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WOOD HEMIPTERA (HETEROPTERA) PREDATORS OF CHARYNSKIY SNNP (SOUTH-EAST KAZAKHSTAN)

Abstract. The article presents the results of field studies years 2018-2019 conducted at the Charyn SNNP. As a result of studies, 30 species of carnivores from 5 heteroptera families were identified: Nabidae (4 species), Anthocoridae (12 species), Reduviidae (3 species), Miridae (5 species), Pentatomidae (6 species). Zoophages by trophic specialization. By the number of generations per year, they are divided into 3 groups: monovoltine (18 species), bivoltine (5 species), polyvoltine (6 species), the number of generations is unknown in 1 species. Among the predatory true bugs of the Charyn SNNP, 21 species winter in the adult stage, 3 species in the adult stage and larvae, and 6 species in the egg stage. By environmental features, all types are mesophiles. By confinement to the habitats, the semi-winged of Charyn SNNP are divided into several groups: dendrobionts (15 species), dendro-tamnobionts (2 species), dendro-tamno-hortobionts (2 species), dendro-hortobionts (9 species), tamno-hortobiont (1 view), eurybiont (1 view). 2 species are listed in the Red Book of Almaty region: *Arma custos* (Fabricius, 1794) and *Zicrona caerulea* (Linnaeus, 1758).

Key words: dendrobiontic hemiptera, Charyn State National Natural Park, Southeast Kazakhstan.

Introduction. True bugs, or Bedbugs (Heteroptera), represent the largest detachment of insects with incomplete transformation. Hemiptera are of great importance in nature, they are well adapted to various environmental conditions. Bedbugs can be of herbivorous, predatory and mixed-food species that consume both plant and animal food. Some true bugs, as predators, exterminate pests of cultivated crops and forests. In Kazakhstan, in spite of the important economic importance of the hemiptera their species composition, biology, ecology, distribution by natural zones and vertical belts, economic importance in certain physical and geographical areas of the republic are not well understood, which determines the relevance of this study.

The authors previously published articles on aquatic hemiptera and coleoptera [1,2], and dendrobiontous predatory hemiptera have not been studied.

The purpose of the research: Study of fauna, biology, ecology and distribution of wood predatory hemiptera on territory of the Charyn SNNP. Therefore, on the basis of our own research on territory of the Charyn State National Natural Park, an inventory and a comprehensive analysis of predatory dendrobiontous hemiptera's fauna were carried out and an annotated list was compiled.

Methods of research. The collection and study of Hemiptera was carried out according to generally accepted entomological methods [3-6]. From bushes and tree branches, bedbugs were collected by a butterfly net; in forest litter, under the bark of trees and various shelters they were caught by an exhaustor or tweezers. Caught insects were killed in a container with ethyl acetate and laid out on cotton mattresses. Microscopes were used for the laboratory study of Hemiptera and their species affiliation.

The material for this work was gathered during 2018-2019 on territories of the Charyn State National Natural Park.

Results of research and discussion. The following is an annotated list of identified species.

Nabidae family

Himacerus apterus (Fabricius, 1798). Almaty region, Uyghur district, Charyn SNNP, floodplain of river Charyn and Temirlik, 05.2018, 2♀, 1♂; 08/06/2018, 1♂; 08/18/2018, 4♂, 2♀; 05/18/2018, 1♂, to the light; ravine 08/01/2018, 1♂, 2♀ (1 full-winged. + 2 small-winged forms); ash grove, 05/15/2018, 3♂, 2♀; 06/08/2018, 1♂, 2♀ + larva II age; 07/12/2018, 3♂, 4♀; 06/27/2018, 2♂, 2♀ + 1 larva III age; floodplain of rivers Charyn and Temirlik, June 28-29, 2019, 2♀, 2♂; July 12-15, 2019, 3♀, 2♂; 08-10.08.2019, 1♀, 2♂. Dendro tannobiont (in deciduous forests, parks, gardens, floodplain tree-shrub thickets), larvae of the 1st and 2nd ages stay in grass, from the 3rd age they pass to shrubs, and then to trees; mesophyll; zoophage (ticks and small insects with soft integuments) [7, 8]; monovoltine; eggs hibernate.

Nabis sinoferus sinoferus Hsiao, 1964. Almaty region, Uyghur district, Charyn SNNP, floodplain of rivers Charyn and Temirlik, June 28-29, 2019, 3♀, 4♂; July 12-15, 2019, 2♀, 2♂; 08-10.08.2019, 2♀, 3♂. Eurytop (found in the valleys of Charyn and Temirlik rivers; mesophile; zoophagus (feeds mainly on eggs and larvae of bedbugs, cicadas, etc.); monovoltine [8], adults winter.

Nabis pallidus Fieber, 1861. Almaty region, Uyghur district, Charyn SNNP, floodplain of river Charyn, 06/06/2018, 3♀, 2♂; 06/30/2018, 3♀, 4♂; 07/11/2018, 3♀, 2♂; 08/05/2018, 1♀, 2♂; 08/16/2018, 3♀, 2♂; 08/03/2018, 6♀, 3♂; 08/30/2018, 3♀, 2♂; in floodplain of river Charyn, June 22-24, 2018, 8♀, 2♂; on Charyn river bank, 08/01/2018, 4♀, 6♂; 08/03/2006, 6♀, 2♂ + larva II-III age; 08/09/2018, 5♀, 6♂ + larva II age; 08/10/2018, 5♀ + 13 larvae II-III age; floodplain of Charyn, 06/28/2019, 2♀, 3♂; floodplain of Temirlik, 06/29/2019, 2♂, 1♀; 11-12.07.2019, 4♂, 3♀; 08-10.08.2019, 3♀, 2♂. Dendrobiont (in tamarisk); mesophile (steppe and semi-desert zone); zoophagus (feeds on various insects); bivoltine; adults wintered [8].

