

# First Record of *Corythucha arcuata* (Say) (Heteroptera: Tingidae) on the Balkan Peninsula

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**Abstract:** *Corythucha arcuata* (Say) was recorded for the first time in Bulgaria and the Balkan Peninsula as well. It was found on the leaves of solitary trees of *Quercus robur* L. in Plovdiv, and in mixed stands formed by *Q. robur* and *Q. cerris* L. in the vicinity of Simeonovgrad in South Bulgaria. *C. arcuata* has most likely penetrated into Bulgaria from the Asiatic part of Turkey where it is widely distributed.

**Key words:** *Corythucha arcuata*, new record, invasive species, Bulgaria, Balkan Peninsula

## Introduction

Five alien lace bug species have been introduced to Europe so far and three of them are known from the territory of the Balkan Peninsula: *Stephanitis pyrioides* (SCOTT, 1874), *S. rhododendri* HORVÁTH, 1905 and *Corythucha ciliata* (SAY, 1832) (RABITSCH 2008, KMENT 2007, SIMOV, PENCHEVA 2006, MACELJSKI, BALARIN 1972a, MACELJSKI, BALARIN 1972b, TOMIĆ, MIHAJLOVIĆ 1974, PROTIĆ 1998, JOSIFOV 1990; TZANAKAKIS 1988, PÉRICART, GOLUB 1996, GOGALA, SELJAK 2010).

In this paper we present data about the first record of oak lace bug, *Corythucha arcuata* (SAY, 1832) (Heteroptera: Tingidae) in Bulgaria and the Balkan Peninsula.

## Material and Methods

The material was collected by beating sheet or by hand after searching leaves of infested oak trees.

The biological material was deposited in

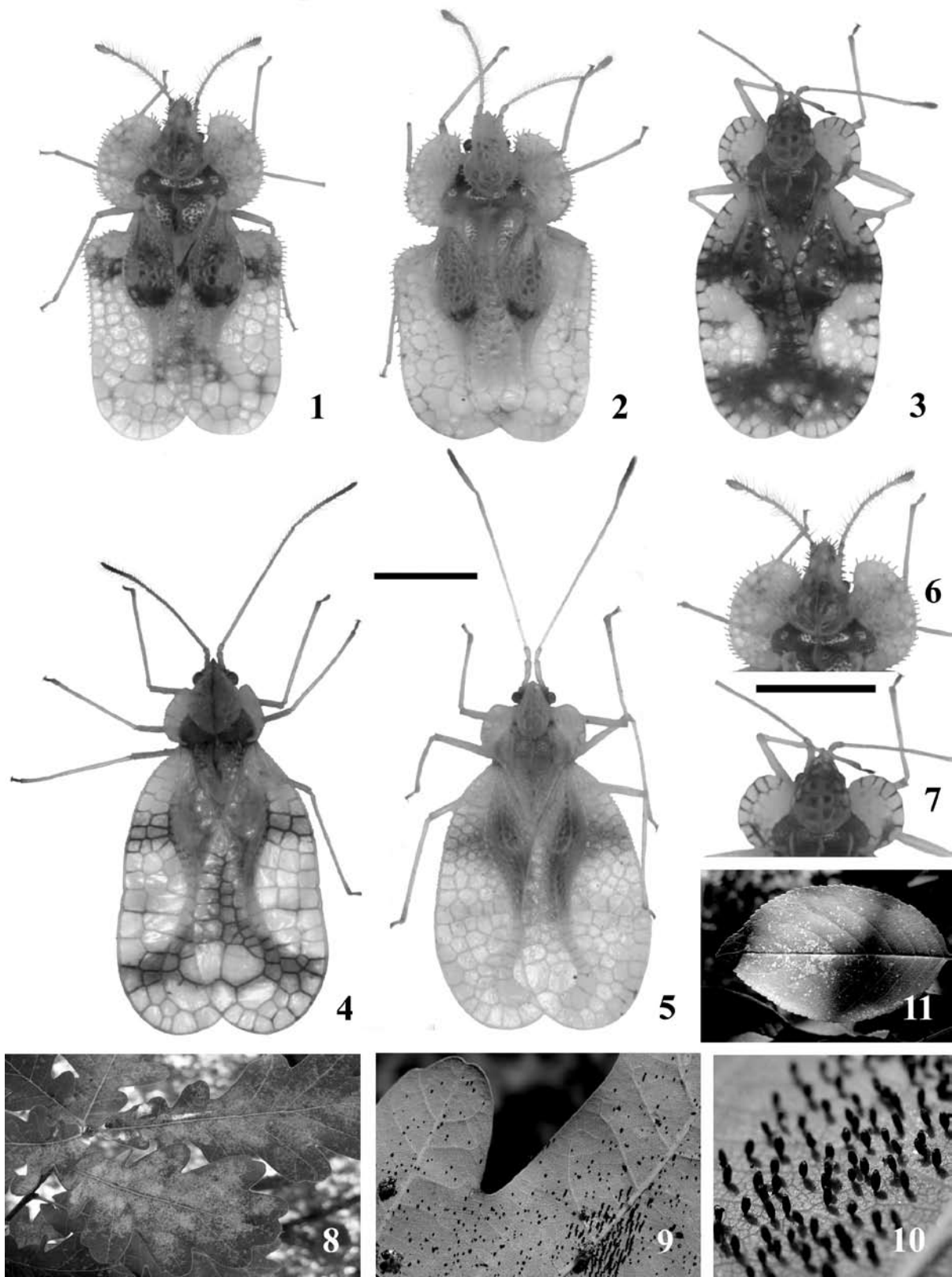
the collection of the National Museum of Natural History, Sofia.

