Acta entomologica serbica, 2012, 17(1/2): 23-28 UDC 595.754(497.11)

PERILLUS BIOCULATUS (FABRICIUS) (HETEROPTERA: PENTATOMIDAE) IN SERBIA

LJILJANA PROTIĆ[1] & NEBOJŠA ŽIVIĆ[2]

1 Natural History Museum, Njegoševa 51, 11000 Belgrade, Serbia
E-mail: ljilja.protic@gmail.com
2 University in Kosovska Mitrovica, Faculty of Science and Mathematics, Serbia
E-mail: nebo.zivic@gmail.com

Abstract

In 1996, in order to study flora and vegetation the members of the science-expert expedition to the Prokletije Mt. - locality named Djeravica, collected specimens of *Perillus bioculatus* (Fabricius, 1775), a new species for the fauna of Serbia. This is the third point in the distribution of *P. bioculatus* (F.) in the Balkan Peninsula: Bulgaria (Stara Planina Mt., Maleshevska Planina Mt.), Greece (Larissa), Serbia (Prokletije, Mt.).

KEY WORDS: *Perillus bioculatus*, Heteroptera, Serbia

Introduction

Perillus bioculatus (Fabricius, 1775) is a North American species known as an efficient predator on the Colorado potato beetle (*Leptinotarsa decemlineata* Say). In the second half of the 20th century it was introduced into Europe in order to restrain the Colorado potato beetle (DE CLERCQ, 2000). France was the first European country where the Colorado potato beetle became acclimatized, so the research on natural enemies started there as well (TROUVELOT, 1932, LE BERRE & PORTIER, 1963). During the research on natural enemies of the Colorado potato beetle in Canada, FRANZ (1957) considered *P. bioculatus* to be a priority species. The biology of this species was studied in several European countries in order to restrain the Colorado potato beetle: in Poland (LAKOCY, 1967), Slovakia (JASIČ, 1975), and Hungary (JERMY, 1980). THOMAS (1994) included *P. bioculatus* in the paper on asopines (Asopinae) of Old World, stating the distribution as follows: Czechoslovakia, France, Germany, Russia and Yugoslavia as an introduced species. MIKLOŠ (1967) wrote in general about the use and importance of predatory insect species for agriculture and

forestry in Croatia, citing the example of biological restraining of the Colorado potato beetle in Europe with *P. bioculatus*.

In Serbia, *P. bioculatus* has been studied under laboratory conditions since 1963 (BJEGOVIĆ, 1971). The studies included three phases: raising and breeding insects in the laboratory, their release into nature, and monitoring of their development and control of their hibernation and accommodation. The initial 200 eggs used in the study were sent from Darmstadt by Dr. FRANZ. Studies lasted for three years. After they were finished, Bjegović concluded that the attempt at biological restraining of the Colorado potato beetle with the predators *P. bioculatus* and *Podisus maculiventris* introduced from North America was not successful. Both species had successfully reproduced both in laboratory conditions and in the wild, but after their release they disappeared completely. The same results were obtained in other European countries.

After its unsuccessful introduction, *P. bioculatus* was only cited as an alien species in Europe (RABITSCH, 2008). However, in the last several years it was collected from litter and potato and egg plant fields in Turkey (KIVAN, 2004; FENT & AKTAÇ, 2007), Greece: Larissa 27.06.2003. leg. H. Brustel (PÉRICART, 2010) and Bulgaria (SIMOV *et al*. 2012) (Map 1).

Material and Methods

In early August 1996, the Institute for Nature Conservation of the Republic of Serbia organized a science-expert expedition to the part of Prokletije Mt. named Djeravica, in order to study flora and vegetation. The participants included researchers from the Institute as well as biology students from the Faculty of Science and Mathematics in Priština. Each section collected the material from their field of science and the results were consequently published (AMIDŽIĆ & KRIVOŠEJ, 1996, DŽUKIĆ *et al*. 1997, HABIJAN-MIKEŠ & ŠTETIĆ; 2003; UROŠEVIĆ, 1996; ŽIVIĆ *et al*. 1996).

