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ON SPECIES COMPOSITION OF INSECTA COLEOPTERA OF FEED CROP FIELDS IN THE KERBULAK BRANCH OF BAYSERKE-AGRO LLP

Abstract. For the territory of the fields of forage crops (wheat grain and corn) of the Kerbulak branch of “Bayserke Agro” LLP, 52 species of winged insects were identified, belonging to 45 genera from 13 families and 2 suborders. both in numbers and in species diversity, lamellar beetles, Scarabaeidae, are represented by 9 genera and 9 species. They are followed by Curculionidae - 6 genera and 6 species, Chrysomelidae - 5 genera and 5 species, Meloidae and Histeridae - 3 genera and 5 species in each family. Coccinellidae, Tenebrionidae and Dermestidae are represented by 4 species, Cerambycidae, Cleridae and Elateridae - 2 species each, and finally, Silphidae - 1 species. Negative economic value have 30 species. Useful entomophages and soil forming agents - 22 species. The number of harmful species does not exceed the economic threshold of harmfulness. Thus, the agrocenosis of the fields of forage crops is currently in equilibrium, and additional measures to limit the number of pests are not required. However, in the future, under favorable conditions, some species, for example, Turkestan maize duply *Pentodon bidens* (Pallas, 1771), can produce an outbreak of mass reproduction. The dominant position in terms of quantity and diversity of representatives of the Scarabaeidae family is explained by the fact that intensive livestock breeding is carried out here. The high number and variety of coprobiontic species of lamellar beetles is an indicator of the good condition of forage crop agrocenoses of the Kerbulak branch of Bayserke Agro LLP, since they play an important role in the disposal of livestock waste and soil enrichment with organic matter.

Key words: Coleoptera, Insecta, Coleoptera, forage crops, wheat grain, corn, “Bayserke Agro” LLP.

Introduction. The study of the species composition of different groups of invertebrates in the fields of agricultural crops is a very urgent task. Among them are many species that are economically significant in the production of agricultural products. Because of this, we have repeatedly studied various invertebrates of the fields of forage crops - beetles, orthopteroid insects, semi-rigid, soil-inhabiting representatives of the mesofauna, spiders, blood-sucking ticks and mollusks [1-19]. However, all these studies were carried out directly in the head office of “Bayserke Agro” LLP, in the Talgar district of Almaty region, and did not capture the Kerbulak branch of this farm. Valuable fodder crops such as wheatgrass and corn are grown in this department. Therefore, this year we conducted studies on the invertebrate fauna of the mentioned cultures.

One of the most important groups of invertebrates are insects from the order Coleoptera, or beetles. Beetles are the largest group among insects and living creatures in general. As of 2015, the order has 400,000 species, which is 40 % of all insect species or 25 % of all animal species. Given the species not yet described, their number is estimated at 2.1 million species. Beetles are widespread throughout the globe, in six zoogeographic areas, except for Antarctica, the Arctic and the highest mountain peaks. The most species-rich order is represented in tropical regions. Approximately 62 % of the total beetle diversity is made up of representatives of only 6 families: weevils (Curculionidae) - 60,000 species, staphylinids (Staphylinidae) - 47,700, ground beetles (Carabidae) - 30,000, lamellar-like (Scarabaeidae) - 27,800, leaf-eating (Chrysomelidae) - 36 350, and longhorn beetle (Cerambycidae) - 26 000 [20-23, 25-27].

The size of the beetles varies widely. The largest species of beetles are the lumberjack-titan (*Titanus giganteus*) from South America, reaching a length of 167 mm, the South American beetle-hercules (*Dynastes hercules*), individual males of which reach a length of up to 171 mm and large-toothed deer (*Macrodonia cervicornis*), with the maximum recorded male 169 mm long. The smallest beetles in the world are feather-winger (Ptiliidae) *Scydosella musawasensis* (from 0.325 mm to 0.352 mm) [24].

Among the coleopterans, there are representatives of most of the main feeding types that are known within the class of insects. Beetles are represented by both numerous predators (polyphagous and specialized), and the overwhelming majority of herbivorous forms (phytophages). Among the latter, there are both leaf-feeding species and consumers of roots (rhizophages), flowers and pollen (anthophagous), wood and bark (xylophagus), fruits or seeds (karpofages). Most phytophages feed on living plant tissues, but some are also able to feed on dry wood. Vast biological groups are made up of beetles that feed on fungi (mycetophages), as well as species that feed on rotting and decaying animals and plant remains (necrophages and saprophages) and detritophages that feed on dry or slowly decomposing substances of plant and animal origin. Named groups are connected by multiple transitions. Among beetles (wood-cutters, lamellar, click beetles and other families), there are species whose imago do not feed at all and live off the stock of nutrients accumulated at the larval stage of development. But for most beetles, especially long-living ones, imago feeding ("additional feeding") is necessary to extend the life and maturation of eggs. The nutrition pattern of the larvae and imago of most groups of beetles is very similar, but in others the nutrition of these phases is completely different. For example, flower chafer beetle larvae live in soil, humus, decaying plant remains, and beetles feed on flowers or flowing sap of trees. Longhorn beetles in the larval phase feed mainly on wood or under the bark of trees, less often on the stems of herbaceous plants, and many imago are found on flowers and feed on pollen. In some cases, the larvae are predators, while the imago feed on plant matter [25-27].

