

Redescription of *Pelecorhynchus kroeberi* (Lindner), a Patagonian species rediscovered after more than 100 years in Chile (Diptera: Pelecorhynchidae)

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Abstract. An adult female of *Pelecorhynchus kroeberi* (Lindner, 1925) is newly recollected after more than 100 years and it is herein redescribed, including, for the first time, illustrations of genitalia. The specimen was collected in the Región de Aysén, Provincia de Aysén (46°40'11.9"S, 74°00'54.0"W), in the extreme south of Chile, and the specimen is deposited in the Entomological Collection of Museo Nacional de Historia Natural, Santiago, Chile.

Keywords. Morphology; Taxonomy; Chilean Patagonia.

INTRODUCTION

Pelecorhynchus Macquart, 1850 (Diptera: Pelecorhynchidae) is a genus of brachyceran flies, with 40 described species, distributed only in Australia (including Tasmania) and Chile (Daniels, 1989; Llanos *et al.*, 2015). In Chile, the genus comprises nine species, known to occur in the central and southern parts of the country (Llanos *et al.*, 2015; González & Elgueta, 2020).

Pelecorhynchus kroeberi (Lindner, 1925) was originally described as *Coenura kroeberi*, based on one female specimen from Punta Arenas, collected by R. Pässler in 1908, and deposited in the Entomological Collection of the Zoologisches Museum in Hamburg, Germany (ZMUH). The type specimen was destroyed in 1943 by fire during World War II (Pechuman, 1967), as along with a large part of the dipteran collection of the Hamburg Museum (Weidner, 1969: 228; Bährmann, 1999: 185). In the original description, Lindner did not describe the female genitalia nor provide illustrations of the species.

The present paper aims to redescrives the female of *Pelecorhynchus kroeberi* based on a specimen collected in southern Chile, providing illustrations of external morphological features and genitalia.

MATERIAL AND METHODS

The specimen was collected in the Región de Aysén, Provincia de Aysén, Chile (46°40'11.9"S, 74°00'54.0"W) (Fig. 1A, B), with a Malaise trap (Fig. 1C). The collecting area corresponds to a subantarctic forest, with a temperate climate of hyper-oceanic influence and dominated by evergreen forests represented by *Nothofagus betuloides* (Mirb.) Blume and *Blechnum magellanicum* (Desv.) Mett. Annual precipitation fluctuates between 2,000 and 2,500 mm and average annual temperatures varies from 8 to 9°C, with maximum values of temperature occurring in January (Olivares-Contreras *et al.*, 2019).

The morphological terminology for the adult and terminalia follows Cumming & Wood (2017) and Carmo & Santos (2011), respectively. Terminalia was macerated in 10% KOH solution at 50°C for one hour to soften internal tissues; the solution (with the piece) was then neutralized with acetic acid, rinsed in distilled water, and then dissected in 80% ethanol. Digital photographs were taken with a DS-Fi2 camera mounted on a Nikon trinocular stereomicroscope SMZ 1500. Depth of field was enhanced by Nikon^{TD} ACT-2U software to stack multiple images into a final image.

RESULTS

Taxonomy

Pelecorhynchus kroeberi (Lindner, 1925)

Figs. 1-9

Coenura kroeberi Lindner, 1925: 23.

Type locality: Chile, Magallanes, Punta Arenas. Holotype ♀ (ZMUH), destroyed according to Pechuman (1967: 555).

References: Kröber, 1930a: 154 (as *Coenura*); Kröber, 1930b: 114 (in key), 115; Kröber, 1934: 232 (catalog); Mackerras & Fuller, 1942: 72 (in key, as *Pelecorhynchus*), 74 (comments); Stuardo, 1946: 67 (catalog); Pechuman, 1967: 555 (comments about holotype); Philip, 1968: 2



Figure 1. (A) Distribution record for *P. kroeberi* of holotype (circle) and specimen (triangle) in southern Chile. (B) Map showing location of sampling site of *P. kroeberi* (Lindner) in Laguna San Rafael, Region de Aysén, Chile. (C) Malaise trap that captured *P. kroeberi* (Lindner).

(catalog); Pino, 1968: 118 (comments); Pino, 1969: 8 (list); Coscarón & Papavero, 2009: 5 (catalog); Llanos *et al.*, 2015: 198 (redescription); González & Elgueta, 2020: 159 (catalog).

