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STRUCTURE AND FEATURES OF CARABID FAUNA (COLEOPTERA, CARABIDAE) OF THE BAIKAL SIBERIA

Shilenkov V.G.

Department of Hydrobiology and Invertebrate Zoology, Irkutsk State University
664003, Irkutsk, Russia, e-mail: shilenkov@zooinv.isu.ru

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Abstract

Generic and specific structure of carabids of the Baikal Siberia, their chorology and ecological grouping are discussed. The special attention is given to steppe and high-mountainous faunas and their distribution on territory.

The carabid fauna of the Baikal Siberia is typically boreal, with prevalence in its structure of such genera as *Bembidion*, *Amara*, *Harpalus*, *Pterostichus*, *Carabus* etc., as a whole very characteristic for a moderate zone of the Palaearctic. Representatives of a part of these genera are mainly humicolous (*Pterostichus*, *Carabus*), others basically are connected to hydrophilous, marsh and meadow landscapes, i.e. as a whole are intrazonal elements (*Bembidion*, *Agonum*, *Nebria*, *Dyschiriodes*). The significant quantity of species belong to the inhabitants of open landscapes – steppes and forest-steppes, steppe meadows, heaths, many of them actively penetrate into an anthropogenous biotopes (*Amara*, *Harpalus*, *Curtonotus*, *Poecilus*). The halophilous species living on salt flats and coasts of salty lakes which by spots are scattered in a steppe zone (some *Dyschiriodes*, *Bembidion*, *Pogonus*, *Cicindela*) and are rather characteristic for the south of Baikal Siberia. At last, the representatives of some genera live in high-mountains (*Bembidion*, *Pterostichus*, *Carabus*, *Nebria*, *Trechus*).

To the present time in the Baikal Siberia 504 species of the carabids are established. By amount of species the Irkutsk area stands on the first place (357 species), further in decreasing order go Buryatiya (341) and Chita area (240). The reduction of species from west to east can be connected to the objective reasons, such as reduction of a variety of natural conditions and influence of the Baikal faunistic filter, which serves a barrier to distribution of the large number of species with the Euro-Siberian areas. On the other hand, the Chita region is investigated faunistically a little bit worse in comparison with Irkutsk region and Buryatiya.

On the basis of the analysis of the distributional patterns of carabids we select three large groups: species with wide areas in the Holarctic and Palaearctic, species with more or less narrow areas in mountains of Southern Siberia and, at last, species with Eurasian steppe areas. 19 faunistic groups with similar types of distribution in total are allocated. In the process of sorting species to this or that zoogeographic group was taken into consideration not only their general modern area, but also connection with certain faunogenetic centres, which as a rule correspond divisions of a Palaearctic selected by the botanists and zoologists.

I. Group with wide areas in the Holarctic and Palaearctic includes following distributional patterns: 1 – Holarctic (47 species, 9,3%), 2 – Asian-American (10 species, 1,9%), 3 – Trans-Palaearctic (67 species, 13,2%), 4 – Euro-Siberian (86 species, 17%), 5 – Siberian (20 species, 3,8%), 6 – East-Siberian (48 species, 9,5%), 7 – Beringian (11 species, 2,1%), 8 – Amurian (= Palaearctic) (56 species, 11,1%). It is necessary to emphasize, that the majority of the carabids of examined territory (345 species or 68,5%) belongs to the group of species with wide areas. In this group humicoles (26,9%), praticoles and arvicoles (19,1%), limnophiles (18,3%), paludicoles and sylvicoles (15,4%) are prevail. Among them alpine (4,9%), as well as steppe species (6,6%) are very scarce, halophiles in this group are absent.

II. Group with areas in mountains of Southern Siberia the following distributional patterns: 9 – South Siberian (9 species, 1,8%), 10 – Altai-Baikalian (7 species, 1,3%), 11 – Altai-Sayanian (2 species, 0,4%), 12 – Sayan-Baikalian (3 species, 0,6%), 13 – Sayanian (6 species, 1,2%), 14 – Baikalian (7 species, 1,3%), 15 – Transbaikalian (16 species, 3,1%). In this group alpicoles (44%) and humicoles (28%) are prevail with some admixture of paludicoles and limnophiles. Meadow and field species practically are not represented and completely are absent steppe and halophilous species, that is explained by absence suitable biotopes in mountains.

III. Group with Eurasian steppe areas includes the following distributional patterns: 16 – South-Palaearctic (11 species, 2,1%), 17 – Central Asian (2 species, 0,4%), 18 – Kazakhstanian (= Eurasian steppe) (30 species, 5,9%), 19 – Mongolian (=Dahuro-Mongolian) (66 species, 13%). Generally group of species with Eurasian

steppe areas is characterized by complete absence of high-mountainous species and reophiles, domination of steppe (65,1%), saline (16,5%) species and limnophiles (11,9%).

The estimation of all carabid fauna of the Baikal Siberia let us easily see, that the dominant positions occupy zonal forest (22,2%) and steppe (18,6%) species. A share of participation of intrazonal elements also is great: limnophiles and psammophiles (15,7%), paludicoles (11,5%) and arvicoles (13,5%). In mountains alpine mostly endemic species (7,7% from all fauna) are concentrated, as well as in significant quantity inhabitants of gravel banks of the mountain rivers (7,1%). In steppe zone halophilous species are present (3,6%).