Nabis viridulus Spinola, 1837. Almaty region, Uyghur district, Charyn SNNP, floodplain of river Charyn, 06/28/2019, 2♀, 2♂; 05/25/2018, 2♀, 3♂; 08/07/2018, 3♀, 2♂; floodplain of Temirlik, 06/08/2018, 2♀, 2♂; 06/29/2019, 2♂, 3♀; 11-12.07.2019, 4♂, 4♀. Dendrobiont (on Tamarisk Tamarix); mesophile (steppe and semi-desert zone); zoophagus (feeds on various insects: aphids, eggs and bug larvae); monovoltine; adults wintered [8].

Anthocoridae family

Anthocoris angularis Reuter, 1884. Almaty region, Uyghur district, Charyn SNNP, floodplain of Charyn river, 06/12/2018, 2♀, 2♂; Charyn forest cottage, 06/26/2018, 3♀, 1♂; 07/14/2018, 3♀, 2♂; 08/23/2018, 4♀, 3♂; floodplain of river Temirlik, 07/10/2018, 2♀, 1♂; in the valleys of Charyn, Temirlik rivers, June 28--29, 2019, 3♀, 4♂; ash grove, 07/12/2019, 4♂, 2♀; 08-10-08, 2019, 3♀, 2♂. Dendrobiont (in the valleys of Charyn, Temirlik rivers, on sea buckthorn, willows and turangs); mesophyll; zoophagus (leaf-shells and larvae of various insects) [9]; monovoltine; wintering imago. Rare.

Anthocoris confusus Reuter, 1884. Almaty region, Uygur district, Charyn SNNP, floodplain of Charyn. 06/16/2018, 3♀, 2♂; floodplain of Ili 06/16/2018, 1♀, 2♂; Charyn forest cottage, 07.26.2018, 3♀, 1♂; floodplain of rivers Charyn, Temirlik, June 28-29, 2019, 3♀, 2♂; ash grove, 06/29/2019, 3♀, 3♂; 11-12.07.2019, 4♂, 2♀; 08-10.08.2019, 3♀, 2♂. Dendrobiont (on various deciduous trees: *Acer*, *Betula*, *Alnus*, *Quercus*, *Populus*, *Salix*, *Ulmus*, sometimes on herbaceous plants); mesophyll; zoophagus (feeds on aphids, leaf flies, butterfly caterpillars); monovoltine; wintering imago [9].

Anthocoris limbatus Fieber, 1836. Almaty region, Uyghur district, Charyn SNNP, Maken cordon suburbs, 06/16/2018, 1♀, 1♂; 08/13/2018, 3♀, 3♂; Charyn forest cottage, 06/15/2018, 1♀, 2♂; 08/18/2018, 1♀, 2♂; floodplain tugai of rivers Charyn, Temirlik, 07/18/2018. 2♀, 1♂; 06/16/2018, 2♀, 2♂; June 28-29, 2019, 2♀, 2♂; ash grove, 06/29/2019, 2♀, 1♂; 10-12.07.2019, 3♂, 2♀. Dendrobiont (floodplains of rivers, as well as mixed forests, willows); mesophyll; zoophagus (feeds on small insects, their larvae and eggs); monovoltine; wintering imago [9].

Anthocoris minki pistaciae Wagner, 1957. Almaty region, Uygyr region, Charyn natural park, Charyn forest cottage, 07/13/2018, 4♀, 3♂; 06/20/2018, 2♀, 2♂. Dendrobiont (on *Populus*, etc.); mesophyll; zoophagus (aphids, leaf flies); monovoltine; wintering imago [9].

Anthocoris nemorum (Linnaeus, 1761). Almaty region, Uygyr district, Charyn SNNP, Charyn forest dacha, 06.16.2018, 1♀, 2♂; 06/25/2018, 1♀, 2♂; Maken cordon suburbs, 06/15/2018, 4♀, 3♂; floodplains of Ili, 06/26/2018, 2♀, 2♂; 05/21/2018, 1♀, 1♂; downstream of Ili river 06/26/2018, 1♀, 3♂; floodplain of Charyn. 08/13/2018, 1♀, 1♂; 08.21.2018, 3♀, 2♂; floodplain of rivers Charyn, Temirlik, June 28-29, 2019, 4♀, 3♂; ash grove, 06/29/2019, 2♀, 3♂; 10-12.07.2019, 3♂, 4♀; 08-10.08.2019, 1♀, 2♂. Dendro-hortobiont (on woody and herbaceous plants); mesophyll; zoophage (plays a large role in regulating the number of pests of apple trees, feeds on aphids, ticks, worms, thrips, scoop eggs and caterpillars, eggs of Miridae) [9]; multivoltine; wintering imago.

Anthocoris nemoralis (Fabricius, 1794). Almaty region, Uygyr district, Charyn natural park, Charyn forest cottage, floodplains of Charyn. 06/16/2018, 2♀, 1♂; 08/25/2018, 1♀, 2♂; Maken cordon suburbs, 07/12/2018, 2♀, 2♂; 08.16.2007, 2♀, 2♂. Dendro-hortobiont (found in large numbers on various deciduous fruit trees, shrubs and herbaceous plants), mesophile; zoophagus; bivoltine or 2-3 generations per year; wintering imago [9].