Of greatest practical importance for the agricultural sector are phytophagous beetles. Larvae and beetles of a number of lamellar species are pests of forest, fruit and agricultural crops. For example, in the years of mass reproduction, May beetles can completely eat tree leaves. A large group of pests is formed by leaf beetles, which damage crops and young plantings of various forest and agricultural plants. Of particular note are the Colorado beetles and their larvae that damage plants of the solanaceous family - potatoes, tomatoes, eggplant, etc. Beetles are of great importance as pests of the forest. Among them there are quite a bit of leaf-eating species that can systematically or periodically breed in mass. Wood pests (longhorn beetles, bark beetles, jewel beetles, death-watch beetles) are more diverse and numerous, among which there are dangerous pests that damage healthy trees and cause their weakening and drying out, as well as technical pests that reduce the quality of harvested wood. The larvae of click beetles (wireworms) are pests of cultivated plants. Some species bite potato and root tubers, damage young stems, others harm grapes by eating buds and young shoots. Skin-beetles are dangerous pests of stocks of animal and vegetable origin, sericulture and museum collections. In sericulture, grena and silk-worm cocoons are destroyed. The larvae and imago of large diving beetles and scavenger beetles, as well as the larvae of large species, can feed on fish fry, causing harm to fisheries. To combat a number of pests, predatory ladybugs, ground beetles, checkered beetles, staphilins, etc. are used. The hemolymph of some beetles contains toxic substances, in particular cantharidin. If it is ingested orally, it can cause serious poisoning and even death. Especially poisonous is hemolymph of ladybugs, red-winged birds, soft-wing flower beetles, and meloids. Representatives of the last family can isolate droplets of yellow hemolymph from the joints of the hips and lower legs, which, on contact with the skin, causes chemical burns that are similar to abscesses with watery contents. In case of accidental eating of these bugs with food, cases of the death of livestock are known. The hemolymph of the Paederus beetles that live on the banks of water bodies is also poisonous. They can be caught on fish lying at the place of catch. Accidentally eating such a bug with fish can cause severe poisoning. At the same time, coleopterans play a useful role as soil-forming agents, for example, dung beetles and rhinos [25-27].

Thus, the study of the species composition of beetles in the fields of forage crops is not only scientific, but also a practical necessity. This determines the relevance of this work.

Materials and methods. The material was collected in Kerbulak district of the Almaty region by the authors of the publication in June-August 2019 when performing phytosanitary monitoring of grain and corn crops and other works as part of the project of the Ministry of Agriculture of the Republic of

Kazakhstan BR 06249249 “Development of a complex system of productivity increase and farm animals breeding qualities improvement, on example of “Bayserke Agro” LLP under subproject 2 “Improving the technologies of cultivation and harvesting of forage crops”.

When collecting the material, standard entomological techniques were used - soil traps, manual collection, inspection of vegetation, manure and dead animals. The collected beetles were pickled in plastic mordants with ethyl acetate and later laid out on cotton entomological mattresses. Then, collected material was partially used for toxicological analyzes for pesticides and heavy metals.

Identification of beetle species collected on the territory of grain and corn crops of the Kerbulak branch of Bayserke Agro LLP, the refinement of the bioecology and economic significance was carried out using summaries and guide books from the list of literature [25-33].

Coordinates of sampling sites:

- 1) corn - N 44°7'41.42" E 77°11'45.47";
- 2) wheatgrass field 1 - N 44°16'20.85" E 77°24'11.38";
- 3) wheatgrass field 2 - N 44°15'59.24" E 77°24'52.81".

Research results. As a result of studies in the territory of the Kerbulak branch of “Bayserke-Agro” LLP, the following species of beetles were identified. Their brief characteristics, taxonomic affiliation, and images of individual representatives in figures 1–9 are given below.

Suborder Adephaga – Carnivore beetles

Family Carabidae – Ground beetles

Amara ovata (Fabricius, 1792). Phytophage, sometimes harms.

