ACTA ZOOLOGICA BULGARICA

Short Communication

Acta Zool. Bulg., 74 (4), December 2022: 623-626
Published online 28 December 2022
http://www.acta-zoologica-bulgarica.eu/2022/002602

First Record of the North American Leafhopper *Erasmoneura vulnerata* (Fitch, 1851) (Hemiptera: Cicadellidae) in Bulgaria

Rumen Tomov

University of Forestry, 10 St. Kliment Ohridski Blvd., 1797 Sofia, Bulgaria; E-mail: rtomov@yahoo.com

Abstract: The North American leafhopper *Erasmoneura vulnerata* is reported as a new species to the fauna of Bulgaria. Adults and a nymph of this species were detected on 20 October 2021 on grapevines (*Vitis* sp.) at two towns along the Danube River (Svishtov and Ruse). At present, *E. vulnerata* is at the initial phase of its invasion in Bulgaria.

Key words: Leafhoppers, alien pests, *Vitis* spp., distribution.

Introduction

The leafhopper *Erasmoneura vulnerata* (Fitch, 1851) is native to North America and infests wild and cultivated grapes and a number of secondary host plants (Martinson & Denney 1995, Olivier et al. 2012, Dmitriev et al. 2019). When large populations occur, feeding areas overlap and involve the entire leaf. In the USA, it has been reported that heavily infested leaves are curled, scorched and may fall prematurely (Paxton & Thorvilson 1996). *Erasmoneura vulnerata* was detected for the first time in Europe in 2004 in a locality of the Veneto Region, north-eastern Italy (Duso et al. 2005). Since then, it has spread to new areas in Italy (Duso et al. 2008). The species was also detected in Slovenia in 2010 (Seljak 2011), Romania in 2015 (Chireceanu et al. 2020), Serbia in 2019 (Sciban & Kosovac 2020) and Switzerland in 2019 (Rizzoli et al. 2020).

Erasmoneura vulnerata is a leafhopper with a body length of 2.7–3.2 mm. Two seasonal colour forms occur. General colouration of the adults of summer forms is reddish-brown, while autumn forms are greenish-brown. In summer forms, anterior wings have a typical red R1 vein. In most of the specimens found in autumn, R1 is whitish. The characteristic transversal red veins at the base of the first apical cell on the forewings make *E. vulnerata* easily identifiable. Description of adults of *E. vulnerata* is given by Duso et al. (2005), Seljak (2011), Dmitriev et al. (2019), Chireceanu et al. (2020), Rizzoli et al. (2020) and Sciban & Kosovac (2020). Description of details of male genitalia in *E. vulnerata* is given by Seljak (2011) and Dmitriev et al. (2019). Newly hatched nymphs are whitish, whereas later nymphs become yellow-brown to brown with red shades. Legs are light green. Vertex and thorax dorsoventrally flattened. The whole body is longitudinally divided by a yellowish stripe (Duso et al. 2005, Seljak 2011, Rizzoli et al. 2020).

Erasmoneura vulnerata can complete two – three generations per year. Nymphs and adults feed on the leaf mesophyll. Feeding sites appear as pale speckled areas. Active feeding by nymphs and adults is associated with the production of black excrements on the foliage (Paxton & Thorvilson 1996). Details on the species' biology and phenology are presented by Duso et al. (2019).

On 20 October 2021, in the framework of a survey for early detection of alien species in Bulgaria, specimens of unknown leafhopper species were accidentally swept from cultivated plants of *Vitis* in the towns of Ruse and Svishtov located along the Danube River. This species was identified as *E. vulnerata*. The present communication reports it as a new species to the fauna of Bulgaria.

Materials and Methods

The field surveys were conducted in the period September – October 2021 in eight towns located along the Danube River. Visual observations of plants of *Vitis* sp. in urban areas and vineyards were made. The insects were collected using a sweep net or by hand, picking infested leaves. The adult insects were identified following the description of Dmitriev et al. (2019) and Seljak (2011). The material was deposited in the author's collection at the University of Forestry in Sofia. The UTM Grid template used is after Abadjiev (2001).

Results

Material examined: Ruse, 43°51'15.4"N 25°57'08.0"E, UTM MJ15, 35 m a.s.l., 20.10.2021, summer form 1♀, autumn form 1♂, 1 nymph; Svishtov, 43°37'07.0"N 25°20'56.8"E, 43°37'14.1"N 25°20'57.7"E, UTM NJ28, 73 m a.s.l., 20.10.2021, summer form 1♀, 11♂. The adult specimens were identified as *Erasmoneura vulnerata* (Fig. 1).

