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BIODIVERSITY OF *AUCHENORRHYNCHA* INSECTS IN A PEAR ORCHARD FROM SOUTH-EAST OF ROMANIA

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Abstract

The aim of the study was detection and identification of existing planthopper, leafhopper and cixiid fauna in the pear orchard of University of Agronomic Sciences and Veterinary Medicine of Bucharest. Studied biological material consist of adult stage has been obtained from yellow and white sticky traps which were placed in host plant canopy. The identification of the collected material has been carried in the Entomology Laboratory of Central Phytosanitary Laboratory. Based on morphological characters were identified following species: Metcalfa pruinosa (Say, 1830) (Flatidae), Reptalus panzeri (Low, 1883) (Cixiidae), Fieberiella florii (Stal1864), Psammotettix notatus (Melichar 1896), Zyginidia pullula (Boheman 1845), Neoaliturus fenestratus Herrich-Schäfer 1834 (Cicadellidae). Photos with male genitalia details are provided.

Key words: *Flatidae, Cixiidae, Cicadellidae, morphological identification.*

INTRODUCTION

Planthopper, leafhopper and other related species are pests of cultivated plants and can be also vectors of different plant diseases.
The aim of the study was focused on the biodiversity of Auchenorrhyncha species (planthopper and leafhopper) assemblages of pear orchard in 2012 to identify possible vectors of specific disease on host.

MATERIALS AND METHODS

Survey was carried in a modern eight year old pear orchard planted with the cultivars Abbé Fétel, Red Williams, Conference, Beurre Bosc, Alexander Lucas, Clapp′s Favorite. Planting distance was 2 m within the row and 4 m between the rows. One sampling method was applied using sticky traps placed in tree′s canopy using one trap/15-20 tree. The sticky traps (yellow and white), sticky on one side were 25X20 cm size. Traps were hanged into the middle part of the canopy during the vegetation period. Regular checks and replacements of the traps were done for faunistical survey.
Accurate species identification requires examination of the structures of the male genitalia. Identification of the males to species requires removing the abdomen then placing in a 10% KOH solution for 12-24 h at room temperature. To examine genitalia remove the abdomen from KOH place it in a Petri dish filled with water for few minutes, then place it in a drop of glycerin to study. For microscopic observation a drop of glycerin was put on a slide on which dissection of the aedeagus was performed.
Identification were made to the genus and species level according to (Ribauld 1952), (Delia Giustina 1989), (Holzinger, 2003), (Le Quesne 1960).

RESULTS AND DISCUSSIONS

As a result of our investigation altogether 265 individuals have been found in pear orchard belonging to 3 *Auchenorryncha* families, namely *Flatidae*, *Cixiidae* and *Cicadellidae* (figure 1).
During the sampling period extending from May to October presence of 6 species was established. *Metcalfa pruinosa* (Say, 1830) from Flatidae family, *Reptalus panzeri* (Low, 1883) from Cixiidae family, *Fieberiella florii* (Stal 1864) , *Psammotettix notatus* (Melichar 1896), *Zyginidia pullula* (Boheman 1845),

Neoaliturus fenestratus Herrich-Schäfer 1834 from Cicadellidae family.

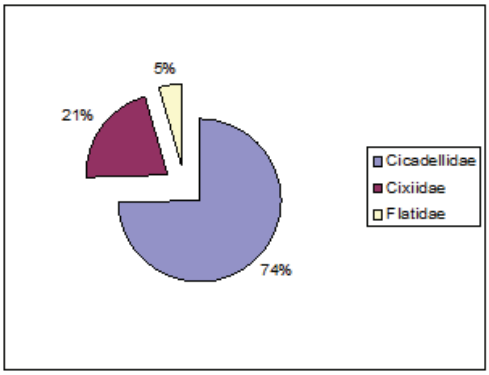

Figure 1. The structure of Auchenorrhyncha family in 2012

The most common species collected in this area, was *Neoaliturus fenestratus* 41 individuals, representing 15% of total record species, followed by *Fieberiella florii* and *Zyginidia pullula* species which were also present in large number in samples, 11% in first case and 12% in second (table 1) of total record species. The other recorded species were present with less frequency. Also, some species have remained unidentified.