The volcanic massif Djeravica (2656 m above sea level), in the southern mountain group of Prokletije at the southwest of Republic of Serbia, is characterized by a variant of Arcto-Alpine climate. At the western cirque of Djeravica there is a glacial lake (N 42°31′ 50.20″; E 20°07′58.43″) called Veliko Djeravičko Jezero (2320 m above sea level) with a diverse invertebrate fauna (ŽIVIĆ *et al*. 1996). The vegetation in this part of the massif is characteristic of high-mountain grassland, meadow peat bogs, stony areas and rock crevices. In the August aspect (August 2nd 1996), it was represented by 107 species of vascular flora. Most of this flora belongs to Arcto-Alpine group and families Asteraceae (13), Caryophyllaceae (12) and Poaceae (12). The most represented elements of flora were Middle European mountain (37%), South European (24.3%), Eurasian (14%), Arctic-Alpine (6.4%), circumboreal (5.6%), Holarctic (3.7%) and boreal-subboreal elements of flora (0.93) (AMIDŽIĆ & KRIVOŠEJ, 1996).

In order to perform hydrobiological studies, samples of algae, zooplankton and macrozoobenthos were taken from Djeravica lakes. Terrestrial fauna in the vicinity of the lakes (insects, millipedes, earthworms) was also sampled during the expedition. A small number of Heteroptera specimens were collected during the fieldwork. Determination was performed with the help of a monograph by PÉRICART (2010).

Results and Discussion

After BJEGOVIĆ's attempts, the studies in Serbia were abandoned and this species was forgotten. It used to be unknown in the wild and in the Serbian lists of fauna. Faunistic studies in Serbia were performed in plots of various crops and agricultural cultures, but this species was never collected.

Map 1. Distribution of *Perillus bioculatus* (F.) in the Balkan Peninsula (black dots): Bulgaria (Stara Planina Mt., Maleshevska Planina Mt.), Greece (Larissa), Serbia (Prokletije, Mt.).

Specimens of Heteroptera collected in the vicinity of the Djeravica lakes remained conserved in an alcohol solution for 16 years, until they were determined in 2012. Only two species were recorded from the terrestrial group:

Perillus bioculatus (Fabricius, 1775)
Prokletije: Veliko Djeravičko jezero (Map 1)
02.08.1996, 1♂ 1♀, leg. N. Živić

Zicrona coerulea (Linnaeus, 1758)
Prokletije: Veliko Djeravičko jezero
02.08.1996, 1♂ 1♀, leg. N. Živić

The processed data contributes to the understanding of the *P. bioculatus* range in Europe. According to the available literature, in addition to Serbia it was also recorded only in Bulgaria, Greece and Turkey. The locality Prokletije is so far the single site in Serbia where this species was recorded, and it is situated at the western boundary of the European range.

Considering the small range of this species in Europe (Map 1), data from Serbia are an important contribution to the understanding of the overall range.

The second species mentioned in the Results is *Zicrona coerulea* Linnaeus. It is the other natural enemy of *L. decemlineata* Say. This species is predacious on the larvae of Colorado potato beetle (BJEGOVIĆ, 1971).

References

AMIDŽIĆ, L. & KRIVOŠEJ, Z., 1996. August Aspect of the high-mountain Vascular Flora of the Djeravica Volcanic massif. Univerzitetska misao, Prirodne nauke, Priština, 3(2): 27-32.

BJEGOVIĆ, P., 1971. The natural enemies of the Colorado potato beetle (*Leptinotars decemlineata* Say) and attempts on its biological control in Yugoslavia. Zaštita Bilja, 21:97-111.

DE CLERCQ, P., 2000. Predaceous Stinkbugs (Pentatomidae: Asopinae). *In*: Schaefer, C. & Panizzi, A. (eds.): Heteroptera of Economic Importance. CRC Press, Boca Raton, FL, pp.: 737–789.

DŽUKIĆ, G., KRIZMANIĆ, I., LABUS, N. & ROT, I., 1997. Distribution of the species Salamandra atra (Laurenti, 1768) in the Republic of Serbia, Yugoslavia. *In*: Roček, Z. & Hart, S. (eds.): „Herpetologa '97", Abstracts, Third World Congress of Herpetology, Abstract Book, Prague, p. 61.

FENT, M. & AKTAÇ, N., 2007. Die Verbreitung des Perillus bioculatus (Fab.) (Heteroptera: Pentatomidae: Asopinae) im türkischen Teil Thrakiens. Heteropteron, 25: 7–10.

FRANZ, J., 1957. Beobachtungen ueber die natuediehe sterblichkeit des kartoffelkaeffers *Leplinolarsa decemlineata* (Say) in Canada. Entomophaga, 2: 197-212.

HABIJAN-MIKEŠ, V. & ŠTETIĆ, J., 2003. Fauna of Mammals. *In*: Amidžić, L., Janković, M.M. & Jakšić, P. (eds.): Metohijske Prokletije – prirodna i kulturna baština. Zavod za zaštitu prirode Republike Srbije, Beograd, pp.: 300-314.