Material: 1 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 1 ex. - 15.08.2019, wheatgrass field 1, soil trap, A.B. Yeszhanov, A.M. Makezhanov, I.I. Temreshev, A.M. Tursynkulov.

Brachinus crepitans Linnaeus, 1758. Cracking bomber. Entomophage. Larvae are parasites of pupae of other beetles.

Material: 1 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 1 ex. - 16.07.2019, wheatgrass field 1, manual collection, I.I. Temreshev.

Dixus eremita Dejean, 1825. Dim dixus. Entomophage.

Material: 1 ex. - 15.07.2019, corn, hand picking, I.I. Temreshev 1 ex. - 16.07.2019, wheatgrass field 2, manual collection, I.I. Temreshev.



Figure 1 – Ground beetle *Dixus eremita* Dejean, 1825

Suborder Polyphaga – Omnivorous beetles

Family Histeridae – Hister beetles

Hister uncinatus Illiger, 1807. Hook-shaped Hister beetle. Entomophage. In manure, soil, humus, on the corpses of animals.

Material: 1 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 2 ex. - 15.07.2019, wheatgrass field 2, manual collection, I.I. Temreshev; 1 ex. - 14.08.2019, on a dead fox, picking with tweezers, A.B. Yeszhanov.

Margarinotus bickhardti Reitter, 1910. Entomophage. In manure, soil, humus, on the corpses of animals.

Material: 2 ex. - 14.08.2019, on a dead fox, picking with tweezers, A.B. Yeszhanov.

Saprinus cribellatus Marseul, 1855. Entomophage. In manure, soil, humus, on the corpses of animals. Beetles feed on larvae of flies, beetles, etc. Larvae usually inhabit carrion or decaying vegetation, where they also prey.

Material: 2 ex. - 14.08.2019, on a dead fox, picking with tweezers, A.B. Yeszhanov.

S. niger Motschulsky, 1849. Black Hister beetle. Entomophage. In manure, soil, humus, on the corpses of animals.

Material: 3 ex. - 14.08.2019, on a dead fox, picking with tweezers, A.B. Yeszhanov.

S. virescens (Paykull, 1798). Greenish Saprin. Entomophage. Unlike the majority of Hister beetles, the beetle lives on the leaves of various plants, where it predares by eating eggs and leaf-eating larvae.

Material: 1 ex. - 15.07.2019, corn, on the leaves of corn, I.I. Temreshev.



Figure 2 –*Hister uncinatus* Illiger, 1807

Family Silphidae – Carrion beetles

Phosphuga atrata (Linnaeus, 1758). Black carrion beetle. Necrophage and predator. It eats clams, worms, caterpillars.

Material: 3 ex. - 15.08.2019, wheatgrass field 1, soil trap, A.B. Yeszhanov, A.M. Makezhanov, I.I. Temreshev, A.M. Tursynkulov; 2 ex. - 16.07.2019, wheatgrass field 2, manual collection, I.I. Temreshev.

Family Dermestidae – Skin beetles

Anthrenus pimpinellae (Fabricius, 1775). Skin beetle femoral flower. Necrophage. Larvae is a pest of stocks and seeds. The imago damages the anthers of flowering plants.

Material: 1 ex. - 15.07.2019, corn, on the flowers of Sophora, manual collection, I.I. Temreshev.



Figure 2 – Skin beetle *Dermestes coronatus* Steven, 1808

Attagenus angustatus Ballion, 1871. Narrowed skin-eater. Necrophage Larva is a pest of stocks and seeds. The imago damages the anthers of flowering plants.

Material: 1 ex. - 15.07.2019, corn, on the fly, I.I. Temreshev.

Dermestes coronatus Steven, 1808. Crowned skin beetle. Necrophage imago and larvae are pests of stocks and raw materials, zoological collections.

Material: 13 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.

D. undulatus Brahm, 1790. Imago and larvae are pests of stocks and leather raw materials, zoological collections.

Material: 1 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 2 ex. - 16.07.2019, wheatgrass field 2, manual collection, I.I. Temreshev.

Family Cleridae – Checkered beetles.

Trichodes hauseri Escherich, 1893. The imago is a predator. The biology of the larva is unknown.

Material: 2 ex. - 12.06.2019, wheatgrass field 2, on a sow thistle, manual collection, I.I. Temreshev; 1 ex. - 15.07.2019, corn, on the flowers of Sophora, manual collection, I.I. Temreshev.

