ABS ACTA BIOLOGICA SIBIRICA
A journal on the biodiversity of Siberia and the adjacent lands

Acta Biologica Sibirica 8: 483–506 (2022)
doi: 10.5281/zenodo.7710448
http:// journal.asu.ru

RESEARCH ARTICLE

New records of native and alien true bugs (Heteroptera) from Kemerovo Region, Western Siberia, Russia

Valentin V. Rudoi[1], Nikolay N. Vinokurov[2], Aleksey V. Korshunov[3], Dmitiy A. Efimov[4], Natalia I. Kirichenko[5, 6]

1 *Altai State University, 61 Lenin Av., Barnaul, 656049, Russia*
2 *Institute for Biological Problems of Cryolithozone, Siberian Branch RAS, 41 Lenin Av., Yakutsk, 677980, Russia*
3 *Museum-Reserve "Tomskaya Pisanitsa", 5a Tomskaya st., Kemerovo, 650099, Russia*
4 *Kemerovo State University, 6 Krasnaya st., Kemerovo, 650043, Russia*
5 *Sukachev Institute of Forest, Siberian Branch of the Russian Academy of Sciences, Federal Research Center "Krasnoyarsk Science Center SB RAS", Akademgorodok 50/28, Krasnoyarsk, 660036, Russia*
6 *Siberian Federal University, Institute of Ecology and Geography, 79 Svobodny pr., Krasnoyarsk, 660041, Russia*

Corresponding author: Valentin V. Rudoi (valentin.rudoi97@gmail.com)

Academic editor: R. Yakovlev | Received 5 September 2022 | Accepted 17 October 2022 | Published 23 October 2022

http://zoobank.org/0770DD1D-9DCF-47DB-BF97-4C6E9960E3EC

Citation: Rudoi VV, Vinokurov NN, Korshunov AV, Efimov DA, Kirichenko NI (2022) New records of native and alien true bugs (Heteroptera) from Kemerovo Region, Western Siberia, Russia. Acta Biologica Sibirica 8: 483–506. https://doi.org/10.5281/zenodo.7710448

Abstract

The article provides first records of 20 true bugs species (Heteroptera) from seven families (Lygaeidae, Miridae, Tingidae, Acanthosomatidae, Berytidae, and Saldidae) in Kemerovo Region, Western Siberia, Russia. These species, except two, are known in other regions of the Asian part of Russia, thus, the novel data clarify their up-to-date distribution. Most of true bugs, including an alien *Hoplomachus thunbergii* (Fallén) (i.e. 70% of all species in the study) were found in two botanical gardens (Kuzbasskiy and Orbita) in Kemerovo Region, highlighting the importance of surveying such plantings when running faunal studies and inventories. Two alien species, *H. thunbergii* (fam. Miridae) and *Arocatus rufipes* Stål (fam. Lygaeidae) originating from the European and Far Eastern parts of Russia respectively, were found in the city of Kemerovo and represent novel records for the Asian part of Russia (the former species) and Siberia (the latter species). These species could be introduced to Kemerovo Region with plants for planting, plant material or transported with human vehicles. Further studies

would be needed to confirm this hypothesis. Here we provide short synopses of the bionomics, distributional records and trophic associations for all species newly documented in Kemerovo Region. The images of adults and male genitalia are given for the majority of species.

Keywords
Heteroptera, Kemerovo, Western Siberia, fauna, new regional records, alien species

Introduction

True bugs are a taxonomic group of insects known by their worldwide distribution, inhabiting various biotopes and having trophic associations with the varieties of substrates (plants, arthropods etc.) (Vinokurov et al. 2010). Among those insects, a number of important pests are known in forestry and agriculture, for instance, *Graphosoma lineatum* (Linnaeus, 1758), *Rubiconia intermedia* (Wolff, 1811), *Dolycoris baccarum* (Linnaeus, 1975) (Pentatomdiae), *Acanthosoma haemorrhoidalis angulatum* Jakovlev, 1880, *Elasmucha grisea* (Linnaeus, 1758) (Acanthosomatidae) (Petrova 1975). Besides, some species are presently known by expanding their ranges and penetrating Russia from other regions of the world, in particular, *Leptoglossus occidentalis* Heidemann, 1910, *Molipteryx fuliginosa* (Uhler, 1860) (Coreidae), *Halyomorpha halys* (Stål, 1855) (Pentatomidae), *Corythucha arcuata* (Say, 1832) (Tingidae) (Neimorovets et al. 2017; Gariepy et al. 2021; Kornev et al. 2021; Markova et al. 2021; Reznik et al. 2022; Musolin et al. 2022).

Fauna of true bugs of Kemerovo, the region situated in the forest-steppe in the southern part of Western Siberia, remains poorly studied (Zolotarev 2005). Overall, 187 aquatic and terrestrial species from 27 families of Heteroptera have been documented here so far (Vinokurov et al. 2010). The data on true bugs diversity was accumulated for this region through the exploration of entomological collections gathered together by various researchers for more than one century and deposited in the Zoological Institute of the Russian Academy of Sciences (St. Petersburg) (Jakovlev 1903; Kiritshenko 1910, 1913; Wnukowsky 1926, 1927; Kulik 1965, 1967; Putshkov 1965, 1974; Kanyukova 1973; Kiritshenko, Kerzhner 1974; Kanyukova 1982, 1984; Kerzhner 1981; Putshkov PV 1982; Muminov 1987; Petrova 1974, 1975, 1978; Golub 1976, 1989; Cobben 1985; Aglyamzyanov 1990; Vinokurov, Kanyukova 1995; Vinokurov 2005, 2009; Vinokurov, Golub 2007, 2009; Kanyukova, Vinokurov 2007, 2009a, 2009b; Namyatova, Konstantinov 2009). Occasional faunistic studies were carried out based on the collections stored in the Kemerovo region (Eremeeva 2004a, 2004b). Furthermore, some region studies, besides faunistic records, provide interesting data on the impact of technogenic pollution on the composition of true bugs communities in Kemerovo Region (Zolotarev 2003; Zolotarev 2005).

The present article provides the list of 20 true bug species documented in Kemerovo Region for the first time, including two alien species, *Hoplomachus thunbergii* (Miridae) and *Arocatus rufipes* (Lygaeidae), originally known from extreme west

and east of Russia, respectively. For all species, brief synopses of the bionomics, data on modern range and trophic associations are given. The adults and male genitalia of the majority of true bug species are illustrated.

Material and methods

The adults of true bugs were collected in Kemerovo Region from May to August 2021 by AV Korshunov and DA Efimov following the standard approaches (Golub et al. 2012). Following eight localities were sampled: 1) Kemerovo city district, 2.5 km SE Mozzhykha village (55°24'48"N, 85°56'11"E); 2) Kemerovo, near Golubaya laguna lake (55°28'59"N, 86°09'54"E); 3) Topkinskiy district, Orbita botanical garden (55°14'57"N, 85°45'57"E); 4) Kemerovo, Central district of the city (55°20'53"N, 86°05'49"E); 5) Kemerovo, Kuzbasskiy botanical garden (55°21'57"N, 86°11'32"E); 6) Belovskiy district, Chudnoe lake (54°13'05"N, 86°13'28"E); 7) Novokuznetsk (53°39'48"N, 86°56'17"E); 8) Mariinskiy distict, Archerkas recreation center (56°10'31"N, 87°46'43"E) (Fig. 1).

The insects were killed using ethyl acetate and transported to the laboratory, where they were pinned, labeled and placed in dry entomological collection at the Altai State University. Species identification was based on external adult morphology and characteristics of male genitalia apparatus. Genitalia slides were prepared following standard protocol (Golub et al. 2012). The species were identified using the keys in Putshkov (1961, 1974), Kerzhner Yachevsky (1964), Petrova (1975), Vinokurov, Kanyukova (1995), Golub (1974), and Vinokurov (1988). All species were identified by V.V. Rudoi and confirmed by N.N. Vinokurov.

Data on bionomic, modern range and trophic associations were retrieved from various sources (Kiritshenko 1951; Wagner, Weber 1964; Kulik 1965; Lindskog 1975; Vinokurov 1988, 2004; Esenbekova 2013; Gao et al. 2013; Kuzhuget 2017). When referring to trophic specialization, following terminology was used: zoophagous species feeds on small arthropods, polyphytophagous – on plants from various taxonomic orders, zoophytophagous – on small arthropods and plants from various orders, oligophytophagous – on plants from certain families or genera (Giljarov et al. 1986). Following terminology was used in regard to species distribution: Holarctic species are distributed across Palaearctic and Nearctic realms; Palaearctic species – across Europe, Asia, North Africa and their range extends to the southern borders of the Sahara desert; West Central Palaearctic species – in Europe, Siberia and Central Asia; Eastern Palaearctic species – in Asian Russia (South Siberia and Far East, Trans-Baikal), Central and Eastern Asia countries; Transpalaearctic species are distributed from the Atlantic coast to the Pacific coast; Euroasian species are common in extratropical Eurasia; European species are found in European countries (Emeljanov 1974; Kerzhner, Josifov 1999; Vinokourov 2004; Sofronova 2015; Knyshov, Namyatova 2010; Vinokurov et al. 2010; Kuzhuget 2017). Data on species distribution are provided mainly for Western Siberia and retrieved from Vinokurov et al. (2010) and some other literature sources (listed in the species essays).

