



A New Genus and Species of Delphacini (Hemiptera: Fulgoromorpha: Delphacidae) Associated with Hydrophytic Plants in Argentina

Authors: Lenicov, Ana M. Marino De Remes, and Walsh, Guillermo Cabrera

Source: Florida Entomologist, 96(4) : 1350-1358

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.096.0414>

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

A NEW GENUS AND SPECIES OF DELPHACINI (HEMIPTERA: FULGOROMORPHA: DELPHACIDAE) ASSOCIATED WITH HYDROPHYTIC PLANTS IN ARGENTINA

ANA M. MARINO DE REMES LENICOV¹ AND GUILLERMO CABRERA WALSH²

¹División Entomología, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata,
Paseo del Bosque S/Nº (B1900FW). La Plata, Buenos Aires, Argentina

²FUEDEI (Fundación para el Estudio de Especies Invasivas), Bolívar 1559, Hurlingham, Buenos Aires, Argentina

Corresponding author; E-mail: amarino@fcnym.unlp.edu.ar ; marinoremes@gmail.com

ABSTRACT

A new delphacid genus and species from Argentina, *Lepidelphax pistiae* Remes Lenicov, **gen. et sp. nov.** (Hemiptera: Fulgoromorpha: Delphacidae: Delphacini), is described and illustrated, and biological, distribution and experimental host range data are provided. Males of the new genus are easily distinguished from all other Neotropical Delphacini by being pale cream to white in color with a distinctive pair of longitudinal stripes on the face and symmetrical dark brown to black spots on the thorax and abdomen; very slender, laterally compressed, with long legs, narrow and short vertex with a small sub-apical areola continued by a distinctively simple frontal median carina. It also has unique male genital structures. Laboratory and field data indicate this species is a specialized herbivore that feeds and oviposits exclusively on *Pistia stratiotes* (Alismatales: Araceae), a floating macrophyte native to South America. *Lepidelphax pistiae* was found throughout the distribution of *P. stratiotes* in Argentina.

Key Words: Auchenorrhyncha, planthopper, new genus new species, distribution, host plants, *Pistia stratiotes*, Araceae, biological control, Argentina

RESUMEN

Un nuevo género y especie de Delphacidae de Argentina, *Lepidelphax pistiae* Remes Lenicov (Hemiptera: Fulgoromorpha: Delphacidae: Delphacini), es descrito e ilustrado aportando datos biológicos, de distribución y rango de hospederos, mediante pruebas experimentales. Los machos del nuevo género se distinguen fácilmente de los otros Delphacini Neotropicales por su coloración amarillenta a blancuzca con distintivas bandas longitudinales pares marrón oscuro a negras entre las carenas de la región frontal, y también otras máculas dorsales y laterales en el tórax y abdomen. Son formas esbeltas, comprimidas lateralmente, con patas largas; cabeza con el vertex estrecho y corto, una pequeña areola subapical continuada por una marcada carena mediana frontal simple. Complejo genital del macho con características distintivas. Datos de laboratorio y de campo indican que es una especie herbívora especialista que se alimenta y ovipone exclusivamente en *Pistia stratiotes* L. (Alismatales: Araceae), macrófita flotante nativa de América del Sur. *Lepidelphax pistiae* fue encontrada a lo largo de la distribución de *P. stratiotes* en la Argentina.

Palabras Clave: Auchenorrhyncha, Delphacidae, nuevo género, nueva especie, distribución, planta huésped, *Pistia stratiotes*, Araceae, control biológico, Argentina

The floating macrophyte *Pistia stratiotes* L. (Alismatales: Araceae), commonly known as water lettuce, is common in fresh waters of most tropical and subtropical regions of the world. In many countries it is considered a noxious weed, and has been a target of management research and control for the last 3 decades (Holm et al. 1979; Neuenschwander et al. 2009). Although its ancestral origin is matter of debate, specialized natural enemies have been located in South America (with the exception of Chile), northern

Australia and the Indian subcontinent (DeLoach et al. 1976; Gillet et al. 1988; <http://www.cabi.org/ISC/>). DNA studies suggest *P. stratiotes* may in fact be native to all these areas (Renner & Zhang 2004).

During a survey for natural enemies of this plant in northern and central Argentina, macropterous and brachypterous specimens of a slender and delicate Delphacini (Hemiptera: Delphacidae) were discovered. The morphology of these specimens showed some similarities with other Neotropical

Delphacini genera (e.g. *Megamelus* Fieber, *Phryctopyga* Caldwell, *Pissonotus* Van Duzee, *Pygospina* Caldwell, *Pyrophagus* Remes Lenicov and *Tarophagus* Zimmerman) due to the presence of a ventral pygofer process.

It most closely resembles *Pissonotus*, because of the narrow and moderately foliaceous calcar, the subequal length of the antennal segments and some features of the male genitalia (Bartlett & Deitz 2000). This species differs from *Pissonotus*, however, in the carination of the head, and the lack of a pair of symmetrical processes on the ventral margin of the opening of the male pygofer, and coloration pattern, which are diagnostic for this genus.