T. axillaris Fischer-Waldheim, 1842. The imago is a predator. Larvae are parasites of locust egg capsules.

Material: 1 ex. - 14.06.2019, wheatgrass field 1, on ferule, manual collection, I.I. Temreshev; 1 ex. - 15.07.2019, wheatgrass field 1, on the flowers of sow thistle, manual collection, I.I. Temreshev.

Family Elateridae – Click beetles

Aelosomus rossi Germar, 1844. The Ross's Click beetle. Phytophage. No harm.

Material: 3 ex. - 12.06.2019, wheatgrass field 2, manual collection, I.I. Temreshev; 2 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 3 ex. - 15.07.2019, wheatgrass field 1, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 2 ex. - 15.07.2019, wheatgrass field 2, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.

Agriotes meticulosus Candeze, 1863. Turkestan sowing Click beetle. Polyphagous soil habiting pest.

Material: 2 ex. - 12.06.2019, wheatgrass field 2, manual collection, I.I. Temreshev; 1 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.

Family Scarabaeidae - Scarabaeidae

Cetonia aurata viridiventrif Reitter, 1896. Green rose chafer. Larvae in wood dust, manure. Imago harm flowering plants, ears of grain, fruits of fruit trees.

Material: 7 ex. - 12.06.2019, corn, on corn and Sophora, manual collection, I.I. Temreshev; 6 ex. - 15.07.2019, corn, on the sofa, hand picking, I.I. Temreshev; 10 ex. - 13.06.2019, breadcrumbs field 1, on the thistle, manual collection, I.I. Temreshev; 5 ex. - 14.06.2019, wheatgrass field 2, on thistle and thistle, I.I. Temreshev; 8 ex. - 15.07.2019, corn, on the sofa, grants of east, corn, manual collection, I.I. Temreshev.

Chironitis haroldi (Ballion, 1871). Harold's Chironit. Coprophage. In the manure. Soil former.

Material: 9 ex. - 15.07.2019, wheatgrass field 1, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 11 ex. - 15.08.2019, wheatgrass field 2, in manure, soil trap, I.I. Temreshev, A.B. Yeszhanov, A.M. Makezhanov, A.M. Tursynkulov; 17 ex. - 15.08.2019, wheatgrass field 1, in manure, soil trap, I.I. Temreshev, A.B. Yeszhanov, A.M. Makezhanov, A.M. Tursynkulov.

Copris lunaris (Linnaeus, 1758). Lunar copra. Coprophage. In the manure. Soil former.

Material: 3 ex. - 15.07.2019, wheatgrass field 1, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 4 ex. - 16.07.2019, wheatgrass field 2, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.

Gymnopleurus aciculatus Gebler, 1845. Common pill beetle. Coprophage. Soil former.

Material: 7 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 19 ex. - 15.07.2019, wheatgrass field 1, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 28 ex. - 16.07.2019, wheatgrass field 2, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 41 ex. - 14.07.2019, wheatgrass field 1, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 17 ex. - 15.08.2019, wheatgrass field 2, in manure, A.B. Yeszhanov, A.M. Makezhanov, I.I. Temreshev;

23 ex. - 15.08.2019, wheatgrass field 1, in manure, soil trap, A.B. Yeszhanov, A.M. Makezhanov, I.I. Temreshev, A.M. Tursynkulov.

Onitis humerosus (Pallas, 1771). The broad-shouldered dung beetle. Coprophage. Soil former.

Material: 3 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 5 ex. - 15.07.2019, wheatgrass field 1, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 6 ex. - 08.15.2019, wheatgrass field 1, in manure, soil trap, A.B. Yeszhanov, A.M. Makezhanov, I.I. Temreshev, A.M. Tursynkulov.

Onthophagus taurus (Schreber, 1759). The bull manure-eater or two-horned manure-eater. Coprophage. Soil former.

Material: 2 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 12 ex. - 15.07.2019, wheatgrass field 1, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 16 ex. - 16.07.2019, wheatgrass field 2, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 11 ex. - 15.08.2019, wheatgrass field 2, in manure, A.B. Yeszhanov, A.M. Makezhanov, I.I. Temreshev; 15 ex. - 15.08.2019, wheatgrass field 1, in manure, soil trap, A.B. Yeszhanov, A.M. Makezhanov, I.I. Temreshev, A.M. Tursynkulov.

Oryctes nasicornis (Linnaeus, 1758). Common rhinoceros beetle. Larvae in wood dust, manure, soil, sometimes accidentally harm the roots of plants. Soil former.

Material: 1 specimen - 15.07.2019, wheatgrass field 1, dead on the field, I.I. Temreshev.

Oxythyrea cinctella Schaum, 1841. Larvae in wood dust, manure, compost, imago strongly harm flowering plants, gnaw grains of milk ripeness.

