

# BIRDWING BUTTERFLY

CARD 34

GROUP 5: INSECTS & SPIDERS

CLASS  
Insecta

ORDER  
Lepidoptera

FAMILY  
Papilionidae

GENUS  
Ornithoptera



**With their huge, iridescent wings, birdwing butterflies are among the jewels of the tropical rainforest. They are the biggest butterflies in the world and are highly prized by collectors.**

## KEY FACTS



### CHARACTERISTICS

**Wingspan:** The largest female specimens of *Ornithoptera alexandrae* measure 11 in.

**Weight:** Up to ½ oz.

**Wings:** Two pairs, with forewings longer than hind wings.

**Mouthparts:** Sucking (adult), chewing (larva).



### BREEDING

**Eggs:** Laid singly on leaves.

**Larva to pupa:** 4 weeks.

**Pupa to adult:** 3 weeks.



### LIFESTYLE

**Habit:** Solitary, active by day.

**Diet:** Adult feeds on nectar from the flowers of forest trees and vines. Larva feeds on vine foliage.



### RELATED SPECIES

The swallowtail and parnassian butterflies found in North America belong to the same family as the birdwings.



Range of birdwing butterflies.

### DISTRIBUTION

Most birdwings are natives of New Guinea and the nearby islands. They are also found from southern India and Ceylon through Southeast Asia to northern Australia.

### CONSERVATION

All birdwing butterflies are threatened by the destruction of their rainforest habitat. But butterfly farming has helped prevent the intentional killing of wild specimens.

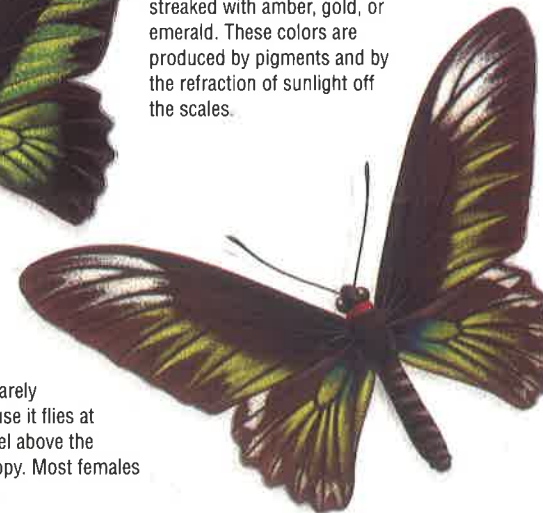
## FEATURES OF BIRDWING BUTTERFLIES



**Male:** Often found on riverbanks, where it feeds on sodium salt minerals—particularly before mating. It also alights on rotting fruit and flowers. Male birdwings are usually more brightly colored and iridescent than females.

Rajah Brooke's birdwing, *Trogonoptera brookianus*, shown here, is found in Malaysia. Both male and female have a wingspan of 5½ inches.

**Color:** Male has dark wings streaked with amber, gold, or emerald. These colors are produced by pigments and by the refraction of sunlight off the scales.



**Female:** Rarely seen because it flies at treetop level above the forest canopy. Most females are brown.



*Birdwing butterfly specimens can be found in collections in all parts of the world. Ironically, this trade may help to preserve living butterflies and their rainforest habitat in Southeast Asia and Australia. The local people are being encouraged to set up butterfly farms instead of cutting down trees to grow crops.*

## CHARACTERISTICS

With wingspans of up to 11 inches, birdwings are the biggest, most spectacular butterflies in the world. They are found in the rainforests of Southeast Asia and Australasia, where they live in treetops high above the forest floor.

The name “birdwing” refers to the shape of the butterfly’s forewings, which are long and slender compared to the relatively small hind wings. This gives them a somewhat bird-like appearance as they slowly fly between trees.

As with many insects, the

females are larger than the males, but the males are more colorful. Their dark, velvety wings are streaked with iridescent amber, gold, or emerald. The colors are produced partly by pigments but primarily by the scattering of light from the wing scales. The scales are only loosely attached to the wings, like tiles on a roof. As the butterfly ages, they tend to fall off, revealing the clear glassy structure of the wings.

**Right:** *After a butterfly emerges from the chrysalis, it must wait for its wings to dry.*

## FOOD & FEEDING

Birdwing larvae (caterpillars) need to eat all day so they can grow. Their bodies are basically muscular bags designed to take in and process as much food as possible. The larvae feed mainly on the leaves of *Aristolochia* vines, which contain toxic substances. It seems probable that the birdwing larva absorbs the toxins into its system, making itself poisonous to its enemies.

