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ORIGINAL ARTICLE

The rare robber fly genus *Pronomopsis* Hermann (Diptera: Asilidae: Dasypogoninae) in Argentina

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ABSTRACT

Pronomopsis rubripes Hermann, and *Pronomopsis talabrensis* Artigas are reported for the first time from Argentina (Salta and Jujuy) and the male terminalia of *P. chalybea* Hermann and *P. talabrensis* are described and illustrated for the first time. An updated distribution map and a key of the species of *Pronomopsis* Hermann are also provided.

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Introduction

The genus *Pronomopsis* was erected by Hermann (1912) to include two species of robber flies: *P. chalybea* Hermann from Mendoza, Argentina (based on three females) and *P. rubripes* Hermann from Juliaca, Peru (based on a single female). Artigas (1964) later described *P. talabrensis* from Antofagasta, Chile (based on five females) and redescribed *P. rubripes* after examination of eight males and three females collected in the same locality of Atacama. Later, Lamas (1972) described the fourth known species of the genus, *P. pseudorubripes* from Cusco, Peru (based on a single female). As a result of these scarce captures, the specimens of some species of this genus are very rare in collections. Species of *Pronomopsis* are restricted to higher elevations, generally above 4,000 m. a.s.l, except for *P. chalybea* collected in Potrerillos, Mendoza (below 1,500 m.a.s.l).

The known species of this genus are medium to large (14–26 mm), black with bluish tint to the abdomen. The legs are moderately robust, dark, almost black (in *P. chalybea*), tibiae and two basal tarsomeres of forelegs yellow, remainder black (in *P. talabrensis*), basal three-fourths of tibiae (in *P. pseudorubripes*) or tibiae and tarsi entirely red (in *P. rubripes*, but see Artigas 1970). In all species, the face is distinctly produced, forming a beak, with a yellow, bare, inverted triangular, central area; the postpedicel is approximately 1.5 times as long as the scape and pedicel combined, attenuated basally, dilated on the remainder and wider on apical third, with a short microsegment bearing a spine. The frons has a longitudinal sulcus (Artigas 1964; Papavero 1975).

Here, we report for the first time the presence of *P. rubripes* and *P. talabrensis* in the Puna high plateau of Argentina, and describe and illustrate the male of *P. chalybea* and *P. talabrensis*. We also provide a key of *Pronomopsis* species and update the distribution records.

Material and methods

This study was developed based on an examination of *Pronomopsis* Hermann specimens housed in the entomological collection of Museo de La Plata (MLP), La Plata, Buenos Aires, Argentina. The specimens were identified utilizing the identification keys for species in Artigas (1964, 1970) and Papavero (1975). The morphological terminology adopted follows Cumming and Wood (2017). In this genus the male terminalia is rotated; thus, the dorsal side is upside down in the specimen. On the image plates, the dorsal and ventral views are shown in their proper position.

The description of the male specimens of *Pronomopsis* and their terminalia were done under a Nikon SMZ 745T stereomicroscope. The images of the specimens were produced with a Canon EOS Rebel T6 camera attached to a stereomicroscope, and digital

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images were assembled using Helicon Focus 6.7.1 software.

The label data are cited in full, with the original spellings, punctuation, and dates. Information presented within square brackets is complementary data that are not included on the labels. The map was generated with SimpleMappr (Shorthouse 2010). Data for the map were derived from specimen labels and previously published literature (Hermann 1912; Artigas 1964, 1970; Lamas 1972; Papavero 1975). All image plates were edited and prepared with Adobe Photoshop CS6 software.

Results

Genus *Pronomopsis* Hermann
Pronomopsis Hermann, 1912: 18. Type species, *Pronomopsis chalybea* Hermann, 1912 (orig. des.).

Pronomopsis chalybea Hermann
(Figures 1a–g, 4)

Diagnosis
Habitus shining black (Figure 1a, b); pedicel and postpedicel black (Figure 1c); wings dark reddish (Figure 1b, c); legs entirely black (Figure 1b); male and female terminalia black (Figure 1d–g).

