

DESCRIPTIONS OF NYMPHS OF THE CAT-TAIL FEEDING  
DELPHACID PLANTHOPPER *PYGOSPINA SPINATA*  
(HOMOPTERA: FULGOROIDEA)

CARL W. DOUD<sup>1</sup>, STEPHEN W. WILSON<sup>1</sup>, AND JAMES H. TSAI<sup>2</sup>

<sup>1</sup>Department of Biology, Central Missouri State University  
Warrensburg, Missouri 64093

<sup>2</sup>Fort Lauderdale Research and Education Center, University of Florida, IFAS  
Fort Lauderdale, Florida 33314

ABSTRACT

Adult male and female genitalia and the first through fifth instar nymphs of the delphacid planthopper *Pygospina spinata* Caldwell, collected from southern cattail (*Typha domingensis* (Pers.) Steudel) in south Florida are described and illustrated and a key to instars is provided. Nymphal instars are distinguished by differences in body size and proportions, spination of the metatibiae, metatibial spurs, and metatarsomeres, and by the number of metatarsomeres.

Key Words: Insecta, Homoptera, Delphacidae, *Pygospina spinata*, immature stages, *Typha*

RESUMEN

Se hacen descripciones del primer y quinto instar ninfal y del aparato reproductor de hembras y machos del salta plantas *Pygospina spinata* Caldwell, colectado de la enea del sur (*Typha domingensis* (Pers.) Steudel) en el sur de Florida. Se publican ilustraciones y una clave para identificación de la especie. Los instares ninfales se distinguen por ciertas diferencias en el tamaño y proporciones del cuerpo, en las espinas de la metatibia, las espuelas de la metatibia y metatarsomeros y por el número de metatarsomeros.

---

The Neotropical delphacid genus *Pygospina* includes five species, *P. aurantii* (Crawford), *P. reducta* Caldwell, *P. rezendensis* (Muir), *P. spinata* Caldwell, and *P.*

*spinigera* (Fennah) (Caldwell & Martorell 1951). No information on biology or immatures of any of these species is available. While collecting in southern Florida, we (SWW & JHT) found adults and nymphs of *P. spinata* at the bases of leaves in the inner whorls of southern cattail (*Typha domingensis* (Pers.) Steudel; Typhaceae). *Pygospina spinata* was described from two specimens from Puerto Rico (Caldwell & Martorell 1951); one specimen has been collected in a Florida light trap (Frost 1964) and two specimens were found from Cocos Island (unpublished data). The apparent rarity of this species is probably due to its feeding habit. We were only able to collect specimens by stripping the leaves from about ten cattails where 104 orange nymphs and four adults were found.

*Pygospina spinata* is the only New World delphacid recorded from cattails; four other delphacid species have been recorded from cattails in Europe and Asia. *Changeondelphax velitchkovski* (Melichar) has been recorded from *T. laxmannii* Lep-echin in South Korea (Kwon 1982); *Chloriona tateyamana* Matsumura has been found on *Phragmites australis* (Cav.) Trin. (Poaceae) in Asia (Yang 1989) and *T. laxmannii* in eastern Russia (Vilbaste 1968); *Kakuna sapporonis* (Matsumura) has been recorded from *T. laxmannii* in eastern Russia (Vilbaste 1968), and *Matutinus putoni* (A. Costa) feeds on *T. latifolia* L. and *T. angustifolia* L. in Europe (D'Urso & Guglielmino 1986).

#### MATERIALS AND METHODS

Specimens used for description have the following collecting data: Florida: Broward Co., I75 12 miles north of I595, 31-V-1994, ex. *Typha domingensis*, coll. S. Wilson and J. Tsai (2 males, 2 females, 27 first instars, 17 second instars, 15 third instars, 23 fourth instars, 22 fifth instars). Specimens are housed in S. W. Wilson's planthopper collection at Central Missouri State University, Warrensburg.

The fifth instar is described in detail but only major differences are described for fourth through first instars. Arrangement and number of pits is provided for the fifth and fourth instars; this information is not given for earlier instars because the pits are extremely difficult to discern (those that could be observed relatively easily are illustrated). Measurements are given in mm as mean  $\pm$  SD. Length was measured from apex of vertex to apex of abdomen, width across the widest part of the body, and thoracic length along the midline from the anterior margin of the pronotum to the posterior margin of the metanotum.

