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A new species of *Pentagramma* Van Duzee (Hemiptera: Delphacidae: Asiracinae) from Chile, with notes on the host relations of the Idiosystatini Emeljanov

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Abstract

Pentagramma lueri sp. nov. is described from central Chile, being the first record of the genus in the country. The host relation of tribe Idiosystatini Emeljanov is discussed; indirect evidence suggests that all genera of the tribe feed on Cyperaceae.

Key words: Fulgoroidea, *Idiosystatus*, *Idiosemus*, South America, Southern Cone

Resumen

Se describe *Pentagramma lueri* sp. nov. de Chile central, siendo el primer registro del género en el país. Se discute la relación con los hospederos de la tribu Idiosystatini Emeljanov; evidencia indirecta sugiere que todos los géneros de la tribu se alimentan de Cyperaceae.

Palabras clave: Fulgoroidea, *Idiosystatus*, *Idiosemus*, South America, Southern Cone

Introduction

Asiracine delphacids are characterized by a spine-like calcar on hind tibia without teeth. They have been recently treated in the New World by Barringer & Bartlett (2011), who provided a key for separation of the genera. Idiosystatini Emeljanov is the only tribe of this group present in Chile. It is currently composed of *Idiosystatus* Berg, with five species (Fennah, 1969); *Idiosemus* Berg, with one species (Berg, 1883; Fennah, 1965); and *Pentagramma* Van Duzee, with seven species (Penner, 1947; Hedrick-Zeller & Wilson, 2010). Whereas *Idiosystatus* and *Idiosemus* are restricted to the Southern Cone; the genus *Pentagramma* is widely distributed over America with species found from Canada to Argentina. The objective of this contribution is to describe a new species of *Pentagramma* from Chile and to discuss the host relations of *Idiosystatus* and *Idiosemus*.

Materials and methods

Morphological terminology is based mostly on Asche (1985), with the following modifications: styles instead of parameres, segment X instead of anal tube, segment XI instead of anal style and using the terminology proposed in Anufriev & Emeljanov (1988) for head and Bourgoin (1993) for female genitalia. All measures are given in millimeters. These were taken from four male and four female specimens obtaining mean, standard deviation, minimum and maximum. Body length was measured excluding wings. Width was measured at level of tegulae. Photographs were taken by a digital camera adapted to stereoscopic and compound optical microscopes. For description and illustration of genitalia, abdomen was removed and placed in a saturated KOH solution at room temperature for 24 to 48 hours and was stored in glycerin in a microvial pinned below respective specimen. The following acronyms are used:

CFUA	Colección Ernesto Kraemer, Universidad Austral de Chile, Valdivia, Chile.
CPAL	Alfredo Lüer Collection, Santiago, Chile.
HRCC	Hemiptera Reference Collection, Centro de Estudios en Biodiversidad, Punta Arenas, Chile.
IDEA	Colección Entomológica, Universidad de Tarapacá, Arica, Chile.
IDEP	Pabellón de Colecciones Biológicas “Prof. Edmundo Pisano”, Instituto de la Patagonia, Universidad de Magallanes, Punta Arenas, Chile.
JFCW	Juan F. Campodonico Collection, Santiago, Chile.
MEUC	Museo Entomológico Luis Peña, Universidad de Chile, Santiago, Chile.
MLPA	Museo de la Plata, Universidad Nacional de la Plata, La Plata, Argentina.
MNNC	Museo Nacional de Historia Natural, Santiago, Chile.
NMPC	Národní Muzeum, Prague, Czech Republic.
UCCC	Museo de Zoología, Universidad de Concepción, Concepción, Chile.
UDCC	Insect Reference Collection, University of Delaware, Newark, DE, USA.
UMCE	Instituto de Entomología, Universidad Metropolitana de Ciencias de la Educación, Santiago, Chile.
USNM	National Museum of Natural History, Smithsonian Institution, Washington D.C., USA.
ZIN	Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia.

Taxonomy

Pentagramma Van Duzee, 1897

Pentagramma lueri sp. nov.

(Figs 1–21)

Description. Male length 4.27 ± 0.09 , min 4.18, max 4.39; width 1.19 ± 0.04 , min 1.16, max 1.24. Female length 5.98 ± 0.5 , min 5.43, max 6.45; width 1.46 ± 0.11 , min 1.31, max 1.59.

