

**A REVISION OF *CHILICOLA (HETEROEDISCELIS)*,
A SUBGENUS ENDEMIC TO CHILE**

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ABSTRACT

The bee subgenus *Chilicola* (*Heteroediscelis*) Toro & Moldenke, 1979 (Colletidae: Xeromelissinae) is revised. Seven new species are described: *Chilicola* (*Heteroediscelis*) *charizard* Monckton **sp. nov.**, *Chilicola* (*Heteroediscelis*) *curvapeligrosa* Monckton **sp. nov.**, *Chilicola* (*Heteroediscelis*) *guanicoe* Monckton **sp. nov.**, *Chilicola* (*Heteroediscelis*) *lickana* Monckton **sp. nov.**, *Chilicola* (*Heteroediscelis*) *mayu* Monckton **sp. nov.**, *Chilicola* (*Heteroediscelis*) *packeri* Monckton **sp. nov.**, and *Chilicola* (*Heteroediscelis*) *randolphi* Monckton **sp. nov.** Nine of the ten existing species are redescribed and *Chilicola* (*Heteroediscelis*) *valparaiso* Toro & Moldenke, 1979 **syn. nov.** is treated as a junior synonym of *Chilicola* (*Heteroediscelis*) *mantagua* Toro & Moldenke, 1979. Keys to species for males and females are provided, along with habitus images, images of male terminalia, and distribution maps for each species. Results of phylogenetic analyses are presented, based upon 61 morphological characters and CO1 barcode sequences. Monophyly of the subgenus is supported, and groupings within it are briefly discussed in the context of geographic distributions.

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DISCLAIMER

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TABLE OF CONTENTS

ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
DISCLAIMER	iv
LIST OF TABLES	vii
LIST OF FIGURES	viii
INTRODUCTION	1
METHODS	2
A) Taxonomy	2
B) Phylogenetic Analysis.....	5
RESULTS	7
A) Taxonomy	7
<i>Chilicola (Heteroediscelis)</i> Toro & Moldenke, 1979	7
Keys to the Species of <i>Heteroediscelis</i>	9
Species Descriptions	22
<i>Chilicola (Heteroediscelis) mantagua</i> Toro & Moldenke, 1979	22
<i>Chilicola (Heteroediscelis) charizard</i> Monckton sp. nov.	29
<i>Chilicola (Heteroediscelis) curvapeligrosa</i> Monckton sp. nov.	35
<i>Chilicola (Heteroediscelis) deserticola</i> Toro & Moldenke, 1979	42
<i>Chilicola (Heteroediscelis) diaguila</i> Toro & Moldenke, 1979.....	50
<i>Chilicola (Heteroediscelis) erithropoda</i> Toro & Moldenke, 1979	56
<i>Chilicola (Heteroediscelis) guanicoe</i> Monckton sp. nov.	63
<i>Chilicola (Heteroediscelis) lickana</i> Monckton sp. nov.	70
<i>Chilicola (Heteroediscelis) mavida</i> Toro & Moldenke, 1979	76
<i>Chilicola (Heteroediscelis) mayu</i> Monckton sp. nov.	83
<i>Chilicola (Heteroediscelis) neffi</i> Toro & Moldenke, 1979	89
<i>Chilicola (Heteroediscelis) packeri</i> Monckton sp. nov.	95
<i>Chilicola (Heteroediscelis) randolphi</i> Monckton sp. nov.	101
<i>Chilicola (Heteroediscelis) travesia</i> Toro & Moldenke, 1979	107

<i>Chilicola (Heteroediscelis) vicugna</i> Toro & Moldenke, 1979	114
<i>Chilicola (Heteroediscelis) vina</i> Toro & Moldenke, 1979	121
B) Phylogenetic Analysis.....	129
DISCUSSION	132
Taxonomy	132
DNA Barcodes	133
Phylogeny	135
REFERENCES.....	137
APPENDIX A: List of Characters.....	141
APPENDIX B: Data Matrix.....	144
APPENDIX C: Character-Annotated Phylogeny	146
APPENDIX D: Non-Redundant Linear Coding	146
APPENDIX E: List of Specimens	149

LIST OF TABLES

Table 1. List of acronyms used throughout.....	4
Table 2. Fixed DNA barcode nucleotide substitutions.....	134
Table S1. Data matrix used in phylogenetic analysis.....	144

LIST OF FIGURES

FIGURES 1-11: Key images to males.....	10
FIGURES 12-23: Key images to females.....	16
FIGURE 24. <i>Chilicola mantagua</i>	28
FIGURE 25. <i>Chilicola charizard</i>	34
FIGURE 26. <i>Chilicola curvapeligrosa</i>	41
FIGURE 27. <i>Chilicola deserticola</i>	49
FIGURE 28. <i>Chilicola diaguita</i>	55
FIGURE 29. <i>Chilicola erithropoda</i>	62
FIGURE 30. <i>Chilicola guanicoe</i>	69
FIGURE 31. <i>Chilicola lickana</i>	75
FIGURE 32. <i>Chilicola mavida</i>	82
FIGURE 33. <i>Chilicola mayu</i>	88
FIGURE 34. <i>Chilicola neffi</i>	94
FIGURE 35. <i>Chilicola packeri</i>	100
FIGURE 36. <i>Chilicola randolphi</i>	106
FIGURE 37. <i>Chilicola travesia</i>	113
FIGURE 38. <i>Chilicola vicugna</i>	120
FIGURE 39. <i>Chilicola vina</i>	127
FIGURE 40. Distribution of <i>Heteroediscelis</i> by species	128
FIGURE 41. Phylogeny of <i>Heteroediscelis</i> from individual analyses	129
FIGURE 42. Phylogeny of <i>Heteroediscelis</i> from combined analysis	131
FIGURE S1. Phylogeny with evolutionary character changes mapped onto branches	146

INTRODUCTION

Chilicola Spinola, 1851 is a diverse neotropical genus of stem-nesting bees, comprising 98 named species (Ascher and Pickering 2015) in 15 subgenera (Packer 2008). The subgenus *Chilicola* (*Heteroediscelis*) Toro & Moldenke, 1979 is notable in that its 10 named species are endemic to Chile (Packer 2008), where they occupy a broad range of habitats, from the hyper-arid Atacama Desert in the north, to moist temperate forests in the south, occurring at altitudes from sea level to over 3500 m a.s.l.. *Heteroediscelis* are small, slender bees, from 4-7 mm long, and hylaeiform in appearance. They are mostly dark brown or black, with females having variable yellow markings on the legs and ventral surface of the antennae, and males having more extensive yellow colouration, particularly on the face. Males are easily distinguished from females by the yellow facial markings, the absence of a scopa, the distinctly expanded hind legs, and by the presence of a robust, truncate process extending ventrally from the first sternum (S1 process). The combination of the latter two characters readily distinguishes males of this subgenus from all other *Chilicola*.

The subgenus *Heteroediscelis* was first described with 13 species (Toro and Moldenke 1979). Three of these species were later moved to *C. (Anoediscelis)* Toro & Moldenke by Michener (1995) due to obvious differences: the males lack the combination of expanded hind legs and truncate S1 process characteristic of the other ten species. Toro and Moldenke (1979) recognized these differences but did not classify the three species in a different subgenus, citing the lack of corresponding differences in females as justification. Michener (1995) moved the other ten species to *C. (Oediscelis)* Philippi. Packer (2008) performed a phylogenetic analysis of *Chilicola* with exemplars from all known subgenera plus additional outgroup taxa, and found very strong support for the monophyly of *Heteroediscelis*, along with moderate support for its placement as sister to the well-supported terminal clade formed by *C. (Chilioediscelis)* Toro & Moldenke, 1979, and *Chilicola s. str* Spinola, 1851.

A number of new species belonging in *Heteroediscelis* have been recognized in collections for some time, several of them from geographic regions novel to the subgenus. However, no alpha-taxonomic work has been done on the group since its description, and the species-level phylogeny is unknown. Here, I synonymise one of the original species, redescribe the remaining nine and describe seven new species, bringing the total within the subgenus to sixteen. I also

present a thorough phylogenetic analysis for the subgenus.

METHODS

A) Taxonomy

For the revision, 443 specimens of *Heteroediscelis* were examined. Of these, 356 were obtained from five collections: the Packer Collection at York University, Toronto, Canada (PCYU), the American Museum of Natural History, New York, U.S.A. (AMNH), the collection at the Pontificia Universidad Católica de Valparaíso, Chile (PUCV), the Bee Biology and Systematics Laboratory, Logan, UT, U.S.A. (BBSL), and the collection at the Universidade Federal do Rio de Janeiro, Brazil (UFRJ). Collections made during two field excursions over the course of this study provided an additional 87 specimens. Because all specimens were collected in Chile, all locality information is written with country excluded.

Specimens were identified using the existing key (Toro and Moldenke 1979) and those not matching the descriptions of the documented species were sorted into putative OTUs based on morphological characters. Sorted specimens were initially compared with paratype material of existing species where possible (later to holotypes for all species). Subsets of specimens from these sorted groups were selected for DNA barcoding (Hebert et al. 2003), particularly where either barcode sequences for that species were apparently not already recorded, or where specific identity was uncertain and comparison could be made to previously databased sequences.

For barcoding, a midleg from each specimen was removed and placed into a single well of a 96-well plate along with three drops of 95% EtOH. Extraction, PCR, and sequencing of the cytochrome *c* oxidase subunit I (CO1) were all done at the Canadian Centre for DNA Barcoding (CCDB) in Guelph, Canada, using standard protocols (see Hebert et al. 2003, Ivanova et al. 2006). Successful output sequences were uploaded to the Barcode of Life Data Systems database (BOLD) (Ratnasingham and Hebert 2007). BOLD's built-in analysis platform was used to generate neighbour-joining trees from DNA barcodes based on the Kimura two-parameter (K80) base substitution model (Kimura 1980).

Barcode sequences were used in species delimitation employing an integrative approach (e.g. Gibbs 2009, DeSalle et al. 2005, Will et al. 2005, Meier et al. 2006). Identified BINs (Barcode Index Number groupings; see Ratnasingham and Hebert 2013) were investigated at the specimen level for any morphological differences that might support further separation into

distinct groups, and additional specimens were selected for barcoding as necessary. Throughout, morphological characters were given precedence over DNA barcodes, as clear morphological differences were in some cases obvious among members of the same barcode BIN. Groupings consistently supported by morphological characteristics were considered to be distinct species (i.e. using the phylogenetic species concept; Nixon and Wheeler 1990). Names assigned to groupings representing existing species were confirmed following examination of holotype material at AMNH.

Body measurements were taken using a calibrated ocular micrometer mounted on a Nikon SMZ1500 stereomicroscope. Measurements of body length, head width, thorax width, and forewing length were recorded in millimeters (mm). Thorax width was measured across the widest point between the pronotal lobes. Because orientation of the tagmata was not always linear, body length was measured in sections (head, meso- and metasoma) and summed. To facilitate comparisons, measurements of pubescence are given relative to the diameter of the median ocellus (OD). Surface sculpture is described with puncture density stated in terms of puncture diameter (d) and interspace (i). All other measurements are expressed as ratios, with values representing ocular units at a common magnification of 90x; these values have a measurement error of ± 0.5 units. For measurements of the pedicel and antennal flagellomeres, greater precision was required, and these measurements were verified at 112.5x magnification; their measurement error is estimated as ± 0.25 units.

Specimen records not originally having GPS coordinates are supplemented with them where possible, as determined via discussions with the collectors and using Google Earth (2013). Supplemented GPS coordinates are rounded to three decimal places and italicized in the descriptions, and include elevations recorded from the nearest road or path according to Google Earth. Specimens with barcode reference numbers or index/database numbers have these codes listed where applicable; multiple codes for a single specimen are listed separated by a double forward slash (*i.e.* //), and when multiple specimens are listed for a single locality, these codes are given in respective order, separated by commas.

The following acronyms are used throughout (also see Table 1): **OD**: diameter of the median ocellus; **MOC**: distance from lower tangent of median ocellus to apex of clypeus; **OOC**: ocellocular distance, shortest distance between lateral ocellus and compound eye; **IOC**: interocellar distance, shortest distance between lateral ocelli; **UOD & LOD**: upper & lower

interocular distance, shortest distance between inner orbits of compound eyes, above & below level of emargination, respectively; **IOD**: maximum interocular distance, greatest distance between inner orbits of compound eyes, at level of emargination; **LOT**: lower ocular tangent, an imaginary line crossing lower extremities of compound eyes in frontal view; **IAD**: intervalveolar distance, shortest distance between antennal sockets; **AOD**: minimum antennocular distance, shortest distance between antennal socket and compound eye, typically at an angle of approximately 30° below horizontal laterad from antennal socket; **F**: antennal flagellomere; **T**: tergum; **S**: sternum.

Table 1. List of acronyms used throughout.

Acronym	Meaning
AMNH	American Museum of Natural History, New York, U.S.A.
AOD	Minimum Antennocular Distance
BBSL	Bee Biology and Systematics Laboratory, Logan, UT, U.S.A.
BIN	Barcode Index Number grouping
BOLD	Barcode of Life Data Systems database
BS	Bootstrap
CCDB	Canadian Centre for DNA Barcoding
CO1	Cytochrome <i>c</i> oxidase subunit I
F	Antennal Flagellomere
IAD	Intervalveolar Distance
IOC	Interocellar Distance
IOD	Maximum Interocular Distance
LOD	Lower Interocular Distance
LOT	Lower Ocular Tangent
MOC	Distance from lower tangent of median ocellus to apex of clypeus
NRLC	Non-Redundant Linear Coding
OD	Median Ocellar Diameter
OOC	Ocellocular Distance
OTU	Operational Taxonomic Unit
PCYU	Packer Collection at York University, Toronto, Canada
PUCV	Pontificia Universidad Católica de Valparaíso, Chile

S	Sternum
SACW	Successive Approximation Character Weighting
T	Tergum
UFRJ	Universidade Federal do Rio de Janeiro, Brazil
UOD	Upper Interocular Distance

Descriptions use terminology from Harris (1979) for surface sculpture and standard melittological terminology from Michener (2007) for structure, with the exception of the following non-standard terms: *clypeal lateral* refers to the lateral, ventrally-bent portion of the clypeal apex; *genal beard* refers to the long erect hairs of the genal area; *ventral metatibial convexity* refers to the apicoventral expansion of the male metatibia, which has a readily defined *summit*; *posterior metatibial concavity* refers to the wide, deep longitudinal groove which extends the length of the male metatibia on the posterior surface; *ventral/posterior metatibial carina* refers to the carinae associated with the posterior concavity of the male metatibia; *apical metatibial lamina* refers to the structure extending mediad from the base of the male metatibial spurs. In descriptions of colouration, orange in place of normal yellow colouration is assumed to indicate discolouration due to exposure to cyanide, and is described as yellow for discoloured specimens.

Distributions were plotted with R (R Core Team 2015) using RStudio (2015) and the “maps” & “mapdata” packages. Output maps were then edited in Adobe Illustrator CS5. Speculative ranges are loosely based on convex hulls plotted over the data with package “rgdal.”

All specimen images were taken using a Visionary Digital lift-operated imaging system and a Canon 5D Mark II digital SLR camera. Composite images were assembled using Helicon Focus stacking software. Images were edited, cropped, and scale bars added using Adobe Photoshop CS5 Extended. Images marked in the caption with a “†” have been flipped horizontally to ease comparison.

B) Phylogenetic Analysis

Outgroups were selected based on the findings of Packer (2008); *Chilicola vernalis* (Philipi, 1866), *Chilicola rubriventris* Spinola, 1851, and *Chilicola penai* Willis & Packer, 2008 were chosen. *Chilicola vernalis* was chosen to represent *Oediscelis*, which was found to be sister

to the clade comprising *Heteroediscelis*, *Chilicola* s. str. and *Chilioediscelis*. *C. penai* and *C. rubriventris*, the type species of the genus, were chosen as members of the sister clade to *Heteroediscelis*, representing *Chilioediscelis* and *Chilicola* s. str. respectively.

Specimens were examined for morphological characters that were potentially phylogenetically informative, and additional characters were adapted from the key and diagnoses of Toro & Moldenke (1979), and from the work of Packer (2008). A total of 48 discrete morphological characters were coded for each species. In addition, 13 continuous morphological characters were assessed, all representing ratios. DNA barcode (CO1) data were aligned in BOLD with default settings and using ClustalW. For incomplete sequences (less than 658 base pairs), trace files were inspected in BOLD and sequences were edited where appropriate in order to maximize length. Specifically, BOLD excludes potentially ambiguous base pairs which do not meet a minimum quality threshold and/or which have minor read abnormalities (e.g. a small secondary peak); I have included such base pairs for analysis when they were qualitatively judged to be unambiguous. The aligned sequences and 61 morphological characters were combined into three datasets for phylogenetic analysis in TNT (Goloboff et al. 2008): morphological data only, molecular data only, and a combined dataset of both. Maximum parsimony analysis was performed with unweighted characters. Continuous characters are treated as additive by TNT (Goloboff et al. 2006), and characters scored using non-redundant linear coding (NRLC; O'Grady and Deets 1987) were also coded as additive (see Appendix C). For all three analyses, a tree search was run for 100 replicates, using a driven search with default settings for ratchet, drift, and tree-fusing. To assess stability of the resulting tree(s), successive approximation character weighting (Farris 1969, Carpenter 1988) was performed with the “rewt.run” script, using the rescaled consistency index as the weighting factor. The output was visualized using WinClada (Nixon 2002). Support for nodes of the most parsimonious tree was assessed using absolute frequencies for bootstrap (BS) and GC values from symmetric resampling in TNT with 1000 replications (Goloboff et al. 2003). GC values represent the percentage of times that a given grouping was found at a node minus the number of times that the next most frequent arrangement was found without that grouping. To compare results obtained with different methodologies, a second analysis of each dataset was performed in TNT using implied weighting (Goloboff 1993, Goloboff et al. 2008) with the value of the constant K determined using the “setk.run” script (e.g. Santos et al. 2014).

RESULTS

A) Taxonomy

Chilicola (Heteroediscelis) Toro & Moldenke, 1979

Chilicola (Heteroediscelis) Toro & Moldenke, 1979: 98, 112. Michener, 1992: 89. Michener, 1995: 335, 337 (*partim*, as *Chilicola (Oediscelis)*). Michener, 2002: 11. Michener, 2007: 182, 184 (*partim*, as *Chilicola (Oediscelis)*). Packer & Genaro, 2007: 41, 50. Packer, 2008: 72-74, 77, 96. Almeida et al., 2008: 80-81. Moure et al., 2012. Monckton, 2014: 234. Packer, 2014: 254, 262. Ascher & Pickering, 2015.

Type species: *Chilicola mantagua* Toro & Moldenke, 1979, by original designation.

Diagnosis: Males are readily diagnosable by S1 with a robust, elongate, ventrally directed process, with truncate apex having a well-defined (sometimes oblique) apical surface (other *Chilicola* that have such a process have it either spatulate as in *C. rubriventris* or narrowing to a pointed apex as in some species of *Oediscelis*). In females, the combination of protibia pale at least in basal half of dorsal surface, stigmal perpendicular basal to or interstitial with first recurrent vein (extending into basal quarter of second submarginal cell in some), and thorax $\leq$ 1.5mm wide separates this subgenus from all but three. From these, *Heteroediscelis* females are distinguished as follows:

- from *Unicarinicola* by at least T1-T2 with apicolateral patches of white hair (lacking in *Unicarinicola*);
- from *Pseudiscelis* by the pronotum not elongate, with medial length of collar at most one-quarter of anterior width of collar (at least one-third in *Pseudiscelis*);
- from *Prosopoides* by the absence of distinct and depressed facial foveae, although these are sometimes represented by a poorly delimited, not-depressed shiny area of reduced sculpture density. The more mesal longitudinal depressions of the paraocular area in *C. neffi* and *C. packeri* partially accommodate the scape and are not homologous with facial foveae (e.g. species of the subgenus *Hylaeosoma* possess both).

Redescription: Small bees, length 4.2-6.8mm.

Colouration: Black to black-brown, with margin of pronotal lobe yellow, tegula translucent yellow, wing veins brown to translucent yellow basally, tarsal segments 2-4 of all legs variable from dark with apices yellow to entirely yellow, metasomal terga and sterna (T1-T6 & S1-S6 in males, T1-T5 & S1-S5 in females) with translucent yellow or yellow-brown marginal zones, wider on recurved lateral portion of terga, slightly widened medially on sterna. Male with yellow as follows: labrum and most of mandible, yellow markings on clypeus and lower paraocular area, ventral surface of antenna, and on all legs at least on femoral apex and tibial base of each. Female labrum variable but usually black-brown, mandible variable and partially dark, face entirely dark, ventral surface of antenna yellow or yellow-brown, and yellow on legs at least on femoral apex and tibial base of fore- and midleg, and following parts invariable: yellow apical ring on profemur, broader on anterior surface; yellow apicodorsal rim on mesofemur; yellow-brown apicoventral rim on coxa and trochanter of all legs.

Pubescence: Short and sparse, not especially plumose. Longer and denser on lower paraocular area and lateral margins of mesosomal dorsum. Scape with single row of long hairs forming a fringe. Genal beard longer and denser in males. Margin of pronotal lobe with short dense tomentum. Mesepisternum with long posteriorly curved hairs. Metasoma with tomentose apicolateral patches of white hair on at least T1-T2, apical margins of all terga otherwise with short and sparse appressed hairs and very sparse tiny setae medially. Male S1 with a few long, erect hairs basad of process, and S2 with long erect hairs dense, shorter toward posterior. Female with scopae on metafemur and metatibia, corbiculate scopa on S2.

Surface sculpture: Microsculpture imbricate and punctures generally deep. Mesosomal dorsum densely punctate ($i=0.5-1d$), except metapostnotum usually coarsely rugose. Legs variably puncticulate. Malar space with microsculpture absent, shiny, punctures moderately dense ($i=1-2d$) along anterior ocular margin, to puncticulate-aciculate along posterior ocular margin, and with dense minute punctures extending to middle of mandibular base in longer-faced bees. Male lateral surface of pronotum with punctures moderately dense posteriorly ($i=1-2d$), dense anteriorly ($i\leq d$); in females moderately dense throughout. Male metasomal T2-T5 with basal depressed area coarsely sculptured and with punctures obscure; in females not coarsely sculptured. Male metasomal sterna with irregularly spaced and sparse shallow punctures ($i\geq 2d$),

deeper and denser apicolaterally (i=1-2d); in females sparsely and minutely punctate throughout.

Structure: Anterior tentorial pits elongate, comma-shaped. Inner orbits of compound eye slightly convergent below. Length of pronotal collar medially ~1OD. Pronotum not elongate, at most one-quarter as long as anterior width. Probasitarsus elongate, $\geq 2.66x$ longer than maximum depth (usually $\geq 3x$). Metatibial spurs not unusually strongly sclerotized or curved.

Metabasisarsus elongate, at least three times longer than maximum depth (usually $\geq 3.5x$).

Stigmal perpendicular at first recurrent vein or in basal quarter of second submarginal cell. Male metafemur strongly swollen, weakly concave ventrally. Male metatibia robust and highly modified: shape approximately triangular in anterior view, with a ventral convexity leading to a rounded summit ventrally; deep longitudinal concavity on posterior surface; posterior surface with two longitudinal carinae: a ventral carina along inside of posterior concavity, and a posterior carina along lateral edge of posterior concavity; apical lamina extending mediad from base of spurs, variable in shape and size, in part forming apical rim to posterior concavity.

Metapostnotum well-defined, slightly depressed medially, longer than metanotum. Male S1 with a robust, elongate, ventrally directed process, with truncate apex with a well-defined and sometimes oblique apical surface.

Comments: Known from Chile as far north as Region II and as far south as Region IX, from sea level to ~3500m a.s.l., with habitats ranging from *Araucaria araucana* Juss. forest to extreme desert.

Keys to the Species of *Heteroediscelis*

Males

1. Tibiae and tarsi mostly or entirely yellow-orange (Fig. 37A) 2
- Tibiae and tarsi mostly brown-black (Fig. 24A)..... 3
- 2(1). Apical surface of S1 process longitudinally concave (Fig. 37G); MOC equal to or greater than width of head (Fig. 1A)..... *C. travesia* Toro & Moldenke, 1979
- Apical surface of S1 process concave posteriorly, convex anteromedially (Fig. 29G); MOC less than ($\leq 0.95x$) width of head (Fig. 1B) ..*C. erithropoda* Toro & Moldenke, 1979

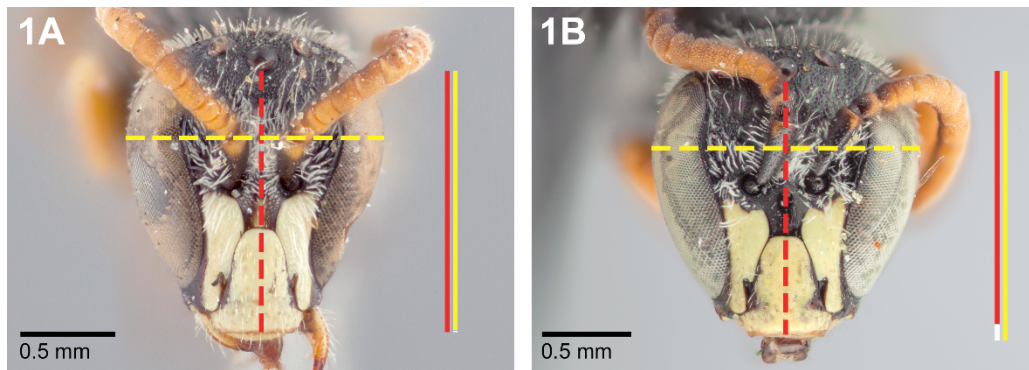


Fig. 1. Male face, showing MOC (red lines) compared to maximum width of head (yellow lines): (A) *C. travesia*, MOC subequal to maximum width of head; (B) *C. erithropoda*, MOC less than width of head.

- 3(1). Frontal area with longitudinal depression above each antennal socket which partially accommodate the scape (Fig. 34B) 4
- Frontal area without such depression (Fig. 38B) 5
- 4(3). Metabasitarsus $\leq 3.8x$ longer than maximum depth; S8 lateral process with anteromedial sclerotized margin distinctly swollen into convex incursion (Fig. 2A).
.....*C. neffi* Toro & Moldenke, 1979
- Metabasitarsus $\geq 4x$ longer than maximum depth; S8 lateral process with anteromedial sclerotized margin wide and subparallel to margin, not swollen (Fig. 2B).
..... *C. packeri* Monckton **sp. nov.**

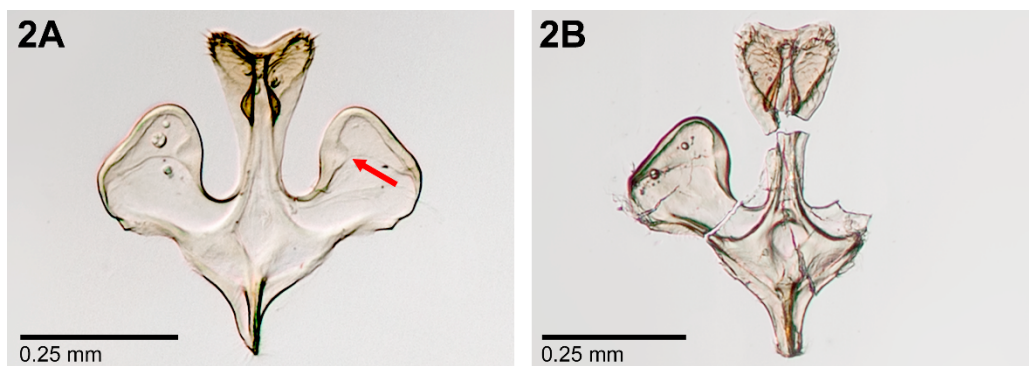


Fig. 2. Male S8: (A) *C. neffi*, arrow indicates presence of swollen convex incursion on anteromedial margin of lateral process; (B) *C. packeri*.

- 5(3). Apical surface of S1 process with distinct longitudinal median ridge, surface otherwise flat (Fig. 3A) 6
- Apical surface of S1 process either longitudinally concave (Fig. 3B) or weakly convex (Fig. 3C), but never with a longitudinal median ridge 11



Fig. 3. Apical surface of male S1 process: (A) *C. mavida*; (B) *C. randolphi*; (C) *C. vicugna*. Arrows indicate presence/absence of longitudinal median ridge.

- 6(5). Malar space at least 1.4x longer than clypeal lateral (Fig. 4A); posterior metatibial carina distinctly toothed (Fig. 5A) 7
- Malar space at most 1.1x longer than clypeal lateral (Fig. 4B); posterior metatibial carina lacking tooth, at most with a rounded inflection at its midlength (Fig. 5B) 8

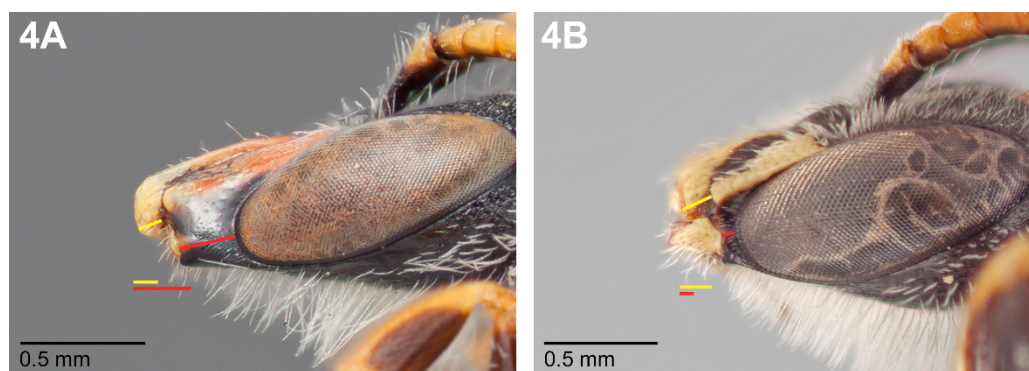


Fig. 4. Malar space (red lines) compared to clypeal lateral (yellow lines): (A) *C. lickana*; (B) *C. vicugna*.

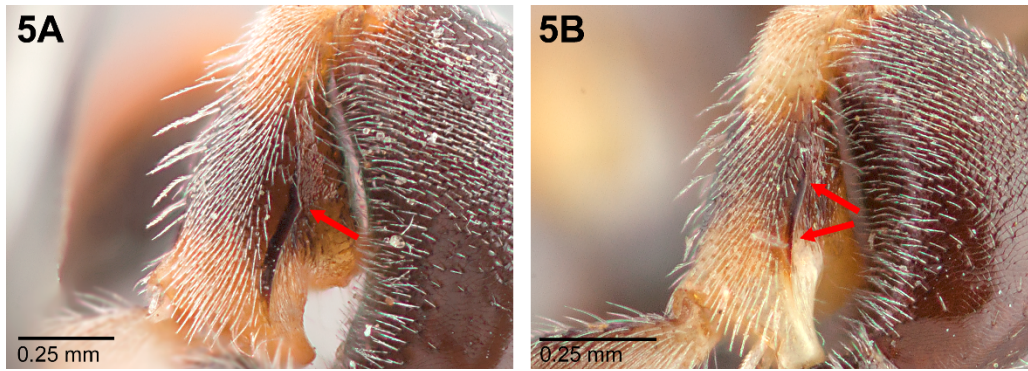


Fig. 5. Male metatibia, posterior view: (A) *C. lickana*, arrow indicates toothed posterior carina; (B) *C. vicugna*, arrows indicate smooth posterior carina.

- 7(6). Clypeus with a distinct median longitudinal depression (Fig. 6A); malar space 2.2x longer than clypeal lateral; lower paraocular maculation not reaching level of antennal socket (Fig. 6A).....*C. lickana* Monckton **sp. nov.**
- Clypeus with median longitudinal depression weak (Fig. 6B); malar space 1.4-2x longer than clypeal lateral; lower paraocular maculation just reaching level of antennal socket (Fig. 6B)*C. guanicoe* Monckton **sp. nov.**

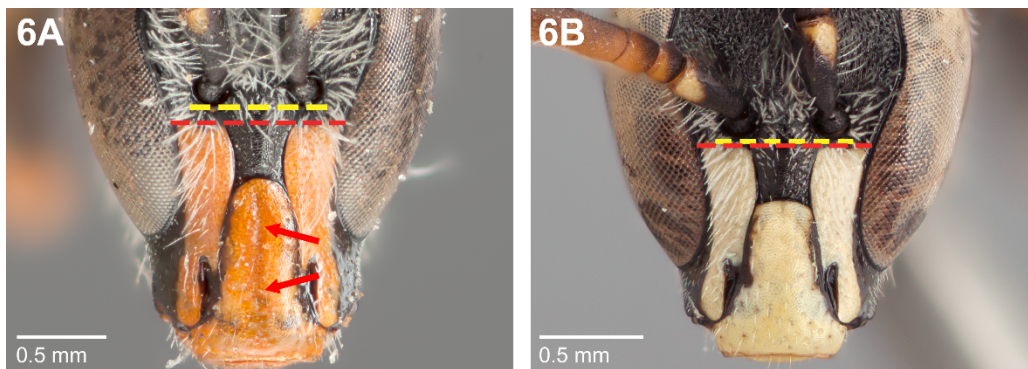


Fig. 6. Male face, showing lower tangent of antennal socket (yellow lines) compared to upper tangent of lower paraocular maculation (red lines): (A) *C. lickana*, arrows indicate presence of strong median depression on clypeus; (B) *C. guanicoe*.

- 8(5). First flagellomere ≥ 1.1 x longer than wide 9
- First flagellomere subequal in length and width (< 1.05 x) 10

- 9(8). Malar space longer than clypeal lateral ($>1.05x$); in lateral view, S1 process with anterior point of apex acute (Fig. 32F); metatibia with ventral carina entire, originating near base of posterior carina (Fig. 32E).....*C. mavida* Toro & Moldenke, 1979
- Malar space shorter ($<0.95x$) than clypeal lateral; in lateral view, apex of S1 process appearing broadly rounded (Fig. 33F); metatibia with ventral carina reduced, originating at midlength of posterior carina (Fig. 33E).....*C. mayu* Monckton **sp. nov.**
- 10(8). Malar space half as long as clypeal lateral; in lateral view, S1 process with anterior point of apex acute (Fig. 38F)*C. vicugna* Toro & Moldenke, 1979
- Malar space subequal to or shorter (but $>0.9x$) than clypeal lateral; in lateral view, S1 process appearing broadly rounded (Fig. 26F) *C. curvapeligrosa* Monckton **sp. nov.**
- 11(5). Metatibia broadly expanded ($<1.9x$ longer than maximum depth) and with summit of ventral convexity near to tibial apex (Fig. 7A); clypeus with a complete median longitudinal depression (Fig. 39B); lower paraocular maculation extending $\geq OD$ further along ocular margin than medially (Fig. 8A)..... 12
- Metatibia not so expanded ($>2.1x$ longer than maximum depth) and with summit of ventral convexity situated basad of tibial apex at approximately two-thirds of tibial length (Fig. 7B); clypeus without median longitudinal depression (Fig. 27B), or depression partial and weak; lower paraocular maculation extending at most as far along ocular margin as medially (Fig. 8B) 14

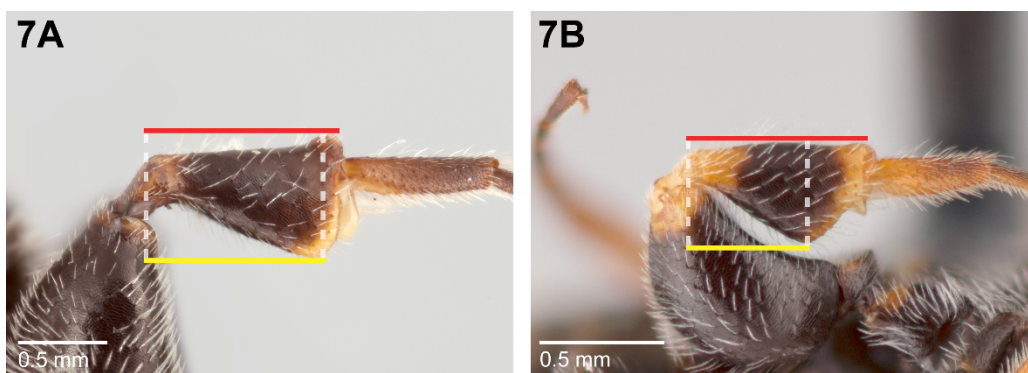


Fig. 7. Male metatibia, anterior view, red lines indicate length of metatibia, yellow lines indicate length to summit of ventral convexity: (A) *C. diaguia*, summit near apex; (B) *C. deserticola*, summit at two-thirds length.



Fig. 8. Male face, red lines are 1OD: (A) *C. diaguita*; (B) *C. deserticola*.

- 12(11).Truncate apex of S1 process perpendicular to axis of process in lateral view, anterior margin sublinear (Fig. 36F); metabasitarsus less than 3.5x longer than maximum depth; malar space short, $\sim 0.9x$ as long as clypeal lateral*C. randolphi* Monckton **sp. nov.**
- Truncate apex of S1 process oblique in lateral view, anterior margin strongly concave; metabasitarsus at least 4.2x longer than maximum depth; malar space long, $\leq 1.2x$ longer than clypeal lateral 13
- 13(12).Malar space 1.5-1.6x longer than clypeal lateral; S8 anteromedial sclerotized margin wide and subparallel to margin throughout, not swollen (Fig. 28I).
..... *C. diaguita* Toro & Moldenke, 1979
- Malar space 1.2-1.4x longer than clypeal lateral; S8 anteromedial sclerotized margin distinctly swollen into convex incursion (Fig. 39I)*C. vina* Toro & Moldenke, 1979
- 14(11).Malar space long, $\sim 1.3x$ longer than width of genal area in lateral view; prodistitarsus dark with at most apical third yellow-brown, and metafemur with apex dark (Fig. 9A); apical surface of S1 process with weak anterior convexity (Fig. 25G).
.....*C. charizard* Monckton **sp. nov.**
- Malar space short, $< 0.67x$ length of clypeal lateral; prodistitarsus mostly (apical two-thirds) or entirely yellow, and metafemur with apical ring yellow, broad dorsally (Fig. 9B); apical surface of S1 process longitudinally concave (Fig. 27G) 15
- 15(14).Mesobasitarsus mostly yellow (Fig. 10A); second flagellomere $> 1.1x$ longer than first (Fig. 11A); malar space less than half as long as clypeal lateral.
.....*C. deserticola* Toro & Moldenke, 1979

- Mesobasitarsus mostly dark (Fig. 10B); second flagellomere subequal to first in length (Fig. 11B); malar space more than half as long as clypeal lateral.

.....*C. mantagua* Toro & Moldenke, 1979

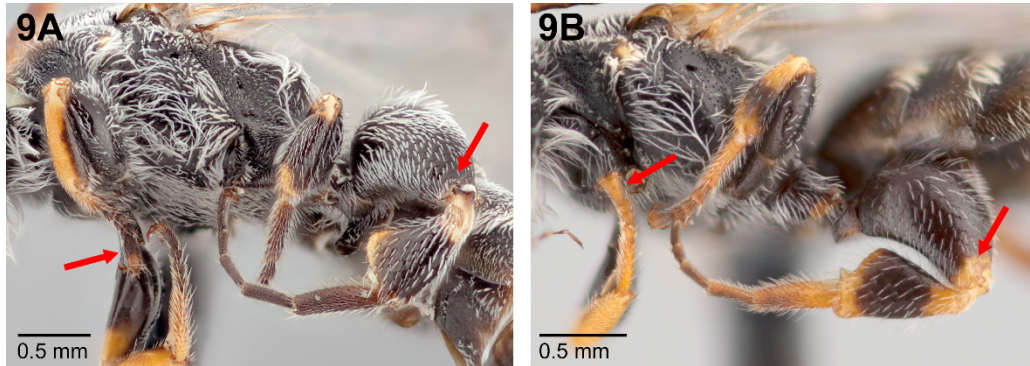


Fig. 9. Male leg colouration, arrows indicate probasitarsus and apex of metafemur: (A) *C. charizard*; (B) *C. deserticola*.

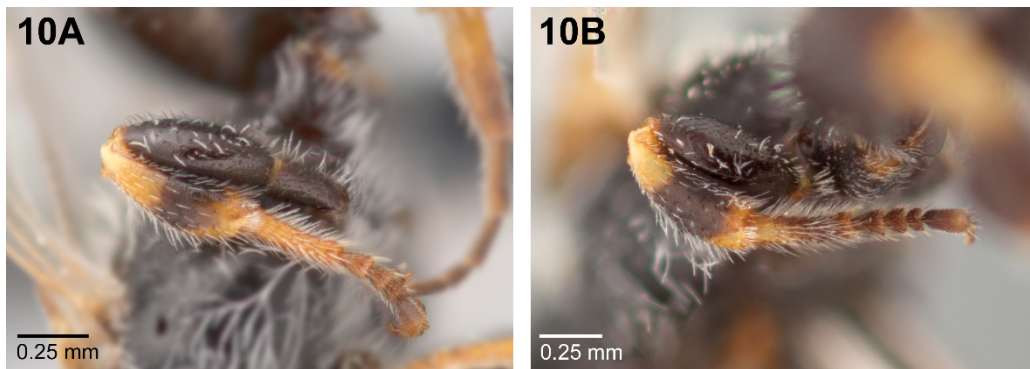


Fig. 10. Male midleg: (A) *C. deserticola*, with entirely yellow basitarsus; (B) *C. mantagua*, with mostly dark basitarsus.

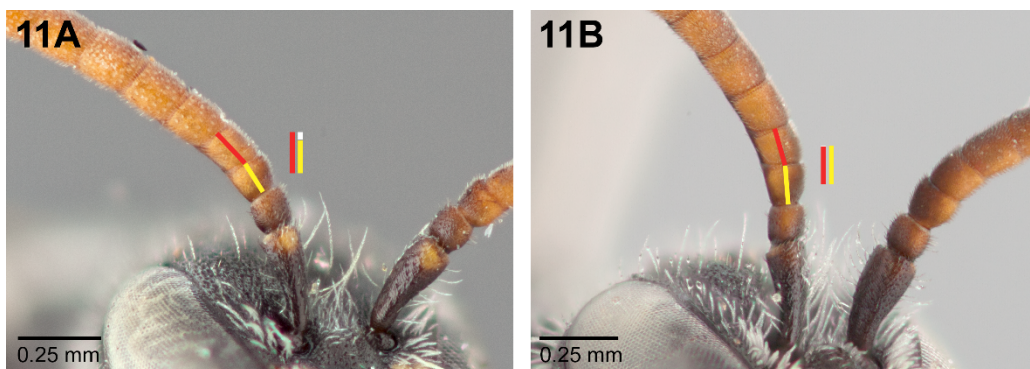


Fig. 11. Male antenna, yellow lines indicate length of F1, red lines indicate length of F2: (A) *C. deserticola*, F2 1.2x longer than F1; (B) *C. mantagua*, F2 subequal to F1.

Females

1. Protibia with yellow on dorsal surface present in basal half only, apical half dark (Fig. 12A) 2
- Protibia with yellow along entire dorsal surface (Fig. 12B; slightly darkened to yellow-brown apically in *C. mantagua*, Fig. 12C)..... 4



Fig. 12. Female protibia colouration: (A) *C. randolphi*, dorsal surface yellow in basal half only; (B) *C. deserticola*, yellow along entire dorsal surface; (C) *C. mantagua*, dorsal surface yellow-brown apically.

- 2(1). Malar space at most 0.8x as long as clypeal lateral; pedicel and first flagellomere yellow-brown apicoventrally (Fig. 36D); metasoma mostly orange-brown (Fig. 13A); T3 with apicolateral hair patches tomentose as on T1-T2 (Fig. 13A).
.....*C. randolphi* Monckton **sp. nov.**
- Malar space at least as long as clypeal lateral; pedicel and first flagellomere dark, at most with apicoventral margins brown (Fig. 39D); metasoma black-brown (Fig. 13B); T3 with apical hair bands evenly sparse, not tomentose apicolaterally as on T1-T2 (Fig. 13B). 3
- 3(2) Lower ocular tangent passing just tangent to or above anterior tentorial pits (in frontal view) (Fig. 14A)..... *C. diaguila* Toro & Moldenke, 1979
- Lower ocular tangent passing through anterior tentorial pits (in frontal view) (Fig. 14B).
.....*C. vina* Toro & Moldenke. 1979
- 4(1) Malar space clearly longer than clypeal lateral (>1.1x)..... 5
- Malar space at most 0.9x as long as, or subequal to, clypeal lateral..... 7

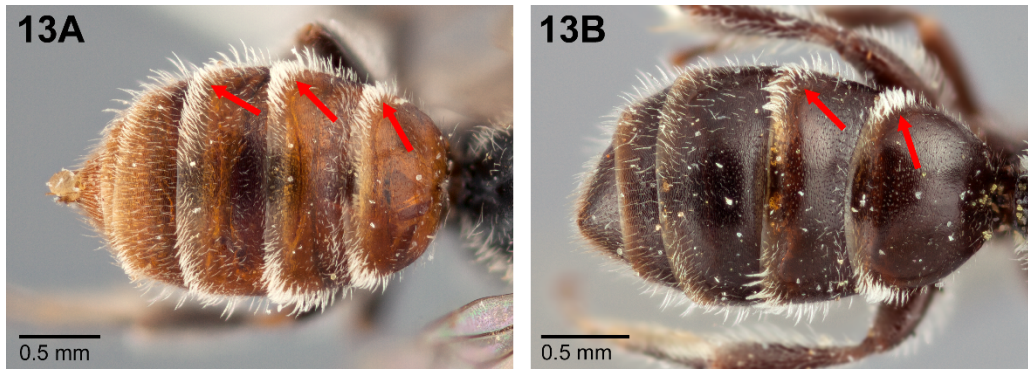


Fig. 13. Female metasoma, arrows indicate tomentose apicolateral hair patches: (A) *C. randolphi*, metasoma mostly orange-brown; (B) *C. vina*, metasoma black-brown.

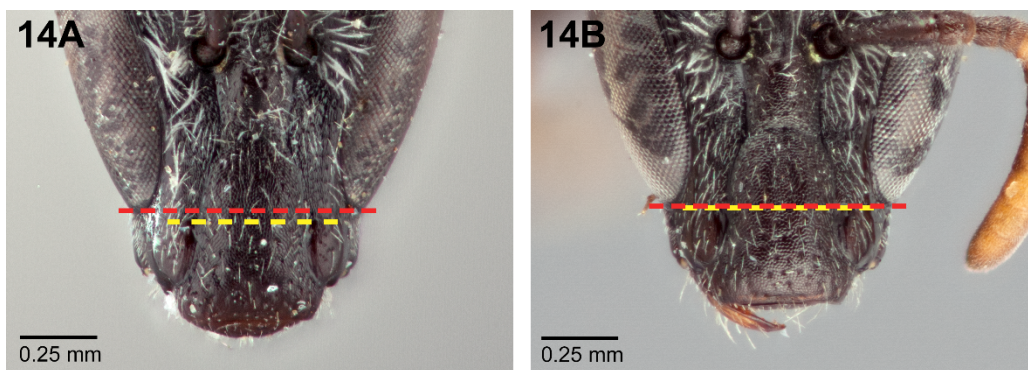


Fig. 14. Female face, red lines indicate lower ocular tangent (LOT), yellow lines indicate upper limit of anterior tentorial pits (ATP): (A) *C. diaguita*, LOT above ATP; (B) *C. vina*, LOT through ATP.

- 5(4) Malar space less than $<1.7\times$ longer than clypeal lateral *C. guanicoe* Monckton **sp. nov.**
- Malar space at least twice as long as clypeal lateral 6
- 6(4) Metatibia with yellow basal and apical rings wide (Fig. 15A); malar space twice as long as clypeal lateral *C. lickana* Monckton **sp. nov.**
- Metatibia evenly dark, or with a wide basal band of brown that is clearly darker than the pale colouration on other legs (Fig. 15B); malar space more than double clypeal lateral, and longer than width of genal area in lateral view *C. charizard* Monckton **sp. nov.**
- 7(4) Malar space approximately $0.9\times$ as long as, or subequal to, clypeal lateral 8
- Malar space at most two-thirds as long as clypeal lateral 9



Fig. 15. Female metatibia colouration: (A) *C. lickana*, wide yellow basal and apical rings; (B) *C. charizard*, brown basal ring only.

- 8(4) Apex of metafemur and base of metatibia yellow-brown to brown, distinctly darker than on midleg (Fig. 16A); subantennal sutures $\geq 1.1\times$ longer than the shortest distance between them *C. curvapeligrosa* Monckton **sp. nov.**
- Apex of metafemur and base of metatibia yellow, same as on midleg (Fig. 16B); subantennal sutures no longer than the shortest distance between them.
..... *C. mavida* Toro & Moldenke, 1979

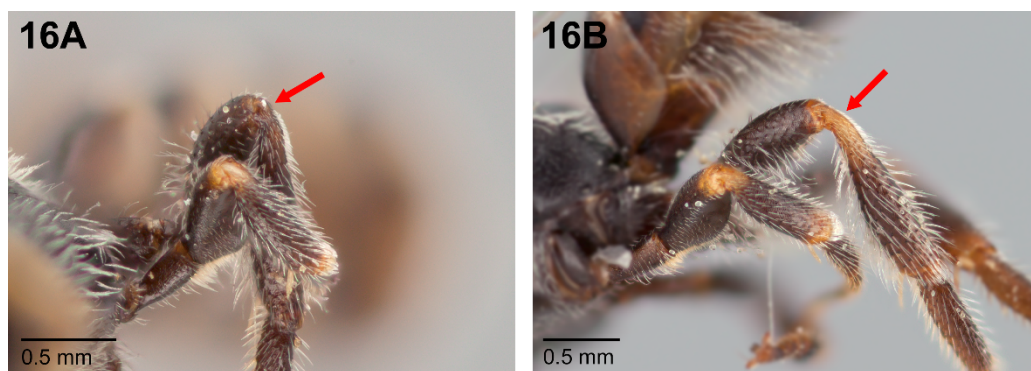


Fig. 16. Female hindleg colouration: (A) *C. curvapeligrosa*, apex of metafemur and base of metatibia brown; (B) *C. mavida*, apex of metafemur and base of metatibia yellow.

- 9(4) Frontal area with longitudinal depressions which partially accommodate the scape (Fig. 34D). 10
- Frontal area without such depressions (Fig. 24D) 11

10(7) Metasoma with at least T1-T3 orange-brown, except for dark premarginal line and/or a pair of lateral dark spots (Fig. 17A); metabasitarsus $\geq 4\times$ longer than maximum depth.

..... *C. packeri* Monckton **sp. nov.**

- Metasoma dark (Fig. 17B), sometimes with T1-T3 orange-brown, but if so then apical half of disc dark (Fig. 17C); metabasitarsus $\leq 4\times$ longer than maximum depth.

..... *C. neffi* Toro & Moldenke, 1979

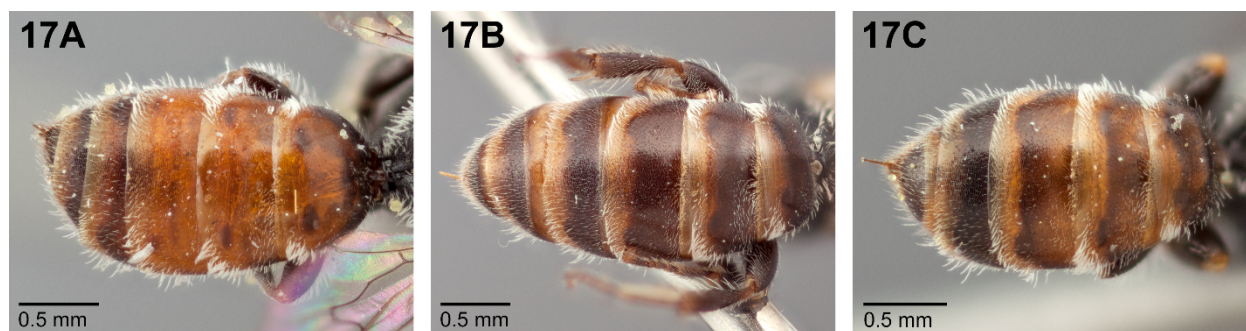


Fig. 17. Female metasoma colouration: (A) *C. packeri*, T1-T3 almost entirely orange-brown; (B) *C. neffi*, T1-T3 mostly dark brown; (C) *C. neffi*, T1-T3 more extensively orange-brown, but with apical half of disc dark brown.

11(7) T3 with apical hair bands evenly sparse, not tomentose apicolaterally as on T1-T2 (Fig. 18A); clypeus with punctures sparser than those of supraclypeal area (Fig. 38D)..... 12

- T3 with apicolateral hair patches tomentose as on T1-T2 (Fig. 18B); clypeus with punctures at least as dense as, or denser than those of supraclypeal area (Fig. 24D)..... 13

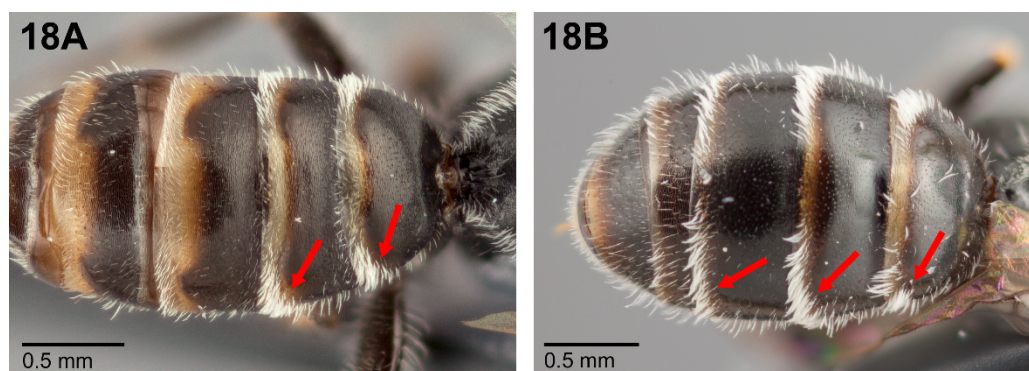


Fig. 18. Female metasomal terga apicolateral hair patches: (A) *C. vicugna*, tomentose on T1-T2 only; (B) *C. mantagua*, tomentose on T1-T3.

- 12(9) Clypeus distinctly convex in dorsal half, projecting $\geq 1.5OD$ above inner orbit of compound eye in lateral view (Fig. 19A); apex of metafemur and base of metatibia brown, distinctly darker than on midleg (Fig. 20A) *C. mayu* Monckton **sp. nov.**
- Clypeus not as above, dorsal half projecting $\leq OD$ above inner orbit of compound eye in lateral view (Fig. 19B); apex of metafemur and base of metatibia yellow as on midleg, or yellow-brown, lighter than marginal zones of metasomal terga (Fig. 20B).
 *C. vicugna* Toro & Moldenke, 1979

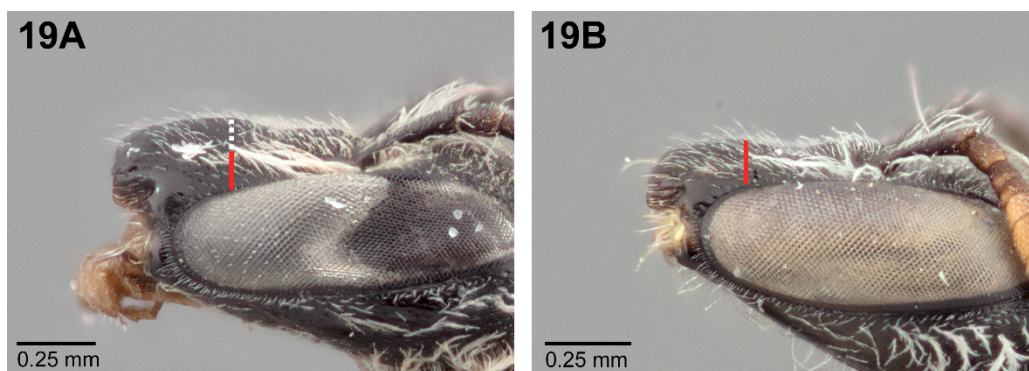


Fig. 19. Female head lateral view, showing convexity of clypeus in dorsal half, red lines are 1OD: (A) *C. mayu*; (B) *C. vicugna*.



Fig. 20. Female hindleg colouration: (A) *C. mayu*, apex of metafemur and base of metatibia brown; (B) *C. vicugna*, apex of metafemur and base of metatibia yellow.

