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DOMINANT SPECIES OF XYLOPHAGE INSECTS (SCOLYTINAE) AND NATURAL ENEMIES ON SPRUCE

Abstract. The article presents the results of monitoring the population of dominant species of insects-xylophages (Scolytinae) and their entomophages in the mountain forests of of Zailiysky Alatau.

Forest pathology surveys were conducted in 6 gorges of the Zaili Alatau and it was determined that in 2 gorges-Medeu and Butakov, there is a weakened state compared to the other areas, as well as noticeable curt shrinkage due to the invasion of bark beetles, which is probably the result of a large volume of previously fallen trees and reforestation. This year, 8.3 hectares of damaged forest with a volume of 556 cubic meters is planned to be cut down in the Butakov gorge from bark beetles. Monitoring using pheromone traps was carried out in various gorges and at various altitude levels, at the beginning of spruce growth, in the middle and at the end (from 1650 m. n.m. to 2,750 m. n.m.). The greatest number of beetles was collected at lower altitude Butakov gorge Medeu branch – 731 PCs and the smallest number in Issyk gorge Turgen branch -122 PCs Butakov gorge, the hotbed of the beetles arose from the windfall in honey, which previously formed a large forage base for mass reproduction of bark beetles. The forest pathological condition of Shrenka spruce trees in the forests of the Ile-Alatau GNPP is generally assessed as satisfactory, with shrinking and dry-top stands accounting for 11.0-31%. It was found that in the Medeu and Butakov gorges there is a weakened state in comparison with other areas, due to the invasion of bark beetles. Gorges that are closer to the city are more weakened than remote areas, and the impact of anthropogenic factors is likely. In order to improve the sanitary condition of forests from biological means of pest control, in addition to nesting sites for birds, it is necessary to create remiznye sites, to register drugs against bark beetles and other xylophages for protective treatments. The population of the bark beetle of the gauser Ips hauseri Reitt 1895 on schrenka spruce on average per 1dm2 pallet, ranged from 2.8 to 5.5 pieces. This year, there were 17 species from the family of bark beetles (Scolytinae). the most common of these species was the gauser's bark beetle (Ips hauseri Reitt), the Kyrgyz root beetle (*Hylastes substriatus* Strohmeyer 1914) and the purple or small spruce bark beetle (*Hylurgops palliatus* (Gyllenhal, 1813).

Key words: Shrenka spruce, xylophage insect, bark beetle, entomophage, pheromone.

Introduction. Preservation of forests made of Shrenka spruce, an endemic and vulnerable species in the Zaili Alatau zone, is an urgent task not only for the Republic of Kazakhstan, but also for the entire world community. At the same time, it is also important for Kazakhstan to increase the forest cover of the territory of the Republic, which also provides for the preservation of existing forests. The conservation of Schrenk spruce forests will also ensure that the endemic biota associated with these forests is preserved for future generations. Taking into account the factors of the appearance of invader insects in the region, primarily the bark beetle, it can lead to disastrous consequences for relic communities and the loss of most of their biological diversity.

A very important problem is the protection of forests from the main species of bark beetles and barbels with a bias towards biological techniques, which will preserve the biodiversity of forest biocenoses [1,2].

Annual losses of wood from pests and diseases of the forest in Kazakhstan amount to 1.0 thousand hectares of coniferous and deciduous species, which in monetary terms is about 50 million tenge. In recent years, according to the sanitary survey, the total area of foci of pests and diseases of the forest in Kazakhstan is 170 thousand hectares, including 136 thousand hectares in state forestry institutions of regional akimats and 34 thousand hectares in specially protected natural territories in the Zaili Alatau, the situation with the spread of insects-xylophages of Shrenka spruce is of particular concern. At the same time, it should be taken into account that chemical control of bark beetles not only does not solve the problem itself, but also aggravates it, worsening the environmental situation [3].

Research methods. Monitoring to identify the species composition of xylophage insects of Shrenka spruce in the mountains of the Zaili Alatau.