Male description (Figure 1a–g)
Similar to female, except terminalia: shining black with blue tinge; epandrium trapezoidal, in dorsal view (Figure 1d), with short, sparse black setae dorsally (Figure 1d, f); cercus with two posterior projections, apices of projections almost touching each other distally, base of cercus bare, shining black, posterior projections with short yellow setae (Figure 1d, f–g); gonocoxite wide with a finger-like projection on dorsal distal corner (almost half length of parameral sheath in lateral view) and ventrally becoming slender toward apex (conical in lateral view), touching apex of cercus (Figure 1f); gonocoxite bare on mid-anterior half with long and sparse black setae on latero-ventral surface, diminishing in length sub-apically (Figure 1f); hypandrium narrow, covered with long black setae, fused with epandrium forming a complete ring (Figure 1e–f); parameral sheath bare, dark reddish, curving 45° downwards on its mid-length, rounded apically and forming a pointed hook curved anteriorly, forming a sub-triangular emargination on ventral margin (Figure 1f); aedeagus shining black, ending in single rounded opening (Figure 1e, g).

Taxonomic discussion
This species can be easily differentiated from its congeners by the ground color of integument shining black with a metallic blue tinge (including antenna and legs). The wings are dark reddish, contrasting with the black wings of the other species in this genus. The male terminalia is similar to that of *P. talabrensis* differing from this species in the shape of the dorsal gonocoxal projection which has only half of the parameral sheath length in lateral view (Figure 1f) and parameral sheath which is angled 45° downwards, rounded apically and forming a pointed hook directed anteriorly. The male terminalia of this species also differs from *P. rubripes* which has the parameral sheath with only a slightly pronounced lobe.

The pattern of coloration of this species is similar to the color pattern of some species of tarantula-hawk wasps of the genus *Pepsis* Fabricius (Pompilidae) occurring in the same area, suggesting that *P. chalybea* may mimic these pompilid wasps.

Based on our review, this is only the fifth specimen of *P. chalybea* known to science. Hermann (1912) based the original description on three females from Mendoza (Argentina). The fourth female specimen was added by Papavero (1975), from Potrerillos (Mendoza). Now, the fifth and first male specimen of this species is here reported from Tunuyán (Mendoza). All these localities are at less than 1,500 m above sea level, with *P. chalybea* found at the lowest altitudes.

Distribution
Only known from Mendoza, Argentina (Figure 4).

Examined material
Argentina: **Mendoza**: 1♂, Tunuyán, 29/II/1940, Biraben Col. (MLP).

Pronomopsis rubripes Hermann
(Figures 2a, 4)

Diagnosis
Habitus shining black; pedicel and postpedicel orange; femora black; tibiae and tarsi orange-red (Figure 2a); male and female terminalia black.