- 13(9) Metatibia somewhat expanded, $< 4x$ longer than maximum depth (Fig. 21A-B); legs with following parts yellow as on protibia: apex of mesotibia with at least a wide ring, apicodorsal rim on metafemur, apex of metatibia with narrow to wide apical ring, apical half of metadistitarsus 14

- Metatibia not expanded, and $>4.1\times$ longer than maximum depth (Fig. 21C); legs less extensively yellow: apex of mesotibia at most narrowly yellow, metafemur with at most a narrow apical ring yellow-brown, apex of metatibia with at most posterior apical rim yellow-brown 15
- 14(11) Metatibia mostly yellow, at least in basal third and apical quarter, often entirely so (Fig. 21A); probasitarsus entirely yellow, or at most suffused with yellow-brown at midlength of posterior surface (Fig. 22A)..... *C. travesia* Toro & Moldenke, 1979
- Metatibia mostly dark, at most basal third and a narrow apical ring yellow (Fig. 21B); probasitarsus darker, only basal and apical quarters as pale as yellow on protibia (Fig. 22B)..... *C. erithropoda* Toro & Moldenke, 1979

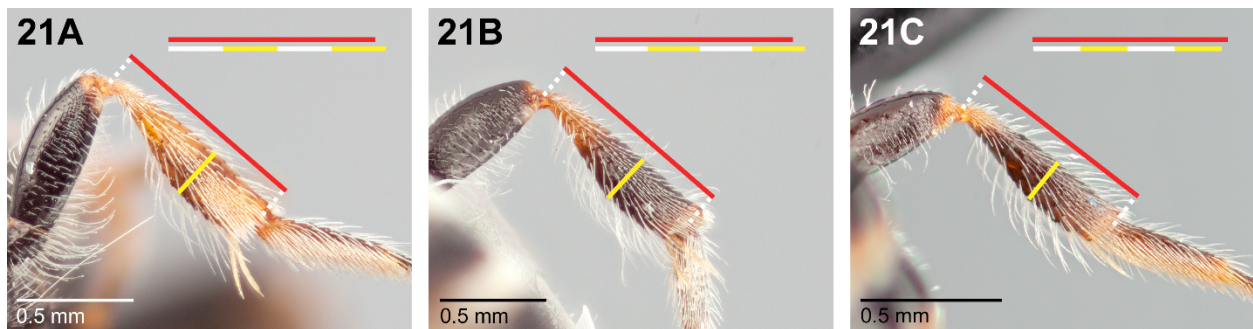


Fig. 21. Female metatibia, yellow lines indicate maximum depth, red lines indicate length: (A) *C. travesia*, mostly yellow and expanded, $<4\times$ longer than maximum depth; (B) *C. erithropoda*, mostly dark brown and expanded, $<4\times$ longer than maximum depth; (C) *C. deserticola*, mostly dark brown and not expanded, $>4.1\times$ longer than maximum depth.

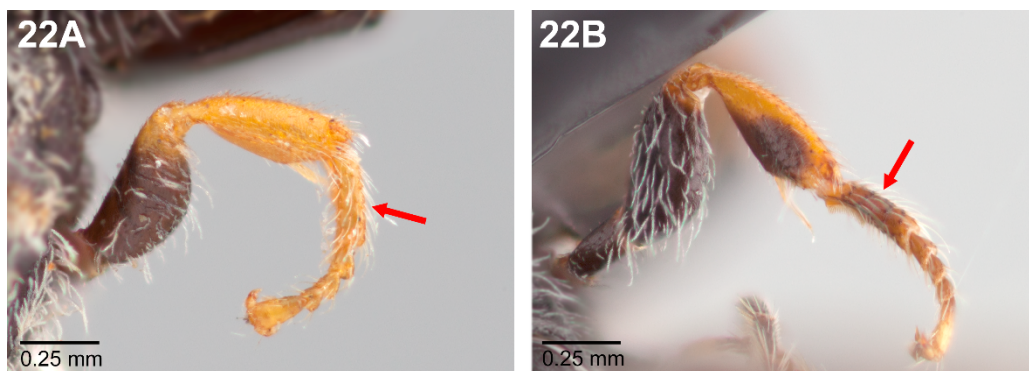


Fig. 22. Female foreleg, arrows indicate probasitarsus: (A) *C. travesia*, probasitarsus entirely yellow; (B) *C. erithropoda*, probasitarsus mostly brown.

15(11) Metapostnotum with sparse, irregular longitudinal carinae (Fig. 23A); protibia with dorsal surface darkened to yellow-brown apically (Fig. 12C); meso- and metabasitarsi mostly dark; mesodistitarsus brown in apical third; apex of metatibia evenly dark.

.....*C. mantagua* Toro & Moldenke, 1979

- Metapostnotum rugose, often more weakly so toward posterior (Fig. 23B) (some specimens have fewer transverse rugae posteriorly); protibia with dorsal surface yellow for entire length (Fig. 12B); meso- and metabasitarsi yellow ventrally; mesodistitarsus yellow or yellow-brown in apical half; posterior apical rim of metatibia brown or yellow-brown.

.....*C. deserticola* Toro & Moldenke, 1979

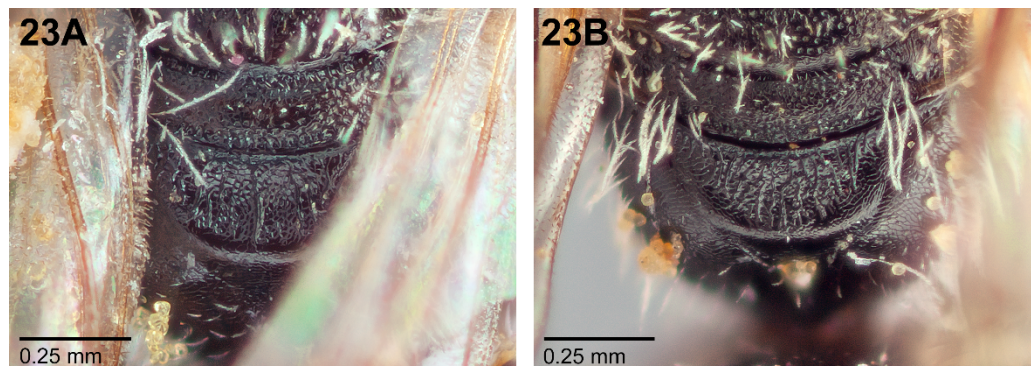


Fig. 23. Female metapostnotum: (A) *C. mantagua*, with sparse & irregular longitudinal carinae; (B) *C. deserticola*, rugose.

Species Descriptions

Chilicola (Heteroediscelis) mantagua Toro & Moldenke, 1979

Chilicola mantagua Toro & Moldenke, 1979: 112, 113-116, 120-121, 170. Ascher & Pickering, 2015. Moure et al., 2012. Montalva & Ruz, 2010: 28. Packer, 2008: 74, 77-78. Almeida et al., 2008: 76. Michener, 2007: 184. Michener, 1995: 337. Aravena & Toro, 1985: 177, 179, 181-183.

Chilicola valparaiso Toro & Moldenke, 1979 (Chile, Valparaíso, Peñuelas, i.1975; holotype male [AMNH]): 113, 117-118, 170. Packer, 2008: 77. Montalva & Ruz, 2010: 29. Moure et al., 2012. Ascher & Pickering, 2015. **Syn. nov.**

Figures: Fig. 10B; Fig. 11B; Fig. 12C; Fig. 18B; Fig. 23A; Fig. 24A-J; Fig. 40.

Material studied (22 males & 8 females): **Holotype** (male): Region V, Lilenes, *S* 32.928°, *W* 71.546°, 19m, 13.i.1967, Toro (AMNH). **Allotype** (female): same data as holotype, coll. De la Hoz (AMNH). **Region V**: one paratype male, same locality as holotype, 23.x.1966, De la Hoz (AMNH); one paratype male, same locality as holotype, 25.x.1966, De la Hoz (AMNH); one paratype male, same locality as holotype, 23.x.1966, H. Toro G. (AMNH); two paratype males, same locality as holotype, 5.x.1975, H. Toro, PUCV-ENTO 21474, PUCV-ENTO 21467 (PUCV); two paratype females, same locality as holotype, 5.x.1975, L. Ruz, PUCV-ENTO 21480, PUCV-ENTO 21481 (PUCV); one paratype female, same locality as holotype, 5.x.1975, L. Ruz (PUCV); two paratype males, Reñaca, *S* 32.972°, *W* 71.544°, 14m, 20.xi.1966, De la Hoz (AMNH); three paratype males, Mantagua, *S* 32.866°, *W* 71.491°, 15m, xii.1971, H. Toro G. (AMNH); one paratype male, same locality, 13.i.1967, H. Toro G. (AMNH); one paratype female, 45330 Pr. Aconcagua, A.R. Moldenke (AMNH); one male, *C. valparaiso* syn. nov. holotype, Peñuelas, *S* 33.149°, *W* 71.559°, 362m, i.1975, Cerda (AMNH); four males, Viña del Mar, *S* 33.025°, *W* 71.552°, 18m, xi.1988, Fritz (AMNH); one male, same locality, xi.1990, Fritz (AMNH); one male, Reñaca, *S* 32.972°, *W* 71.544°, 14m, 22.x.1994, J.G. Rozen (AMNH); two males and two females, Concón, *S* 32.917°, *W* 71.5°, 60m, 21.x.2008, K.S. Ramos, CCDB-06736 F02 // PCYU-KCC-10040, CCDB-06736 F03 // PCYU-KCC-10041, CCDB-06736 F01 // PCYU-KCC-10039, CCDB-06736 E12 // PCYU-KCC-10038 (PCYU); one female, Playa Ritoque, N. of Concón, *S* 32.849°, *W* 71.515°, 13m, date unknown, L. Packer (PCYU); one male, same data, CCDB-03755 A04 (PCYU).

Diagnosis: Males are diagnosable by the combination of malar space short (~0.6x clypeal lateral), mesobasitarsus mostly dark, and metatibia with the combination of ventral carina entire and smooth, posterior carina reduced originating in distal half of ventral carina, and apical lamina reduced (~0.5OD in length). Females are diagnosable by the combination of the malar

space short (~0.5x clypeal lateral), metapostnotum with sparse, irregular longitudinal carinae, and protibia yellow along entire dorsal surface but darkened somewhat to yellow-brown apically. Among consubgenera *C. deserticola* is most similar, but can be differentiated in both sexes by the characters given in the key.

Description: Male: Length 4.8-5.5mm, forewing length 3.0-3.3mm, head width 1.1-1.3mm, thorax width 1.1-1.4mm, median ocellar diameter (OD) 0.11-0.12mm.

Colouration: Black-brown except as follows: antenna variable (scape with yellow apicoventral spot to entirely dark; apicoventral rim of pedicel brown to entirely dark; ventral surface of flagellum yellow to yellow-brown, narrowing basally on F1, remaining flagellomeres suffused with brown basally). Following parts yellow: labrum; clypeus except narrowly to broadly dark along epistomal suture, and apical margin usually brown laterad; lower paraocular area extending ~1OD above transverse portion of epistomal suture and not reaching lower tangent of antennal socket; posterior apical rim of protochanter; apex of profemur broadly on anterior surface, narrowly on posterior surface; protibia except dark medioventrally; probasitarsus, at least on dorsal half; prodistitarsus, at least on apical two-thirds; narrow apical ring on mesofemur; wide basal ring and narrow apical ring on mesotibia, the latter wider anteriorly; apical ring on metafemur, broad dorsally; broad basal and apical rings on metatibia, excluding apical margin of ventral convexity; metabasitarsus in basal quarter dorsally, extending to apex ventrally; anterior spot on tegula. Apicoventral rim of metacoxa yellow-brown. Ventral metatibial carina black. Metasoma dark brown, T1-T6 with marginal zones translucent yellow.

Pubescence: White, hairs generally short and sparse, not especially plumose; on lower paraocular area and around antennal base moderately long and moderately dense (1OD); genal beard long and dense (0.5-2OD) longest at midlength; mesoscutum, scutellum, and metanotum mostly bare, few short hairs (0.5OD) except mesoscutal hairs short and moderately dense toward lateral margin (0.5OD), scutellar hairs long and moderately dense toward lateral and posterior margins (1-2OD) longest posteromedially, metanotal hairs long and moderately dense toward lateral margin (≤ 2 OD); propodeal hairs moderately long and dense dorsolaterally (0.5-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 hairs long and dense (1.5OD basad, 0.5OD distad, shorter mesad).

Surface sculpture: Microsculpture imbricate and punctures generally deep. Clypeus and supraclypeal, lower paraocular, and vertexal areas moderately densely punctate ($i=1-2d$) except more densely punctate toward lateral margins of supraclypeal area ($i \leq d$); frontal area and region around ocelli densely punctate ($i \leq d$) less so on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; scape shallowly and moderately densely punctate ($i=1-2d$), denser apicoventrally ($i \leq d$); genal area coarsely imbricate to weakly microstriate, punctures moderately dense ($i=1-2d$); hypostomal area weakly imbricate, punctures dense ($i=d$); pronotum densely punctate ($i=0.5-1d$); mesoscutum and scutellum moderately densely punctate ($i=1-2d$), punctures crowded around median line ($i \leq d$); mesepisternal punctures irregularly spaced, sparse below scrobe and anterior of episternal suture ($i=1-3d$), impunctate just dorsad of scrobe, otherwise dense on hypoepimeral area ($i \leq d$); metanotum moderately densely punctate ($i=1-2d$), punctures crowded on median line and anteriorly ($i \leq 0.5d$); metepisternum densely punctate ($i \leq d$), distinctly striate anterodorsally; metapostnotum rugose, fewer transverse rugae and more weakly sculptured posteriorly; propodeum coarsely imbricate, punctures moderately dense ($i=1-2d$); T1 moderately densely punctate ($i=1-2d$); T2-T5 moderately densely punctate-puncticulate ($i=1-3d$); T6-T7 moderately sparsely punctate ($i \geq 2d$); marginal zones of terga weakly imbricate and shiny, shallowly punctate.

Structure: Labrum 2.4x wider than long (24:10); malar space $\sim 0.6x$ as long as clypeal lateral (5:8); LOT below anterior tentorial pits; clypeus $\sim 1.2x$ longer than maximum width in frontal view (35:29), extending for less than half its length beyond LOT; clypeus without median longitudinal groove; subantennal sutures $\sim 1.15x$ longer than shortest distance between them (14:12); IAD 1.5x AOD (12:8); scape $\sim 2.5x$ longer than maximum width (23:9); pedicel slightly shorter than wide (7.5:8); F1 slightly shorter than wide (8:8.5); F2 shorter than F1, and $\sim 0.75x$ as long as F3 (F2:F3 - 7:9); UOD $\sim 1.4x$ LOD, IOD $\sim 1.1x$ UOD (UOD:IOD:LOD - 47:51:34); frontal line carinate in lower half, flat above; MOC subequal to width of head (84:83); OOC $\sim 0.7x$ IOC (12:17); genal area $\sim 0.6x$ as wide as compound eye in lateral view (18:31); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 55:22:10:12; probasitarsus $\sim 3.33x$ longer than maximum depth (20:6); prodistitarsus $\sim 0.9x$ as long as preceding three tarsomeres combined (from 2nd to 5th - 6:5:4:13); metafemur nearly twice as long as maximum depth (61:31); summit of metatibial ventral convexity at approximately two-thirds tibial length; metatibia $\sim 2.2x$ longer than maximum depth (55:25); in apical view apical lamina of metatibia

reduced, short and thick, length $\sim 0.5 \times OD$ (5:9); ventral metatibial carina entire and smooth, posterior carina reduced and originating in distal half of ventral carina; metabasitarsus 3.4x longer than maximum depth (34:10); S1 process apical surface longitudinally concave, in lateral view anterior and posterior margins convergent apically. S7 apodemal arm sclerotized margin entire, fully enclosing membranous portion of arm; ventral lobe $\sim 0.5 \times$ as broad as its basal length; dorsal lobe strap-like, roughly parallel-sided, with basal tuft of long setae, and a short apical row, midlength bare. S8 lateral process basolateral margin with obtuse inflection, anteromedial sclerotized margin wide, subparallel to margin throughout.

Female: Length 4.5-5.1mm, forewing length 2.8-3.0mm, head width 1.0-1.1mm, thorax width 1.1-1.2mm, median ocellar diameter (OD) 0.10mm.

Colouration: Black to black-brown except as follows: mandible with yellow basal spot, translucent yellow in apical half except apex translucent brown; antenna variable (apicoventral margin of F3 yellow-brown to brown; ventral surface of flagellum from F4 to terminal flagellomere yellow-brown to yellow, flagellomeres suffused with brown basally). Following parts yellow: dorsal surface of protibia, darkened to yellow-brown apicodorsally; apical half of prodistitarsus; narrow basal ring on mesotibia, wide dorsally. Anterior spot on tegula absent or faintly yellow. Following parts brown: apicodorsal spot on mesotibia; apical third of mesodistitarsus; narrow apical ring on metafemur (yellow-brown on some specimens). Metatibia with wide basodorsal band yellow-brown. Metasoma black, T1-T5 with marginal zones narrowly translucent yellow.

Pubescence: As in male except as follows: clypeal hairs short and sparse (0.5OD); genal beard sparse (0.5-1.5OD) longest at midlength; mesoscutal hairs short and sparse ($\leq 0.5D$) denser and short toward lateral margin (0.5OD); scutellar hairs long and moderately sparse toward lateral and posterior margins (1-1.5OD) longest posteromedially; metafemur and metatibia with scopae (1-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); on S1 long and moderately dense ($\leq 2OD$); S2 corbiculate scopa (1-2OD)

Surface sculpture: As in male except as follows: lower paraocular area densely punctate ($i=d$); scape and frontal, vertexal, and genal areas moderately densely punctate ($i=1-2d$); scape punctures shallow; genal area weakly imbricate; hypostomal area weakly imbricate to glabrous apically, shallow punctures moderately sparse ($i \geq 2d$); mesoscutum and scutellum densely

punctate ($i=0.5-1d$); mesepisternal punctures irregularly spaced, sparse below scrobe and anterior of episternal suture ($i=1-3d$), irregularly spaced on hypoepimeral area ($i\leq 2d$); metanotum moderately densely punctate ($i=0.5-2d$); metapostnotum sparsely longitudinally carinate, carinae irregular; propodeum moderately densely punctate ($i=1-2d$); T1-T5 punctures small and sparse ($i=1-3d$ on T1-T3; $i\geq 2d$ on T4-T5); T6 moderately densely punctate ($i=1-2d$).

Structure: Labrum $\sim 2.5x$ wider than long (21:8); malar space $0.5x$ as long as clypeal lateral (4:8); LOT below anterior tentorial pits; clypeus subequal in length to maximum width in frontal view (30:28), extending for less than half its length beyond LOT; median longitudinal groove weak on clypeus; subantennal suture length subequal to shortest distance between them (11:12); IAD $\sim 1.5x$ AOD (12.5:8); scape $\sim 3.2x$ longer than maximum width (21:6.5); pedicel longer than wide (7.5:6.5); F1 subequal in length and width (6:6); F2 $\sim 0.67x$ as long as F1 and equal in length to F3 (F2:F3 - 4:4); UOD $\sim 1.3x$ LOD, IOD $\sim 1.05x$ longer than UOD (UOD:IOD:LOD - 44:47:34); frontal line carinate in lower half, flat above; MOC subequal to or slightly longer than width of head (78:74); OOC $\sim 0.75x$ IOC (11.5:16); genal area $\sim 0.6x$ as wide as eye in lateral view (16:26); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 51:20:10:11.5; probasitarsus $\sim 3x$ longer than maximum depth (20:6.5); length of prodistitarsus subequal to that of preceding three tarsomeres combined (from 2nd to 5th - 5.5:5:4:14); metafemur $\sim 2.6x$ longer than maximum depth (42:16); metatibia $\sim 4.2x$ longer than maximum depth (55:13); metabasitarsus $\sim 3.67x$ longer than maximum depth (33:9).

Distribution & Habit: Coastal, from Valparaíso southeast to Peñuelas, and north to Playa Ritoque (Region V); 15-362m a.s.l. Recorded October to January.

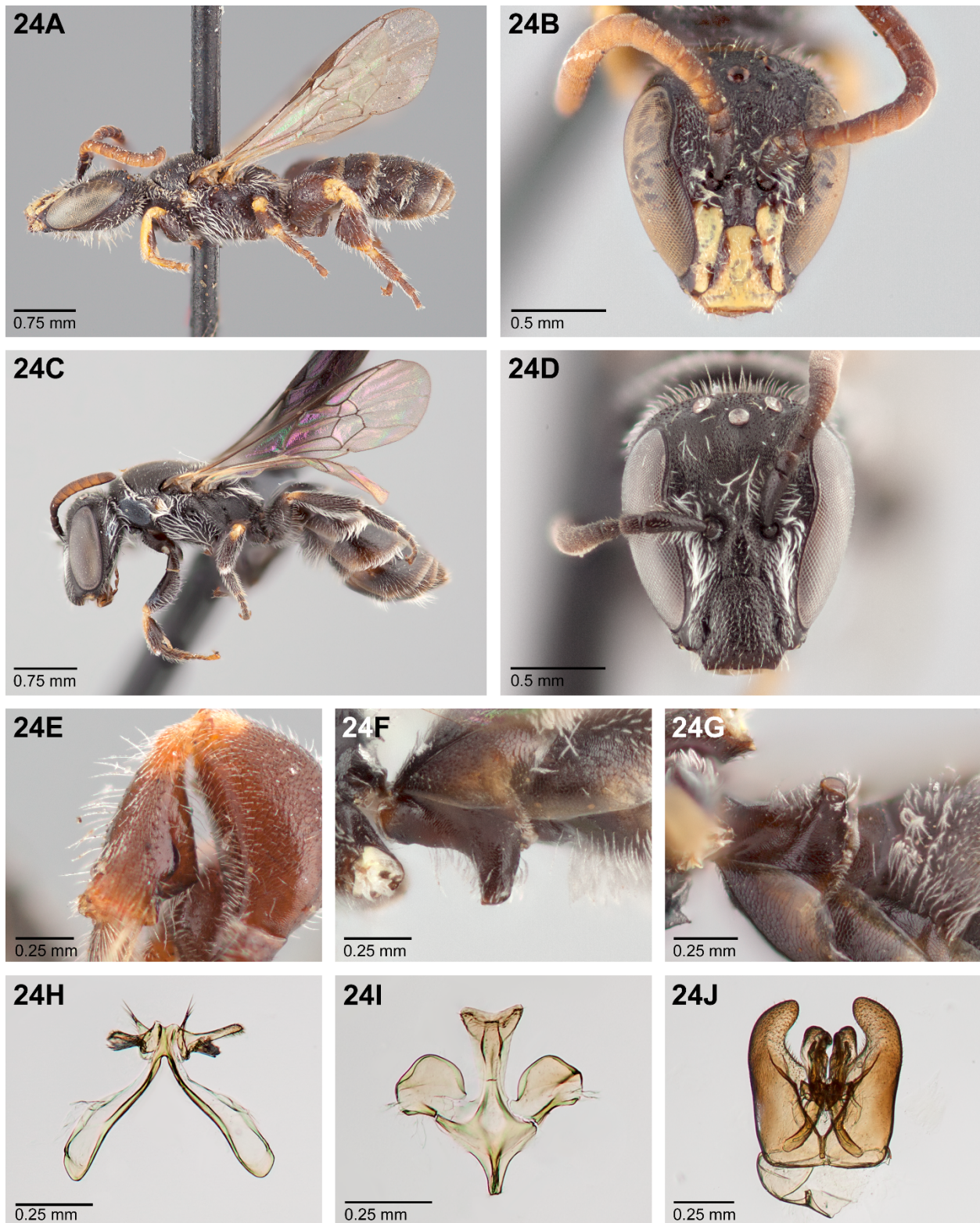


Fig. 24. *Chilicola mantagua*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view[†]; (F) male S1 process, lateral view[†]; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) charizard* Monckton sp. nov.**

Figures: Fig. 9A; Fig. 15B; Fig. 25A-J; Fig. 40.

Type Material: Holotype (male): Region III, Emb. Sta Juana, C-479 km 21.5, S 28.67467°, W 70.64323°, 642m, 15.x.2013, S. Monckton (PCYU). **Allotype** (female): Region III, Chuingo, S 28.82510°, W 70.35596°, 963m, 15.ix.2010, L. Packer (PCYU). **Paratypes** (3 males & 8 females): **Region III**: one male, C-453 km 22, S 28.1816°, W 69.82605°, 1625m, 30.ix.2013, S. Monckton, CCDB-19989 A11 // PCYU 0021673 (PCYU); one female, Chuingo, S 28.8251°, W 70.35596°, 963m, 15.ix.2010, L. Packer, B09857-E05 Bees of Chile 337 (PCYU); one female, Alto del Carmen, S 28.759°, W 70.487°, 2272m, 2.x.1982, F. Rodriguez (BBSL); one female, Fundo La Semilla, 125 km SE. Copiapó, S 28.25066°, W 69.741°, 2358m, 17.x.2004, pan trap, F.D. Parker & M.E. Irwin, CHL-14509-57 // FDP52565 (BBSL); **Region IV**: two males, Incahuasi, S 29.228°, W 71.014°, 779m, 10.x.1981, H. Toro (PUCV); three females with same locality and date, collectors H. Donoso, B. Dyer, H. Burgos respectively (PUCV); one female with same locality, 1.x.1982, O. Martinez (PUCV); one female, Puente Las Terneras, S 29.908876°, W 70.25223°, 1644m, 4.x.2010, L. Packer, PCYU 0021698 (PCYU).

Etymology: The specific epithet is in homage to the fictional monster which this species resembles. It is treated as a noun in apposition.

Diagnosis: This species has the longest malar space in the subgenus. In both males and females *C. charizard* is diagnosable by the malar space at least 1.3x longer than the width of the genal area in lateral view (in other species, the malar space is shorter than the width of the genal area).

Description: Male (Holotype): Length 6.1mm, forewing length 3.6mm, head width 1.2mm, thorax width 1.3mm, median ocellar diameter (OD) 0.13mm.

Colouration: Black-brown with following parts yellow: labrum; clypeus except broadly dark along epistomal suture, and apical margin brown laterad; lower paraocular area, extending further medially than laterally, more than 1OD above transverse portion of epistomal suture, not

reaching lower tangent of antennal socket; apicoventral spot on scape; apicoventral surface of pedicel; ventral surface of F1-F5, F5 suffused with brown; posterior apical rim of protrochanter; apex of profemur broadly on anterior surface, narrowly on posterior surface; dorsal surface of protibia, including dorsal half of anterior face; anterior spot on tegula; narrow apical ring on mesofemur; narrow basal ring and apicodorsal rim of mesotibia; basal quarter of metatibia, as well as apical quarter in ventral half only; basal quarter of metabasitarsus ventrally. Following parts yellow-brown: ventral surface of F6-F10; ventral surface of F11 brown. Apicoventral rim of metacoxa brown. Metasoma black, T1-T6 marginal zones yellow to translucent margins.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard long (0.5-3OD) and dense, longest at midlength; mesoscutum mostly bare with few short hairs (0.5OD), longer and denser toward lateral margin (0.5-1OD); moderately long and moderately dense toward lateral and posterior margins of scutellum (0.5-1OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum (≤ 2.5 OD); moderately long and moderately dense on dorsolateral angle of propodeum (0.5-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hair long and dense (1.5OD basad, 1OD distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), sparse medially ($i=2-3d$); lower paraocular area with punctures moderately dense ($i=1-2d$); supraclypeal area with punctures irregularly spaced ($i=1-3d$), dense toward lateral margins ($i\leq d$); frontal area with punctures very dense ($i\leq 0.5d$), dense around ocelli ($i\leq d$), moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures dense ($i\leq d$); punctures shallow and dense on scape ($i=d$), denser apicoventrally ($i\leq d$); genal area striate with punctures dense ($i\leq 2d$); hypostomal area glabrous apically, with punctures dense ($i=d$); pronotum with punctures dense ($i=0.5-1d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures moderately dense ($i=0.5-1d$), crowded around median line ($i\leq d$); mesepisternum with punctures irregularly spaced, moderately dense below scrobe ($i=1-2d$), more sparse anterior of episternal suture ($i=1-3d$), impunctate just dorsad of scrobe, otherwise with irregularly spaced punctures on hypoepimeral area ($i\leq 2d$); metanotum with punctures moderately dense ($i=1-2d$), crowded on median line and anteriorly ($i\leq 0.5d$); metepisternum with punctures dense ($i\leq d$), without distinct

striae anterodorsally; metapostnotum rugose, minutely rugose posteriorly; propodeum coarsely imbricate, rugulose posteriorly, punctures moderately dense ($i=1-2d$); T1-T5 coarsely imbricate with punctures moderately dense ($i\leq 2d$); T6 coarsely imbricate with punctures moderately dense ($i=1-2d$); T7 punctures moderately dense ($i=1-3d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum $\sim 2.7x$ wider than long (23:8.5); length of malar space $2.75x$ that of clypeal lateral (22:8); LOT crossing above anterior tentorial pits; clypeus $\sim 1.4x$ longer than maximum width in frontal view (40:28), extending for approximately three quarters of its length beyond LOT; clypeus lacking median longitudinal groove; subantennal sutures $\sim 1.6x$ longer than the shortest distance between them (22:14); IAD double AOD (12:6); scape $\sim 2.6x$ longer than maximum width (25:9.5); pedicel shorter than wide (8:9); F1 slightly shorter than wide (9:9.5); F2 $\sim 1.3x$ longer than F1, and shorter than F3 (12:14); UOD $1.5x$ LOD, IOD slightly wider than UOD (UOD:IOD:LOD - 51:53:34); frontal line carinate in lower half, flat above; MOC longer than width of head (101:87); OOC $0.6x$ IOC (12:20); genal area less than half as wide as compound eye in lateral view (15:34); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 65:24:12:16; probasitarsus $\sim 4.1x$ longer than wide (29:7); prodistitarsus $\sim 0.7x$ as long as preceding three tarsomeres combined (from base to apex - 7:6:5:13); metafemur nearly twice as long as maximum depth (63:32); summit of metatibial ventral convexity situated at approximately two-thirds of its length; metatibia more than twice as long as maximum depth (57:27); in apical view length of metatibial apical lamina $\sim 0.8x$ median ocellar diameter (7:9), broad and thick; metatibia with posterior carina black and rounded, ventral carina black and toothed; metabasitarsus $4.2x$ longer than maximum depth (42:10); S1 process with apical surface weakly concave and slightly convex anteromedially, in lateral view with anterior and posterior margins divergent apically. S7 apodemal arm with sclerotized margin recurved mesad, dividing membranous portion of arm; ventral lobe narrow, almost linear; dorsal lobe strap-like, roughly parallel-sided, with basal tuft of long setae and a short apical row, midlength bare; apical disc sinuate. S8 lateral process with basolateral margin rounded, anteromedial sclerotized margin wide and following marginal contour. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance less than width of lateral tubercle.

Female (Allotype): Length 5.8mm, forewing length 3.3mm, head width 1.1mm, thorax width 1.3mm, median ocellar diameter (OD) 0.12mm.

Colouration: Black to black-brown except as follows: mandible with yellow basal spot, translucent yellow in apical half except apex translucent brown. Following parts brown: apicoventral margin of pedicel, F1 and F2, the latter two also with pale apicoventral spots; apicodorsal rim of metafemur; basodorsal spot on metatibia. Following parts yellow: ventral surface of antenna from F3 to terminal flagellomere; dorsal surface of protibia; apical half of prodistitarsus; anterior spot on tegula; basodorsal and apicodorsal spots on mesotibia. Metasoma black, T1-T5 with marginal zones narrowly translucent yellow.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard sparse (0.5-1.5OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), longer and denser toward lateral margin (0.5-1OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 2OD$); moderately long and dense on dorsolateral angle of propodeum (0.5-1OD); metafemur and metatibia with scopae (1-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); long and moderately dense on S1 ($\leq 2OD$); S2 with corbiculate scopa (1-2.5OD)

Surface sculpture: As in male except as follows: lower paraocular area with punctures moderately dense ($i=d$); supraclypeal area with punctures irregularly spaced ($i=1-2d$), dense toward lateral margins ($i\leq d$); frontal area with punctures dense ($i\leq d$); punctures moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures dense ($i\leq d$); punctures shallow and moderately dense on scape ($i=1-2d$); genal area weakly imbricate with punctures dense ($i=d$); hypostomal area weakly imbricate to glabrous apically, with shallow punctures moderately dense ($i=1-2d$); mesoscutum with punctures moderately dense ($i=0.5-2d$), crowded around median line ($i\leq d$); scutellum with punctures dense ($i=0.5-1d$), crowded around median line ($i\leq d$); mesepisternum with punctures irregularly spaced, moderately dense below scrobe ($i=1-2d$), sparser anterior of episternal suture ($i=2-3d$), impunctate immediately dorsad of scrobe, otherwise with punctures dense on hypoepimeral area ($i\leq d$); metanotum with punctures dense ($i=0.5-1d$), crowded on median line and anteriorly ($i\leq 0.5d$); metapostnotum rugose, weakly sculptured at posterior; propodeum coarsely imbricate with punctures moderately dense ($i=1-2d$); T1-T5 with punctures sparse ($i\geq 2d$)

on T1; i=1-3d on T2-5); T6 with punctures moderately dense (i=1-2d); marginal zones weakly imbricate and shiny, mostly impunctate.

Structure: Labrum 2.25x wider than long (22.5:10); length of malar space 2.75x that of clypeal lateral (22:8); LOT crossing above anterior tentorial pits; clypeus ~1.5x longer than maximum width in frontal view (40:27), extending for more than three-quarters of its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures 1.85x longer than the shortest distance between them (18.5:10); IAD ~1.5x AOD (11.5:7.5); scape ~3x longer than maximum width (25:8); pedicel longer than wide (8.5:7); F1 slightly longer than wide (7.5:7); F2 0.6x as long as F1 (4.5) and ~0.65x as long as F3 (7); UOD ~1.4x LOD, IOD ~1.05x longer than UOD (UOD:IOD:LOD - 48:51:34); frontal line carinate in lower half, flat above; MOC longer than width of head (98:81); OOC ~0.5x IOC (11:20); genal area ~0.6x as wide as eye in lateral view (16:28); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 61:22:10:15; probasitarsus ~4.6x longer than wide (30:6.5); prodistitarsus ~0.75x as long as preceding three tarsomeres combined (from base to apex - 8:6.5:5:14); metafemur ~3.1x longer than maximum depth (50:16); metatibia ~4.1x longer than maximum depth (62:15); metabasitarsus 4x longer than maximum depth (40:10).

Variation: Some females have the apicoventral surface of pedicel, F1 and F2 yellow-brown, and/or a brown or yellow-brown spot on the lower paraocular below the anterior tentorial pit.

Distribution & Habit: Puente Las Ternerias (Region IV) north to E of Potrerillos (Region III), west to Incahuasi (Region III), east to Fundo La Semilla (Region III); 642-2839m a.s.l. Recorded September to October.

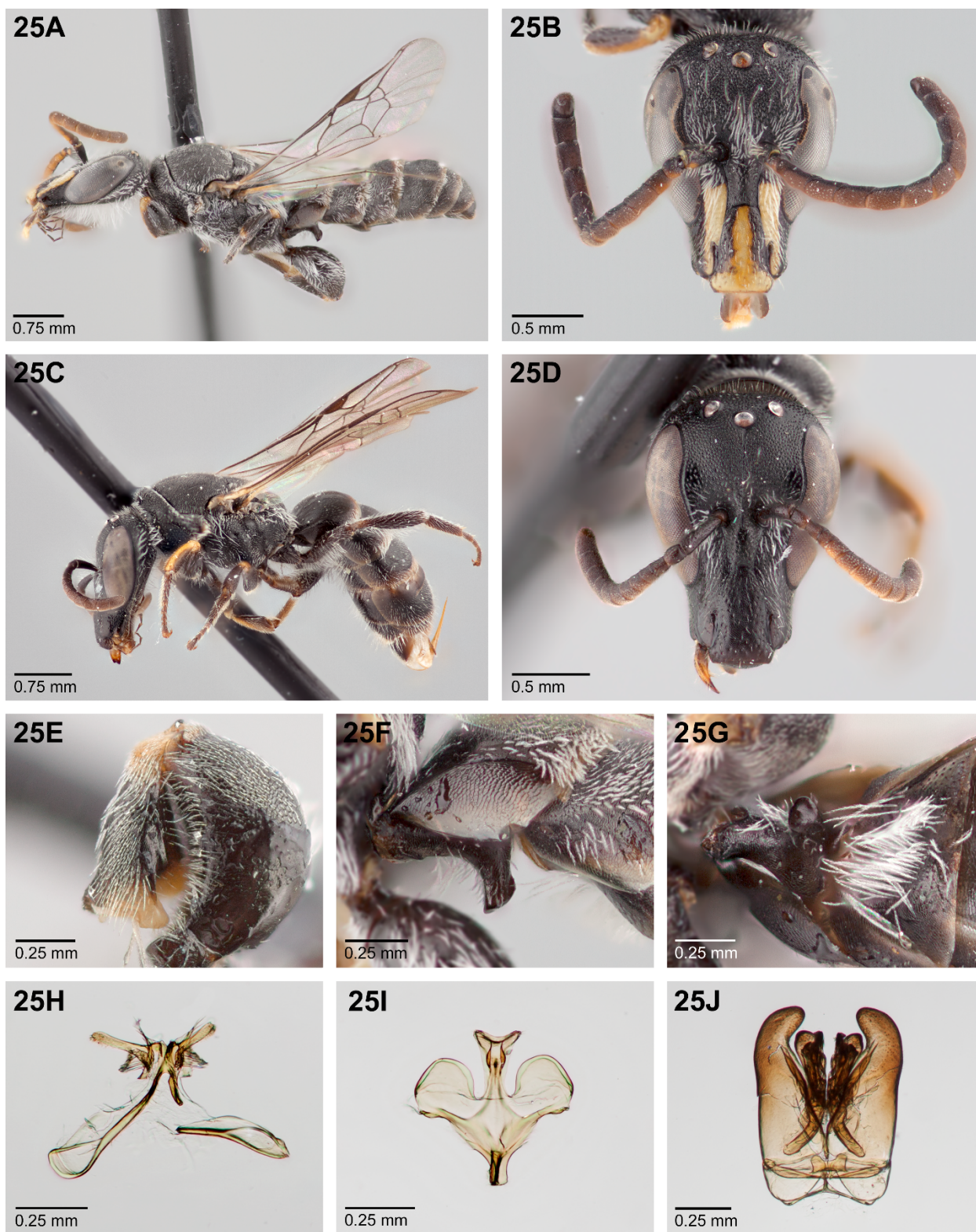


Fig. 25. *Chilicola charizard*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view[†]; (F) male S1 process, lateral view; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) curvapeligrosa* Monckton sp. nov.**

Figures: Fig. 16A; Fig. 26A-J; Fig. 40.

Type Material: Holotype (male): RM Santiago, Farellones, S 33.36995°, W 70.27856°, 2393m, 31.xii.2008, L. Packer, on *Phacelia*, CHI09-2-3-005 (PCYU). **Allotype** (female): RM Santiago, Farellones, S 33.35627°, W 70.32478°, 2179m, 31.xii.2008, L. Packer, on *Echium vulgare* (PCYU). **Paratypes** (22 males & 15 females): **RM Santiago**: three males and three females, same data as holotype, CHI09-2-3-008, CHI09-2-3-003, CHI09-2-3-006, B09997-B10 Bees of Chile591 // CHI09-2-3-004, CHI09-2-3-001, CHI09-2-3-002 (PCYU); one male, same data as allotype (PCYU); one male, Farellones, S 33.35428°, W 70.3195°, 2295m, 30.xii.2012, L. Packer & R. Smith (PCYU); two males, Farellones, S 33.354°, W 70.317°, 2385m, 1.i.1973, A. Moldenke (PUCV); two males, Farellones, S 33.3535°, W 70.31684°, 2385m, 9.i.2009, L. Packer, CHI09-12-3-004, CHI09-12-3-003 (PCYU); two males and two females, Valle Nevado, S 33.34111°, W 70.29497°, 2596m, 9.i.2009, L. Packer, CHI09-10-2-008, CHI09-10-2-009, CHI09-10-2-011, CHI09-10-2-010 (PCYU); four males and three females, Valle Nevado, S 33.3622°, W 70.25764°, 2677m, 31.xii.2008, L. Packer, on *Phacelia* (PCYU); one male and one female, Valle Nevado, S 33.856°, W 69.98037°, 3000m, 8.i.2009, L. Packer, CCDB-03755 G03 // CHI09-10-2-004, CCDB-03755 H02 // CHI09-10-2-003 (PCYU); two males and one female, Cerro Roble, nr. Til-til, S 32.976°, W 71.014°, 2200m, 17.xi.2001, L. Packer (PCYU); one male, same data, CCDB-03755 F09 (PCYU); two males and one female, Río Yeso, Hwy G-455 km 18.1, S 33.69422°, W 70.11203°, 2337m, 27.ii-22.iii.2013, S. Monckton & J. Postlethwaite, pan trap (PCYU); one female, same data as allotype, CHI09-2-2-017 (PCYU); Farellones, S 33.22077°, W 70.16333°, 2464m, 31.xii.2008, L. Packer (PCYU); one female, Termas del Plomo, S 33.62085°, W 69.91956°, 2337m, 31.xii-7.i.2013, L. Packer & R. Smith, pan trap, CCDB-19991 C04 (PCYU); **Region VII**: one male and one female, Río Teno, Paso Vergara control post, S 35.13807°, W 70.47831°, 1789m, 28.ii-21.iii.2013, S. Monckton & J. Postlethwaite, pan trap (PCYU).

Etymology: The specific epithet is a nounphrase inspired by the signs encountered on the road leading to the type locality, and refers to the hairpin turns used achieve high elevation. It is to be treated as a noun in apposition.

Diagnosis: Males are diagnosable by the combination of S1 process in lateral view having a rounded anterior apical angle, malar space subequal to or slightly shorter than the clypeal lateral, and first flagellomere no longer than wide. Females are diagnosable by the combination of malar space subequal in length to the clypeal lateral (0.9-1x) and the following leg colouration, with the following parts brown: apicodorsal spot on mesotibia, apicodorsal rim of metafemur, basodorsal spot on metatibia.

Description: Male (Holotype): Length 5.7mm, forewing length 3.5mm, head width 1.2mm, thorax width 1.2mm, median ocellar diameter (OD) 0.13mm.

Colouration: Black-brown with following parts yellow: labrum; clypeus except broadly dark brown along epistomal suture, with apical margin yellow along entire width; lower paraocular area, extending ~1OD above transverse portion of epistomal suture medially, further laterally but not reaching lower tangent of antennal socket; apicoventral surface of scape; posterior apical rim of protrochanter; apex of profemur broadly on anterior surface, narrowly on posterior surface; dorsal surface of protibia, including dorsal half of anterior face; anterior spot on tegula; narrow apical ring on mesofemur; basal and apical ring of mesotibia, the latter extending to cover apical half of anterodorsal surface; apicodorsal rim of metafemur; ventral surface of metatibia, as well as dorsal surface in basal quarter, and narrowly yellow apically, except broad around apical lamina and posterior concavity; basal half of metabasitarsus ventrally; apex of T7. Following parts orange-brown: ventral surface of antenna from apical half of pedicel to terminal flagellomere, narrowing basad on pedicel and F1; ventral surface of mesobasitarsus. Apicoventral rim of metacoxa and metatrochanters translucent yellow. Apical half of prodistitarsus brown. Metasoma black, T1-T6 with yellow-orange marginal zones to translucent margins.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard long and dense (0.5-3OD) longest at midlength; mesoscutum mostly bare with few short

hairs (0.5OD), moderately long and moderately dense toward lateral margin (0.5-1OD); long and moderately dense toward lateral and posterior margins of scutellum (1-2OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 2OD$); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); T1-T2 apicolateral hair patches tomentose (0.5-1OD) and T3 apical hair bands evenly sparse; S2 with hair long and dense (1.5OD basad, 1OD distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), sparse medially ($i=2-3d$); lower paraocular area with punctures moderately dense ($i=1-2d$); supraclypeal area with punctures moderately dense ($i=1-2d$); frontal area with punctures very dense ($i\leq 0.5d$), dense around ocelli ($i\leq d$), and moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures dense ($i\leq d$); punctures shallow and moderately dense on scape ($i=1-2d$), denser apicoventrally ($i\leq d$); genal area striate with punctures dense ($i\leq 2d$); hypostomal area rough, weakly imbricate with punctures dense ($i=d$); pronotum with punctures moderately dense ($i=1-2d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$), sparser laterad ($i=1-2d$), crowded around median line ($i\leq d$); scutellum with punctures moderately dense ($i=1-2d$), crowded around median line ($i\leq d$); mesepisternum with punctures irregularly spaced, sparse below scrobe ($i=2-3d$), more sparse anterior of episternal suture ($i\geq 3d$), impunctate immediately dorsad of scrobe, otherwise with irregularly spaced punctures on hypoepimeral area ($i=1-3d$); metanotum with punctures moderately dense ($i=1-2d$), crowded on median line and anteriorly ($i\leq 0.5d$); metepisternum with punctures dense ($i\leq d$) and distinctly striate anterodorsally; metapostnotum rugose; propodeum coarsely imbricate with punctures moderately dense ($i=1-2d$); T1-T5 coarsely imbricate with punctures moderately dense ($i\leq 2d$); T6 coarsely imbricate posteriorly, with punctures moderately dense ($i=1-2d$); T7 punctures moderately dense ($i=1-3d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum $\sim 2.4x$ wider than long (22:9); length of malar space subequal to that of clypeal lateral (7:7.5); LOT crossing through anterior tentorial pits; clypeus $\sim 1.1x$ longer than maximum width in frontal view (31:28), extending for half its length beyond LOT, and in lateral view bulging above anterior tentorial pit ($\sim 1OD$); median longitudinal groove on clypeus present in dorsal half, absent ventrad; subantennal sutures $\sim 1.1x$ longer than the shortest distance between them (15:13.5); IAD nearly double AOD (12.5: 6.5); scape $\sim 2.5x$ longer than maximum

width (23:9); pedicel as long as wide (8:8); F1 as long as wide (8.5:8.5); F2 ~1.4x longer than F1, and slightly shorter than F3 (12:12.5); UOD ~1.4x LOD, IOD ~1.1x UOD (UOD:IOD:LOD - 48:52:34); frontal line carinate between antennal bases for a length less than 0.5OD, bare just below median ocellus for a length of ~1OD, and otherwise undefined; MOC subequal to width of head (84:85); OOC two-thirds IOC (12:18); genal area approximately half as wide as eye in lateral view (16:30); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 58:21:11:17; probasitarsus ~3.4x longer than wide (22:6.5); prodistitarsus ~0.9x as long as preceding three tarsomeres combined (from base to apex- 6:5:4.5:14); metafemur ~1.7x longer than maximum depth (65:38); summit of metatibial ventral convexity nearly perpendicular to apex; metatibia less than twice as long as maximum depth (51:28); in apical view length of metatibial apical lamina ~1.1x median ocellar diameter (10:9), broad and thick; metatibia with posterior carina black and broadly rounded, ventral carina yellow and rounded; metabasitarsus 3.7x longer than maximum depth (37:10); S1 process with a longitudinal median ridge on apical surface, in lateral view with anterior and posterior margins subparallel apically, and median ridge projecting posteriorly from apex. S7 apodemal arm with sclerotized margin terminating mesolaterad; ventral lobe narrow, almost linear; dorsal lobe roughly triangular, wide at base narrowing to apex, with row of setae long basally and shorter apically; apical disc distinctly emarginate. S8 lateral process produced anteriorly, basolateral margin dully pointed, anteromedial sclerotized margin wide and following marginal contour. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance less than width of lateral tubercle.

Female (Allotype): Length 5.0mm, forewing length 3.0mm, head width 1.0mm, thorax width 1.1mm, median ocellar diameter (OD) 0.10mm.

Colouration: Black to black-brown except as follows: mandible with yellow basal spot, translucent yellow in apical half except apex translucent brown. Following parts brown: apicoventral margin of pedicel; apicodorsal spot on mesotibia; apicodorsal rim of metafemur; basodorsal spot on metatibia. Following parts yellow-brown: ventral surface of antenna from F3 to terminal flagellomere, flagellomeres suffused with darker brown basally; posterior surface of mesobasitarsus. Following parts yellow: dorsal surface of protibia; apical two-thirds of

prodistitarsus; anterior spot on tegula; narrow basal ring on mesotibia. Metasoma brown, T1-T5 with yellow marginal zones to translucent yellow margins.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard sparse (0.5-2OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), more dense and short toward lateral margin (0.5OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; moderately long and dense on dorsolateral angle of propodeum (0.5-1OD); metafemur and metatibia with scopae (1-1.5OD); T1-T2 apicolateral hair patches tomentose (0.5-1OD) and T3 apical hair bands evenly sparse; long and moderately dense on S1 ($\leq 2.5OD$); S2 with corbiculate scopa (1-2.5OD).

Surface sculpture: As in male except as follows: lower paraocular area with punctures moderately dense ($i=d$); frontal area with punctures dense ($i \leq d$), moderately dense around ocelli ($i=1-2d$); punctures moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures moderately dense ($i=1-2d$); punctures shallow and moderately dense on scape ($i=1-2d$); genal area very weakly imbricate with punctures moderately dense ($i=1-2d$); hypostomal area glabrous apically, with punctures moderately dense ($i=1-2d$); mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures dense ($i=0.5-1d$); mesepisternum with punctures irregularly spaced, sparse below scrobe and anterior of episternal suture ($i \geq 3d$), impunctate immediately dorsad of scrobe, otherwise with irregularly spaced punctures on hypoepimeral area ($i=1-3d$); metanotum with punctures moderately dense ($i=0.5-2d$); metapostnotum rugose; T1-T5 with punctures small and sparse ($i \geq 2d$); T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum $\sim 2.3x$ wider than long (21.5:9.5); length of malar space $\sim 0.9x$ that of clypeal lateral (6.5:7.5); LOT crossing through anterior tentorial pits; clypeus slightly longer than maximum width in frontal view (29:27), extending for half its length beyond LOT, and in lateral view bulging above anterior tentorial pit as in male; median longitudinal groove weak on clypeus; subantennal sutures $\sim 1.1x$ longer than the shortest distance between them (13.5:12); IAD 1.5x AOD (12:8); scape $\sim 3.2x$ longer than maximum width (21:6.5); pedicel $\sim 1.33x$ longer than wide (8:6); F1 slightly longer than wide (6.5:6); F2 $\sim 0.75x$ as long as F1 (5) and $\sim 0.8x$ as long as F3 (6); UOD $\sim 1.3x$ LOD, IOD $\sim 1.1x$ UOD (UOD:IOD:LOD - 45:49:34); frontal line carinate in lower half, flat above; MOC longer than width of head (80:74); OOC $\sim 0.7x$ IOC (12:17.5); genal area about two thirds as wide as eye in lateral view (17:25); ratio of lengths of

mesoscutum: scutellum: metanotum: metapostnotum – 53:20:9:14; probasitarsus ~3.1x longer than wide (20:6.5); prodistitarsus ~1.2x as long as preceding three tarsomeres combined (from base to apex - 5:4:3:14); metafemur 2.75x longer than maximum depth (44:16); metatibia ~4.2x longer than maximum depth (55:13); metabasitarsus 4x longer than maximum depth (34:8.5).

Variation: Some males have the apical margin of the clypeus brown laterad. Some females have the apicoventral margin of F1 and F2 brown or yellow-brown, and/or a yellow-brown or brown spot on the lower paraocular area below the anterior tentorial pit.

Distribution & Habit: Farellones (RM Santiago) south to Paso Vergara (Region VII), also known from Cerro Roble (RM Santiago); 1789-3000m a.s.l. Collected on *Echium vulgare* L. (3 records) and *Phacelia* Juss. (7 records). Recorded November to February.

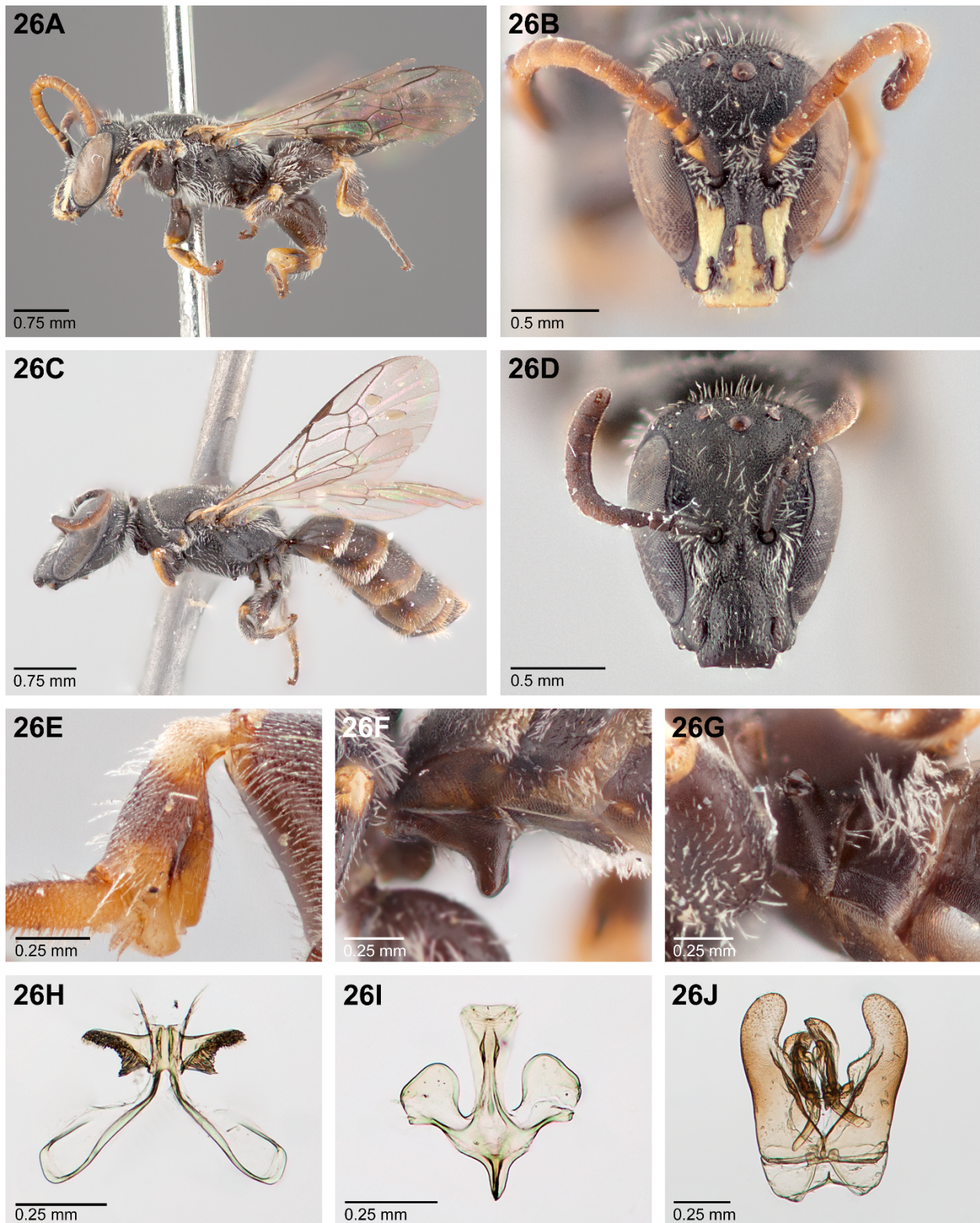


Fig. 26. *Chilicola curvapeligrosa*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view[†]; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view[†]; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) deserticola* Toro & Moldenke, 1979**

Chilicola deserticola Toro & Moldenke, 1979: 113, 121-122, 172. Packer, 2008: 77.
Montalva & Ruz, 2010: 28. Moure et al., 2012. Ascher & Pickering, 2015.

Figures: Fig. 7B; Fig. 8B; Fig. 9B; Fig. 10A; Fig. 11A; Fig. 12B; Fig. 21C; Fig. 23B; Fig. 27A-J; Fig. 40.