Taking into consideration the carabid fauna of the separate steppe territories of Baikal Siberia it is possible to make the following conclusions: the greatest number of species is recorded in large regions with steppe and forest-steppe vegetation, such as Southern Cisbaikalia (75 species), Selenginskaya Dahuria (80 species) and Ononskaya Dahuria (76 species). Much less species are observed in Priolkhon'e (40) and Tunka valley (49), that is explained by the smaller sizes of these steppe territories isolated from zonal steppe landscapes. Especially poor steppe fauna is established in Bargusinskaya kettle (26 species), that on the one hand is explained by its isolated position, and on another – insufficient investigations. The data on Kyra steppes are based on a small material and have preliminary character. Here while 25 species are recorded. It is interesting to analyze a ratio of faunistic complexes in forming of a carabid fauna of different steppe areas. In Transbaikalian steppes (Ononskaya Dahuria, Selenginskaya Dahuria, Tunka valley) the share of participation of the Mongolian faunistic elements exceeds 50%. But in Cisbaikalia it makes no more than 42,5%. In this territory participation of the Kazakhstani faunistic elements essentially grows, as especially appreciable in Priolkhon'e (32,5%), as well as increasing the rate of species with wide transpalaearctic and Euro-Siberian areas. The share of participation of the Mongolian species in Bargusinskaya kettle (up to 34,6%) is especially strongly reduced. A mountain frame of Baikal and Altai-Sajan mountain country represent itself as serious faunistic filter for distribution of steppe species. So, in steppe of Transbaikalia 25 species of the Kazakhstani, Transpalaearctic and Euro-Siberian complexes are not penetrate. On the other hand a lot of species (*Carabus glyptopterus*, *C. vladimirskii*, *Pangus nanulus*, *Neophygas microcephalus* etc.) are well represented in Transbaikalia and perfectly are absent in forest-steppe Priangarie. Though the kettle steppe of Baikal Siberia contain a rather rich steppe fauna, it become more poor from a southwest to northeast in process of distance from zone steppes. The presence of halophilous elements depends on a degree of development of saline process, for example, in Tunka valley the saline species completely are absent and very poorly they are represented in Priolkhon'e. It is characteristic, that despite of isolated position kettle steppe do not contain the endemics, that speaks about their rather recent isolation and slow speed of a speciation in conditions of steppes.

Mountain ridges occupy in territory of the Baikal Siberia a significant area, and a well expressed alpine landscape causes development of a rather rich alpine fauna of the carabids. In total 46 species of the carabids are registered in a high-mountains in the Baikal region. Better then others the high-mountains of East Sajan (29 species), Khamar-Daban (18 species), Bargusinskij ridge (15 species), mountain massif Sokhondo (17 species) and Kodar ridge (19 species) are investigated. Baikalskij ridge (6 species) and Verkhneangarskij ridge (4 species) are lesser investigated. The high-mountainous carabids are represented by the inhabitants of mountain tundras, alpine meadows, edges of snow spots and banks of the alpine reservoirs (streams, lakes). Many species penetrate into high-mountains from a forest zone. Zoogeographical structure of a high-mountainous fauna is appreciably defined by biotopic preferences. For example, many Siberian, Beringian and Transpalaearctic species are connected with mountain forests, but regularly penetrate into high-mountains (*Carabus ermaki*, *C. macleayi*, *Agonum alpinum*, *Cymindis vaporariorum*).

The greatest number of the local high-mountainous endemics are recorded among eualpine species. For example, *Nebria sajanica*, *Carabus mestscherjakovi*, *Trechus almonius*, *Pterostichus turanensis* are endemics of East Sajan, *Nebria dabanensis*, *Trechus mongolorum*, *Pterostichus septentrionis*, *Duvalius baicalensis* are endemic for Khamar-Daban. For Bargusinskij and Baikalskij ridges *Nebria bargusunica* is endemic. Only from a high-mountains of Sokhondo *Nebria sochondensis* is known.

Many species are distributed more widely in Altai-Sajan mountain country (*Leistus frater*, *Carabus slovtzovi*, *Pterostichus lucidus* etc.). In many cases the holarctic arcto-alpine species are very pronounced and essential element in forming of a high-mountainous fauna. Comparing alpine carabid fauna of the various mountain systems it is possible to note the following laws. The richest fauna of the carabids is marked in high-mountains of East Sajan (29 species), from which 6 species (20,7%) are represented by the endemics of this mountain system. In Khamar-Daban, which is separated from Tunkinskij Gol'tsy by Irkut valley, 18 alpine species are registered, the degree of an endemism of alpine fauna of this ridge makes 16,7%. It is interesting to notice, that exactly here is minimal participation of holarctic arcto-alpine species, – only 16,7%. In a mountain massif Sokhondo, which is the part of Khentei-Tshikoiskoje upland, 17 species of the alpine carabids are recorded, and the participation of a transbaikalian faunistic complex in forming of this fauna is rather significant (23,5%). The

alpine fauna of Kodar range (19 species) is rather rich, first of all at the expense of penetration of arcto-alpine elements. The general tendencies in forming of alpine fauna of the carabids of the Baikal Siberia are following: reduction of species diversity from a southwest to northeast, reduction of a local endemism with complete disappearance of the endemics in northern mountain areas with simultaneous increase of a share of holarctic arcto-alpine elements.