



## ***Belicinus Rhomboideus*, a new genus and species of Psepheninae (Coleoptera: Byrrhoidea: Psephenidae) from Belize**

ROBERTO ARCE-PÉREZ<sup>1</sup>, WILLIAM D. SHEPARD<sup>2</sup> & MIGUEL A. MORÓN<sup>1</sup>

<sup>1</sup>Red Biodiversidad y Sistemática, Instituto de Ecología, A.C. km. 2.5 carr. Xalapa-Coatepec, 351, El Haya, Xalapa, 91070, Veracruz, MEXICO. E-mail: roberto.arce, miguel.moron @inecol.edu.mx

<sup>2</sup>Essig Museum of Entomology, 1101 Valley Life Sciences, University of California, Berkeley, California, 94720, USA.  
E-mail: william.shepard@csus.edu

### **Abstract**

*Belicinus rhomboideus* **gen. nov., sp. nov.** is described and illustrated based on specimens collected in Belize. *Belicinus* **gen. nov.** can be distinguished from other Psepheninae genera by the following characteristics: pronotal shape, tibiae and tarsomeres (*Psephenus*, *Psephenops*); antennae, tibiae, tarsomeres and phallobase (*Pheneps*); antennae, pronotum and tibiae (*Psephenotarsis*); maxillary palpi and tibiae (*Psephenopalpus*). *Belicinus* appears to be more closely related to *Psephenotarsis* than to other Psepheninae genera. The larvae and habitat are described. A key for American Psepheninae genera is provided.

**Key words:** Psephenidae, Psepheninae, new genus, key, Belize

### **Introduction**

The subfamily Psepheninae is represented in the New World by the genera *Psephenus* Haldeman, *Psephenops* Grouvelle, *Pheneps* Darlington, *Psephenotarsis* Arce-Pérez and *Psephenopalpus* Arce-Pérez (Brown 1981; Spangler 1982; Arce-Pérez and Novelo-Gutiérrez 2001; Arce-Pérez and Shepard 2001; Arce-Pérez 2004a, Lee *et al.* 2005). *Psephenus* contains 15 species with seven in North America (Shepard 2002), two of which are also found in Mexico; four in Mesoamerica; three in Brazil, and one in Peru (Arce-Pérez and Novelo-Gutiérrez 2001). *Psephenops* has eight species (Arce-Pérez and Novelo-Gutiérrez 2000; Bameul 2001; Arce-Pérez 2002) with a tropical distribution, including two in Mexico, one in Guatemala, one in Costa Rica, one in Haiti, one in the Antilles with two subspecies, one in Colombia that is also found in Costa Rica, and one in Argentina. *Pheneps* has eight species (Arce-Pérez and Novelo-Gutiérrez 2001; Souza Fernandez *et al.* 2001) also with a tropical distribution: one in Cuba, one in Haiti, one in Suriname, one in Venezuela which also is found in Brazil, and another four in Brazil. *Psephenotarsis* includes two species (Arce-Pérez and Novelo-Gutiérrez 2001; Arce-Pérez 2004a): one in Mexico, and the other in Guatemala. *Psephenopalpus* has only one species, which is found in Mexico (Arce-Pérez 2004b).

### **Material and methods**

Thirty three adults were examined and observations carried out in 70% ethanol except for the observations of the vestment. Microphotographs were taken with a scanning electron microscope (Joel model JSM- 5600LV, magnification 200X and 1000X). Four larval specimens and female adults of *Belicinus* **gen. nov.** were collected in the submerged part of the stones not exposed to the current, and their comparison with other known larval of Psepheninae allows the larvae to be associated with the adults of the new taxon (Bameul 2001; Lee *et al.* 2003; Souza *et al.* 2001; Spangler 1968). Drawings were made with a Leica MZ12.5 dissecting scope equipped with a camera lucida, with specimens in either ethanol or glycerine. Nomenclature of dorsal sulci (this is a larval characteristic, Fig. 23) follows Lee *et al.* (2003).

## Acronyms and abbreviations:

EMEC	Essig Museum of Entomology Collection, Berkeley, California, USA
IEXA	Instituto de Ecología, Xalapa, Veracruz, Mexico
NMNH	National Museum of Natural History, Washington, District of Columbia, USA
A	adult (s)
Ab	abdominal segment
L	larva(e)
Msn	mesonotum
Mtn	metanotum
Pn	pronotum

## Results

Diversity of Psephenidae is higher in the tropics than in the temperate zones (Lee *et al.* 2005), as six of seven known genera of Psepheninae have a Neotropical distribution. This realm is considered the center of diversity for the subfamily. Many undescribed taxa are either known or await discovery.

