

TARANTULA

CARD 10

GROUP 5: INSECTS & SPIDERS

CLASS
Arachnida

SUBCLASS
Mygalomorphae

FAMILY
Theraphosidae



The huge, furry tarantula is among the largest and longest-lived of all land invertebrates. Despite its reputation for viciousness, it is aggressive only when provoked.

S. Dalton/Oxford Scientific Films Ltd.

KEY FACTS



SIZES
Length: 3 in.
Leg span: Up to 10 in.
Weight: Average 3 oz.



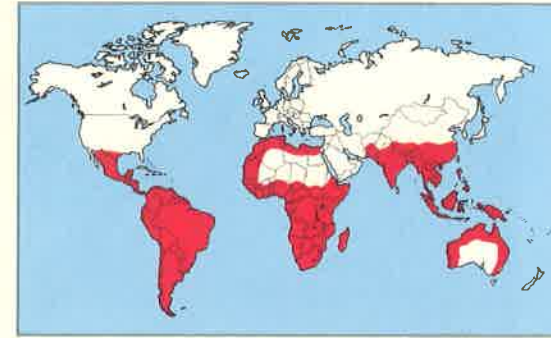
BREEDING
Sexual maturity: 3-10 years.
Mating: Varies according to species.
No. of eggs: Up to 3,000.
Hatching time: 2-3 weeks.



LIFESTYLE
Lifespan: 30 years or more.
Habit: Solitary.
Coloration: Usually various shades of brown mixed with black. Some species display striking coloration.
Diet: Grasshoppers, beetles, moths, woodlice, millipedes, other spiders. Larger species eat lizards, snakes, frogs, toads, mice, and nestling birds.



RELATED SPECIES
Approximately 300 species all over the world.



Range of the tarantula.

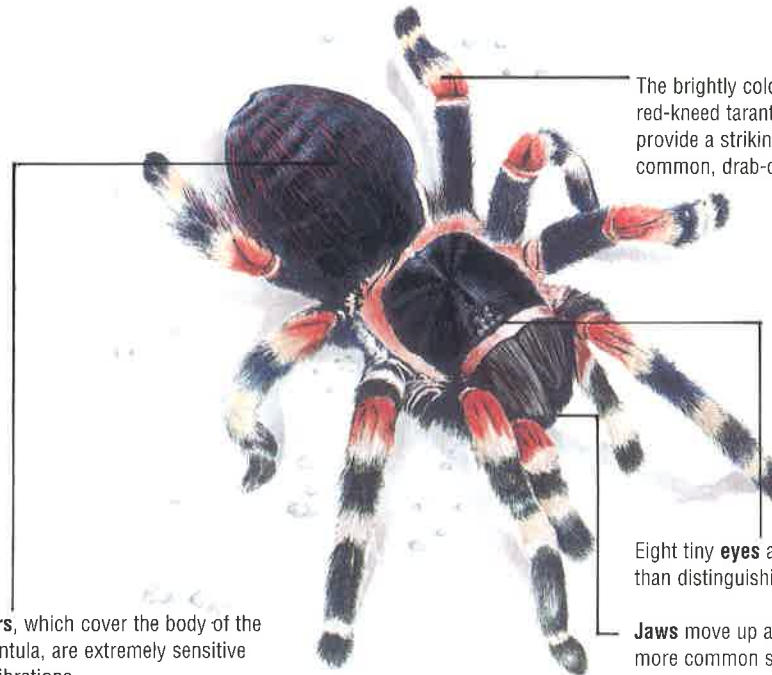
DISTRIBUTION

Throughout the warmer parts of the world, but mainly in the American tropics.

CONSERVATION

Some species threatened by collectors. The Peruvian *Pamphobetus antinous* is decreasing because it is collected in huge numbers for sale to tourists. Species that live in tropical rainforests face loss of habitat.

FEATURES OF THE TARANTULA



The brightly colored **legs** of the Mexican red-kneed tarantula *Brachypelma smithi* provide a striking contrast to the more common, drab-colored species.

Eight tiny **eyes** are capable of little more than distinguishing light and dark.

Hairs, which cover the body of the tarantula, are extremely sensitive to vibrations.

Jaws move up and down, instead of the more common side-to-side motion found in other species.

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True tarantula spiders come only from southern Europe and rarely exceed an inch in length. But the name tarantula is more generally applied to any large, hairy spider and, in particular, to the furry bird spiders of South America.

HABITAT

Tarantulas have adhesive, brushlike hairs on the tips of their legs that allow them to walk on the slick surfaces of leaves. Of the 40 types of tarantula that are found in the United States, most occur in the warm deserts of the

Southwest, where they live on the ground.

Some tarantula species live in burrows. The females of these species often spend their entire lives inside the burrow. They feed by seizing insects that come near the entrance.



DEFENSES

Tarantulas have a wide range of defenses. Some species ward off their attackers by leaning back on their haunches, raising their head and legs, and exposing their long fangs.

Other species turn their back on their attacker and squirt an unpleasant substance into the adversary's face. Or, the spider may use its legs to scrape the very fine hairs from the top of

its abdomen and send them airborne. Each hair is covered with sharp points and, if they come into contact with either eyes or skin, they can cause pain and even temporary blindness.

These defenses are used by the tarantulas in defending themselves from predators, such as coati mundis, raccoons, and skunks, which dig tarantu-

las out of their burrows.

The deadliest enemy of the tarantula, however, is the peppis, or spider-hunting wasp. It is also known as the tarantula hawk. The wasp is much smaller than the tarantula. It enters the tarantula's burrow and paralyzes the spider with its sting. The wasp then drags the defenseless tarantula back to its nest and feeds it to its larvae.

Right: A female Aphonopelma chalcodes in Arizona stands in a defensive posture, exposing her fangs to frighten an enemy.



Below left: A myglamorph spider in Malaysia waits for prey. Its silk-lined burrow is in moist, well-drained earth, where there is little danger of flooding.

BREEDING

Mating among tarantulas takes place at various times, depending on the species. After a rainstorm in the deserts of the southwestern United States and Mexico, vast numbers of males may be seen wandering in search of females.

After mating, the eggs begin to develop inside the female's body. After they are born, the young do not fully mature for

some time. American desert species can take up to 10 years to fully mature; tropical rainforest species take only three to four years.

As with all spiders, the tarantula's growth proceeds through a series of molts, whereby it sheds its skin. Only after the final molt has occurred can the spider's sex be determined.

DID YOU KNOW?

