Journal *of* Melittology
Bee Biology, Ecology, Evolution, & Systematics *The latest buzz in bee biology*
No. 64, pp. 1–11 2 December 2016

Two new species of Epeolini from northern Chile, with the first record of *Triepeolus* for the country and a key to Chilean species of *Doeringiella* (Hymenoptera: Apidae)

Laurence Packer[1]

Abstract. ***Triepeolus cecilyae*** Packer, new species, and ***Doeringiella mamabee*** Packer, new species, both from the far north of Chile are described and illustrated. Both are known from single male specimens despite considerable search effort in the area of their provenance. The former species is the first of the genus recorded from Chile. A key to the three species of *Doeringiella* Holmberg known from Chile is provided. *Caupolicana dimidiata* Herbst is recorded as a likely host of *D. gigas* (Spinola).

INTRODUCTION

Many cleptoparasitic bee species are rarely collected, perhaps as a result of their reliance upon healthy host populations thereby making them susceptible to the impacts of, effectively, belonging to a higher trophic level (Sheffield *et al*., 2013). Here I describe two species of cleptoparasitic Epeolini from northern Chile. Both are known from single male specimens and both have been known to me since 2000/2001. However, despite considerable additional collecting in the same and nearby localities over the intervening time period, no additional material has been found. Consequently, I describe and illustrate the two species here despite the limited material. A key to the Chilean species of *Doeringiella* Holmberg is also provided.

MATERIAL AND METHODS

The terminologies of Michener (2007), Rightmyer (2008), Roig-Alsina (1989), and Compagnucci & Roig-Alsina (2003) are used for structural features. The abbreviations

[1] Department of Biology, York University, 4700 Keele St., Toronto, Ontario, M3J 1P3, Canada (xeromelissa@mail.com).
doi: http://dx.doi.org/10.17161/jom.v0i64.5775

ISSN 2325-4467

F, S, and T are used to refer to flagellomeres, and metasomal sterna and terga, respectively; UOD and LOD refer to the upper and lower interocular distances, respectively. Some measurements are made in comparison to the transverse diameter of the median ocellus — MOD; others are made based upon raw graticule units and expressed as ratios. Puncture spacing is given in relation to the diameter of adjacent punctures, thus i~2d indicates that the spaces between punctures approximate twice their diameter.

The collection where both type specimens are currently deposited is the Packer Collection at York University (PCYU). GPS coordinates could be retroactively obtained for the new species of *Doeringiella* based upon the exact site where the specimen was obtained. Coordinates are given in decimal degrees. Both new species were found in what was Chile's Region I at the time of collection. However, in 2006 the previous Region I was divided into a northern Region XV (Arica and Parinacota) and a more southern Region I (Tarapacá). The locality information given below reflects this change. Images were taken with a Visionary Digital BK plus system with a Canon 40DSLR camera, using incident light and processed with Adobe Photoshop.

SYSTEMATICS

Genus *Triepeolus* Robertson, 1901

Triepeolus cecilyae Packer, new species

ZooBank: urn:lsid:zoobank.org:act:43F77C7E-5782-4192-895B-4859A21F8076

(Figs. 1–6)

DIAGNOSIS: The mesepisternum with long erect hairs separates this species from all other South American *Triepeolus* Robertson except *Triepeolus atoconganus* Moure from Peru, from which it can be most easily distinguished based upon the entirely orange femora and tibiae (Fig. 1) (marked with dark brown in *T. atoconganus*), T3 with apical transverse band complete (Fig. 2) (medially interrupted in *T. atoconganus*), and S3 uniformly covered in pale hairs (Fig. 3) (with apicolateral patches in *T. atoconganus*). The combination of T1 with apical transverse band present, that of T2 narrowly interrupted, and those of T3–T5 complete is also diagnostic among South American *Triepeolus*.

DESCRIPTION: ♂: Body length 10.6 mm, forewing length 9.0 mm, head width 3.45 mm, intertegular span 2.05 mm.

Coloration. Black except as follows: labrum with laterobasal pale brown spot; bright orange on all trochanters, femora, tibiae, and tarsi; orange-brown apicoventrally on F1 (remainder of flagellum dark brown), pronotal lobe, and tegula; basal 2/3 of mandible dark orange-brown, apex ochraceous.

