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Article

The first attempt to study the habitat-related distribution of the owlet moths (Lepidoptera: Noctuoidea) in the mountains of Central Asia using low-power UV-sources

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Abstract. For the first time, the habitat-related distribution of the owlet moths in the central part of the northern slope of the Kyrgyz Mountain Range was studied with the help of low-power UV-sources. In total, 174 species in seven types of habitats were identified: 78 species in the sagebrush-fescue steppe, 111 species, in the forb-feather grass steppe, 94, in the xerophytic meadow, 49, in the subalpine meadow and in the thickets of shrubs each, 40, in the mixed forest, and 13 species in the coniferous forest. The fauna of Noctuoidea at most stations in the study area are not similar, but the stations that are similar by conditions (both types of steppes and a xerophytic meadow, thickets of shrubs and mixed forest) are combined into clusters. The number of eurybiont species among those noted for the studied locality is 85%. The share of Central Asian endemics among stenobiont species exceeds 57%.

Key words: owlet moths, habitat-related faunas, Middle Asia, Kyrgyzstan, analysis

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Научная статья

Первый опыт изучения стациального распределения совкообразных чешуекрылых (Lepidoptera: Noctuoidea) в горах Средней Азии с использованием маломощных источников УФ-излучения

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Аннотация. С помощью маломощных источников УФ-излучения впервые изучено стациальное распределение совкообразных чешуекрылых в центральной части северного склона Киргизского хребта. Выявлено 174 вида, распределенных по 7 стациям: 78 в полынно-типчаковой степи, 111 в разнотравно-ковыльной степи, 94 на ксерофитном лугу, 49 на субальпийском лугу, 49 в зарослях кустарников, 40 в смешанном лесу, 13 в хвойном лесу. Показано, что фауны Noctuoidea большинства стаций на исследованной территории несходны, однако близкие по условиям стации (оба типа степей и ксерофитный луг, заросли кустарников и смешанный лес) объединяются в кластеры. Количество эврибионтных видов среди отмеченных для исследованного локалитета составляет 85%. Доля среднеазиатских эндемиков среди стенобионтных видов составляет более 57%.

Ключевые слова: совки, ноктуоидные, фауны, Киргизия, анализ

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Introduction

The issue of studying the habitat-related distribution of owlet moths is not new (Merckx et al., 2013), but there is no research devoted to this topic for the Central Asian region. Fragmentary information on habitat-related distribution is available for pests of agriculture and forestry (Artokhin et al., 2017), as well as for a few species found during the daytime (Fefelova and Frolov, 2007; Duthie, 1983; Gelbrecht et al., 2008). A large part of this fauna, – the species that are active only at night, – still remains unexplored in this respect.

The study of the habitat-related distribution of Noctuoidea (as well as, in fact, nocturnal Lepidoptera as a whole) was not possible until recently due to the peculiarities of the collection method. Sampling was carried out mainly by attracting powerful mercury or mercury-quartz lamps to UV radiation, located at a 1.5–2.5-m height from the ground opposite a white screen that performed a reflective function, as well as a substrate for landing insects (Derzhinsky, 2016). Using this collection method, it is impossible to separate the inhabitants of biotopes close to the radiation source from insects that have arrived from afar.

Recently, the power of UV emitters for collecting nocturnal insects has begun to be reduced (Weinzieri et al., 1990), up to designing them based on low-emission LEDs (Cohnstaedt et al., 2008), so the location of the radiation source is shifted as close as possible to the ground, being almost just above the soil surface (Russo et al., 2011). Such innovations make it possible to solve two problems at once: (1) to reduce significantly the attraction distance for the insects and (2) to increase the catching efficiency significantly. Many insects that do not have a strong flight (microlepidoptera, small beetles, etc.) cannot overcome the distance from the ground to the radiation source (1.5–2.5 m); therefore, most of them are not included in the counts physically. The same are true for flightless insects. Therefore, there is a shift in the aim from collecting well-flying insects from a large area to collecting the maximum number of species from a small area.

