SOUTHERN FLYING SQUIRREL

GROUP 1: MAMMALS

ORDER FAMILY
Rodentia Sciuridae

GENUS & SPECIES
Glaucomys volans



The southern flying squirrel looks like a small rodent when it moves along the branches of a tree, but when it glides through the air, it appears to have the grace of a bird.

KEY FACTS



SIZES

Length: Body, 6 in. Tail, 4 in. **Weight:** Up to 6 oz.



BREEDING

Sexual maturity: 1-2 years. **Breeding season**: January to March.

Gestation: 40 days. No. of young: 2-6.



LIFESTYLE

Habit: Nocturnal (sleeps by day). Solitary in summer but lives in groups of up to 24 during winter. Call: A musical chirping sound or a squeal when threatened. Diet: Nuts, seeds, fruit, insects, spiders, and birds' eggs. Lifespan: Up to 10 years.



RELATED SPECIES

The northern flying squirrel, Glaucomys sabrinus, also from North America, is often regarded as the same species.



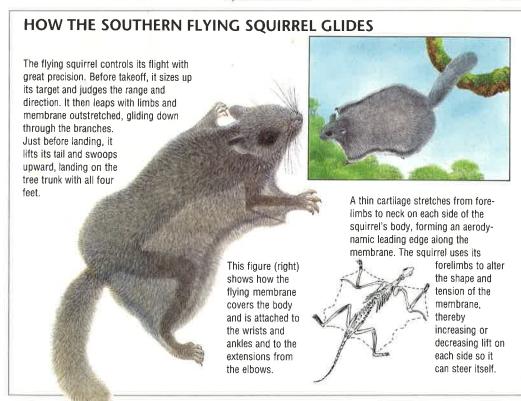
Range of the southern flying squirrel.

DISTRIBUTION

Throughout eastern North America from Canada to Mexico in areas where there are forests of various species of tall trees.

CONSERVATION

The southern flying squirrel is in no danger of extinction while the North American forests are still standing. It is an adaptable animal that can live near human populations.



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A flying squirrel does not fly in the true sense
of the word. It does not have wings to power itself
through the air like a bird. Instead, it glides for long
distances, traveling from tree to tree by extending
a fur-covered membrane that is attached to its
hind and forelegs.



DID YOU KNOW?

- Flying squirrels usually glide from tree to tree but often make sharp, acrobatic turns in the air before landing.
- The membrane's bulk makes flying squirrels.
 flying squirrels.
 The giant Sous species of flying squirrels.
- Australasian marsupials

called gliders use the same technique for moving through the forest canopy, but they are not related to flying squirrels.

• The giant Southeast Asian species of flying squirrel can glide 350 feet.

HABITS

Flying squirrels live in tall trees in the forests of North America. By gliding through the air among the trees, they avoid ground predators but are still vulnerable to attack by hawks. Flying squirrels feed at night, but they must remain alert to the presence of owls, which also prey upon them.

At dawn flying squirrels return to hollow trees, abandoned woodpecker holes, or outbuildings and spend most of the day sleeping. The number of squirrels in an area depends on the supply of suitable places to rest and sleep during the day.

In summer individual squirrels have their own resting places, but in winter they sleep in groups of 20 or more for warmth. During very cold weather the flying squirrels become lethargic and may emerge only to eat the food they gathered in the fall.



BREEDING

Approximately 40 days after mating, the female squirrel gives birth to two to six young in a nest she makes in a hole in a tree.

By the time the young are weaned at two months, they have already made short exploratory flights with their mother. As they mature, they follow her on nightly foraging trips. Fewer than a third of all young squirrels survive their first year.

Right: Newborn squirrels are naked, blind, and helpless for the first few weeks of life. But they already have well-developed flying membranes.





Above: At night the squirrel leaves its tree to forage for

Left: The flying squirrel can glide through the air for up to 160 feet before landing.

food.

Right: The squirrel's chisel-like front teeth enable it to crack the hard shells of nuts and seeds.



Flying squirrels feed on most types of vegetation. In addition to nuts and seeds, they eat buds, shoots, soft fruit, lichens, and fungi. They also eat insects, spiders, and birds' eggs and nestlings.

