



Four new species of genus *Parallaxis* McAtee (Hemiptera: Cicadellidae: Typhlocybinae: Dikraneurini) from Argentina, with a key to known species

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Abstract

Four new species of *Parallaxis* McAtee are described from Argentina, *P. jujuiensis* sp. n., *P. misionensis* sp. n., *P. tucumanensis* sp. n. and *P. virilai* sp. n. Detailed morphological descriptions and illustrations of the new species and a key to males of known species are provided.

Key words: Auchenorrhyncha, identification, morphology, distribution

Resumen

Cuatro nuevas especies de *Parallaxis* McAtee son descritas desde Argentina, *P. jujuiensis* sp. n., *P. misionensis* sp. n., *P. tucumanensis* sp. n. y *P. virilai* sp. n. Se proveen detalladas descripciones morfológicas e ilustraciones de las nuevas especies y una clave a machos de las especies conocidas.

Palabras claves: Auchenorrhyncha, identificación, morfología, distribución

Introduction

Species of the dikraneurine microleafhopper genus *Parallaxis* McAtee are widespread and common in the Neotropical region from Mexico to Argentina and have been collected from a variety of plants including several of economic importance, e.g., avocado, bean, and potato (Linnavuori 1954). Until now, 13 species have been described (Linnavuori 1954, Freytag 2001), the largest number from Brazil. Linnavuori (1954) revised the genus and provided a key to species and illustrations of the male genitalia for known species. More recently, Freytag (2001) described two additional species from Central America. In Argentina, four species were previously recorded, *P. donaldsoni*, *P. imitans*, *P. praenubila* and *P. permunda*. In this paper, we describe four new species from Argentina and provide a key to males of the known species.

Materials and methods

Specimens of the new species were collected with Malaise and mercury vapor light traps in Jujuy, Misiones and Tucumán provinces. For morphological study of the genital structures, clearing was accomplished by immersion of the entire abdomen in a solution of 10% KOH at room temperature for several hours followed by several rinses

with water. For illustration, genital structures were embedded in glycerin. The color pattern here described is the post-mortem coloration. In living or recently collected individuals the coloration can be more vivid relative to that of old preserved specimens. Morphological terminology follows Young (1952) and Dietrich (2005) for habitus and male genitalia characters, and Catalano *et al.* (2010) for female characters. Digital photographs were taken using a QImaging Micropublisher 3.3 digital camera mounted on an Olympus SZX12 stereomicroscope. Except for two species recently described by Freytag (2001), specimens of all previously described species, including types, were examined in the collections of the U.S. National Museum of Natural History, Washington, DC, and the Instituto Miguel Lillo, Tucumán, Argentina. For completeness, *Parallaxis anisa* Freytag and *P. maesi* Freytag, both described from Central America, are included in the key based the original descriptions and illustrations. The type-series of the new species are deposited in the entomological collection of Museo de Ciencias Naturales de la Plata, Argentina (MLP), Illinois Natural History Survey, USA (INHS) and Instituto Miguel Lillo, Tucumán, Argentina (IML).

Taxonomy

Genus *Parallaxis* McAtee

Parallaxis McAtee 1926, 34: 154. Type species: *Parallaxis vacillans* McAtee 1926.

Diagnosis. Small predominantly dark leafhoppers, dorsum usually mottled with green or yellowish, sometimes gray with or without brick red markings. Head with face in profile more vertical than in other Dikraneurini species and with crown shorter. Forewing with all apical cells conspicuously broadened to wing apex; third apical cell sessile, embracing wing apex.

Distribution. Neotropical Region.

Key to species of *Parallaxis* (males)