Table 1. Identified Cicadellidae species and their density

No	***Cicadellidae* species identified**	**No of indiv.**	**Abundance (%)**
1.	*Fieberiella*	30	11
2.	*Neoaliturus*	41	15
3.	*Zyginidia*	32	12
4.	*Psammotettix*	8	3
	Total	111	

We present below some information on identified Auchenorrhyncha in the monitored area about their biology and few morphological characters useful for their identification.

Metcalfa pruinosa is an insect with one generation per year and is very polyphagous. Adults are present between July and October. This species overwinters in eggs stage, the eggs are inserted into the bark of host plants. They are 5.5 to 8 mm in length have broadly triangular front wings that are held close to the body in a vertical position. The color of adults is brown to gray, due to the presence or absence of a bluish white waxy powder. Forewings in the basal half have a pair of dark spots. It is an invasive species quite new for Europe, (introduced in Italy in 1970) and also for our fauna. Has been recorded in Romania in Constanta region in 2009 for first time (Preda et al., 2009), then in western part of the country in 2010 (Gogan et al., 2010) and also in Bucharest area in 2011 (Chireceanu et al., 2011).

Genitalia: Male pygofer and subgenital plates not differentiated from ringlike segment IX; anal tube short, with elongate tongue like process (grooved on midline) above lower angle; styles held vertically, in ventral aspect slender, slightly divergent near tips, in lateral aspect broadening towards tips, bearing recurved hook beyond tip of aedeagus, setose, articulated against undifferentiated sternite IX; connective linear; aedeagus curved dorsal, parallel-margined to truncate tip bearing two pairs of processes directed forward (CABI, 2013) (Annex I, figures 1A, 1B).

Reptalus panzeri, polyphagous, has one generation per year and larva overwinter. Adults polyphagouus and lives in the shrubs and herb layer. Imagoes are active from mid June till beginning of August. This insect can be vector diseases. It is believed that nymphs, like those of other Cixiids, are root feeders Adult has vertex much broader than long. Eyes usually grayish, sometimes marginated reddish. Overall length: 4.6-5.2 (male) and 5.7-6.8 mm (female) (Le Quesne, 1960). First segment of hind tarsus apically without platellae (Holzinger et al., 2003).

Genitalia: Styles symmetrical (Holzinger et al., 2003), male anal tube produced laterally into sharp angles posteriorly; projection of parameres long; sclerotized projections at lower margin of genital segment pointed apically (Le Quesne, 1960) (Annex I, figures 2A, 2B).

Neoaliturus fenestratus Body small, slender, general coloration of the body deep brow almost black with red tinge; total length of the male and female 3.9 to 4.5 mm; Forewings deep brown, apical third with irregularly shaped and sized whitish patches.

Genitalia: aedeagus oval narrowing at both ends, with tips biforked, the connective at the base of aedegus biforked posteriorly; genital plate triangular; its outer lateral margin with a row of identical spines (Al-Asady et al., 2003) (Annex I, figures 3A., 3B.).

Fieberiella florii is a polyphagous species living on woody plants. Has one generation a year and on woody plants and overwinter in stage of egg. Imagoes emerge from the beginning of June till end of October.
Length 6.5-7mm male and 7-7.5 mm female. Round vertex, wings and body covered with dark punctuation.
Genitalia: Pygofer in lateral aspect about 1% times as long as wide; aedeagus in lateral aspect broad medially, shaft curved laterally, tube like and narrow, shaft with numerous minute spines; style short in dorsal aspect simple, with distal half curved laterally; connective large (Ribaut, 1952) (Annex II, figures 4A., 4B.)
Ziginidia pullula small species overall length 2.2-2.6 mm male and 2,6-3.0 mm female. The general color is dark grey-yellowish. It is a multivoltine species, able to produce up to four generations a year in some area of the Europe.
Genitalia: the anal tube has a pair of appendix developed and sinuous; sides of male genital segment with Y-shaped lobe internally; aedeagus with two appendages long and thin which are very difficult to observe in lateral position (Delia Giustina, 1989) (Annex II. figures 6A., 6B.)
Psammotettix notatus:
Small, linear species. Length overall over 3 mm for male and female. Head much larger than pronotum. The general color of pronotum and fore wings very pigmented. Fore wings developed, rounded symmetrical covers the body entirely.
Genitalia: Genital sternit in trapezoidal form; basal part of the aedegus simple, without annexes; aedeagus in lateral aspect round or less sharp; shaft tubelike and those two arms of shaft like U or V; style in dorsal aspect shorter than connective and apex curved laterally; connective very long, free; gonopore on ventral surface, near apex, bifid apically in ventral aspect (Ribaut, 1952) (Annex II. figures 5A., 5B.)