Flying squirrels have large eyes that allow them to see clearly in the dark. Their keen eyesight, their acute hearing, and their long, sensitive whiskers, enable them to locate food.

Most of their food is eaten immediately, but nuts and seeds are often hoarded to be eaten later during the cold winter months. The squirrels' instinct to store food becomes stronger as fall approaches.



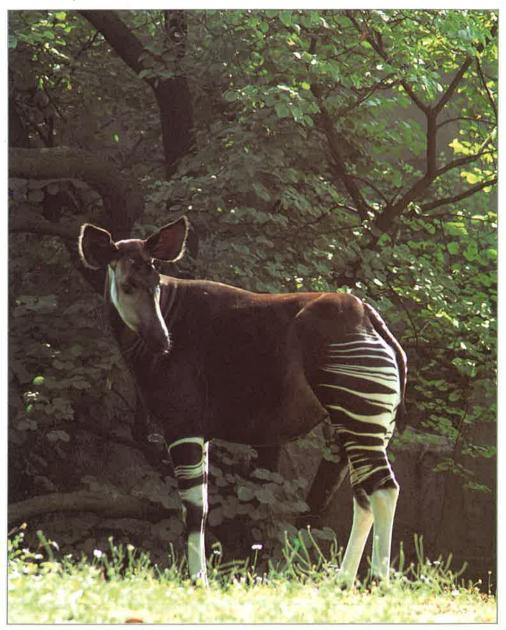
OKAPI

Artiodactyla

ORDER

FAMILY Giraffidae GENUS & SPECIES Okapia johnstoni

GROUP 1: MAMMALS



The okapi, native to Africa's densest jungle, is the giraffe's closest relative. It is so elusive that Western zoologists learned of its existence only at the turn of this century.

KEY FACTS



SIZES

Height to shoulder: 5 ft. Length: 6-7 ft. Weight: 450-550 lb.



BREEDING

Sexual maturity: Females, from 19 months. Males, later.

Mating season: Usually May-June or November-December, but can occur anytime.

Gestation: 14-16 months.

No. of young: 1.



Habit: Solitary, or small temporary groups.

Diet: Leaves, fruit, and seeds. Call: Cough. Female bellows to attract males. Young bleats. Lifespan: Oldest captive, 33 years.



RELATED SPECIES

The okapi's closest relative is the giraffe, the only other species in the same family.



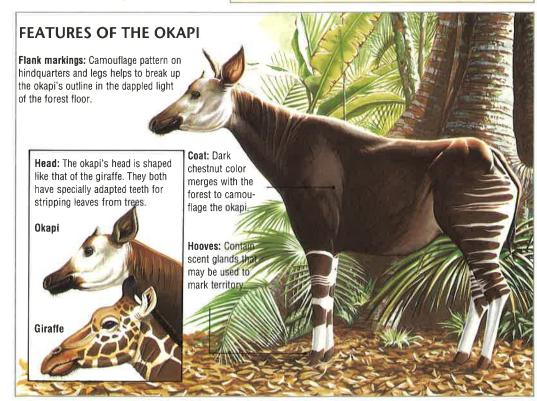
Range of the okapi.

DISTRIBUTION

Found only in the equatorial rainforest of northern, central, and eastern Zaire, near the Sudan and Uganda borders.

CONSERVATION

The okapi has had local protection since 1932, but some hunting continues. Because the okapi's range is limited, its future remains insecure. Its elusive nature makes it impossible to estimate how many live in the wild.



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The okapi is built more like a zebra than like its only relative, the giraffe. The male possesses small horns on his forehead, similar to those of the giraffe. They are covered with skin that is never shed.

HABITAT

Active by day, the okapi prefers the pathways of those areas of forest where the growth is thick and lush, but not where the forest canopy is dense. It also inhabits large clearings in forest and bush regions, especially where water is close by.

The okapi has glands between its hooves that secrete scented substance, used to mark its range. It has also been also a threat to the okapi.

observed spraying bushes with urine. The okapi is not very territorial, although it does establish its own sleeping and resting areas.