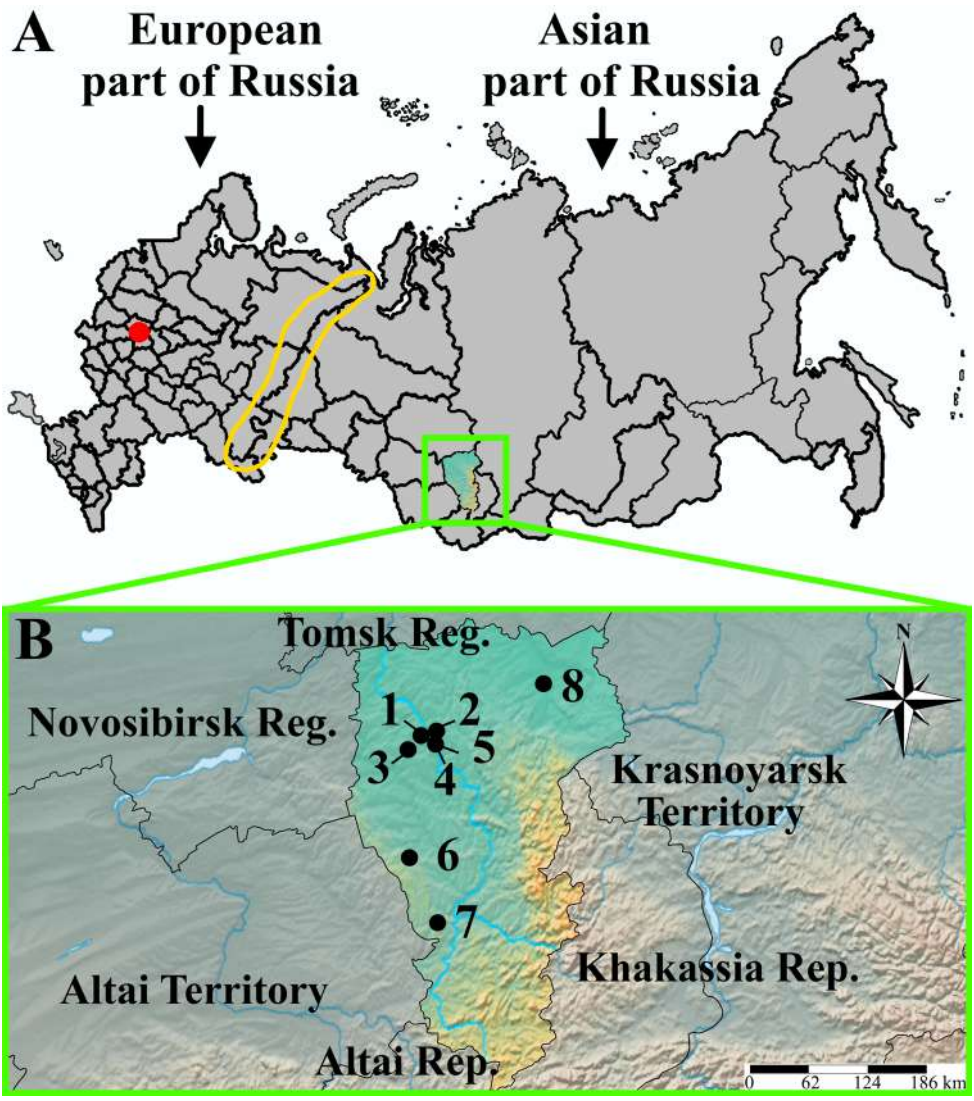


Figure 1. The sampled localities of true bugs (Heteroptera) in Kemerovo Region (**A**, **B**). In the general map (**A**), the capital is indicated by red circle; the Ural Mountains are outlined by orange line; the study region is indicated by green rectangle. In zoom up (**B**), sampled localities are indicated: **1** – 2.5 km SE Mozzhykha village; **2** – Golubaya laguna lake; **3** – Orbita botanical garden; **4**, **5** – Kemerovo (**4** – Central district of the city, **5** – Kuzbasskiy botanical garden); **6** – Chudnoe lake; **7** – Novokuznetsk; **8** – Archerkas recreation center.

The images of true bug adults and their genitalia were taken with a digital camera Olympus DP74 attached to the stereomicroscope Olympus SZX16 at the Altai State University. The photographs were revised in Paint.net, a free (except for Microsoft Store) raster graphics editor for Windows NT based on NET Framework (getpaint.net). The map with sampled localities was produced using the online mapping software SimpleMappr (Shorthouse 2010). Plant species were verified based on the data provided in plantarium.ru (Plantarium 2007—2022).

Results

Overall 20 species of true bugs were collected representing seven families: Lygaeidae (nine species, i.e.45% of all recorded species in the study), Miridae (five species, 25%), Tingidae (two species, 10%), Acanthosomatidae, Berytidae Saldidae (represented by one species each, i.e. 5% in each case).

All species recorded in the study are new for Kemerovo Region. Eighteen out of 20 species are known from other parts of Siberia (see faunistic list below). Two species, *Hoplomachus thunbergii* (Miridae) and *Arocatus rufipes* (Lygaeidae) are alien for Kemerovo Region and represent new records for the Asian part of Russia (the former species) and Siberia (the latter species). These two species are originally known from European and Far Eastern parts of Russia, respectively (Kerzhner, Yachevsky 1964; Vinokurov 1988). *Hoplomachus thunbergii* feeds on herbaceous plants from Asteraceae and Fabaceae (Kerzhner, Yachevsky 1964; Wagner, Weber 1964; Schuh 1995; Malenovský et al. 2011), whereas *Arocatus rufipes* is known to develop on Ulmus (Ulmaceae) (Vinokurov 1988; Gao et al. 2013). So far, no noticeable impact of these two true bug species on their host plants in Kemerovo Region was documented.

The majority of species, 14 out of 20 (i.e. 70%), were collected exclusively in the botanical gardens in Kemerovo Region. Three species (15%) were collected both in the botanical gardens and outside, on adjustment territories, whereas other three species (15%) were collected outside the botanical gardens, in different urbanized areas of Kemerovo.

Overall, seven out of 20 species are known to be associated with herbs, six species with roots and seeds of herbs and shrubs, two with woody plants, two species consume small arthropods, one species consumes small arthropods and sacks herbs, one species feeds on small arthropods and woody plants, and for one species no specific information is found in literature. Thus, 11 out of 20 species are polyphytophagous, two species are zoophagous, four species are oligophytophagous, two species are zoophytophagous, and one species with unknown trophic relations.

New records of true bugs in Kemerovo Region

Family Saldidae Amyot et Serville, 1843

***Saldula saltatoria* (Linnaeus, 1758)**
Figures 2, 3

Material examined. 1♂, Orbita botanical garden, 1.07.2021, 270 m alt., D.A. Efimov leg.

Distribution. Holarctic species (Péricart 1990; Vinokourov 2004; Kuzhuget 2017). West Siberia: Tyumen and Tomsk Regions, Altai Territory, Yamal, Khanty-Mansi Republic (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. The species is found on the surface of wet sandy or clayey soil, sediments and debris on the banks of rivers, lakes, near puddles, on wet meadows and swamps (Lindskog 1975; Vinokurov 2004). Imago hibernates in grass; in case of short-term warming, overwintering individuals are able to move (Péricart 1990). In England, mating and ovipositing adaults were observed between late April and early June; eggs are laid in hard dirt or in uneven soils among low vegetation (Péricart 1990). In the Carpathians, the species has two generations per year (Benedek 1970).

Trophic associations. Zoophagous species (Esenbekova 2013; Kuzhuget 2017); feeds on small insects (larvae of Diptera), earthworms (Enchytraeidae) etc. (Vinokurov 2004).

Family Miridae Hahn, 1833

***Deraeocoris (Deraeocoris) scutellaris* (Fabricius, 1794)**
Figures 4, 5

Material examined. 1♂, Kuzbasskiy botanical garden, 17-18.05.2021, 130 m alt., A.V. Korshunov leg.

Distribution. Eurosiberian species (Vinokurov et al. 2010). West Siberia: Tyumen, Novosibirsk Regions, Altai Territory (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. In Kazakhstan, this species lives on mesophyte multiherbal forest meadows; has one generation per year and hibernates in the egg stage (Esenbekova 2013).

Trophic associations. Zoophagous species; consumes small insects (Kulik 1965).

***Phytocoris (Ktenocoris) nowickyi* Fieber, 1870**
Figures 6–9

Material examined. 1♂, Orbita botanical garden, 17.08.2021, 270 m alt., D.A. Efimov leg.

Distribution. Euroasian species (Sofronova 2015). West Siberia: Altai Territory (Vinokurov, Golub 2009); first record for Kemerovo Region (present paper).

Bionomics. In Eastern Siberia and the Russian Far East, adults can be found in July and August; the species hibernates in the egg stage (Kulik 1965).

Trophic associations. Zoophytophagous (Sofronova 2015). In the European part of Russia, this species is found on *Atriplex* (Chenopodiaceae) (Kiritshenko 1951) and on deciduous trees (exact species are not listed in literature) (Kerzhner, Yachevsky 1964). In Eastern Siberia and the Russian Far East, it was documented on *Salix* (Salicaceae) (Kulik 1965). In Europe, it was found in humid areas on *Rumex conglomeratus* Murray (Polygonaceae) (Wagner, Weber 1964).

