

CORYTHUCHA CILIATA (SAY, 1832) (HEMIPTERA: TINGIDAE) – SECOND RECORD FOR THE LACE BUG FAUNA OF ROMANIA

Alexandru Ioan TATU*
Ioan TĂUȘAN**

Abstract. In the present study a new Romanian record is given for *Corythucha ciliata* (Say, 1832) a well-known alien pest species of *Platanus* spp. Although this species is very common in Europe, it has only once been recorded in Romania until now, in Craiova. Alongside the biology and economic importance of *C. ciliata*, the damage it produces and pest control methods are emphasized.

Keywords: alien species, lace bugs, *Corythucha ciliata*, Romania

Rezumat. În studiul de față se prezintă o nouă semnalare pentru specia *Corythucha ciliata* (Say, 1832) în România, dăunător al speciilor de *Platanus* spp. Deși larg răspândită în Europa, în România specia a fost semnalată doar la Craiova. Sunt prezentate de asemenea date privind biologia, ecologia și importanța economică a speciei *C. ciliata*, precum și impactul produs și metodele de combatere.

Cuvinte cheie: specii invazive, Tingidae, *Corythucha ciliata*, România

Introduction

Tingidae are members of a rather large family, comprising about 2100 species and 250 genera (Bisson *et al.* 2003; Henry, 2009). 171 of these species are native to Europe and only six of them are alien (Péricart, Golub, 1996; Streito *et al.* 2010). The adults, commonly known as lace bugs, due to the lace-like appearance of the dorsum, are small-sized (less than 8 mm in body size), phytophagous and host specific insects that can be identified by examining the head, pronotum and hemelytra (Bisson *et al.* 2003). One useful distinguishing character is often the host plant (Bisson *et al.* 2003).

The damage they cause resembles that of certain leafhoppers or mites but it can positively be identified by brown or black patches of excrements on the underside of leaves (Bisson *et al.* 2003; Rabitsch, 2010). This particular aspect and that of control measures will be discussed further in the article with more detailed information being provided on *Corythucha ciliata* (Say, 1832).

Corythucha ciliata is one of the six alien species and probably one of the most widespread of alien Heteroptera in Europe (Rabitsch, 2008). It was first described by Say and it is native to the North American Rocky Mountains. The species was introduced in Europe in the 1960s

supposedly by ships (Őszi *et al.*, 2005), the first record dating back to 1964 when it was found in Padua (Northern Italy) (Rabitsch, 2008).

Records of *Corythucha ciliata* in the world

The species quickly spread across Central and Southern Europe with records in Croatia (1970), Slovenia (1972), Serbia (1973), France (1974) - including Corsica, Switzerland (1975), Hungary (1976), Spain (1978), Austria (1982), and Germany (1983), Bulgaria (1987), Greece (1988), Southern Italy (Sicily), Sardinia (Rabitsch, 2008). *C. ciliata* has also been recorded in Portugal (Grosso-Silva, Aguiar, 2007; Kment, 2007), in the Czech Republic (1995), in Slovakia (1997) (Stehlík, 1997), in Russia (Voigt, 2001), Montenegro (Protić, 1998) and more recently in the United Kingdom (2005), (Malumphy *et al.* 2006), in Belgium (2006) (Aukema *et al.* 2007), in the Netherlands (Aukema, Hermes, 2009) and in Poland (Lis, 2009). Records of the species have also been mentioned from Turkey (Mutun, 2009), Eastern Asia, China (Ju *et al.* 2009), Japan (Tokihiro *et al.* 2003), Chile (Prado, 1990) and Australia (Dominiak *et al.* 2008).

The purpose of this study is of course to mention the new record and to provide detailed information based on the study of available literature regarding the biology and economic importance of *C. ciliata*, the damage it produces and pest control methods.

*Babeș-Bolyai University of Cluj-Napoca,
alex_tatu@ymail.com

**Natural History Museum of Sibiu and Babeș-Bolyai
University of Cluj-Napoca,
itausan@gmail.com

Corythucha ciliata in Romania

Surprisingly or not, only one record of this lace bug is known so far in Romania. The first record dates to 1990 when Kis collected it in Craiova (Dolj County). It hasn't been recorded since.

On the 27th of November 2010, we found it in large numbers wintering under the bark of *Platanus* sp. and other trees in a park in Sibiu (Sibiu County). It was later collected and now deposited at the Natural History Museum Collections of Sibiu.

The species is expected to be widespread in Romania due its host preference for *Platanus* spp., found in many city parks.

On the basis of our results, two localities are now known for the sycamore lace bug distribution in Romania (Fig. 1).