Within its habitat, the okapi's only natural enemy is the leopard. If confronted by a leopard, the normally peaceful okapi will lash out with its hooves in defense. Illegal hunting by local tribesmen is

FOOD & FEEDING

The okapi is a browser, or grazer, and its favorite food is young shoots of forest plants. It also eats leaves, seeds, fruit, and some grasses and ferns.

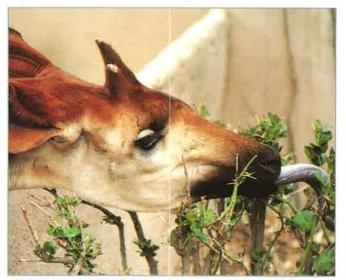
It feeds by grasping branches with its long tongue and stripping off the shoots, leaves, and fruit. Like the giraffe, the okapi has lobed canine teeth that are a special adaptation; they help

Left: With its wild population dwindling, the okapi is usually seen only in a zoo.

it strip the leaves from trees.

The okapi cannot jump or support itself on its hind legs to reach high into the trees to feed. Still, its neck, although much shorter than that of a giraffe, is extremely supple. With the use of its neck and long tongue, the okapi can reach branches 10 feet above the ground.

Below: The okapi reaches its food by grasping branches with its long, muscular tongue.



OKAPI & MAN

The okapi first became known to the scientific community through the British explorer Sir Harry Johnston at the turn of the century. African pygmy tribesmen brought him part of an okapi skin, which the Zoological Society of London later examined. They classified the animal as Equus johnstoni— Johnston's horse. It was only later, when a complete skin and some bones were exam-

ined, that is was found that the okapi was not, in fact. related to the horse.

In its native habitat the okapi is wary and elusive: its acute hearing provides early warning of danger, and its effective camouflage enables it to move about in the wild undetected by man. Therefore, most knowledge about the okapi has been learned by observing it in zoos.

BREEDING

Okapis are usually solitary come together only to mate. Scientists believe that a female marking an area with urine.

A male attracts a female by curling his lip and by tossing his head to show off his white throat. At first the female responds aggressively to his attentions, but she eventually mates with him.

Most births occur during the period of maximum rainfall, when there are plenty of new shoots for the mother and young to eat. The female retreats deep into the forest to give birth. The single young okapi is able to stand and suckle from its mother within

6 to 12 hours of birth. At this animals; the males and females stage, the young okapi barely resembles its parents. In proportion, its head is smaller, its shows her readiness to mate by neck is shorter, and its legs are thicker and longer.

> The female okapi is very protective of her offspring. In her natural habitat, she hides the youngster in the forest, returning at regular intervals, quided by its bleating calls.

The young okapi begins to browse, or graze, at six weeks but continues to suckle for at least six months and does not become fully independent until it is nine months old.

Below: Early discoverers of the okapi thought it was related to



DID YOU KNOW?

- Native pygmies of the Congo gave the okapi its name, describing it to explorers as okhapi.
- At 14 inches, the okapi's tongue is so long that it can lick its eyelids to clean them.
- The okapi keeps itself very clean by licking its body. Zoo keepers take advantage of

this habit when an okapi needs medication by pouring it over the animal's back. The okapi licks it off at once and ingests the medicine.

• 1918 was the first year an okapi was kept in a zoo, but it was not until the 1950s that one was successfully bred and raised in captivity.

WILDEBEEST

ORDER Artiodactyla **FAMILY** Bovidae

GROUP 1: MAMMALS

GENUS & SPECIES Connochaetes taurinus & C. gnou



The wildebeest is an odd-looking animal. It has the head of an ox, the mane and tail of a horse, and the horns of a buffalo, but it is actually a kind of grazing antelope.

KEY FACTS



Height: At shoulder, 3-4½ ft. Length: Head and body, 5-8 ft. Tail, 14-22 in. Weight: Males, 400-600 lb. Females, 300-360 lb.



BREEDING

Sexual maturity: 2-3 years. Breeding season: February to April in South Africa; April to May in the Serengeti. Gestation: 8-9 months. Number of young: Usually 1.



LIFESTYLE

Habit: Lives in herds; often migratory; active by day. Diet: Grasses and succulents. Lifespan: 21 years in captivity.



