

The genus *Pilobalia* Burmeister 1875 in Peru: updated checklist and distribution records (Coleoptera: Tenebrionidae: Pimeliinae: Nycteliini)

GIRALDO, Alfredo E.

Universidad Nacional Agraria La Molina, Museo de Entomología Klaus Raven Büller, Lima Perú.

ORCID number: <http://orcid.org/0000-0002-6062-3977>

E-mail: alfre2cotobius@yahoo.com

Received 08 - XI - 2022 | Accepted 01 - II - 2023 | Published 31 - III - 2023

<https://doi.org/10.25085/rsea.820110>

El género *Pilobalia* Burmeister 1875 en Perú: catálogo actualizado y registros de distribución (Coleoptera: Tenebrionidae: Pimeliinae: Nycteliini)

RESUMEN. *Pilobalia* (Pimeliinae: Nycteliini) es un género endémico de la región andina de América del Sur, distribuido en Perú, Bolivia, Chile y Argentina. El objetivo del presente trabajo fue actualizar el conocimiento del género en el territorio peruano, aportando un catálogo actualizado de especies y nuevos registros de distribución. A partir del examen de alrededor de 580 especímenes, se registran un total de 26 especies y dos subespecies de *Pilobalia* para Perú, incorporando dos que no fueron catalogadas previamente, *P. decorata immaculata* (Blanchard) y *P. oblonga* (Blanchard). Además se presentan mapas de distribución y comentarios sobre sus patrones de distribución.

PALABRAS CLAVE. Andes. Listado de especies. Nuevos registros. Revisión. Sudamérica.

ABSTRACT. *Pilobalia* (Pimeliinae: Nycteliini) is an endemic genus of the Andean region of South America, distributed in Peru, Bolivia, Chile and Argentina. The objective of this work was to update the knowledge of the genus in the Peruvian territory, providing an updated checklist of species and new distribution records. From examination of around 580 specimens, a total of 26 species and two subspecies of *Pilobalia* are recorded for Peru, incorporating two that were not previously recorded, *P. decorata immaculata* (Blanchard) and *P. oblonga* (Blanchard). Also distribution maps and comments about its distribution patterns are provided.

KEYWORDS. Andes. New records. Revision. South America. Species list.

The genus *Pilobalia* Burmeister 1875 includes forty six species and four subspecies distributed in Andean environments of Peru, Bolivia, Chile and Argentina (Flores, 1997). This is the third most diverse genus of the Nycteliini tribe, a set of twelve genera and around 300 species endemic to the arid and semi-arid regions of South America (Flores, 1997; Flores, 1999; Flores & Vidal, 2000; Flores & Triplehorn, 2002).

The first species of the genus *Pilobalia* were described under various other genera by Perty (1830), Erichson (1834, 1847), Blanchard (1843), Waterhouse (1844) and Kirsch (1886). Subsequently, the genus *Pilobalia* was proposed by Burmeister (1875) providing a morphological diagnosis and listing the species known at that date. Fairmaire (1876; 1878; 1902; 1903) added five species

and Gebien (1936) designated *Pilobalia decorata* (Erichson, 1834) as type species of the genus. In his revision of the Nycteliini tribe, Kulzer (1954) reviewed the genus, described twenty species, assigned subspecies rank to *Pilobalia immaculata* (Blanchard, 1843) and presented a key for all species known until then. Subsequent contributions of Kulzer (1955, 1958, 1959) added seven species and assigned subspecies rank to *Pilobalia murina* Kulzer, 1954. Later, Molinari (1968) and Peña (1973) described four and five species respectively, all of them from Argentina. More recently, Ferru & Pizarro-Araya (2007) offered the first Chilean records of *Pilobali torresi* Molinari, 1968 and *Pilobalia escobari* Peña, 1973 based on specimens collected in the Altiplano of Tarapaca Region, including morphological redescrptions and environmental characterization of collection sites.

Within the tenebrionid fauna of Peru, the genus *Pilobalia* is currently represented by 25 species and one subspecies, with a high rate of endemism (about 96%) and with an imprecise number of undescribed species observed in collecting trips and entomological collections (Smith et al., 2015; Giraldo & Flores, 2016). Most of its species are distributed in Andean environments, including western Andean ranges (1000 m – 3800 m), inter-Andean valleys (1500m – 3300 m) and high plateaus or “Puna” (3800 m – 5000 m) (Giraldo & Flores, 2016) (Fig. 1a). Available published records account for its presence in particular habitats such as “lomas” vegetation in coastal desert (Aguilar 1976), quinoa and potato crops (Escalante et al., 1981; Rasmussen et al., 2003) and high Andean *Polylepis* forests (Rossi et al., 2018).

The purpose of the present work is to update the knowledge of the genus *Pilobalia*, providing an updated checklist of *Pilobalia* species and new distribution records in Peruvian territory.

This study is based on direct and indirect examination of type and non-type specimens housed in the following collections: Natural History Museum Basel (NHMB, Christoph Germann), California Academy of Sciences, San Francisco, California, USA (CASC, Rachel Diaz Bastin, Chris Grinter), Instituto Argentino de Investigaciones de Zonas Áridas, Mendoza, Argentina (IADIZA, Sergio Roig-Juñent, Gustavo Flores), Laboratorio de Entomología, Universidad Nacional Mayor de San Marcos, Lima, Perú (LEUSM, Eliana Quispitupac), Museo de Entomología Klaus Raven Büller, Universidad Nacional Agraria La Molina, Lima, Perú (MEKRB, Clorinda Vergara), Museo de La Plata, Universidad Nacional de La Plata, La Plata, Argentina (MLP, Nora Cabrera), Muséum National d'Histoire Naturelle, Paris, France (MNHN, Antoine Mantilleri, Christophe Rivier), Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Perú (MUSM, Mabel Alvarado), Laboratorio de Sanidad Vegetal, Servicio Nacional de Sanidad Agraria, Lima, Perú (SENASA, Graciano Tejada).

The primary source of distribution records were about 580 specimens examined in Peruvian entomological collections, namely LEUSM, MEKRB, MUSM and SENASA. Direct examination of type specimens of eight Argentinean and two Peruvian species was carried out in IADIZA, through temporary loans from MLP (Cabrera et al., 2010). Indirect examination of type specimens housed at CASC, MNHN and NHMB was carried out through images sent by their respective curators, including two Peruvian and two Bolivian (CASC), four Peruvian (MNHN) and four Peruvian species (NHMB). Also specimens from Argentina and Bolivia were examined for comparative purposes at IADIZA. When type specimens were not accessible, dichotomic key, original descriptions and image plates presented by Kulzer (1954; 1955; 1958; 1959) were useful for species determination.