Material studied (32 males & 15 females): **Holotype** (male): Region IV, Pueblo Hundido (but see comments), $S\ 30.063^\circ$, $W\ 70.491^\circ$, 1031m, x.1972, L. Ruz, on *Heliotropium stenophyllum* (AMNH). **Region IV:** Paratype male, same data as holotype (AMNH); one female, same data as holotype, V. Cabezas (AMNH); one male, Los Vilos, Caleta Los Lobos, $S\ 31.949^\circ$, $W\ 71.526^\circ$, 11m, 26.x.2001, Packer & Fraser (PCYU); one male, Coquimbo Prov. 4km. S. Socos, $S\ 30.745^\circ$, $W\ 71.528^\circ$, 201m, 22.ix.1966, M.E. Irwin (BBSL); one male, P.N. Fray Jorge Entrance, $S\ 30.627^\circ$, $W\ 71.663^\circ$, 282m, 7.x.2001, L. Packer (PCYU); one male, Qda Los Litres SW of Tongoy, inland rd. $S\ 30.323^\circ$, $W\ 71.526^\circ$, 16m, 26.x.2001, Packer & Fraser (PCYU); four males, Puerto Aldea nr. Tongoy, $S\ 30.301^\circ$, $W\ 71.606^\circ$, 9m, 26.x.2001, Packer & Fraser (PCYU); three males, Bahía Tongoy, S. of Tongoy, $S\ 30.272^\circ$, $W\ 71.483^\circ$, 25m, 8.x.2001, Packer & Fraser (PCYU); one male, same data, CCDB-22789 D05 (PCYU); one male, W. of Barrancas, $S\ 30.214^\circ$, $W\ 71.329^\circ$, 337m, 10.x.2000, L. Packer (PCYU); one male, Guanaqueros, $S\ 30.198^\circ$, $W\ 71.422^\circ$, 22m, 7.x.1982, H. Toro (PUCV); one male, La Serena, $S\ 29.906^\circ$, $W\ 71.250^\circ$, 20m, 28.xii.1988, L. Ruz E. (PUCV); one male, Pr. Coquimbo, Carretera Pan-Am al norte de La Serena, 1970-72, A.R. Moldenke, INT. BIOL. PROGRAM #47128 (PUCV); one male, same data, on *Cistanthe grandiflora* (PUCV); one male and one female, Q. Los Choros, $S\ 29.343^\circ$, $W\ 71.155^\circ$, 232m, 11.x.1977, V. Cabezas (AMNH); one male, Prov. Coquimbo, Río Los Choros, $S\ 29.343^\circ$, $W\ 71.155^\circ$, 232m, 6.xi.1956, Wagenknecht (PUCV); one male and one female, Dunes, Los Choros, $S\ 29.313^\circ$, $W\ 71.294^\circ$, 145m, 13.ix.2010, L. Packer, B09857-A09 Bees of Chile293, B09857-B01 (PCYU); one male and one female, Choros Bajos, $S\ 29.291^\circ$, $W\ 71.309^\circ$, 57m, 12.x.1977, H. Flores, PUCV-ENTO 19926, PUCV-ENTO 19930 (PUCV); four females, same data (AMNH); one female, Incahuasi, $S\ 29.22814^\circ$, $W\ 71.01387^\circ$, 779m, 1.x.1982, De la Hoz (PUCV); **Region III:** seven males, SE of Los Choros, $S\ 29.30518^\circ$, $W\ 71.28362^\circ$, 280m,

13.ix.2010, L. Packer (PCYU); one female, Caleta Apolillado, S 29.1826°, W 71.48815°, 18m, 8.xi-13.xii.2013, S. Monckton & J. Postlethwaite (PCYU); one female, Caleta Carrizalillo, S 29.10981°, W 71.4613°, 11m, 13.x-08.xi.2013, J. Postlethwaite & S. Monckton (PCYU); one female, same locality, 8.xi.2013, S. Monckton, pan trap, CCDB-19989 C05 // PCYU 0021691 (PCYU); one male, Huasco prov., Carrizalillo, S 29.09911°, W 71.39117°, 179m, 20.ix.2003, A. Ugarte, B10037-H8 Bees of Chile756 (PCYU); one female, Caleta Chañaral de Aceituna, S 29.09°, W 71.467°, 8m, 18.ix.2003, L. Packer (PCYU); one male and one female, E of Carrizalillo, C-500, km 53.3, S 28.99822°, W 71.37874°, 208m, 8.xi-13.xii.2013, S. Monckton & J. Postlethwaite (PCYU); one female, Huasco prov., Chañaral de Aceituno, S 28.95342°, W 71.34719°, 271m, 18.ix.2003, A. Ugarte, B10037-H11 Bees of Chile759 (PCYU).

Diagnosis: Males are diagnosable by the combination of malar space short ($<0.5\times$ clypeal lateral), mesobasitarsus mostly yellow, and metatibia with the combination of ventral carina entire and toothed, posterior carina reduced originating in distal half of ventral carina, and apical lamina reduced ($\sim 0.5OD$ in length). Females are diagnosable by the combination of the malar space short ($\sim 0.4\times$ clypeal lateral), frontal area without longitudinal depressions which partially accommodate the scape, and clypeal punctures evenly distributed and moderately dense throughout ($i=1-2d$). Among consubgenera, *C. mantagua* is most similar, but can be differentiated in both sexes by the characters given in the key.

Description: Male: Length 4.3-5.5mm, forewing length 2.7-3.3mm, head width 1.0-1.2mm, thorax width 1.0-1.3mm, median ocellar diameter (OD) 0.10-0.12mm.

Colouration: Black-brown with following parts yellow: labrum; clypeus except narrowly dark along epistomal suture near anterior tentorial pit, and apical margin usually brown laterad; lower paraocular area extending $\sim OD$ above transverse portion of epistomal suture medially, further laterally and nearly reaching lower tangent of antennal socket; apicoventral surface of scape; apical third of profemur on anterior surface, apical quarter on posterior surface; protibia except dark medioventrally; protarsus; anterior spot on tegula; broad apical ring on mesofemur, wider anteriorly; broad basal and apical rings on mesotibia, expanded to basal and apical third or continuous on dorsal margin; mesobasitarsus ventrally to entirely; wide apical ring on metafemur; basal quarter and apical quarter of metatibia, apical colouration extending to summit

of ventral convexity; metabasitarsus ventrally, and at least basal third dorsally. Following parts yellow-brown: apicoventral surface of pedicel; ventral surface of antenna from F1 to terminal flagellomere, narrowing basally on F1; posterior apical rim of protrochanter; apical third of mesodistitarsus. Apicoventral rim of metacoxa and metatrochanter brown. Metasoma dark brown, T1-T7 with marginal zones yellow-brown to translucent margins.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard long and dense (0.5-2OD) longest at midlength; mesoscutum mostly bare with few short hairs (0.5OD), moderately long and moderately dense toward lateral margin (0.5-1OD); long and moderately dense toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum (≤ 2 OD); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hair long and dense (1.5OD basad, 0.5OD distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense throughout ($i=1-2d$); lower paraocular area with punctures dense ($i=d$); supraclypeal area with punctures moderately dense ($i=1-2d$), dense toward lateral margins ($i\leq d$); frontal area with punctures very dense ($i\leq 0.5d$), dense around ocelli ($i\leq d$), moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures dense ($i\leq d$); punctures shallow and moderately dense on scape ($i=1-2d$), denser apicoventrally ($i\leq d$); genal area striate with punctures moderately dense ($i=1-2d$); hypostomal area weakly imbricate with punctures dense ($i=d$); pronotum with punctures dense ($i=0.5-1d$) lateral surface coarsely imbricate; mesoscutum with punctures moderately dense ($i=1-2d$), crowded around median line ($i\leq d$); scutellum with punctures moderately dense ($i=1-2d$), crowded around median line ($i\leq d$); mesepisternum with punctures irregularly spaced, sparse below scrobe and anterior of episternal suture ($i=1-3d$); punctures irregularly spaced on hypoepimeral area ($i\leq 3d$); metanotum with punctures dense ($i=0.5-1d$), crowded on median line and anteriorly ($i\leq 0.5d$); metepisternum with punctures dense ($i\leq d$), distinctly striate anterodorsally; metapostnotum rugose, minutely rugose and weakly sculptured posteriorly; propodeum coarsely imbricate with punctures moderately dense ($i=1-2d$); T1-T5 coarsely imbricate; T1-T3 with punctures moderately dense ($i\leq 2d$); T4 moderately punctate ($i=1-3d$); T5 sparsely punctate ($i\geq 2d$); T6 coarsely imbricate posteriorly,

and sparsely punctate ($i \geq 2d$); T7 moderately sparsely punctate ($i \geq 2d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum 3x wider than long (21:7); length of malar space $\sim 0.3x$ that of clypeal lateral (2:7); LOT crossing below anterior tentorial pits; length of clypeus subequal to maximum width in frontal view (29:28), extending for approximately one third of its length beyond LOT; clypeus without median longitudinal groove; subantennal sutures $\sim 1.15x$ longer than the shortest distance between them (14:12); IAD 1.6x AOD (12:7.5); scape $\sim 2.5x$ longer than maximum width (22:9); pedicel shorter than wide (7:8); F1 shorter than wide (6.5:8.5); F2 $\sim 1.4x$ longer than F1, and subequal in length to F3 (9:9.5); UOD $\sim 1.5x$ LOD, IOD $\sim 1.1x$ UOD (UOD:IOD:LOD - 48:52:33); frontal line carinate in lower half, flat above; MOC shorter than width of head (79:84); OOC $\sim 0.67x$ IOC (12:18); genal area $\sim 0.67x$ as wide as compound eye in lateral view (18:28); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 56:20:11:14; probasitarsus 4x longer than wide (20:5); prodistitarsus 0.8x as long as preceding three tarsomeres combined (from base to apex - 6:5:4:12); metafemur $\sim 1.75x$ longer than maximum depth (60:34); summit of metatibial ventral convexity situated at approximately two-thirds of its length; metatibia $\sim 2.2x$ longer than maximum depth (54:25); in apical view apical lamina of metatibia reduced, length $\sim 0.5x$ median ocellar diameter (4:9), short and thick; metatibia with ventral carina black and with a dull tooth, posterior carina reduced and originating distad of tooth on ventral carina; metabasitarsus 3.4x longer than maximum depth (34:10); S1 process with apical surface longitudinally concave, in lateral view with anterior and posterior margins convergent apically. S7 apodemal arm with sclerotized margin terminating mesolaterad; ventral lobe narrow, almost linear; dorsal lobe strap-like, roughly parallel-sided, with basal tuft of long setae and a short apical row, midlength bare; apical disc sinuate. S8 lateral process with basolateral margin rounded, anteromedial sclerotized margin following marginal contour. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance $\sim 2x$ width of lateral tubercle.

Female: Length 4.5-5.0mm, forewing length 2.4-3.0mm, head width 0.9-1.0mm, thorax width 1.0-1.2mm, median ocellar diameter (OD) 0.09-0.11mm.

Colouration: Black to black-brown except as follows: mandible with yellow basal spot, otherwise translucent yellow to yellow except apex translucent brown. Following parts brown:

apicoventral margin of pedicel, F1; posterior apical rim of metatibia (yellow-brown on some specimens). Following parts yellow: apicoventral surface of F2; ventral surface of antenna from F3 to terminal flagellomere, suffused with yellow-brown basally; dorsal surface of protibia, and narrow basal and apical rings; probasitarsus; apical two-thirds of prodistitarsus; wide basal ring and narrow apical ring on mesotibia; mesobasitarsus ventrally; ventral half of metabasitarsus; apical half of metadistitarsus brown; anterior spot on tegula. Following parts yellow-brown: narrow apical ring on metafemur; wide basal ring on metatibia (yellow on some specimens). Metasoma black, T1-T5 with marginal zone yellow-brown to translucent yellow.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard sparse (0.5-2OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), more dense and short toward lateral margin (0.5OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; metafemur and metatibia with scopae (1-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); long and of medium density on S1 ($\leq 2.5OD$); S2 with corbiculate scopa (1-3OD)

Surface sculpture: As in male except as follows: lower paraocular area with punctures moderately dense ($i=1-2d$); frontal area with punctures dense ($i \leq d$), moderately dense around ocelli ($i=1-2d$); punctures moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures moderately dense ($i=1-2d$); punctures shallow and moderately dense on scape ($i=1-2d$); genal area weakly imbricate, punctures moderately dense ($i=1-2d$); hypostomal area weakly imbricate to glabrous apically, with shallow punctures sparse ($i \geq 2d$); mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures dense ($i=0.5-1d$); mesepisternum with punctures irregularly spaced, sparse below scrobe ($i=2-3d$), sparser anterior of episternal suture ($i \geq 3d$); punctures irregularly spaced on hypoepimeral area ($i \leq 2d$); metanotum with punctures moderately dense ($i=0.5-2d$); metapostnotum rugose or striate-rugose in anterior half, weakly sculptured posteriorly; propodeum moderately densely punctate ($i=1-2d$); T1-T3 moderately punctulate; T4-T5 with punctures small and sparse ($i \geq 2d$); T6 with punctures moderately dense ($i=1-2d$).

Structure: labrum $\sim 2.5x$ wider than long (19.5:7.5); length of malar space $\sim 0.4x$ that of clypeal lateral (3:7); LOT crossing below anterior tentorial pits; clypeus subequal in length to maximum width in frontal view (24:26), extending for less than half of its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures subequal in length to the

shortest distance between them (11.5:11); IAD $\sim 1.6\times$ AOD (11.5:7); scape $\sim 3.33\times$ longer than maximum width (20:6); pedicel longer than wide (8:6.5); F1 subequal in length and width (5.5:5); F2 $\sim 0.67\times$ as long as F1 (3.5) and shorter than F3 (4.5); UOD 1.4x LOD, IOD $\sim 1.05\times$ longer than UOD (UOD:IOD:LOD - 42:45:30); frontal line carinate in lower half, flat above; MOC subequal to width of head (72:69); OOC 0.8x IOC (10:12.5); genal area $\sim 0.6\times$ as wide as eye in lateral view (14:23); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 48:18:9:12; probasitarsus $\sim 3.5\times$ longer than wide (19:5.5); length of prodistitarsus $\sim 0.9\times$ that of preceding three tarsomeres combined (from base to apex - 5:4.5:4:11.5); metafemur $\sim 2.8\times$ longer than maximum depth (39:14); metatibia $\sim 4.5\times$ longer than maximum depth (52:11.5); metabasitarsus $\sim 4.4\times$ longer than maximum depth (31:7).

Distribution & Habit: Mainly coastal from Los Vilos (Region IV) north to Caleta Chañaral de Aceituna (Region III), and inland east to Socos in Region IV, Incahuasi in Region III; 8-779m a.s.l. The type locality is disjunct from the otherwise observed distribution as described here. Collected on *Heliotropium stenophyllum* Hook. & Arn. (3 records) and *Cistanthe grandiflora* (Lindl.) Schldl. (1 record). Recorded September to December.

Comments: The type series (one male holotype & one male paratype) is labeled Atacama, Pueblo Hundido, x.1972, L. Ruz, on *Heliotropium stenophyllum*. Atacama is the name of Region III, thus the locality is interpreted as Diego de Almagro (formerly called Pueblo Hundido), and was indicated as such on a map of type localities by Toro and Moldenke (1979). However, besides the type series, *C. deserticola* has not been collected from further north than Carrizal Bajo, Region III, and *H. stenophyllum* does not occur north of Totoral, Region III (Luebert 2013), while Diego de Almagro is located 1.1° latitude further north than Totoral and in a different biogeographic region (Peña 1966, O'Brien 1971, Artigas 1975). In contrast, Pueblo Hundido is also the name of a village in Region IV (Coquimbo) to the southeast of Vicuña (COPEC 2012, Sernatur 2012); a road sign marks its location at approximately S 30.0629° W 70.4911° (Google Earth 2013). This village is within the range of *H. stenophyllum* (Luebert 2013) and is the apparent provenance of a specimen collected on that host plant species, labeled Coquimbo, Pueblo Hundido, x.1972, V. Cabezas. Specimen records show that Ruz, Toro, Neff, and Cabezas traveled together in September/October 1972 (see Appendix E); to collect near

Diego de Almagro in October of that year would have been inconsistent with their pace and pattern of travel. Moreover, regional mislabeling for locality names that occur in multiple regions is known for the Toro and PUCV collections (L. Ruz, personal communication) where the type material was originally held. Following these considerations, I believe the type locality to be misattributed, and have adjusted it to the village in Region IV accordingly.

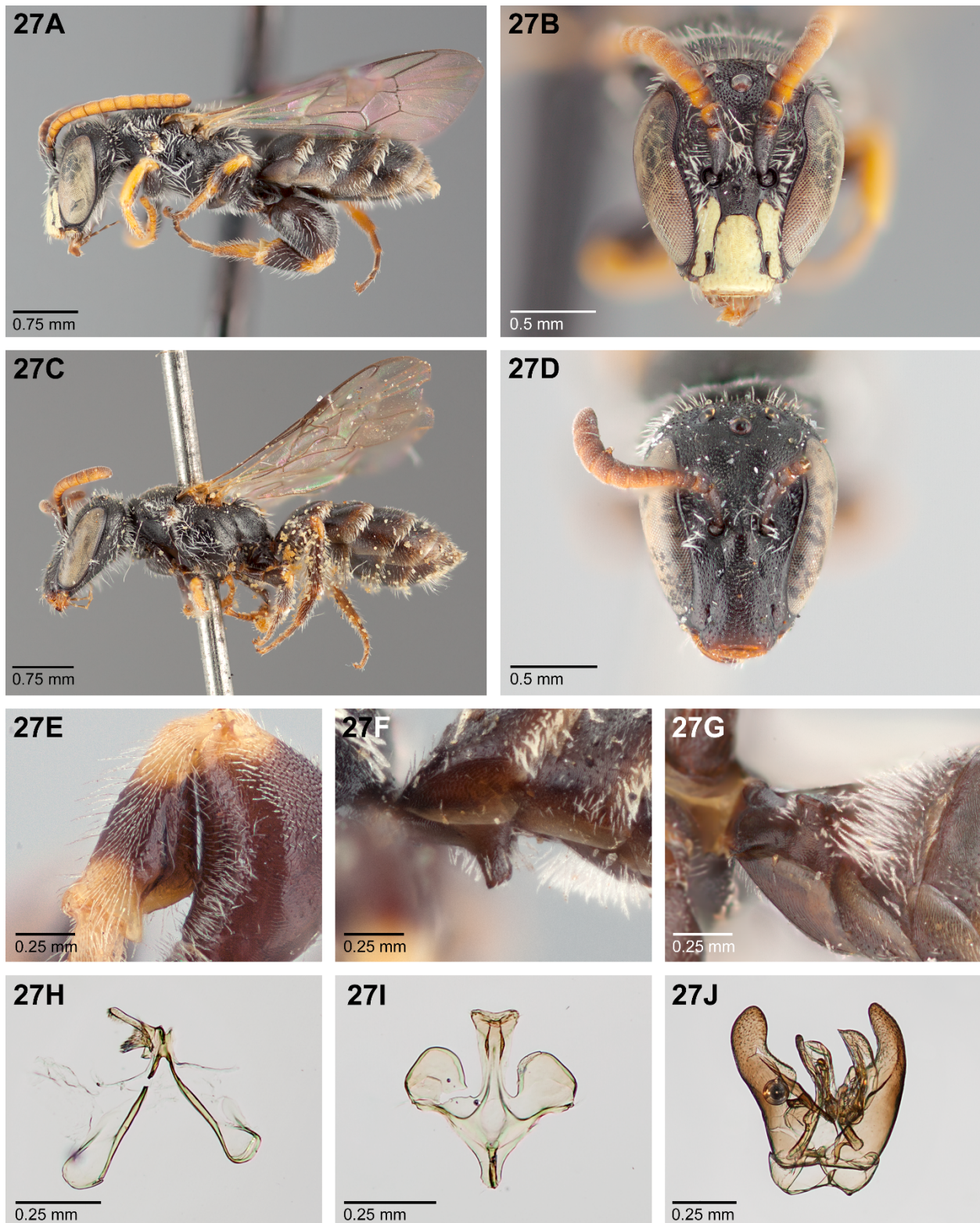


Fig. 27. *Chilicola deserticola*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) diaguia* Toro & Moldenke, 1979**

Chilicola diaguia Toro & Moldenke, 1979: 113-114, 116-117, 124, 170. Packer, 2008: 77. Montalva & Ruz, 2010: 28. Moure et al., 2012. Ascher & Pickering, 2015.

Figures: Fig. 7A; Fig. 8A; Fig. 14A; Fig. 28A-J; Fig. 40.

Material studied (12 males & 9 females): **Holotype** (male): Region IV, La Serena, S 29.906°, W 71.250°, 20m, 28.ii.1956, Moure (AMNH). **Allotype** (female): same locality as holotype, 20.iii.1952, Wagenknecht (AMNH). **Region IV**: one male and one female, Los Molles, S 30.74958°, W 70.64864°, 1147m, 12.X.2013, S. Monckton, CCDB-19989 B01 // PCYU 0021675 (PCYU); one female, Las Breas, S 30.369°, W 70.613°, 1622m, 23.ix.1980, H. Toro (AMNH); four males, Elqui: 16 km south Pisco, S 30.248°, W 70.495°, 1811m, 26.x.1992, A. Sharkov (AMNH); one male, El Pangue, S 30.1677°, W 70.6627°, 1711m, x.1972, H. Toro (PUCV); one male and one female, Cuesta Buenos Aires, S 29.56237°, W 71.25304°, 518m, 13.x-8.xi.2013, S. Monckton, pan trap, CCDB-22789 D07, CCDB-22789 D10 (PCYU); one male, same locality and collector, 8.xi.2013, CCDB-19989 B09 // PCYU 0021683 (PCYU); one male, El Tofo, S 29.442°, W 71.252°, 631m, x.1972, L. Ruz, on *Flourensia* (PUCV); four females, Q. Los Choros, S 29.343°, W 71.155°, 232m, 12.x.1977, V. Cabezas (PUCV); one male, Choros Bajos, S 29.291°, W 71.309°, 57m, 12.x.1977, H. Flores (PUCV); one female, same data, coll. Magunacelaya (PUCV); one male, same locality, x.1977, De La Hoz (PUCV).

Diagnosis: Males are diagnosable by the combination of malar space 1.5-1.6x longer than the clypeal lateral, apical surface of the S1 process weakly longitudinally concave, and LOT just tangent to or above the anterior tentorial pits. Females are diagnosable by the combination of protibia with yellow colouration on dorsal surface only in basal half, malar space 1.4-1.6x longer than the clypeal lateral, and LOT just tangent to or above the anterior tentorial pits. Shorter-faced individuals of both sexes may be confused with *C. vina* and are best distinguished by the position of the LOT as above. Males of *C. diaguia* additionally have the S8 anteromedial sclerotized margin wide and subparallel to margin throughout, not swollen as in *C. vina*.

Description: Male: Length 6.0-6.7mm, forewing length 3.5-4.2mm, head width 1.2-1.4mm, thorax width 1.3-1.5mm, median ocellar diameter (OD) 0.13-0.15mm.

Colouration: Black-brown with following parts yellow: labrum except apical margin; inverted T to funnel shape on clypeus, with apical margin dark laterad; lower paraocular area, extending <1OD above transverse portion of epistomal suture medially, further laterally but not reaching lower tangent of antennal socket; apicoventral spot on scape; apicoventral surface of pedicel; posterior apical rim of protrochanter; apex of profemur broadly on anterior surface, narrowly on posterior surface; dorsal surface of protibia, including dorsal half of anterior face; faint anterior spot on tegula; narrow apical ring on mesofemur; narrow basal ring and apicodorsal spot on mesotibia; wide basal ring on metatibia, as well as apical quarter in ventral half only; basal third of metabasitarsus ventrally. Ventral surface of antennal flagellum yellow-brown, narrowing basally on F1, with F11 brown. Apical third of prodistitarsus brown. Metasoma black, T1-T7 with marginal zone translucent yellow.

Pubescence: White hairs generally short and sparse, not especially plumose; long and moderately dense on lower paraocular area and around antennal base (1.5-2OD); genal beard long and moderately dense (0.5-2OD) longest at midlength; mesoscutum sparsely covered in moderate hairs (0.5-1OD), denser toward lateral margin (0.5-1OD); long and moderately dense toward lateral and posterior margins of scutellum (1-2OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq$ 2OD); moderately long and dense on dorsolateral angle of propodeum (0.5-2OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hair long and dense (1.5OD basad, 1OD distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), sparse medially ($i=2-3d$); lower paraocular area with punctures moderately dense ($i=1-2d$); supraclypeal area with punctures irregularly spaced ($i=1-3d$), dense toward lateral margins ($i\leq d$); frontal area with punctures very dense ($i\leq 0.5d$); punctures dense on ocellocular space adjacent to compound eye ($i\leq d$), impunctate immediately adjacent to lateral ocellus; vertexal area rugose with punctures very dense ($i\leq 0.5d$); punctures shallow and moderately dense on scape ($i=1-2d$), denser apicoventrally ($i\leq d$); genal area striate with punctures moderately dense ($i=1-2d$); hypostomal area glabrous apically, with punctures sparse ($i=1-3d$); pronotum with punctures dense ($i=0.5-1d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$), crowded on median line ($i\leq 0.5d$); scutellum with punctures dense ($i\leq d$); mesepisternum with punctures

irregularly spaced, moderately dense to sparse below scrobe ($i=1-2d$), more sparse anterior of episternal suture ($i=2-3d$), punctures dense on hypoepimeral area ($i\leq d$); metanotum with punctures dense ($i\leq d$); metepisternum with punctures dense ($i\leq d$); metapostnotum rugose, more weakly sculptured in posterior; propodeum coarsely imbricate, rugulose posteriorly, with punctures moderately dense ($i=1-2d$); T1-T6 coarsely imbricate; T1 with punctures sparse basally ($i\geq 2d$), very dense apically ($i\leq d$); T2-T5 with punctures very dense ($i\leq d$) basal depressed area more coarsely sculptured but punctures distinct; T6 with punctures moderately sparse ($i=1-3d$); T7 punctures moderately sparse ($i=1-3d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum $\sim 2.6x$ wider than long (28:11); length of malar space $\sim 1.6x$ that of clypeal lateral (16:10); LOT crossing above anterior tentorial pits; clypeus $\sim 1.25x$ longer than maximum width in frontal view (43:35), extending for more than half of its length beyond LOT; median longitudinal groove present on clypeus but weak apically; subantennal sutures $\sim 1.5x$ longer than the shortest distance between them (23:15); IAD $\sim 1.6x$ AOD (14:9); scape $\sim 2.4x$ longer than maximum width (29:12); pedicel shorter than wide (10:11); F1 shorter than wide (10:11); F2 $1.4x$ longer than F1, and shorter than F3 (14:15.5); UOD $\sim 1.4x$ LOD, IOD $\sim 1.1x$ UOD (UOD:IOD:LOD - 57:63:40); frontal line carinate between antennal bases for a length of $\sim 0.5OD$, bare just below median ocellus for a length of $\sim 1OD$, otherwise roughly defined; MOC $\sim 1.1x$ longer than width of head (111:101); OOC $\sim 0.6x$ IOC (13:21); genal area $\sim 0.6x$ as wide as compound eye in lateral view (20:35); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 75:26:14.5:19; probasitarsus $\sim 3.9x$ longer than wide (31:8); length of prodistitarsus $\sim 0.8x$ that of preceding three tarsomeres combined (from base to apex - 8:6:5:16); metafemur $\sim 1.85x$ longer than maximum depth (84:45); summit of metatibial ventral convexity evenly rounded and nearly perpendicular to apex; metatibia $\sim 1.75x$ longer than maximum depth (61:35); in apical view length of metatibial apical lamina $\sim 0.9x$ median ocellar diameter (10:11), broad and thick; metatibia with posterior carina black and rounded; ventral carina black and toothed; metabasitarsus $4.25x$ longer than maximum depth (51:12); S1 process with apical surface longitudinally concave at least in posterior half, in lateral view with anterior and posterior margins divergent apically, apex appearing anteriorly bent. S7 apodemal arm with sclerotized margin terminating mesolaterad; ventral lobe narrow, almost linear; dorsal lobe strap-like, roughly parallel-sided, with basal tuft of long setae and a short apical row, midlength bare;

apical disc sinuate. S8 lateral process produced laterally, basolateral margin rounded, anteromedial sclerotized margin following marginal contour. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance less than width of lateral tubercle.

Female: Length 5.3-6.6mm, forewing length 3.3-3.5mm, head width 1.1-1.2mm, thorax width 1.2-1.4mm, median ocellar diameter (OD) 0.12mm.

Colouration: Black to black-brown except as follows: mandible with yellow basal spot, translucent yellow in apical half, except apex translucent brown. Following parts brown: apicoventral margin of pedicel, F1 and F2. Following parts variably yellow to yellow-brown: ventral surface of F3-F10, suffused with brown basally; dorsal surface of protibia in basal half; apical half of prodistitarsus; faint anterior spot on tegula; basodorsal spot on mesotibia. Metasoma black, T1-T5 with marginal zone translucent yellow.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard sparse (0.5-2OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), denser toward lateral margins; long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 2OD$); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); metafemur and metatibia with scopae (1-1.5OD); T1-T2 apicolateral hair patches tomentose (0.5-1OD) and T3 apical hair bands evenly sparse; long and moderately dense on S1 ($\leq 2.5OD$); S2 with corbiculate scopa (1-3OD)

Surface sculpture: As in male except as follows: frontal area and ocellocular space with punctures dense ($i \leq d$); vertexal area with punctures dense ($i \leq d$); punctures shallow and moderately dense on scape ($i = 1-2d$); genal area weakly striate, with punctures moderately dense ($i = 1-2d$); hypostomal area weakly imbricate to glabrous apically, with shallow punctures moderately dense ($i = 1-2d$); mesoscutum with punctures dense ($i = 0.5-1d$), crowded on median line ($i \leq d$); scutellum with punctures dense ($i \leq d$); mesepisternum with punctures irregularly spaced, sparse below scrobe ($i = 1-3d$), sparser anterior of episternal suture ($i = 2-3d$), denser on hypoepimeral area ($i \leq 2d$); metanotum with punctures dense ($i \leq d$); metapostnotum rugose, fewer transverse rugae and weakly sculptured posteriorly; propodeum punctures moderately dense

($i=1-2d$); T1 with punctures small and sparse ($i \geq 2d$ basally; $i=1-3d$ apically); T2-T5 with punctures small and sparse ($i=1-3d$ on T2-T3; $i \geq 2d$ on T4-T5); T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum 2.6x wider than long (26:10); length of malar space $\sim 1.4x$ that of clypeal lateral (12:8.5); LOT crossing above anterior tentorial pits; clypeus $\sim 1.3x$ longer than maximum width in frontal view (40:31), extending for more than half of its length beyond LOT; clypeus with median longitudinal groove weakly present at least in dorsal half; subantennal sutures $\sim 1.2x$ longer than the shortest distance between them (17:14); IAD $\sim 1.4x$ AOD (12:8.5); scape $\sim 3.1x$ longer than maximum width (25:8); pedicel longer than wide (9:8); F1 longer than wide (8:7); F2 shorter than F1, and shorter than F3 (5:6); UOD $\sim 1.33x$ LOD, IOD 1.1x longer than UOD (UOD:IOD:LOD - 50:55:37); frontal line carinate in lower third, flat above; MOC $\sim 1.2x$ longer than width of head (99:84); OOC $\sim 0.6x$ IOC (11:19); genal area $\sim 0.65x$ as wide as eye in lateral view (18:28); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 62:23:11:15; probasitarsus $\sim 3.7x$ longer than wide (26:7); length of prodistitarsus $\sim 0.9x$ that of preceding three tarsomeres combined (from base to apex - 6.5:6:4.5:15); metafemur 3x longer than maximum depth (54:18); metatibia $\sim 4.25x$ longer than maximum depth (64:15); metabasitarsus $\sim 4.3x$ longer than maximum depth (41:9.5).

Distribution & Habit: La Serena north to Choros Bajos (Region IV) up to 631m a.s.l. Also known from Los Molles & Las Breas (Region IV), 1147 & 1622m a.s.l. respectively. Collected on *Flourensia* DC. (1 record). Recorded September to November and February to March.

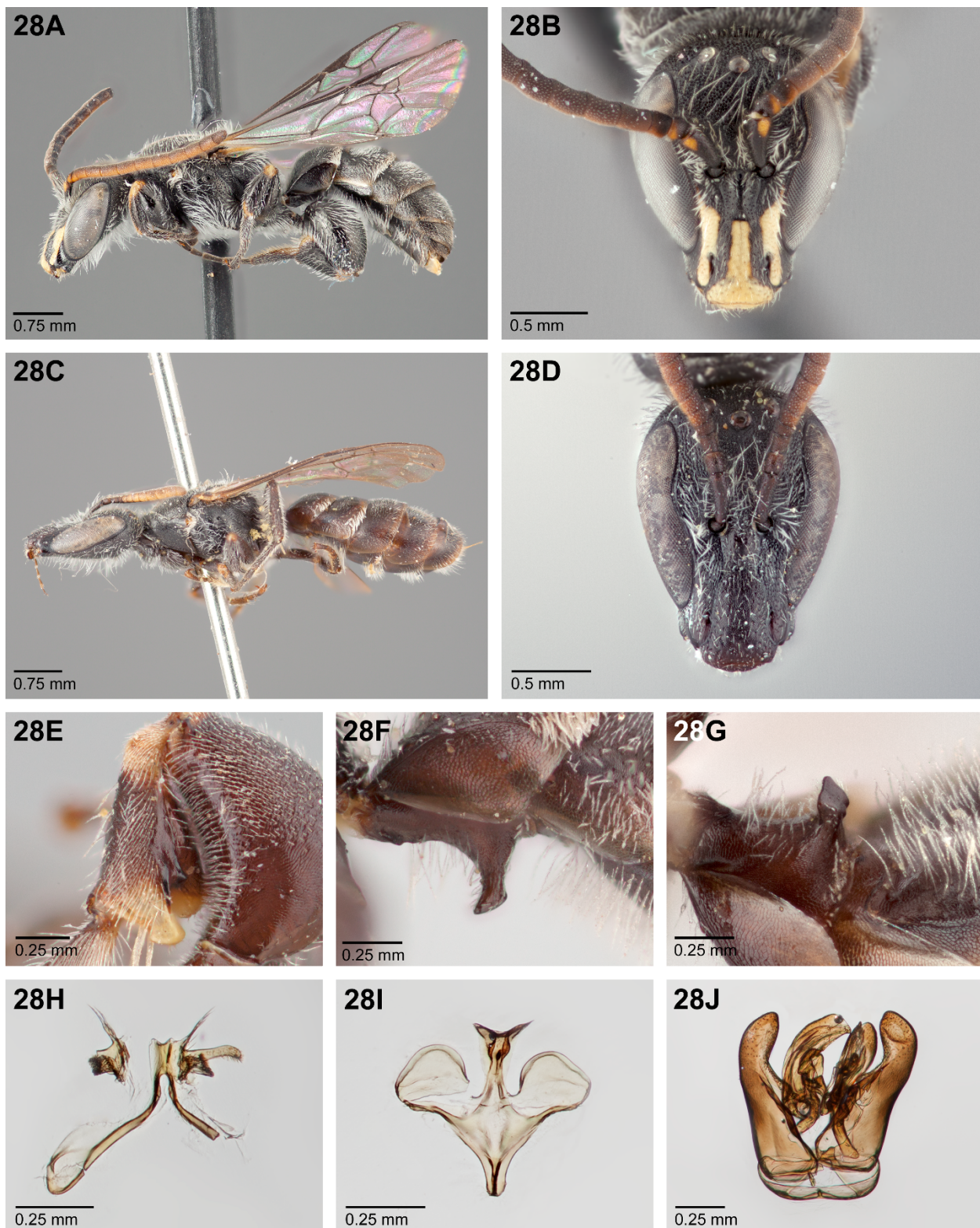


Fig. 28. *Chilicola diaguia*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) erithropoda* Toro & Moldenke, 1979**

Chilicola erithropoda Toro & Moldenke, 1979: 113, 127, 172. Packer, 2008: 77. Montalva & Ruz, 2010: 28. Moure et al., 2012. Ascher & Pickering, 2015.

Figures: Fig. 1B; Fig. 21B; Fig. 22B; Fig. 29A-J; Fig. 40.

Material studied (13 males & 7 females): **Holotype** (male): Region IV, Pueblo Hundido (but see comments), *S* 30.063°, *W* 70.491°, 1031m, x.1972, L. Ruz, on *Heliotropium stenophyllum* (AMNH). **Region IV**: one female, Dunes, Los Choros, *S* 29.31303°, *W* 71.29369°, 145m, 13.ix.2010, L. Packer, B09857-A06 Bees of Chile290 (PCYU); one male, Los Choros, *S* 29.291°, *W* 71.309°, 57m, 25.x.2002, J. Grixti & A. Zayed (PCYU); **Region III**: four males, 11km WNW Choros Bajos, *S* 29.265°, *W* 71.411°, 10m, 14.x.2001, L. Packer (PCYU); one male, same data, CCDB-03755 D02 (PCYU); one female, Caleta Carrizalillo, *S* 29.10981°, *W* 71.4613°, 11m, 8.xi.2013, S. Monckton, pan trap, CCDB-19989 C06 // PCYU 0021692 (PCYU); one male and two females, Huasco prov., Carrizalillo, *S* 29.099°, *W* 71.391°, 179m, 20.ix.2003, A. Ugarte, B10037-H07 Bees of Chile755, B10037-H9 Bees of Chile757, B10037-H10 Bees of Chile758 (PCYU); three males and two females, Caleta Chañaral de Aceituna, *S* 29.09037°, *W* 71.46716°, 10m, 5.x.2010, L. Packer & G.S. Fraser, PCYU 0004648, PCYU 0004662, PCYU 0004658, PCYU 0004656, PCYU 0004666 (PCYU); one male and one female, same data (PUCV); one male, Caleta Chañaral de Aceituna, *S* 29.09°, *W* 71.467°, 8m, 18.ix.2003, L. Packer (PCYU).

Diagnosis: Males are separated - along with *C. travesia* - by the tibiae and tarsi mostly or entirely yellow-orange, and differentiated from the latter by MOC less than 0.95x width of the head, and apical surface of S1 process with a median anterior convexity. Females of *C. erithropoda* and *C. travesia* share the combination of malar space less than 2/3x as long as the clypeal lateral, metatibia expanded (<4x longer than maximum depth), and apex of T3 with apicolateral hair patches tomentose as on T1-T2. Females of *C. erithropoda* are differentiated by the hind tibia mostly dark (at most basal third and narrow apical band yellow) and the probasitarsus mostly yellow-brown to dark brown (at most basal and apical quarter yellow).

Description: Male: Length 5.5-6.8mm, forewing length 3.4-3.9mm, head width 1.3-1.5mm, thorax width 1.3-1.5mm, median ocellar diameter (OD) 0.13-0.15mm.

Colouration: Black-brown except as follows: antenna variable (scape with yellow apicoventral spot to entirely dark; apicoventral surface of pedicel yellow to brown; ventral surface of flagellum yellow to yellow-brown, narrowing basally on F1). Following parts yellow: labrum; clypeus except narrowly dark at mid-length along epistomal suture, and often with apical margin translucent brown laterad; lower paraocular area, extending more than 1OD above transverse portion of epistomal suture medially and reaching lower tangent of antennal socket laterally; posterior apical rim of prothorax; apical third to half of profemur on anterior surface, narrowly on posterior surface; protibia; protarsus; anterior spot on tegula; apex of mesofemur broadly on anterior surface, narrowly on posterior surface; mesotibia; mesobasitarsus variable from brown to yellow; apical half of mesodistitarsus; broad apical ring on metafemur; metatibia; metabasitarsus ventrally, sometimes dorsally in basal half; apex of T7. Apicoventral rim of metacoxa and metatrochanter yellow-brown. Metasoma dark brown, T1-T6 marginal zones yellow-orange to translucent yellow margins.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard long and dense (0.5-2.5OD) longest at midlength; mesoscutum sparsely covered in moderate hairs (1-1.5OD), shorter and denser toward lateral margin (0.5-1OD); long and moderately dense toward lateral and posterior margins of scutellum (1-2OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 2.5OD$); moderately long and dense on dorsolateral angle of propodeum (0.5-2OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hairs moderately long and moderately sparse (1OD basad, 0.5OD distad, bare mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), irregularly spaced in upper half ($i=1-3d$); lower paraocular area with punctures irregularly spaced ($i=1-3d$); supraclypeal area with punctures moderately dense ($i=1-2d$), dense toward lateral margins ($i \leq d$); frontal area with punctures very dense ($i \leq 0.5d$), dense around ocelli ($i \leq d$), moderately dense on ocellocular space ($i=1-2d$); vertexal area with punctures moderately dense ($i=1-2d$); punctures shallow and moderately dense on scape ($i=1-2d$), denser apicoventrally ($i \leq d$); genal area striate

with punctures dense ($i \leq d$); hypostomal area weakly imbricate, with punctures dense ($i \leq d$); pronotum with punctures dense ($i = 0.5-1d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i = 0.5-1d$), crowded around median line ($i \geq 0.5d$); scutellum with punctures moderately dense ($i = 0.5-2d$); mesepisternum with punctures irregularly spaced, sparse below scrobe and anterior of episternal suture ($i = 1-2d$); impunctate just dorsad of scrobe, otherwise with irregularly spaced punctures on hypoepimeral area ($i \leq 2d$); metanotum with punctures dense ($i = 0.5-2d$), crowded on median line and anteriorly ($i \leq 0.5d$); metepisternum with punctures dense ($i \leq d$); metapostnotum rugose, minutely rugose posteriorly; propodeum coarsely imbricate with punctures moderately dense ($i = 1-2d$); T1-T5 coarsely imbricate; T1-T3 with punctures moderately dense ($i \leq 2d$); T4 moderately punctate-puncticulate ($i = 1-2d$); T5 moderately punctate-puncticulate ($i = 1-3d$); T6 coarsely imbricate posteriorly and sparsely punctate-puncticulate ($i \geq 2d$); T7 sparsely punctate-puncticulate ($i \geq 2d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum $\sim 2.5x$ wider than long (28:11); length of malar space $0.4x$ that of clypeal lateral (4:10); LOT crossing below anterior tentorial pits; length of clypeus subequal to maximum width in frontal view (37:37), extending for less than half of its length beyond LOT; clypeus without median longitudinal groove; subantennal sutures $\sim 1.4x$ longer than the shortest distance between them (18:13); IAD $\sim 1.5x$ AOD (11:16); scape $\sim 2.67x$ longer than maximum width (29:11); pedicel as long as wide (9:9); F1 shorter than wide (8.5:9.5); F2 slightly shorter than F1, and shorter than F3 (8:10); UOD $\sim 1.3x$ LOD, IOD $\sim 1.1x$ UOD (UOD:IOD:LOD - 59:64:46); frontal line carinate in lower half, flat above; MOC shorter than width of head (96:105); OOC $\sim 0.5x$ IOC (12:23); genal area $\sim 0.6x$ as wide as compound eye in lateral view (21:36); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 68:26:12:17; probasitarsus $\sim 3.9x$ longer than wide (27:7); length of prodistitarsus $\sim 0.8x$ that of preceding three tarsomeres combined (from base to apex - 8:6:5:15); metafemur $\sim 1.5x$ longer than maximum depth (69:45); summit of metatibial ventral convexity situated at approximately two-thirds of its length; metatibia $\sim 1.67x$ longer than maximum depth (69:42); in apical view length of metatibial apical lamina $\sim 1.1x$ median ocellar diameter (12:11), short and thick; metatibia with posterior carina brown and following contour of ventral carina, the latter widely brown with a dull tooth; metabasitarsus $\sim 3x$ longer than maximum depth (46:15.5); S1 process with apical surface concave posteriorly and convex anteromedially, in lateral view with anterior and

posterior margins divergent apically, apex appearing strongly anteriorly bent. S7 apodemal arm with sclerotized margin entire, enclosing membranous portion of arm; ventral lobe $\sim 0.25\times$ as broad as its basal length; dorsal lobe roughly triangular, wide at base narrowing to apex, with row of setae long basally and shorter apically; apical disc distinctly emarginate. S8 lateral process produced laterally and anteriorly; basolateral margin dully pointed; anteromedial sclerotized margin following marginal contour. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance $\sim 2\times$ width of lateral tubercle.

Female: Length 5.2-6.6mm, forewing length 3.2-3.7mm, head width 1.2-1.4mm, thorax width 1.3-1.5mm, median ocellar diameter (OD) 0.12-0.13mm.

Colouration: Black to black-brown except as follows: labrum entirely black or with yellow-brown apex; mandible with yellow basal spot, otherwise translucent yellow with apex translucent brown; antenna variable (scape dark or with brown apicoventral; apicoventral rim of pedicel yellow-brown to brown; apicoventral spot on F1 and F2 yellow-brown to brown; ventral surface of flagellum from F3 to terminal flagellomere yellow to yellow-brown). Following parts yellow: protibia except dark medioventrally; probasitarsus at most in basal and apical quarter; prodistitarsus; anterior spot on tegula; wide basal and apical rings on mesotibia; mesobasitarsus variable from brown to yellow ventrally; apical half of mesodistitarsus; narrow apicodorsal rim on metafemur; metatibia at most in basal third and narrow apical band; metabasitarsus ventrally; apical half of metadistitarsus yellow to yellow-brown. Metasoma black, T1-T5 marginal zones yellow to translucent yellow margins.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard sparse (0.5-2.5OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), interspersed with sparse moderate-length hairs (1 OD), denser moderate-length hairs toward lateral margins (0.5-1OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 2OD$); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); metafemur and metatibia with scopae (1-1.5OD T1-T3 apicolateral hair patches tomentose (0.5-1OD); long and moderately dense on S1 ($\leq 2.5OD$); S2 with corbiculate scopa (1-2.5OD)

Surface sculpture: As in male except as follows: clypeus with punctures moderately dense throughout ($i=2d$); lower paraocular area with punctures moderately dense ($i=1-2d$); supraclypeal area with punctures irregularly spaced ($i=1-3d$), dense toward lateral margins ($i\leq d$); frontal area with punctures moderately dense ($i=1-2d$); punctures moderately dense on ocellocular space ($i=1-2d$); vertexal area with punctures moderately dense ($i=1-2d$); punctures shallow and dense on scape ($i=d$); genal area striate, with punctures dense ($i=d$); hypostomal area weakly imbricate, with shallow punctures moderately dense ($i=1-2d$); mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures dense ($i=0.5-1d$), crowded around median line ($i\leq d$); mesepisternum with punctures irregularly spaced, moderately dense below scrobe and anterior of episternal suture ($i=1-2d$); punctures dense on hypoepimeral area ($i\leq d$); metanotum with punctures dense ($i=0.5-1d$), crowded on median line and anteriorly ($i\leq d$); metapostnotum rugose, more weakly sculptured at posterior; propodeum coarsely imbricate, rugulose posteriorly, with punctures moderately dense ($i=1-2d$); T1 impunctate basally, with small and sparse punctures apically ($i=1-3d$); T2-T5 with punctures small and sparse ($i=1-3d$); T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum $\sim 3x$ wider than long (28:9.5); length of malar space $\sim 0.6x$ that of clypeal lateral (4.5:8); LOT crossing below anterior tentorial pits; clypeus $\sim 1.1x$ longer than maximum width in frontal view (38:34), extending for approximately one third of its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures $\sim 1.1x$ longer than the shortest distance between them (14:13); IAD $1.5x$ AOD (15:10); scape $\sim 3.1x$ longer than maximum width (28:6); pedicel longer than wide (9:8); F1 as long as wide (7.5:7.5); F2 shorter than F1, and slightly shorter than F3 (4.5:5); UOD $\sim 1.3x$ LOD, IOD $\sim 1.1x$ longer than UOD (UOD:IOD:LOD - 54:60:42); frontal line carinate in lower half, flat above; MOC shorter than width of head (91.5:96.5); OOC $\sim 0.5x$ IOC (10.5:20); genal area $\sim 0.67x$ as wide as eye in lateral view (20:31); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 62:26:11:13; probasitarsus $\sim 3.1x$ longer than wide (22:7); length of prodistitarsus $\sim 0.9x$ that of preceding three tarsomeres combined (from base to apex - 7:6:4.5:15); metafemur $\sim 2.6x$ longer than maximum depth (53:20.5); metatibia $\sim 3.8x$ longer than maximum depth (66:17.5); metabasitarsus $\sim 3.9x$ longer than maximum depth (41:10.5).

Distribution & Habit: Coastal from Los Choros (Region IV) north to Chañaral de Aceituna (Region III); 8-179m a.s.l. The type locality is disjunct from the otherwise observed distribution as described here. Collected on *Heliotropium stenophyllum* (1 record). Recorded September to November.

Comments: The holotype is labeled Atacama, Pueblo Hundido, x.1972, L. Ruz, on *Heliotropium stenophyllum*. This refers to the renamed village of Diego de Almagro (Region III), but is inconsistent with the otherwise-documented distribution of *C. erithropoda*, as well as the known range of *H. stenophyllum* (Luebert 2013). Following evidence presented in the comments on *C. deserticola* above, I believe the type locality to be misattributed, and have adjusted it to the village of Pueblo Hundido in Region IV accordingly.

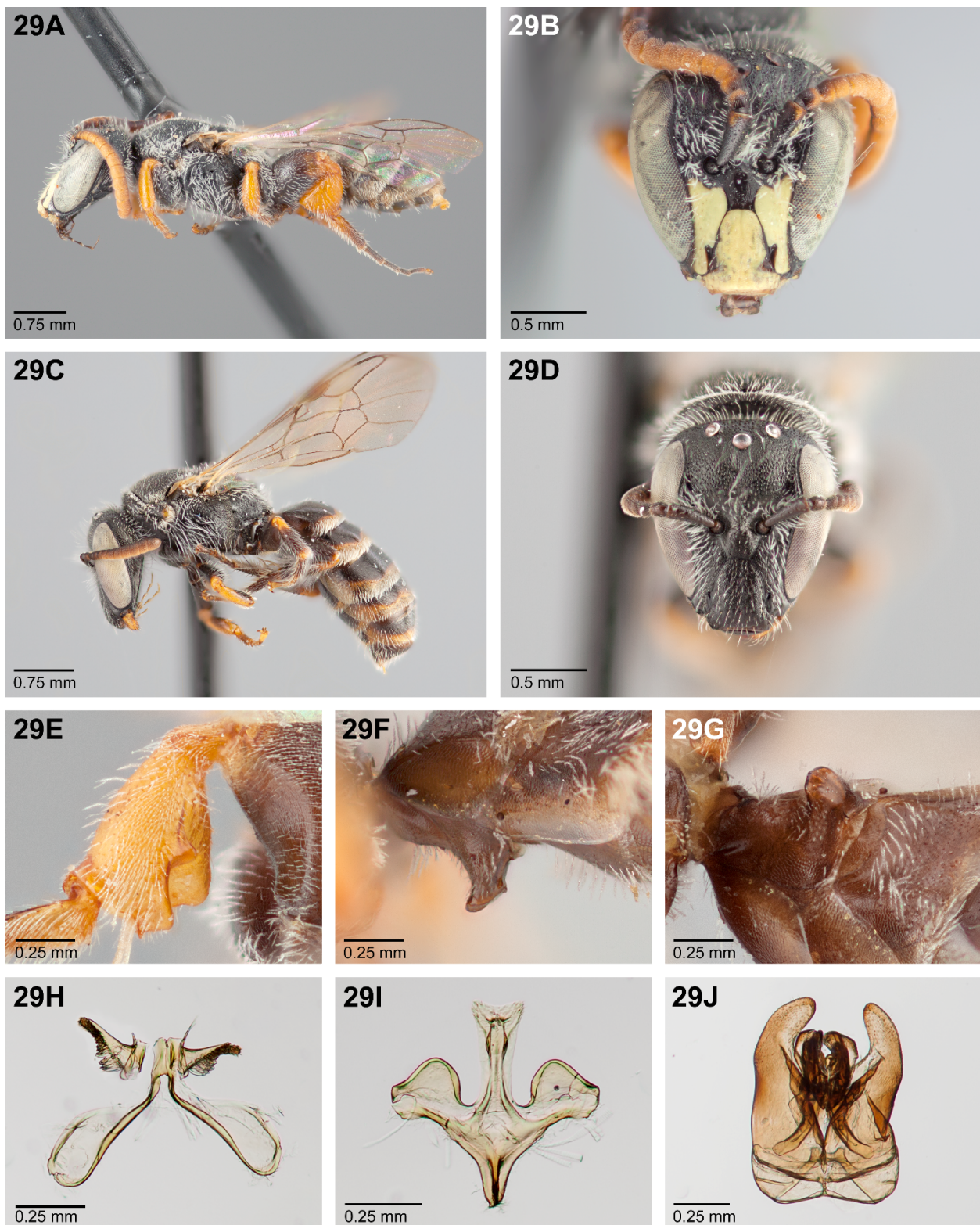


Fig. 29. *Chilicola erithropoda*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) guanicoe* Monckton sp. nov.**

Figures: Fig. 6B; Fig. 30A-J; Fig. 40.

Type Material: Holotype (male): Region III, C-453 km 22, S 28.1816° W 69.82605°, 1625m, 6.xi.2013, fl. yellow pan trap, S. Monckton, CCDB-19989 B08 // PCYU 0021682 (PCYU). **Allotype** (female): Region III, C-35 km 51.5, S 27.82374°, W 70.1227°, 875m, 29.ix.2013, S. Monckton, CCDB-19989 A12 // PCYU 0021674 (PCYU). **Paratypes** (4 males & 9 females): **Region III**: one male and one female, Las Juntas, S 28.003°, W 69.976°, 1160m, 5.x.1982, C. Tobar (male), R. Aldunate (female) (PUCV); one male, E. of Potrerillos, Hwy C-177 km 16, S 26.40077°, W 69.37687°, 2488m, 16.xi.2013, blue pan, J. Postlethwaite, CCDB-22789 F02 (PCYU); one male and one female, E. of Potrerillos, C-177, km 24, S 26.45853°, W 69.32718°, 2839m, pan trap, 28.ix-16.xi.2013 J. Postlethwaite (PCYU); one male, Hwy C-269 km 0.5 (WP: 155), S 26.47625°, W 69.32137°, 3000m, 28.iii-24.iv.2013, yellow cup, J. Postlethwaite & S. Monckton (PCYU); three females, Fundo La Semilla, 125 km SE. Copiapó, S 28.25066°, W 69.741°, 2358m, 17.x.2004, pan trap, F.D. Parker & M.E. Irwin, CHL-14509-54 // FDP52511, CHL-14509-55 // FDP52599 17, CHL-14509-56 // FDP52403 30 (BBSL); one female, same locality and collectors, 30.x.2003, CHL-14509-03 // FDP4749 // USDA Native Bee Survey BBSL699121 (BBSL); one female, Rd to Pastos Largos, km 0.5, S 28.18022°, W 69.80470°, 1863m, 6.xi.2013, S. Monckton (PCYU); one female, Rd to Pastos Largos, km 0.5, S 28.18022°, W 69.80470°, 1863m, 6.xi-11.xii.2013, pan trap, J. Postlethwaite & S. Monckton (PCYU); one female, Rd to Pastos Largos, km 4, S 28.16429°, W 69.79134°, 2102m, 21.x-6.xi.2013, pan trap, S. Monckton (PCYU).

Etymology: This species is named after the guanaco - *Lama guanicoe* (Müller, 1776) - a camellid native to South America and found throughout Chile. The specific epithet is identical to that of the guanaco, and is treated as a noun in apposition.

Diagnosis: Males are diagnosable by the combination of malar space 1.4-2x longer than the clypeal lateral, and apical surface of S1 process with a longitudinal median ridge. Males share many characters with *C. vicugna* and *C. mavida*, but are differentiable by the longer face

and weakly toothed posterior carina on the metatibia. Females are diagnosable by the combination of malar space 1.2-1.7x longer than the clypeal lateral, and dorsal surface of the protibia yellow along its entire length.

Description: Male (Holotype): Length 5.5mm, forewing length 3.3mm, head width 1.1mm, thorax width 1.2mm, median ocellar diameter (OD) 0.14mm.

Colouration: Black-brown with following parts yellow: labrum; clypeus except narrowly dark brown along epistomal suture, with apical margin yellow along entire width; lower paraocular area extending more than 1OD above transverse epistomal suture, nearly reaching lower tangent of antennal socket; apicoventral surface of scape; apex of profemur broadly on anterior surface, narrowly on posterior surface; dorsal surface of protibia, including anterior face in dorsal half, with ventral half translucent yellow; probasitarsus; anterior spot on tegula; apicodorsal rim of mesofemur, wider anteriorly; wide basal and apical rings on mesotibia, as well as apical half of anterior surface; mesobasitarsus, suffused with brown distad; apicoventral rim of metacoxa; wide apical ring on metafemur; metatibia except medial dark patch on posterior surface, and dark medial quadrangle on anterior surface covering approximately half of total length; basal half of metabasitarsus, and ventrally in apical half; apex of T7. Following parts yellow-brown: apicoventral surface of pedicel; ventral surface of F1, narrowing basally; ventral surface of antenna from F2 to terminal flagellomere, suffused with darker brown; posterior apical rim of protrochanter; apical half of prodistitarsus; apicoventral rim of mesocoxa; apical half of mesodistitarsus; apicoventral rim of metatrochanter. Metasoma black, T1-T6 marginal zones yellow-orange to translucent margins.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard long and dense (0.5-2OD) longest at midlength; moderately long and sparse on mesoscutum (0.5-1OD), moderately long and moderately dense toward lateral margin (0.5-1OD); long and moderately dense toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 2OD$); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hair long and dense (1.5OD basad, 0.5OD distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), sparse medially ($i\geq 2d$); lower paraocular area with punctures moderately dense ($i=1-2d$); supraclypeal area with punctures irregularly spaced ($i=1-3d$), dense toward lateral margins ($i\leq d$); frontal area with punctures very dense ($i\leq 0.5d$); punctures dense on ocellocular space adjacent to compound eye ($i\leq d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures dense ($i\leq d$); punctures shallow and moderately dense on scape ($i=1-2d$); genal area striate with punctures moderately dense ($i=1-2d$); hypostomal area rough, weakly imbricate with punctures moderately dense ($i=1-2d$); pronotum with punctures moderately dense ($i=1-2d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$), crowded around median line ($i\leq d$); scutellum with punctures moderately dense ($i=0.5-2d$), crowded around median line ($i\leq d$); mesepisternum with punctures irregularly spaced, moderately dense to sparse below scrobe ($i=1-2d$), more sparse anterior of episternal suture ($i=1-3d$), impunctate just dorsad of scrobe, otherwise with punctures moderately dense on hypoepimeral area ($i\leq 2d$); metanotum with punctures moderately dense ($i=1-2d$), crowded on median line and anteriorly ($i\leq d$); metepisternum with punctures dense ($i\leq d$); metapostnotum rugose, with fewer transverse rugae and more weakly sculptured posteriorly; propodeum rugulose posteriorly, with punctures moderately dense ($i=1-2d$); T1-T5 coarsely imbricate with punctures moderately dense ($i=1-2d$ on T1-T4; $i=1-3d$ on T5); T2-T5 basal depressed area more coarsely sculptured but punctures distinct; T6 coarsely imbricate posteriorly with punctures moderately dense ($i=1-3d$); T7 punctures moderately dense ($i=1-3d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum $\sim 2.4x$ wider than long (22:9); length of malar space $\sim 1.4x$ longer than that of clypeal lateral (11:8); LOT crossing just above anterior tentorial pits; clypeus $\sim 1.1x$ longer than maximum width in frontal view (34:30), extending for more than half of its length beyond LOT; median longitudinal groove on clypeus weakly present in dorsal half, absent ventrad; subantennal sutures $\sim 1.4x$ longer than the shortest distance between them (16:11.5); IAD $2x$ AOD (12:6); scape $2.4x$ longer than maximum width (24:10); pedicel shorter than wide (7.5:8.5); F1 slightly shorter than wide (8.5:9); F2 $\sim 1.5x$ longer than F1, and shorter than F3 (12.5:14); UOD $\sim 1.5x$ LOD, IOD $\sim 1.1x$ UOD (UOD:IOD:LOD - 48:52:33); frontal line carinate between antennal bases for a length less than 0.5OD, bare just below median ocellus for less than 1OD, and otherwise undefined; MOC longer than width of head (88:83); OOC $\sim 0.67x$ IOC

(12:18); genal area $\sim 0.6\times$ as wide as compound eye in lateral view (18:29); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 60:21:9:14; probasitarsus $\sim 3.8\times$ longer than wide (25:6.5); length of prodistitarsus subequal to that of preceding three tarsomeres combined (from base to apex - 6:5:4:14); metafemur almost twice as long as maximum depth (59:30); summit of metatibial ventral convexity rounded and situated at approximately two-thirds of its length; metatibia $\sim 2.1\times$ longer than maximum depth (53:25); in apical view length of metatibial apical lamina $0.7\times$ median ocellar diameter (7:10), short and thick; metatibia with posterior carina black and weakly toothed, ventral carina yellow and rounded; metabasitarsus $\sim 4.2\times$ longer than maximum depth (38:9); S1 process with a longitudinal median ridge on apical surface, in lateral view with anterior and posterior margins convergent apically, and median ridge projecting posteriorly from apex. S7 apodemal arm with sclerotized margin recurved mesad, dividing membranous portion of arm; ventral lobe narrow, almost linear; dorsal lobe roughly triangular, wide at base narrowing to apex, with row of setae long basally and shorter apically; apical disc distinctly emarginate. S8 lateral process produced anteriorly, basolateral margin dully pointed, anteromedial sclerotized margin wide and weakly convex. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance $\sim 1.5\times$ width of lateral tubercle.