Anthocoris pilosus (Jakovlev, 1877). Almaty region, Uigur district, Charyn SNNP, Charyn forest cottage, 06/19/2018, 1♀, 2♂; ash grove, 06/12/2006, 1♀, 1♂; 06/16/2006, 4♀, 3♂; Maken cordon suburbs, 06/16/2018, 5♀, 2♂; 08/03/2018, 3♀, 2♂; Charyn forest cottage, 07/23/2018, 3♀, 08/13/2018, 3♀, 3♂; 09/02/2018, 2♀, 1♂; floodplain of rivers Charyn, Temirlik, June 28-29, 2019, 2♀, 3♂; ash grove, 06/29/2019, 2♀, 1♂; 10-12.07.2019, 4♂, 4♀. Horto-dendrobiont (found in large numbers on herbaceous plants, shrubs and deciduous trees: *Populus*, *Salix*, fruit), mesophyll; zoophagus, is one of the main enemies of different types of aphids on tree and shrub species; multivoltine; wintering imago [9].

Orius laticollis laticollis (Reuter, 1884). Almaty region, Uigur district, Charyn SNNP, Charyn forest cottage, 06/02/2018, 2♀, 3♂; floodplains of Charyn, 08/25/2018, 1♀, 3♂; Maken cordon suburbs, 06/25/2018, 1♀, 2♂; 08/03/2018, 3♀, 2♂; floodplain of rivers Charyn, Temirlik, June 28-29, 2019, 4♀, 5♂; ash grove, 06/29/2019, 2♀, 3♂; 10-12.07.2019, 5♂, 4♀; 08-10.08.2019, 3♀, 2♂. Dendrobiont; mesophyll (in moist places, mainly on *Salix*, as well as on *Populus*, *Zygophyllum*, *Artemisia*); zoophagus (aphids, leaf flies, thrips, etc.); multivoltine; wintering imago [9].

Orius majusculus (Reuter, 1879). Almaty region, Uigur district, Charyn SNNP, Charyn forest cottage, Charyn floodplain. 06/15/2018, 1♀, 3♂; 06/15/2018, 2♀, 1♂; floodplains of river Ili 06/15/2018, 2♀, 1♂; 07/22/2018, 4♀, 3♂; floodplain of Charyn, Temirlik, June 28-29, 2019, 4♀, 5♂; ash grove, June 28-29, 2019, 4♀, 3♂; 10-12.07.2019, 5♂, 5♀. Dendrobiont (on fruit deciduous trees); mesophyll (lives in moist places); zoophagus (various insects, ticks and their eggs); bivoltine; wintering imago [9].

Orius minutus (Linnaeus, 1758). Almaty region, Uigur district, Charyn SNNP, Charyn forest cottage, floodplain of Charyn. 06/16/2018, 1♀, 2♂; 07/19/2018, 3♀, 3♂; floodplain of Ili, 06/15/2018, 2♀, 3♂; Maken cordon suburbs, 06/15/2018, 1♀, 3♂; floodplain of Temirlik, 06/25/2018, 2♀, 3♂; Sartogai cordon suburbs, 07/15/2018, 1♀, 3♂; 07/28/2018, 4♀, 5♂; 08/26/2018, 1♀, 1♂; floodplain of Ili, 11.06-26.2018, 5♀, 6♂; 07/26/2018, 1♀, 1♂; floodplain of Temirlik, 05/31/2018, 1♀, 1♂; 06/02/2018, 4♀, 5♂; ash rosh, 08/09/2018, 1♀, 2♂; 07/16/2018, 1♀, 3♂; 06/13/2018, 1♀, 3♂; 06/15/2018, 1♀, 2♂; floodplain of Charyn, Temirlik, June 28-29, 2019, 5♀, 5♂; ash grove, June 28--29, 2019, 2♀, 3♂; 11-12.07.2019, 3♂, 4♀; 08-10-08, 2019, 4♀, 3♂. Tamno-hortobiont (on grassy plants, valley shrubs and trees: willow, spirea, birch, on flowers and leaves); mesophyll; polyphagous zoophagus (various insects, ticks and eggs of various harmful invertebrates); multivoltine; wintering imago [9].

Orius niger (Wolff, 1811). Almaty region, Uygyr district, Charyn SNNP, Charyn forest cottage, 05/25/2018, 2♀, 1♂; 08/05/2018, 2♀, 3♂; 08/09/2018, 1♀, 2♂; floodplain of Charyn, 06/26/2018, 4♀, 4♂; floodplain of Ili, 06/15/2018, 2♀, 3♂; August 15-26, 2018, 6♀, 8♂; Ili downstream 11.06-28.06.2018, 4♀, 5♂; 07/21/2018, 2♀, 1♂; Maken cordon, 07/28/2018, 2♀, 5♂; 06/07/2018, 2♀, 3♂; Maken cordon suburbs, June 20-25, 2018, 3♀, 2♂; floodplain of Temirlik, 06/20/2018, 2♀, 1♂; near the river Temirlik, 06/08/2018, 2♀, 1♂; ash grove surroundings, 08/09/2018, 1♀, 2♂; 08/14/2018, 5♀, 4♂; 08/14/2018, 5♀, 3♂; 08/20/2018, 3♀, 3♂; floodplain of Charyn, June 28--29, 2019, 2♀, 3♂; floodplain of Temirlik, 06/29/2019, 3♂, 2♀; ash grove, June 28-29, 2019, 2♀, 2♂; 11-12.07.2019, 4♂, 3♀; 08-10.08.2019, 3♀, 2♂. Horto-dendrobiont (on deciduous, fruit trees, shrubs and herbaceous plants); mesophile (in floodplains, along forest edges, on slopes); zoophagus (various insects); multivoltine; wintering imago [9].

Xylocoris cursitans (Fallen, 1807). Charyn Natural Park, Charyn forest cottage, 06/03/2018, 2♀, 3♂; floodplain of Ili, 08/22/2018, 1♀, 2♂; Maken cordon suburbs, Sartogai 06/14/2018, 3♀, 4♂; 06/09/2018, 1♀, 3♂; floodplain of Charyn, 06/02/2018, 3♀, 4♂. Dendrobiont (on the bark and under the bark of *Populus*, *Quercus*, etc., often in the passages of bark beetles); mesophile (forest); zoophagus (various insects); bivoltine; wintering imago. Also occurs in the middle taiga subzone [9].