- | | | |
|--------|--|-------------------------------|
| 1 | Aedeagus with one or more processes arising near base; paired distal processes absent | 12 |
| 1' | Aedeagus without one or more processes near base; processes, if present, arising on shaft distad of midlength | 2 |
| 2(1') | Aedeagus with single pair of long, symmetrical, unbranched, distal processes; with or without unpaired processes or short paired projections processes | 3 |
| 2' | Aedeagus not as above; processes, if present, either branched, unpaired, or more than one pair present | 8 |
| 3(2) | Aedeagus with apex in lateral view falcate, strongly recurved ventrad and terminating in acute spine | 4 |
| 3' | Aedeagus with apex acute or truncate, not falcate in lateral view | 5 |
| 4(3) | Aedeagus with preapical paired processes curved dorsad in posterior view | <i>P. tucumanensis</i> sp. n. |
| 4' | Aedeagus with preapical paired processes curved ventrad in posterior view | <i>P. donaldsoni</i> (Baker) |
| 5(3') | Aedeagus with numerous small teeth on posteroventral surface of shaft basad of gonopore | <i>P. tessellata</i> McAtee |
| 5' | Aedeagus without teeth on posteroventral surface of shaft | 6 |
| 6(5') | Aedeagus with paired triangular ventral subapical processes | 7 |
| 6' | Aedeagus without paired triangular ventral subapical processes | <i>P. colorata</i> Linnavuori |
| 7(6) | Aedeagus with apex in posterior view acute, small teeth on ventral surface | <i>P. jujuiensis</i> sp. n. |
| 7' | Aedeagus with apex in posterior view truncate, small teeth on dorsal surface | <i>P. virlai</i> sp. n. |
| 8(2') | Aedeagus with pair of long bifurcate processes arising at apex and extended basolaterad | 9 |
| 8' | Aedeagus without bifurcate processes | 10 |
| 9(8) | Aedeagal processes with branches subequal in length | <i>P. ornata</i> Osborn |
| 9' | Aedeagal processes with lateral branch much shorter than medial branch | <i>P. anisa</i> Freytag |
| 10(8') | Aedeagus with two pairs of processes | 11 |
| 10' | Aedeagus with single preapical process extended dorsolaterad and distal process extended basolaterad, apex acuminate and nearly straight | <i>P. misionensis</i> sp. n. |
| 11(10) | Aedeagus with one pair of retrorse preapical processes and another pair of apical processes extended distad, apex falcate | ... |
| | | <i>P. vacillans</i> McAtee |
| 11' | Aedeagus with two pairs of parallel processes near apex, both extended posterolaterad | <i>P. maesi</i> Freytag |
| 12(1) | Aedeagus with single, unpaired, unbranched basal appendage | 13 |
| 12' | Aedeagus with pair of basal appendages or with branched appendage | 14 |
| 13(12) | Aedeagal shaft slender and acuminate, gonopore well basad of apex; pygofer with posterodorsal process with two long branches extended posteroventrad | <i>P. guzmani</i> (Baker) |

- 13' Aedeagal shaft broadened near midlength, apex obliquely rounded, gonopore apical; pygofer with two short posteroventral teeth *P. imitans* Linnavuori
 14(12') Pygofer with posterior margin with dorsal and ventral spines; aedeagal processes in lateral view broader than shaft 15
 14' Pygofer with posterior margin with only dorsal spines (may be bifid); aedeagal processes in lateral view more slender than shaft 16
 15(14) Aedeagus with shaft in lateral view slender, acuminate and evenly curved dorsad *P. respersa* McAtee
 15' Aedeagus with shaft in lateral view with dorsal and ventral margins uneven near base, curved dorsad only in distal half
 *P. praenubila* Linnavuori
 16(14') Aedeagal processes very short, arising on preatrium and curved dorsad, not extended to base of shaft *P. beata* McAtee
 16' Aedeagal processes very long, arising from preatrium as single stem, branched well beyond shaft base and extended past shaft apex *P. permunda* (Stål)



FIGURE 1. Dorsal habitus. A, *Parallaxis jujuiensis* sp. n.; B, *P. misionensis* sp. n.; C, *P. tucumanensis* sp. n.; D, *P. virilai* sp. n. Scale = 1 mm.

***Parallaxis jujuiensis* sp. n.**

(Figs 1A, 2A–G)

Description. Length of male: 2.7–2.8 mm.

Ground color brown, mottled with red and yellow. Crown yellow with two V-shaped dark brown spots on apical margin and two triangular spots on hind margin, coronal suture dark basally. Pronotum red medially, anterior margin mottled with brown, lateral and posterior margins yellow. Scutellum yellow with irregular light brown spots. Forewing yellowish with four rectangular red spots, two in claval area and two in brachial cell; two transverse brown stripes arising from costal margin; apical cells smoky with transparent spots, veins yellow (Fig. 1A). Fore and hind wing venation characteristic of genus.

Male: Second sternal apodemes (2S) (Fig. 2A) short, scarcely exceeding third segment. Pygofer (Fig. 2B) quadrangular in lateral view, with vertical row of five macrosetae posterodorsally, group of very thin and long setae near ventral margin and several microsetae on caudal margin, and pair of short convergent spines near mid-height of caudal margin. Subgenital plate (Fig. 2C) with nearly parallel margin, oblique single row of three or four macrosetae over basal half of disk, long and thin setae on dorsal margin and several microsetae in apical half. Style (Fig. 2D) with rounded preapical lobe with group of four or five small setae; apical extension falcate. Connective (Fig. 2E) U-shaped. Aedeagus (Figs 2F–G) with very small preatrium; dorsal apodeme well developed, wider at apex than at base; shaft compressed, with few small teeth on ventral surface, paired long apical processes extended ventro-cephalad and paired triangular ventral subapical processes, apex acuminate slightly extended dorsally; gonopore apical.