Pubescence. Mostly brown-black and short <1MOD, longer on sides of thorax ~1.5MOD and between antennal sockets <2MOD. White and erect laterad antennal socket ~2MOD, white and subappressed below antennal socket ~1MOD. Pale brown long <2MOD and erect on mesepisternum posterolaterally and metanotum laterally. Horizontal surface of pronotum with short subappressed pale grey hair band. Mesoscutum with paramedian band pale yellowish, becoming blackish anteriorly, transverse anterior band absent; posterolateral corner of mesoscutum and scutoscutellar sulcus with short white hairs. Posterolateral region of propodeum with erect greyish hairs. Metasternum fringed with greyish hairs posterolaterally. Tergal hair bands pale cream except white on T6. Tergum 1 with apical transverse band narrowly interrupted medially, basal transverse band broadly interrupted medially, lateral lon-

Figures 1–3. *Triepeolus cecilyae*, new species, holotype male. **1.** Lateral habitus. **2.** Dorsal view of metasoma to show complete hair band on T3. **3.** Metasomal sterna to show pale setae covering S3. Scale bars = 2 mm.

gitudinal band complete, discal patch with lateral margins acute. Tergum 2 apical transverse band very narrowly interrupted medially; T3–T5 apical bands complete but indented anteromedially. Short silvery-white appressed hairs apically on S1, covering

S2 and S3, laterally on S4 where replaced medially by black-brown hairs; S4 and S5 with apical fringes of medially curved, long hairs <1.5MOD, blackish medially becoming silvery white towards sides; S6 with subappressed brown hairs.

Sculpture. Head and thorax shiny, lacking microsculpture; densely punctate throughout, i<d except for occasional interspaces ~d and punctures behind ocellar area and on metanotum small and crowded. Clypeal midline not distinct. Metapostnotum imbricate medially, punctures crowded laterally; propodeal punctation crowded. Metasomal terga and sterna minutely and shallowly punctate, i~d except punctures deeper and more distinct on more apical terga and sterna; pygidial plate coarsely rugose.

Structure. Labrum with paired parallel submedial ridges on apical half. Scape twice as long as greatest width, approximately as long as F1 and F2 combined; F1 with length and breadth subequal; F2 twice as long as broad. Frontal carina strong on supraclypeal area, weakening dorsad, flat anterior to median ocellus. Compound eyes convergent below UOD:LOD 108:85; occipital carina strong to upper 1/5th of compound eye, converging towards posterior margin of compound eye above, absent dorsally although junction between vertexal and occipital areas somewhat sharp.

Mesoscutum with medial line strongly raised for anterior one half, weakly impressed posteriorly; scutellum with paired weak swellings. Axilla subtriangular, apex rounded, only briefly separated from lateral margin of scutellum, not extending to posterior downcurved surface of scutellum.

Pygidial plate with sides almost straight, forming an angle of ~30°, apex broadly rounded. Genitalia as in figures 5–6.

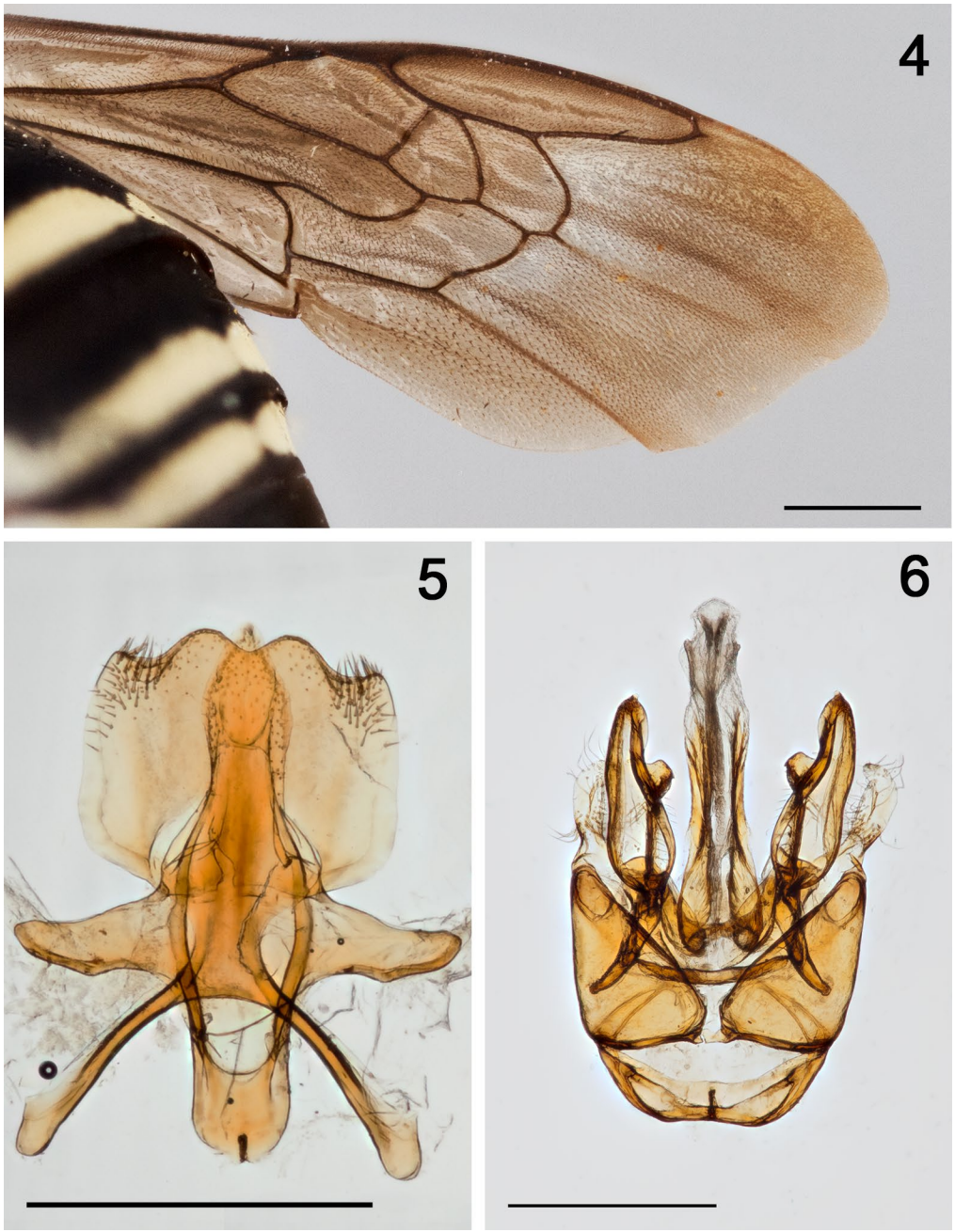
♀: Unknown.