- Despite their reputation for being aggressive toward humans, tarantulas are fairly placid and will only attack if provoked.
- Tarantulas eat young poisonous snakes.
- The largest tarantula, *Theraphosa leblondi*, has a body length of 3 inches and a leg span of 10 inches.

FOOD & HUNTING

Tarantulas feed on small lizards, young snakes and amphibians, tree frogs, and small mammals, such as rodents. The smaller of the forest-dwelling tarantulas and most of the desert species prey mainly on grasshoppers and beetles, as well as on other types of spiders.

The tarantula spears its prey with long fangs, and kills it with its poison. The spider then crushes its prey with its powerful mouthparts. The tarantula produces a special fluid that reduces the prey to a pulpy liquid, which the spider can absorb and digest.



Left: Tarantula carrying an egg case. Hatching time varies from species to species, but all spiderlings spend the first few weeks of life in the female's burrow or another secure place.

EUROPEAN WASP

CARD 9

GROUP 5: INSECTS & SPIDERS

CLASS
Insecta

ORDER
Hymenoptera

FAMILY
Vespidae

GENUS & SPECIES
Vespula vulgaris



One of the most feared of insects, the yellow and black European stinging wasp is beneficial as well: it feeds on garden pests and the larvae of houseflies.

KEY FACTS



CHARACTERISTICS

Length: Queens, $\frac{3}{4}$ in. Drones and workers, $\frac{1}{2}$ in.

Coloration: Workers, drones, and queens have the same yellow and black coloration.

Mouthparts: Biting.



LIFECYCLE

Mating: Fall.

No. of eggs: 300 laid per day.

Hatching time: 4-6 days. Wasps emerge 2-3 weeks after pupation.



LIFESTYLE

Habit: Lives in colonies.

Diet: Small insects, fruit, and meat juices.

Lifespan: Queens: 10 months; drones and workers: 4 weeks.



RELATED SPECIES

Hornets and yellow jackets are social wasps related to the European wasp.



Range of the wasp species.

DISTRIBUTION

The common and German wasps are the most abundant wasp species in western Europe. The Norwegian wasp is found in Scotland, Wales, and central England, but is rare in southern and southeastern England.

CONSERVATION

Common and German wasps are both widespread. Only the European hornet is at risk because of loss of habitat.

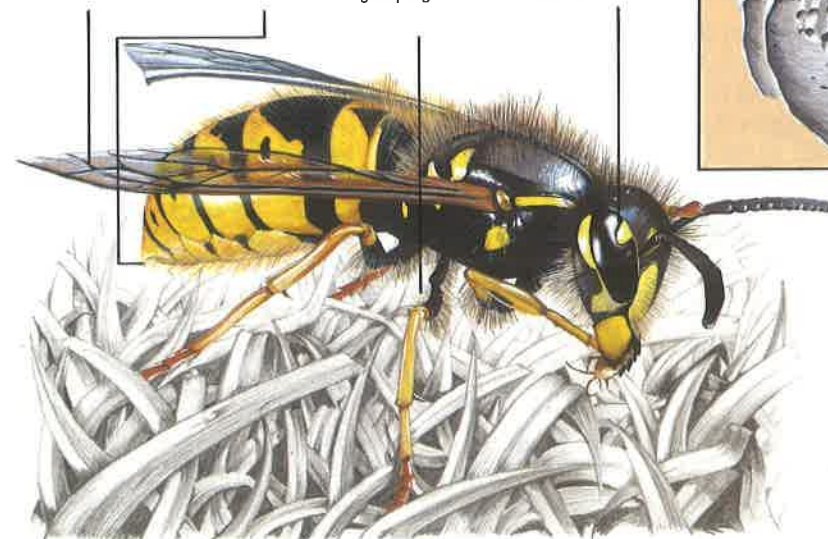
SPECIAL ADAPTATIONS OF THE EUROPEAN WASP

Wings: 2 pairs of transparent wings aid rapid flight.

Stinger: Unbarbed; can be used repeatedly.

Legs: 3 pairs of jointed legs, ending in claws for grasping.

Eyes: 2 pairs of compound eyes provide good vision.



Jaws: The queen uses her tough jaws to tear pieces of fiber from trees and fences. These are used to build the nest, which consists of a system of paper cells (above) within which the eggs are laid.

European wasps belong to a group known as social wasps, which all live in large colonies.

Their nests, built initially by the queens, are intricate paper structures. The wasps make them by chewing wood fibers and mixing them with saliva.



FOOD & FEEDING

In the spring and summer, wasps feed on small insects. Workers also feed on nectar, as well as on a sweet fluid secreted by the immature wasps, which are called *grubs*.

Since wasps do not store food the way bees store honey, they die from starvation in the fall. As their insect prey becomes increasingly scarce, wasps are attracted to populated areas where they can scavenge for food. Only the queen is able to hibernate and live on fat reserves.

Right: In the fall, wasps eat the sweet pulp of fallen fruit.



DEFENSES

Wasps have two forms of defense—their coloration and their sting. The bright yellow-and-black band of color on their bodies acts as a warning to birds, lizards, and small mammals.

The wasp's stinger consists of

a curved, barb-free lance that can deliver a quick shot of poison into the skin of a predator. Unlike a bee, the wasp is able to withdraw the stinger to use it many times. The tree wasp, *Dolichovespula sylvestris*, is particularly aggressive.

DID YOU KNOW?

- Wasps never swarm. Virgin queens fly away from their old colonies in the fall to mate, hibernate, and establish new colonies in spring.
- Wasp colonies may contain as many as 20,000 wasps.
- Wasps have distinct facial patterns that help to identify them. The common wasp has an anchorlike marking.
- There is a species of wasp known as the cuckoo wasp that lays its eggs in the nests of red wasps, which then care for its hatching larvae.

LIFECYCLE

Only the queen wasp lays eggs. She lays unfertilized eggs that become male workers, called *drones*, and fertilized eggs that become sterile female workers or queens, depending on the diet they are fed as grubs.

Mating between drones and a queen wasp occurs on sunny days in October. The queen generally mates with several drones and stores their sperm in her body until spring.

Soon after mating, the drones and workers die, since food is scarce. The queen, however, searches for a suitable place to hibernate for the next 6 to 7 months. When the warmth of the spring sunshine awakens her, she flies off to find a nest site where she will lay her eggs.

When the grubs hatch, they remain attached to special cells within the nest and to their egg cases so that they do not fall out of the nest.

Newly hatched wasps emerge from the nest in July and assume the work of nest building and feeding the grubs from the queen, who continues to lay eggs. Grubs destined to be queens are fed protein-rich secretions.



NATUREWATCH

Wasps' paper nests can be found under the eaves of houses, on compost heaps, or attached to windows, beams, or rafters. Other species make nests in hollow trees or in bushes.