Female (Allotype): Length 5.4mm, forewing length 3.1mm, head width 1.0mm, thorax width 1.2mm, median ocellar diameter (OD) 0.11mm.

Colouration: Black to black-brown except as follows: labrum translucent yellow, apex black medially; mandible with yellow basal spot and translucent yellow except apex translucent brown. Following parts yellow-brown: apicoventral margin of pedicel and F1; apical two-thirds of prodistitarsus; apices of mesotarsomeres, including apical half of mesodistitarsus; apical third of metadistitarsus. Following parts yellow: ventral surface of antenna from F2 to terminal flagellomere, F2 suffused with yellow-brown medially; dorsal surface and narrow apical ring on protibia; anterior spot on tegula; wide basal and narrow apical ring on mesotibia; narrow apical ring on metafemur; basal ring on metatibia, one-third of overall length dorsally, narrow ventrally; wide apical ring on metatibia; first to third metatarsomere, anterior surface with brown spots at base of hairs and appearing darker. Protarsus translucent yellow, with second to fourth

tarsomere and basal third of distitarsus darker. Metasoma brown, T1-T5 marginal zones yellow to translucent yellow margins.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard sparse (0.5-2OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), denser and longer toward lateral margin (0.5-1.0OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); scopae on metafemur (1-2OD) and metatibia (1-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); long and moderately dense on S1 ($\leq 2OD$); S2 with corbiculate scopa (1-2.5OD)

Surface sculpture: As in male except as follows: clypeus with punctures moderately dense throughout ($i=1-2d$); supraclypeal area with punctures irregularly spaced ($i=1-2d$), dense toward lateral margins ($i\leq d$); frontal area with punctures dense ($i\leq d$); punctures moderately dense on ocellular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures moderately dense ($i=1-2d$); genal area with punctures moderately dense ($i=1-2d$); hypostomal area weakly imbricate to glabrous apically, with punctures moderately dense ($i=1-3d$); mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures dense ($i=0.5-1d$); mesepisternum with punctures irregularly spaced, sparse below scrobe ($i=1-3d$), sparser anterior of episternal suture ($i\geq 3d$); impunctate just dorsad of scrobe, otherwise with punctures irregularly spaced on hypoepimeral area ($i\leq 2d$); metanotum with punctures moderately dense ($i=0.5-2d$); metapostnotum rugose to longitudinally striate posteriorly; propodeum coarsely imbricate with punctures moderately dense ($i=1-2d$); T1-T5 moderately punctulate; T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum $\sim 2.67x$ wider than long (24:9); length of malar space $\sim 1.4x$ that of clypeal lateral (10:7); LOT crossing just above anterior tentorial pits; clypeus $\sim 1.2x$ longer than maximum width in frontal view (34:29), extending for more than half of its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures ~ 1.4 longer than shortest distance between them (15:11); IAD $\sim 1.4x$ AOD (12:8.5); scape $\sim 3.6x$ longer than maximum width (25:7); pedicel longer than wide (8:6.5); F1 slightly shorter than wide (6:6.5); F2 two thirds as long as F1 (4) and $\sim 0.7x$ as long as F3 (5.5); UOD $\sim 1.3x$ LOD, IOD $\sim 1.05x$ longer than UOD (UOD:IOD:LOD - 48.5:53:38); frontal line carinate in lower third, bare just below median ocellus for a length of $\sim 1OD$, otherwise roughly defined; MOC longer than width of head

(86:75); OOC ~0.6x IOC (11:19); genal area 0.75x as wide as eye in lateral view (18:24); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 56:20:9:14.5; probasitarsus ~3x longer than wide (19:6.5); length of prodistitarsus ~0.8x that of preceding three tarsomeres combined (from base to apex - 7:5:4.5:13); metafemur 2.75x longer than maximum depth (44:16); metatibia ~4.1x longer than maximum depth (58:14); metabasitarsus ~4.2x longer than maximum depth (38:9).

Variation: Some females have a yellow-brown or yellow spot on the lower paraocular area below the anterior tentorial pit.

Distribution & Habit: Fundo La Semilla north to E of Potrerillos, west to NW of Los Loros (Region III); 875-3000m a.s.l. Recorded September to October and March to April.

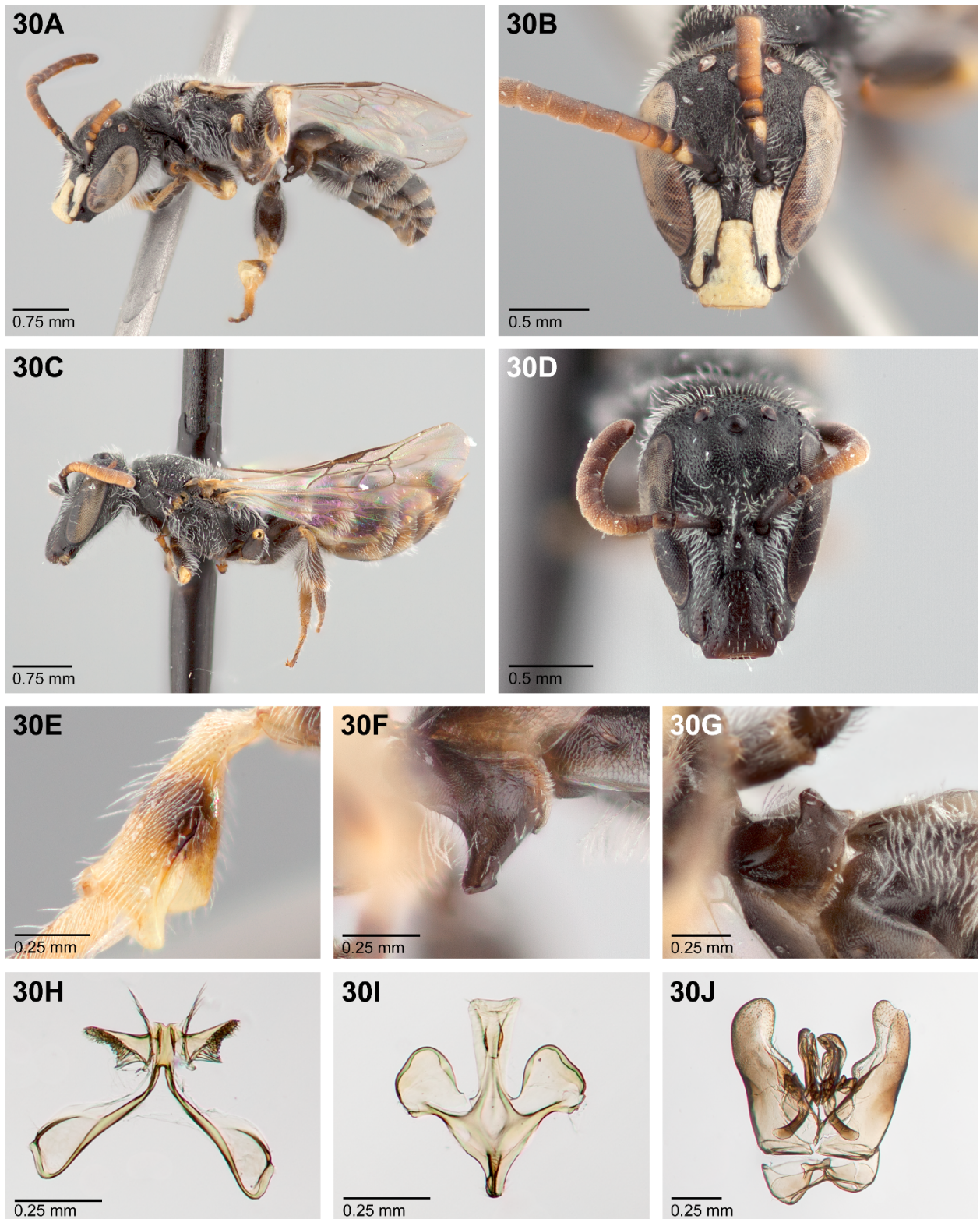


Fig. 30. *Chilicola guanicoe*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view[†]; (F) male S1 process, lateral view; (G) male S1 process, apical view[†]; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) lickana* Monckton sp. nov.**

Figures: Fig. 4A; Fig. 5A; Fig. 6A; Fig. 15A; Fig. 31A-J; Fig. 40.

Type Material: Holotype (male): Region II, 5.1km NNE. of San Pedro, *S* 22.872°, *W* 68.177°, 2531m, 14.x.2001, L. Packer (PCYU). **Allotype** (female): Region II, B-245 km 12, N. of SP de Atacama, *S* 22.82718°, *W* 68.1289°, 2801m, 6.xii.2013, J. Postlethwaite, CCDB-19989 D06 (PCYU). **Paratypes** (1 males, 1 female, 1 mixed sample): **Region II:** one male, Aguas Blancas SE. of San Pedro de Atacama, *S* 23.268°, *W* 67.995°, 2474m, 12.x.2001, Packer & Fraser, CCDB-22789 D12 (PCYU); one female, same data, CCDB-03755 E11 (PCYU); one sample, mixed male and female cleared parts, same data (PCYU).

Etymology: The specific epithet is taken from Kunza, an extinct language of the Atacama people. “Lickana” is the word for the Atacama region, encompassing the type locality and nearby San Pedro de Atacama (Vaïsse and Hoyos 1896). It is to be treated as a noun in apposition.

Diagnosis: Males are diagnosable by the combination of malar space more than double the length of the clypeal lateral, and apical surface of S1 process with a longitudinal median ridge. Females are diagnosable by the combination of malar space double the length of the clypeal lateral, and the presence of wide yellow basal and apical rings on the metatibia.

Description: Male (Holotype): Length 6.8mm, forewing length 4.4mm, head width 1.4mm, thorax width 1.4mm, median ocellar diameter (OD) 0.15mm.

Colouration: Black-brown with following parts yellow: labrum; clypeus except broadly dark brown along epistomal suture, with apical margin yellow along entire width; lower paraocular area extending more than 1OD above transverse epistomal suture, not reaching lower tangent of antennal socket; apex of profemur broadly on anterior surface, narrowly on posterior surface; dorsal surface of protibia, including dorsal half of anterior face; apicodorsal rim of mesofemur, wider anteriorly; apicodorsal rim of metatibia; wide basal and apical rings on mesotibia, as well as apical quarter of anterior surface; basal half of mesobasitarsus dorsally; apicodorsal rim of metafemur; anterior face of metatibia in basal quarter and with apical band

narrow dorsally to wide on summit of ventral convexity, posterior face in basal third and apical third; basal half of metabasitarsus ventrally; apex of T7. Following parts yellow-brown: apicoventral surface of scape and pedicel, ventral surface of antenna from F1 to terminal flagellomere, narrowing basally on F1, and suffused with darker brown on remaining flagellomeres; apical half of prodistitarsus. Posterior apical rim of protrochanter yellow-brown. Faint yellow anterior spot on tegula. Apicoventral rim of metacoxa and metatrochanter translucent brown. Metasoma black, T1-T6 marginal zones yellow-orange to translucent yellow margins.

Pubescence: White hairs generally short and sparse, not especially plumose; long and moderately dense on lower paraocular area and around antennal base (1.5-2OD); genal beard long and dense (0.5-3OD) longest at midlength; moderately long and sparse on mesoscutum (1OD), slightly longer and more dense toward lateral margin (1-1.5OD); long and moderately dense toward lateral and posterior margins of scutellum (1-2OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum (≤ 2 OD); moderately long and dense on dorsolateral angle of propodeum (0.5-2OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hair long and dense (2OD basad, 0.5OD distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), irregularly spaced and sparse medially ($i\geq 2d$); lower paraocular area with punctures dense ($i=d$); supraclypeal area with punctures irregularly spaced ($i=1-4d$), dense toward lateral margins ($i\leq d$); frontal area with punctures very dense ($i\leq 0.5d$), dense around ocelli and on ocellocular space ($i\leq d$); vertexal area with punctures moderately dense ($i=1-2d$); punctures shallow and moderately dense on scape ($i=1-2d$), denser apicoventrally ($i\leq d$); genal area striate with punctures dense ($i\leq d$); hypostomal area with punctures dense ($i=d$); pronotum with punctures dense ($i=0.5-1d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$), sparser laterad ($i=1-2d$), crowded around median line ($i\leq d$); scutellum with punctures moderately dense ($i=0.5-2d$), crowded around median line ($i\leq d$); mesepisternum with punctures irregularly spaced, moderately dense below scrobe and anterior of episternal suture ($i=1-2d$), impunctate just dorsad of scrobe, otherwise with irregularly spaced punctures on hypoepimeral area ($i\leq 3d$); metanotum with punctures moderately dense ($i=1-2d$), crowded on median line and anteriorly ($i\leq 0.5d$); metepisternum with punctures dense ($i\leq d$) and distinctly striate anterodorsally; metapostnotum rugose; propodeum rugulose posteriorly, with punctures moderately dense ($i=1-2d$); metasomal

terga coarsely imbricate, T1-T3 with punctures very dense ($i \leq d$), T4-T5 with punctures moderately dense ($i \leq 2d$), T6 with punctures moderately dense ($i = 1-2d$), and T7 with punctures sparse ($i \geq 2d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum $\sim 2.6\times$ wider than long (30:11.5); length of malar space $\sim 2.2\times$ longer than that of clypeal lateral (20:9); LOT crossing above anterior tentorial pits; clypeus $\sim 1.3\times$ longer than maximum width in frontal view (46:35), extending for approximately two thirds of its length beyond LOT; median longitudinal groove present on clypeus; subantennal sutures $\sim 1.8\times$ longer than the shortest distance between them (22:12); IAD $\sim 1.7\times$ AOD (13.5:8); scape $\sim 2.4\times$ longer than maximum width (29:12); pedicel slightly shorter than wide (9:11); F1 shorter than wide (10:11); F2 $1.4\times$ longer than F1, and shorter than F3 (14:16); UOD $\sim 1.3\times$ LOD, IOD $\sim 1.1\times$ UOD (UOD:IOD:LOD - 55:61:42); frontal line carinate between antennal bases for a length less than 1OD, bare just below median ocellus for less than 0.5OD, and otherwise undefined; MOC $\sim 1.1\times$ width of head (111:100); OOC $\sim 0.67\times$ IOC (14:21); genal area $\sim 0.6\times$ as wide as compound eye in lateral view (22:36); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 73:27:13:20; probasitarsus $\sim 3.8\times$ longer than wide (34:9); length of prodistitarsus subequal to that of preceding three tarsomeres combined (from base to apex - 8:6:4:17); metafemur $\sim 1.8\times$ longer than maximum depth (80:45); summit of metatibial ventral convexity situated at approximately two-thirds of its length; metatibia $2\times$ longer than maximum depth (66:33); in apical view length of metatibial apical lamina equal to median ocellar diameter (11:11), short and thick; metatibia with posterior carina black and toothed, ventral carina yellow and rounded; metabasitarsus $\sim 4.2\times$ longer than maximum depth (50:12); S1 process with a longitudinal median ridge on apical surface, in lateral view with anterior and posterior margins subparallel apically, and median ridge projecting posteriorly from apex. S7 apodemal arm with sclerotized margin terminating mesolaterad; ventral lobe narrow, almost linear; dorsal lobe roughly triangular, wide at base narrowing to apex, with row of setae long basally and shorter apically; apical disc distinctly emarginate. S8 lateral process produced anteriorly, basolateral margin rounded, anteromedial sclerotized margin distinctly swollen into convex incursion. Genital capsule with apicoventral truncate process weakly emarginate.

Female (Allotype): Length 6.4mm, forewing length 3.5mm, head width 1.1mm, thorax width 1.4mm, median ocellar diameter (OD) 0.12mm.

Colouration: Black to black-brown except as follows: labrum translucent brown with apex yellow; mandible with yellow basal spot, translucent yellow with apex translucent brown; pale spot on lower paraocular area below anterior tentorial pit. Following parts yellow: dorsal surface and narrow apical ring on protibia; probasitarsus; apical two-thirds of prodistitarsus; anterior spot on tegula; wide basal and apical rings on mesotibia; apical half of mesodistitarsus; apical ring on metafemur, wider ventrally; wide basal and apical ring on metatibia. Following parts yellow-brown: small spot on apicoventral rim of scape; apicoventral surface of pedicel, F1, and F2; ventral surface of antenna from F3 to terminal flagellomere, with pale apical bands; ventral half of metabasitarsus. Metasoma black-brown, T1-T5 marginal zones narrowly yellow to translucent margins.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard sparse (0.5-2OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), more dense and short toward lateral margin (0.5OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); metafemur and metatibia with scopae (1-1.5OD); T1-T2 apicolateral hair patches tomentose (0.5-1OD) and T3 apical hair bands evenly sparse; long and moderately dense on S1 ($\leq 2OD$); S2 with corbiculate scopa (1-2OD).

Surface sculpture: As in male except as follows: frontal area with punctures dense ($i \leq d$); punctures moderately dense on ocellocular space ($i = 1-2d$); vertexal area with punctures moderately dense ($i = 1-2d$); punctures shallow and moderately dense on scape ($i = 1-2d$); genal area coarsely imbricate to weakly imbricate anteriorly, punctures dense ($i = d$); hypostomal area imbricate to glabrous apically, with irregularly spaced shallow punctures ($i = 1-3d$); pronotum with punctures dense ($i = d$); mesoscutum with punctures dense ($i = 0.5-1d$), crowded around median line ($i \leq 0.5d$); scutellum with punctures dense ($i = 0.5-1d$), crowded around median line ($i \leq 0.5d$); mesepisternum with punctures irregularly spaced, moderately dense below scrobe ($i = 1-2d$), sparser anterior of episternal suture ($i = 1-3d$), impunctate just dorsad of scrobe, otherwise with punctures moderately dense on hypoepimeral area ($i \leq 2d$); metanotum with punctures moderately dense ($i = 0.5-2d$); metapostnotum rugose, with fewer transverse rugae and more weakly sculptured posteriorly; propodeum coarsely imbricate with punctures moderately dense

(i=1-2d); T1-T3 with punctures moderately dense (i=1-3d on T1-T2; i=1-2d on T3); T4-T5 with punctures small and sparse (i≥2d); T6 with punctures moderately dense (i=1-2d).

Structure: Labrum ~2.25x wider than long (26:11.5); malar space twice as long as clypeal lateral (18:9); LOT crossing above anterior tentorial pits; clypeus ~1.4x longer than maximum width in frontal view (45:32), extending for approximately two thirds of its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures ~1.75 longer than shortest distance between them (19:11); IAD ~1.33x AOD (12:9); scape 3.6x longer than maximum width (27:7.5); pedicel slightly longer than wide (8:7.5); F1 longer than wide (8:7); F2 more than half as long as F1 (5) and ~0.7x as long as F3 (7); UOD ~1.3x LOD, IOD ~1.1x UOD (UOD:IOD:LOD - 48.5:53:38); frontal line carinate in lower third, flat above; MOC ~1.25x longer than width of head (103:81); OOC ~0.5x IOC (11:20.5); genal area ~0.67x as wide as eye in lateral view (17:26); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 63:24:11:15; probasitarsus 4x longer than wide (28:7); length of prodistitarsus equal to that of preceding three tarsomeres combined (from base to apex - 5.5:5:4.5:15); metafemur ~2.8x longer than maximum depth (53:19); metatibia ~4.9x longer than maximum depth (68:14); metabasitarsus ~4.3x longer than maximum depth (41:9.5).

Distribution & Habit: Aguas Blancas north to Cuesta del Diablo (Region II); 2474-2801m a.s.l. Recorded October to December.

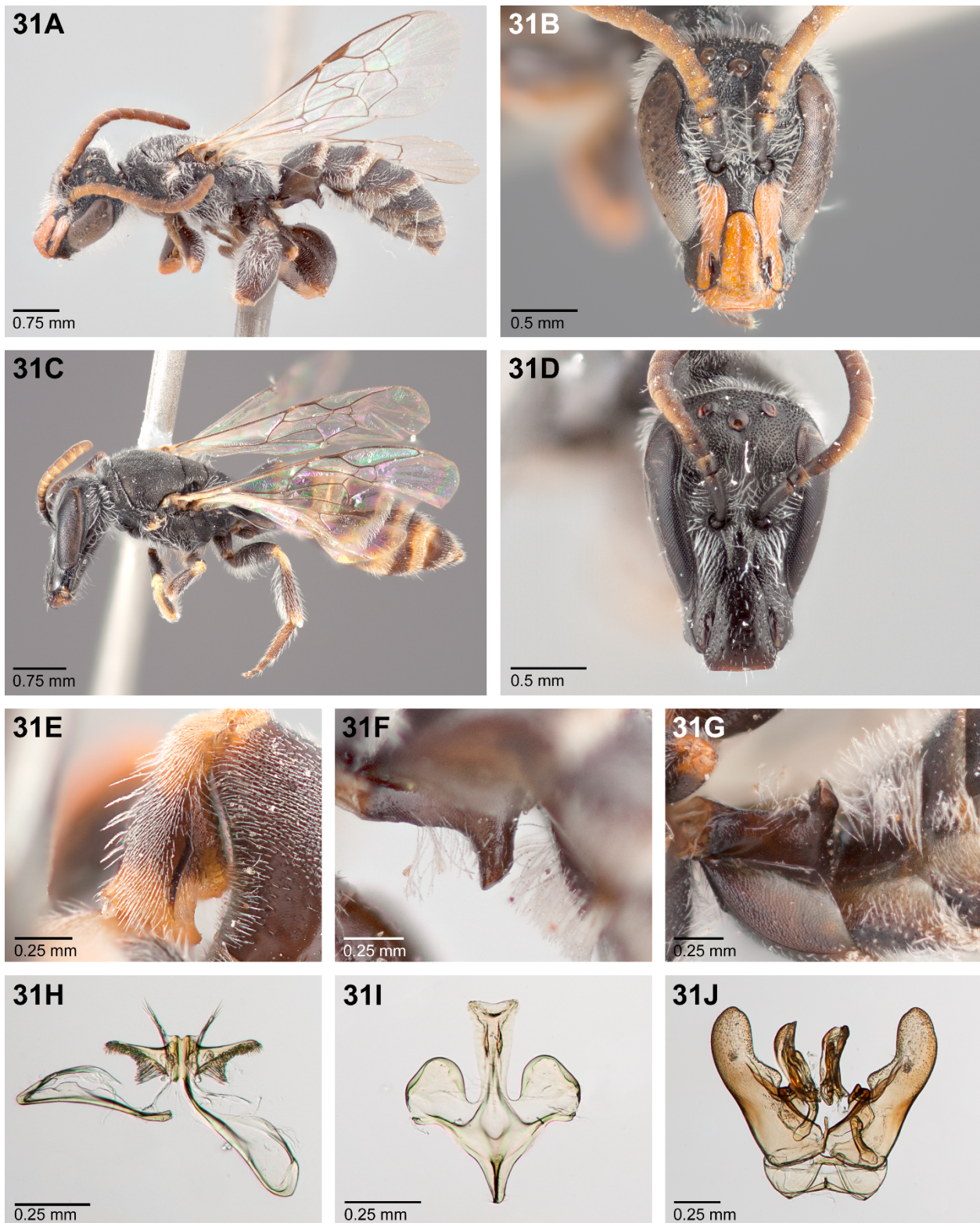


Fig. 31. *Chilicola lickana*: (A) male habitus, lateral view[†]; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view[†]; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) mavida* Toro & Moldenke, 1979**

Chilicola mavida Toro & Moldenke, 1979: 113-114, 122-124, 172. Michener, 2002: 5-7. Packer, 2008: 77. Montalva & Ruz, 2010: 28. Moure et al., 2012. Monckton, 2014: 234. Ascher & Pickering, 2015.

Figures: Fig. 3A; Fig. 16B; Fig. 32A-J; Fig. 40.

Material studied (13 males & 13 females): **Holotype** (male): Region IV, Baños del Toro, S 29.838°, W 70.026°, 3202m, i.1970, Toro (AMNH). **Allotype** (female): same data as holotype (AMNH). **Region IV**: one paratype male, same data as holotype (AMNH); five paratype males, Laguna Dam, S 30.206°, W 70.042°, 3170m, 5.xii.1950, Ross & Michelbacher (AMNH); one paratype male, Rio Laguna, S 30.191°, W 70.047°, 3000m, i.1970, Dazarola (AMNH); one male, 41-CH km 171, N. of Emb La Laguna, S 30.17874°, W 70.04730°, 2942m, 15.xii.2013, J. Postlethwaite, CCDB-19989 D05 (PCYU); one male, Elqui, El Panque 24 km S. of Vicuña, S 30.168°, W 70.663°, 1711m, 31.x.1992, Snyder & Sharkov (AMNH); two females, W. of Junta Toro, 41-CH km 146, S 29.96747°, W 70.12852°, 1977m, 8.xi.2013, S. Monckton, pan trap, CCDB-19989 D02 // PCYU 0021695, CCDB-19989 D01 // PCYU 0021694 (PCYU); one male, 41-CH km 137.8, S 29.96704°, W 70.19362°, 1800m, 8.xi.2013, S. Monckton, pan trap, CCDB-19989 B10 // PCYU 0021684 (PCYU); one female, Baños del Toro, S 29.8375°, W 70.02611°, 3202m, 1970, collector unknown (AMNH); **Region V**: one female, Portillo, S 32.85065°, W 70.13394°, 2612m, 30.xii.2009, L. Packer, CHI09-2-2-031 (PCYU); one male and one female, same data, on *Stachys*, CHI09-2-2-039, CHI09-2-2-038 (PCYU); five females, Portillo, S 32.837187°, W 70.129622°, 2870m, 11.i.2009, L. Packer, on *Phacelia*, CHI09-13-1-009, CHI09-13-1-006, CHI09-13-1-002, CHI09-13-1-007, CHI09-13-1-008 (PCYU); one male and one female, same data (PUCV); one female, Portillo Aduanas, S 32.83042°, W 70.09047°, 3210m, 10.i.2009, L. Packer, on *Phacelia*, CHI09-13-2-011 (PCYU).

Diagnosis: Males are diagnosable by the combination of first flagellomere longer than wide ($\geq 1.05x$), malar space longer than clypeal lateral (up to 1.1x), and ventral metatibial carina entire. Females are differentiated by the malar space subequal in length to the clypeal lateral

(0.9-1x) and distinguished from *C. curvapeligrosa* by the lighter leg colouration, with the following parts yellow or yellow-brown: apicodorsal spot on mesotibia yellow-brown, apicodorsal rim of metafemur yellow, wide basal ring of metatibia yellow, posterior apical rim of metatibia.

Description: Male: Length 5.3-5.8mm, forewing length 3.4-3.5mm, head width 1.1-1.2mm, thorax width 1.1-1.2mm, median ocellar diameter (OD) 0.13mm.

Colouration: Black-brown with following parts yellow: labrum; clypeus except broadly dark along epistomal suture; lower paraocular area, extending ~1OD above transverse portion of epistomal suture and not reaching lower tangent of antennal socket; apicoventral spot on scape; apicoventral surface of pedicel; posterior apical rim of protrochanter; apex of profemur broadly on anterior surface, narrowly on posterior surface; protibia except dark medioventrally; probasitarsus dorsally, at least in basal half; anterior spot on tegula; apex of mesofemur broadly on anterior surface, narrowly on posterior surface; broad basal and apical rings on mesotibia, the latter widened to apical half anteriorly; at least basoventral spot on mesobasitarsus; apicoventral rim of metacoxa and metatrochanter, the latter sometimes yellow-brown; narrow apical ring on metafemur; metatibia in basal third, as well as apical quarter of anterior surface and apical third of posterior surface, yellow colouration continuous along ventral surface, sometimes continuous or nearly so along dorsal surface; metabasitarsus in basal third dorsally, basal two-thirds ventrally; apex of T7. Ventral surface of flagellum yellow-brown, flagellomeres suffused with brown basally. Apical half of prodistitarsus and apical third of mesodistitarsus brown. Metasoma black, T1-T6 with marginal zones translucent yellow.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard long and dense (0.5-3OD) longest at midlength; mesoscutum mostly bare with few short hairs (0.5OD), moderately long and moderately dense toward lateral margin (0.5-1OD); long and moderately dense toward lateral and posterior margins of scutellum (1-2OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum (≤ 2 OD); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hair long and dense (1.5OD basad, 0.5OD distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), irregularly spaced in upper half ($i=1-3d$); lower paraocular area with punctures moderately dense ($i=1-2d$); supraclypeal area with punctures irregularly spaced ($i=1-4d$), dense toward lateral margins ($i\leq d$); frontal area with punctures very dense ($i\leq 0.5d$), dense around ocelli ($i\leq d$), dense on ocellocular space adjacent to compound eye ($i\leq d$) becoming impunctate adjacent to lateral ocellus; vertexal area rugose with punctures very dense ($i\leq 0.5d$); punctures shallow and moderately dense on scape ($i=1-2d$), denser apicoventrally ($i\leq d$); genal area striate with punctures moderately dense ($i=1-2d$); hypostomal area weakly imbricate to glabrous apically, with punctures dense ($i=d$); pronotum with punctures dense ($i=0.5-1d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$), moderately dense laterally ($i=1-2d$); scutellum with punctures moderately dense ($i=1-2d$), crowded on median line ($i\leq d$); mesepisternum with punctures irregularly spaced, sparse below scrobe ($i=2-3d$), more sparse anterior of episternal suture ($i\geq 3d$), impunctate just dorsad of scrobe, otherwise with punctures moderately dense on hypoepipimeral area ($i=1-2d$); metanotum with punctures moderately dense ($i=1-2d$), crowded on median line and anteriorly ($i\leq 0.5d$); metepisternum with punctures dense ($i\leq d$), distinctly striate anterodorsally; metapostnotum rugose, with fewer transverse rugae posteriorly; propodeum coarsely imbricate, rugulose posteriorly, with punctures moderately dense ($i=1-2d$); T1-T5 coarsely imbricate; T1 with punctures sparse basally ($i\geq 2d$), more dense apically ($i=1-2d$); T2-T5 with punctures moderately dense ($i=1-2d$); T6 coarsely imbricate posteriorly, with punctures moderately dense ($i=1-2d$); T7 sparsely puncticulate; marginal zones of terga weakly imbricate and shiny, punctate to impunctate.

Structure: Labrum 2.3x wider than long (23:10); length of malar space subequal to that of clypeal lateral (9:8.5); LOT crossing through anterior tentorial pits; clypeus subequal in length to maximum width in frontal view (31:30), extending for more than half of its length beyond LOT; median longitudinal groove present on clypeus, weak apically; subantennal sutures $\sim 1.4x$ longer than the shortest distance between them (17:12); IAD $\sim 2.2x$ AOD (13:6); scape 2.4x longer than maximum width (24:10); pedicel shorter than wide (8:9); F1 longer than wide (10:8.5); F2 1.3x longer than F1, and shorter than F3 (13:14); UOD $\sim 1.4x$ LOD, IOD $\sim 1.1x$ UOD (UOD:IOD:LOD - 50:54:35); frontal line carinate in lower two-fifths, bare just below median ocellus for a length of $\sim 1OD$, otherwise roughly defined; MOC subequal to width of head (89:90); OOC $\sim 0.6x$ IOC (11:18); genal area $\sim 0.5x$ as wide as compound eye in lateral view

(17:33); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 63:23:9:15; probasitarsus 3.25x longer than wide (26:8); length of prodistitarsus subequal to that of preceding three tarsomeres combined (from base to apex - 7:5:5:16); metafemur ~1.9x longer than maximum depth (70:37); summit of metatibial ventral convexity rounded and nearly perpendicular to apex; metatibia ~1.8x longer than maximum depth (56:31); in apical view length of metatibial apical lamina 0.8x median ocellar diameter (8:10), broad and thick; metatibia with posterior carina black and rounded; ventral carina yellow and rounded; metabasitarsus ~3.6x longer than maximum depth (43:12); S1 process with a longitudinal median ridge on apical surface, in lateral view with anterior and posterior margins convergent apically, and median ridge projecting posteriorly from apex. S7 apodemal arm with sclerotized margin terminating mesolaterad; ventral lobe narrow, almost linear; dorsal lobe roughly triangular, wide at base narrowing to apex, with row of setae long basally and shorter apically; apical disc distinctly emarginate. S8 lateral process produced anteriorly, basolateral margin rounded, anteromedial sclerotized margin following marginal contour. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance ~1.5x width of lateral tubercle.

Female: Length 4.2-4.8mm, forewing length 2.6-3.0mm, head width 1.0mm, thorax width 1.0-1.1mm, median ocellar diameter (OD) 0.10mm.

Colouration: Black to black-brown except as follows: mandible with yellow basal spot, translucent yellow in apical half except apex translucent brown; antenna variable (scape entirely dark; pedicel to F2 dark, or with apicoventral rim brown; ventral surface of F3 to penultimate flagellomere yellow-brown, narrowing basally on F3, flagellomeres suffused with brown basally; terminal flagellomere yellow-brown in basal half, brown in apical half). Following parts yellow: dorsal surface of protibia; apical two-thirds of prodistitarsus, sometimes yellow-brown; anterior spot on tegula; narrow basal ring on mesotibia; apicodorsal rim on metafemur; wide basal ring on metatibia, narrow ventrally. Following parts yellow-brown: apicodorsal spot on mesotibia; posterior apical rim on metatibia. Apical half of mesodistitarsus brown. Metasoma black, T1-T5 yellow-brown beyond premarginal line to translucent yellow margins.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard sparse (0.5-2.5OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$),

moderately long and moderately sparse toward lateral margin (0.5-1OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; metafemur and metatibia with scopae (1-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); long and moderately dense on S1 ($\leq 2OD$); S2 with corbiculate scopa (1-2OD).

Surface sculpture: As in male except as follows: clypeus with punctures sparse ($i=2-3d$), moderately dense toward lateral margins ($i=1-2d$); lower paraocular area with punctures dense ($i=d$); supraclypeal area with punctures irregularly spaced ($i=1-2d$), dense toward lateral margins ($i \leq d$); frontal area with punctures dense ($i \leq d$), moderately dense around ocelli ($i=1-2d$); punctures dense on ocellocular space adjacent to compound eye ($i \leq d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures moderately dense ($i=1-2d$); punctures shallow and moderately dense on scape ($i=1-2d$); genal area weakly imbricate with punctures moderately dense ($i=1-2d$); hypostomal area weakly imbricate to glabrous apically, with punctures moderately dense ($i=1-2d$); mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures dense ($i=0.5-1d$); metanotum with punctures moderately dense ($i=0.5-2d$); metepisternum with punctures dense ($i \leq d$), distinctly striate anterodorsally (weak in some specimens); metapostnotum rugose, with fewer transverse rugae posteriorly (posterior half to two-thirds longitudinally carinate in some specimens); propodeum with punctures moderately dense ($i=1-2d$); T1-T5 moderately puncticulate; T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum 2.5x wider than long (20:8); length of malar space subequal to that of clypeal lateral (6:6.5); LOT crossing through anterior tentorial pits; clypeus $\sim 1.1x$ longer than maximum width in frontal view (29:26), extending for approximately half of its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures subequal in length to the shortest distance between them (11:11); IAD $\sim 1.4x$ AOD (11.5:8); scape $\sim 3.4x$ longer than maximum width (22:6.5); pedicel longer than wide (8:6.5); F1 longer than wide (6.5:5.5); F2 shorter than F1, and shorter than F3 (4:5); UOD $\sim 1.3x$ LOD, IOD $\sim 1.1x$ longer than UOD (UOD:IOD:LOD - 44:47:34); frontal line carinate in lower third, flat above; MOC $\sim 1.1x$ longer than width of head (77:71); OOC $\sim 0.7x$ IOC (11:16); genal area $\sim 0.65x$ as wide as eye in lateral view (15:23); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 51:20:9:12.5; probasitarsus $\sim 3.2x$ longer than wide (21:6.5); length of prodistitarsus $\sim 1.3x$ that of preceding three tarsomeres combined (from base to apex - 4:4:3:14); metafemur $\sim 2.9x$ longer

than maximum depth (43:15); metatibia ~4.6x longer than maximum depth (53:11.5); metatarsus 4.25x longer than maximum depth (34:8).

Variation: Some females have a yellow-brown or yellow spot on the lower paraocular area below the anterior tentorial pit.

Distribution & Habit: El Pangué east to Embalse La Laguna, north to Baños del Toro (Region IV); 1711-3202m a.s.l. Collected on *Stachys* L. (2 records) and *Phacelia* (8 records). Recorded November to January.

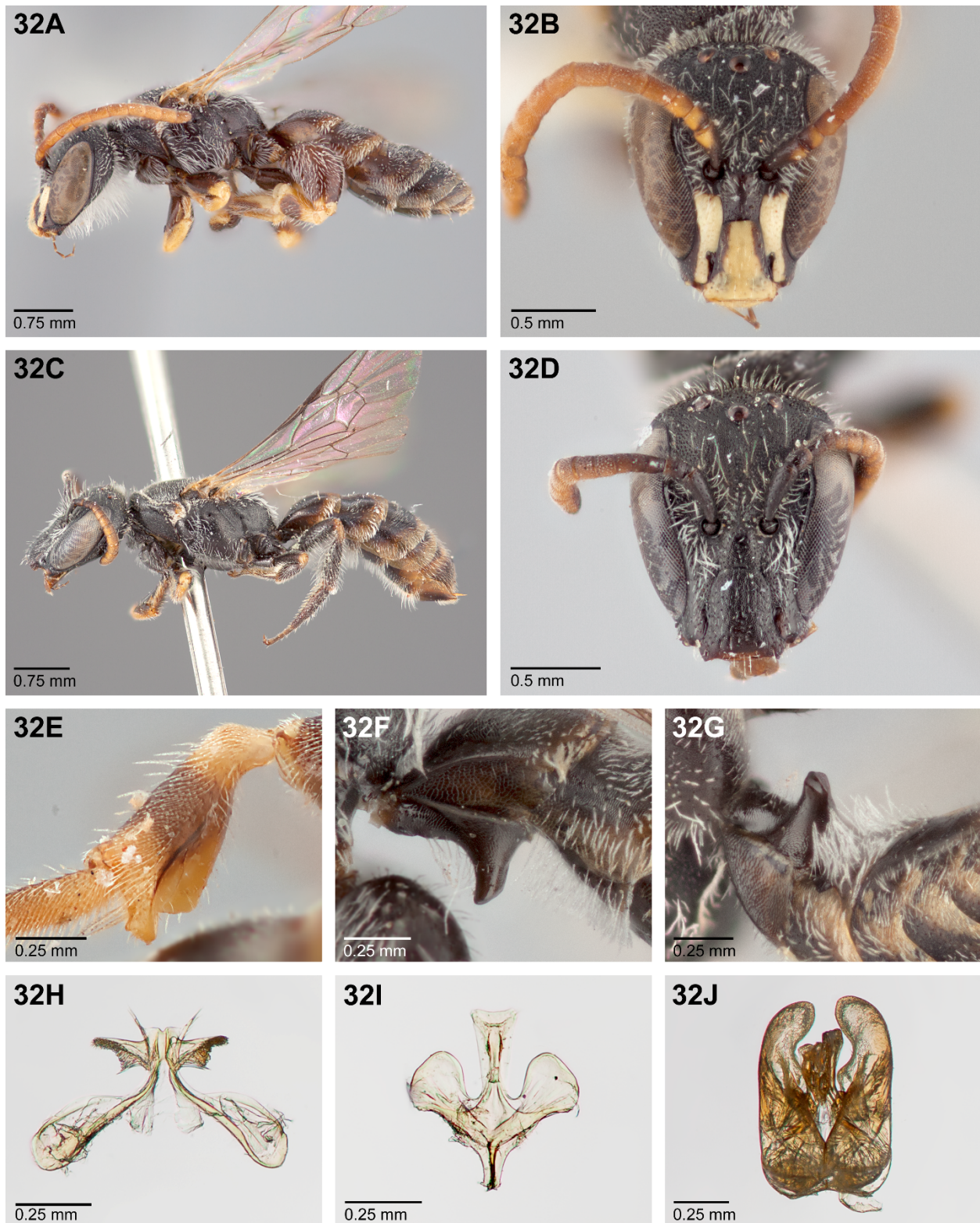


Fig. 32. *Chilicola mavida*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view[†]; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) mayu* Monckton sp. nov.**

Figures: Fig. 19A; Fig. 20A; Fig. 33A-J; Fig. 40.

Type Material: Holotype (male): Region IX, Cuesta Las Raíces, S 38.42992°, W 71.44887°, 1583m, 12.ii.2013, S. Monckton & R. Smith, CCDB-19989 G08 (PCYU). **Allotype** (female): same data as holotype, CCDB-19989 G09 (PCYU). **Paratypes** (2 males & 1 female): **Region VIII:** one male, Ñuble, Las Trancas, SE Recinto in Chillán area, S 36.917°, W 71.480°, 1250m, ii.1987, Luis E. Peña (AMNH); one female, Ñuble, Las Trancas, S 36.917°, W 71.480°, 1250m, xii.1993, L. Peña (AMNH); **Region VII:** one male, Laguna del Maule, S 36.00272°, W 70.45546°, 2227m, 9.i.2009, L. Packer, on *Phacelia* CCDB-22789 D04 // CHI09-7-2-005 (PCYU).

Etymology: The specific epithet was recommended by R.A. Lühr, and is derived from the type locality near Lonquimay, a place name formed in part from the Quechua *mayu* meaning “river”. It is to be treated as a noun in apposition.

Diagnosis: Males are diagnosable by the combination of first flagellomere longer than wide, metatibia with reduced ventral carina, and S1 process in lateral view with anterior apical angle broadly rounded. Females may be diagnosable by the distinctly convex clypeus, which in lateral view projects ~1.5OD above the inner orbit of the compound eye; otherwise by the combination of metatibia expanded ($\leq 3.9\times$ longer than maximum depth) and T3 with apical hair bands evenly sparse, not tomentose apicolaterally as on T1-T2.

Description: Male (Holotype): Length 6.5mm, forewing length 3.3mm, head width 1.3mm, thorax width 1.4mm, median ocellar diameter (OD) 0.12mm.

Colouration: Black-brown with following parts yellow: labrum; inverted T on clypeus, with apical margin dark laterad; lower paraocular area extending to level of transverse epistomal suture medially, further laterally but not reaching lower tangent of antennal socket; apicoventral spot on scape and pedicel; apex of profemur broadly on anterior surface, narrowly on posterior surface; dorsal surface of protibia, including dorsal half of anterior face; apical half of

prodistitarsus; anterior spot on tegula; apicodorsal rim of mesofemur, wider anteriorly; wide basal and narrow apical ring on mesotibia, as well as apical half of anterior surface; apicodorsal rim of metafemur; ventral surface of metatibia, as well as dorsal surface in basal quarter, and narrowly yellow apically, except broad around apical lamina and posterior concavity; basal half of metabasitarsus ventrally; apex of T7. Following parts yellow-brown: ventral surface of antenna from F1 to terminal flagellomere, suffused with darker brown basally; posterior surface of mesobasitarsus ventrally. Metasoma black, T1-T6 marginal zones yellow to translucent yellow margins.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard long and dense (0.5-3OD) longest at midlength; moderately long and dense on dorsolateral angle of propodeum (0.5-2OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), sparse in lower half ($i=2-3d$); lower paraocular area with punctures moderately dense ($i=1-2d$); supraclypeal area with punctures moderate ($i=1-2d$), dense toward lateral margins ($i \leq d$); frontal area with punctures very dense ($i \leq 0.5d$), moderately dense around ocelli ($i=1-2d$), dense on ocellocular space ($i \leq d$); vertexal area rugose with punctures dense ($i \leq d$); punctures shallow and moderately dense on scape ($i=1-2d$), denser apicoventrally ($i \leq d$); genal area striate with punctures dense ($i \leq d$); hypostomal area coarsely imbricate with punctures dense ($i \leq d$); pronotum with punctures moderately dense ($i=1-2d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$), sparser laterad ($i=1-2d$), crowded around median line ($i \leq d$); scutellum with punctures irregularly spaced ($i=1-3d$), crowded around median line ($i \leq d$); mesepisternum with punctures irregularly spaced, sparse below scrobe and anterior of episternal suture ($i \geq 2d$), impunctate just dorsad of scrobe, otherwise with dense punctures on hypoepimeral area ($i \leq d$); metanotum with punctures irregularly spaced ($i=1-3d$), crowded on median line and anteriorly ($i \leq d$); metepisternum with punctures moderate ($i=1-2d$) and distinctly striate anterodorsally; metapostnotum rugose; propodeum coarsely imbricate, rugulose posteriorly, with punctures moderately dense ($i=1-2d$); T1-T5 with punctures small and sparse ($i=1-3d$); T6 coarsely imbricate posteriorly, with punctures small and sparse ($i \geq 2d$); T7 with punctures small and sparse ($i \geq 2d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum ~2.67x wider than long (24:9); length of malar space ~0.85x that of clypeal lateral (6:7); LOT crossing below anterior tentorial pits; length of clypeus equal to maximum width in frontal view (30:30), extending for less than half of its length beyond LOT, and in lateral view distinctly bulging above anterior tentorial pit (~1.5OD); median longitudinal groove present on clypeus except on apical margin; subantennal sutures 1.1x longer than the shortest distance between them (16:14.5); IAD ~1.7x AOD (14.5:8.5); scape ~2.6x longer than maximum width (26:10); pedicel slightly longer than wide (9.5:9); F1 longer than wide (10:9); F2 1.3x longer than F1, and shorter than F3 (13:15); UOD ~1.4x LOD, IOD ~1.1x UOD (UOD:IOD:LOD - 55:60:39); frontal line carinate only between antennal bases for a length less than OD, undefined above; MOC subequal to width of head (87:89); OOC 0.75x IOC (15:20); genal area ~0.6x as wide as compound eye in lateral view (17:29); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 61:23:12:17; probasitarsus ~2.9x longer than wide (25:8.5); prodistitarsus 0.9x as long as preceding three tarsomeres combined (from base to apex - 6.5:5:4:14); metafemur nearly twice as long as maximum depth (67:40); summit of metatibial ventral convexity rounded and nearly perpendicular to apex; metatibia ~1.67x longer than maximum depth (52:31); in apical view length of metatibial apical lamina ~1.2x median ocellar diameter (11:9), broad and thick; metatibia with posterior carina black and rounded, ventral carina reduced and originating at midlength of posterior carina; metabasitarsus ~3.5x longer than maximum depth (46:13); S1 process with a longitudinal median ridge on apical surface, in lateral view with anterior and posterior margins subparallel apically, and median ridge projecting posteriorly from apex. S7 apodemal arm with sclerotized margin recurved mesad, dividing membranous portion of arm; ventral lobe narrow, almost linear; dorsal lobe roughly triangular, wide at base narrowing to apex, with row of setae long basally and shorter apically; apical disc nearly linear. S8 lateral process produced laterally, basolateral margin distinctly pointed, anteromedial sclerotized margin following marginal contour. Genital capsule with apicoventral truncate process weakly emarginate.

Female (Allotype): Length 6.1mm, forewing length 3.1mm, head width 1.1mm, thorax width 1.3mm, median ocellar diameter (OD) 0.10mm.

Colouration: Black to black-brown except as follows: labrum black to yellow-brown on apex; mandible with yellow basal spot, translucent yellow with apex black. Following parts

yellow-brown: apicoventral spot on F1 and F2; ventral surface of antenna from F3 to terminal flagellomere, with pale apical bands; apicodorsal rim of metafemur; basodorsal spot on metatibia. Following parts yellow: dorsal surface of protibia; apical two-thirds of prodistitarsus; basodorsal and apicodorsal spots on mesotibia. Metasoma black, T1-T5 marginal zones yellow to translucent yellow margins.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard moderately dense (0.5-2.5OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), more dense and short toward lateral margin (0.5OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-2OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 2OD$); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); metafemur and metatibia with scopae (1-1.5OD); T1-T2 apicolateral hair patches tomentose (0.5-1OD) and T3 apical hair bands evenly sparse; long and moderately dense on S1 ($\leq 2OD$); S2 with corbiculate scopa (1-2OD)

Surface sculpture: As in male except as follows: lower paraocular area with punctures dense ($i=d$); frontal area and ocellocular space with punctures moderately dense ($i=1-2d$); vertexal area with punctures dense ($i\leq d$); punctures shallow and moderately dense on scape ($i=1-2d$); genal area weakly striate, with punctures moderately dense ($i=1-2d$); hypostomal area imbricate with punctures moderately dense ($i=1-2d$); pronotum with punctures dense ($i=0.5-1d$); mesoscutum with punctures dense ($i=d$), moderately dense laterad ($i=1-2d$), crowded around median line ($i\leq d$); scutellum with punctures moderately dense ($i=0.5-2d$), crowded around median line ($i\leq d$); mesepisternum with punctures irregularly spaced, sparse below scrobe ($i=1-3d$), sparser anterior of episternal suture ($i\geq 3d$), impunctate just dorsad of scrobe, otherwise with punctures dense on hypoepimeral area ($i\leq d$); metanotum with punctures moderately dense ($i=0.5-2d$), crowded on median line and anteriorly ($i\leq d$); metapostnotum rugose; propodeum coarsely imbricate with punctures moderately dense ($i=1-2d$); T1-T5 with punctures small and sparse ($i=1-3d$ on T1-T3; $i\geq 2d$ on T4-T5); T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum 2.3x wider than long (23:10); length of malar space $\sim 0.6x$ that of clypeal lateral (5:8.5); LOT crossing below anterior tentorial pits; length of clypeus subequal to maximum width in frontal view (33.5:32), extending for less than half of its length beyond LOT, and in lateral view distinctly bulging above anterior tentorial pit as in male; median longitudinal groove weak on clypeus; length of subantennal sutures subequal to shortest distance between

them (13:13.5); IAD $\sim 1.4\times$ AOD (15:10.5); scape 3.25x longer than maximum width (26:8); pedicel $\sim 1.4\times$ longer than wide (9:6.5); F1 longer than wide (8:7); F2 more than half as long as F1 (4.5) and 0.75x as long as F3 (6); UOD $\sim 1.3\times$ LOD, IOD $\sim 1.1\times$ UOD (UOD:IOD:LOD - 51:58:40); frontal line carinate in lower third, flat above; MOC subequal to width of head (84:83); OOC $\sim 0.75\times$ IOC (14:19); genal area $\sim 0.67\times$ as wide as eye in lateral view (17:25); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 58:22:12:15; probasitarsus $\sim 2.9\times$ longer than wide (20:7); prodistitarsus $\sim 0.8\times$ as long as preceding three tarsomeres combined (from base to apex - 7:6:5:15); metafemur $\sim 2.9\times$ longer than maximum depth (49:17); metatibia $\sim 3.8\times$ longer than maximum depth (61:16); metabasitarsus $\sim 3.7\times$ longer than maximum depth (39:10.5).

Distribution & Habit: Known from Cuesta Las Raíces (Region IX), Las Trancas (Region VIII), and Laguna del Maule (Region VII); 1250-2227m a.s.l. Collected on *Phacelia* (1 record). Recorded December to February.

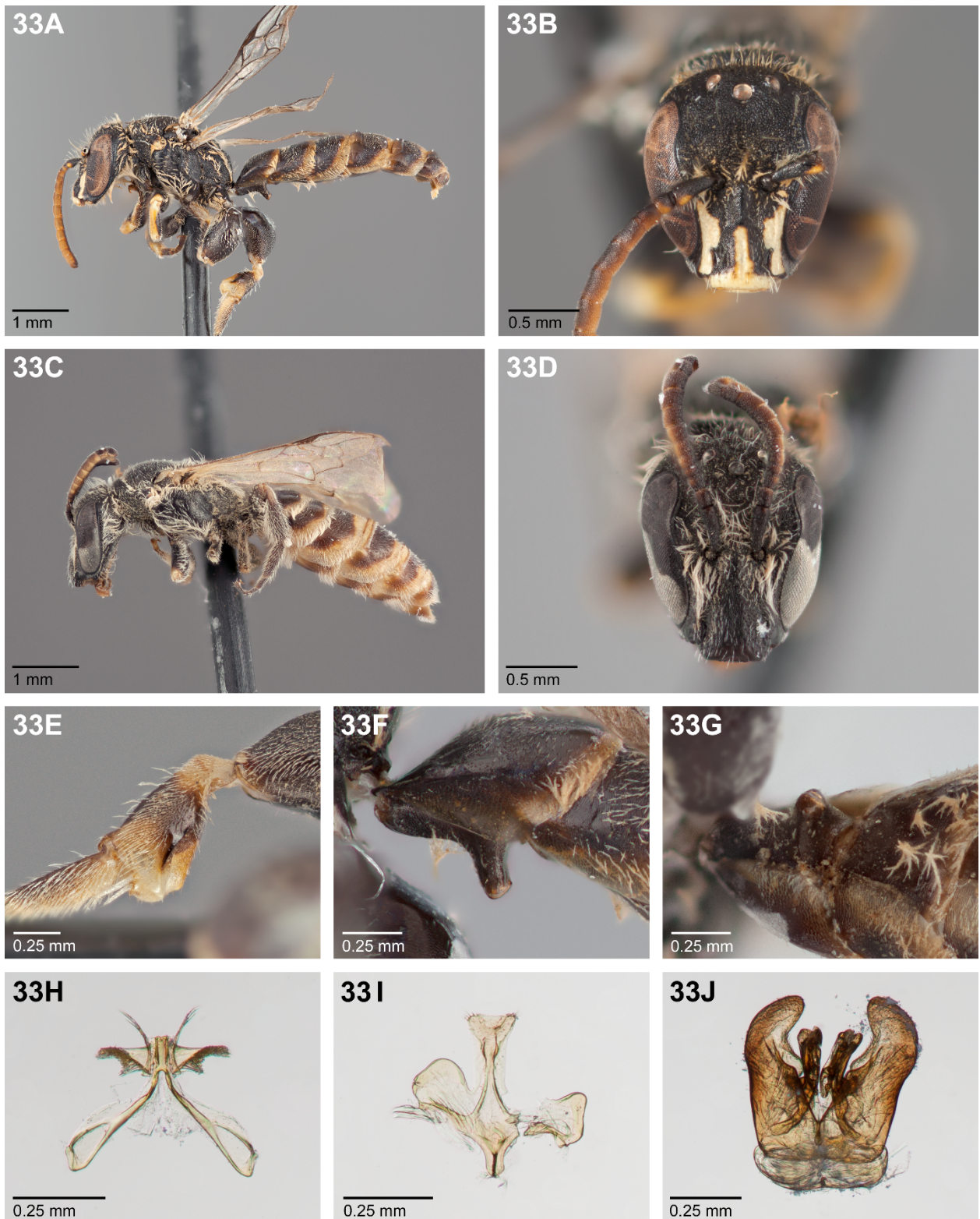


Fig. 33. *Chilicola mayu*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view[†]; (D) female face, frontal view; (E) male metatibia, posterior view[†]; (F) male S1 process, lateral view; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) neffi* Toro & Moldenke, 1979**

Chilicola neffi Toro & Moldenke, 1979: 113-114, 118-119, 172. Packer, 2008: 74, 77-78. Montalva & Ruz, 2010: 29. Moure et al., 2012. Ascher & Pickering, 2015.

Figures: Fig. 2A; Fig. 17B-C; Fig. 34A-J; Fig. 40.

