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A new species of *Liphanthus* from Peru (Hymenoptera: Andrenidae)

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Abstract. The protandrenine bee genus *Liphanthus* Reed (Panurginae: Protandrenini) is currently known from Chile and Argentina. *Liphanthus (Melaliphanthus) cuscoensis* Gonzalez, Rasmussen, & Engel, new species, is described and figured from a male collected in Cusco, Peru, at 4167 meters of elevation. This finding represents the northernmost record for the genus and the fourth protandrenine species described from Peru. An updated key to the species of the subgenus *Melaliphanthus* Ruz & Toro is provided.

INTRODUCTION

The purpose of this paper is to describe a new species of the protandrenine bee genus *Liphanthus* Reed from Peru. The genus *Liphanthus* is currently known from Chile and Argentina, and consists of 33 species grouped in seven subgenera, except for five species whose subgeneric placement remains uncertain (Ruz & Toro, 1983; Tapia & Ruz, 2003; Michener, 2007; Moure *et al.*, 2007; Vivallo, 2008; Gonzalez *et al.*, 2013). The new species described herein belongs to the subgenus *Melaliphanthus* Ruz & Toro, a group consisting of only three species currently known from the Chilean provinces of Malleco and Arauco (*Liphanthus atratus* Ruz & Toro and *L. penai* Ruz & Toro) and the Argentinean province of Mendoza (*L. inornatus* Vivallo). The Peruvian species was collected in the Altiplano region at 4167 m elevation between Cusco, Puno, and Arequipa, thus representing the northernmost record for the genus; the province of

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Santa Cruz, Argentina, is the southernmost locality known for *Liphanthus* (Vivallo, 2008). This is also the fourth protandrenine species described from Peru (Gonzalez & Engel, 2004, 2011; Gonzalez & Ruz, 2007; Moure *et al.*, 2007; Gonzalez *et al.*, 2013).

MATERIAL AND METHODS

Morphological terminology follows that of Engel (2001) and Michener (2007) except that the projections from the spurs are called branches (following Engel, 2009), instead of teeth, and torulus is used in place of antennal socket. Given the advances being made to develop universal terminology for the morphology of insects, and Hymenoptera in particular, we have chosen to adopt more widely-applicable names for certain structures that recognize specific homologies in preference to overly-specialized terms unique to smaller taxonomic groups. The format for the description generally follows that used by Gonzalez & Engel (2011). Photomicrographs were prepared using a Canon EOS 7D digital camera attached to an Infinity K-2 long-distance microscopic lens, and were assembled with the CombineZMTM software package. Final figures were processed with Adobe Photoshop® 7.0. Measurements were made with an ocular micrometer on an Olympus SZX-12 stereomicroscope. The map in figure 10 showing the type locality along with the distribution of areas with different elevations in Peru was created in DIVA-GIS v.7.5 (Hijmans *et al.*, 2001).

SYSTEMATICS

Genus *Liphanthus* Reed

Subgenus *Melaliphanthus* Ruz & Toro

Liphanthus (Melaliphanthus) cuscoensis Gonzalez, Rasmussen, & Engel, new species

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(Figs. 1–9)

DIAGNOSIS: The male of this species resembles that of *L. inornatus* in the metasomal sterna with apical margins straight and unmodified. However, it can easily be separated from that species primarily by the discs of metasomal sterna 2–5 with distinct semicircular mid-apical depressions (Fig. 4); such distinct modifications are absent in *L. inornatus*.

DESCRIPTION: ♂: Total body length 6.5 mm; forewing length 4.5 mm. Head 1.2 times wider than long; inner orbits of compound eyes diverging ventrally (Fig. 1); intertorular distance 2.3 times torular diameter, as long as torulorbital distance; torulus diameter 0.9 times median ocellar diameter; ocellocular distance 2.3 times median ocellar diameter; ocellocipital 1.6 times median ocellar diameter, 0.7 times ocellocular distance; interocellar distance 1.7 times median ocellar diameter, about as long as ocellocipital distance, 0.8 times length of ocellocular distance; compound eye 1.8 times longer than broad; clypeus 3.0 times broader than long, projecting about two-thirds of compound eye width in lateral view; gena 0.7 times narrower than compound eye in profile; inner subtorular sulcus about 0.6 times length of outer subtorular sulcus; facial fovea small, shallow, ellipsoid, about 2.5 times longer than wide; scape 2.6 times longer than broad; antennal flagellum longer than head width, apically curled, second to fifth flagellomeres slightly crenulate on ventral surface; pedicel about as long as broad, 0.4 times length of first flagellomere; first flagellomere dorso-ventrally compressed, about 3.0 times longer than broad, twice as long as the second; second flagellomere 1.7 times