The described change in the collection methods allows us to focus on the study of individual stations, even of a relatively small size. Low-power UV emitters (15 W) are characterized by the attraction distance, which often do not exceed 10 m for insects (Truxa and Fiedler, 2012); this makes it possible to install a light trap based on such source of radiation at a larger station and to be sure that insects attracted from the stations distanced not far away will not be attracted by this one.

Our reseach is the first experience of studying the habitat-related distribution of owlet moths (Lepidoptera: Noctuoidea) in the mountains of Central Asia using low-power sources of UV radiation.

Materials and methods

The study was performed from April 2014 to April 2021 on the northern slope of the central part of the Kyrgyz Mountain Range, on the meridian of the city of Bishkek; the studied locality is the Ala-Archa Gorge. The presence of a road about 24-km long from the base (altitude about 1000 m a.s.l.) to the middle part of the gorge (altitude about 2400 m a.s.l.) allows one to install quickly automatic autonomous light traps based on low-power UV lamps with car along the entire route and to remove them just as quickly.

In the low part of the Ala-Archa Gorge (1000–1500 m a.s.l.), there are sagebrush-fescue steppes. Uphill, they are replaced by forb-feather grass steppes (1500–1700 m a.s.l.). Above 1500 m a.s.l., steppe formations are replaced by meadows of different types: xerophytic (1500–2000 m a.s.l.) and subalpine (2000–2400 m a.s.l.). At the bottom of the gorge, there are dense thickets of shrubs (spirea, sea buckthorn, barberry, wild rose, and willow). Starting from 1500 m a.s.l., there are separate groves of mixed forests on the slopes surrounding the gorge, from 1700 m above the sea level, coniferous forests. Studies of the fauna of owlet moths (Lepidoptera) have been carried out in all these habitats.

The samples were collected by automatic autonomous light traps equipped with 8-W UV-sources. The design of the light trap was described earlier (Korb, 2018). The light traps were installed at the study sites (stations) during a short time interval from 20:00 to 21:00 (by means of a car, as mentioned above), one trap per station. The traps were removed the next morning from 6:00 to 7:00 by the same procedure. On average, they were installed for 30 nights.

The insects were identified according to the keys of the series “The Witt Catalog” (Ronkay et al., 2008) and “Noctuidae Europaeae” (Fibiger and Hacker, 2005). In difficult cases, experts were invited: O. Pekarsky (O. Pekarsky, Budapest, Hungary) and A.Yu. Matov (Zoological Institute of Russian Academy of Sciences, St. Petersburg, Russia). Data processing was performed using MS Excel 2019 and SPSS Statistics 26.0.0.1. The Jaccard coefficient (*K,* coefficient of similarity) was used to assess the measure of similarity between faunas.

Results and discussion

In total, 174 species of owlet moths were recorded when studying 7 stations of different habitat types at the Ala-Archa Gorge (Table 1).

Comparison of the faunas of the studied stations brought to the unexpected results (Table 2). The faunas of diurnal butterflies at the stations of one complex (different types of steppes, meadows, forests) were usually similar (Khanamiryan and Aghababyan, 2012; Sasova, 1993; van Swaay et al., 2006), but the faunas of nocturnal owlet moths were conditionally similar (similarity coefficient $K \geq 0.50$) of only the steppe complex of stations (sagebrush-fescue and forb-feather grass steppe); the K value for these stations was 0.50, which was the minimum for similar faunas. The xerophytic meadows and the forb-feather grass steppes were characterized by $K = 0.49$, which was very close to similarity; nevertheless, these faunas were dissimilar. In addition, $K = 0.47$ for nocturnal fauna (Noctuoidea) of the mixed forest and shrubs, which was also quite close to the boundary value of 0.50. Both types of steppes and the xerophytic meadow were combined into one cluster; the same was true for bush and mixed forest faunas, when applying visualization methods to track the similarity of the faunas of the studied stations (Fig. 1). This phenomenon may be explained by the similarity of conditions at these stations; however, no causes have yet been clarified for the dissimilarity of faunas.

