



ВИДОВ СЪСТАВ НА ЦИКАДИТЕ В ЛОЗОВИ НАСАЖДЕНИЯ В РАЙОНА НА СТРУМИЦА,  
РЕПУБЛИКА МАКЕДОНИЯ  
CICADA SPECIES ON VINE PLANTATIONS IN THE STRUMITZA REGION, REPUBLIC OF MACEDONIA

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#### Abstract

During the two-year investigation of the fauna of *Fulgoromorpha* and *Cicadomorpha* (Hemiptera) of grapevine in the Strumica region, Republic of Macedonia, the presence of 13 species was established. In the first year of testing (2005), 10 species were registered: *Zygina* sp., *Euscelis incisus*, *Psammotettix alienus*, *Neoliturus fenestratus*, *Delphax* sp., *Aphrodes* sp., *Euscelidius schenhii*, *Erzaleus metrius*, *Dictyophara europaea* and *Fieberiella florii*. In the second year of the survey (2006), 7 species were registered: *Fieberiella florii*, *Neoliturus fenestratus*, *Allygidius* sp., *Delphax* sp., *Tettigetia dimissa*, *Cicadetta* sp. and *Dictyophara europaea*. The species *Dictyophara europaea*, *Fieberiella florii*, *Neoliturus fenestratus* and *Delphax* sp. were encountered in the two years of investigation.

**Ключови думи:** лоза, *Fulgoromorpha*, *Cicadomorpha*, *Dictyophara europaea*.

**Key words:** grapevine, *Fulgoromorpha*, *Cicadomorpha*, *Dictyophara europaea*.

#### INTRODUCTION

The main goal of our research is determination of faunistic composition of planthoppers and leafhoppers in Strumica region. These examinations will indicate the most abundant and the most present planthoppers and leafhoppers on the grapevine in Strumica region. Those results would help in finding rational decision for controlling the population of planthoppers and leafhoppers that will also prevent transmission of pathogenic microorganisms.

The necessity of studying planthoppers and leafhoppers on grapevine emanates from not enough research work of these species in Republic of Macedonia. In our country planthoppers and leafhoppers are not studied as pests on grapevine. Only the big cicadas, noisemakers, (Hemiptera: Auchenorrhyncha: Cicadidae) (Gogala et al., 2005), which are not registered as pests in agriculture, are examined.

#### MATERIALS AND METHODS

The examinations were conducted during 2005/06, on vineyards, on a surface of 0,5 ha. Vineyards, on which our investigations are conducted, are grown in commercial terms, in which are implemented standard

agrotechnics. For collecting insects on field, yellow water traps were used. Three yellow water traps were put on the level of the vine sprouts and the leaves of the grapevine, diagonally, during the vegetation of the grapevine. Collected material was transferred into plastic container, with 75 % ethanol. The yellow water traps were placed on 03.05., and gathered on 30.09., respectfully each year. Control of the collected material was done in period of 14 days.

The method of cultivation of the vine, as well as the application of agricultural measures creates specific agro-ecological conditions that affect the formation weed communities in the vine, with a specific floristic composition. In our two-year investigation, dominant weed species were: *Amaranthus retroflexus* L., *Capsella bursa – pastoris* L., *Chenopodium album* L., *Convolvulus arvensis* L., *Cynodon dactylon* L., *Solanum nigrum* L., *Panicum crus – galli* L., *Stellaria media* L., *Urtica dioica* L., *Xanthium strumarium* L. and *Taraxacum officinale* L. Considering that some of the weeds in and around the vineyards are host plants for a number of planthoppers and leafhoppers (Homoptera: Auchenorrhyncha), it is important for them to be listed in this paper.

Laboratory processing of the material was performed continuously, after the vegetation of vines in each year of the examinations. The material was triaged and the separated samples were preserved in 75% alcohol and kept in sealed plastic cups in a refrigerator at a temperature of 4°C.

Determination and verification of the collected material was performed by Dr. Ivo Tosevski, the Institute of plant protection and environment, Zemun, Belgrade, Republic of Serbia.