Above: The queen chooses her hibernation site, usually in a shed or greenhouse, and remains there, unconscious, for six to seven months. She lives on her fat reserves.



Left: In spring, the queen starts laying eggs, sticking them to the roof of each cell in the nest to keep them secure.

STINK BUG

CARD 8

GROUP 5: INSECTS & SPIDERS

CLASS
Insecta

ORDER
Hemiptera

SUBORDER
Heteroptera

FAMILY
Pentatomidae



Known as the stink bug because of its ability to spray an unpleasant odor if it is disturbed, this insect numbers more than five thousand species and is specially adapted to its environment.

KEY FACTS



CHARACTERISTICS

Length: Varies from ¼ in.-2 in., depending on species.
Body: Flatter than other insects.
Mouthparts: Sucking.



BREEDING

Breeding season: Varies according to species.
Eggs: Batches from 10-40.
Hatching time: Depends on temperature. Delayed until warm.
Sexual maturity: Varies.



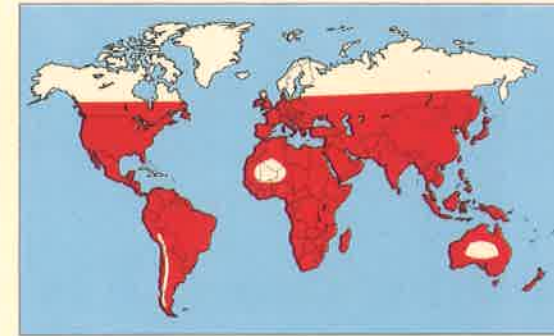
LIFESTYLE

Habit: Solitary, free-living.
Diet: Predatory or herbivorous.
Lifespan: Varies according to species.



RELATED SPECIES

More than 5,000 worldwide. Main families are *Pentatomidae*, *Scutelleridae*, *Tessaratomidae*, *Acanthosomidae*, and *Cydnidae*.



■ Range of the stink bug.

DISTRIBUTION

Found virtually worldwide and in all climates, with the greatest number in the tropics.

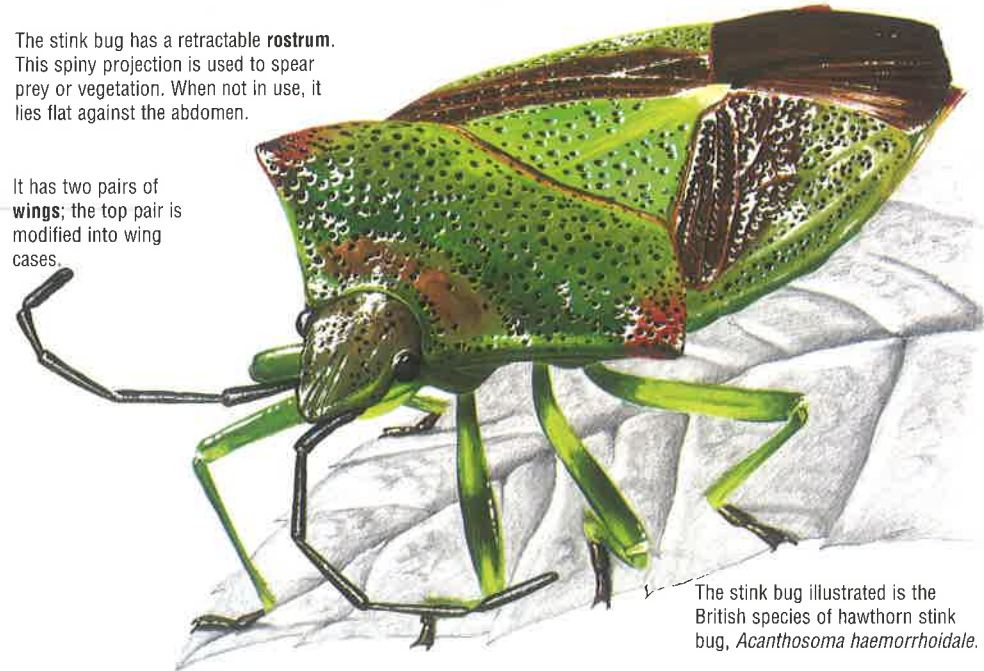
CONSERVATION

Most species are in no immediate danger, but some are considered pests in certain areas of the world—the tortoise bug, *Eurygaster*, for example, attacks wheat in Europe, the former Soviet Union, and the Near East.

FEATURES OF THE STINK BUG

The stink bug has a retractable **rostrum**. This spiny projection is used to spear prey or vegetation. When not in use, it lies flat against the abdomen.

It has two pairs of **wings**; the top pair is modified into wing cases.



The stink bug illustrated is the British species of hawthorn stink bug, *Acanthosoma haemorrhoidale*.

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Although the word “bug” is often used to describe small insects in general, it actually refers to insects in the order Hemiptera. Stink bugs, which comprise thousands of species, are among the most interesting.

HABITAT

The many species of stink bug have adapted to a wide variety of habitats. They inhabit areas ranging from deserts to tropical mangrove swamps. Stink bugs in the tropics are among the largest and most

spectacularly colored.

About 300 species of stink bug can be found in the United States. Most are plain, but one exception is the brightly colored harlequin bug, *Murgantia histrionica*.

DID YOU KNOW?

- A single species of stink bug manages to survive in the Arctic.
- The female stink bug shows great care for her eggs and young—more so than any other group of insects with

the exceptions of bees, wasps, ants, and termites.

- Females of the European species, *Elasmucha grisea*, stay with their offspring for several weeks after they hatch, and then die.

BREEDING

The scent of stink bugs plays an important part in their mating habits. It enables the sexes to locate and recognize one another. Many species also attract partners with the use of sound. By rubbing their legs together, they produce a noise similar to that made by a grasshopper. This action is known as *stridulation*.

During mating, stink bugs remain firmly locked together for several hours in a back-to-back position. Females then lay their eggs in batches. *Herbivorous* (plant-eating) species often seek out one particular food plant or family of plants on which to lay an egg batch,

whereas predatory species are less particular.

After laying her eggs, the female stands over them and guards them vigorously. If they are bothered, she moves her body sideways, acting as a shield between the intruder and her young, which are called *nymphs* once they hatch.

Stink bug nymphs look like small wingless versions of their parents, with more rounded bodies. They often do not display the pattern of adult coloration until they are mature. They *molt* (shed their skin) several times before reaching the fully winged adult stage.



Above: A female *Elasmucha grisea* guards her nymphs.