Among delphacids, the association with Araceae is a biological feature only shared with all three species of *Tarophagus* (the taro planthoppers), *T. colocasiae* (Matsumura, 1929), *T. persephone* (Kirkaldy, 1907) and *T. proserpina* (Kirkaldy, 1907), which are all restricted to taro, *Colocasia esculenta* (L.) Schott (Asche & Wilson 1989; Wilson et al. 1994). Nevertheless, we consider that the combination of the shape and carination of the head, the wing venation, the disproportionate length of the rostrum and legs (very noticeable in brachypterous individuals), the genital characters and the unique longitudinal face coloration pattern, are remarkable enough to erect a new genus.

This study provides the description of the new genus and species: *Lepidelphax pistiae* **gen. nov.** The main diagnostic features are described and illustrated, and further information on biology, geographical distribution and host range in laboratory conditions are provided.

MATERIALS AND METHODS

Adults and nymphs of this species were captured on *P. stratiotes* with aspirators during exploratory surveys carried out by personnel of the Fundación para el Estudio de Especies Invasivas, FUEDEI (formerly USDA-ARS-South American Biological Control Laboratory, SABCL) in the wetlands of the Paraná/Uruguay Basin in Argentina during 2009-2011. Biological observations were recorded in the field and in laboratory conditions at the FUEDEI. Live specimens were transported to the laboratory in 4-L plastic containers with ventilated lids, with some water and 1-2 *P. stratiotes* plants, and used to establish a laboratory colony. Experimental cultures were kept in a greenhouse, in four 9-L polycarbonate tubs with 2 grown *P. stratiotes* plants, for observations on oviposition and development. Equivalent tubs were kept free of these insects alongside the insect colonies as controls. Three large colonies were established in 350-L canvas pools enclosed in walk-in cages in the laboratory garden. One of

these colonies came from populations from the northernmost collection sites in Pirané, province of Formosa (S 25° 59' 18"; W 58° 25' 50"), another from the westernmost locations in Río Hondo, province of Santiago del Estero (S 27° 30' 29"; W 64° 54' 09"), and the last one from its southernmost location in the lower Delta of the Paraná river in Isla Talavera, province of Buenos Aires (S 34° 06' 33"; W 58° 47' 18"). Specimens from each colony and from field collections were preserved in 70% EtOH for morphological studies. Others were frozen dry at -18 °C, in order to preserve the original colors.

The brachypterous male described in detail, but for females and the other winged forms only the different traits were specified. The morphological terminology mostly follows Asche (1985), but segment X and anal style (segment XI) are used instead of 'anal tube'. For descriptive purposes the parameres will be referred to as having a proximal 'basal angle', and distal 'inner' and 'outer angles' after Bartlett (2006 sensu Metcalf 1949). 'Genital complex' is used descriptively for the aedeagus, connective, parameres, and postgenital segments when these structures are separate from the pygofer. Other components associated with the aedeagus were described following the terminology established by Bourgoin (1987). Nomenclature of the carinae of the vertex follows Yang & Yang (1986). The names of collections from which specimens were examined or deposited are abbreviated. Both male and female genitalia of the species were prepared for microscopic examination according to standard taxonomic techniques (Remes Lenicov & Virla 1993). Measurements were taken from 10 specimens of each gender and winged forms and are given in millimeters. Drawings were made with a LEICA EZ5 stereoscopic microscope with a camera lucida and also from photographs using a RRID 18 HD digital camera adapted to the microscope.

Abbreviations are as follows: L., total length with forewing in repose; B.L., body length; W., maximum body width; t.l., tegmina length and t.n., number of teeth on metatibial spur; other measurements are relative.

Total length was measured from the anterior margin of vertex to the abdominal apex and in macropters up to the apex of the wings; body width was measured at the external margin of tegulae. For macropters, an additional measurement is given, body length, which measures from the apex of vertex to tip of abdomen. Averages are expressed as means \pm SE. The length: width (L:W) ratio of the vertex was measured along the midline and near midlength respectively.

Specimens were deposited in the collections of the Museo de La Plata (MLP), and 2 paratypes (male and female) in Museo Argentino de Ciencias Naturales de Buenos Aires (MACN), Argentina.

LEPIDELPHAX, GEN. NOV.
(FIGS. 12-15)

Type Species

Lepidelpfax pistiae, **sp. nov.**

Diagnosis

Slender, compressed, rather long-legged, pale with distinctive pair of longitudinal dark brown to black stripes on face and several maculations on thorax and abdomen. Head with a shallow, small subapical areola on vertex continued into a distinctive simple median carina extended throughout frons and postclypeous. Male genitalia with a single subacutemedian process margined with a smaller rounded tooth on ventral margin of the pygofer.