Material studied (20 males & 28 females): **Holotype** (male): Region II, Taltal, S 25.406°, W 70.481°, 39m, 30.ix.1972, J. Neff (AMNH). **Allotype** (female): same data as holotype (AMNH). **Region II:** one paratype female, same data as holotype, on *Oxalis* (AMNH); one paratype female, same locality and collector as holotype, 1.x.1972, on *Cristaria* (AMNH); one paratype female, same locality and collector as holotype, 1.x.1972, on *Balbisia peduncularis* (AMNH); three males and two females, SE. of Taltal, Ruta 1, km 11, S 25.49631°, W 70.42129°, 499m, 27.ix-17.xi.2013, J. Postlethwaite & S. Monckton, pan traps (PCYU); one male, same locality, 17.xi.2013, J. Postlethwaite, white pan, CCDB-22789 D08 (PCYU); seven males and thirteen females, ~13km S. of Paposo, S 25.11111°, W 70.48352°, 21m, 29.ix-4.x.2002, J. Grixti & A. Zayed, pan traps (PCYU); four females, same locality and collectors, 28.ix-29.ix.2002, pan traps (PCYU); one male and two females, Cuesta Paposo, S 25.01861°, W 70.42714°, 676m, 24.x.2013, S. Monckton, PCYU 0021578, PCYU 0021645, PCYU 0021646 (PCYU); one male and three females, same locality and collector, 5.xi.2013, CCDB-19989 A01 // PCYU 0021663; CCDB-19989 A02 // PCYU 0021664, PCYU 0021579, PCYU 0021580 (PCYU); six males, Paposo, S 25.003°, W 70.463°, 39m, 1.x.1983, R. Aldunate (PUCV).

Diagnosis: Males and females of *C. neffi* are differentiated - along with *C. packeri* - by the longitudinal depressions on the paraocular area. Males can be distinguished from the latter by the metabasitarsus at most 3.9x longer than maximum depth. Females have variable metasomal colouration, ranging from entirely dark to more extensively orange-brown, but lighter-coloured females are distinguished from *C. packeri* by the orange-brown colouration on T1-T3 restricted to marginal zone and pregradular area, and disc darker in apical half.

Description: Male: Length 5.0-5.7mm, forewing length 3.1-3.2mm, head width 1.0-1.1mm, thorax width 1.1-1.2mm, median ocellar diameter (OD) 0.10-0.12mm.

Colouration: Black-brown with following parts yellow: labrum; variable on clypeus from inverted T to median line only, with apical margin dark laterad; lower paraocular area extending <1OD above transverse epistomal suture, not reaching ventral tangent of antennal socket; apicoventral spot on scape; apex of profemur broadly on anterior surface, narrowly on posterior surface; dorsal surface of protibia, including dorsal half of anterior face; anterior spot on tegula; apicodorsal rim of mesofemur, wider anteriorly; narrow basal ring and apicodorsal spot on mesotibia; apicodorsal rim of metafemur; basal quarter of metatibia, with apical ring narrow on anterior surface, extending to summit of ventral convexity, and widened to apical quarter on posterior surface. Following yellow-brown: apicoventral surface of pedicel, sometimes brown; ventral surface of flagellum, narrowing basally on F1, remaining flagellomeres variably suffused with brown basally and terminal flagellomere sometimes brown; posterior apical rim of protochanter; anterior face of probasitarsus; apical half of prodistitarsus. Apical third of mesodistitarsus brown. Metasoma dark brown, T1-T6 with marginal zones yellow-brown to translucent margins. Apex of T7 yellow to translucent yellow.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard long and moderately dense (0.5-3OD) longest at midlength; mesoscutum mostly bare with few short hairs (0.5OD), short and moderately dense toward lateral margin (0.5OD); moderately long and moderately dense toward lateral and posterior margins of scutellum (0.5-1OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum (≤ 2 OD); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hair long and dense (1.5OD basad, 1OD distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), sparse in apical half ($i=2-3d$); lower paraocular area with punctures moderately dense ($i=1-2d$); supraclypeal area with punctures moderately dense ($i=1-2d$), dense toward lateral margins ($i \leq d$); frontal area with punctures very dense ($i \leq 0.5d$), moderately dense on ocellocular space ($i=1-2d$); vertexal area with punctures very dense ($i \leq 0.5d$); punctures shallow and sparse on scape ($i=2d$); genal area striate with punctures dense ($i \leq d$); hypostomal area weakly imbricate with punctures moderately

dense ($i=1-2d$); pronotum with punctures dense ($i=0.5-1d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures moderately dense ($i=0.5-2d$), crowded around median line ($i\leq 0.5d$); mesepisternum with punctures irregularly spaced, moderately dense below scrobe ($i=0.5-2d$), more sparse anterior of episternal suture ($i=1-2d$); punctures irregularly spaced on hypoepimeral area ($i\leq 2d$); metanotum with punctures dense ($i=0.5-1d$), crowded on median line and anteriorly ($i\leq 0.5d$); metepisternum with punctures dense ($i\leq d$), distinctly striate anterodorsally; metapostnotum rugose; propodeum coarsely imbricate, rugulose posteriorly, with punctures moderately dense ($i=1-2d$); T1-T5 coarsely imbricate; T1-T2 with punctures moderately dense ($i\leq 2d$); T3-T5 with punctures dense ($i\leq d$); T6 coarsely imbricate posteriorly, with punctures moderately dense ($i=1-2d$); T7 with punctures moderately dense ($i=1-2d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum $\sim 2.6x$ wider than long (21:8); length of malar space $\sim 0.4x$ that of clypeal lateral (3:7); LOT crossing below anterior tentorial pits; length of clypeus subequal to maximum width in frontal view (28:28), extending for less than half of its length beyond LOT; median longitudinal groove on clypeus weakly present in dorsal half, absent ventrad; subantennal sutures $1.5x$ longer than the shortest distance between them (15:10); IAD $\sim 1.6x$ AOD (11:7); scape $\sim 2.67x$ longer than maximum width (24:9); pedicel as long as wide (8:8); F1 shorter than wide (6:8.5); F2 $\sim 1.33x$ longer than F1, and equal in length to F3 (8:8); UOD $\sim 1.4x$ LOD, IOD $\sim 1.1x$ UOD (UOD:IOD:LOD - 43:47:31); frontal line carinate between antennal bases for a length less than 1OD, bare just below median ocellus for a length of $\sim 1OD$, and otherwise undefined; MOC longer than width of head (78:74); OOC $\sim 0.7x$ IOC (11:16); genal area $\sim 0.67x$ as wide as compound eye in lateral view (17:27); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 53:20:9:14; probasitarsus $3.5x$ longer than wide (21:6); length of prodistitarsus subequal to that of preceding three tarsomeres combined (from base to apex - 6:5:4:14); metafemur $\sim 1.75x$ longer than maximum depth (59:34); summit of metatibial ventral convexity situated at approximately two-thirds of its length; metatibia $\sim 2.1x$ longer than maximum depth (49:23); in apical view length of metatibial apical lamina $\sim 0.67x$ median ocellar diameter (6:9), short and thick; metatibia with posterior carina black and toothed, ventral carina reduced and originating in apical third of posterior carina; metabasitarsus $\sim 3.75x$ longer than maximum depth (32:8.5); S1 process with apical surface weakly convex, in lateral view with anterior and posterior margins subparallel apically. S7 apodemal arm with sclerotized margin

entire, enclosing membranous portion of arm; ventral lobe $\sim 0.5x$ as broad as its basal length; dorsal lobe digitiform, apex widened relative to midlength, with row of broad setae mesobasally to apex; apical disc distinctly emarginate. S8 lateral process produced anteriorly, basolateral margin rounded, lateral process anteromedial sclerotized margin having distinct convex incursion, appearing swollen. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance $\sim 1.5x$ width of lateral tubercle.

Female: Length 4.4-5.6mm, forewing length 2.6-2.8mm, head width 0.9-1.0mm, thorax width 1.0-1.1mm, median ocellar diameter (OD) 0.10mm.

Colouration: Black to black-brown except as follows: mandible with yellow basal spot, translucent yellow in apical half, except apex translucent brown. Following parts yellow-brown: ventral surface of antenna from F3 to terminal flagellomere, flagellomeres suffused with brown basally, terminal flagellomere brown. Following parts yellow: dorsal surface of protibia; apical half of prodistitarsus; anterior spot on tegula, sometimes faint; wide basal and narrow apical ring on mesotibia. Following parts brown: apical third of mesodistitarsus; apicodorsal rim of metafemur; wide basal ring on metatibia. Metasoma variable from mostly black to mostly orange-brown, with at least marginal zones of T1-T5 narrowly translucent yellow; individuals with lighter metasomae have T1-T5 with wider yellow marginal zones to translucent yellow, and T1-T3 with pregradular area yellow to yellow-brown, but always with disc mostly brown.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard sparse (0.5-2OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), more dense and short toward lateral margin (0.5OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 1.5OD$); metafemur and metatibia with scopae (1-1.5OD); T1-T2 apicolateral hair patches tomentose (0.5-1OD) and T3 apical hair bands evenly sparse; long and moderately dense on S1 ($\leq 2.5OD$); S2 with corbiculate scopa (1-3OD).

Surface sculpture: As in male except as follows: clypeus with punctures moderately dense throughout ($i=1-2d$); lower paraocular area with punctures dense ($i=d$); supraclypeal area with punctures irregularly spaced ($i=1-2d$), dense toward lateral margins ($i \leq d$); frontal area with punctures dense ($i \leq d$); punctures moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures dense

($i \leq d$); punctures shallow and moderately dense on scape ($i=1-2d$); genal area with punctures dense ($i=d$); hypostomal area weakly imbricate with punctures sparse ($i \geq 2d$); lateral surface of pronotum coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$), crowded around median line ($i \leq 0.5d$); scutellum with punctures dense ($i=0.5-1d$), crowded around median line ($i \leq 0.5d$); mesepisternum with punctures irregularly spaced, moderately dense below scrobe ($i=1-3d$), sparser anterior of episternal suture ($i=1-4d$); punctures irregularly spaced on hypoepimeral area ($i \leq 2d$); metanotum with punctures dense ($i=0.5-1d$), crowded on median line and anteriorly ($i \leq 0.5d$); metapostnotum rugose, more weakly sculptured in posterior; propodeum with punctures moderately dense ($i=1-2d$); T1-T5 with punctures small and sparse ($i=1-3d$); T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum 2.3x wider than long (23:10); length of malar space $\sim 0.33x$ that of clypeal lateral (2.5:7.5); LOT crossing below anterior tentorial pits; clypeus subequal in length to maximum width in frontal view (28.5:27), extending for less than half of its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures 1.25x longer than the shortest distance between them (12.5:10); IAD $\sim 1.8x$ AOD (11.5:6.5); scape $\sim 3.33x$ longer than maximum width (20:6); pedicel longer than wide (8:6); F1 slightly shorter than wide (5:5.5); F2 shorter than F1, and shorter than F3 (3:4); UOD $\sim 1.4x$ LOD, IOD $\sim 1.05x$ longer than UOD (UOD:IOD:LOD - 40:42.5:29); frontal line carinate in lower half, flat above; MOC longer than width of head (75:66.5); OOC $\sim 0.67x$ IOC (10:15); genal area $\sim 0.7x$ as wide as eye in lateral view (16:23); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 49:18:8:11; probasitarsus 3.5x longer than wide (21:6); length of prodistitarsus subequal to that of preceding three tarsomeres combined (from base to apex - 5:4:3:13); metafemur $\sim 3x$ longer than maximum depth (41:14); metatibia $\sim 4.2x$ longer than maximum depth (52:12.5); metabasitarsus 3.75x longer than maximum depth (30:8).

Distribution & Habit: Costal from Taltal north to Paposo, and inland SE of Taltal (Region II); 21-676m a.s.l. Collected on *Cristaria* Cav. (1 record), *Balbisia peduncularis* (Lindl.) D. Don (1 record), and *Oxalis* L. (1 record). Recorded September to November.

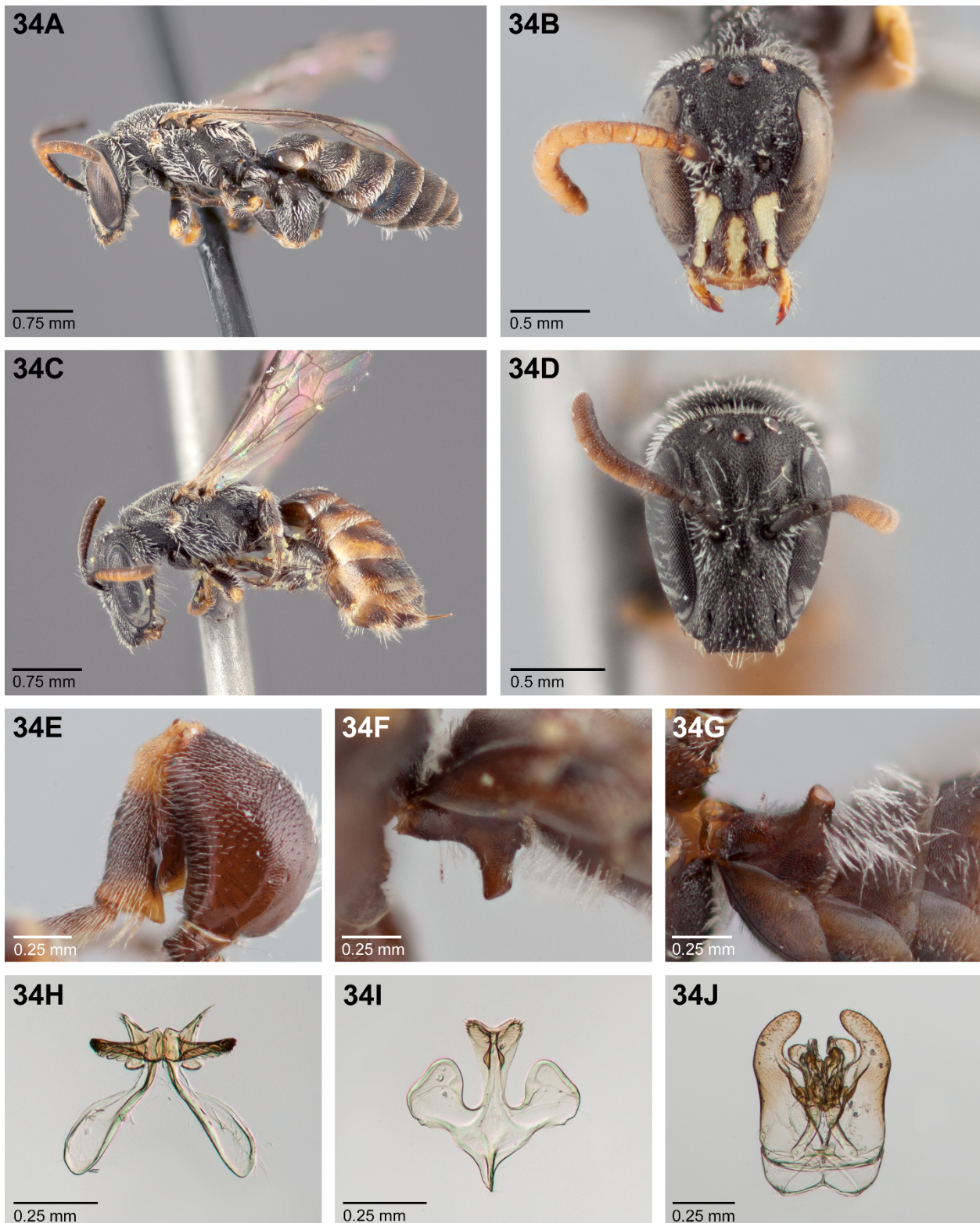


Fig. 34. *Chilicola neffi*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view[†]; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) packeri* Monckton sp. nov.**

Figures: Fig. 2B; Fig. 17A; Fig. 35A-J; Fig. 40.

Type Material: Holotype (male): Region III, N. of Vallenar, S 28.41415°, W 70.72134°, 658m, 15-17.ix.2010, L. Packer, pan trap (PCYU). **Allotype** (female): Region III, E. of Llanos de Challe, S 28.14995°, W 70.96102°, 189m, 14.x.2013, S. Monckton, PCYU 0020860 (PCYU).

Paratypes (3 males & 18 females): **Region III:** three males and two females, same data as allotype, PCYU 0020858, PCYU 0020859, CCDB-19989 A03 // PCYU 0021665, PCYU 0020864, CCDB-19989 A04 // PCYU 0021666 (PCYU); two females, same data (PUCV); two females, same data (CTMI); one female, same data (AMNH); four females, Parque Nacional Llanos de Challe, S 28.19642°, W 71.04398°, 230m, 22.x.2000, L. Packer (PCYU); two females, N. of Huasco km 39, S 28.14721°, W 71.15618°, 37m, 7.xi.2013, S. Monckton, CCDB-19989 A06 // PCYU 0021668, PCYU 0021594 (PCYU); one female, same data (AMNH); one female, Quebrada del Potrero, S 26.85686°, W 70.66392°, 348m, 14.x.2010, L. Packer & E. Almeida, PCYU 0004790 (PCYU); one female, Emb. Sta Juana, C-149 km 21.5, S 28.67467°, W 70.64323°, 642m, 15.x.2013, S. Monckton, CCDB-19989 A07 // PCYU 0021669 (PCYU); one female, Ruta 5, 768.8km, S 27.67283°, W 70.47462°, 653m, 1.x.2013, S. Monckton, CCDB-22788 F01 (PCYU); one female, Rd to Nantoco km 3, S 27.61610°, W 70.42785°, 678m, 6.xi.2013, S. Monckton, CCDB-19989 A05 // PCYU 0021667 (PCYU).

Etymology: The specific epithet honours Laurence Packer, the author's mentor and supervisor, and collector of the holotype specimen. It is formed in the genitive singular case.

Diagnosis: Males and females of *C. packeri* are differentiated - along with *C. neffi* - by the longitudinal depressions on the paraocular area. Males are distinguished from the latter by the metabasitarsus at least four times longer than maximum depth. Females are distinguished by the first three metasomal segments orange-brown, with the premarginal line of T1-T3 entirely dark or with paired lateral dark spots, and disc always entirely orange-brown.

Description: Male (Holotype): Length 5.3mm, forewing length 3.0mm, head width 1.0mm, thorax width 1.1mm, median ocellar diameter (OD) 0.10mm.

Colouration: Black-brown with following parts yellow: labrum; inverted funnel shape on clypeus, with apical margin dark laterad; lower paraocular area extending ~1OD above transverse epistomal suture, not reaching ventral tangent of antennal socket; apicoventral surface of scape and pedicel; ventral surface of antenna from F1 to terminal flagellomere, narrowing basally on F1, remaining flagellomeres suffused with brown basally; posterior apical rim of protochanter; apex of profemur broadly on anterior surface, narrowly on posterior surface; dorsal surface of protibia, including dorsal half of anterior face; anterior face of probasitarsus; apical half of prodistitarsus; anterior spot on tegula; apicodorsal rim of mesofemur, wider anteriorly; wide basal and apical rings on mesotibia, wider on apical anterior surface; basal spot on anterior surface of mesobasitarsus; apicoventral rim of metatrochanter; apicodorsal rim of metafemur; basal quarter of metatibia, with apical ring narrow on anterior surface, extending to summit of ventral convexity, and widened to apical quarter on posterior surface; basal quarter of metabasitarsus ventrally. Apicoventral margin of metacoxa translucent yellow. Apex of T7 yellow-brown. Metasoma dark brown, T1-T6 with marginal zones yellow-brown to translucent margins.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard long and moderately dense (0.5-2.5OD) longest at midlength; mesoscutum mostly bare with few short hairs (0.5OD), short and moderately dense toward lateral margin (0.5OD); long and moderately dense toward lateral and posterior margins of scutellum (1-2OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum (≤ 2 OD); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hair long and dense (1.5OD basad, 1OD distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), very sparse medially ($i\geq 3d$); lower paraocular area with punctures dense ($i=d$); supraclypeal area with punctures irregularly spaced ($i=1-3d$), dense toward lateral margins ($i\leq d$); frontal area with punctures very dense ($i\leq 0.5d$); punctures dense on ocellocular space adjacent to compound eye ($i\leq d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures very dense ($i\leq 0.5d$); punctures shallow and irregularly spaced scape ($i=1-3d$); genal area striate with punctures dense ($i\leq d$); pronotum with punctures dense (0.5-1d), lateral surface coarsely

imbricate; hypostomal area weakly imbricate to glabrous apically, with punctures sparse ($i \geq 2d$); mesoscutum with punctures dense ($i \leq d$); scutellum with punctures dense ($i = 0.5-1d$), crowded around median line ($i \leq d$); mesepisternum with punctures irregularly spaced, moderately dense to sparse below scrobe and anterior of episternal suture ($i = 1-2d$), irregularly spaced on hypoepimeral area ($i \leq 2d$); metanotum with punctures dense ($i = 0.5-1d$); metepisternum with punctures dense ($i \leq d$); metapostnotum coarsely rugose; propodeum coarsely imbricate, rugulose posteriorly, with punctures moderately dense ($i = 1-2d$); T1-T5 coarsely imbricate with punctures moderately dense ($i \leq 2d$); T6 with punctures sparse ($i = 3d$) to coarsely imbricate with punctures dense ($i = 0.5d$) posteriorly; T7 with punctures moderately dense ($i = 1-3d$); marginal zones of terga weakly imbricate and shiny, minutely punctate to impunctate.

Structure: Labrum $\sim 2.6x$ wider than long (21:8); length of malar space $\sim 0.5x$ that of clypeal lateral (3:6.5); LOT crossing below anterior tentorial pits; clypeus $\sim 1.2x$ longer than maximum width in frontal view (30:26), extending for approximately one third of its length beyond LOT; median longitudinal groove on clypeus weakly present in dorsal half, absent ventrad; length of subantennal sutures subequal to the shortest distance between them (13:12.5); IAD $\sim 1.6x$ AOD (11.5:7); scape $\sim 2.4x$ longer than maximum width (20:8.5); pedicel shorter than wide (7:8); F1 shorter than wide (6.5:7.5); F2 $\sim 1.2x$ longer than F1, and shorter than F3 (8:9); UOD $\sim 1.4x$ LOD, IOD $\sim 1.05x$ UOD (UOD:IOD:LOD - 42:45:31); frontal line carinate in lower third, flat above; MOC longer than width of head (74:71); OOC $\sim 0.6x$ IOC (10:17); genal area $\sim 0.6x$ as wide as compound eye in lateral view (12:21); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 50:18:7:11; probasitarsus $4x$ longer than wide (20:5); length of prodistitarsus $\sim 0.7x$ that of preceding three tarsomeres combined (from base to apex - 7:5.5:4:12); metafemur $\sim 1.9x$ as long as maximum depth (55:29); summit of metatibial ventral convexity situated at approximately two-thirds of its length; metatibia $\sim 2.2x$ longer than maximum depth (47:21); in apical view length of metatibial apical lamina $\sim 0.85x$ median ocellar diameter (6:7), short and thick; metatibia with posterior carina black and toothed, ventral carina reduced and originating in apical third of posterior carina; metabasitarsus $4x$ longer than maximum depth (30:7.5); S1 process with apical surface weakly convex, in lateral view with anterior and posterior margins subparallel apically. S7 apodemal arm with sclerotized margin entire, encircling membranous portion of arm; ventral lobe $\sim 0.5x$ as broad as its basal length; dorsal lobe digitiform, apex widened relative to midlength, with row of broad setae mesobasally

to apex; apical disc distinctly emarginate. S8 lateral process produced anteriorly, basolateral margin rounded, anteromedial sclerotized margin wide and following marginal contour. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance ~2x width of lateral tubercle.

Female (Allotype): Length 4.8mm, forewing length 2.8mm, head width 1.0mm, thorax width 1.1mm, median ocellar diameter (OD) 0.10mm.

Colouration: Black to black-brown except as follows: mandible with apex black, and pale yellow at base to translucent yellow apically. Following parts yellow-brown: ventral surface of antenna from F3 to terminal flagellomere, suffused with brown basally, terminal flagellomere dark apically. Following parts yellow: dorsal surface of protibia; anterior surface of probasitarsus; apices of protarsomeres, including apical two-thirds of prodistitarsus; anterior spot on tegula; wide basal ring on mesotibia. Following parts brown: apicoventral spot on F1 and F2; narrow apical ring on mesotibia; apical half of mesodistitarsus; apicodorsal rim of metafemur; wide basal ring on metatibia. Metasoma mostly orange-brown, T1-T5 marginal zones translucent orange to translucent yellow margins; T1 with pregradular area black, T1-T2 with lateral recurved portion of gradulus black, T1-T3 with lateral dark spots on premarginal line, T4-T6 black; sterna orange-brown, suffused with dark brown on disc and premarginal line.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard sparse (0.5-1.5OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), more dense and short toward lateral margin (0.5OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 1.5OD$); moderately long and dense on dorsolateral angle of propodeum (0.5-1OD); scopae on metafemur and metatibia (1-1.5OD); T1-T2 apicolateral hair patches tomentose (0.5-1OD) and T3 apical hair bands evenly sparse; long and moderately dense on S1 ($\leq 2.5OD$); S2 with corbiculate scopa (1-2.5OD)

Surface sculpture: As in male except as follows: clypeus with punctures moderately dense throughout ($i=1-2d$); supraclypeal area with punctures irregularly spaced ($i=1-2d$), dense toward lateral margins ($i\leq d$); frontal area with punctures dense ($i\leq d$); punctures moderately dense on ocellocular space ($i=1-2d$); vertexal area with punctures dense ($i\leq d$); genal area coarsely imbricate with punctures dense ($i=d$); mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures dense ($i=0.5-1d$); mesepisternum with punctures irregularly spaced, moderately

dense below scrobe ($i=0.5-2d$), sparser anterior of episternal suture ($i=1-3d$), punctures irregularly spaced on hypoepimeral area ($i\leq 2d$); metanotum with punctures moderately dense ($i=0.5-2d$); metapostnotum coarsely rugose; propodeum coarsely imbricate with punctures moderately dense ($i=1-2d$); T1-T5 with punctures small and sparse ($i\geq 2d$; but $i=1-3d$ on T3); T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum $\sim 2.5\times$ wider than long (23:9); length of malar space approximately one third that of clypeal lateral (2.5:8); LOT crossing below anterior tentorial pits; length of clypeus subequal to maximum width in frontal view (34:29), extending for less than half of its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures ~ 1.1 longer than shortest distance between them (12.5:11); IAD $1.5\times$ AOD (12:8); scape $3.5\times$ longer than maximum width (21:6); pedicel longer than wide (8:6.5); F1 slightly longer than wide (6:5.5); F2 half as long as F1 (3) and $0.75\times$ as long as F3 (4); UOD $\sim 1.3\times$ LOD, IOD $\sim 1.05\times$ longer than UOD (UOD:IOD:LOD - 42:44:32); frontal line carinate in lower half, flat above; MOC longer than width of head (75:69); OOC $\sim 0.6\times$ IOC (10:17); genal area $\sim 0.75\times$ as wide as eye in lateral view (17:23); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 51:19:9:13.5; probasitarsus $\sim 3.5\times$ longer than wide (19:5.5); length of prodistitarsus $\sim 0.9\times$ that of preceding three tarsomeres combined (from base to apex - 5:4.5:4:12); metafemur $3\times$ longer than maximum depth (39:13); metatibia $\sim 4.33\times$ longer than maximum depth (52:12); metabasitarsus $4\times$ longer than maximum depth (32:8)

Variation: Some females have F1-F3 more thoroughly dark, with only the apicoventral margin brown.

Distribution & Habit: Embalse Sta. Juana north to Travesía, west to coast W of P.N. Llanos de Challe (Region III); 37-653m a.s.l. Recorded September to November.

Comments: Specimens of *C. packeri* had previously all been identified as *C. neffi* due to the longitudinal depressions on the frontal area present in both species. The former was recognized following the observation that it has a distinct, non-overlapping geographic distribution relative to *C. neffi*, as well as a unique DNA barcode sequence, following which morphological differences were also observed.

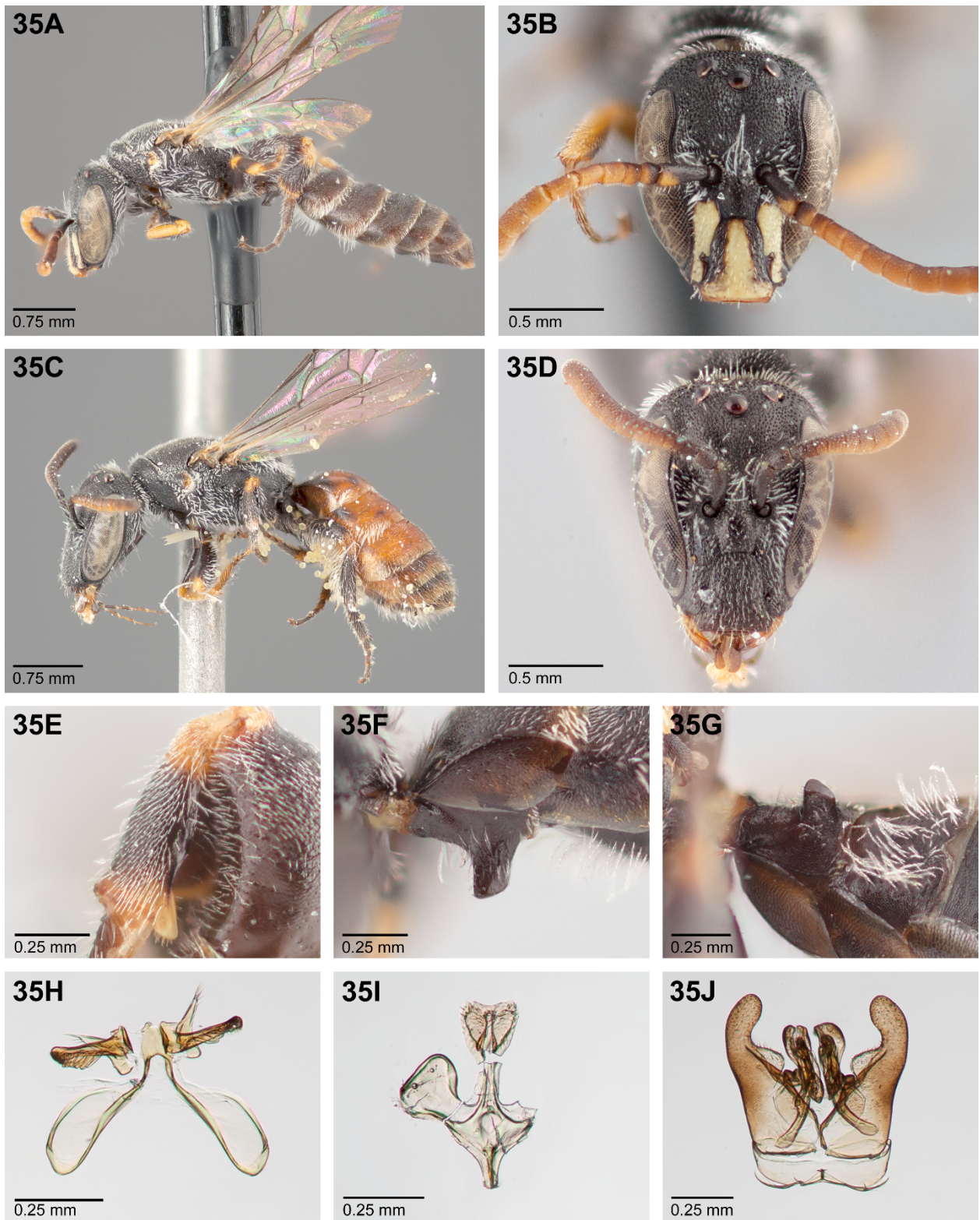


Fig. 35. *Chilicola packeri*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) randolphi* Monckton sp. nov.**

Figures: Fig. 3B; Fig. 12A; Fig. 13A; Fig. 36A-J; Fig. 40.

Type Material: Holotype (male): Region VII, Laguna del Maule, S 36.00272°, W 70.45546°, 2227m, 4.i.2009, L. Packer, on *Phacelia*, CCDB-03755 D08, CHI09-6-5-004 (PCYU). **Allotype** (female): same data as holotype, CHI09-6-5-007 (PCYU). **Paratypes** (5 males & 12 females): **Region VII**: one male and four females, same data as holotype, CHI09-6-5-008, CHI09-6-5-001, CHI09-6-5-002, CHI09-6-5-005, CHI09-6-6-001, (PCYU); two females, same data as holotype (PUCV); two females, same data as holotype (CTMI); one male and one female, E. of Laguna del Maule, 160.120km, S 35.99282°, W 70.39911°, 2505m, 1-6.i.2013, L. Packer & R. Smith, white pan traps, CCDB-19991 D05, CCDB-19991 D02 (PCYU); one female, W. of Laguna del Maule, S 35.99009°, W 70.39767°, 2541m, 5.i.2009, L. Packer, on *Phacelia*, CCDB-03755 E07 // CHI09-6-5-056 (PCYU); **Region VIII**: two males, Ñuble, Los Lleuques, 4km. E. of Recinto, S 36.854°, W 71.645°, 783m, xii.1982, L. Peña (AMNH); one male, Ñuble Prov., Las Cabras, mts. in Chillán area, S. Chillán Volcano, S 36.918°, W 71.429°, 1500m, 6-31.i.1963, L.E. Peña (AMNH); one female, Ñuble, Las Trancas, SE. Recinto in Chillán area, S 36.911°, W 71.480°, 1250m, i.1987, Luis E. Peña (AMNH); one female, Ñuble, Las Trancas, Shangrila in Chillán area, SE. Recinto, S 36.876°, W 71.468°, 1549m, 14.xii.1983, L. Peña (AMNH).

Etymology: The specific epithet honours the author's father, Randolph W. Monckton, who nurtured an interest in science and geography, and encouraged a desire for knowledge. It is formed in the genitive singular case.

Diagnosis: Males are readily diagnosed by the distinctly truncate S1 process with apex perpendicular to axis of process in lateral view, and metabasitarsus expanded (only ~3x longer than maximum depth). Among consubgenera, only *C. erithropoda* has the metabasitarsus expanded thus, but is readily distinguished from *C. randolphi* by the entirely yellow-orange tibiae and S1 process in lateral view with anterior and posterior margins divergent apically. Females are diagnosable by the red-brown metasoma and protibia yellow only on basal half of dorsal surface. Females of *C. packeri* (and some individuals of *C. neffi*) also have the metasoma

red-brown, but are distinguished from *C. randolphi* by the presence of frontal depressions which partially accommodate the scape and protibia yellow on entire dorsal surface.

Description: Male (Holotype): Length 5.6mm, forewing length 3.6mm, head width 1.3mm, thorax width 1.4mm, median ocellar diameter (OD) 0.13mm.

Colouration: Black-brown with following parts yellow: labrum; clypeus except broadly dark along epistomal suture, and apical margin brown laterad; lower paraocular area, extending dorsad to just below lower tangent of antennal socket laterally and about 1OD above transverse portion of epistomal suture medially; apicoventral spot on scape; posterior apical rim of protochanter; apex of profemur broadly on anterior surface, narrowly on posterior surface; protibia except dark medioventrally; basal half of dorsal surface of probasitarsus; anterior spot on tegula; wide apical ring on mesofemur; basal and apical quarters of mesotibia, with dorsal surface suffused with yellow throughout; base of mesobasitarsus; apicodorsal rim of metafemur; ventral surface of metatibia, as well as dorsal surface in basal third, and narrowly yellow apically, except broad around apical lamina and posterior concavity; basal half of metabasitarsus ventrally; apex of T7. Following parts yellow-brown: ventral surface of antenna from apical half of pedicel to terminal flagellomere, narrowing basad on pedicel and F1; apical half of prodistitarsus; apicoventral rim of metacoxa and metatrochanter. Metasoma dark brown, T1-T6 marginal zones yellow-orange to translucent yellow margins.

Pubescence: White hairs generally short and sparse, not especially plumose; of long and moderately dense on lower paraocular area and around antennal base (1.5OD); genal beard long and dense (0.5-3OD) longest at midlength; moderately long and sparse on mesoscutum (1-1.5OD), more dense toward lateral margin; long and moderately dense toward lateral and posterior margins of scutellum (1-2OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum (≤ 2.5 OD); moderately long and dense on dorsolateral angle of propodeum (0.5-2.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hair long and dense (2OD basad, 1.5OD distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), sparse medially ($i=2-3d$); lower paraocular area with punctures moderately dense ($i=1-2d$); supraclypeal area with punctures irregularly spaced ($i=1-4d$), dense toward lateral margins ($i\leq d$); frontal area with punctures very dense ($i\leq 0.5d$), dense around ocelli ($i\leq d$), and moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus;

vertexal area rugose with punctures dense ($i \leq d$); punctures shallow and moderately dense on scape ($i=1-2d$), denser apicoventrally ($i \leq d$); genal area striate with punctures dense ($i \leq 2d$); hypostomal area with punctures dense ($i=d$); pronotum with punctures dense ($i=0.5-1d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$), sparser laterad ($i=0.5-2d$), crowded around median line ($i \leq d$); scutellum with punctures moderately dense ($i=1-2d$), crowded around median line ($i \leq d$); mesepisternum with punctures irregularly spaced, sparse below scrobe ($i=1-3d$), more sparse anterior of episternal suture ($i \geq 2d$), denser on hypoepimeral area ($i \leq 2d$); metanotum with punctures moderately dense ($i \leq 2d$), crowded on median line and anteriorly ($i \leq 0.5d$); metepisternum with punctures dense ($i \leq d$) and distinctly striate anterodorsally; metapostnotum rugose; propodeum coarsely imbricate with punctures moderately dense ($i=1-2d$); T1 with punctures small and moderately dense ($i=1-3d$); T2-T5 with punctures moderately dense ($i=1-3d$); marginal zones of terga weakly imbricate and shiny, minutely punctate to impunctate.

Structure: Labrum $\sim 2.2x$ wider than long (25:11.5); malar space slightly shorter than clypeal lateral (7:8); LOT crossing through anterior tentorial pits; length of clypeus subequal to maximum width in frontal view (30:31), extending for less than half its length beyond LOT, and in lateral view bulging above anterior tentorial pit ($\sim 1OD$); median longitudinal groove present on clypeus except on apical margin; subantennal sutures shorter than the shortest distance between them (15:16); IAD nearly double AOD (15: 8); scape $\sim 2.3x$ longer than maximum width (25:11); pedicel slightly shorter than wide (9:9.5); F1 as long as wide (9.5:9.5); F2 $\sim 1.5x$ longer than F1, and same length as F3 (14.5:14.5); UOD $\sim 1.3x$ LOD, IOD $\sim 1.1x$ UOD (UOD:IOD:LOD - 55:60:42); frontal line carinate in lower half, flat above, and interrupted at midlength; MOC shorter than width of head (82:93); OOC $\sim 0.8x$ IOC (16:19); genal area $0.6x$ as wide as eye in lateral view (18:30); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 65:25:11:20; probasitarsus $\sim 2.6x$ longer than wide (21:8); length of prodistitarsus subequal to that of preceding three tarsomeres combined (from base to apex- 6:4:5:16); metafemur $1.85x$ longer than maximum depth (74:40); summit of metatibial ventral convexity nearly perpendicular to apex; metatibia less than twice as long as maximum depth (53:32); in apical view length of metatibial apical lamina $\sim 1.33x$ median ocellar diameter (12:9), laminar, and with a distinct, secondary, anterior lobe; metatibia with posterior carina distinct and black, but weakly defined and concave at midlength; ventral carina distinct and black, and

sharply toothed apically; metabasitarsus very deep in basal half, only ~3x longer than maximum depth (46:15); S1 process with apical surface longitudinally concave, in lateral view with anterior and posterior margins subparallel apically. S7 apodemal arm with sclerotized margin terminating mesolaterad; ventral lobe ~0.5x as broad as its basal length; dorsal lobe strap-like, roughly parallel-sided, with basal tuft of long setae and a short apical row, midlength bare; apical disc sinuate. S8 lateral process with basolateral margin rounded, anteromedial sclerotized margin following marginal contour. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance less than width of lateral tubercle.

Female (Allotype): Length 5.6mm, forewing length 3.6mm, head width 1.1mm, thorax width 1.3mm, median ocellar diameter (OD) 0.10mm.

Colouration: Black to black-brown except as follows: labrum yellow-brown; mandible with yellow basal spot, translucent yellow in apical half except apex translucent brown. Following parts brown: spot below anterior tentorial pit; median spot on clypeus just above level of anterior tentorial pits; basoventral spot on scape. Following parts yellow: dorsal surface of protibia in basal half; apical two-thirds of prodistitarsus; faint anterior spot on tegula; narrow basal ring on mesotibia. Following parts yellow-brown: apicoventral surfaces of pedicel and F1; ventral surface of antenna from F2 to terminal flagellomere, flagellomeres suffused with brown basally; apical ring on protibia; apical half of mesodistitarsus; apical ring on metafemur; basal ring on metatibia. Metasoma orange-brown, with graduli of T2-T4 and S2-S4 dark, widened medially to basal half of disc on S2.

Pubescence: As in male except as follows: moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard moderately dense (0.5-2.5OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5OD$), more dense toward lateral margin; long and moderately sparse toward lateral and posterior margins of scutellum (1-2OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum (2OD); metafemur and metibia with scopae (1-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); long and moderately dense on S1 ($\leq 2OD$); S2 with corbiculate scopa (1-2OD).

Surface sculpture: As in male except as follows: lower paraocular area with punctures moderately dense ($i=1-2d$), denser adjacent to epistomal suture ($i<d$); frontal area with punctures dense ($i\leq d$), moderately dense around ocelli ($i=1-2d$); punctures dense on ocellocular space adjacent to compound eye ($i\leq d$) becoming impunctate adjacent to lateral ocellus; vertexal area

with punctures dense ($i \leq d$); punctures shallow and moderately dense on scape ($i=1-2d$); genal area weakly imbricate with weak striae in posterior, punctures moderately dense ($i=1-2d$); hypostomal area with punctures moderately dense ($i \leq 2d$); pronotum with punctures dense ($i=d$); mesoscutum with punctures dense ($i=d$), more sparse laterad ($i=1-2d$); scutellum with punctures moderately dense ($i=0.5-2d$); metanotum with punctures moderately dense ($i=0.5-2d$) crowded on median line and anteriorly ($i \leq 0.5d$); metapostnotum rugose; T1-T5 with punctures small and sparse ($i=1-3d$); T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum $\sim 2.3x$ wider than long (26:11.5); length of malar space $\sim 0.8x$ that of clypeal lateral (7:9); LOT crossing through anterior tentorial pits; length of clypeus subequal to maximum width in frontal view (34:33), extending for less than half its length beyond LOT, and in lateral view weakly bulging above anterior tentorial pit as in male; median longitudinal groove absent from clypeus; subantennal sutures shorter than the shortest distance between them (12.5:14.5); IAD $1.6x$ AOD (16:10); scape $\sim 3.3x$ longer than maximum width (26:8); pedicel $\sim 1.3x$ longer than wide (9:7); F1 slightly longer than wide (8:7.5); F2 $\sim 0.6x$ as long as F1 (4.5) and $0.75x$ as long as F3 (6); UOD $\sim 1.3x$ LOD, IOD $\sim 1.1x$ UOD (UOD:IOD:LOD - 55:60:42); frontal line carinate in lower half, flat above; MOC shorter than width of head (85:90); OOC $\sim 0.7x$ IOC (13.5:20); genal area about two thirds as wide as eye in lateral view (18:28); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 61:25:11.5:16; probasitarsus $\sim 3.5x$ longer than wide (25:8.5); prodistitarsus $\sim 0.9x$ as long as preceding three tarsomeres combined (from base to apex - 6:4:5:14); metafemur $\sim 3.3x$ longer than maximum depth (53:16); metatibia $\sim 4.7x$ longer than maximum depth (66:14); metabasitarsus almost $4x$ longer than maximum depth (43:11).

Variation: Some males have the ventral margin of the metatibia dark. Females often have the gradulus of T1 dark, and usually lack the brown spots on the clypeus and below the anterior tentorial pit.

Distribution & Habit: Laguna del Maule (Region VII) southwest to Las Trancas (Region VIII); 783-2227m a.s.l. Collected on *Phacelia* (12 records). Recorded December to January.

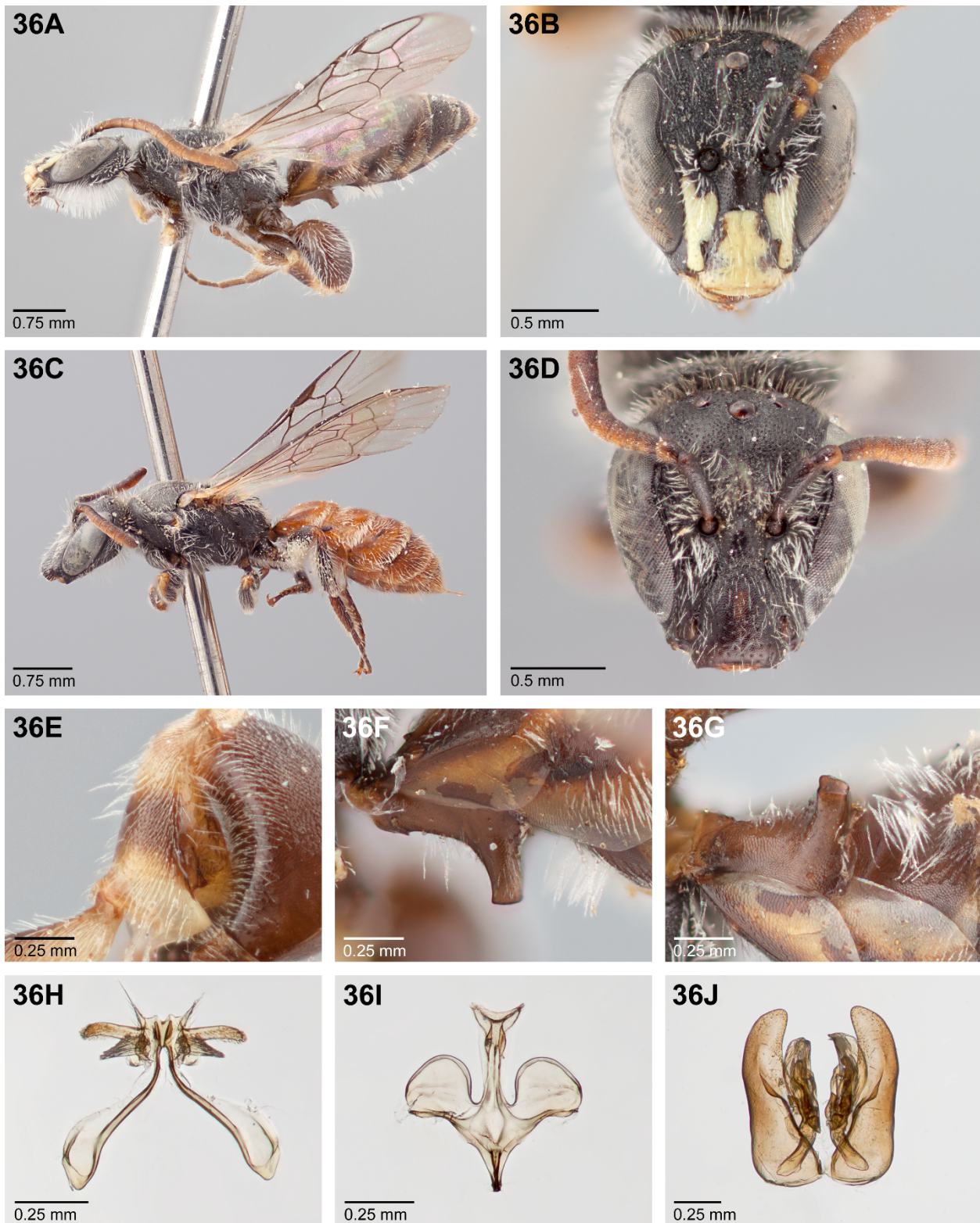


Fig. 36. *Chilicola randolphi*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view[†]; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) travesia* Toro & Moldenke, 1979**

Chilicola travesia Toro & Moldenke, 1979: 113-114, 125-127, 172. Packer, 2008: 77. Montalva & Ruz, 2010: 29. Moure et al., 2012. Ascher & Pickering, 2015.

Figures: Fig. 1A; Fig. 21A; Fig. 22A; Fig. 37A-J; Fig. 40.

Material studied (24 males & 19 females): **Holotype** (male): Region III, Travesía, S 27.540°, W 70.443°, 713m, x.1972, Toro (AMNH). **Allotype** (female): same data as holotype (AMNH). **Region III**: one paratype female, same data as holotype (AMNH); two paratype females, same data as holotype, on *Heliotropium* (AMNH); one paratype male, same locality as holotype, 23.x.1969, H. Toro, PUCV-ENTO 19915 (PUCV); three paratype males and two paratype females, same locality as holotype, x.1969, H. Toro (AMNH); one paratype female, Via Panam N of Caldera, S 27.058°, W 70.803°, 17m, 2.x.1972, J.L. Neff, on *Cristaria* (AMNH); one male, same locality as holotype, ix.1986, De la Hoz (PUCV); one female, same locality as holotype, ix.1986, De la Hoz Jr. (PUCV); one male and one female, Atacama Prov., 50-60km S Copiapó, S 27.798°, W 70.501°, 500m, 24.viii.1966, M.E. Irwin & E.I. Schlinger (BBSL); one female, 2.4 km N. of Huasco Bajo, S 28.4554°, W 71.1849°, 19m, 19.x.2009, J. Gibbs, Bee-BOL BOWGF1091-10 B04743D10-CHL (PCYU); two females, N. of Huasco, S 28.44019°, W 71.18803°, 26m, 14.x.2013, S. Monckton, pan trap, CCDB-19989 C03 // PCYU 0021689, CCDB-19989 D04 // PCYU 0021697 (PCYU); one female, same locality, 7.xi.2013, S. Monckton, pan trap, CCDB-19989 C04 // PCYU 0021690 (PCYU); four males, 4.4km N. of Huasco Bajo, S 28.430°, W 71.192°, 16m, 14.ix.2010, L. Packer (PCYU); one male, Tres Playitas 10km N. of Huasco Bajo, S 28.397°, W 71.185°, 32m, 13.x.2001, L. Packer (PCYU); one male and one female, Parque Nacional Llanos de Challe, S 28.196°, W 71.044°, 230m, 13.x.2000, L. Packer (PCYU); one female, N. of Huasco km 67.2, S 27.92718°, W 71.08508°, 169m, 7.xi.2013, S. Monckton, pan trap, CCDB-19989 C01 // PCYU 0021687 (PCYU); one male, N. of Huasco km 72, S 27.88955°, W 71.08239°, 216m, 7.xi.2013, S. Monckton, pan trap, CCDB-19989 B07 // PCYU 0021681 (PCYU); one male, Castilla, S 27.856°, W 70.597°, 327m, 18.ix.1986, L. Ruz (PUCV); one male, same locality, ix.1986, H. Toro (AMNH); one female, Caleta Totoral, S 27.83161°, W 71.08409°, 14m, 7.xi.2013, S. Monckton, pan trap, CCDB-19989

C02 // PCYU 0021688 (PCYU); one male and one female, Rd to Nantoco km 0, S 27.60427°, W 70.44953°, 580m, 1.x.2013, S. Monckton, CCDB-19989 B04 // PCYU 0021678, CCDB-19989 B05 // PCYU 0021679 (PCYU); one male and one female, Hwy 5, km 848, S 27.3448°, W 70.6931°, 193m, 16.x.2009, J. Gibbs (PCYU); one male, same data, Bee-BOL BOWGF1087-10 B04743D06-CHL (PCYU); one male, 1 km N of Caldera, S 27.0575°, W 70.8028°, 17m, 18.x.2009, J. Gibbs, Bee-BOL BOWGF1094-10 B04743E01-CHL (PCYU); one male and one female, Pesquera Bahía Caldera, S 27.05143°, W 70.80428°, 0m, 6-15.xi.2013 S. Monckton & J. Postlethwaite (PCYU); two males, Balneario Flamenco, S. of Chanaral, S 26.573°, W 70.682°, 15m, 22.iii.2000, L. Packer (PCYU).

Diagnosis: Males are separated - along with *C. erithropoda* - by the tibiae and tarsi mostly or entirely yellow-orange, and differentiated from the latter by MOC equal to or greater than width of the head, and apical surface of S1 process longitudinally concave. Females of *C. travesia* and *C. erithropoda* share the combination of malar space less than 2/3x as long as the clypeal lateral, metatibia expanded (<4x longer than maximum depth), and apex of T3 with apicolateral hair patches tomentose as on T1-T2. Females of *C. travesia* are differentiated by the metatibia mostly or entirely yellow (basal third and apical quarter at minimum) and the probasitarsus entirely yellow (sometimes suffused with yellow-brown at midlength on posterior face).

Description: Male: Length 5.3-5.8mm, forewing length 3.2-3.5mm, head width 1.2-1.3mm, thorax width 1.3mm, median ocellar diameter (OD) 0.13mm.

Colouration: Black-brown with following parts yellow: labrum; clypeus except narrowly dark at mid-length along epistomal suture, and often with apical margin translucent brown laterad; lower paraocular area, extending more than 1OD above transverse portion of epistomal suture medially and reaching lower tangent of antennal socket laterally; apicoventral surface on scape; ventral surface of pedicel, narrowing basally; ventral surface of flagellum; posterior apical rim of protrochanter; apex of profemur broadly on anterior surface, narrowly on posterior surface; protibia; protarsus; anterior spot on tegula; broad apical ring on mesofemur; mesotibia, sometimes suffused with brown medioventrally; mesotarsus; apicoventral rim of metacoxa and metatrochanter; broad apical ring on metafemur; metatibia, sometimes suffused with brown

mediodorsally; metabasitarsus, at least ventrally; apical half of metadistitarsus; apex of T7.

Metasoma dark brown, T1-T6 marginal zones yellow-orange to translucent yellow margins.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base (1OD); genal beard long and moderately dense (0.5-2OD) longest at midlength; mesoscutum sparsely covered in moderate hairs (1OD), denser toward lateral margin (0.5-1OD); long and of medium density toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; long and of medium density toward lateral margin of metanotum (≤ 2 OD); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 with hairs moderately long and moderately sparse (1OD basad, 0.5OD distad, bare mesad).

Surface sculpture: Clypeus with punctures irregularly spaced and sparse ($i=1-3d$); lower paraocular area with punctures dense ($i=d$); supraclypeal area with punctures moderately dense ($i=1-2d$), dense toward lateral margins ($i\leq d$); frontal area with punctures very dense ($i\leq 0.5d$); punctures moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures moderately dense ($i=1-2d$); punctures shallow and moderately dense on scape ($i=1-2d$), denser apicoventrally ($i\leq d$); genal area striate with punctures moderately dense ($i=1-2d$); hypostomal area weakly imbricate, with punctures dense ($i=d$); pronotum with punctures dense ($i=0.5-1d$); mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures moderately dense ($i=1-2d$), crowded around median line ($i\leq d$); mesepisternum with punctures irregularly spaced, sparse below scrobe and anterior of episternal suture ($i=1-2d$); impunctate just dorsad of scrobe, otherwise with irregularly spaced punctures on hypoepimeral area ($i\leq 2d$); metanotum with punctures dense ($i=0.5-2d$), crowded on median line and anteriorly ($i\leq 0.5d$); metepisternum with punctures dense ($i\leq d$); metapostnotum rugose, minutely rugose posteriorly; propodeum coarsely imbricate with punctures moderately dense ($i=1-2d$); T1-T5 coarsely imbricate; T1-T4 with punctures moderately dense ($i\leq 2d$); T5 moderately punctate-puncticulate ($i=1-3d$); T6 coarsely imbricate posteriorly and sparsely punctate-puncticulate ($i\geq 2d$); T7 sparsely punctate-puncticulate ($i\geq 2d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum ~ 2.8 x wider than long (24:8.5); length of malar space ~ 0.6 x that of clypeal lateral (4:7); LOT crossing below anterior tentorial pits; clypeus ~ 1.1 x longer than

maximum width in frontal view (35:31), extending for less than half of its length beyond LOT; clypeus with median longitudinal groove absent or marked by a very weak depression; subantennal sutures $\sim 1.3\times$ longer than the shortest distance between them (14:11); IAD $\sim 1.6\times$ AOD (13:8); scape $2.4\times$ longer than maximum width (24:10); pedicel slightly shorter than wide (8:8.5); F1 shorter than wide (7:9); F2 slightly longer than F1, and shorter than F3 (7.5:10); UOD $\sim 1.4\times$ LOD, IOD $\sim 1.1\times$ UOD (UOD:IOD:LOD - 50:54:36); frontal line carinate in lower half, bare just below median ocellus for a length of $\sim 0.5OD$, otherwise roughly defined; MOC subequal to width of head (89:87); OOC $\sim 0.5\times$ IOC (9:20); genal area $\sim 0.6\times$ as wide as compound eye in lateral view (18:33); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 61:25:11:14; probasitarsus $4\times$ longer than wide (24:6); length of prodistitarsus $\sim 0.7\times$ that of preceding three tarsomeres combined (from base to apex - 7:6:5:13); metafemur $\sim 1.67\times$ longer than maximum depth (60:36); summit of metatibial ventral convexity situated at approximately two-thirds of its length; metatibia $\sim 1.67\times$ longer than maximum depth (55:33); in apical view length of metatibial apical lamina $0.8\times$ median ocellar diameter (8:10), short and thick; metatibia with posterior carina brown and following contour of ventral carina, the latter brown with a dull tooth; metabasitarsus $\sim 3.7\times$ longer than maximum depth (41:11); S1 process with apical surface longitudinally concave, in lateral view with anterior and posterior margins divergent apically, apex appearing strongly anteriorly bent. S7 apodemal arm with sclerotized margin terminating mesolaterad; ventral lobe $\sim 0.25\times$ as broad as its basal length; dorsal lobe strap-like, roughly parallel-sided, with row of setae long basally and shorter apically; apical disc distinctly emarginate. S8 lateral process produced laterally and anteriorly, basolateral margin dully pointed, with anteromedial sclerotized spot, disjunct from margin. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance less than width of lateral tubercle.