A birdwing adult needs high-

energy food as fuel for flying and mating, and nectar is an ideal source. Like other butterflies, the birdwing obtains nectar by uncoiling its long *proboscis*, or mouthpart, and inserting it into the center of a flower. The proboscis is actually two structures that form a tube when they are held together. The butterfly uses the tube to suck up the nectar—a process comparable to drinking through a straw.

**Left:** *The Cairns birdwing is found in tropical areas of north-eastern Australia.*

**Right:** *The birdwing adult feeds on the nectar it collects from forest flowers.*

## DID YOU KNOW?

- Some birdwings are so big that collectors used to kill them with bows and arrows.
- If attacked, a larva will defend itself by exuding a foul odor from a retractable organ behind its head.
- Butterflies are attracted to each other by smell rather

than color. When scientists bred a male butterfly of the “wrong” color, it did not bother the female.

- After fertilization, the male plugs the female’s genital tract with a frothy secretion to prevent other males from mating with her.



**Left:** *This larva is fully grown and ready to pupate, or turn into a butterfly. At this stage it produces a silken girdle around its “waist” and attaches itself to a leaf.*

## LIFECYCLE

Like all butterflies, birdwings have a four-stage lifecycle. The egg hatches into a larva, which then becomes a *chrysalis*, or pupa. The winged adult finally emerges from the pupa.

The female birdwing lays her eggs on the upper sides of the leaves and leaves them to develop unguarded. After they hatch, the larvae feed voraciously and reach their maximum size within a month. Each larva outgrows its skin several times as it gets bigger. Finally it stops feeding and develops a tough pupal skin.

During this chrysalis phase, the insect is sealed inside a cocoon and does not eat. The cocoon is attached to a plant by a pad of silk at its lower end and a girdle around its “waist.”

Inside the cocoon the body of the insect is completely rebuilt. Most of the larval cells are broken down, and a few dormant cells are brought to life to create the body of the winged adult. Within three weeks the process is complete. The butterfly emerges from the cocoon, expands its wings, and flies off to find a mate.



# COMMON EARWIG

GROUP 5: INSECTS & SPIDERS

ORDER  
Dermaptera

FAMILY  
Forficulidae

GENUS & SPECIES  
*Forficula auricularia*



**The common earwig can be identified easily by its pointed tail pincers. It looks fierce, but it is a harmless creature, and tales that it pierces eardrums are untrue.**

## KEY FACTS



### CHARACTERISTICS

**Length:** Up to ½ in.  
**Mouthparts:** Simple biting jaws.  
**Wings:** Forewings modified into tough wing cases for large, very thin, semicircular hind wings.



### BREEDING

**Breeding season:** Early spring.  
**No. of eggs:** 20-50.  
**Hatching time:** 3-4 weeks.



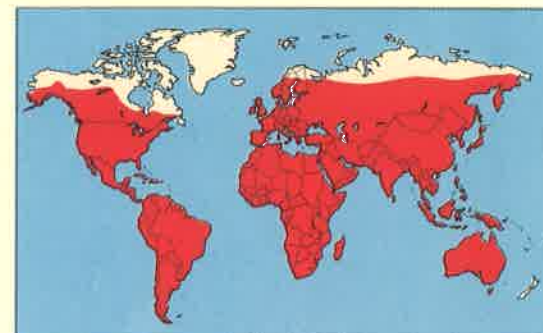
### LIFESTYLE

**Habit:** Active at night; generally solitary.  
**Diet:** Plant and animal remains and live fruit and flowers.  
**Lifespan:** 18 months or more.



### RELATED SPECIES

There are 1,200 known species of earwig. Common species include the lesser earwig, *Labia minor*, and the large earwig, *Labidura riparia*, which may grow to 1 inch long.



Range of the earwig family.

### DISTRIBUTION

The common earwig and related species are found worldwide, except in the polar regions.

### CONSERVATION

Earwigs are very adaptable and in no danger of becoming extinct. But the world's largest earwig, *Labidura herculiana* from Saint Helena, may be extinct because of loss of habitat.

