

RESEARCHES REGARDING THE EXPANSION OF METCALFA PRUINOSA (SAY) IN ROMANIA

M. Vlad, I. Grozea

Abstract: *Metcalfa pruinosa* (Say) is an invasive species accidentally introduced to Europe. It was also observed in Romania since 2009. The objective of our study is to reveal with are the areas infected with this cicada in Romania. Parks and green areas from Western part of Romania were assessed for the presence of *Metcalfa pruinosa* (Say) and the altitude of each observation point was recorded. Results show that 45% of observed areas were infested with this species. The most infested points were the green areas near roads and the entry points of the cities, which indicates that the spread of *Metcalfa* is facilitated by vehicles. *Metcalfa* infestation was discovered only at altitudes below 200 m. Hilly areas and highlands were not favorable for the proliferation of this cicada probably due to lower temperatures and higher levels of precipitation. The fast spread of *Metcalfa* in Romania indicates the need for future monitoring to assess the pest risk and to control its attack.

Key words: *metcalfa pruinosa*, cicada, monitoring, altitude.

INTRODUCTION

Metcalfa pruinosa (Say) has its origins in Nearctic regions of North America, specifically eastern part of the continent, from Quebec to Florida, and from Mexico to Cuba [13]. In Europe it was accidentally introduced for the first time to Italy in 1979 [1, 5, 11, 17, 18] The countries from Europe where this cicada has spread are presented in Fig. 1.



Fig.1 European countries where *Metcalfa pruinosa* was discovered

In Romania it was observed since 2009, during a monitoring project in port Constanța [16]. In year 2010 it was also discovered in the western part of our country, with a hot spot in Timisoara [6]. A year later it was discovered in Bucharest too [2].

Propagation of this cicada and the invasion in new areas are realized through the eggs, through flight of adults on very short distances and through export of infected plants [7, 10]. For example, in Czech Republic it was introduced through egg-infected plants imported from Italy [9]. In Italy it was observed that the transport of insects was facilitated by the cars parked under infected trees, thus the vehicles acting as vectors for the spreading of the species [14].

M. pruinosa has one generation per year and is wintering through eggs in the cracks of tree barks [4, 3, 8, 9, 12, 18]. *Cicada* has five larval stages of different dimensions [16], the larval development stage lasting around 42 days. The first three stages are called larva and the last stages – nymph.

It is very complicated to monitor *M. pruinosa* on large areas, therefore it is necessary to identify the regions with high potential to offer proper conditions for the adaptation of this species and to establish the short, medium and long term spreading of this invasive species, *Metcalfa pruinosa*.

The scope of our researches was to identify the habitats of *Metcalfa pruinosa* in Romania.

MATERIAL AND METHODS

Observations took place during year 2014, between May-September, in order to identify the cicada in its active period. Researches were performed on a large area, in counties: Timis; Arad; Bihor; Hunedoara; Sibiu; Mures; Alba; Cluj; Mehedinti; Dolj; Salaj; Ilfov and Arges (fig. 2). These areas were chosen to cover more varied regions (plain, hill, plateau).



Fig.2 Observation areas

In each county we chose several observation points, in public parks, green areas between flats and alleys, entrances to cities and also vineyards and orchards. There were totally 71 observation points, where the presence or the absence of the cicada was assessed. In each point, the GPS coordination and the altitude were recorded.

RESULTS AND DISCUSSION

The areas assessed during our study presented altitudes between 59 m (in Mehedinti county) and 437 m (in Sibiu county). Regarding the altitude of observation points from each county, there were the following averages recorded: Timis 105.6 m; Arad 113.6 m; Bihor 143.7 m; Hunedoare 197.6 m; Sibiu 420 m; Mures 376 m; Alba 247.7 m; Cluj 371.2 m; Mehedinti 78.6 m; Dolj 118.8 m; Salaj 235.5 m; Ilfov 119m and Arges 234.5 m.

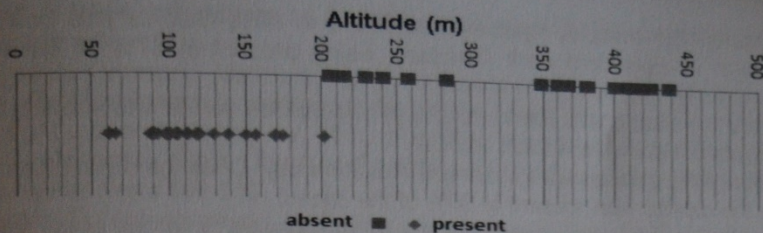


Fig.3 The influence of altitude on the presence of *Metcalfa pruinosa*

The distribution of *Metcalfa pruinosa* had a strong correlation with the altitude, the species being present only up to 202 m altitude. The absence of the cicada at altitudes above 203 m is mainly due to improper climatic conditions for the development of this species (fig. 3).