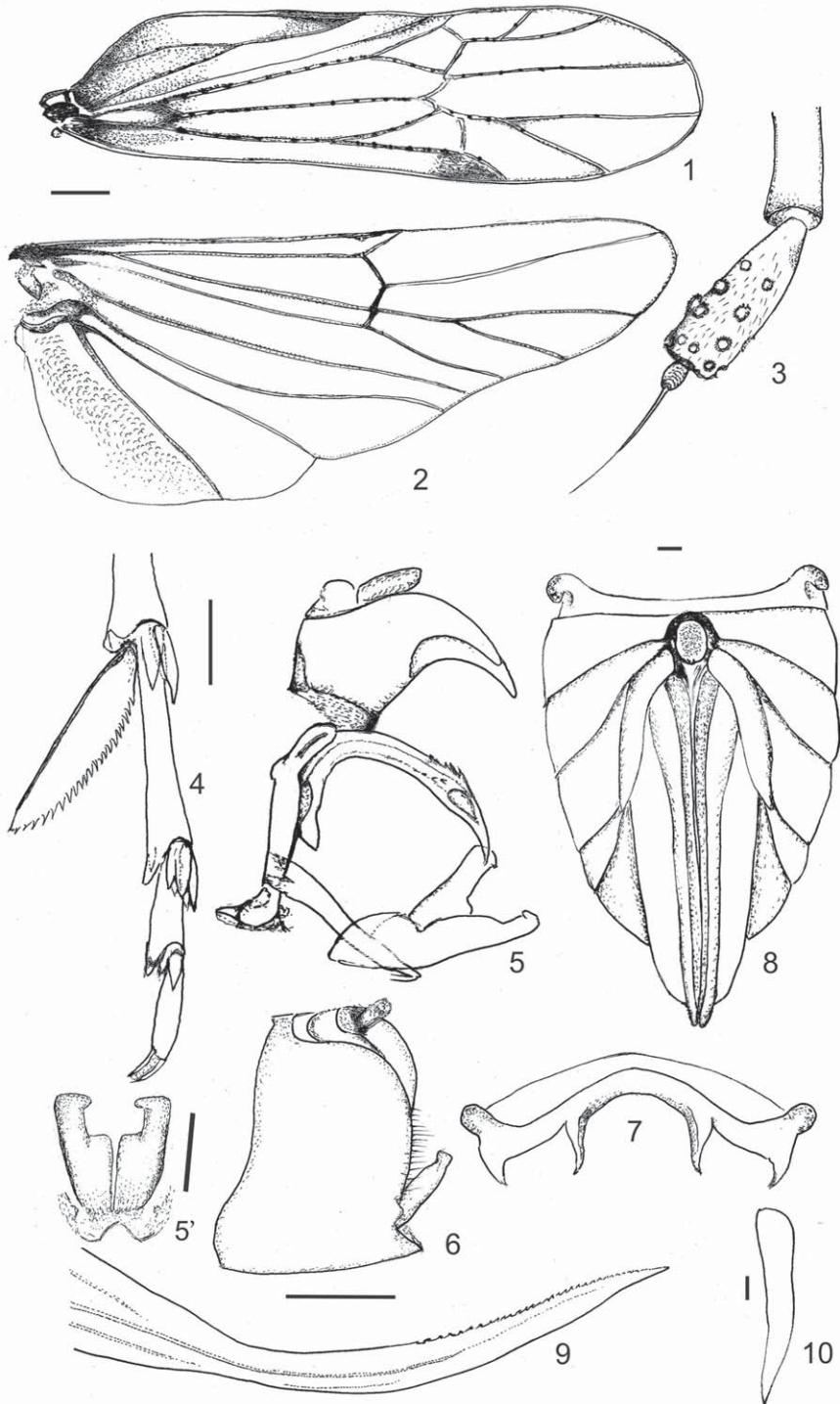
Description

Slender, compressed, rather long-legged, pale delphacid with distinctive longitudinal dark brown to black stripes on face and several maculations on thorax and abdomen. Head narrower than pronotum (1: 1.4). Vertex in dorsal view short and narrow, a little longer than wide, about $\frac{1}{3}$ of its total length projecting beyond the anterior margin of eyes, posterior compartments as long as anterior one, with shallow depressed areas marked on both sides, lateral margin ridged and slightly elevated above eye; submedian carinae arising near anterior margin of the eyes, near to lateral carinae, meeting shortly before the fastigium, delimiting a very shallow, small sub-apical areola continued into a simple nonfurcated median carina; angle of vertex to frons: ca 85-90°. Frons like a slender trapezoid, with lateral margins becoming strongly convex distally, narrower between anterior margins of eyes, maximum width at $\frac{1}{3}$ before apex; suture between front and postclypeus shallowly concave; post- and anteclypeus together $\frac{3}{4}$ the length of frons, median carinae of postclypeus prominent, rounded and almost extinct on anteclypeus. Ocelli small but distinct; compound eyes well developed. Rostrum 3-segmented, well developed, surpassing the third urosternite in repose. Antennae terete, slender, surpassing frontoclypeal suture, with both segment elongate, pedicel covered with short sturdy bristles and 14-16 irregularly arranged sensorial structures. Genae with conspicuous transverse carinae ending in a swelling beneath antennal base; frontal and genal areas laterad of carinae shallowly concave.

