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DESCRIPTION OF A NEW SPECIES OF *ARBORIDIA* (HEMIPTERA: AUCHENORRHYNCHA: CICADELLIDAE: TYPHLOCYBINAЕ) FROM CHINA

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ABSTRACT

A new species of leafhopper, *Arboridia sinensis* **sp. nov.**, belonging to the subgenus *Arboridia* Zachvatkin, 1946 s. str. and closely related to *Arboridia* (*Arboridia*) *gaurii* Thapa, 1989, *A. cerna* Dworakowska, 1977, and *A. soror* Dworakowska, 1977, is described from Yunnan, China. It differs from *A. gaurii* in the body coloration and aedeagus shape, and from *A. cerna* and *A. soror* also in the shape of its pygofer process. In Yunnan, China the new species lives on *Zanthoxylum bungeanum* Maximowicz (Rutaceae).

Key Words: *Arboridia sinensis*, taxonomy, *Zanthoxylum bungeanum*, natural enemies, pest damage.

RESUMEN

Se describe una nueva especie de chicharrita (saltahoja) de Yunnan, China, *Arboridia sinensis*. **sp. nov.**, que pertenece al subgénero *Arboridia* y es cercana a las especies *Arboridia* (*Arboridia*) *gaurii*, Thapa 1989, *A. cerna* Dworakowska, 1977 y *A. soror* Dworakowska, 1977. Esta especie se diferencia de *A. gaurii* por la coloración del cuerpo y la forma del aedeago, y de *A. cerna* y *A. soror* por la forma del proceso del pygofer. La nueva especie reside en *Zanthoxylum bungeanum* Maximowicz (Rutaceae) en Yunnan, China.

Palabras Clave: *Arboridia sinensis*, taxonomía, *Zanthoxylum bungeanum*, enemigos naturales, daños de plagas

Arboridia Zachvatkin, 1946 is a genus of typhlocybina leafhoppers restricted to the Old World with some 60 species occurring in the Palaearctic and Oriental Regions (Dietrich & Dmitriev 2006; Dmitriev & Dietrich 2003-2009). Currently, *Arboridia* includes 2 subgenera, *Arboridia* and *Arborifera* Sohi & Sandhu, 1971, which differ from each other in the morphology of the genital plates, styles and aedeagus. The genus in its current definition may, however, be polyphyletic (Dietrich & Dmitriev 2006).

In China 2 species of *Arboridia* have been recorded: *Arboridia* (*Arboridia*) *apicalis* (Nawa, 1913) and *Arboridia* (*Arborifera*) *surstyli* Cai & Xu, 2006. *Arboridia apicalis* is polyphagous on

various deciduous trees and vines: *Acer* sp. (Sapindales: Sapindaceae), *Morus* sp. (Rosales: Moraceae), *Malus* sp., *Prunus* (*Cerasus*) sp., *Prunus persica* (L.) Batsch, *Prunus* sp., *Pyrus communis* L. (all Rosales: Rosaceae), *Vitis amurensis* Ruprecht, *V. coignetiae* Pulliat ex Planch., and *Vitis* sp. (all Vitales: Vitaceae), and is distributed in China (NE, Taiwan), far eastern Russia, Japan and the Korean Peninsula. *Arboridia surstyli* feeds on *Macrocarpium officinalis* (Sieb. et Zucc.) Nakai (Cornales: Cornaceae) and has been recorded only from China.

In 2011, we examined some specimens of Typhlocybinae from Yunnan Province, China, living on *Zanthoxylum bungeanum* Maximowicz (Sap-

indales: Rutaceae), a condiment and medicinal plant known as Chinese prickly-ash and Sichuan pepper tree. On the basis of their external appearance and the morphology of the male genitalia, we describe them as a new species of *Arboridia* (*Arboridia*).

MATERIAL AND METHODS

The specimens were collected with entomological nets and aspirators, and preserved in 70% ethanol.

All material studied in this paper is deposited in the following collections: SCAU: The Hymenoptera Collection of South China Agricultural University, Department of Entomology, Guangzhou, Guangdong, P.R. China, GC: Department of Agriculture, Forests, Nature and Energy, University of Tuscia, Viterbo, Italy (Guglielmino's collection), and SMT: Senckenberg Naturhistorische Sammlungen Dresden, Museum für Tierkunde, Germany.

SYSTEMATICS

Arboridia (*Arboridia*) *sinensis* Guglielmino, Xu, Bückle and Dong, **sp. nov.**

Diagnosis

Arboridia (*Arboridia*) *sinensis* **sp. nov.** is probably closely related to *A. cerna* Dworakowska, *A. gaurii* Thapa and *A. soror* Dworakowska for the bifurcate and apically not widened genital styles. In addition, those species show, except for *A. soror*, a particularly elongate pygofer appendage, the distal part of which is almost straight and directed caudad in *A. cerna*, whereas it is coiled over its whole length in *A. gaurii* and *A. sinensis*. *A. sinensis* shares with *A. gaurii* most characters of its genital apparatus, but is distinguished by its different aedeagus shape, which presents a more elongate shaft and a smaller ventral spur, and by its yellow or light greyish brown coloration.