Remarks. Common species in Eastern Siberia and the Russian Far East (Kulik 1965).

***Polymerus (Poeciloscytus) brevicornis* (Reuter, 1879)**
Figure 10

Material examined. 1♀, Kuzbasskiy botanical garden, 10.06.2021, 130 m alt., A.V. Korshunov leg.; 1♀, ibidem, 17-18.05.2021, A.V. Korshunov leg.

Distribution. Transpalaearctic species (Kuzhuget 2017). West Siberia: Tyumen, Omsk Regions, Altai Territory, Altai Republic (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. This species inhabits steppes and found on rocky and sandy soil; has two generations per year, hibernates in the egg stage (Kulik 1965; Kuzhuget 2017).

Trophic associations. Polyphytophagous; feeds on Fabaceae, *Urtica* (Urticaceae), *Galium* (Rubiaceae) (Kulik 1965).

***Hoplomachus thunbergii* (Fallén, 1807)**
Figures 11–13

Material examined. 1♂, Kuzbasskiy botanical garden, 30.06.2021, 130 m alt., A.V. Korshunov leg.

Distribution. Euro-Caucasian (Zinovyeva, Polumordvinov 2017). Native to European part of Russia: widely distributed from south (Transcaucasia) to north and from west to east up to the Ural Mountains (Zinovyeva, Polumordvinov, 2017); first record for Asian part of Russia from Kemerovo Region (present paper).

Bionomics. In France, this species was found from July to August; hibernates in the egg stage (Wagner, Weber 1964).

Trophic associations. Polyphytophagous; feeds on *Pilosella officinarum* F.W. Schultz & Sch. Bip. (= *Hieracium pilosella* L.) (Asteraceae) in European part of Russia and France (Kerzhner, Yachevsky 1964; Wagner, Weber 1964), *Sarothamnus scoparius* (L.) W.D.J. Koch (Fabaceae) (Schuh 1995), *Hippocrepis* sp. (Fabaceae), *Leucanthemum vulgare* Lam. (Asteraceae), *Senecio erucifolius* L. (Asteraceae) in Czech Republic (Malenovský et al. 2011).

Remarks. The species could arrive to Kemerovo Region through natural dispersion or anthropogenic transportation. Bearing in mind that the host plants of this true bug, *Senecio erucifolius* and *Leucanthemum vulgare* (Asteraceae), are naturally present in Siberia, the species could potentially be found in other Siberian regions and in such case its alien status would need further exploration and confirmation.

***Psallus (Apocremnus) aethiops* (Zetterstedt, 1838)**
Figures 14, 15

Material examined. 1♂, Kuzbasskiy botanical garden, 8.06.2021, 130 m alt., A.V. Korshunov leg.

Distribution. Holarctic species (Kuzhuget 2017). West Siberia: Yamalo-Nenets Autonomous Okrug, Altai Republic (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. Species hibernates on the egg stage (Kulik 1965). In tundra of the European part of Russia, it was noted in a high density (Zinovjeva 2006).

Trophic associations. In Eastern Siberia, it was mentioned either as zoophagous (Kulik 1965) or zoophytophagous (Kuzhuget 2017). In the Far East (Kerzhner, 1988) and the European part of Russia, it was noted as a phytophagous on *Salix* sp. (Salicaceae) (Zinovjeva 2006).

Family Tingidae Laporte, 1832

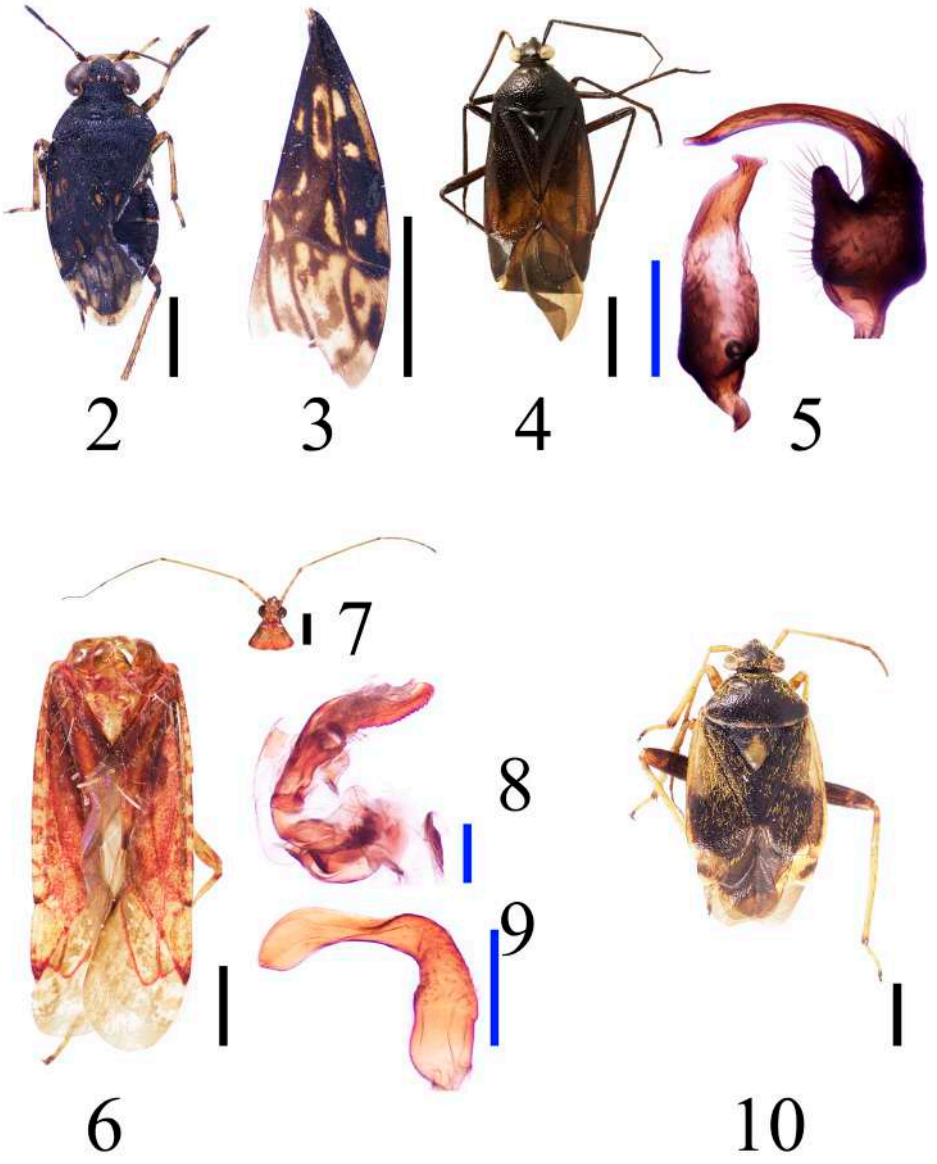
***Derephysia* (*Paraderephysia*) *longispina* Golub, 1974**
Figure 16

Material examined. 1♂, Orbita botanical garden, 17.08.2021, 270 m alt., D.A. Efimov leg.

Distribution. Palaearctic species (Knyshov, Namyatova 2010). West Siberia: Novosibirsk Region (Petrova 1974, 1978), Altai Territory (Knyshov, Namyatova 2010; Vinokurov, Rudoi 2022a); first record for Kemerovo Region (present paper).

Bionomics. The species inhabits grassy meadows; has one generation per year and hibernates as adults (Esenbekova 2013).

Trophic associations. Oligophytophagous; feeds on plants from Asteraceae (Esenbekova 2013).



Figures 2–10. Novel species of Heteroptera for Kemerovo Region. **2**, **3** – *Saldula saltatoria*. **4**, **5** – *Deraeocoris scutellaris*. **6–9** – *Phytocoris nowickyi*. **10** – *Polymerus brevicornis* (**2**, **4**, **6**, **10** – dorsal view, **3** – right hemelytron, **5**, **9** – paramers, **6** – body dorsal view, **7** – head dorsal view, **8** – aedeagus). The scale for adults (black vertical line) is 1 mm; for genitalia (blue line) is 0.2 mm.

***Dictyla echii* (Schrank, 1782)**
Figure 17

Material examined. 1♂, 1♀, Orbita botanical garden, 17.08.2021, 270 m alt., D.A. Efimov leg.; 2♂, Belovskiy district, Chudnoe lake, 3.06.2021, 230 m alt., A.V. Korshunov leg.

Distribution. Transpalaearctic species (Péricart, Golub 1996). West Siberia: Tyumen, Omsk, Novosibirsk, Tomsk Regions, Altai Territory (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. In Kazakhstan and the Republic of Tuva, the species inhabits a variety of biotopes, avoiding wet and strongly shaded places in the steppe; has two generations per year, hibernates as adults (Esenbekova 2013; Kuzhuget 2017).

Trophic associations. Oligophytophagous; feeds on *Symphytum*, *Echium* and *Pulmonaria* (Boraginaceae) (Esenbekova 2013; Kuzhuget 2017).

Family Berytidae Fieber, 1851

***Berytinus (Berytinus) clavipes* (Fabricius, 1775)**
Figures 18, 19

Material examined. 1♂, Kuzbasskiy botanical garden, 130 m alt., 23.05.2021, A.V. Korshunov leg.; 1♀, Kemerovo, near Golubaya laguna lake, 25.08.2021, 250 m alt., D.A. Efimov leg.

