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## ARBORIDIA KAKOGAWANA (MATSUMURA) (HEMIPTERA CICADELLIDAE TYPHLOCYBINAЕ) - A NEW PEST OF GRAPEVINE IN SOUTHERN RUSSIA

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Gnezdilov V.M., Sugonyaev E.S., Artokhin K.S. – *Arboridia kakogawana* (Matsumura) (Hemiptera Cicadellidae Typhlocybinae) - a new pest of grapevine in Southern Russia.

*Arboridia kakogawana* (Matsumura) is recorded as a pest of grapevine from Krasnodar Territory and Rostov Province in Southern Russia. Population dynamics of *A. kakogawana* on grapevine in Krasnodar Territory was studied.

KEY WORDS: leafhoppers, grapevine, population dynamics, Krasnodar Territory, Rostov Province.

### INTRODUCTION

The genus *Arboridia* Zachvatkin belongs to the tribe Erythroneurini. *Arboridia kakogawana* (Matsumura) is a leafhopper with body length 2.6-3.1 mm. General coloration of adult light yellow, with brown or orange spots on fore wings, vertex and upper angles of scutellum with a pair of black spots (fig. I). Larva green yellowish. The species can be easily recognized after the structure of male genitalia (fig. V). Aedeagal shaft flattened laterally, with 2 teeth apically, aedeagal base with one median tooth (fig. V, 1, 2). Pygofer with bifurcated processes (fig. V, 3). Genital plates concaved laterally, each plate with 3 macrochetae (fig. V, 4). Style with 2 teeth apically (fig. V, 5).

*A. kakogawana* was described from Honshu Island in Japan (MATSUMURA, 1932). Later on this species was recorded from Korea (DWORAKOWSKA, 1970) and from the Russian Far East (Primorsky Territory) (ANUFRIEV & EMELJANOV, 1988). In 1999 *A. kakogawana* was discovered near Goryachy Klyuch in Krasnodar Territory in Southern Russia (GNEZDILOV, 2000). In the Russian Far East *A. kakogawana* inhabits broadleaved and mixed forests and feeds on *Vitis amurensis* Rupr. (ANUFRIEV, 1971). Recently *A. kakogawana* was recorded as a pest of *Vitis vinifera* L. in vineyards of Russia (SUGONYAEV *et al.*, 2004) and Southern Korea (AHN *et al.*, 2005).

VIDANO & ARZONE (1983) listed five ampelophilous species of the genus *Arboridia*: *A. adanae* (Dlabola, 1957) from Turkey and Israel, *A. dalmatina* (Wagner, 1962) and *A. vitisuga* (Dlabola, 1963) from Croatia and Bulgaria, *A. bussaini* (Ghauri, 1964) from Iraq, and *A. kermanshab* (Dlabola, 1963) from Iran. All these species are closely related in the structure of the aedeagus, which bears a pair of long lateral processes basally. *A. kakogawana* belongs to another species group according to the structure of aedeagus without such lateral processes, but with median tooth (fig. V, 1, 2).

According to VIDANO & ARZONE (1983) nymphs and adults of erythroneurine species feed on mesophyll tissue of the lower surface of leaves and cause symptomatic dechlorophyllation.