## Results and Discussion

*Corythucha arcuata* is an invasive alien species of North American origin (RABITSCH 2008). The species was first recorded in Europe in 2000, in Italy (BERNARDINELLI, ZANDIGIACOMO 2000). In 2002 it was recorded in Switzerland, and in 2003 in Turkey (FORSTER *et al.* 2005, MUTUN 2003). Within just five years, the species spread to a large part of Turkey, including nine provinces (MUTUN *et al.* 2009). It was expected to reach Bulgaria soon (SIMOV *et al.* 2012).

**Material examined:** 25 males and 20 females, Bulgaria, Plovdiv downtown, 165 m a.s.l., Forest Protection Station – Plovdiv, 20 July 2012, on *Quercus robur* L., leg. N. Simov and M. Dobрева; 2 males and 2 females Bulgaria, Plovdiv downtown,

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**Figs. 1-11.** 1. Dorsal view of *Corythucha arcuata* (Say, 1832), Bulgaria; 2. Dorsal view of *Corythucha ciliata* (Say, 1832), Bulgaria; 3. Dorsal view of *Stephanitis pyri* (Fabricius, 1775), Bulgaria; 4. Dorsal view of *S. pyrioides* (Scott, 1874), Caucasus; 5. Dorsal view of *S. rhododendri* Horváth, 1905, Bulgaria; 6. Pronotum of *C. arcuata*; 7. Pronotum of *S. pyri*; 8. Chlorotic discolouration of infested oak leaves caused by feeding activity of *C. arcuata*; 9. Lower leaf surfaces with dark brown spots of lace bug excrements and groups of eggs of *C. arcuata*; 10. Eggs of *C. arcuata*; 11. Cherry leaves with symptoms caused by *S. pyri*

165 m a.s.l., Agricultural University – Plovdiv, 20 July 2012, on *Quercus robur* L., leg. N. Simov; 25 males and females, Bulgaria, Simeonovgrad (Zlati Dol district), on *Quercus robur* L. and *Quercus cerris* L., 15 September 2012, leg. I. Gjonov.

This is the first record of *C. arcuata* in Bulgaria and the Balkan Peninsula. The species has most likely penetrated into Bulgaria from the Asiatic part of Turkey. Human-mediated dispersal of the species is the most probable. The above cited localities are close to transport arteries or are within the town and information on the dispersal mechanism in Bulgaria and Europe of the other invasive species from the genus – *C. ciliata* (RABITSCH 2008, 2010; SIMOV *et al.* 2012) as a whole supports this hypothesis.

In its native range, *C. arcuata* feeds on the leaves of different oak species (*Quercus muehlenbergii* ENGELM., *Q. alba* L., *Q. macrocarpa* MICHX., *Q. prinoides* WILLD., *Q. prinus* L. and *Q. rubra* L.) and occasionally on representatives of the genera: *Castanea*, *Acer*, *Pyrus*, *Malus* and *Rosa* (OSBORN, DRAKE 1917; DRAKE, RUHOFF 1965; DREW, ARNOLD 1977). In Europe the species feeds on *Quercus petraea* (MATT.), *Q. robur* L., *Q. pubescens* WILLD., *Q. cerris* L., *Q. rubra* L., *Rubus idaeus* L., *R. ulmifolius* SCHOTT, *Castanea sativa* MILL. and *Rosa canina* L. (BERNARDINELLI, ZANDIGIACOMO 2000; FORSTER *et al.* 2005; MUTUN 2003; MUTUN *et al.* 2009; DIOLI *et al.* 2007).