Left: Newly hatched Pentatomidae stink bugs.



FOOD & FEEDING

Stink bugs eat a wide variety of foods, which differ according to species. Many stink bugs suck the sap from plants. Herbivorous species have a special bacteria in their digestive tracts that breaks down the plant matter.

Many stink bugs prey on any insect that is small enough to

be overpowered, like the beetle. Soft-bodied insects, such as caterpillars, are their usual prey, but some species of stink bug will sometimes eat other stink bugs.

Below: A Mexican stink bug, *Opilomus dichorus*, feeding on a caterpillar.



DEFENSES

The many species of stink bug have defenses that vary greatly. All are at risk from predators such as birds. Plant-eating stink bugs have coloration that blends in with the surrounding vegetation. Those that feed on leaves and

stems are mostly green; those that feed on tree bark are gray or brown.

Many species feed on toxic plants. These poisons are absorbed by the stink bugs, causing them to taste unpleasant to predators.



NATUREWATCH

North America is home to many species of stink bug, most of which are plainly colored and have brown or gray, shield-shaped bodies. Stink bugs are generally easy

to find. The harlequin bug, found nearly year-round in the South and West, is most often seen on garden vegetables, and on blackberry and strawberry plants.

GLANVILLE FRITILLARY

CARD 7

GROUP 5: INSECTS & SPIDERS

CLASS
Insecta

ORDER
Lepidoptera

FAMILY
Nymphalidae

GENUS & SPECIES
Melitaea cinxia



The Glanville fritillary spends most of its life as a black, spiny caterpillar. The orange-patterned butterfly lives only a few weeks.

KEY FACTS



CHARACTERISTICS

Wings: 2 pairs.
Wingspan: Female, about 2 in. Male, slightly smaller.
Mouthparts: Caterpillar has biting jaws, adult has a coiled tubular proboscis.



LIFECYCLE

Eggs: Laid in batches of up to 200, usually in May or June.
Hatching time: 3 weeks.
Caterpillar to pupa: 10 months.
Pupa to butterfly: 15 days.



LIFESTYLE

Diet: Caterpillar eats foliage of narrow-leaved and sea plantains. Adult drinks nectar.
Lifespan: About 12 months from egg to death of adult.



RELATED SPECIES

There are many fritillaries in the family *Nymphalidae*, as well as more familiar species such as the peacock and red admiral.



Range of the Glanville fritillary butterfly.

DISTRIBUTION

Throughout Europe (except much of Great Britain, Scandinavia, and southern Spain) and temperate Asia. A subspecies inhabits North Africa.

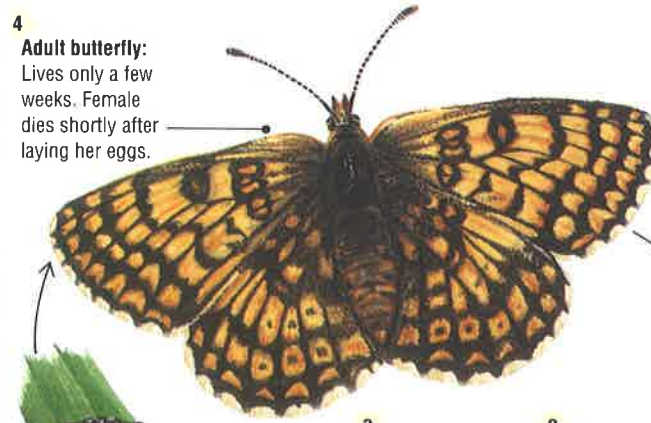
CONSERVATION

The Glanville fritillary's range in Great Britain is shrinking. Its future there depends on the conservation of its grass-land habitat. The species flourishes elsewhere.

LIFECYCLE OF THE GLANVILLE FRITILLARY

4

Adult butterfly: Lives only a few weeks. Female dies shortly after laying her eggs.



1

Eggs: Laid in clusters of about 200 on the leaves of narrow-leaved plantain or sea plantain.



2

Caterpillar: The longest stage in the butterfly's lifecycle. Hatches on food plant and eats until winter. Lies dormant until spring, when it resumes eating. It pupates after 10 months.



3

Pupa: Hangs from plantain. Tough outer casing protects the insect as it evolves into a butterfly.





Left: *The orange-patterned adult butterfly.*

Above: *A pair of Glanville fritillaries settle briefly on the kidney vetch, a nectar-rich plant.*

ENEMIES

Glanville fritillaries can live for two to three weeks, but many survive for only a few days. Some dry up in the summer heat. Others are killed by butterfly-eating spiders, such as the crab spider and the orb-web spinner.

The crab spider waits for butterflies in flowers, blending with the color of the petals. When the butterfly settles to drink the nectar, the spider pounces and kills it.

The orb-web spider suspends its web between tall flower heads, snaring the butterflies as they pass.

DID YOU KNOW?

- The Glanville fritillary is named for Lady Eleanor Glanville, 18th-century butterfly enthusiast.
- All insects have six legs, but the Glanville fritillaries and its relatives only use four. The front pair are too small for walking.
- When alarmed, a feeding group of Glanville fritillaries will jerk their heads in unison. They may do it to confuse predators or keep tiny parasitic wasps from injecting their eggs into the caterpillars.

The warm southern European

climate attracts the Glanville

fritillary more than the cool, wet

northwest does. The butterfly has almost

disappeared from Great Britain.

LIFECYCLE

The Glanville fritillary spends most of its one-year lifecycle as a caterpillar.

After mating, the female lays her first batch of eggs in loose clusters under the tips of

narrow-leaved plantain or sea plantain leaves. She then feeds on buttercups, yellow vetches, or trefoils by sucking the nectar with her *proboscis* (tongue). The nectar helps her

mature a second batch of eggs. After she lays them, the female dies.

Caterpillars soon emerge from the eggs and feed on the plantain under a protec-

tive silken web. The caterpillars soon outgrow their tough skins. The skin splits, leaving a new, pliable skin that will be molted when it can stretch no further.

By winter, the caterpillars have molted four times. They stop feeding and lie dormant until spring when they resume eating, becoming full-grown after their sixth molt in early April.

When the caterpillar sheds its skin for the seventh time, it emerges as a legless, non-feeding *pupa* (inactive form). It hangs from a plantain stem while the insect inside grows into an adult butterfly.

After 15 days, the Glanville fritillary crawls out of the pupa, unfurling its wings so they will harden in the sun. After flexing its wings a few times, the butterfly flies off to feed, mate, and lay another generation of eggs.

