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Abstract. We describe and illustrate a new Neotropical predaceous midge, *Parabezzia carlae* Huerta, Spinelli and Grogan, **new species** (Diptera: Ceratopogonidae) from males collected by Malaise trap in La Union, Ayutla de los Libres, state of Guerrero, Mexico. We also report a second record of *P. alexanderi* Wirth from Veracruz, Mexico. A key to the known species in Mexico is included.

Key words. Distribution, taxonomy, new record, new taxa.

Resumen. Se describe e ilustra una especie nueva de mosquita predadora de la región Neotropical, *Parabezzia carlae* Huerta, Spinelli y Grogan, **nueva especie** (Diptera: Ceratopogonidae) sobre la base de machos colectados con trampa Malaise procedentes de La Unión, Ayutla de Los Libres, estado de Guerrero, México. También se ofrece el segundo registro de *P. alexanderi* Wirth para Veracruz, México. Una clave para las especies conocidas en México es incluida.

Palabras clave. Distribución, taxonomía, nuevo registro, nuevo taxa.

ZooBank registration. urn:lsid:zoobank.org:pub:377A33C3-D770-4CCA-BE85-C11516727DA1

Introduction

The predaceous midges in the genus *Parabezzia* Malloch, 1915 includes 44 species in the world (Borkent and Dominiak 2020). This genus is primarily known from the New World, with 15 species in the Nearctic region (Wirth 1965; Grogan and Wirth 1977; Borkent and Grogan 2009), 20 species in the Neotropics (Wirth 1965; Clastrier and Raccurt 1979; Spinelli and Grogan 1987; Grogan et al. 2013; Felippe-Bauer and Spinelli 2015), and four species inhabit both biogeographic regions (Borkent and Spinelli 2007). Three species are known from the Afrotropical region (Clastrier 1960; De Meillon and Wirth 1981a, b), and single species are known from the Palearctic (Szadziewski and Wirth 1983) and Oriental regions (Giles and Wirth 1982).

Their immature stages are poorly known, as larvae are still unknown. However, larvae and pupae inhabit small streams, rivers and ponds (Grogan and Wirth 1977), but the pupae of only 7 species have been described (Grogan and Wirth 1977; Spinelli and Grogan 1987; Borkent 2014). Adults have been collected on vegetation near aquatic environments, and females prey on small nematocerous flies (Grogan and Wirth 1977; Downes 1978).

Grogan and Wirth (1977) recognized three species groups (alexanderi, uncinata and unguis groups) in the Nearctic region. Species of these groups and the brunnea group proposed by Spinelli and Grogan (1987) also inhabit the Neotropical region. The alexanderi group is unique as the wings of both sexes have a basal costal swelling, the most apomorphic character in the genus (Grogan and Wirth 1977). The arrangement, distribution, density, and size of the costal setae on female wings are important for recognizing the other three species groups, whereas diagnostic characters for their conspecific males are not yet well defined (Grogan and Wirth 1977; Spinelli and Grogan 1987).

Three species have been previously recorded from Mexico: *P. alexanderi* Wirth (1965) (alexanderi group), which is widely distributed in eastern North America (Ontario, Massachusetts south to Florida), in Mexico (Veracruz), Central America (Belize and El Salvador), and in South America (Argentina); *P. unguis* Wirth (1965) (unguis group), widely distributed from USA (Arizona, Texas), Mexico (Sonora) to Colombia; and, *P. pallida* Spinelli and Grogan (1987) (uncinata group), which is only known from the type locality in the state of Oaxaca, Mexico (Borkent and Spinelli 2007).

In Malaise trap collections from the states of Guerrero and Veracruz, Mexico, we discovered males of a new species unplaced to species group in Ayutla de Los Libres, Guerrero, which is described and illustrated herein. We also found specimens of *P. alexanderi* from El Farallon, Veracruz, the second record of this species from this Mexican state.

Materials and Methods

All specimens were collected with a Malaise trap, preserved in 75% ethanol and subsequently cleared, dissected, and mounted on microscope slides in Canada balsam by the techniques described by Borkent and Spinelli (2007). Illustrations were prepared with the aid of a drawing tube attached to an Olympus BX50 compound microscope, and photographs were taken with a Lumenera Infinity 1 camera mounted on the Olympus BX50 microscope.