Pronotum medially short, at midlength little shorter than length of vertex, broader than head, lateral carinae distinct, posterolaterally directed, not reaching posterior margin; mesonotum, in macropterous form, medially ca. 1.5-1.6 \times longer than pronotum, carinae

straight, lateral carinae shorter and lightly diverging; total length of mesoscutum disc distinctly greater than scutellum (3:1). Fore wing in macropterous specimen, translucent, rather long and slender, length 3.5 times the width, surpassing the distal end of the abdomen about one fifth of their total length; node-line just beyond the half of the length of tegmina; basal cell among Cu, M and ScR well developed; outer subapical cell considerably larger than inner one (Fig. 1); hind wings with M and Cu closed and parallel to each other along mid length, the M forked toward margin, the Cu single and slightly divergent and 3 single anal veins (Fig. 2). Brachypterous form with the forewing semi-hyaline, distally truncate, not exceeding the 4th segment; veins distinct. Legs, long and slender, post tibiae distally with 5 stiff spines grouped 2 in the inner side and 3 in outer side, postbasitarsus distally 7 spines, the 2 shortest located a little basad on external margin; second segment of post tarsi with 4 spines, the submedian shorter than the laterals; post-tibial spur, slender and moderately foliaceous, as long as basitarsus, bearing 20 to 22 regular conical teeth including the distal one on outer margin (22 on holotype); outer margin slightly convex. Postbasitarsus $\frac{1}{3}$ shorter than post-tarsal segments II and III together, spinal formula of hind leg 5-7-4. Pretarsus with claws and a conical pad well developed (Fig. 4). Drumming organ sexually dimorphic, male with the 2nd abdominal tergite differentiated in a slightly convex subquadrate central plate limited by weak lateral divergent furrows; 2nd abdominal sternite furnished with a pair of small, slender, apodemes slightly bent caudad (Fig. 7). Female drumming organ inconspicuous, 2nd tergite without major morphological alterations.

Male genitalia. Pygofer longer ventrally than dorsally (about 5:1), dorsal margin deeply excavated to receive anal segment and short style; laterocaudal margins regularly curved; ventrocaudal margin strongly projected in a subacute process margined with a smaller rounded tooth (Fig. 6). Diaphragm weak, without apparent armature. Parameres short, rather flattened and truncate at apex, distal half subparallel with the inner apical angle directed mesad. Aedeagus curved ventrad, bent in "C" shape, shaft slightly compressed, with small retrorse spines, abruptly narrowing at distal fourth; phallosoma subapical on dorsolateral surface; periantrum as a transverse strut obtusely bent caudally against the phallosoma, periantrum and anal segment in close contact; connective long, stout, shortly braced to the periantrum above tectiform structure. Anal segment (X) slender, slightly longer than wide, caudal margins with pair of spinose processes extending ventrally close to each other, anal style (segment XI) moderately short (Fig. 5).



Figs. 1-10. *Lepidelfphax pistae* sp. nov. 1, left forewing; 2, right hind wing; 3, antenna; 4, apex of hind leg (post tibial spur and tarsi); 5, genital complex (aedeagus, connective and parameres) and anal segments, left lateral view; 5', parameres, posterior view; 6, male pygofer, left lateral view; 7, 2nd urosternite, dorsal view. Female: 8, genitalia, ventral view; 9, median gonapophysis IX, lateral view; 10, right valvifer VIII (scale lines figs. 1-7: 0.2 mm.; Figs. 8-10: 0.1 mm.).

Female genitalia: Ovipositor barely surpassing the posterior margin of pygofer; gonapophyses IX slender, slightly curved, wider at basal third, distal third with minute teeth on dorsal margin; valvifers VIII slender, regularly expanded at base; sternite VIII differentiated as uniform, slightly sclerotized plate (Fig. 8); anal style moderately short.

This new genus includes a single species, *Lepidelphax pistiae* Remes Lenicov **sp. nov.**, the type species by original designation.

Etymology

The generic name a combination of words derived from Greek λεπτή (*Lepi*) that means “delicate” with *Delphax* (referring to the type genus, derived from the Greek *delphax* “small pig”). The generic name is feminine.

Remarks

This genus bears superficial resemblance to morphological features of *Pissonotus*, such as the compressed aedeagus, ventroposteriorly curved

with retrorse spines, the weak unarmed diaphragma and the long paired processes on segment 10. It does not share, however, the most critical features of *Pissonotus*—the median carina bifurcate just on the frons, with the forked arms closely proximate until they reach the vertex, and the paired processes on the ventral margin of the pygofer in males. *Lepidelphax* differs also in the ground pattern coloration with distinctive longitudinal dark marks on the head and several regularly distributed small spots on the thorax and abdomen, the simple median carina of the frons, not forked below the fastigium, and the single median process on the ventral margin of the pygofer.

Lepidelphax pistiae sp. nov. (Figs. 1-10, 11 and 12-15)

Type Locality

Isla Talavera, Buenos Aires, Argentina.