To collect materials, a reconnaissance and detailed survey was conducted in the following route sections: in the Turgen branch -Essik gorge, in the Talgar branch-Soldat gorge; in the Medeu branch: -Almaarasan and Butakov gorge, in the Aksai branch-More-Almaty and Kaskelen gorge.

Collection and accounting of the number of insects was carried out using standard methods used in entomology and forest pathology [4,5,6,7,8].

To find out the species composition and number of bark beetles on each test area, 1-2 model trees, stumps, lying trees and shrinking ones were taken. On felled and cleared of branches of trees along the entire trunk make a strip about 10 cm wide and determine the species composition and number of pests, noting the places of their settlement.

In the middle of the settlement sites of each type, you should take a pallet (pad) of 10 dm^2 (50x20 cm). On such pallets, the density of the settlement is determined by counting the uterine passages, and by counting the input channels or mating chambers (for polygamous bark beetles), the number of families of bark beetles is determined. On pallets, the number of young bark beetles is also taken into account, counting the number of young beetles before departure and pupae under the bark or flight holes on the bark after the departure of the young generation. All this data is translated to 1 dm^2 of the trunk surface.

Materials for identifying the main types of entomophages-xylophages are carried out by manual collection, during reconnaissance, detailed and other surveys, and systematic records of insects.

Research result. According to the results of the research, the species composition of bark beetles ((Scolytinae) on the endemic Tien Shan spruce in the mountains of the Zaili Alatau was revealed (table 1).

In the study period focused on the establishment of the species composition of dominant species, studying of features of development, determine the dynamics of number and harmfulness of the bark beetles at endemic spruce spruce.

Weather conditions in 2019 were characterized by a long and cool spring, sharp temperature changes, and frequent precipitation in mountainous areas. Hydrothermal indicators for the growing season April-June restrained the development of insect pests. Despite the increased humidity during this period, the temperature indicators were low and fluctuated within 10-17 C. in may and June, some temperature increases are noted, but the humidity in these growing seasons, according to the weather station, did not reach the necessary parameters for the mass departure of wintering bark beetles in the spring period. In July and August, the temperature parameters were optimal for the development of young bark beetles, but it did not greatly contribute to the mass development of the second generation of the pest.

In General, the biological features of the development of bark beetles in 2019 were late by 7-12 days compared to 2018 due to spring weather conditions with prolonged precipitation in may and June. Mass flight of wintering beetles was observed at an average temperature of 18-200 C (late may -early June).

It was found that (Scolytinae) was dominated by the gauser's bark beetle (IPS hauseri reittt), the Kirghiz root beetle (Hylastes substriatus strohmeyer 1914), and the purple or small spruce luboed (Hylurgops palliatus (Gyllenhal, 1813).

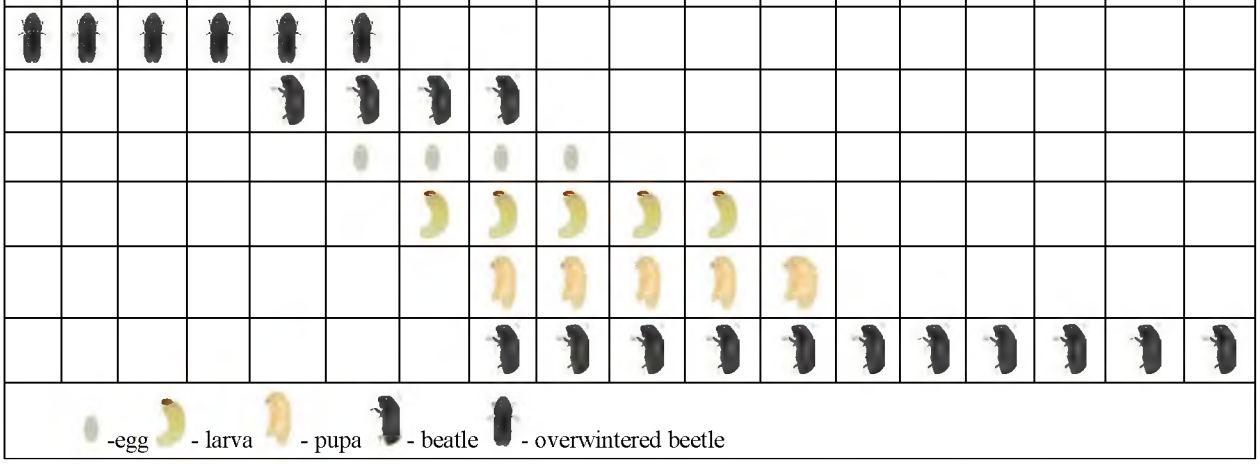
Gauser's bark beetle (Ips hauseri Kush) - the largest bark beetle identified on schrenka spruce , which is one of the mass pest species of schrenka spruce . The bark beetle inhabits the entire trunk from the butt end to the crown. Prefers freshly dead or physiologically weakened trees. During outbreaks of mass reproduction, it attacks perfectly healthy trees and is the most numerous type of secondary pests on wind- blown and shrinking trees. It also inhabits business wood stacked in places where timber is harvested.