Reduviidae family

Empicoris vagabundus (Linnaeus, 1758). Almaty region, Uigur district, Charyn SNNP, floodplain of Charyn, caught in the light, 06/15/2018, 2♀, 1♂; June 28-29, 2019, 2♀, 2♂; floodplain of Temirlik, 06/29/2019, 1♂, 2♀; ash grove, June 28-29, 2019, 3♀, 2♂; 11-12.07.2019, 3♂, 3♀. Dendrobiont, caught in the light in ash grove; mesophyll; zoophagus; the number of generations is unknown; adults and larvae of older ages overwinter [10].

Rhynocoris annulatus (L., 1758). Almaty region, Uigur district, Charyn SNNP, Charyn forest cottage, floodplain of Charyn, 05.24.2018, 2♀, 3♂; 06/10/2018, 1♀, 2♂; 06/10/2018, 2♀, 1♂; floodplain of Ili, 06/19/2018, 1 larva of the third age; Maken cordon suburbs, Sartogai, 07/10/2018, 2♀, 2♂; 07/28/2018, 2♀, 4♂; 07/22/2018, 2♀, 2♂; 08/14/2018, 2♀, 2♂; floodplain of Charyn, June 28--29, 2019, 4♀, 3♂; floodplain of Temirlik, 06/29/2019, 3♂, 2♀; ash grove, June 28-29, 2019, 4♀, 3♂; 11-12.07.2019, 3♂, 5♀; 08-10-08, 2019, 2♀, 2♂. Dendro-hortobiont (on various trees, shrubs and grassy vegetation); mesophyll; polyphagous zoophagus; monovoltine; wintering larvae of IV-V ages. Wintering of larvae was proven by field observations [10].

Rhynocoris iracundus (Poda, 1761). Almaty region, Uigur district, Charyn SNNP, Charyn forest cottage, floodplain of Charyn, 06/06/2018, 2♂; 06/24/2018, 2♀, 2♂; 06/25/2018, 2♀, 1♂; Maken cordon suburbs, Sartogai, 08/14/2018, 1♀, 2♂; 08/13/2018, 1♀, 3♂; 07/13/2018, 2♀, 2♂; floodplain of Ili, 07/18/2018, 2♀, 2♂; Ili downstream, 07/18/2018, 2♀, 2♂; floodplain of river Ili, 06/23/2018, 1♀, 3♂; Charyn forest cottage, 06/26/2018, 2♀, 1♂; 07/28/2018, 2♀, 4♂; floodplain of Temirlik, May 29-31, 2018, 1♀, 2♂; Sartogai cordon, 06/05/2018, 2♀, 3♂; 06/03/2018, 1♀, 1♂; 07/20/2018, 2♀, 1♂; floodplain of Charyn, June 28--29, 2019, 2♀, 2♂; floodplain of Temirlik, 06/29/2019, 1♂, 2♀; ash grove, June 28-29, 2019, 3♀, 2♂; 11-12.07.2019, 3♂, 3♀, 08-10.08.2019, 2♀, 2♂. Dendro-hortobiont; mesophyll; zoophagus (they are eager to catch various insects: leaf beetles, wasps, bees, caterpillars of butterflies, etc.); monovoltine; older larvae winter [10].

Miridae family

Campylomma verbasci (Meyer-Dur, 1843). Almaty region, Uigur district, Charyn SNNP, floodplain of Charyn, June 28-29, 2019, 1♀, 2♂; floodplain of Temirlik, 06/29/2019, 2♂, 2♀; 11-12.07.2019, 3♂, 2♀. Horto-dendrobiont; mesophyll; zoophytophage; multivoltine; eggs hibernate [11,13].

Cyllecoridea decorata (Kiritshenko, 1931). Almaty region, Uigur district, Charyn SNNP, floodplain of Charyn, June 28-29, 2019, 3♀, 2♂; floodplain of Temirlik, 06/29/2019, 2♂, 3♀; ash grove, 07/12/2019, 3♂, 4♀. Dendrobiont (on an apple tree, pear, birch, karagach); mesophyll; zoophage: exterminates aphids [11,13]; monovoltine; eggs hibernate.

Blepharidopterus angulatus (Fallen, 1807). Almaty region, Uigur district, Charyn SNNP, floodplain of Charyn, June 28-29, 2019, 2♀, 1♂; floodplain of Temirlik, 06/29/2019, 2♂, 2♀; ash grove, June 28-29, 2019, 3♀, 2♂; 11-12.07.2019, 3♂, 3♀; 08-10.08.2019, 1♀, 2♂. Dendrobiont (on hardwood); mesophyll; zoophytophage (feeds on aphids); monovoltine; eggs hibernate [11].

Deraeocoris lutescens (Schilling, 1830). Almaty region, Uigur district, Charyn SNNP, floodplain of Charyn, June 28--29, 2019, 4♀, 4♂; floodplain of Temirlik, 06/29/2019, 2♂, 2♀; ash grove, June 28-29, 2019, 3♀, 2♂; 11-12.07.2019, 2♂, 3♀. Dendrobiont (on deciduous and fruit trees; mesophile; zoophagus; bivoltine; wintering adults. In Moldova, it is more common on oaks where it propagates in bulk [11].

Pilophorus perplexus (Douglas & Scott, 1875). Almaty Region, Uyghur district, Charyn SNNP, floodplain of river. Charyn, June 28-29, 2019, 2♀, 2♂; floodplain of Temirlik, 06/29/2019, 1♂, 2♀; ash grove, June 28-29, 2019, 2♀, 4♂; 11-12.07.2019, 3♂, 1♀. Dendrobiont; mesophyll; zoophagus; monovoltine; eggs hibernate [11].

