

Short communication

## An attempt of wintering of *Leptoglossus occidentalis* Heidemann, 1910 (Hemiptera: Heteroptera: Coreidae) in Grey Heron *Ardea cinerea* nests

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**Abstract.** An attempt of wintering of Western conifer seed bug (*Leptoglossus occidentalis*) in nests of large, tree-nesting and colonial bird – Grey Heron (*Ardea cinerea* Linnaeus, 1758) is described. The colony is located in the city centre of Wrocław (Lower Silesia, Poland). In November 2020, at least 61 imagines in five dropped nests were observed. Such big nests might function as shelter or a food resource for nest-dwelling arthropods and provide desirable warm microclimates during winter.

**Key words:** true bugs, western conifer seed bug, invasive species, biology, Poland.

The Western conifer seed bug (*Leptoglossus occidentalis* Heidemann, 1910) represents the family of leaf-footed bugs (Coreidae) within Heteroptera. Initially, it is a species native to North America, where it occurs in Mexico, the western parts of the United States and southern Canada (Heidemann 1910; Koerber 1963). It was brought to Europe at the end of the 20th century, and was found in the vicinity of Vicenza, Italy, in 1999 (Tescari 2001). This record was followed by a rapid spread of this species in Italy, where it was found all around the country, including Sicily and Sardinia (e.g., Bernardinelli & Zandigiacomo 2001). Soon, it crossed Italian boundaries and began spreading in Europe (e.g., Gogala 2003; Ribes et al. 2004; Kulijer & Ibrahim 2017). It has already settled such countries as England (Malumphy & Reid 2007), Norway (Mjøs et al. 2010) and Sweden (Lindelöw & Bergsten 2012). In 2007 the species also reached Poland (Lis et al. 2008), and now is known from almost the entire territory of Poland (Gierlasiński & Taszakowski 2013-2021).

*Leptoglossus occidentalis* is specialised in conifers. It has been recorded from about 40 species of conifers, mostly pines (Fent & Kment 2011). The cones pierced by this hemipteran deform and do not produce seeds. In their natural range in North America, this species is deemed to be a pest of coniferous cone plantations, where it can damage even up to 80% of seeds of *Pinus monticola* (Connelly & Schowalter 1991). In Europe, it hurts plantations of pine nuts, reducing seed formation by the *Pinus pinea* (Fent & Kment 2011). In Italy, the species was recorded on *P. strobus*, *P. sylvestris*, *P. nigra*, *Pseudotsuga* sp., but without essential harm to the host trees (Hellrigl 2006).

During autumn, the adults seek a variety of overwintering sites. The well-known wintering spots for imagines are human buildings, mainly houses (e.g., Spencer 1942; Lis et al. 2008; Hebda et al. 2010). They have also been collected under loose bark (Downes 1927) and holes in dead trunks (Dennys 1927). Hussey (1953) wrote about wintering of this species in hawk nests too (no information which species). We describe the first attempt, to our knowledge, of wintering of *Leptoglossus occidentalis* in nests of large, tree-nesting and colonial, bird species.



**Fig. 1.** Western conifer seed bug in the nest of Grey Heron (Wrocław, 13.11.2020).

Since 2019 we have been monitoring nests in Grey Heron colony in the city of Wrocław (51.107782 N, 17.073140 E). This colony is the only one located in the city centre in Poland (Przymencki et al. 2019); it is also the biggest one in the SW part of the country (Beuch et al. 2020). It is divided into two subcolonies, one in the zoo and one in the park square. Due to the location of the latter one, it is very harmful to people walking in the park and causes destroying the historic trees growing up there (mainly *Pinus nigra*). In 2020 city authorities decided to drop all 144 nests in that subcolony in the non-breeding season. Dropping was carried out on 12–14 November. Many nests were damaged on trees and then threw off. Only a few ones fell on the ground integrally. Every day after that, we checked the content in non-damaged nests under trees. We found only five such nests. We measured their diameter and height.

In all five nests, we observed individuals (all imagines) of *L. occidentalis* (Fig. 1). We saw only a few in three nests, but we counted all individuals in two nests. There were ~25 and 36 ones in these nests. The contents of the nests accounted for mainly pine and larch twigs, rotten leaves and conifer needles, fish scales and eggshells. The average diameter of the nests (the compact part inhabited by bugs) was 54 cm, and the average height – 16 cm. The nests were originally located at *Pinus nigra* trees. In the part of a park square where Grey Herons breed, this species is the most common one. There are also some specimens of genus: *Quercus*, *Pseudotsuga*, *Picea* and *Larix*. The location of nests above the ground was estimated on average 20 metres.

As the Western conifer seed bugs were being found in different habitats, from cavities of dead and dry trees to buildings (Koerber 1963), overwintering in such kinds of nests could be expected, since they had been located mainly at conifer trees. In Poland, the species is found in a vast range of forest micro-environments during winter: from tree hollows, bird or bat nest boxes to old passerine bird nests (G. Hebda – pers. comm.). We suggest that the choice of Grey Herons' nests as a hibernating place might be treated as random, but at the same time probably effective and successful. Bird nests host a large diversity of arthropods (e.g., Hansell 2000; Boyes & Lewis 2019). The structures built by birds can function as shelter or a food resource for various arthropods living in them. Therefore, active nests may establish well-insulated 'heat islands' in colder environments.

Nevertheless, during the non-breeding period, bird nests might not provide such protection because of a lack of incubating adults or nestings. However, even at that time, nests can be used as adequate shelter – they may protect arthropods from wind or cold weather since they are a compact structure filled with various plant and animal material types. They contain the rest of food, eggs or dead nestlings so that arthropods could use them as a place of feeding. It might be crucial for their survival and fitness.

## Acknowledgements

We wish to express our gratitude to Dr. Grzegorz Hebda and Prof. Jerzy Lis (both of the Institute of Biology, University of Opole), and two reviewers who gave us excellent comments and improved this paper. Special thanks go to Damian Celiński, who helped us with many parts of the work.

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**Received:** 20 March 2021

**Accepted:** 30 July 2021