

## Spreading of Scarab Beetles (*Scarabaeidae*) Distributed in Azerbaijan Territories of the Greater Caucasus in Ecological and Zoogeographical Groups

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The material was collected during 2013-2015 years in the agrocenoses and biocenoses of the Guba-Khachmaz, Sheki-Zagatala and Absheron physical-geographical regions of the Greater Caucasus Natural Area. Analysis of the materials showed that 57.4% of the species common for studied territories are arexerophilous, 40.74% are mezophilous and 1.85% are eurybiont. According to zoogeographical analysis 3 species (5.55%) belong to Transpalearctic group, 1 species (1.85%) to Eurosiberian group, 9 species (16.67%) to European group, 5 species (9.26%) to Steppe-lowland group, 34 species (62.98%) to Mediterranean group and 2 species (3.7%) to Middle Asian group.

**Keywords:** *Scarabaeidae*, ecology, zoogeographic groups

### INTRODUCTION

Every year pests cause great damage to agricultural plants decreasing the level of their productivity and the quality of products. That is why the detail studying of pests and effectively controlling of their number is very urgent.

*Coleoptera* is the most numerous and rich in species composition order of *Insecta*. From 83 species of *Melolonthinae* (*Scarabaeidae*) distributed in Azerbaijan about 44 species are the serious pests of agricultural plants. During last 40-50 years some authors (A. Atakishiyeva, T. Mamedova, N. Samadov, A. Salmanov, etc.) carried out researches on spreading and damage of some species in the different regions of the republic (Mamedov and Atakishiyeva, 2010). However, there is not enough information about biology of *Melolonthinae*, their trophic relations, seasonal activity and ecological factors affecting them. The *Scarabaeidae* family have not been studied ecologically and zoogeographically.

### MATERIALS AND METHODS

The material was collected in different agro- and biocenoses of the Guba-Khachmaz, Sheki-Zagatala regions and Absheron peninsula in 2013-2015. Researches were carried out according to standard entomological methods (Narimanova and Ahmadov, 2016). Zoogeographical characteristic was given according to G.M. Abdurahmanov's method (Abdurahmanov, 1983).

### RESULTS AND DISCUSSION

Most of scarab beetles are related to plant associations. Some species inhabit humid forests, other species prefer deserts and hemi-deserts.

Species collected by us in the Azerbaijan territories of the Greater Caucasus belong to the following ecological groups.

Xerophile species- include species living in steppes, semideserts, dry foothills, mountains, sunny mountain slopes, etc. These species usually occur at the height of 400-1800 m above sea level. The xerophile species make 57.4% (31 species) of all species (54 species).

Mesophile species populate steppes, foothills and forests. They can occur at the height of 1500 a.s.l. This group includes 22 species making 40.74% of total species (Fig. 1).

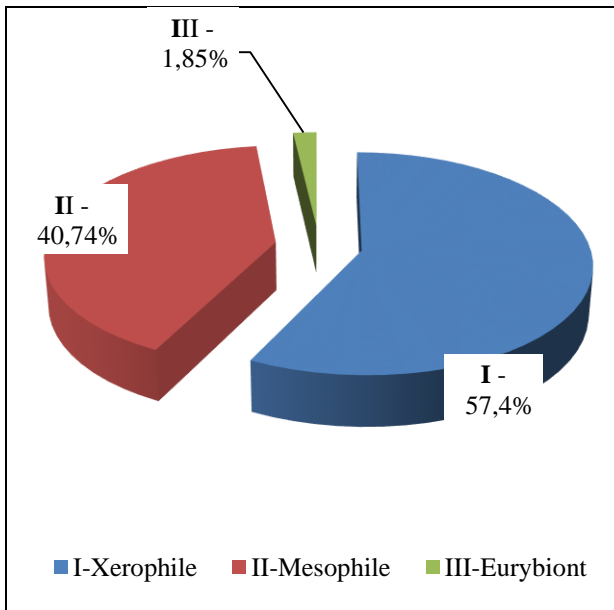
Eurybionts include only one species. It is *Amphimallon solstitialis* Linnaeus, 1758 the representative of subfamily *Rhizotroginae*. It lives under different ecological conditions in steppes, mountains, foothills, natural and agrocenoses. It is found at the height of up to 1800 m a.s.l. and gives 1 generation in a year.

The Greater Caucasus Natural Area of Azerbaijan has a favorable condition for development of scarab beetles. Therefore, *Scarabidae* in Azerbaijan is rich in species composition.

Azerbaijan is a part of South Caucasus and included in the Western Mediterranean Province of the Mediterranean subregion of Palearctic ecoregion.

Species collected in the studied area can be distributed between zoogeographical groups below (Figure 2):

1. Transpalearctic species; spread widely, up to North Taiga boundary. Boreal Transpalearctic subregion of this ecoregion is represented by 2 species (*Trichius fasciatus* Linnaeus, 1758 and *Potosia metallica* Herbst., 1782).