Distribution. Holarctic species (Kuzhuget 2017). West Siberia: Tyumen Region, Altai Territory, Altai Republic (see in Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. In Ukraine, this species inhabits forest steppes, forest edges and woodlands, , mesophyte meadows, middle belt of mountains, as well as urbanized areas (parks); one generation per year, hibernates as adults (Putshkov 1974).

Trophic associations. Oligophytophagous; feeds on Fabaceae (Putshkov 1974; Esenbekova 2013; Kuzhuget 2017).

Family Lygaeidae Schilling, 1829

***Arocatus rufipes* Stål, 1872**
Figure 20

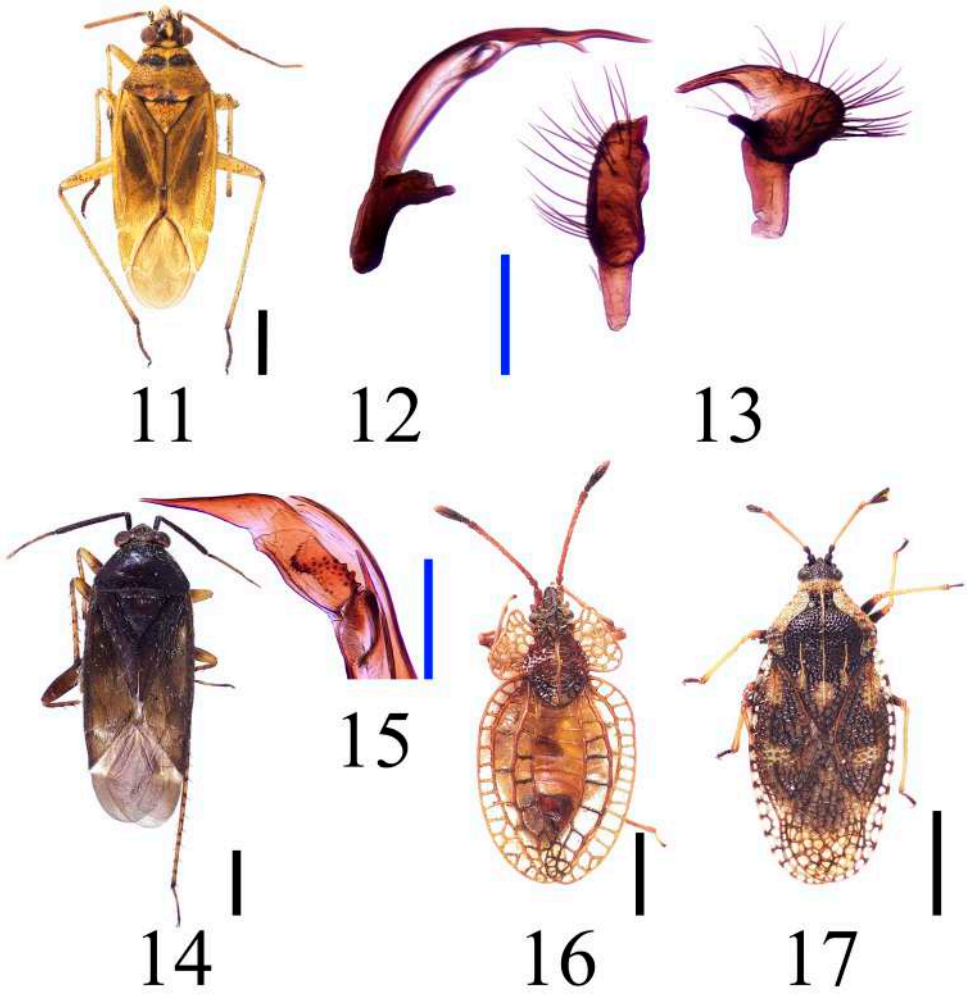
Material examined. 1♀, Kemerovo, Central district of the city, 25.08.2021, 120 m alt., A.V. Korshunov leg.

Distribution. Eastern Palaearctic species (Kuzhuget 2017), naturally present in Mongolia, Japan (Vinokurov et al. 2010), the Russian Far East and Eastern Siberia (up to Buryatia Republic inclusively) (Sofronova, Sofronov 2021); recorded in

Krasnoyarsk Territory as an alien species (Kanyukova, Vinokurov 2010). Western Siberia: first record for Kemerovo Region (present paper).

Trophic associations. Oligophytophagous; feeds on *Ulmus* (Ulmaceae) (Vinokurov 1988; Gao et al. 2013). In the Republic of Buryatia, the true bug isolated population was found in a relict grove of Japanese elm, *U. japonica* (Sofronova, Sofronov 2021).

Remarks. This true bug species could be introduced to Kemerovo either with elms or with other goods, or adults, as hitchhikers, could be transported with vehicles. Its further distribution in Western Siberia would require further study.



Figures 11–17. Novel species of Heteroptera for Kemerovo Region. **11–13** – *Hoplomachus thunbergii*. **14**, **15** – *Psallus graminicola*. **16** – *Derephysia longispina*. **17**– *Dictyla echii* (**11**, **14**, **16**, **17** – dorsal view, **13** – paramers, **12**, **15** – vesica). The scale for adults (black vertical line) is 1 mm; for genitalia (blue line) is 0.2 mm.

***Cymus aurescens* Distant, 1883**
Figures 21, 22

Material examined. 2♂, 2♀, Novokuznetsk, 24.07.2021, 280 m alt., D.A. Efimov leg.; 2♀, Kemerovo, Kuzbasskiy botanical garden, 130 m alt., 23.05.2021, 130 m alt., A.V. Korshunov leg.

Distribution. Euroasian species (Vinokurov et al. 2010). West Siberia: Tyumen Region, Altai Territory, Altai Republic (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. This species inhabits floodplains, damp and wetlands; one generation per year, hibernates as adults (Esenbekova 2013).

Trophic associations. Polyphitophagous; feeds on *Scirpus* (Cyperaceae), Carex (Cyperaceae), *Juncus* (Juncaceae) (Esenbekova 2013).

***Ischnodemus sabuleti* (Fallén, 1826)**
Figure 23

Material examined. 1♀, Kuzbasskiy botanical garden, 130 m alt., 23.05.2021, A.V. Korshunov leg.

Distribution. Transpalaearctic species (Vinokurov et al. 2010). West Siberia: Tyumen, Tomsk Regions, Altai Territory (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. This species inhabits steppes, meadows of the floodplains, as well as can be found on open patches on the banks of lakes and ponds; one generation per year, hibernates as adults (Putshkov 1969; Esenbekova 2013).

Trophic associations. Polyphitophagous; feeds on *Agropyron*, *Glyceria*, *Elymus*, *Calamagrostis*, *Pragmites* (Poaceae), and *Typha latifolia* L. (Typhaceae) (Putshkov 1969).

***Drymus (Sylvadrymus) sylvaticus* (Fabricius, 1775)**
Figures 25, 26

Material examined. 1♂, Kuzbasskiy botanical garden, 130 m alt., 23.05.2021, A.V. Korshunov leg.

Distribution. Transpalaearctic species (Kuzhuget 2017). West Siberia: Tyumen Region, Altai Territory, Altai Republic (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. This species inhabits forest edge and meadows next to deciduous forests, can be found in urbanized areas (parks, gardens, in places with ruderal vegetation); one generation per year, hibernates as adults (Putshkov 1969; Esenbekova 2013; Kuzhuget 2017).

Trophic associations. Polyphitophagous (Esenbekova 2013; Kuzhuget 2017); feeds on fallen seeds of *Rumex acetocella* L. (Polygonaceae) and *Erica cinerea* L (Ericaceae) and sacks juice of roots of these plants (Putshkov 1969).

***Aphanus rolandri* (Linnaeus, 1758)**
Figure 27

Material examined. 1♂, Kuzbasskiy botanical garden, 130 m alt., 29.05.2021, A.V. Korshunov leg.

Distribution. West-Central Palaearctic species (Vinokurov et al. 2010). West Siberia: Tyumen Region, Altai Territory (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. It inhabits meadows and forest edge, found on the ground under plants, most often under Verbascum (Scrophulariaceae) or in the litter among vegetable detritus and grass, rarely on plants, can also be found in urbanized area (parks); has one generation per year, hibernates as adults (Putshkov 1969; Esenbekova 2013).

Trophic associations. Polyphitophagous (Esenbekova 2013); feeds on fallen seeds of *Verbascum* sp. (Scrophulariaceae) (Putshkov 1969) *Thuja occidentalis* L. (Cupressaceae) (Stehlík, Vavřínová 1998).

***Megalonotus chiragra* (Fabricius, 1794)**
Figure 28

Material examined. 1♀, Archerkas recreation center, 23.06.2021, 160 m alt., A.V. Korshunov leg.

Distribution. Transpalaearctic (Péricart 2001). West Siberia: Tyumen, Tomsk Regions, Altai Territory (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. It is found in steppes, semi-deserts, floodplains, along forest edges and meadows, on roadsides, on/in litter, under plants of *Artemisia* (Asteraceae), *Potentilla* (Rosaceae), among the detritus of woody plants; has from two to three generations per year, hibernates as adults (Putshkov 1969; Esenbekova 2013; Kuzhuget 2017).

