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The genus *Philorea* in Peru: checklist and distribution records (Coleoptera: Tenebrionidae: Pimeliinae: Physogasterini)

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Notas


The genus *Philorea* in Peru: checklist and distribution records (Coleoptera: Tenebrionidae: Pimeliinae: Physogasterini)

El género *Philorea* en Perú: catálogo y registros de distribución (Coleoptera: Tenebrionidae: Pimeliinae: Physogasterini)

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Abstract: *Philorea* Erichson, 1834 (Pimeliinae: Physogasterini) is a South American endemic genus of the Desert, Puna and Atacaman biogeographic provinces, in the territories of Peru, Bolivia and Chile. The objective of this work was to update the knowledge of the genus in the Peruvian territory, providing a checklist of species and new distribution records. From examination of 821 specimens, a total of 15 species of *Philorea* are recorded for Peru. Also distributions maps and comments about its distribution patterns are provided.

Keywords: Darkling beetles, Distribution patterns, South America, South American transition zone, Species list.

Resumen: *Philorea* Erichson, 1834 (Pimeliinae: Physogasterini) es un género sudamericano endémico de las provincias biogeográficas de Desierto, Puna y Atacama, en los territorios de Perú, Bolivia y Chile. El objetivo del presente trabajo fue actualizar el conocimiento del género en el territorio peruano, aportando un catálogo de especies y nuevos registros de distribución. A partir del examen de 821 especímenes, se registran un total de 15 especies de *Philorea* para Perú. Asimismo, se presentan mapas de distribución y comentarios sobre sus patrones de distribución.

Palabras clave: Escarabajos tenebriónidos, Listado de especies, Patrones de distribución, Sudamérica, Zona de transición sudamericana.

The genus *Philorea* Erichson, 1834 (Pimeliinae: Physogasterini) includes around 24 species distributed in localities of Peru, Bolivia and Chile (Kulzer, 1956; Peña, 1980; Vidal & Flores, 2000) within the South American transition zone (Morrone, 2015). This is the most diverse genus of the Physogasterini tribe, a set of six genera and around 69 species endemic to the arid and semi-arid regions of South America (Lacordaire, 1859; Kulzer, 1956; Ferrú & Ruiz De Gamboa, 2021).

The genus *Philorea* was proposed by Erichson (1834) to accommodate his new species *Philorea picipes* Erichson, 1834. This first species was temporarily transferred by Solier (1844) to the genus *Polpochara* Solier, 1844, to later be restored to its original genus by Erichson (1847). The second species, *Philorea peruana* (Erichson, 1847) was described under the genus *Physogaster* Guérin-Méneville, 1834 (Erichson, 1847), being later placed in the genus *Philorea* by Kulzer (1956). Lesne's contributions (1911, 1917, 1935) added four new species *Philorea escomeli* Lesne, 1911, *Philorea mucronata* Lesne, 1911, *Philorea setipennis* Lesne, 1911 and *Philorea arequipana* Lesne, 1935, as well as distribution records for previously described species. In his revision of the Physogasterini tribe, Kulzer (1956) reviewed the genus, described nine species, synonymized *Philorea arequipana* under *Philorea picipes* and presented a key for all species known until then. One more species was described by Kulzer (1966) in a subsequent contribution. Later, Peña (1980) and Vidal & Flores (2000) described four and three species respectively. More recently, Ferrú & Elgueta (2011) offered a brief review of *Philorea* species in Arica and Parinacota region of northern Chile, including distribution records for 12 known species and two undescribed species. Some morphological characters of head and abdominal ventrites of *Philorea* were treated and illustrated by Ferrú & Ruiz De Gamboa (2021).

Within the tenebrionid fauna of Peru, the genus *Philorea* is currently represented by 15 species (Smith et al., 2015), with high rate of endemism (about 67 %) and with an uncertain number of undescribed species observed in collecting trips and entomological collections (Giraldo & Flores, 2016). This genus has been found in coastal deserts (0-1000 m), equatorial dry forest (0-2800 m), western Andean ranges (1000-3800 m) and high Andean plateaus "Puna" (3800-5000 m) (Giraldo & Flores, 2016). Available published records account for its presence in particular habitats such as "lomas" vegetation in coastal desert (Aguilar, 1963, 1976), western Andean dry ravines "quebradas" (Pierre, 1980) and Sechura desert (Juárez-Noé & González-Coronado, 2019).

The purpose of the present work is to update the knowledge of the genus *Philorea*, providing a checklist of *Philorea* 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: California Academy of Sciences, San Francisco, California, USA (CASC, Rachel Diaz-Bastin, Chris Grinter); Instituto de Entomología, Fundación Miguel Lillo, San Miguel de Tucumán, Argentina (IFML, Aranda et al. 2016); Museo de Entomología Klaus Raven Büller, Universidad Nacional Agraria La Molina, Lima, Perú (MEKRB, Clorinda Vergara); Muséum National d'Histoire Naturelle, Paris, France (MNHN, Antoine Mantilleri, Christophe Rivier); Museum für Naturkunde der Humboldt Universität, Berlin, Germany (MNHUB, Bernd Jaeger); Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Perú (MUSM, Mabel Alvarado); Natural History Museum Basel, Basel, Switzerland (NHMB, Christoph Germann); Laboratorio de Sanidad Vegetal, Servicio Nacional de Sanidad Agraria, Lima, Perú (SENASA, Norma Nolazco); Senckenberg Museum, Frankfurt, Germany (SMF, Andrea Hastenpflug-Vesmanis).

The primary source of distribution records were 821 specimens examined in Peruvian entomological collections, namely MEKRB, MUSM and SENASA. Indirect examination of type specimens housed at CASC, MNHN, MNHUB, NHMB and SMF was carried out through images sent by their respective curators. Species determination was also based on original descriptions and dichotomic keys presented by Lesne (1911, 1935), Kulzer (1956, 1966) and Peña (1980). Male specimens were recognized by smaller and slender body, elongated antennae and legs, and scales on abdominal ventrites 2-3, diagnostic morphological characters proposed by Kulzer (1956) and Ferrú & Ruiz De Gamboa (2021).

The checklist includes distribution status, synonymy, type specimens examined, type localities, supplementary records and material examined, as available for each species. The distribution records of specimens that were not assigned to 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 SimpleMapp (Shorthouse, 2010). Histogram plots for latitude and altitude data were elaborated with PAST software (Hammer et al., 2001).

Checklist of *Philorea* species recorded in Peru

1. *Philorea acunai* Peña, 1980 ENDEMIC

Type locality. PERU, Arequipa (North of Camana on road to Nasca).