Erasmoneura vulnerata was detected on grape plants (*Vitis* sp.) in urban areas of the towns Ruse and Svishtov located along the Danube River (Fig. 2). In Ruse, the specimens were found on plants of *Vitis* sp. in a yard near Hotel Riga, in which a large part of the tourist flow along the Danube River is directed. In Svishtov, the specimens were found on *Vitis* sp. in a yard near Svishtov International Port. The species was less abundant, accounting for 0.8% of the leafhopper specimens sampled in both towns. It was not found at other six localities along the Danube: the towns of Lom, Kozloduy, Nikopol, Byala (near Ruse), Mizia and Silistra, which were also surveyed during in September – October 2021.

Discussion

The survey showed that *E. vulnerata* is at the beginning of its invasion in Bulgaria. It was detected only in two towns along the Danube River, which most probably are the entry points of the species in Bulgaria. Single specimens were collected on plants of *Vitis* sp. that were the only surveyed plant species. Hence, it might be expected that other plant species should be infested as well. In Europe, it has been detected on several European grapevine cultivars and on groups of *Vitis labrusca* plants (cv. Isabella) or *V. riparia, V. labrusca* (cv. Noah), *Cercis siliquastrum* L. and *Parthenocissus* spp. Among them, *Vitis vinifera* L. is considered the most suitable host plant (Duso et al. 2005, 2019, Seljak 2011, Dmitriev et al. 2019).

Despite the fact that only several specimens were collected, there were summer and autumn forms as well as nymphs. The number of specimens detected in this study is low, however, *E. vulnerata* could have a potential to become a pest in commercial vineyards in Bulgaria, considering its current pest status in Italy. Several years after the first record of *E. vulnerata* in Italy, its populations remained at low-density levels and the species was considered as a minor pest of grapevine in commercial vineyards (Duso et al. 2005, 2008). Duso et al. (2005) recorded significant population density in north-eastern Italy and severe symptoms on isolated plants of European cultivars, which had not been treated with insecticides, as well as on groups of plants of *V. labrusca* (cv. Isabella) or *V. riparia, V. labrusca* (cv. Noah) growing in gardens. These authors also observed severe symptoms on caged grapevines and assumed that the occurrence of *E. vulnerata* in commercial vineyards is relatively unimportant probably because of the insecticide applications. During 2006 and 2007, Duso et al. (2008) reported increasing spread of *E vulnerata* but records were related mainly to unsprayed vines, in particular belonging to *V. labrusca* and French hybrids. Nymphs and adults of *E. vulnerata* were frequently detected on *Parthenocissus* spp. Few individuals were detected in commercial vineyards. Few individuals were observed on *V. vinifera* in Slovenia as well, whereas large populations were reported in various localities around Nova Gorica, especially on *V. labrusca* 'Isabella' and *Cercis siliquastrum* L. (Seljak 2011).

The pest status of *E. vulnerata* changed in 2016 when Duso et al. (2017) detected outbreaks in commercial vineyards (*Vitis vinifera*) located in the Veneto Region (Treviso and Vicenza Provinces). In late summer, the authors observed symptoms caused by the leafhopper spread on more than 90 % of the canopy, and population densities exceeded 10 nymphs per leaf in some vineyards. Duso et al. (2017) detected infestations both in conventional and organic vineyards despite the application of insecticides. According to the authors, this phenomenon is associated with reduced susceptibility toward pes-

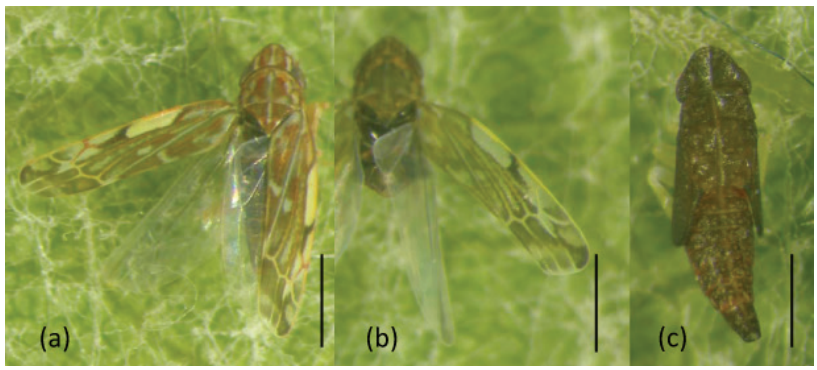

Fig. 1. *Erasmoneura vulnerata* (scale bar 1 mm): (a) adult summer form; (b) adult autumn form; (c) nymph, dorsal view.