Trophic associations. Polyphitophagous (Esenbekova 2013; Kuzhuget 2017); feeds on Chenopodiaceae, Asteraceae, Brassicaceae (Putshkov 1969).

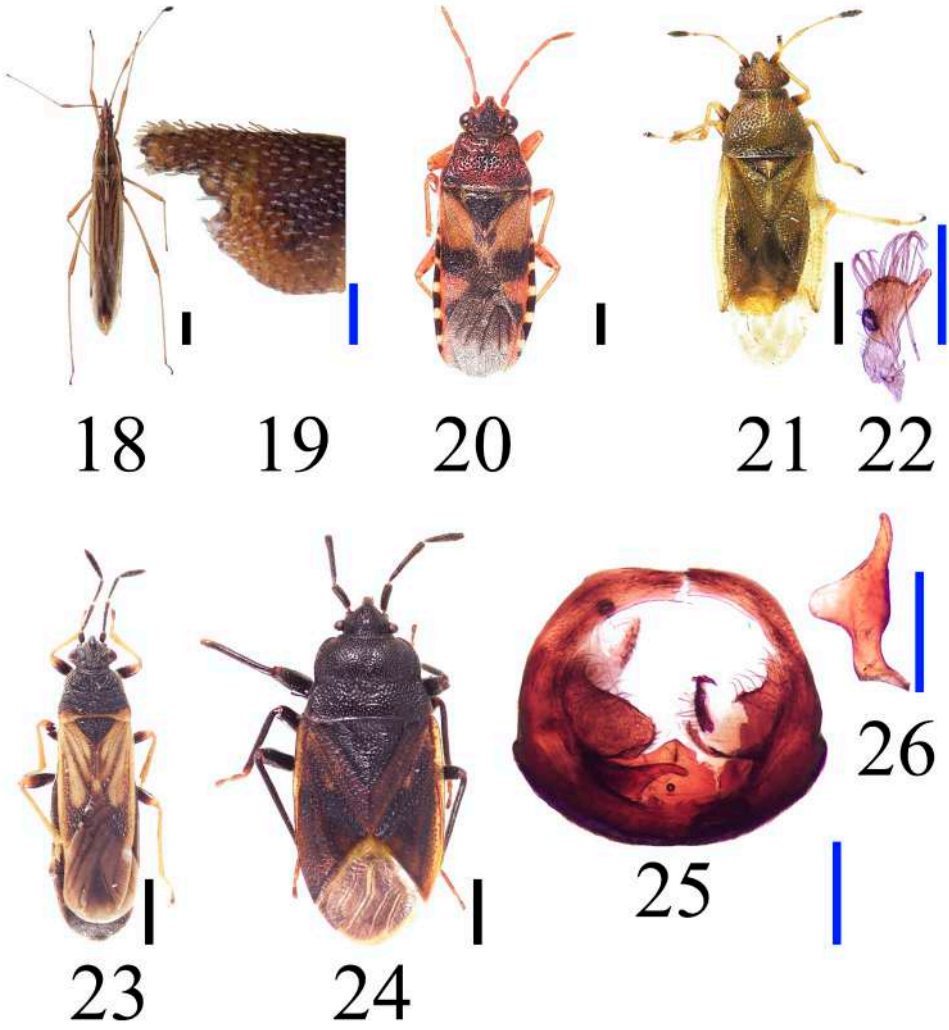
***Peritrechus geniculatus* (Hahn, 1832)**
Figure 29

Material examined. 2♀, Kuzbasskiy botanical garden, 130 m alt., 14-30.06.2021, A.V. Korshunov leg.; 1♀, Orbita botanical garden, 270 m alt., 1.07.2021, D.A. Efimov leg.

Distribution. West-Central Palaearctic species (Vinokurov et al. 2010). West Siberia: Tyumen, Novosibirsk and Tomsk Regions (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. It is found among vegetable detritus, on the edge and meadows of forests. This species prefers wet places with overgrown ruderal vegetation; has one generation per year; hibernates as adults (Putshkov 1969; Esenbekova 2013).

Trophic associations. Polyphitophagous; feeds on plant sap and fallen seeds (exact plant species were not found in literature) (Putshkov 1969; Esenbekova 2013).



Figures 18–26. Novel species of Heteroptera for Kemerovo Region. **18**, **19** – *Berytinus clavipes*. **20** – *Arocatus rufipes*. **21**, **22** – *Cymus aurescens*. **23** – *Ischnodemus sabuleti*. **24**, **25**, **26** – *Drymus sylvaticus* (18, 20, 21, 23, 24 – dorsal view, 19 – external male segment, lateral view, 22, 26 – paramers, 25 – male genital capsule). The scale for adults (black vertical line) is 1 mm; for genitalia (blue line) is 0.2 mm.

***Acompus rufipes* (Wolff, 1804)**
Figure 30

Material examined. 1♂, Kuzbasskiy botanical garden, 130 m alt., 14.06.2021, A.V. Korshunov leg.

Distribution. Transpalaearctic species (Vinokurov et al. 2010). West Siberia: Tyumen, Tomsk Regions, Altai Territory (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. It inhabits humid biotopes, can be found on the edge of forest steppe; has one generation per year, hibernates as adults (Putshkov 1969; Esenbekova 2013).

Trophic associations. Polyphitophagous (Esenbekova 2013); feeds on Valerianaceae and Poaceae (Putshkov 1969).

***Stygnocoris sabulosus* (Schilling, 1829)**
Figure 31

Material examined. 1♂, 1♀, Orbita botanical garden, 270 m alt., 17.08.2021, D.A. Efimov leg.

Distribution. Transpalaearctic species (Vinokurov et al. 2010). West Siberia: Altai Republic (Vinokurov 2007); first record for Kemerovo Region (present paper).

Bionomics. The species prefers mesophytic places, can be found on meadows and forest steppe, in thickets of ruderal vegetation; has one generation per year, hibernates in the egg stage (Putshkov 1969; Esenbekova 2013).

Trophic associations. Polyphitophagous, imago feeds on fallen plant seeds, larvae suck plant juice on *Ranunculus* (Ranunculaceae), *Erica* (Ericaceae), *Rumex* (Polygonaceae) (Putshkov 1969; Esenbekova 2013).

Family Acanthosomatidae Signoret, 1864

***Acanthosoma denticaudum* Jakovlev, 1880**
Figure 32

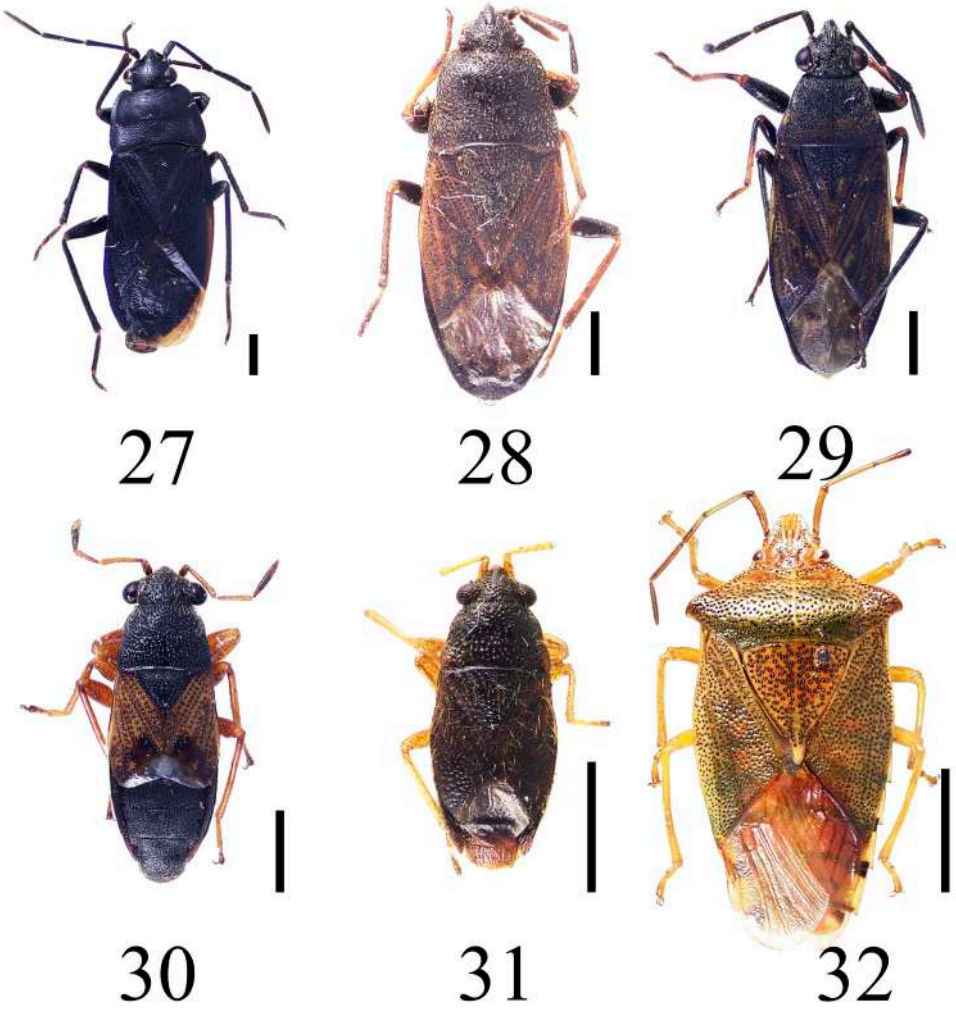
Material examined. 1♀, Kuzbasskiy botanical garden, 130 m alt., 23.05.2021, A.V. Korshunov leg.