Coloration. Fulvous with green tonalities and dark markings (brown to black); coloration of females normally lighter with green tonalities and dark markings less conspicuous. Head (Figs 1–5) with usually a pair of maculae on disc of coryphe, median carina concolorous; rest of carinae of head darkened; eumetope (Figs 4, 5) inferiorly lighter, with a pair of dark longitudinally enlarged markings on inferior half positioned laterad to carinae, and a pair of enlarged pale markings near middle positioned mediad to lateral margins; clypeus (Figs 4, 5) paler at carinae; longitudinal dark stripes on pedicel (Figs 4, 5). Thorax with pronotum (Figs 1, 3) darkened behind eyes, green tonalities distinct on posterior margin, median and lateral carinae concolorous, usually pair of foveolar dark markings on disc; mesonotum (Figs 1, 3) darkened laterocaudally and between carinae; laterocaudal markings transverse, usually not reaching posterior margin. Wings (Figs 1–3) with dark maculae near apex of clavus. Femora and tibiae with longitudinal dark stripes. Abdomen with terga and sterna darkened at disc, medially and marginally lighter, sometimes dark portion reduced to a pair of markings or absent.

Head. Macroscoryphe (Figs 1, 3) slightly narrowing distad, near one third of its length distally of anterior margin of eyes; median carina distinct or rather indistinct; posterior margin weakly concave, positioned slightly basad of level of middle of eyes. Ocelli near eyes (Fig. 2). Concavities of eyes reaching near one third of its height (Fig. 2). Eumetope (Figs 4, 5) with maximum width near middle, wider than half of its length; carinae conspicuous, separation between carinae as separation between each carina and lateral margin. Clypeus (Figs 4, 5) with basal width about two thirds as its length. Rostrum (Figs 4, 5) reaching mesocoxae. Pedicel near two times length of scape (Figs 4, 5).

Thorax. Pronotum (Figs 1, 3) with median and lateral carinae distinct; length about one third of maximum width; posterior margin sinuous, medially concave. Mesonotum (Figs 1, 3) with length about two thirds of its width; five carinae on disc; intermediate carinae more elevated than rest, not reaching margins. Tegulae (Figs 1–3) conspicuous.

Wings. Length of forewing (Figs 1–3): male 3.94 ± 0.17 , min 3.71, max 4.11; female 5.21 ± 0.39 , min 4.93, max 5.78; forewings in females sometimes not surpassing segment XI.



FIGURES 1–5. *Pentagramma lueri* sp. nov. 1. Male habitus, dorsal view. 2. Male habitus, lateral view. 3. Female habitus, dorsal view. 4. Female head, ventral view. 5. Male head, ventral view. Scale bars = 1 mm.

Legs. Fore legs weakly compressed; protibiae slightly shorter than profemora. Metatibiae (Fig. 6) with three lateral spines, first near base, second slightly nearer to third than to first, third slightly nearer to second than to apex; five apical spines, lateral spines slightly longer. Calcar moderately curved, reaching middle of basal metatarsomere. Basal metatarsomere about two fifths length of metatibia; apex with five outer and three inner spines; outer spines in row larger to smaller from outermost to innermost, fifth spine usually positioned slightly apicad or at level of fourth; first and third inner spines positioned at same level, second positioned basad of first and third. Second metatarsomere with three apical spines at same level, about two fifths length of basal metatarsomere. Apical metatarsomere as long as second metatarsomere.

Male genitalia. Pygofer in lateral view (Fig. 7) with ventral surface longer than dorsal, caudally projected at level of armature of diaphragm; in ventral view (Fig. 8) basally wider; in caudal view (Fig. 9) with armature of diaphragm dorsally convex and conspicuously notched. Styles in lateral view (Fig. 7) abruptly narrowed from ventral surface after basal three fifths, then slightly narrowing apicad; apical portion slightly inclined ventrad and indistinctly curved dorsad; in ventral view (Fig. 8) abruptly narrowed from inner surface after basal three fifths; apical portion curved mediad and slightly convex from inner surface near base. Phallus (Figs 10, 11) asymmetrical, with terminal flagellum dorsally folded craniad; flagellum ending in lobule bearing gonopore and with inner

process arising near middle; flagellum length from base to tip of lobule slightly shorter than length of basal part of phallus from base of phallosome to fold; process bifurcated into large curved spine, and shorter straight spine nearer to lobule. Segment X slightly asymmetrical, shorter than styles, in dorsal view (Fig. 12) slightly narrower at base; in lateral view (Figs 13, 14) with dorsal surface inclined dorsocaudad on basal half; left margin (Fig. 13) more distinctly concave than right (Fig. 14). Segment XI near four sevenths of length of segment X.