### ***Belicinus* Arce-Pérez and Shepard gen. nov.**

(Figs. 1, 2, 4, 5, 6, 9)

**Description.** Head (Fig. 1) long, eyes spherical, very prominent; antennae short (e.g. hardly reaching the apex of scutellum), filiform and subserrated, 11 antennomeres, scape more robust and larger than remainder of antennomeres (globose); clypeus subtrapezoidal, declivous at an angle of less than 45 degrees from the plane of the frons, distal margin slightly lifted and bent backwards. Pronotum (Figs. 1, 4) trapezoidal, with a longitudinal glabrous line and a fine carina in the distal half, with posterior margin quite smooth, never crenulate or rugose; lateral margins rounded, unexpanded at posterior half. Legs with fore coxae and middle coxae not far apart (Fig. 2); fore femora robust subtriangular; tibiae (Figs. 5, 6) slender, clearly arched, with tiny teeth on their internal margin; basal four tarsomeres triangular (Fig. 7), flattened and widely emarginate at apex, fifth tarsomere (Fig. 5) longest, as long as preceding ones together, cylindrical; tarsal claws entire, never bifid or split, widely separate, widened at base and without teeth or accessory membranes. Male genitalia (Fig. 9) in ventral view subrectangular, trilobate; phallobase shorter than parameres; parameres shorter than median lobe; median lobe long and of expanded rhombic shape.

**Remarks.** Other Psepheninae genera can be distinguished from *Belicinus* gen. nov. by the following characters: *Psephenus* has the posterior half of the pronotum occasionally expanded; tibiae straight; four basal tarsomeres slender and subcylindrical, slightly emarginate at apex, with delicate, minute setae or papillae ventrally (Fig. 22); and the median lobe of the male genitalia is mostly membranous and subcylindrical. *Psephenops* has the pronotum expanded laterally on posterior half; tibiae straight; tarsomeres 1 and 2, and occasionally 3, with wide ventral expansions that cover apical tarsomeres (Fig. 19); and the median lobe of the male genitalia is mostly membranous, subtriangular or finger-like. In *Pheneps*, the body is more slender; the antennae are long – approximately 0.75 times the length of the elytra; tibiae straight; tarsomeres 1–2 clearly stouter than any of the three apical tarsomeres (Fig. 15); and the phallobase is notably larger than the parameres. *Psephenotarsis* has the antennae short, moniliform or filiform; pronotum expanded laterally in posterior half; tibiae straight; and the median lobe of the male genitalia is long, subcylindrical and sclerotized, or finger-like and membranous. *Psephenopalpus* has the maxillary palpus extremely long, extending beyond sixth antennomere (Fig. 18); tibiae straight; and the median lobe of the male genitalia is finger-like.

**Type species.** *Belicinus rhomboideus*

**Distribution.** Belize

**Etymology.** Named for the first record of the family in Belize; *Belicinus*.

***Belicinus rhomboideus* sp. nov. Arce-Pérez and Shepard**

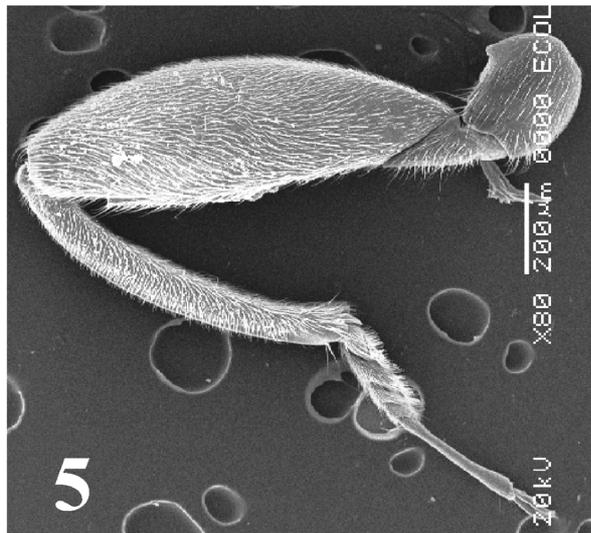
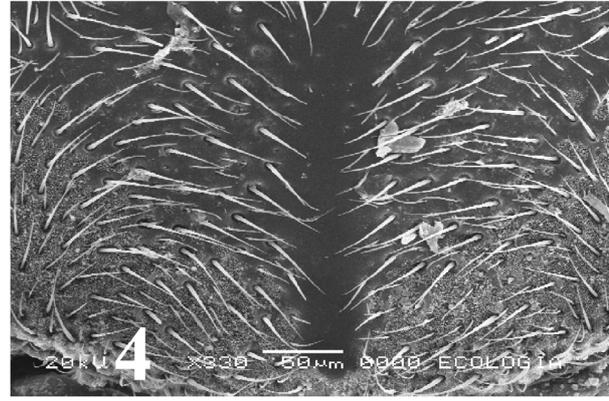
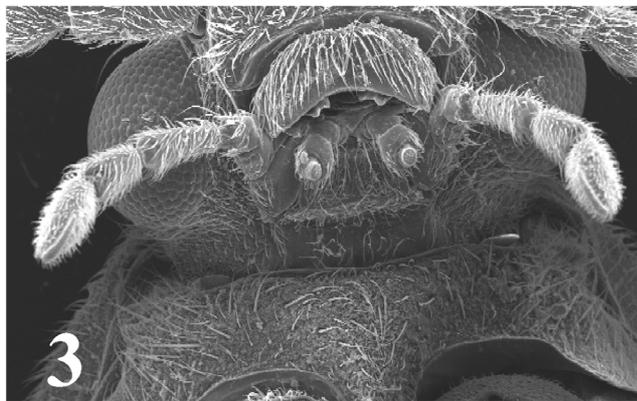
(Figs. 1–12)