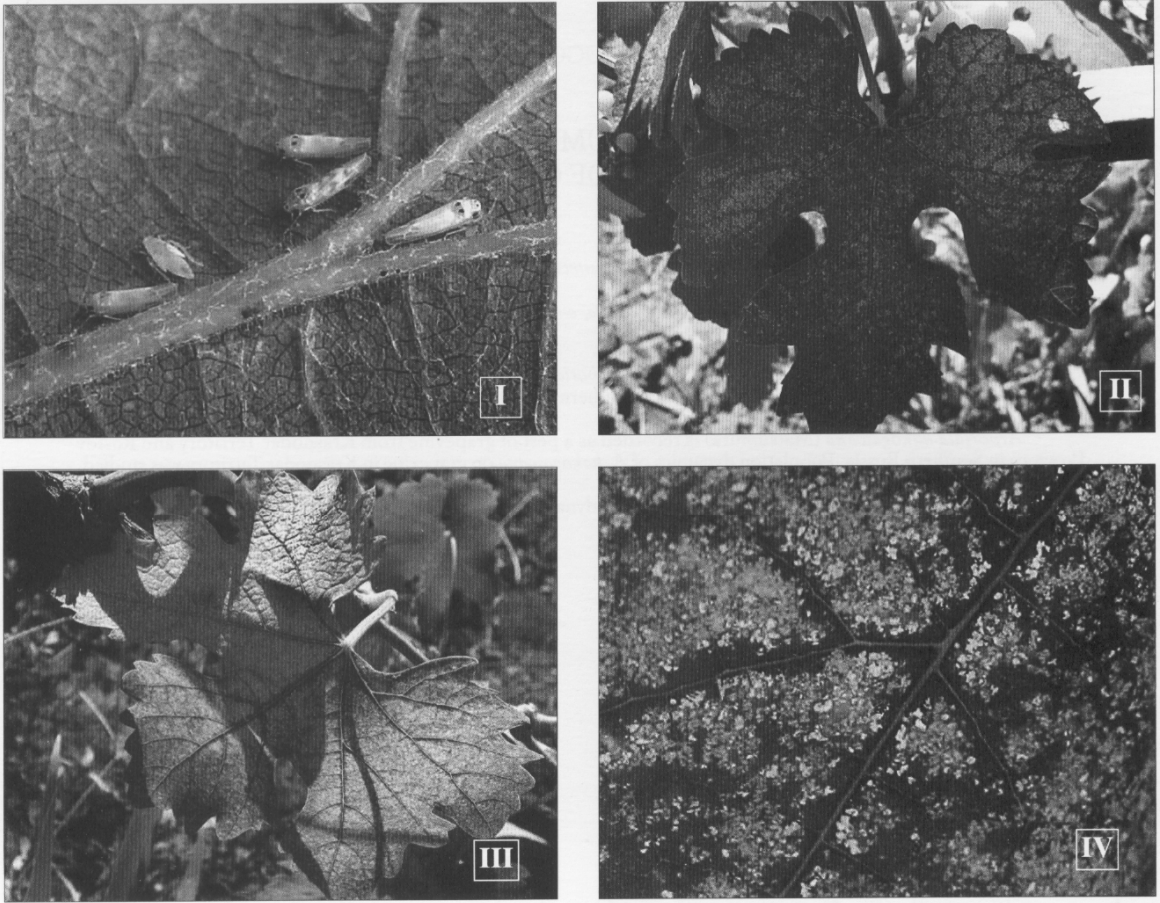
### MATERIAL AND METHODS

A visual quantitative survey was carried out on 10 leaves of 5 model grapevine plants in Krasnodar during May-September 2007 by counting the number of specimens of *A. kakogawana*, its development stages and the extent of damage on every leaf. Damage about 25% of leaf surface (yellow-white dots) is considered as a weakly damaged leaf, more than 51% – badly damaged leaf. Another survey method for *A. kakogawana* adults is the use of one-sided yellow glue trap (length 30 cm, width 20 cm), which were placed perpendicularly to rows of grape at a distance of 20-25 m. The majority (80-90%) of all small insects collected on yellow glue traps belonged to *A. kakogawana*. A method of photo survey (or fixation) based on the use of the digital camera Canon IXUS 700 in macrophoto way was offered by Ms. Irina Balakhnina (Russian Institute of Biological Control, Krasnodar). Photos were transferred to personal computer and then a calculation of the number of *A. kakogawana* specimens was made by means of marking them with white color on a display.

### RESULTS

During 2000-2003 *A. kakogawana* was collected in large quantities on «Isabella» and «Moldova» grapes in private plots and urban plantations in Krasnodar (SUGONYAEV *et al.*, 2004). In 2006-2007 the species was collected also in Slavyansk-na-Kubani (Krasnodar Territory) and near Rostov-na-Donu, Novocherkassk, and Salsk (Rostov Province). In Rostov Province *A. kakogawana* damaged about 70 different grapevine varieties. According to survey in Krasnodar and neighborhood solitary adults *A. kakogawana* only may be found in middle-late May and early June. The species reaches peak population three times, in late June - mid July and late August-early September by larva and in late July-early August by adult (fig. VI). From 18<sup>th</sup>-29<sup>th</sup> July 2007 a mass flight of adults at light was observed.

Adults and nymphs concentrate on lower surface of grapevine leaves. Nymphs form dense colonies sucking mainly between central vein of leaf and its lateral branches.



Figs. I - IV

Fig. I – *Arboridia kakogawana*, adults and larva, Krasnodar Territory, August 2007.

Figs II-IV – Damaged leaves of grapevine, Krasnodar Territory (II - July 2007, III, IV - August 2007).

