Journal *of* Melittology
Bee Biology, Ecology, Evolution, & Systematics *The latest buzz in bee biology*
No. 8, pp. 1–9 3 May 2013

Incasarus garciai, a new genus and species of panurgine bees from the Peruvian Andes (Hymenoptera: Andrenidae)

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Abstract. ***Incasarus garciai*** Gonzalez, Rasmussen, & Engel, a new genus and species of protandrenine bees (Andrenidae: Panurginae), is described and figured from a male collected in Ayacucho, Peru. *Incasarus* superficially resembles *Liphanthus* Reed in the narrow pterostigma and gonostylus articulated to the gonocoxite but it can be distinguished easily by the combination of two submarginal cells, the seventh sternum with apodemes and apical lobes broad, short, attached to a large disc, and the gonostylus long, about as long as the gonocoxite. *Incasarus* also resembles *Rhophitulus* Ducke and *Heterosarus* Robertson in the male seventh tergum with the distal margin medially projected, but it differs from both genera in the shape of the hidden sterna and genitalia, among other features.

INTRODUCTION

Several morphologically distinctive bee species have been discovered in the past decades from the Andean region of northern South America, from Venezuela to Peru (*e.g.*, Engel, 1997, 2007, 2009a, 2010; Engel *et al*., 1997, 2006; Gonzalez, 2004, 2006; Gonzalez & Engel 2004, 2011; Ascher *et al*., 2006; Engel & Gonzalez, 2009; Gonzalez & Ruz 2007; Smith-Pardo & Gonzalez, 2009). The bee fauna from this part of the Andes remains largely unexplored and underrepresented in collections. Appraisals of museum specimens from this area often reveal new and interesting material as the one presented in this work, a distinctive new species of Panurginae from the Andes of Peru that cannot be assigned to any of the available genera. This species superficially resembles *Liphanthus* Reed (Andrenidae: Panurginae: Protandrenini) in the narrow pterostigma and the genitalia with the gonostylus articulated to the gonocoxite. If assumed a mem-

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ISSN 2325-4467

ber of *Liphanthus* based on the number of submarginal cells of the forewing, it could be placed in *Neoliphanthus* Ruz & Toro, a monotypic Chilean subgenus characterized by having two submarginal cells (Figs. 1–3). However, it significantly differs from *Neoliphanthus* as well as from any other known species of *Liphanthus* primarily in the second metasomal tergum with a shallow postgradular depression as on the remaining terga (postgradular depression of second tergum is deeper than on remaining terga in *Liphanthus*) and in the shape of the hidden sterna and genitalia. The new species also resembles the genera *Rhophitulus* Ducke and *Heterosarus* Robertson in the male seventh tergum with the distal margin medially projected, but it differs in the hidden sterna and genitalia, as discussed below.

The genus *Liphanthus* occurs in Chile and Argentina and consists of 33 species grouped in seven subgenera (Ruz & Toro, 1983; Tapia & Ruz, 2003; Michener, 2007; Moure *et al*., 2007; Vivallo, 2008), except for five distinctive Chilean species whose subgeneric placement remains uncertain (Table 1). The Peruvian species could be another example of a distinctive *Liphanthus* with dubious subgeneric affinities; however, the generic placement of those Chilean species has never been questioned. In fact, those five Chilean species agree with the generic characters of *Liphanthus* and instead they cast doubts on the circumscription, validity, and utility of the current subgenera. This is not the case with the Peruvian species whose unique combination of characters suggests a distinct lineage of Andean panurgines.

Herein we propose a new generic name, *Incasarus* Gonzalez, Rasmussen, & Engel, and describe the species, which represents the third protandrenine taxon known from

Figures 1–3. Male of *Liphanthus* (*Neoliphanthus*) *bicellularis* Ruz & Toro. **1.** Dorsal habitus. **2.** Lateral habitus. **3.** Facial view.

Table 1. Summary of the subgeneric classification and diversity of *Liphanthus* Reed.