HOLOTYPE: ♂, CHILE: Region XV, W. of Zapahuira, Candelabra Cactus Zone, 2400–2800 m, 24.iv.2001 [24 April 2001], R.E. Owen (PCYU).

ETYMOLOGY: The specific epithet is in celebration of the 50th birthday of Cecily Bradshaw, a friend and advocate for, and supporter of, bee research.

COMMENTS: This species is seemingly most similar to *T. atoconganus* from Lima, Peru. It differs in the features mentioned in the diagnosis and some less obvious ones such as the relative lengths of the posterior margins of the submarginal cells, 60:20:25 (for cells 1 through 3, respectively) in *T. atoconganus* (Moure, 1955) and 60:30:25 in *T. cecilyae* (Fig. 4). Thus, the new species has the posterior margin of the second submarginal cell greater than that of the third, while the converse is the case for *T. atoconganus*.

This is the first record of the genus *Triepeolus* from Chile, although two species of the related *Doeringiella* are known from central Chile (Montalva & Ruz, 2010), and a third from the far north is described below. Most species of *Triepeolus* with known hosts attack members of the Eucerini, although some attack Diphaglossini (Rightmyer, 2008). Most of the exceptions have Nomiinae as hosts but this subfamily of bees is absent from South America. The only Diphaglossini known from the area around the locality for the new species are those of *Caupolicana* Spinola, which seem too large to be the host of *T. cecilyae*. Thus, it seems likely that *T. cecilyae* has a long-horned bee as a host. The only eucerines known from near the type locality of *T. cecilyae* are in the genera *Alloscirtetica* Holmberg (Vivallo, 2009) and *Mirnapis* Urban (Packer & Dumesh, 2012). Although *Melissodes* Latreille are common hosts for species of *Triepeolus*, the only Chilean species — *Melissodes ecuadoria* Bertoni & Schrottky has not been found near the type locality, rather it is common at lower elevations towards the coast (pers. obs.), and it is very unlikely that *M. ecuadoria* is a host of *T. cecilyae*. *Alloscirtetica weyr-*



Figures 4–6. *Triepeolus cecilyae*, new species, holotype male. **4.** Forewing to show relative lengths of submarginal cells. **5.** Metasomal S7 and S8. **6.** Genital capsule. Scale bars = 1 mm.

auchi Michener, LaBerge, & Moure and *A. gelida* Vivallo are also known from the area around the type locality but seem rather small to serve as host for the new species. Thus, I surmise that the host for this new species might be *Mirnapis inca* Urban which was found at the same locality (albeit two weeks later) as the male of the new species (Packer & Dumesh, 2012), but which is also a rather rare bee.

Genus *Doeringiella* Holmberg, 1886

Doeringiella mamabee Packer, new species
ZooBank: urn:lsid:zoobank.org:act:9A3E873C-7F25-443F-9D26-B23DB5B7DA41
(Figs. 7–11)