Note. Type locality offered by the author is assumed to be an imprecise midpoint between Camana and Nasca, since the road distance that separates both cities is 393 km.

2. *Philorea escomeli* Lesne, 1911 (Fig. 1a)

Type specimen examined. Syntype (MNHN).

Type locality. PERU, Arequipa (Arequipa) “Pérou méridional, environs d’Arequipa”.

Supplementary records. CHILE, Arica and Parinacota (Camarones, Codpa) (Peña, 1980; Ferrú & Elgueta, 2011).

Material examined. PERU, Arequipa, Arequipa, 31-VII-1998, L. Cuadros, 1 male (MEKRB), Yura, Quiscos, 16°05'19.68"S 71°36'41.04"W, 2950 m, VII-2015, J. Ugarte, 1 male, 1 female (MEKRB).

3. *Philorea koepcke* Kulzer, 1956 ENDEMIC (Fig. 1b)

Type specimen examined. Allotype (SMF).

Type locality. PERU, Arequipa (Arequipa, 2200 m).

Supplementary records. PERU, Ica (NE from Nasca at 2000 m) (Pierre, 1980).

Material examined. PERU, Arequipa, Arequipa, 20-II-1983, E. Deza, 1 male, 1 female (MEKRB), Chiguata, 3100 m, II-1948, Weyrauch, 1 female (MUSM), La Joya, 16°22'58.52"S 71°44'04.08"W, 2000 m, 03-IV-2022, G. Sarabia, 1 male, 4 females (MUSM), 16°30'28.8"S 71°44'20.4"W, 1850 m, 17-I-2022, A. Giraldo, 8 males, 13 females (MEKRB), Santa Isabel de Siguas, 16°11'59.00"S 72°03'06.13"W, 1654 m, 24-IX-2017, O. Quispe, 7 males, 11 females (MEKRB), 16°18'57.17"S 72°04'03.58"W, 1667 m, 15-II-2016, E. Quispe, 2 females (MUSM), Yarabamba, 16°28'53.04"S 71°37'42.6"W, 2318 m, 08-V-2015, J. Ugarte, 49 males, 29 females (MEKRB), 16°29'21"S 71°37'54"W, 08-V-2015, 2349 m, matorral, D. Samanez, 62 males, 42 females (MEKRB), Yarabamba, Linga, 16°41'13"S 71°39'40"W, 1781 m, 23-III-2017, C. Bravo, 2 males, 1 female (MUSM), Yura, 16°07'06"S 71°38'04.2"W, 3026 m, 27-XI-2013, C. Carranza, 1 male, 1 female (MUSM), 10 km northeast to Uyupampa, 16°10'04.8"S 71°38'31.19"W, 3130 m, 18-I-2022, 3 males, 6 females (MEKRB); Castilla, Huancarqui, 16°04'14.57"S 72°26'33.65"W, 1624 m, 19-25-IV-2021, I. Medina, 1 female (MUSM), 16°02'28.27"S 72°26'02.07"W, 1528 m, 19-25-IV-2021, I. Medina, 1 female (MUSM), 20-27-IX-2021, I. Medina, 1 male (MUSM), 16°06'29.02"S 72°23'20.66"W, 1144 m, 06-IV-2022, G. Sarabia, 5 females (MUSM); Caylloma, Lluta, 16°02'02"S 72°13'48"W, 2960 m, matorral, 13-IV-2015, J. Ugarte, 14 males, 32 females (MEKRB), 16°06'20.32"S 72°15'10.24"W, 1588 m, 19-25-IV-2021, I. Medina, 1 female (MUSM), 16°06'26.09"S 72°14'56.42"W, 1598 m, 19-25-IV-2021, I. Medina, 1 male, 1 female (MUSM), Lluta, Huayca, 16°11'10"S 72°01'40"W, 2010 m, colecta manual, 23-IX-2020, M. Bobadilla, 2 females (MUSM), Majes, 16°09'38.13"S 72°16'28.90"W, 213 m, 19-25-IV-2021, I. Medina, 1 female (MUSM), 16°09'41.31"S 72°16'21.05"W, 211 m, 20-27-

IX-2021, I. Medina, 2 females (MUSM); Islay, Jesus, 13-III-1964, A. Florez, 1 male, 1 female (MUSM); Unión, C. C. Chaucalla, 15°34'50.7"S 73°06'11.17"W, 910 m, 04-IV-2012, L. Huerto, 1 female (MUSM). Moquegua, General Sánchez Cerro, La Capilla, 16°45'40.01"S 71°20'59.99"W, 2735 m, 22-III-2017, M. Cardenas, 2 males, 1 female (MUSM), 16°45'51.17"S 71°21'59.97"W, 2585 m, 19-VII-2017, M. Cardenas, 6 males, 6 females (MUSM); Mariscal Nieto, near to Cruz Misionera, 17°14'52.8"S 71°15'03.6"W, 1332 m, 17-I-2022, A. Giraldo, 1 male, 4 females (MEKRB), near to centro poblado Otorá, 17°00'10.8"S 70°52'12"W, 2748 m, 25-II-2022, A. Giraldo, 1 male, 4 females (MEKRB), Torata, 16°55'02.87"S 70°59'01.05"W, 2840 m, matorral, II-2019, J. Ugarte, 20 males, 20 females (MEKRB), 17°02'46.2"S 70°56'11.3"W, 2290 m, 26-XI-2018, L. Castro, 1 male (MUSM).

4. *Philorea leechi* Kulzer, 1956 ENDEMIC (Fig. 1c)

Type specimen examined. Holotype (CASC).

Type locality. PERU, Ica (40 miles S from Nasca "costal loma").

