

INSECT MIGRATION (IN ORTHOGRAPHS)

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Abstract: Ethological features of locusts in the process of migration were studied and their nature was revealed. In particular, *Dociostaurus kraussii* Ing. and *Calliptamus turanicus* Tarb. belong to the group of individually migratory locusts. The locusts types of *Calliptamus italicus italicus* L. and *Dociostaurus maroccanus* Thunb. migrate in large numbers. The migration of orthopteran in large numbers were divided into regular and irregular flying insects, and also observations were carried out on regularly migrating locusts over large distances; and the factors affecting their migration were identified.

Keywords: Orthopteran, family, generation, species, locust, zoogeography, migration, landscape, imago, larva.

Zoogeography is an integral part of biogeography, studying the patterns of animal distribution on the globe. The main object of zoogeography is fauna. Fauna is a population of a certain animal species formed as a result of its historical development in a certain geographical environment-biogeocenosis. Any zoogeographical research begins with determining the species composition of the animal world of a certain territory. [1, 2]. It is important to identify faunal elements within the boundaries of the territory, to have information about the features of its formation, to determine the area occupied by these elements, their number and changes in it. Studying the species composition of the animal world is a rather difficult and laborious task, which takes a long time. Although research on the species composition of animals began in the 18th century, it has not been completed until now [3,4,5].

Orthoptera are insects that occupy an important place in the food chain of natural and cultural entomocenoses. As primary consumers, they are one of the components that ensure the functioning and stability of entomocenoses. Locusts are herbivorous insects. In nature, one locust feeds on 90 mg to 280 mg of plant mass per day, depending on the size of its body. In desert areas, such an indicator certainly has a significant impact on the vegetation layer. In areas where locusts are widespread, especially locusts, they eat up to 30% of plants, and when they multiply in large numbers, they completely destroy them. [6, 7, 8].

Our research is based on a comprehensive study of the biology, life cycle and distribution characteristics of locusts, to explain the migratory processes of

insects and identify solitary and gregarious species, as well as to study their migration patterns and determine the factors affecting migration.

Locusts migrate mainly due to the need for food. Locust swarms can fly from a few hundred meters to tens or even thousands of kilometers. This process is manifested as a product of instinctive traits that have evolved in them. It was observed that the migrations of locusts take place in the following ways. It was observed more in grasshoppers and grasshoppers, which do not form individual flights. Before the flight, the locusts form a swarm in a certain small area, but during the flight, their movements were observed one after the other and in different directions. Also, most of the individuals in the flock may not fly and feed in the same area. Their location in the plant will also be irregular.

These locusts cannot fly very far alone. Their migration is hindered by natural barriers and obstacles. Therefore, when moving from one place to another foraging area, an individual stops often for protection and slowly reaches its destination (Figure 1).



Figure 1. Feeding of the valley locust during migration

The process of migration in the form of a gala is a characteristic feature of most grasshoppers, which can be clearly observed in our area, mainly in oasis and Moroccan grasshoppers (Fig. 2). Migration can be divided into two groups. In particular, the migration of a flock of locusts is organized and irregular.



Figure 2. The process of gala formation of right-winged birds

In orderly migration, Moroccan locust larvae gather in clumps with their heads close together before dispersing across the field. Then he moves in search of food in different directions. Forms that have grown wings are located facing one side. Orderly migration is evident in the winged forms of locusts in a purposeful way, for example, moving to another distant area. One by one, the locusts begin to rise above the gathering place. The ascent process first occurs in the form of a steeper 45-600, in some cases 900 angle, directed in one direction in all individuals. Despite the fact that the gala is very dense, flying individuals almost do not allow each other to take off from the ground. Because they settle in the plant in the same order, one after the other, looking up and get ready to fly. Also, individuals from flocks rising from dry (rocky, sandy, or clayey) areas will settle down facing one side, maintaining a small distance from each other, before taking off.



Figure 3. Preparation for orderly migration

When the locusts rise 2-3 meters above the ground, they straighten horizontally, and the subsequent rise is carried out gradually on a swarm scale. When the locust swarm rises, it can also take on a unique shape. The swarm first flies a short distance, and then can migrate to very distant areas. This form of migration is synchronized with the direction of certain air currents and winds, which makes migration somewhat easier during this period. Some swarms take on wavy, swirling, orderly, sparse, striped, and other forms during migration. Swarms can also change direction towards new feeding grounds. The migration of the swarm takes on a sharp and merciless character. Individuals fly long distances in order not to be left behind the swarm. When migrating in a swarm, various natural obstacles and obstacles cannot present any significant resistance to individuals. A representative of a swarm is more aggressive, angry, and violent than an individual living alone. They do not break the order of the flock even when crossing natural barriers. In particular, locusts swim across streams and rivers. During this period, all individuals maintain their movement in one



direction. Such social behavior in a locust flock can be considered a unique ethological adaptation of this species in the struggle for survival.

The flock lands to feed and rest. When landing, individuals rarely approach the ground, keeping a long distance from each other. Individuals first land on a plant, then move to the lower parts and jump down.

During chaotic flight, locusts manage to destroy feeding areas in a short time. They fly chaotically during the feeding period. Pests do not fly long distances during this period. At the same time, many individuals of the flock die as a result of various factors, including chemical control, natural predators, and others. The ascent of the flock, which has fed and rested, depends on the depletion of the amount of food available here and the direction of the wind. The flock forms an orderly "line" again to move to another area and continues its migration.

In conclusion, the biology and migration patterns of flock-forming and singly migrating species living in the territories of Central Uzbekistan were studied, their life cycle, reproduction processes and food plants in this area were determined. The ethological characteristics of locusts in the migration process were studied and its essence was revealed. In particular, the species *Dociostaurus kraussii* Ing. and *Calliptamus turanicus* Tarb. belong to singly migrating locusts. *Calliptamus italicus italicus* L. and *Dociostaurus maroccanus* Thunb. locusts form flock migrations. Migration in the form of flocks, in turn, is divided into 2 groups, namely, ordered and irregular flights. Orderly migration ensures that insects can fly long distances. The main reason for the widespread spread of the locust *Dociostaurus maroccanus*, which causes great damage to pastures and agricultural crops in the desert regions of Central Uzbekistan, is that during drought years, annual weeds wither from lack of water, and as a result, insects migrate to irrigated agricultural crops, struggling to survive as much as possible. Insects belonging to the family of Orthoptera, in nature, enrich the soil with natural nutrients using the plant waste they consume, thereby contributing to the development of plants. During the rapid decomposition of plant material and the process of potting, they enrich the soil with various beneficial elements, ensuring air circulation in the soil (aeration), and they themselves become food for a large number of insects, reptiles and other animals. They play a huge role in maintaining the balance of nature.

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