Female: Unknown

Material examined: Holotype male: ARGENTINA: Jujuy, P.N. Calilegua, Arroyo Tres Cruces, 1110 m., 23°41'38''S 64°52'4''W, 14–16 January 2008, C.H. Dietrich *et al.*, Malaise trap [MLP]. Paratypes: 2 males, same data [INHS].

Etymology: The specific name refers to the province where the holotype was collected.

Notes: This species closely resembles *P. colorata* Linnavuori, but has the aedeagus with basal and subapical paired processes.

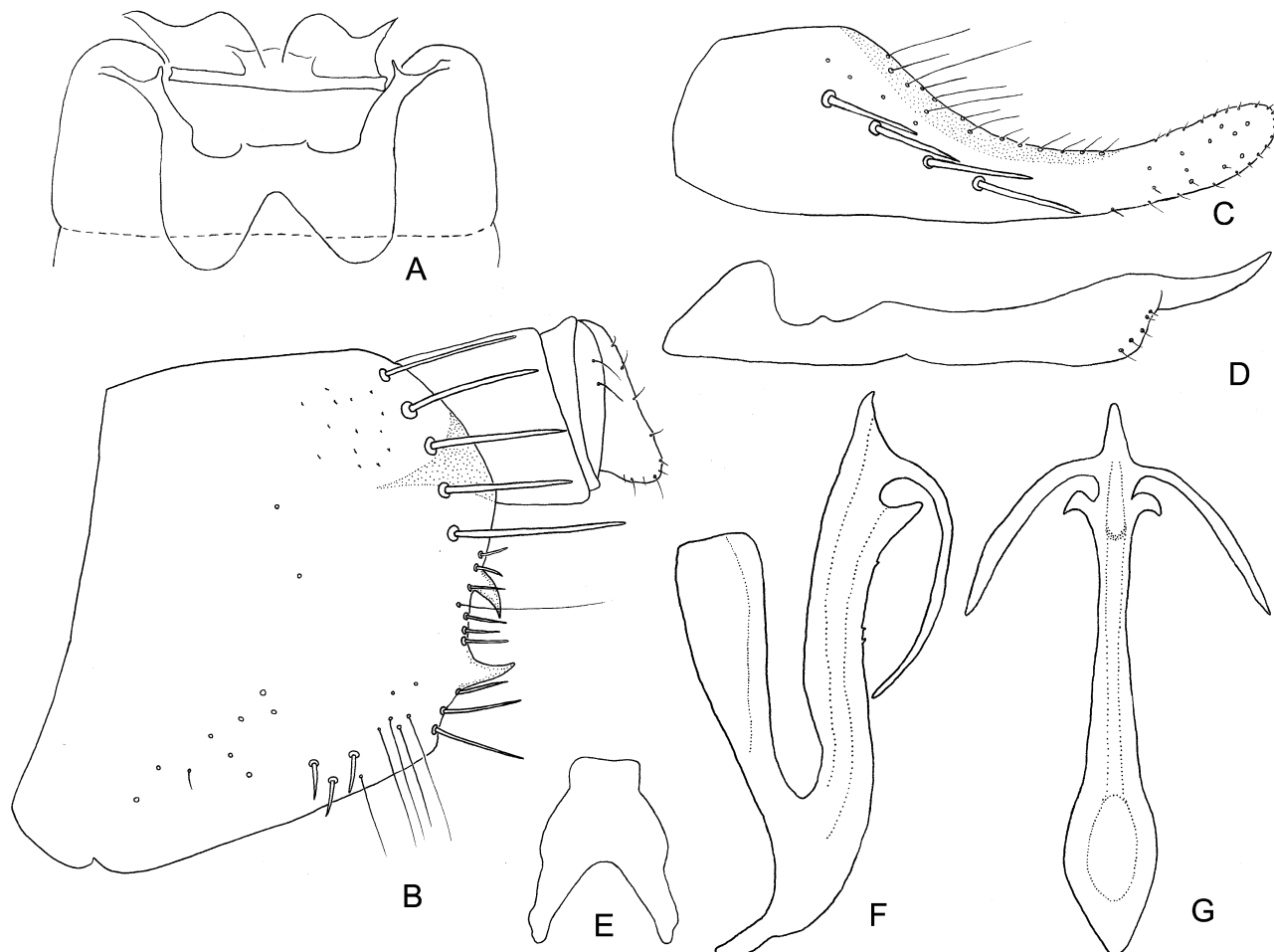


FIGURE 2. *Parallaxis jujuiensis* sp. n., male. A, sternal apodeme 2S; B, pygofer, lateral view; C, subgenital plate, lateral view; D, style; E, connective; F, aedeagus, lateral view; G, aedeagus, posterior view.