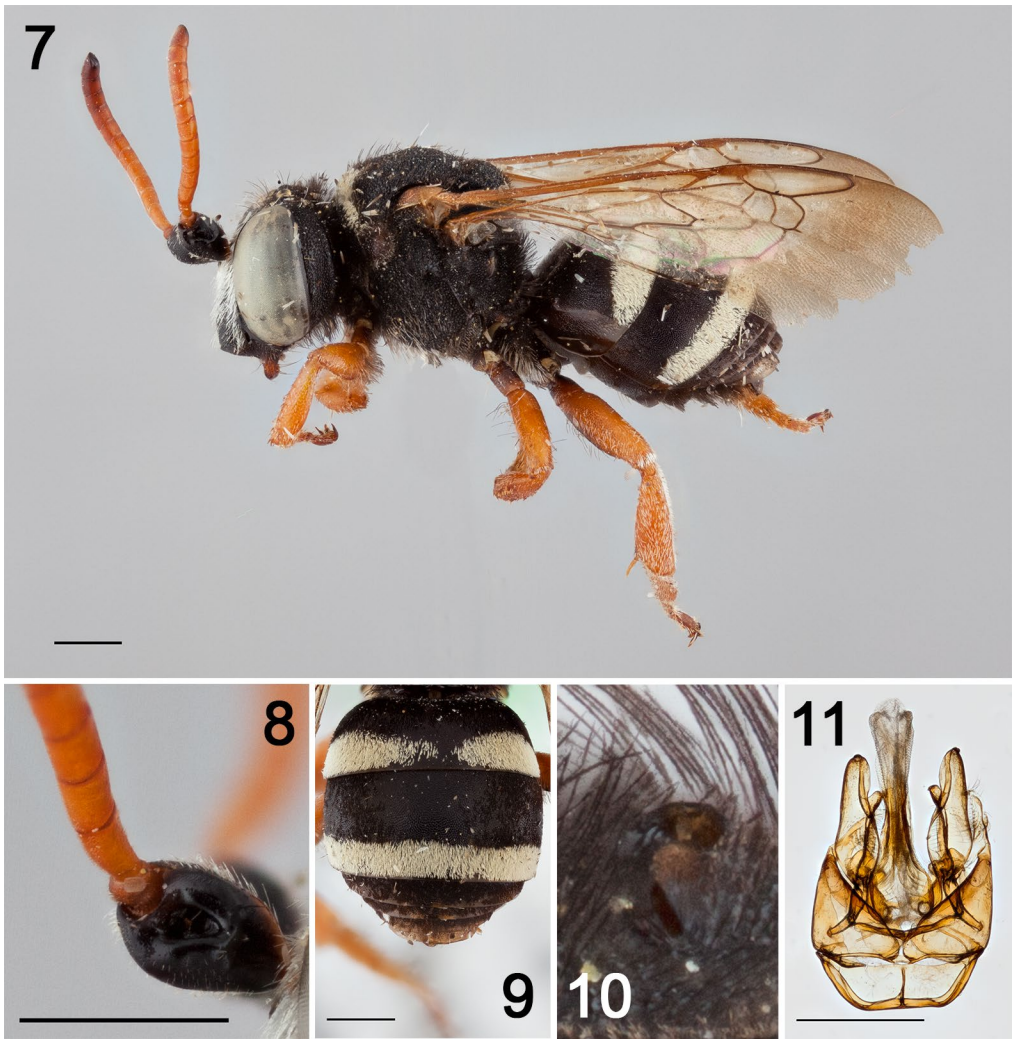
DIAGNOSIS: *Doeringiella mamabee* can be distinguished from all other congeners by the combination of scape swollen and mostly black, axilla short not projecting as a strong tooth, scutellum black and setation, other than for patches of pale hairs, black. It is most similar to *D. baeri* (Vachal) from which it differs as follows (condition in *D. baeri* in brackets): the mostly black (Fig. 8) and shorter scape which is only slightly longer than the first two flagellomeres combined (scape red and as long as the first three flagellomeres combined), hairs on the ventral surface of the mesofemur 1.5× as long as apical width of femur (as long as apical width), and small patches of white appressed pubescence on T6 (pale hairs on metasoma restricted to T1 and T2). The new species differs from the two previously known Chilean species through the uniformly black pilosity on the dorsal surface of the mesosoma (Fig. 7): the other two — *D. gayi* (Spinola) and *D. gigas* (Spinola) — have abundant pale yellow to whitish pubescence (Fig. 12). The two previously described species are also known only from much further south within Chile (the most northern record for either of them is in the province of Coquimbo, approximately 1300 km to the south of the type locality of the new species).

DESCRIPTION: ♂: Body length 7.8 mm, forewing length 6.4 mm, head width 2.95 mm, intertegular span 2.0 mm.

Coloration. Black except as follows: bright orange for mid one-third of mandible (base dark brown, apex red-brown), basal half of dorsal surface of scape, pedicel, flagellum (gradually darkening to red-brown on F11), tegula, apicoventral ring on pro- and metatrochanters, ventral surface of mesotrochanter (remainder of trochanters orange-brown), all femora (except ventral surface of metafemur dark brown), all tibiae, all basitarsi; orange-brown as follows: dorsal mark on pronotal lobe, tarsomeres 2–5 of all legs, wing veins, S6.