### RESULTS

During two years of trials, 13 species of planthoppers and leafhoppers are identified. In the first year of testing (2005), 10 species were registered: *Zygina sp.*, *Euscelis incisus*, *Psammotettix alienus*, *Neoaliturus fenestratus*, *Delphax sp.*, *Aphrodes sp.*, *Euscelidius schenhii*, *Erzaleus metrius*, *Dictyophara europaea* and *Fieberiella florii*. In the second year of survey (2006), 7 species were registered: *Fieberiella florii*, *Neoaliturus fenestratus*, *Allygidius sp.*, *Delphax sp.*, *Tettigetia dimissa*, *Cicadetta sp.* and *Dictyophara europaea* (Table 1).

Dynamic of population of the Auchenorrhyncha (Hemiptera) species on the grapevine in Strumica region during 2005/2006 is shown in Graphic 1.

### DISCUSSION

In our country, until now, no investigations are done about the planthoppers and leafhoppers on the grapevine. Until now, Macedonia has data for large cicada - musicians, family Cicadidae, who are not registered as a pest in agricultural production (Gogala et al., 2005). Watching the intensity of their infestation and damage they cause on the

grapevine, we felt it was necessary to do research for faunistic composition of planthoppers and leafhoppers on the grapevine in Strumica region.

The results, we obtained from our research, showed presence of 13 species of planthoppers and leafhoppers, of which 5 were determined to systematic category genus (*Delfax sp.*, *Cicadetta sp.*, *Aphrodes sp.*, *Zygina sp.*, *Allygidius sp.*) and 8 to a systematic category species (*D. europaea*, *F. florii*, *N. fenestratus*, *P. alienus*, *E. schenckii*, *E. incisus*, *E. metrius*, *T. dimissa*).

Identified species are grouped into 4 families: Delphacidae, Dictyopharidae, Cicadidae and Cicadellidae, which in turn belong to two infraorders: Cicadomorpha and Fulgoromorpha.

Family Delphacidae in our surveys in 2005 and 2006 was represented with three individuals of the genus *Delfax*. According to Holzinger et al., 2003, some, if not all, species feed on grass of the family Poaceae, and are important pests of rice and grains, transmitting viruses. So their presence on the grapevine may be attributed to the presence of weed vegetation around vineyards, where one can meet grass of family Poaceae, and of course, the favorable climatic conditions which enabled the survival of species.

Family Dictyopharidae, in our tests, was represented only with the species *Dictyophara europaea*. *D. europaea* was observed in both years of examinations. Until now, this species had not an economic significance, since, in the latest research of Lessio and Alma, 2008, has shown that an individual has been infected with phytoplasma of group 16Sr-V, which is the carrier of the famous "flavescence dorée" on the grapevine. To date the only carrier of Flavescence dorée is the species *Scaphoideus*

**Table 1.** Representation of planthoppers and leafhoppers in Strumica region, Republic of Macedonia, in 2005/2006

Species	2005		2006	
	Number of species	%	Number of species	%
<i>Zygina spp.</i> / Cicadellidae	1	9,09	-	-
<i>Euscelis incisus</i> / Cicadellidae	1	9,09	-	-
<i>Psammotettix alienus</i> / Cicadellidae	1	9,09	-	-
<i>Neoaliturus fenestratus</i> / Cicadellidae	1	9,09	2	18,18
<i>Aphrodes spp.</i> / Cicadellidae	1	9,09	-	-
<i>Euscelidius schenhii</i> / Cicadellidae	1	9,09	-	-
<i>Erzaleus metrius</i> / Cicadellidae	1	9,09	-	-
<i>Fieberiella florii</i> / Cicadellidae	1	9,09	3	27,27
<i>Allygidius spp.</i> / Cicadellidae	-	-	2	18,18
<i>Delfax spp.</i> / Delphacidae	2	18,18	1	9,09
<i>Dictyophara europaea</i> / Dictyopharidae	1	9,09	1	9,09
<i>Tettigetia dimissa</i> / Cicadidae	-	-	1	9,09
<i>Cicadetta spp.</i> / Cicadidae	-	-	1	9,09