**Description. Holotype Male:** Body oval and depressed; integument reddish-brown; completely covered (Fig. 4) with spread vestiture of long and short reddish-brown setae, with yellow iridescent setae; ventrally longer and darker; frons, pronotal disc, and apical third of the elytron darker; antennae with scape robust and globose; tibiae slender, clearly arched, with tiny teeth in their internal margin. Total length 3.15 mm, maximum humeral length 1.30 mm. Head: long (Figs. 1–3), with a longitudinal furrow in the postoccipital region, concave between the eyes; eyes spherical, very prominent; clypeus subtrapezoidal, declivous at an angle of less than 45 degrees from the plane of the frons, distal margin lightly lifted and bent posteriorly; antennae short, filiform to subserrate, 11 antennomeres, hardly reaching the scutellum, scape larger than other antennomeres (globose), pedicel one third as long as scape; labrum (Fig. 3) small with distal margin widely emarginate; maxillary palpus (Fig. 3) short, with 4 palpomeres, slightly longer than first two antennomeres combined, three basal palpomeres subconical, apical palpomere ovoid, slightly depressed with subapical sensorial region, first palpomere shortest, second palpomere 3 times longer than first, third palpomere 0.75 times the length of the second, fourth palpomere 0.25 longer than the second; labial palpus (Fig. 3) very short, with 3 palpomeres, two basal labial palpomeres robust and wide, segment 3 subspherical and shorter. Thorax: pronotum (Fig. 1) trapezoidal (posterior margin 1.15 mm, lateral margin 0.70 mm); anterior margin arcuate, posterior margin bisinuate and almost as wide as elytral base; lateral margins rounded and unexpanded; with a longitudinal glabrous line and a weak carina on the distal half, with a slight depression on each side; the margins with dark reddish thick setae; prosternum (Fig. 2) short, not elevated, with long and lanceolate prosternal process not reaching anterior half of mesosternum; procoxae globose; femora robust and enlarged in the middle giving them a subtriangular appearance and longer than the tibiae; tibiae (Fig. 5) slender, markedly arched toward exterior, with a series of tiny teeth in the internal margin (Fig. 6), and with small apical posterolateral denticle; tarsi with 5 tarsomeres (Fig. 5,7), basal four tarsomeres notably triangular and emarginate at apex, fifth tarsomere longest, as long as preceding ones together, subcylindrical and stout; first and second tarsomeres with small ventral lobe of spongy vestiture, first one covers basal half of second, second covers two thirds of third but their vestiture extends until the base of fifth; tarsal claws entire, never bifid or split, widely separated, curved downward in apical half, widened at base and without teeth or accessory membranes. Mesonotum with scutellum short, triangular, with apex rounded; elytron reddish-brown, darker on apical third; surface without striae; length (from base to apex of suture) 2.05 mm; width (across humerus) 1.30 mm, leaving two tergites exposed; mesosternum (Fig. 2) short, mesosternal groove deep for reception of prosternal process; mesocoxae globose, slightly separate, other features of midleg as described above except tibiae without apical tooth. Metasternum bulky, with a longitudinal shallow groove between metacoxae; metacoxae transverse and prominent, other features as described above. Abdomen: slightly convex, with seven sternites (Fig 8), first sternite with an edge on the basal half, posterior margin of first and second sternites sinuate in middle, posterior margin of third and fourth sternites straight, fifth sternite clearly emarginate, sixth sternite widely emarginate (Y-shaped) and hidden under fifth sternite; seventh sternite small and oval, pygidial plate short, oval and convex. Aedeagus: trilobate, ventrally subrectangular (Fig. 9), total length 0.45 mm, parameres subtrapezoidal, shorter than middle lobe, with external margin slightly sinuate, ending in a truncate and emarginate apex, with light membrane, length 0.14 mm; parameres in dorsal view (Fig. 10) completely united along basal 2/3 and broadly separate in the apical third, length 0.26 mm; penis in ventral view (Fig. 9) with expanded rhomboidal shape, with (Fig. 11) small spines on the surface, length 0.17 mm, in dorsal view (Fig. 12) triangular with rounded apex and the basal corners pointed; dorsal area of phallobase (Fig. 10) concave, subcylindrical, 0.9 mm long by 0.2 mm of wide.

**Female:** Coloration of the integument and the outer appearance similar to male. Sexual dimorphism is evident in the form and size of the body: the females are more robust (humerus 3.25 mm long by 1.45 mm wide); the clypeus is not upturned; the antennae are short and do not reach the apical margin of the pronotum; the pronotum is clearly subrectangular, wider than long, 1.35 mm by 0.75 mm, and slightly expanded laterally in the posterior half; prosternal process and groove on the mesosternum are very wide, making both procoxae and mesocoxae appear more separated; tibiae straight, tarsi slender, without lobes and vestiture; abdomen ventrally is very wide, abdominal segment 7 subtriangular; genital plates as in (Fig. 13).