HABITAT

The Glanville fritillary inhabits all types of grassland throughout continental Europe and large areas of Asia. In Great Britain the butterfly lives only on the coastal slopes of the Isle of Wight, an island filled with flowers and grassland. Its mild climate attracts the Glanville fritillary.

A slight change in the climate has kept the Glanville fritillary from migrating further north in Great Britain. The butterfly was once found as far north as Yorkshire, but it prefers the milder, warmer regions rather than the cold.



Right: *The caterpillar feeds on plantain, molting whenever it grows too large for its black, spiny skin.*

Left: *Its feeding complete, each caterpillar turns into a compact pupa. It hangs from the food plant for 15 days until hatching into an adult butterfly.*



SWALLOWTAIL BUTTERFLY

CARD 5



GROUP 5: INSECTS & SPIDERS

CLASS
Insecta

ORDER
Lepidoptera

FAMILY
Papilionidae

GENUS & SPECIES
Papilio machaon



The swallowtail butterfly is common throughout much of Europe and Asia, and it is a familiar sight among grassy hillsides and flower-filled meadows.

KEY FACTS



CHARACTERISTICS

Wings: 2 pairs, overlapping.
Wingspan: 3-4 in.
Coloration: Yellow and black. Blue and red spots on hind wings.



BREEDING

Breeding season: Spring-summer.
Eggs: Spherical, laid singly.
Egg to larva: 8-10 days.
Larva to pupa: 6-7 weeks.
Pupa to butterfly: 2-24 weeks, depending on time of pupation.



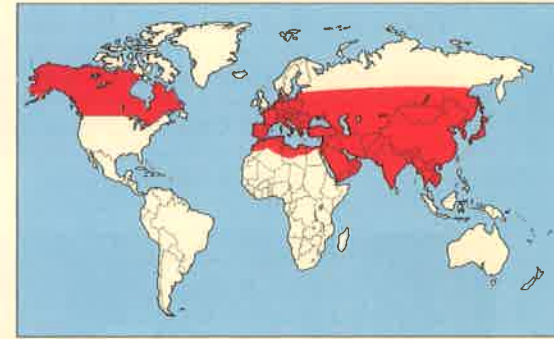
LIFESTYLE

Diet: Larvae feed on specific foliage. Adults drink nectar.
Lifespan of adult: 3-4 weeks.



RELATED SPECIES

The closest relative is the Corsican swallowtail, *Papilio hospiton*. Others include the scarce swallowtail, *Iphiclides podalirius*, and apollo, *Parnassius apollo*, both common in Europe.



Range of the swallowtail butterfly.

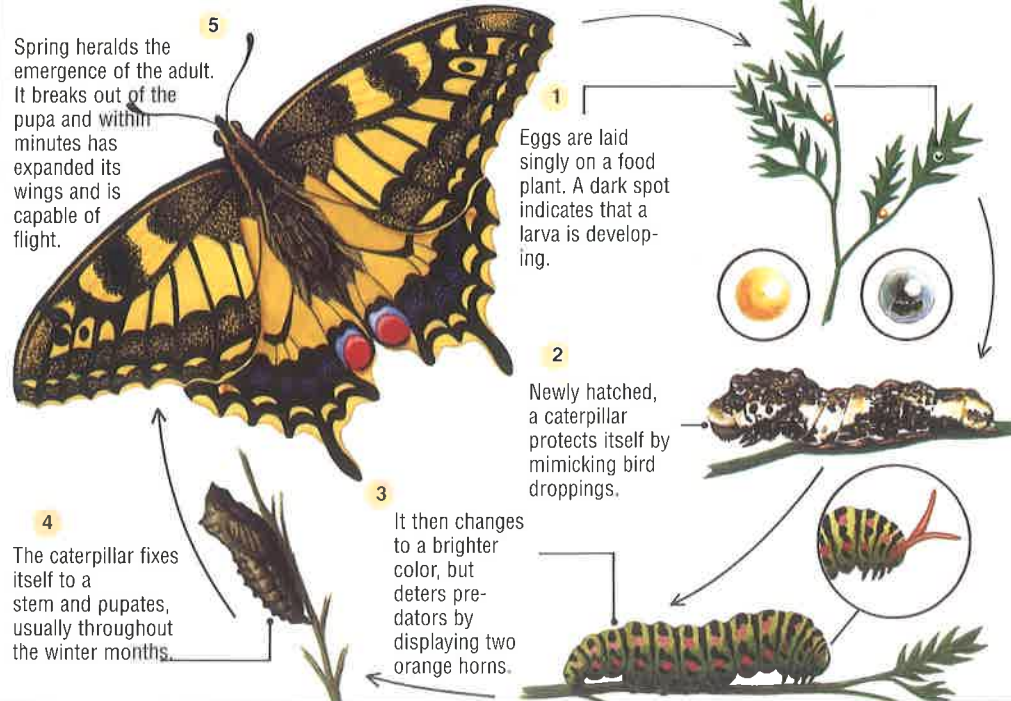
DISTRIBUTION

Widespread throughout Europe and Asia to Japan. Also found in North Africa, Russia, Canada, and Alaska.

CONSERVATION

Common and flourishing throughout most of its habitat.

LIFECYCLE OF THE SWALLOWTAIL BUTTERFLY



The swallowtail butterfly may live for more than half a year as a caterpillar, or pupa, but it survives for less than a month as a butterfly. The adult's purpose in the remaining weeks of its life is to find a mate and breed. Once it has done this, its life is effectively over.



BREEDING & DEVELOPMENT

Young *pupate* (develop in a cocoon) in fall and finally emerge as butterflies in spring. Once the caterpillar transforms into a butterfly, it begins immediately to look for a mate since it has only a few weeks to live. The male is attracted to a female by her scent, and they quickly pair.

Spherical eggs are laid singly and attached to the leaflets of a food plant—usually milk parsley or fennel. After 10 days, caterpillars emerge to feed.

The caterpillar's sole activity is eating. It eats for six to seven weeks before binding itself to a plant stem with silk it pro-

duces. It then molts and spins a cocoon before beginning the final transformation into an adult butterfly. During this process, most of the bulk

Below: The short-lived adults make the most of the spring and summer mating season.

amassed by the feeding caterpillar is broken down to provide nutrients to a small core of cells that develops into the adult butterfly.

When the butterfly is ready to emerge two weeks later, the pupa splits down the back and

the butterfly is released. At first, its wings are crumpled and distorted, but as the wing veins are inflated by blood pressure, they expand and take shape. The adult swallowtail butterfly then flies off to search for a mate.



Left: The butterfly's wing markings help it to distract predators away from its body.