Material: 12 ex. - 12.06.2019, wheatgrass field 2, on a sow thistle, manual collection, I.I. Temreshev; 19 ex. - 15.07.2019, wheatgrass field 1, on the flowers of a thistle, manual collection, I.I. Temreshev; 15 ex. - 14.08.2019, corn, at the endowment of the east, manual collection, I.I. Temreshev.

Pentodon bidens (Pallas, 1771). Turkestan corn rhinoceros beetle. Multi-pest crop pest. Larva lives in soil.

Material: 2 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.



Figure 4 – Dung beetle *Gymnopleurus aciculatus* Gebler, 1845

Family Tenebrionidae – Darkling beetles

Gonocephalum rusticum Olivier, 1811. Rustic sluggish. Beetles and larvae harm seedlings of various cultures. Common.

Material: 3 ex. - 12.06.2019, wheatgrass field 2, manual collection, I.I. Temreshev; 4 ex. - 15.07.2019, wheatgrass field 1, manual collection, I.I. Temreshev; 2 ex. - 16.07.2019, wheatgrass field 2, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 3 ex. - 15.08.2019, wheatgrass field 2, manual collection, I.I. Temreshev; 1 ex. - 15.08.2019, wheatgrass field 1, manual collection, I.I. Temreshev.

Microdera iliensis Skopin, 1961. *Microdera* Ili. It lives in aeolian sediments under plants on gravelly sandy loamy and sandy soils.

Material: 2 ex. - 12.06.2019, wheatgrass field 2, manual collection, I.I. Temreshev; 3 ex. - 15.08.2019, wheatgrass field 2, soil trap, manual harvesting, A.B. Yeszhanov, A.M. Makezhanov, I.I. Temreshev, A.M. Tursynkulov.

Omophlus deserticola Kirsch, 1869. Steppe pollen eater. Larvae in the soil harm plant roots. Beetles damage flowers of various cultures. Mass species.

Material: 4 ex. - 12.06.2019, corn, wheat grass creeping, I.I. Temreshev.

Trigonoscelis nodosa (Fischer von Waldheim, 1821) ssp. *schrenki* Gebler 1845. Schrenk's Darkling beetle. It lives in sands with a diverse relief and varying degrees of overgrowing. Larvae in fixed tuberous sand under bushes of *Calygonum* and sand acacia.

Material: 1 ex. - 12.06.2019, wheatgrass field 2, manual collection, I.I. Temreshev; 2 ex. - 12.06.2019, corn, hand picking, I.I. Temreshev.



Figure 5 – Darkling beetle *Gonocephalum rusticum* Olivier, 1811

Family Meloidae – Blister beetles

Epicauta erythrocephala (Pallas, 1776). Red-headed blister. Larvae are parasites of locust and grasshoppers egg capsules. Imago harms cultivated plants. Severe damage to soybean leaves was noted.

Material: 1 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.

Hycleus atratus (Pallas, 1773). Small floral blister. Larvae are parasites of locust and grasshoppers egg capsules. Imago harms cultivated plants.

Material: 5 ex. - 12.06.2019, corn, at the endowment of the east, manual collection, I.I. Temreshev; 2 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.



Figure 6 – Blister *Mylabris quadripunctata* (Linnaeus, 1767)

Mylabris crocata (Pallas, 1781). The saffron blister. Marked food on chicory, cornflower, tulips, gallows, chondrill, bindweed, chingil, astragalus, poppies; registered as a pest of crops. Parasite of Moroccan locust, grasshoppers.

Material: 3 ex. - 12.06.2019, corn, on the sofa and gifts of the east, manual collection, I.I. Temreshev; 4 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.

M. geminata Fabricius, 1798. Southern blister. It is registered as a pest of a number of crops. The parasite of the grasshoppers.

Material: 4 ex. - 12.06.2019, corn, on the sofa, hand picking, I.I. Temreshev; 2 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.

M. quadripunctata (Linnaeus, 1767). Four-point blister. Larvae are parasites of locust egg capsules. Imago harms cultivated plants.

Material: 6 ex. - 12.06.2019, corn, at the endowment of the Oriental and Sophora, manual collection, I.I. Temreshev; 3 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.

Famiy Coccinellidae – Ladybugs

Adalia bipunctata Linnaeus, 1758. Two-pointed Adalia. Entomophage of aphids and other homopterans.

Material: 9 ex. - 12.06.2019, corn, wheatgrass creeping and leaves of corn, manual collection, I.I. Temreshev; 7 ex. - 15.07.2019, corn, on the leaves of corn, manual collection, I.I. Temreshev.