Taxon	No. of Species	Distribution
Genus *Liphanthus* Reed		
subgenus *Leptophanthus* Ruz & Toro	8	Argentina, Chile
subgenus *Liphanthus* Reed	5	Chile
subgenus *Melaliphanthus* Ruz & Toro	3	Chile
subgenus *Neoliphanthus* Ruz & Toro	1	Chile
subgenus *Pseudoliphanthus* Ruz & Toro	4	Argentina, Chile
subgenus *Tricholiphanthus* Ruz & Toro	3	Chile
subgenus *Xenoliphanthus* Ruz & Toro	4	Chile
subgenus *Incertae sedis*	5	Chile

Peru. To date, the others species known from Peru are *Protandrena femoralis* Gonzalez & Engel from Pasco (San Miguel de Eneñas) and *Rhophitulus pygidialis* (Vachal) from Cusco (Callanga and Cusco) (Gonzalez & Engel, 2004, 2011; Gonzalez & Ruz 2007; Moure *et al*., 2007). It is beyond the scope of the present work to explore the phylogenetic relationships for this newly proposed genus within the exclusively New World Protandrenini. Such a work would require a thorough exploration of characters and a new phylogenetic hypothesis for the tribe, which is likely paraphyletic (Michener, 2007). Despite this shortcoming, by documenting at this time the novelty of this lineage of Andean panurgine, we hope to bring it to the attention of melittologists working in the area. *Incasarus* is yet another example of the uniqueness of the tropical Andean bee fauna as well as the paucity of our knowledge of Peruvian bees.

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, 2009b), instead of teeth, and torulus is used in place of antennal socket. The format for the description generally follows that used by Gonzalez & Engel (2011). Photomicrographs were prepared using a Canon 7D digital camera attached to an Infinity K-2 long-distance microscope lens, and were assembled with the CombineZM™ software package. Final figures were processed with Adobe Photoshop® 7.0. Measurements were made with an ocular micrometer on an Olympus SZX-12 stereomicroscope.