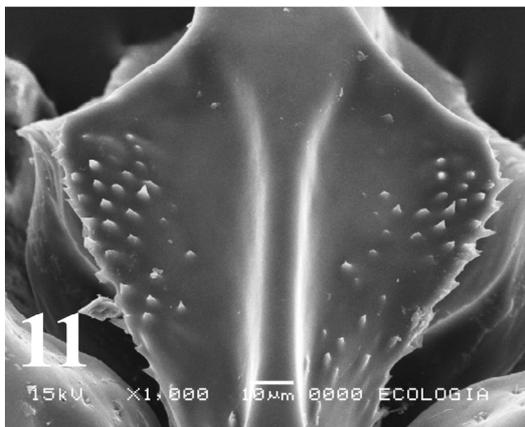
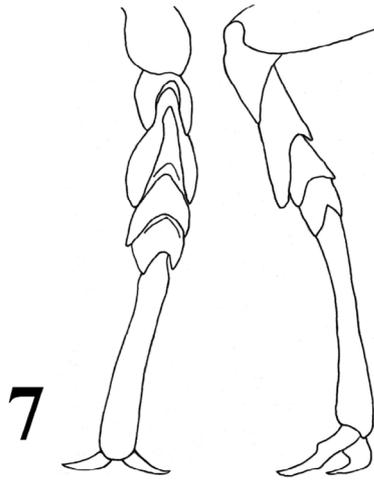
Variations: Some specimens are darker on the head, pronota and elytra.

