

# Taxonomic Composition And Faunistic Characteristics Of Scaritinae (Carabidae) In The Fergana Valley

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## Abstract.

The article examines the spatial distribution, landscape zonation, and ecological dependencies of representatives of the Scaritinae subfamily under the conditions of the Fergana Valley. The results indicate that species belonging to this subfamily are predominantly distributed in alluvial plains, riverbanks, and sandy-clay soils. It was also determined that their activity is significantly influenced by soil moisture, temperature, and anthropogenic factors.

During the study, the species composition of Scaritinae representatives was analyzed across different landscape zones. It was revealed that maximum species diversity is observed in lowland areas, whereas it decreases sharply in mountainous regions. The genera *Dyschirius*, *Clivina*, and *Scarites* are characterized by a wide ecological amplitude and are dominant groups within the region.

**Keywords:** Scaritinae, Carabidae, entomofauna, bioindicators, soil ecosystem, landscape zonation, zoogeography, ecological adaptation, alluvial plains, sandy-clay soils, anthropogenic factors, *Dyschirius*, *Clivina*, *Scarites*.

## Introduction.

Among coleopteran insects, the Scaritinae subfamily represents one of the most ecologically significant groups within the Carabidae family. Representatives of this group are active predatory organisms inhabiting the soil surface and its upper layers, and they are widely distributed across various landscape ecosystems, particularly in alluvial plains, river valleys, and agroecosystems. Scaritinae populations are highly sensitive to substrate characteristics, soil moisture, and anthropogenic pressure, which makes them valuable tools for ecological monitoring and bioindication.

The genera *Dyschirius*, *Clivina*, and *Scarites*, belonging to this subfamily, occur across diverse ecological zones and are particularly dominant in riverine areas, irrigated lands, and moist soils. The Fergana Valley is characterized by a complex climate, a well-developed hydrographic network, and diverse soil conditions, all of which serve as key ecological factors determining the spatial distribution and species diversity of Scaritinae.

In recent years, intensive agricultural practices and anthropogenic landscape transformations have had a significant impact on Scaritinae populations. Therefore, regional faunistic studies, including species inventory and the assessment of their ecological characteristics, are of great scientific importance for monitoring regional biodiversity.

## Literature Review and Methodology.

Scientific studies on the Scaritinae subfamily, an important component of the Carabidae family, have been developing since the early 20th century within European and Russian entomological schools. These studies have comprehensively addressed the systematic position, morphological characteristics, and soil-related ecological adaptations of Scaritinae representatives.

In Central Asia, significant contributions to the study of this group have been made by representatives of the Russian entomological school. In particular, the fundamental works of Oleg Kryzhanovskij have played a key role in the study of the systematics and zoogeography of the Scaritinae subfamily. His catalogs and identification keys on the Carabidae family provide detailed analyses of the taxonomic structure, diagnostic features, and geographical distribution of Scaritinae groups [1; 5]. These scientific sources serve as a primary methodological basis for identifying Scaritinae representatives in Central Asia, especially within Uzbekistan.

The studies conducted by Igor Mikhailov are also of great importance in understanding the carabid fauna of Central Asia. His research includes data on the distribution, ecological characteristics, and descriptions of several new species of Scaritinae found in Kazakhstan and adjacent regions [6]. In particular,

the information provided on species of the genus *Dyschirius* is essential for understanding the mechanisms of microhabitat adaptation within this group.

In the Pamir-Alai and Hissar mountain systems, studies conducted by Sergey Kabak have comprehensively analyzed the species composition of the Carabidae family, noting that Scaritinae representatives are primarily associated with foothill and lowland landscapes [3]. These findings indicate that the Scaritinae subfamily is less adapted to high-mountain conditions, and that their distribution is mainly determined by soil and moisture factors.

Among the studies dedicated to the fauna of carabid beetles in Uzbekistan, the works of A. Y. Eshmuratov deserve special attention. His investigations in the Kyzylkum desert and adjacent territories revealed that Scaritinae representatives are widely distributed in desert and semi-desert ecosystems, particularly in sandy and clay substrates [2].

Furthermore, research conducted by F. Z. Khalimov in the Zarafshan mountain range and surrounding areas identified the species composition of the Carabidae family and noted that Scaritinae representatives are mainly found in alluvial plains and foothill regions [4]. These results provide important comparative material for regional analyses of the fauna of the Fergana Valley.

### **Results and Discussion.**

The Fergana Valley is a large landscape system located at the borders of Uzbekistan, Kyrgyzstan, and Tajikistan, encompassing diverse climatic and soil conditions. Long-term studies have shown that the spatial distribution of the Scaritinae (Carabidae family) in this region is closely linked to vertical and landscape zonation.

Although Scaritinae species are widely distributed globally, within the Fergana Valley they are more abundant in lowlands, open areas along river valleys, and sandy-clay soils. Soil texture, moisture levels, and microclimatic conditions are the main ecological factors influencing their populations and activity.

Scaritinae exhibit high activity in landscapes with elevated temperatures and moderate soil moisture. During wet and cool seasons, they are actively predatory and reproduce on the soil surface, whereas activity decreases under dry conditions. These beetles are predominantly soil-dwelling predators, and their morphology and locomotor adaptations allow efficient movement through sandy-clay substrates. Consequently, various Scaritinae species can be found in irrigated sandy-clay soils along riverbanks in the valley.