Of the 13 counties of our study with a total number of 71 observation point, the cicada was found in 8 counties and 32 observation points respectively. The absence of *Metcalfa pruinosa* was recorded in 5 counties (Alba, Cluj, Mures, Salaj and Sibiu), in totally 39 observation points (fig. 4).

Regarding the distribution of *Metcalfa pruinosa* in each county, we observed the following:

-In Timis county the cicada was found in all cities taken into observation and in 86.67% of the observation points. Thus this county can be considered on the most infested areas by this invasive cicada. Our observations conduct to the conclusion that *Metcalfa pruinosa* is present in all parks and green areas of Timisoara, but also in other cities of the county.



Fig.4 Counties where *Metcalfa pruinosa* is present in Romania

-another strongly infested county was Ilfov, where the species was found in 100% of observation points. There was a stronger infection at the vegetation bordering the main roads. As Bozsik showed [1], the spontaneous vegetation near the roads is the main spreading way for *Metcalfa pruinosa*, which needs bands of continuous vegetation for travelling, the flight being used only for short distances.

-in Arad *Metcalfa pruinosa* was found in 67% of the observation points, being present in parks and green areas of Arad city.

- in Bihor county, the invasive species was found in cities Salonta and Oradea, with a strong invasion in Episcopia park (Oradea), being present in 67% of the observation points.
- in Dolj county the cicada was found in 40% of observation points with a strong infection in Nicolae Romanescu park from Craiova city.
- in Arges county the species was observed in Slatina city. Of all the observation point from this county, the cicada was present in 50% of the cases.
- in Hunedoara county the cicada was found only in Deva city, in green areas bordering the main roads. The fact that the cicada was observed at the main entrances to the cities confirm the observations of Pantaleoni [15], which discovered that the vehicles act as vector for the spreading of this species.
- in Mehedinti county, from all observation points, the cicada was found only in Drobeta Turnu Severin city.
- the cities where the cicada was not found at all were: Mures, Cluj, Sibiu, Alba, Salaj. The reason why the cicada was not spread in these areas can be due to higher altitudes than at the other observation points. In these areas there were predominantly plateaus and hills.

CONCLUSIONS AND FUTURE WORK

Of all the observation points, the cicada was found in 45% of cases. The most infested areas are plains, especially from the western part of Romania but also from Ilfov county.

Distribution of *Metcalfa pruinosa* is strongly correlated with the altitude, being present only until 202 m altitude. The absence of the cicada at higher altitudes is due to the unfavorable climatic conditions for the development of this species.

Monitoring shows that *Metcalfa pruinosa* or "the hitchhiker of Europe" is present mostly near the main transport roads and railways from the entrances and exits of the cities, in the main truck parking places, which suggests that the cicada travels on the plants imported from other European countries and also on vehicles.

In the future we aim to monitor the presence of *Metcalfa pruinosa* in other parts of Romania too, establishing the precise parameters which limit the biological cycle of the species in order to assess the adaptation potential to ecological conditions of our country.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the Municipal City Halls of all localities from the western part of Romania for allowing us to make observations in parks and green spaces. The results of this study fulfill an objective of the PhD thesis of PhD Eng. M. Vlad under coordination of prof. dr. I. Grozea.

REFERENCES

- [1]. Bozsik A. 2012. Mass occurrence of the citrus flatid planthopper (*Metcalfa pruinosa* (Say, 1830) (Hemiptera: Flatidae) in an agricultural hedgerow at Gödöllő (Hungary). *Journal Of Agricultural Sciences, Debrecen*, 2012/50 Supplement
- [2]. Chirceanu and Gutue, 2011. *Metcalfa pruinosa* (Say)(Hemiptera:Flatidae) identified in a new south eastern area of Romania (Bucharest Area). *Romanian Journal of Plant Protection Vol.4*, 28-24.
- [3]. Dean, H. A. & Bailley, J. C. 1961. A flatid planthopper *Metcalfa pruinosa*. — *J. Econ. Entomol.* 54, 1104-1106.
- [4]. Della Giustina, W. & Navarro, E. 1993. *Metcalfa pruinosa*, un nouvel envahisseur? — *Phytoma - La Défense des végétaux* 451, 30-32.