Among the noted species, eurybiont species made up most of the diversity (148 species out of 174 found), registered more than at one station. 31 species (20.9% of eurybiont species and 17.8% of their total number) was found at the stations of the steppe complex only; 11 species (7.4% and 6.3%, respectively), in the meadow complex only; 10 species (6.7% and 5.7%, respectively), in the forest complex (including bushes) only. The remaining 96 species (65.0% and 70.2%, respectively) were found in the habitats of more than one complex.

The following species were registered in all habitat-related complexes: *Drasteria obscurata, D. caucasica, Diachrysia chrysitis, D. stenochrysis, Autographa gamma, Cornutiplusia circumflexa, Raphia approximata, Tyta luctuosa, Lophoterges centralasiae, Bryoxena centralasiae, Bryophila raptricula, Apamea ferrago, A. lateritia, Mythimna vitellina, Agrotis exclamationis,* and *Xestia baja;* or 9.2% of the total number of species. Four species were found at all stations: *Autographa gamma, Tyta luctuosa, Mythimna vitellina,* and *Agrotis exclamationis.* All of them have a wide geographical distribution; *Autographa gamma, Tyta luctuosa* and *Agrotis exclamationis* inhabit the entire Palearctic (Fibiger and Hacker, 2005; Ronkay et al., 2008), *Mythimna vitellina* distributed in the Eastern and Central Palearctic (Fibiger and Hacker, 2005). When considering other species found in all habitats, four have Central Asian ranges: *Drasteria obscurata, Raphia approximata, Lophoterges centralasiae,* and *Bryoxena centralasiae.*

The number of stenobiont species was 26; their presence at habitats was completely different. These included *Furcula terminata, Zekelita ravalis, Spilosoma urticae, Pelosia obtusa, Eublemma pulchralis, Acantholipes regularis, Clytie gracilis, Euchalcia anthea, E. aranka, Autographa monogramma, Syngrapha alaica, Armada panaceorum, Cucullia boryphora, Hypsophila jugorum, Caradrina expansa, C. sogdiana, Athetis lepigone, Polymixis trisignata, Dasypolia diva, D. shugnana, Perigrapha yasawii, P. heidi, Actebia confusa, Dichagyris melanuroides, Agrotis bigramma, Cerastis rubricosa.* More than half of these species (57.7%) were Central Asian endemics: *Clytie gracilis, Euchalcia anthea, E. aranka, Autographa monogramma, Syngrapha alaica, Armada panaceorum, Hypsophila jugorum, Caradrina expansa, C. sogdiana, Dasypolia diva, D. shugnana, Perigrapha yasawii, P. heidi, Actebia confusa,* and *Dichagyris melanuroides*. The remaining 42.3% of stenobiont species had wide (mainly Palearctic) ranges.

Conclusion

The owlet moths inhabiting Ala-Archa Gorge are characterized by a significant predominance of eurybiont species (85% of the total number of species) over stenobiont ones. Among the stenobiont species, slightly more than a half (57%) are Central Asian endemics. The discovered eurybiont species are mainly widespread. Among 26 stenobiont species, 11 species (42.3%) are widespread species; among 148 eurybiont species, these are 96 species (66.2%).

Among the studied habitats, only the stations of the steppe complex (sagebrush-fescue and forb-feather grass steppes) have faunistic similarity. The xerophytic meadows are dissimilar to the forb-feather grass steppe, although the K value is very close to similarity ($K = 0.49$), like for the faunas of shrubs and mixed forests ($K = 0.47$). The grouping of these stations into clusters indicates the commonality of their origin. Presumably, this picture is a consequence of the similarity of conditions in the studied habitats with a relatively low share of stenobiont species..

Table 1. Habitat-related distribution of owlet moths in the central part of the northern slope of the Kyrgyz Mountain Range: 1 – sagebrush-fescue steppe, 2 – forb-feather grass steppe, 3 – xerophytic meadow, 4 – subalpine meadow, 5 – thickets of shrubs, 6 – mixed forest, 7 – coniferous forest.