RELATED SPECIES

Relatives include the bontebok, Damaliscus dorcas, and the hartebeest, Alcephalus busephalus.



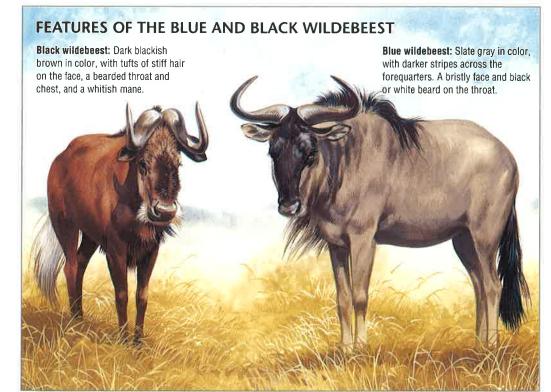
Range of blue wildebeest. Range of black wildebeest.

DISTRIBUTION

Blue wildebeest are found from Kenya to northern South Africa. Black wildebeest are found only in South Africa.

CONSERVATION

The blue wildebeest is numerous and widespread, with an estimated 350,000 roaming the Serengeti plains. The black wildebeest was nearly wiped out in the 19th century, but its numbers have now risen to around 4,000.



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There are two species of wildebeest. The black
wildebeest, also called the white-tailed gnu, is found
only in South Africa. The blue wildebeest, known
as the brindled gnu, ranges from Kenya to
northern South Africa.

HABITS

Although it looks frightening, the horned wildebeest is neither aggressive nor particularly dangerous. When approached, it will stab the ground with its horns, stamp its hooves, and thrash its tail menacingly. It may even lower its head and pretend to charge. But if this display fails to stop the intruder, the wildebeest will retreat and then repeat its performance from a safe distance.

Territorial battles between males involve a similar con-

DID YOU KNOW?

- The name *gnu* comes from a Bushman word for the wildebeest's bellow.
- Only one in every six calves survives its first year.
 Both males and females have horns, although the male's horns are thicker and

heavier than the female's.

• The largest known wildebeest horns measure 33

frontation. Trespassers are

first threatened with loud

in a head-to-head trial of

strength. Horns may lock,

The wildebeest's usual

to 100 animals. If a herd

the whole herd flees.

response to danger is flight.

member spots danger, such

as a pride of lions out hunt-

ing, it sounds a warning and

Wildebeest live in herds of up

but the fights are rarely

bloody.

bellowing calls. If this warn-

ing is ignored, the pair meets

inches across.
To groom itself, the wildebeest rubs its face either on the ground or against a tree or partner.

BREEDING

The breeding habits of the wildebeest vary depending on whether it belongs to a traveling herd. Traveling herds contain animals of all ages and both sexes. The mature male may establish a breeding territory and mate with any females entering it.

Sedentary (nontraveling) wildebeest tend to be more organized. Females with young form separate herds of 10 to 1,000. Males leave the female herds when they are about a year old and join separate bachelor groups. At the age of three or four the male leaves the group and attempts to establish

territories of his own. These territories may be held only briefly while the female herd is passing, or they may be maintained for many years. A male will then attempt to mate with any mature female that enters his territory.

The young are born at the beginning of the rainy season when food is most abundant. A wildebeest calf can stand within 15 minutes of birth and can run shortly after. Until the calf is weaned, at about nine months, it stays close to its mother for protection. But the calves are easy prey for large predators such as lions, and many die.

Right: Males clash horns in a territorial battle.

Below: Calves stay near their mothers for nine months.





FOOD & FEEDING

The wildebeest lives in fertile plains and open woodland, where it grazes on short sweet grass. A taste for this type of grass often leads the wildebeest to recently burned areas, where the fire has cleared the tall, dry scrub, allowing shorter grass to grow. The wildebeest may also follow behind other grazing animals that eat the

Above: In the dry season wildebeest often travel up to 30 miles to find water.

Right: During the herd's migration, many die in fast-flowing rivers. taller, coarser vegetation. It also eats succulent plants and browses on karroo bushes.

It begins grazing soon after sunrise, rests briefly at midday, and continues feeding until sunset.