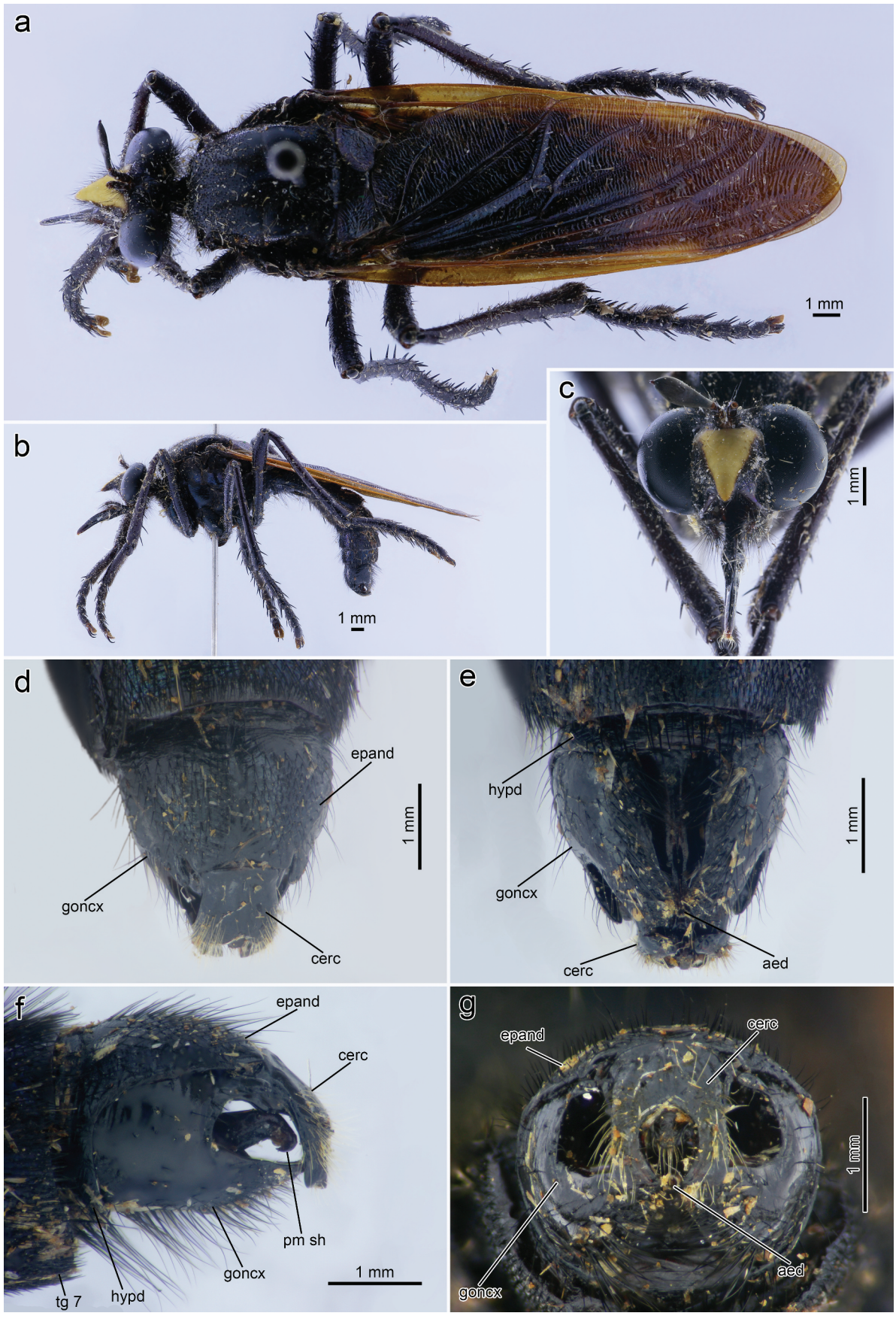

Figure 1. *Pronomopsis chalybea* Hermann, male. a, Habitus, dorsal view. b, Habitus, lateral view. c, Head, frontal view. d, Terminalia, dorsal view. e, Same, ventral view. f, Same, lateral view; g, Same, posterior view. Abbreviations: aed = aedeagus, cerc = cercus, epand = epandrium, goncx = gonocoxite, hypd = hypandrium, pm sh = parameral sheath, tg 7 = tergite seven.