Parallaxis misionensis sp. n.

(Figs 1B, 3A–G)

Description. Length of male: 3.0–3.1 mm.

Ground color whitish with red marks. Crown white to yellowish with two small red spots on hind margin. Pronotum with two longitudinal red bands. Forewing whitish with three elongated red spots, two in claval area and one in brachial cell; costal margin orange-reddish, apical cell smoky (Fig. 1B). Fore and hind wing venation characteristic of genus.

Male: Second sternal apodemes (2S) (Fig. 3A) reaching midlength of fourth segment, apices obliquely truncated. Pygofer (Fig. 3B) rounded in lateral view, with a dorso-apical lobe slightly sclerotized, vertical row of six or seven macrosetae near caudal margin, several microsetae on disk. Subgenital plate (Fig. 3C) with nearly parallel margins, oblique single row of four macrosetae over basal half of disk, and several microsetae in dorsal and ventral margin. Style (Fig. 3D) with rounded preapical lobe; apical extension short and curved, apex bilobed. Connective (Fig. 3E) U-shaped. Aedeagus (Figs 3F–G) with long preatrium; barlike dorsal apodeme; shaft

asymmetrical compressed, with a single subapical ventral process extending dorso-cephalad, and single apical process curved ventro-cephalad, apex acuminate extended dorsally; gonopore subapical.

Female: Unknown.

Material examined: Holotype male: ARGENTINA: Misiones, P.N. Iguazú, 25°49'43''S 54°26'58''W, 6–7 January 2008, C.H. Dietrich *et al.*, Malaise trap [MLP]. Paratypes: 4 males, same data [INHS].

Etymology: The specific name refers to the province where the holotype was collected.

Notes: This species is easily distinguished from other species by the processes of the aedeagus.

