

RODENTIA and LAGOMORPHA

TAXONOMY

Rodents are found worldwide except Antarctica and consist of about 29 families, 389 genera and 1702-1814 species. Nearly 40% of all mammal species belong to this order! Roughly two-thirds of rodent species (1011) belong to the family **Muridae** - (rats, mice, hamsters, voles, lemmings and gerbils). Squirrels of the **Sciuridae** make up the second largest rodent family with 268 species.

Rabbits, Hares and Pikas are found worldwide except Antarctica and Saharan Africa and consist of 2 families, 13 genera and 80 species.

INTRODUCTION

Lagomorphs were once classified within Rodentia due to their similar incisors and herbivorous life styles. It was not until 1912 that Lagomorpha was created.

Rodents and Lagomorphs are successful because they are extremely adaptable. They can live in many different types of habitats and occupy a variety of niches that include: arboreal, terrestrial, fossorial (burrowing), and semi aquatic. They are opportunistic feeders with a wide ranging diet. They are also prolific breeders, producing several large litters each year.

Rodents frequently cohabitate with humans that is not always advantageous for people since they carry germs and can spread fatal diseases. They eat from our farms and stored food supplies and are considered “pests”. Even with eradicating attempts with traps and chemical rodenticides plus the fact that some species are eaten by humans (guinea pigs & dormice) and others are used for research (guinea pigs, rats & mice) they remain a very resilient order.

Rodents have unwittingly been introduced to new areas by human movements while others (i.e. rabbits) were introduced into Australia and southern South America creating a variety of ecological issues.

EVOLUTION

The fossil record is fairly sparse but it is known that the Rodentia goes back to the late Paleocene era some 57 mya. During the Eocene (54-38 mya) they went through a rapid diversification that produced the members we see today. These dates are based on finds in North America. Finds in Asia (Mongolia) may push these dates even further back.

Lagomorphs appear to have arisen in Asia some 50 mya during the Eocene with a major radiation during the Oligocene / Miocene in North America 38 - 20 mya.

The phylogenetic affinities of lagomorphs are controversial, although recent evidence has suggested that they may be related to rodents. But other groups have also been suggested as closest relatives, including marsupials, insectivores, primates, artiodactyls, and other ungulate groups!

PHYSICAL AND BEHAVIORAL ADAPTATIONS

In general, rodents all have squat, compact bodies with short limbs and tails. They range in size from the very tiny, such as Silky pocket mice weighing approximately .245 oz to the Capybara that weighs in at about 146 lbs.

Hands and Feet:

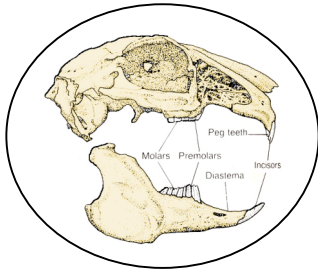
They usually have 5 digits on their hands, although the thumb is sometimes vestigial or absent, and they have 3-5 toes on their feet. Most rodent species are plantigrade (walking on their palms and soles) and have claw-like nails. Others are digitigrade (walking on their fingers and toes) and have hoof-like nails. Yet others are adapted for an aquatic life style with webbed hind feet. Lagomorph feet are fully furred while rodent feet are bare.

Tails:

Rodents have a variety of tail structures adapted to their different needs. There are flattened tails for swimming or for use as a rudder, long tails with tufts of hair at the end for balance, prehensile tails for gripping, bushy tails to provide drag for arboreal species, and others that have little or no tail at all. Some are even lizard-like in their ability to break off and re-grow (allowing animals to escape predators attacking from behind).

Dentition:

Most rodents have $I1/1 - C0/0 - P2/1 - M3/3 \times 2 = 22$ teeth or less. The term “Rodent” comes from the Latin word rodere which means “to gnaw” while Lagomorpha have $I2/1 - C0/0 - P3/2 - M3/3 \times 2 = 28$. The term “Lagomorph” comes from the Greek word lagōs which means “a hare” and morphē - form or shape. Their razor sharp incisors (2 upper, 2 lower) are specialized to gnaw through the toughest husks, pods and shells to get to the food. The incisors have open roots and continue to grow throughout their lives.



They are automatically worn down by the opposite tooth on the opposing jaw and by their diet. They eat plants, fruit, small invertebrates and some are even specialized carnivores. Lagomorphs like rodents don't have canines; instead they have a sizable gap between the incisors and molars called the **diastema**. They can draw their lip into this gap to use as a barrier from inedible fragments dislodged by the gnawing. The food is finely ground by the enamel covered molars and stored in internal or external cheek pouches (depending on the species). Cheek pouches are folds of skin that open near the edge of the mouth, some of which are even lined with fur.



These teeth grow throughout the animal's life and have a layer of enamel that extends around to the posterior surface of the tooth (in contrast to rodent incisors, which have enamel on one face only).

Digestion:

Rodents and Lagomorphs are well adapted for digestion of cellulose with a large cecum containing dense bacterial flora. The bacterium splits the cellulose into digestible carbohydrates, which are then re-ingested directly from the anus (a practice called refection) and absorbed during the second trip through the stomach. This efficient system assimilates 80% of the ingested energy.

NOTE: by ingesting the parent's cecal pellets, young gain the bacterial flora they need.

Sensory Organs:

Rodents and Lagomorphs, in general have relatively good sight, hearing and sense of smell. They use a combination of all three for communication.

Communication:

They make considerable use of vocalizations, which are usually above the frequencies of human hearing. They have very dramatic threat displays in some species, and they also communicate extensively through odors produced by a variety of scent glands.

Behavior:

They are highly social mammals for the most part, living in huge aggregations. Prairie dog townships sometimes exceed 5,000 individuals. The solitary species tend to live in arid grasslands and deserts and can be quite territorial. When density is high the territorial system breaks down and dominance hierarchies are established. Lagomorphs are more solitary or form family groups and are not as gregarious as rodents.

COURTSHIP AND YOUNG

In many species all aspects of reproduction are controlled by odor signals. Sexual receptivity of females is advertised through their urine while the pheromones in the male's urine accelerate sexual maturity of young females and female receptivity. In some species a pregnant female will even reabsorb her litter and come into heat again if she comes into contact with an unknown male. Lagomorphs are able to undergo "...induced ovulation, where eggs are shed in response to copulation rather than only a cyclic basis..." They are very prolific breeders and tend to reach sexual maturity at a young age. Litter size, weaning ages and whether the young are altricial or precocial varies with species (hares are more developed than rabbits).

Lagomorph testes in males lie in front of the penis as in marsupials.

STATUS AND CONSERVATION

Although some species are extremely rare, there are very few endangered rodents. Some are threatened in the West Indies due to draining the land and clearing of dense brush for cattle or other agricultural uses. Overall most species are flourishing worldwide.

The European rabbit was introduced in to Australia and New Zealand in the early 1900s and Argentina in 1888. Myxomatosis was introduced to the Australian population in 1951-2 to control the population. It is transmitted by mosquitoes or fleas.

Sources:

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