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ПРОДУКТЫ С ПОВЫШЕННОЙ АНТИОКСИДАНТНОЙ АКТИВНОСТЬЮ НА ОСНОВЕ ПРОРОЩЕННОЙ КУКУРУЗЫ

Проведены исследования антиоксидантной активности продуктов длительного хранения на основе пророщенных зерен кукурузы и содержание минеральных элементов участвующих в окислительно-востановительных процессах.

Ключевые слова: кукуруза, антиоксиданты, пророщенные зерна.

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PRODUCTS PREPARED FROM GERMINATED CORN WITH HIGH ANTIOXIDANT ACTIVITY

Investigations of the antioxidant activity of long-storage products prepared from germinated corn and the content of mineral elements participating in redox processes.

Keywords: corn, antioxidants, germinated seeds.

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STUDY OF SAPROXYLIC BEETLES OF SOME TREE SPECIES IN THE TUGAI FORESTS OF THE ILI RIVER

Abstract

The composition and structure of the Saproxylic beetles fauna were studied in the tugai forests of the Ili River in Kazakhstan. The research was related to the study of distribution features of the Saproxylic beetle species which inhabit the Bloomy poplar Populus pruinosa Schrenk and the Relic hygrophilous ash Fraxinus sogdiana Bunge in the tugai forests of the Ili River. There are Curculionidae for both tree species and Anobiidae in the Ash trees as well as Melyridae in the Poplar have the highest number of specimens among the rest Families of Saproxylic beetles.

Key words: tugai forests, saproxylic beetles, pests, poplar, ash.

The tugai forests, known as the tugais, are intrazonal forests formations which grow along bottom lands of rivers in arid regions. These forests are called intrazonal forests because they are not separate zones. They are like inclusions in an extensive arid zone but they are intra-area vegetation which is different from the main background arid flora [1]. Tugai forests are the riparian forests along the rivers in the continental, winter-cold deserts of Central Asia [2]. The

tugai forests grow along watersides of the Southern rivers of Kazakhstan: Syrdarya, Chu, Ili, Karatal.

Because of the specificity of the tugai forests, such as a peculiarity of the trees and shrubs, conditions of the climate, soil and hydrology, they have their own species of insect fauna. In spite of the harsh climatic conditions, low humidity and species limitations of trees and shrubs, the forest insect fauna is very diverse in the tugais [3]. Beetles are the most important component of the insect fauna of the tugai forests. Xylophylic beetles, a part of the Saproxylic beetles, are the ecological group that brings together species which have all or most of their life cycle under bark or in the wood of dead or weakened trees. Saproxylic beetles play a constructive and destructive role in the forests.

The composition and structure of the Saproxylic beetles fauna were studied in the tugai forests of the Ili River in Kazakhstan. The research was related to the study of distribution features of the Saproxylic beetle species which inhabit the Bloomy poplar Populus pruinosa Schrenk (the Poplar) and the Relic hygrophilous ash Fraxinus sogdiana Bunge (the Ash) in the tugai forests of the Ili River.

Four localities were chosen in the tugai forests. Two localities were with trees of the Ash and they were situated in the Charyn State National Nature Park, Almaty region. The third locality was with trees of the Poplar and it was situated in Kurty Forest Enterprise, Almaty region. The fourth locality was also with trees of the Poplar and it was situated in Kyzyl-Zhide Forest Enterprise, Almaty region. There were twenty trees on each locality, so the total number of trees was eighty. GPS coordinates were identified for each tree. The environmental parameters were measured for each tree: habitat (canopy openness), amount of dead wood, tree composition, density of shrubs, estimations of river or other objects from window traps. Also there were measured tree parameters: circumference of the tree, height of the tree, height to the first dead branch and height to the first green branch, sanitary condition of the tree, presence or absence of fungi, a number of holes in the stem, presence or absence wood without bark, a number of hanging branches.

Methods of the research included using the window traps for catching beetles. The universal window trap is served for catching of insects which migrate in the air and this trap is effective for all the directions of the migration (Figure 1). The action of the window trap is following: migrant insects colliding with the guide surfaces fall down and get into the bottle.

Fig. 1 – Window trap in the tugai forest

Fig. 2 – Collection of insects

Insects were collected every two weeks in the vegetation period (Figure 2). Collected material was put into plastic bags with the number of the window trap and period of the collection. The bags with insects were sorted in the laboratory of entomology. Insects were

divided to Orders and counted separately for each locality. Coleoptera (beetles) were prepared to identification by glued to labels with insect pins and put into entomological boxes. Labels with the name of the region, number of a trap, GPS coordinates of the tree, period of collection, and names of collectors were attached to the each label with glued beetles. Order Coleoptera was identified to the Family level.

After the field material was sorted it was found that there were insects from twelve Orders (Table1).