No.	Species	Study site no.						
		1	2	3	4	5	6	7
1	*Furcula terminata* Wiltshire, 1958	–	–	–	–	+	–	–
2	*Notodonta tritophus* (Denis et Schiffermueller, 1775)	–	–	–	–	+	+	–
3	*N. ziczac* (Linnaeus, 1758)	–	–	–	–	+	+	–
4	*Clostera anachoreta* (Denis et Schiffermueller, 1775)	–	–	+	–	+	–	–
5	*Hypena rostralis* (Linnaeus, 1758)	–	+	+	–	–	–	–
6	*Zekelita ravalis* (Herrich-Schäffer, 1851)	–	+	–	–	–	–	–
7	*Lymantria dispar* (Linnaeus, 1758)	–	–	–	–	+	+	
8	*Carcinopyga proserpina* Staudinger, 1887	–	+	+	–	+	–	–
9	*Tyria jacobaeae* (Linnaeus, 1758)	–	–	+	+	+	–	–
10	*Lacydes spectabilis* (Tauscher, 1806)	+	+	–	–	–	–	–
11	*Arctia intercalaris* (Eversmann, 1843)	–	–	–	+	–	+	–
12	*A. caja* (Linnaeus, 1758)	+	+	+	–	–	–	–
13	*Chelis strigulosa* (Böttcher, 1905)	–	+	+	–	–	–	–
14	*Diacrisia sannio* (Linnaeus, 1758)	–	–	+	+	–	–	–
15	*Eudiaphora turensis* (Erschoff, 1874)	+	+	+	–	–	–	–
16	*Spilosoma urticae* (Esper, 1789)	–	+	–	–	–	–	–
17	*Phragmatobia fuliginosa* (Linnaeus, 1758)	+	+	+	–	+	–	–
18	*Pelosia obtusa* (Herrich-Schäffer, [1852])	–	–	–	+	–	–	–
19	*Manulea complana* (Linnaeus, 1758)	+	+	–	–	–	–	–
20	*Calyptra thalictri* (Borkhausen, 1790)	–	–	+	–	–	+	–
21	*Lygephila craccae* (Denis et Schiffermueller, 1775)	+	+	+	–	–	–	–
22	*Apopestes phantasma* (Eversmann, 1843)	+	–	–	–	–	–	–
23	*Eublemma pannonica* (Freyer. 1789)	+	+	–	–	–	–	–
24	*E. amoena* (Hübner, [1803])	+	+	+	–	–	–	–
25	*E. purpurina* (Denis et Schiffermueller, 1775)	+	+	–	–	–	–	–
26	*E. pulchralis* (de Villers, 1789)	+	–	–	–	–	–	–
27	*E. pallidula* (Herrich-Schäffer, [1856])	+	+	–	–	–	–	–
28	*E. griseola* (Erschoff, 1874)	–	+	+	–	–	–	–
29	*Odice arcuinna* (Hübner, 1790)	+	+	+	–	–	–	–
30	*Pericyma albidentaria* (Freyer, [1841])	–	+	–	–	–	–	–
31	*Acantholipes regularis* (Hübner, [1813])	+	–	–	–	–	–	–
32	*Drasteria sculpta* (Püngeler, 1904)	–	+	+	–	–	–	–
33	*D. obscurata* (Staudinger, 1882)	–	+	+	+	+	+	–
34	*D. saisani* (Staudinger, 1882)	+	+	+	–	–	–	–
35	*D. caucasica* (Kolenati, 1846)	+	+	+	–	+	+	–