Table 1 – Species composition of bark beetles (Scolytinae) in the mountains of the Zaili Alatau, 2019

The species and systematic position	
The Order Coleoptera	Coleoptera
The Family Of Weevils	Curculionidae
Subfamily Of Bark Beetles	Scolytinae
Gauser's bark beetle, a mountain Kyrgyz bark beetle	*Ips hauseri* Reitt 1895*
Six-toothed bark beetle or stenographer	*Ips sexdentatus* Boerner, 1776
Double bark beetle	*Ips duplicatus* Sahlberg
Bark beetle fires	*Orthotomicus suturalis* Gyllenhal
Ordinary engraver	*Pityogenes chalcographus* L.
Engraver Baikal	*Pityogenes conjunctus* Reitter, (*P. baikalicus* Eggers)
Asian engraver	*Pityogenes perfossus* Bees.
The micrograph of the Kyrgyz	*Pityophthorus kirgisicus* Pjatnitzky*1931
	Pityogenes spessivtsevi Lebedev, 1926*
Parfentyev The Micrograph (The Micrograph Spruce)	*Pityophthorus parfentjevi* Pjatnitzky 1931 (*P. schrenkianus* Pjatnitzky)*.
Lobed purple or small spruce lubed	*Hylurgops palliatus* Gyllenhal 1813
Taiga Forester, bark beetle-hectograph	*Dryocoetes hectographus* Reitter 1913
Coniferous forest- dweller, the beetle - autograph	*Dryocoetes autographus (Ratzeburg, 1837)*
Kyrgyz corneil	*Hylastes substriatus* Strohmeyer 1914*
Coniferous woodworm	*Trypodendron lineatum* (Olivier, 1795)*
Bark beetle fires	*Orthotomicus suturalis* (Gyllenhal, 1813) *
Kholodkov Lubed	*Carphoborus cholodkovskyi* Spessivtsev, 1916
Note: + - there are single individuals , ++ - average and constant occurrence, + + + - frequent occurrence. Bark beetles spruce spruce marked species * endemic spruce, Shrenk, not marked – adventive species.	

We also observed the development of bark beetles in various gorges using pheromone traps along with the species composition in the selected test sites, as described above. Standard barrier-type polyethylene traps were placed under the forest canopy at a height (dispenser position) of 1.6 to 2.0 m. the Distance between the traps was about 50 m. we observed the dominant species of gauser bark beetles-Ips hauseri Reitt with the preparation of a phenocalendar (table 2). In mountainous areas, in addition to the adverse weather conditions of the current year, the altitude of the n.u. m., the exposure of the North or South slope, and the warming of the sites have a significant impact.

Table 2 – Average phenodates of development of gauser's bark beetles- Ips hauseri Reitt in the Zaili Alatau, 2019

April			May			June			July			August			September-March		
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
																	
-egg - larva - pupa - beatle - overwintered beetle																	

For example, according to our observations it was noted that the area of ouseley Medeo (mountain Beaver) on the lower part of spruce forests (1645 m. n.m.) the Northern exposure of the slope in a well-heated area with the beginning of summer, the development of bark beetles was 14-16 days before on the site Chimbulak (2465 m. n.m.) in the upper part of spruce forests with southern exposure slope with a weak warm phase. In unfavorable areas for the development of bark beetles, the state of spruce forests is better by 10-15%.