**Figure 1.** Distribution of scarab beetles by ecological groups.

South Transpalearctic subregion includes species distributed in the Central Asia, Pribaykalye, Mongolia, South Primorye and some areas of Siberia. The subregion is represented in Azerbaijan by *Valgus hemipterus* L., 1758.

2. Eurosiberian species: The species are widely distributed mainly in the territory of Western Europe till Eastern Siberia and Mongolia. From this region one species only (*Cetonia aurata* Linnaeus, 1758) is founded in the Greater Caucasian Natural Area of Azerbaijan.

3. Euromediterranean species of the European zoogeographical region are distributed widely in North Africa included Kazakhstan and Central Asia. Studied area represents *Oxythyrea funesta* Poda, 1761 only.

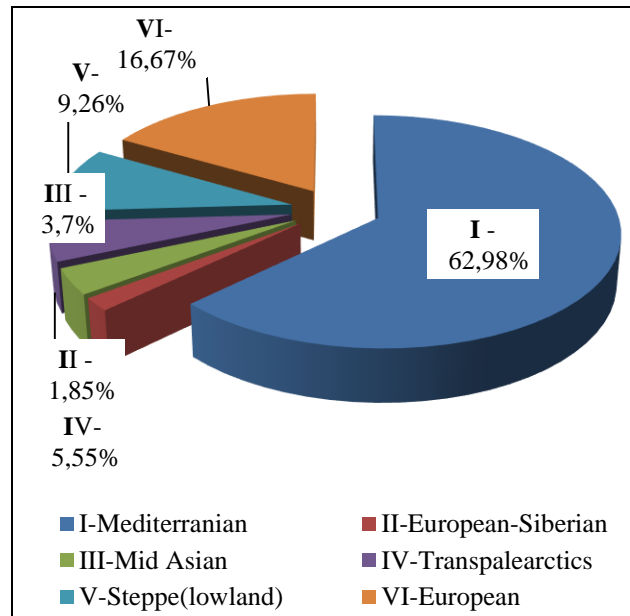
The representatives of the South-European subregion of the European zoogeographical region are mainly distributed in Ukraine, Crimea and Caucasus.

*Epicometa hirta* Poda, 1761 and *Potosia affinis* Ander., 1791 from this subregion recorded in the studied area.

*Melolontha pectoralis* Germ., 1854, the species of the Central Eurocaucasian subregion of the European zoogeographical region is recorded in the Sheki – Zagatala and Absheron regions.

4. Species from Steppe (lowland) zoogeographical region are mainly distributed in the European and Asian steppes, sometimes they occur in the Mediterranean territory. *Anisoplia segetum* Herbst., 1873 and *Pentodon idiota* Herbst., 1789 the species distributed in the Western Steppe subregion (the spread of this species in the territory from

Middle Europe to Caucasus and West Kazakhstan) were recorded in the studied area. The second subregion of the Steppe region is characterized by widespread species. Their area covers the territory from Central Europe to Eastern Kazakhstan steppes and Central Siberia.



**Figure 2.** Distribution of scarab beetles by zoogeographical groups

5. Species from Mediterranean-Central Asian-Indian subregion of the Mediterranean zoogeographical region are widely distributed in the territory of Mediterranean sea, Central Asia, Iran, Pakistan and India. *Oxythyrea cinctella* Schaum., 1841 from this subregion is recorded in the studied area.

From Mediterranean-Caspian-Iranian subregion the *Rhizotrogus aestivus* Ol., 1789 and *Sericina caspia* Fald., 1837 are distributed in the Greater Caucasus.

In the studied area the Eastern Mediterranean species *Polyphylla olivieri* Cast., 1840 is recorded in the Guba-Khachmaz, Sheki-Zagatala and Absheron regions, *Amphimallon caucasicus* Gyll., 1817 and *Potosia cuprina* Motsch., 1849 in Sheki-Zagatala region only. *Amphicoma arctos* Faldermann, 1835, *A. psillotrichia*, *Anisoplia leucaspis* Gast., 1840, *Amphicoma bombylifformis* Pallas., 1781, *Anoxia pilosa* Fabricius, 1792, *Miltotrogus aequinoctialis* Herbst, 1790 and *Maladera punctatissima* Fald., 1834 are recorded in the different regions.

Species from this subregion are widely distributed in Balkans (sometimes in Italy), the European part of the former USSR up to Caucasus, Iran, Western Kazakhstan and Central Asia.

The following species belong to Southwest Asian subregion of the Mediterranean geographical region: *Anisoplia signata* Fald., 1835, *A.faldermanni* Reit., 1883, *Amphimallon solstitialis setosus* L., 1758, *Epicometis suturalis* Reitter., 1913, *Potosia speciosa* Adams, 1817, *P.hungarica* Herbst., 1832. These species are distributed from Southwest Asia to Caucasus, North Iran, sometimes Turkmenistan.

*Oryctes nasicornis* L., 1845, *Blitopertha lineata* Fabr., 1798, *Potosia hieroglyphica* Men., 1832 belong to Caucasian-Iranian subregion. These species are frequently found in South Turkmenistan.