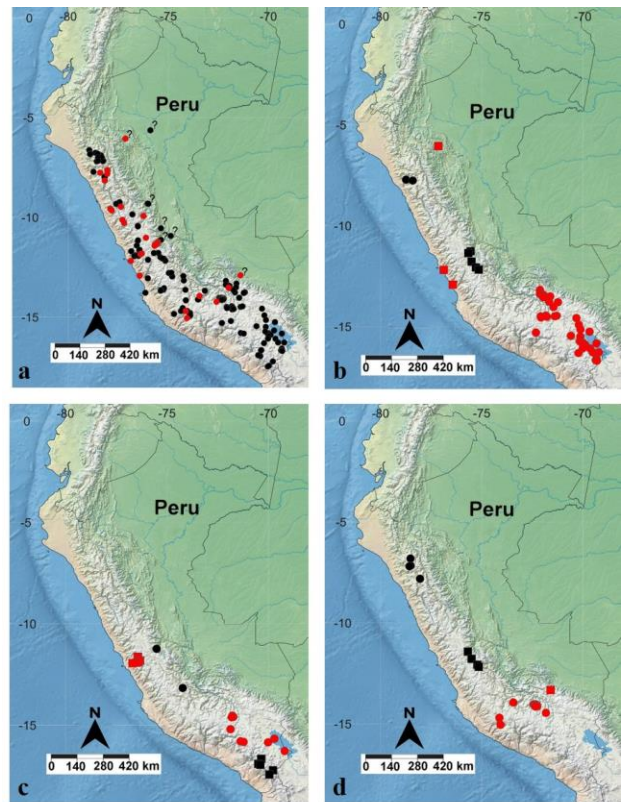


Fig. 1. Distribution maps of genus *Pilobalia* in Peru. a. Overall distribution of the genus, type localities (red circles), localities based on examined specimens (black circles), localities deserving verification (question marks). b. Distribution of *Pilobalia decorata decorata* (Erichson, 1834) (red circles), *Pilobalia alboscripta* Fairmaire, 1903 (black circles), *Pilobalia blancasi* Kulzer, 1958 (red squares) and *Pilobalia crassicornis* Kulzer, 1954 (black squares). c. *Pilobalia decorata immaculata* (Blanchard, 1843) (red circles), *Pilobalia crassicosta* Kulzer, 1954 (black circles), *Pilobalia michelbacheri* Kulzer, 1954 (red squares) and *Pilobalia oblonga* (Blanchard, 1843) (black squares). d. *Pilobalia decorata titschacki* Kulzer, 1954 (red circles), *Pilobalia ruficollis* Kulzer, 1954 (black circles), *Pilobalia unicolor* Kulzer, 1954 (red squares) and *Pilobalia weyrauchi* Kulzer, 1954 (black squares).

The checklist includes distribution status (endemic or new record), synonymy, type specimens examined (directly or indirectly), type localities (incorrectly spelled in quotation marks, doubtful with a question mark) and material examined, as available for each species. The distribution records of specimens that were not assigned to any described species due to their poor condition, doubtful resemblance to known species, or preliminary assignment to undescribed species were summarized in a table indicating regions and provinces according to Peruvian territorial jurisdictions, number of specimens found for each of them, as well as geographic coordinates and altitude data. Overall, type and non-type localities were employed to plot distribution maps for the genus in Peru. The frequency of distribution records according to its latitude and altitude were plotted with histograms and their patterns were interpreted taking into account habitat selection of genus and collecting effort performed in Peruvian territory.

Distribution maps were elaborated using SimpleMappr (Shorthouse, 2010). Histogram plots for latitude and altitude data were elaborated with PAST software (Hammer et al. 2001).

Checklist of *Pilobalia* species recorded in Peru

Pilobalia alboscrypta Fairmaire, 1903 ENDEMIC (Fig. 1b)

Type specimen examined: Syntype (MNHN).

Type locality: La Libertad (Otuzco, Chuquisongo "Choquisongo" 2100 m).

Material examined: La Libertad, Otuzco, Sinsicap, 07°42'47.59"S 78°44'24.81"W, 2380 m, 12-III-2022, E. Gamboa, 1 (MUSM).

Pilobalia baeri Fairmaire, 1902 ENDEMIC

Type specimen examined: Syntype (MNHN).

Type locality: La Libertad (Santiago de Chuco 3000 m).

Pilobalia becki Kulzer, 1954 ENDEMIC (Fig. 2a)

Type specimens examined: Holotype (CASC), paratype (MLP).

Type locality: Junin (Junin Lake).

Pilobalia blancasi Kulzer, 1958 ENDEMIC (Figs. 1b, 2b)

Type specimen examined: Holotype (NHMB).

Type localities: Lima (Atocongo, Quilmaná "Quilmara"), San Martín (Rioja).

Material examined: Lima, Cañete, Quilmaná, 300 m, 11-XI-1951, Jordan, 1 (MUSM); Lima, 15-IV-1958, F. Blancas, 2 (MUSM), lomas de Atocongo, 04-IX-1948, F. Blancas, 2 (MUSM), 30-X-1958, P. Aguilar, 2 (MEKRB), 12-X-1969, R. García, 1 (MUSM). San Martín, Rioja, 4 (MUSM). PERU (no data), 2 (MUSM).

Pilobalia crassicornis Kulzer, 1954 ENDEMIC (Fig. 1b)

Type localities: Junin (Tarma, Acobamba 2900 m and Carpapata "Carpapaca" 2300 m). Material examined: Junín, Chupaca, Comunidad Ñahuinpuquio, 3200m., 07-XII-2003, Rivera & Montgomery, 1 (MEKRB); Huancayo, Pucará, 3310 m., 30-IX-2005, S. Mayta, 1 (MEKRB); Jauja, 23-II-1998, J. Paucar, 1 (MEKRB).

Pilobalia crassicosta Kulzer, 1954 ENDEMIC (Fig. 1c)

Type localities: Arequipa, Junin (Huacapistana "Huacapistana").

Material examined: Ayacucho, 08-IV-2004, A. Martínez, 1 (MEKRB). Junín, 20-XII-1960, Vargas, 1 (SENASA).

Pilobalia decorata decorata (Erichson, 1834) (Fig. 1b)

= *Pilobalia nebulosa* (Waterhouse, 1844)

Type localities: Southern Peru, Tacora and Titicaca plateaus.