Material examined: 1♀, Chile, Región de Aysén, Provincia de Aysén 46°40'11.9"S, 74°00'54.0"W, 02/December/2021-12/January/2022, R.I. Madriz Coll., Malaise trap, C.R. González Det., Colección Nacional de Insectos, Museo Nacional de Historia Natural, Área de Entomología, Santiago, Chile (MNNC).

Diagnosis: Body color dark-brown. Eyes bare. Frons moderately wide and slightly divergent. Ocellar triangle with three ocelli. Clypeus with brownish pruinescence, laterally with long and dense black hairs. Antennae brownish. Palpus with brown pruinescence, stout, relatively flat, as long as $\frac{1}{4}$ of the proboscis. Mesonotum dark-brown, with short and dense brown-reddish hairs and a pair of submedial, nearly parallel pale vittae; scutellum dark brown, with long brown hairs on distal margin. Legs mostly brown with short black hairs. Wings hyaline. Abdomen dark-brown dorsally in the background; tergite 1 with a pair of small white-yellowish spots, tergites 2-4 with a pair of circular and broad lateral white-yellowish spots.

Description: Female (length = 21.5 mm; wing length = 16.5). Body color dark-brown (Fig. 2).

Head: Eyes dark-brown, bare, without color pattern. Frons moderately wide and slightly divergent ventrally, with brownish pruinescence and medium black hairs. Vertex with brown pruinescence and short black and brown hairs and few reddish hairs (Fig. 3). Ocellar triangle dark-brown, with short black hairs, three ocelli. Gena with golden-brown pruinescence, and with long brownish and goldish hairs. Clypeus with brownish pruinescence, laterally with long and dense black hairs, medially hairs are shorter and less abundant. Antennal scape brown, with short brownish hairs, pedicel darker. First flagellomere and following three flagellomeres light brown, darker on distal half apically (Fig. 4). Palpus two-segmented with brown pruinescence, stout, relatively flat, as long as $\frac{1}{4}$ of the proboscis, with long and scarce black hairs (Fig. 3). Proboscis brown, labellum small (Fig. 3). Occiput with light brown pruinescence and black hairs on dorsal edge.

Thorax: Mesonotum dark-brown, with short and dense brown-reddish hairs and a pair of submedial, nearly parallel pale vittae. Postpronotal lobes dark-brown, with long brown-reddish hairs. Scutellum dark brown, with long brown hairs on distal margin (Fig. 5). Pleura coated with gray pruinescence and long yellowish hairs; anepisternum and anepimeron with long yellowish hairs; katepisternum and katepimeron bare (Fig. 6). Legs mostly brown with short black hairs, except for coxa grayish with long yellowish hairs, femur with light brown hairs; tibia concolorous with shorter light brown and black hairs. Wings hyaline, darker on costal and subcostal cells,



Figure 2. Habitus of *P. kroeberi* (Lindner) female in lateral view. Scale bar = 1.0 mm.



Figure 3. Head of *P. kroeberi* (Lindner) female in frontal view. Scale bar = 1.0 mm.



Figure 4. Antenna of *P. kroeberi* (Lindner) female in lateral view. Scale bar = 0.5 mm.



Figure 5. Thorax of *P. kroeberi* (Lindner) female in dorsal view. Scale bar = 1.0 mm.



Figure 6. Thorax of *P. kroeberi* (Lindner) female in lateral view. Scale bar = 1.0 mm.



Figure 7. Wing of *P. kroeberi* (Lindner) female in dorsal view. Scale bar = 1.0 mm.

cell r_5 widely open; veins Sc and R_1 bare (Fig. 7). Basicosta bare. Halter whitish, darker at apex.

Abdomen: Dark-brown dorsally in the background, distal margin of tergites densely covered by brown-red-dish hairs; tergite 1 with a pair of small white-yellowish spots, tergites 2-4 with a pair of circular and broad lateral white-yellowish spots, occupying most of the tergite, triangular (Fig. 8). Sternites mostly pale brown, without spots and with scarce brownish hairs.

Terminalia: Cercus two-segmented, apical segment ovoid-shaped (Fig. 9A), and with posteroventral cercal lobes developed curved towards the median plane (Fig. 9B). Tergite 8 squared as long as wide (Fig. 9A). Tergite 9 widely divided, trianguliform. Tergite 10 small. Sternite 8 acuminated (Fig. 9B). Genital fork with a narrow base, neck wide basally and a long spine present on the comb. Three spermathecal ducts, mostly slender.