Morphological terms are those in the chapter on Ceratopogonidae by Borkent et al. (2009) in the Manual of Central American Diptera, and the book on Neotropical Ceratopogonidae by Borkent and Spinelli (2007). Special terms of *Parabezzia* are those by Wirth (1965), Grogan and Wirth (1977) and Spinelli and Grogan (1987). Eye separation was measured between ommatidia on the dorsal portion of the head. The holotype and paratype of the new species and specimens of *P. alexanderi* are deposited in the Colección de Artropódos con Importancia Médica (CAIM), Mexico City.

Key to adult *Parabezzia* from Mexico

(females of *Parabezzia carlae*, **new species** and males of *P. pallida* Spinelli and Grogan unknown)

Female

1. Costa with basal swelling (Fig. 3A) (alexanderi group) . . . . . ***P. alexanderi* Wirth**
— Costa without basal swelling **2**
2. Costal fringe long, the setae arising distally from margin of vein (uncinata group); legs yellowish . . . . . ***P. pallida* Spinelli and Grogan**
— Costal fringe short, setae on the distal portion very short and widely spaced (unguis group); legs brown . . . . . ***P. unguis* Wirth**

Male

1. Aedeagus with well-developed lateral basal arm (Fig. 2C–D) . . . . . ***P. carlae* Huerta, Spinelli and Grogan, new species**
— Aedeagus with poorly developed lateral basal arms **2**

2. Costa with basal swelling; distal portion of aedeagus about ⅓ of total length .... ***P. alexanderi*** **Wirth**
— Costa without basal swelling; distal portion of aedeagus about ½ of total length ..... ***P. unguis*** **Wirth**

Systematics

Subfamily CERATOPOGONINAE
Tribe CERATOPOGONINI
Parabezzia Malloch 1915: 358. Type species, *Parabezzia petiolata* Malloch, by original designation.

Parabezzia carlae **Huerta, Spinelli and Grogan, new species**

Fig. 1–2

Diagnosis. Male with the following combination of characters: antenna with only 12 flagellomeres; palpal segments 1–3 pale, segment 4 (fused 4+5) brownish; scutellum yellowish; femora and tibiae mostly pale with femoral-tibial joints and narrow apices of tibiae dark brown; tarsomeres 1–4 pale, tarsomeres 5 dark brown; parameres with well-developed basal apodemes that are mesally fused, but the mesal process is absent; aedeagus triangular, basal and lateral arms heavily sclerotized, basal arch straight, low, distal portion slender, apical portion lightly sclerotized, tip rounded. Female unknown.