#### DESCRIPTIONS

*Adult.* A lateral view of an adult and a somewhat diagrammatic illustration of the male genitalia were provided by Caldwell & Martorell (1951).

*Male genitalia* (Fig. 1A, B, C). Pygofer, in lateral view, triangular, with an acute lateral process on laterocaudal aspect on either side, and an elongate blunt process on ventrocaudal aspect; diaphragm below aedeagus v-shaped, unarmed. Anal tube, in lateral view, with a single spinose process originating on the ventrocaudal aspect of the tube. Styles, in caudal view, broadest across basal third, narrowing distally to a bulbous apex. Aedeagus subcylindrical, with an acute dorsocaudally directed process in basal third, and a postapical flange extending laterally on right (Fig. 1B).

*Female genitalia* (Fig. 2A, B, C). The terminology used in describing the female genitalia follows Asche (1985) and Heady & Wilson (1990). Tergite nine oriented anteroventrally (see Asche 1985), elongate, longitudinally concave in ventral midline. Anal tube subcylindrical. Genital scale very large, subovate. Valvifers of segment

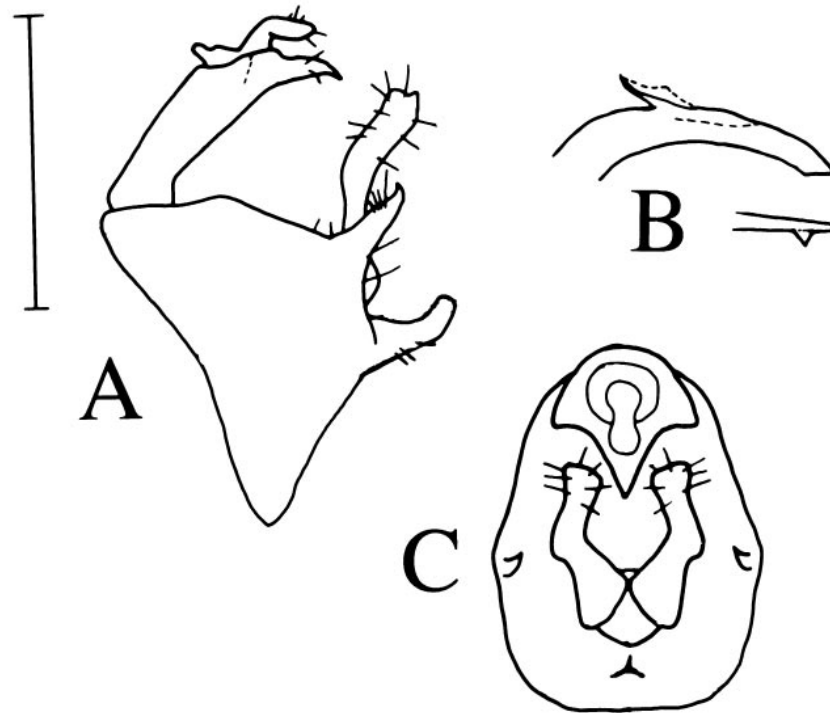


Fig. 1. *P. spinata* male genitalia. (A) Pygofer, anal tube, and style, lateral view. (B) Lateral view of aedeagus and ventral view of apex of aedeagus. (C) Pygofer, anal tube, and styles, caudal view. Bar = 0.5 mm.

eight each covering approximately one-fourth of tergite nine anterolaterally; slender, broadly concave on median margin. Lateral gonapophyses of segment nine elongate, spatulate posteriorly. In lateral view, median gonapophyses of segment nine saber-shaped, with approximately 25 prominent small teeth on dorsal margin in distal one-half. Gonapophyses of segment eight adhering tightly to median gonapophyses of segment nine; slender, acute apically.

*Fifth Instar* (Figs. 3A, B). Length  $2.4 \pm 0.2$  mm; thoracic length  $0.9 \pm 0.06$  mm; thoracic width  $1.04 \pm 0.08$  mm; N = 13. Body straw colored with white middorsal line extending from vertex almost to end of abdomen. Form elongate, subcylindrical slightly flattened dorsoventrally. Vertex subtriangular; narrowing anteriorly with two pairs of longitudinal carinae which extend onto frons. Frons border with clypeus slightly concave; lateral margin strongly convex and carinate (outer carinae) and paralleled by second pair of carinae (inner carinae) continuous with lateral margins of vertex; area between inner and outer carinae with nine pits on each side (six visible in ventral view, three in dorsal aspect); four pits between each outer carina and eye. Clypeus narrowing distally, consisting of subconical basal postclypeus and cylindrical distal anteclypeus. Beak three-segmented, cylindrical, segment one hidden by anteclypeus, segment two subequal in length to segment three, with black apex. Antennae three-segmented; scape short, cylindrical; pedicel subcylindrical,  $2\times$  length of scape, with

