

MORPHOBIOLOGICAL CHARACTERISTICS OF THE GENUS *BLAPS* (COLEOPTERA: TENEBRIONIDAE) IN THE CENTRAL KYZYLKUM DESERT

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The Central Kyzylkum Desert is one of the largest desert regions, characterized by a sharply continental climate, high temperatures, and extreme moisture deficiency. Such harsh environmental conditions are clearly reflected in the morphological and biological adaptations of insect fauna, particularly in species belonging to the family Tenebrionidae (darkling beetles). Representatives of the genus *Blaps* Fabricius, 1775 constitute an important taxonomic group within the typical xerophilous entomofauna of the Kyzylkum Desert.

Species of the genus *Blaps* are generally medium to large-sized beetles with an elongated body and strong sclerotization; their body coloration is usually dark. The head is relatively large, with small to medium-sized eyes. The antennae are typically filiform or slightly thickened and serve as important sensory organs. The thick cuticle covering the thoracic and abdominal segments plays a significant role in reducing water loss.

From a biological perspective, representatives of the genus *Blaps* are predominantly nocturnal. During daytime, when air temperatures rise sharply in desert conditions, they seek shelter in soil cracks, under stones, or among plant debris. They are characterized by detritophagous and saprophagous feeding habits, consuming decaying plant remains, seeds, and substrates rich in organic matter. Their life cycle involves complete metamorphosis, with larvae developing in the soil and exhibiting high resistance to arid conditions.

The systematic position of the genus *Blaps* is as follows:

Order: Coleoptera Linnaeus, 1758

Family: Tenebrionidae Latreille, 1802

Subfamily: Tenebrioninae Latreille, 1802

Tribe: Blaptini Leach, 1815

Genus: *Blaps* Fabricius, 1775

During field studies conducted across various regions of the Central Kyzylkum Desert between 2023 and 2025, several species of the genus *Blaps* were recorded. Among them, *Blaps deplanata* Ménétriés, 1832 and *Blaps holconata* Fischer von Waldheim, 1844 were the most widely distributed species.

Blaps deplanata has been repeatedly recorded in Azerbaijan (Europe) and in Asian regions including Iran, Kazakhstan, Turkmenistan, and Uzbekistan. This species is primarily distributed in desert and semi-desert areas and is characteristic of the Ancient Mediterranean Province of the Palearctic zoogeographical region.

From an ecological standpoint, *Blaps deplanata* represents a xerophilous zoogeographical complex adapted to sandy and loamy soils, saline areas, and open landscapes with sparse vegetation. The species is most frequently encountered in natural desert habitats with minimal anthropogenic disturbance, indicating its strong association with native desert fauna. The Central Kyzylkum region itself is largely composed of sandy and semi-desert landscapes; nevertheless, it also includes numerous human settlements.

As a result of its habitat conditions, *B. deplanata* has developed a number of morphological and biological adaptations. Its body is distinctly dorsoventrally flattened, facilitating concealment within soil fissures and dense loamy or saline layers, as well as protection from extreme daytime temperatures. The wide and weakly convex elytra significantly reduce water loss and ensure energetic efficiency by abandoning flight. The non-glossy, strongly sclerotized body surface minimizes solar reflection and increases resistance to mechanical stress.

The eyes are small, while the filiform antennae are well adapted to nocturnal activity, allowing effective perception of chemical and mechanical signals under low-light conditions. The legs are robust, with particularly well-developed fore and middle legs, enabling efficient movement on dense soil surfaces and penetration into narrow crevices. Adults are mainly active at night, spending the hottest part of the day underground, which helps them avoid sharp fluctuations in temperature and humidity.

Blaps deplanata exhibits detritophagous feeding habits. The species is well adapted to efficient utilization of limited resources in desert environments, and the development of larvae within soil layers ensures high tolerance to arid conditions. This complex of morphobiological adaptations is one of the key factors enabling *Blaps deplanata* to form stable populations and maintain a wide distribution across desert and semi-desert regions.

Blaps holconata occurs in several Asian countries, including Afghanistan, Kazakhstan, Turkmenistan, and Uzbekistan. *Blaps holconata* (Coleoptera: Tenebrionidae) belongs to the Palearctic zoogeographical region, with its distribution mainly associated with Central Asia and adjacent territories. This species is a representative of xerophilous entomofauna formed within the Turanian zoogeographical province, characterized by desert and semi-desert landscapes.

An examination of the morphobiological characteristics of *B. holconata* indicates clear adaptation to arid, open, and partially rocky desert and semi-desert environments. The elytra are thick and strongly sclerotized, providing resistance to mechanical damage and reflecting the species' association with stone-covered and hard-substrate microhabitats. Such elytral structure limits moisture loss and helps maintain water balance under arid climatic conditions.

The legs are relatively short but very strong, adapted for stable movement across uneven, hard, and rocky surfaces. This trait explains the predominance of the species in compact substrates rather than in loose sandy habitats. The relatively small eyes and well-developed sensory antennae indicate adaptation to a predominantly nocturnal lifestyle. During daytime heat, *B. holconata* remains under stones or in deeper shelters and becomes active at night, allowing it to avoid extreme temperatures.

Within desert ecosystems, representatives of the genus *Blaps* play an active role in the decomposition of organic matter by fragmenting decaying plant remains, thereby increasing soil biological activity. Their movement through soil cracks and burrows promotes mechanical mixing of the soil, improves aeration, and facilitates moisture penetration into deeper layers. The nocturnal activity and detritophagous feeding behavior of *Blaps* species ensure the recycling of limited food resources under desert conditions and stimulate microbial activity. Moreover, they represent an important link in desert food chains, serving as prey for reptiles and insectivorous vertebrates.

Under the conditions of the Central Kyzylkum Desert, the morphobiological traits of *Blaps* species demonstrate deep adaptation to extreme desert environments. The body structure, protective integument, activity patterns, and feeding strategies observed in *Blaps deplanata* and *Blaps holconata* ensure survival under high temperatures, severe moisture deficiency, and limited food availability. These species are not only xerophilous organisms adapted to desert habitats but also important ecological components involved in organic matter cycling and soil processes. Therefore, the study of *Blaps* representatives is of significant scientific importance for understanding the formation of entomofauna in the Central Kyzylkum Desert, assessing ecosystem stability, and conserving biological diversity.

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