It is known that beetles of the parent generation overwinter in the forest floor or under the bark of trees, in which they received additional nutrition in the past year. I n t he last d ecade of may or the first d ecade o f J une, when d aytime t emperatures p ass t he2 0° C mark , male bark beetles are the first to fly out and begin searching for spruce trees suitable for settlement. The sum of the effective temperatures by this time reaches 185-215 °C, and the temperature of the upper soil layer is 11°C.

The most active flight of beetles occurs in the second half of the day from 14 to 19 hours. The first beetles fly out from under the bark of dead trees that were used last year and are located in well-heated, open places, so the number of beetles in the traps is small. Under favorable weather conditions, the mass flight of the bark beetle begins two or three days after the appearance of the first beetles in the traps, as it happened in 2018. When the cold weather comes, the beginning of the mass summer is delayed. For example, in 2019, the first bark beetles appeared in traps on may 24, and the mass flight began only in June. In cloudy weather, at a temperature of 16-17 °C, we observed bark beetles actively crawling along the bark and digging into it, despite the fact that their presence in the traps at this time was insignificant. Thus, there was a settlement of the fresh bast of the Comber part of the old spruce trees, the top part of which was worked out by the bark beetle last year. The beginning of the mass summer of the bark beetle coincides with the opening of leaves on aspen and birch trees, as well as during the flowering period of the dandelion.

First-growth beetles that penetrate the bark of weakened trees find themselves in less favorable conditions, being exposed to the protective mechanisms of the tree. However, by inserting them under the bark, they reduce the protective reactions, thus preparing the tree for mass settlement.

It takes two or three days for males to find a tree suitable for the development of their offspring, and to set up a mating chamber. After building a mating chamber, the male begins to secrete the sexual component of the pheromone, which attracts females to it.

Arrived and fertilized females, under favorable conditions, immediately begin to build uterine passages and lay eggs. The average multi-year start date for laying eggs, as can be seen from the table, is in the month of June. The first larvae appear about two weeks after the beginning of mass summer, at the end of the third decade of June. Hatching of larvae from the first eggs occurs, on average, after 15 days and is highly dependent on temperature conditions. So, in the upper part of the fallen fir trees in well-warmed places last year, the first larvae hatched in six days. In 2019 during the prolonged may cold snap, the first larvae appeared only 26 days after the start of egg laying. The larval stage of bark beetle development lasts on average 15 days, but these terms can also vary. So, according to our observations, in years with favorable weather, the larvae started pupating 11 days (2018) after hatching from eggs, and in cold and rainy weather, these terms stretched to 20 days (2019). The first pupae usually appear in the second decade of June. By the time half of the larvae pupate, the parent generation begins to leave the uterine passages. They fly out for additional food and production of the "sister" generation. By the time the first young beetles appear, there are almost no parent-generation beetles left in the uterine passages. An indirect confirmation of this is the regular increase in the number of trapped beetles occurring in the second or third decade of June. Although in the literature there is information that in the second decade of June, the "belated" part of the parent generation, "matured" in the spring of this year, takes off. This issue will continue next year.

The total amount of effective temperatures required for the full development of the young generation of bark beetles is 740 °C.

The first young beetles are found under the bark of wind and windbreak firs at the end of the third decade of June, in the first or early second decade of July. From the moment the first eggs appear in the moves to the appearance of the first young beetles, an average of 41 days pass (from 26 to 47 days), depending on the site and locality of the bark beetle settlement. After emerging from the pupae, the young beetles undergo additional feeding, gnawing out platforms and mini-holes and completely destroying the bast. Additional nutrition usually takes place under the bark of the same tree where they appeared.

Thus, the use of pheromone traps helps not only in monitoring the number of bark beetles, but also helps to expand our knowledge about the composition of entomocomplexes at the early stages of decomposition of the bark and wood of Shrenka spruce in the forests of the Zaili Alatau.

