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STRUCTURE AND SIGNIFICANCE OF RODENTS LIVING IN THE DESERT

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Annotation: This article examines the anatomical and physiological adaptations of desert-dwelling rodents, their ecological roles, and their impact on ecosystems. These rodents have evolved to survive in conditions of water scarcity, extreme temperatures, and limited food resources. Their unique morphological features, such as elongated hind limbs, enlarged auditory canals, and compact body shapes, enhance their adaptation to harsh environments. Moreover, they contribute significantly to ecosystem stability by improving soil fertility, dispersing plant seeds, and serving as key components of food chains.

Key words: Desert rodents, morphological adaptation, physiological adaptation, ecological role, food chain, soil fertility, desert ecosystem, survival strategies,biodiversity

CHO'LDA HAYOT KECHIRUVCHI KEMIRUVCHILAR TUZILISHI VA AHAMIYATI.

Annotatsiya: Ushbu maqolada cho'l muhitida yashovchi kemiruvchilarning anatomik va fiziologik moslashuvlari, ularning ekologik roli va ekotizimga ta'siri tahlil qilinadi. Cho'l kemiruvchilari suv tanqisligi, yuqori harorat va oziq-ovqat resurslarining cheklanganligi sharoitida yashashga moslashgan. Ularning maxsus tuzilishi, masalan, uzun orqa oyoqlar, kattalashgan eshitish kanallari va ixcham tana shakli ularga yashash sharoitlariga moslashishga yordam beradi. Bundan tashqari, ular tuproq unumdorligini oshirish, urug'larni tarqatish va oziq zanjirining muhim bo'g'ini sifatida ekotizim barqarorligida muhim rol o'ynaydi.

Kalit so'zlar: Cho'l kemiruvchilari, morfologik moslashuv, fiziologik moslashuv, ekologik rol, oziq zanjiri, tuproq unumdorligi, cho'l ekotizimi, yashash sharoitlari, biologik xilma-xillik.

Introduction. Desert ecosystems have extremely harsh climatic conditions, and the organisms living there must be adapted to the extreme environment. Rodents (Rodentia) living in deserts are an excellent example of adaptation to these conditions. They are able to survive despite high temperatures, water scarcity, and limited food resources. Their body and physiological characteristics are adapted to desert life, and they play an important role in increasing soil fertility, dispersing seeds, and in the food chain. This article analyzes in detail the structure, adaptation mechanisms, and importance of desert rodents in the ecosystem.

Main part. Morphological adaptations.

1. Continuous growth of the front teeth.

Desert rodents, especially rabbits and ground squirrels, have continuously growing front teeth. This allows them to chew hard plants (such as cactus leaves or dry grass).

2. Unique eye structure.

Most desert rodents have large eyes and a wide field of vision. This allows them to detect predators from a distance and avoid danger. Some species, such as jerboas and field mice, are adapted for night vision.

3. Adaptations of claws and paws.

The front paws of ground squirrels have very strong and sharp claws. For example, the claws of the desert marmot are adapted for digging deep burrows. Other species, such as jumping rodents, are adapted for fast movement on the sand using their hind paws.

4. Unique skull structure.

Some desert rodents, especially subterranean species, have flatter skulls, which allow them to move through narrow burrows.

Physiological adaptations.

1. Nasal passages that reduce water evaporation.

Desert rodents have a special structure to retain moisture in the nasal cavity. When the air is exhaled, water vapor condenses in special nasal passages and is reabsorbed into the body.

2. Seasonal changes in sleep and activity.

Some desert rodents, especially species living in cold deserts, can hibernate. For example, desert marmots slow down their metabolism during the cold months, protecting themselves from food and water shortages.

3. Adaptations of the circulatory system.

The circulatory system of desert rodents can change cardiovascular activity. In hot conditions, blood vessels dilate, helping to lower body temperature.

4. Special adaptations of the digestive system.

Some rodents (for example, desert rats) have an intestinal system adapted to digest fibrous and tough plants. Their large intestines are longer, which helps them reabsorb more water.

5. High levels of antidiuretic hormone.

Their kidneys produce more antidiuretic hormone, which reduces the process of urine excretion. This helps the body retain water longer.

Rodents living in the desert play an important role in the ecosystem:

Increasing soil fertility - Their digging activity loosens and loosens the soil.

Seed dispersal - Helps the natural spread of plants.

An important link in the food chain - They are a source of food for predators (snakes, foxes, owls and falcons).

Controlling insect populations - Some rodents feed on insects, regulating their numbers.

Ensuring ecosystem stability - Their nests create living conditions for other organisms.

Behavioral adaptations.

1. Social structure and lifestyle.

Some rodents (e.g., ground squirrels) live in colonies.

Other rodents (e.g., field mice) live alone.

2. Food storage.

Some rodents store food for the future (e.g., desert badgers and some gerbils).

Some species store body fat as a reserve energy source during winter or drought.

3. Defense and hiding strategies.

Burrowing - To avoid heat and reduce water loss.

Mortification - Some species remain motionless when threatened.

Rapid movement and jumping - Jerboas and shrews jump to escape predators.

Energetic adaptations.

Metabolic adaptations.

1. Due to the scarcity of food in the desert, some rodents have a low metabolic rate. This helps them to spend less energy and endure hunger for a long time.

2. Some species have an energy-saving sleep state (torpor). That is, their body temperature temporarily decreases and their metabolism slows down.

Heat management

3. In the desert, temperatures can change dramatically during the day, so some rodents save energy by adjusting their body temperature to the environment during the day.

4. Some species have blood vessels under their skin that dilate or constrict, helping to regulate heat loss.

Genetic and biochemical adaptations.

Adaptation to water scarcity.

1. Some rodents have genetically adapted to increase the level of ADH (antidiuretic hormone). This helps them retain water in their bodies.

2. Studies show that desert rodents produce more special transport proteins (aquaporins) in their kidney cells to reabsorb water.

Mutations and natural selection.

Over hundreds of years, species that are best adapted to survive in the desert have survived through genetic mutations. For example, desert rodents, due to their lack of carotenoid pigments, have avoided bright colors and adapted to the color of sand.

These adaptations increase the resistance of desert rodents to the arid environment and ensure their life cycle.

Conclusion. Desert rodents have a variety of morphological, physiological, and behavioral characteristics to adapt to harsh environmental conditions. Their adaptive processes have been formed over a long period of evolution and help them survive in the desert ecosystem. At the same time, they play an important role in ensuring the stability of the desert ecosystem. Since anthropogenic factors can reduce their habitat, protecting their population is one of the important ecological tasks. In the future, it is important to expand scientific research on the study of desert rodents, to deeply understand their ecological role, and to develop specific strategies for their protection. This will serve the preservation and development not only of these animals, but also of the entire desert ecosystem.

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