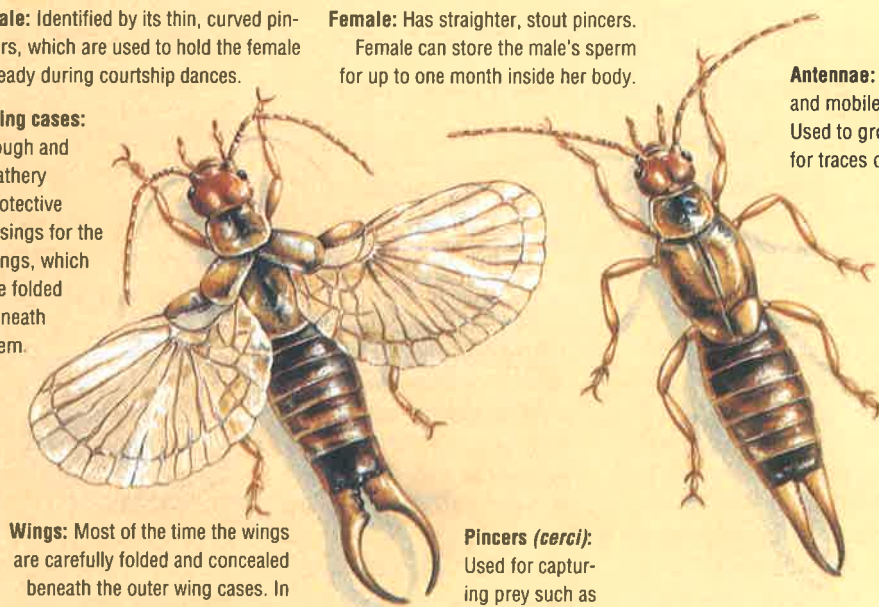
## CHARACTERISTICS OF THE COMMON EARWIG

**Male:** Identified by its thin, curved pincers, which are used to hold the female steady during courtship dances.

**Female:** Has straighter, stout pincers. Female can store the male's sperm for up to one month inside her body.

**Wing cases:** Tough and leathery protective casings for the wings, which are folded beneath them.

**Antennae:** Long and mobile. Used to grope for traces of food.



**Wings:** Most of the time the wings are carefully folded and concealed beneath the outer wing cases. In some species a pair of hind wings fits beneath the forewings.

**Pincers (cerci):** Used for capturing prey such as small flies and caterpillars.



*The common earwig is unusual because it cares for its young even before they hatch, tending the eggs and licking them clean. Later, it feeds its young and even accompanies them on their first foraging expeditions. Such parental attention is very rare in the insect world.*

## HABITS

With flattened body and short legs, the common earwig is ideally shaped for lurking in crevices. It wedges itself into tight corners and squeezes its body against the walls. It lies dormant all day and creeps out at night to feed, using its antennae to grope for food.

If the previous night's food source has been exhausted,

the common earwig may fly off in search of food. Its wings are concealed under a pair of very short wing cases. Each wing is quite large but extremely thin, so it can be folded up under its wing case like a parachute. The earwig must carefully manipulate its tail pincers to unfold the wings, which may be why it does not fly very much.

## BREEDING

Earwigs pair and mate in late summer or fall, before the female finds a refuge for the winter. Often the pair spends the winter together, along with other earwigs.

In early spring the female lays 20 to 50 creamy-white oval eggs in a crevice. She guards the eggs, turning and licking them to keep them free of mold spores and bacteria that could destroy them. The eggs hatch after three or four

weeks. A young earwig does not undergo a larval stage. It is much paler than an adult and has no wings.

The mother earwig feeds and protects the young for about 10 days, until they shed their skins. This is the first of four or five *instars* (growth stages). At the second instar the young venture outside the nest and begin to forage for themselves. But a family group frequently stays together until the young are fully grown in late summer.



Left: A newly hatched earwig is known as a nymph.

Right: A female earwig tends her eggs.



## DID YOU KNOW?

- The earwig's wings are folded into 40 layers to fit under the wing cases.
- Some tropical earwigs live as parasites on rats and bats. They infest the fur like lice or feast on the debris found in bat roosts.
- The name *earwig* originates from the belief that earwigs crawl into people's ears and bite holes in their eardrums. It is possible the insect might regard an ear as a cozy crevice, but the rest of the story is unfounded.

## FOOD & FEEDING

The common earwig is primarily a scavenger that feeds on decaying fruit and *carrion* (dead flesh). It uses its biting mouthparts to eat damaged fruit, the delicate parts of flowers, and fungi spores. On flower and fruit farms, where food

is abundant, earwigs may multiply to plague proportions.

The common earwig may capture insects in its powerful tail pincers. More often it is on the defensive. It will arch its pincers over its back in order to discourage attackers.



Left: Male and female earwigs can be identified by the shape of their cerci (pincers). On the male (left) the cerci are slim and curved. On the female (right) they are short, thick, and straight.

# ARMY ANT

CARD 32

GROUP 5: INSECTS & SPIDERS

ORDER

Hymenoptera

FAMILY

Formicidae

GENUS

*Eciton*



**The lives of army ants differ from those of most other ants. These nomadic hunters roam from one temporary nest to another and devour any small creature in their path.**

## KEY FACTS



### CHARACTERISTICS

**Length:** Up to 1 in.

**Coloration:** Dark brown to black.

**Mouthparts:** Large, powerful, pincerlike jaws.

**Wings:** Only on male.



### BREEDING

**Eggs:** Up to 120,000 laid during each stationary phase.

**Larval development:** 23-33 days.

**Pupation:** 10-15 days.



### LIFESTYLE

**Habit:** Lives in colonies; nomadic.

**Diet:** Small animals that colony subdues, such as insects, baby birds, and snakes.



### RELATED SPECIES

There are about a dozen species within the genus *Eciton*. Together with African driver ants and several other genera, they make up the subfamily *Dorylinae*.