Despite the fact that the amount of accumulated and generalized phenological data is still insufficient, it is still possible to draw certain conclusions that are of practical importance in the fight against bark beetles. The use of pheromone traps provides a rich material for identifying species that together with the bark beetle form the core of the entomocomplex on spruce, and clarifying their phenology in the study area.

Figure 1 – gauser's bark Beetle (Ips hauseri Reitter, 1895). Photo by S. V. Kozlov

Figure 2 – Damage to wood by gauser's bark beetle. Photo by G. Zh. Mendibayev

The Kyrgyz kornezhil-Hylastes substriatus Strohmeyer 1914 is a pest of many coniferous trees, including Shrenka spruce and common pine. It is found mostly in wet shady places: near mountain rivers and streams, in low terrain. Inhabits the root neck, roots of large and medium-sized trees, stumps of the current and last year of felling. The main condition is that they are in the ground or covered with moss; on fresh-grown trees, it inhabits the lower, wetter part of the base of the trunk. Gives one generation per year. Beetles, pupae and larvae overwinter. Beetles and larvae feed on the inner part of the bark, making passages in it. When introduced into the bark and for additional nutrition, it often uses the moves of the bark beetle gauser. In the cortex, the root beetle chews out a round chamber of irregular shape, from which there is a longitudinal uterine passage through the bast layer of the bark. The female lays eggs on the sides of the uterine passage in special egg cradles. The larvae chew out thick entangled passages when feeding, then merge into a single cavity filled with drill flour. Beetles are active in may, immature individuals are caught under the bark and occasionally on the surface of the bark during the entire summer period. However, mass flight occurs from mid-may to early June. Beetles of the new generation appear in early August, and are fed additional bast in places of development. After leaving the wintering areas, they usually move to the root neck and roots of young spruce and pine trees and feed on their bark. Bark beetles cause trees to weaken, slow down their growth and development. Populating trees weakened by other types of pests, kornezhil significantly accelerates their death, and thus is able to cause significant

damage. At the end of may-the first decade of June, an active period of *Hylastes substriatus* was observed.

A series of beetles was collected and the biological features of this species endemic to the Tien Shan were clarified, consisting in the pubescence of the elytra and the structure of the male abdomen. Special attention is paid to the biology of *Hylastes substriatus* – the only subendemic species of Central Asia, restricted in distribution by the Tien Shan (Kazakhstan, Kyrgyzstan, China).

The purple luboed or small spruce luboed-*Hylurgops palliatus (Gyllenhal*, 1813), collected on a lying Tien Shan spruce in the Kazachka tract, is a Trans-Palearctic species. The pest is widely distributed in coniferous, mostly raw forests. When settling, it prefers more dark places, and therefore to damaged fallen trees, it chooses the lower side facing the ground. Attacks equally willingly, as on standing strongly weakened firs (preferably) and pines (less often-other breeds), populating mainly part of the trunk with thick and transitional bark, and on trees lying on the ground, uncut timber and thick 1-2-meter firewood. The uterine course is longitudinal, the beginning of it is expanded stepwise. The larval passages are very confused. The area of Almaty was probably filled with pine or spruce timber.

Figure 3 – Lobed purple or small spruce lubed. *Hylurgops palliatus* (Gyllenhal.1813) - det. Mandelshtam. Zaili Alatau mountain Beaver under the spruce bark spruce. Note-photo by S. V. Kozlov. https://www.zin.ru/Animalia/Coleoptera/rus/hylsubsk.htm.

Us have been conducted, surveys of density of settlement on spruce bark beetles in spruce forests of the Zaili Alatau, the overall density of settlements and the number of nuptial chambers of bark beetles is low, the greatest - the bark of the fallopian Hauser more than 4 moves and 3 nuptial chambers, and the least amount of lobeda.

Given the importance of the dominant species of gauser's bark beetle (Ips hauseri Raitt.) we studied the distribution of uterine passages, since this indicator determines the possibility of mass spreading of the pest. In mid – July, during the mass summer of young beetles, the population of the gauser bark beetle-Ips hauseri Reitt-was counted, where on average there were more than 6 pieces per pallet (1 sq. DM.), in an area with a relative humidity of wood during the settlement period, equal to an average of 45.3%, and a bark thickness of 1.61 cm, although the number of uterine passages remains high enough for more than two.