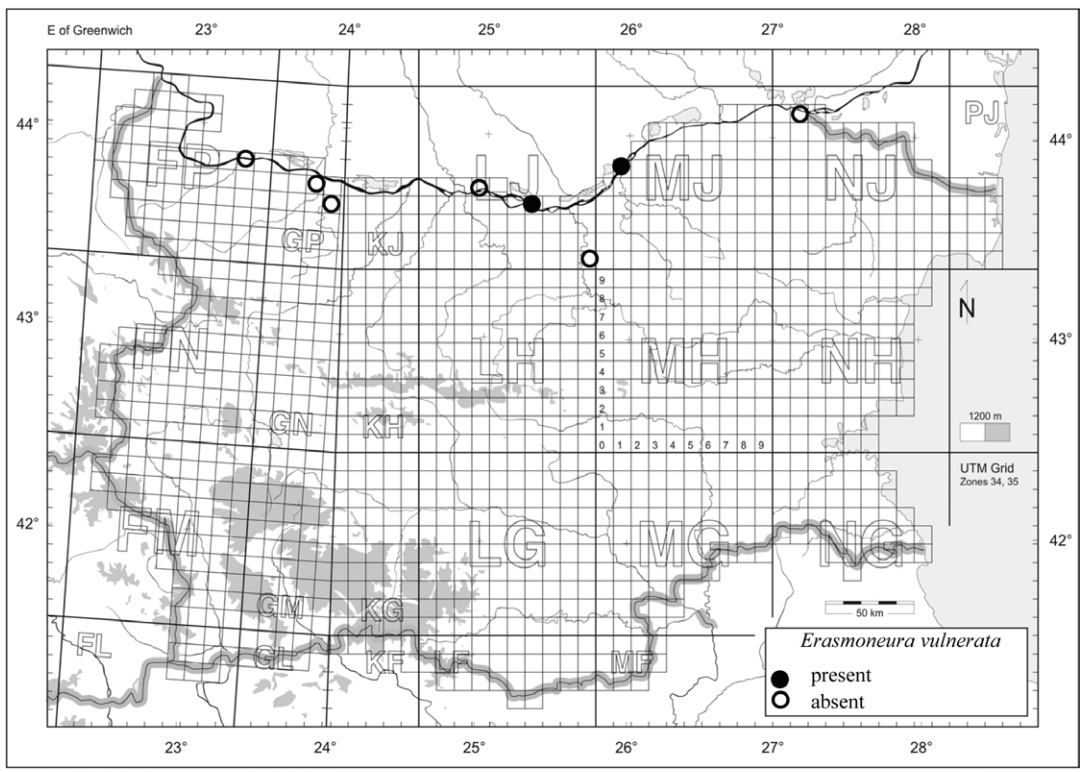

Fig. 2. Distribution of *Erasmoneura vulnerata* in Bulgaria (2021), UTM Grid. The black circles indicate the localities, in which the species was recorded, while the white circles indicate the localities, where the species was not found.

ticides commonly used in viticulture, in particular, organophosphates. According to Duso et al. (2020), the recent outbreaks involve both conventional and organic vineyards located in north-eastern Italy, particularly in the Veneto Region. Overwintered adults can damage shoots at sprouting, while the first nymphal generation is usually not harmful. The second generation is associated with the highest population densities, while the third is sometimes a problem for the plants.

Chireceanu et al. (2020) recorded *E. vulnerata* in two regions of Romania, the vineyards of the Moldova Hill Region in the eastern part of the country and Bucharest City in the southern part of the country, where the species was observed on plants of *Vitis*, cultivated for different purposes in home gardens or randomly grown in the city's urban area. *Erasmoneura vulnerata* was the most abundant species, accounting for 67.89% of the leafhopper species sampled in their study. In 2019, *E. vulnerata* was recorded in vineyards in Ticino (southern Switzerland) (Rizzoli et al. 2020). In Serbia, only four specimens were collected on *Vitis* sp. in Belgrade in 2019 (Sciban & Kosovac 2020).

In Bulgaria, this leafhopper was detected on plants in private gardens in urban areas only. Considering the severe infestation on European grapevine cultivars found recently in Italy and the high

abundance of the species recorded in Romania, further studies of the impact of this species on vineyards should be carried out.