RESEARCH PEOPLE AND ACTUAL TASKS ON MULTIDISCIPLINARY SCIENCES
24 – 28 JUNE 2015, LOZENEC, BULGARIA

- [5]. Duso, C. 1984. Infestations by *Metcalfa pruinosa* in the Venice district. *Informatore Fitopatologico* 34, 11-14.
- [6]. Gogan A, Grozea I., Virteiu a. 2010 - *Metcalfa pruinosa* say (insecta: homoptera: flatidae) First occurrence in western part of Romania, 42 (4).
- [7]. Heung-Su L. and Stephen W. 2010. First Report of the Nearctic Flatid Planthopper *Metcalfa pruinosa* (Say) in the Republic of Korea (Hemiptera: Fulgoroidea). *Entomological News* 506-513.
- [8]. Lauterer P, Malenovsky I., 2002. *Metcalfa pruinosa* (Say, 1830) introduced into the Czech Republic (Hemiptera, Flatidae) *Beiträge zur Zikadenkunde* 5.
- [9]. Lauterer, P. 2002. Citrus Flatid Planthopper - *Metcalfa pruinosa* (Hemiptera: Flatidae), a New Pest of Ornamental Horticulture in the Czech Republic. *Plant Protection Science*, 38(4), 145-148.
- [10]. Lee HeungSu, Wilson SW, 2010. First report of the Nearctic flatid planthopper *Metcalfa pruinosa* (Say) in the Republic of Korea (Hemiptera: Fulgoroidea). *Entomological News*, 121(5), 506-513.
- [11]. Lucchi, A. 2000. Interesse apistico, pp. 51-63. In, A. Lucchi (Editor). *La Metcalfa negli ecosistemi italiani. Agenzia Regionale per lo Sviluppo e l'Innovazione nel settore Agricolo-forestale, Firenze, Italy*, pp. 163 .
- [12]. Mead F.W. 1969. Citrus flatid planthopper, *Metcalfa pruinosa* (Say). Homoptera: Flatidae. *Entomol. Circular, Florida D.A.* 85, 1-2.
- [13]. Metcalf ZP, Bruner SC, 1948. Cuban Flatidae with new species from adjacent regions. *Annals of the Entomological Society of America* 41, 63-118.
- [14]. Pantaleoni RA, 1989. The ways in which *Metcalfa pruinosa* (Say, 1830) (Auchenorrhyncha Flatidae) invades a new area. *Bollettino dell'Istituto di Entomologia "Guido Grandi" della Università degli Studi di Bologna*, 43, 1-7.
- [15]. Pantaleoni RA, 1989. The ways in which *Metcalfa pruinosa* (Say, 1830) (Auchenorrhyncha Flatidae) invades a new area. *Bollettino dell'Istituto di Entomologia "Guido Grandi" della Università degli Studi di Bologna*, 43, 1-7.
- [16]. Preda C., Skolka M. 2009. First record of a new alien invasive species in Constanta – *Metcalfa pruinosa* (Homoptera: Fulgoroidea). In: Păltineanu C. 2009 - *Lucrările Simpozionului Mediul și agricultura în regiunile aride, Prima editie, București (Romania)*. pp. 141-146.
- [17]. Sacchetti, P., A. Guidotti, and P. Braccini. 2000. Impiego di *Neodryinus typhlocybae* in Toscana, pp. 131-158. In, A. Lucchi (Editor). *La Metcalfa negli ecosistemi italiani. Agenzia Regionale per lo Sviluppo e l'Innovazione nel settore Agricolo-forestale, Firenze, Italy*, pp.163.
- [18]. Zangheri, S. and P. Donadini, 1980. Comparsa nel Veneto di un omottero neartico: *Metcalfa pruinosa* Say (Homoptera, Flatidae). *Redia* 63, 301-305.

ABOUT THE AUTHORS

M. Vlad, Faculty of Agriculture, Agricultural Entomology Discipline, Department of Biology and Plant Protection, Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, 119 Calea Aradului, 300645 Timisoara, Romania, E-mail: speozarandbrad@yahoo.com

I. Grozea, Faculty of Agriculture, Agricultural Entomology Discipline, Department of Biology and Plant Protection, Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, 119 Calea Aradului, 300645 Timisoara, Romania, E-mail: ioana.entomol@yahoo.com

ISSN 1313-7735

**RESEARCH PEOPLE AND ACTUAL TASKS ON
MULTIDISCIPLINARY SCIENCES**

**Proceedings of the
Fifth International Conference**

Publisher

**Bulgarian National Multidisciplinary Scientific Network of the
Professional Society for Research work**

Volume 2

**LOZENEK, BULGARIA
24– 28 JUNE, 2015**