Female: Length 4.9-5.5mm, forewing length 3.1-3.2mm, head width 1.1-1.2mm, thorax width 1.1-1.3mm, median ocellar diameter (OD) 0.11-0.12mm.

Colouration: Black to black-brown except as follows: labrum black to translucent yellow; mandible with yellow basal spot, otherwise translucent yellow with apex translucent brown; antenna variable (scape with yellow-brown apicoventral spot to entirely dark; apicoventral surface of pedicel yellow to brown; ventral surface of flagellum yellow, either narrowing basally

on F1, or with apicoventral surface of F1 brown and narrowing basally on F2). Following parts yellow: protibia, sometimes dark medioventrally; protarsus; anterior spot on tegula; mesotibia, at least in basal quarter ventrally, basal third dorsally, and apical quarter; mesotarsus, at least basitarsus ventrally and apical half of distitarsus; broad apical ring on metafemur; metatibia, at least in basal third and apical quarter; metabasitarsus ventrally; apical half of metadistitarsus. Metasoma black, T1-T5 marginal zones yellow to translucent yellow margins.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard sparse (0.5-1.5OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), denser toward lateral margins; long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 1.5OD$); moderately long and dense on dorsolateral angle of propodeum (0.5-1.5OD); metafemur and metatibia with scopae (1-2OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); long and moderately dense on S1 ($\leq 2.5OD$); S2 with corbiculate scopa (1-3OD).

Surface sculpture: As in male except as follows: supraclypeal area with punctures irregularly spaced ($i=1-3d$), dense toward lateral margins ($i\leq d$); frontal area with punctures dense ($i\leq d$), moderately dense around ocelli ($i=1-2d$); punctures moderately dense on ocellocular space ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures moderately dense ($i=1-2d$); punctures shallow and moderately dense on scape ($i=1-2d$); genal area coarsely imbricate with punctures moderately dense ($i=1-2d$); hypostomal area weakly imbricate with shallow punctures sparse ($i\geq 2d$); mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures dense ($i=0.5-1d$); mesepisternum with punctures irregularly spaced, sparse below scrobe and anterior of episternal suture ($i=1-3d$); punctures dense on hypoepimeral area ($i\leq d$); metanotum with punctures moderately dense ($i=0.5-2d$); metapostnotum rugose, minutely rugose posteriorly; propodeum with punctures moderately dense ($i=1-2d$); T1 with punctures small and sparse ($i\geq 2d$ basally; $i=1-3d$ apically); T2-T5 with punctures small and sparse ($i=1-3d$ on T2-T3; $i\geq 2d$ on T4-T5); T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum 2.4x wider than long (24:10); length of malar space $\sim 0.67x$ that of clypeal lateral (6:9); LOT crossing below anterior tentorial pits; clypeus $\sim 1.2x$ longer than maximum width in frontal view (35:29), extending for less than half of its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures shorter than the shortest

distance between them (11.5:12.5); IAD 1.5x AOD (13.5:9); scape ~3.3x longer than maximum width (23:7); pedicel longer than wide (8.5:7); F1 shorter than wide (5.5:7); F2 shorter than F1, and shorter than F3 (4:5); UOD ~1.3x LOD, IOD ~1.1x longer than UOD (UOD:IOD:LOD - 48:51:38); frontal line carinate in lower half, flat above; MOC longer than width of head (83:79); OOC ~0.5x IOC (9.5:20.5); genal area ~0.6x as wide as eye in lateral view (16:28); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 56:22:11:12; probasitarsus 3.5x longer than wide (21:6); length of prodistitarsus ~0.7x that of preceding three tarsomeres combined (from base to apex - 7:6:5:12.5); metafemur ~3x longer than maximum depth (46:15); metatibia 3.6x longer than maximum depth (54:15); metabasitarsus 4x longer than maximum depth (36:9).

Distribution & Habit: Coastal from Huasco Bajo north to Balneario Flamenco and inland to Travesía (Region III); 0-713m a.s.l. Collected on *Heliotropium* L. (2 records) and *Cristaria* (1 record). Recorded August to November and March.

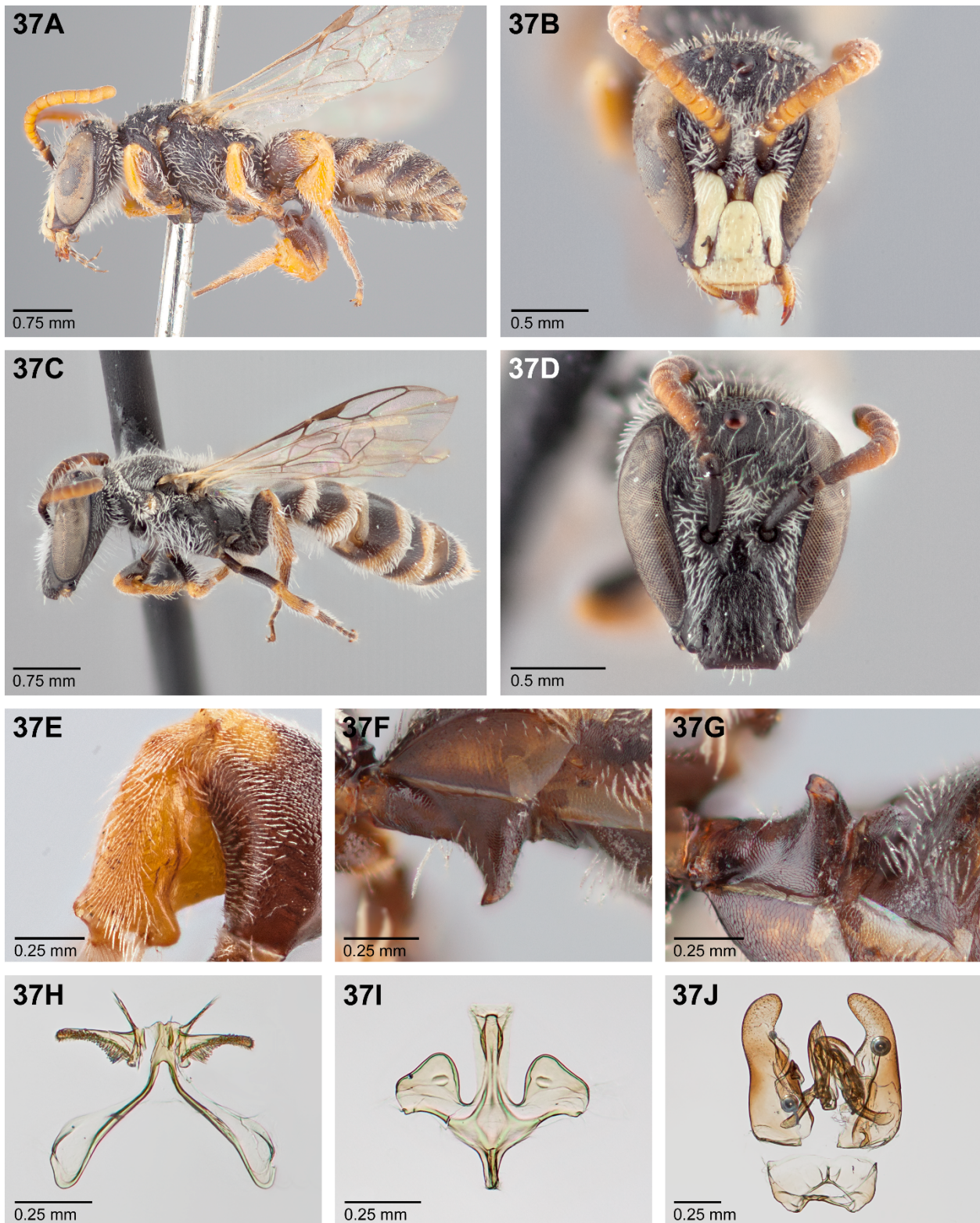


Fig. 37. *Chilicola travesia*: (A) male habitus, lateral view[†]; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view[†]; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) vicugna* Toro & Moldenke, 1979**

Chilicola vicugna Toro & Moldenke, 1979: 113-114, 120-121, 172. Packer, 2008: 77. Almeida et al., 2008: 76, 79. Montalva & Ruz, 2010: 29. Moure et al., 2012. Monckton, 2014: 234. Ascher & Pickering, 2015.

Figures: Fig. 3C; Fig. 4B; Fig. 5B; Fig. 18A; Fig. 19B; Fig. 20B; Fig. 38A-J; Fig. 40.

Material studied (18 males & 19 females): **Neotype** (male): Region IV, Elqui Prov. 26 km S. Vicuña, *S* 30.190°, *W* 70.661°, 1691m, 5.x.1994, Rozen, Quinter, & Ascher (AMNH). See comments. **Holotype** (male): El Pangue, *S* 30.168°, *W* 70.663°, 1711m, x.1972, Toro (AMNH). **Allotype** (female): same data as holotype, coll. Cabezas (AMNH). **Region IV**: Paratype male, same data as holotype, on *Pleurophora pusilla* (AMNH); one female, same locality as holotype, 13.x.1977, De la Hoz (PUCV); one male, Elqui: 45 km south Pisco, *S* 30.383°, *W* 70.347°, 3361m, 27.x.1992, A. Sharkov (AMNH); one male and two females, Chañar-Los Lavadores, *S* 30.2963°, *W* 70.62728°, 1396m, 10.ix.2010, L. Packer, B09866-F09 Bees of Chile258, B09866-F07 Bees of Chile256, B09866-F08 Bees of Chile257 (PCYU); two males, Chañares, *S* 30.296°, *W* 70.629°, 1389m, 12.ix.1984, H. Toro (AMNH); two males and one female, same data, coll. De la Hoz (AMNH); two males, Elqui Prov. 19km S. Pisco Elqui, *S* 30.265°, *W* 70.499°, 1991m, 6.x.1994, Rozen, Quinter, & Ascher (AMNH); one female, S. of Vicuña km 97, *S* 30.14154°, *W* 70.69011°, 1304m, 3.x.2013, S. Monckton, CCDB-19989 B06 // PCYU 0021680 (PCYU); one female, Puente Las Ternerías, *S* 29.98876°, *W* 70.25223°, 1644m, 4.ix.2010, Packer & Fraser, B09866-A08 Bees of Chile197 (PCYU); three males and six females, E. of Vicuña, 127.8 km, *S* 29.97767°, *W* 70.22926°, 1711m, 12-19.ix.2010, L. Packer (PCYU); one male and one female, 41-CH km 137.8, *S* 29.96704°, *W* 70.19362°, 1800m, 8.xi.2013, S. Monckton, pan trap, CCDB-19989 B11 // PCYU 0021685, CCDB-19989 B12 // PCYU 0021686 (PCYU); one male, Hwy 41-CH, km 133, *S* 29.96568°, *W* 70.20154°, 1716m, 17.x-8.xi.2013, S. Monckton (PCYU); four females, E. of Rivadavia, 41-CH, km 83, *S* 29.96192°, *W* 70.54105°, 855m, 5.xi.2013, S. Monckton (PCYU); one male, Elqui Prov. bet. Chapilca & Guanta, *S* 29.844°, *W* 70.461°, 1107m, 7.x.1994, Rozen, Quinter, & Ascher (AMNH); one male and one female, Emb. Sta

Juana, C-479 km 21.5, S 28.67467°, W 70.64323°, 642m, 15.x.2013, S. Monckton, CCDB-19989 A08 // PCYU 0021670, CCDB-19989 A09 // PCYU 0021671 (PCYU).

Diagnosis: Males are diagnosable by the combination of malar space shorter than ($\sim 0.5x$) clypeal lateral, S1 process apical surface with a distinct longitudinal ridge, and in lateral view having a distinctly acute anterior apical angle, sloping strongly toward sternum posteriorly. Females are diagnosable by the combination of malar space less than half as long as clypeal lateral, clypeal punctures sparse medially ($i \geq 2d$), and absence of longitudinal depressions on the paraocular area.

Description: Male (Neotype): Length 5.1mm, forewing length 3.1mm, head width 1.1mm, thorax width 1.1mm, median ocellar diameter (OD) 0.12mm.

Colouration: Black-brown with following parts yellow: labrum; clypeus except broadly dark along epistomal suture, sometimes with apical margin brown altered; lower paraocular area, extending $>1OD$ above transverse portion of epistomal suture and not reaching lower tangent of antennal socket; apicoventral spot on scape; apicoventral surface of pedicel; posterior apical rim of protochanter; apex of profemur broadly on anterior surface, narrowly on posterior surface; dorsal surface of protibia, as well anterior face, and basal and apical rings narrowing ventrally; probasitarsus dorsally, suffused with brown ventrally; anterior spot on tegula; apex of mesofemur broadly on anterior surface, narrowly on posterior surface; narrow basal and apical ring on mesotibia, the latter widened to apical third anteriorly; anterior face of metatibia in basal quarter and narrowly on apical margin to summit of ventral convexity, on posterior face in basal and apical third; metabasitarsus ventrally, darker apically. Following parts yellow-brown: ventral surface of flagellum, flagellomeres suffused with brown basally; apical third of prodistitarsus; apicoventral rim of metatrochanter; apex of T7. Metasoma black, T1-T6 with marginal zones translucent yellow.

Pubescence: White hairs generally short and sparse, not especially plumose; moderately long and moderately dense on lower paraocular area and around antennal base ($1OD$); genal beard long and dense ($0.5-3OD$) longest at midlength; mesoscutum mostly bare with few short hairs ($0.5OD$), moderately long and moderately dense toward lateral margin ($0.5-1OD$); long and moderately dense toward lateral and posterior margins of scutellum ($1-2OD$) longest

posteromedially; long and moderately dense toward lateral margin of metanotum ($\leq 2OD$); moderately long and dense on dorsolateral angle of propodeum ($0.5-1.5OD$); T1-T3 apicolateral hair patches tomentose ($0.5-1OD$); S2 with hair long and dense ($1.5OD$ basad, $0.5OD$ distad, shorter mesad).

Surface sculpture: Clypeus with punctures moderately dense ($i=1-2d$), sparse medially ($i=2-3d$); lower paraocular area with punctures dense ($i=d$); supraclypeal area with punctures moderately dense ($i=1-2d$), dense toward lateral margins ($i \leq d$); frontal area with punctures very dense ($i \leq 0.5d$), dense around ocelli ($i \leq d$), moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures dense ($i \leq d$); punctures shallow and moderately dense on scape ($i=1-2d$), denser apicoventrally ($i \leq d$); genal area striate with punctures dense ($i \leq d$); hypostomal area weakly imbricate, with punctures dense ($i=d$); pronotum with punctures dense ($i=0.5-1d$), lateral surface coarsely imbricate; mesoscutum with punctures dense ($i=0.5-1d$), crowded around median line ($i \leq 0.5d$); scutellum with punctures dense ($i=0.5-1d$), crowded around median line ($i \leq d$); mesepisternum with punctures irregularly spaced, sparse below scrobe and anterior of episternal suture ($i=1-3d$); impunctate just dorsad of scrobe, otherwise with punctures moderately dense on hypoepimeral area ($i=1-2d$); metanotum with punctures moderately dense ($i=0.5-2d$), crowded anteriorly ($i \leq 0.5d$); metepisternum with punctures dense ($i \leq d$), distinctly striate anterodorsally; metapostnotum rugose; propodeum coarsely imbricate with punctures moderately dense ($i=1-2d$); T1-T5 coarsely imbricate; T1 with punctures sparse basally ($i \geq 2d$), more dense apically ($i \leq 2d$); T2-T5 with punctures dense ($i \leq d$); T6 coarsely imbricate posteriorly, with punctures moderately dense ($i=1-2d$); T7 with punctures moderately dense ($i=1-2d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum 2.5x wider than long (20:8); length of malar space $\sim 0.5x$ that of clypeal lateral (4:7); LOT crossing below anterior tentorial pits; length of clypeus subequal to maximum width in frontal view (24:26), extending for approximately one third of its length beyond LOT; median longitudinal groove on clypeus weakly present in dorsal half, absent ventrad; length of subantennal sutures subequal the shortest distance between them (14:13.5); IAD $\sim 2.2x$ AOD (13:6); scape 3x longer than maximum width (24:8); pedicel slightly shorter than wide (8:8.5); F1 slightly shorter than wide (8.5:9); F2 $\sim 1.5x$ longer than F1, and $\sim 0.9x$ length of F3 (13:15); UOD $\sim 1.5x$ LOD, IOD $\sim 1.05x$ UOD (UOD:IOD:LOD - 49:52:32); frontal line carinate between

antennal bases for a length less than OD, bare just below median ocellus for less than 1OD, and otherwise roughly defined; MOC shorter than width of head (76:83); OOC $\sim 0.7\times$ IOC (12:17); genal area $\sim 0.67\times$ as wide as compound eye in lateral view (19:28); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 52:20:10:14; probasitarsus $\sim 3.33\times$ longer than wide (20:6); prodistitarsus 0.8x as long as preceding three tarsomeres combined (from base to apex - 6:5:4:12); metafemur $\sim 1.75\times$ longer than maximum depth (54:31); summit of metatibial ventral convexity situated at approximately two-thirds of its length; metatibia 2.2x longer than maximum depth (44:20); in apical view length of metatibial apical lamina $\sim 0.8\times$ median ocellar diameter (7:9), short and thick; metatibia with posterior carina black and broadly rounded, ventral carina yellow and rounded; metabasitarsus $\sim 4.2\times$ longer than maximum depth (36:8.5); S1 process with a longitudinal median ridge on apical surface, in lateral view with anterior and posterior margins convergent apically. S7 apodemal arm with sclerotized margin terminating mesolaterad; ventral lobe narrow, almost linear; dorsal lobe roughly triangular, wide at base narrowing to apex; row of setae long basally and shorter apically; apical disc distinctly emarginate. S8 lateral process produced anteriorly, basolateral margin dully pointed, anteromedial sclerotized margin following marginal contour. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance $\sim 1.5\times$ width of lateral tubercle.

Female: Length 4.3-5.3mm, forewing length 2.8-3.0mm, head width 1.0-1.1mm, thorax width 1.1-1.2mm, median ocellar diameter (OD) 0.11-0.12mm.

Colouration: Black to black-brown except as follows: mandible yellow except apex translucent brown, sometimes translucent yellow in apical half; antenna variable (pedicel and F1-2 with apicoventral surface narrowly brown to broadly yellow-brown; ventral surface of F3 to penultimate flagellomere yellow, often suffused with brown basally; terminal flagellomere yellow basally, brown apically). Following parts yellow: dorsal surface of protibia; apical third of prodistitarsus; anterior spot on tegula; narrow basal and apical rings on mesotibia; wide basal ring on metatibia, narrow ventrally, as well as posterior apical rim. Following parts yellow-brown: anterior surface of probasitarsus; apicodorsal rim of metafemur. Apical third of mesodistitarsus brown. Metasoma black, T1-T5 yellow-brown beyond premarginal line to translucent yellow margins.

Pubescence: As in male except as follows: short and sparse on clypeus (0.5OD); genal beard sparse (0.5-1.5OD) longest at midlength; short and sparse on mesoscutum ($\leq 0.5D$), more dense and short toward lateral margin (0.5OD); long and moderately sparse toward lateral and posterior margins of scutellum (1-1.5OD) longest posteromedially; metafemur and metatibia with scopae (1-1.5OD); T1-T2 apicolateral hair patches tomentose (0.5-1OD) and T3 apical hair bands evenly sparse; long and moderately dense on S1 ($\leq 2OD$); S2 with corbiculate scopa (1-2OD).

Surface sculpture: As in male except as follows: frontal area with punctures dense ($i \leq d$), moderately dense around ocelli ($i=1-2d$); punctures moderately dense on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area with punctures moderately dense ($i=1-2d$); punctures shallow and moderately dense on scape ($i=1-2d$); genal area with punctures moderately dense ($i=1-2d$); hypostomal area weakly imbricate to glabrous apically, with punctures sparse ($i \geq 2d$); mesoscutum with punctures dense ($i=0.5-1d$); scutellum with punctures dense ($i=0.5-1d$); mesepisternum with punctures irregularly spaced, sparse below scrobe ($i=1-3d$), sparser anterior of episternal suture ($i \geq 3d$); impunctate just dorsad of scrobe, otherwise with punctures irregularly spaced on hypoepimeral area ($i \leq 2d$); metanotum with punctures moderately dense ($i=0.5-2d$); metapostnotum rugose, more weakly sculptured in posterior; propodeum with punctures moderately dense ($i=1-2d$); T1-T5 with punctures small and sparse ($i=1-3d$ on T1-T3; $i \geq 2d$ on T4-T5); T6 with punctures moderately dense ($i=1-2d$).

Structure: Labrum $\sim 2.2x$ wider than long (18.5:8.5); length of malar space $\sim 0.4x$ that of clypeal lateral (2.5:6); LOT crossing below anterior tentorial pits; clypeus subequal in length to maximum width in frontal view (24:23), extending for approximately one third of its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures shorter than the shortest distance between them (9.5:11); IAD $\sim 1.6x$ AOD (11.5:7); scape $\sim 3.33x$ longer than maximum width (20:6); pedicel longer than wide (7:6); F1 shorter than wide (4.5:6); F2 slightly shorter than F1, and slightly shorter than F3 (4:4.5); UOD $\sim 1.4x$ LOD, IOD $\sim 1.05x$ longer than UOD (UOD:IOD:LOD - 44:46:31); frontal line carinate in lower half, flat above; MOC subequal to width of head (66:67.5); OOC $\sim 0.67x$ IOC (11:17); genal area $\sim 0.6x$ as wide as eye in lateral view (14:22); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum – 47:17:9.5:11; probasitarsus $3.8x$ longer than wide (19:5); length of prodistitarsus $\sim 0.8x$ that of

preceding three tarsomeres combined (from base to apex - 6:4:3.5:11); metafemur ~2.7x longer than maximum depth (38:14); metatibia ~4.4x longer than maximum depth (48:11); metabasitarsus ~4.1x longer than maximum depth (29:7).

Variation: Some females have a yellow-brown or yellow spot on the lower paraocular area below the anterior tentorial pit.

Distribution & Habit: Chañares north to Vicuña, east to Puente Las Terneras (Region IV); 642-1991m a.s.l. Collected on *Pleurophora pusilla* Hook. & Arn. (1 record). Recorded September to November.

Comments: Designation of the neotype is justified by damaged type material. Identification of *C. vicugna* relies on characters on the head, without which it is not readily differentiated from *C. mavida*. However, the male holotype and single male paratype have lost their heads since the time of original description, and the taxonomic identity of *C. vicugna* cannot, therefore, be strictly verified based on existing type material; this renders *Chilicola vicugna* a *nomen dubium*. The neotype described herein is so designated in the interest of taxonomic stability, and is the subject of a proposal to the International Commission on Zoological Nomenclature (ICZN) to set aside the name-bearing status of the holotype and to officially designate the neotype in its place (Monckton 2014).

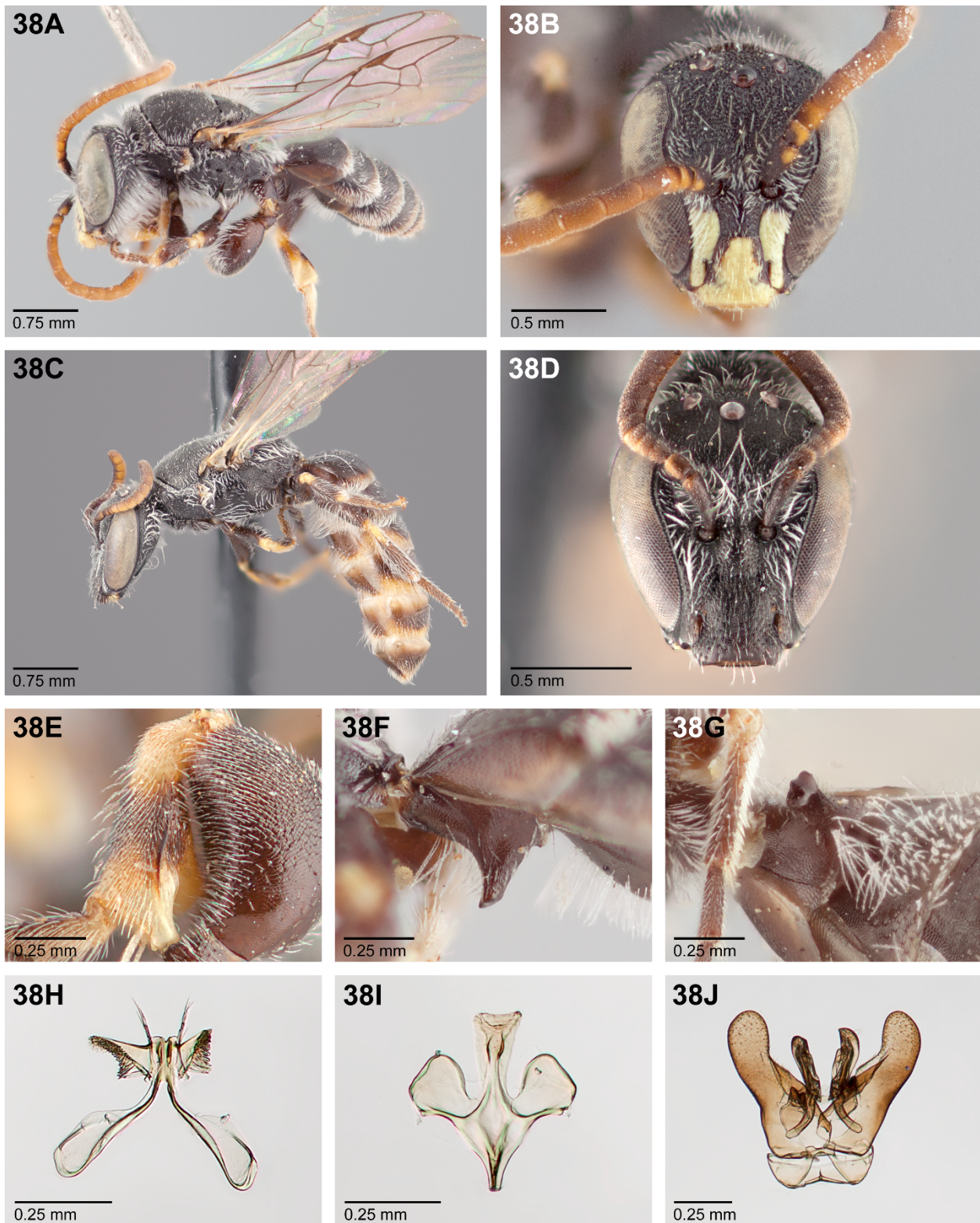


Fig. 38. *Chilicola vicugna*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

***Chilicola (Heteroediscelis) vina* Toro & Moldenke, 1979**

Chilicola vina Toro & Moldenke, 1979: 113-114, 124-125, 172. Packer, 2008: 77.
Montalva & Ruz, 2010: 29. Moure et al., 2012. Ascher & Pickering, 2015.

Figures: Fig. 13B; Fig. 14B; Fig. 39A-J; Fig. 40.

Material studied (40 males & 11 females): **Holotype** (male): Region V, Cuesta la Dormida, *S* 33.067°, *W* 71.019°, 1197m, Moldenke (AMNH). **Allotype** (female): same data as holotype (AMNH). **Region V**: two females, Alto de Cantillana, Alhue, *S* 33.979°, *W* 70.987°, 1398m, 25.xi.2000, L. Packer (PCYU); one male, Colliguay, *S* 33.171°, *W* 71.164°, 491m, 17.ix.1976, O. Martinez (PUCV); one male, Valparaíso Prov., Río Marga Marga, Los Perales, *S* 33.15°, *W* 71.31666°, 330m, 13.x.1966, M. Irwin & E.I. Schlinger (BBSL); one male, Cuesta la Dormida, *S* 33.067°, *W* 71.019°, 1197m, 26.x.2010, L. Packer, PCYU 0004674 (PCYU); one male, El Salto, *S* 33.041°, *W* 71.522°, 31m, 6.xi.1966, L. Ruz (PUCV); one female, *Quinta Vergara*, *S* 33.032°, *W* 71.552°, 71m, 18.xi.2000, F. Vivallo (UFRJ); one female, Loncura, *S* 32.786°, *W* 71.508°, 38m, 5.x.2000, L. Packer (PCYU); one female, Choapa, Pichidangui, *S* 32.13833°, *W* 71.50667°, 15m, 10.ii.2003, F.D. Parker, pan trap, CHL-14610-84 // USDA Native Bee Survey BBSL695284 (AMNH); one female, Colliguay, Las Compuertas, 4.x.2000, L. Packer, CCDB-03755 C03 (PCYU); **RM Santiago**: Paratype female, Pr. Valparaíso & Santiago, Cuesta La Dormida, *S* 33.068°, *W* 70.998°, 1078m, 1970-72, A.R. Moldenke, INT. BIOL. PROGRAM (AMNH); eleven males, Pte. Alto, *S* 33.61666°, *W* 70.5666°, 705m, 04.ii.2001, F. Vivallo (UFRJ); eight males, same data, on *Aloysia citriodora* (UFRJ); one male, same locality and collector, 05.xii.1999 (UFRJ); two males, same locality and collector, 25.xii.2001 (UFRJ); one male, same locality and collector, 10.i.2000, on *Aloysia citriodora* (UFRJ); three males, same locality and collector, 04.iii.2001, on *Aloysia citriodora* (UFRJ); two males, same locality and collector, 05.xii.1999, on *Aloysia citriodora* (UFRJ); five males, same locality and collector, 25.xii.2001, on *Aloysia citriodora* (UFRJ); one male, Quebrada de San Ramón, *S* 33.433°, *W* 70.516°, 853m, xii.1974, L.E. Peña (PUCV); one male, Nr. Caleu, *S* 33.00885°, *W* 70.9966°, 1230m, 26.x.2010, L. Packer, B09857-C02 Bees of Chile310 (PCYU); two females, Caleu, *S* 32.998°, *W* 70.977°, 1054m, 3.x.2000, L. Packer (PCYU); **Region IV**: one female, Los Vilos

path of Lobos, S 31.93764°, W 71.51545°, 15m, 11.ix.2010, Packer & Fraser, B09866-D01 Bees of Chile226 (PCYU).

Diagnosis: Males are diagnosable by the combination of malar space 1.2-1.4x longer than the clypeal lateral, apical surface of the S1 process weakly longitudinally concave, and the LOT passing through the anterior tentorial pits. Females are diagnosable by the combination of protibia with yellow on basal half of dorsal surface only, malar space 1-1.3x longer than clypeal lateral, and the LOT passing through the anterior tentorial pits. Longer-faced individuals of both sexes may be confused with *C. diaguia* and are best distinguished by the position of the LOT as above. Males of *C. vina* have the S8 anteromedial sclerotized margin distinctly swollen into a convex incursion (subparallel to margin throughout in *C. diaguia*).

Description: Male: Length 6.0-6.5mm, forewing length 3.5-3.7mm, head width 1.3mm, thorax width 1.3-1.4mm, median ocellar diameter (OD) 0.13mm.

Colouration: Black-brown with following parts yellow: labrum except apical margin; inverted T to funnel shape on clypeus, apical margin dark laterad; lower paraocular area at level of or below transverse portion of epistomal suture medially, extending further laterally but not reaching lower tangent of antennal socket; apicoventral spot on scape; apicoventral surface of pedicel; posterior apical rim of protrochanter; apex of profemur broadly on anterior surface, narrowly on posterior surface; dorsal surface of protibia, including dorsal half of anterior face; anterior spot on tegula; narrow apical ring on mesofemur; narrow basal ring and apicodorsal rim of mesotibia; wide basal ring on metatibia, narrow apical ring wide ventrally; basal half to two-thirds of metabasitarsus ventrally. Ventral surface of antennal flagellum yellow-brown, narrowing basally on F1, F11 brown. Apical half of prodistitarsus variably yellow to yellow-brown. Ventral metatibial carina black. Metasoma black, T1-T7 with marginal zone translucent yellow.

Pubescence: White hairs generally short and sparse, not especially plumose; on lower paraocular area and around antennal base long and moderately dense (1.5-2OD); genal beard long and moderately dense (0.5-3OD) longest at midlength; mesoscutum, scutellum, and metanotum mostly bare, few short hairs (0.5OD) except mesoscutal hairs short and moderately dense toward lateral margin (0.5-1OD), scutellar hairs long and moderately dense toward lateral

and posterior margins (1-2OD) longest posteromedially, metanotal hairs long and moderately dense toward lateral margin ($\leq 2.5OD$); propodeal hairs moderately long and dense dorsolaterally (0.5-2OD); T1-T3 apicolateral hair patches tomentose (0.5-1OD); S2 hairs long and dense (1.5OD basad, 0.5OD distad, shorter mesad).

Surface sculpture: Microsculpture imbricate and punctures generally deep. Clypeus and lower paraocular areas moderately dense punctate ($i=1-2d$) except sparse medially on clypeus ($i=2-3d$); supraclypeal area moderately densely and irregularly punctate ($i=1-4d$) denser toward lateral margins ($i<d$); frontal area very densely punctate ($i\leq 0.5d$), densely punctate around ocelli ($i\leq d$) less so on ocellocular space adjacent to compound eye ($i=1-2d$) becoming impunctate adjacent to lateral ocellus; vertexal area rugose and densely punctate ($i\leq d$); scape shallowly and moderately densely punctate ($i=1-2d$), denser apicoventrally ($i\leq d$); genal area microstriate, punctures moderately dense ($i=1-2d$); hypostomal area weakly imbricate, punctures moderately dense ($i=1-2d$); pronotum densely punctate ($i=0.5-1d$), lateral surface coarsely imbricate; mesoscutum densely punctate ($i=0.5-1d$) more sparsely punctate laterally ($i=1-2d$), punctures crowded on median line ($i\leq d$); scutellum moderately densely punctate ($i=1-2d$), punctures crowded on median line ($i\leq d$); mesepisternal punctures irregularly spaced, sparse below scrobe ($i=1-3d$), more sparse anterior of episternal suture ($i\geq 3d$), irregularly spaced on hypoepimeral area ($i\leq 2d$); metanotum moderately densely punctate ($i=1-2d$), punctures crowded on median line and anteriorly ($i\leq 0.5d$); metepisternum densely punctate ($i\leq d$), distinctly striate anterodorsally; metapostnotum rugose, fewer transverse rugae posteriorly; propodeum coarsely imbricate, rugulose posteriorly, punctures moderately dense ($i=1-2d$); T1-T5 coarsely imbricate; T1 punctures sparse basally ($i\geq 2d$), dense apically ($i\leq 2d$); T2-T5 moderately densely punctate ($i=1-2d$) basal depressed area more coarsely sculptured but punctures distinct; T6 coarsely imbricate posteriorly; T6-T7 moderately sparsely punctate ($i=1-3d$); marginal zones of terga weakly imbricate and shiny, minutely punctate.

Structure: Labrum 2.1x wider than long (21:10); malar space $\sim 1.4x$ as long as clypeal lateral (11:8); LOT at level of anterior tentorial pits; clypeus $\sim 1.25x$ longer than maximum width in frontal view (36:29), extending for approximately half its length beyond LOT; median with median longitudinal groove, weak apically; subantennal sutures $\sim 1.2x$ longer than the shortest distance between them (17:14); IAD $\sim 1.6x$ AOD (11:7); scape 2.5x longer than maximum width (25:10); pedicel as long as wide (9:9); F1 shorter than wide (8.5:9.5); F2 $\sim 1.6x$ longer than F1,

and shorter than F3 (F2:F3 - 13.5:16); UOD 1.5x LOD, IOD ~1.1x UOD (UOD:IOD:LOD - 51:56:34); frontal line carinate in lower two-fifths, flat just below median ocellus for a length of ~1OD, otherwise roughly defined; MOC subequal to width of head (93:90); OOC ~0.67x IOC (12:18); genal area ~0.6x as wide as compound eye in lateral view (17:31); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 62:23:14.5:19; probasitarsus 4x longer than maximum depth (24:6); length of prodistitarsus subequal to that of preceding three tarsomeres combined (from 2nd to 5th - 7:6:4:16); metafemur ~2x longer than maximum depth (71:36); summit of metatibial ventral convexity broadly rounded and near tibial apex; metatibia ~1.9x longer than maximum depth (56:30); in apical view apical lamina of metatibia subequal to median ocellar diameter (10:10), broad and thick; posterior metatibial carina entire and smooth, ventral carina black and toothed; metabasitarsus ~4.67x longer than maximum depth (42:9); S1 process apical surface longitudinally concave at least in posterior half, in lateral view anterior and posterior margins divergent apically, apex appearing anteriorly bent. S7 apodemal arm sclerotized margin terminating mesolaterad; ventral lobe ~0.33x as broad as its basal length; dorsal lobe strap-like, roughly parallel-sided, with basal tuft of long setae and a short apical row, midlength bare. S8 lateral process produced laterally, basolateral margin sharply pointed, anteromedial sclerotized margin having distinct convex incursion, appearing swollen. Genital capsule with apicoventral truncate process bituberculate and distinctly notched for a distance less than width of lateral tubercle.

Female: Length 4.9-6.1mm, forewing length 3.2-3.5mm, head width 1.1-1.2mm, thorax width 1.1-1.3mm, median ocellar diameter (OD) 0.12mm.

Colouration: Black to black-brown except as follows: mandible with yellow basal spot, translucent yellow in apical half, except apex translucent brown. Following parts variably brown to black: apicoventral margin of pedicel, F1 and F2; apicodorsal rim of metafemur; wide basal ring on metatibia. Following parts variably yellow to yellow-brown: ventral surface of F3-F10, suffused with brown basally; dorsal surface of protibia in basal half; apical half of prodistitarsus; basodorsal spot on mesotibia. Anterior spot on tegula absent or faintly translucent yellow. Metasoma black, T1-T5 marginal zone translucent yellow.

Pubescence: As in male except as follows: lower paraocular hairs and hairs around antennal base moderately long and moderately dense (1OD); genal beard sparse (0.5-2OD)

longest at midlength; mesoscutal hairs short and sparse ($\leq 0.5D$) denser toward lateral margins; scutellar hairs long and moderately sparse toward lateral and posterior margins (1-1.5OD) longest posteromedially; metanotal hairs long and moderately dense toward lateral margin ($\leq 2OD$); propodeal hairs moderately long and dense dorsolaterally (0.5-1.5OD); metafemur and metatibia with scopae (1-2OD); T1-T2 apicolateral hair patches tomentose (0.5-1OD) and T3 apical hair bands evenly sparse; on S1 long and moderately dense ($\leq 2.5OD$); S2 corbiculate scopa (1-3OD).

Surface sculpture: As in male except as follows: clypeus moderately densely punctate throughout ($i=1-2d$); ocellocular space and supraclypeal, vertexal, and genal areas moderately densely punctate ($i=1-2d$) except more densely punctate toward lateral margin of supraclypeal area ($i \leq d$) and impunctate on ocellocular space adjacent to lateral ocellus; frontal area densely punctate ($i \leq d$); scape shallowly and moderately densely punctate ($i=1-2d$); hypostomal area weakly imbricate to glabrous apically, punctures sparse ($i \geq 2d$); mesoscutum densely punctate ($i=0.5-1d$); scutellum densely punctate ($i=0.5-1d$); mesepisternal punctures irregularly spaced, sparse below scrobe ($i=2-4d$), sparser anterior of episternal suture ($i \geq 4d$); impunctate just dorsad of scrobe, otherwise irregular and moderately dense on hypoepimeral area ($i \leq 2d$); metanotum moderately densely punctate ($i=0.5-2d$); metapostnotum rugose, fewer transverse rugae posteriorly; propodeum moderately densely punctate ($i=1-2d$); T1-T5 punctures small and sparse ($i=1-3d$); T6 moderately densely punctate ($i=1-2d$).

Structure: Labrum 2.3x wider than long (23:10); malar space $\sim 1.3x$ longer than clypeal lateral (9.5:7.5); LOT at level of anterior tentorial pits; clypeus $\sim 1.1x$ longer than maximum width in frontal view (33:29), extending for approximately half its length beyond LOT; median longitudinal groove weak on clypeus; subantennal sutures subequal in length to the shortest distance between them (13.5:13); IAD $\sim 1.33x$ AOD (12:9); scape $\sim 3.6x$ longer than maximum width (25:7); pedicel as long as wide (6.5:6.5); F1 as long as wide (8:8); F2 shorter than F1, and shorter than F3 (F2:F3 - 4.5:6); UOD $\sim 1.4x$ LOD, IOD $\sim 1.1x$ longer than UOD (UOD:IOD:LOD - 49:53:36); frontal line carinate in lower third, flat above; MOC $\sim 1.1x$ longer than width of head (86:79); OOC $\sim 0.65x$ IOC (12:19); genal area $\sim 0.65x$ as wide as eye in lateral view (17:26); ratio of lengths of mesoscutum: scutellum: metanotum: metapostnotum - 58:21:10:14; probasitarsus 4x longer than wide (24:6); length of prodistitarsus $\sim 0.9x$ that of preceding three tarsomeres combined (from 2nd to 5th - 6:5:5:14); metafemur $\sim 3.1x$ longer than maximum depth (50:16);

metatibia ~4.2x longer than maximum depth (59:14); metabasitarsus ~4.4x longer than maximum depth (40:9).

Distribution & Habit: Viña del Mar (Region V) east to Puente Alto (RM Santiago), south to Alto de Cantillana (RM Santiago), north to P.N. Fray Jorge (Region IV); 11-1398m a.s.l. Collected on *Aloysia citriodora* Palau (18 records). Recorded September to March.

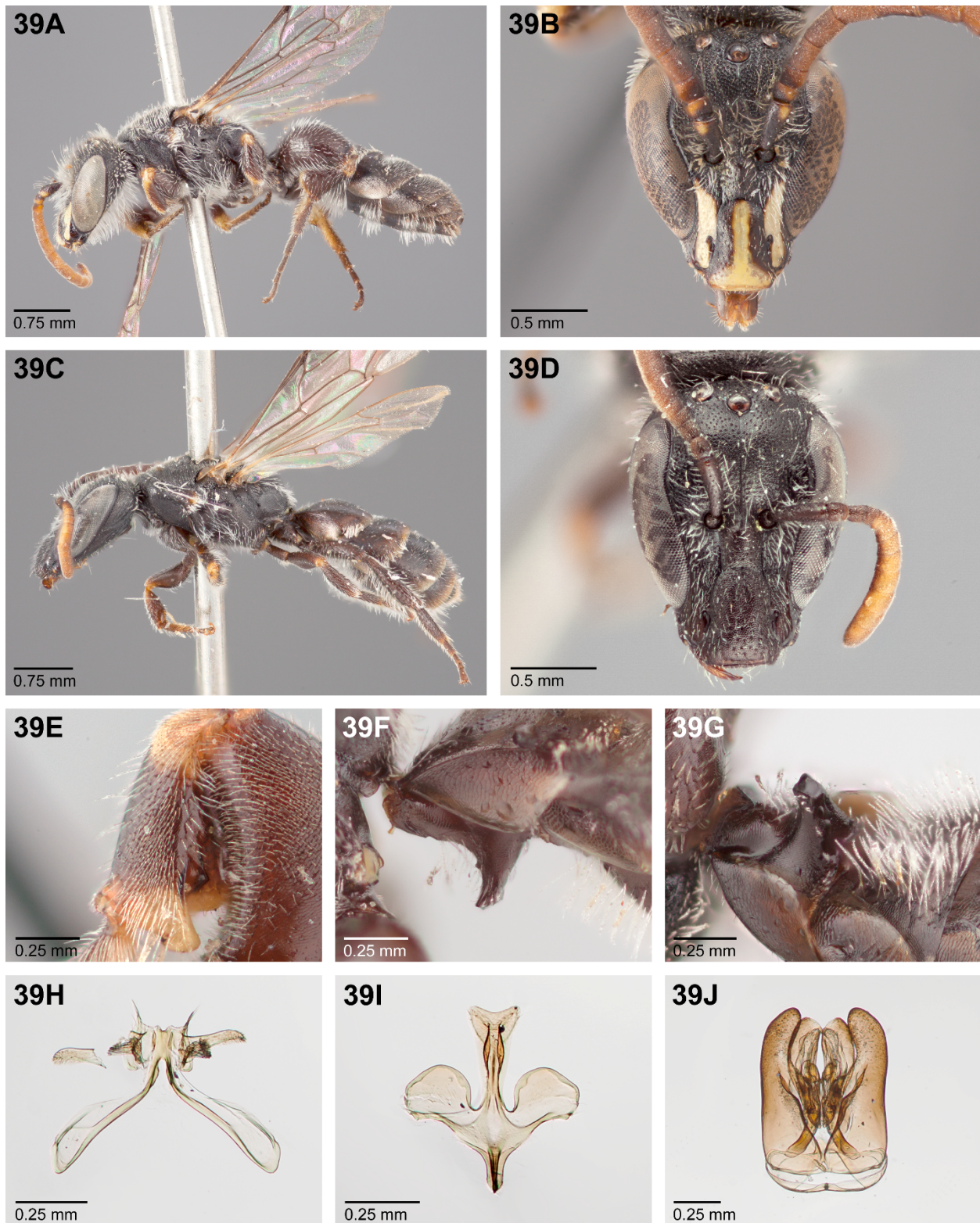


Fig. 39. *Chilicola vina*: (A) male habitus, lateral view; (B) male face, frontal view; (C) female habitus, lateral view; (D) female face, frontal view; (E) male metatibia, posterior view; (F) male S1 process, lateral view[†]; (G) male S1 process, apical view; (H) male S7; (I) male S8; (J) male genital capsule.

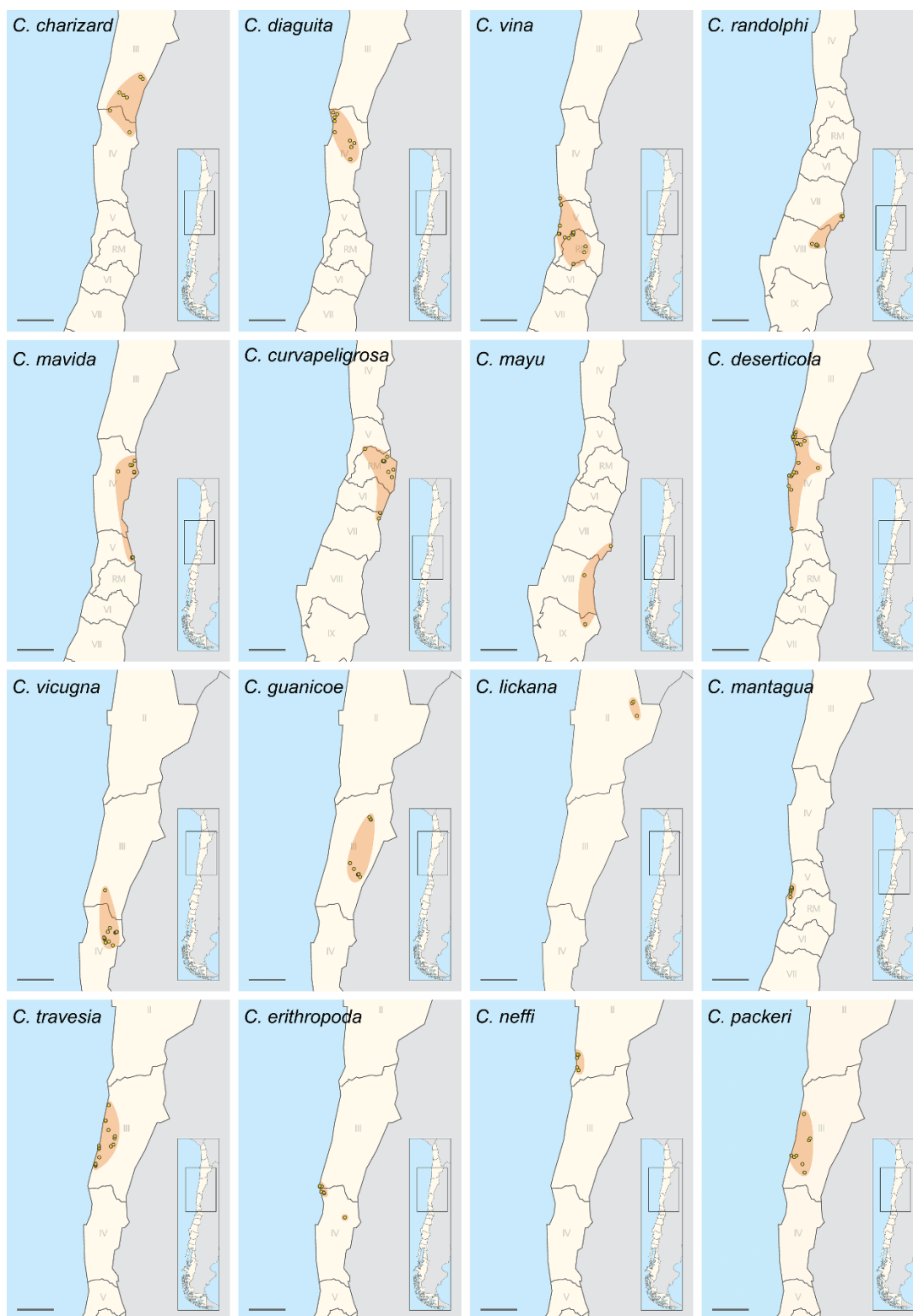


Fig. 40. Distribution of *Heteroediscelis* by species. Original and geo-referenced records are plotted as yellow circles; speculative range is plotted as an orange convex hull. Inset panels show area of detail, scale bar approximately 150 km.

B) Phylogenetic Analysis

Analysis of 61 morphological characters (discrete and continuous) produced one most parsimonious tree with a score of 10284.61, CI = 42, RI = 54.1 (Fig. 41A). The tree was stable to successive approximations character weighting and weights stabilized after one iteration. Most groups were found to have negative support from symmetric resampling and bootstrap analysis, meaning that these groups were more often contradicted than supported in resampling routines. Species pairs *C. diaguia* + *C. vina*, *C. neffi* + *C. packeri*, and *C. erithropoda* + *C. travesia* were strongly supported and groups (i) and (ii) (Fig. 41A) received moderate support. Both are defined by female leg colouration, with (ii) additionally defined by male midleg colouration (i.e. occupying unique positions on the respective NRLC axes; see Appendix D). Under implied weighting (K = 6.094) a single most parsimonious tree was found, with a fit of 18.86, CI = 37, RI = 48.4. Relative to the SACW tree, the implied weights tree had two single-taxon rearrangements. In one, *C. penai* was sister to the clade *C. curvapeligrosa* + (*C. mavida* + (i)) with negative support. In the second, *C. charizard* was sister to (*C. diaguia* + *C. vina*) with low support (GC = 20, BS = 19).

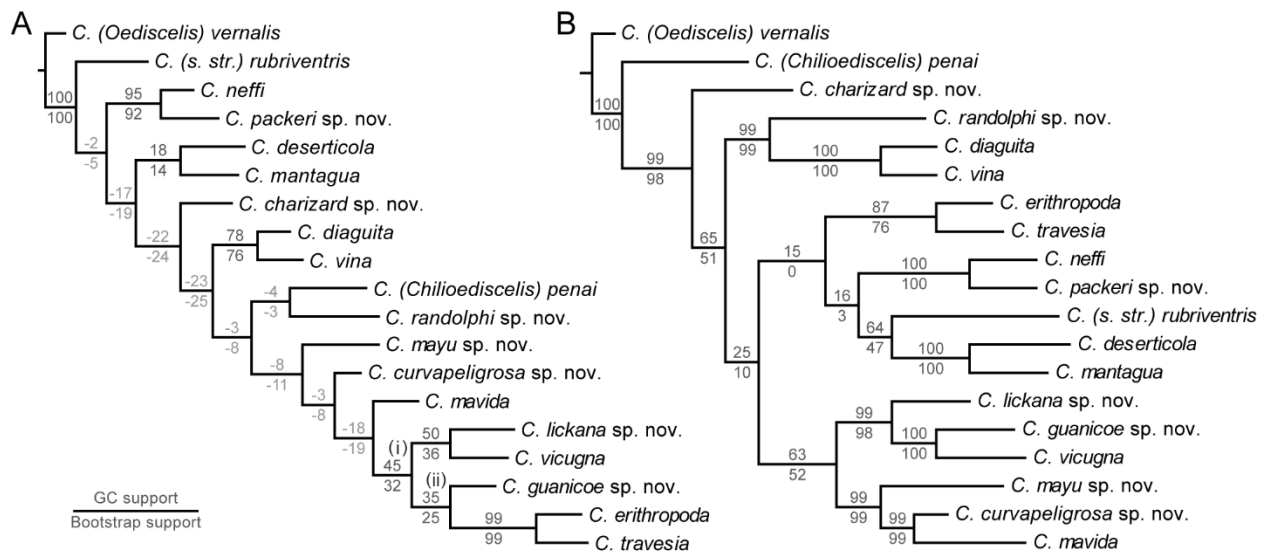


Fig. 41. Results of maximum parsimony analysis of: (A) morphological data only; (B) DNA barcode data only. GC support values are indicated above branches, bootstrap support values are below. Groups (i) and (ii) are discussed in text.

Analysis of 658 base pairs from DNA barcode data initially produced four equally most parsimonious trees, stabilizing to one tree after two iterations of SACW. The resulting tree, with a score of 21264, CI = 58.4 and RI = 66, was identical to one of the initial four trees and is presented as the preferred result (Fig. 41B). Analysis under implied weighting (K = 2.656) produced an identical tree, with a fit of 46.2, CI = 56, RI = 59.1. On the barcode-based tree, *C. charizard* was recovered as sister to the remaining members of the subgenus, a group which shares an untoothed posterior metatibial carina (with multiple reversals to the toothed state, in *C. lickana*, *C. guanicoe*, *C. neffi*, and *C. packeri*). The placement of *C. rubriventris* as sister to (*C. deserticola* + *C. mantagua*) is defined by a single homoplasy: male S8 lateral process not produced. This tree agrees with the morphology-based tree with respect to the species pairs *C. diaguaita* + *C. vina*, *C. neffi* + *C. packeri*, *C. erithropoda* + *C. travesia*, and *C. deserticola* + *C. mantagua*. Both trees also support the grouping of *C. lickana* and *C. vicugna*, although the barcode-based tree includes *C. guanicoe* in this group.

Combined analysis of both datasets produced a single most parsimonious tree with a score of 31653.28, CI = 52.4, RI = 60.8 (Fig. 42). This tree was stable to successive approximations character weighting with weights stabilizing after one iteration. An identical tree was produced under implied weighting (K = 6.328) with a fit of 47.41, CI = 48.1, RI = 52.7. This phylogeny has higher support overall than either morphological or DNA barcode data alone, and monophyly is strongly supported for a majority of the groups presented. Groups 2, 6, 7, and 8 (Fig. 42) were consistently recovered in the combined and barcode-only analyses, and all species pairs were consistently recovered in all three analyses, except for *C. guanicoe* + *C. vicugna* which was not recovered using morphology alone. Each group in Fig. 42 is well supported by morphological characters (see Appendix C for character-annotated tree, Fig. S1).

Monophyly of the subgenus is supported by the yellow posterior margin of the pronotal lobe in both males and females, the male flagellomere F3 longer than F2, and the male S7 dorsal lobe with basal tuft of long setae and short apical row with midlength bare.

Group 1 is supported by the mesoventral lobe of the male gonoforceps with anterior and posterior margins concave (present also in *C. erithropoda* and *C. mayu*) and the male prodistitarsus mostly dark and the male mesepisternum with punctures sparser anterior of the mesepisternal suture (both also support Group 6). The clade *C. randolphi* + (*C. diaguaita* + *C.*

vina) is supported by a strong median depression on the male clypeus and the female protibia yellow in basal half only. The pair *C. diaguita* + *C. vina* is supported by the malar space 1.2-1.7x longer than the clypeal lateral, the female terga with apicolateral hair patches tomentose on T1-T2 only, and other homoplasies (Fig. S1).