Distribution: Chile. Región de Aysén, Provincia de Aysén ($46^{\circ}40'11.9''S$, $74^{\circ}00'54.0''W$, Western shore of Laguna San Rafael); Región de Magallanes: Provincia de Magallanes (Punta Arenas).

Comments: The genitalia of *P. kroeberi* is similar to the female genitalia described for other species of *Pelecorhynchus* (see Mackerras & Fuller, 1942; Nagatomi & Iwata, 1976; Kerr, 2010; Carmo & Santos, 2011), with the basal segment of cercus expanded, forming posteroventral lobe (Carmo & Santos, 2011: 477, Fig. 9A). This character has also been observed in species of Pelecorhynchidae (*Glutops* Burgess), Rhagionidae (*Chrysopilus* Macquart,



Figure 8. Abdomen of *P. kroeberi* (Lindner) female in dorsal view. Scale bar = 1.0 mm.

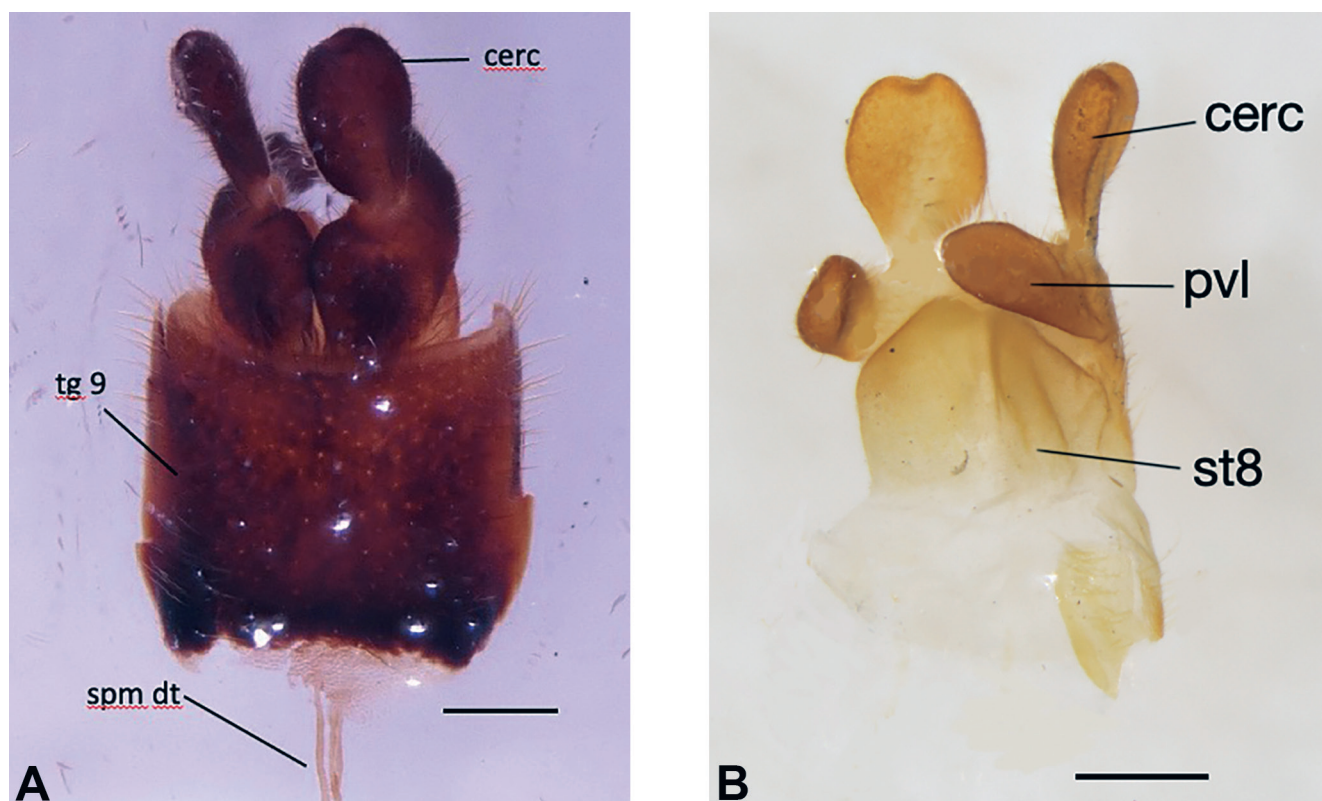


Figure 9. Terminalia of *P. kroeberi* (Lindner) female. (A) Terminalia dorsal view. (B) Terminalia ventral view. Abbreviations: cerc: cercus; pvl: posteroventral lobe; spm dt: spermathecal duct; st 8: sternite 8; tg 9: tergite 9. Scale bar = 0.1 mm.