Although wildebeest are known for their seasonal migrations, not all wildebeest migrate. If there is a constant supply of fresh green grass, they remain in the same area all year. Only when there is severe seasonal drought does the wildebeest migrate in search of food. Herds of over 1,000 animals may then thunder over the plains, raising dark clouds of dust visible for many miles. Hundreds die on these journeys. Many drown as they try to cross fast-flowing rivers.



WILDEBEEST & MAN

The wildebeest is hunted for its skin, which makes a durable leather, and its tail, which is used to make fly swatters called *chowries*. Some hunters also shoot wildebeest for sport.

During the 19th century the Boer farmers killed black wildebeest to provide meat for their workers and turned the hides into bags, belts, and other accessories. The massacre continued until 1870, when only 600 of the animals remained. The species was saved by two Boer landowners, who kept breeding herds on their lands, thus enabling the population to recover.

Because the wildbeest has the same diet as domestic cattle, it is seen as competition for grazing land in some areas.

INDIAN FLYING FOX

ORDER Chiroptera

FAMILY Pteropidae GENUS & SPECIES
Pteropus giganteus

GROUP 1: MAMMALS



The Indian flying fox is one of the largest of all bats and has a wingspan of more than four feet. It does not prey on animals, feeding, instead, almost exclusively on a variety of fruit.

KEY FACTS



SIZE

Length: 12 in. Wingspan: 50 in. Weight: Male, 3-4 lb. Female, 2 lb.



BREEDING

Sexual maturity: 1-2 years.

Breeding season: July to October.

Gestation: 140-150 days.

No. of young: 1; twins rare.



LIFESTYLE

Habit: Roosts in colonies; active at night.

Diet: Mangos, guavas, bananas. Lifespan: Usually 15 years. Maximum recorded in captivity, 31 years 4 months.



RELATED SPECIES

There are over 60 species of flying fox in the genus *Pteropus*, including *P. vampyrus*, the largest of all bats. All are closely related to each other.



Range of the Indian flying fox.

DISTRIBUTION

Widespread from the Maldive Islands of the Indian Ocean through Pakistan, India, Nepal, Sri Lanka, and Burma.

CONSERVATION

The Indian fox is less endangered than many of the less numerous island species of flying fox, but its numbers have been reduced where it has been hunted extensively and where its habitat has been destroyed.

FEATURES OF THE INDIAN FLYING FOX



Eyes: Somewhat large for a bat. It does not use echolocation to navigate in the dark, as do other species of bat but relies on its excellent vision instead.

Hearing: Its hearing is acute.
The female can identify her young by its call.



Wings: Its wings are longer and broader than those of most insect-eating bats and enable the flying fox to fly more powerfully. The wings are jointed in several places, and the bat wraps them around itself for warmth and protection while it is roosting.

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The Indian flying fox was named

for the shape of its head and its reddish brown fur, which resemble those of a fox. Flying foxes are the largest of all bats and are found widely throughout

Asia and Australia.

HABITAT

The Indian flying fox lives in tropical forests and swamps, primarily in coastal areas. Where it does live inland, the bat is seldom found far from large areas of water. It is widespread throughout the Indian subcontinent and is also found on the Maldive Islands.

The Indian flying fox is one of the larger species of flying fox bats, and its strong flying ability has enabled it to colonize many of the islands throughout the Indian and Pacific oceans. Many species of flying fox are, in fact, found only on specific island groups. It is likely that their ancestors flew to the islands from the mainland or were blown there by strong winds.

By day the Indian flying fox roosts in communal sites, called *camps*, hanging upside down in a large tree. Favored roost sites are often used for



many years, and the trees become stripped of bark and foliage by the bats' sharp claws. The camps also have a musky odor that is characteristic of flying foxes.

During the day the bats are noisy and active. Camps may contain several hundred to

Above: The flying fox spends its day in the roost, leaving at dusk to feed.

> several thousand flying foxes. Within the roost there is often a pecking order whereby the more dominant males occupy the best roosting sites.