Description. Male holotype: Head: (Fig. 1A). Dark brown, slightly wider than long; maximum width 0.31 mm. Eyes separated by the diameter of 4.2 ommatidia. Antenna (Fig. 1B–C) with 12 flagellomeres, bases of flagellomeres 1–9 pale, distal portions brown; 10–12 entirely dark brown; flagellomeres 1–9 vasiform, 10–12 greatly elongate; plume moderately dense; antennal ratio 1.4. Palpal segments 1–3 pale, segment 4 (fused 4+5) brownish; segment 3 moderately long, cylindrical, with one capitate sensillum on apicomesal surface; segment 4 moderately elongate, nearly as long as segment 3; palpal ratio 4.5. Clypeus with 12 setae. **Thorax:** (Fig. 1D). Dark brown; scutellum pale, with 2 marginal, 2 mesal setae. Pleura dark brown; anepisternum well developed, not bilobed posteriorly. **Legs:** (Fig. 1D–G) Mostly pale; coxae, trochanters dark brown; fore femur (Fig. 1E) brownish, mid, hind femora (Fig. 1F–G) with subapical brownish band; femoral–tibial joints darkish brown; tibiae pale, narrow apices dark brown, fore tibia (Fig. 1E) with narrow mesal brownish band; tarsi pale except narrow base of tarsomere 1 of foreleg and tarsomeres 5 dark brown; fore, mid coxae with spine-like setae, absent on hind coxa; tarsomere 1 of hind leg with row of ventral palisade setae; hind tibial comb with 7 spines; hind tarsal ratio 2.0; claws short, stout, equal–sized, slightly curved with small basal setae, tips bifid. **Wing:** (Fig. 2A–B) Membrane hyaline, covered with fine microtrichia; anterior veins pale brown; one elongate radial cell; one large seta on costa proximal of basal arculus; costal fringe moderately long, setae arising from wing margin, uniformly distributed along costal section I, more widely spaced on costal section II; wing length 0.97 mm, breadth 0.30 mm; costal ratio 0.60. Halter pale. **Abdomen:** Dark brown, sternites 1–4 pale. Genitalia (Fig. 2C–E). Dark brown. Tergite 9 extending to apices of gonocoxites, posterior margin with deep U–shaped excavation. Sternite 9 2.2 times broader than long, lateral margins slightly pointed, with small tuft of short, fine setae; anterior margin nearly straight, posterior margin slightly concave; sternite 10 setose, produced slightly beyond posterior margin of tergite 9; cerci short. Gonocoxite stout, 1.2 times longer than broad, covered with fine setae and sparse scattered large setae on mesal surface. Gonostylus darker, slightly longer than gonocoxite, covered with fine setae; broadest basally, abruptly tapered, slightly curved mesally, apex slender with sharply pointed tip. Parameres (Fig. 2D) with fused, well developed heavily sclerotized basal apodemes that are mesally directed; mesal process absent. Aedeagus triangular, about twice as long as basal width, extending beyond level of apex of gonocoxites; basal, lateral arms heavily sclerotized; basal arch straight, very low, extending 0.10 of total aedeagus length; distal portion slender, tapering gradually distally to slender apex, surface smooth; apical section lightly sclerotized, with hyaline rounded tip.