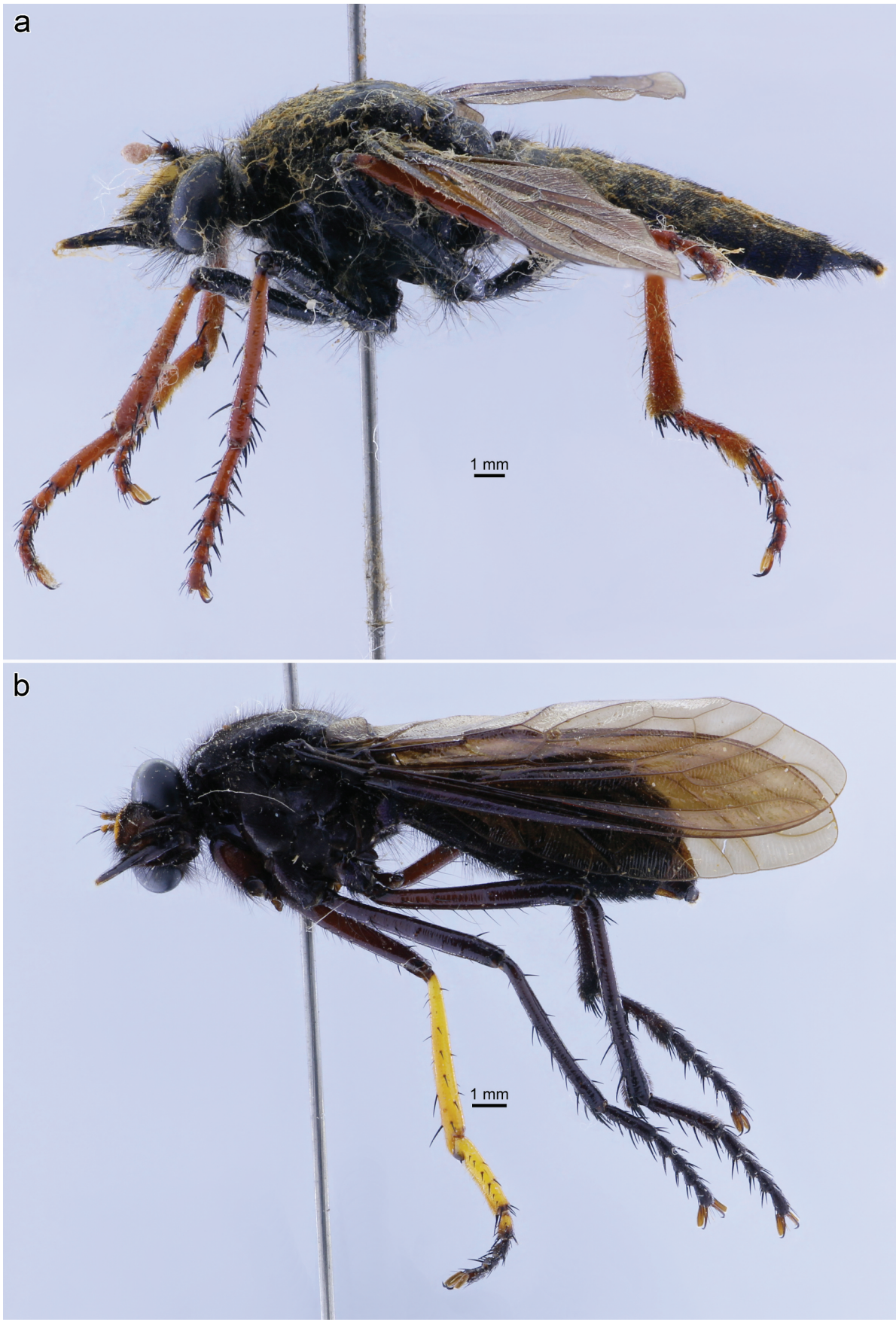

Figure 2. a, *Pronomopsis rubripes* Hermann, female, habitus, lateral view. b, *Pronomposis talabrensis* Artigas, female, habitus, lateral view.

Taxonomic discussion

Specimens of *P. rubripes* are easily recognized by the entirely orange-red tibiae and tarsi. Individuals of this species and *P. talabrensis* share the same color of pedicel and postpedicel, and differ from *P. chalybea*, the other species present in Argentina, by the entirely black antennae and legs uniformly dark, almost black.

This species is the most abundant one in collections as recorded by Artigas (1970) and Papavero (1975): there are 21 males and 12 females deposited in different collections. In this work, we add one female, increasing to 34 the number of specimens known to science.