We observed typical chlorotic discolouration of infested leaves caused by the feeding activity of *C. arcuata* (Fig. 8). Infested leaves had a whitish blotching or stippling on the upper surface and lower leaf surfaces with dark brown spots of lace bug excrements and groups of bug eggs (Fig. 9 and Fig. 10). Close to the trees infested by *C. arcuata* in Plovdiv we observed other trees (*Prunus cerasus*) infested by *Stephanitis pyri* (FABRICIUS, 1775)

with identical symptoms (Fig. 11). In Bulgaria and the Balkan Peninsula, the oak lace bug is similar to *C. ciliata* and representatives of genus *Stephanitis* concerning the general habitus view and damage on the leaves. The three *Stephanitis* species (Figs. 3-5) recorded from the Balkan Peninsula up to now are: *S. pyri*, *S. pyrioides* and *S. rhododendri* (JOSIFOV 1986; PÉRICART, GOLUB 1996; SIMOV, PENCHEVA 2006, KMENT 2007), and can be easily distinguished from *C. arcuata* (Fig. 1 and Fig. 6) by the lack of spines on the edge of the pronotum (Fig. 7). *C. ciliata* can be easily distinguished from the *C. arcuata* by the lack of extensive brown markings: brown band of the elytra and especially the band near its base. Only a brown marking spot on each tumid elevation on the hemelytra is present in *C. ciliata* (Fig. 2).

Feeding on oak, the lace bug may cause desiccation and premature leaf-fall, and may increase susceptibility to other insects, diseases, or pollutants (RABITSCH 2008, 2010). This would be a problem for oak forests in the regions in Bulgaria with prolonged dry climatic conditions. Furthermore, oak trees have the richest dendrobiont true bug fauna in Bulgaria with many endemic and rare species (JOSIFOV 1974, 1978, 1999; JOSIFOV, SIMOV 2006). The effect of the mass development of oak lace bug on the insect communities associated with oak has not yet been investigated. Last but not least, due to progressive degradation and the poor health condition of sweet chestnut (*Castanea sativa* L.) forests in Bulgaria (GEORGIEVA *et al.* 2011), mass development of oak lace bug would be a serious problem in chestnut natural range in the country. Honeydew producers would also be affected. Future monitoring of this invasive alien species in Bulgaria is needed.

**Acknowledgments:** The study was supported by the National Science Fund of Bulgaria, Project DO-02/191/2008.

## References

- BERNARDINELLI I., P. ZANDIGIACOMO 2000. Prima segnalazione di *Corythucha arcuata* (Say) (Heteroptera, Tingidae) in Europa. – *Informatore Fitopatologico*, **50**: 47-49.
- DIOLI P., I. G. FORINI, M. MORETTI and M. SALVETTI 2007. Note sulla distribuzione di *Corythucha arcuata* (Insecta, Heteroptera, Tingidae) in Cantone Ticino (Svizzera), Valtellina e alto Lario (Lombardia, Italia). – *Il Naturalista Valtellinese*, **18**: 59-68.
- DRAKE C. J., F. A. RUHOFF 1965. Lacebugs of the world: a catalog (Hemiptera: Tingidae). Smithsonian Institution, United States National Museum, Washington, Bulletin, **243**: 1-634.
- DREW W. A., D. C. ARNOLD 1977. Tingidae of Oklahoma (Hemiptera). – Proceedings of the Oklahoma Academy of Science, **57**: 29-31.
- FORSTER B., I. GIACALONE, M. MORETTI, P. DIOLI and B. WERMELINGER 2005. Die amerikanische Eichennetzwanze *Corythucha arcuata* (Say) (Heteroptera, Tingidae) hat die Südschweiz erreicht. – *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, **78**: 317-323.