Distribution. Eastern Palaearctic species (Vinokurov et al. 2010). West Siberia: Omsk, Novosibirsk, Tomsk Regions, Altai Territory, Altai Republic (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. The species inhabits forested areas and steppes, prefers wetlands of sparse mixed and deciduous forests, can be also found at the edges of swamps,

river valleys, lake banks, as well as in urbanized areas (gardens and parks); has one generation per year, hibernates as adults (Petrova 1975).

Trophic associations. Polyphitophagous; feeds on woody plants from Rosaceae, Grossulariaceae, Betulaceae, and Salicaceae (Petrova 1975).



Figures 27–32. Novel species of Heteroptera for Kemerovo Region. **27** – *Aphanus rolandri*. **28** – *Megalonotus chiragra*. **29** – *Peritrechus geniculatus*. **30** – *Acompus rufipes*. **31** – *Stygnocoris sabulosus*. **32** – *Acanthosoma denticaudum* (**27–32** – dorsal view). The scale for adults (black vertical line) is 1 mm (except Fig. **32**, where the scale is 4 mm); for genitalia (blue line) is 0.2 mm.

Family Pentatomidae Leach, 1815

Pentatoma (Pentatoma) rufipes (Linnaeus, 1758)

Material examined. 1♀, 2.5 km SE Mozzhykha vill., 10.08.2021, 120 m alt., A.V. Korshunov leg.

Distribution. Transpalaearctic species (Kuzhuget 2017). West Siberia: Tyumen, Omsk, Tomsk Regions, Altai Territory, Altai Republic (Vinokurov et al. 2010); first record for Kemerovo Region (present paper).

Bionomics. This species is commonly found in coniferous and deciduous forests and meadows including along flooded plains; has one generation per year, hibernates as adults (Putshkov 1961; Petrova 1975; Esenbekova 2013; Kuzhuget 2017).

Trophic associations. Zoophytophagous; feeds on *Quercus*, *Fagus* (Fagaceae), *Tilia* (Malvaceae), *Betula*, *Alnus*, *Corylus* (Betulaceae), *Acer* (Sapindaceae), *Cornus* (Cornaceae), sucks vegetative and generative parts of tree and shrubs (Putshkov 1961; Petrova 1975; Esenbekova 2013; Kuzhuget 2017). This species was also documented as sucking eggs, larvae and pupae of various insects (Putshkov 1961; Petrova 1975).

Discussion

The study performed within one field season allowed us to detect 20 new true bug species for Kemerovo Region, increasing the list of Heteroptera of this region from 187 to 207 species., i.e. on 10,7%. In contract, in neighboring regions the number of documented heteropteran species is much higher. For instance, 351 and 382 species of Heteroptera are known from Altai Territory and the Altai Republic, respectively (Vinokurov et al. 2010; Vinokurov, Golub 2016; Vinokurov, Rudoi 2020, 2022a, 2022b; Golub et al. 2021), 388 true bug species are recorded from the Republic of Tuva (Kuzhuget 2017).

Notably, the majority of true bugs, i.e. 70% of all species in the study, we collected in two botanical gardens (Kuzbasskiy and Orbita) in Kemerovo Region, highlighting the importance of such plantings for performing faunal research. Indeed, the botanical gardens and arboreta gathering together many plant species originating from different countries/ floristic regions of the world can be served as sentinel plantings allowing detecting native insect species shifting on novel host plants or alien species arrived to the region, which host plants are present in such planting (Kirichenko, Kenis 2016; Eschen et al. 2019). One of the two alien true bug species, *Hoplomachus thunbergii* (Miridae) was detected in the botanical garden. Another alien species, *Arocatus rufipes* (Lygaeidae), was found in urbanized area. These two species represented novel records for the Asian part of Russia (*H. thunbergii*) and Siberia (*A. rufipes*). They did not provide any noticeable damage to their host plants,

i.e. various species of herbs (in case of *H. thunbergii*), and *Ulmus* spp. (Ulmaceae) (in case of *A. rufipes*) in Kemerovo Region in 2021. In natural habitats, these species have not been recorded as pests (Kerzhner, Yachevsky 1964; Wagner, Weber 1964; Schuh 1995; Vinokurov 1988; Malenovský et al. 2011; Gao et al. 2013; Sofronova, Sofronov 2021).

Among other true bug species recorded in Kemerovo Regions for the first time, following three species, found in a botanical garden, represent interesting geographical records: *Phytocoris nowickyi* was known before only from Altai Territory (Vinokurov, Golub 2009), *Derephysia longispina* from Novosibirsk Region (Petrova 1974, 1978) and *Stygnocoris sabulosus* from Altai Republic (Vinokurov 2007). Their detection in Kemerovo Region indicates that these species may have a wider distribution in Siberia than previously thought.

Despite novel records, the fauna of true bugs in Kemerovo Region remains still little studied. In 2021, we performed field research only in few localities of the region and in the city of Kemerovo, whereas other biotopes (in particular the mountainous part of the region) were not explored. We expect that some species present in neighboring regions (Tomsk, Novosibirsk Regions, Krasnoyarsk, Altai Territories, the Republics Altai and Khakassia) can be found in Kemerovo Region. Thus, the faunal list of true bugs of the region can be increased, if not twice, at least on 30%.

Conclusion

Our research underlines the importance of faunistic observations and field collections in Siberian regions for better understanding faunal communities, detecting alien species and clarifying their modern ranges. As shown in our paper, surveying botanical gardens may play an important role in such research, and even opportunistic sampling during one season may provide valuable data on the mentioned above aspects. Further studies would be needed to better explore the compositions of true bugs in Kemerovo Region as well as in other poorly studied regions of Siberia for improving our knowledge on this ecologically and economically important insect group. Furthermore, the development of DNA barcoding reference library would be of a high importance to genetically characterize true bug species of Siberia and accumulate data for fast and reliable species identification, defining the origin and clarifying the routes of species distribution.

Acknowledgements

The authors are grateful to Prof. R.V. Yakovlev (Altai State University, Barnaul) for his help and support on different stages of this study, A. Ustyuzhanina (Tomsk) for useful comments on early version of the manuscript. The contribution of V.V. Rudoi and N.I. Kirichenko was supported by the Russian Science Foundation (project

No. 22-16-00075) [species identification, distribution and trophic association data review, the manuscript preparation], N.N. Vinokurov was supported by the project of the Ministry of Science and Higher Education of the Russian Federation (project No. 0297-2021-0044) [verification of species identification].

References

Aglyamzyanov RS (1990) Review of species of the genus *Lygus* (Heteroptera, Miridae) in the fauna of Mongolia. I. In: Nasekomye Mongolii [Insects of Mongolia] 11: 25–30. [In Russian]

Benedek P (1970) The semiaquatic Heteroptera in the Carpathian Basin with notes on the distribution and the phenology of the species. Faunistische Abhandlungen Staatliches Museum für Tierkunde in Dresden 3: 27–49.

Cobben RH (1985) Addition to the Eurasian saldid fauna, with a description of fourteen new species (Heteroptera, Saldidae). Tijdschrift voor Entomologie 128 (4): 215–270.

Emeljanov AF (1974) Proposals an the classification and nomenclature of areals. Entomological review 3: 497–522. [In Russian]

Eremeeva NI (2004a) True bugs (Heteroptera) Belovskiy district. Trudy Kuzbasskoi komplexnoi expedicii. Belovskiy, Yashkinskiy, Tashtagolskiy raiony Kemerovskoi oblasti [Proceedings of the Kuzbass complex expedition. Belovskiy, Yashkinskiy, Tashtagolskiy districts of the Kemerovo Region] 1: 256–258. [In Russian]

Eremeeva NI (2004b) True bugs (Heteroptera) Yashkin district. Trudy Kuzbasskoi komplexsnoi expedicii. Belovskiy, Yashkinskiy, Tashtagolskiy raiony Kemerovskoi oblasti [Proceedings of the Kuzbass complex expedition. Belovskiy, Yashkinskiy, Tashtagolskiy districts of the Kemerovo Region] 1: 259–260. [In Russian]

Eschen R, O'Hanlon R, Santini A, Vannini A, Roques A, Kirichenko N, Kenis M (2019) Safeguarding global plant health: the rise of sentinels. Journal of Pest Science 92: 29–36. https://doi.org/10.1007/s10340-018-1041-6

Esenbekova PA (2013) True bugs (Heteroptera) of Kazakhstan. Nur-Print, Almaty, 349 pp. [In Russian]

Gao C, Kondorosy E, Bu W (2013) A review of the genus *Arocatus* from Palaearctic and Oriental Regions (Hemiptera: Heteroptera: Lygaeidae). The Raffles Bulletin of Zoology 61 (2): 687–704.