Artigas (1970) studied six additional males and three females with variations in leg coloration. He decided to exclude them from the described material of *P. rubripes*, since he considered those specimens as a variation from the typical color pattern. The observed variations were as follows: apex of tibiae and tarsi black (5 specimens); femora medially orange-red with base and apex black, tibiae with black apex and tarsi entirely black (3 specimens); legs black, except basal third of hind tibiae orange-red (1 specimen). These specimens are from Putre and Tocara (Arica, northern Chile) and Huanta (Peru; Figure 4). It is interesting to note that *P. pseudorubripes* was described two years later by Lamas (1972). This species is characterized by having the tibiae orange-red with basal end and apical fourth shining black. Some of the aforementioned specimens not included in *P. rubripes* by Artigas (1970) fit quite perfectly the diagnosis of *P. pseudorubripes* indicating that a revision of this material is necessary. In conclusion, this case shows us the importance of regional faunistic inventories, and also the value of publication of lists of specimens deposited in museums and institutions.

Distribution

Peru (Puno), Chile (Antofagasta) and Argentina (Salta) (Figure 4).

Examined material

New record. Argentina: **Salta**: 1♀, Mina Esperanza, 12/II/1960, Torres-Hernández Col. (MLP).

Pronomopsis talabrensis Artigas

(Figures 2b, 3a–f, 4)

Diagnosis

Habitus shining black; pedicel and postpedicel yellow; tibiae and first two tarsomeres of fore legs yellow (Figures 2b, 3a), remaining tarsomeres black; mid and hind legs entirely black.

Male description (Figure 3c–f)

Similar to female, except terminalia: shining black; epandrium trapezoidal, in dorsal view (Figure 3c), with short, sparse black setae dorsally, a few slightly longer setae subapically (Figure 3e); cercus with two posterior projections, forming a deep U-shape indentation at mid-posterior margin, base bare, shining black, margin of projections and border of U-shape indentation dark reddish, cercus posterior projections with short yellow setae (Figure 3c, f); gonocoxite wide with a finger-like projection on dorsal distal corner (almost as long as parameral sheath in lateral view, see Figure 3e) and ventrally becoming slender toward apex, touching apex of cercus; gonocoxite bare on mid-anterior half with long and sparse black setae on latero-ventral surface and subapically, and with few black setae at base of dorsal finger-like projection (Figure 3e); hypandrium narrow, covered with long black setae, fused with epandrium forming complete ring (Figure 3d–e); parameral sheath bare, dark reddish, rounded at posterior margin with distal, small, rounded apical hook, slightly curved anteriorly, ventral margin with very slightly indentation (Figure 3e); aedeagus shining black, dark reddish medially and apically, ending in single rounded opening (Figure 3d).

Variation

Both studied males are very similar in coloration and structure, and the terminalia is identical. However, one of them has a dull yellow spot on the external surface of the middle tibiae (see Figure 3a), while the second specimen has fully black middle tibiae. Artigas (1964) in the original description, mentioned that only the fore tibiae and first tarsomeres of the forelegs are yellow. However, among the specimens examined for this study, the second tarsomeres of the forelegs are almost entirely yellow, with only the extreme apex dark brown; the first tarsomeres also have the extreme apex dark brown. Third tarsomeres of the forelegs are brown with dark brown apex and a dull yellow spot anterolaterally; the last two tarsomeres are dark brown (see Figures 2b and 3a).

Taxonomic discussion

This species, *P. talabrensis*, can be easily separated from its congeners by the yellow tibiae and first two tarsomeres of forelegs with the remaining

Figure 3. *Pronomopsis talabrensis* Artigas, male. a, Habitus, lateral view. b, Head, frontal view. c, Terminalia, dorsal view. d, Same, ventral view. e, Same, lateral view. f, Same, posterior view. Abbreviations: aed = aedeagus, cerc = cercus, epand = epandrium, goncx = gonocoxite, hypd = hypandrium, pm sh = parameral sheath, tg 7 = tergite seven.