Description

Body length: Males: 3.30-3.80 mm (Holotype 3.45 mm); females: 3.40-3.85 mm. Body yellow or light greyish-brown. Vertex (Fig. 4C in Supplementary Material) yellow or light greyish-brown with 2 broad dark brown bands of irregular shape and unsharply delimited outline, anteriorly diverging and posteriorly fused in a black triangular spot touching hind margin of vertex. Face yellow or light greyish-brown. Pronotum (Figs. 4B, C, E in Supplementary Material) yellow or light greyish-brown. Scutellum (Figs. 4A-E in Supplementary Material) yellow or light greyish-brown with a black, tongue shaped spot on each side. Ventrally, prothorax dark

brown, meso- and metathorax yellow or light greyish-brown. Legs yellow or light greyish-brown. Forewing light yellow or greyish-yellow, infumated in basal (in particular on clavus) and apical parts, hyaline in middle area (Figs. 4B-E in Supplementary Material). Hindwing membrane fuliginous, veins uniformly brown. Abdominal segments dark brown.

Male genitalia: Pygofer as in Fig. 1A, with very long, strongly curved and apically narrowing process (Figs. 1A, B) and with robust elongate irregularly shaped sclerite extending between basis of pygofer process and dorsal apodeme of aedeagus (Fig. 1A). Anal tube with slightly sclerotised anteriorly directed lateral process on each side (Fig. 1A). Genital plates slightly exceeding pygofer, distally curved and twisted laterad, with laterally 4 or 5 long macrosetae and numerous irregularly arranged stout, short and black setae on inner part of folded dorsal side (Figs. 1A, C). Genital styles bifurcate and apically not widened with lateral branch shorter and thinner than caudal branch (Figs. 1E, F). Connective with geniculate branches, stem short (Fig. 1D). Aedeagus (Figs. 2A, B) laterally compressed, shaft apically with 3 lamellae: one sagittal lamella and 2 lamellae in dorsolateral direction originating on each side from dorsal margin of sagittal lamella. Ventral surface of shaft with preapical gonopore and small spur inserted basally of gonopore in shallow pit (Fig. 2B).

Type Series

Holotype: Male, CHINA: Yunnan Province, Yonghsan Co., Huanghua Town, N 28° 00' E 103° 51', 1500 m asl, 30 Oct 2010, reared on *Zanthoxylum bungeanum*, Wei Dong leg (SCAU). Paratypes: Same data as holotype, 27 males and 52 females paratypes (20 in SCAU, 55 in GC, 4 in SMT).

Distribution

The species is so far known only from the Yunnan Province, Yonghsan Co., Huanghua Town, China.

Biological Data

Adult specimens of *Arboridia sinensis* **sp. nov.** were collected on *Z. bungeanum* at 1500 m, in Oct 2010. Postembryonic development consists of 5 immature instars (Figs 3A-F in Supplementary Material), that were observed during Sep and Oct 2010. Immature instars of *A. sinensis* **sp. nov.** live usually on the lower surface of the leaves of *Z. bungeanum* (Chinese prickly-ash, Sichuan pepper tree), whereas adults were observed also on other green parts of the host plant, such as leafstalks