Description

Male: Small to medium-sized, predominantly brachypterous forms.



Fig. 11. Map of Argentina with collection sites for *Lepidelphax pistiae* **gen. et sp. nov.** (black squares).

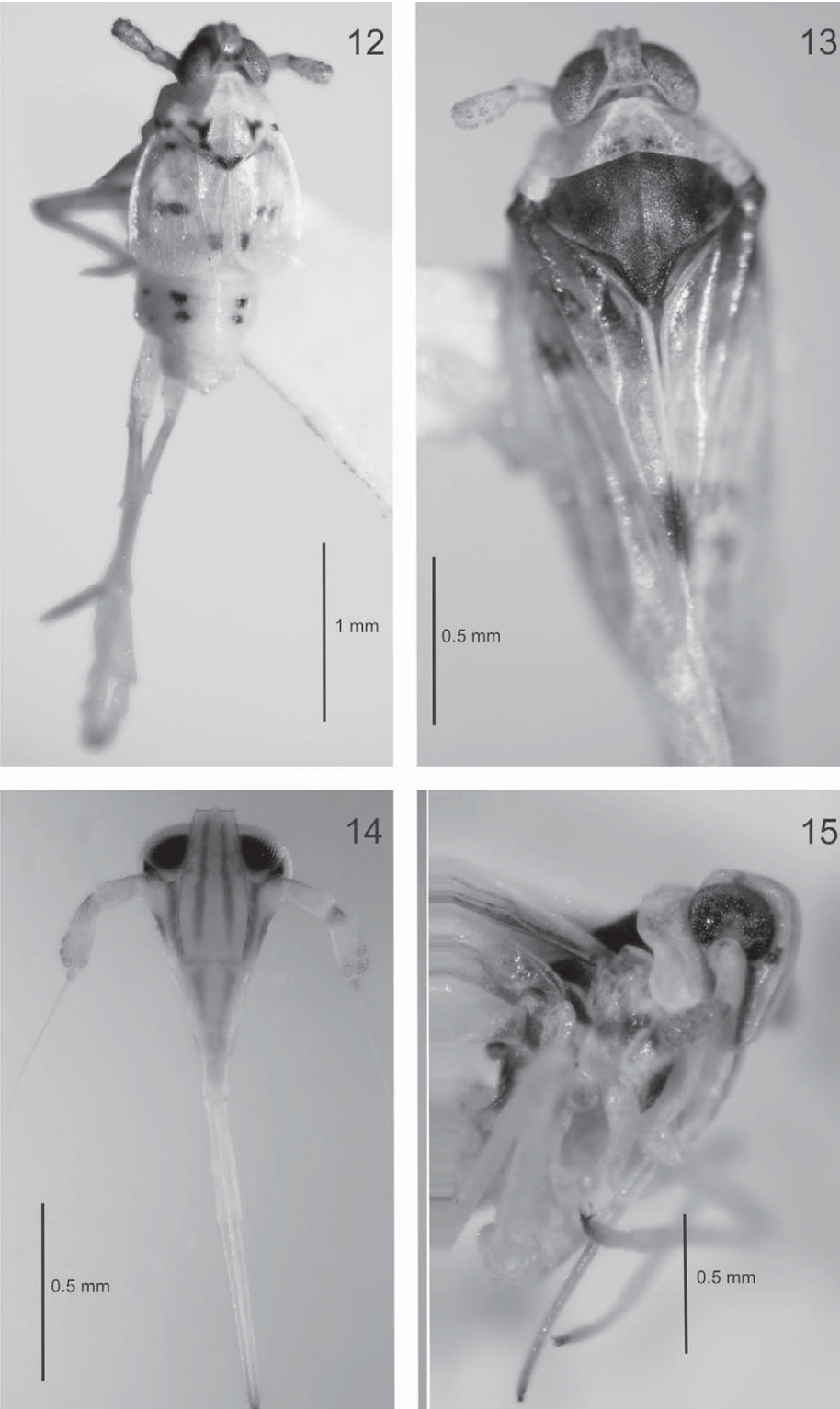


Fig. 12-15. 1: *Lepidelfhax pistae* sp. nov. : 12, male holotype, habitus, dorsal view; 13, macropter female, habitus, dorsal view; 14, head macropter male, anterior view; 15, head and thorax macropter male, right lateral view.

Brachypterous Form: male ($n = 5$) L.: 1.78 ± 0.50 , W.: 0.62 ± 0.1 , t.l.: 0.67 , t.n.: 21 ± 1 ; female ($n = 5$), L.: 2.15 ± 0.4 , W.: 0.64 ± 0.1 , t.l.: 0.70 , t.n.: 21 ± 1 .

Macropterous Form: male ($n = 5$) L.: 2.80 ± 0.58 , B.L.: 1.53 ± 0.4 , W.: 0.77 ± 0.14 , t.l.: 2.46 ± 0.4 , t.n.: 21 ± 1 ; female ($n = 5$) L.: 3.07 ± 0.50 , B.L.: 2.24 ± 0.4 , W.: 0.8 ± 0.1 , t.l.: 2.64 ± 0.1 , t.n.: 21 ± 1 .