In the regulation of the number of bark beetles are important entomophages. The recorded entomophages of the order Coleoptera include representatives of 12 families, 13 genera, 14 species; Diptera: 2 families, 2 genera, 2 species and Hymenoptera (Hymenoptera) include 2 families, 6 genera, 9 species and Hemiptera include 3 families, 4 genera and 4 species (table 3).

Table 3 – Identified entomophages of bark beetles on Schrenka spruce in Zailiysky Alatau, 2019

Title		Occurence
The order Coleoptera (Coleoptera)		
Family	Species name	
Ground beetle family Toslak crucifers, or cruciferous beetle	Carabidae *Amara ovata* F.	++
The Family Burying Beetles Mertvoe treherbert	Silphidae *Phosphuga atrata* L.	++
The Family Of Rove Beetles Station	Staphylinidae *Xantholinus* sp.	++
Stafilin	*Placusa* sp.	++
A Family Of Beetles Toddler-plane	Histeridae *Hololepta plana* Sul.	++
Family Of Moulders Moult flat	Pythidae *Pytho depressus* L.	++
Family Petraki Ants	Cleridae *Thanasimus formicarius* L.	++
The Family Oskolki Uscatescu bandaged	Colydiidae *Bitoma crenata* F.	++
The Family Of Click Beetles The click beetle red-winged	Elateridae *Ampedus sanguineus* L.	+
Blood-spotted Nutcracker	*Ampedus sanguinolentus* Schr.	+
The Family Of Monotonity Bestanca pokorova	Monotomidae *Rhizophagus bipustulatus* F.	++
Family Of Glitter Glittery wood	Nitidulidae *Epuraea limbata* F.	++
Family Of Darkling Moorish booger	Trogossitidae *Tenebroides mauritanicus* L.	+
The Family Of Malesci Malashka copper, or bronze	Malachiidae *Malachius aeneus* L.	+
The order Diptera (Diptera)		
The Family Of Ctyri Latria red	Asilidae *Laphria flava* L.	+
Family – Greenfinches Bark fly	Dolichopodidae *Medetera plumbella* Meigen, 1824	++
Order of Hymenoptera (Hymenoptera)		
Семейство Муравьи	Formicidae	
Red-breasted bore ant	*Camponotus herculeanus* L.	+
Tugai woodworm ant	*Camponotus lameerei* Emery	+
Black Lazius (Black garden ant)	*Lasius niger* L.	+
Mirmika Dzungar	*Myrmica dshungarica* Ruzsky	+
Mirmika red	*Myrmica rubra* L.	+
Sod ant	*Tetramorium caespitum* L.	+
Thin-headed Central Asian ant	*Formica mesasiatica* Dlus.	+
Brown ant	*Formica fusca* L.	+
The Braconids Family	Braconidae	
Highbone Rider	*Atanycolus genalis* Thom.	+
Order of Hemiptera (Hemiptera)		
Family Predators Crumb * Bedbug baby	Anthocoridae *Scoloposcelis pulchella* Zett.	++
Predator Family Predatory bug	Reduviidae *Coranus subapterus* De Geer	+
Rinokor ringed	*Rhynocoris annulatus* L.	+
Family Shchitniki	Pentatomidae	
Armagh alder	*Arma custos* F.	+

* - Baby bug-*Scoloposcelis pulchella Zetterstedt*. Found in the Small Almaty gorge, mount Mokhnatka in the moves of bark beetles, etc.

During the period of our research, a predator from the Hemiptera order was found – Scoloposcelis pulchella Zetterstedt, Which was not previously recorded in Kazakhstan. Small bug 3,0-3,8 mm, Shiny, glabrous. Elytra for the most part whitish. The shins and legs are light yellow. The collection of insect pests will continue.

