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DETECTION OF THE TROPICAL BED BUG *CIMEX HEMIPTERUS* (FABRICIUS, 1803) IN BELGOROD (RUSSIA)

ОБНАРУЖЕНИЕ ТРОПИЧЕСКОГО ПОСТЕЛЬНОГО КЛОПА *CIMEX HEMIPTERUS* (FABRICIUS, 1803) В Г. БЕЛГОРОДЕ (РОССИЯ)

Yu.A. Prisiy
Ю.А. Присный

Belgorod National Research University,
85 Pobedy St, Belgorod, 308015, Russia
Белгородский государственный национальный исследовательский университет,
Россия, 308015, г. Белгород, ул. Победы, 85
E-mail: prisniy_v@bsu.edu.ru

Abstract

The tropical bed bug *Cimex hemipterus* (Fabricius, 1803) was reliably detected in Belgorod in 2020 for the first time. Specimens were collected in dormitories for foreign students at both Belgorod State National Research University and Belgorod State Technological University named after V.G. Shukhov. Retrospective analyses of specimens collected in earlier years reveal that *Cimex hemipterus* was already present in Belgorod in 2013, and subsequently ousted the cosmopolitan species *Cimex lectularius* Linnaeus, 1758 which inhabited the area earlier.

Аннотация

Впервые в г. Белгороде достоверно отмечен тропический постельный клоп *Cimex hemipterus* (Fabricius, 1803). Клопы были собраны в общежитиях для иностранцев Белгородского государственного национального исследовательского университета и Белгородского государственного технологического университета им. В.Г. Шухова. Вероятно, данный вид появился здесь уже в 2013 году и затем вытеснил обитавшего здесь ранее космополитного *Cimex lectularius* Linnaeus, 1758.

Keywords: Heteroptera, Cimexidae, European part of Russia, alien species, new records.

Ключевые слова: Heteroptera, Cimexidae, европейская часть России, чужеродные виды, новые находки.

Introduction

The tropical bed bug *Cimex hemipterus* (Fabricius, 1803) has been spreading in the European part of Russia for several years. This invasive bloodsucking species of important epidemiological significance [Roslavtseva, Alekseev, 2015] is active around the clock; its net reproduction rate may be quite high. *C. hemipterus* was first recorded in Russia in 2015 in Moscow, Saint Petersburg, Smolensk, Saransk and in the Moscow Region [Gapon, 2016]; it was observed in these areas during subsequent years [Khryapin et al., 2017; Krivonos et al., 2019]. In Voronezh, this species was found for the first time in 2020 [Golub et al., 2020]. The tropical bed bug was detected in private residences and apartments, in dormitories, hospital wards, pre-trial detention facilities at police stations, and even in the sales areas of a grocery supermarket. The growing migration of human populations and the increasing number of rented accommodations are factors contributing to the spread of bed bugs, since *C. hemipterus* may shelter during all developmental stages in garments, household goods, and personal effects, and thus may be

transported easily from one place to another. As noted earlier [Khryapin et al., 2017] the list of regions where this species has already settled is extensive. However, due to the lack of targeted studies and absence of guiding materials for local sanitary-epidemiological and disinfection service staff, the extent of *C. hemipterus* distribution in Russia is still poorly covered.

The study aims to identify bed bug species found in Belgorod.

Material and methods

Research specimens were collected by students in dormitories for foreign students at the campuses of Belgorod National Research University (NRU "BelGU") and Belgorod State Technological University named after V.G. Shukhov (BSTU named after V.G. Shukhov).

In the dormitories of NRU "BelGU" 26 specimens were collected: 01.10.2020 4♂ and 2♀ and one nymph; 10.08.2020 2♂ and 4♀ and one nymph; 11.10.2020 8♂ and 3♀ and one nymph.

In the dormitories of BSTU named after V.G. Shukhov 26 specimens were collected: 11.29.2020 6♂ and 16♀ and four nymphs.

The species of collected bed bugs were determined using taxonomic keys [Usinger, 1966; Ueshima, 1968]. Optics used: binocular stereoscopic microscope (Carl Zeiss Jena), objectives $\times 0.63$ –4, eyepieces $\times 6.3$; Sony Cyber-shot DSC-W7 camera.