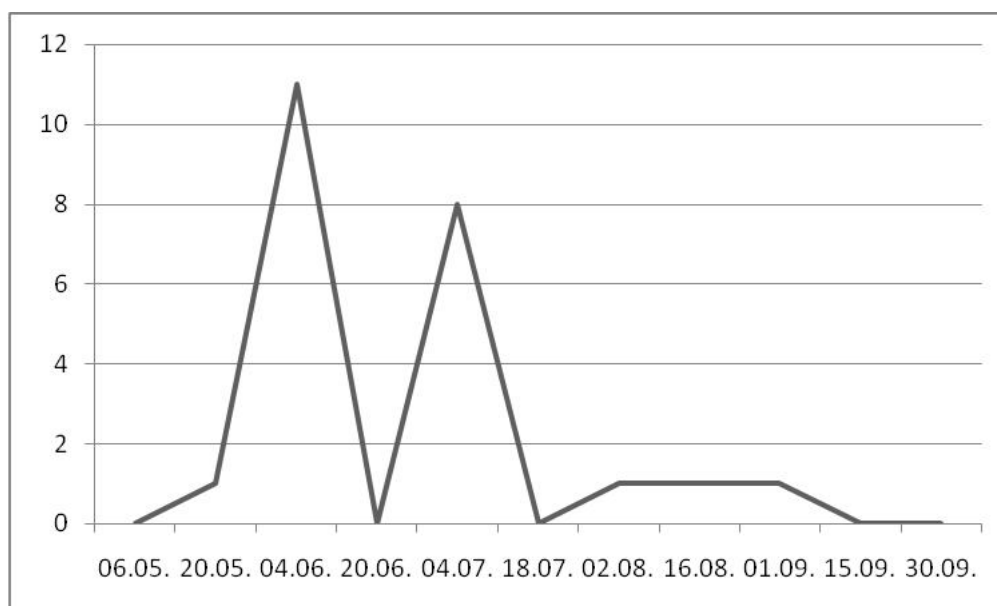


Fig. 1. Dynamic of population of the Auchenorrhyncha (Hemiptera) species on the grapevine in Strumica region during 2005/2006

*titanus* Ball, which is monophagous on the grapevine. Their studies showed that host of *D. europaea* are the weeds *Amaranthus retroflexus* and *Urtica dioica*. These weeds are present between the rows of vines. These weeds may be harboring Stolbur phytoplasmas, where through *D. europaea* can be transferred in the grapevine. These weeds were noticed around the vineyards in our country too, so it could be possible that *D. europaea* may occur as a potential carrier of stolbur phytoplasma on the grapevine in our country.

Family Cicadidae in our trials was represented with two species, namely, one individual of the species *T. dimissa* and one individual of the species *Cicadetta* sp. These species live on trees or shrubs, on moderately dry areas and are not significant pests in agriculture. Identification of species from this family is difficult because of their vast distribution and lack of keys for determination (Dietrich, 2005). Its presence in our tests can determine just like incident.

Family Cicadellidae is one of the richest families in species, including important pests of agricultural crops. Damages caused to plants can be direct, through the damage they do with the oral apparatus, sucking plant juices, or it also cause indirect damage by transmitting a variety of pathogens (viruses, bacteria and mycoplasmas) from plant to plant, which damages are very significant (<http://creatures.ifas.ufl.edu/fruit/sharpshooters>). In our examinations were identified species belonging to 3 subfamilies: Aphrodinae, Typhlocybinae and Deltocephalinae.

Subfamily Aphrodinae in our examinations was represented only by genus *Aphrodes*, with only one

individual. According to Dietrich, 2005, species of this genus are found on grassy compound vegetation and near, or at the root of the plant. Their random occurrence in entomocenosis on the grapevine is due to the presence of grassy compound vegetation between the rows of vineyards.

Subfamily Typhlocybinae is represented by an individual belonging to the genus *Zygina*. *Zygina* sp. was found in the first year of studies. This species are found on woody plants and a variety of shrubs and in winter move on evergreen plants (Nickel, 2003). This genus includes species that feed on related plants, especially species of the family Asparagaceae, plants that prefer dry areas with the high temperatures (Witt & Edwards, 2002). The presence of species of this genus in entomocenosis of the grapevine, in the first year of studies, can be connected with the benefit of climate conditions.