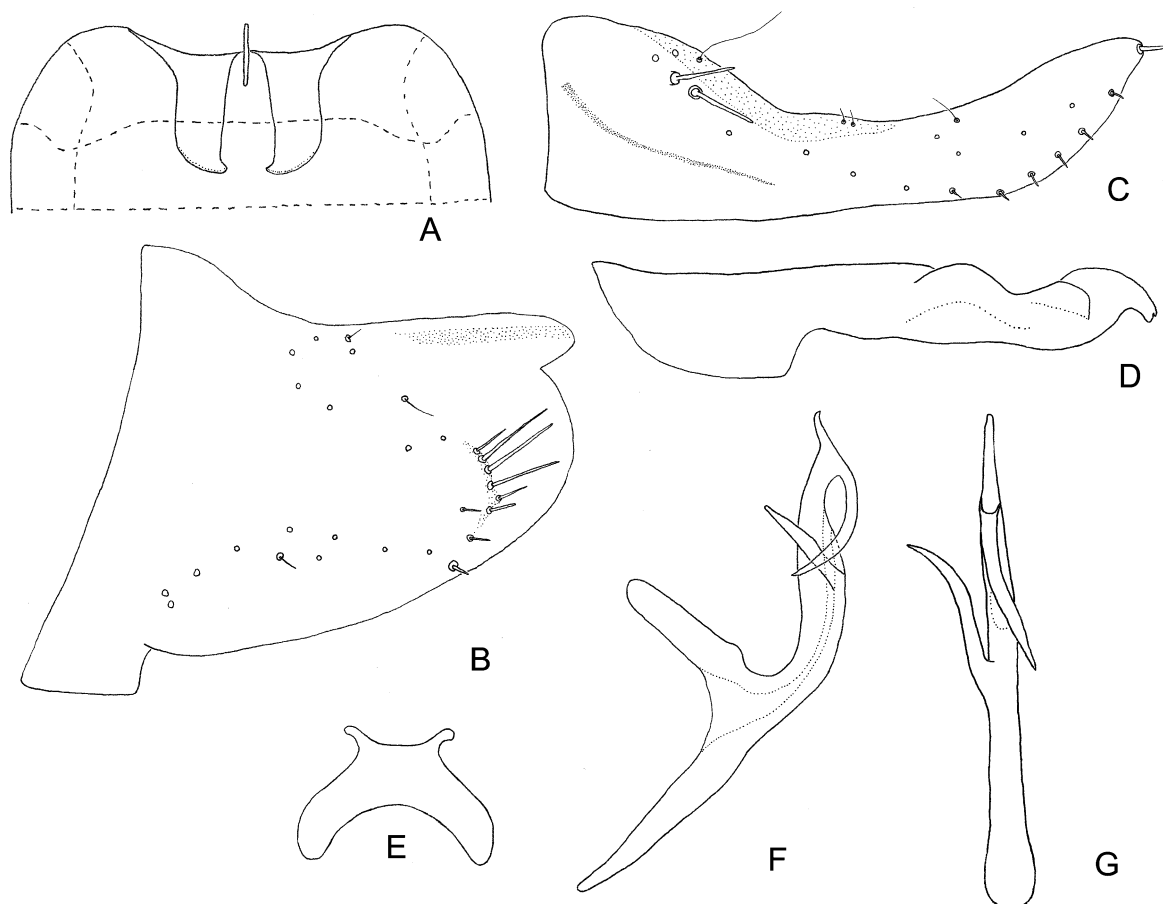


FIGURE 3. *Parallaxis misionensis* sp. n., male. A, sternal apodeme 2S; B, pygofer, lateral view; C, subgenital plate, lateral view; D, style; E, connective; F, aedeagus, lateral view; G, aedeagus, posterior view.

***Parallaxis tucumanensis* sp. n.**

(Figs 1C, 4A–K)

Description. Length of male: 2.9–3.0 mm; female: 3.0–3.1 mm.

Ground color yellowish brown. Crown and pronotum yellow with irregular light brown spots, coronal suture dark. Scutellum yellow. Forewing greenish yellow, apex smoky with transparent roundish spots at base of apical cells and at apex of discal cells; claval area with brownish areas tessellated with small round whitish spots (Fig. 1C). Fore and hind wing venation characteristic of genus.

Male: Second sternal apodemes (2S) (Fig. 4A) long, reaching posterior margin of fourth segment. Pygofer (Fig. 4B) quadrangular in lateral view, posterior margin with strong falcate spine on upper corner and short fingerlike lobe with irregular denticuli posteroventrally, 4–5 macrosetae on dorsal caudal margin and several microsetae on caudal margin. Subgenital plate (Fig. 4C) with base wider than apex, apex curved dorsally, oblique single row of 5–6 macrosetae over basal half and several microsetae in apical half. Style (Fig. 4D) with small preapical lobe with group of 4–5 small setae on margin; apical extension elongate and nearly straight. Connective (Fig. 4E) U-shaped. Aedeagus (Figs 4F–G) with short preatrium; barlike dorsal apodeme; shaft with pair of

subapical dorsal processes curved cephalo-ventrad in lateral view, single apical process curved caudo-ventrad, and a subapical tooth on dorsal margin; gonopore subapical.

Female: Sternite VII (Fig. 4H) rounded with several microsetae on disk. Pygofer (Fig. 4I), in lateral view, oval with 12 macrosetae in row on caudo-ventral margin. Second valvulae slender, large valve (Fig. 4J) with 14–16 strong teeth irregularly denticulate, ventral margin with 7–8 small teeth, with three sclerotized longitudinal bars, ramified apically, on lateral surface; small valve (Fig. 4K) without teeth on apex, and three sclerotized longitudinal bars on lateral surface.