SYSTEMATICS

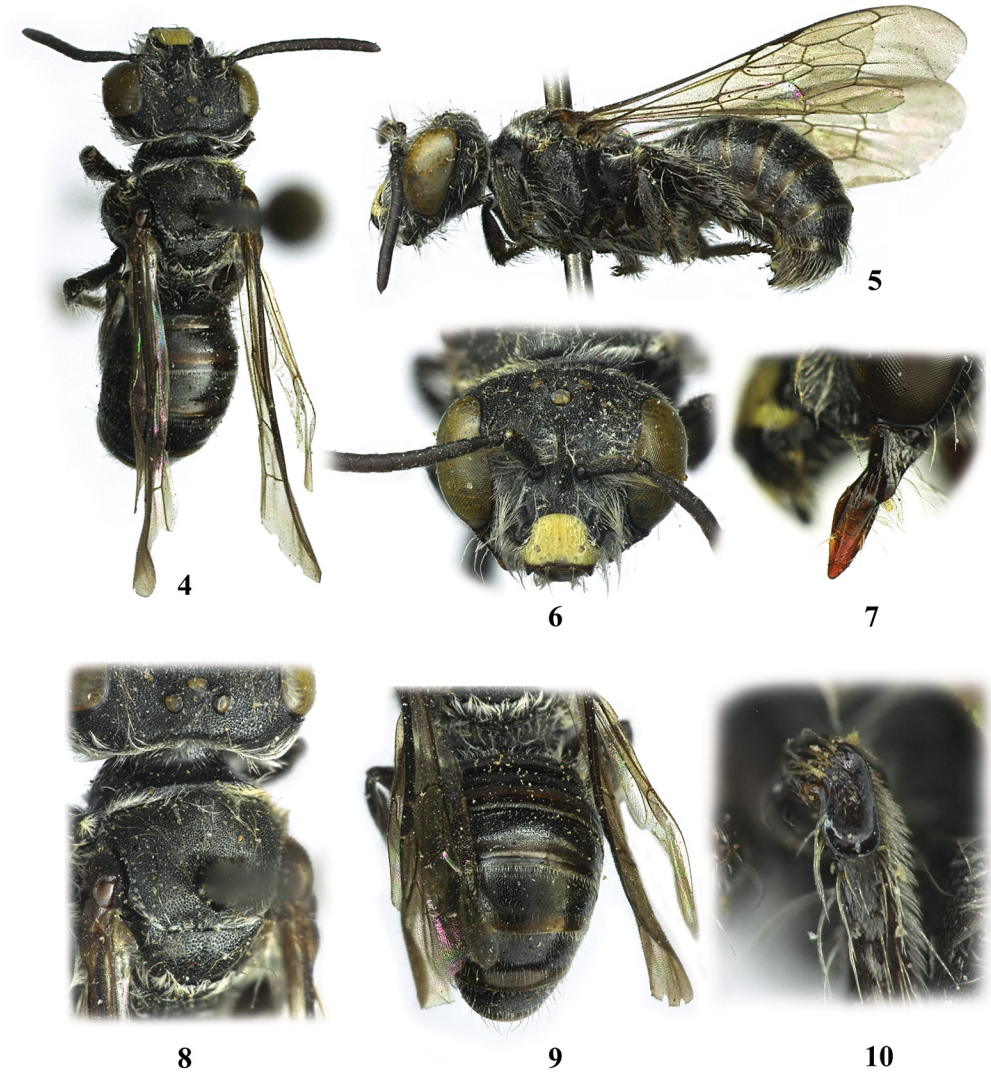
Tribe Protandrenini Robertson, 1904

Incasarus Gonzalez, Rasmussen, & Engel, new genus

ZooBank urn:lsid:zoobank.org:act:7F729602-E30A-4A36-8D92-319948C72214

Type species: *Incasarus garciai* Gonzalez, Rasmussen, & Engel, new species.

Diagnosis: The new genus can be recognized easily by the following combination of characters: body predominantly dark brown to black with reduced yellow maculations (Figs. 4, 5); forewing with two submarginal cells; propodeum setose; mesoscutum smooth and shiny between fine, contiguous punctures (Fig. 8); dorsal surface of



Figures 4–10. Male holotype of *Incasarus garciai*, new species. **4.** Dorsal habitus. **5.** Lateral habitus. **6.** Facial view. **7.** Detail of mandible in profile. **8.** Detail of vertex and mesosoma in dorsal view. **9.** Detail of metasoma. **10.** Metabasitibial plate.

propodeum about as long as metanotum; anterior tentorial pit in epistomal sulcus, below intersection between outer subantennal and epistomal sulci; male seventh tergum strongly projected medially (Fig. 11); fourth sternum with two premarginal combs of thick, simple setae medially (Fig. 12); fifth sternum with long, thick, simple setae medially on premarginal line (Fig. 13); sixth sternum with broad U- or V-shaped midapical emargination (Fig. 14); seventh sternum with apodemes and apical lobes broad, short, attached to a large disc (Fig. 15); and genitalia with gonostylus about as long as gonocoxite, simple, without apical lobes or projections, with long, thick mid-ventral and apical setae, and articulated to gonocoxite (Figs. 18–20).