Female. Unknown.

Distribution. Mexico, Guerrero (Fig. 4).

Type material. HOLOTYPE male, PARATYPE male, MEXICO, GUERRERO, Ayutla de los Libres, Locality La Unión, Rancho Camalote, 7-Apr to 16-May-2009, Malaise trap, col. Bibiano-Marin W (deposited in CAIM).

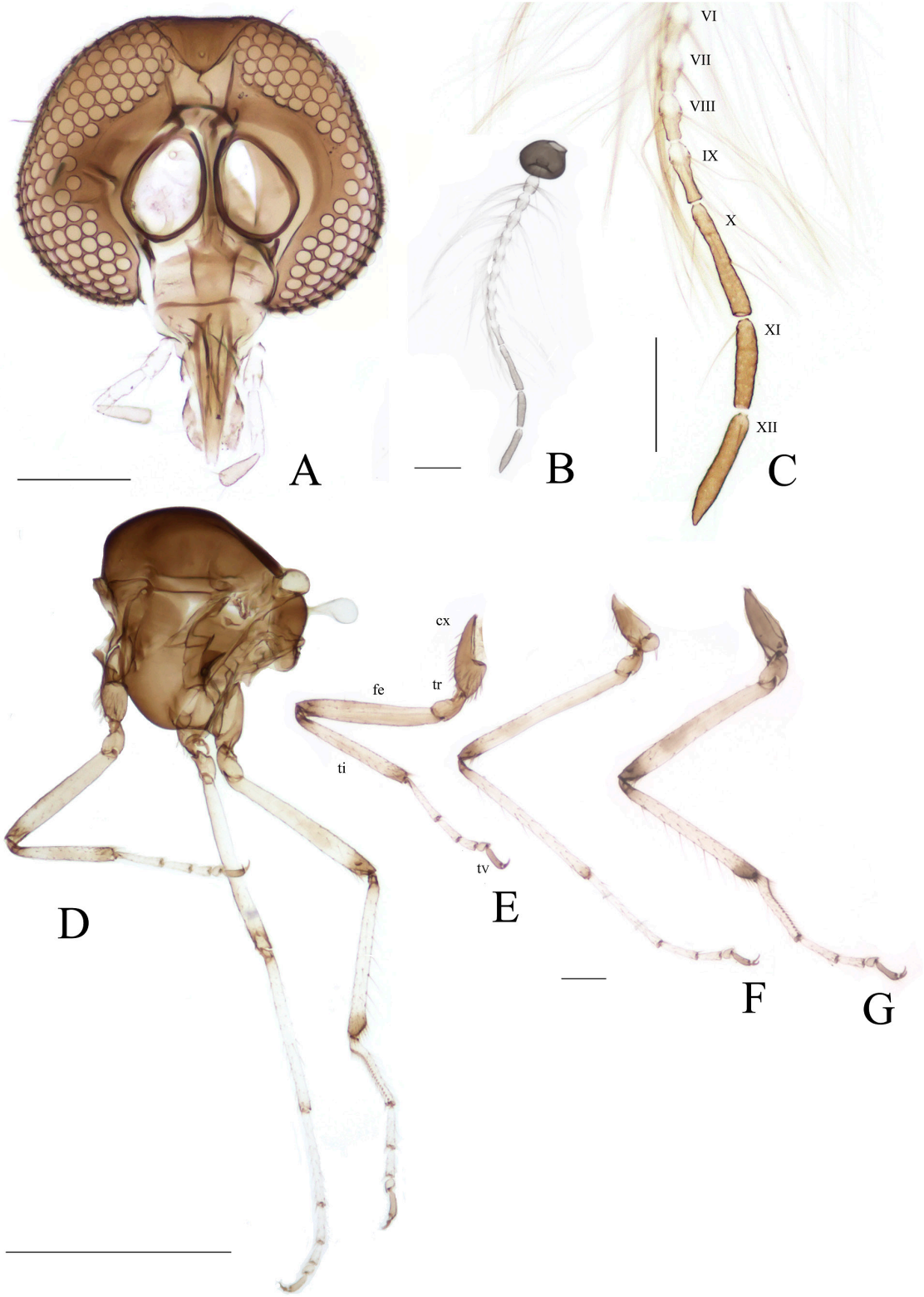

Figure 1. *Parabezzia carlae*, new species. Male. **A)** Head frontal view. **B)** Antenna lateral view. **C)** Distal flagellomeres lateral view. **D)** Thorax lateral view. **E)** Fore leg. **F)** Mid leg. **G)** Hind leg. Scales: A–C, E–G = 0.1 mm, D= 0.5 mm. Abbreviations: cx= coxa; fe= femur; ti= tibia, tr= trochanter, tv= fifth tarsomere; VI–XII= flagellomeres 6–12.