Pentatomidae family

Arma custos (Fabricius, 1794). Almaty region, Uigur district, Charyn SNNP, floodplain of Charyn, June 28--29, 2019, 2♀, 2♂; floodplain of Temirlik, 06/29/2019, 2♂, 1♀; ash grove, June 28-29, 2019, 1♀, 2♂; 11-12.07.2019, 2♂, 2♀; 08-10.08.2019, 1♀, 2♂. Dendro-hortobiont; mesophyll; zoophagus (feeds on various small arthropods); monovoltine; adults are wintering [12, 13]. Listed in the Red Book of Almaty region [14].

Picromerus lewisi (Scott, 1874). Almaty Region, Uyghur district, Charyn SNNP, floodplain of Charyn, June 28-29, 2019, 2♀, 2♂; floodplain of Temirlik, 06/29/2019, 1♂, 2♀; ash grove, June 28-29, 2019, 2♀, 2♂; 11-12.07.2019, 2♂, 1♀; 08-10.08.2019, 1♀, 1♂. Dendro-hortobiont; mesophyll; zoophagus; monovoltine; eggs hibernate [12].

Rhacognatus punctatus (Linnaeus, 1758). Almaty region, Uigur district, Charyn SNNP, floodplain of Charyn, June 28-29, 2019, 2♀, 1♂; floodplain of Temirlik, 06/29/2019, 1♀; ash grove, June 28-29, 2019,

The taxonomic composition of camivorous Hemiptera at the Charyn SNNP

Taxa names	Biology and ecology
Nabidae family	
<i>Himacerus apterus</i> (Fabricius, 1798)	tamno-dendrobiont, mesophile, zoophagus, monovoltine, eggs winter
<i>Nabis siniferus siniferus</i> (Hsiao, 1964)	eurybiont, zoophagus, monovoltine, wintering adults
<i>Nabis pallidus</i> (Fieber, 1861)	dendrobiont, mesophile, zoophagus, bivoltine, wintering adults
<i>Nabis viridulus</i> (Spinola, 1837)	dendrobiont, mesophile, zoophagus, monovoltine, wintering adults
Anthocoridae family	
<i>Anthocoris angularis</i> (Reuter, 1884)	dendrobiont, mesophile, zoophagus, monovoltine, wintering adults
<i>Anthocoris confusus</i> (Reuter, 1884)	dendrobiont, mesophile, zoophagus, monovoltine, wintering adults
<i>Anthocoris limbatus</i> (Fieber, 1836)	dendrobiont, mesophile, zoophagus, monovoltine, wintering adults
<i>Anthocoris minki pistaciae</i> (Wagner, 1957)	dendrobiont, mesophile, zoophagus, monovoltine, wintering adults
<i>Anthocoris nemorum</i> (Linnaeus, 1761)	dendro-hortobiont, mesophile, zoophagus, multivoltine, adults winter
<i>Anthocoris nemoralis</i> (Fabricius, 1794)	dendro-hortobiont, mesophile, zoophagus, multivoltine, adults winter
<i>Anthocoris pilosus</i> (Jakovlev, 1877)	dendro-hortobiont, mesophile, zoophagus, multivoltine, adults winter
<i>Orius laticollis laticollis</i> (Reuter, 1884)	dendro-hortobiont, mesophile, zoophagus, multivoltine, adults winter
<i>Orius majusculus</i> (Reuter, 1879)	dendro-hortobiont, mesophile, zoophagus, bivoltine, adults winter
<i>Orius minutus</i> (Linnaeus, 1758)	tamno-hortobiont, mesophile, zoophagus, multivoltine, wintering adults
<i>Orius niger</i> (Wolff, 1811)	horto-dendrobiont, mesophile, zoophagus, bivoltine, wintering adults
<i>Xylocoris cursitans</i> (Fallen, 1807)	dendrobiont, mesophile, zoophagus, bivoltine, wintering adults
Reduviidae family	
<i>Empicoris vagabundus</i> (Linnaeus, 1758)	dendrobiont, zoophagus, the number of generations is unknown, adults and elder larvae winter
<i>Rhynocoris annulatus</i> (L., 1758)	dendro-hortobiont, mesophile, zoophagus, monovoltine; adults and larvae of IV-V ages winter
<i>Rhynocoris iracundus</i> (Poda, 1761)	dendro-hortobiont, mesophile, zoophagus, monovoltine, larvae and adults winter
Miridae family	
<i>Campylomma verbasci</i> (Meyer-Dur, 1843)	horto-dendrobiont, mesophile, zoophytophagus, multivoltine, eggs winter
<i>Cyllecoridea decorata</i> (Kiritschenko, 1931)	dendrobiont, mesophyll, zoophytophagus, monovoltine, eggs winter
<i>Blepharidopterus angulatus</i> (Fallen, 1807)	dendrobiont, mesophyll, zoophytophagus, monovoltine, eggs winter
<i>Deraeocoris lutescens</i> (Schilling, 1830)	dendrobiont, mesophyll, zoophytophagus, bivoltine, wintering adults
<i>Pilophorus perplexus</i> (Douglas & Scott, 1875)	dendrobiont, mesophyll, zoophytophagus, monovoltine, eggs winter
Pentatomidae family	
<i>Arma custos</i> (Fabricius, 1794)	dendro-hortobiont, mesophile, zoophagus, monovoltine, wintering adults
<i>Picromerus lewisi</i> (Scott, 1874)	dendro-hortobiont, mesophile, zoophagus, monovoltine, eggs winter
<i>Rhacognatus punctatus</i> (Linnaeus, 1758)	dendrobiont, mesophile, zoophagus, monovoltine, wintering adults
<i>Troilus luridus</i> (Fabricius, 1775)	dendro-tamnobiont, mesophile, zoophagus, monovoltine, adult winter
<i>Pinthaeus sanguinipes</i> (Fabricius, 1781)	dendro-tamno-hortobiont, mesophile, zoophagus, monovoltine, wintering adults
<i>Zicrona caerulea</i> (Linnaeus, 1758)	horto-tamno-dendrobiont, mesophile, zoophagus, monovoltine, wintering adults

2♀, 2♂; 11-12.07.2019, 1♂, 2♀. Dendrobiont (on *Salix*, *Betula*, aspen, raspberry, nettle, etc.); mesophile (river valleys with shrubby vegetation); zoophage (various small arthropods); monovoltine; adults wintered. A new-generation imago appears in mid-August [12].