Measurements (in mm) total body length 2.80–3.15; maximum width 1.25–1.35.

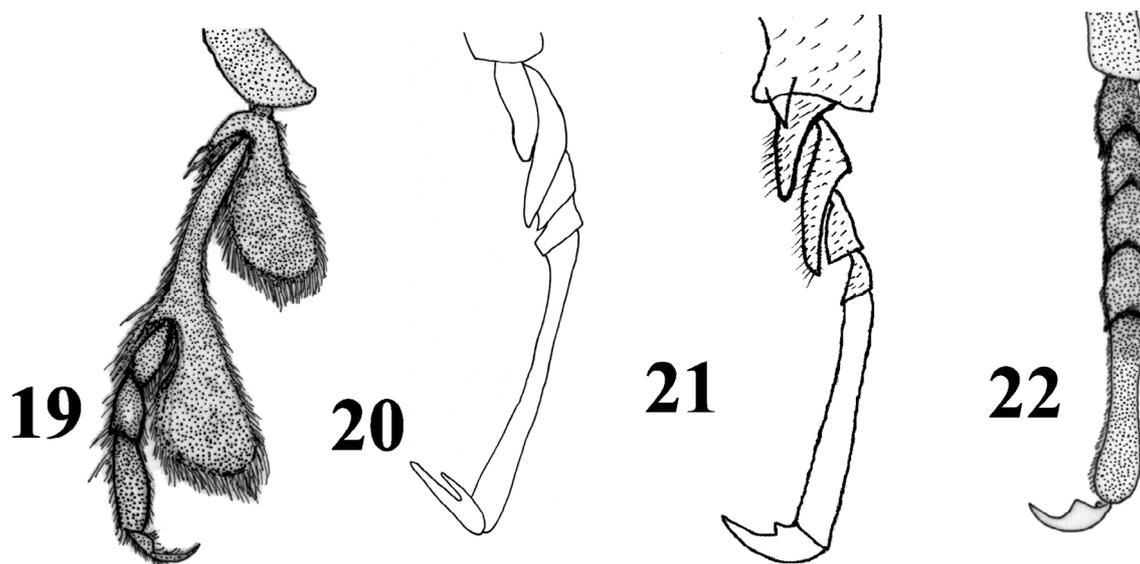
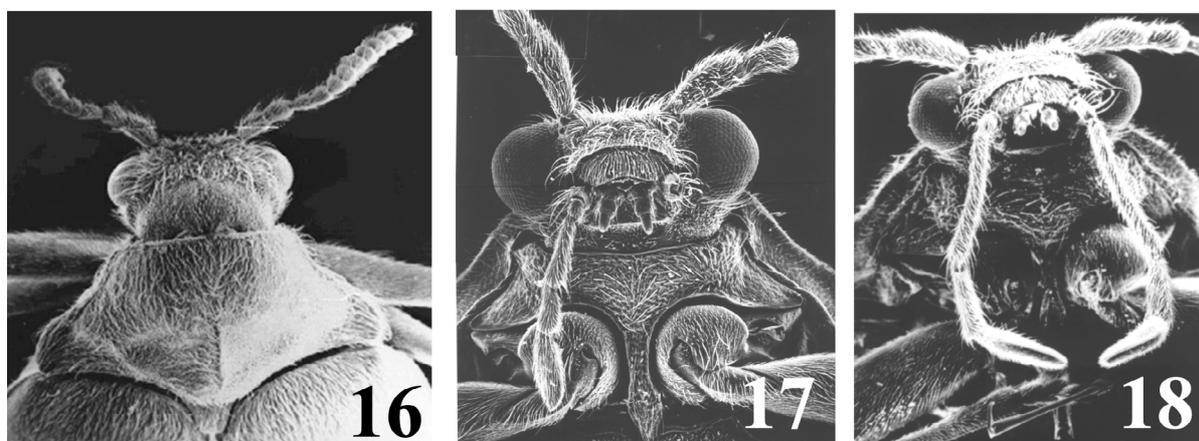
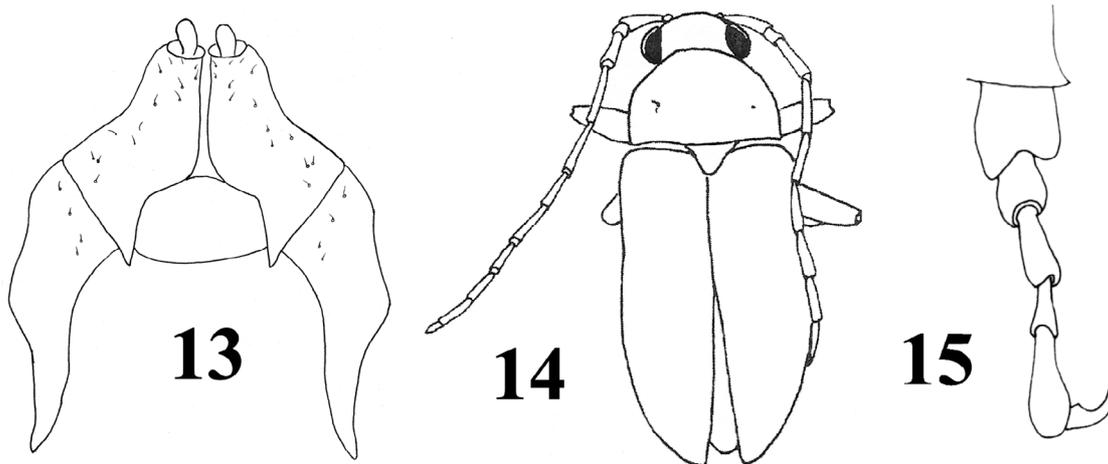