Coccinella septempunctata (Linnaeus, 1758). Seven-pointed ladybugs. Entomophage of aphids and other homopterans.

Material: 8 ex. - 12.06.2019, corn, on the sofa and wheat grass creeping, manual collection, I.I. Temreshev; 5 ex. - 15.07.2019, corn, on the sofa and corn, manual collection, I.I. Temreshev.

Harmonia axyridis (Pallas, 1773). Asian ladybug. Entomophage of aphids and other homopterans. In the USA and Europe it is considered a dangerous invasive species.

Material: 2 ex. - 12.06.2019, corn, on the sofa and corn, manual collection, I.I. Temreshev; 1 ex. - 15.07.2019, corn, at the endowment of the East, manual collection, I.I. Temreshev.

Hippodamia (Adonia) variegata (Goeze, 1777). Changeable ladybug. Entomophage of aphids and other homopterans.

Material: 7 ex. - 12.06.2019, corn, wheat grass creeping wheat, corn and Sophora, manual collection, I.I. Temreshev; 11 ex. - 13.06.2019, wheatgrass field 1, on a thistle and white marie, manual collection, I.I. Temreshev; 9 ex. - 14.06.2019, wheatgrass field 2, on a sow thistle, white marie and thistle, I.I. Temreshev; 10 ex. - 15.07.2019, corn, on the sofa, grants of east, corn, manual collection, I.I. Temreshev; 5 ex. - 12.08.2019, corn, wheat grass creeping, manual collection, I.I. Temreshev.



Figure 7 – Ladybug *Harmonia axyridis* (Pallas, 1773)

Family Cerambycidae - Longhorn beetles

Agapanthia leucaspis Steven, 1817. White-carapace Agapanthia. Larvae develop in the stems of sow thistle, bodykie, and muzzle. Imago on flowers may slightly damage anthers.

Material: 1 ex. - 12.06.2019, corn, on the sofa, hand picking, I.I. Temreshev; 1 ex. - 15.07.2019, corn, on the flowers of Sophora, manual collection, I.I. Temreshev.

A. violacea Fabricius, 1775. Valerian Longhorn beetles. Larvae harm alfalfa and other legumes, valerian, and asteraceae.

Material: 2 ex. - 12.06.2019, wheatgrass field 2, on a sow thistle, manual collection, I.I. Temreshev; 1 ex. - 15.07.2019, wheatgrass field 1, on the thistle, manual collection, I.I. Temreshev.

Family Chrysomelidae - Leaf beetles

Cassida nebulosa Linnaeus, 1758. Beetroot shield. On a swan, marie, shiritse, etc. It harms beets.

Material: 4 ex. - 15.07.2019, wheatgrass field 1, on Marie White, manual collection, I.I. Temreshev.

Chaetocnema aridula Gyllenhal, 1827. Southern stem flea. It harms cereals.

Material: 3 ex. - 12.06.2019, corn, wheat grass creeping, I.I. Temreshev; 6 ex. - 15.07.2019, grain box field 1, on a grain box, manual collection, I.I. Temreshev.

Hispa atra Linnaeus, 1767. Dark shield. Imago dults and larva on cereals.

Material: 2 ex. - 12.06.2019, corn, wheat grass creeping, I.I. Temreshev; 1 ex. - 15.07.2019, wheatgrass field 1, manual collection, I.I. Temreshev.

Phyllotreta vittula (Redtenbacher, 1849). Striped bread flea. Strongly harms cultivated and wild-growing cereals.

Material: 4 ex. - 12.06.2019, corn, wheat grass creeping, I.I. Temreshev; 3 ex. - 15.07.2019, wheatgrass field 1, manual collection, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov.

Psylliodes cucullata Illiger, 1807. Secretive-headed cereal flea. It harms cereals, sometimes tree species of the elm family - elm, etc.

Material: 1 ex. - 12.06.2019, corn, wheat grass creeping, I.I. Temreshev; 2 ex. - 15.07.2019, corn, on the leaves of corn, manual collection, I.I. Temreshev.



Figure 8 – Leaf eater *Phyllotreta vittula* (Redtenbacher, 1849)

Family Curculionidae - Weevils

Asproparthenis foveicollis (Gebler, 1834). Eastern beetroot weevil. On Chenopodiaceae. It harms beetroot.

Material: 2 ex. - 12.06.2019, corn, on the ground, hand picking, I.I. Temreshev; 1 ex. - 15.07.2019, corn, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov; 2 ex. - 12.06.2019, corn, on the ground, hand picking, I.I. Temreshev.

Chloebius immeritus Boheman, 1834. Small green licorice weevil. On licorice, turanga, tamarix and sucker. It hurts. Was marked by us on corn.