Gariepy TD, Musolin DL, Konjević A, Karpun NN, Zakharchenko VY, Zhuravleva EN, Tavella L, Bruin A, Haye T (2021) Diversity and distribution of cytochrome oxidase I (COI) haplotypes of the brown marmorated stink bug, *Halyomorpha halys* Stål (Hemiptera, Pentatomidae), along the eastern front of its invasive range in Eurasia. NeoBiota 68: 53–77. https://doi.org/10.3897/neobiota.68.68915

Giljarov MS, Baev AA, Vinberg GG, Zavarzin GA, Ivanov AV, Severin SE, Simolin AV, Sokolov VE, Tatarinov LP, Takhtadzhyan AL, Yablokov AV (Eds) (1986) Biological encyclopedic dictionary. Soviet Encyclopedia, Moscow, 831 pp.

Golub VB (1974) A new species of the genus *Gerephysia* Spin., (Heteroptera, Tingidae) From the USSR. Trudy Zoologicheskogo Instituta Akademii Nauk SSSR [Proceedings of the Zoological Institute, Academy of Sciences of the USSR] 53 (5): 798–799. [In Russian]

Golub VB (1976) Lace bugs of the genus *Physatocheila* Fieb. (Heteroptera, Tingidae) of the fauna of the USSR. Trudy Zoologicheskogo Instituta Akademii Nauk SSSR [Proceedings of the Zoological Institute, Academy of Sciences of the USSR] 67: 22–29. [In Russian]

Golub VB (1989) Palaearctic species of capsid bugs of the genus *Trigonotylus* (Heteroptera, Miridae). Nasekomye Mongolii [Insects of Mongolia] 10: 137–164. [In Russian]

Golub VB, Tsurikov MN, Prokin AA (2012) Insect collections: material collection, treatment and storage. KMK, Moscow, 339 pp. [In Russian]

Golub VB, Vinokurov NN, Golub NV, Soboleva VA, Aksenenko EV (2021) True bugs (Hemiptera: Heteroptera) from the taiga zone of the mountainous Altai of Russia: the first records and new data on rare species. Ecologica Montenegrina 40: 164–175. https://doi.org/10.37828/em.2021.40.14

Jakovlev BJ (1903) Bugs (Hemiptera–Heteroptera) of the Irkutsk Province. II. Horae Societatis Entomologicae Rossicae 36: 317–324. [In Russian]

Kanyukova EV (1973) On the fauna and biology of water bugs (Heteroptera) of Western Siberia. Entomologicheskoe Obozrenie [Entomological Review] 52 (4): 814–820. [In Russian]

Kanyukova EV (1982) Water-skaters (Heteroptera, Gerridae) of the fauna of the USSR. Trudy Zoologicheskogo Instituta Akademii Nauk SSSR [Proceedings of the Zoological Institute, Academy of Sciences of the USSR] 105: 62–93. [In Russian]

Kanyukova EV (1984) Heteroptera of the Aradus betulae group in the USSR fauna. Vestnik zoologii [Bulletin of Zoology] 4: 9–14. [In Russian]

Kanyukova EV, Vinokurov NN (2007) New data on distribution of bark bugs in Siberia and the Far East of Russia (Heteroptera: Aradidae). Zoosystematica Rossica 16 (1): 48. https://doi.org/10.31610/zsr/2007.16.1.48

Kanyukova EV, Vinokurov NN (2009a) New data to the fauna of superfamilies Lygaeoidea, Pyrrhocoroidea and Coreioidea (Heteroptera) of the Asian Part of Russia. Problemy izuchenia i okhrany zhivotnogo mira na Severe [Problems of studying and protecting wildlife in the North] (Syktyvkar, Republika Komi, Rossiya, 16-20 November 2009). Syktyvkar, 57–59. [In Russian]

Kanyukova EV, Vinokurov NN (2009b) New data on shield-bugs with notes of its distribution in Siberia (Heteroptera: Pentatomomoidea). Problemy izuchenia i okhrany zhivotnogo mira na Severe [Problems of studying and protecting wildlife in the North] (Syktyvkar, Republika Komi, Rossiya, 16-20 November 2009). Syktyvkar, 59–61. [In Russian]

Kanyukova EV, Vinokurov NN (2010) Materials for a fauna of true bugs of Asian part of Russia (Heteroptera: Reduviidae, Aradidae, Lygaeidae, Cydnidae). Amurskiy zoologicheskiy Zhurnal [Amur zoology journal] 2 (1): 10–12. [In Russian]

Kerzhner IM (1981) Heteropterans of the family Nabidae. Fauna SSSR. Nasekomye khobotnye (Fauna of the USSR. Rhynchota) 13 (2): 327 pp. [In Russian]

Kerzhner IM (1988) Family Miridae. In: Lehr PA (Ed.) Keys to the Insects of the Far East of the USSR. Nauka: Leningrad, 2: 778–857 [in Russian]

Kerzhner IM, Josifov M (1999) Family Miridae Hahn., 1833. In: Aukema B, Rieger Chr (Eds) Catalogue of the Heteroptera of the Palaearctic Region 3: 577 pp.

Kerzhner IM, Yachevsky TL (1964) Order Heteroptera (Hemiptera) Semi-winged. In: Key to insects of the European part of the USSR: in five volumes. Volume 1. Science, Moscow – Leningrad, 655–845. [In Russian]

Kirichenko N, Kenis M (2016) Using a botanical garden to assess factors influencing the colonization of exotic woody plants by phyllophagous insects. Oecologia 182: 243–252. https://doi.org/10.1007/s00442-016-3645-y

Kiritshenko AN (1910) Contribution to the entomofauna of West Siberia: Hemiptera–Heteroptera of Altai and Tomsk Gubernia. Revue Russe d'Entomologie 10 (3): 173–185. [In Russian]

Kiritshenko AN (1913) Dysodiidae and Aradidae. Fauna Rossii i sopredel'nykh stran. Nasekomye poluzhestkokrylye [Fauna of Russia and neighboring countries. Hemipterous insects] (Insecta, Hemiptera) 6 (1): 302 pp. [In Russian, with Latin diagnoses]

Kiritshenko AN (1951) True Hemiptera of European USSR. Key and bibliography. Keys to the fauna of the USSR, published by the Zoological Institute of the Academy of Sciences of the USSR. Volume 42. Nauka, Leningrad, 423 pp. [In Russian]

Kiritshenko AN, Kerzhner IM (1974) Terrestrial Heteroptera of the Mongolian People's Republic. II. Dipsocoridae, Nabidae, Reduviidae. In: Kerzhner IM (Ed.) Nasekomye Mongolii [Insects of Mongolia]. Volume 1. Nauka, Leningrad, 80–92. [In Russian]

Knyshov AA, Namyatova AA (2010) Additions to the fauna of bugs (Heteroptera) of the Tigirekskii State Nature Reserve, Altai Krai. Bulletin of St. Petersburg State University 3 (3): 9–20. [In Russian]

Kornev I, Aksenenko E, Kharchenko N (2021) Invasion *Leptoglossus occidentalis* Heidemann, 1910 (Heteroptera: Coreidae) in the conditions of Voronezh (Russia). IOP Conf. Series: Earth and Environmental Science 875: 12–18. https://doi.org/10.1088/1755-1315/875/1/012018

Kulik SA (1965) Terrestrial bugs (Heteroptera) of Eastern Siberia and the Far East. (II. Assassin families). In: Kulik SA (Ed.) Izvestiya Irkutskogo sel'skokhozyaystvennogo instituta [Transactions of the Irkutsk Institute of Agriculture] 25: 409–424. [In Russian]

Kulik SA (1967) Land bugs (Heteroptera) of Eastern Siberia and the Far East [III. Lygaeidae]. Fragmenta Faunistica 13 (22): 391–406. https://doi.org/10.3161/00159301FF1966.13.22.391 [In Russian]

Kuzhuget SV (2017) The fauna of terrestrial true bugs (Heteroptera: Leptopodomorpha, Cimicomorpha, Pentatomomorpha) of Tuva: Abstract of the dissertation for the degree of Candidate of Biological Sciences. Kyzyl, 20 pp. [In Russian]

Lindskog P (1975) Taxonomy and systematic notes of some species group of *Saldula* Van Duzze, with discussion of riparian-terrestrial shift in the Saldidae (Heteroptera). Zoolodica Scripta 4: 159–174.

Malenovský I, Banar P, Kment P (2011) A contribution to the faunistics of the Hemiptera (Cicadomorpha, Fulgoromorpha, Heteroptera, and Psylloidea associated with dry grassland sites in southern Moravia (Czech Republic). Acta Musei Moraviae, Scientiae biologicae 96: 41–187.

Markova TO, Kanyukova EV, Maslov MV (2021) Dynamics of the Distribution of *Molipteryx fuliginosa* (Uhler) (Heteroptera, Coreidae) in the Russian Far East. Russian Journal of Biological Invasions 12 (3): 70–80. https://doi.org/10.1134/S2075111721030103

Muminov NN (1987) On species of the genus *Adelphocoris* Reut. and *Calocoris* Fieb. (Heteroptera, Miridae) of Middle Asia. Izvestiya Akademii Nauk Tadzhikskoy SSR. Otdelenie biologicheskikh Nauk [Proceedings of the Academy of Sciences of the Tajik SSR. Department of Biological Sciences] 3: 93–95. [In Russian]

Musolin DL, Kirichenko NI, Karpun NN, Aksenenko EV, Golub VB, Kerchev IA, Mandelshtam MY, Vasaitis R, Volkovitsh MG, Zhuravleva EN, Selikhovkin AV (2022) Invasive Insect Pests of Forests and Urban Trees in Russia: Origin, Pathways, Damage, and Management. Forests 13: 521. https://doi.org/10.3390/f13040521

Namyatova AA, Konstantinov FV (2009) Revision of the genus *Orthocephalus* Fieber, 1858 (Hemiptera: Heteroptera: Miridae). Zootaxa 2316 (1): 1–118. https://doi.org/10.11646/zootaxa.2316.1.1

Neimorovets VV, Shchurov VI, Bondarenko AS, Skvortsov MM, Konstantinov FV (2017) First Documented Outbreak and New Dataon the Distribution of *Corythucha arcuata* (Say, 1832) (Hemiptera: Tingidae) in Russia. Acta Zoologica Bulgarica, suppl 9: 139–142.