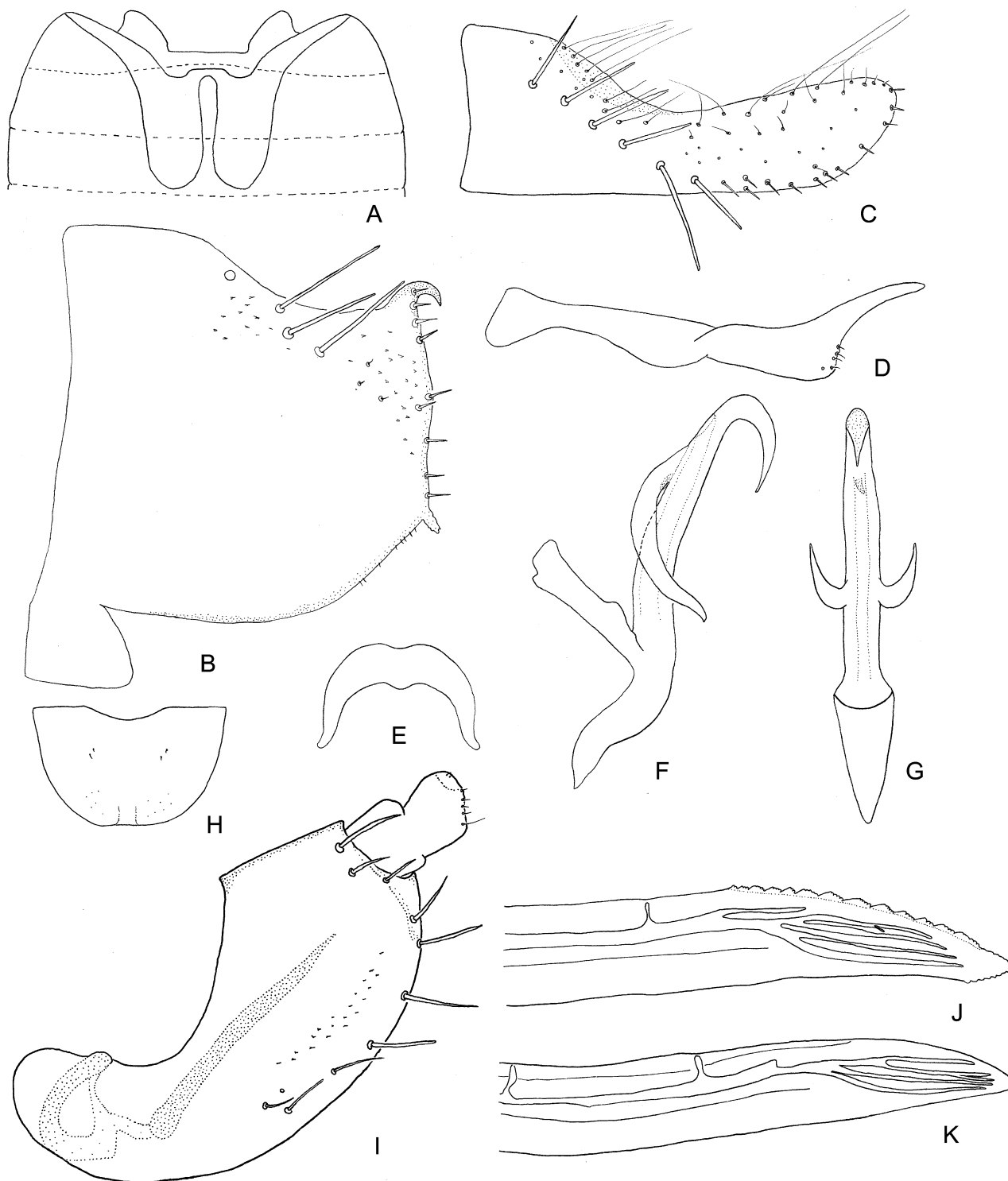


FIGURE 4. *Parallaxis tucumanensis* sp. n. A–G (male). A, sternal apodeme 2S; B, pygofer, lateral view; C, subgenital plate, lateral view; D, style; E, connective; F, aedeagus, lateral view; G, aedeagus, posterior view. H–K (female). H, sternite VII; I, pygofer; J, large valve; K, small valve.

Material examined: Holotype male: ARGENTINA: Tucumán, Los Planchones, 26°36'04.32S 65°25'11.49W, 30–31 March 2010, E. Virla, Malaise trap. [MLP]. Paratypes 3 males and 3 females: ARGENTINA: Tucumán, Los Planchones, 16–19 April 2010 and 8–11 April 2011, E. Virla, Malaise trap. [2 males and 2 females in INHS] [1 male and 1 female in IML].

Etymology: The specific name refers to the province where the holotype was collected.

Notes: This species closely resembles *P. donaldsoni* Baker, but has the apical processes of the aedeagus longer, shifted basad and oriented differently in posteroventral view.