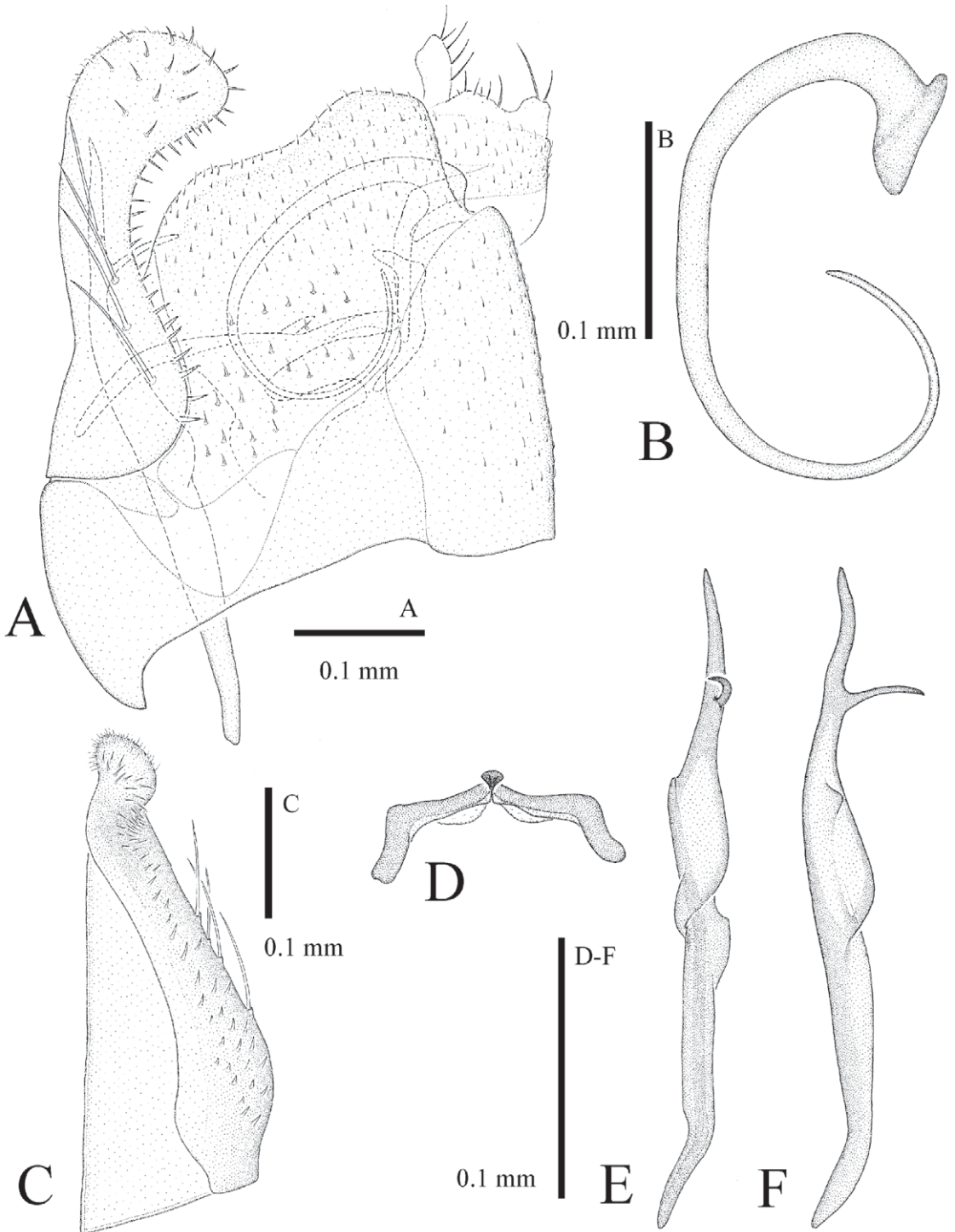


Fig. 1. *Arboridia (Arboridia) sinensis* sp. nov.: A: Pygofer, lateral view; B: Right pygofer process, lateral view; C: Left genital plates, dorsal view; D: Connective, mediadorsal view; E: Right genital style, mediadorsal view; F: Right genital style, laterodorsal view.