Material examined: Arequipa, 10-X-1996, O. Marín, 2 (MEKRB), 06-VIII-1999, J. Huanca, 1 (MEKRB), Castilla, Orcopampa, 15°17'29.90"S 72°19'17"W, 3855 m, 10-II-2018, P. Sanchez, 1 (MUSM). Cusco, Canas, Langui, 14°27'32.39"S 71°17'34.8"W, 4296 m, 28-II-2022, A. Giraldo, 3 (MEKRB); Canchis, Sicuani, 11-II-2002, I. Pardo, 1 (MEKRB); Chumbivilcas, Chilloroya, pajonal, 4020 m, 14°30'09.63"S 71°46'52.51"W, VI-2012, J. Jara, 10 (MEKRB), Livitaca, 14°29'15.46"S 72°05'0.07"W, 3841 m, 21-III-2021, E. Quispe, 3 (MUSM), 14°32'46.90"S 72°04'05.87"W, 3841 m, 21-III-2021, E. Quispe, 1 (MUSM), Urasana, 4029 m., V-2012, J. Jara, 1 (MEKRB); Cusco, 08-X-1961, Molledo, 2 (SENASA), 06-I-1962, Molledo, 5 (SENASA), 05-VI-1974, C. Martínez, 1 (SENASA), 13-III-1971, P. Aguilar, 2 (MEKRB), 20-IV-1971, M. Buitrón, 2 (MEKRB), 10-VIII-1995, C. Marhuay, 1 (MEKRB), 04-IV-1998, N. Elguera, 2 (MEKRB), 03-VI-2001, M. Cárdenas, 1 (MEKRB), Sacsayhuamán, 3585 m, 27-IV-1977, R. García, 1 (MUSM), V-1979, N. Castro, 1 (MUSM); Paucartambo, Huancarani, 3500 m, 03-III-1975, G. Lamas, 1 (MUSM); Quispicanchi, Huaró, 13°45'33.3"S 71°39'59.6"W, 4246 m, 12-I-2021, M. Gill, 4 (MUSM); Urubamba, Chincheros, 08-VII-1996, W. Catalán, 2 (MEKRB). Puno, Azángaro, Arapa, II-1948, F. Blancas, 8 (MUSM), Azángaro, II-1948, F. Blancas, 1 (MUSM), San Antón, 14°34'31.40"S 70°19'01.27"W, 4062 m, 20-II-2022, J. Aragon, 12 (MUSM); Chucuito, 06-II-2013, J. Huanca, 11 (MEKRB), Huacullani, Comunidad Córdor de Aconcahua, 16°39'41.72"S 69°21'52.03"W, 4183 m, 01-III-2010, E. Rázuri, 1 (MUSM), Comunidad de Cotoco, 16°41'23.20"S 69°18'18.69"W, 4070m., 05-III-2010, E. Rázuri, 1 (MUSM), Comunidad de Ingenio, 16°39'41.72"S 69°19'01.41"W, 4226m., 02-III-2010, E. Rázuri, 1 (MUSM), Comunidad de Yorohoco, 16°34'05.64"S 69°19'34.19"W, 3856 m, 06-III-2010, E. Rázuri, 1 (MUSM), Juli, 16°16'08.39"S 69°30'54"W, 4060 m, 23-II-2022, A. Giraldo, 1 (MEKRB); El Collao, Ilave, 3900 m, II-1948, Weyrauch, 11 (MUSM); Huancane, Miajachi, 28-II-1948, F. Blancas, 6 (MUSM); Lampa, 0.5 Km NE of Paratia, 15°27'07"S 70°35'38"W, II-2020, G. Sarabia, 3 (MEKRB); Puno, 1 (no data) (MUSM), 1940, Soukup, 1 (SENASA), 3900 m, II-1948, F. Blancas, 5 (MUSM), 15-IV-1948, J.E. Wille, 2 (SENASA), 12-II-1952, F. Blancas, 1 (MUSM), 23-II-1968, M. Delgado, 4 (SENASA), 3850 m, 27-IV-1974, R. García, 6 (MUSM), 31-VIII-1981, R. Ortiz, 3 (MEKRB), 26-31-XII-1981, G. Mamani, 3 (MEKRB), 13-I-1982, F. Wong, 4 (MEKRB), 20-I-1983, E. Deza, 4 (MEKRB), II-2020, H. Coaquira, 3 (MEKRB), Hacienda Umayo, III-1948, F. Blancas, 3 (MUSM), Lago Titicaca, 27-XI-1952, F. Blancas, 1 (MUSM), Pichacani, 1.3 km northeast to Ayuncora, 16°04'40.79"S 70°00' 39.59"W, 3978 m, 15-I-2022, A. Giraldo, 2 (MEKRB), Pichacani, 5.8 km northeast

to Puente Bello, 16°18'17.99"S 70°13'01.19"W, 4459 m, 24-II-2022, A. Giraldo, 2 (MEKRB), Toramipata, 3825m., 15°48'08"S 69°59'36"W, II-2015, J. Ugarte, 3 (MEKRB); San Román, Juliaca, III-1956, 1 (MUSM); Yunguyo, Cuturapi, 16°16'11.99"S 69°12' 25.19"W, 3869 m, 02-III-2022, A. Giraldo, 1 (MEKRB).

Pilobalia decorata immaculata (Blanchard, 1843) NEW COUNTRY RECORD (Fig. 1c)

= *Pilobalia opaca* (Kirsch, 1886)

= *Pilobalia alticola* (Kirsch, 1886)

Type localities: Bolivia (mountain range near to Potosí; Sajama 4500 m).

Material examined: Arequipa, Caylloma, Caylloma, 15°11'38.15"S 71°52'17.56"W, 4900 m, 15-VIII-2021, A. Aliaga, 2 (MUSM), 15-II-2022, E. Medina, 2 (MUSM), Pampa de Tocra, 15°47'31.19"S 71°22'40.8"W, 4325 m, 18-I-2022, A. Giraldo, 2 (MEKRB), San Antonio de Chuca, 15°49'22.8"S 71°13'44.39"W, 4358 m 27-II-2022, A. Giraldo, 1 (MEKRB). Cusco, Chumbivilcas, Chilloroya Alto, Mina Constanza, 14°31'34"S 71°46'52"W, 4139 m, 11-VI-2013, L. Huerto, 1 (MUSM), 14°35'21"S 71°44'13"W, 4380 m, 11-VI-2013, L. Huerto, 1 (MUSM), Pumacocha, 4029 m., V-2012, J. Jara, 7 (MEKRB). Puno, Puno, 1944, 2 (MUSM), 3800 m, II-1948, F. Blancas, 2 (MUSM), 3900 m, II-1948, Weyrauch, 1 (MUSM), 23-II-1968, M. Delgado, 11 (SENASA), Isla Amantani, 3900 m., III-1948, F. Blancas, 10 (MUSM); Yunguyo, Cuturapi, 16°16'11.99"S 69°12'25.19"W, 3869 m, 23-II-2022, A. Giraldo, 8 (MEKRB).