FIGURES 6–14. *Pentagramma lueri* sp. nov., male. 6. Hind leg. 7. Genitalia, lateral view. 8. Genitalia, ventral view. 9. Pygopher, caudal view. 10. Phallus, lateral view. 11. Phallus, ventral view. 12–14. Segment X and segment XI: 12. Dorsal view. 13. Left lateral view. 14. Right lateral view. Scale bars Figs 6–8 = 1 mm; Figs 9–14 = 0.5 mm.

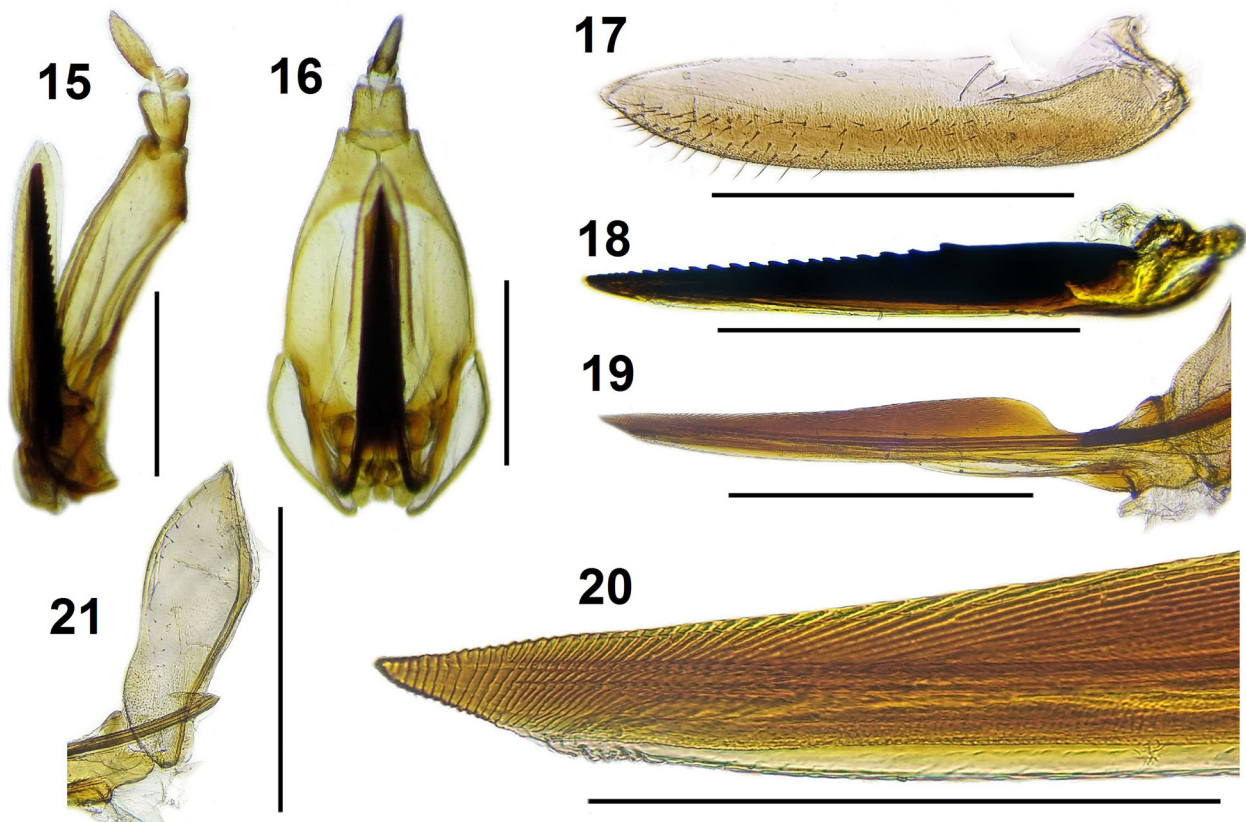
Female genitalia. Ovipositor not surpassing tergum IX (Figs 15, 16). Gonoplags (Fig. 17) slightly more than five times longer than wide; apex slightly acute. Gonapophyses IX (Fig. 18) with superior border coarsely serrated caudad, with about 20 teeth starting after basal third and abruptly reducing size near apex. Gonapophyses VIII (Figs 19, 20) with striation basally longitudinal and becoming transverse at apex, where it generates inconspicuous denticulation on borders; apex acute. Gonocoxae VIII (Fig. 21) with maximum width on distal half; superior border slightly sinuous. Segment X in lateral view (Fig. 15) higher at apex; in ventral view (Fig. 16) wider at base, slightly longer than basal width. Segment XI slightly longer than segment X.