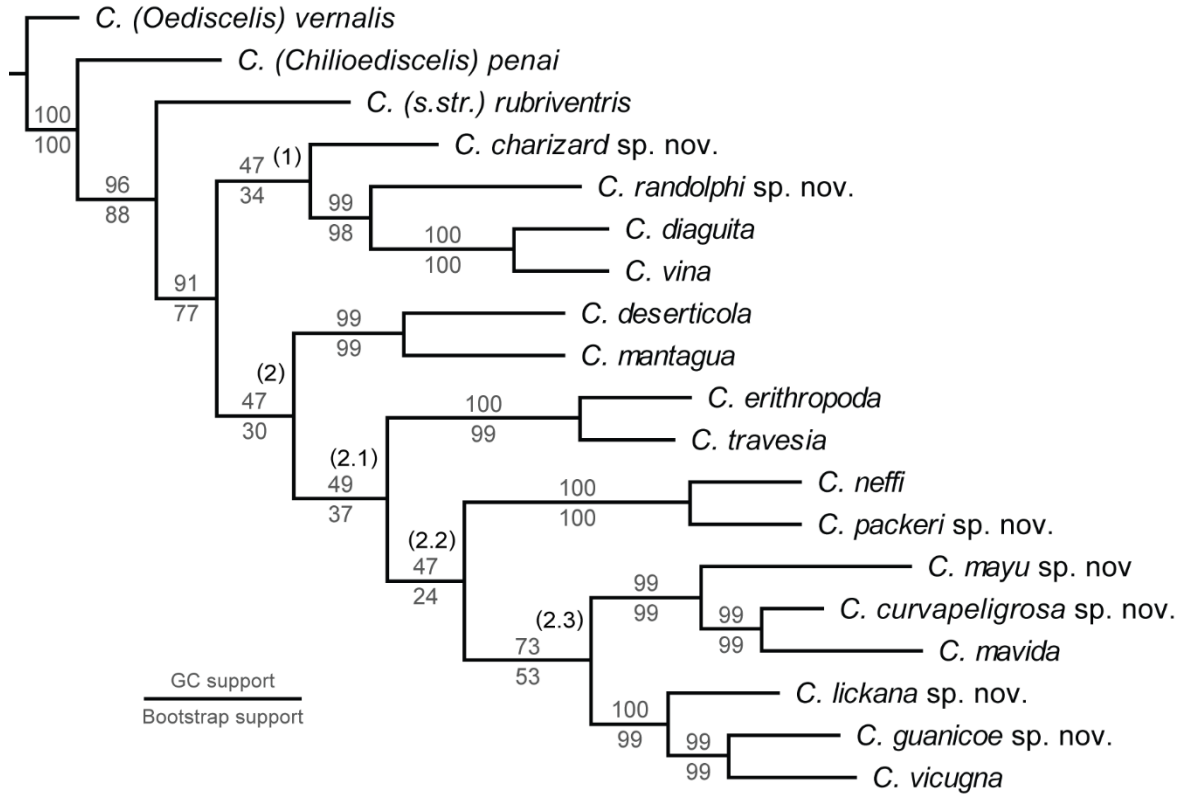


Fig. 42. Single most parsimonious tree resulting from maximum parsimony analysis of combined morphological and molecular dataset. GC support values are indicated above branches, bootstrap support values are below. Numbered groups are discussed in text.

Group 2 is united by the apical margin of the male clypeus yellow along its entire width and the female clypeus with punctures moderately dense throughout (the latter has a reversal to punctures sparse medially in Group 2.3). The pair *C. deserticola* + *C. mantagua* is uniquely defined by the reduced male posterior metatibial carina. Group 2.1 is supported by the male T7 with yellow apical margin, and is further defined by characters of the male terminalia: a continuous row of setae on the S7 dorsal lobe, a distinctly emarginate S7 apical disc, and an anteriorly produced S8 lateral process. The pair *C. erithropoda* + *C. travesia* is defined by

several synapomorphies, most notably by the extensively pale leg colouration in both sexes and the shortened male S2 pubescence. Group 2.2 is defined by the female terga with apicolateral hair patches tomentose on T1-T2 only (this arises on two other occasions in the subgenus) and by the non-concave apical surface of the male S1 process. Namely, the male S1 processes of *C. neffi* and *C. packeri* have a weakly convex apical surface, which may represent an intermediate step to the median ridge of the species in Group 2.3. The pair *C. neffi* + *C. packeri* is additionally defined by the longitudinal depressions on the frontal area and the broad mesoventral lobe of the male gonoforceps.

Group 2.3 is united by morphological characters of high taxonomic value: they share a median longitudinal ridge on the apical surface of the male S1 process, as well as a narrow male S7 ventral lobe and triangular dorsal lobe. The clade *C. mayu* + (*C. curvapeligrosa* + *C. mavida*) is defined by the expanded shape of the male metatibia, the presence of a clypeal bulge in lateral view, and a unique state of male hindleg colouration. The pair *C. curvapeligrosa* + *C. mavida* is uniquely defined by the malar space subequal in length to clypeal lateral. The clade *C. lickana* + (*C. guanicoe* + *C. vicugna*) is defined by a unique state of female mid- and hindleg colouration, as well as male S2 pubescence which is 3x longer basally than apically. The pair *C. guanicoe* + *C. vicugna* is united by the lower paraocular maculation reaching the antennal socket (unique in group 2.2).

DISCUSSION

Taxonomy

This revision dramatically increases the size of the subgenus *Heteoediscelis*; with the description of seven new species and the redescription of nine previously-described species, the total is increased to sixteen (previously ten). Included is the first comprehensive set of keys to males and females of each species, and both descriptions and keys are illustrated using high-resolution photography.

Also included are three minor, but notable alterations to the taxonomic record: the synonymy of *C. mantagua* with *C. valparaíso*, the designation of a neotype specimen for *C. vicugna*, and a re-interpretation of the type localities of *C. erithropoda* and *C. deserticola*. Details regarding the latter two are included under comments on the relevant species

descriptions. The first was motivated by insufficient distinction between *C. mantagua* and *C. valparaiso*. The diagnosis for *C. valparaiso* refers to two characters (Toro and Moldenke 1979): malar space subequal to minimum width of scape, and metatibia with apical lamina at base of spurs narrowing distally in ventral view. In fact, the holotypes of *C. mantagua* and *C. valparaiso* both have the malar space half as long as the clypeal lateral (i.e. of equal relative length), and the apical lamina of the metatibia is not differentiable between them. Moreover, characters of the male terminalia do not support any division between these two supposed species, and many specimens from the same geographic area as the *C. valparaiso* holotype have been identified as either *C. mantagua* or *C. vina*. Indeed, the type locality of *C. valparaiso* is just to the south of the otherwise documented range of *C. mantagua*. Finally, CO1 barcode sequences from specimens tentatively identified as *C. valparaiso* are indistinguishable from those of *C. mantagua*. Therefore, in absence of any evidence to maintain the distinction of *C. valparaiso* as a species, I have treated it as a synonym of *C. mantagua*.

DNA Barcodes

DNA barcoding was useful for the association of females to males of several species, particularly among those whose females are difficult to tell apart (e.g. *C. deserticola*, *C. erithropoda*, *C. mantagua*, and *C. vicugna*). As an exploratory tool, barcoding initially revealed the presence of two new species from unique localities: *C. randolphi* from Laguna del Maule and *C. curvapeligrosa* from Farellones. In other cases, distinct barcode sequences were considered as supporting evidence for the description of morphologically distinct species, such as *C. charizard*, *C. lickana*, and *C. mayu*.

Within each of three pairs of species, DNA barcodes are effectively identical using the BIN approach. These are: *C. mavida* & *C. curvapeligrosa*, *C. vicugna* & *C. guanicoe*, and *C. vina* & *C. diaguita*. These cases emphasize the importance of an integrative approach to taxonomy and the value of comparative morphology: each of the six species is supported by the morphological characters provided in the key and descriptions, but reliance on barcodes alone would have ignored those differences. DNA barcoding is a rapid, efficient means to estimate diversity (e.g. Smith et al. 2005, Gibson et al. 2014) and can be invaluable for the discovery of new species (e.g. Gibbs et al. 2009, Butcher et al. 2012), but should be considered along with comparative morphology as one of multiple lines of evidence used in the course of a taxonomic revision (DeSalle et al. 2005). Indeed, among barcodes within the same BIN, comparison of sequences of

morphologically distinct species can reveal single-nucleotide variations that differentiate their otherwise indistinguishable barcode sequences (Gibbs 2009). Of the 16 species in *Heteroediscelis*, 11 have fixed nucleotide substitutions in their barcode sequences which are unique and not shared by other members of the subgenus (Table 2). These substitutions can be thought of as diagnostic within the subgenus, potentially making DNA-based identification possible beyond distance-based methods such as BIN analysis.

Table 2. Fixed DNA barcode nucleotide substitutions not shared by other members of *Heteroediscelis*. Nucleotides in other species are listed in order of prevalence. Nucleotide positions are expressed relative to *Apis mellifera*.

Species	# of unique substitutions	Nucleotide position	Invariant nucleotide	Most common nucleotide in other species
<i>C. mantagua</i>	3	388	G	A
		433	G	A,T
		637	G	A
<i>C. charizard</i>	3	19	A	T,C
		44	A	T,G
		361	T	A
<i>C. curvapeligrosa</i>	1	499	C	T
<i>C. deserticola</i>	1	241	T	A
<i>C. diaguita</i>	2	595	C	T
		160	G	A
<i>C. erithropoda</i>	2	484	C	T
		544	G	A
<i>C. lickana</i>	6	125	A	G
		244	G	A
		250	C	T
		280	C	T
		356	A	C,T
		380	A	G
<i>C. mayu</i>	1	364	C	T
<i>C. packeri</i>	1	451	C	A,T

<i>C. randolphi</i>	4	5	C	T
		81	T	C
		382	C	T,A
		596	C	T
<i>C. travesia</i>	4	124	C	T,A
		205	T	A,C
		526	C	T,A
		548	C	T

Phylogeny

The phylogeny in Fig. 42 represents a robust evolutionary hypothesis for the subgenus, drawing on a total-evidence approach to analysis (Eernisse and Kluge 1993, Huelsenbeck et al. 1996). A single tree was recovered using both SACW and implied weighting with good GC/BS support for its nodes, and with corresponding synapomorphies to support them. Aside from the morphological evidence supporting the presented clades, this phylogeny includes groupings which make geographic sense, potentially holding promise for future biogeographic analyses.

Specifically, groups in Fig. 42 broadly correspond with the entomofaunal regions described by Peña (1966) and zoogeographic areas described by Artigas (1975). Group 2 consists of a high-elevation Andean clade (Group 2.3) nested within a larger group occurring in coastal and lower/moderate-elevation inland areas of the Coquimban (semi-arid), intermediate, and northern deserts. The Andean clade is in turn composed of two sister clades: *C. lickana* + (*C. guanicoe* + *C. vicugna*) occurs in the central/northern Andes and in higher-elevation intermediate desert, and *C. mayu* + (*C. curvapeligrosa* + *C. mavida*) occurs in the central/southern Andes and into Peña's Pehuenar region. Within group 1, the terminal pair *C. diaguíta* + *C. vina* occurs in the Coquimban desert and central valley, while *C. charizard* and *C. randolphi* occur in the central and southern Andes, respectively. These are presented as general patterns only, and further investigation into the nature of these patterns is warranted.

With the completion of this phylogenetic analysis, along with the work done by Gibbs and Packer (2006) on *Chilicola s. str.* and by Willis and Packer (2007) on *Chilioediscelis*, revisionary work on the terminal clade *Heteroediscelis* + (*Chilicola s. str.* + *Chilioediscelis*) found in Packer's subgeneric phylogeny (2008) is fit for synthesis. In light of the seven species newly described herein, as well as the results of the morphology-only and DNA-barcode-only analyses

which place exemplars of *Chilicola s. str.* and *Chilioediscelis* within *Heteroediscelis* (Fig. 41), a combined analysis of these three subgenera along with *Oediscelis* is recommended in order to re-evaluate subgeneric boundaries and relationships within *Chilicola*.

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APPENDIX A: List of Characters

1. Male colour of apical margin of clypeus: (0) yellow full width; (1) brown laterad.
2. Male clypeus colour: (0) entirely yellow except along epistomal suture; (1) yellow in T or funnel shape.
3. Male clypeus median depression: (0) absent or weak; (1) strong throughout.
4. Male clypeus sculpture: (0) punctures moderately dense throughout; (1) punctures sparse medially.
5. Male F1: (0) at most as long as wide; (1) longer than wide.
6. Male F2 length: (0) F2 subequal F1 ($<1.1x$); (1) F2 longer than F1 ($\geq 1.2x$).
7. Male F3 length: (0) F3 subequal F2 ($<1.05x$); (1) F3 longer than F2 ($\geq 1.1x$).
8. Male frontal line: (0) carinate in lower half; (1) carinate only between antennal bases.
9. Male lower paraocular maculation: (0) extending $<1OD$ above transverse epistomal suture; (1) extending $\sim 1OD$ above transverse epistomal suture; (2) reaching/nearly reaching lower tangent of antennal socket.
10. Female antennal colour: (0) F1 & F2 mostly brown or black; (1) at least F2 mostly yellow or yellow-brown.
11. Female clypeus sculpture: (0) punctures moderately dense throughout ($i=1-2d$); (1) punctures sparse medially ($i\geq 2d$).
12. Female F3 length: (0) F3 subequal F2 ($\leq 1.1x$); (1) F3 longer than F2 ($\geq 1.2x$).
13. Genal beard: (0) moderately dense in male and sparse in female; (1) dense in male and sparse in female; (2) dense in male and moderately dense in female.
14. Projection of clypeus: (0) projecting for less than half its length beyond LOT; (1) projecting for half its length or more beyond LOT.
15. Clypeus above anterior tentorial pit: (0) unmodified; (1) weakly bulging $\sim 1OD$ above inner orbit of compound eye in lateral view; (2) bulging $\sim 1.5OD$ above inner orbit of compound eye in lateral view.
16. Frontal area: (0) without longitudinal depressions; (1) with longitudinal depressions which partially accommodate the scape.
17. Malar space: (0) $<0.9x$ clypeal lateral; (1) $\sim 1x$ clypeal lateral; (2) $1.2-1.7x$ clypeal lateral; (3) $\geq 2x$ clypeal lateral.

18. Male metatibia shape: (0) 2.0-2.2x longer than maximum depth, summit of ventral convexity at two-thirds tibial length; (1) ~1.67x longer than maximum depth, summit of ventral convexity at two-thirds tibial length; (2) <2.0x longer than maximum depth, summit of ventral convexity near tibial apex.
19. Male ventral metatibial carina: (0) reduced, originating in distal half of posterior carina; (1) entire and smooth or rounded; (2) entire and toothed.
20. Male posterior metatibial carina: (0) reduced, originating in distal half of ventral carina; (1) entire and smooth or rounded; (2) entire and toothed.
21. Male midleg colour: NRLC axis 1 (See Appendix D).
22. Male midleg colour: NRLC axis 2 (See Appendix D).
23. Male hindleg colour: NRLC axis 1 (See Appendix D).
24. Male hindleg colour: NRLC axis 2 (See Appendix D).
25. Male mesepisternum: (0) punctures anterior of mesepisternal suture same density as those below scrobe; (1) punctures anterior of mesepisternal suture sparser than those below scrobe.
26. Male prodistitarsus: (0) brown or black; (1) apical third/half yellow-brown or yellow.
27. Female pronotal lobe colour: (0) dark; (1) with yellow posterior margin.
28. Female mesepisternum: (0) punctures anterior of mesepisternal suture same density as those below scrobe; (1) punctures anterior of mesepisternal suture sparser than those below scrobe.
29. Female prodistitarsus: (0) brown or black; (1) apical third/half yellow-brown or yellow.
30. Female protibia dorsal surface: (0) yellow for entire length; (1) yellow in basal half only.
31. Female mid-/hindleg colour: NRLC axis 1 (See Appendix D).
32. Female mid-/hindleg colour: NRLC axis 2 (See Appendix D).
33. Metepisternum: (0) without striae anterodorsally; (1) distinctly striate anterodorsally.
34. Male S1 process apical surface: (0) longitudinally concave; (1) concave posteriorly, convex anteromedially; (2) weakly convex; (3) with distinct longitudinal median ridge.
35. Male S1 process shape in profile: (0) anterior and posterior margins convergent apically; (1) anterior and posterior margins subparallel; (2) anterior and posterior margins divergent apically.
36. Male S2 pubescence: (0) 3x longer basally than distally; (1) 1.5x longer basally than distally; (2) reduced, no longer than 1OD basally.
37. Male T7: (0) apical margin brown or black; (1) apical margin yellow.

38. Male S7 ventral lobe: (0) narrow, almost linear; (1) $\sim 0.25x$ as broad as its basal length; (2) $\sim 0.33x$ as broad as its basal length; (3) $\sim 0.5x$ as broad as its basal length.
39. Male S7 dorsal lobe shape: (0) roughly triangular, wide at base narrowing to apex; (1) strap-like, roughly parallel-sided; (2) digitiform, apex widened relative to midlength.
40. Male S7 dorsal lobe setation: (0) row of setae long basally and shorter apically; (1) row of broad setae mesobasally to apex; (2) basal tuft of long setae and a short apical row, midlength bare.
41. Male S7 apical disc: (0) sinuate; (1) distinctly emarginate; (2) nearly linear.
42. Male S7 apodemal arm: (0) sclerotized margin entire, enclosing membranous portion of arm; (1) sclerotized margin terminating mesolaterad; (2) sclerotized margin recurved mesad, dividing membranous portion of arm.
43. Male S8 lateral process: (0) anteromedial sclerotized margin following marginal contour; (1) anteromedial sclerotized margin distinctly swollen into convex incursion; (2) with anteromedial sclerotized spot, disjunct from margin.
44. Male S8 lateral process: (0) unmodified; (1) produced anteriorly; (2) produced laterally; (3) produced laterally and anteriorly.
45. Male gonobase, truncate process of apicoventral margin: (0) weakly emarginate; (1) bituberculate and distinctly notched for a distance less than width of lateral tubercle; (2) bituberculate and distinctly notched for a distance $\sim 1.5x$ width of lateral tubercle; (3) bituberculate and distinctly notched for a distance $\sim 2x$ width of lateral tubercle.
46. Male gonoforceps, mesoventral lobe: (0) evenly rounded; (1) anterior and posterior margins concave; (2) broad, width of lobe approximately equal minimum width of gonoforceps.
47. Female metasoma: (0) mostly black-brown; (1) mostly orange-brown.
48. Female terga: (0) T1-T3 with apicolateral hair patches tomentose; (1) T1-T2 apicolateral hair patches tomentose, but apical hairs evenly sparse on T3.
49. Male UOD:LOD – continuous.
50. Female UOD:LOD – continuous.
51. Male OOC:IOC – continuous.
52. Male scape length:maximum width – continuous.
53. Male probasitarsus length:depth – continuous.
54. Male prodistitarsus length:combined length of tarsomeres 2-4 – continuous.

55. Female prodistitarsus length:combined length of tarsomeres 2-4 – continuous.
56. Male metafemur length:depth – continuous.
57. Female metafemur length:depth – continuous.
58. Female metatibia length:depth – continuous.
59. Female metabasitarsus length:depth – continuous.
60. Male metapostnotum length:mesoscutum length – continuous.
61. Female metapostnotum length:mesoscutum length – continuous.

APPENDIX B: Data Matrix

Table S1. Discrete and continuous morphological data matrix used in phylogenetic analysis.

Character #	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
<i>C. (O.) vernalis</i>	1	0	0	1	1	1	0	1	1	0	1	0	0	0	0	0	0	2	1	2	1	2	0	2	0	1	0	1	1	1
<i>C. (C.) penai</i>	1	0	1	1	0	1	1	0	0	0	1	0	1	1	2	0	0	-	-	-	3	3	3	2	0	1	0	0	0	0
<i>C. (s. str.) rubriventris</i>	1	1	0	1	0	1	0	1	0	0	1	1	2	0	0	0	0	2	0	1	1	2	1	0	0	1	0	0	1	1
<i>C. (H.) charizard</i>	1	0	0	1	0	1	1	0	1	1	1	1	1	1	0	0	3	0	2	2	0	2	0	2	1	0	1	1	0	0
<i>C. (H.) deserticola</i>	0	0	0	0	0	1	0	0	2	0	0	1	1	0	1	0	0	0	2	0	3	3	1	3	0	1	1	1	0	0
<i>C. (H.) diaguia</i>	1	1	1	1	0	1	1	1	0	0	1	1	0	1	0	0	2	2	2	1	0	2	0	2	1	0	1	1	0	1
<i>C. (H.) erithropoda</i>	0	0	0	1	0	0	1	0	2	0	0	0	1	0	0	0	0	1	2	1	5	2	5	2	0	1	1	0	1	0
<i>C. (H.) guanicoe</i>	0	0	0	1	0	1	1	1	2	1	0	1	1	1	0	0	2	0	1	2	3	2	4	2	1	0	1	1	1	0
<i>C. (H.) curvapeligrosa</i>	0	0	0	1	0	1	0	1	1	0	1	1	1	1	2	0	1	2	1	1	2	2	2	2	1	0	1	1	0	0
<i>C. (H.) lickana</i>	0	0	1	1	0	1	1	1	1	1	1	1	1	1	0	0	3	0	1	2	3	1	1	1	0	0	1	0	1	0
<i>C. (H.) mantagua</i>	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	2	1	2	0	1	1	0	0	0
<i>C. (H.) mavida</i>	0	0	1	0	1	1	0	0	1	0	1	1	1	1	1	0	1	2	1	1	3	2	3	2	1	1	1	1	0	0
<i>C. (H.) mayu</i>	1	1	1	1	1	1	1	1	0	0	1	1	2	0	2	0	0	2	0	1	3	1	2	2	1	0	1	1	0	0
<i>C. (H.) neffi</i>	1	1	0	1	0	1	0	1	0	0	0	1	0	0	0	1	0	0	0	2	0	2	1	2	0	1	1	1	1	0
<i>C. (H.) packeri</i>	1	1	0	1	0	1	1	0	1	0	0	1	0	0	0	1	0	0	0	2	3	0	1	2	0	1	1	1	0	0
<i>C. (H.) randolphi</i>	1	0	1	1	0	1	0	0	2	1	1	1	2	0	1	0	0	2	2	1	4	2	3	2	1	0	1	1	0	1
<i>C. (H.) travesia</i>	0	0	0	1	0	0	1	0	2	0	0	1	0	0	0	0	0	1	2	1	5	2	5	2	0	1	1	0	1	0
<i>C. (H.) vicugna</i>	0	0	0	1	0	1	1	1	2	0	1	0	1	0	0	0	0	0	1	1	3	0	1	0	1	1	1	1	0	0
<i>C. (H.) vina</i>	1	1	1	1	0	1	1	0	0	0	0	1	0	1	1	0	2	2	2	1	0	2	0	2	1	0	1	1	0	1
(continued).																														
Character #	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
<i>C. (O.) vernalis</i>	0	0	0	-	-	-	0	1	2	-	0	1	0	2	1	-	0	1	1.566	1.436	1.182	3.077								

<i>C. (C.) penai</i>	1	0	1	-	-	-	1	2	1	0	0	0	0	2	3	0	0	0	1.185	1.116	0.864	3.182
<i>C. (s. str.) rubriventris</i>	0	0	1	-	-	-	1	-	0	1	2	1	1	0	0	0	1	0	1.391	1.382	0.867	3.000
<i>C. (H.) charizard</i>	1	0	0	1	2	1	0	0	1	2	0	2	0	0	1	1	0	0	1.500	1.412	0.600	2.632
<i>C. (H.) deserticola</i>	3	0	1	0	0	0	0	0	1	2	0	1	0	0	3	0	0	0	1.455	1.400	0.667	2.444
<i>C. (H.) diaguia</i>	0	0	0	0	2	1	0	0	1	2	0	1	0	2	1	1	0	1	1.425	1.351	0.619	2.417
<i>C. (H.) erithropoda</i>	5	0	0	1	2	2	1	1	1	0	1	0	0	3	3	1	0	0	1.283	1.286	0.522	2.636
<i>C. (H.) guanicoe</i>	4	0	0	3	1	0	1	0	0	0	1	1	0	1	2	0	0	0	1.455	1.292	0.667	2.400
<i>C. (H.) curvapeligrosa</i>	1	0	1	3	1	1	1	0	0	0	1	1	0	1	1	0	0	1	1.412	1.324	0.667	2.556
<i>C. (H.) lickana</i>	4	0	1	3	2	0	1	0	0	0	1	1	1	1	0	0	0	1	1.310	1.276	0.667	2.417
<i>C. (H.) mantagua</i>	1	1	1	0	0	0	0	3	1	2	0	0	0	0	?	0	0	0	1.382	1.294	0.706	2.556
<i>C. (H.) mavida</i>	1	2	1	3	2	0	1	0	0	0	1	1	0	1	2	0	0	0	1.429	1.294	0.611	2.400
<i>C. (H.) mayu</i>	1	0	1	3	1	1	1	0	0	0	2	2	0	2	0	1	0	1	1.410	1.275	0.750	2.600
<i>C. (H.) neffi</i>	2	0	1	2	0	1	0	3	2	1	1	0	1	1	2	2	0	1	1.387	1.379	0.688	2.667
<i>C. (H.) packeri</i>	2	0	0	2	0	1	1	3	2	1	1	0	1	1	3	2	1	1	1.355	1.313	0.588	2.353
<i>C. (H.) randolphi</i>	1	1	1	0	0	1	1	3	1	2	0	1	0	0	1	1	1	0	1.310	1.310	0.842	2.273
<i>C. (H.) travesia</i>	6	0	0	0	2	2	1	1	1	0	1	1	2	3	1	0	0	0	1.389	1.280	0.450	2.400
<i>C. (H.) vicugna</i>	4	0	1	3	2	0	0	0	0	0	1	1	0	1	2	0	0	1	1.531	1.419	0.706	3.000
<i>C. (H.) vina</i>	0	0	1	0	2	0	0	2	1	2	0	1	1	2	1	1	0	1	1.500	1.361	0.667	2.500

(continued).

Character #	5 3	5 4	5 5	5 6	5 7	5 8	5 9	6 0	6 1
<i>C. (O.) vernalis</i>	5.857	1.050	0.826	1.768	3.227	5.444	5.818	0.128	0.186
<i>C. (C.) penai</i>	3.333	1.000	1.353	2.091	2.500	3.000	4.077	0.274	0.254
<i>C. (s. str.) rubriventris</i>	2.800	1.000	1.000	1.870	2.400	3.947	4.455	0.228	0.227
<i>C. (H.) charizard</i>	4.143	0.722	0.718	1.969	3.125	4.133	4.000	0.246	0.246
<i>C. (H.) deserticola</i>	4.000	0.800	0.852	1.765	2.786	4.522	4.429	0.250	0.250
<i>C. (H.) diaguia</i>	3.875	0.842	0.882	1.867	3.000	4.267	4.316	0.253	0.242
<i>C. (H.) erithropoda</i>	3.857	0.789	0.857	1.533	2.585	3.771	3.905	0.250	0.210
<i>C. (H.) guanicoe</i>	3.846	0.933	0.788	1.967	2.750	4.143	4.222	0.233	0.259
<i>C. (H.) curvapeligrosa</i>	3.385	0.903	1.167	1.711	2.750	4.231	4.000	0.293	0.264
<i>C. (H.) lickana</i>	3.778	0.944	1.000	1.778	2.789	4.857	4.316	0.274	0.238
<i>C. (H.) mantagua</i>	3.333	0.867	0.966	1.968	2.625	4.231	3.667	0.218	0.225
<i>C. (H.) mavida</i>	3.250	0.941	1.273	1.892	2.867	4.609	4.250	0.238	0.245
<i>C. (H.) mayu</i>	2.941	0.903	0.833	1.675	2.882	3.813	3.714	0.279	0.259
<i>C. (H.) neffi</i>	3.500	0.933	1.083	1.735	2.929	4.160	3.750	0.264	0.224
<i>C. (H.) packeri</i>	4.000	0.727	0.889	1.897	3.000	4.333	4.000	0.220	0.265
<i>C. (H.) randolphi</i>	2.625	1.067	0.933	1.850	3.313	4.714	3.909	0.308	0.262
<i>C. (H.) travesia</i>	4.000	0.722	0.694	1.667	3.067	3.600	4.000	0.230	0.214
<i>C. (H.) vicugna</i>	3.333	0.800	0.815	1.742	2.714	4.364	4.143	0.269	0.234
<i>C. (H.) vina</i>	4.000	0.941	0.875	1.972	3.125	4.214	4.444	0.306	0.241

APPENDIX C: Character-Annotated Phylogeny

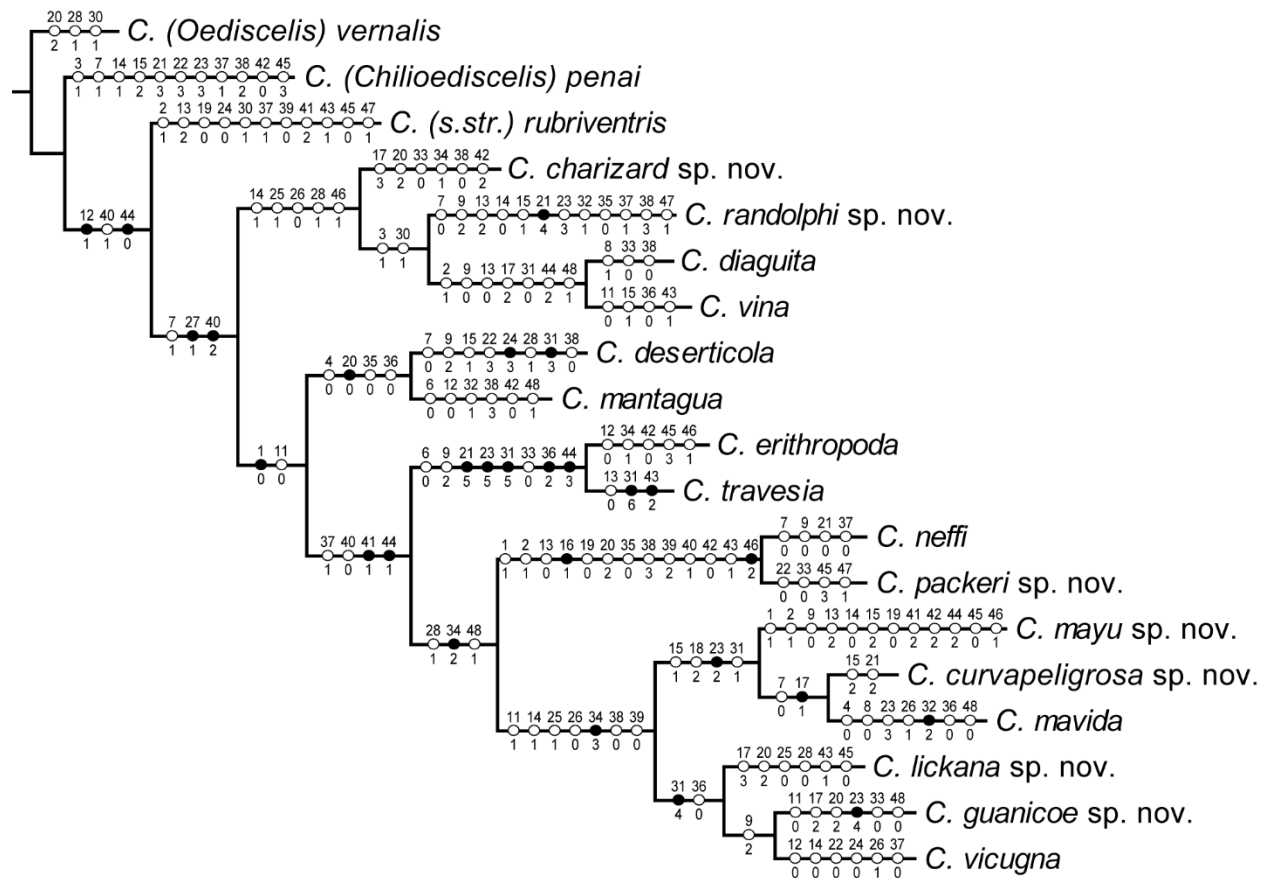


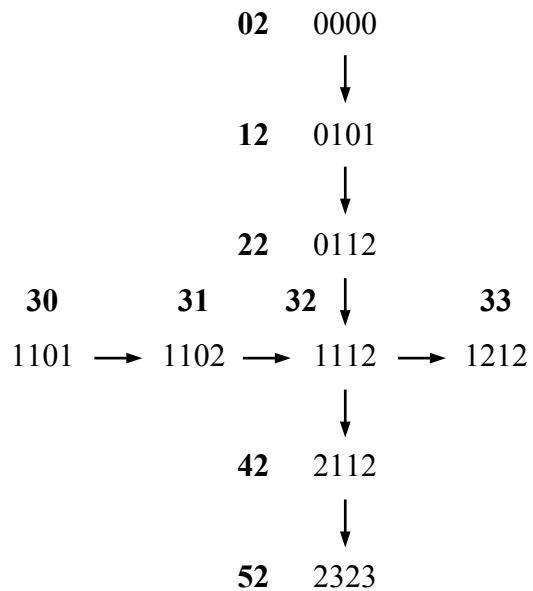
Fig. S1. Phylogeny with evolutionary character changes mapped onto branches. Character numbers are above branches with corresponding states below. Solid circles indicate unique changes, open circles indicate homoplasies.

APPENDIX D: Non-Redundant Linear Coding

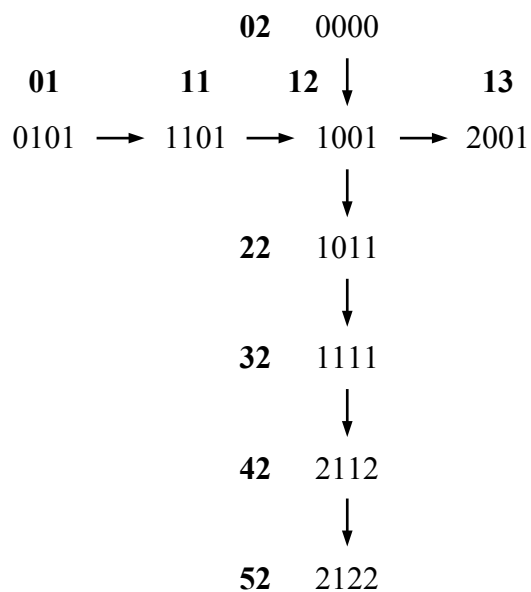
Three character state trees were constructed for non-redundant linear coding of potentially confounded leg colour characters (O'Grady and Deets 1987). Each sequence of numbers refers to a different combination of colour character states for the mid- or hindleg. Given that some combinations are not observed, it is probable that changes in colour of different leg regions occur

in concert; thus, these character state combinations are shown as linked by single evolutionary changes. Bolded numbers indicate character states derived from these trees, and the resultant NRLC characters (21-24, 31-32) are coded as additive in the analysis.

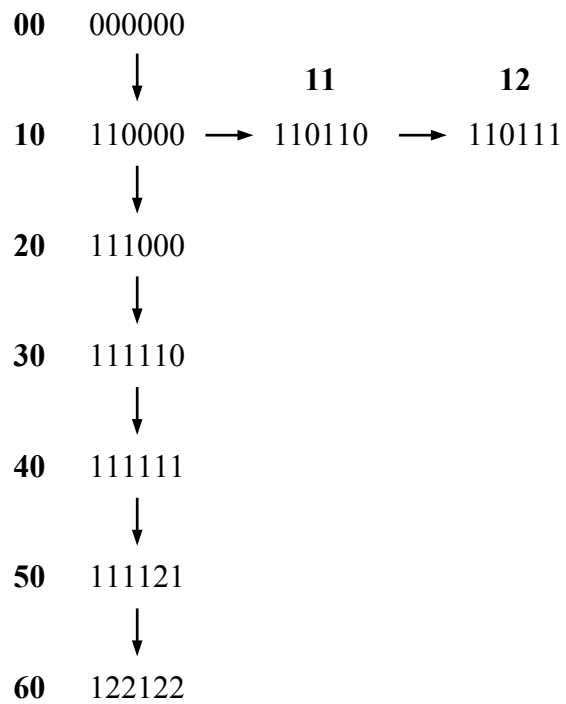
Male midleg colour (characters: apex of mesofemur, base of mesotibia, midlength of mesotibia, apex of mesotibia):



Male hindleg colour (characters: apex of metafemur, base of metatibia, midlength of metatibia, apex of metatibia):



Female mid-/hindleg colour (characters: apex of mesofemur, base of mesotibia, apex of mesotibia, apex of metafemur, base of metatibia, apex of metatibia):



APPENDIX E: List of Specimens

	SPECIES	KIND	CODE	SEX	REG.	LOCALITY	LAT	LONG	ELEV (m)	DATE (or start date)	END DATE (if applicable)	COLLECTOR(s)	HOST PLANT	METHOD	BARCODE NUMBER	DATABASE NUMBER / SORTING CODE	COLLECTION	
C.(H.)	charizard	HOLOTYPE	SKM C.chzd.001	M	III	Emb. Sta Juana, C-479 km	21.5	-28.67467	-70.64323	642	15.x.2013		S. Monckton			CCDB-19989 A10	PCYU 0021672	PCYU
C.(H.)	charizard	ALLOTYPE	SKM C.chzd.002	F	III	Chuingo		-28.8251	-70.35596	963	15.ix.2010		L. Packer			B09857-D12 Bees of Chile332		PCYU
C.(H.)	charizard	PARATYPE	SKM C.chzd.003	M	IV	Incahuasi		-29.22814	-71.01387	779	10.x.1981		H. Toro					PUCV
C.(H.)	charizard	PARATYPE	SKM C.chzd.004	M	IV	Incahuasi		-29.22814	-71.01387	779	10.x.1981		H. Toro					PUCV
C.(H.)	charizard	PARATYPE	SKM C.chzd.005	M	III	C-453 km 22		-28.1816	-69.82605	1625	30.ix.2013		S.Monckton			CCDB-19989 A11	PCYU 0021673	PCYU
C.(H.)	charizard	PARATYPE	SKM C.chzd.006	F	IV	Incahuasi		-29.22814	-71.01387	779	10.x.1981		H. Donoso					PUCV
C.(H.)	charizard	PARATYPE	SKM C.chzd.007	F	III	Chuingo		-28.8251	-70.35596	963	15.ix.2010		L. Packer			B09857-E05 Bees of Chile337		PCYU
C.(H.)	charizard	PARATYPE	SKM C.chzd.008	F	IV	Incahuasi		-29.22814	-71.01387	779	1.x.1982		O. Martinez					PUCV
C.(H.)	charizard	PARATYPE	SKM C.chzd.009	F	IV	Incahuasi		-29.22814	-71.01387	779	10.x.1981		B. Dyer					PUCV
C.(H.)	charizard	PARATYPE	SKM C.chzd.010	F	IV	Incahuasi		-29.22814	-71.01387	779	10.x.1981		H. Burgos					PUCV
C.(H.)	charizard	PARATYPE	SKM C.chzd.011	F	IV	Puente Las Ternerias		-29.908876	-70.25223	1644	4.x.2010		L. Packer				PCYU 0021698	PCYU
C.(H.)	charizard	PARATYPE	SKM C.chzd.012	F	III	Fundo La Semilla, 125 km SE Copiapó		-28.25066	-69.741	2358	17.x.2004		F.D. Parker, M.E. Irwin	pan trap		CHL-14509-57	FDP52565	BBSL
C.(H.)	charizard	PARATYPE	SKM C.chzd.013	F	III	Alto del Carmen		-28.75944	-70.48667	2272	2.x.1982		F. Rodriguez					BBSL
C.(H.)	deserticola	HOLOTYPE		M	IV	Pueblo Hundido		-30.0629	-70.4911	1031	x.1972		L. Ruz	Heliotropium stenophyllum				AMNH
C.(H.)	deserticola	PARATYPE	SKM C.dsrt.001	M	IV	Pueblo Hundido		-30.0629	-70.4911	1031	x.1972		L. Ruz	Heliotropium stenophyllum				AMNH
C.(H.)	deserticola		SKM C.dsrt.002	F	IV	Dunes, Los Choros		-29.31303	-71.29369	145	13.ix.2010		L. Packer			B09857-B01		PCYU
C.(H.)	deserticola		SKM C.dsrt.003	M	IV	Dunes, Los Choros		-29.31303	-71.29369	145	13.ix.2010		L. Packer			B09857-A09 Bees of Chile293		PCYU
C.(H.)	deserticola		SKM C.dsrt.004	M	IV	Bahía Tongoy, S. of Tongoy		-30.272	-71.483	25	8.x.2001		Packer & Fraser					PCYU
C.(H.)	deserticola		SKM C.dsrt.005	M	IV	La Serena		-29.9063	-71.2502	20	28.xii.1988		L. Ruz E.					PUCV
C.(H.)	deserticola		SKM C.dsrt.006	M	IV	Bahía Tongoy, S. of Tongoy		-30.272	-71.483	25	8.x.2001		Packer & Fraser					PCYU
C.(H.)	deserticola		SKM C.dsrt.007	M	IV	Puerto Aldea nr. Tongoy		-30.30098	-71.60627	9	26.x.2001		Packer & Fraser					PCYU
C.(H.)	deserticola		SKM C.dsrt.008	M	III	E of Carrizalillo, C-500, km 53.3		-28.99822	-71.37874	208	8.xi.2013	13.xii.2013	S. Monckton & J. Postlethwaite					PCYU
C.(H.)	deserticola		SKM C.dsrt.009	M	IV	Puerto Aldea nr. Tongoy		-30.30098	-71.60627	9	26.x.2001		Packer & Fraser					PCYU
C.(H.)	deserticola		SKM C.dsrt.010	M	IV	Bahía Tongoy, S. of Tongoy		-30.272	-71.483	25	8.x.2001		Packer & Fraser			CCDB-22789 D05		PCYU
C.(H.)	deserticola		SKM C.dsrt.011	M	IV	Puerto Aldea nr. Tongoy		-30.30098	-71.60627	9	26.x.2001		Packer & Fraser					PCYU

C.(H.)	<i>deserticola</i>	SKM C.dsrt.012	M	IV	Puerto Aldea nr. Tongoy	-30.30098	-71.60627	9	26.x.2001	Packer & Fraser						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.013	M	IV	W. of Barrancas	-30.21493	-71.32916	337	10.x.2000	L. Packer						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.014	M	IV	P.N. Fray Jorge Entrance	-30.62659	-71.66328	282	7.x.2001	L. Packer						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.015	M	IV	Los Vilos, Caleta Los Lobos	-31.94918	-71.52582	11	26.x.2001	Packer & Fraser						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.016	M	IV	Bahía Tongoy, S. of Tongoy	-30.272	-71.483	25	8.x.2001	Packer & Fraser						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.017	M	IV	Guaqueros	-30.19797	-71.42207	22	7.x.1982	H. Toro						PUCV
C.(H.)	<i>deserticola</i>	SKM C.dsrt.018	M	IV	Pr. Coquimbo, Carretera Pan-Am al norte de La Serena				1970-72	A.R. Moldenke	<i>Calandrinia grandiflora</i>			INT. BIOL. PROGRAM # ???		PUCV
C.(H.)	<i>deserticola</i>	SKM C.dsrt.019	M	IV	Pr. Coquimbo, Carretera Pan-Am al norte de La Serena				1970-72	A.R. Moldenke				INT. BIOL. PROGRAM #47128		PUCV
C.(H.)	<i>deserticola</i>	SKM C.dsrt.020	M	IV	Coquimbo Prov. 4km.S.Socos	-30.74454	-71.52837	201	22.ix.1966	M.E. Irwin						BBSL
C.(H.)	<i>deserticola</i>	SKM C.dsrt.021	M	IV	Q. Los Choros	-29.34297	-71.15532	232	11.x.1977	V. Cabezas						AMNH
C.(H.)	<i>deserticola</i>	SKM C.dsrt.022	M	IV	Choros Bajos	-29.29083	-71.30889	57	12.x.1977	H. Flores				PUCV-ENTO 19926		PUCV
C.(H.)	<i>deserticola</i>	SKM C.dsrt.023	M	IV	Prov. Coquimbo, Río Los Choros	-29.34297	-71.15532	232	6.xi.1956	Wagenknecht						PUCV
C.(H.)	<i>deserticola</i>	SKM C.dsrt.024	M	III	Huasco prov., Carrizalillo	-29.09911	-71.39117	179	20.ix.2003	A. Ugarte			B10037-H8 Bees of Chile756			PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.025	M	III	SE of Los Choros, between WP & the dunes	-29.30518	-71.28362	280	13.ix.2010	L. Packer						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.026	M	III	SE of Los Choros, between WP & the dunes	-29.30518	-71.28362	280	13.ix.2010	L. Packer						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.027	M	III	SE of Los Choros, between WP & the dunes	-29.30518	-71.28362	280	13.ix.2010	L. Packer						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.028	M	III	SE of Los Choros, between WP & the dunes	-29.30518	-71.28362	280	13.ix.2010	L. Packer						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.029	M	III	SE of Los Choros, between WP & the dunes	-29.30518	-71.28362	280	13.ix.2010	L. Packer						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.030	M	III	SE of Los Choros, between WP & the dunes	-29.30518	-71.28362	280	13.ix.2010	L. Packer						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.031	M	III	SE of Los Choros, between WP & the dunes	-29.30518	-71.28362	280	13.ix.2010	L. Packer						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.032	M	IV	Qda Los Litres SW of Tongoy, inland rd.	-30.3231	-71.52617	16	26.x.2001	Packer & Fraser						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.033	F	III	Caleta Carrizalillo	-29.10981	-71.4613	11	8.xi.2013	S. Monckton	pan trap	CCDB-19989 C05		PCYU 0021691		PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.034	F	III	Huasco prov., Chañar de Aceituno	-28.95342	-71.34719	271	18.ix.2003	A. Ugarte			B10037-H11 Bees of Chile759			PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.035	F	IV	Pueblo Hundido	-30.0629	-70.4911	1031	x.1972	V. Cabezas	<i>Heliotropium stenophyllum</i>					AMNH
C.(H.)	<i>deserticola</i>	SKM C.dsrt.036	F	III	Caleta Carrizalillo	-29.10981	-71.4613	11	13.x.2013 08.xi.2013	J. Postlethwaite & S. Monckton						PCYU
C.(H.)	<i>deserticola</i>	SKM C.dsrt.037	F	IV	Incahuasi	-29.22814	-71.01387	779	1.x.1982	De la Hoz						PUCV
C.(H.)	<i>deserticola</i>	SKM C.dsrt.038	F	IV	Q. Los Choros	-29.34297	-71.15532	232	12.x.1977	V. Cabezas						AMNH
C.(H.)	<i>deserticola</i>	SKM C.dsrt.039	F	IV	Choros Bajos	-29.29083	-71.30889	57	12.x.1977	H. Flores				PUCV-ENTO 19930		PUCV

<i>C.(H.) deserticola</i>	SKM C.dsrt.040	F	IV	Choros Bajos	-29.29083	-71.30889	57	12.x.1977	H. Flores	AMNH
<i>C.(H.) deserticola</i>	SKM C.dsrt.041	F	IV	Choros Bajos	-29.29083	-71.30889	57	12.x.1977	H. Flores	AMNH
<i>C.(H.) deserticola</i>	SKM C.dsrt.042	F	IV	Choros Bajos	-29.29083	-71.30889	57	12.x.1977	H. Flores	AMNH
<i>C.(H.) deserticola</i>	SKM C.dsrt.043	F	IV	Choros Bajos	-29.29083	-71.30889	57	12.x.1977	H. Flores	AMNH
<i>C.(H.) deserticola</i>	SKM C.dsrt.044	F	III	Caleta Chañaral de Aceituna	-29.09	-71.467	8	18.ix.2003	L. Packer	PCYU
<i>C.(H.) deserticola</i>	SKM C.dsrt.045	F	III	Caleta Apollillado	-29.1826	-71.48815	18	8.xi.2013 13.xii.2013	S. Monckton & J. Postlethwaite	PCYU
<i>C.(H.) deserticola</i>	SKM C.dsrt.046	F	III	E of Carrizalillo, C-500, km 53.3	-28.99822	-71.37874	208	8.xi.2013 13.xii.2013	S. Monckton & J. Postlethwaite	PCYU
<i>C.(H.) diaguita</i>	ALLOTYPE	F	IV	La Serena	-29.9063	-71.2502	20	20.iii.1952	Wagenknecht	AMNH
<i>C.(H.) diaguita</i>	HOLOTYPE	M	IV	La Serena	-29.9063	-71.2502	20	28.ii.1956	Moure	AMNH
<i>C.(H.) diaguita</i>	SKM C.dgta.001	M	IV	Choros Bajos	-29.29083	-71.30889	57	x.1977	De La Hoz	PUCV
<i>C.(H.) diaguita</i>	SKM C.dgta.002	F	IV	Q. Los Choros	-29.34297	-71.15532	232	12.x.1977	V. Cabezas	PUCV
<i>C.(H.) diaguita</i>	SKM C.dgta.003	M	IV	Cuesta Buenos Aires	-29.56237	-71.25304	518	13.x.2013 8.xi.2013	S. Monckton	CCDB-22789 D07
<i>C.(H.) diaguita</i>	SKM C.dgta.004	M	IV	Choros Bajos	-29.29083	-71.30889	57	12.x.1977	H. Flores	PUCV
<i>C.(H.) diaguita</i>	SKM C.dgta.005	M	IV	Cuesta Buenos Aires	-29.56237	-71.25304	518	8.xi.2013	S. Monckton	CCDB-19989 B09
<i>C.(H.) diaguita</i>	SKM C.dgta.006	M	IV	El Tofo	-29.44227	-71.25176	631	x.1972	L. Ruz	Flourenca gagana
<i>C.(H.) diaguita</i>	SKM C.dgta.007	M	IV	Elqui: 16 km south Pisco	-30.24752	-70.49454	1811	26.x.1992	A. Sharkov	AMNH
<i>C.(H.) diaguita</i>	SKM C.dgta.008	M	IV	Elqui: 16 km south Pisco	-30.24752	-70.49454	1811	26.x.1992	A. Sharkov	AMNH
<i>C.(H.) diaguita</i>	SKM C.dgta.009	M	IV	Elqui: 16 km south Pisco	-30.24752	-70.49454	1811	26.x.1992	A. Sharkov	AMNH
<i>C.(H.) diaguita</i>	SKM C.dgta.010	M	IV	Elqui: 16 km south Pisco	-30.24752	-70.49454	1811	26.x.1992	A. Sharkov	AMNH
<i>C.(H.) diaguita</i>	SKM C.dgta.011	M	IV	El Pangue	-30.1677	-70.6627	1711	x.1972	H. Toro	PUCV
<i>C.(H.) diaguita</i>	SKM C.dgta.012	M	IV	Los Molles	-30.74958	-70.64864	1147	12.X.2013	S. Monckton	CCDB-19989 B01
<i>C.(H.) diaguita</i>	SKM C.dgta.013	F	IV	Q. Los Choros	-29.34297	-71.15532	232	12.x.1977	V. Cabezas	PUCV
<i>C.(H.) diaguita</i>	SKM C.dgta.014	F	IV	Q. Los Choros	-29.34297	-71.15532	232	11.x.1977	V. Cabezas	PUCV
<i>C.(H.) diaguita</i>	SKM C.dgta.015	F	IV	Q. Los Choros	-29.34297	-71.15532	232	12.x.1977	V. Cabezas	PUCV
<i>C.(H.) diaguita</i>	SKM C.dgta.016	F	IV	Choros Bajos	-29.29083	-71.30889	57	12.x.1977	Magunacelaya	PUCV
<i>C.(H.) diaguita</i>	SKM C.dgta.017	F	IV	Cuesta Buenos Aires	-29.56237	-71.25304	518	13.x.2013 8.xi.2013	S. Monckton	pan trap
<i>C.(H.) diaguita</i>	SKM C.dgta.018	F	IV	Las Breas	-30.36851	-70.61282	1622	23.ix.1980	H. Toro	AMNH
<i>C.(H.) diaguita</i>	SKM C.dgta.019	F	IV	Los Molles	-30.74958	-70.64864	1147	12.x.2013	S. Monckton	CCDB-19989 B02
<i>C.(H.) erithropoda</i>	HOLOTYPE	M	IV	Pueblo Hundido	-30.0629	-70.4911	1031	x.1972	L. Ruz	Heliotropium

<i>stenophyllum</i>													
<i>C.(H.) erithropoda</i>		SKM C.erot.001	M	III	Huasco prov., Carrizalillo	-29.09911 -71.39117	179	20.ix.2003	A. Ugarte		B10037-H10 Bees of Chile758		PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.002	F	III	Huasco prov., Carrizalillo	-29.09911 -71.39117	179	20.ix.2003	A. Ugarte		B10037-H9 Bees of Chile757		PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.003	M	IV	Los Choros	-29.29083 -71.30889	57	25.x.2002	J. Gixiti & A. Zayed				PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.004	M	III	Caleta Chañaral de Aceituna	-29.09 -71.467	8	18.ix.2003	L. Packer				PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.005	M	III	Caleta Chañaral de Aceituna	-29.09037 -71.46716	10	5.x.2010	L. Packer & G.S. Fraser		PCYU 0004648		PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.006	M	III	Caleta Chañaral de Aceituna	-29.09037 -71.46716	10	5.x.2010	L. Packer & G.S. Fraser		PCYU 0004662		PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.007	M	III	Caleta Chañaral de Aceituna	-29.09037 -71.46716	10	5.x.2010	L. Packer & G.S. Fraser		PCYU 0004658		PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.008	M	III	Caleta Chañaral de Aceituna	-29.09037 -71.46716	10	5.x.2010	L. Packer & G.S. Fraser		PCYU 0004650		PUCV
<i>C.(H.) erithropoda</i>		SKM C.erot.009	M	III	11km WNW Choros Bajos	-29.2649 -71.41117	10	14.x.2001	L. Packer		CCDB-03755 D02		PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.010	M	III	11km WNW Choros Bajos	-29.2649 -71.41117	10	14.x.2001	L. Packer				PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.011	M	III	11km WNW Choros Bajos	-29.2649 -71.41117	10	14.x.2001	L. Packer				PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.012	M	III	11km WNW Choros Bajos	-29.2649 -71.41117	10	14.x.2001	L. Packer				PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.013	M	III	11km WNW Choros Bajos	-29.2649 -71.41117	10	14.x.2001	L. Packer				PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.014	F	III	Caleta Carrizalillo	-29.10981 -71.4613	11	8.xi.2013	S. Monckton	pan trap	CCDB-19989 C06	PCYU 0021692	PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.015	F	III	Huasco prov., Carrizalillo	-29.09911 -71.39117	179	20.ix.2003	A. Ugarte		B10037-H07 Bees of Chile755		PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.016	F	III	Caleta Chañaral de Aceituna	-29.09037 -71.46716	10	5.x.2010	L. Packer & G.S. Fraser		PCYU 0004665		PUCV
<i>C.(H.) erithropoda</i>		SKM C.erot.017	F	III	Caleta Chañaral de Aceituna	-29.09037 -71.46716	10	5.x.2010	L. Packer & G.S. Fraser		PCYU 0004656		PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.018	F	III	Caleta Chañaral de Aceituna	-29.09037 -71.46716	10	5.x.2010	L. Packer & G.S. Fraser		PCYU 0004666		PCYU
<i>C.(H.) erithropoda</i>		SKM C.erot.019	F	IV	Dunes, Los Choros	-29.31303 -71.29369	145	13.ix.2010	L. Packer		B09857-A06 Bees of Chile290		PCYU
<i>C.(H.) guanicoe</i>	HOLOTYPE	SKM C.gnco.001	M	III	C-453, km 22 [Near Fundo La Semilla]	-28.1816 -69.82605	1625	6.xi.2013	S. Monckton	fl. yellow pan trap (17d)	CCDB-19989 B08	PCYU 0021682	PCYU
<i>C.(H.) guanicoe</i>	ALLOTYPE	SKM C.gnco.002	F	III	C-35 km 51.5 [SE of Copiapó]	-27.82374 -70.1227	875	29.ix.2013	S. Monckton		CCDB-19989 A12	PCYU 0021674	PCYU
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.003	M	III	E of Potrerillos, Hwy C-177, km 16	-26.40077 -69.37687	2488	16.xi.2013	J. Postlethwaite	blue pan	CCDB-22789 F02		PCYU
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.004	M	III	Las Juntas	-28.00317 -69.97582	1160	5.x.1982	C. Tobar				PUCV
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.005	M	III	E of Potrerillos, C-177, km 24	-26.45853 -69.32718	2839	28.ix.2013 16.xi.2013	J. Postlethwaite	pan trap			PCYU
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.006	M	III	Hwy C-269, km 0.5 (WP: 155) [E of Potrerillos]	-26.47625 -69.32137	3000	28.iii.2013 24.iv.2013	J. Postlethwaite, S. Monckton	yellow cup			PCYU
<i>C.(H.) guanicoe</i>	ALLOTYPE	SKM C.gnco.007	F	III	Fundo La Semilla, 125 km SE Copiapó	-28.25066 -69.741	2358	17.x.2004	F.D. Parker, M.E. Irwin	pan trap	CHL-14509-54	FDP52511	BBSL
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.008	F	III	Fundo La Semilla, 125 km SE Copiapó	-28.25066 -69.741	2358	17.x.2004	F.D. Parker, M.E. Irwin	pan trap	CHL-14509-55	FDP52599	BBSL