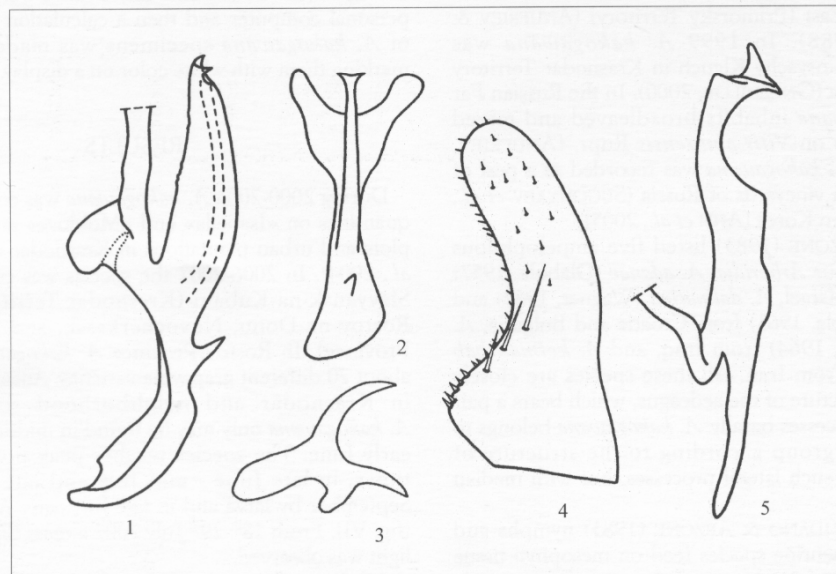


Fig. V – *Arboridia kakogawana*, male genitalia, Krasnodar. 1 - aedeagus, lateral view; 2 - same, ventral view; 3 - process of pygofer, lateral view; 4 - genital plate, ventral view; 5 - style, lateral view.

Maximal number of specimens on grapevine (from several specimens up to 80 specimens per leaf) and accordingly maximal amount of damaged leaves were recorded in the second half of August and in September (fig. VII). As a result of nymphs and adults feeding the leaves of grapevine have yellow – white dots, (fig. II). Feeding causes symptomatic dechlorophyllation and subsequent necrosis of the leaves (figs III, IV), which damages the maturation of grapes. In Krasnodar Territory and Rostov Province there are 2 generations per year. According to study in vineyards of Southern Korea (AHN *et al.*, 2005) from early October adults *A. kakogawana* moves to nearby forests in search of

a tree with bark to overwinter. In Krasnodar Territory yellow glue traps showed that the number of adult specimens on grape plants decreasing continuously from late September as a result of its migration for wintering. (fig. VIII).

DISCUSSION

During the last 20 years the discovery of *A. kakogawana* appears to be the second case of unintentional introduction of a typhlocybinae species from Far East to

Fig. VI – Population dynamics of *Arboridia kakogawana* on grapevine in Krasnodar Territory, July – September 2007. Y-axis: number of specimens per 50 leaves. X-axis: dates of accounts.

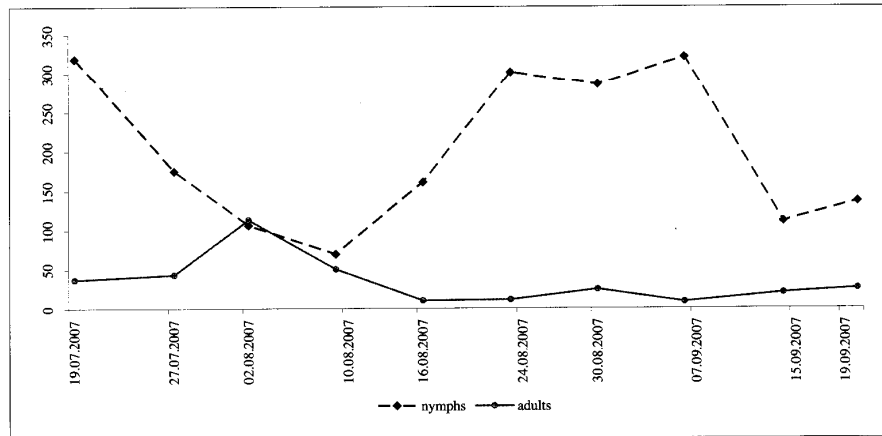


Fig. VII – Dynamics of leaf damage of grapevine by *Arboridia kakogawana* in Krasnodar Territory, July – September 2007. Y-axis: percentage (%) of damaged leaves. X-axis: dates of accounts.