CONCLUSIONS

The Fulgoromorpha and Cicadomorpha constitute an important part of the trophic network of land ecosystem.

Because some of the identified genera like *Fieberiella*, *Psammotettix* and *Neoaliturus* have been reported to transmit phytoplasmas to fruit trees (Fos et al., 1986), (Jensen, 1957), (Narayanasamy, 2011) it is important to monitor their presence in orchard in order to establish their role in propagation of the disease.

All planthopper, leafhopper and cixiid species identified in the orchard were recorded previous

in the country (Boguleanu, 1994), (Chireceanu et al., 2011), (Gogan et al., 2010), (Preda et al., 2009) but we must underline the presence of the exotic pest *Metcalfa pruinosa* in the monitored area. It is not very clear if this species can be a vector disease but its presence on host plants and ability to establish in new areas must be take in account. Following species haven′t been recorded in Bucharest area by Boguleanu (1994) : *Reptalus panzeri*, *Fieberiella florii*, *Psammotettix notatus* and *Zyginidia pullula*, so we can record here these species as result as our work.

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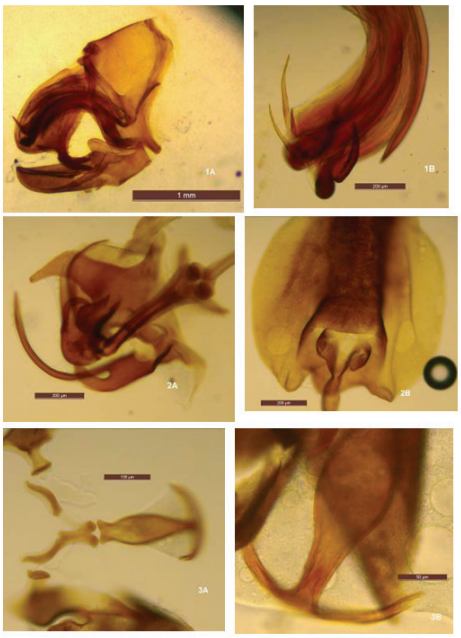

Figure 2. Annex I: figure 1A. Metcalfa pruinosa (genitalia), 1B. (aedeagus); figure 2A. Reptalus panzeri (genitalia complex), 2B. (aedeagus); figure 3A. Neoaliturus fenestratus (aedeagus with connective), 3B. (aedeagus in dorsal view).

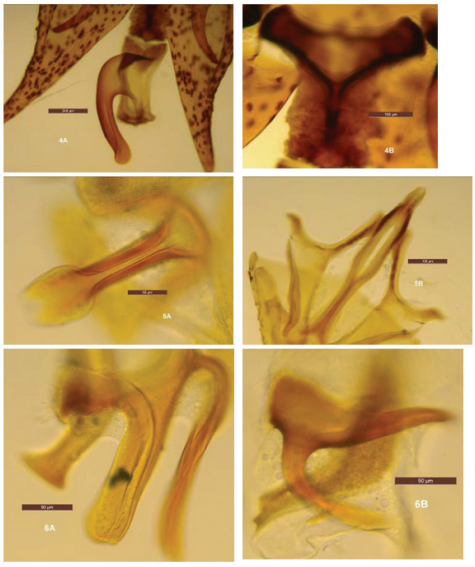

Figure 3. Annex II: figure 4A Fieberiella florii (genitalia), 4 B (connective); figure 5A Psammotettix notatus (aedeagus), 5 B (connective); Figure 6A Zyginidia pullula (genitalia complex in lateral view), 6B (aedeagus in lateral position).