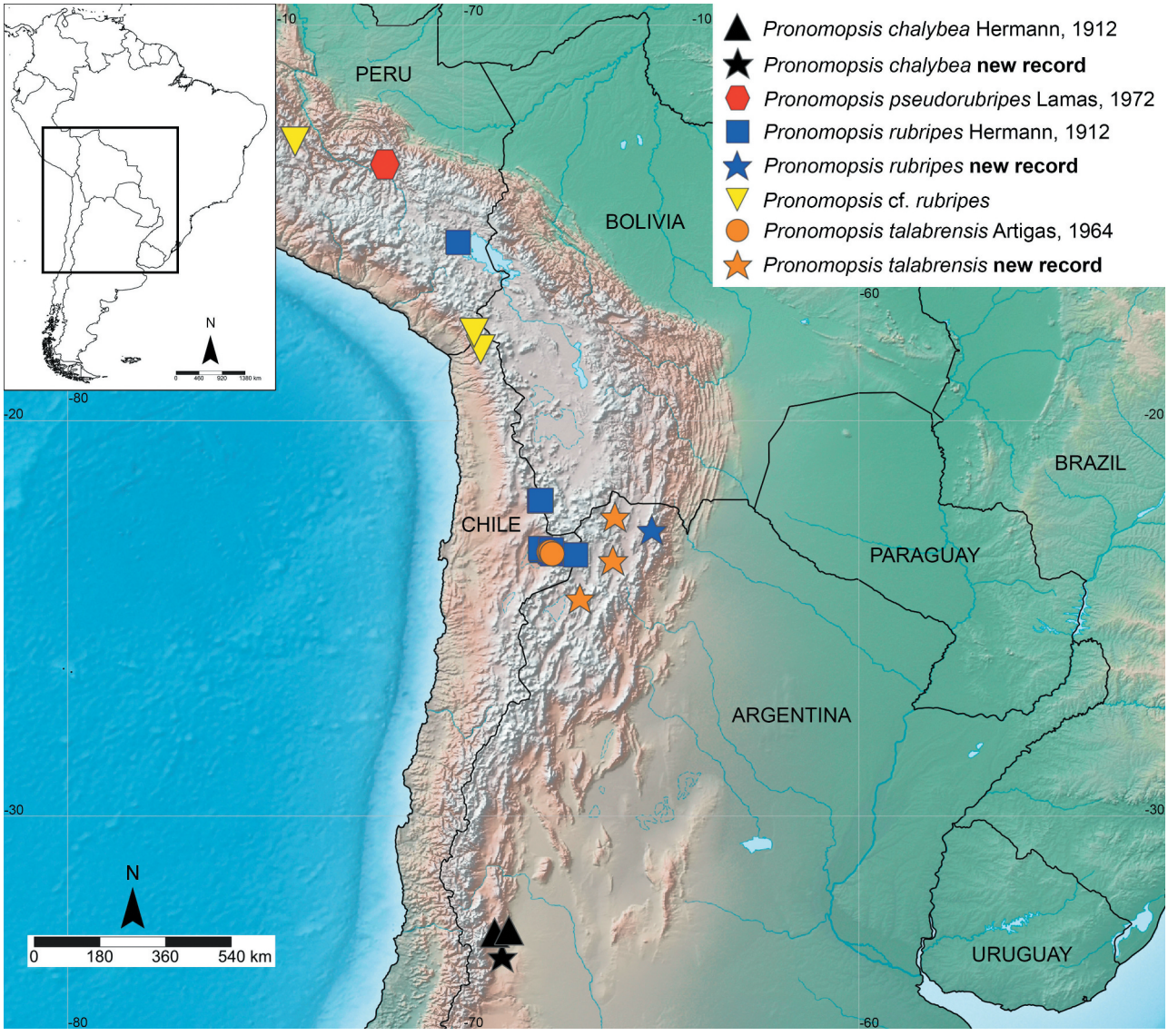

Figure 4. Distribution map showing the known geographic records of the species of *Pronomopsis* Hermann.

tarsomeres black and by mid and hind legs being entirely black.