Material: 8 ex. - 11.06.2019, corn, on the leaves of corn, manual collection, I.I. Temreshev; 5 ex. - 15.07.2019, corn, on the leaves of corn, manual collection, I.I. Temreshev; 2 ex. - 12.08.2019, corn, dead on the ground, I.I. Temreshev, A.M. Makezhanov.

Larimus turbinatus Gyllenhal, 1835. Safflower weevil. On Asteraceae. It harms safflower.

Material: 3 ex. - 12.06.2019, breadcrumbs field 1, on the thistle, manual collection, I.I. Temreshev; 5 ex. - 15.07.2019, wheatgrass field 1, on a sow thistle, manual collection, I.I. Temreshev; 1 ex. - 15.07.2019, wheatgrass field 2, soil trap, I.I. Temreshev, A.M. Makezhanov, A.M. Tursynkulov, A.B. Yeszhanov.

Lixus algirus Linnaeus, 1758. Bean Frankman. On legumes, malva and Chenopodiaceae. It harms raspberries.

Material: 2 ex. - 12.06.2019, corn, on the sofa, hand picking, I.I. Temreshev; 3 ex. - 13.08.2019, wheatgrass field 1, on Astragalus, manual collection, I.I. Temreshev.

Sitona callosus Gyllenhal, 1834. Brown nodule weevil. On various legumes. It harms clover, alfalfa, sainfoin, sand acacia, etc.

Material: 3 ex. - 12.06.2019, corn, on the sofa, hand picking, I.I. Temreshev; 5 ex. - 12.08.2019, corn, on the sofa, hand picking, I.I. Temreshev; 3 ex. - 12.08.2019, breadcrumbs field 1, on astragalus, manual collection, I.I. Temreshev; 4 ex. - 12.08.2019, wheatgrass field 2, on Astragalus, manual collection, I.I. Temreshev.

Xanthochelus nomas (Pallas, 1771). Wandering Weevil. On Asteraceae. Marked as a sugar beet pest.

Material: 2 ex. - 12.06.2019, breadcrumbs field 1, on the thistle, manual collection, I.I. Temreshev; 1 ex. - 13.08.2019, corn, dead on the ground, I.I. Temreshev.



Figure 9 - Weevil *Larimus turbinatus* Gyllenhal, 1835

Discussion of research results. As a result of the research, for the fields of forage crops in the territory of the Kerbulak branch of “Bayserke Agro” LLP, a total of 52 species of beetles were identified, belonging to 45 genera from 13 families and 2 suborders and having different economic significance. Of these, both larva and species diversity are dominated by lamellar beetles - Scarabaeidae, represented by 9 genera and 9 species. They are followed by Curculionidae - 6 genera and 6 species, Chrysomelidae - 5 genera and 5 species, Meloidae and Histeridae - 3 genera and 5 species in each family. Coccinellidae, Tenebrionidae and Dermestidae are represented by 4 species, Cerambycidae, Cleridae and Elateridae - 2 species each, and finally, Silphidae - 1 species.

Findings. Of the 52 species of beetles found on the territory of forage crops of the Kerbulak branch of “Bayserke Agro” LLP, the number of species of negative economic importance is 30. Useful species are entomophages and soil-formers - 22. Moreover, the number of harmful species does not exceed the economic threshold of harmfulness. Thus, we can conclude that the agrocenosis of the fields of forage crops is currently in equilibrium, and additional measures to limit the number of pests are not required. However, it should be kept in the mind that in the future, under favorable conditions, some species, for example, Turkestan corn rhinoceros beetle *Pentodon bidens* (Pallas, 1771), can give an outbreak of mass

reproduction. The dominant position in the number and species composition of the representatives of the Scarabaeidae family is largely due to the fact that not only plant growing, but also intensive livestock breeding is carried out in the studied territory - cattle, horses, camels and sheep are bred. The high abundance and species diversity of coprobiontic species of lamellar beetles is also an indicator of the good condition of forage crop agrocenoses of the Kerbulak branch of "Bayserke Agro" LLP, since they play an important role in the disposal of livestock waste and enrichment of the soil with organic substances.