All specimens were characterized by specific features, namely, a paragenital sinus with a narrow cleft form (with bristles); a length to width ratio of the hind femur of more than 2.6; coxa III with an external spur; a length to width ratio of the pronotum of less than 2.5 (ranging from 2.12 to 2.31), and a narrow paranota (Fig. 1). The combination of these features characterize *Cimex hemipterus* (Fabricius, 1803) (Fig. 2).

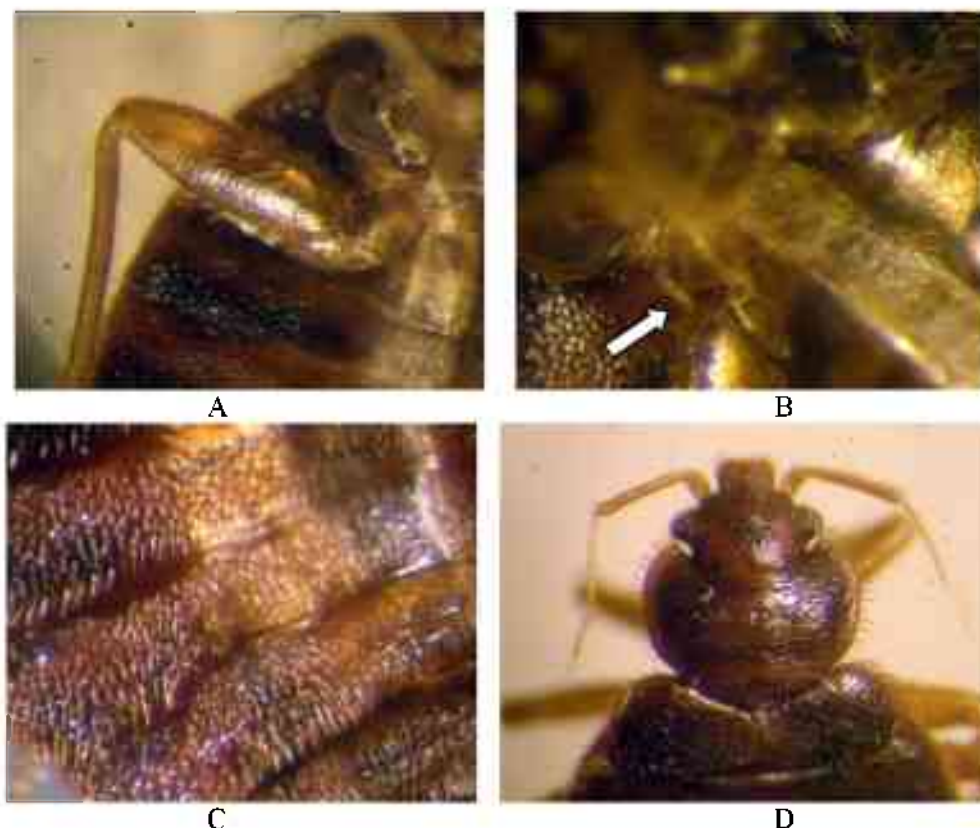


Fig. 1. Features of *Cimex hemipterus* (Fabricius, 1803) (female) collected in dormitories of Belgorod National Research University (Belgorod, 2020): A – hind femur, B – external spur on coxa III, C – paragenital sinus, D – head and pronotum dorsally

Рис. 1. Признаки *Cimex hemipterus* (Fabricius, 1803) (самка), собранных в общежитии Белгородского государственного национального исследовательского университета (г. Белгород, 2020 год): А – заднее бедро, В – зубчик на заднем тазике, С – парагенитальный синус, D – голова и переднеспинка сверху



Fig. 2. Male (left) and female (right) *Cimex hemipterus* (Fabricius, 1803) collected in dormitories of Belgorod National Research University (Belgorod, 2020)

Рис. 2. Самец (слева) и самка (справа) *Cimex hemipterus* (Fabricius, 1803), собранные в общежитии Белгородского государственного национального исследовательского университета (г. Белгород, 2020 год)

Discussion

Analysis of previously sampled material stored in the collection of the Department of Biology (NRU "BelGU") suggests that *C. hemipterus* appeared in the European part of Russia earlier than it was initially reported [Gapon, 2016].