No.	Species	Study site no.						
		1	2	3	4	5	6	7
36	*Catocala nupta* (Linnaeus, 1758)	–	–	–	–	+	+	–
37	*C. afghana* Swinhoe, 1885	+	+	–	–	–	–	–
38	*C. neonympha* (Esper, 1805)	–	+	+	–	–	+	–
39	*C. puerpera* (Giorna, 1791)	–	–	–	–	+	+	–
40	*C. pudica* (Moore, 1879)	–	–	–	–	+	+	–
41	*Callistege mi* (Clerck, 1759)	+	+	–	–	–	–	–
42	*Clytie gracilis* (Bang-Haas, 1907)	+	–	–	–	–	–	–
43	*Abrostola tripartita* (Hufnagel, 1766)	–	+	+	–	+	–	–
44	*Trichoplusia ni* (Hübner, 1803)	+	+	–	–	–	–	–
45	*Euchalcia anthea* L. Ronkay, G. Ronkay et Behounek, 2008	–	–	+	–	–	–	–
46	*E. herrichi* (Staudinger, 1861)	–	–	–	+	–	+	–
47	*E. aranka* Hacker et Ronkay, 1993	–	–	–	+	–	–	–
48	*Polychrysia esmeralda* (Oberthür, 1880)	–	–	+	+	–	+	–
49	*Diachrysia chrysitis* (Linnaeus, 1758)	–	+	+	+	+	+	+
50	*D. stenochrysis* (Warren, 1913)	+	+	+	–	–	+	–
51	*Macdunnoughia confusa* (Stephens, 1850)	+	+	–	–	–	–	–
52	*Autographa gamma* (Linnaeus, 1758)	+	+	+	+	+	+	+
53	*A. camptosema* (Hampson, 1813)	–	–	+	+	–	–	–
54	*A. monogramma* (Alphéraky, 1887)	–	–	–	+	–	–	–
55	*Cornutiplusia circumflexa* (Linnaeus, 1758)	–	+	+	–	+	+	–
56	*Syngrapha alaica* (Galvagni, 1906)	–	–	–	–	–	–	+
57	*Acontia trabealis* (Scopoli, 1763)	+	+	+	–	–	–	–
58	*A. lucida* (Hufnagel, 1766)	+	+	–	–	–	–	–
59	*Armada clio* (Staudinger, 1884)	+	+	–	–	–	–	–
60	*A. panaceorum* (Ménétriès, 1849)	+	–	–	–	–	–	–
61	*Raphia approximata* Alphéraky, 1887	–	+	+	+	+	+	–
62	*Acronicta psi* (Linnaeus, 1758)	–	–	–	–	+	+	–
63	*A. centralis* Erschoff, 1874	–	+	+	–	+	–	–
64	*A. rumicis* (Linnaeus, 1758)	–	–	–	–	+	+	+
65	*Simyra nervosa* (Denis et Schiffermueller, 1775)	+	+	+	–	–	–	–
66	*Dismylichia bicyclica* (Staudinger, 1888)	+	+	–	–	–	–	–
67	*Tyta luctuosa* (Denis et Schiffermueller, 1775)	+	+	+	+	+	+	+
68	*Cucullia absinthii* (Linnaeus, 1758)	–	+	+	–	–	–	–
69	*C. cineracea* Freyer, [1841]	+	+	+	–	–	–	–
70	*C. infuscata* Tshetverikov, 1925	+	+	–	–	–	–	–
71	*C. umbratica* (Linnaeus, 1758)	+	+	+	–	–	–	–
72	*C. boryphora* Fischer von Waldheim, 1840	+	–	–	–	–	–	–