JASIČ, J., 1975. On the life cycle of *Perillus bioculatus* (Heteroptera: Pentatomidae) in Slovakia. Acta Entomologica Bohemoslovaca, 72(6):383-390.

JERMY, T. 1980. The introduction of *Perillus bioculatus* into Europe to Control the Colorado Beetle. EPPO Bulletin, 10: 475-479.

KIVAN, M. 2004. Some observations on *Perillus bioculatus* (F.) (Heteroptera: Pentatomidae) a new record for the entomofauna of Turkey. Türkish Journal of Entomology, 28: 95-98.

LAKOCY, A., 1967. Observations on the resistance to DDT of the blossom beetle (*Meligethes aeneus*) and the Colorado potato beetle (*Leptinotarsa decemlineata*) in Poland . Prace Naukowe Institutu Ochrony Roslin Warszawa, 9(1): 157–170. [in Polish, with English s.]

LE BERRE, J.R. & PORTIER, G., 1963. Utilisation d'un héteroptère pentatomidae *Perillus bioculatus* (Fabr.) dans la lute contre le Doryphore *Leptinotarsa decemlineata* (Say): premiers riésultats obtenus en France. Entomophaga, 8: 183-190.

LIPA, J.J., 1985. Progress in biological control of the Colorado beetle (*Leptinotarsa decemlineata*) in Eastern Europe. EPPO Bulletin, 15: 207-211.

MIKLOŠ, I., 1967. Contribution la connaissance de faune entomologique predateur sur les peupliers dans la R.S. de Croatie. Šumarski list, 5-6: 224-231 [in Croatian, with French s.]

PÉRICART, J., 2010. Hémiptères Pentatomoidea Euro-Méditerranéens (Bd. 3) Podopinae et Asopinae. Faune de France, 93, 290 pp.

RABITSCH, W., 2008. Alien True Bugs of Europe (Insecta: Hemiptera: Heteroptera). Zootaxa, 1827: 1-44.

SIMOV, N., LANGOUROV, M., GROZEVA, S. & GRADINAROV, D., 2012. New and Interesting Records of Alien and Native True Bugs (Hemiptera: Heteroptera) from Bulgaria. Acta zoologica bulgarica, 64(3): 241-252.

THOMAS, D.B., 1994. Taxonomic synopsis of the Old World asopine genera (Heteroptera: Pentatomidae). Insecta Mundi. Paper 296. Available through: http://digitalcommons.unl.edu/insectamundi/296.

TROUVELOT, B., 1932. Recherches sur les parasites et predateurs attaquant le doryphore en Amerique du Nord. Annales des Epiphyties, 17: 408-45.

UROŠEVIĆ, V., 1996. Peryphyton alge in the system of Djeravica Lakes on the Spring Branch of Erenik. Univerzitetska misao, Prirodne nauke, Priština, 3(2): 11-21.

ŽIVIĆ, N., MILJANOVIĆ, B., LABUS, N. & JAKŠIĆ, T., 1996. Composition of Zooplankton and Macrozoobenthos in Big and Small Djeravica Lake. Univerzitetska misao, Prirodne nauke, Priština, 3(2): 51-56.

PERILLUS BIOCULATUS (FABRICIUS) (HETEROPTERA: PENTATOMIDAE) У СРБИЈИ

ЉИЉАНА ПРОТИЋ И НЕБОЈША ЖИВИЋ

Извод

Perillus bioculatus (Fabricius, 1775) је северноамерчка врста која је позната као ефикасан предатор кромпирове златице (*Leptinotarsa decemlineata* Say). У Србији је почела да се гаји у лабораторији 1963. (BJEGOVIĆ, 1971). После три године истраживања, покушај биолошког сузбијања кромпирове златице у Србији помоћу унетих предатора из Северне Америке није успео. После неуспешне интродикције *P. bioculatus*, сада се наводи само као унесена (alien) врста у Европи (RABITSCH, 2008). Ипак, последњих година успешно се гаји и развија на пољима у Турској (KIVAN, 2004, FENT & AKTAÇ, 2007). На Балканском полуострву забележена је у Бугарској, Грчкој и Србији. У раду је објављен први налаз ове врсте у природи Србије. Примерке је уловио Небојша Живић на Проклетијама, у околини Ђеравичког језера.

Received September 9th, 2012
Accepted December 13th, 2012