Pubescence. Silvery white and subappressed on face up to level of antennal socket laterally, to just below midocellus mesally. Black and erect on vertexal and genal areas, longer on former (~1MOD) than latter (~0.5MOD). Pronotum with narrow transverse band of pale cream, thick and appressed hairs, hairs shorter and sparser medially. Mesoscutum with pale cream, thick appressed transverse hair band hairs short <0.5MOD, band longest medially, <1/3 length of mesoscutum; remainder of dorsal and lateral surfaces of thorax with erect to suberect black hairs, longest towards side of metanotum ~3.5MOD, shortest on disc of scutellum ~0.3MOD. Mesopleuron ventrally and metasternum with brown to silvery hairs, ~2MOD, erect anteriorly, appressed elsewhere. Ventral surface of all femora with erect brown-black hairs, on mesofemur ~2MOD and 1.5× as long as apical width of mesofemur, ~1MOD on pro- and metafemora. Metapostnotum glabrous. Terga 1–2 with complete, broad, apical transverse bands of short, thick, whitish, appressed hairs, that on T1 narrow laterally; T3–T7 lacking distinct apical pale bands but with at least a small patch of apical white appressed hairs on T6 (similar patches may have been abraded from T3–T5). Metasomal sterna 3–5 with apical fringe of brown-black hairs, >1MOD, not notably shorter medially; S6 covered with brown hairs.

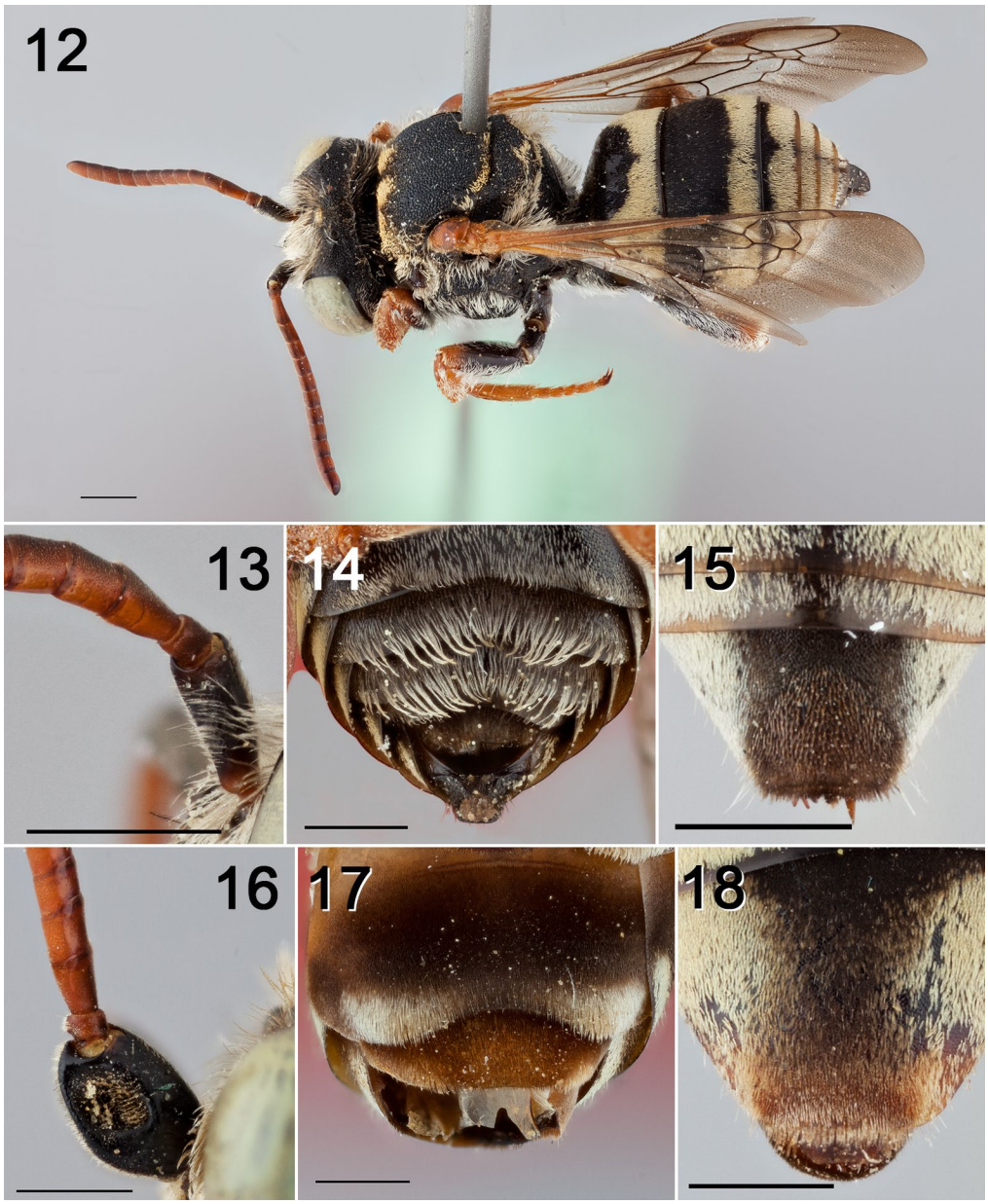
Sculpture. Clypeal surface shiny, punctures small and crowded except for impunctate apical margin. Frontal area dull, punctures large and mostly crowded except