No.	Species	Study site no.						
		1	2	3	4	5	6	7
73	*C. tanaceti* (Denis et Schiffermueller, 1775)	+	–	–	–	–	–	–
74	*C. asteris* (Denis et Schiffermueller, 1775)	+	+	+	+	–	–	–
75	*C. kurilullia* Bryk, 1942	+	+	+	–	–	–	–
76	*Shargacucullia verbasci* (Linnaeus, 1758)	+	+	+	–	–	–	–
77	*Hypsophila jugorum* (Erschoff, 1874)	–	–	–	+	–	–	–
78	*Lophoterges centralasiae* (Staudinger, 1901)	–	+	+	+	+	+	–
79	*L. varians* Ronkay, 2005	–	+	+	+	–	–	–
80	*Bryopolia chrysospora* Boursin, 1954	–	+	+	–	–	–	–
81	*B. chameleon* (Alphéraky, 1887)	–	–	+	+	–	–	–
82	*Bryoxena centralasiae* (Staudinger, 1882)	–	+	+	+	–	+	–
83	*B. tenuicornis* (Alphéraky, 1887)	–	–	+	+	–	–	–
84	*Amphipyra tragopoginis* (Clerck, 1759)	–	+	–	–	–	+	–
85	*Protoschinia scutosa* (Denis et Schiffermueller, 1775)	+	+	+	–	–	–	–
86	*Heliothis viriplaca* (Hufnagel, 1766)	+	+	–	–	–	–	–
87	*H. adaucta* Butler, 1878	+	+	–	–	–	–	–
88	*Helicoverpa armigera* (Hübner, [1808])	+	+	–	–	–	–	–
89	*Cryphia ravula* (Hübner, 1813)	+	+	–	–	–	–	–
90	*C. distincta* (Christoph, 1887)	+	+	–	–	–	–	–
91	*C. rueckbeili* (Boursin, 1953)	–	+	+	–	–	–	–
92	*C. receptricula* (Hübner, [1803])	+	+	–	–	–	–	–
93	*Bryophila plumbeola* (Staudinger, 1881)	–	+	+	+	–	–	–
94	*B. dolopis* Hampson, 1908	+	+	+	–	–	–	–
95	*B. raptricula* (Denis et Schiffermueller, 1775)	+	+	+	–	+	+	+
96	*Caradrina expansa* Alphéraky, 1887	–	+	–	–	–	–	–
97	*C. terrea* Freyer, [1839]	–	+	+	–	+	–	–
98	*C. sogdiana* Boursin, 1936	+	–	–	–	–	–	–
99	*C. genitalana* Hacker, 2004	+	+	–	–	–	–	–
100	*C. armeniaca* (Boursin, 1936)	–	+	+	–	–	–	–
101	*C. fergana* (Staudinger, 1892)	+	+	–	–	+	–	–
102	*C. clavipalpis* (Scopoli, 1763)	–	–	+	–	+	–	–
103	*Hoplodrina octogenaria* (Goeze, 1781)	–	+	–	–	+	+	–
104	*H. levis* (Staudinger, 1888)	–	+	+	–	+	–	–
105	*Athetis lepigone* (Möschler, 1860)	–	+	–	–	–	–	–
106	*Auchmis detersina* (Staudinger, 1896)	–	+	+	–	+	–	–
107	*Photedes fluxa* (Hübner, [1809])	–	+	+	–	–	–	–
108	*Apamea ferrago* (Eversmann, 1837)	–	+	+	+	+	+	+
109	*A. lateritia* (Hufnagel, 1766)	–	+	+	+	+	+	+