DEFENSES

The swallowtail is preyed on by spiders, birds, and small mammals at all stages of its life, but it is particularly vulnerable when it is a caterpillar or a pupa.

Its main defense is disguise. When the caterpillar first hatches, it is black in color and has a white spot, which makes it resemble a bird dropping. But after its third molt, it emerges in a bright green skin

flecked with orange and black spots, which makes it more conspicuous.

At this stage, it protects itself by inflating a pair of orange horns from behind its head. The horns effectively ward off predators because of a smell they produce that suggests the caterpillar is foul-tasting if eaten. Although harder to catch, the adult butterfly does fall prey to birds.

HABITAT

In most of Europe, the swallowtail butterfly is a familiar sight among flowery hillsides and meadows. Its broad, yellow-and-black wings carry it from flower to flower as it pauses to feed on nectar.

Swallowtail butterflies found in countries off the European mainland, like those in England, are regarded as a separate species. They are usually smaller, darker, and weaker in flight. They also occupy a different habitat—mostly in marshes. It is thought that, while all swallowtail butterflies prefer dry, sunny climates, the species found in England lives in marshes because the availability of its food plant is greater there than in other, more arid

Above: Hanging by threads of silk that it produces, the caterpillar prepares for its long pupation.

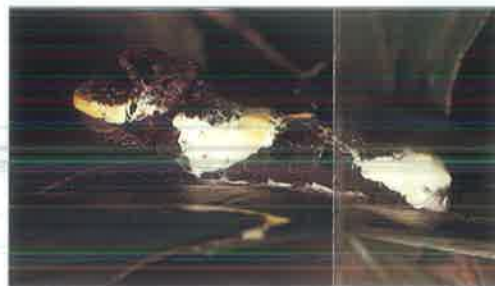
FOOD & FEEDING

As do most butterflies, the swallowtail butterfly eats a great amount of food while it is a caterpillar. At this stage of its life, it will feed only on the foliage of *umbellifers*—a group of plants that includes carrots, fennel, and angelica—and it shows a marked preference for the leaves of the milk parsley plant.

The caterpillar has powerful jaws that are ideal for biting through tough plant material. It feeds constantly, and puts on weight quickly, outgrowing and *molting* (shedding) its skin four times before it changes into its adult form.

Once it becomes an adult, the butterfly no longer grows, so it only needs enough food to provide energy for flying and breeding. It gets its food in the form of sugary nectar, which it sucks from flowers using its long, tubular mouthpart, called a *proboscis*. The proboscis is coiled up like a spring when it is not in use.

The adult butterfly eats a broader range of food than the caterpillar. It will drink nectar from a wide variety of flowers, including milk parsley, ragged robin, and thistle. It is attracted by both the scent of the flower and its color.



Left: Early in its life, the caterpillar resembles a bird dropping. In this way, it avoids the unwelcome attention of its predators.

DID YOU KNOW?

- Some swallowtail butterflies occasionally have black wings due to a condition called *melanism*.
- The swallowtail butterfly normally lives in temperate climates, but one species is found in Alaska. This butterfly spends the long, cold winter in the pupal state, then emerges to produce a single brood during the short summer.
- In 1975, an attempt was made to reintroduce the swallowtail to an area in England. Although 3,500 milk parsley plants were planted, the attempt failed.

GRASSHOPPER

CARD 4

GROUP 5: INSECTS & SPIDERS



CLASS
Insecta

ORDER
Orthoptera

FAMILY
Tettigoniidae or Locustidae



The grasshopper is often hard to see because it blends in with its surroundings. Some are striped or spotted, and tropical species are often brightly colored.

Donald D. Burgess/Ardea London

KEY FACTS



CHARACTERISTICS

Length: From 1/2-8 in.
Coloration: Varies with species.
Mouthparts: Biting.
Wings: Some have no wings.
Winged forms have 2 pairs.



BREEDING

Mating season: Year-round in the tropics; summer elsewhere.
No. of eggs: 3-100.
Hatching time: Depends on temperature and rainfall, but can be many months.



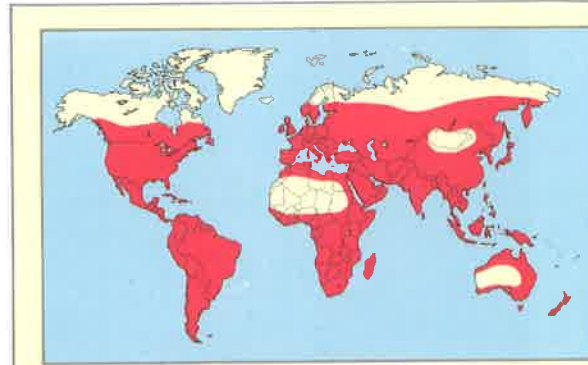
LIFESTYLE

Diet: Mainly green leaves of plants and grasses.
Sound production: By rubbing back legs against wings.



RELATED SPECIES

Various species of cricket.



■ Range of the grasshopper.

DISTRIBUTION

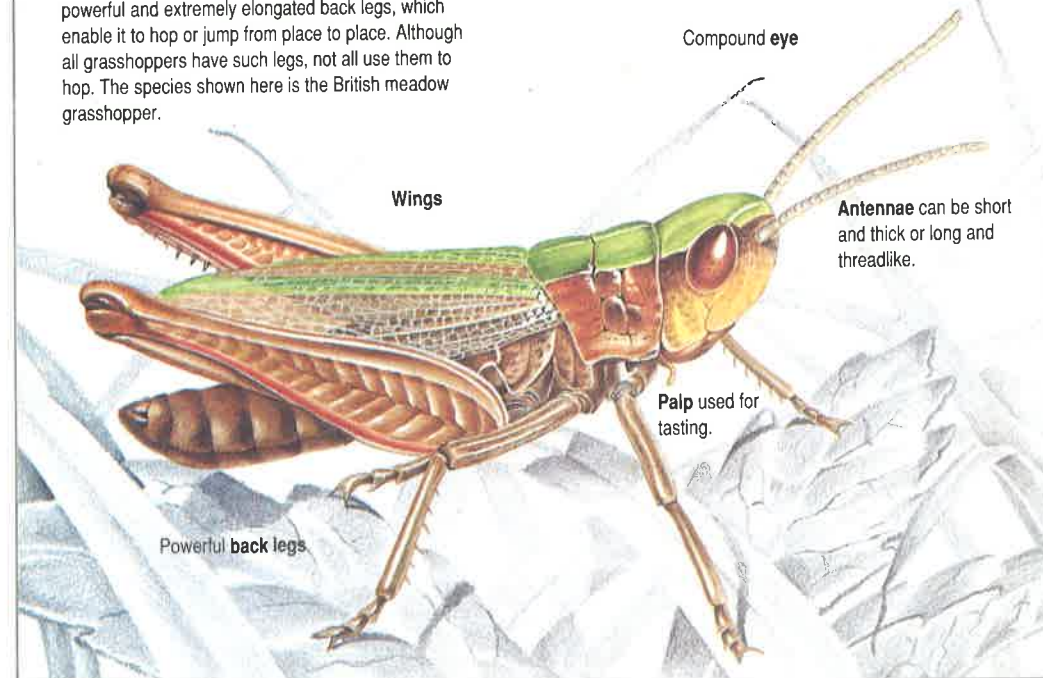
Found widely throughout vegetated areas worldwide as well as in more arid regions.