Troilus luridus (Fabricius, 1775). Almaty region, Uigur district, Charyn SNNP, floodplain of Charyn, June 28-29, 2019, 2♀, 2♂; floodplain of Temirlik, 06/29/2019, 1♂, 2♀; ash grove, June 28-29, 2019, 1♀, 2♂; 11-12.07.2019, 1♂, Dendro-tamnobiont (on woody-shrubby vegetation); mesophyll; zoophage [27, 28]; monovoltine; adults wintered.

Pinthaeus sanguinipes (Fabricius, 1781). Almaty region, Uigur district, Charyn SNNP, floodplain of Charyn, June 28-29, 2019, 2♀, 2♂; floodplain of Temirlik, 06/29/2019, 2♂, 2♀; ash grove, June 28-29, 2019, 1♀, 2♂; 11-12.07.2019, 2♂, 1♀; 08-10.08.2019, 1♀, 2♂. Dendro-tamno-hortobiont; mesophyll; zoophagus; monovoltine; adults winter [12].

Zicrona caerulea (Linnaeus, 1758). Almaty region, Uigur district, Charyn SNNP, floodplain of Charyn, June 28-29, 2019, 2♀, 2♂; floodplain of Temirlik, 06/29/2019, 2♀; ash grove, June 28-29, 2019, 2♀, 1♂; 11-12.07.2019, 1♂, 2♀. Horto-tamno-dendrobiont; mesophyll; zoophagus; monovoltine; adults are wintering [12,13]. Listed in the Red Book of Almaty region [14].

From table it is seen that the fauna of predatory Hemiptera at the Charyn SNNP consists of Nabidae, Anthocoridae, Reduviidae, Miridae, Pentatomidae families, 30 species were identified.

Conclusion. As a result of field studies 2018-2019 at the Charyn SNNP, 30 species of predatory hemiptera from 5 families were identified: *Nabidae* (4 species), *Anthocoridae* (12 species), *Reduviidae* (3 species), *Miridae* (5 species), *Pentatomidae* (6 species). Of these, 2 species (*Arma custos*, *Zicrona caerulea*) are listed in the Red Book of the Almaty region.

Hemiptera bugs are characterized by wintering at different stages of development. In most species, winter diapause occurs at the adult stage, but few species winter at egg or larva stages. The hemiptera of Charyn SNNP wintering in the adult stage consist of 21 species, in the adult and larvae stage only 3 species winter, 6 species winter in the egg stage.

The seasonal development of hemiptera is heterodynamic. Voltinism of the population reflects the number of annual generations. For the Charyn SNNP hemiptera, 3 known types of voltinism are characteristic: monovoltine species - 18; bivoltine - 5; polyvoltine - 6 species, the number of *Empicoris vagabundus* generations is unknown.

According to ecological features, all types are mesophiles, they inhabit open and shaded habitats with a moderate degree of moisture.

By their habitats, the Charyn SNNP hemiptera are divided into several groups: dendrobionts (15 species), dendro-tamnobionts (2 species), dendro-tamno-hortobionts (2 species), dendro-hortobionts (9 species), tamno-hortobiont (1 kind), eurybiont (1 kind).

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ШАРЫН МЕМЛЕКЕТТІК ҰЛТТЫҚ ТАБИҒИ ПАРКІНІҢ (ОҢТҮСТІК-ШЫҒЫС ҚАЗАҚСТАН) АҒАШ ЖЫРТҚЫШ ЖАРТЫЛАЙ ҚАТТЫ ҚАНАТТЫЛАРЫ (НЕТЕРОПТЕРА)

Аннотация. Мақалада 2018-2019 жылдары Шарын мемлекеттік ұлттық табиғи паркі территориясында жүргізілген зерттеулер нәтижесі берілді. Зерттеу нәтижесінде жыртықшы жартылай қатты қанаттылардың 5 тұқымдасына жататын 30 түрі анықталды: Nabidae тұқымдасы: *Himacerus apterus* (Fabr., 1798), *Nabis siniferus siniferus* Hsiao, 1964, *Nabis pallidus* Fieb., 1861, *Nabis viridulus* Spin., 1837; Anthocoridae тұқымдасы: *Anthocoris angularis* Reut., 1884, *Anthocoris confusus* Reut., 1884, *Anthocoris limbatus* Fieb., 1836, *Anthocoris minki pistaciae* Wagn., 1957, *Anthocoris nemorum* (L., 1761), *Anthocoris nemoralis* (Fabr., 1794), *Anthocoris pilosus* (Jak., 1877), *Orius laticollis laticollis* (Reut., 1884), *Orius majusculus* (Reut., 1879), *Orius minutus* (L., 1758), *Orius niger* (Wolff, 1811), *Xylocoris cursitans* (Fall., 1807); Reduviidae тұқымдасы: *Empicoris vagabundus* (L., 1758), *Rhynocoris annulatus* (L., 1758), *Rhynocoris iracundus* (Poda, 1761); Miridae тұқымдасы: *Campylomma verbasci* (Meyer-Dur, 1843), *Cylloceria decorata* (Kiritsh., 1931), *Blepharidopterus angulatus* (Fall., 1807), *Deraeocoris lutescens* (Schill., 1830), *Pilophorus perplexus* Douglas & Scott, 1875; Pentatomidae