Figures 7–11. *Doeringiella mamabee*, new species, holotype male. **7.** Lateral habitus. **8.** Base of antenna to show swollen scape. **9.** Dorsal view of mesosoma to show mostly black hairs. **10.** Ventral view of propodeum to show supraspiracular carina, the round structure immediately above the spiracle. **11.** Genital capsule. Scale bars = 1 mm.

for a narrow, largely impunctate band below level of median ocellus and a broader area immediately above antennal socket. Vertexal area punctures crowded, sharp-edged, irregular in size, smallest behind ocellar triangle. Genal area punctures dense, i~0.5d. Thoracic punctures crowded, sharp-edged except on hypoepimeral area and ventral surface, i=0.2–1d. Metapostnotum rugoso-punctate anteriorly for a distance ~3/4 length of metanotum, coarsely imbricate posteriorly. Propodeum densely rugoso-punctate. Metasomal terga with small, dense punctures as on clypeus but not as deep. Sternum 2 punctures larger and slightly sparser than on terga and succeeding sterna, i≤d.

Structure. Labrum with bituberculate apex. Scape strongly swollen, length to breadth 41:27, with strong oval depression on lateral surface; scape half as long as UOD, shorter than F1–F3 combined (41:47), F1:F2:F3 20:15:12, respectively. Paraocu-



Figures 12–18. Key characters permitting identification of Chilean species of *Doeringiella* Holmberg [12–15, *Doeringiella gayi* (Spinola); 16–18, *D. gigas* (Spinola)]. **12.** Oblique dorsal view to show abundant pale pubescence on male meso- and metasoma. **13.** Base of male antenna to show lack of swelling of scape. **14.** Apex of male metasoma in ventral view to show approximately even length of apical hair row on S5. **15.** Apex of female metasoma in dorsal view to show elongate pseudopygidial area. **16.** Base of male antenna to show swollen scape. **17.** Apex of male metasoma, ventral view, to show shorter hairs medially on apical fringe of S5. **18.** Apex of female metasoma, dorsal view, to show short pseudopygidial area. Scale bars = 1 mm.

lar carina extending to just below anterior tangent of median ocellus. Frontal carina strong from just below median ocellus to lower tangent of antennal socket. Supra-

antennal areas strongly depressed. UOD: LOD 78:68. Occipital carina strong from level of lower 1/3 to near top of compound eye, subparallel with posterior margin of compound eye throughout, briefly becoming evanescent as it curves mesad near top of compound eye, horizontal portion distinct except medially.

Mesoscutum with weakly impressed anteromedian area. Scutellum with weakly depressed midline for mid one-half of its length, weakly bigibbous. Axilla triangular, apex only briefly separated from lateral margin of scutellum, not attaining midlength of horizontal surface of scutellum. Basitibial plate short, rounded, entire margin distinct. Supraspiracular carina well developed but short, above dorsal margin of spiracle only.

Pygidial plate with sides straight, forming an angle of ~40°, apex rounded. Genital capsule as in figure 11.

♀: Unknown.

Holotype: ♂, CHILE: Region XV, Puente Murmuntani, ESE Zapahuira, -18.345943 -69.551974, 3560 m, 4.iv.2000 [4 April 2000], L. Packer (PCYU).

Etymology: The specific epithet is named in honor of Miwa Kobayashi Malcolmson, in recognition of the Malcolmson family's generous donation to the David Suzuki Foundation. Miwa was busy like a bee, keeping care of her five kids and other children as well. She was known to many as 'MamaMiwa'.

Comments: Rightmyer (2004) analysed the phylogenetic relationships among genera of Epeolini. The new species has all of the characteristics listed as diagnostic for the genus: the enormously expanded scape, frontal area depressed above the antennal socket, weakly biconvex scutellum, long setae on ventral surface of the mesofemur, completely bordered basitibial plate, emarginate sides of S8 apical process, emarginate ventral margin of gonocoxa, and scroll-like recurved articulating surfaces of the penis valve.

Bees of the genus *Doeringiella* have had *Svastrides* Michener, LaBerge, & Moure as confirmed, and *Diadasia* Patton, *Svastra* Holmberg, *Melissoptila* Holmberg, and *Caupolicana* as surmised hosts (Roig-Alsina, 1989). The new species is likely too small to have the latter as a host and none of the other genera have been collected near the type locality. The only eucerine genus collected near the type locality is *Alloscirtetica*, represented there by the species *A. gelida* and *A. weyrauchi*. The new species is of an appropriate size to have one of these species as a host.

