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Holocacista rivillei (Stainton, 1855) (*Lepidoptera Heliozidae*) – A LEAFMINER SPECIES RECORDED ON *Vitis vinifera* L. FROM SOUTHERN ROMANIA

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Abstract

Holocacista rivillei Stainton is an European grapevine leafminer distributed in southern Europe and western Asia (Nieukerken et al., 2012). This small butterfly was described from Malta and is considered a minor pest in vineyards being a monophagous species. Another two lepidopteran leafminers occur in European vineyards, both species being originated from North America, i.e. Antispila oinophylla van Nieukerken&Wagner, 2012 (Lepidoptera: Heliozelidae) and Phyllocnistis vitegenella Clemens, 1859 (Lepidoptera:Gracilariidae). Few years ago mines in grapevine leaves were observed in a vineyard located in southern part of the country (Voluntari, Ilfov county). The leaves with symptoms were collected and larvae were reared in laboratory to obtain adults. Identification of the species was done based on their morphological characteristics. Photographs of mines, adults, pupae and genitalia slides are here showed. Preliminary observation on the behavior of this pest are reported.

Key words*: moth, mines, vineyard, genitalia, Antispila oinophilla, Phyllocnistis vitegenella.*

INTRODUCTION

In Europe grapevine (*Vinis vinifera* L.) is a culture damaged by few lepidopteran leafminer species. Nevertheless in past years two species originated from North America, invaded Old Continent and they are now considered as serious pests for vineyards, especially in Italy (Nieukerken et al., 2012). These species are *Phyllosticnis vitegella* Clemens, 1859 (Lepidoptera: Gracillariidae) found in Italy since 1995 and *Antispilla oinophylla* van Nieukerken &Wagner 2012 (Lepidoptera: Heliozidae) which was detected and identified in Italy since 2006 as *Antispilla* sp. (Baldesssari et al., 2009) and finally identified in 2012 (Nieukerken et al., 2012). In Europe the only native leafminer on grape is *Holocacista rivillei* (Stainton, 1855). This species was described from Malta and later was reported in Italy, France, Greece, Russia, Slovenia, Spain (www.faunaeuropea.org), Croatia, Bulgaria, Ukraine, Turkey, Georgia, Kazakhstan, Uzbekistan, Turkmenistan (Nieukerken et al., 2012).

According to the Romanian check list and also fauna europea site in our fauna there is no record of *Holocacista rivillei*. There were recorded only two genera from Heliozidae Family: Antispila *(Antispila metallella* Denis&Schiffermüller, 1775 on *Cornus* spp; *Antispila treitschkiella* Fisher & Röslerstamm, 1843 on *Cornus* spp.) and Heliozela *(Heliozela hammoniella* Sorhagen, 1885 on *Quercus* spp; *Heliozela sericiella* Haworth, 1828 on *Betula* spp; *Heliozela resplendella* Stainton, 1851 on *Alnus* spp.) (Rakosy, 2007).

MATERIALS AND METHODS

A survey was carried out in a private vineyard from Ilfov county (near Bucharest) since 2003 having main objective detection of leafminer fauna in this perimeter.

Several leaves with mines were collected and larvae and pupae were reared to obtain adults. Identification was carried out based on morphological characters. Material examined: 3 ♀ (all dissected).

Accurate species identification requires examination of the genitalia structures. Methods for preparation of genitalia 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. Microscopic slides were

made in Hoyer solution. For microscopic observation of wings they are stained in double stain solution (EAF, fuchsine acid, lignin pink) and then mounted also in Hoyer solution. Identification was made to the genus and species level according to Nieukerken et al. (2012). Photographs of moths, genitalia slides and wing slides were taken with a Leica DFC 295 digital camera attached to a Leica DMLB microscope, using Leica LAS software (Figures 5, 6, 7 and 8) and Leica DC 300 digital camera attached to a Leica stereomicroscope MZ $_{12,5}$ (Figures 3 and 4) and pictures showing symptoms with Canon camera (Figures 1 and 2).

RESULTS AND DISCUSSIONS

As a result of our investigation in the studied area were observed leafmines on leaves produced by a lepidopteran species at the end of June-beginning of July (Cean, 2011).

Figure 1. *Holocacista rivillei* mines

Larvae had produced characteristic mines (Figure 1) between two epiderms of leaf started with a narrow, long and transparent gallery which became finally more or less an oval blotch inside being visible frass.

Finally larva before pupate cuts out an oval excision from blotch leaving a hole in the leaf (Figure 2).

Figure 2. Oval cut-off in leaf and other mines

Larvae drop in soil or other substrates in these cut-outs, shields or cases (Figure 3) and pupate. They can be found on leaves, soil (in summer period) or in the crevices of stem and large branches (in winter).