Material examined. Holotype ♂, CHILE, [METROPOLITAN REGION] Santiago Province, Quilicura, Humedal Las Cruces, 33°20'S. 70°43'W., 490 m., 15.XII.2016. J.F. Campodonico leg., on *Schoenoplectus californicus* (MNNC). **Paratypes.** CHILE, [METROPOLITAN REGION] Santiago Province, Quilicura, Humedal Las Cruces, 33°20'S. 70°43'W., 490 m., 15.XII.2016. J.F. Campodonico leg., on *Schoenoplectus californicus*, 8♂♂, 4♀♀ (MNNC), 8♂♂, 4♀♀ (MEUC), 8♂♂, 4♀♀ (UDCC), 8♂♂, 4♀♀ (MLPA), 4♂♂, 2♀♀ (UMCE), 4♂♂, 2♀♀ (UCCC), 4♂♂, 2♀♀ (CFUA), 4♂♂, 2♀♀ (IDEP), 4♂♂, 2♀♀ (HRCC), 4♂♂, 2♀♀ (IDEA), 4♂♂, 2♀♀ (USNM), 4♂♂, 2♀♀ (NMPC), 4♂♂, 2♀♀ (CPAL), 1♂ (ZIN), 23♂♂, 6♀♀ (JFCW); CHILE, [METROPOLITAN REGION] Santiago Province, Quilicura, Humedal Las Cruces, 33°20'S. 70°43'W., 490 m., 27.XI.2016. A. Lüer leg., on *Schoenoplectus californicus*, 4♂♂, 5♀♀ (JFCW).

Etymology. This species is named after Chilean entomologist Alfredo Lüer who collected the first specimens used in this study.

Note. This species is the first Chilean species of *Pentagramma* and the fourth of the Southern Cone (together with *P. nimbata* (Berg, 1879), *P. nigrifrons* Muir, 1934 and *P. cosquina* Penner, 1947). *P. lueri* differs from *P. cosquina* by the absence of a ventral projection at apex of segment X and the presence of a pair of dark and pale markings on eumetope (a ventral projection at apex of segment X and eumetope with two transverse pale fringes in *P. cosquina*); from *P. nimbata* by the not darkened clypeus and for having the intermediate carinae of mesonotum more elevated than the rest (clypeus anteriorly darkened and intermediate carinae less distinct in *P. nimbata*), and from *P. nigrifrons* by the abruptly narrowing of styles in lateral view and not darkened eumetope and clypeus (styles not abruptly narrowed in lateral view and eumetope darkened with pale markings in *P. nigrifrons*). It can be easily separated from *P. douglasensis* Penner, 1947, *P. bivittata* Crawford, 1914, *P. vittatifrons* (Uhler, 1876) and *P. longistylata* Penner, 1947 (distributed on the northern hemisphere; treated by Hedick-Zeller & Wilson, 2010) by the long and curve spine of flagellum in phallus (males) and the coarsely serrated caudad gonapophyses IX (females) (flagellum of phallus with spines short or absent and gonapophyses IX with teeth fine or not directed caudad in the other species).

All specimens were collected on *Schoenoplectus californicus* (C.A. Mey.) Soják (Cyperaceae). A sample of the host plant is deposited in Herbario de la Facultad de Ciencias Agronómicas, Universidad de Chile, Santiago, Chile (AGUCH).



FIGURES 15–21. *Pentagramma lueri* sp. nov., female. 15. Genitalia, lateral view. 16. Genitalia, ventral view. 17. Gonoploc. 18. Gonapophyses IX. 19. Gonapophysis VIII. 20. Detail of apex of gonapophysis VIII. 21. Gonocoxa VIII. Scale bars Figs 15–19, 21 = 1 mm; Fig. 20 = 0.5 mm.