тұқымдасы: *Arma custos* (Fabr., 1794), *Picromerus lewisi* Scott, 1874, *Rhacognatus punctatus* (L., 1758), *Troilus luridus* (Fabr., 1775), *Pinthaeus sanguinipes* (Fabr., 1781), *Zicrona caerulea* (L., 1758). Трофикалық мамандандыруға сәйкес анықталған түрлер – зоофагтар. Жылына ұрпақ қалдыру санына қарай 3 топқа бөлінеді:

Моновольгинді түрлер: *Himacerus apterus* (Fabr., 1798), *Nabis sinoferus sinoferus* Hsiao, 1964, *Nabis viridulus* Spinola, 1837, *Anthocoris angularis* Reut., 1884, *Anthocoris confusus* Reut., 1884, *Anthocoris limbatus* Fieb., 1836, *Anthocoris minki pistaciae* Wagn., 1957, *Rhynocoris annulatus* (L., 1758), *Rhynocoris iracundus* (Poda, 1761), *Cyllecoridea decorata* (Kiritshenko, 1931), *Blepharidopterus angulatus* (Fall., 1807), *Pilophorus perplexus* Douglas & Scott, 1875, *Arma custos* (Fabr., 1794), *Picromerus lewisi* Scott, 1874, *Rhacognatus punctatus* (L., 1758), *Troilus luridus* (Fabr., 1775), *Pinthaeus sanguinipes* (Fabr., 1781), *Zicrona caerulea* (L., 1758);

Бивольгинді түрлер: *Nabis pallidus* Fieb., 1861, *Anthocoris nemoralis* (Fabr., 1794), *Orius majusculus* (Reut., 1879), *Xylocoris cursitans* (Fall., 1807), *Deraeocoris lutescens* (Schill., 1830);

Поливольгинді түрлер: *Anthocoris nemorum* (L., 1761), *Anthocoris pilosus* (Jak., 1877), *Orius laticollis laticollis* (Reut., 1884), *Orius minutus* (L., 1758), *Orius niger* (Wolff, 1811), *Campylomma verbasci* (Meyer-Dur, 1843);

Empicoris vagabundus (L., 1758) түрінің ұрпақ саны белгісіз.

Шарын МҰТП территориясында тіршілік ететін жыртқыш жартылай қатты қанаттылардың арасында 21 ересек түрі қыстайды: *Nabis sinoferus sinoferus* Hsiao, 1964, *Nabis pallidus* Fieb., 1861, *Nabis viridulus* Spin., 1837, *Anthocoris angularis* Reut., 1884, *Anthocoris confusus* Reut., 1884, *Anthocoris limbatus* Fieb., 1836, *Anthocoris minki pistaciae* Wagn., 1957, *Anthocoris nemorum* (L., 1761), *Anthocoris nemoralis* (Fabr., 1794), *Anthocoris pilosus* (Jak., 1877), *Orius laticollis laticollis* (Reut., 1884), *Orius majusculus* (Reut., 1879), *Orius minutus* (L., 1758), *Orius niger* (Wolff, 1811), *Xylocoris cursitans* (Fall., 1807); *Deraeocoris lutescens* (Schill., 1830), *Arma custos* (Fabr., 1794), *Rhacognatus punctatus* (L., 1758), *Troilus luridus* (Fabr., 1775), *Pinthaeus sanguinipes* (Fabr., 1781), *Zicrona caerulea* (L., 1758);

ересек және дернәсіл сатысындағы 1 түр: *Empicoris vagabundus* (L., 1758);

дернәсіл сатысындағы 2 түр: *Rhynocoris annulatus* (L., 1758), *Rhynocoris iracundus* (Poda, 1761);

жұмыртқасы сатысындағы 6 түр: *Himacerus apterus* (Fabr., 1798), *Campylomma verbasci* (M.-D., 1843), *Cyllecoridea decorata* (Kiritsh., 1931), *Blepharidopterus angulatus* (Fall., 1807), *Pilophorus perplexus* Douglas & Scott, 1875, *Picromerus lewisi* Scott, 1874 қыстайды.

Экологиялық ерекшелігіне қарай барлық мезофил түр болып саналады. Тіршілік ету ортасына қарай Шарын МҰТП жартылай қатты қанаттылары бірнеше топқа бөлінеді: дендробионттар (15 түр), дендро-тамнобионттар (2 түр), дендро-тамно-хортобионттар (2 түр), дендро-хортобионттар (9 түр), тамно-хортобионт (1 түр), эврибионт (1 түр). 2 түр – *Arma custos* (Fabr., 1794) и *Zicrona caerulea* (L., 1758) Алматы облысының «Қызыл кітабына» енген.

Түйін сөздер: дендробионтты жартылай қаттықанаттылар, Шарын мемлекеттік ұлттық табиғи паркі, Оңтүстік-шығыс Қазақстан.