CONSERVATION

Species are in danger only in areas where loss of habitat is occurring, such as in tropical rainforests. Elsewhere, grasshoppers have survived determined attempts at extermination by man.

FEATURES OF THE GRASSHOPPER

A characteristic feature of the grasshopper is its powerful and extremely elongated back legs, which enable it to hop or jump from place to place. Although all grasshoppers have such legs, not all use them to hop. The species shown here is the British meadow grasshopper.



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K.P.-M./Premaphotos Wildlife

There are 10,000 different species of grasshopper throughout the world. Often confused with their close relatives, the crickets, grasshoppers can be identified by their thick antennae which are always shorter than their bodies.

HABITAT

Grasshoppers are found throughout the vegetated areas of the world. But they are not restricted to grasslands as their name would suggest. Some grasshopper species live in desert habitats, but the most attractive and brightly colored species are

found in tropical rainforests. Many grasshopper species are wingless and must hop or walk to get around. But those that do have wings are strong fliers. Locusts, a winged variety, swarm in huge numbers, destroying all vegetation in their path.



Alan Wearning/Ardea

*Left: Mating between grasshoppers, such as these *Zonocerus elegans*, often takes place on leaves. Note the typically larger size of the female beneath the male.*

FOOD & FEEDING

Grasshoppers feed on the leaves and flowers of plants. They chew them with their powerful jaws, called mandibles, which move side-to-side. A relatively few species feed mainly or solely on grass, but most grasshoppers feed on an enormous variety of herbs, shrubs, and trees. Some even feed on dung. Some of the vegetation eaten by grasshoppers

contains toxic or unpleasant tasting chemicals. Rather than causing ill effects in the grasshoppers, the chemicals are absorbed into their systems and used as a means of defense that repels would-be predators by producing an unpleasant taste.

Below: Tiny grasshopper nymphs feed on the surface tissue of a banana leaf.



K.P.-M./Premaphotos Wildlife

BREEDING

The male grasshopper perches on the female's back when mating, which can last several hours. The female immediately lays her eggs in the soil. Her abdomen is highly flexible and can be extended like a telescope to more than

double its normal length, allowing her to deposit the eggs as deep in the soil as possible.

The eggs are wrapped in a spongy material, known as an *ootheca*. In spite of this protection, the eggs may be detected and preyed on by a variety of parasites, which lay their own eggs inside the grasshoppers' eggs.

When grasshoppers first hatch, they resemble tiny worms. They soon molt to become nymphs. Several more molts then follow, and the nymphs grow larger as each skin is cast off and they become fully mature. Wings do not develop fully until this adult stage.



SPECIAL ADAPTATIONS

The grasshopper produces its "song," or *stridulation*, by rubbing the prominent veins of its rear legs against a corresponding ridge of veins on its forewings.

Some females can stridulate, but it is mostly a male sound, used to establish and maintain territory and to attract females with whom to mate.

DEFENSES

Many grasshoppers have brilliant, contrasting colors that serve as warnings to would-be predators. These grasshoppers produce an awful-tasting foam when they are bothered. Other species, which do not have such defenses, often camouflage themselves to blend in with an inedible part of their surroundings, such as stones, twigs, or leaves.

Many European grasshop-

per species are sandy colored to blend in with their dull environments, but when disturbed or threatened they burst into flight, briefly exposing bright red or blue wings that disappear as soon as they land. This kind of "flash coloration" is meant to confuse predators.

*Below: The *Acrida hungarica* grasshopper blends in so well with its surroundings that it is barely visible on a leaf.*



K.P.-M./Premaphotos Wildlife

DID YOU KNOW?

- The song of every species of grasshopper is different, and females can recognize the sound of males of their own species. It is also possible for people to identify different species in this way.
- Some species of grasshopper can cover up to twenty times their body length in a single leap.
- One of the world's largest grasshoppers, Costa Rica's *Tropidacris cristatus*, was once mistaken for a bird and shot by an ornithologist, who was collecting skins for a natural history museum.

MONARCH BUTTERFLY

CARD 3

GROUP 5: INSECTS & SPIDERS



CLASS
Insecta

ORDER
Lepidoptera

FAMILY
Danaidae

GENUS & SPECIES
Danaus plexippus



Borne aloft on brightly colored wings, the monarch butterfly completes a marvelous feat of endurance each year, migrating thousands of miles to spend the winter in California and Mexico.

KEY FACTS



CHARACTERISTICS

Length: 1 in. (body).
Mouthparts: Adults, sucking.
Wings: 2 pairs of flying wings.
Wingspan: 3 in.



BREEDING

Eggs: Number varies.
Hatching time: 3-4 days.
Caterpillar development: 3-4 weeks.



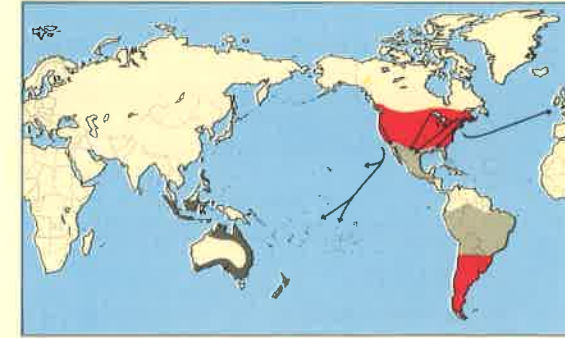
LIFECYCLE

Diet: Larvae feed on milkweed; adults feed on flower nectar.
Lifespan: 3-4 weeks in summer generations; 7-8 months in overwintered generations.



RELATED SPECIES

The similar African monarch butterfly, *Danaus chrysippus*.



■ Areas where monarch seen. ■ Wintering areas. ■ Summer breeding areas.

DISTRIBUTION

From Canada, south to Argentina, Hawaii, Fiji, the Marquesas, the Moluccas, Indonesia, Australia, New Zealand, and the Azores.

