INVASIVE SPECIES OF TRUE BUGS (HEMIPTERA: HETEROPTERA) ON THE TERRITORY OF BELARUS

A. O. Lukashuk
Berezinskiy Biosphere Reserve, 3 Tsentralnaya Str., 211188, Domzheritsy vill., Lepel distr., Vitebsk obl., Belarus
(*lukashukao@tut.by*)

Introduction. The whole fauna of Belarus, probably except some its representative species that inhabit springs, is allochthonic and adventive. It appeared and formed in the post-glacial periods. The appearance of adventive species in regional faunas is a natural factor of fauna genesis, caused by global zoogeographic and evolutionary processes (migrations, pulsations of habitats, population waves, etc.).

However, not all the species new to the fauna are adventive in the modern sense, i.e., discovered in historical times and originating from exotic habitats not related to a specific territory. Perhaps they are simply rare, or there was no specialist in a particular taxonomic group in the region. Or new techniques have emerged that allow to discover covertly living species. Development of systematics and taxonomy also leads to distinction of new taxons. At the same time not all allochthonic species are invasive (spread rapidly, transform existing natural systems and complexes, negatively affect humans and their activities).

But a number of processes and phenomena of the recent decades (weather anomalies, the rapid development of transport networks, globalization) have put issues related to allochthonic and especially invasive species among the main and global problems of our time (not only ecological, but also medical, economical, etc.). All of the above is relevant for Belarus, which lies at the peculiar biotic and economic crossroads between the north and the south part of Europe.

Materials and methods. The material for this article was done from own collections of true semiparasitic insects (Hemiptera: Heteroptera) carried out from 1982 to 2020 in all the administrative areas of Belarus. Also the author extremely grateful to his colleagues for their collections that were included in the research.

The material was collected by standard methods widely used in entomological studies like this – mowing with an entomological net, hand-picking, shaking off branches, sifting various substrates through soil sieves, trapping, interrupting flight traps, trapping by a light source, etc.

Results. As a result of our studies, taking into account published data of colleagues, 561 species of bugs were registered in Belarus. Among them 45 species have been reported in the last 20 years, and only about half of them can be considered allochthonic.

From the number of allochthonic species recorded in Belarus only 3 species are considered invasive: *Cimex hemipterus* (Fabricius, 1803), *Leptoglossus occidentalis* Heidemann, 1910, and *Halyomorpha halys* (Stål, 1855) (Rabitsch, 2010).

In Belarus, only *Cimex hemipterus* (Khryapin, Pugayev & Matveyev, 2017) really demonstrates the properties of invasive species, rapidly expanding its area, displacing the bed bug *Cimex lectularius*, that appeared earlier from the established parasitocenosis, and has a social and economic significance as a human haematophage.

Leptoglossus occidentalis, that was discovered in Brest region in 2020, has a high invasive potential, but there are still no data on its territorial expansion within the country and on the damage done to coniferous plantations; it is necessary to have the monitoring of this species (Bubenko, Lukashuk & Naiman, 2020).

Invasive *Halyomorpha halys* (Stål, 1855) was found in the country sporadically and rather curiously (Lukashuk & Bogovet, 2019), and there are no data on its naturalization in our conditions. But still we should expect its appearance in the future. It might be imported by

transport and plant introduction or natural expansion from the regions of the Caucasus, southern Russia, Ukraine and countries of southern Europe.

The other species have not naturalized in Belarus yet, or just have been discovered and data on the dynamics of their dispersal and their impact on ecosystems are not available, they are potential invaders and require additional monitoring.

Conclusion. The appearance of allochthonic and especially invasive species emphasizes the necessity to preserve and develop classical branches of zoology, such as faunistics, zoosystematics, chorology, zoogeography.

Moreaver, it is necessary to develop a national system of faunistic monitoring, that provides timely discovering and monitoring of the dynamics of allochthonic species dispersal, and the ability to study international experience in regulating the number of invasive species and preventing their occurrence in the country.

References

Bubenko A.N., Lukashuk A.O. & Naiman O.A. 2020. Pervoe ukazanie dlia territorii Belarusi *Leptoglossus occidentalis* (Hemiptera: Heteroptera: Coreidae) iz natsionalnogo parka «Belovezhskaia Puscha» [The first indication for Belarus *Leptoglossus occidentalis* (Hemiptera: Heteroptera: Coreidae) from the Belovezhskaya Pushcha National Park]. *Osobo okhraniaemye prirodnye territorii Belarusi. Issledovania.* **15**. Minsk: Belorusskiy Dom pechati. 41–45. (In Russian).

Khryapin R.A., Pugayev S.N. & Matveyev A.A. 2017. Dannye o rasprostranenii tropicheskogo postelnogo klopa *Cimex hemipterus* F. na territorii Rossiyskoy Federacii. [Distribution of tropical bedbug *Cimex hemipterus* F. in Russian Federation.]. *Voprosy prikladnoy entomologii*, **2**: 22–24. (In Russian).

Lukashuk A.O. & Bogovets A.A. 2019. Pervye nakhodki vostochnoaziatskogo mramornogo klopa *Halyomorpha halys* (Stål, 1855) (Heteroptera, Pentatomidae) na territorii Berezinskogo biosfernogo zapovednika i Respubliki Belarus. [First record of brown marmorated stink bug *Halyomorpha halys* (Heteroptera: Pentatomidae) in the Berezinsky biosphere reserve and Belarus]. *Osobo okhraniaemye prirodnye territorii Belarusi. Issledovania.* **14**. Minsk: Belorusskiy Dom pechati. 149–154. (In Russian).

Rabitsch W. 2010. True Bugs (Hemiptera, Heteroptera). Chapter 9.1. *In*: **Roques A. et al.** (Eds). *Alien terrestrial arthropods of Europe*. *BioRisk*, **4** (1): 407–433. DOI: 10.3897/biorisk.4.44