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"БАЙСЕРКЕ-АГРО" ЖШС КЕРБҰЛАҚ БӨЛІМШЕСІНІҢ ЖЕМ-ШӨП ДАҚЫЛДАРЫ АЛҚАПТАРЫНЫҢ ҚАТТЫ ҚАНАТТЫ (INSECTA, COLEOPTERA) ЖӘНДІКТЕРДІҢ ТҮРЛІК ҚҰРАМЫ ТУРАЛЫ

Аннотация. Аумағы үшін алаңдарын жемшөп дақылдарын (еркекшөптің мен жүгері), Кербұлақ аудандық бөлімшесі "Байсерке Агро" ЖШС анықталды 52 түрі жесткоккрылых жәндіктердің жататын 45 аударылған 13 тұқымдасқа және 2-ші подотряд. Бойынша саны және түрлік әртүрлілігі басым Scarabaeidae тұқымдас, ұсынылған 9 родами және 9 түрі бар. Одан кейінгі орында Curculionidae – 6 босану және 6-түрлері, Chrysomelidae – 5, босану және 5-түрлері, Meloidae және Histeridae – 3 түрі және 5 түр әр түр. Coccinellidae, Tenebrionidae және Dermestidae ұсынылған 4 түрлерімен, Cerambycidae, Cleridae және Elateridae – 2 түрін, және, ақырында, Silphidae – 1. Теріс шаруашылық маңызы бар 30 түрі. Пайдалы энтомофагтар мен топырақ түзушілер – 22 түрі. Саны зиянды түрлерінің аспайды экономикалық зияндылық шегінен. Сонымен, агроценоз алаңдарын жемшөп дақылдарын қазіргі уақытта мұнда орналасқан артық жүктеменің тең таралуын жай-күйі және шектеу жөнінде қосымша шаралар зиянкестер санының талап етілмейді. Алайда, болашақта қолайлы жағдайларда кейбір түрлері, мысалы, түркістан жүгері дупляк *Pentodon bidens* (Pallas, 1771), бере жаркылды жаппай көбеюі. Үстем жағдайын сандық және түрлі тобы өкілдерінің Scarabaeidae түсіндіріледі мұнда қарқынды мал шаруашылығы қызметі. Жоғары саны мен әртүрлілігі копробионт Scarabaeidae тұқымдасқа көрсеткіші болып табылады жақсы жағдайын аумақтарындағы агроценоздардың жемшөп дақылдарының Кербұлақ бөлімінің "Байсерке Агро" ЖШС, өйткені олар маңызды рөл атқарады және қалдықтарды кәдеге жарату мал және байыту топырақты органикалық заттармен.

Түйін сөздер: Қатты қанаттылар, Insecta, Coleoptera, жемдік дақылдар, еркекшөп, жүгері, «Байсерке Агро» ЖШС.

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О ВИДОВОМ СОСТАВЕ ЖЕСТКОКРЫЛЫХ НАСЕКОМЫХ (INSECTA, COLEOPTERA) ПОЛЕЙ КОРМОВЫХ КУЛЬТУР КЕРБУЛАКСКОГО ОТДЕЛЕНИЯ ТОО «БАЙСЕРКЕ-АГРО»

Аннотация. Для территории полей кормовых культур (житняка и кукурузы) Кербулакского отделения ТОО «Байсерке Агро» было выявлено 52 вида жесткоккрылых насекомых, относящихся к 45 родам из 13 семейств и 2-х подотрядов. как по численности, так и по видовому разнообразию доминируют пластинчатосые жуки - Scarabaeidae, представленные 9 родами и 9 видами. За ними следуют Curculionidae – 6 родов и 6 видов, Chrysomelidae – 5 родов и 5 видов, Meloidae и Histeridae – по 3 рода и 5 видов в каждом семействе. Coccinellidae, Tenebrionidae и Dermestidae представлены 4 видами, Cerambycidae, Cleridae и Elateridae – по 2 вида, и наконец, Silphidae – 1 вид. Отрицательное хозяйственное значение имеют 30 видов. Полезные энтомофаги и почвообразователи – 22 вида. Численность вредных видов не превышает экономического порога вредоносности. Таким образом, агроценоз полей кормовых культур в настоящее время здесь находится в равновесном состоянии, и дополнительных мер по ограничению численности вредителей не требуется.

Однако, в будущем при благоприятных условиях некоторые виды, например, туркестанский кукурузный дупляк *Pentodon bidens* (Pallas, 1771), могут дать вспышку массового размножения. Доминирующее положение в количественном отношении и разнообразии представителей семейства Scarabaeidae объясняется тем, что здесь ведется интенсивная животноводческая деятельность. Высокая численность и разнообразие копробионтных видов пластинчатоусых жуков является показателем хорошего состояния агроценозов кормовых культур Кербулакского отделения ТОО «Байсерке Агро», так как они играют важную роль в утилизации отходов скота и обогащении почвы органическими веществами.

Ключевые слова: Жесткокрылые, Insecta, Coleoptera, кормовые культуры, житняк, кукуруза, ТОО «Байсерке Агро».

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