Prior to this study, *P. rubripes* was the only species in this genus with the male terminalia described (Artigas 1964, 1970, 1971). Comparing our images of the terminalia of *P. talabrensis* with the drawings of the male terminalia of *P. rubripes* from Papavero (1975: 250, figure 113) we noted that the dorsal distal projection of the gonocoxite seemed to be slightly shorter in *P. rubripes*. The U-shape indentation at the mid-posterior margin of cercus is wide in *P. rubripes* (1975: 250, figures 111 and 112), and thin in *P. talabrensis* where the two posterolateral projections of the cercus are closer to each other.

According to Artigas (1964) the male terminalia of *P. rubripes* is black with black setae and the apex of the parameral sheath is dark reddish brown. In the drawings of the male terminalia of *P. rubripes* presented in Artigas (1970: 258, figure 216) the apex of the parameral sheath is shown with the distal projection curved upwards forming a hook. This drawing differs from that of Artigas (1964: 12, figure 5) where this distal lobe is not shown. Also, in the drawings of Papavero (1975) the aforementioned projection is not shown. However, in Artigas and Papavero (1988: 235, figure 76) the parameral sheath is illustrated with only a slight ventral lobe at the apex, without any hook, and the gonostylus, which is internal, has a hook curved apically. Therefore, the parameral sheath with a ventral slight lobe at apex, a more or less narrow U-shaped indentation at the mid-posterior margin of cercus and also the presence of yellow setae distally on the cercus are the main differences between the male terminalia of *P. talabrensis* and *P. rubripes*.

Artigas (1964, 1970) studied five females and Papavero (1975) mentioned three additional males. Thus, this species had only eight specimens previously known to science. Herein, we added two males and one female increasing to 11 the total number of known specimens.

Distribution

Chile (Antofagasta) and Argentina (Jujuy and Salta) (Figure 4).

Examined material

New records. Argentina: **Jujuy**: 1♀, Rinconada, 23/I/1959, Torres-Dadone Col. (MLP). **Salta**: 1♂, Vega de Guirón, Pocitos, 31/I/1960, Torres-Hernández Col. (MLP); 1♂, San Antonio de los Cobres, 22/II/1961, Torres-Ferreyra Col. (MLP).

Identification key to the species of Pronomopsis *Hermann*

1. Antennae and legs entirely black (Figure 1a–c), wings reddish to dark reddish (reddish yellow on the basal two-thirds of the anterior margin) (Figure 1a, b) . . .. *P. chalybea* Hermann

- Antennae with pedicel and postpedicel yellow to orange-red (Figure 2a, 3a,b), legs with yellow to orange-red areas (Figures 2a,b, 3a), wings dark brown to almost black (on anterior margin and base) (Figures 2a,b, 3a) 2

2. Forelegs with tibiae and first and second tarsomeres yellow; mid and hind legs entirely black (Figures 2b, 3a) (variations were observed and described in this paper) . . . *P. talabrensis* Hermann

- Combination of colors on legs not as above 3

3. Legs with tibiae and tarsi entirely orange-red (Figure 2a) (variations were observed and described by Artigas 1970) . . .. *P. rubripes* Hermann

- All tibiae orange-red with shining black areas on base and on the apical fourth . . . *P. pseudorubripes* Lamas

Herein, we update to three the species of *Pronomopsis* in Argentina, which is the South American country with the highest species richness of this small and rare genus of robber flies. The number of known specimens was increased to 34 in *P. rubripes*, 11 in *P. talabrensis* and five in *P. chalybea* and the distribution area was broadened. Furthermore, the male terminalia of *P. chalybea* and *P. talabrensis* were described and illustrated for the first time.

Thus, we have improved the distribution records of two Asilidae species, contributing to diminish the gaps in the distribution of the Neotropical fauna of this family, since most of the described species in this biogeographic region are known only from their type localities (Papavero 2009; Vieira 2012; Camargo et al. 2017; Vieira et al. 2019).

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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