Description: ♂: Moderate-sized bees (7–8 mm in length); color dark brown to black, nonmetallic, without yellow maculations except on clypeus; integument largely smooth and shiny between punctures, especially on dorsal surface of mesosoma; punctures coarser, denser on head than on meso- and metasoma; pubescence whitish, sparse, longer and denser on head and mesosoma than on metasoma; metasomal terga with distal margins glabrous, narrow; second metasomal tergum with postgradular area as shallow as on remaining terga. Head broader than long, broader than mesosoma; mandible edentate, pointed; labrum with strong ridge bordering glabrous, impunctate, triangular basal area; clypeus more than twice broader than long; supraclypeal area elevated along midline; lower mesal paraocular area distinctly swollen (Fig. 6); anterior tentorial pit in epistomal sulcus, below intersection between outer subantennal and epistomal sulci; antennal toruli about at middle of face; antennal scape unmodified, not surpassing lower tangent of median ocellus in repose; antennal flagellum unmodified, slightly shorter than head width; facial fovea well-marked, ovoid; compound eyes slightly convergent ventrally; lower margin of median ocellus coinciding with upper orbital tangent; vertex gently convex; gena narrower than compound eye in profile, widest medially; labiomaxillary complex of moderate length, not distinctly elongate. Pronotal collar rounded, not carinate; dorsal surface of propodeum gently sloping, areolate. Forewing with pterostigma more than three times longer than broad, slightly wider than prestigma, margin basal to vein r-rs slightly divergent from costa, that within marginal cell straight or nearly so; marginal cell obliquely and broadly truncate at apex, appendiculate, about as long as distance from its apex to wing tip; two submarginal cells, first submarginal cell slightly shorter than second; basal vein gently curved; 1m-cu distal to 2Rs (second free abscissa Rs, or first submarginal crossvein *sensu* Michener, 2007); 2m-cu basal to 2rs-m (second submarginal crossvein *sensu* Michener, 2007); jugal lobe about two-thirds length of vannal lobe; hind wing with second abscissa of M+Cu about four times length of cu-a; 8 distal hamuli. Legs unmodified; mesotibial spur about half mesobasitarsal length; outer surfaces of pro- and mesotibia apically with small posterior spine; metabasitibial plate carinate, slightly broader apically, with scattered, semierect, short, stiff setae basally on disc (Fig. 10); metatibia about twice as long as metabasitarsus, with posterior marginal carina weakly toothed basally; keirotrichia on inner surface except on anterior and posterior margins; inner metatibial spur slightly curved at apex, outer spur shorter and more strongly curved at apex than inner; metabasitarsus strongly projecting on posterodistal margin; pretarsal claws cleft, symmetrical or nearly so. Second metasomal tergum with well-marked lateral fovea; seventh tergum without pygidial plate, distal margin strongly projected medially (Fig. 11); fourth sternum with two medial premarginal combs of thick, simple setae (Fig. 12); fifth sternum with long, thick, simple setae medially on premarginal line (Fig. 13); sixth sternum with broad U- or V-shaped midapical emargination (Fig. 14); seventh sternum with apodemes short, apical lobes broad, short, attached to large disc (Fig. 15); eighth sternum longer than broad, midapical projection long, slightly longer than disc (Figs. 16, 17); genital capsule longer than broad, gonobase absent (Figs. 18–20); gonostylus about as long as gonocoxite, simple, without apical lobes or projections, with long, thick mid-ventral and apical setae, articulated to gonocoxite; volsella simple, not differentiated in digitus and cupis; penis valves simple, short, apices not surpassing basal one-fourth of gonostylar length (measured in ventral view); penis membranous, bilobed, shorter than penis valves.

ETYMOLOGY: The new genus-group name is a combination of Inca, referring to the pre-Columbian civilization that occupied most of the Andes, and *-sarus*, a stem commonly used in a number of related panurgine genera. The name is masculine.

Incasarus garciai Gonzalez, Rasmussen, & Engel, new species
ZooBank urn:lsid:zoobank.org:act:3A6BCE1E-6B4C-47D9-A824-EA1AC514FEC0
(Figs. 4–20)