Material examined. PERU, Arequipa, Camaná, Ocoña, 16°22'35.2"S 73°03'24.5"W, 850 m, 21-VII-2021, E. Medina, 3 males, 1 female (MUSM); Caravelí, lomas, 15°19'47.80"S 74°59'42.49"W, 670 m, 09-XII-2019, T. Neyra, 1 female (MUSM), 15°20'34.3"S 75°00'41.02"W, 709 m, 21-VIII-2020, T. Neyra, 1 male (MUSM), 15°20'43.7"S 75°00'25.52"W, 702 m, 20-VIII-2020, T. Neyra, 1 female (MUSM), 15°21'47.05"S 75°00'55.35"W, 580 m, 21-VIII-2020, T. Neyra, 2 females (MUSM), 15°24'31.26"S 75°01'18.71"W, 304 m, 19-VIII-2020, T. Neyra, 3 males (MUSM), Bella Union, Quebrada Sacaco, 15°24'42.9"S 74°47'41.6"W, 295 m, 26-30-V-2012, C. Carranza, 2 males, 3 females (MUSM). Ica, Nasca, San Juan de Marcona, 15°11'47.25"S 75°11'58.34"W, 09-II-2014, L. Huerto, 3 males, 2 females (MUSM), 15°12'44.4"S 75°10'35.9"W, lomas, trampas pitfall, 24-III-2019, I. Galindo, 6 males (MUSM), 15°12'44.4"S 75°10'35.9"W, 732 m, lomas, 07-VIII-2019, I. Galindo, 1 male, 1 female (MUSM), 15°14'03.3"S 75°06'17.7"W, 836 m, tillandsial, trampas pitfall, I. Galindo, 3 females (MUSM), 15°14'03.3"S 75°06'17.7"W, 836 m, tillandsial, colecta directa, I. Galindo, 2 males (MUSM), 15°21'08.78"S 75°01'15.09"W, 668 m, 22-VIII-2020, T. Neyra, 1 male (MUSM), 15°24'13.98"S 75°03'51.63"W, 257 m, 24-VIII-2020, T. Neyra, 1 female (MUSM), lomas de San Fernando, 15°07'29"S 75°20'19.8"W, 430 m, 03-IV-2010, D. Silva & M. Vilchez, 2 males, 2 females (MUSM).

5. *Philorea michelbacheri* Kulzer, 1956 (Fig. 1d)

Type specimen examined. Holotype (CASC).

Type locality. PERU, Arequipa (Mollendo "loma zone").

Supplementary records. CHILE, Arica and Parinacota (25 km E from Arica, Azapa) (Kaszab, 1969; Ferrú & Elgueta, 2011).

Material examined. PERU, Arequipa, Camaná, Ocoña, 16°23'15.32"S 73°03'18.59"W, 812 m, loma costera, 11-II-2021, E. Medina, 1 male (MUSM); Islay, lomas de Matarani, 16°41'49.081"S 72°27'41.408"W, 307 m, 12-I-2022, A. Giraldo, 5 males, 1 female

(MEKRB), lomas de Mollendo, 16°56'34.8"S 72°04'26.399"W, 864 m, 21-II-2022, A. Zúñiga, 2 males, 3 females (MEKRB).

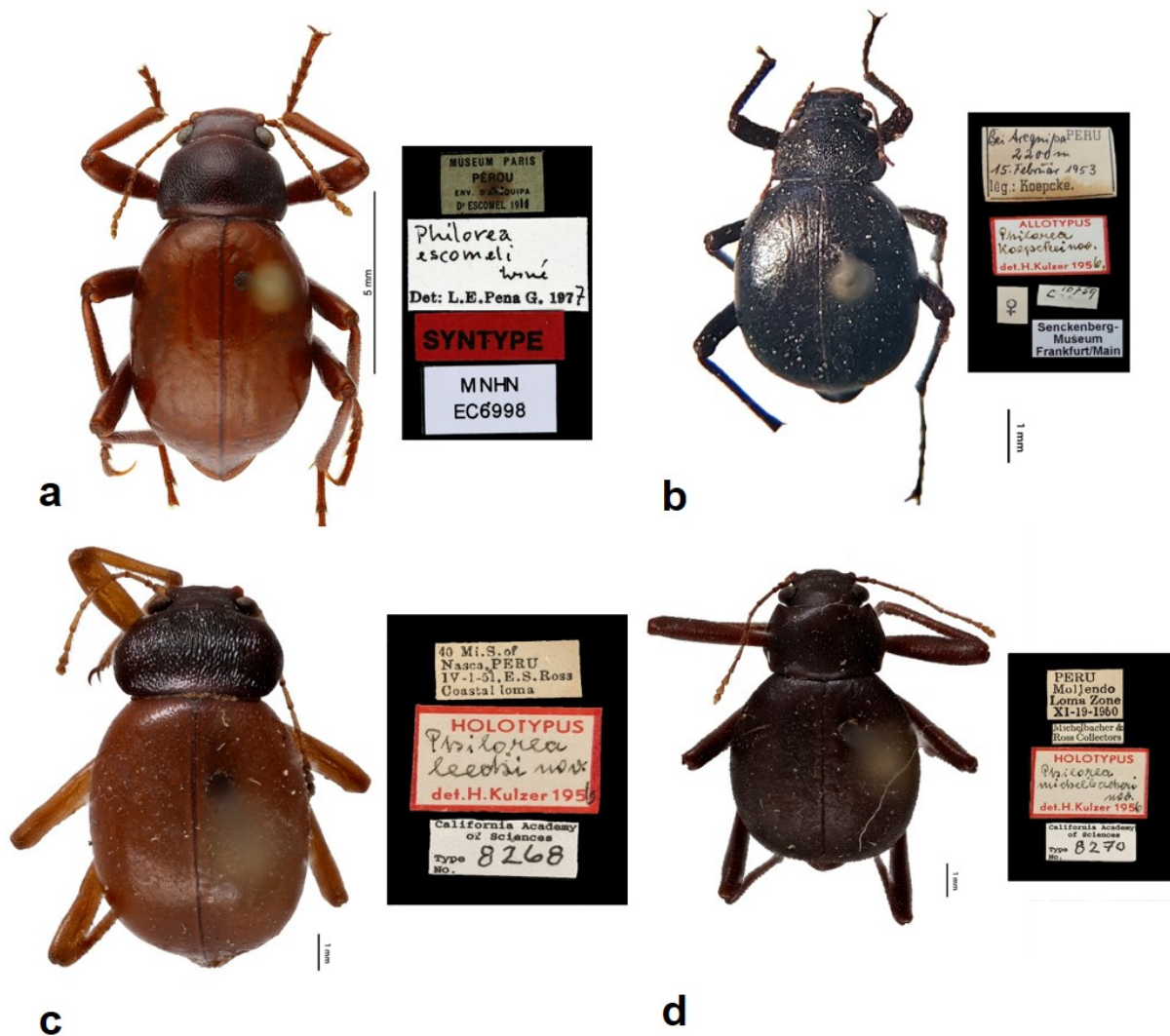


Fig. 1.

Habitus of type specimens in dorsal view. a. *Philorea escomeli* Lesne, 1911 MNHN syntype (photo by Christophe Rivier); b. *Philorea koepckeii* Kulzer, 1956 SMF allotype (photo by Andrea Hastenpflug-Vesmanis); c. *Philorea leechi* Kulzer, 1956 CASC holotype (photo by Rachel Diaz-Bastin); d. *Philorea michelbacheri* Kulzer, 1956 CASC holotype (photo by Rachel Diaz-Bastin).