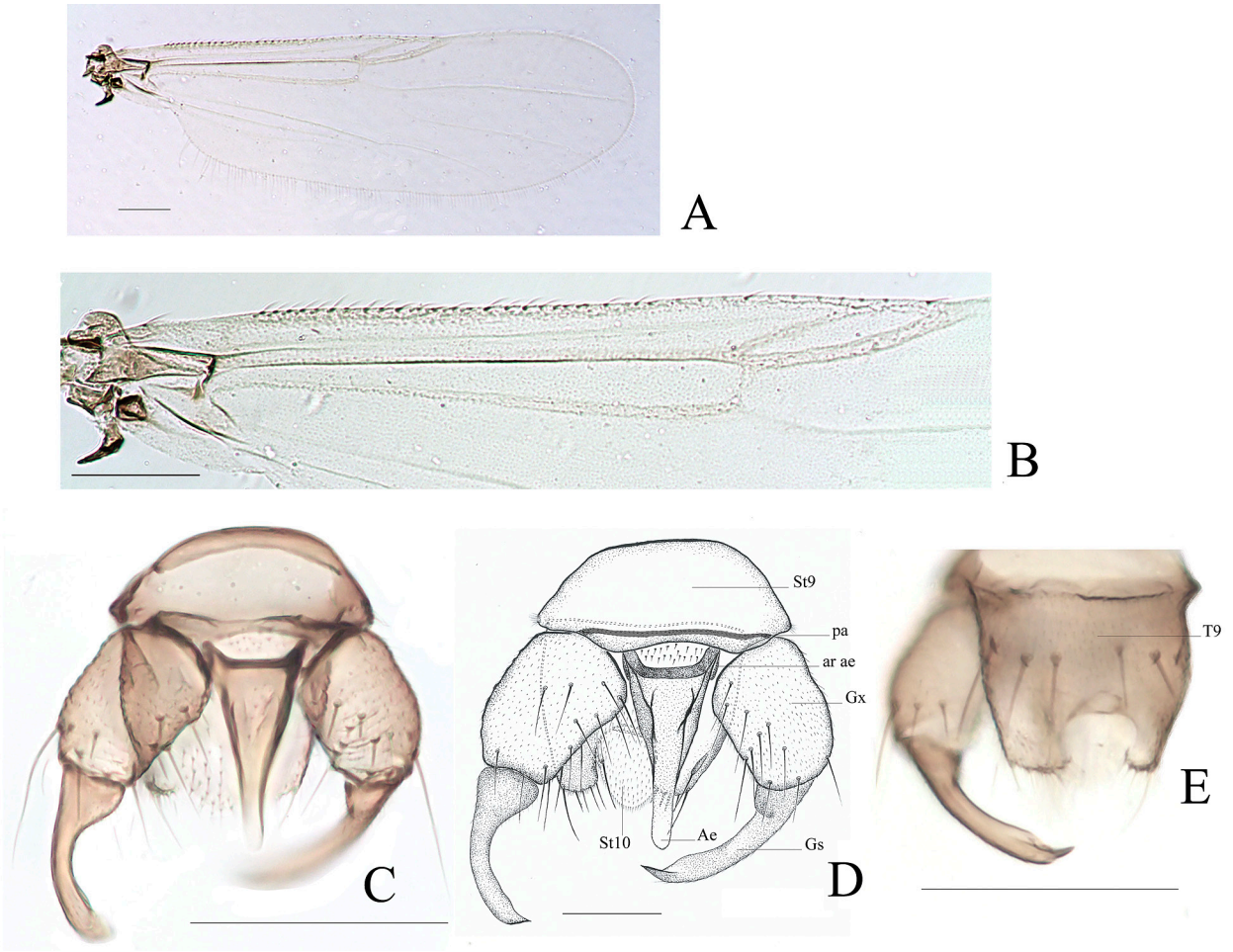

Figure 2. *Parabezzia carlae*, new species. Male. **A)** Wing. **B)** Anterior wing veins. **C–D)** male genitalia ventral view. **E)** Tergite 9 dorsal view. Scales: A–C, E = 0.1 mm, D= 0.04 mm. Abbreviations: Ae= aedeagus; ar ae= lateral arm of aedeagus; Gx= gonocoxite; Gs= gonostyle; pa= basal apodemes of parameres; st9= sternite 9; st10= sternite 10, T9= tergite 9.

Etymology. The specific name is named for our Argentine colleague, Carla G. Cazorla, in recognition of her important taxonomic contributions on Neotropical Ceratopogonidae.

Remarks. Because this new species is described from males, it is not assigned to any of the four recognized species groups of *Parabezzia*. Nevertheless, it is readily distinguished from all other New World species by its antenna that has only 12 flagellomeres, the very pale femora and tibiae with pale femoral-tibial joints and narrow apices of tibiae darkish brown, and, parameres with well-developed mesally oriented basal apodemes which lack a mesal process. We initially thought that elongate flagellomere 10 might possibly be fused flagellomeres 10–11, but it appears to be a normal flagellomere 10 in that it has sparse long setae that are distributed as in males of other species.

In the key to females and males of Nearctic *Parabezzia* by Grogan and Wirth (1977), *P. carlae* keys out to couplet 23, *P. inermis* (Coquillett), from which it can be distinguished by its broader aedeagus, the distal portion of which lacks lateral expansions, in addition to the others characters included above. Of the Neotropical species reviewed by Spinelli and Grogan (1987), *P. pallida* Spinelli and Grogan from Oaxaca, Mexico, also has pale legs but they are entirely yellowish including their femoral–tibial joints, the apices of tibiae and some femora and tibiae, which lack brownish bands and the abdomen is also yellowish.