Biology and ecology

Corythucha ciliata (Fig. 2) feeds on the underside of leaves causing desiccation of tissue, first near the veins and subsequently affecting the entire leaf, which may drop prematurely. They produce droplets of liquid frass, which dry out as black spots on the lower surface of the leaves. Mating pairs of sycamore lace bugs initiate colonies by laying eggs along the leaf veins. A single female can lay up to 350 eggs. There are five immature instars. Nymphs stay close together at first, only moving to new leaves after they reach the fourth instar. First generation adults appear in June and second generation appears around July/August.

They overwinter as adults under loose bark, leaf litter and crevices, and tolerate extreme temperatures as low as -24°C. As the average daily temperature rises above 8 °C in spring, the adults emerge and start wandering. The wandering can strictly be limited by wet weather. The first eggs are laid around the beginning of May; the number of eggs/female is 80–160. The swarming starts about at the end of May, the embryonic state of developing lasts three weeks, or so. Around three weeks after the larvae have developed the second egg-laying-period starts mainly in the second half of July with a number of 80–160 eggs/female. Approximately in the middle of September, the adults of the second generation emerge, and they start wintering at the end of October. The wings of the adults are very delicate, and they rarely fly very far; however, supported by wind they can be blown over many kilometers. Human activity is thought to be the main cause of its spread over long distances (Halbert, Meeker 1998; Őszi et al., 2005; Malumphy et al., 2006).

Economic importance

The main host plant of *C. ciliata* is the American sycamore tree, *Platanus occidentalis* Linnaeus (family). Other *Platanus* spp. host species listed in literature are *P. orientalis* and the hybrid species *P. acerifolia*. Furthermore, *C. ciliata* has also been found on *Broussonetia papyrifera* (L.), Moraceae, *Carya ovata* (Mill.), Juglandaceae, *Chamaedaphne* sp., Ericaceae and *Fraxinus* sp., Oleaceae (Halbert, Meeker, 1998). Severe infestations are often associated with ornamental plane trees found in parks and gardens rather than with those of natural settings; they are also known to invade homes in large numbers (Malumphy et al. 2006) and to be passively spread by wind-drift or stuck to clothes, cars etc. (Rabitsch, 2008). It has been noted that they can spread on a distance of 100 km/year (Rabitsch, 2008).

The bug feeds on the underside of the plant's leaves sucking the cytoplasm, mainly the chloroplasts which may ultimately result in the death of the entire tree due to lack of nutrients (Őszi et al. 2005). On the other hand, Halbert, Meeker (1998) conclude that "despite the spectacular appearance of severe damage, the practical impact of occasional late-season defoliation on otherwise healthy sycamore trees is principally only aesthetic in nature". Its presence on the lower surface is confirmed by black spots which are actually dried out frass. However, the damage is more apparent on the upper surface, with the leaves exhibiting a white speckle which also leads to premature fall (Malumphy et al. 2006).

The same paper suggests that greater damage is associated with drier weather, that severe infestations may end up with trees defoliating in late summer and that "several consecutive years of severe lace bug damage combined with other stress factors, may kill the trees". Furthermore, certain types of fungi (e.g., *Apiognomonia platani*, Valsaceae, *Ceratocystis fimbriata* f. *platani* Ceratocystidaceae) and plant pathogens are associated with the presence of *C. ciliata* which provides the perfect support for infections (Neal, Schaefer, 2000; Rabitsch, 2008).

Pest Control

There is a wide variety of pest control methods listed in literature. Some studies mention the use of insecticides such as petroleum, potassium phosphate, products that contain bifenthrin, deltamethrin (both pyrethroids), plant extracts that coat the insects or just plain water, sprayed to dislodge the larvae as soon as they hatch

(Malumphy *et al.* 2006) as well as diverse ways of application: foliar sprays, trunk injections, soil treatments (Halbert, Meeker, 1998). However, *C. ciliata* is known to tolerate insecticides that contain phosphorus acid ester (Őszi *et al.* 2005). According to Őszi *et al.* (2005) a very appropriate method is the use of pyrethroids, which would prove both efficient and harmless for the plant and for the environment.

Other methods are using tree bindings made of jute treating the underside of the bark which is not a harmful process but is hardly efficient or injecting the insecticide straight into the conducting tissue for it to be later sucked by the insect (Őszi *et al.* 2005). However, this has proven inappropriate for the trees because it facilitates the infection with other pests (Tremblay, 1985).