Pilobalia decorata titschacki Kulzer, 1954 ENDEMIC (Fig. 1d)

Type localities: Apurímac (37 km South of Andahuaylas), Ayacucho (Huacaña 3700 m "Huacana", Querobamba 3500 m, Tayapampa 4000 m).

Material examined: Apurímac, Cotabambas, 14°07'37.65"S 72°15'34.45"W, 3798m., 22-24-I-2017, J. Suárez, 1 (MUSM), 14°03'43.37"S 72°18'36.89"W, 4326m., 29-30-I-2017, J. Suárez, 1 (MUSM), Chalhuahuacho, C. C. Ccahuapirhua, 14°07'17.53"S 72°21'55.38"W, 4384 m, 23-III-2021, R. Coronel, 1 (MUSM), 14°08'05.93"S 72°20'27.92"W, 4030 m, 23-III-2021, J. Aragon, 1 (MUSM), 14°08'13.02"S 72°19'43.95"W, 3876 m, 24-III-2021, J. Aragon, 1 (MUSM), Chalcobamba, Qda. Itaña, 14°04'08.02"S 72°22'51.19"W, 4419 m, 03-III-2021, J. Aragon, 1 (MUSM), Ferrobamba, 14°05'18.54"S 72°20'51.01"W, 4376 m, J. Aragon, 1 (MUSM), 14°06'26.73"S 72°15'08.01"W, 3994 m, 18-III-2021, R. Coronel, 1 (MUSM), Coyllurqui, Huancuire, 14°01'05.37"S 72°20'36.04"W, 4367 m, 09-IV-2021, R. Coronel, 1 (MUSM), 14°01'24.64"S 72°20'48.85"W, 4442 m, 09-IV-2021, J. Aragon & A. Elme, 1 (MUSM), 14°02'21.48"S

72°23'06.43"W, 4351 m, 12-IV-2021, R. Coronel, 1 (MUSM), Pumamarca (Sallahue), 14°01'46.67"S 72°19'36.28"W, 4349 m, 24-II-01-III-2020, N. Zenteno & A. Silva, 1 (MUSM), Mina Las Bambas, sector Sagrapeña, 14°04'37.24"S 72°18'33"W, 4265 m, 01-III-2020, L. Perez, 2 (MUSM), Tambobamba, C. C. Antuyo, 14°04'32.38"S 72°16'03.88"W, 4244 m, 29-II-01-III-2020, N. Zenteno & A. Silva, 1 (MUSM); Grau, Progreso, Palcca, 14°01'52.88"S 72°26'28.02"W, 4148 m, 12-III-2021, R. Coronel, 2 (MUSM). Cusco, 1962, Molleda, 1 (MEKRB); Chumbivilcas, Urasana, 4029 m, V-2012, J. Jara, 21 (MEKRB), 5 (IADIZA).

Pilobalia dorsoplicata Fairmaire, 1876 ENDEMIC

Type locality: Peru (without further details).

Note: After examining the only type specimen housed at British Museum, Kulzer (1954) pointed out that an accurate determination of the species is unreliable, since the elytral pattern is completely lost and the "Peru" locality is too imprecise.

Pilobalia freyi Kulzer, 1954 ENDEMIC

Type specimen examined: Holotype (NHMB).

Type locality: Lima? (Pativilca River "Rio Pativilia" 3300-3600 m Huaraz to Huacho route).

Pilobalia gracilipes Kulzer, 1954 ENDEMIC

Type locality: Junin (Tarma River, Palca 2800 m).

Pilobalia haagi Fairmaire, 1878 ENDEMIC

Type locality: Peru (without further details).

Pilobalia lineata Kulzer, 1958 ENDEMIC

Type locality: Peru (without further details).

Pilobalia löffleri Kulzer, 1955 ENDEMIC

Type localities: Ancash (Cohuptal? 4600 m in Huaraz zone, dry slope west to Huaraz 4200 m, highland between Quilcayhuanca "Quilquaihuanca" and Shallapa "Schallaptal").

Pilobalia michelbacheri Kulzer, 1954 ENDEMIC (Figs. 1c, 2c)

Type specimen examined: Holotype (CASC).

Type localities: Lima (Matucana, San Miguel de Viso "Viso, Rio Rimai" 2700 m).

Material examined: Lima, Huarochirí, 28-V-1974, P. Hocking, 1 (MUSM), carretera central km 70, 26-IV-1945, 2 (MUSM), Huanza, 11°37'20.54"S 76°25'48.54"W, 3910

m, 15-VII-2021, M. Rodriguez, 1 (MUSM), 11°37'51.34"S 76°26'53.01"W, 3900 m, 15-III-2021, M. Rodriguez, 2 (MUSM), Matucana, 23-VI-2001, S. Díaz, 1 (MEKRB), San Bartolomé, 04-VI-2003, E. Arango, 1 (MEKRB), San Jerónimo de Surco, V-2014, A. Solano, 2 (MEKRB); Lima, Chosica, 13-IV-2003, W. Soto, 1 (MEKRB).

Pilobalia oberthüri Kulzer, 1954 ENDEMIC (Fig. 2d)

Type specimens examined: Holotype, allotype, two paratypes (MNHN).

Type locality: Cajamarca (Cajabamba 4000 m).