Péricart J (1990) Hemiptères Saldidae et Leptopodidae d'Europe occidentale et du Maghreb. Fauna de France. Paris, 238 pp. [In French]

Péricart J (2001) Family Lygaeidae Schilling, 1829 — Seed-Bugs. In: Aukema B, Rieger C (Eds) Catalogue of the Heteroptera of the Palaearctic Region. Volume 4. The Netherlands Entomological Society, Amsterdam, 35–220.

Péricart J, Golub VB (1996) Superfamily Tingoidea Laporte, 1832. In: Aukema B, Rieger C (Eds) Catalogue of the Heteroptera of the Palaearctic Region. Volume 2. The Netherlands Entomological Society, Amsterdam, 3–83.

Petrova VP (1974) About the species composition of lacebugs (Hemiptera, Tingidae) of forest steppe the Ob' River area. Voprosy entomologii Sibiri [Questions of entomology of Siberia]. Nauka, Novosibirsk, 57–58. [In Russian]

Petrova VP (1975) Shield bugs of West Siberia (Hemiptera, Pentatomoidea). Novosibirsk Pedagogical Institute, Novosibirsk, 237 pp. [In Russian]

Petrova VP (1978) To the knowledge of lace bugs (Hemiptera, Tingidae) of West Siberia. Trudy Biologicheskogo instituta SO AN SSSR [Proceedings of the biological institute Academy of Sciences of the USSR] 34: 62–73. [In Russian]

Plantarium (2007—2022) Plants and lichens of Russia and neighboring countries: open online galleries and plant identification guide. URL: https://www.plantarium.ru/lang/en.html (accessed on 1 Oct 2022).

Putshkov VG (1961) Pentatomoidea. Fauna Ukrainy 21 (1): 338 pp. [In Ukrainian]

Putshkov VG (1965) The most important plant bugs – pests of agricultural crops. Naukova Dumka, Kiev, 172 pp. [In Russian]

Putshkov VG (1969) Lygaeidae. Fauna Ukrainy 21 (3): 388 pp. [in Ukrainian]

Putshkov VG (1974) Berytidae, Pyrrhocoridae, Piesmatidae, Aradidae and Tingidae. Fauna Ukrainy 21 (4): 332 pp. [In Ukrainian]

Putshkov PV (1982) Maps 131, 132, 134. *Rhynocoris annulatus*, *Rh. irancundus*, *Rh. personatus*, *Phymata crassipes* (Heteroptera, Reduviidae). In: Provisional atlas of the insects of the European part of USSR. Nauka, Leningrad, 9–12. [In Russian]

Reznik SYa, Karpun NN, Zakharchenko VYe, Shoshina YeI, Dolgovskaya MYu, Saulich AKh, Musolin DL (2022) To Every Thing There Is a Season: Phenology and Photoperiodic Control of Seasonal Development in the Invasive Caucasian Population of the Brown Marmorated Stink Bug, Halyomorpha halys (Hemiptera: Heteroptera: Pentatomidae). Insects 13 (7): 580. https://doi.org/10.3390/insects13070580

Schuh RT (1995) Plant Bugs of the World (Insecta: Heteroptera: Miridae): Systematic Catalog, Distributions, Host List and Bibliography. The New York Entomological Society, New York, NY, USA, 1036–1119.

Shorthouse DP (2010) SimpleMappr, an online tool to produce publication-quality point maps. http://www.simplemappr.net. Accessed on: 2022-3.

Sofronova EV (2015) On studying Heteroptera fauna from the northern slope of the Khamar-Daban Ridge (Eastern Siberia). Vestnik Tomskogo gosudarstvennogo universiteta [Tomsk State University Journal of Biology] 2 (30): 82–95. https://doi.org/10.17223/19988591/30/6 [In Russian, English summary]

Sofronova EV, Sofronov AP (2021) True bugs (Heteroptera) of relict elm groves in the lower reaches of the Selenga River (Republic of Buryatia). Entomologicheskoe obozrenie [Entomological Review] 100 (3): 590–601. https://doi.org/10.31857/S0367144521030072 [In Russian]

Stehlík JL, Vavřínová (1998) Result of the investigations on Hemiptera in Moravia made by the Moravian Museum (Lygaeidae III). Acta Musei Moraviae. Scientiae Biologicae 83: 21–70.

Vinokurov NN (1988) Fam. Lygaeidae. In: Ler [Lehr] PA (Ed.) Keys to the insects of the Far East of the USSR. Volume 2. Nauka, Leningrad, 883–902. [In Russian]

Vinokurov NN (2004) Bugs of the genus *Saldula* V.D., 1914 (Heteroptera, Saldidae) in Russia and adjacent countries. Eurasian entomological journal 3 (2): 101–118. [In Russian]

Vinokurov NN (2005) New data on distribution of shore bugs (Heteroptera, Saldidae) in Siberia. Zoologicheskiy Zhurnal [Zoological journal] 84 (7): 885–888. [In Russian]

Vinokurov NN (2007) New records of ground bugs from Siberia (Heteroptera: Lygaeidae). Zoosystematica Rossica 16 (2): 243—244.

Vinokurov NN (2009) A review of the shore bugs genus *Teloleuca* Reut. (Heteroptera, Saldidae) in the fauna of Russia and adjacent countries. Entomological Review 89 (9): 1092–1103. https://doi.org/10.1134/S0013873809090115

Vinokurov NN, Golub VB (2007) New data on distribution of plant bugs (Heteroptera, Miridae) in the Asian part of Russia. Zoosystematica Rossica 16 (1): 27–30. https://doi.org/10.31610/zsr/2007.16.1.27

Vinokurov NN, Golub VB (2009) Materials on Heteroptera of the fauna of Siberia and the Russian Far East. Altaiskiy Zoologicheskiy Zhurnal [Altai zoological journal] 3: 25–28. [In Russian]

Vinokurov NN, Golub VB (2016) New data on the Heteroptera fauna of Siberia. Euroasian entomological journal 15 (4): 349–353. [In Russian]

Vinokurov NN, Kanyukova EV (1995) True bugs (Heteroptera) of Siberia. Nauka, Novosibirsk, 237 pp. [In Russian]

Vinokurov NN, Kanyukova EV, Golub VB (2010) Catalogue of the Heteroptera of Asian part of Russia. Nauka, Novosibirsk, 320 pp. [In Russian]

Vinokurov NN, Rudoi VV 2020. New materials on heteropterans from Kurai steppe (southwest of Russian Altai). Ecologica Montenegrina 38: 25–35. https://doi.org/10.37828/em.2020.38.5

Vinokurov NN, Rudoi VV (2022a) To the fauna of terrestrial bugs (Heteroptera: Cimicomorpha, Pentatomomorpha) of Altai Territory (Russia) I. Russian entomological journal 31 (1): 1–9. https://doi.org/10.15298/rusentj.31.1.01

Vinokurov NN, Rudoi VV (2022b) On the fauna of terrestrial bugs (Heteroptera: Cimicomorpha, Pentatomomorpha) of Altai Territory (Russia). II. Acta Biologica Sibirica 8: 381–398. https://doi.org/10.14258/abs.v8.e22

Wagner E, Weber HH (1964) Fauna de France. Heteropteres Miridae. Paris, 587 pp. [In French]

Wnukowsky W (1926) Hemipteren (Rhyncoten) des Berzirks Kuznezk (südwestliches Sibirien, früheres Gouvenement Tomsk). Zoologischer Anzeiger 68 (7–8): 177–180.

Wnukowsky W (1927) Über die Hemiptera Fauna des Bezirks Tomsk, Nowo-Sibirsk (Nowo-Nikolaewsk) und Atschinsk in West-Siberien. Zoologischer Anzeiger 72 (3–4): 110–114.

Zolotarev DA (2003) The fauna of true bugs of the Kemerovo District (Kemerovo Region). Trudy Kemerovskogo otdelenya Russkogo entomologicheskogo obshestva [Proceedings of the Kemerovo Branch of the Russian Entomological Society] 1: 47–50. [In Russian]

Zolotarev DA (2005) Hortobiont true bugs (Insecta: Hemiptera-Heteroptera) of anthropogenic transformed territories (on the example of Kemerovo city): Abstract of the dissertation for the degree of Candidate of Biological Sciences. Tomsk, 20 pp. [In Russian]

Zinovjeva AN (2006) To the fauna of Heteroptera of Bolshezemelskaya tundra. Russian entomological journal 15 (2): 127–130. [In Russian, English summary]

Zinovyeva AN, Polumordvinov OA (2017) To the fauna of true bugs (heteroptera) of the Penza region (Russia). Bulletin of Moscow society of naturalists 122 (2): 27–33. [In Russian, English summary]