Specimens of bed bugs previously found in foreign student dormitories of NRU "BelGU" collected in 2010 and 2013 were identified at that time as *Cimex lectularius* Linnaeus, 1758. We have re-identified these specimens and compared them with the bed bugs collected in 2020 (Fig. 3).

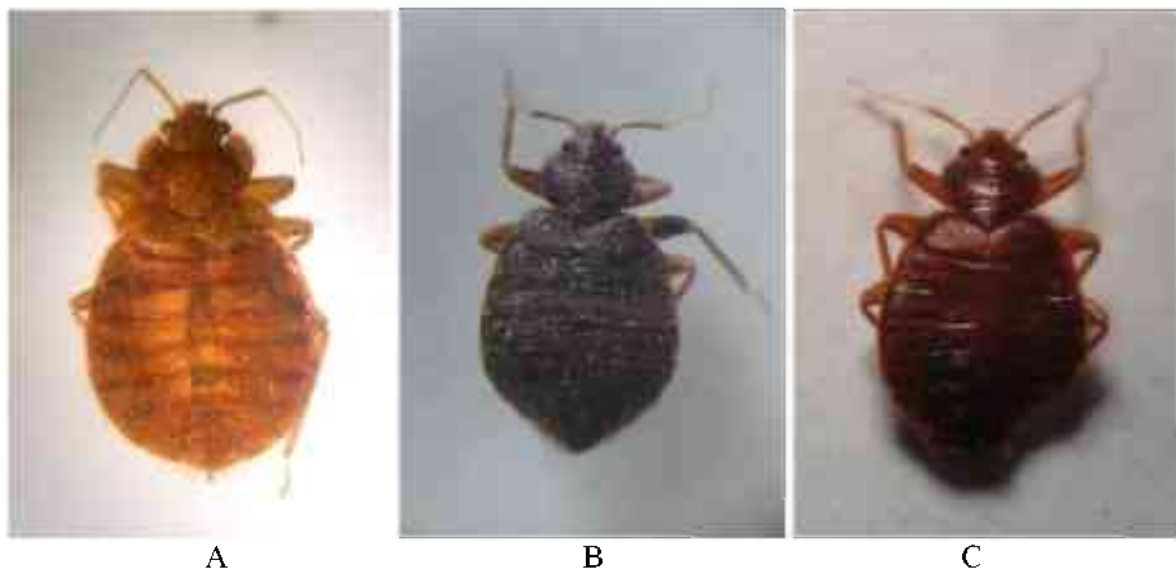


Fig. 3. Bed bugs collected in dormitories of Belgorod National Research University (Belgorod) in different years: A – 2012, B – 2013, C – 2020

Рис. 3. Постельные клопы, собранные в общежитии Белгородского государственного национального исследовательского университета (г. Белгород) в разные годы: А – 2012 год, В – 2013 год, С – 2020 год

In the bed bugs collected in 2010, the length to width ratio of their pronotum exceeds 2.5, and the paranota are wider (see Fig. 3A). These features are characteristic of the common bed bug *C. lectularius*. One specimen collected from the same dormitories in 2013 has all the features of *C. hemipterus* (see Fig. 3B). However, having no information about this species at that time, we mistakenly identified it as *C. lectularius*. Therefore, we maintain that *C. hemipterus* appeared in Belgorod as early as in 2013.

It was noted [Khryapin et al., 2017] that no cases of co-habitation of *C. hemipterus* and *C. lectularius* forming mixed populations were ever recorded. It is likely that the more active tropical bed bug *C. hemipterus* may have displaced the cosmopolitan species *C. lectularius*, as evidenced by the fact that no *C. lectularius* was found in the samples of bed bugs collected in 2020 in the dormitories of NRU "BelGU" and BSTU named after V.G. Shukhov.

Conclusion

The distribution of the tropical bed bug *Cimex hemipterus* (Fabricius, 1803) in Belgorod was registered in 2020, although this species has appeared here already in 2013. During this period, *C. hemipterus* regularly occurs in the dormitories of the Belgorod universities, apparently displacing the cosmopolitan species *C. lectularius*, which has been noted here earlier.

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