CONSERVATION

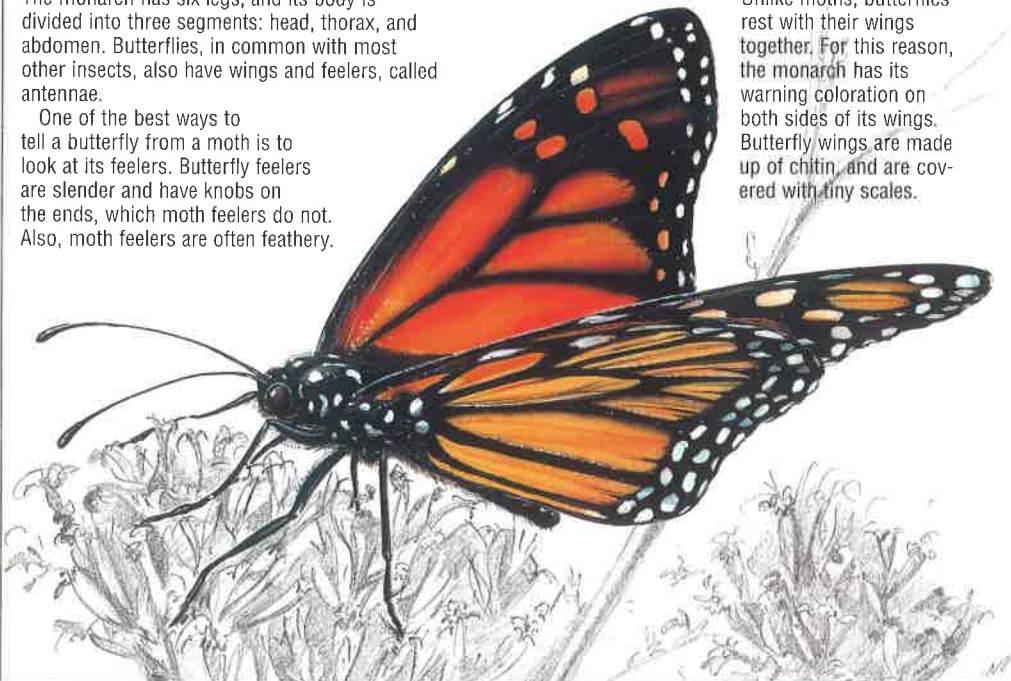
Widespread and numerous, the monarch butterfly's numbers are stable.

DISTINGUISHING FEATURES OF THE MONARCH

The monarch has six legs, and its body is divided into three segments: head, thorax, and abdomen. Butterflies, in common with most other insects, also have wings and feelers, called antennae.

One of the best ways to tell a butterfly from a moth is to look at its feelers. Butterfly feelers are slender and have knobs on the ends, which moth feelers do not. Also, moth feelers are often feathery.

Unlike moths, butterflies rest with their wings together. For this reason, the monarch has its warning coloration on both sides of its wings. Butterfly wings are made up of chitin and are covered with tiny scales.



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Monarch butterflies travel remarkable distances on their autumn migration. Since they stop to breed along the way, the butterflies that make the reverse migration in spring are often five generations removed from those that originally migrated in autumn.

HABITS

The monarch butterfly is found throughout North and South America wherever the milkweed plant grows. The monarch larvae feed on various types of milkweed,

which thrives in open spaces, as well as beside roads, along woodland edges, on empty lots, and in overgrazed pastures. Monarchs will thrive wherever milkweed grows.



SPECIAL ADAPTATIONS

Monarchs have striking, black and white stripes and yellow spots. Their bold coloration serves as a warning to predators that they are unpleasant to eat. The caterpillars feed on

milkweed, and their bodies absorb its poisons. These poisons can cause severe vomiting in almost any animal that eats either a monarch caterpillar or an adult butterfly.

MIGRATION

Despite its paper-thin wings, the monarch butterfly is a powerful flyer with uncanny endurance. It is best known for its annual migration—sometimes as far as 3,000 miles—through North America to California and Mexico. Monarch butterflies that breed in temperate parts of North America migrate so that their eggs and caterpillars will not be killed by prolonged winter frost. For this reason, the autumn monarch broods are more likely to migrate than those that are hatched during the warm spring weather.

The five million monarch

butterflies from western North America head for a small number of sites scattered along the coast of California. The 100 million butterflies from the eastern part of the continent head south to Michoacan, in central Mexico.

During the last 200 years, the monarch butterfly has also succeeded in colonizing places as far away as Hawaii, Fiji, Australia, and New Zealand. These tropical monarch butterflies tend to be less mobile than their relatives in the temperate zones, seldom needing to travel far from their warm habitat.

Right: Thousands of butterflies congregate on one tree.

HIBERNATION

The crowded winter roosts of the monarch butterfly are one of the natural wonders of the world. In Mexico, the roosting sites of the eastern monarch butterfly consist of a small area of pine forest. As many as 15 million orange and black

butterflies cover the trees at one time. The temperature of the roost should be just above freezing. If it is too cold, the butterflies will die; if it is too warm, they will awaken from hibernation and expend valuable energy.



BREEDING

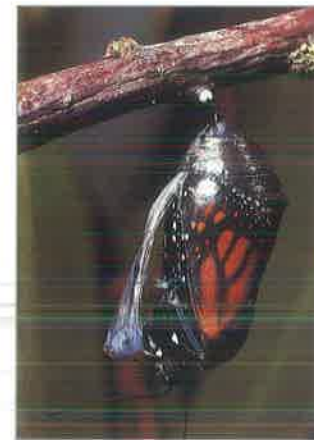
In early spring, monarch butterflies come out of hibernation and begin their migration north. Many stop to mate and lay their eggs on milkweed plants. The eggs hatch into caterpillars within a few days. After the caterpillars pupate and become butterflies a month later, they also join the flight northward.

During the flight, the new adult butterflies may also stop

to breed. Up to five generations of monarch butterflies may migrate in one season. All monarch butterflies congregate at specific winter roosting sites in California and Mexico.

Right: Monarch caterpillars feed exclusively on milkweed plants.

Far right: An adult monarch emerges slowly from its cocoon.



DID YOU KNOW?

- The longest recorded flight of a monarch butterfly is more than 3,000 miles. The monarch can cover 80 miles a day when migrating.
- The monarch butterfly is believed to have reached some of the islands it has colonized by hanging onto ship riggings.
- The monarch makes its migratory flight at speeds of up to 11 miles per hour.

travels 16 or 17 feet above the ground.

Below: A monarch in flight.