6. *Philorea mucronata* Lesne, 1911 ENDEMIC (Fig. 2a)

Type specimen examined. Syntype (MNHN).

Type locality. PERU, Lambayeque (Éten). Lesne (1911) wrote "Pérou septentrional et moyen" because the author also recorded specimens of Lima (Lima).

Supplementary records. PERU, Lima (Huacho) (Kulzer, 1956), Lima ("lomas" near to Lima city on sandy places) (Aguilar, 1963), Piura (Sechura) (Juárez-Noé & González-Coronado, 2019).

Material examined. PERU, Ancash, Huarmey, Huarmey, 10°09'27"S 78°06'26"W, 129 m, 23-27-II-2022, M. Lozano, 2 males, 4 females (MUSM). Lambayeque, Lambayeque, El Colorado, 06°08'13.2"S 80°15'11.7"W, 22 m, trampas de caída, V-2008, A. Giraldo, 1 male (MEKRB), La Capilla, 06°36'16"S 80°10'35.3"W, 3

m, trampas de caída, V-2008, A. Giraldo, 1 male, 1 female (MEKRB); Chiclayo, cerro Reque, 06°51'16.20"S 79°47'36.63"W, 36 m, 09-VIII-2023, A. Giraldo, 4 males, 5 females (MEKRB), near to Puerto Eten, mineroducto El Galeno, 06°59'15.29"S 79°46'09.45"W, 26 m, 09-IX-2009, S. Carbonel, 2 males (MUSM), 06°59'15.29"S 79°45'74.04"W, 29 m, 10-IX-2009, S. Carbonel, 1 male, 1 female (MUSM), 06°59'59.90"S 79°47'03.98"W, 14 m, 08-IX-2009, S. Carbonel, 2 females (MUSM), 07°00'31.88"S 79°45'51.53"W, 18 m, 10-IX-2009, S. Carbonel, 2 females (MUSM), 07°01'17.29"S 79°46'24.26"W, 12 m, 10-IX-2009, S. Carbonel, 2 females (MUSM), Lagunas, 07°00'23"S 79°45'27"W, 21 m, 02-05-VIII-2022, M. Lozano, 1 male, 2 females (MUSM). Piura, Sechura, dunas Las Partidas, 06°06'53.87"S 80°27'48.66"W, 15 m, trampas de caída, V-2008, A. Giraldo, 1 male (MEKRB).

7. *Philorea opaca* Peña, 1980 ENDEMIC (Fig. 2b)

Type specimen examined. Paratype (MNHN).

Type locality. PERU, Arequipa (S from La Joya).

Note. Type locality offered by the author is imprecise, without indicating the distance from the reference site.

8. *Philorea penai* Kulzer, 1966 ENDEMIC (Fig. 2c)

Type specimen examined. Paratype (NHMB).

Type locality. PERU, Ancash (220 km N from Lima city).

Material examined. PERU, La Libertad, Trujillo, 04-VIII-1973, E. Carbonel, 1 female (MEKRB); Virú, 04-X-2000, R. Jaramillo, 1 female (MEKRB). Lima, Lima, lomas de Pachacamac, 09-III-1970, R. García, 4 males, 7 females (MUSM), 16-VII-1972, R. García, 1 male, 2 females (MUSM).

9. *Philorea peruana* (Erichson, 1847) ENDEMIC (Fig. 2d)

= Described as *Physogaster peruanus* Erichson, 1847

Type specimen examined. Holotype (MNHUB).

Type locality. PERU.

Material examined. PERU, Ica, Pisco, Independencia, 13°42'54.46"S 75°57'31.54"W, 337 m, área de cultivo, pan traps, 14-16-VI-2017, M. Cardenas, 5 females (MUSM).

Note. The original description only stated origin of the specimens at country level. The first precise indication of its distribution in Peruvian coastal desert is offered here. This species bears a superficial resemblance to species of the genus *Entomochilus* Solier, 1844 (Pimeliinae: Physogasterini), because its body surface is covered with hirsute setae and its limbs are relatively short. However, its placement in the genus *Philorea* was verified with the observation of the following diagnostic characters (Kulzer, 1956; Ferrú & Ruiz De Gamboa, 2021): clypeus with straight anterior margin, slightly marked frontoclypeal suture, and meso- and metatibiae without sharp edges or strong spines.