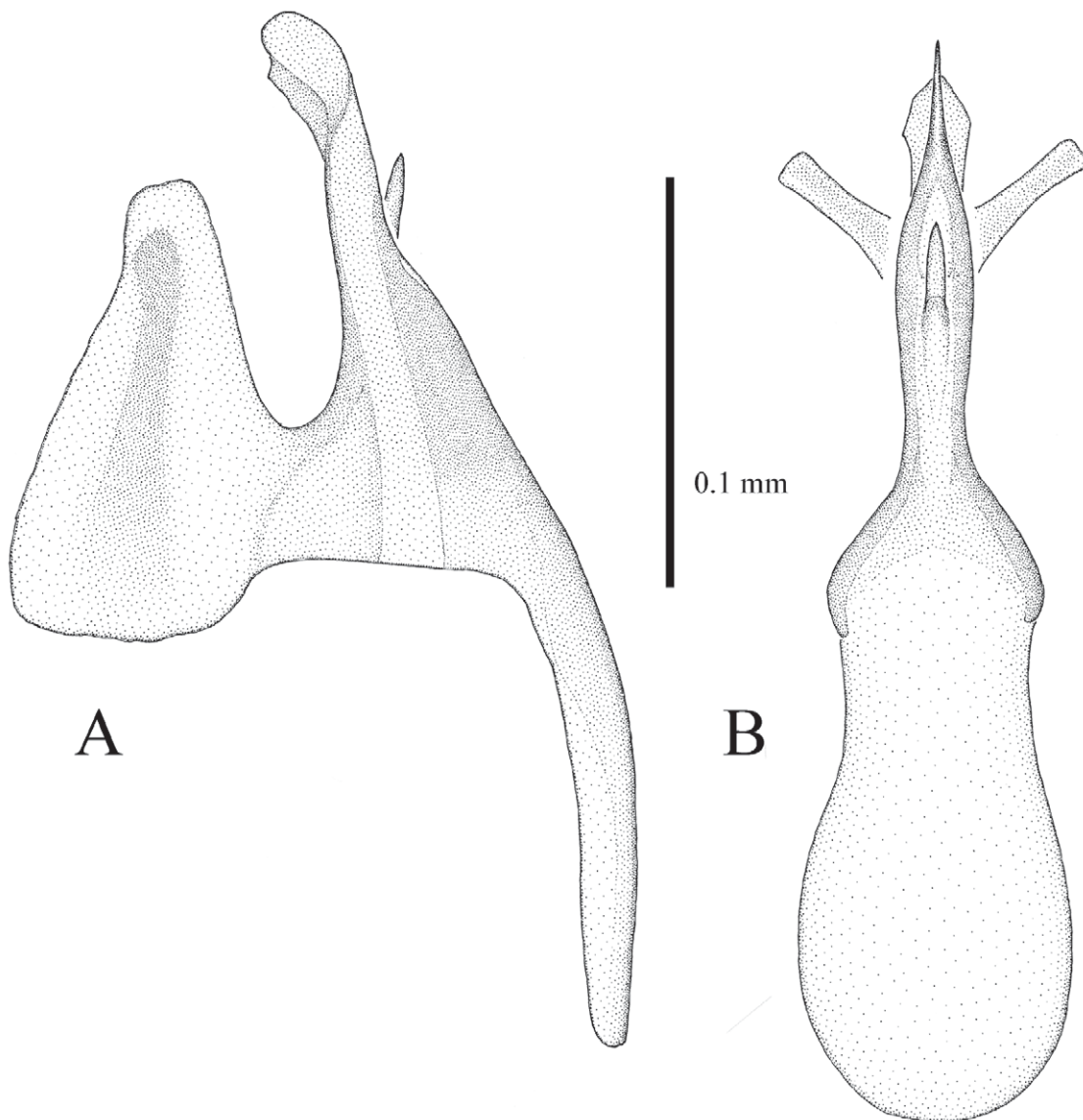


Fig. 2. *Arboridia (Arboridia) sinensis* **sp. nov.**: A: Aedeagus, lateral view; B: Aedeagus, ventral view.

and fruits (Figs. 4A-F in Supplementary Material). Nymphs and adults are mesophyll feeders and their feeding cause symptomatic white-silver dechlorophyllation punctures on the leaves (Figs. 4B, 4C, 5C, 5D in Supplementary Material). The adults are attracted by yellow sticky traps (Fig. 5B in Supplementary Material). The host plant is economically important, because the bark and the berries of *Z. bungeanum* (Fig. 5A in Supplementary Material) are used for medicinal purposes. In particular, the fruit has remarkable anaesthetic, antihelminthic, astringent, diuretic and vasodilatory property. In addition, the dried fruit follicles

of *Z. bungeanum* are used as a culinary spice and are particularly popular in Sichuan cuisine.

Nothing is known about the number of generations per year. In the natural environment, the populations of *A. sinensis* **sp. nov.** are controlled by natural enemies, among which are predators, such as spiders (Araneae), and parasitoids, such as *Aphelopus alebroides* Xu, Olmi, Guglielmino and Dong (Hymenoptera: Dryinidae) (Xu et al. 2011) (Figs. 6A, B in Supplementary Material). *A. sinensis* **sp. nov.** cohabits on *Z. bungeanum* with *Empoasca (Matsumurasca) quadrialata* Qin and Zhang, 2011 (Hemiptera: Cicadellidae).

Remarks

Based on a similar shape of the pygofer process and the genital styles, *A. sinensis* **sp. nov.** has probably a close relationship with *A. gaurii* Thapa, 1989 described from Nepal and recorded on *Zanthoxylum armatum* (Thapa, 1989). In addition, both species feed on plants belonging to the same genus. The main differences between them consist in the coloration and markings of body (orange-brown in *A. gaurii*) and the aedeagus shape (see Thapa 1989, Figs. 7a, b, p. 118). The new species is probably related also to *Arboridia cerna* Dworakowska, 1977, and *A. soror* Dworakowska, 1977; both latter species were recorded in India. *Arboridia cerna* lives on Chinese cinnamon, *Cassia* sp. (Fabales: Fabaceae) and *A. soror* has been found on wormwood, *Artemisia* sp. (Asterales: Asteraceae) and on the orchid tree, *Bauhinia* sp. (Fabales: Fabaceae). In addition to the features mentioned above, the main difference between *A. sinensis* and the 2 Indian species concerns the shape of the pygofer process (see Dworakowska, 1977, Figs. 208-211, 216, 217, 221, 222, p. 302).

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