- GEORGIEVA M., P. PETKOV, G. GEORGIEV, P. MIRCHEV, B. ROSSNEV and T. ZLATANOV 2011. Health condition of European chestnut dominated forests in the Bulgarian part of Belasitsa Mountain. – In: ZLATANOV T., I. VELICHKOV and B. NIKOLOV (Eds.): State and prospects of the *Castanea sativa* population in Belasitsa mountain: climate change adaptation; maintenance of biodiversity and sustainable ecosystem management. Project BG 0031 EEA report. URL: [http://www.castbelbg.com/deliverables/Health\\_condition\\_of\\_Castanea\\_sativa\\_dominated\\_forests\\_of\\_Belasitsa\\_Mountain.pdf](http://www.castbelbg.com/deliverables/Health_condition_of_Castanea_sativa_dominated_forests_of_Belasitsa_Mountain.pdf).
- GOGALA A., G. SELJAK 2010. Two new records of Heteroptera species in Slovenia. – *Acta entomologica slovenica*, **18** (1): 63-65.
- JOSIFOV M. 1974. Dendrobionte Heteropteren im Balkangebirge. – *Bulletin de l'Institut de Zoologie et Musée*, **41**: 95-105. (In Bulgarian, German summary).
- JOSIFOV M. 1978. Dendrobionte und dendrophile Halbflügler (Heteroptera) an der Eiche in Bulgarien. – *Acta zoologica bulgarica*, **9**: 3-12. (In Bulgarian, German Summary).
- JOSIFOV M. 1986. Verzeichnis der von der Balkanhalbinsel bekannten Heteropterenarten (Insecta, Heteroptera). – *Faunistische Abhandlungen Staatliches Museum für Tierkunde in Dresden*, **14** (6): 61-93.
- JOSIFOV M. 1990. On the appearance of the nearctic species *Corythucha ciliata* (SAY, 1832) (Heteroptera, Tingidae) in Bulgaria. – *Acta zoologica bulgarica*, **39**: 53-55. (In Bulgarian, English summary).
- JOSIFOV M. 1999. Heteropterous insects in the Sandanski-Petrich Kettle, Southwestern Bulgaria. – *Historia naturalis bulgarica*, **10**: 35-66.
- JOSIFOV M., N. SIMOV 2006. Endemism among the Heteroptera on the Balkan Peninsula. – In: RABITSCH W. (Ed.): Hug the bug – For love of true bugs. Festschrift zum 70. Geburtstag von Ernst Heiss. – *Denisia*, **19**: 879-898.
- KMENT P. 2007. First record of the alien lace bug *Stephanitis pyrioides* in Greece and note on *Corythucha ciliata* from Portugal (Heteroptera: Tingidae). – *Linzer Biologische Beiträge*, **39**: 421-429.
- MACELJSKI M., I. BALARIN 1972a. Preliminary note on the appearance of a new species of insect pest in Yugoslavia. The bug *Corythucha ciliata* (Say). – *Acta entomologica yugoslavica*, **8**: 105-106.
- MACELJSKI M., I. BALARIN 1972b. Ein neues Mitglied der schädlichen Entomofauna in Jugoslavien *C. ciliata*. – *Plant Protection*, **23**: 193-206.
- MUTUN S. 2003. First report of the oak lace bug, *Corythucha arcuata* (Say, 1832) (Heteroptera: Tingidae) from Bolu, Turkey. – *Israel Journal of Zoology*, **49** (4): 323-324.
- MUTUN S., Z. CEYHAN and C. SÖZEN 2009. Invasion by the oak lace bug, *Corythucha arcuata* (Say) (Heteroptera: Tingidae), in Turkey. – *Turkish Journal of Zoology*, **33**: 263-268.
- PÉRICART J., V. GOLUB 1996. Family Tingidae LAPORTE, 1832. – In: AUKEMA B., CH. RIEGER (Eds.): Catalogue of the Heteroptera of the Palaearctic Region. Vol. 2. Cimicomorpha I. The Netherlands Entomological Society, Amsterdam, 3-78 pp.
- PROTIĆ L. 1998. Catalogue of the Heteroptera fauna of Yugoslav countries. Part One. Natural History Museum Belgrade, Special Issue, **38**: 1-215.
- RABITSCH W. 2008. Alien True Bugs of Europe (Insecta: Hemiptera: Heteroptera). – *Zootaxa*, **1827**: 1-44.
- RABITSCH W. 2010. True Bugs (Hemiptera, Heteroptera). Chapter 9.1. – In: ROQUES A., M. KENIS, D. LEES, C. LOPEZ-VAAMONDE, W. RABITSCH, J.-Y. RASPLUS and D. ROY (Eds.): Alien terrestrial arthropods of Europe. BioRisk (Pensoft Publishers, Sofia). 1028 p., **4** (1): 407-433.
- OSBORN H., C. J. DRAKE 1917. Notes on American Tingidae with descriptions of new species. – *The Ohio Journal of Science*, **17** (8): 295-307.
- SIMOV N., A. PENCHEVA 2007. *Stephanitis rhododendri* HORVÁTH, 1905 (Heteroptera: Tingidae) – a new American pest on rhododendrons in Bulgaria. – *Plant Science*, Sofia, **43**: 483-485.
- SIMOV N., M. LANGOUROV, S. GROZEVA and D. GRADINAROV 2012. New and Interesting Records of Alien and Native True Bugs (Hemiptera: Heteroptera) in Bulgaria. – *Acta zoologica bulgarica*, **64** (3): 241-252.
- TOMIĆ D., L. MIHAJLOVIĆ 1974. American netlike bug (*Corythucha ciliata* SAY – Heteroptera, Tingidae) new serious enemy of plane trees in Belgrade. – *Sumarstvo*, **7-9**: 51-54.
- TZANAKAKIS M. E. 1988. First records of the Sycamore Lace Bug, *Corythucha ciliata* (Say) in Greece. – *Entomologica Hellenica*, **6**: 55-57.

Received: 12.05.2012  
Accepted: 05.02.2013