*Oxythyrea albopicta* Motsch., 1845 belongs to Caucasian- Central Asian subregion, however, *Rhizotrogus serrifunus* Mars., 1879, *Anisoplia austriaca* Hrbst., 1783, *Epicometis senicula* Men., 1832, *Anomala abchasica* Motsch., 1854, *Anisoplia signata*, *A.farraria* Er., 1847, *Adoretis discolor* Fald., 1835, *Melolontha aceris* Fald., 1835, *Hoplia caucasica* Medvedyev, 1952, *Potosia asiatica* Fald., 1835, *Homaloplia adulta* Reitt., 1887 to Caucasian subregion.

6. Two species *Adoretus nigrifrons* Stev., 1809 and *Polypylla adspersa* Motsch., 1853 represent the Central Asian zoogeographical region.

Analyses of the materials show that 3 species (5.55%) belong to Transpalearctic, 1 species to Eurosiberian (1.85%), 9 species to (16.67%) European, 5 species (9.26%) to Steppe (lowland), 34 species (62.98%) to Mediterranean and 2 species (3.7%) to Central Asian group.

Collected material was analyzed according to distribution among regions of the Greater Caucasus and the following results have been obtained:

*Anisoplia farraria*, *A.faldermanni*, *A.signata*, *Hoplia caucasica*, *Homaloplia adulta*, *Gnorimus subcostatus*, *Oxythyrea albopicta*, *Potosia cuprina*, *P.speciosa*, *P.affinis* were recorded only in the Sheki-Zagatala region.

*Epicometis suturalis* was recorded in the Guba-Khachmaz region.

*Pentodon bidens* Pall, 1771, *Polyphylla alba* Pall 1773, *Anomala proticola*, *Sericina caspia*, *Chioneosoma pulverum* Knoch., 1801, *Potosia asiatica* Fald., 1835, *Anisoplia segetum* were recorded only in Absheron.

*Oryctes nasicornis*, *Pentodon idiota*, *Polyphylla olivieri*, *P.adspersa*, *Anoxia pilosa*, *Adoretus discolor* Fald., 1835, *A.nigrifrons*, *Anomala errans*, *A.abchasica*, *Blitopertha majuscula* Medvedyev, 1949, *B.lineata*, *Anisoplia leucaspis*, *A.austriaca*, *Amphicoma vulpes* Fabricius, 1781, *Valgus hemipterus*, *Amphimallon solstitialis*, *Miltotrogus aequinoctialis*, *Epicometis hirta*, *E.senicula*, *Oxythyrea funesta*, *O.cinctella*, *Cetonia aurata*, *Potosia hieroglyphica* and *P.hungarica* were recorded in all three regions of the Azerbaijan territory of the Greater Caucasus.

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**Azərbaycanın Böyük Qafqaz Təbii Vilayətində Yayılmış Lövhəbiğ Böcəklərin  
(Scarabaeidae) Ekoloji və Zoocoğrafi Qruplar Üzrə Paylanması**

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Məqalədə Azərbaycanın Böyük Qafqaz təbii vilayətindən toplanmış lövhəbiğlər fəsiləsinə məxsus 54 növ xırıladağ böcəyin ekoloji və zoocoğrafi qruplar üzrə paylanması və fiziki-coğrafi rayonlar üzrə yayılması haqqında məlumatlar verilir. Materialların təhlili göstərirki, Böyük Qafqazın Azərbaycanın ərazisində yayılmış 54 növ lövhəbiğ böcəklərin 57,4%-ni kresofil, 40,74%-nimezofil növlər təşkil edir. Evribiont növlərdən isə yalnız 1 növə rast gəlinir. Zoocoğrafi vilayətlər üzrə Transpalearktikaya 3 növ (5,55%), Avropa-Sibir vilayətinə 1 növ (1,85%), Avropa qrupuna 9 növ (16,67%), Çöl (düzənlik) vilayətinə 5 növ (9,26%), Aralıq dənizinə 34 növ (62,98%), Orta Asiya qrupuna isə 2 növ (3,7%) daxildir.

*Açar sözlər: Scarabaeidae, ekoloji, zoocoğrafi qruplar*

**Распределение по Экологическим и Зоогеографическим Группам  
Пластинчатых Жуков (Scarabaeidae), Распространенных  
на Азербайджанской Территории Природной Области Большого Кавказа**

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В статье приводятся данные о распределении по экологическим и зоогеографическим группам 54 видов пластинчатых жуков, собранных из районов Азербайджанской территории Большого Кавказа. Анализ материалов, показывает, что из 54 видов пластинчатых жуков, распространенных на территории Большого Кавказа Азербайджана, 57,4% составляют ксерофилы, а 40,74% - мезофиллы. Из эврибионтов можно встретить лишь 1 вид. По зоогеографическим областям 3 вида относятся к Транспалеарктике (5,55%), 1 вид - к Европейско-Сибирской области (1,85%), 9 видов - к Европейской группе (16,67%), 5 видов - к степной (равнинной) области (9,26%), 34 вида - к Средиземному морю (62,98%), 2 вида - к Средне-Азиатской группе (3,7%).

*Ключевые слова: Scarabaeidae, экология, зоогеографические группы*