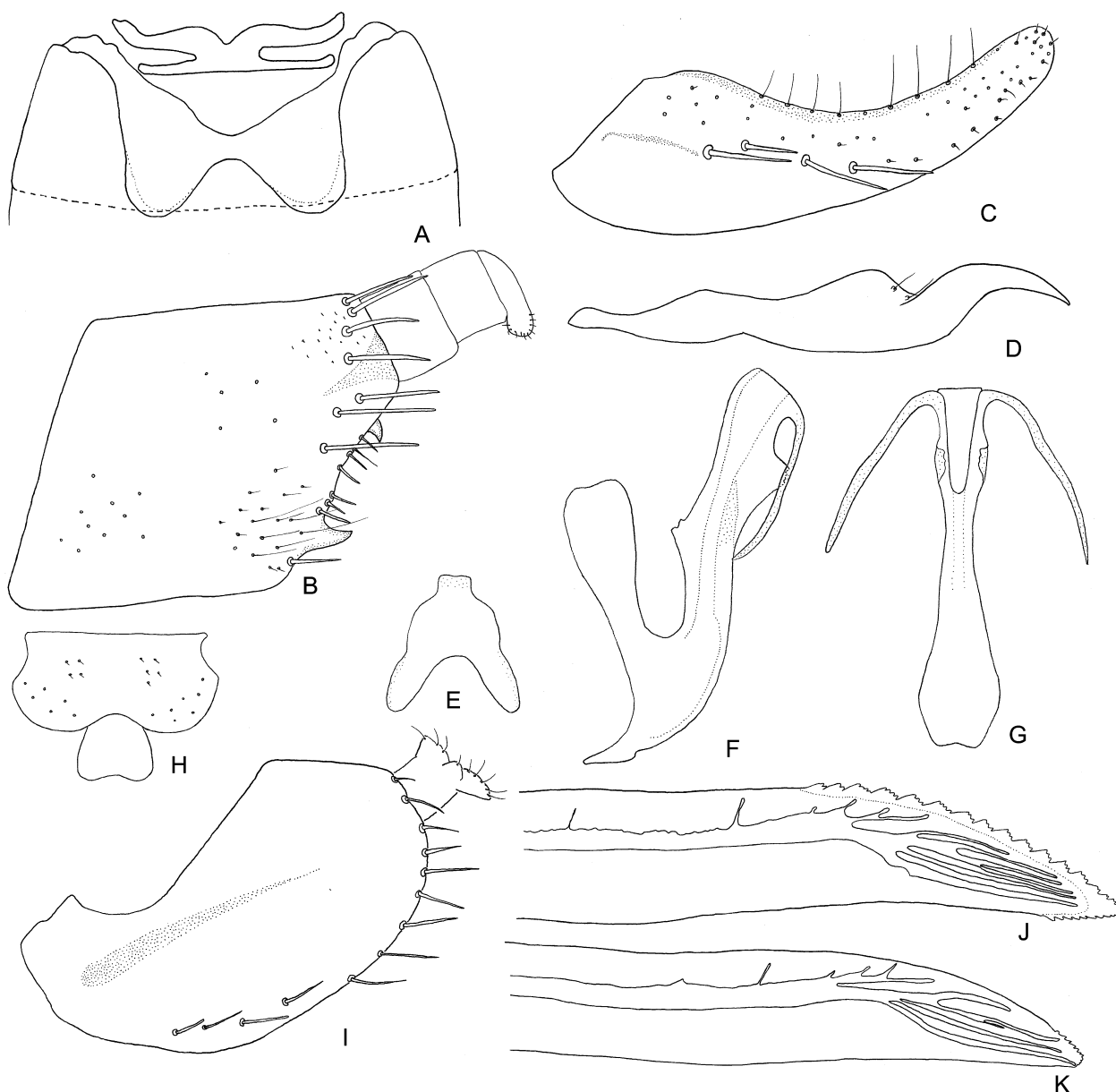


FIGURE 5. *Parallaxis virlai* sp. n. A–G (male). A, sternal apodeme 2S; B, pygofer, lateral view; C, subgenital plate, lateral view; D, style; E, connective; F, aedeagus, lateral view; G, aedeagus, posterior view. H–K (female). H, sternite VII; I, pygofer; J, large valve; K, small valve.

***Parallaxis virlai* sp. n.**

(Figs 1D, 5A–K)

Description. Length of male: 2.7–2.8 mm; female 3.0 mm.

Ground color brown, mottled with red and yellow. Crown yellow with two V-shaped dark brown spots on

apical margin and two small triangular spots on hind margin, coronal suture dark basally. Pronotum and scutellum mottled with brown. Forewing light brown with four rectangular red spots, two in claval area and two in brachial cell, brochosome area delimited by brown and red; apical cells smoky with transparent spots, veins yellow (Fig. 1D). Fore and hind wing venation characteristic of genus.