Figures 1–3. Male holotype of *Liphanthus* (*Melaliphanthus*) *cuscoensis*, new species. 1. Facial view. 2. Lateral habitus. 3. Dorsal habitus.

longer than broad, slightly shorter than third, remaining flagellomeres progressively increasing in length, apical flagellomere longest; malar area linear; mandible strongly curved, simple, with outer ridge strong. Mesosoma narrower than head width; mesoscutum 1.4 times wider than long, 2.3 times longer than mesoscutellum, about 5 times longer than metanotum; protibial spur with apical portion of rachis about as long as malus, with about 10 elongate branches (not including apical portion of rachis); probasitarsus curved, 3.5 times longer than broad; mesotibial spur ciliate, straight or nearly



Figures 4–9. Male holotype of *Liphanthus (Melaliphanthus) cuscoensis*, new species. 4. Metasomal sterna in ventral view. 5. Ventro-posterior view of metasoma. 6. Eighth metasomal sternum. 7. Genitalia in lateral view. 8. Genitalia in dorsal view. 9. Genitalia in ventral view.

so, slightly shorter than mesobasitarsus; mesobasitarsus straight, about 3 times longer than broad; metafemur swollen, about twice as long as broad; metabasitibial plate narrowly rounded, delimited by strong carina; metatibia flattened, 3.3 times longer than broad, with distinct carina on posterior margin; metatibial spurs about same length, inner spur slightly curved apically; metabasitarsus about twice as long as broad, parallel-sided, except basally broadly convex on anterior margin; metadistitarsi stouter than pro- and mesodistitarsi. Lateral fovea of second metasomal tergum slit-like (6.7 times longer than broad), about one-third length of tergum; first to fifth sterna with distal margins straight or nearly so (bilobed on first sternum), with distinct median

