process, hairy at apex (Fig. 11)....*X. mamigna*
- Head in frontal view slightly longer than wide (1:1.1, Fig. 3), mesoscutum punctate (i~d on disk, i<d medially) and mesoscutellum (i=d) irregularly punctate; S7 with apical lobe entire(Fig. 19); S8 with short, glabrous apical process (Fig.20) .....  
.....*X. haroldotoroi* n. sp.

### Key to the females of *Xenochilicola*

The female of *X. haroldotoroi* n. sp. is not known, but it is expected to key to *X. mamigna* but to have a malar space intermediate in length between *X. mamigna* and *X. diminuta* as is the case in the male (Figs. 1–3).

1. Metasomal terga brown with yellow bands, or bands occupying all the tergum; with one spot laterally on each side of terga; malar area longer than mandible width at base .....*X. diminuta*
- Metasomal terga black, with marginal zone brown; without lateral spots on each tergum; malar area not longer than mandible width at base.....*X. mamigna*

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