Pseudoerinna Shiraki, *Rhagio* Fabricius, *Symphoromyia* Frauenfeld), and Vermileonidae (*Vermileo* Macquart) (Stuckenberg, 2001; Kerr, 2010). The similarity of the posteroventral lobes in *Pelecorrhynchus* and could be interpreted as a synapomorphy of Rhagionidae + *Pelecorrhynchus* (*Pelecorrhynchidae*) (see Santos, 2006). The shape of sternite 8, with the acuminate anterior margin, is an additional feature supporting Rhagionidae and *Pelecorrhynchidae* as sister groups.

DISCUSSION

Lindner (1925) described *Coenura kroeberi* based on one female from Punta Arenas, Chile. Later, Mackerras & Fuller (1942: 74) transferred the species of *Coenura* Bigot

to *Pelecorrhynchus*, and stated that "(...) *P. kroeberi* is similar to *P. elegans* (Philippi), but differs in that *P. kroeberi* has white hairs on the pleura, scutellum with distal margin with brown hairs, and legs reddish brown (...)". Clearly, there are more differences between *P. kroeberi* and *P. elegans*. Also, there are many characters by which *P. kroeberi* can be distinguished from the other South American species of *Pelecorrhynchus*, all of them known only from Chile, as detailed in Table 1.

Pechuman (1967: 555) commented on the morphological similarities between *P. kroeberi* and his species *P. penai* Pechuman, 1967, mentioning some differences between both species, such as: "(...) both species have small white spots on the lateral margin of the tergite 1, a character not observed in other species of *Pelecorrhynchus* (...)". To these differences we added the size (*P. kroeberi* is

Table 1. Morphological differences between species of *Pelecorrhynchus* from Chilean distribution and *P. kroeberi* (Lindner).

Characters	<i>P. kroeberi</i>	<i>P. biguttatus</i> (Philippi)	<i>P. elegans</i> (Philippi)	<i>P. hualqui</i> Llanos & González	<i>P. longicauda</i> (Bigot)	<i>P. penai</i> Pechuman	<i>P. toltensis</i> Llanos & González	<i>P. vulpes</i> (Macquart)	<i>P. xanthopleura</i> (Philippi)
Body coloration	Brown	Black	Black	Black	Black	Brown	Black	Reddish-brown	Black
Distal margin of scutellum	With brown hairs	With golden yellow hairs	With brown hairs	With black hairs	With black hairs	With golden hairs	With yellow hairs	With orange-rufous hairs	With black hairs
Pleura	With yellowish hairs	With yellow hairs	With yellowish and golden hairs	With black hairs	With black hairs	With golden hairs	With yellowish hairs	With orange-rufous hairs	With yellow hairs
Wings	Hyaline darker on costal and subcostal cells	Infuscated orange on costal margin	Slightly infuscated orange on costal margin	Infuscated orange	Infuscated orange	Wing hyaline darker along the costal margin	Infuscated orange	Infuscated orange	Infuscated orange
Abdomen	Dark brown dorsally	Black dorsally	Black dorsally	Black dorsally	Shining brown dorsally	Brown dorsally	Black dorsally	Reddish-brown dorsally	Shining black dorsally
T1	With two spots	Without spots	Without spots	Without spots	Without spots	With two spots	Without spots	Without spots	Without spots
Sternites	Without spots	With spots	With spots	With small spots	With spots	Without spots	With spots	Without spots	With spots

longer than *P. penai*), and color of the pilosity that covers the distal portion of the scutellum (brown in *P. kroeberi* and golden in *P. penai*).

Pelecorhynchus kroeberi has been only known from the type locality: "Punta Arenas". This represents the southernmost Chilean record for a species of *Pelecorhynchus*. This area corresponds to a vast uninhabited area, primarily inaccessibility, with high biodiversity and endemism (Armesto *et al.*, 1998). The specimen collected on the shore of San Rafael Lake, Province of Aysén, is a record approximately 1,000 km up to the north of the type locality. This is only the second specimen of *P. kroeberi* found, also a female, and additional collecting effort could contribute to a better understanding of the southern distribution of the species of *Pelecorhynchus*.

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