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ДРЕВЕСНЫЕ ХИЩНЫЕ ПОЛУЖЕСТКОКРЫЛЫЕ (НЕТЕРОПТЕРА) ЧАРЫНСКОГО ГНПП (ЮГО-ВОСТОЧНЫЙ КАЗАХСТАН)

Аннотация. В статье приводятся результаты полевых исследований 2018-2019 гг. на территории Чарынского Государственного национального природного парка. В результате проведенных исследований выявлено 30 видов хищных полужесткокрылых из 5 семейств: Nabidae: *Himacerus apterus* (Fabr., 1798), *Nabis sinoferus sinoferus* Hsiao, 1964, *Nabis pallidus* Fieb., 1861, *Nabis viridulus* Spin., 1837; Anthocoridae: *Anthocoris angularis* Reut., 1884, *Anthocoris confusus* Reut., 1884, *Anthocoris limbatus* Fieb., 1836, *Anthocoris minki pistaciae* Wagn., 1957, *Anthocoris nemorum* (L., 1761), *Anthocoris nemoralis* (Fabr., 1794), *Anthocoris pilosus* (Jak., 1877), *Orius laticollis laticollis* (Reut., 1884), *Orius majusculus* (Reut., 1879), *Orius minutus* (L., 1758), *Orius niger* (Wolff, 1811), *Xylocoris cursitans* (Fall., 1807); *Empicoris vagabundus* (L., 1758), *Rhynocoris annulatus* (L., 1758), *Rhynocoris iracundus* (Poda, 1761); Miridae тұқымдасы: *Campylomma verbasci* (Meyer-Dur, 1843), *Cyllecoridea decorata* (Kiritsh., 1931), *Blepharidopterus angulatus* (Fall., 1807), *Deraeocoris lutescens* (Schill., 1830), *Pilophorus perplexus* Douglas & Scott, 1875; Pentatomidae тұқымдасы: *Arma custos* (Fabr., 1794), *Picromerus lewisi* Scott, 1874, *Rhacognatus punctatus* (L., 1758), *Troilus luridus* (Fabr., 1775), *Pinthaeus sanguinipes* (Fabr., 1781), *Zicrona caerulea* (L., 1758). По трофической специализации все выявленные виды являются зоофагами. По числу поколений в год разделяются на 3 группы:

Моновольгинные виды: *Himacerus apterus* (Fabr., 1798), *Nabis sinoferus sinoferus* Hsiao, 1964, *Nabis viridulus* Spinola, 1837, *Anthocoris angularis* Reut., 1884, *Anthocoris confusus* Reut., 1884, *Anthocoris limbatus*

Fiab., 1836, *Anthocoris minki pistaciae* Wagn., 1957, *Rhynocoris annulatus* (L., 1758), *Rhynocoris iracundus* (Poda, 1761), *Cyllecoridea decorata* (Kiritshenko, 1931), *Blepharidopterus angulatus* (Fall., 1807), *Pilophorus perplexus* Douglas & Scott, 1875, *Arma custos* (Fabr., 1794), *Picromerus lewisi* Scott, 1874, *Rhacognatus punctatus* (L., 1758), *Troilus luridus* (Fabr., 1775), *Pinthaeus sanguinipes* (Fabr., 1781), *Zicrona caerulea* (L., 1758);

Бивольтинные виды: *Nabis pallidus* Fieb., 1861, *Anthocoris nemoralis* (Fabr., 1794), *Orius majusculus* (Reut., 1879), *Xylocoris cursitans* (Fall., 1807), *Deraeocoris lutescens* (Schill., 1830);

Поливольтинные виды: *Anthocoris nemorum* (L., 1761), *Anthocoris pilosus* (Jak., 1877), *Orius laticollis laticollis* (Reut., 1884), *Orius minutus* (L., 1758), *Orius niger* (Wolff, 1811), *Campylomma verbasci* (Meyer-Dur, 1843);

Неизвестно число поколений 1 вида: *Empicoris vagabundus* (L., 1758).

Среди хищных полужесткокрылых Чарынского ГНПП в стадии имаго зимуют 21 вид: *Nabis sinoferus sinoferus* Hsiao, 1964, *Nabis pallidus* Fieb., 1861, *Nabis viridulus* Spin., 1837, *Anthocoris angularis* Reut., 1884, *Anthocoris confusus* Reut., 1884, *Anthocoris limbatus* Fieb., 1836, *Anthocoris minki pistaciae* Wagn., 1957, *Anthocoris nemorum* (L., 1761), *Anthocoris nemoralis* (Fabr., 1794), *Anthocoris pilosus* (Jak., 1877), *Orius laticollis laticollis* (Reut., 1884), *Orius majusculus* (Reut., 1879), *Orius minutus* (L., 1758), *Orius niger* (Wolff, 1811), *Xylocoris cursitans* (Fall., 1807); *Deraeocoris lutescens* (Schill., 1830), *Arma custos* (Fabr., 1794), *Rhacognatus punctatus* (L., 1758), *Troilus luridus* (Fabr., 1775), *Pinthaeus sanguinipes* (Fabr., 1781), *Zicrona caerulea* (L., 1758);

в стадии имаго и личинки – 1 вид: *Empicoris vagabundus* (L., 1758);

в стадии личинки – 2 вида: *Rhynocoris annulatus* (L., 1758), *Rhynocoris iracundus* (Poda, 1761);

а в стадии яйца – 6 видов: *Himacerus apterus* (Fabr., 1798), *Campylomma verbasci* (M.-D., 1843), *Cyllecoridea decorata* (Kiritsh., 1931), *Blepharidopterus angulatus* (Fall., 1807), *Pilophorus perplexus* Douglas & Scott, 1875, *Picromerus lewisi* Scott, 1874.

По экологическим особенностям все виды мезофилы. По приуроченности к местам обитания полужесткокрылые Чарынского ГНПП подразделяются на несколько групп: дендробионты (15 видов), дендро-тамнобионты (2 вида), дендро-тамно-хортобионты (2 вида), дендро-хортобионты (9 видов), тамно-хортобионт (1 вид), эврибионт (1 вид). 2 вида включены в Красную книгу Алматинской области: *Arma custos* (Fabricius, 1794) и *Zicrona caerulea* (Linnaeus, 1758).

Ключевые слова: дендробионтные полужесткокрылые, Чарынский Государственный национальный природный парк, Юго-Восточный Казахстан.

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