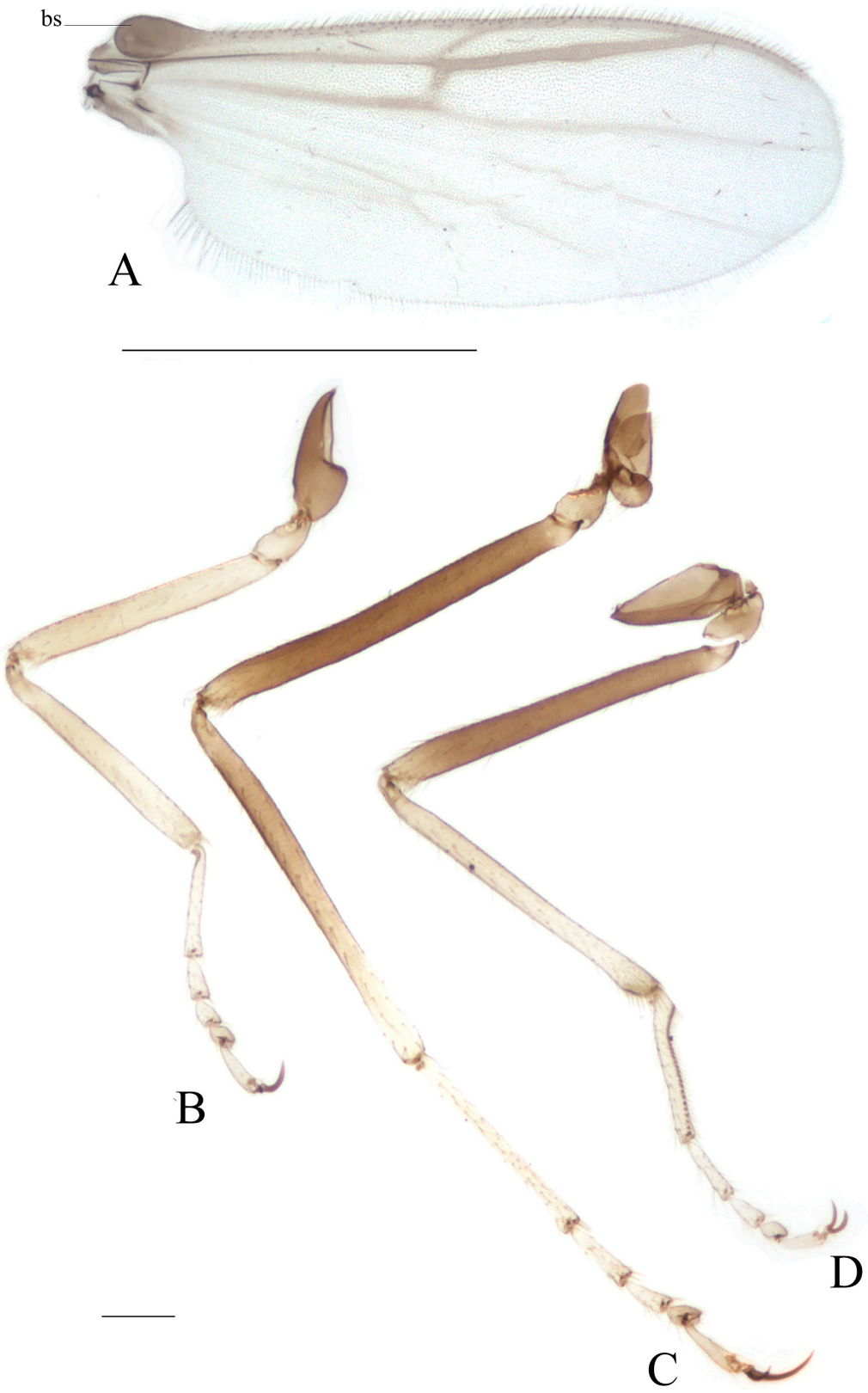

Figure 3. *Parabezzia alexanderi* Wirth. Female. **A)** Wing dorsal view. **B–D)** Legs lateral views. **B)** Fore leg. **C)** Mid leg. **D)** Hind leg. Scale: A= 0.5 mm, B–D= 0.1 mm. Abbreviation: bs= basal swelling.

Parabezzia alexanderi Wirth

Fig. 3

Parabezzia alexanderi Wirth 1965: 219 (female; USA, Massachusetts); Grogan and Wirth 1977: 56 (female, male, pupa; distribution); Wirth and Grogan 1981: 50 (female, male, pupa; biology; distribution; illustrations); Borkent and Wirth 1997: 103 (in World catalog); Borkent and Spinelli 2000: 51 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 84 (in Neotropical catalog; distribution); Borkent and Grogan 2009: 15 (in Nearctic catalog; distribution); Borkent 2014: 73 (pupal characters); Ronderos et al. 2018: 642 (pupa; list of pupae in Neotropical region); Borkent and Dominiak 2020: 168 (in World catalog).

Distribution. This wide-ranging species inhabits eastern North America (Ontario, Massachusetts to Alabama and Florida), and in Mexico (Veracruz), Belize, El Salvador, and also Argentina (Borkent and Spinelli 2007). Spinelli and Grogan (1987) included the first Mexican record from Rio Palma, Los Tuxtlas, Veracruz. We provide the second record from Veracruz, El Farallón, Actopan region (Fig. 4).