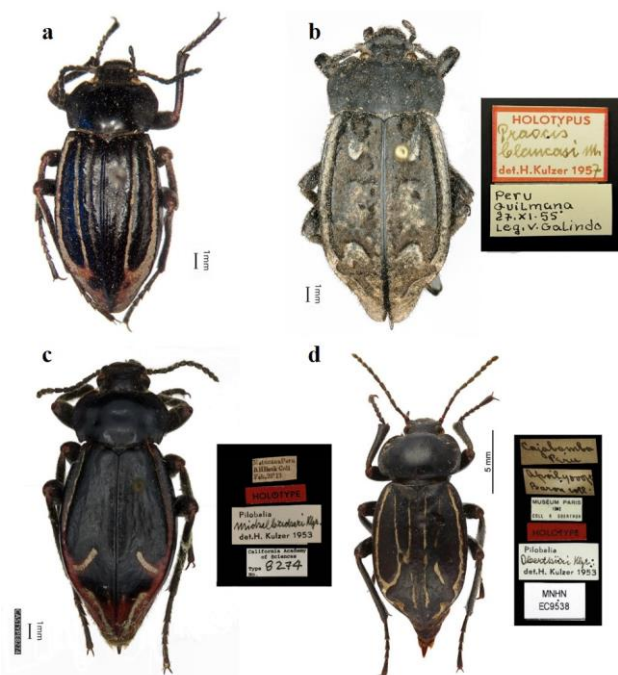


Fig. 2. Habitus of type specimens in dorsal view. a. *Pilobalia becki* Kulzer, 1954 MLP paratype (photo by Gustavo Flores). b. *Pilobalia blancasi* Kulzer, 1958 NHMB holotype (photo by Christoph Germann). c. *Pilobalia michelbacheri* Kulzer, 1954 CASC holotype (photo by Rachel Diaz-Bastin). d. *Pilobalia oberthüri* Kulzer, 1954 MNHN holotype (photo by Christophe Rivier).

Pilobalia oblonga (Blanchard, 1843) NEW COUNTRY RECORD (Fig. 1c)

Type locality: Puna highlands of mountain range (no mention of any country).

Material examined: Moquegua, Mariscal Nieto, Carumas, 16°38'52"S 70°20'48"W, III-2015, M. Deza, 5 (MEKRB), 16°39'41.20"S 70°21'53.43"W, 4371 m, 22-23-II-2021, L. Ramirez, 1 (MUSM), 16°54'16.54"S 70°30'26.00"W, 4659 m, 22-23-II-2021, L. Ramirez, 3 (MUSM). Puno, El Collao, Capaso, Challapalca, 17°13'15.6"S 69°46'37.2"W, 4305 m, 23-II-2022, A. Giraldo, 3 (MEKRB). Tacna, Candarave, Laguna Suches, 16°56'57.69"S 70°24'09.87"W, 4462 m, pajonal, VIII-2015, Y. Callohuari, 1 (MEKRB); Tarata, near to Ticaco, 17°25'44.39"S 69°57'46.79"W, 4247 m, 23-II-2022, A. Giraldo, 1 (MEKRB).

Pilobalia ornata Kulzer, 1958 ENDEMIC
Type locality: Ancash (Laguna Conococha "Cenococha" 4150 m).

Pilobalia philippi Kulzer, 1958 ENDEMIC
Type locality: La Libertad (Otuzco, Chuquisongo "Choquisongo" 2100 m).

Pilobalia ruficollis Kulzer, 1954 ENDEMIC (Fig. 1d)
Type locality: La Libertad (Huamachuco).
Material examined: Cajamarca, Cajamarca, 1969, J. Alata, 3 (SENASA), Cumbemayo, 3300 m., 30-VI-2002, M. Diéguez, 6 (MUSM); Hualgayoc, El Tambillo, 1877, A. Raimondi, 3 (MUSM).

Pilobalia soror Kulzer, 1958 ENDEMIC (Fig. 3a)
Type specimen examined: Holotype (NHMB).
Type locality: Peru (without further details).

Pilobalia subnuda Kulzer, 1954 ENDEMIC (Fig. 3b)
Type specimen examined: Paratype (MLP)
Type locality: Lima? (Pativilca River "Pativilia" 3300-3600 m Huaraz to Huacho route).

Pilobalia tenella Kulzer, 1954 ENDEMIC (Fig. 3c)
Type specimen examined: Paratype (MNHN).
Type locality: La Libertad (Otuzco, Chuquisongo "Choquisongo" 2100 m).

Pilobalia tristis Kulzer, 1954 ENDEMIC
Type localities: Apurimac (Mamara), Cusco, Madre de Dios.

Pilobalia unicolor Kulzer, 1954 ENDEMIC (Figs. 1d, 3d)
Type specimen examined: Holotype (NHMB).
Type locality: Cusco (Cajea? 3900 m).
Material examined: Cusco, Paucartambo, 18-IV-1993, L. González, 1 (MEKRB).

Pilobalia voogdi Kulzer, 1954 ENDEMIC
Type locality: Huánuco 1900 m.

Pilobalia weyrauchi Kulzer, 1954 ENDEMIC (Fig. 1d)
Type locality: Junin (Tarma 3300-3800 m).
Material examined: Junin, Huancayo, 21-IV-1978, J. Alcázar, 9 (MEKRB), 24-XI-2012, C. Huaripata, 1 (MEKRB), Pucará, 30-IX-2005, S. Mayta, 2 (MEKRB); Jauja, 7 Km NE Jauja, 3390 m., 22-XI-2004, N. Lara, 1 (MEKRB).

According to the updated checklist presented here, the genus *Pilobalia* in Peru is now represented by 26 species and two subspecies. It has been possible to examine type specimens of eleven species, which represents a 39% of the recorded species and subspecies in Peru. In the Peruvian collections, specimens corresponding to 10 species and two subspecies were found, namely *P. alboscrita*, *P. blancasi*, *P. crassicornis*, *P. crassicosta*,

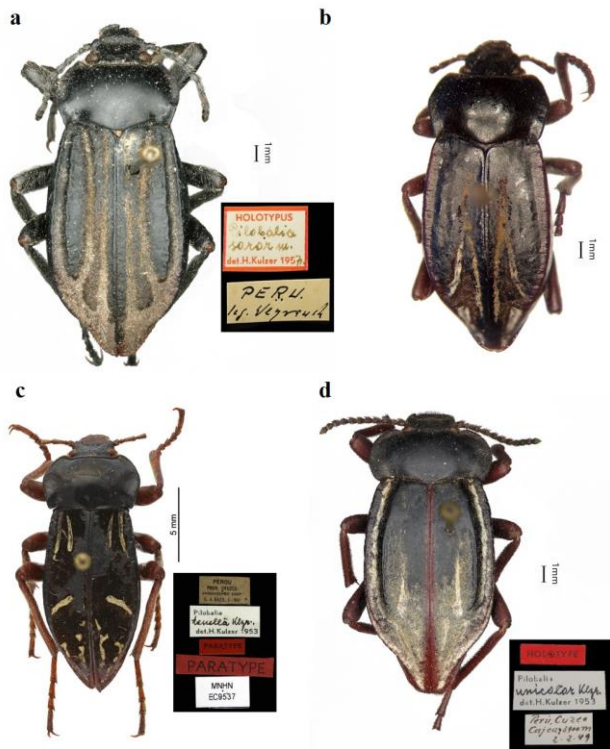


Fig. 3. Habitus of type specimens in dorsal view. a. *Pilobalia soror* Kulzer, 1958 NHMB holotype (photo by Christoph Germann). b. *Pilobalia subnuda* Kulzer, 1954 MLP paratype (photo by Gustavo Flores). c. *Pilobalia tenella* Kulzer, 1954 MNHN paratype (photo by Christophe Rivier). d. *Pilobalia unicolor* Kulzer, 1954 NHMB holotype (photo by Christoph Germann).