Key to Chilean Species of *Doeringiella*

1. Mesosoma with setation entirely black except on dorsum of pronotum and anterior transverse band on mesoscutum (Fig. 7); metasoma with pale apical bands primarily on T1 and T2 (Figs. 7, 9); far northern Chile (Region XV) ..... *D. mamabee* Packer, n. sp.
—. Mesosoma with abundant pale setation (Fig. 12); metasoma with pale markings distinct on all terga (Fig. 12); central and southern Chile (from Region IV south to Region X) 2
2(1). Male scape not swollen (Fig. 13); male S5 with complete row of approximately equally long hairs (Fig. 14); female T5 with pseudopygidial area at least as long as wide (Fig. 15) ..... *D. gayi* (Spinola)
—. Male scape considerably swollen (Fig. 16); male S5 with moderately long hairs laterally, short medially (Fig. 17); female T5 with pseudopygidial area much shorter than broad (Fig. 18) ..... *D. gigas* (Spinola)

Note, although females of the new species are unknown, the characters used in the key above are not generally sexually dimorphic among these bees and both sexes should be identifiable using it.

DISCUSSION

Both new species are known from a single individual despite numerous field trips in the same area in the period since their capture. The type localities of the two species are separated by less than 15 km and are both in the summer rainfall area of the northeastern portion of the far north of Chile (Bershaw *et al*., 2009; Houston, 2006). The climatic feature of summer rainfall in this area is believed to have arisen 2–3 million years ago, after the cessation of permanent El Niño conditions (Amundson *et al*., 2012). Present day intermittent El Niño events bring drought conditions to this area, which is already arid, while wetter conditions occur during La Niña events (Bershaw *et al*., 2009; Houston, 2006; Morales *et al*., 2012).

Mujica *et al*. (2015) present evidence for occasional wetter periods in the northern Atacama during the past 40,000 years. They argue that there are important refugial areas in parts of the arid Atacama and it is possible that the area where these two new species have been found would warrant such a designation. It has been predicted that this area will become increasingly arid as a result of climate change (Minvielle & Garreaud, 2011; Mujica *et al*., 2015; Thibeault *et al*., 2012). It seems that the two rare bees described here may become even rarer in the future.

I take this opportunity to record *Caupolicana dimidiata* Herbst as a highly probable host of *D. gigas* as both species were abundant flying along the almost vertical bank on the roadside along the Rio Maule, at -35.918 -70.627, 1435 m, in January 2009, with the female cleptoparasites inspecting holes in the substrate. The relative sizes of cuckoo bee and putative host support this suggestion. *Caupolicana gayi* (Spinola) has also been recorded as a host for *D. gigas* (Claude-Joseph, 1928).

ACKNOWLEDGEMENTS

I am grateful to Liam Graham for taking the images of the new species described herein; he is supported by a generous donation to bee research at York University made by Robert and Cecily Bradshaw. Luisa Ruz and the late Haroldo Toro were of great assistance in helping arrange for the fieldwork that resulted in these bees being discovered. I am grateful to Robin Owen for collecting bees for me in northern Chile, including the holotype of *T. cecilyae*, and to Claudio Latorre for discussions on past climates in the Atacama. Funding for the fieldwork was obtained from the Natural Sciences and Engineering Research Council of Canada and The National Geographic Society. Luis Compagnucci is thanked for identifying *C. dimidiata*. The imaging system was purchased with funds from the Canadian Foundation for Innovation and the Ontario Research Fund through Canadensys. I am grateful for all these sources of funding. The manuscript was improved as a result of the efforts of three anonymous reviewers, for which I am grateful.

REFERENCES

Amundson, R., W. Dietrich, D. Bellugi, S. Ewing, K. Nishiizumi, G. Chong, J. Owen, R. Finkel, A. Heimsath, B. Stewart, & M. Caffee. 2012. Geomorphologic evidence for the last Pliocene onset of hyperaridity in the Atacama Desert. *Geological Society of America Bulletin* 124(7–8): 1048–1070.

Bershaw, J., C.N. Garzione, P. Higgins, B.J. MacFadden, F. Anaya, & H. Alvarenga. 2009. Spatial–temporal changes in Andean plateau climate and elevation from stable isotopes of mammal teeth. *Earth and Planetary Science Letters* 289(3–4): 530–538.

Bertoni, A.W., & C. Schrottky. 1910. Beitrag zur Kenntnis der mit *Tetralonia* verwandten Bienen aus Südamerika. *Zoologische Jahrbücher, Abteilung für Systematik, Geographie und Biologie der Tiere* 29(5): 563–596.

Claude-Joseph, F. 1926. Recherches biologiques sur les Hyménoptères du Chili (Mellifères). *Annales des Sciences Naturelles, 10ème Série, Zoologie* 9: 113–268.

Compagnucci, L.A., & A. Roig-Alsina. 2003. Cuatro nuevas especies y análisis filogenético de *Doeringiella* Holmberg *sensu stricto* (Hymenoptera, Apidae, Epeolini). In: Melo, G.A.R., & I. Alves dos Santos (Eds.), *Apoidea Neotropica: Homenagem aos 90 Anos de Jesus Santiago Moure*: 123–133. UNESC [Universidade do Extremo Sul Catarinense]; Criciúma, Brazil; xvi+320 pp.

Holmberg, E.L. 1886. Viajes al Tandil y á La Tinta. Segunda Parte, Zoología [Insectos. I. Himenópteros–Hymenoptera]. *Actas de la Academia Nacional de Ciencias en Córdoba* 5(4): 137–184.