Idiosystatus Berg, 1883

Idiosystatus acutiusculus (Spinola, 1852)

Material examined. CHILE, [VALPARAÍSO REGION] San Antonio Province, El Tabo, Quebrada de Cordova, 33°26'S. 71°39'W., 35 m., 10.XII.2016, J.F. Campodonico leg., sweeping, 2♀♀ (JFCW); CHILE, [METROPOLITAN REGION] Santiago Province, Quilicura, Humedal Las Cruces, 33°20'S. 70°43'W., 495 m.,

15.XII.2016. J.F. Campodonico leg., on *Schoenoplectus californicus*, 12♂♂, 9♀♀ (JFCW); CHILE, [METROPOLITAN REGION] Santiago Province, Quilicura, Humedal Las Cruces, 33°20'S. 70°43'W., 495 m., 27.XI.2016. A. Lüer leg., on *Schoenoplectus californicus*, 1♂, 1♀ (JFCW); CHILE, [MAULE REGION] Talca Province, Putú, 35°40'S. 72°11'W., 11 m., 16.VII.2016, J.F. Campodonico leg., sweeping, 2♂♂, 9♀♀ (JFCW); CHILE, [MAULE REGION] Cauquenes Province, Los Queules, 35°59'S. 72°41'W., 500 m., 28.VIII.2016, J.F. Campodonico leg., sweeping 2♂♂ (JFCW); CHILE, REGIÓN DE LOS RÍOS [LOS RÍOS REGION], Provincia de Valdivia [Valdivia Province], Chaihuín, 39°57'S. 73°34'W., 5 m., 11.II.2015, J.F. Campodonico leg., sweeping, 8♂♂, 3♀♀ (JFCW).

Note. Specimens of this species were collected together with *P. lueri* on *S. californicus*. This species has been collected by sweep netting on wetland vegetation dominated by Cyperaceae.

Idiosystatus fuscoirroratus (Blanchard, 1852)

Material examined. CHILE, [VALPARAÍSO REGION] San Antonio Province, El Tabo, Quebrada de Cordova, 33°26'S. 71°39'W., 35 m., 10.XII.2016, J.F. Campodonico leg., sweeping, 3♂♂ (JFCW); CHILE, [VALPARAÍSO REGION] San Antonio Province, Las Cruces, 33°29'S, 71°38'W, 10 m., 18.VII.2016, J.F. Campodonico leg., sweeping, 2♀♀ (JFCW).

Note. This species has been collected by sweep netting on wetland vegetation dominated by Cyperaceae.

Idiosemus Berg, 1883

Idiosemus xiphias (Berg, 1879)

Material examined. CHILE, V REGIÓN [VALPARAÍSO REGION], Provincia de Valparaíso [Valparaíso Province], Humedal de Mantagua, 32°52'S. 71°30'W. 11 m., 28.XII.2014, J.F. Campodonico leg., sweeping, 4♂♂, 3♀♀ (JFCW); CHILE, [VALPARAÍSO REGION] San Antonio Province, Las Cruces, 33°29'S, 71°38'W, 10 m., 18.VII.2016, J.F. Campodonico leg., sweeping, 2♀♀ (JFCW); CHILE, [MAULE REGION], Talca Province, Putú, 35°40'S. 72°11'W., 11 m., 16.VII.2016, J.F. Campodonico leg., sweeping 1♂ (JFCW).

Note. This species has been recorded on *Baccharis coridifolia* DC. (Asteraceae) by Berg (1883). All specimens collected by the author were obtained from sweep netting on wetland vegetation dominated by Cyperaceae.

Discussion

Regarding to the host relations of the tribe Idiosystatini, the monophagy of *Pentagramma* with *Schoenoplectus* (Cyperaceae) has been already addressed by Hedrick-Zeller & Wilson (2010). In *Idiosystatus*, the first host plant record is provided for *I. acutiusculus* by selective sampling on *S. californicus*, while not selective sampling already suggest the association of this genus with its plant family. The record of *Idiosemus xiphias* on *Baccharis coridifolia* (Asteraceae) by Berg (1883) could have been occasional, as this species have been collected on herbaceous stratum of wetlands dominated by Cyperaceae, not on Chilean *Baccharis* representatives nor other Asteraceae. This specific kind of habitat does not support polyphagy or feeding on dicots but a similar host relation as other Idiosystatini genera. Additional efforts to elucidate the amplitude of *Idiosemus* and *Idiosystatus* hosts are required.

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