Methods of biocontrol are not to be ignored. *Corythucha ciliata* has several known natural enemies: certain types of true bugs, spiders, crickets and locusts, viruses, nematodes and spore plants (Sidor, 1985) and deuteromycete fungi species (e.g., *Beauveria bassiana*, Clavicipitaceae,

Verticilium lecanii Cordycipitaceae, *Paecilomyces farinosus*, Trichocomaceae) that ravage the populations of wintering adults (Balarin, Maceljski, 1986).

However, some studies have pointed out (Tavella, Arzone, 1987) that although the predation of *C. ciliata* is effective in laboratory conditions, it does not inhibit its reproduction in natural circumstances (Őszi *et al.* 2005).

Conclusions

In conclusion, one can only suppose that this potentially dangerous alien lace bug is actually widespread in Romania.

Acknowledgments

The authors are grateful for the useful comments of Petr Kment PhD, and Cecilia Ţerban PhD that seriously improved the first version of the manuscript. Also, special thanks goes to Stanislav Krejčík for the kind permission of using one of his photographs of the species.

REFERENCES

- Aukema *et al.* 2007 Aukema Berend, Bruers Jos, Viskens Gaby, *Nieuwe en zeldzame Belgische wantsen II (Hemiptera: Heteroptera)*. In: *Bulletin van de Koninklijke Belgische Vereniging voor Entomologie* 143 (2007) Bruxelles, p. 83–91.
- Aukema, Hermes 2009 Aukema Berend, Hermes Dik, *Nieuwe en interessante Nederlandse Wanten III (Hemiptera: Heteroptera)*. In: *Nederlandse Faunistische Mededelingen* 31 (2009), p. 53-88.
- Balarin, Maceljski 1986 Balarin Inoslava, Maceljski Milan, *Some new results of investigations on the biology and ecology of Corythucha ciliata. II Meeting WG "Integrated Control of C.ciliata"* Padova, 1985. In: *Bull. IOBC/WPRS IX/1* (1986) Bruxelles, p. 48-52.
- Bisson *et al.* 2003 Bisson, Amanda, Clark, Sarah, Lehnert, Matt, Stein, Rick, *Key to Tingidae of Florida Lace Bugs*. In: *Insect Classification Spring* (2003) Florida.
- Dominiak *et al.* 2008 Dominiak Bernie, Gillespie Peter, Worsley Peter, Loecker Holger, *Survey for sycamore lace bug Corythucha ciliata (Say) (Hemiptera: Tingidae) in New South Wales during 2007*. In: *General and Applied Entomology* 37, (2008), p. 27-30.
- Grosso-Silva, Aguiar 2007 Grosso-Silva José Manuel, Aguiar Ana, *Corythucha ciliata (Say, 1832) (Hemiptera, Tingidae), the nearctic Sycamore lace bug, found in Portugal*. In: *Boletín Sociedad Entomológica Aragonesa* 40 (2007) Zaragoza, p. 366.
- Halbert, Meeker 1998 Halbert Susan, Meeker James, *The Sycamore Lace Bug, Corythucha ciliata (Say) (Hemiptera: Tingidae)*. In: *Entomology Circular* 387 (1998) Florida, p. 1-2 .
- Henry 2009 Henry Thomas, *Biodiversity of Heteroptera*. In Foottit Robert, Adler Peter, *Insect Biodiversity: Science and Society* (2009), p. 223–263.
- Ju *et al.* 2009 Ju Rui-Ting, Li Yue-Zhong, Wang Feng, Du Yu-Zhou, *Spread of and damage by an exotic lacebug, Corythucha ciliata (Say, 1832) (Hemiptera: Tingidae), in China*. In: *Entomological News* 120 (2009), p. 409-414.
- Kis 1990 Kis Béla, *Corythucha ciliata (Heteroptera, Tingidae) un dăunător forestier nou pentru fauna României*. In: *Analele Banatului* 2 (1990) Timișoara, p. 320-321.
- Kment 2007 Kment Petr, *First record of the alien lace bug Stephanitis pyrioides in Greece and note on Corythucha ciliata from Portugal (Heteroptera: Tingidae)*. In: *Linzer biologische Beiträge* 39 (2007) Linz, p. 421–429.
- Lis, 2009 Lis Barbara, *Corythucha ciliata (Say) (Hemiptera: Heteroptera: Tingidae) – a bug species new to the Polish fauna*. In: *Opole Scientific Society Nature Journal* 42 (Opole), p. 119-122.
- Malumphy *et al.*, 2006 Malumphy Chris, Reid Sharon, Eyre Dominic, *Platanus lace bug Corythucha ciliata*. In: *Plant Pest Notice* 36 (2006) York, p. 1-4.
- Mutun 2009 Mutun Serap, *Corythucha ciliata, a new Platanus pest in Turkey*. In: *Phytoparasitica* 37 (2009), p. 65-66.
- Neal, Schaefer 2000 Neal John, Schaefer Carl, *Lace Bugs (Tingidae)*. In Schaefer, Carl & Panizzi, Antônio., *Heteroptera of Economic Importance* (2000), p. 85-137.
- Őszí *et al.* 2005 Őszí B, Ladányi M, Hufnagel Levente, *Population dynamics of the sycamore lace bug, Corythucha ciliata (Say) (Heteroptera: Tingidae) in Hungary*. In: *Applied Ecology and Environmental Research* 4(1) (2005) Budapest, p. 135-150.
- Péricart, Golub 1996 Péricart Jean, Golub Viktor, *Tingidae Laporte 1832*. In: Aukema Berend, Reiger Christian, *Catalogue of the Heteroptera of the Palaearctic Region*. Nederlandse Entomologische Vereniging (1996) Amsterdam, p. 3-78.
- Prado 1990 Prado Ernesto, *Presencia en Chile de Corythucha ciliata (Say) (Hemiptera: Heteroptera: Tingidae)*. In: *Revista Chilena de Entomología* 18 (1990), p. 53-55.
- Protić 1998 Protić, Ljiljana, *Catalogue of the Heteroptera fauna of Yugoslav countries. Part One*. In *Prirodnjački Muzej u Beogradu. Posebna Izdanja* 38 (1998) Belgrad.
- Rabitsch 2008 Rabitsch Wolfgang, *Alien True Bugs of Europe (Insecta: Hemiptera: Heteroptera)*. In: *Zootaxa* 1827 (2008) Auckland, p. 1-44.
- Rabitsch 2010 Rabitsch Wolfgang, *True Bugs (Hemiptera, Heteroptera) Chapter 9.1*. In Roques Alain *et al.*, *Alien terrestrial arthropods of Europe* (2010), p. 407-433.
- Sidor 1985 Sidor Ćiril, *Micro-organisms pathogenic for Insects till now found in Corythucha*