P. decorata decorata, *P. decorata immaculata*, *P. decorata titschacki*, *P. michelbacheri*, *P. oblonga*, *P. ruficollis*, *P. unicolor* and *P. weyrauchi*. Otherwise, sixteen species are currently known only from their type specimens and are not properly represented in Peruvian collections. Among these species with poorly known distribution, *P. baeri*, *P. becki*, *P. freyi*, *P. gracilipes*, *P. löffleri*, *P. oberthüri*, *P. ornata*, *P. philippi*, *P. subnuda*, *P. tenella*, *P. tristis* and *P. voogdi* have more or less well-defined type localities, so their distributions must be restricted and hitherto overlooked by collecting surveys in Peru. For *P. haagi*, *P. lineata* and *P. soror*, the label data of type specimens only indicates "Peru" without further details, so its precise distribution will only be defined with more collecting effort. The status of *P. dorsoplicata* is even more uncertain following notes by Kulzer (1954), with a type specimen extensively damaged and bearing label data "Peru", so this species should be declared *nomen dubium* according to International Code of Zoological Nomenclature.

Distribution records of undetermined specimens of genus *Pilobalia* are presented in Table I. These records include 275 specimens from 15 regions and 41 provinces of the Peruvian territory. A high number of specimens not reliably assigned to any described species is not surprising for a genus of wingless darkling beetles prone to speciation by vicariant orographic barriers and this biological trait partly explains why its systematics studies are still in progress.

Table I. Distribution records of undetermined specimens of the genus *Pilobalia* arranged in regions and provinces of Peruvian territory.

Region	Province (specimens)	Latitude	Longitude	Altitude	
Loreto	Maynas (2)	-5.630	-75.894	148	
	Cajamarca	Santa Cruz (8)	-6.626	-78.945	2035
		-6.805	-78.898	3723	
		-6.829	-78.911	3338	
Hualgayoc (2)		-6.757	-78.640	3668	
San Miguel (1)		-6.811	-78.883	3533	
Celendín (2)			-6.896	-78.357	4000
			-6.974	-78.337	3975
Cajamarca (52)			-6.931	-78.444	4015
		-6.941	-78.472	4008	
		-6.958	-78.461	4025	
		-6.985	-78.461	3798	
		-6.988	-78.481	4094	
		-6.992	-78.477	4050	
		-7.003	-78.516	3807	
		-7.006	-78.487	4026	
		-7.015	-78.308	3940	
		-7.030	-78.320	3770	
		-7.038	-78.335	3530	
		-7.086	-78.347	3500	
		-7.162	-78.243	3600	
		-7.175	-78.266	3450	
	Cajabamba (1)		-7.624	-78.046	2654

La Libertad	Santiago de Chuco (9)	-7.962	-78.192	4055
		-7.999	-78.181	3871
Huánuco	Leoncio Prado (3)	-9.302	-76.036	647
		-9.314	-75.997	650
	Dos de Mayo (1)	-9.847	-76.797	3500
	Huánuco (1)	-9.929	-76.240	1900
Ancash	Carhuaz (2)	-9.323	-77.604	2720
Pasco	Daniel Alcides Carrión (6)	-10.413	-76.527	4055
		-10.437	-76.514	4024
		-10.451	-76.516	4132
	Oxapampa (1)	-10.541	-75.369	2250
Junin	Chanchamayo (4)	-10.925	-74.877	525
		-11.124	-75.360	820
	Tarma (1)	-11.417	-75.683	3050
	Jauja (2)	-11.786	-75.718	3800
	Huancayo (9)	-12.001	-75.394	3282
-12.067		-75.217	3249	
Lima	Huaral (6)	-11.146	-76.514	4585
		-11.150	-76.516	4628
		-11.185	-76.525	4358
	Canta (3)	-11.407	-76.575	3583
		-11.695	-76.847	940
	Huarochirí (24)	-11.631	-76.448	3900
		-11.845	-76.386	2378
		-11.893	-76.553	1719
		-11.901	-76.664	1036
		-11.911	-76.541	1450
		-11.912	-76.529	1600
		-11.929	-76.489	2550
	Lima (2)	-11.937	-76.696	850
	Yauyos (9)	-12.122	-76.013	4000
	Cañete (1)	-13.049	-76.022	2346
Huancavelica	Huancavelica (12)	-12.771	-74.849	3385
		-12.785	-74.971	3676
	Angaraes (4)	-12.960	-74.806	4088
	Huaytará (8)	-13.545	-75.213	4295
		-13.610	-75.235	4325
		-13.637	-75.375	3778
	-13.676	-75.383	3473	
Ica	Chincha (3)	-13.778	-76.142	1850
	Nasca (3)	-14.837	-74.716	2350
Ayacucho	Huanta (1)	-12.940	-74.248	2500
	Cangallo (4)	-13.629	-74.144	4000
	Lucanas (19)	-14.151	-74.124	4336
		-14.158	-74.124	4245
		-14.543	-74.279	3432
		-14.665	-74.319	4174
		-14.681	-74.061	3841
		-14.693	-74.369	4000
		-14.786	-73.908	4213
		-14.800	-73.910	4347
-14.863	-73.924	4172		
	-14.909	-73.899	4089	
Cusco	Urubamba (2)	-13.180	-72.120	3600
		-13.379	-72.122	3605
	Cusco (6)	-13.430	-71.941	4041
		-13.508	-71.982	3700

		-13.522	-71.983	3400
		-13.542	-71.949	3354
	Quispicanchi (3)	-13.789	-71.231	2794
		-13.755	-71.172	4270
		-13.639	-71.741	3162
	Canchis (1)	-14.025	-71.454	3450
Aurimac	Andahuaylas (5)	-13.678	-73.172	4010
		-14.119	-73.511	4004
	Cotabambas (8)	-14.050	-72.252	4060
		-14.054	-72.254	4097
		-14.068	-72.269	4083
		-14.078	-72.226	3912
Puno	Puno (3)	-15.843	-70.024	3810
		-15.961	-69.992	3961
Tacna	Tarata (41)	-17.442	-69.981	3921
		-17.474	-70.031	3083

Specimen numbers in parentheses. Geographic coordinates in decimal degrees and altitude in meters.