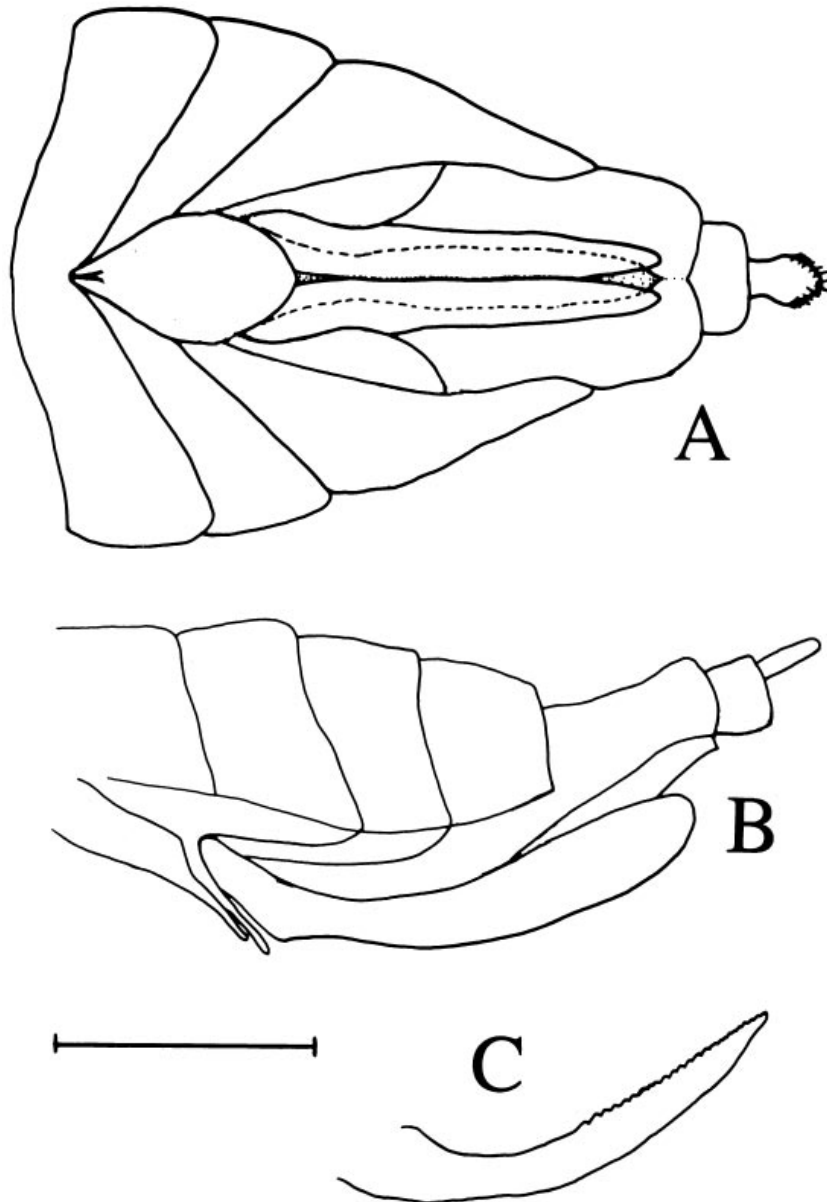


Fig. 2. *P. spinata* female genitalia. (A) Ventral view. (B) Lateral view. (C) Lateral view of ovipositor (median gonapophyses of segment 9). Bar = 0.5 mm.

about ten small pits, four pits visible in dorsal aspect; flagellum bulbous basally, with elongate bristle-like extension distally, bulbous base approximately 0.2× length of