FOOD & FEEDING

As darkness grows near, the Indian flying fox becomes increasingly restless. It leaves the roost with a group of other bats, and they fly to a feeding site that may be as far as 30 miles away. The Indian flying

fox finds its way through the dark not by sound, as insectivorous (insect-eating) bats do, but by sight and smell. Its eyes are far larger than those of most bats and more closely resemble those of nocturnal primates.

The Indian flying fox uses its large, flat molars to chew up a Below: A flying fox clutches a piece of fruit in its mouth.

variety of fruit to obtain the juice. Very soft fruit such as bananas is swallowed, but usually the bat spits out the fruit pulp and seeds once it has extracted all the juice.

The Indian flying fox also feeds on the juice and pollen of various tree flowers. Because the fruit on trees in a tropical forest does not ripen according to season, the bat must determine which trees have fruit about to ripen. Where the fruit is thinly scattered, the bats spread out at the feeding site. But more often, an entire group of bats descends on a few heavily laden trees and picks them bare.



BREEDING

The Indian flying fox breeds from July to October. Mating takes place in the roost. Indian flying foxes do not form strong pair bonds, and males mate with any adult females roosting nearby. After five months—a long pregnancy for such a small mammal the female gives birth to a single offspring. The young bat emerges feet first.

The newborn is in a far more advanced state than are most other types of bat of the same age. It is alert and its eyes are open. It is covered with fur and weighs as much as nine ounces—nearly a third as much as its mother. The care and feeding of the young are provided only by the female.

For the first few weeks of its life, the newborn clings to its mother's breast, even when she flies from the roost to feed. The young bat is nursed for five months but remains with its mother until it is



Above: Mating takes place from July to October.

eight months old. It is fully grown after a year but is not sexually mature until it is two years old.

DID YOU KNOW?

- During flight the bat extends its legs outward to expand the span of its wing membrane.
- Bats need more water than do other mammals of the same size because they lose a lot of moisture through their wings.
- The largest bat in the world is a flying fox called the Kalong, which has a wingspan of nearly five feet.
- One reason that bats roost upside down is so they can take flight easily—by simply letting go with their feet.
- The flying fox is a strong
- swimmer and crosses rivers using its wings as flippers.
- Fruit-eating bats pollinate flowers and distribute their seeds.
- Flying foxes sometimes drink sea water, possibly to obtain minerals absent from their sugary diet.

FLYING FOX & MAN

Despite its large size, the Indian flying fox is less feared than other types of bats, such as the vampire bat. Rather than preying on animals, the Indian flying fox eats only fruit.

While it once fed mainly on wild fruit, the bat now increas-

ingly raids cultivated crops of fruit trees, which has brought it into conflict with man. In some areas it has posed such a threat to fruit farmers that it has been poisoned.

The Indian flying fox is also hunted in parts of Pakistan for

its fat, which is used for medicinal purposes. In the past 50 years, many small oceanic islands have been almost completely deforested and, as a result, the flying fox populations have experienced a decline.

EUROPEAN RABBIT

ORDER Lagomorpha

FAMILY Leporidae GENUS & SPECIES
Oryctolagus cuniculus

GROUP 1: MAMMALS



The European rabbit is the type commonly sold as a pet in the United States, yet it originated in Spain and Portugal.

KEY FACTS



SIZES

Length: Males up to 16 in. long. Females are slightly smaller. **Weight:** Males, 4 lb. Females are slightly less.



BREEDING

Sexual maturity: 4-5 months.

Mating season: Spring and
summer primarily, but year-round
to some extent.

Gestation: 28-31 days.

No. of young: 2-8.



LIFESTYLE

Habit: Highly sociable, lives in large communities.

Diet: Mainly grasses, clover, herbs. **Lifespan:** About 9 years. Continue to breed until 6 years old.



RELATED SPECIES

The brown hare, closely related to the European rabbit, is distinguished by its longer hind legs.