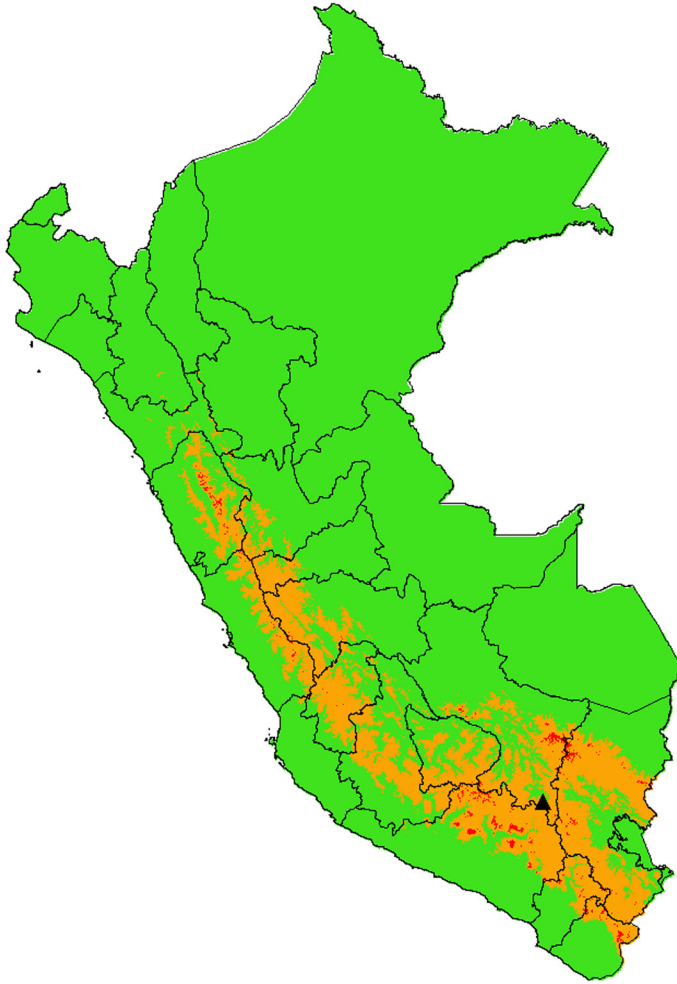


Figure 10. Map of Peru with the collecting locality (black triangle) of *Liphanthus (Melaliphanthus) cuscoensis*, new species, indicated. Areas below 4000 m.a.s.l. are marked in green, areas between 4000 and 5000 m.a.s.l. in orange, and areas above 5000 m.a.s.l. in red.

semicircular depressions on discs (borders of these depressions preapically appearing as low sublateral tubercles or swellings in profile: Fig. 4); sixth tergum with mid-apical margin distinctly thick, bent ventrally (Figs. 4, 5); eighth sternum and genital capsule as in figures 6–9.

Color dark reddish brown to black, except yellow or cream maculations as follows: labrum, clypeus basally, mandible basally (reddish brown apically), pro- and mesofemora apically on dorsal surfaces, protibia on outer surface, meso- and metatibia basally on outer surfaces, and basitarsi on outer surfaces. Ventral surface of antennal flagellum and pro- and mesodistitarsi light reddish brown, except basalmost prodistitarsi yellow. Wing membranes brownish, veins and pterostigma dark brown.

Pubescence yellowish to light brown. Ventral surface of antennal flagellum sparsely covered with long (0.5–0.7 times width of flagellum), erect, simple setae. Setae long and sparse on head and mesosoma, minute and adpressed on metasoma, longer and



Figures 11–12. Photographs of the Puna grassland habitat in which *Liphanthus* (*Melaliphanthus*) *cuscoensis*, new species, was captured. Photographs taken by and used with permission from I. Medina. **11.** View looking across the grassland. **12.** View looking down a long slope near Chaisamayo brook.

erect on seventh tergum and preapical sublateral swellings of second to fifth sterna. Sixth sternum with long, stiff, spatulate setae forming lateral and central patches on disc (Figs. 4, 5). Gonostylus laterally with long, minutely-branched setae (Figs. 8, 9).

Outer surface of mandible and basal area of labrum smooth and shiny, impunctate; clypeus with sparse, faint punctures separated by a puncture width or more, integument between punctures micro-aerolate basally, weakly imbricate distally; supraclypeal area with punctures smaller, stronger than on clypeus, separated by a puncture width or less; subantennal area and lower paraocular area imbricate with larger punctures than on supraclypeal area separated by 1–2 times a puncture width; frons and vertex micro-aerolate, punctures coarse and contiguous on frons, sparser on vertex (1–2 times a puncture width); gena imbricate with punctures separated by 1–2 times a puncture width; postgena weakly imbricate with scattered, shallower punctures than on gena. Pleura micro-aerolate to strongly imbricate; mesoscutum smooth and shiny between coarse, contiguous punctures; mesoscutellum with punctures larger and sparser than on mesoscutum, particularly on disc, integument weakly imbricate to nearly smooth and shiny; metanotum with contiguous punctures; propodeum with basal area reticulate, lateral and posterior surfaces micro-aerolate with large, faint punctures separated by 1–2 times a puncture width. First to sixth metasomal terga weakly imbricate on discs, with punctures smaller and sparser (1–2 times a puncture width) than on mesoscutum, premarginal zones strongly imbricate, impunctate; seventh tergum largely impunctate, smooth and shiny on center, with large, coarse punctures elsewhere; sterna with minute, sparse punctures, strongly imbricate except largely smooth and shiny on preapical sublateral tubercles or swellings.

♀: Unknown.

HOLOTYPE: ♂, Peru: CU [Cusco], Espinar, Qbda [Quebrada] Chaisamayo, 14°59'46.15"S, 71°15'25.93"W, 4167m, 16–17.iii.2011 [16–17 March 2011], Pastizal [grassland], M. Alvarado; deposited in the Museo de Historia Natural, Universidad Mayor de San Marcos, Lima, Peru.