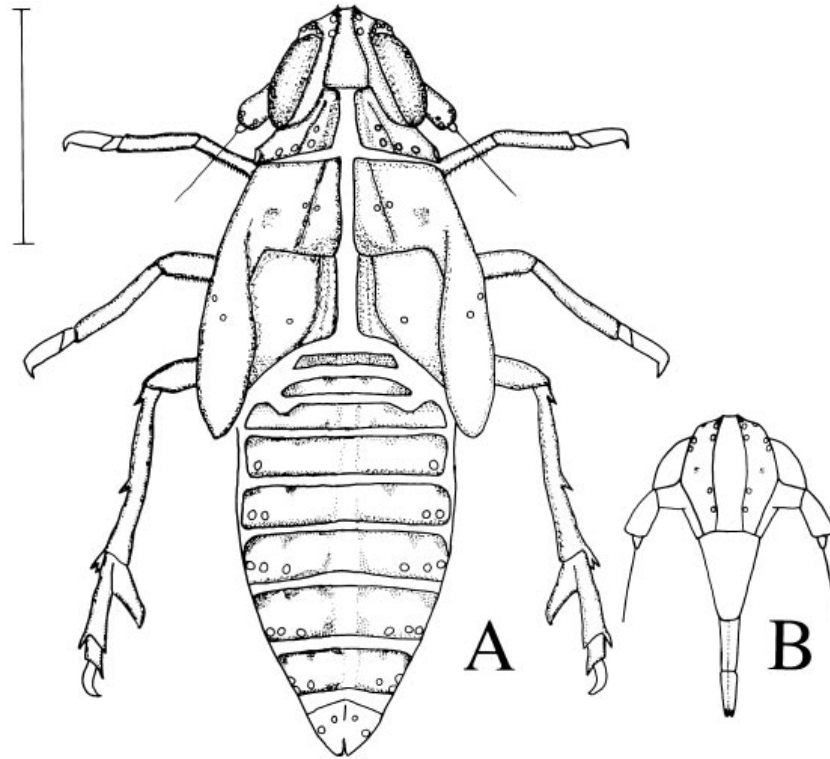


Fig. 3. *P. spinata* fifth instar nymph. (A) Habitus, dorsal view. (B) Frontal view of head. Bar = 0.5 mm.

pedicel. Eyes black; in dorsal aspect, median border red. Thoracic nota divided by mid-dorsal line into three pairs of plates. Pronotal plates subtriangular (in dorsal view); anterior margin convex; posterior border sinuate; each plate with a weak posterolaterally directed carina and seven pits extending anteriorly from near middorsal line posterolaterally to lateral margin (lateralmost pits often not visible in dorsal view). Mesonotum with median length 1.5× that of pronotum; elongate lobate wingpads extending to tips of metanotal wingpads; each plate with very weak posterolaterally directed carina originating on anterior margin in median one quarter and terminating on posterior margin in lateral one third, triangular area between carinae elevated; two pits near middle of plate on either side of carinae and two pits on lateral one half of plate. Metanotum with median length slightly shorter than that of mesonotum, subtriangular; lobate wingpads extending to third tergite; each plate with one pit near middle. Pro- and mesocoxae elongated and directed posteromedially; metacoxae fused to sternum. Metatrochanter short and subcylindrical. Metatibia with two spines on lateral aspect of shaft, an apical transverse row of five black-tipped spines on plantar surface and a subtriangular flattened movable spur with one apical tooth and 15-19 other teeth on posterior aspect. Pro- and mesotarsi with two tarsomeres, tarsomere one wedge-shaped; tarsomere two subconical, with pair of apical claws and median membranous pulvillus. Metatarsi with three tarsomeres; tarsomere one with