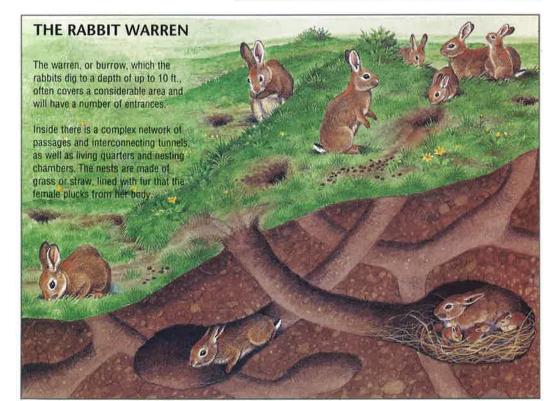
Range of the European rabbit.

DISTRIBUTION

Originally from the Iberian Peninsula and northwestern
Africa, but now widespread across much of Europe, eastward
to the Ukraine. Also introduced to many countries and
islands, including Australia, New Zealand, and Chile.

CONSERVATIO

There are over 50 species of rabbits and hares worldwide. Their numbers are controlled and they are in no danger.



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Able to adapt to almost any type of habitat, the sociable European rabbit lives in underground colonies that can be very large. So great are their numbers that they are considered pests in many parts of their range.

HABITS

Mainly nocturnal, the rabbit spends most of the day underground, emerging from the burrow at dusk. Because it has so many natural predators, it is constantly alert to danger. It pauses as it emerges from its burrow, twitching its nose to smell the air for the scent of predators. It never strays far from the safety of its burrow.

When it senses danger, the animal sounds a warning to other rabbits by thumping the ground with both hind feet before running off.

Generally, there is a dominant female in the colony, called a doe, and she will fight the others for the best nest site.



NATUREWATCH

Unlike wild rabbits found in North America, European rabbits live in vast, underground burrows called warrens. Tracks in the snow are signs that a colony lives nearby. Also, clusters of small, round droppings on the ground are an indication that a warren is close by.





Rabbits breed continually. Litters of five or more rabbits are produced after a short gestation. Within hours of giving birth, the female (or doe) will mate again. She can produce up to seven litters a year.

Spring and summer are the peak reproductive periods, but breeding can start as early as January. Beginning in August, breeding is less intensive, and the doe often does not give birth once she has conceived, but rather reabsorbs the

Right: Baby rabbits huddle together in the nesting chamber. embryos into her body.

Above: A

rabbit sniffs

its burrow.

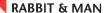
the air before

emerging from

The newborn young are blind, deaf, and hairless. They are born in a nest made by the doe. After the birth, she returns to the nest for

only a few minutes every 24 hours to suckle them. She then leaves, covering the nesting chamber with dirt to protect the young from predators.

tem is unique. Unlike cattle and sheep, which chew to aid digestion, the rabbit rests formed of partly digested food. The rabbit then eats these droppings to extract the maximum nourishment like droppings which it deposits outside the burrow.



Because the rabbit causes extensive damage to crops and gardens, it is considered a pest by most farmers, many of whom kill rabbits to remove them from their land.

In the 1950s, the wild rabbit population was dramatically reduced by an outbreak of the disease myxomatosis. The near-elimination of the rabbit had far-reaching ecological consequences in some areas, since the rabbits naturally controlled the spread of unwanted plants, such as gorse, bramble, and coarse grasses, by eating them.

In Australia, the rabbit population has increased drastically. From a dozen rabbits that were introduced there in the 1850s, the population in 1988 numbered over 200 million. A severe drought occurred soon after, causing the starving rabbits to raid and destroy crops.

In some countries, man regards the rabbit as a game animal. It is also bred for food and sport, and it is widely used for biomedical research.

DID YOU KNOW?

- Glands under the rabbit's chin generate a secretion used to mark territory.
- Badgers and foxes dig young rabbits from their burrow to kill and eat them.
- In the Kerguelen Islands of Antarctica, rabbits survive the harsh winters by feeding on seaweed washed ashore by the storms.

FOOD & FEEDING

Rabbits are *herbivorous* (plant eating) and feed mainly on grass, clover, and selected herbs. In winter, when vegetation is scarce, they eat the bark of trees.

Their preferred feeding times are dawn and dusk. Because rabbits have enormous

appetites and often feed together in large groups, they can cause widespread damage to crops.

The rabbit's digestive sysin its burrow after feeding

and passes soft droppings from the food. Afterward, the rabbit produces hard, pellet-