**FIGURES 1–6.** *Belicinus rhomboideus* sp. nov. 1. Head and pronotum, dorsal view. 2. Head and prosternum, ventral view. 3. Labrum and maxillary palpus, ventral view. 4. Midline of pronotum with a fine carina in the distal half. 5–6. Protibiae slender, clearly arched toward the exterior, with tiny teeth on their internal margin.

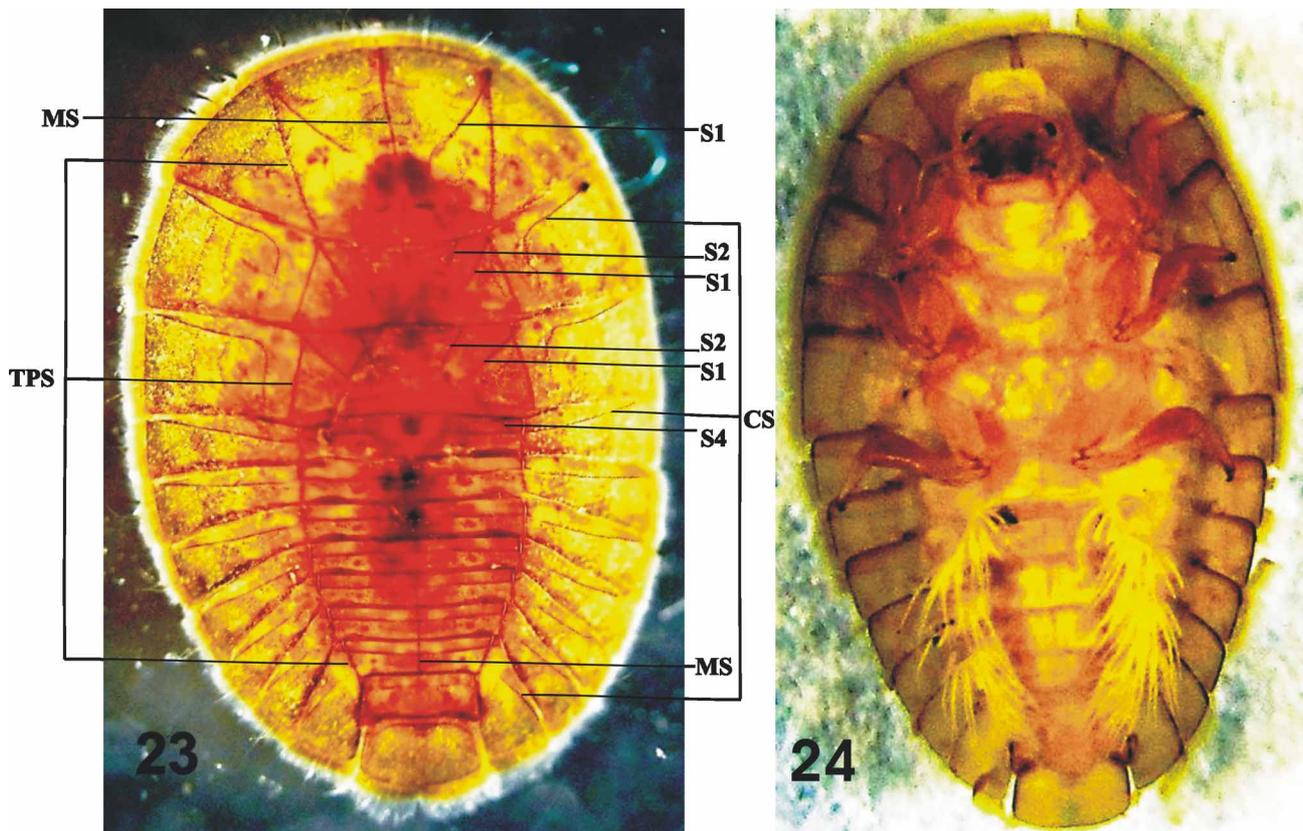
**Type material and deposition.** Holotype male Belize, Toledo District, Big Fall, Río Grande, 10-I-1995, WDS-A-1136, W. Shepard leg. (EMEC); 17 ♂, 1 ♀ (paratypes same data as holotype), EMEC (10), IEXA (6), NHNM (2); same data as holotype except 6-I-95, W. Shepard leg. 2 ♂, 2 ♀ (IEXA); Belize, Toledo District, 7 miles S Mafredi, 9-I-1996, Mafredi Cr Trib. WDS-A-1191, W. Shepard leg. 1 ♂ (IEXA); Belize, Cayo District, 16.6 km SE, Belmopan, 3-VIII-1993, Caves Branch, WDS-A- 982, W. Shepard leg. 3 ♂, 3 ♀ (EMEC); Belize, Cayo District, 20 mi SE Belmopan, Sibun River, 20-I-93, WDS-A-946, 2 ♂, (IEXA); Belize, Belize District, 5 mi WNW Belize, 14-I-95, Mahogany Creek, WDS-A-1144, 1 ♂, (IEXA).



**FIGURES 7–12.** *Belicinus rhomboideus* sp. nov. 7. First four tarsomeres (dorsal and lateral view). 8. Abdominal ventrites. 9. Aedeagus on ventral view, showing phallobase, parameres and middle lobe (penis). 10. Aedeagus, dorsal view. 11. Aedeagus, close-up of penis, ventral view. 12. Aedeagus, dorsal view.



**FIGURES 13–22.** *Belicinus rhomboideus* sp. nov. 13. Genital plates of *Belicinus rhomboideus* sp. nov. 14. Habitus of *Pheneps cursitatus*. 15. Protarsomeres of *Pheneps antennalis*. 16. Pronotum showing middorsal carina of *Psephenops mexicanus*, dorsal view. 17. Ventral aspect of head and maxillary palpus of *Psephenops lupita*. 18. Ventral aspect of head and maxillary palpus of *Psephenopalpus browni*. 19. Protarsomeres of *Psephenops* sp. 20. Protarsomeres of *Psephenopalpus browni*. 21. Protarsomeres of *Psephenotarsis triangularis*. 22. Protarsomeres of *Psephenus* sp. (Fig. 14 from Spangler 1987; Fig. 15 from Spangler and Steiner 1983; Fig. 16 from Arce-Pérez and Novelo-Gutiérrez 2000; Fig. 17 from Arce-Pérez 2002; Fig. 18 from Arce-Pérez 2004b; Figs. 19, and 22 Arce-Pérez and Novelo-Gutiérrez 2001)



FIGURES 23–24. *Belicinus rhomboideus* sp. nov. 23. Larva, dorsal view. 24. Larva, ventral view.

**Type locality.** Belize, Toledo District, Big Fall, Río Grande, 16E16' N 88E53' W. Here the Río Grande is a fast flowing, clear, warm-water stream. The water is more than 1 m deep and flows swiftly over cobbles and boulders.