Brachypterous Male

Color. Overall whitish translucent with distinctive brown dark to black stripes and maculations: frons, postclypeous and genae with longitudinal stripe between carinae; distinct dark maculae on vertex - 2 median on posterior compartment and one very close on each lateral compartment above the eyes and below the lateral carinae; distinct longitudinal short maculae at the outer side of lateral carinae of mesonotum, 2 transverse at each side on anterior margin and another at apical scutellum, 2 along anterior and posterior margins of postnotum and some other marks on pleurites. Urotergite IV-VI with 4 distinctive submedian and lateral spots on each segment, the submedian larger than the lateral; pygofer slightly testaceous in color. Legs stramineous with femora paler than tibiae. Fore wing semi-hyaline with small spot on claval apex, veins distinct.

Structure. Slender, compressed and rather long-legged delphacid. Head narrower than pronotum (1:1.4), width of head including eyes 1.5 times the length of vertex in middle line. Vertex short and narrow, a little longer than wide, subacutely rounding into frons, about $\frac{1}{3}$ of its total length projecting beyond the anterior margin of eyes, lateral margins subparallel, strongly expanded laterally before eyes, base of vertex with shallow depressed marked areas on both sides; submedian carinae arising near anterior margin of eyes next to prominent lateral carinae, meeting shortly before to fastigium and delimiting a very faint small subapical areola. Median carina distinct, sharp-edged along frons, turning almost extinct toward apex. Frons like a slender trapezoid, with lightly convex side-margins, strongly narrower between anterior margins of eyes, maximum width at $\frac{1}{3}$ before apex. Epistomal suture shallowly concave; post- and anteclypeus together $\frac{1}{3}$ the length of frons, median carinae of postclypeus prominent, anteclypeus rounded, median carina almost extinct; well developed, 3-segmented rostrum, exceeding the third urosternite. Antennae terete, slender, surpassing epistomal suture; basal segment distinctly longer than broad (3x the width); second segment as long as the first, subglobose, with 14-16 sparse antennal sensorial pits irregularly arranged over whole sur-

face, 6 around frontoapical margin (Fig. 3). Eyes prominent on dorsal view. Mesonotal lateral and median carinae short, subparallel, becoming obsolete at $\frac{1}{2}$ of the segment length. Fore wings distally truncate, not exceeding the 4th segment. Pretarsus with slender unguis and a conical pad, both of them quite equally sized (Fig. 4). Other characters of head and thorax as in generic description.

Male drumming organ as in generic description.

Male genitalia (Figs. 5, 5' and 6). Pygofer (Fig. 6) with shape and proportions as in generic description, in caudal aspect ovate, nearly twice higher than its maximum width; laterodorsal angles broadly rounded; diaphragm uniformly weak, dorsal margin shallowly concave leaving a large oval-elliptic opening between diaphragm and segment X, the ventral one very small and rounded. Parameres short, dorsocaudally directed, twice wider at basal half, narrower and subparallel sided at the apical half; in caudal view, apical half with profile rectangular with acute inner apical angle (Fig. 5'). Aedeagus as in generic description, with shaft curved ventrad furnished with retrorse small spines, periantrum obtusely bent caudally at apical third; a small slightly sclerotized plate contacts the periantrum with the ventral margin of the anal segment; connective stout, long, length/width 10:1 (Fig. 5). Anal segment (X) as in generic description.

Macropterous Male

Similar pattern coloration as the brachypterous form but the marks are more infusate, the mesonotum uniformly brown dark colored except the tegulae that are pale and the hyaline fore wing - that are heavily infusate at basal third and at apex of clavus (Fig. 1).

Fore wing rather long and slender, length 3.5 times the width, surpassing the distal end of abdomen about one third of their total length, node-line just beyond the half of the length; outer subapical cell considerably larger than inner one (Fig. 1); hind wing with M and Cu closed and parallel to each other before nodal line, the M forked toward margin and the Cu single and slightly divergent, 3 single anal veins (Fig. 2).

Genitalia similar to brachypterous form.

Brachypterous Female

Structure and pattern coloration similar to the brachypterous males. Drumming organ inconspicuous, with the 2nd tergite armed with bilateral depressions continued with convex areas on both side.

Macropterous Female

Structure and pattern coloration similar to macropterous male. Drumming organ asbrachypterous female.

Female genitalia (Figs. 8-10). Ovipositorwith 20-25 minute caudad directed teeth on dorsal margin; valvifer VIII short, regularly expanded, rounded at base; sternite VIII differentiated in a uniform sclerotized fore sized plate.

Etymology

The specific name “*pistiae*” is taken from the genus of the preferential host plant; and is feminine.