Conclusion. During the study period, the family of bark beetles (*Scolytinae*) met - 17 species: gauser's bark beetle (*Ips hauseri Reitt.*), six-toothed bark beetle or stenographer (Ips sexdentatus Bergner), double bark beetle (*Ips duplicates Sahalb.*), pozharishch bark beetle (*Orthotomicus suturalis Gyllenhal*), Baikal engraver (*Pityogenes conjunctus Reitter*), common engraver (*Pityogenes chalcographus L.*), Asian engraver (*Pityogenes perfossus Bees.*), the micrograph of the Kirghiz (*Pityophtorus kirgisicus Pjat.*), Engraver Spesivtseva (*Pityogenes spessivtsevi Lebedev*, 1926*), micrograph parfentjeva (*Schrenk's Micrograph*) Pityophthorus parfentjevi Pjatnitzky (*p. schrenkianus* Pjatnitzky), purple or small spruce luboed *Hylurgops palliatus Gyllenhal*, taiga Forester, hectograph (*Dryocoetes hectographus Reitter*), Kyrgyz root beetle (*Hylastes substriatus Strohmeyer*) arboreal (*Trypodendron lineatum* (Olivier, 1795)), Kholodkovsky's luboed (*Carphoborus cholodkovskyi* Spessivtsev, 1916).

Hylastes substriatus-is the only endemic species of Central Asia, limited in distribution by the Tien Shan (Kazakhstan, Kyrgyzstan, China).

Recorded entomophages were from the order Coleoptera (Coleoptera), which include representatives of 12 families, 13 genera, 14 species; from two - winged (Diptera): 2 families, 2 genera, 2 species and Hymenoptera (Hymenoptera) - 2 families, 6 genera, 9 species and from the order Hemiptera (Hemiptera) – representatives of 3 families, 4 genera and 4 species found a predator from the order Hemiptera (Hemiptera) is a crumb bug-*Scoloposcelis pulchella* zetterstedt that has not been previously recorded in Kazakhstan.

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ШРЕНКА ШЫРШАСЫНЫҢ ЗИЯНКЕС-БУНАҚДЕНЕЛІЛЕРІНІҢ (*SCOLYTINAE*) БАСЫМДЫ ТҮРЛЕРІМЕН ОЛАРДЫҢ ЭНТОМОФАГТАРЫ

Аннотация. Мақалада Іле Алатауының таулы ормандарындағы зиянкес-бунақденелілерінің (*Scolytinae*) басымды түрлерімен олардың энтомофагтарының мониторингі баяндалған.

Іле Алатауының 6 шатқалында орман патологиялық зерттеулер жүргізілді және 2 шатқалда – Медеу және Бутаковкада – қалған учаскелермен салыстырганда ағаштардың әлсіреген жағдайы мен қабықжегі қоңыздарының көбеюі байқалды, бұл бұрын құлаган ағаштар мен жүргізілетін орманды қалпына келтіру жұмыстарының үлкен көлемінің салдары болып табылады. Агымдагы жылы Бутаковка шатқалында қабықжегілерден зиян шеккен 556 текше метр 8,3 га қураған орманды кесу жоспарлануда. Феромон тұтқыларын қолдану мониторингі әртүрлі шатқалдарда және әртүрлі биіктік деңгейлерде, шырша басында, ортасында және аягында (1650 м.м. бастап 2750 м.м. дейін) жүргізілді. Ең көп қабықжегі Медеу филиалының Бутаковка шатқалында – 731 дана, ал ең аз саны Түрген филиалының Есік шатқалында – 122 дана жиналды. Бутаковка шатқалында қабықжегі ошағы Медеу желінен пайда болды, онда бұрын қабықжегілердің жаппай көбеюі үшін үлкен азық базасы пайда болды. Іле Алатауы МҰТП орман алаптарындағы Шренка шыршасы агаштарының орман патологиялық жагдайы тұтастай алғанда қанагаттанарлық, әлсіреген және қурап қалған ағаштар 11,0-31% құрайды. Медеу және Бутаковка шатқалында қабықжегілердің шабуылына байланысты басқа учаскелермен салыстырганда әлсіз жагдай байқалганы анықталды. Қалаға жақын орналасқан шатқалдардың алыс жерлерге қарағанда әлсіреуіне антропогендік факторлардың әсер ету ықтималдыгы бар. Орман зиянкестеріне қарсы күрестің биологиялық құралдарынан ормандардың санитарлық жағдайын жақсарту мақсатында құстарга арналған ұялардан басқа, ремиз учаскелерін құру, қорга-