**Etymology.** The name *rhomboideus* refers to the expanded, rhomboidal shape of the penis.

### Key to New World Genera of Psepheninae Based on Adults

(Modified from Arce-Pérez 2004b)

1. Antennae long, filiform, extending notably beyond elytral humeri (Fig. 14); pro- and mesotarsomeres 1 and 2 much stouter than succeeding three and slightly emarginate at apex (Fig. 15) . . . . . *Pheneps*
- 1' Antennae short, filiform, moniliform or subserrate, scarcely or not extending beyond elytral humeri; pro- and mesotarsomeres 1 and 2 of variable length but never stouter than following three tarsomeres . . . . . 2
2. Tibiae slender, clearly arched (Fig. 5), with tiny teeth in their internal margin (Fig. 6); pronotum with a longitudinal glabrous line and a weak carina on the distal half (Figs. 1, 4). . . . . *Belicinus*, **gen. nov.**
- 2' Tibiae straight, without teeth; pronotum without a longitudinal glabrous line, with or without carina . . . . . 3
3. Pronotum with mid-dorsal longitudinal carina (Fig. 16). . . . . 4
- 3' Pronotum without carina . . . . . 5
4. Pronotum expanded laterally on posterior half, with a well-developed carina (Fig. 16); maxillary palpus short, last palpomere longest (Fig. 17); tarsomeres 1 and 2, and occasionally 3, with wide ventral expansions that cover apical tarsomeres (Fig. 19). . . . . *Psephenops*
- 4' Pronotum with lateral margins rounded, not expanded on posterior half, with a feeble carina; maxillary palpus (Fig. 18) extremely long, second palpomere much longer than other palpomeres; tarsomeres with short ventral expansions that do not cover apical tarsomeres (Fig. 20) . . . . . *Psephenopalpus*
5. Tarsomeres 1–4 (Fig. 21) short, triangular, flattened, deeply emarginate for reception of following tarsomere; tarsomeres 1–2 with long ventral setae or papillae, those on 2 reaching base of fifth tarsomere . . . . . *Psephenotarsis*
- 5' Tarsomeres 1–4 (Fig. 22) subconical and slender, scarcely emarginate at apex; tarsomeres 1–2 usually with ventral setae or papillae that never cover contiguous tarsomere . . . . . *Psephenus*

**Larva:** Body elongate onisciform, convex; widest at metanotum; head concealed; color yellow to light brown, with numerous dark brown maculae. Entire margin with dense row of setae. Dorsal sulci include (Fig. 23): medial (Pn-Ab7); tergopleural (Pn-Ab7); S1 (Pn-Mtn); S2 (Msn-Mtn); S4 (Ab1); costal (Msn-Ab7). Pleurites present from Pn-Ab7; absent on Ab8–9. Scattered vermiform lines of dark brown tubercles; lines mostly on thoracic nota. Mesonotal spiracle on pleurite by medial end of costal line; slit-like. Pleurites expanded laterally from Pn-Ab7; lateral border with elongate complex setae forming a dense fringe, setae on posterolateral corner shorter and dorsal to following pleurite (Fig. 23). Venter less sclerotized than dorsum (Fig. 24); body thick between pleurites, very thin on pleurites. Pleurites with setal fringe on anterior edge ventral to previous pleurite. Head weakly sclerotized except apically on mouthparts; epicranial suture V-shaped; each eyespot with 6 ommatidia, 5 in a dorsoventral row and 1 posterior to that row. Antennae with 4 antennomeres, elongate; first antennomere short and wide; second long and thin, more than half length of antennae; third about half as long as second, with apical peg-like seta; fourth very short, no longer than peg-like seta of third. Clypeus free; short and widely rectangular; frontoclypeal suture straight, between antennal bases; apex broadly emarginate medially. Labrum free, heavily setose; epipharynx with two very setose patches; no setae medially. Mandibles symmetrical, wedge-shaped, unidentate apically; with ventromedial cutting edge having no teeth; setose protheca. Maxillae elongate; galea, lacinia and stipes fused; cardo well developed, wide; lacinia and galea setose apically; lacinia with 3 apical spine-like setae; palp with 4 palpomeres, apical palpomere very small. Labium unsegmented, apically entire; palpi very short, with 3 palpomeres. Cervical sclerites well sclerotized and brown. A pair of small patches of sclerotized tubercles just lateral of midline on pro-, meso- and metasternum. Legs five segmented; prothoracic legs shortest. Coxae conical and strongly projecting. Trochanters as elongate as femur. Femora widening apically; ventral fringe of spines and setae along face where tibia closes. Tibiae as long as femur, slightly narrower apically; fringe of spines laterally and medially. Tarsungulus short, with single claw. Pair of tracheal gills on abdominal sternites 2–6; each gill with 8–13 branches, more branched posteriorly. Anus on midline between abdominal sternites 8 and 9; slitlike; between two sclerotized lobes.

**Habitat:** *B. rhomboideus* **sp. nov.** has been collected in all four lotic regions of Belize (Shepard 2004), but it mainly occurs in regions 3 and 4. All collection sites are listed in the appendix. Both larvae and adults of *B. rhomboideus* **sp. nov.** are found in waterways from very small streams to large rivers, and in waterways with a full canopy to those that are entirely in the open. Males are often seen running about on dry rocks in riffles, similar to males of *Psephenus* (Murvosh 1971). Females were found only on the submerged parts of rocks where they were ovipositing. Larvae were found on submerged parts of rocks. *B. rhomboideus* **sp. nov.** often co-occurs with an undescribed psephenid species in the genus *Psephenops*, and with other aquatic byrrhoids such as: Dryopidae - *Helichus suturalis*; Elmidae - *Cylloepus*, *Heterelmis*, *Macrelmis*, *Microcylloepus*, *Neoelmis*, *Phanocerus* and *Xenelmis*; Lutrochidae - *Lutrochus*.