Houston, J. 2006. Variability of precipitation in the Atacama Desert: Its causes and hydrological impact. *International Journal of Climatology* 26(15): 2181–2198.

Michener, C.D. 2007. *The Bees of the World* [2nd Edition]. Johns Hopkins University Press; Baltimore, MD; xvi+[i]+953 pp., +20 pls.

Michener, C.D., W.E. LaBerge, & J.S. Moure. 1955. Some South American Eucerini bees. *Dusenia* 6(6): 213–230.

Minvielle, M., & R.D. Garreaud. 2011. Projecting rainfall changes over the South American Altiplano. *Journal of Climate* 24(17): 4577–4583.

Montalva, J., & L. Ruz. 2010. Actualización de la lista sistemática de las abejas chilenas (Hymenoptera: Apoidea). *Revista Chilena de Entomología* 35: 15–52.

Morales, M.S., D.A. Christie, R. Villalba, J. Argollo, J. Pacajes, J.S. Silva, C.A. Alvarez, J.C. Llancabure, & C.C. Soliz Gamboa. 2012. Precipitation changes in the South American Altiplano since 1300 AD reconstructed by tree-rings. *Climate of the Past* 8(2): 653–666.

Moure, J.S. 1955. Notas sôbre Epeolini sulamericanos (Hymenopt.–Apoidea). *Dusenia* 6(3–4): 115–138.

Mujica, M.I., C. Latorre, A. Maldonado, L. González-Silvestre, R. Pinto, R. de Pol-Holz, & C.M. Santoro. 2015. Late Quaternary climate change, relict populations and present-day refugia in the northern Atacama Desert: A case study from Quebrad La Higuera (18°S). *Journal of Biogeography* 42(1): 76–88.

Packer, L., & S. Dumesh. 2012. *Mirnapis ohloweni* Packer and Dumesh, new species with notes on *M. inca* Urban (Hymenoptera: Apidae: Eucerini). *Zootaxa* 3478: 113–122.

Robertson, C. 1901. Some new or little-known bees. *Canadian Entomologist* 33(8): 229–231.

Rightmyer, M.G. 2004. Phylogeny and classification of the parasitic bee tribe Epeolini (Hymenoptera: Apidae, Nomadinae). *Scientific Papers, Natural History Museum, the University of Kansas* 33: 1–51.

Rightmyer, M.G. 2008. A review of the cleptoparasitic bee genus *Triepeolus* (Hymenoptera: Apidae). — part I. *Zootaxa* 1710: 1–170.

Roig-Alsina, A. 1989. A revision of the bee genus *Doeringiella* (Hymenoptera, Anthophoridae, Nomadinae). *University of Kansas Science Bulletin* 53(10): 576–621.

Sheffield, C.S., A. Pindar, L. Packer, & P.G. Kevan. 2013. The potential of cleptoparasitic bees as indicator taxa for assessing bee communities. *Apidologie* 44(5): 501–510.

Thibeault, J., A. Seth, & G.-L. Wang. 2012. Mechanisms of summertime precipitation variability in the Bolivian Altiplano: Present and future. *International Journal of Climatology* 32(13): 2033–2041.

Vivallo, F. 2009. Notes on the bee genus *Alloscirtetica* Holmberg, 1909, in northern Chile with the description of two new altiplanic species and a key for the Chilean species of Eucerini (Hymenoptera: Apidae). *Zootaxa* 2010: 16–30.

ZooBank: urn:lsid:zoobank.org:pub:240E5338-8655-4C65-9EAA-AAB0246B6CEF

A Journal of Bee Biology, Ecology, Evolution, & Systematics

The *Journal of Melittology* is an international, open access journal that seeks to rapidly disseminate the results of research conducted on bees (Apoidea: Anthophila) in their broadest sense. Our mission is to promote the understanding and conservation of wild and managed bees and to facilitate communication and collaboration among researchers and the public worldwide. The *Journal* covers all aspects of bee research including but not limited to: anatomy, behavioral ecology, biodiversity, biogeography, chemical ecology, comparative morphology, conservation, cultural aspects, cytogenetics, ecology, ethnobiology, history, identification (keys), invasion ecology, management, melittopalynology, molecular ecology, neurobiology, occurrence data, paleontology, parasitism, phenology, phylogeny, physiology, pollination biology, sociobiology, systematics, and taxonomy.

The *Journal of Melittology* was established at the University of Kansas through the efforts of Michael S. Engel, Victor H. Gonzalez, Ismael A. Hinojosa-Díaz, and Charles D. Michener in 2013 and each article is published as its own number, with issues appearing online as soon as they are ready. Papers are composed using Microsoft Word® and Adobe InDesign® in Lawrence, Kansas, USA.

Journal of Melittology is registered in ZooBank (www.zoobank.org), and archived at the University of Kansas and in Portico (www.portico.org).

http://journals.ku.edu/melittology
ISSN 2325-4467