Table 1 – Numbers of insect Orders from four localities

No	Names of Orders	The Ash		The Poplar	
		Locality 1	Locality 2	Locality 3	Locality 4
1	Odonata	4	9	5	12
2	Mantodea	0	0	0	4
3	Orthoptera	15	10	2	9
4	Dermaptera	0	0	79	1
5	Thysanoptera	17	8	15	22
6	Hemiptera: Auchenorrhyncha	278	625	578	329
7	Hemiptera: Sternorrhyncha	120	196	580	649
8	Hemiptera: Heteroptera	387	1743	79	80
9	Raphidioptera	31	69	0	17
10	Neuroptera	30	89	16	18
11	Diptera	1044	789	1248	530
12	Lepidoptera	137	193	112	133
13	Hymenoptera without Formicidae	345	403	292	320
14	Hymenoptera: Formicidae	322	379	4313	4502
15	Coleoptera	1581	1975	1602	1425

Orders Coleoptera (1581 in the first locality and 1975 – in the second), Diptera (1044 in the first locality and 789 – in the second) and Hemiptera: Heteroptera (387 in the first locality and 1743 – in the second) have the highest number of specimens for the Ash. For the Poplar Orders Hymenoptera: Formicidae (4313 in the third locality and 4502 – in the fourth) and Coleoptera (1602 in the third locality and 1425 – in the fourth) have the highest number of specimens.
There were identified beetles from 49 Families of Coleoptera (Table 2).

Table 2 – Number of beetles of Coleoptera Families from four localities

No	Names of Families	Fraxinus		Populus	
		Locality 1	Locality 2	Locality 3	Locality 4
1	2	3	4	5	6
1	Staphylinidae	98	147	29	147
2	Mycetophagidae	141	127	3	1
3	Heteroceridae	0	1	1	1
4	Tenebrionidae	137	163	109	19
5	Elateridae	183	242	55	108
6	Dermestidae	154	166	90	118
7	Anobiidae	261	108	8	142
8	Melyridae	28	65	149	3
9	Oedemeridae	10	3	1	0
10	Cantharidae	3	4	1	0
11	Scraptiidae	137	25	8	10

12	Cerambycidae	4	7	0	22
13	Cleridae	16	28	7	9
14	Bostrichidae	3	4	5	1
15	Buprestidae	4	4	2	11
16	Meloidae	0	9	2	0
17	Ripiphoridae	0	15	0	0
18	Scarabaeidae	102	92	78	71
19	Nitidulidae	1	3	132	7
20	Histeridae	18	20	47	34
21	Noteridae	0	1	0	0
22	Leiodidae	2	9	0	2
23	Laemophloeidae	0	3	8	10
24	Scirtidae	0	0	0	6
25	Corylophidae	0	2	0	8
26	Clambidae	0	1	0	1
27	Colydiidae	0	1	0	0
28	Cryptophagidae	4	4	2	1
29	Monotomidae	1	3	1	0
30	Limnichidae	0	2	0	0
31	Throscidae	1	2	1	6
32	Phalacridae	0	0	0	1
33	Endomychidae	2	4	0	0
34	Coccinellidae	15	19	73	44
35	Ciidae	10	8	1	2
36	Silvanidae	0	0	0	4
37	Aderidae	1	1	0	0
38	Hydrophilidae	0	0	1	14
39	Trogossitidae	1	1	1	0
40	Eucnemidae	0	0	2	0
41	Erotylidae	15	40	1	16
42	Anthicidae	22	36	2	9
43	Carabidae	15	23	1	26
44	Corticariidae	21	7	3	1
45	Chrysomelidae	8	43	18	48
Continuation of Table 2					
1	2	3	4	5	6
46	Dryopidae	0	1	0	0
47	Mordellidae	6	6	2	1
48	Anthribidae	1	2	0	0
49	Curculionidae: Scolytinae	7	158	1	2
50	Curculionidae	148	365	883	540

There are Curculionidae for both tree species and Anobiidae in the Ash trees as well as Melyridae in the Poplar trees have the highest number of specimens among the rest Families of Saproxylic beetles.

According to received data there are a lot of Saproxylic beetles of the trees of the Ash and the Poplar in the tugai forests of the Ili River. In future beetles from all Families will be identified to the Species level.

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ҚАЗАҚСТАННЫҢ ІЛЕ ӨЗЕНІ АЛАБЫНЫҢ ТОҒАР ОРМАНДАРЫНДА САПРОКСИЛЬДІ ҚОҢЫЗДАРҒА ЗЕРТТЕУ ЖҮРГІЗУ

Қазақстанның Іле өзені алабының тоғар ормандарында сапроксильді қоңыздарға зерттеу жүргізілді. Зерттеу торaңғы ағашында Populus pruinosa Schrenk және согдиан шетен ағашында Fraxinus sogdiana Bunge өмір сүретін жәндіктермен байланысты. Зерттеу жұмыстарының нәтижесінде екі ағаш түрінен де сапроксильді қоңыздардың Curculionidae туыстығы анықталды, сонымен қатар Anobiidae туыстығы согдиан шетен ағашында Curculionidae туыстығы мен ылғал сүйгіш теректе Melyridae туыстығы анықталды.

Кілт сөздер: тоғай ормандары, сапроксильді қоңыздар, зиянкестер, торaңғы, шетен.

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ИЗУЧЕНИЕ САПРОКСИЛЬНЫХ ЖУКОВ НЕКОТОРЫХ ВИДОВ ДЕРЕВЬЕВ В ТУГАЙНЫХ ЛЕСАХ РЕКИ ИЛИ

Проводилось изучение сапроксильных видов жуков на территории тугайных лесов реки Или в Казахстане. Исследование было связано с насекомыми, обитающими на Туранге сизолистной Populus pruinosa Schrenk и Ясене согдианском Fraxinus sogdiana Bunge. В результате проведенных работ наиболее многочисленными семействами сапроксильных жуков определено семейство Curculionidae для обоих видов деревьев, а также семейство Anobiidae для ясеня согдианского и семейство Melyridae для тополя влаголюбивого.

Ключевые слова: тугайные леса, сапроксильные жуки, вредители, туранга, ясень.