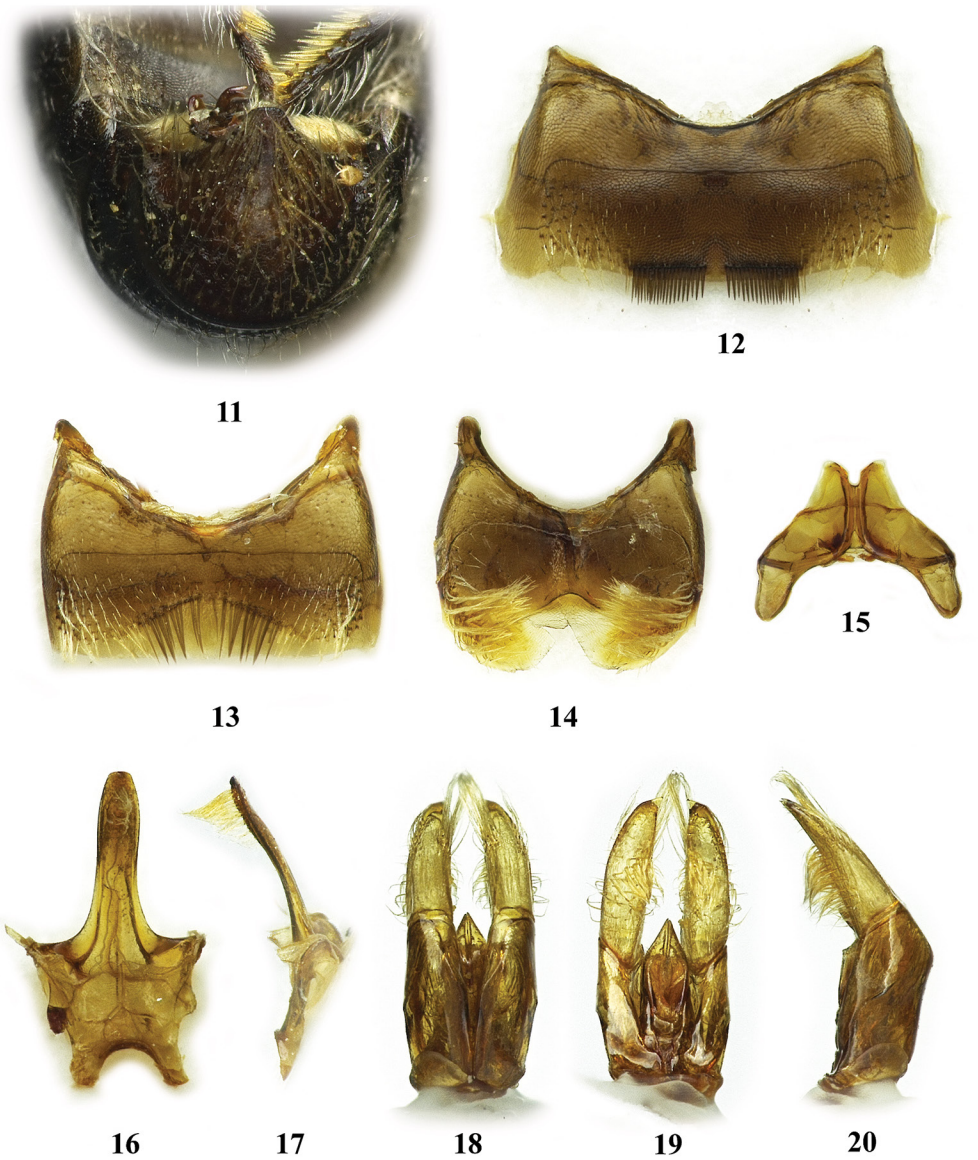
DIAGNOSIS: In addition to the generic characters, this species is easily recognized by the modified mandible (Fig. 7).

DESCRIPTION: ♂: Body length 7.5 mm; forewing length 5.3 mm. Head 1.2 times wider than long; intertorular distance 1.4 times torular diameter, shorter (0.7 times) than torulorbital distance; torulus diameter about as wide as median ocellar diameter; ocellocular distance 2.7 times median ocellar diameter; ocelloccipital distance slightly longer than median ocellar diameter, 0.4 times ocellocular distance; interocellar distance 1.7 times median ocellar diameter, 0.6 times length of ocellocular distance; compound eye 1.8 times longer than broad; clypeus mid-apically slightly depressed, projecting about 0.6 times compound eye width in lateral view; gena 0.7 times narrower than compound eye in profile; scape 2.4 times longer than broad; pedicel about as long as broad, 0.7 times length of first flagellomere; first flagellomere twice as long as broad, 1.3 times longer than second; second flagellomere slightly longer than broad, shorter than third, remaining flagellomeres progressively increasing in length, apical flagellomere longest; malar area linear; mandible with outer ridge strong, forming distinct protuberance about one-third from base (Fig. 7), thus appearing elbow-shaped in dorsal view. Protibial spur with apical portion of rachis long, 0.7 malus length, with distinct row of eight elongate branches (not including apical portion of rachis).

Color black, except as follows: mandible, labrum, tegula, and legs dark reddish brown. Wing membranes brownish, veins and pterostigma dark brown.

Mandible with tuft of dense, branched setae beneath protuberance formed by outer ridge (Fig. 7).