No.	Species	Study site no.						
		1	2	3	4	5	6	7
110	*Mesoligia furuncula* (Denis et Schiffermueller, 1775)	+	+	–	–	–	–	–
111	*Litoligia literosa* (Haworth, 1809)	–	+	+	–	–	+	–
112	*Mesogona oxalina* (Hübner, [1803])	–	–	+	+	–	+	–
113	*Agrochola lychnidis* (Denis et Schiffermueller, 1775)	+	–	–	–	+	–	–
114	*Eupsilia transversa* (Hufnagel, 1766)	–	+	–	–	+	+	–
115	*Cosmia affinis* (Linnaeus, 1758)	+	+	–	–	–	–	–
116	*C. ledereri* (Staudinger, 1897)	–	+	+	–	–	–	–
117	*Phidrimana amurensis* (Staudinger, 1892)	+	+	–	–	–	–	–
118	*Polymixis trisignata* (Ménétriès, 1849)	–	–	+	–	–	–	–
119	*Eremohadena immunda* (Eversmann, 1842)	+	+	+	–	–	–	–
120	*Dasypolia diva* Ronkay et Varga, 1990	+	–	–	–	–	–	–
121	*D. shugnana* Varga, 1982	+	–	–	–	–	–	–
122	*Orthosia pallidior* (Staudinger, 1888)	–	+	–	–	+	–	–
123	*O. incerta* (Hufnagel, 1766)	–	–	–	–	+	+	–
124	*O. opima* (Hübner, [1809])	–	–	–	–	+	+	–
125	*Perigrapha centralasiae* Bartel, 1906	+	+	–	–	–	–	–
126	*P. yasawii* Volynkon, Titov et Knyazev, 2014	+	–	–	–	–	–	–
127	*P. heidi* Hreblay, 1996	+	–	–	–	–	–	–
128	*Anarta trifolii* (Hufnagel, 1766)	+	+	+	–	–	–	–
129	*Haderonia arschanica* (Alphéraky, 1887)	–	–	–	+	–	+	+
130	*Ctenoceratoda tancrei* (Graeser, 1892)	–	+	+	–	–	–	–
131	*Polia bombycina* (Hufnagel, 1766)	–	–	+	+	+	+	+
132	*P. subcontigua* (Eversmann, 1852)	–	–	+	+	+	–	–
133	*Lacanobia w-latinum* (Hufnagel, 1766)	+	–	–	–	+	–	–
134	*L. suasa* (Denis et Schiffermueller, 1775)	+	+	+	+	–	–	–
135	*Heliophobus texturata* Alphéraky, 1892	–	–	–	+	+	+	–
136	*Hadena albimacula* (Borkhausen, 1792)	–	+	+	–	–	–	–
137	*H. intensa* Boursin, 1962	–	–	+	+	–	–	–
138	*H. strouhali* Boursin, 1955	–	–	+	+	–	–	–
139	*Mythimna vitellina* (Hübner, [1808])	+	+	+	+	+	+	+
140	*M. l-album* (Linnaeus, 1758)	+	+	–	–	–	–	–
141	*Lasionhada orientalis* (Alphéraky, 1882)	–	–	+	+	–	–	–
142	*Actebia squalida* (Guenee, 1852)	–	+	+	–	–	–	–
143	*A. confusa* (Alphéraky, 1882)	–	–	–	+	–	–	–
144	*Dichagyris vallesiaca* (Boisduval, 1837)	+	+	–	–	–	–	–
145	*D. candelisequa* (Denis et Schiffermueller, 1775)	+	+	–	–	–	–	–
146	*D. melanuroides* Kozhantshikov, 1930	+	–	–	–	–	–	–

No.	Species	Study site no.						
		1	2	3	4	5	6	7
147	*D. flammatra* (Denis et Schiffermueller, 1775)	+	+	–	–	–	–	–
148	*D juldussi* (Alphéraky, 1882)	–	–	+	+	+	+	–
149	*Euxoa conspicua* (Hübner, [1824])	+	+	+	–	–	–	–
150	*E. tritici* (Linnaeus, 1758)	–	+	+	–	–	–	–
151	*E. aquilina* (Denis et Schiffermueller, 1775)	+	+	+	–	–	–	–
152	*E. bogdanovi* (Erschoff, 1874)	–	+	+	–	–	–	–
153	*Feltia plumbea* (Alphéraky, 1882)	–	–	+	+	–	–	–
154	*Agrotis segetum* (Denis et Schiffermueller, 1775)	+	+	+	–	–	–	–
155	*A. turbans* Staudinger, 1888	+	+	–	–	–	–	–
156	*A. exclamationis* (Linnaeus, 1758)	+	+	+	+	+	+	+
157	*A. bigramma* (Esper, 1790)	–	+	–	–	–	–	–
158	*Cerastis rubricosa* (Denis et Schiffermueller, 1775)	–	+	–	–	–	–	–
159	*Eicomorpha antiqua* Staudinger, 1888	+	+	–	–	–	–	–
160	*Standfussiana socors* (Corti, 1925)	–	–	+	+	–	–	–
161	*Rhyacia similis* (Staudinger, 1881)	–	–	+	+	+	–	–
162	*R. junonia* (Staudinger, 1881)	–	–	+	+	–	–	–
163	*Chersotis sordescens* (Staudinger, 1900)	–	–	–	+	+	–	–
164	*C. transiens* (Staudinger, 1897)	–	+	+	+	–	–	–
165	*C. vicina* (Corti, 1930)	–	+	+	–	–	–	–
166	*Noctua orbona* (Hufnagel, 1766)	+	+	+	–	–	–	–
167	*Spaelotis deplorata* (Staudinger, 1897)	–	–	+	+	–	–	–
168	*Eurois occulta* (Linnaeus, 1758)	–	–	+	+	+	+	+
169	*Xestia baja* (Denis et Schiffermueller, 1775)	–	+	+	+	+	–	–
170	*X. xanthographa* (Denis et Schiffermueller, 1775)	+	+	–	–	–	–	–
171	*X. c-nigrum* (Linnaeus, 1758)	–	+	+	–	–	–	–
172	*Eugnorisma trigonica* (Alphéraky, 1882)	+	+	+	+	–	–	–
173	*Eugraphe senescens* (Staudinger, 1881)	–	–	+	+	–	–	–
174	*Isochlora viridissima* Staudinger, 1882	–	–	+	+	+	–	–
	TOTAL:	**78**	**111**	**94**	**49**	**49**	**40**	**13**