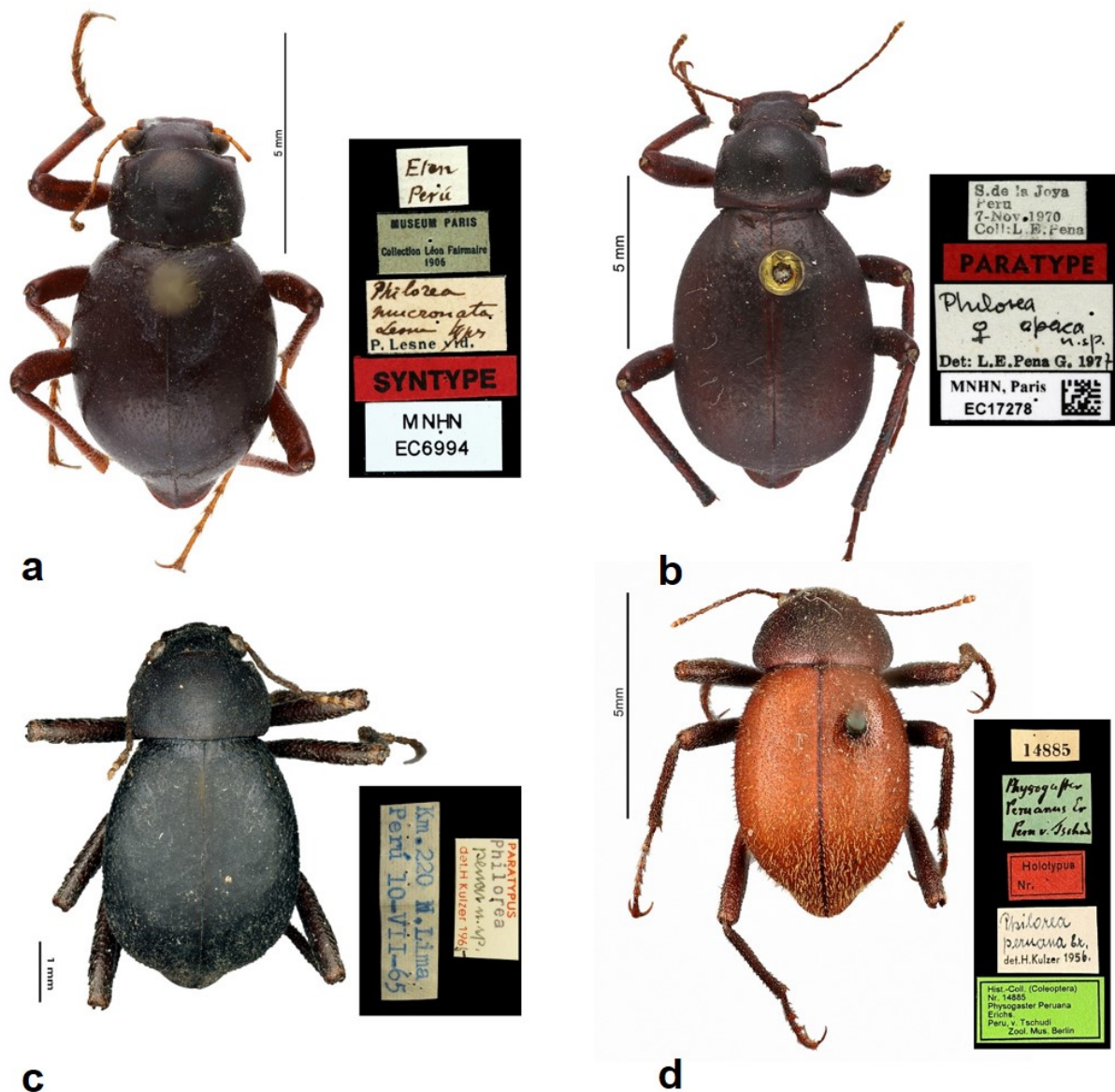


Fig. 2.

Habitus of type specimens in dorsal view. a. *Philorea mucronata* Lesne, 1911 MNHN syntype (photo by Christophe Rivier); b. *Philorea opaca* Peña, 1980 MNHN paratype (photo by Christophe Rivier); c. *Philorea penai* Kulzer, 1966 NHMB paratype (photo by Christoph Germann); d. *Philorea peruana* (Erichson, 1847) MNHUB holotype (photo by Bernd Jaeger).

10. *Philorea picipes* (Erichson, 1834) (Fig. 3a)

= *Philorea arequipana* Lesne, 1935

Type specimen examined. Syntype of *P. arequipana* (MNHN).

Type locality. CHILE, Arica and Parinacota (East from Tacora plateau “volcanic ash fields above 15,000 feet”).

Supplementary records. PERU, Tacna “sandy slopes of the valley” (Lesne, 1911). PERU, Arequipa “environs d’Arequipa” (Lesne, 1917, 1935). PERU, Puno (Urcunimuni) (Lesne, 1917). CHILE (based only on type locality) (Ferrú & Elgueta 2011).

Material examined. PERU, Arequipa, Arequipa, Yura, 16°14'52.8"S 71°40'37.2"W, 2635 m, 18-I-2022, A. Giraldo, 5 males,

1 female (MEKRB); Caylloma, Lluta, 16°02'02"S 72°13'48"W, 2960 m, matorral, 13-IV-2015, J. Ugarte, 7 males, 5 females (MEKRB).

11. *Philorea pilosula* Kulzer, 1956 (Fig. 3b)

Type specimen examined. Holotype (NHMB).

Type locality. CHILE, Arica (Azapa). Also two paratypes from CHILE, Arica (Azapa, Chaca) and one paratype from PERU, Arequipa (Mollendo "loma zone").

12. *Philorea rossi* Kulzer, 1956 ENDEMIC (Fig. 3c)

Type specimen examined. Holotype (CASC).

Type locality. PERU, Arequipa (12 miles SE from Camana "costal loma").

13. *Philorea setipennis* Lesne, 1911 (Fig. 3d)

Type specimen examined. Holotype (MNHN).

Type locality. PERU, Arequipa (Arequipa) "Pérou méridional, environs d'Arequipa".

Supplementary records. PERU, Puno (Urcunimuni) (Lesne, 1917). CHILE, Arica and Parinacota (80 km NE from Azapa, Chapiquiña, Misituni, Putre, Socoroma, Zapahuira "Sapahuira"), Tarapacá (Alto Camiña, Champaja, Poroma, Quipinta) (Kaszab, 1969; Peña, 1980; Ferrú & Elgueta, 2011).

Material examined. PERU, Moquegua, General Sanchez Cerro, near to Quinistaquillas, 16°48'50.4"S 70°53'16.8"W, 1835 m, 25-II-2022, A. Giraldo, 1 female (MEKRB); Mariscal Nieto, Torata, Bocatoma Estuquiña, 17°02'58.68"S 70°51'21.86"W, 2493 m, 15-VII-2013, L. Huerto, 1 female (MUSM), 17°06'40.60"S 70°53'26.36"W, 1437 m, 15-VII-2013, L. Huerto, 1 male, 1 female (MUSM), 2493 m, 15-VII-2013, L. Huerto, 1 female (MUSM), Bocatoma Otorá, 17°05'50.44"S 70°55'14.59"W, 2191 m, 17-VII-2013, L. Huerto, 1 female (MUSM), near to Chujulay, 17°01'01.2"S 70°45'39.599"W, 3291 m, 24-II-2022, A. Giraldo, 1 male, 2 females (MEKRB), Sajena Alta, 16°59'09.02"S 70°50'33.45"W, 2493 m, 12-VII-2013, L. Huerto, 1 male (MUSM), 17°06'40.60"S 70°53'26.36"W, 2493 m, 15-VII-2013, L. Huerto, 1 female (MUSM).

14. *Philorea stangei* Peña, 1980 ENDEMIC

Type specimen examined. holotype (IFML) (Aranda et al. 2016, p. 29, fig. 98)

Type locality. PERU, La Libertad (5 km S from Pacasmayo "Pascamayo").

15. *Philorea weyrauchi* Kulzer, 1956 ENDEMIC (Fig. 3e)

Type specimen examined. Paratype (SMF).

Type locality. PERU, Lima (20 km E from Ancon, 650 m).