- Stehlík 1997 *ciliata*. In: *IUBS Bulletin WPRS IX(1)* (1985) Dijon, p. 72.
- Stehlík Jaroslav 1997, *Corythucha ciliata* (Say), a pest of plane trees, now also in the Czech Republic (Tingidae, Het.). In: *Acta Musei Moraviae, Scientiae Naturales* 81 (1996), p. 299-306.
- Streito *et al.* 2010 Streito Jean-Claude, Matocq Armand, Guilbert Éric, *Découverte d'un foyer de Corythauma ayyari* (Drake, 1933) et point sur la présence de plusieurs espèces de Stephanitis envahissants en France (Hemiptera Tingidae). In: *L'Entomologiste* 66(1) (2010), p. 7-12.
- Tavella, Arzone 1987 Tavella Luciano, Arzone A., *Indagini sui limitatori naturali di Corythucha ciliata* (Say) (Rhynchota, Heteroptera). In: *Redia* 70 (1987) Firenze, p. 443-457.
- Tokihiro *et al.* 2003 Tokihiro Goro, Tanaka Kenji, Kondo Kyoshi, *Occurrence of the sycamore lace bug, Corythucha ciliata* (Say) (Heteroptera: Tingidae) in Japan. In: *Research Bulletin of the Plant Protection Service Japan* 39 (2003), p. 85-87.
- Tremblay 1985 Tremblay Eremengildo, *Evaluation of the different possibilities of chemical control*. In: *IUBS Bulletin WPRS IX(1)* (1985) Dijon, p. 68.
- Voigt 2001 Voigt Klaus, *The first Russian record of Corythucha ciliata* (Say) from Krasnodar (Heteroptera: Tingidae). In: *Zoosystematica Rossica* 10 (2001), p. 76.
- *** <http://www.meloidae.com/>

LIST OF ILLUSTRATIONS

Fig.1. Currently known distribution of *Corythucha ciliata* in Romania

Fig. 2. *Corythucha ciliata* (Say, 1832) (Photo by kind permission of © Stanislav Krejcik, www.meloidae.com)

LISTA ILUSTRĂȚILOR

Fig. 1. Distribuția cunoscută a speciei *Corythucha ciliata* în Romania

Fig. 2. *Corythucha ciliata* (Say, 1832) (Fotografia cu permisiunea © Stanislav Krejcik, www.meloidae.com)



Fig.1. Currently known distribution of *Corythucha ciliata* in Romania



Fig. 2. *Corythucha ciliata* (Say, 1832) (Photo by kind permission of © Stanislav Krejcik, www.meloidae.com)