Acknowledgements: This study was conducted within the project NIS-B-1070 "Assessment of the impact of the alien insects and the risk of their introduction in agrocenoses in Bulgaria" funded by the Scientific Sector of the University of Forestry. It was also supported by the National Science Programme "Environmental Protection and Reduction of Risks of Adverse Events and Natural Disasters" approved by Resolution of the Council of Ministers № 577/17.08.2018 and supported by the Ministry of Education and Science of Bulgaria (Agreement № DO-230/06-12-2018).

References

Abadjiev S. 2001. An atlas of the distribution of the butterflies in Bulgaria (Lepidoptera: Hesperioidea & Papilionoidea). Zoogeographica Balcanica. 1. Sofia-Moscow: Pensoft, 335 p.

Chireceanu C., Bosoi M., Podrumar T., Ghica M., Teodoru A., Chiriloaie-Palade A. & Zaharia R. 2020. Invasive insect species detected on grapevines in Romania during 2016–2019 and first record of *Erasmoneura vulnerata* (Fitch, 1851) (Hemiptera: Cicadellidae). Acta Zoologica Bulgarica 72 (4): 649–659.

Dmitriev D., Sanborn A. & Takiya D. 2019. 3i Auchenorrhyncha: World Auchenorrhyncha Database (version Nov 2017). In: Roskov Y., Ower G., Orrell T., Nicolson D., Bailly N., Kirk P. M., Bourgoin T., DeWalt R. E., Decock W., Nieukerken E. van, Zarucchi J. & Penev L. (Eds.) Species 2000 & ITIS Catalogue of Life, 2019 Annual Checklist. Digital resource at www.catalogueoflife.org/annual-checklist/2019. Species 2000: Naturalis, Leiden, the Netherlands. ISSN 2405-884X.

Duso C., Bressan A., Mazzon L. & Girolami V. 2005. First record of the grape leafhopper *Erythroneura vulnerata* Fitch (Homoptera, Cicadellidae) in Europe. Journal of Applied Entomology 129 (3): 170–172.

Duso C., Moret R., Marchegiani G. & Pozzebon A. 2008. Notes on the distribution and the phenology of *Erasmoneura vulnerata* (Fitch) (Homoptera: Cicadellidae) in North-eastern Italy. IOBC/WPRS Bullein 36: 251–254.

Duso C., Borgo, M., Pozzebon A., Mazzon L., Mori N., Pavan F., Fornasiero D., Marchesini E., Martinez-Sañudo I. & Zanettin G. 2017. Vite: *Erasmoneura vulnerata*, una minaccia da valutare. L'Informatore Agrario 44: 31–35.

Duso C., Moret R., Manera A., Berto D., Fornasiero D., Marchegiani G. & Pozzebon A. 2019. Investigations on the Grape Leafhopper *Erasmoneura vulnerata* in North-Eastern Italy. Insects 10, 44; doi:10.3390/insects10020044

Duso C., Zanettin G., Gherardo P., Pasqualotto G., Raniero D., Rossetto F., Tirello P. & Pozzebon A. 2020. Colonization patterns, phenology and seasonal abundance of the Nearctic leafhopper *Erasmoneura vulnerata* (Fitch), a new pest in European vineyards. Insects 11, 731; doi:10.3390/insects11110731

Sciban M. & Kosovac A. 2020. New records and updates on alien Auchenorrhyncha species in Serbia. Pesticidi i Fitomedicina 35: 9–16.

Martinson T. E. & Dennehy T. J. 1995. Varietal preferences of *Erythroneura* leafhoppers (Homoptera: Cicadellidae) feeding on grapes in New York. Environmental Entomology 24: 550–558.

Olivier C., Vincent C., Saguez J., Galka B., Weintraub P. G. & Maixner M. 2012. Leafhoppers and planthoppers: Their bionomics, pathogen transmission and management in vineyards. In: Arthropod Management in Vineyards; Dordrecht, The Netherlands: Springer, 253–270.

Paxton D. W. & Thorvilson H. G. 1996. Oviposition of three *Erythroneura* species on grape leaves in Western Texas. Southwestern Entomologist 21: 141–144.

Rizzoli A., Battelli R., Conedera M. & Jermini M. 2020. First record of *Erasmoneura vulnerata* Fitch, 1851 (Hemiptera, Cicadellidae, Typhlocybinae) in Switzerland. Alpine Entomology 4: 151–156.

Seljak G. 2011. First record of the Nearctic leafhopper *Erasmoneura vulnerata* (Fitch, 1851) (Hemiptera, Cicadomorpha: Cicadellidae) in Slovenia. Acta Entomologica Slovenica 19 (1): 37–42.

Received: 14.01.2022
Accepted: 02.09.2022