Material examined. PERU, Lima, Huaral, Chancay, lomas de Iguanil, IX-1999, W. Tori, 1 male (MEKRB), Huaral, 04-VIII-1980, V. Flores, 1 male (MEKRB), Río Seco, 11°19'57"S 77°16'49"W, 464 m, 14-IX-2018, M. Lozano, 1 female (MUSM), 11°20'04.22"S 77°16'38.71"W, 399 m, 07-11-VIII-2015, P. Sanchez, 1 female (MUSM); Huaura, lomas de Lachay, trampas de caída, VI-2000, A. Giraldo, 1 male (MEKRB); Lima, 21-V-1936, J. E. Wille, 11 males, 3

females (SENASA), Pachacámac, Picapiedra, Río Limón, 01-V-1952,
1 male, 1 female (MEKRB).

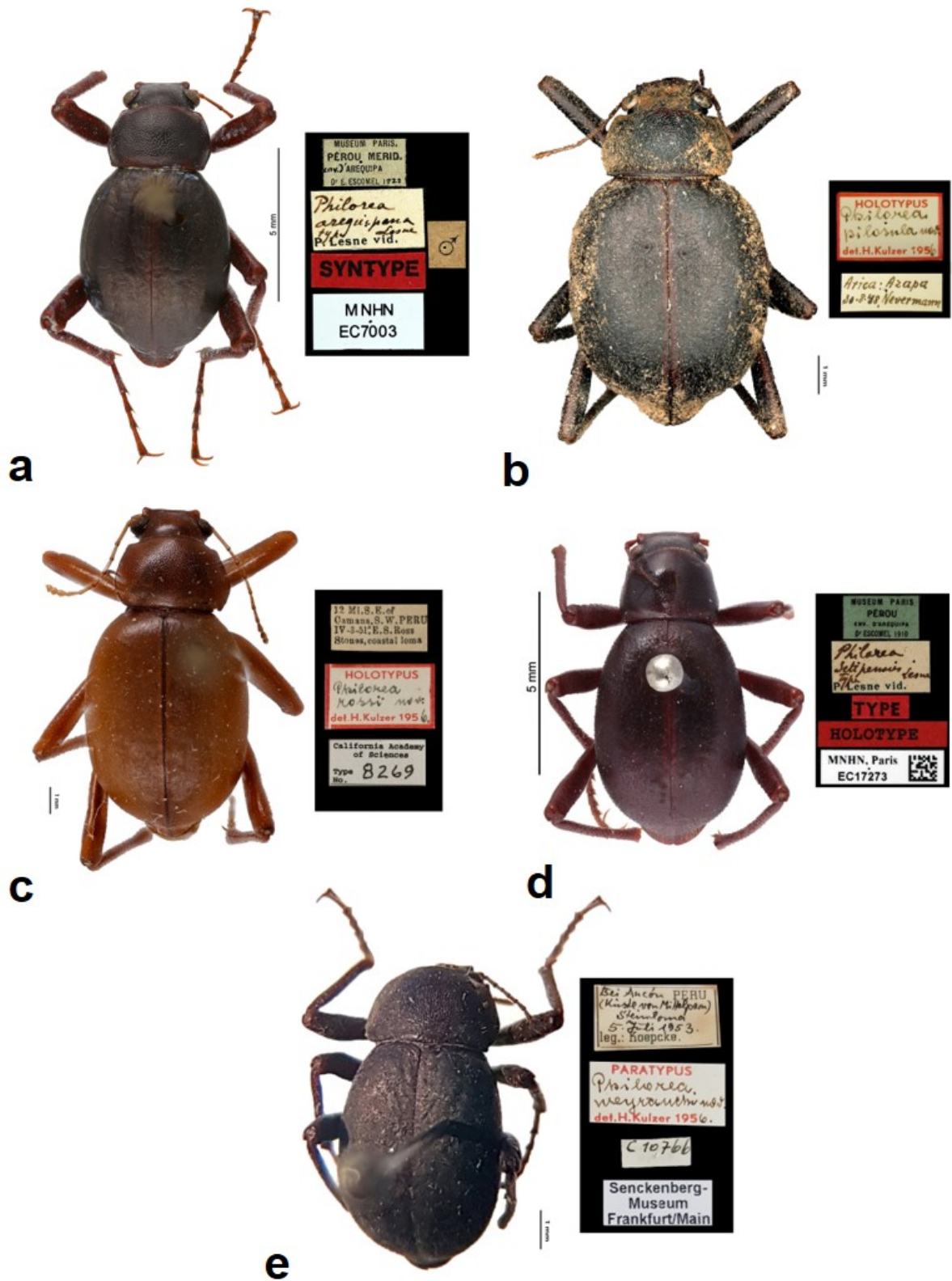


Fig. 3.

Habitus of type specimens in dorsal view. a. *Philorea arequipana* Lesne, 1935 MNHN syntype (photo by Christophe Rivier); b. *Philorea pilosula* Kulzer, 1956 NHMB holotype (photo by Christoph Germann); c. *Philorea rossi* Kulzer, 1956 CASC holotype (photo by Rachel Diaz-Bastin); d. *Philorea setipennis* Lesne, 1911 MNHN holotype (photo by Christophe Rivier); e. *Philorea weyrauchi* Kulzer, 1956 SMF paratype (photo by Andrea Hastenpflug-Vesmanis).

According to the checklist presented here, the genus *Philorea* in Peru is still represented by 15 species in agreement with Smith et al. (2015). It has been possible to examine type specimens of thirteen species, which represents 87 % of the recorded species in Peru. In the Peruvian collections, specimens corresponding to 10 species were found, namely *P. escomeli*, *P. koepcke*, *P. leechi*, *P. michelbacheri*, *P. mucronata*, *P. penai*, *P. peruana*, *P. picipes*, *P. setipennis* and *P. weyrauchi*. Otherwise, five species are currently known only from their type specimens and are not properly represented in Peruvian collections. It is very likely that these five species have restricted distributions and have therefore been overlooked by collecting surveys in Peru.

Distribution records of undetermined specimens of genus *Philorea* are presented in Table I. These records include 288 specimens from 6 regions and 17 provinces of the Peruvian territory. Systematic studies on the genus are still in progress, with a large number of specimens not reliably assigned to the described species. Wingless darkling beetles are prone to speciation due to aridity and orographic barriers with isolated populations diverging into species by vicariance. Based on the examination of specimens carried out for this work, it is proposed a conservative guess of 14 undescribed *Philorea* species in Peruvian territory, an increase of 93% in relation to current number of 15 species.