Figure 3. Empty shield of *Holocacista rivillei*

After rearing of the larvae and pupae we obtained adults which were identify as *Holocacista rivillei* (Stainton, 1855) a very small moth from Heliozidae Family. They are hardly visible due to their small size.

The morphological characteristics observed were according to Balachovski (1966), Balsedessari et. al. (2009) and Nieurkerken (2012), namely lanceolate forewings (Medvedev, 1989), bright black with four triangular golden yellowish spots (Figure 4) two placed in alaire region and other two in the basal area. The apical spot presented in

Antispilla oinophylla species is lacking at this species. Wingspan between 3.5-4 mm. The antenna is ringed, forelegs are black and other pairs are silvery in color (Balachowski, 1966).

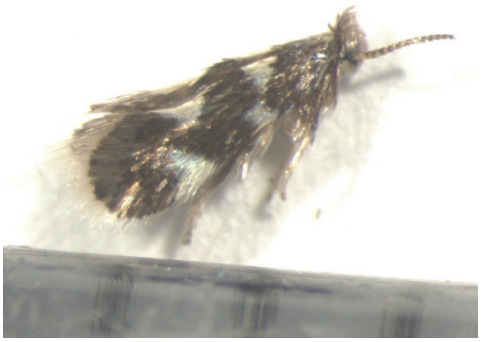

Figure 4. *Holocacista rivillei* (female)

As Nieukerken et al. (2012) showed the venation is reduced for both wings (Figures 5 and 6). Cu venation is lacking in the forewings, A1+2 a strong separate vein.

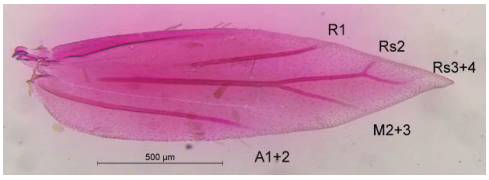

Figure 5. Forewing of *Holocacista rivillei*

Hindwing cu Sc barely visible, Cu and A1+2 separet veins.

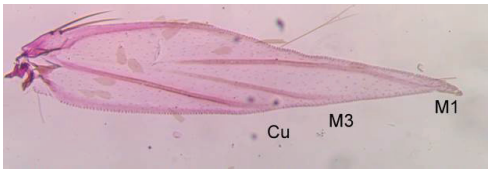

Figure 6. Hidewing of *Holocacista rivillei*

Comparing morphological details of female abdominal segments between our specimens and those illustrated by Nieukerken et al. (2012) we don't find any differences.
Number of lateral cusps on the ovipositor are reduced comparing with *Antispila oinophylla* which has 4-5 cusps and also the shape and dimensions are different being more unequal and smaller with rounded end at *Holocacista rivillei*.

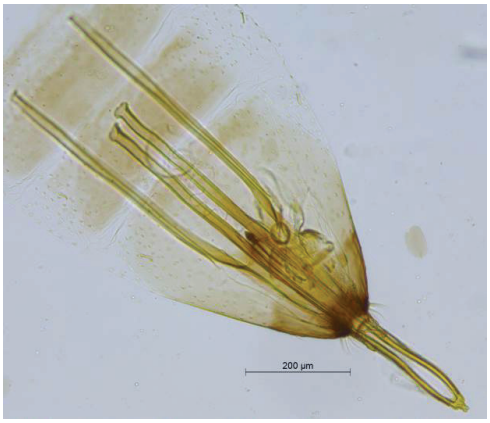

Figure 7. Abdominal segments of female showing apophyses and ovipositor

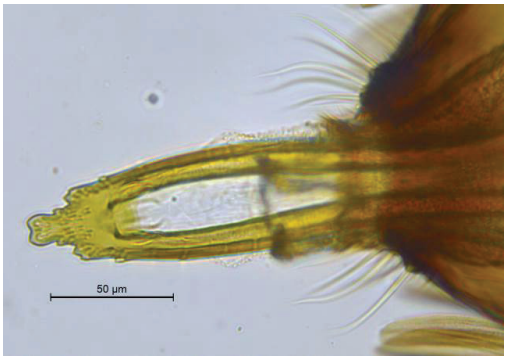

Figure 8. Detail of ovipositor tip showing cusps

CONCLUSIONS

Based on bibliographic research work we can conclude that in Romania there were not known lepidopteran leafmining species on *Vitis vinifera* L.
Holocacista rivillei (Stainton, 1855) is a native European leafminer but through this paper we want to draw attention about appearance of this moth in Romania at least in south part of the country.
Identification of the pest by a specialist is needed having regards apparition in Europe of two other lepidopteran leafminers on *Vitis vinifera*, from Nearctic Area.

We observed two generations per year with a peak in June-July and other in September.
However *Holocacista rivillei* can became a pest for vineyard at heavy infestation reducing the photosynthetic capacity of the leaves.

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