Subfamily Deltocephalinae was represented by 5 genuses. The genus *Fieberiella* was represented with 4 individuals of the species *F. florii*. According Aldini, 2001, host plant of this species is apple or some other species of the family Rosaceae, but rarely can meet on the grapevine. *F. florii* has significant phytopathological importance as vector of phytoplasma. Harmfulness of vines here, caused by the *F. florii*, by transferring phytoplasma has not been investigated, but will certainly be subject to some future research.

Genus *Neoaliturus* was represented only by the species *N. fenestratus*. The main host plants of *N. fenestratus* are species from the family Asteraceae, and some other grasses, to which is due its presence in entomocenosis of the grapevine (Nickel, 2003). According

Aldini, 2001, this species is suspected as the vector of phytoplasmas, and in Israel was announced as vector of phytoplasma at *Carthamus tinctorius* (Nickel, 2003).

The genus *Allygidius* was represented with 2 individuals, only in 2006.

The species *E. schenckii* was represented with a single species in 2005. So its presence is accidental, possibly due to the presence of weeds in and around the rows of vineyards, because, according to literature data, is found in vineyards, and prefers the nettle, which was quite present in our locality of investigation. Some species of this genus are possible vectors of phytoplasmas (*E. variegates* Kirschbaum), (Aldini, 2001).

*E. incisus*, was the only individual in the region of Strumica in 2005. Species of this genus are difficult for determination (Nickel, 2003). The color of the body is very variable and most reliable recognizable features are found on the genital apparatus. Host plants of this species are clover and other grasses that are found in weed vegetation at the grapevine, which can be connected to its presence in the entomocenosis of the grapevine. This species demonstrated ability to transfer phytoplasmas (Aldini, 2001).

Species *P. alienus* was found only in the first year of the examinations. This species has long been known as vector of viral diseases in wheat (Aldini, 2001). Its presence in entomocenosis of the grapevine is certainly due to the presence of weeds in and around the vineyards.

*E. metrius* was also represented with an individual in entomocenosis of the grapevine.

### CONCLUSION

In our two-year investigation of the fauna of Fulgoromorpha and Cicadomorpha (Hemiptera) of grapevine in the Stumica region, Republic of Macedonia, presence of 13 species was established: *Zygina* sp., *Euscelis incisus*, *Psammotettix alienus*, *Neoaliturus fenestratus*, *Delphax* sp., *Aphrodes* sp., *Euscelidius schenckii*, *Erzaleus metrius*, *Dictyophara europaea*, *Fieberiella florii*, *Allygidius* sp., *Tettigetia dimissa* and *Cicadetta* sp. For the most of cicada found, the presence in the grapevine is due to the weed vegetation that

surrounds the vineyards, which is the main host of planthoppers and leafhoppers.

### REFERENCES

- Aldini, N. R., 2001: Cicaline della vite e del digneto in Lombardia, Iniversita Cattolica del Sacro Cuore, Facolta di Agraria – Piacenza, Istituto di Entomologia e Patologia Vegetale.
- Dietrich, C. H., 2005: Keys to the families of Cicadomorpha and subfamilies and tribes of Cicadellidae (Hemiptera: Auchenorrhyncha). – Florida Entomologist 88 (4): 502-517.
- Gogala, M., Trilar T., Krpač V., 2005: Fauna of singing cicadas (Auchenorrhyncha: Cicadoidea) of Macedonia – a bioacoustic survey. – Acta entomologica slovenica 13 (2): 103-126.
- Holtzinger, W E, Kammerlander I, Nickel H., 2003: The Auchenorrhyncha of Central Europe: Die Zikaden Mitteleuropas. Brill, Leiden – Boston, 673.
- Lessio, F., Alma A., 2008: Host plants and seasonal presence of *Dictyophara europaea* in the vineyard agroecosystem. – Bulletin of Insectology 61 (1): 199-200.
- Nickel, H., 2003: The leafhoppers and planthoppers of Germany (Hemiptera, Auchenorrhyncha): Patterns and strategies in a highly diverse group of phytophagous insects. Pensoft publishers, Sofia - Moscow, 460.  
<http://creatures.ifas.ufl.edu/fruit/sharshooters>

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