<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.009 F	III	Fundo La Semilla, 125 km SE Copiapó	-28.25066 -69.741	2358	17.x.2004	F.D. Parker, M.E. Irwin	pan trap	CHL-14509-56	FDP52403	BBSL
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.010 F	III	Fundo La Semilla, 125 km SE Copiapó	-28.25066 -69.741	2358	30.x.2003	F.D. Parker, M.E. Irwin	pan trap	CHL-14509-03	FDP4749; USDA Native Bee Survey BBSL699121	BBSL
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.011 F	III	Rd to Pastos Largos, km 0.5	-28.18022 -69.80470	1863	6.xi.2013	S. Monckton				PCYU
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.012 F	III	Rd to Pastos Largos, km 0.5	-28.18022 -69.80470	1863	6.xi.2013 11.xii.2013	J. Postlethwaite & S. Monckton	pan trap			PCYU
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.013 F	III	Rd to Pastos Largos, km 4	-28.16429 -69.79134	2102	21.x.2013 6.xi.2013	S. Monckton	pan trap			PCYU
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.014 F	III	Las Juntas	-28.00317 -69.97582	1160	5.x.1982	R. Aldunate				PUCV
<i>C.(H.) guanicoe</i>	PARATYPE	SKM C.gnco.015 F	III	E of Potrerillos, C-177, km 24	-26.45853 -69.32718	2839	28.ix.2013 16.xi.2013	J. Postlethwaite	pan trap			PCYU
<i>C.(H.) horquilla</i>	HOLOTYPE	SKM C.hqla.001 M	RM	Farellones [Camino a Valle Nevado]	-33.36995 -70.27856	2393	31.xii.2008	L. Packer	<i>Phacelia</i>		PCYU CHI09-2-3-005	PCYU
<i>C.(H.) horquilla</i>	ALLOTYPE	SKM C.hqla.002 F	RM	Farellones [Curva 31]	-33.35627 -70.32478	2179	31.xii.2008	L. Packer	<i>Echium vulgare</i>		PCYU CHI09-2-2-015	PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.003 M	RM	Farellones [Camino a Valle Nevado]	-33.36995 -70.27856	2393	31.xii.2008	L. Packer	<i>Phacelia</i>		PCYU CHI09-2-3-008	PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.004 M	RM	Farellones [Camino a Valle Nevado]	-33.36995 -70.27856	2393	31.xii.2008	L. Packer	<i>Phacelia</i>		PCYU CHI09-2-3-003	PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.005 M	RM	Farellones [Camino a Valle Nevado]	-33.36995 -70.27856	2393	31.xii.2008	L. Packer	<i>Phacelia</i>		PCYU CHI09-2-3-006	PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.006 M	RM	Farellones [Curva 31]	-33.35627 -70.32478	2179	31.xii.2008	L. Packer	<i>Echium vulgare</i>			PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.007 M	RM	Farellones	-33.3535 -70.31684	2385	1.i.1973	A. Moldenke				PUCV
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.008 M	RM	Farellones	-33.3535 -70.31684	2385	9.i.2009	L. Packer			PCYU CHI09-12-3-004	PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.009 M	RM	Farellones	-33.3535 -70.31684	2385	9.i.2009	L. Packer			PCYU CHI09-12-3-003	PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.010 M	RM	Farellones	-33.3535 -70.31684	2385	1.i.1973	A. Moldenke				PUCV
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.011 M	RM	Farellones [Curva 33]	-33.35428 -70.3195	2295	30.xii.2012	L. Packer, R. Smith				PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.012 M	RM	Valle Nevado	-33.3622 -70.25764	2677	31.xii.2008	L. Packer	<i>Phacelia</i>			PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.013 M	RM	Valle Nevado	-33.3622 -70.25764	2677	31.xii.2008	L. Packer	<i>Phacelia</i>			PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.014 M	RM	Valle Nevado	-33.3622 -70.25764	2677	31.xii.2008	L. Packer	<i>Phacelia</i>			PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.015 M	RM	Valle Nevado	-33.3622 -70.25764	2677	31.xii.2008	L. Packer	<i>Phacelia</i>		PCYU CHI09-2-5-011	PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.016 M	RM	Valle Nevado [Farellones/El Colorado]	-33.34111 -70.29497	2596	9.i.2009	L. Packer			PCYU CHI09-10-2-008	PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.017 M	RM	Valle Nevado [Farellones/El Colorado]	-33.34111 -70.29497	2596	9.i.2009	L. Packer			PCYU CHI09-10-2-009	PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.018 M	RM	Valle Nevado [Termas de Colina]	-33.856 -69.98037	3000	8.i.2009	L. Packer		CCDB-03755 G03	PCYU CHI09-10-2-004	PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.019 M	RM	Río Yeso, Hwy G-455 km 18.1	-33.69422 -70.11203	2337	27.ii.2013 22.iii.2013	S. Monckton & J. Postlethwaite	pan trap			PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.020 M	RM	Río Yeso, Hwy G-455 km 18.1	-33.69422 -70.11203	2337	27.ii.2013 22.iii.2013	S. Monckton & J. Postlethwaite	pan trap			PCYU
<i>C.(H.) horquilla</i>	PARATYPE	SKM C.hqla.021 M	VII	Río Teno, Paso Vergara control post	-35.13807 -70.47831	1789	28.ii.2013 21.iii.2013	S. Monckton & J. Postlethwaite	pan trap			PCYU

C.(H.)	horquilla	PARATYPE	SKM C.hqla.022	M	RM	Cerro Roble, nr. Til-til	-32.97635	-71.01421	2200	18.xi.2001	L. Packer		CCDB-03755 F09	PCYU	
C.(H.)	horquilla	PARATYPE	SKM C.hqla.023	M	RM	Cerro Roble, nr. Til-til	-32.97635	-71.01421	2200	17.xi.2001	L. Packer			PCYU	
C.(H.)	horquilla	PARATYPE	SKM C.hqla.024	M	RM	Cerro Roble, nr. Til-til	-32.97635	-71.01421	2200	18.xi.2001	L. Packer			PCYU	
C.(H.)	horquilla	PARATYPE	SKM C.hqla.025	F	RM	Farellones [Camino a Valle Nevado]	-33.36995	-70.27856	2393	31.xii.2008	L. Packer	Phacelia		PCYU CHI09-2-3-001	PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.026	F	RM	Farellones [Camino a Valle Nevado]	-33.36995	-70.27856	2393	31.xii.2008	L. Packer	Phacelia		PCYU CHI09-2-3-002	PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.027	F	RM	Farellones [Camino a Valle Nevado]	-33.36995	-70.27856	2393	31.xii.2008	L. Packer	Phacelia	B09997-B10 Bees of Chile591	PCYU CHI09-2-3-004	PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.028	F	RM	Farellones [Curva 31]	-33.35627	-70.32478	2179	31.xii.2008	L. Packer	Echium vulgare		PCYU CHI09-2-2-017	PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.029	F	RM	Valle Nevado	-33.3622	-70.25764	2677	31.xii.2008	L. Packer	Phacelia			PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.030	F	RM	Valle Nevado	-33.3622	-70.25764	2677	31.xii.2008	L. Packer	Phacelia			PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.031	F	RM	Valle Nevado	-33.3622	-70.25764	2677	31.xii.2008	L. Packer	Phacelia			PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.032	F	RM	Valle Nevado [Farellones/El Colorado]	-33.34111	-70.29497	2596	9.i.2009	L. Packer			PCYU CHI09-10-2-011	PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.033	F	RM	Valle Nevado [Farellones/El Colorado]	-33.34111	-70.29497	2596	9.i.2009	L. Packer			PCYU CHI09-10-2-010	PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.034	F	RM	Valle Nevado [Termas de Colina]	-33.856	-69.98037	3000	8.i.2009	L. Packer		CCDB-03755 H02	PCYU CHI09-10-2-003	PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.035	F	RM	Farellones [?????]	-33.22077	-70.16333	2464	31.xii.2008	L. Packer				PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.036	F	RM	Río Yeso, Hwy G-455 km 18.1	-33.69422	-70.11203	2337	27.ii.2013	22.iii.2013	S. Monckton & J. Postlethwaite	pan trap		PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.037	F	RM	Termas del Plomo	-33.62085	-69.91956	2337	31.xii.2012	7.i.2013	L. Packer, R. Smith	pan trap	CCDB-19991 C04	PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.038	F	VII	Río Teno, Paso Vergara control post	-35.13807	-70.47831	1789	28.ii.2013	21.iii.2013	S. Monckton & J. Postlethwaite	pan trap		PCYU
C.(H.)	horquilla	PARATYPE	SKM C.hqla.039	F	RM	Cerro Roble, nr. Til-til	-32.97635	-71.01421	2200	19.xi.2001		L. Packer			PCYU
C.(H.)	horquilla			F	VI	Colchagua, Vegas del Flaco	-34.96119	-70.43241	1735	28-30.vi.1957		L. Peña			PUCV
C.(H.)	lickana	HOLOTYPE	SKM C.lkna.001	M	II	5.1km NNE of San Pedro	-22.87161	-68.17707	2531	14.x.2001		L. Packer			PCYU
C.(H.)	lickana	ALLOTYPE	SKM C.lkna.002	F	II	B-245 km 12, N of SP de Atacama	-22.82718	-68.1289	2801	6.xii.2013		J. Postlethwaite		CCDB-19989 D06	PCYU
C.(H.)	lickana	PARATYPE	SKM C.lkna.003	M	II	Aguas Blancas SE of San Pedro de Atacama	-23.26774	-67.99506	2474	12.x.2001		Packer & Fraser		CCDB-22789 D12	PCYU
C.(H.)	lickana	PARATYPE	SKM C.lkna.004	F	II	Aguas Blancas SE of San Pedro de Atacama	-23.26774	-67.99506	2474	12.x.2001		Packer & Fraser		CCDB-03755 E11	PCYU
C.(H.)	lickana	PARATYPE	SKM C.lkna.005	M/F	II	Aguas Blancas SE of San Pedro de Atacama	-23.26774	-67.99506	2474	12.x.2001		Packer & Fraser			PCYU
C.(H.)	mantagua	HOLOTYPE		M	V	Lilenes	-32.92788	-71.54550	19	13.i.1967		Toro			AMNH
C.(H.)	mantagua	ALLOTYPE		F	V	Lilenes	-32.92788	-71.54550	19	13.i.1967		De la Hoz			AMNH
C.(H.)	mantagua	PARATYPE	SKM C.mtga.001	M	V	Mantagua	-32.86562	-71.49053	15	xii.1971		H. Toro G.			AMNH
C.(H.)	mantagua	PARATYPE	SKM C.mtga.002	F	V	Lilenes	-32.92788	-71.54550	19	5.x.1975		L. Ruz			PUCV

C.(H.)	mantagua	PARATYPE	SKM C.mtga.003 M	V	Mantagua	-32.86562	-71.49053	15	xii.1971	H. Toro G.				AMNH
C.(H.)	mantagua	PARATYPE	SKM C.mtga.004 M	V	Mantagua	-32.86562	-71.49053	15	xii.1971	H. Toro G.				AMNH
C.(H.)	mantagua	PARATYPE	SKM C.mtga.005 M	V	Mantagua	-32.86562	-71.49053	15	13.i.1967	H. Toro G.				AMNH
C.(H.)	mantagua	PARATYPE	SKM C.mtga.006 M	V	Pr. Valp., Lilenes	-32.92788	-71.54550	19	5.x.1975	H. Toro		PUCV-ENTO 21467		PUCV
C.(H.)	mantagua	PARATYPE	SKM C.mtga.007 M	V	Lilenes	-32.92788	-71.54550	19	23.x.1966	De la Hoz				AMNH
C.(H.)	mantagua	PARATYPE	SKM C.mtga.008 M	V	Lilenes	-32.92788	-71.54550	19	25.x.1966	De la Hoz				AMNH
C.(H.)	mantagua	PARATYPE	SKM C.mtga.009 M	V	Lilenes	-32.92788	-71.54550	19	23.x.1966	H. Toro G.				AMNH
C.(H.)	mantagua	PARATYPE	SKM C.mtga.010 M	V	Lilenes	-32.92788	-71.54550	19	5.x.1975	H. Toro		PUCV-ENTO 21474		PUCV
C.(H.)	mantagua	PARATYPE	SKM C.mtga.011 M	V	Reñaca	-32.97197	-71.54432	14	20.xi.1966	De la Hoz				AMNH
C.(H.)	mantagua	PARATYPE	SKM C.mtga.012 M	V	Reñaca	-32.97197	-71.54432	14	20.xi.1966	De la Hoz				AMNH
C.(H.)	mantagua	PARATYPE	SKM C.mtga.013 F	V	Lilenes	-32.92788	-71.54550	19	5.x.1975	L. Ruz		PUCV-ENTO 21480		PUCV
C.(H.)	mantagua	PARATYPE	SKM C.mtga.014 F	V	Lilenes	-32.92788	-71.54550	19	5.x.1975	L. Ruz		PUCV-ENTO 21481		PUCV
C.(H.)	mantagua	PARATYPE	SKM C.mtga.015 F	V	45330 Pr. Aconcagua					A.R. Moldenke				AMNH
C.(H.)	mantagua		SKM C.mtga.016 M	V	Viña del Mar	-33.02452	-71.55234	18	xi.1988	Fritz				AMNH
C.(H.)	mantagua		SKM C.mtga.017 M	V	Viña del Mar	-33.02452	-71.55234	18	xi.1988	Fritz				AMNH
C.(H.)	mantagua		SKM C.mtga.018 M	V	Viña del Mar	-33.02452	-71.55234	18	xi.1990	Fritz				AMNH
C.(H.)	mantagua		SKM C.mtga.019 M	V	Viña del Mar	-33.02452	-71.55234	18	xi.1988	Fritz				AMNH
C.(H.)	mantagua		SKM C.mtga.020 M	V	Viña del Mar	-33.02452	-71.55234	18	xi.1988	Fritz				AMNH
C.(H.)	mantagua		SKM C.mtga.021 M	V	Reñaca	-32.97197	-71.54432	14	22.x.1994	J.G. Rozen				AMNH
C.(H.)	mantagua		SKM C.mtga.022 M	V	Concón	-32.916667	-71.5	60	21.x.2008	K.S. Ramos	CCDB-06736 F02	PCYU-KCC-10040		PCYU
C.(H.)	mantagua		SKM C.mtga.023 M	V	Concón	-32.916667	-71.5	60	21.x.2008	K.S. Ramos	CCDB-06736 F03	PCYU-KCC-10041		PCYU
C.(H.)	mantagua		SKM C.mtga.024 M	V	Playa Ritoque, N. of Concón	-32.849	-71.515	13		L. Packer	CCDB-03755 A04			PCYU
C.(H.)	mantagua		SKM C.mtga.025 F	V	Playa Ritoque, N. of Concón	-32.849	-71.515	13		L. Packer				PCYU
C.(H.)	mantagua		SKM C.mtga.026 F	V	Concón	-32.916667	-71.5	60	21.x.2008	K.S. Ramos	CCDB-06736 F01	PCYU-KCC-10039		PCYU
C.(H.)	mantagua		SKM C.mtga.027 F	V	Concón	-32.916667	-71.5	60	21.x.2008	K.S. Ramos	CCDB-06736 E12	PCYU-KCC-10038		PCYU
C.(H.)	mavida	ALLOTYPE		F	IV Baños del Toro	-29.8375	-70.02611	3202	i.1970	Toro				AMNH
C.(H.)	mavida	HOLOTYPE		M	IV Baños del Toro	-29.8375	-70.02611	3202	i.1970	Toro				AMNH
C.(H.)	mavida	PARATYPE	SKM C.mvda.001M	IV	Laguna Dam	-30.20581	-70.0418	3170	5.xii.1950	Ross & Michelbacher				AMNH

<i>C.(H.) mavida</i>		SKM C.mvda.002F	IV	W of Junta Toro, 41-CH km 146-29.96747	-70.12852	1977	8.xi.2013	S. Monckton	pan trap	CCDB-19989 D01	PCYU 0021694	PCYU
<i>C.(H.) mavida</i>	PARATYPE	SKM C.mvda.003M	IV	Laguna Dam	-30.20581 -70.0418	3170	5.xii.1950	Ross & Michelbacher				AMNH
<i>C.(H.) mavida</i>	PARATYPE	SKM C.mvda.004M	IV	Laguna Dam	-30.20581 -70.0418	3170	5.xii.1950	Ross & Michelbacher				AMNH
<i>C.(H.) mavida</i>	PARATYPE	SKM C.mvda.005M	IV	Laguna Dam	-30.20581 -70.0418	3170	5.xii.1950	Ross & Michelbacher				AMNH
<i>C.(H.) mavida</i>	PARATYPE	SKM C.mvda.006M	IV	Laguna Dam	-30.20581 -70.0418	3170	5.xii.1950	Ross & Michelbacher				AMNH
<i>C.(H.) mavida</i>	PARATYPE	SKM C.mvda.007M	IV	Rio Laguna	-30.19063 -70.04659	3000	i.1970	Dazarola				AMNH
<i>C.(H.) mavida</i>	PARATYPE	SKM C.mvda.008M	IV	Baños del Toro	-29.8375 -70.02611	3202	i.1970	H. Toro				AMNH
<i>C.(H.) mavida</i>		SKM C.mvda.009M	IV	41-CH km, 137.8	-29.96704 -70.19362	1800	8.xi.2013	S.Monckton	pan trap	CCDB-19989 B10	PCYU 0021684	PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.010M	IV	41-CH km km 171, N of Emb La Laguna	-30.17874 -70.04730	2942	15.xii.2013	J. Postlethwaite		CCDB-19989 D05		PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.011M	IV	Elqui: El Panque 24 km south Vicuña	-30.1677 -70.6627	1711	31.x.1992	Snyder, Sharkov				AMNH
<i>C.(H.) mavida</i>		SKM C.mvda.012M	V	Portillo	-32.85065 -70.13394	2612	30.xii.2009	L. Packer	<i>Stachys</i>		PCYU CHI09-2-2-039	PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.013M	V	Portillo	-32.837187-70.129622	2870	11.i.2009	L. Packer	<i>Phacelia</i>		PCYU CHI09-13-1-003	PUCV
<i>C.(H.) mavida</i>		SKM C.mvda.014F	IV	Baños del Toro	-29.8375 -70.02611	3202	i.1970					AMNH
<i>C.(H.) mavida</i>		SKM C.mvda.015F	IV	W of Junta Toro, 41-CH km 146-29.96747	-70.12852	1977	8.xi.2013	S. Monckton	pan trap	CCDB-19989 D02	PCYU 0021695	PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.016F	V	Portillo	-32.85065 -70.13394	2612	30.xii.2009	L. Packer	<i>Stachys</i>		PCYU CHI09-2-2-038	PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.017F	V	Portillo	-32.85065 -70.13394	2612	30.xii.2009	L. Packer			PCYU CHI09-2-2-031	PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.018F	V	Portillo Aduanas	-32.83042 -70.09047	3210	10.i.2009	L. Packer	<i>Phacelia</i>		PCYU CHI09-13-2-011	PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.019F	V	Portillo	-32.837187-70.129622	2870	11.i.2009	L. Packer	<i>Phacelia</i>		PCYU CHI09-13-1-004	PUCV
<i>C.(H.) mavida</i>		SKM C.mvda.020F	V	Portillo	-32.837187-70.129622	2870	11.i.2009	L. Packer	<i>Phacelia</i>		PCYU CHI09-13-1-009	PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.021F	V	Portillo	-32.837187-70.129622	2870	11.i.2009	L. Packer	<i>Phacelia</i>		PCYU CHI09-13-1-006	PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.022F	V	Portillo	-32.837187-70.129622	2870	11.i.2009	L. Packer	<i>Phacelia</i>		PCYU CHI09-13-1-002	PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.023F	V	Portillo	-32.837187-70.129622	2870	11.i.2009	L. Packer	<i>Phacelia</i>		PCYU CHI09-13-1-007	PCYU
<i>C.(H.) mavida</i>		SKM C.mvda.024F	V	Portillo	-32.837187-70.129622	2870	11.i.2009	L. Packer	<i>Phacelia</i>		PCYU CHI09-13-1-008	PCYU
<i>C.(H.) mayu</i>	HOLOTYPE	SKM C.mayu.001M	IX	Cuesta Las Raíces	-38.42992 -71.44887	1583	12.ii.2013	S. Monckton, R. Smith		CCDB-19989 G08		PCYU
<i>C.(H.) mayu</i>	ALLOTYPE	SKM C.mayu.002F	IX	Cuesta Las Raíces	-38.42992 -71.44887	1583	12.ii.2013	S. Monckton, R. Smith		CCDB-19989 G09		PCYU
<i>C.(H.) mayu</i>	PARATYPE	SKM C.mayu.003M	VII	Laguna del Maule	-36.00272 -70.45546	2227	9.i.2009	L. Packer	<i>Phacelia</i>	CCDB-22789 D04	PCYU CHI09-7-2-005	PCYU
<i>C.(H.) mayu</i>	PARATYPE	SKM C.mayu.004M	VIII	Ñuble, Las Trancas, SE.Recinto in Chillán area	-36.91066 -71.47965	1250	ii.1987	Luis E. Peña				AMNH
<i>C.(H.) mayu</i>	PARATYPE	SKM C.mayu.005F	VIII	Ñuble, Las Trancas	-36.91066 -71.47965	1250	xii.1993	L. Peña				AMNH

<i>C.(H.) neffi</i>	HOLOTYPE	M	II	Taltal	-25.40644 -70.48075	39	30.ix.1972	J. Neff			AMNH
<i>C.(H.) neffi</i>	ALLOTYPE	F	II	Taltal	-25.40644 -70.48075	39	30.ix.1972	J. Neff			AMNH
<i>C.(H.) neffi</i>	SKM C.neff.001	M	II	Cuesta Paposo	-25.01861 -70.42714	676	24.x.2013	S. Monckton		PCYU 0021578	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.002	F	II	Cuesta Paposo	-25.01861 -70.42714	676	24.x.2013	S. Monckton		PCYU 0021646	PCYU
<i>C.(H.) neffi</i>	PARATYPE	SKM C.neff.003	F	II	Taltal	-25.40644 -70.48075	39	1.x.1972	J.L. Neff	<i>Cristaria</i>	AMNH
<i>C.(H.) neffi</i>	PARATYPE	SKM C.neff.004	F	II	Taltal	-25.40644 -70.48075	39	1.x.1972	J.L. Neff	<i>Balbisia peduncularis</i>	AMNH
<i>C.(H.) neffi</i>	PARATYPE	SKM C.neff.005	F	II	Taltal	-25.40644 -70.48075	39	30.ix.1972	J.L. Neff	<i>Oxalis</i>	AMNH
<i>C.(H.) neffi</i>	SKM C.neff.006	M	II	Paposo	-25.00271 -70.4627	39	1.x.1983	R. Aldunate			PUCV
<i>C.(H.) neffi</i>	SKM C.neff.007	M	II	Paposo	-25.00271 -70.4627	39	1.x.1983	R. Aldunate			PUCV
<i>C.(H.) neffi</i>	SKM C.neff.008	M	II	Paposo	-25.00271 -70.4627	39	1.x.1983	R. Aldunate			PUCV
<i>C.(H.) neffi</i>	SKM C.neff.009	M	II	Paposo	-25.00271 -70.4627	39	1.x.1983	R. Aldunate			PUCV
<i>C.(H.) neffi</i>	SKM C.neff.010	M	II	Paposo	-25.00271 -70.4627	39	1.x.1983	R. Aldunate			PUCV
<i>C.(H.) neffi</i>	SKM C.neff.011	M	II	Cuesta Paposo	-25.01861 -70.42714	676	5.xi.2013	S. Monckton		CCDB-19989 A01	PCYU 0021663
<i>C.(H.) neffi</i>	SKM C.neff.012	M	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002 4.x.2002	J Gixiti & A Zayed	yellow pans		PCYU
<i>C.(H.) neffi</i>	SKM C.neff.013	M	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002 4.x.2002	J Gixiti & A Zayed	yellow pans		PCYU
<i>C.(H.) neffi</i>	SKM C.neff.014	M	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002 4.x.2002	J Gixiti & A Zayed			PCYU
<i>C.(H.) neffi</i>	SKM C.neff.015	M	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002 4.x.2002	J Gixiti & A Zayed	yellow pans		PCYU
<i>C.(H.) neffi</i>	SKM C.neff.016	M	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002 4.x.2002	J Gixiti & A Zayed	yellow pans		PCYU
<i>C.(H.) neffi</i>	SKM C.neff.017	M	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002 4.x.2002	J Gixiti & A Zayed	yellow pans		PCYU
<i>C.(H.) neffi</i>	SKM C.neff.018	M	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002 4.x.2002	J Gixiti & A Zayed	yellow pans		PCYU
<i>C.(H.) neffi</i>	SKM C.neff.019	M	II	SE of Taltal, Ruta 1, km 11	-25.49361 -70.42129	499	17.xi.2013	J. Postlethwaite	white pan	CCDB-22789 D08	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.020	M	II	SE of Taltal, Ruta 1, km 11	-25.49361 -70.42129	499	27.ix.2013 17.xi.2013	J. Postlethwaite & S. Monckton	yellow cup		PCYU
<i>C.(H.) neffi</i>	SKM C.neff.021	M	II	SE of Taltal, Ruta 1, km 11	-25.49361 -70.42129	499	27.ix.2013 17.xi.2013	J. Postlethwaite & S. Monckton	blue cup		PCYU
<i>C.(H.) neffi</i>	SKM C.neff.022	M	II	SE of Taltal, Ruta 1, km 11	-25.49361 -70.42129	499	27.ix.2013 17.xi.2013	J. Postlethwaite & S. Monckton	blue cup		PCYU
<i>C.(H.) neffi</i>	SKM C.neff.023	F	II	Cuesta Paposo	-25.01861 -70.42714	676	5.xi.2013	S. Monckton		CCDB-19989 A02	PCYU 0021664
<i>C.(H.) neffi</i>	SKM C.neff.024	F	II	Cuesta Paposo	-25.01861 -70.42714	676	24.x.2013	S. Monckton		PCYU 0021645	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.025	F	II	Cuesta Paposo	-25.01861 -70.42714	676	5.xi.2013	S. Monckton		PCYU 0021579	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.026	F	II	Cuesta Paposo	-25.01861 -70.42714	676	5.xi.2013	S. Monckton		PCYU 0021580	PCYU

<i>C.(H.) neffi</i>	SKM C.neff.027	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.028	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.029	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.030	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.031	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	28.ix.2002	29.ix.2002	J Gixti & A Zayed	white pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.032	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	white pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.033	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	white pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.034	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.035	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.036	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.037	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.038	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	28.ix.2002	29.ix.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.039	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	28.ix.2002	29.ix.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.040	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	28.ix.2002	29.ix.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.041	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.042	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.043	F	II	~13km S. of Paposo	-25.11111 -70.48352	21	29.ix.2002	4.x.2002	J Gixti & A Zayed	yellow pans	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.044	F	II	SE of Taltal, Ruta 1, km 11	-25.49631 -70.42129	499	27.ix.2013	17.xi.2013	J. Postlethwaite & S. Monckton	yellow cup	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.045	F	II	SE of Taltal, Ruta 1, km 11	-25.49361 -70.42129	499	27.ix.2013	17.xi.2013	J. Postlethwaite & S. Monckton	blue cup	PCYU
<i>C.(H.) neffi</i>	SKM C.neff.046	M	II	Paposo	-25.00271 -70.4627	39	1.x.1983		R. Aldunate		PUCV
<i>C.(H.) packeri</i>	HOLOTYPE	SKM C.pckr.001	M	III	N. of Vallenar	-28.41415 -70.72134	658	15-17.ix.2010	L. Packer	pan trap	PCYU
<i>C.(H.) packeri</i>	ALLOTYPE	SKM C.pckr.002	F	III	E of Llanos de Challe	-28.14995 -70.96102	189	14.x.2013	S. Monckton		PCYU 0020860
<i>C.(H.) packeri</i>	PARATYPE	SKM C.pckr.003	M	III	E of Llanos de Challe	-28.14995 -70.96102	189	14.x.2013	S. Monckton		PCYU 0020858
<i>C.(H.) packeri</i>	PARATYPE	SKM C.pckr.004	M	III	E of Llanos de Challe	-28.14995 -70.96102	189	14.x.2013	S. Monckton		PCYU 0020859
<i>C.(H.) packeri</i>	PARATYPE	SKM C.pckr.005	M	III	E of Llanos de Challe	-28.14995 -70.96102	189	14.x.2013	S. Monckton	CCDB-19989 A03	PCYU 0021665
<i>C.(H.) packeri</i>	PARATYPE	SKM C.pckr.006	F	III	Parque Nacional Llanos de Challe	-28.19642 -71.04398	230	22.x.2000	L. Packer		PCYU
<i>C.(H.) packeri</i>	PARATYPE	SKM C.pckr.007	F	III	Parque Nacional Llanos de Challe	-28.19642 -71.04398	230	22.x.2000	L. Packer		PCYU
<i>C.(H.) packeri</i>	PARATYPE	SKM C.pckr.008	F	III	Parque Nacional Llanos de Challe	-28.19642 -71.04398	230	22.x.2000	L. Packer		PCYU

C.(H.)	packeri	PARATYPE	SKM C.pckr.009	F	III	Parque Nacional Llanos de Challe	-28.19642	-71.04398	230	22.x.2000	L. Packer			PCYU	
C.(H.)	packeri	PARATYPE	SKM C.pckr.010	F	III	N of Huasco km 39	-28.14721	-71.15618	37	7.xi.2013	S. Monckton		PCYU 0021593	AMNH	
C.(H.)	packeri	PARATYPE	SKM C.pckr.011	F	III	N of Huasco km 39	-28.14721	-71.15618	37	7.xi.2013	S. Monckton	CCDB-19989 A06	PCYU 0021668	PCYU	
C.(H.)	packeri	PARATYPE	SKM C.pckr.012	F	III	N of Huasco km 39	-28.14721	-71.15618	37	7.xi.2013	S. Monckton		PCYU 0021594	PCYU	
C.(H.)	packeri	PARATYPE	SKM C.pckr.013	F	III	E of Llanos de Challe	-28.14995	-70.96102	189	14.x.2013	S. Monckton		PCYU 0020864	PCYU	
C.(H.)	packeri	PARATYPE	SKM C.pckr.014	F	III	E of Llanos de Challe	-28.14995	-70.96102	189	14.x.2013	S. Monckton		PCYU 0020865	PUCV	
C.(H.)	packeri	PARATYPE	SKM C.pckr.015	F	III	E of Llanos de Challe	-28.14995	-70.96102	189	14.x.2013	S. Monckton		PCYU 0020861	PUCV	
C.(H.)	packeri	PARATYPE	SKM C.pckr.016	F	III	E of Llanos de Challe	-28.14995	-70.96102	189	14.x.2013	S. Monckton	CCDB-19989 A04	PCYU 0021666	PCYU	
C.(H.)	packeri	PARATYPE	SKM C.pckr.017	F	III	E of Llanos de Challe	-28.14995	-70.96102	189	14.x.2013	S. Monckton		PCYU 0020862	CTMI	
C.(H.)	packeri	PARATYPE	SKM C.pckr.018	F	III	E of Llanos de Challe	-28.14995	-70.96102	189	14.x.2013	S. Monckton		PCYU 0020863	CTMI	
C.(H.)	packeri	PARATYPE	SKM C.pckr.019	F	III	E of Llanos de Challe	-28.14995	-70.96102	189	14.x.2013	S. Monckton		PCYU 0020867	AMNH	
C.(H.)	packeri	PARATYPE	SKM C.pckr.020	F	III	Emb. Sta Juana, C-149 km 21.5	-28.67467	-70.64323	642	15.x.2013	S. Monckton	CCDB-19989 A07	PCYU 0021669	PCYU	
C.(H.)	packeri	PARATYPE	SKM C.pckr.021	F	III	Ruta 5, 768.8km	-27.67283	-70.47462	653	1.x.2013	S. Monckton	CCDB-22788 F01		PCYU	
C.(H.)	packeri	PARATYPE	SKM C.pckr.022	F	III	Rd to Nantoco km 3	-27.61610	-70.42785	678	6.xi.2013	S. Monckton	CCDB-19989 A05	PCYU 0021667	PCYU	
C.(H.)	packeri	PARATYPE	SKM C.pckr.023	F	III	Quebrada del Potrero	-26.85686	-70.66392	348	14.x.2010	L. Packer & E. Almeida		PCYU 0004790	PCYU	
C.(H.)	randolphi	HOLOTYPE	SKM C.rndi.001	M	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	Phacelia	CCDB-03755 D08	PCYU CHI09-6-5-004	PCYU
C.(H.)	randolphi	ALLOTYPE	SKM C.rndi.002	F	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	Phacelia		PCYU CHI09-6-5-007	PCYU
C.(H.)	randolphi	PARATYPE	SKM C.rndi.003	M	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	Phacelia		PCYU CHI09-6-5-008	PCYU
C.(H.)	randolphi	PARATYPE	SKM C.rndi.004	M	VII	E. of Laguna del Maule, 160.120km	-35.99282	-70.39911	2505	1-6.i.2013	L. Packer, R. Smith	white pan traps	CCDB-19991 D05		PCYU
C.(H.)	randolphi	PARATYPE	SKM C.rndi.005	M	VIII	Las Cabras, mts. in Chillan area, S.Chillan Volcano, Ñuble Prov.	-36.91781	-71.42919	1500	6-31.i.1963	L.E. Peña				AMNH
C.(H.)	randolphi	PARATYPE	SKM C.rndi.006	M	VIII	Ñuble, Los Lleuques, 4km. E. of Recinto	-36.85401	-71.64457	783	xii.1982	L. Peña				AMNH
C.(H.)	randolphi	PARATYPE	SKM C.rndi.007	M	VIII	Ñuble, Los Lleuques, 4km. E. of Recinto	-36.85401	-71.64457	783	xii.1982	L. Peña				AMNH
C.(H.)	randolphi	PARATYPE	SKM C.rndi.008	F	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	Phacelia		PCYU CHI09-6-5-001	PCYU
C.(H.)	randolphi	PARATYPE	SKM C.rndi.009	F	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	Phacelia		PCYU CHI09-6-5-002	PCYU
C.(H.)	randolphi	PARATYPE	SKM C.rndi.010	F	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	Phacelia		PCYU CHI09-6-6-001	PCYU
C.(H.)	randolphi	PARATYPE	SKM C.rndi.011	F	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	Phacelia		PCYU CHI09-6-5-005	PCYU
C.(H.)	randolphi	PARATYPE	SKM C.rndi.012	F	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	Phacelia		PCYU CHI09-6-5-009	PUCV
C.(H.)	randolphi	PARATYPE	SKM C.rndi.013	F	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	Phacelia		PCYU CHI09-6-6-002	PUCV

<i>C.(H.) randolphi</i>	PARATYPE	SKM C.rndi.014	F	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	<i>Phacelia</i>		PCYU CHI09-6-5-013	CTMI
<i>C.(H.) randolphi</i>	PARATYPE	SKM C.rndi.015	F	VII	Laguna del Maule	-36.00272	-70.45546	2227	4.i.2009	L. Packer	<i>Phacelia</i>		PCYU CHI09-6-5-010	CTMI
<i>C.(H.) randolphi</i>	PARATYPE	SKM C.rndi.016	F	VII	W. of Laguna del Maule	-35.99009	-70.39767	2541	5.i.2009	L. Packer	<i>Phacelia</i>	CCDB-03755 E07	PCYU CHI09-6-5-056	PCYU
<i>C.(H.) randolphi</i>	PARATYPE	SKM C.rndi.017	F	VII	E. of Laguna del Maule, 160.120km	-35.99282	-70.39911	2505	1-6.i.2013	L. Packer, R. Smith	white pan traps	CCDB-19991 D02		PCYU
<i>C.(H.) randolphi</i>	PARATYPE	SKM C.rndi.018	F	VIII	Ñuble, Las Trancas, Shangrila in Chillán area SE Recinto	-36.87649	-71.46834	1549	14.xii.1983	L. Peña				AMNH
<i>C.(H.) randolphi</i>	PARATYPE	SKM C.rndi.019	F	VIII	Ñuble, Las Trancas, SE. Recinto in Chillán area	-36.91066	-71.47965	1250	i.1987	Luis E. Peña				AMNH
<i>C.(H.) travesia</i>	HOLOTYPE		M	III	Travesía	-27.53992	-70.44296	713	x.1972	Toro				AMNH
<i>C.(H.) travesia</i>	ALLOTYPE		F	III	Travesía	-27.53992	-70.44296	713	x.1972	Toro				AMNH
<i>C.(H.) travesia</i>	PARATYPE	SKM C.trva.001	M	III	Travesía	-27.53992	-70.44296	713	x.1969	H. Toro				AMNH
<i>C.(H.) travesia</i>	PARATYPE	SKM C.trva.002	F	III	Travesía	-27.53992	-70.44296	713	x.1969	H. Toro				AMNH
<i>C.(H.) travesia</i>	PARATYPE	SKM C.trva.003	M	III	Acatama Travesía	-27.53992	-70.44296	713	23.x.1969	H. Toro			PUCV-ENTO 19915	PUCV
<i>C.(H.) travesia</i>		SKM C.trva.004	M	III	N of Huasco km 72	-27.88955	-71.08239	216	7.xi.2013	S. Monckton	pan trap	CCDB-19989 B07	PCYU 0021681	PCYU
<i>C.(H.) travesia</i>		SKM C.trva.005	M	III	Tres Playitas 10km N of Huasco Bajo	-28.39710	-71.18477	32	13.x.2001	L. Packer				PCYU
<i>C.(H.) travesia</i>		SKM C.trva.006	M	III	Castilla	-27.85564	-70.59674	327	18.ix.1986	L. Ruz				PUCV
<i>C.(H.) travesia</i>		SKM C.trva.007	M	III	(WP: 378) Pesquera Bahía Caldera	-27.05143	-70.80428	0	06-15.xi.2013	S. Monckton & J. Postlethwaite				CTMI
<i>C.(H.) travesia</i>		SKM C.trva.008	M	III	Parque Nacional Llanos de Challe	-28.19642	-71.04398	230	13.x.2000	L. Packer				PCYU
<i>C.(H.) travesia</i>		SKM C.trva.009	M	III	Balneario Flamenco, S. of Chanaral	-26.57253	-70.68196	15	22.iii.2000	L. Packer				PCYU
<i>C.(H.) travesia</i>		SKM C.trva.010	M	III	4.4km N of Huasco Bajo	-28.42992	-71.19162	16	14.ix.2010	L. Packer				PCYU
<i>C.(H.) travesia</i>		SKM C.trva.011	M	III	4.4km N of Huasco Bajo	-28.42992	-71.19162	16	14.ix.2010	L. Packer				PCYU
<i>C.(H.) travesia</i>		SKM C.trva.012	M	III	4.4km N of Huasco Bajo	-28.42992	-71.19162	16	14.ix.2010	L. Packer				PCYU
<i>C.(H.) travesia</i>		SKM C.trva.013	M	III	4.4km N of Huasco Bajo	-28.42992	-71.19162	16	14.ix.2010	L. Packer				PCYU
<i>C.(H.) travesia</i>		SKM C.trva.014	M	III	Travesía	-27.53992	-70.44296	713	ix.1986	De la Hoz				PUCV
<i>C.(H.) travesia</i>		SKM C.trva.015	M	III	Balneario Flamenco, S. of Chanaral	-26.57253	-70.68196	15	22.iii.2000	L. Packer				PCYU
<i>C.(H.) travesia</i>		SKM C.trva.016	M	III	Hwy 5, km 848	-27.3448	-70.6931	193	16.x.2009	J. Gibbs				PCYU
<i>C.(H.) travesia</i>		SKM C.trva.017	M	III	1 km N of Caldera	-27.0575	-70.8028	17	18.x.2009	J. Gibbs		Bee-BOL BOWGF1094-10 B04743E01-CHL		PCYU
<i>C.(H.) travesia</i>		SKM C.trva.018	M	III	Hwy 5, km 848	-27.3448	-70.6931	193	16.x.2009	J. Gibbs		Bee-BOL BOWGF1087-10 B04743D06-CHL		PCYU
<i>C.(H.) travesia</i>		SKM C.trva.019	M	III	Rd to Nantoco km 0	-27.60427	-70.44953	580	1.x.2013	S. Monckton		CCDB-19989 B04	PCYU 0021678	PCYU
<i>C.(H.) travesia</i>		SKM C.trva.020	F	III	Travesía	-27.53992	-70.44296	713	ix.1986	De La Hoz Jr.				PUCV

<i>C.(H.) travesia</i>	SKM C.trva.021	F	III	Rd to Nantoco km 0	-27.60427 -70.44953	580	1.x.2013	S. Monckton		CCDB-19989 B05	PCYU 0021679	PCYU
<i>C.(H.) travesia</i>	SKM C.trva.022	F	III	2.4 km N of Huasco Bajo	-28.4554 -71.1849	19	19.x.2009	J. Gibbs		Bee-BOL BOWGF1091-10 B04743D10-CHL		PCYU
<i>C.(H.) travesia</i>	SKM C.trva.023	F	III	N of Huasco	-28.44019 -71.18803	26	14.x.2013	S. Monckton	pan trap	CCDB-19989 C03	PCYU 0021689	PCYU
<i>C.(H.) travesia</i>	SKM C.trva.024	F	III	(WP: 378) Pesquera Bahia Caldera	-27.05413 -70.80428	0	06-15.xi.2013	S. Monckton & J. Postlethwaite				CTMI
<i>C.(H.) travesia</i>	SKM C.trva.025	F	III	Hwy 5, km 848	-27.3448 -70.6931	193	16.x.2009	J. Gibbs				PCYU
<i>C.(H.) travesia</i>	SKM C.trva.026	F	III	Parque Nacional Llanos de Challe	-28.19642 -71.04398	230	13.x.2000	L. Packer				PCYU
<i>C.(H.) travesia</i>	SKM C.trva.027	F	III	N of Huasco	-28.44019 -71.18803	26	14.x.2013	S. Monckton	pan trap	CCDB-19989 D04	PCYU 0021697	PCYU
<i>C.(H.) travesia</i>	SKM C.trva.028	F	III	N of Huasco, km 67.2	-27.92718 -71.08508	169	7.xi.2013	S. Monckton	pan trap	CCDB-19989 C01	PCYU 0021687	PCYU
<i>C.(H.) travesia</i>	SKM C.trva.029	F	III	Cta Totoral	-27.83161 -71.08409	14	7.xi.2013	S. Monckton	pan trap	CCDB-19989 C02	PCYU 0021688	PCYU
<i>C.(H.) travesia</i>	SKM C.trva.030	F	III	N of Huasco	-28.44019 -71.18803	26	7.xi.2013	S. Monckton	pan trap	CCDB-19989 C04	PCYU 0021690	PCYU
<i>C.(H.) travesia</i>	PARATYPE	M	III	Travesía	-27.53992 -70.44296	713	x.1969	H. Toro				AMNH
<i>C.(H.) travesia</i>		M	III	Atacama Prov., 50-60km S Copiapó	-27.79817 -70.50055	500	24.viii.1966	M.E. Irwin & E.I. Schlinger				BBSL
<i>C.(H.) travesia</i>		M	III	Castilla	-27.85564 -70.59674	327	ix.1986	H. Toro				AMNH
<i>C.(H.) travesia</i>	PARATYPE	M	III	Travesía	-27.53992 -70.44296	713	x.1969	H. Toro				AMNH
<i>C.(H.) travesia</i>	PARATYPE	F	III	Travesía	-27.53992 -70.44296	713	x.1972	H. Toro	<i>Heliotropium</i>			AMNH
<i>C.(H.) travesia</i>		F	III	Atacama Prov., 50-60km S Copiapó	-27.79817 -70.50055	500	24.viii.1966	M.E. Irwin & E.I. Schlinger				BBSL
<i>C.(H.) travesia</i>	PARATYPE	F	III	Travesía	-27.53992 -70.44296	713	x.1972	H. Toro				AMNH
<i>C.(H.) travesia</i>	PARATYPE	F	III	Via Panam N of Caldera	-27.0575 -70.8028	17	2.x.1972	J.L. Neff	<i>Cristaria</i>			AMNH
<i>C.(H.) travesia</i>	PARATYPE	F	III	Travesía	-27.53992 -70.44296	713	x.1969	H. Toro				AMNH
<i>C.(H.) travesia</i>	PARATYPE	F	III	Travesía	-27.53992 -70.44296	713	x.1972	H. Toro	<i>Heliotropium</i>			AMNH
<i>C.(H.) valparaiso</i>	HOLOTYPE	M	V	Peñuelas	-33.14911 -71.55867	362	i.1975	Cerda				AMNH
<i>C.(H.) vicugna</i>	ALLOTYPE	F	IV	El Pangue	-30.1677 -70.6627	1711	x.1972	Cabezas				AMNH
<i>C.(H.) vicugna</i>	HOLOTYPE	M	IV	El Pangue	-30.1677 -70.6627	1711	x.1972	Toro				AMNH
<i>C.(H.) vicugna</i>	NEOTYPE	SKM C.vcna.001	M	IV	Elqui Prov. 26 km S Vicuña	-30.19031 -70.66084	1691	5.x.1994	Rozen, Quinter, Ascher			AMNH
<i>C.(H.) vicugna</i>	PARATYPE	SKM C.vcna.002	M	IV	El Pangue	-30.1677 -70.6627	1711	x.1972	H. Toro	<i>Pleurophora pusilla</i>		AMNH
<i>C.(H.) vicugna</i>		SKM C.vcna.003	F	IV	Chañar-Los Lavadores	-30.2963 -70.62728	1396	10.ix.2010	L. Packer		B09866-F08 Bees of Chile257	PCYU
<i>C.(H.) vicugna</i>		SKM C.vcna.004	M	IV	Chañares	-30.29546 -70.62876	1389	12.ix.1984	H. Toro			AMNH
<i>C.(H.) vicugna</i>		SKM C.vcna.005	M	IV	E. of Vicuña , 127.8 km	-29.97767 -70.22926	1711	12.ix.2010 19..2010	L. Packer			PCYU

C.(H.)	vicugna	SKM C.vcna.006	M	III	Emb. Sta Juana, C-479 km 21.5	-28.67467	-70.64323	642	15.x.2013	S.Monckton		CCDB-19989 A08	PCYU 0021670	PCYU
C.(H.)	vicugna	SKM C.vcna.007	M	IV	41-CH km 137.8	-29.96704	-70.19362	1800	8.xi.2013	S.Monckton	pan trap	CCDB-19989 B11	PCYU 0021685	PCYU
C.(H.)	vicugna	SKM C.vcna.008	M	IV	Chañares	-30.29546	-70.62876	1389	12.ix.1984	H. Toro				AMNH
C.(H.)	vicugna	SKM C.vcna.009	M	IV	Chañares	-30.29546	-70.62876	1389	12.ix.1984	De la Hoz				AMNH
C.(H.)	vicugna	SKM C.vcna.010	M	IV	Chañares	-30.29546	-70.62876	1389	12.ix.1984	De la Hoz				AMNH
C.(H.)	vicugna	SKM C.vcna.011	M	IV	Elqui Prov. bet. Chapilca & Guanta	-29.84351	-70.46135	1107	7.x.1994	Rozen, Quinter, Ascher				AMNH
C.(H.)	vicugna	SKM C.vcna.012	M	IV	Elqui Prov. 19km S Pisco Elqui	-30.26531	-70.49851	1991	6.x.1994	Rozen, Quinter, Ascher				AMNH
C.(H.)	vicugna	SKM C.vcna.013	M	IV	Elqui Prov. 19km S Pisco Elqui	-30.26531	-70.49851	1991	6.x.1994	Rozen, Quinter, Ascher				AMNH
C.(H.)	vicugna	SKM C.vcna.014	M	IV	Elqui: 45 km south Pisco	-30.38343	-70.34657	3361	27.x.1992	Andrey Sharkov				AMNH
C.(H.)	vicugna	SKM C.vcna.015	M	IV	E. of Vicuña , 127.8 km	-29.97767	-70.22926	1711	12.ix.2010 19..2010	L. Packer				PCYU
C.(H.)	vicugna	SKM C.vcna.016	M	IV	E. of Vicuña , 127.8 km	-29.97767	-70.22926	1711	12.ix.2010 19..2010	L. Packer				PCYU
C.(H.)	vicugna	SKM C.vcna.017	M	IV	Chañar-Los Lavadores	-30.2963	-70.62728	1396	10.ix.2010	L. Packer		B09866-F09 Bees of Chile258		PCYU
C.(H.)	vicugna	SKM C.vcna.018	M	IV	Hwy 41-CH, km 133	-29.96568	-70.20154	1716	17.x.2013 8.xi.2013	S.Monckton				PCYU
C.(H.)	vicugna	SKM C.vcna.019	F	IV	Puente Las Ternerias	-29.98876	-70.25223	1644	4.v.2010	Packer & Fraser		B09866-A08 Bees of Chile197		PCYU
C.(H.)	vicugna	SKM C.vcna.020	F	IV	41-CH km 137.8	-29.96704	-70.19362	1800	8.xi.2013	S.Monckton	pan trap	CCDB-19989 B12	PCYU 0021686	PCYU
C.(H.)	vicugna	SKM C.vcna.021	F	III	Emb. Sta Juana, C-479 km 21.5	-28.67467	-70.64323	642	15.x.2013	S.Monckton		CCDB-19989 A09	PCYU 0021671	PCYU
C.(H.)	vicugna	SKM C.vcna.022	F	IV	S of Vicuña km 97	-30.14154	-70.69011	1304	3.x.2013	S.Monckton		CCDB-19989 B06	PCYU 0021680	PCYU
C.(H.)	vicugna	SKM C.vcna.023	F	IV	Chañar-Los Lavadores	-30.2963	-70.62728	1396	10.ix.2010	L. Packer		B09866-F07 Bees of Chile256		PCYU
C.(H.)	vicugna	SKM C.vcna.024	F	IV	El Pangue	-30.1677	-70.6627	1711	13.x.1977	De la Hoz				PUCV
C.(H.)	vicugna	SKM C.vcna.025	F	IV	Chañares	-30.29546	-70.62876	1389	12.ix.1984	De la Hoz				AMNH
C.(H.)	vicugna	SKM C.vcna.026	F	IV	E. of Vicuña , 127.8 km	-29.97767	-70.22926	1711	12.ix.2010 19..2010	L. Packer				PCYU
C.(H.)	vicugna	SKM C.vcna.027	F	IV	E. of Vicuña , 127.8 km	-29.97767	-70.22926	1711	12.ix.2010 19..2010	L. Packer				PCYU
C.(H.)	vicugna	SKM C.vcna.028	F	IV	E. of Vicuña , 127.8 km	-29.97767	-70.22926	1711	12.ix.2010 19..2010	L. Packer				PCYU
C.(H.)	vicugna	SKM C.vcna.029	F	IV	E. of Vicuña , 127.8 km	-29.97767	-70.22926	1711	12.ix.2010 19..2010	L. Packer				PCYU
C.(H.)	vicugna	SKM C.vcna.030	F	IV	E. of Vicuña , 127.8 km	-29.97767	-70.22926	1711	12.ix.2010 19..2010	L. Packer				PCYU
C.(H.)	vicugna	SKM C.vcna.031	F	IV	E. of Vicuña , 127.8 km	-29.97767	-70.22926	1711	12.ix.2010 19..2010	L. Packer				PCYU
C.(H.)	vicugna	SKM C.vcna.032	F	IV	E of Rivadavia, 41-CH, km 83	-29.96192	-70.54105	855	5.xi.2013	S.Monckton				PCYU
C.(H.)	vicugna	SKM C.vcna.033	F	IV	E of Rivadavia, 41-CH, km 83	-29.96192	-70.54105	855	5.xi.2013	S.Monckton				PCYU

C.(H.)	vicugna	SKM C.vcna.034	F	IV	E of Rivadavia, 41-CH, km 83	-29.96192	-70.54105	855	5.xi.2013	S.Monckton		PCYU	
C.(H.)	vicugna	SKM C.vcna.035	F	IV	E of Rivadavia, 41-CH, km 83	-29.96192	-70.54105	855	5.xi.2013	S.Monckton		PCYU	
C.(H.)	vina	HOLOTYPE		M	V	Cuesta la Dormida	-33.06701	-71.01942	1197		Moldenke	AMNH	
C.(H.)	vina	ALLOTYPE		F	V	Cuesta la Dormida	-33.06701	-71.01942	1197		Moldenke	AMNH	
C.(H.)	vina	SKM C.vina.001	M	RM	Nr Caleu	-33.00885	-70.9966	1230	26.x.2010	L. Packer	B09857-C02 Bees of Chile310	PCYU	
C.(H.)	vina	PARATYPE	SKM C.vina.002	F	RM	Pr. Valparaíso & Santiago, Cuesta La Dormida	-33.06791	-70.99799	1078	.1970-72	A.R. Moldenke	INT. BIOL. PROGRAM	AMNH
C.(H.)	vina	SKM C.vina.003	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.iii.2001	F. Vivallo	Aloysium citriodora	UFRJ	
C.(H.)	vina	SKM C.vina.004	M	V	Colliguay	-33.17122	-71.16365	491	17.ix.1976	O. Martinez		PUCV	
C.(H.)	vina	SKM C.vina.005	M	RM	Quebrada de San Ramón	-33.43293	-70.51589	853	xii.1974	L.E. Peña		PUCV	
C.(H.)	vina	SKM C.vina.006	M	V	El Salto	-33.04116	-71.52204	31	6.xi.1966	L. Ruz		PUCV	
C.(H.)	vina	SKM C.vina.007	M	V	Valparaíso Prov., Río Marga Marga, Los Perales	-33.15	-71.31666	330	13.x.1966	M. Irwin & E.I. Schlinger		BBSL	
C.(H.)	vina	SKM C.vina.008	M	V	Cuesta la Dormida	-33.06701	-71.01942	1197	26.x.2010	L. Packer		PCYU 0004674	PCYU
C.(H.)	vina	SKM C.vina.009	M	RM	Pte. Alto	-33.61666	-70.5666	705	05.xii.1999	F. Vivallo		UFRJ	
C.(H.)	vina	SKM C.vina.010	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo	Aloysium citriodora	UFRJ	
C.(H.)	vina	SKM C.vina.011	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo		UFRJ	
C.(H.)	vina	SKM C.vina.012	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo		UFRJ	
C.(H.)	vina	SKM C.vina.013	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo	Aloysium citriodora	UFRJ	
C.(H.)	vina	SKM C.vina.014	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo	Aloysium citriodora	UFRJ	
C.(H.)	vina	SKM C.vina.015	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo		UFRJ	
C.(H.)	vina	SKM C.vina.016	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo		UFRJ	
C.(H.)	vina	SKM C.vina.017	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo	Aloysium citriodora	UFRJ	
C.(H.)	vina	SKM C.vina.018	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo		UFRJ	
C.(H.)	vina	SKM C.vina.019	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo	Aloysium citriodora	UFRJ	
C.(H.)	vina	SKM C.vina.020	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo		UFRJ	
C.(H.)	vina	SKM C.vina.021	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo	Aloysium citriodora	UFRJ	
C.(H.)	vina	SKM C.vina.022	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo		UFRJ	
C.(H.)	vina	SKM C.vina.023	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo		UFRJ	
C.(H.)	vina	SKM C.vina.024	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo		UFRJ	

C.(H.)	vina	SKM C.vina.025	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.026	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.ii.2001	F. Vivallo		UFRJ		
C.(H.)	vina	SKM C.vina.027	M	RM	Pte. Alto	-33.61666	-70.5666	705	25.xii.2001	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.028	M	RM	Pte. Alto	-33.61666	-70.5666	705	25.xii.2001	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.029	M	RM	Pte. Alto	-33.61666	-70.5666	705	25.xii.2001	F. Vivallo		UFRJ		
C.(H.)	vina	SKM C.vina.030	M	RM	Pte. Alto	-33.61666	-70.5666	705	25.xii.2001	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.031	M	RM	Pte. Alto	-33.61666	-70.5666	705	25.xii.2001	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.032	M	RM	Pte. Alto	-33.61666	-70.5666	705	25.xii.2001	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.033	M	RM	Pte. Alto	-33.61666	-70.5666	705	10.i.2000	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.034	M	RM	Pte. Alto	-33.61666	-70.5666	705	05.xii.1999	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.035	M	RM	Pte. Alto	-33.61666	-70.5666	705	05.xii.1999	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.036	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.iii.2001	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.037	M	RM	Pte. Alto	-33.61666	-70.5666	705	04.iii.2001	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.038	M	RM	Pte. Alto	-33.61666	-70.5666	705	4.ii.2001	F. Vivallo		UFRJ		
C.(H.)	vina	SKM C.vina.039	M	RM	Pte. Alto	-33.61666	-70.5666	705	25.xii.2001	F. Vivallo		UFRJ		
C.(H.)	vina	SKM C.vina.040	M	RM	Pte. Alto	-33.61666	-70.5666	705	4.ii.2001	F. Vivallo	Aloysium citriodora	UFRJ		
C.(H.)	vina	SKM C.vina.041	F	V	Choapa, Pichidangui	-32.13833	-71.50667	15	10.ii.2003	F.D. Parker	pan trap	CHL-14610-84	USDA Native Bee Survey BBSL695284	BBSL
C.(H.)	vina	SKM C.vina.042	F	IV	Los Vilos path of Lobos	-31.93764	-71.51545	15	11.v.2010	Packer & Fraser		B09866-D01 Bees of Chile226		PCYU
C.(H.)	vina	SKM C.vina.043	F	RM	Caleu	-32.99788	-70.97736	1054	3.x.2000	L. Packer				PCYU
C.(H.)	vina	SKM C.vina.044	F	RM	Caleu	-32.99788	-70.97736	1054	3.x.2000	L. Packer				PCYU
C.(H.)	vina	SKM C.vina.045	F	V	Alto de Cantillana, Alhue	-33.97949	-70.98742	1398	25.xi.2000	L. Packer				PCYU
C.(H.)	vina	SKM C.vina.046	F	V	Alto de Cantillana, Alhue	-33.97949	-70.98742	1398	25.xi.2000	L. Packer				PCYU
C.(H.)	vina	SKM C.vina.047	F	V	Loncura	-32.78617	-71.50806	38	5.x.2000	L. Packer				PCYU
C.(H.)	vina	SKM C.vina.048	F	V	Colliguay, Las Compuertas				4.x.2000	L. Packer			CCDB-03755 C03	PCYU
C.(H.)	vina	SKM C.vina.049	F	V	Quinta Vergara	-33.03206	-71.55259	71	18.xi.2000	F. Vivallo				UFRJ