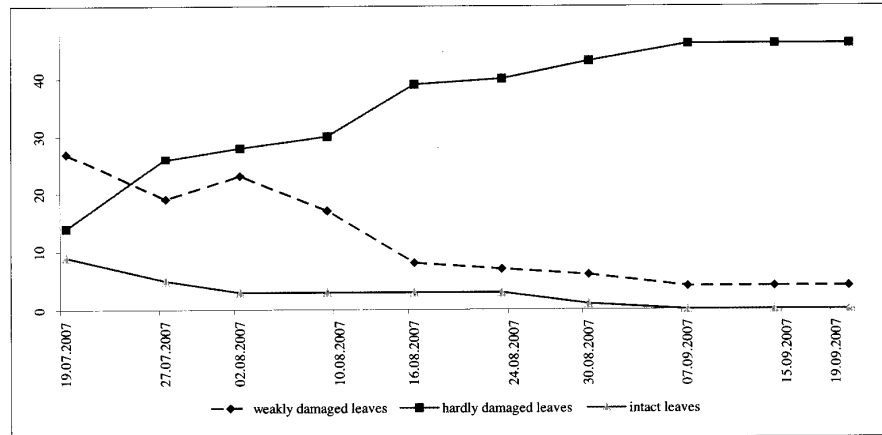
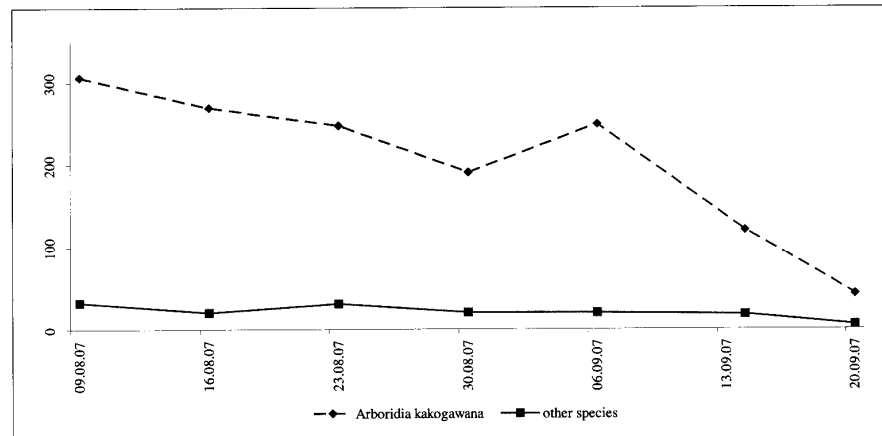


Fig. VIII – Population dynamics of insects on yellow glue traps in Krasnodar Territory, August – September 2007. Y-axis: number of specimens. X-axis: dates of accounts.



European part of Russia. In 1988 Tishechkin recorded *Igutettix oculatus* (Lindberg) (tribe Dikraneurini) from Moscow Province (TISHECHKIN, 1988) and it is also recorded from Finland (ALBRECHT *et al.*, 2003). In the Russian Far East it feeds on *Syringa reticulata amurensis* (Rupr.) P. S. Green & M. C. Chang (ANUFRIEV & EMELJANOV 1988). In St. Petersburg this species feeds both on *Syringa henryi* Schneid and *S. vulgaris* L.

Apparently both species have been introduced into European Russia from their native regions with cargo. Both species are oligophagous (feed on the species of the same genus), which have easily changed its native host plant to cultural or ornamental one in another territory. Penetration of both *A. kakogawana* and *I. oculatus* to other European countries is rather probable.

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#### RIASSUNTO

ARBORIDIA KAKOGAWANA (MATSUMURA)  
(HEMIPTERA CICADELLIDAE TYPHLOCYBINAЕ)  
UN NUOVO PARASSITA DELLA VITE  
NEL SUD DELLA RUSSIA

Il Cicadellidae Typhlocybino *Arboridia kakogawana* primariamente descritto per l'isola giapponese di Honshu e successivamente ritrovato in Corea e nell'estremo oriente russo su *Vitis amurensis* Rupr. in prossimità di foreste miste, viene ora segnalato su *Vitis vinifera* L. nei vigneti russi e del sud Corea. Attualmente il parassita è segnalato per i vigneti del territorio di Krasnodar e della provincia di Rostov nel sud della Russia. La dinamica di popolazione del Typhlocybino è stata studiata nei vigneti di Krasnodar (Russia).

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