Taking into account all the available distribution records, distribution maps were elaborated, including 240 localities (Fig. 1). These records place the northern limit of the Nycteliini tribe to around 6°S, some 7° further north than on the map presented by Flores & Triplehorn (2002). As expected according to previous works (Peña, 1973, Giraldo & Flores, 2016), records are mostly located along the different altitude levels of the Andes mountain range, with very few to the west (coastal desert) and east (tropical forests) of the Andes. The records in the coastal desert are located between 12–13°S, these correspond specifically to *Pilobalia blancasi* collected in patches of fog-dependent vegetation called "lomas", as documented in early works by Aguilar (1976) and by the specimens found in the collections. The label data of some specimens suggest that they were collected in tropical areas between 5–13°S, from 150 to 2200 meters of altitude. At first glance, tropical areas do not have suitable habitats for the genus, however the presence of semi-arid patches or dry micro-habitats cannot be ruled out, which should be verified with a greater collection effort in these places.

The histogram plot of latitude data shows higher frequencies (0.57) for southern latitudes from 12°30'0" S (Fig. 4a). This pattern could be explained by the fact that the Southern Peruvian Andes have a wider area, mostly covered with highland grasslands, which are also easier places for collecting, using a combination of pitfall trapping and direct searching under rocks. The histogram plot of altitude data shows higher frequencies (0.76) for altitudes above 3000 m (Fig. 4b). This means that the genus *Pilobalia* would have largest populations and species number inhabiting highland plains and interandean valleys, while ravines covered with cacti and shrubs at lower altitudes would be secondary habitats. Also, as stated above, collecting is easier in larger areas and more difficult in narrow places, where populations could also be smaller.

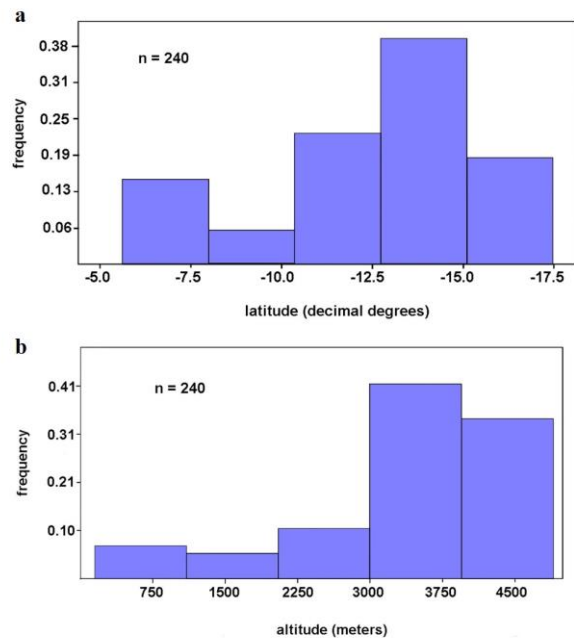


Fig. 4. Histogram plots for distribution data of genus *Pilobalia* in Peru. a. latitude (decimal degrees). b. altitude (meters).

ACKNOWLEDGMENTS

The author wishes to thank Gustavo Flores (IADIZA), Eliana Quispitupac (LEUSM), Clorinda Vergara (MEKRB), Mabel Alvarado (MUSM), and Graciano Tejada (SENASA) for the collaboration provided during the visit to their respective entomological collections. Also, thanks to Nora Cabrera (MLP) for the loan of type specimens to IADIZA, which were examined during two author's visits, the first during the Fourth International Tenebrionidea Symposium (November 25-26th, 2015) and the second for the internship titled "Implementación de investigaciones sobre Sistemática de tenebriónidos".

sudamericanos (Coleoptera, Tenebrionidae)" (FONDECYT-Peru, September 3–16, 2017). Photos of type specimens were kindly provided by Rachel Diaz-Bastin and Chris Grinter (CASC), Christophe Rivier and Antoine Mantilleri (MNHN), and Christoph Germann (NHMB).