Región	Provincia (specimens)	Coordenadas (decimal degrees)	Altitud (m)
Junín	Junín (1)	-10.385 -75.955	4272
	Yanú (2)	-11.331 -75.956	3918
Lima	Banashim (1)	-11.901 -76.664	0040
	Lima (2)	-12.060 -77.038	200
		-12.078 -76.911	235
	Calleja (24)	-12.732 -76.496	348
		-13.047 -76.029	2315
		-13.049 -76.022	2346
		-13.050 -76.018	2213
Ica	Chuscha (21)	-13.095 -75.967	2180
		-13.095 -75.986	2200
		-13.332 -76.023	647
		-13.340 -76.055	460
	Pisco (13)	-13.339 -76.430	200
		-13.362 -76.267	10
		-13.367 -76.270	10
		-13.876 -76.311	20
		-14.279 -76.207	300
	Ica (54)	-13.902 -76.075	180
		-14.088 -75.765	403
		-14.176 -75.727	240
		-14.183 -75.727	75
		-14.340 -75.689	313
		-14.411 -75.656	273
		-14.430 -75.668	300
		-14.579 -75.611	273
		-14.654 -75.873	309
-14.655 -75.872		326	
-14.657 -75.873		314	
-14.662 -75.841		480	
Nasca (46)	-14.837 -74.716	2320	
	-14.841 -74.807	1162	
	-14.869 -74.772	1675	
	-14.933 -75.421	45	
	-15.001 -75.001	540	
	-15.115 -75.178	768	
	-15.115 -75.178	809	
	-15.148 -75.258	489	
	-15.158 -75.267	409	
	-15.212 -75.177	485	
	-15.241 -75.123	725	
-15.318 -75.142	149		
Arequipa	Caraveli (9)	-15.330 -74.995	670
		-15.349 -74.790	717
		-15.415 -74.872	231
		-15.499 -72.943	9
		-15.631 -75.917	3191
		-15.761 -74.382	320
	Caylloma (8)	-15.877 -71.151	3904
		-15.910 -72.083	3766
		-16.034 -72.230	2960
		-16.076 -71.487	3817
-16.165 -72.020		1830	
Arequipa (15)	-16.070 -71.469	4075	
	-16.202 -71.653	2745	
	-16.402 -71.392	3100	
Castilla (5)	-16.376 -73.057	850	
Moquegua	Mamacañ Nieto (59)	-17.012 -70.643	4200
		-17.113 -70.841	2030
		-17.134 -70.849	1839
		-17.164 -70.606	3215
		-17.179 -70.891	1570
		-17.188 -71.081	1221
		-17.370 -71.155	1046
		-17.370 -71.155	1046
Ilo (13)	-17.406 -71.375	220	
	-17.768 -71.151	420	
Tacna	Tacna (14)	-17.172 -70.456	4380
		-17.576 -70.884	727
		-17.756 -70.528	370
		-17.812 -69.824	4238
Tarata (1)	-17.560 -70.030	3460	

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

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 178 localities (Fig. 4 a-d). These records place the northern limit of the genus to around 5°S and an altitudinal range between sea level and 4380 meters. As expected according to previous works (Aguilar, 1963; Pierre, 1980; Giraldo & Flores, 2016; Juárez-Noé & González-Coronado, 2019), records are mostly located west to the Andes in coastal desert vegetation “lomas”, dry ravines “quebradas” and northern dry forests. Available records above 3800 meters are restricted to those of *P. picipes* and *P. setipennis* in Urcunimuni at Puno region (Lesne,

1917) and eight scattered localities in Junin, Arequipa, Moquegua and Tacna regions. At first glance, high Andean environments do not have suitable habitats for this genus, however the presence of 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 datashows higher frequencies (0.84) for southern latitudes from 12°30'00" S (Fig. 5a) and the histogram plot of altitude data shows higher frequencies (0.56) for altitudes under 800 meters (Fig. 5b). These patterns could be explained by the fact that arid zones cover a greater altitudinal extension from the Paracas Peninsula (14°S) to the Peruvian-Chilean border (18°S) as can be seen in ecological maps and satellite images of Peru. Since most of records were under 800 meters, it seems that "lomas" vegetation is the most valuable habitat for species in the genus, with its particular combination of seasonal fog-mediated precipitations and sandy soils. Available records for *P. leechi*, *P. michelbacheri*, *P. mucronata*, *P. penai*, *P. pilosula* and *P. weyrauchi* and several undetermined specimens are evidence to support that claim.

