

Environmental Change and the Prairie Dog

By John Doe

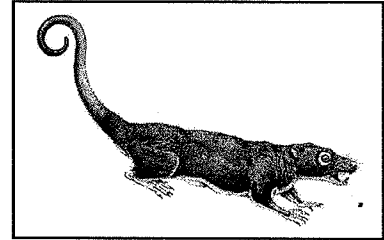
Section 1: Your animal today.

What animal did you select and why?

The animal that I selected to research is the prairie dog. The reason that I selected this animal is because it is one of my favorite animals. I like to watch them in their prairie dog towns, running from hole to hole. It is interesting when they give warning calls to each other to let the group know that a predator or person is around.

Evolutionary history of my animal.

The prairie dog belongs to the rodent order. Rodent evolution began from earlier mammals called microtuberculates (*right*) about 56 million years ago. Recent ancestors of all rodents were the lagomorphs (rabbits, hares, etc) Today there are 27 families of rodents totally 2055 species. We have fossil records of 26 extinct families of rodents, about as many as survive today. The largest of the rodents was the extinct giant beaver, about the size of a bear. The oldest non-extinct rodent is the mountain beaver. Prairie dogs belong to the squirrel family and evolved about 37 million years ago from a species of ground squirrel. There are currently five species of prairie dogs.



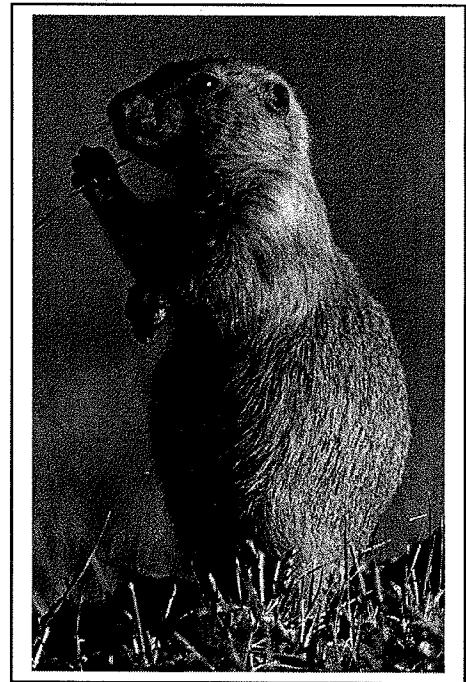
Where does your animal live today? Describe habitat and climate.

The prairie dog lives in the grassland biome of western United States. From Canada to Mexico, they are located in the Midwestern states of Montana, North and South Dakota, Nebraska, Oklahoma, Texas, New Mexico, Colorado, Arizona and Wyoming. The areas in which they live are primarily flatlands that don't have lots of trees. The dominant plant species are short and medium grasses, with some wildflowers and shrubs. They like to eat the crops of farmers in the grasslands, especially alfalfa, grains and hay.

The prairies generally are areas that show a wide range of temperatures: hot summers and cold winters. The high can range from 86 degrees in the summer to a low of 13 degrees in the winter. Precipitation in the grasslands can vary. In the short grass prairies there can be an annual rainfall of ~13 inches. In the tall grass prairies rainfall can be as much as 22 inches. There would be ponds and streams in the grasslands because of accumulation of rain.

Animals that live with the prairie dogs are various insects, snakes, lizards and bird species. Predators of the prairie dogs are bald eagles, badgers, bobcats and coyotes.

An unusual behavior of the prairie dog is to dig burrows and live underground. Several hundred prairie dogs can live in a single prairie dog town, having many tunnels and openings. It is easy to dig tunnels in the soil of the grasslands. The prairie dogs will have guards and will give a warning call if any predators come into sight. This gives them a chance to escape into a hole.



Adaptations

Feeding. A prairie dog's diet consists of leaves, stems and roots. Sometimes they will also eat grasshopper, beetles and bugs. They spend most of their day looking for food, using their sharp teeth to cut through the plants stems.

Movement. Prairie dogs are very quick runners and have long toes with claws that give them balance to scan the environment looking for trouble. Its forelegs are very strong to help it dig its burrows. They do not move very far from the burrows, so they do not travel great distances.

Reproduction. Usually there is a dominant male that will mate with many females. They reproduce late winter to early spring. The babies are born about 6 weeks later. Each female may have a litter of 2-8 babies. They mother needs to provide lots of care for the young because they are helpless when they are born.

Shelter. Prairie dogs find great shelter in the underground tunnels and chambers that they build. They use the chambers as nurseries, sleeping rooms and toilets. They have many openings that are guarded for protection.

Dealing with temperature extremes. The burrows offer a cool shelter during the hot summer month. During the extremely cold winter months the prairie dogs will go into a type of hibernation in their burrows, where they are inactive and sluggish- but not entirely unconscious.

Section 2: Environmental Change.

I am going to explain what I think will happen to the prairie dog population if the average annual temperature were to increase by 10 degrees, possibly by global warming.

If that were to happen I would expect some of the following changes:

The plant life may change. Grasses are usually very hardy plants and so I would expect some of the grasses to remain. However, they would be more of the tougher, less-leafy grasses, probably more like the grasses you would see in the desert.

With an increase in temperature, there would be less water available found in ponds and streams that may run through the grasslands. The winters would be less harsh, with somewhat warmer temperatures. I would expect that snowfall would decrease as well.

Section 3: Your animal in the future?

I will assume that my animal will survive the environmental changes that come with a 10 degree increase in temperature. Here are some changes I would expect to find over time.

Feeding. The prairie dog should still be able to have food to eat, although there may not be as much grass so there will be an increase in competition for the food. The food may be harder for the prairie dogs to chew so their teeth may become sharper in order to chew the tougher grasses that can survive with smaller amounts of rainfall.

Movement. I would expect the prairie dog to have to run faster, there will be less food for its predators so there will be more competition to catch the prairie dog. According to Darwin's natural selection of its predators, the fastest ones will be surviving and reproducing so prairie dogs will have to be faster to escape them. Characteristics such as larger hind legs and less bulkier bodies will be an adaptation that will increase the chances of survival.

Reproduction. Because of the warmer temperatures and water availability, I would predict that there will be fewer offspring that survive. The female may produce less milk- so fewer babies will be born. The mother that produces fewer babies will have healthier, stronger babies and she will be able to feed them better.

Shelter. The burrows of the prairie dogs will probably be dug deeper. They will need to do this because the upper soil may not allow for them to dig the tunnels. There will be fewer roots in the soil and burrows may collapse easier.

Temperature Changes. Another reason that the burrows may be dug deeper is to be cooler for the animals in the summer. Also, during the winter the animals may not need to hibernate- so they will be active all year long. This may create a hardship for finding food. The population will have to be more competitive and many will not survive. The animal may have larger ears, to help cool down its body temperature

National Geographic:

<http://animals.nationalgeographic.com/animals/mammals/prairie-dog.html>

Desert USA

<http://animals.nationalgeographic.com/animals/mammals/prairie-dog.html>