Male: Second sternal apodemes (2S) (Fig. 5A) short, scarcely exceeding third segment. Pygofer (Fig. 5B) quadrangular in lateral view, with vertical irregular row of seven macrosetae posterodorsally, group of very thin and long setae near posteroventral margin and several setae on caudal margin, and pair of short convergent spines, one near posterodorsal caudal margin and another near posteroventral caudal margin. Subgenital plate (Fig. 5C) with nearly parallel margin, oblique single row of four macrosetae over basal half of disk, long and thin setae on dorsal margin and several microsetae in apical half. Style (Fig. 5D) with rounded preapical lobe with two small setae; apical extension falcate. Connective (Fig. 5E) U-shaped. Aedeagus (Figs 5F–G) without preatrium; dorsal apodeme well developed, wider at apex than at base; shaft compressed, with few small teeth in middle of dorsal surface, paired long apical processes extended ventro-cephalad and paired triangular irregularly denticulate ventral subapical processes; apex truncate; gonopore apical.

Female: Sternite VII (Fig. 5H) bilobed with heart-shaped medial process, with few microsetae on disk. Pygofer (Fig. 5I) in lateral view oval with 12–14 macrosetae in row on caudo-ventral margin. Second valvulae slender, large valve (Fig. 5J) with 14 strong teeth with two to four denticles each, ventral margin with 9–10 teeth, one sclerotized longitudinal bar ramified from apical third on lateral surface; small valve (Fig. 5K) with 6–8 small teeth on apex, and one sclerotized longitudinal bar ramified near apex on lateral surface.

Material examined: Holotype male: ARGENTINA: Tucumán, Las Tipas, 966 m 26°37'53.16"S 65°23'03.28"W, 14–21 January 2008, [MLP], E. Virla *et al.*, Malaise trap. Paratypes: ARGENTINA: 2 males and 1 female, Tucumán, Los Planchones, 26°36'04.32S 65°25'11.49W, 30–31 March 2010, Malaise trap; 1 female, Los Planchones, 16–19 April 2010, E. Virla *et al.*, Malaise trap. [IML].

Etymology: This species is named in honor of Dr. Eduardo Virla, who sent the specimens to me for study.

Notes: This species closely resembles *P. jujuiensis* sp. n., but has the aedeagus with teeth on dorsal surface, apex truncate, subapical processes denticulate; pygofer with apical processes in different position.

Previously described species

Parallaxis anisa Freytag

Parallaxis anisa Freytag, 2001: 137.

Distribution: Belize.

Parallaxis beata McAtee

Parallaxis tessellata var. *beata* McAtee, 1926: 155.

Parallaxis beata Linnavuori 1954: 162.

Distribution: Brazil.

Parallaxis colorata Linnavuori

Parallaxis colorata Linnavuori, 1954: 157.

Distribution: Costa Rica, Panama.

Parallaxis donaldsoni (Baker)

Erythria donaldsoni Baker, 1903: 4.

Parallaxis donaldsoni Young, 1952: 50.

Parallaxis diffusa Ruppel & DeLong, 1953, 181.

Distribution: Mexico, Belize, Honduras, Panama, Nicaragua, Costa Rica, Panama, Venezuela, Brazil, Paraguay, Argentina.

Biology: on grass.

***Parallaxis guzmani* (Baker)**

Erythria guzmani Baker, 1903: 4.

Parallaxis clathrata McAtee, 1926: 157.

Parallaxis guzmani Osborn, 1928: 266.

Distribution: Mexico, Honduras, Nicaragua, Costa Rica, Panama, Peru.

Biology: on *Avocado*, *Citrus*, grass, and *Phaseolus vulgaris*.

***Parallaxis imitans* Linnavuori**

Parallaxis imitans Linnavuori, 1954: 161.

Distribution: Argentina.

***Parallaxis maesi* Freytag**

Parallaxis maesi Freytag, 2001: 135.

Distribution: Costa Rica, Nicaragua.

***Parallaxis ornata* Osborn**

Parallaxis ornata Osborn, 1928: 266.

Distribution: Colombia.

***Parallaxis permunda* (Stål)**

Typhlocyba permunda Stål, 1862: 56.

Parallaxis permunda (Stål) Young, 1954: 50.

Distribution: Brazil, Argentina.

***Parallaxis praenubila* Linnavuori**

Parallaxis praenubila Linnavuori, 1954: 160.

Distribution: Argentina.

***Parallaxis respersa* McAtee**

Parallaxis respersa McAtee, 1926: 156.

Distribution: Brazil.

***Parallaxis tessellata* McAtee**

Parallaxis tessellata McAtee, 1926: 155.

Distribution: Brazil.

***Parallaxis vacillans* McAtee**

Parallaxis vacillans McAtee 1926: 154.

Distribution: Brazil.

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