Outer surface of mandible distally and basal area of labrum smooth and shiny, impunctate; clypeus with sparse, faint punctures separated by a puncture width or more, integument between punctures smooth and shiny except basally weakly imbricate; supraclypeal area with small, contiguous punctures; subantennal area and lower paraocular area imbricate with larger punctures than on supraclypeal area separated by a puncture width; lower mesal paraocular area largely impunctate, smooth and shiny; frons and vertex with larger, coarser, contiguous punctures than on supraclypeal area; gena smooth and shining between shallower, larger punctures than on vertex; postgena with scattered punctures, largely smooth and shiny, except weakly imbricate near hypostomal carina. Mesosoma generally smooth and shiny except imbricate on mesepisternum posteriorly, metepisternum and sides of propodeum; mesoscutum and mesoscutellum with contiguous, shallower punctures than on vertex; metanotum duller, with coarser punctures than on mesoscutellum; mesepisternum with larger, shallower, sparser punctures than on mesoscutum; metepisternum transversely weakly striate near wing base, otherwise with scattered, small punctures separated by a puncture width; sides of propodeum with large, faint punctures. Metasomal terga largely smooth and shiny except weakly imbricate on seventh tergum; first and second terga with punctures on discs slightly smaller than those on mesoscutum, separated by a puncture width, with finer, contiguous punctures on marginal zones; remain-



Figures 11–20. Male holotype of *Incasarus garciai*, new species. **11.** Detail of seventh metasomal tergum. **12.** Fourth sternum. **13.** Fifth sternum. **14.** Sixth sternum. **15.** Seventh sternum. **16, 17.** Eighth sternum in ventral view and profile. **18–20.** Genital capsule in dorsal, ventral view, and profile.

ing terga with punctures smaller and sparser on discs except on seventh tergum with large, coarse punctures separated by a puncture width, marginal zones with punctures becoming faint, forming lines, thus becoming weakly lineolate on distal terga; distal margins impunctate, smooth; sterna strongly imbricate with large, scattered, faint punctures.

♀: Unknown.

Holotype: ♂; Peru: Ayacucho, 2750 m, 22.xi.71, col. R. Garcia / RG. 532. Deposited in the Museo de Historia Natural, Universidad Mayor de San Marcos, Lima, Peru.

ETYMOLOGY: The specific epithet is a patronym honoring the late Peruvian Entomologist Renán Julio García Aronés (1936–1977). García was born in Ayacucho and worked as an entomologist at the Universidad Nacional Mayor de San Marcos in Lima (Lamas, 1979). Following his death, his personal collection of 12,000 insect specimens was donated to the Museo de Historia Natural, previously known as Museo de Historia Natural 'Javier Prado' (Rasmussen & Lamas, 2011). Most of the insects collected by García consisted of wasps and bees, and included the unique specimen described herein.

COMMENTS: *Incasarus garciai* was collected 42 years ago around the city of Ayacucho. This city is located in an interandean valley characterized by narrow canyons and a rather warm and dry climate despite being found at a high elevation. No other specimens of *I. garciai* have been found and nothing is known about the phenology of the bee fauna from this area.

DISCUSSION

Incasarus superficially resembles *Liphanthus* in the head broader than the mesosoma, the narrow pterostigma, and in the genitalia with the gonostylus articulated to the gonocoxite. It differs from that genus in the antennal flagellum slightly shorter than the head width, the second metasomal tergum with a postgradular depression shallow as on the remaining terga, the male seventh sternum with apodemes and apical lobes short and broad attached to a large disc (Fig. 15), and the genital capsule with the gonostylus long, about as long as the gonocoxite, and penis valves short (Figs. 19–20). In *Liphanthus* the antennal flagellum is longer than the head width in the male, the second metasomal tergum has a postgradular depression deeper than on the remaining terga, the male seventh sternum has a small disc with large apodemes and without or with small apical lobes, the gonostylus is short, about half the length of the gonocoxite or less, and the penis valves usually reach the gonostylar apex (*cf*. Michener, 2007: fig. 53-4). *Incasarus* also resembles *Rhophitulus* and *Heterosarus* in the male seventh tergum with the distal margin medially projected. However, the propodeum is basally asetose in *Heterosarus* and, in both taxa, the male seventh sternum has long apical lobes and the gonostylus is partially fused to the gonocoxite, at least ventrally. In addition, *Incasarus* lacks the distinctive dorsal remnant of the gonobase so typical of *Rhophitulus*.

ACKNOWLEDGEMENTS

We are thankful to Kelli Ramos and to two anonymous reviewers for their helpful feedback on the manuscript. Partial support for the work has been provided by US National Science Foundation grant DBI-1057366 (to MSE) and by the Department of Biological Sciences, Southwestern Oklahoma State University (to VHG). This is a contribution of the Division of Entomology, University of Kansas Natural History Museum.

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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.

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ISSN 2325-4467