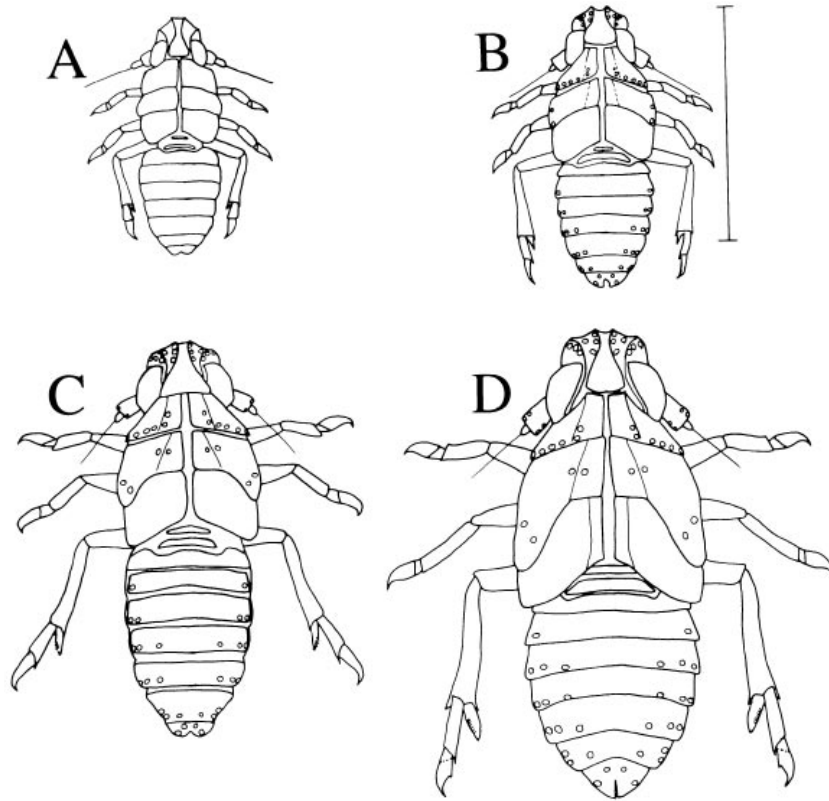


Fig. 4. *P. spinata* first through fourth instar nymphs. (A) First instar. (B) Second instar. (C) Third instar. (D) Fourth instar. Bar = 0.5 mm.

apical transverse row of seven black tipped spines; tarsomere two cylindrical, approximately 0.3× length of tarsomere one, with apical transverse row of four black tipped spines on plantar surface; tarsomere three subconical, slightly longer than tarsomere two, with pair of apical claws and median pulvillus. Abdomen nine segmented; flattened dorsoventrally; widest across fourth abdominal segment. Tergite one small, subtriangular; tergite two subtriangular approximately 1.3× width of first; tergites three through eight subrectangular, four with one pit on both lateral margins, five with two lateral margin pits on each side, six through eight each with three pits on each side; segment nine surrounding anus, with three pits on each side; female with one pair of acute processes extending from juncture of sternites eight and nine; males lacking processes.

*Fourth Instar* (Fig. 4D) Length  $1.8 \pm 0.09$  mm; thoracic length  $0.7 \pm 0.02$  mm; thoracic width  $0.8 \pm 0.03$  mm; N = 15. Antennal flagellum with basal portion approximately 0.3× length of pedicel, about seven small pits. Mesonotal wingpads shorter, each covering approximately two-thirds of metanotal wingpad laterally. Metanotal median length 1.5× that of mesonotum; wingpad extending to tergite three. Metatibial spur smaller, with one apical tooth and seven to eight marginal teeth. Metatarsi with

two tarsomeres; metatarsomere one with apical transverse row of six black-tipped spines; metatarsomere two with three black-tipped spines in middle of tarsomere.

*Third Instar* (Fig. 4C). Length  $1.4 \pm 0.1$  mm; thoracic length  $0.5 \pm 0.02$  mm; thoracic width  $0.6 \pm 0.03$  mm; N = 15. Mesonotal wingpads shorter, each covering one-third of metanotal wingpad laterally. Metanotal wingpads extending to tergite two. Metatibial spur smaller, with one apical tooth and one to three marginal teeth. Metatarsomere one with apical transverse row of five black-tipped spines on plantar surface.

*Second Instar* (Fig. 4B). Length  $1.3 \pm 0.1$  mm; thoracic length  $0.4 \pm 0.02$  mm; thoracic width  $0.4 \pm .02$  mm; N = 14. Wingpads undeveloped. Metatibia with apical row of three black-tipped spines; spur small with one apical tooth and no marginal teeth, approximately 3× longer than longest metatibial spine. Metatarsomere one with four apical black-tipped spines.

*First Instar* (Fig. 4A). Length  $1.07 \pm 0.05$  mm; thoracic length  $0.3 \pm 0.02$  mm; thoracic width  $0.3 \pm 0.02$  mm; N = 15. Bulbous base of antennal flagellum 0.7× length of pedicel. Metatibia lacking lateral spines on shaft; metatibial spur smaller, approximately 1.5× length of longest metatibial spine.