Agricultural lands, intensive land use, and urban areas affect the composition of Scaritinae communities. Species in this group are sensitive to anthropogenic changes, with biodiversity decreasing in areas subject to intensive transport or agricultural activity compared to natural open landscapes.

In the Fergana Valley, observed Scaritinae species, such as *Scarites subcylindricus*, *Clivina fossor*, and *Dyschirius kirghizicus*, exhibit predatory lifestyles on the soil surface and play an important role in the ecological turnover of soil organisms. Their distribution varies according to landscape type, soil structure, and anthropogenic conditions, further reflecting the zonation of the regional entomofauna.

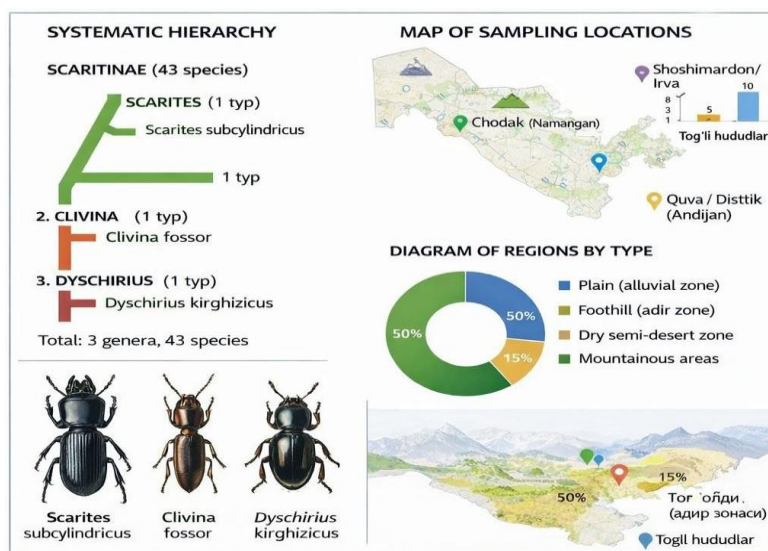
Lowland and alluvial zones (central and riverine areas of the Fergana Valley) represent the primary distribution area of Scaritinae. Observations recorded 22 species in these areas, with genera *Dyschirius*, *Clivina*, and *Scarites* dominating. These species are highly adapted to moist, sandy-clay, and alluvial soils, especially on river terraces and irrigated lands.

The foothill (adir) zone (Chodak, Pop, Uchqo'rg'on areas) is represented by 10 species. Substrate heterogeneity (gravelly, sandy, and dense soils) allows different ecological groups of Scaritinae to coexist. In particular, *Clivina* and *Dyschirius* species are widely distributed, adapted to mesophilic and partially xerophilic conditions.

Dry and semi-desert zones (peripheral, low-moisture areas) are relatively less suitable for Scaritinae, with only 8 species recorded. These zones are mainly inhabited by drought-tolerant, soil-dwelling species (e.g., some *Scarites* representatives), whose activity is primarily nocturnal or associated with increased soil moisture.

Mountainous areas (Shohimardon, Yordon) are not typical habitats for Scaritinae; only three species were recorded here. These species are mostly adapted to soil layers at mountain foothills, and species diversity sharply decreases in true mountain biotopes. This pattern indicates that Scaritinae are an ecologically specialized group, preferring soils and lowland habitats.

Species distribution across zones (lowlands ~50%, foothills ~25%, semi-desert ~15%, mountains ~10%) confirms that maximum diversity of Scaritinae subfamily occurs in moist, loose-soil lowlands. The occurrence of *Dyschirius* and *Clivina* genera across all zones demonstrates their broad ecological amplitude, although they are particularly dominant along riverbanks and irrigated soils.



**Figure 1.** Systematic and regional analysis of the subfamily Scaritinae (Fergana valley)

Overall, the formation of the Scaritinae fauna in the Fergana Valley is directly influenced by soil properties, moisture regimes, and anthropogenic impacts, making this group an important bioindicator for assessing soil ecosystem conditions.

### Conclusion.

The study of the faunistic composition and taxonomic structure of the Scaritinae in the Fergana Valley revealed clear patterns of regional and ecological diversity within this group. During the research, three major genera (*Dyschirius*, *Clivina*, and *Scarites*) and 43 species were recorded. These findings indicate that the distribution of Scaritinae is closely related to the complex landscape and climatic conditions, hydrographic network, and soil characteristics of the Fergana Valley.

The results demonstrate that the Fergana Valley represents a complex landscape system providing diverse ecological opportunities for Scaritinae (Carabidae) representatives. Their spatial distribution is primarily determined by soil properties, moisture regimes, and anthropogenic impacts. Lowland and alluvial zones constitute the main distribution area, where *Dyschirius*, *Clivina*, and *Scarites* genera dominate. The foothill zone functions as an ecological transition area, allowing multiple species to coexist on varied substrates, whereas dry and semi-desert areas support only drought-tolerant species. Mountainous areas are relatively unsuitable for Scaritinae, with a sharp decline in species richness.

Furthermore, the findings indicate that Scaritinae populations are sensitive to landscape type, soil structure, and anthropogenic conditions. This sensitivity highlights their importance as bioindicators for assessing the health and status of soil ecosystems.

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