ETYMOLOGY: The specific epithet refers to Cusco, the Peruvian department where the species was collected.

COMMENTS: The holotype was collected while sweep-netting Puna grassland (Figs. 10–12) and is in poor condition. The setae are plastered against the integument (following storage in ethanol), and the apical flagellomeres of the left antenna and metapretarsal claws are missing. It is hoped that this paper will focus the attention of melittologists on this high elevation grasslands and their unique bee fauna, and thereby discovering additional material including females and the biology of this species.

Key to Species of *Melaliphanthus*
(modified from Vivallo, 2008)

Note that the female of *L. cuscoensis* is unknown.

- | | | |
|-------|--|-------------------------------|
| 1. | Males | 2 |
| —. | Females | 5 |
| 2(1). | Second metasomal sternum with distal margin straight or nearly so, not medially projected | 3 |
| —. | Second metasomal sternum with distal margin strongly projecting medially .. | 4 |
| 3(2). | Discs of second to fifth metasomal sterna unmodified, not medially depressed (Argentina: Mendoza) | <i>L. inornatus</i> Vivallo |
| —. | Discs of second to fifth metasomal sterna modified, with distinct median semicircular depressions (Fig. 4), borders of these depressions preapically appearing as low sublateral tubercles in profile (Fig. 5) (Peru: Cusco) | <i>L. cuscoensis</i> , n. sp. |

- 4(2). Third metasomal sternum with posterior margin produced mesally; facial fovea almost half length of antennal scape; clypeus yellow on distal third (Chile: Arauco, Malleco) *L. atratus* Ruz & Toro
- Third metasomal sternum with posterior margin almost straight; facial fovea less than one-third length of antennal scape; clypeus yellow on distal margin (Chile: Malleco) *L. penai* Ruz & Toro
- 5(1). Frontal line, in lower half, difficult to detect (Chile: Malleco) *L. penai* Ruz & Toro
- Frontal line, in lower half, a narrow groove 6
- 6(5). Mandible without yellow; wing translucent, veins yellow; tegula dark on anterior one-third (Argentina: Mendoza) *L. inornatus* Vivallo
- Mandible with yellow spot on distal third; wing testaceous, veins dark brown; tegula uniformly dark brown (Chile: Arauco, Malleco) *L. atratus* Ruz & Toro

DISCUSSION

Very few bee species have been reported flying above 4000 m.a.s.l. in Peru or anywhere else in South America. The relative short flowering season at this elevation, the general harsh conditions, and frequent sub-zero night temperature limits bee diversity. In addition, systematic high-elevation sampling is non-existent in Peru and only a very few locations, such as Puno on the shores of Lago Titicaca (3812 m.a.s.l.), has been visited frequently by collectors. Despite other locations above 4000 m.a.s.l. are rather common in the country (Fig. 10), they are rarely sampled for any period of time. Some of the bees reported from above 4000 m.a.s.l. in Peru are species of *Bombus* Latreille (Rasmussen, 2003), *Anthidium* Fabricius (Gonzalez & Griswold, 2013), *Megachile* Latreille (Moure, 1956), *Caenohalictus* Cameron (pers. obs.), and undescribed species of *Lonchopria* Vachal (pers. obs.). The finding and reporting here of *L. cuscoensis* should stimulate further collecting, as more interesting species can be found at this elevation. For example, we examined a single male panurgine specimen that was also collected near the type locality of *L. cuscoensis*. This specimen, which is also in poor condition, resembles those males of *Protandrena* Cockerell subgenus *Andinopanurgus* Gonzalez & Engel, but cannot be placed with certainty in that group. It may represent another taxon of *Protandrena* s.l., also endemic to the Andes. Only further exploration of these unique habitats will provide us with a more robust picture of bee diversity and biology at such high-elevation extremes of their distribution. It is hoped that this paper will focus the attention of melittologists on these high elevation grasslands and their unique bee fauna, and thereby facilitate the discovery of further material of *L. cuscoensis*, including females and the biology of this distinctive species.

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