Material examined. MEXICO, VERACRUZ, Municipio Actopan, Localidad El Farallón, near to potrero, Malaise trap, 13–14-Aug-2009, col. Pérez-Rentería C and Rodríguez-Atanacio JA, 4 females (in CAIM). **New state record.**

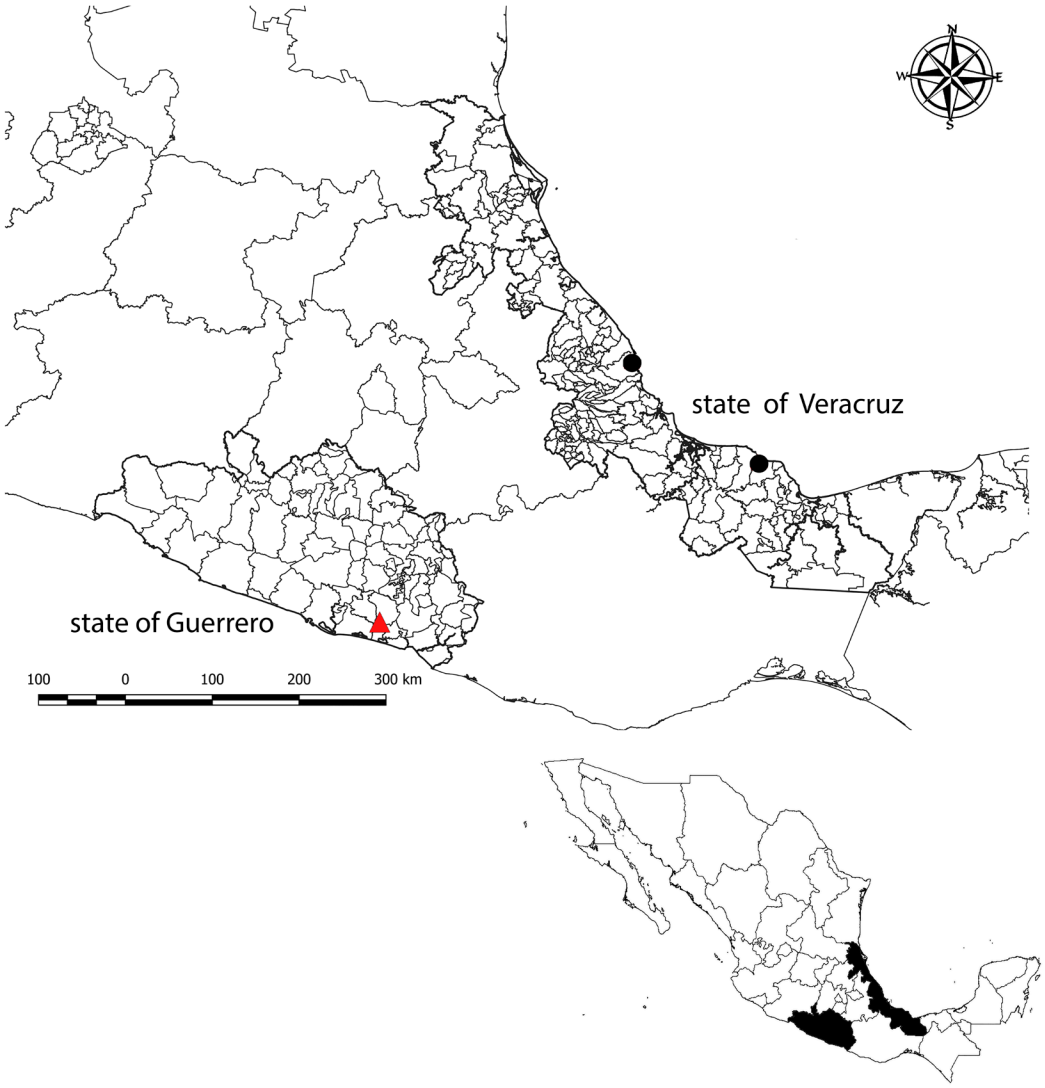

Figure 4. Locality records of *Parabezzia alexanderi* Wirth (black circles) in state of Veracruz and *P. carlae*, new species, (red triangle) in state of Guerrero.

Remarks. This large species (female WL 1.02–1.32 mm and male WL 1.13–1.20 mm) has a large, rounded, dark, basal costal swelling (Fig. 3A) on the wings of both sexes; and mostly yellow legs (Fig. 3B–D), with at least the basal ½ of the mid and hind femora dark brown.

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