## Discussion

In the phylogeny of Psephenidae by Lee et al. (2007), *Belicinus* **gen. nov.** is listed as "genus D" from Belize. In the analyses using both the full data set and the larval data set, *Belicinus* **gen. nov.** is the most derived genus in the Subfamily Psepheninae. However, in these analyses the genera *Psephenotarsis* and *Psephenopalpus* were not available for study. Thus a new phylogenetic analysis of the subfamily would be necessary to clarify the relationships among the genera included in Psepheninae. However, this should not be done now due to several new taxa remaining to be described.

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## APPENDIX. Collecting sites of *B. rhomboideus* sp. nov. in Belize, by lotic region.

### Lotic region 1

1. Orange Walk District: Cedar Crossing; Rio Bravo, 1-I- 1996 - 4L

### Lotic region 2

1. Belize District: 4.8 km (3 mi) W of Gales Point; Soldier Creek; 14- I-1995 - 1 L
2. Belize District: 8 km (5 mi) WNW of Gales Point; Mahogany Creek; 14-I-1995 - 1A, 1L
3. Cayo District: Bullet Tree Falls; Mopan River; 5-I-1996 - 1L / 13-I-1996 - 1L
4. Cayo District: Unitedville; unnamed stream; 23-I-1993 - 2L
5. Cayo District: San Jose de Succoths; West Branch Belize River; 23-I-1993 - 3L / 6- I-1995 -1L
6. Cayo District: Roaring Creek; Roaring Creek; 19-I-1995 - 5A, 1L
7. Cayo District: 4.8 km SW of Mullins River Village; 14-I-1995 - 3L / 11-I-1996 - 1L

**Lotic region 3**

1. Cayo District: 16.6 km SE of Belmopan; Caves Branch Sibun River; 3-VIII-1993 - 6A, 4L / 20-I-1993 - 8A, 10+L
2. Cayo District: 28.4 km SE of Belmopan; Sibun River; 20-I-1993 - 2A, 1L / 3-VIII-1993 - 1A
3. Cayo District: just W of Over-the-Top Camp; Santa Margaret's Creek; 9-I-1995 - 15+L
4. Stann Creek District: 4.3 km N of Silk Grass Village; Silk Grass Creek; 8-I-1996 - 1L
5. Stann Creek District: 3.4 km S of Silk Grass Village; Freshwater Creek; 4-VIII-1993 - 5L
6. Stann Creek District: Maya Center; Cabbage Haul Creek; 4 VIII 1993 - 5L / 8- I-1996 - 8L
7. Stann Creek District: 3.2 km SE of Middlesex; North Stann Creek; 22-I-1993 - 7L / 3-VIII-1993 - 14A, 4L
8. Stann Creek District: 5.9 km SE of Over-the-Top Camp; Dry Creek; 22-I-1993 - 1A, 1L / 6-VIII-1993 - 15+L / 11-I-1996 - 3A, 22L
9. Stann Creek District: 5.9 km SE of Over-the-Top Camp; tributary to Dry Creek; 22-I-1993 - 1A, 20+L / 9-I-1995 - 2A, 15+L
10. Toledo District: 6.4 km S of Blue Creek Village; Moho River; 9-I-1996 - 2A, 1L
11. Toledo District: 6.4 km SW of Blue Creek Village; Aguacate Creek; 9-I-1996 - 7A, 22L
12. Toledo District: Big Fall; Rio Grande; 10-I-1995 - 17A, 25+L / 10-I-1996 - 14L
13. Toledo District: Golden Stream Village; Golden Stream; 11-I-1995 - 11A / 10-I-1996 - 12L
14. Toledo District: 1.6 km SW of Hellgate; Joshua Creek; 10-I-1995 - 12L
15. Toledo District: 2.1 km NE of Silver Creek Village; tributary to Rio Grande; 10-I-1995 - 1A
16. Toledo District: 4.0 km E of San Antonio; Crique Trosa; 11-I-1995 - 1L
17. Toledo District: 0.7 km S of Mafredi; Mafredi Creek tributary; 9-I-1996 - 1A

**Lotic region 4**

1. Cayo District: Cristo Rey; East Branch Belize River; 23-I-1993 - 2L
2. Cayo District: 6.0 km N of Augustine; Rio On; 7-I-1995 - 1L / 5- I -1996 - 1L
3. Cayo District: 16.4 km N of Augustine; Privession Creek; 8-VIII-1993 - 1L
4. Cayo District: 3.8 km S of Augustine; unnamed stream; 8-VIII-1993 - 1L
5. Cayo District: 7.2 km S of Augustine; unnamed stream; 8-VIII-1993 - 1L
6. Cayo District: 15 km S of Augustine; Macal River; 8-I-1995 - 5L / 6-I-1996 - 16L