#### KEY TO THE NYMPHAL INSTARS OF *PYGOSPINA SPINATA*

1. Metatibial spur with seven to nineteen marginal teeth (Fig. 5); mesonotal wingpads extending to half length of metanotal wingpads (Figs. 3A, 4D) . . . . . 2
- Metatibial spur with fewer than seven marginal teeth (Fig. 5); mesonotal wingpads not extending beyond half length of metanotal wingpads (Figs. 4A, B, C) . . . . . 3
2. Metatarsi with three tarsomeres; metatibial spur with more than ten marginal teeth (Figs. 3A, 5) . . . . . 5th Instar
- Metatarsi with two tarsomeres; metatibial spur with fewer than eight marginal teeth (Figs. 4D, 5) . . . . . 4th Instar

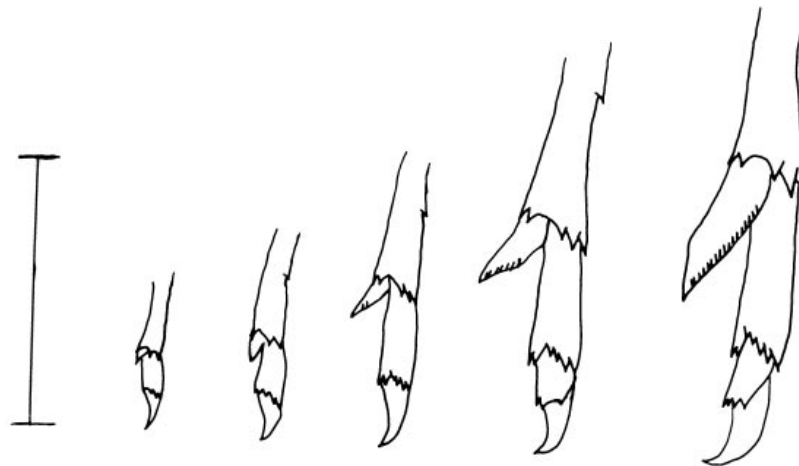


Fig. 5. *P. spinata* apices of metathoracic legs, plantar surface, of first (left) through fifth (right) instar nymphs. Bar = 0.5 mm.

3. Metatarsomere one with apical transverse row of five spines; spur with one to three marginal teeth (Fig. 5) . . . . . 3rd Instar  
 Metatarsomere one with apical transverse row of four spines; spur lacking marginal teeth (Fig. 5) . . . . . 4
4. Metatibia with three lateral spines on shaft and metatarsomere one with apical transverse row of four spines; spur more than 3× length of longest apical spine (Figs. 4B, 5) . . . . . 2nd Instar  
 Metatibia without lateral spines on shaft and apical transverse row of three spines; spur about 1.5× length of longest apical spine (Figs. 4A, 5) . . . 1st Instar

## ACKNOWLEDGMENT

We thank Dr. David Sutton for identifying the host plant. Florida Agricultural Experiment Stations Journal Series #R-05537.

## REFERENCES CITED

- ASCHE, M. 1985. Zur Phylogenie der Delphacidae Leach, 1815 (Homoptera Cicadina Fulgoromorpha). Marburger Entomol. Publ. 2(1): 1-910.
- CALDWELL, J. S., AND L. F. MARTORELL. 1951. Review of the auchenorynchous Homoptera of Puerto Rico. Part II. The Fulgoroidea except Kinnaridae. J. Agric. Univ. Puerto Rico 34: 133-269.
- D'URSO, V., AND A. GUGLIELMINO. 1986. Sviluppo postembrionale di *Matutinus putoni* (Costa, A., 1888) (Homoptera, Delphacidae) e note sulla sua biologia. Animalia 13(1/3): 77-93.
- FROST, S. W. 1964. Insects taken in light traps at the Archbold Biological Station, Highlands County, Florida. Florida Entomol. 47: 129-161.
- HEADY, S. E., AND S. W. WILSON. 1990. The planthopper genus *Prokelisia* (Homoptera: Delphacidae): Morphology of female genitalia and copulatory behavior. J. Kansas Entomol. Soc. 63: 267-278.
- KWON, Y. J. 1982. New and little known planthoppers of the Family Delphacidae (Homoptera: Auchenorrhyncha). Korean J. Entomol. 12: 1-11.
- VILBASTE, J. 1968. On the Cicadine fauna of the Primorsk region. Tallin, 180 pp.
- YANG, C. T. 1989. Delphacidae of Taiwan (II) (Homoptera: Fulgoroidea). Nat. Sci. Council (Rep. China) Spec. Publ. 6: 1-334.