Table 2. Similarity of faunas (K) of owlet moths (Lepidoptera) studied stations. Designations as in Table 1.

Site no.	1	2	3	4	5	6
1	–	–	–	–	–	–
2	0.50	–	–	–	–	–
3	0.22	0.49	–	–	–	–
4	0.06	0.13	0.37	–	–	–
5	0.09	0.19	0.27	0.26	–	–
6	0.06	0.15	0.21	0.29	0.47	–
7	0.06	0.07	0.10	0.19	0.22	0.30

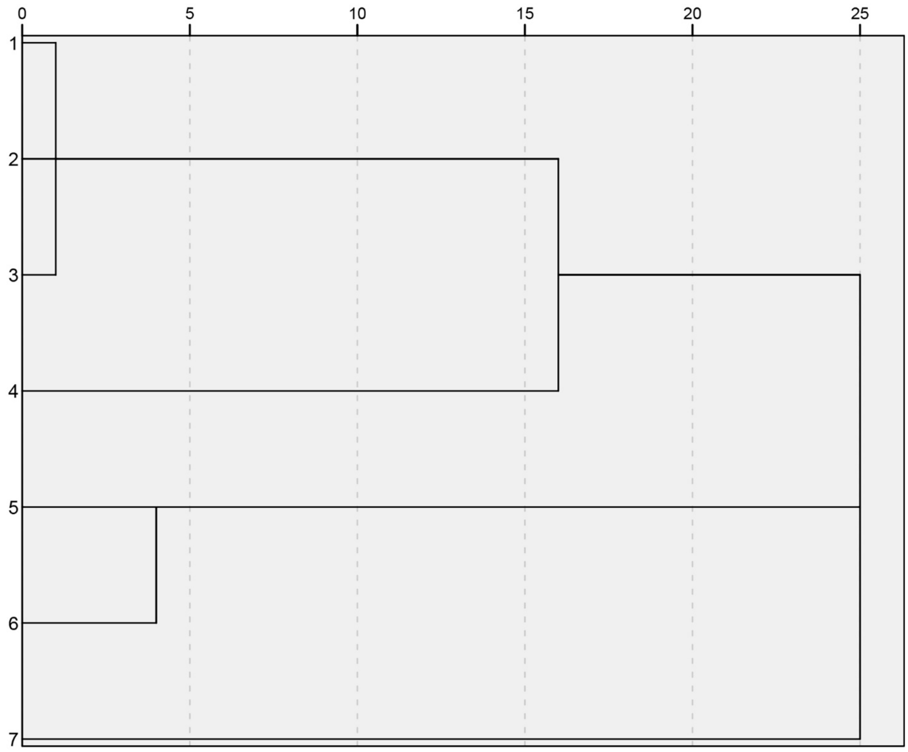

Fig. 1. Dendrogram of the similarity of the faunas of the owlet moths (Lepidoptera) from the studied habitats of the central part of the northern slope of the Kyrgyz Mountain Range. 1 – sagebrush-fescue steppe, 2 – forb-feather grass steppe, 3 – xerophytic meadow, 4 – subalpine meadow, 5 – thickets of shrubs, 6 – mixed forest, 7 – coniferous forest.

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