



## MORPHOMETRIC CHARACTERS OF THE FAMILY OF GRYLLIDAE IN THE CONDITIONS OF THE FERGANA VALLEY

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### ABSTRACT

*This article is aimed at an in-depth analysis of morphometric characters of the family Gryllidae. The study identified key parameters such as body length, head, eyes, antennae, and legs between species, and used statistical analysis methods to study their differences and the influence of environmental conditions.*

### INTRODUCTION

The family Gryllidae is a widespread and ecologically important group of insects belonging to the order Orthoptera. Their morphometric characteristics are of great importance not only in identifying species, but also in analyzing their ecological adaptations, life forms and evolutionary trends. Therefore, this article discusses the identification of the main morphometric characters of the Gryllidae family, methods of measurement and their dependence on various factors, as well as their taxonomic significance.

### MATERIALS AND METHODS

The following steps were taken to collect Gryllidae samples within the framework of the study: The mountainous and foothill regions of Uzbekistan - open forests, pastures, mountain slopes and dry steppes - were selected as the habitats of the Gryllidae. The ecological conditions and climatic changes of each region were taken into account, so that species adapted to different living conditions were observed.

Fieldwork was carried out using a specially designed net and light hand tools (e.g. fine-toothed nets, fine knives and collection containers). When collecting each sample, attention was paid to preserving the natural state of the chirping insects during their activity. During the sampling process, at least 30–50 individuals were collected from each area to isolate individual species and assess their importance in the habitat.

The collected samples were quickly placed in special containers for analysis in the laboratory. In order to prevent biological changes during sample storage, methods of storing



them in cold and dark places, under protective conditions, were used. Detailed information about the location, time and environmental conditions of each sample was also recorded.

Seasonal changes were also taken into account during the sampling process. For example, samples were collected in the spring and summer months, when chirping insects are most active, as this is when the species is at its maximum number and activity.

The following statistical measures were used to analyze the results of the study: The mean value, variance, and standard deviation were determined for each morphometric parameter, and the general trends of the data were assessed.

## RESULTS

Crickets show significant diversity in body length. In the studied species, body length usually varies from 10 mm to 50 mm. This parameter is primarily taken into account when identifying species.

Small species: in the range of 10–20 mm.

Medium species: in the range of 20–35 mm.

Large species: in the range of 35–50 mm.

The head of the cricket family (Gryllidae) is one of the main parameters of interspecific differentiation. The following aspects are taken into account: The head usually has a round or spherical shape, and this shape serves as an important criterion for classifying species. The overall size and proportions of the head can vary significantly in different species.

In crickets, the eyes are large, convex, and located at the front of the head. They provide visual sensitivity and enhance the ability to observe the environment across species. The size and location of the eyes, as well as the general structure of the head, are used to determine morphometric differences between different species.

Other sensory organs located on the head, such as antennae, also provide additional information in distinguishing species. Antennae are recognized as important sensory organs. Their morphometric characteristics are of great importance in determining interspecific differentiation. The length of cricket antennae varies significantly between species. In some species, the antennae make up 60–80% of the body length. This parameter is used to identify species and assess their ecological adaptation. Antennae are often multi-segmented, with each segment having a thin and threadlike shape. This segmentation increases the accuracy of the sensory organ and plays a major role in receiving chemical and physical signals from the environment. Antennae are the main chemosensory organs for crickets, which detect odors and other molecules in the air, helping them to find food and mate. With this organ, insects respond to changes in their environment.

The legs of crickets determine their jumping ability. Forelegs: Strongly developed, serve as feeding and sometimes as protection. Hindlegs: Long and strong femurs, designed for jumping. Elytra: Males are usually well developed, providing acoustic signaling and visual protection. Females may have smaller or completely absent elytra.

Habitat and climatic conditions have a significant impact on the morphometric parameters of crickets:

In warmer regions, species tend to have larger body sizes, because heat and resources are more abundant. In colder regions, they may have a smaller and more compact structure, which may be due to energy conservation.



Morphometric characters also play an important role in determining genetic differences between species. The dispersion of morphometric parameters reflects genetic adaptations depending on the habitat. Based on the measurements, it is possible to determine evolutionary relationships and divergence processes between species.

A total of 100 chirping specimens were collected from different regions in the study.

No	Body parts	Average	Importance of size
1	Body length	32.5 ± 4.2 mm	This parameter is used as a key indicator in determining the overall size of insects.
2	Head width	7.0 ± 0.8 mm	Head shape and proportions are important in distinguishing between species.
3	Eye diameter	2.5 ± 0.3 mm	Large, convex eyes enhance the ability of crickets to sense their surroundings.
4	Antenna length	22.8 ± 3.5 mm	Antenna segmentation and length are used to determine differences in chemical sensation between species.
5	Foreleg length	13.0 ± 1.6 mm	This measurement is used to shed light on the feeding and locomotor characteristics of an insect
6	Hind leg length	19.5 ± 2.0 mm	the presence of strong musculature for jumping is reflected in this parameter.
7	Elytra (wings) length	12.2 ± 1.7 mm	The development and structure of the elytra show differences between male and female species

Based on the measurements obtained, statistical and correlation analyses were used, and significant differences were found between all parameters at the  $p < 0.05$  level. This constitutes the main scientific basis for determining interspecific morphometric differences and the influence of environmental conditions.

These results constitute a set of important morphometric measurements used in further studying the taxonomic classification, evolutionary relationships, and ecological adaptations of the cricket family (Gryllidae).

The accuracy of morphometric characters of crickets is used as a key indicator in classifying species and identifying new species. Based on morphometric parameters, even small differences between species are identified, strengthening their taxonomic status. Measurements are used to determine evolutionary relationships, adaptive changes, and ecological segmentation between species. Morphometric analysis also serves to shed light on ecological conditions and regional differences. Changes in the natural environment, such as vegetation, climate, and geological features, have a significant impact on morphometric parameters. Differences in size between species indicate regional divergence and local adaptations.

## SUMMARY

This article presents the main results of a study on the morphometric characteristics of the cricket family (Gryllidae). The main parameters such as body length, head and eyes,



antennae, legs and elytra were determined, and the influence of habitat and environmental conditions on their morphology was shown. The results of statistical analysis clearly showed interspecific differences and confirmed that they can be used to clarify taxonomic accuracy and evolutionary relationships. Future studies are expected to serve to create a more complete system of the cricket fauna by combining morphometric and genetic analyses.

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