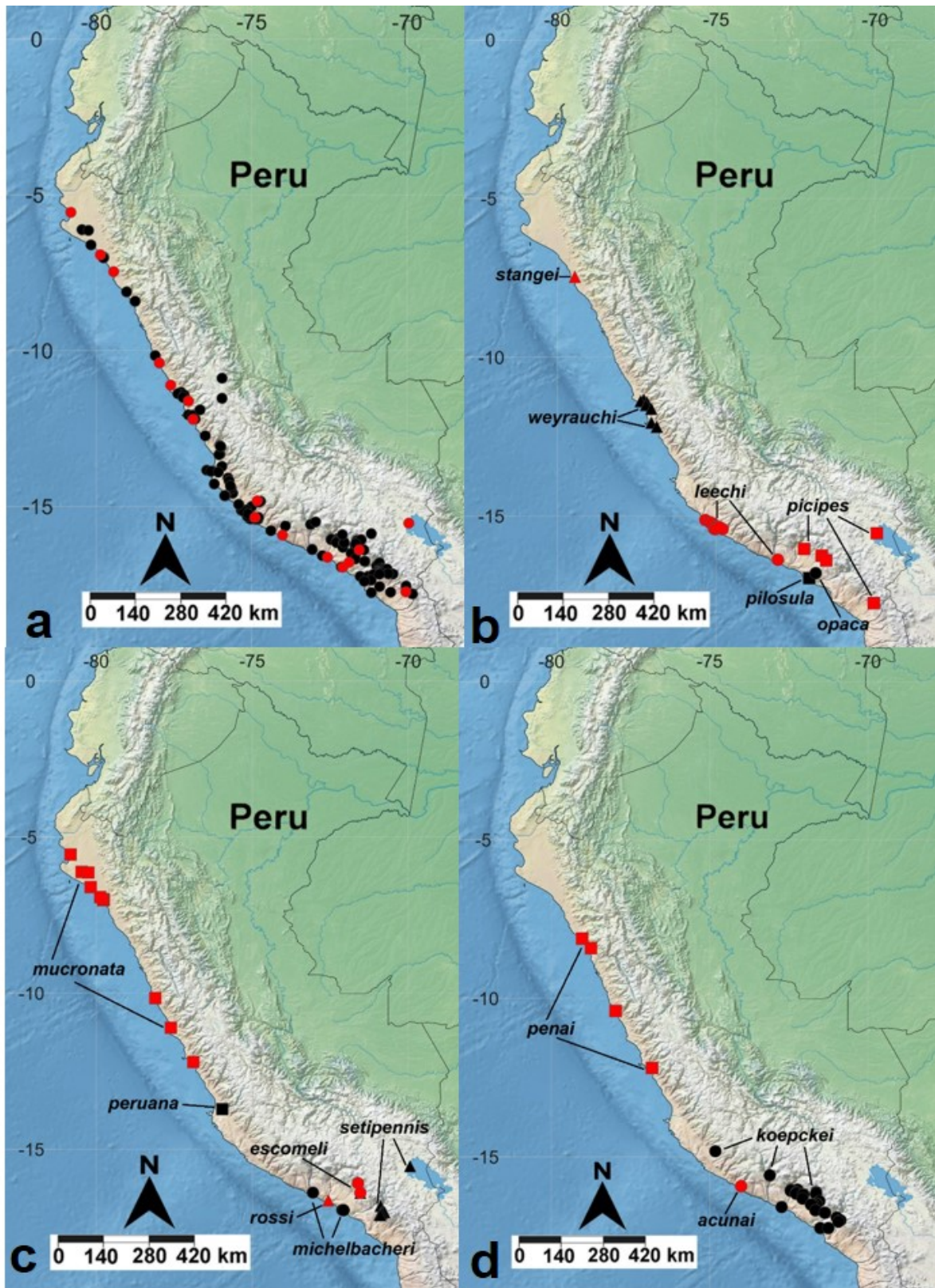


Fig. 4.

Distribution maps of genus *Philorea* in Peru. a. Overall distribution of the genus, previously published records (red circles), localities based on examined specimens (black circles); b. Distribution of *Philorea leechi* Kulzer, 1956 (red circles), *Philorea opaca* Peña, 1980 (black circles), *Philorea picipes* (Erichson, 1834) (red squares), *Philorea pilosula* Kulzer, 1956 (black squares), *Philorea stangei* Peña, 1980 (red triangles) and *Philorea weyrauchi* Kulzer, 1956 (black triangles); c. *Philorea escmeli* Lesne, 1911 (red circles), *Philorea michelbacheri* Kulzer, 1956 (black circles), *Philorea mucronata* Lesne, 1911 (red squares), *Philorea peruana* (Erichson, 1847) (black squares), *Philorea rossi* Kulzer, 1956 (red triangles) and *Philorea setipennis* Lesne, 1911 (black triangles); d. *Philorea acunai* Peña, 1980 (red circles), *Philorea koepcke* Kulzer, 1956 (black circles) and *Philorea penai* Kulzer, 1966 (red squares).

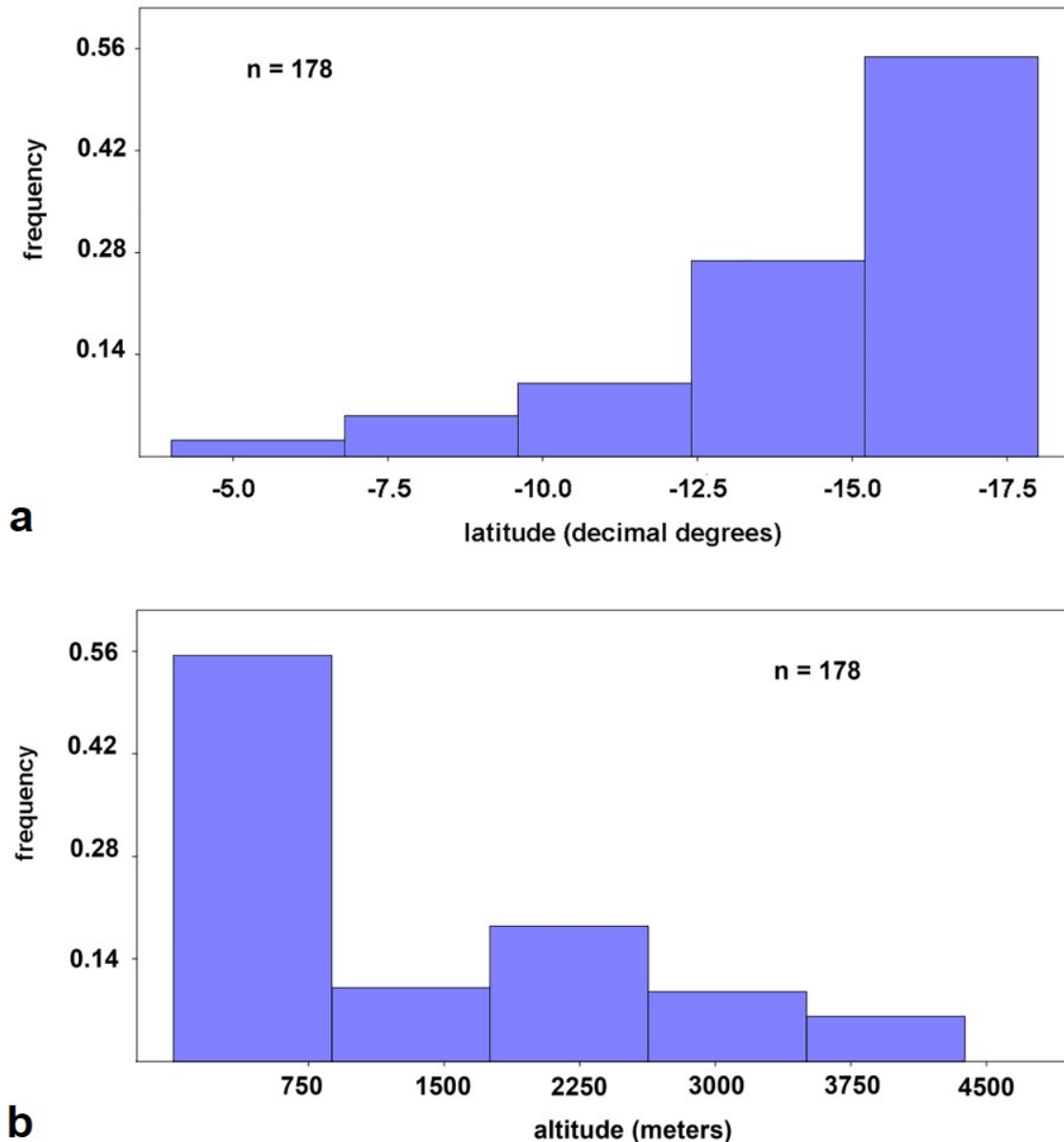


Fig. 5.

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

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