Remarks

Most of the examined specimens of each winged form showed limited range of morphological and color variations. *Lepidelfhax pistiae* can be easily recognized by their distinctive color pattern: pale with brown dark to black longitudinal stripe on face and several maculations on thorax and abdomen; the laterally compressed long-legged form, with narrow and short vertex with a small subapical areola continued into a distinctive simple frontal median carina, and also by the male genital structures. The male specimens can be recognized by the pygofer ventrally 5 times longer than dorsally, with the ventroposterior margin trilobate, diaphragm wide and uniformly membranous; the aedeagus ventrocaudally curved, subtubular at base, shaft, furnished with retrorse small spines, abruptly narrowing in apical fourth, ending in an acute apex; phallotrema subapical on dorsolateral surface, the periandrum as a transversal strut

shortly joined to the anal segment which is armed with a pair of long spinose processes extending ventrally close to one another on the caudal angles. Females can be also recognized by the slightly sclerotized subquadrate plate on sternite VIII and the rounded basal valvifers VIII.

Type Locality

Argentina: Isla Talavera. Buenos Aires.

Type Material

HOLOTYPE: 1♂ brachypter ARGENTINA: Isla Talavera (S 34° 06' 33"; W 58° 47' 18"), Buenos Aires 26-IV-2010, on *Pistia stratiotes*, Cabrera Walsh, col. PARATYPES: 5♀♀ macropters, 3♀♀ brachypters and 2♂♂ macropters and 5♂♂ brachypters, same data; 1♂ and 1♀ brachypter, Río Hondo (S 27° 30' 29"; W 64° 54' 09"), Santiago del Estero 28-VIII-2011 on *Pistia stratiotes* Cabrera Walsh, col.

Additional material (in alcohol): 49♂♂ brachypters, 3♂♂, macropters, 23♀♀ brachypters, and 24♀♀ macropters, ARGENTINA: Isla Talavera (S 34° 06' 33"; W 58° 47' 18"), Buenos Aires IV-2010, on *Pistia stratiotes*, Cabrera Walsh, 5♂♂ and 10♀♀ brachypters, Río Hondo (S 27° 30' 29"; W 64° 54' 09"), Santiago del Estero 28-VIII-2011 on *Pistia stratiotes* Cabrera Walsh, col. (See Table 1 for additional collection sites).

Biology

Our observations indicate that this delphacid is an obligate herbivore on *P. stratiotes* (unpub-

TABLE 1. COLLECTION SITES OF *LEPIDELPHAX PISTIAE* GEN. ET SP. NOV.

Coordinates	Province	Date
S 25° 54' 13" W 58° 35' 27"	Formosa	Dec-17, 2009
S 25° 59' 16" W 58° 25' 52"	Formosa	Dec-17, 2009
S 25° 43' 22" W 59° 05' 14"	Formosa	Apr-10, 2010
S 26° 12' 26" W 59° 06' 51"	Formosa	Oct-28, 2010
S 24° 26' 34" W 60° 22' 30"	Formosa	Oct-28, 2010
S 25° 42' 46" W 60° 09' 50"	Formosa	May-25, 2012
S 26° 35' 18" W 58° 33' 25"	Chaco	Jun-11, 2009
S 27° 32' 39" W 58° 55' 25"	Chaco	Mar-23, 2010
S 26° 57' 01" W 60° 01' 36"	Chaco	May-4, 2011
S 27° 30' 29" W 64° 54' 09"	Santiago del Estero	Aug-8, 2011
S 28° 44' 29" W 59° 27' 55"	Santa Fe	Oct-30, 2010
S 31° 39' 16" W 60° 36' 43"	Santa Fe	May-26, 2012
S 29° 31' 20" W 60° 13' 09"	Santa Fe	May-4, 2011
S 31° 00' 56" W 59° 39' 31"	Entre Ríos	Mar-13, 2010
S 34° 15' 54" W 58° 54' 01"	Buenos Aires	Apr-26, 2010
S 34° 06' 33" W 58° 47' 18"	Buenos Aires	Dec-23, 2010
S 34° 12' 29" W 58° 53' 15"	Buenos Aires	Dec-23, 2010

lished), on which it feeds and lays eggs, which are embedded in the plant tissue of either side of the leaf. It has 5 nymphal instars: instars I and II live amidst the leaf trichomes of the host plant, feeding on the leaf surface. Instars III to adults live on the trichome layer, and use their unusually long rostrums to reach the leaf surface. Plants exposed to high insect density showed evidence of hopperburn (Backus et al. 2005), and general weakness, including significant stunting and mortality, compared to control plants.

This species has so far been found throughout the distribution area of *P. stratiotes* in Argentina, comprising the Paraná/Uruguay basin, plus the basins of several tributaries as the Pilcomayo and Bermejo rivers (Fig. 11).

Regarding the seasonal abundance of this insect, adults and nymphs have been collected throughout the year in the lower Parana Delta, in the province of Buenos Aires, although they were very rare from August to November. Plants collected in the field during winter in several temperate and subtropical locations and kept in cages in outdoor conditions, started showing instars I by early spring (September), suggesting that this species overwinters mainly in the egg stage.

The number of eggs laid per female was hard to observe because of the difficulty in examining the leaf surface due to the dense trichome layer. However, in 9-L tubs with fertilized water, we observed a 30-fold population increase in 4 weeks ($F_0 = 20$; $F_2 \approx 550$; $n = 4$).