LITERATURE CITED

- Aguilar, P.G. (1976) Fauna desértico-costera peruana – I Invertebrados más frecuentes en las lomas. *Revista Peruana de Entomología*, **19(1)**, 67-70.
- Blanchard, C.E. (1835-1847) Insectes de l'Amérique méridionale. Recueillis par Alcide d'Orbigny et décrits par Emile Blanchard et Auguste Brullé. *Voyage dans l'Amérique méridionale (le Brésil, la République orientale de l'Uruguay, la République Argentine, la Patagonie, la République du Chili, la République de Bolivie, la République du Pérou), exécuté pendant les années 1826, 1827, 1828, 1829, 1830, 1831, 1832 et 1833 par Alcide d'Orbigny. Ouvrage dédié au Roi, et publié sous les auspices de M. le Ministre de l'Instruction publique (commencé sous le ministère de M. Guizot). Tome sixième. 2.e Partie: Insectes* (ed. Bertrand, P., Paris [& Levrault, V., Strasbourg.), pp. 57-222. [4] + 222 pp. [+ 32 associated pls]. (4to-text; Folio-plates) CNC, GB, BHL.
- Burmeister, H. (1875) Melanosoma Argentina. *Stettin Entomologische Zeitung*, **36**, 457-500.
- Cabrera, N., Fernández, L.A., Flores, G.E. & Lattari, M. (2010) Catalog of the types of Tenebrionidae and Perirnylopididae (Insecta, Coleoptera) deposited at Museo de La Plata (Argentina). *Transactions of the American Entomological Society*, **136(1-2)**, 107-123. <https://doi.org/10.3157/061.136.0202>
- Erichson, W.F. (1834) Coleoptera. Meyen, F. J. F. Beiträge zur Zoologie, gesammelt auf einer Reise um die Erde. *Nova Acta Physico-Medica Academiae Caesareae-Leopoldino-Carolinae, Naturae Curiosorum*, **16 (Suppl. 1)**, 219-276. Bonn.
- Erichson, W.F. (1847) Conspectus insectorum coleopterorum quae in Republica Peruana observata sunt. *Archiv für Naturgeschichte Berlin*, **13(1-2)**, 67-185.
- Escalante, J.A., Castillo, M., & Ochoa, O. (1981) Catálogo preliminar de las plagas insectiles de papa, maíz y frutales en el departamento del Cusco, Perú. *Revista Peruana de Entomología*, **24(1)**, 87-90.
- Fairmaire, L. (1876) Révision des Coléoptères du Chili. Famille des Tenebrionidae, Tribu des Nyctérites. *Annales de la Société Entomologique de France*, **5(6)**, 1ère. partie: 141-170; 2ème. partie: 341-383.
- Fairmaire, L. (1878) Description of Coléoptères nouveaux d'Amérique. *Revue et Magasin de Zoologie Pure et Appliquée*, **Series 3 (6)**, 260-270.
- Fairmaire, L. (1902) Diagnoses de Coléoptères hétéromères recueillis par M. G. A. Baer au Pérou. *Bulletin de la Société Entomologique de France*, **1902**, 148-151.
- Fairmaire, L. (1903) Coléoptères hétéromères recueillis par M. Baer dans le Haut-Pérou et le Tucuman. *Annales de la Société Entomologique de France*, **72**, 461-468.
- Ferru, M.A., & Pizarro-Araya, J. (2007) Primeros registros para Chile de dos especies de *Pilobalia* Burmeister, 1875 (Coleoptera, Tenebrionidae). *Gayana*, **71(1)**, 120-123. <http://dx.doi.org/10.4067/S0717-65382007000100013>
- Flores, G.E. (1997) Revisión de la tribu Nycteliini (Coleoptera: Tenebrionidae). *Revista de la Sociedad Entomológica Argentina*, **56(1-4)**, 1-19.
- Flores, G.E. (1999) Systematic revision and cladistic analysis of the Neotropical genera *Mitragenius* Solier, *Auladera* Solier and *Patagonogenius* gen. n. (Coleoptera: Tenebrionidae). *Entomologica Scandinavica*, **30(4)**, 361-396. <https://doi.org/10.1163/187631200X00516>
- Flores, G.E., & Triplehorn, C.A. (2002) *Entomobalia*, new genus, the first member of Nycteliini (Coleoptera: Tenebrionidae) from Brazil. *Proceedings of Entomological Society of Washington*, **104(3)**, 602-613.
- Flores, G.E., & Vidal, P. (2000) Revalidation and systematic revision of the Chilean genus *Callyntra* Solier (Coleoptera: Tenebrionidae). *Annals of the Entomological Society of America*, **93(5)**, 1052-1075. [https://doi.org/10.1603/0013-8746\(2000\)093\[1052:RASROT\]2.0.CO;2](https://doi.org/10.1603/0013-8746(2000)093[1052:RASROT]2.0.CO;2)
- Gebien, H. (1936) Katalog der Tenebrioniden. Teil 1. *Pubblicazioni del Museo Entomologico "Pietro Rossi" Duino*, **2**, 744 -753.
- Giraldo, A.E., & Flores, G.E. (2016) Peruvian Tenebrionidae: A review of present knowledge and biodiversity. *Annales Zoologici*, **66(4)**, 499-513. <http://dx.doi.org/10.3161/00034541ANZ2016.66.4.002>
- Hammer, Ø., Harper, D.A.T., & Ryan, P.D. (2001) PAST: Paleontological Statistics Software Package for Education and Data Analysis. *Palaeontologia Electronica*, **4(1)**, 9pp. Available on: <https://past.en.lo4d.com/windows> (Accessed on 20/09/2022)
- Kirsch, T. (1886) Neue südamerikanische Käfer. *Berliner Entomologische Zeitschrift*, **30**, 331-340.
- Kulzer, H. (1954) Neunter Beitrag zur Kenntnis der Tenebrioniden (Col.): Eine Studie über die Tribus Nycteliini. *Entomologische Arbeiten aus dem Museum G. Frey Tutzing bei München*, **5**, 145-267.
- Kulzer, H. (1955) Neue Tenebrioniden aus Sudamerika. Eine neue *Pilobalia* (Nycteliini) aus Peru. *Entomologische Arbeiten aus dem Museum G. Frey Tutzing bei München*, **6**, 481-482.
- Kulzer, H. (1958) Neue Tenebrioniden aus Sudamerika. (17 Beitrag zur Kenntnis der Tenebrioniden). *Entomologische Arbeiten aus dem Museum G. Frey Tutzing bei München*, **9**, 184-219.
- Kulzer, H. (1959) Neue Tenebrioniden aus Sudamerika. (18 Beitrag zur Kenntnis der Tenebrioniden). *Entomologische Arbeiten aus dem Museum G. Frey Tutzing bei München*, **10(2)**, 559-561.
- Molinari, H. (1968) Tenebrionidos de Jujuy (República Argentina) (Coleoptera – Tenebrionidae). *Revista de la Sociedad Entomológica Argentina*, **31(1-4)**, 113-140.

- Peña, L.E. (1973) Insectos de la zona altiplánica de La Argentina. II. El género *Pilobalia* Burmeister (Coleoptera, Tenebrionidae). *Revista de la Sociedad Entomológica Argentina*, **34(1-2)**, 161-176.
- Perty, M. (1830) *Delectus animalium articulorum, quae in itinere per Brasiliam annis MDCCCXVII-MDCCCXX jussu et auspiciis Maximiliani Josephi I. Bavariae regis augustissimi peracto, collegerunt Dr. J. B. Spix et Dr. C. F. Ph. de Martius. Fasc. 3*, pp. 125-224. Monachii [= Munich]: published by the author.
- Rasmussen, C., Lagnaoui, A., & Esbjerg, P. (2003) Advances in the knowledge of quinoa pests. *Food Reviews International*, **19(1-2)**, 61-75. <https://doi.org/10.1081/FRI-120018868>
- Rossi, C., Galindo, I., Huamán, G., Cuadros, B., Ortega, Y., Quispitupac, E., & Martínez, N. (2018) Primer estudio de la riqueza de coleópteros en un bosque de *Polylepis tomentella* del distrito de Chaviña (Ayacucho, Perú). *Ecología Austral*, **28**, 229-234. <https://doi.org/10.25260/EA.18.28.1.1.493>
- Shorthouse, D.P. (2010) SimpleMappr, an online tool to produce publication-quality point maps. Available on: <http://www.simplemappr.net> (Accessed on 20/09/2022)
- Smith, A.D., Giraldo-Mendoza, A.E., Flores, G.E., & Aalbu, R.A. (2015) Beetles (Coleoptera) of Peru: A Survey of the Families. Tenebrionidae Latreille, 1802. *Journal of the Kansas Entomological Society*, **88(2)**, 221-228. <http://dx.doi.org/10.2317/kent-88-02-221-228.1>
- Waterhouse, G.R. (1844) Contributions to the entomology of the southern portions of South America. *Annals and Magazine of Natural History*, **13**, 41-55.