ныштық өңдеу үшін қабықжегілерге және басқа да ксилофагтарға қарсы препараттарды тіркеуді жүргізу қажет. Шренка шыршасына *Ips hauserireitt* Гаузер қабықжегісі орта есеппен 1 дм^2 палеткасына 2,8 данадан 5,5 данаға дейін қоныстануды құрады. Агымдағы жылы қабықжегілер тұқымдасынан (Scolytidae) 17 түрі кездесін, осы түрлердің ішіндегі ең басымдылық танытқандары: *Ips hauseri* Reitt, *Hylastes substriatus* Strohmeyer 1914, *Hylurgops palliatus* Gyllenhal, 1813.

Түйін сөздер: Шренка шыршасы, зиянкес-бунақдене, қабықжегі, энтомофаг, феромандыт тұтқы.

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ДОМИНАНТНЫЕ ВИДЫ НАСЕКОМЫХ-КСИЛОФАГОВ *(SCOLYTINAE)* И ИХ ЭНТОМОФАГОВ НА ЕЛИ ШРЕНКА

Аннотация. В статье приводятся результаты мониторинга за популяцией доминантных видов насекомых-ксилофагов *(Scolytinae)* и их энтомофагов в горных лесах Заилийского Алатау.

Проведены лесопатологические обследования в 6-ти ущельях Заилийского Алатау и было определено, что в 2-х ущельях – Медеуском и Бутаковском – наблюдается ослабленное состояние по сравнению с остальными участками, а также заметны куртинные усыхания из-за нашествия жуков-короедов, что, вероятно, является следствием большого объёма ранее поваленных деревьев и проводимыми лесовосстановительными работами. В текущем году в Бутаковском ущелье от вредоносности короедами планируется вырубить 8,3 га поврежденного леса, объёмом 556 куб.м. Мониторинг с применением феромоновых ловушек проводили в различных ущельях и на различных высотных уровнях, в начале произрастания ельников, в середине и завершении (от 1650 м.н.у.м. до 2 750 м.н.у.м.). Наибольшее количество короедов было собрано на нижней высоте в Бутаковском ущелье Медеуского филиала – 731 шт, а наименьшее количество – в Иссыкском ущелье Тургенского филиала – 122 шт. В Бутаковском ущелье очаг короедов возник из-за ветровала в Медеу, где ранее образовалась большая кормовая база для массового размножения короедов. Лесопатологическое состояние деревьев ели Шренка в лесных массивах Иле-Алатауского ГНПП оценивается в целом как удовлетворительное, усыхающие и суховершинные насаждения составляют 11,0-31%. Установлено, что в Медеуском и Бутаковском ущелье наблюдается ослабленное состояние по сравнению с другими участками из-за нашествия жуков-короедов. Ущелья, находящиеся ближе к городу, более ослабленные, чем отдаленные участки, вероятность воздействия на них антропогенных факторов выше. С целью улучшения санитарного состояния лесов из биологических средств борьбы с вредителями леса, помимо гнездовий для птиц, необходимо создавать ремизные участки, проводить регистрацию препаратов против короедов и других ксилофагов для защитных обработок. Заселенность короедом Гаузера *Ips hauseri* Reitt 1895 на ели Шренка в среднем на одну палетку 1дм^2, составило от 2,8 до 5,5 штук. В текущем году из семейства короедов (Scolytinae) встречались 17 видов, самым встречаемый из этих видов был короед Гаузера (*Ips hauseri* Reitt), киргизский корнежил *(Hylastes substriatus* Strohmeyer 1914) и лубоед фиолетовый или малый еловый лубоед *(Hylurgops palliatus* (Gyllenhal, 1813).

Ключевые слова: ель Шренка, насеком-ксилофаг, короед, энтомофаг, феромон.

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