ACKNOWLEDGMENTS

We wish to express thanks to Charles Bartlett (University of Delaware, USA) for his valuable comments and suggestions and Thierry Bourgoïn (Musée National d'Histoire Naturelle, Paris) for his constructive comments and kindly assistance providing access to the Fulgoroidea collection. Special gratitude to Ted Center and Phillip Tipping (USDA-USA) for economic support while visiting Smithsonian collections and to Stuart McKamey (Smithsonian National Museum of Natural History, Washington, DC, USA) for kindly providing access to the delphacid collection in this institution. We also thank to Dr. Arnaldo Maciá (CIC: Scientific Research Committee of the Province of Buenos Aires, Argentina). for the technical assistance with the illustrations.

This work was partially supported by the USDA-ARS Invasive Plant Research Laboratory, the National Research Council (CONICET), and La Plata National University (UNLP) from Argentina.

REFERENCES CITED

- ASCHE, M. 1985. Zur phylogenie der Delphacidae Leach, 1815 (Homoptera Cicadina Fulgoromorpha). *Marburger Entomol. Publ.* 2(1/2): 1-910.
- ASCHE, M., AND WILSON, M. R. 1989. The three taro planthoppers: species recognition in *Tarophagus* (Hemiptera: Delphacidae). *Bull. Entomol. Res.* (London) 79: 285-298.
- BACKUS, E. A., SERRANO, M. S., AND RANGER, C. M. 2005. Mechanisms of hopperburn: An overview of insect taxonomy, behavior, and physiology. *Annu. Rev. Entomol.* 50: 125-51.
- BARTLETT, C. R. 2006 (dated 2005). Two new genera and species of Stenocranina planthoppers (Hemiptera : Delphacidae) from North America. *Entomol. News* 116(5): 291-303.
- BARTLETT, C. R., AND DEITZ, L. L. 2000. Revision of the New World Delphacid Planthopper Genus *Pissonotus* (Hemiptera : Fulgoroidea). Thomas Say Publications in Entomology: Monographs. Entomol. Soc. America, Lanham, Maryland. vi + 234 pp.
- BOURGOIN, T. 1987. A new interpretation of the homologies of the Hemiptera male genitalia, illustrated by the Tettigometridae (Hemiptera, Fulgoromorpha). *Proc. 6th Auchenorrhyncha Mtg.*, Turin, Italy, 7-10 Sep 1987, pp. 113-120.
- DELOACH, C. J., DELOACH, A. D., AND CORDO, H. A. 1976. *Neohydronomus pulchellus*, a weevil attacking *Pistia stratiotes* in South America: biology and host specificity. *Ann. Entomol. Soc. America* 69: 830-834.
- GILLETT, J. D., DUNLOP, C. R., AND MILLER, I. L. 1988. Occurrence, origin, weed status, and control of water lettuce (*Pistia stratiotes* L.) in the Northern Territory. *Plant Prot. Quarterly* 3: 144-148.
- HOLM, L. G., PLUCKNETT, D. L., PANCHO, J. V., AND HERBERGER, J. P. 1977. The world's worst weeds: distribution and biology. Univ. Press Hawaii, Honolulu. 609 pp.
- METCALF, Z. P. 1949. The redescription of twenty one species of Areopidae described in 1923. *J. Elisha Mitchell Sci. Soc.* 65(1): 48-60 plus 4 plates.
- NEUENSCHWANDER, P., JULIEN, M. H., CENTER, T. D., AND HILL, M. P. 2009. *Pistia stratiotes* L. (Araceae), pp. 332-352 *In* R. Muniappan, G. V. P. Reddy and A. Raman [eds.], *Biological Control of Tropical Weeds Using Arthropods*. Cambridge Univ. Press.
- REMES LENICOV, ANA M. M. DE, AND VIRLA, E. 1993. Homópteros Auquenorrincos asociados al cultivo de trigo en la República Argentina. I. Análisis preliminar de la importancia relativa de las especies. *Studies on Neotropical Fauna and Environment (Ecology and Systematics)* 28(4): 211-222.
- RENNER, S. S. AND ZHANG, L.-B. 2004. Biogeography of the *Pistia* clade (Araceae): based on chloroplast and mitochondrial DNA sequences and bayesian divergence time inference. *Systematic Biol.* 53: 422-432.
- WILSON, S. W., MITTER, C., DENNO, R. F., AND WILSON, M. R. 1994. Evolutionary patterns of host plant use by Delphacidae planthoppers and their relatives. *In* R. F. Denno and T. J. Perfect [eds.], *Planthoppers: Their Ecology & Management*. Chapman & Hall, New York. 799 pp.
- YANG, J.-T., AND YANG, CH.-T. 1986. Delphacidae of Taiwan (I). Asiracinae and the Tribe Tropidocephalini (Homoptera: Fulgoroidea). *Collected Papers on Homoptera of Taiwan*, 1-78.