■ Range of army ants.

### DISTRIBUTION

Found from southern Mexico to tropical South America and as far north as the Mississippi valley. Related species occur in India and Malaysia.

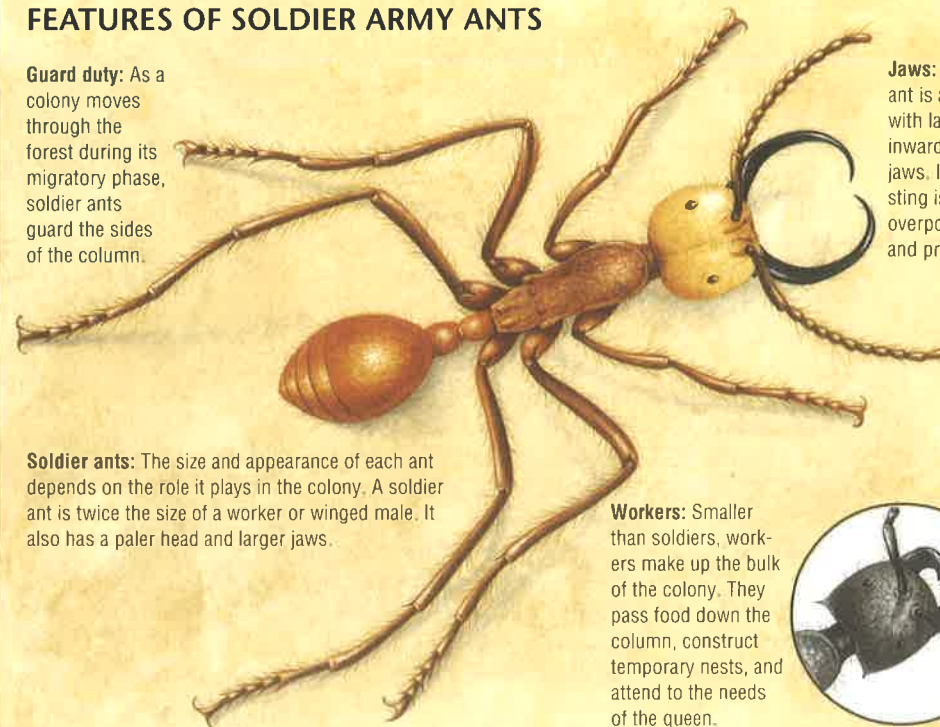
### CONSERVATION

Army ants are abundant and widespread in many parts of their range. They are considered a nuisance when their colonies meet human settlements.

## FEATURES OF SOLDIER ARMY ANTS

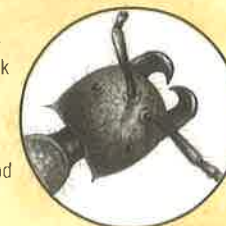
**Guard duty:** As a colony moves through the forest during its migratory phase, soldier ants guard the sides of the column.

**Soldier ants:** The size and appearance of each ant depends on the role it plays in the colony. A soldier ant is twice the size of a worker or winged male. It also has a paler head and larger jaws.



**Jaws:** A soldier ant is armed with large, inward-growing jaws. Its deadly sting is used to overpower prey and predators.

**Workers:** Smaller than soldiers, workers make up the bulk of the colony. They pass food down the column, construct temporary nests, and attend to the needs of the queen.





*A colony of army ants on the march is an awe-inspiring sight. Hundreds of thousands of individual ants form a highly organized procession.*

*Though sometimes feared, these ants*

*are of little danger to humans—*

*as long as people step aside and let them pass.*

## HABITS

Army ants live in the lowland forests of Central and South America. They are unusual among social insects in that they lead nomadic lives. Each colony contains hundreds of thousands of ants. Most are workers, and there are also soldier ants. The central figure in the colony is the queen, who lays all the eggs.

The colony's activities are based on a 30- to 40-day cycle that is divided into a migratory and a stationary phase. During a migratory phase the colony marches daily and rests at night, sometimes in nests formed by the workers' bodies. The ants grip each other with their legs and jaws to form long chains. These chains in-

terweave into a net that surrounds and protects the queen and the young.

During the stationary phase the colony builds a nest in a sheltered spot on the forest floor and the queen lays up to 120,000 eggs. The eggs soon hatch into larvae and parties of workers forage in the area to bring them food. As the number of larvae increases, more and more food is needed to sustain the colony. Soon the colony must migrate again in search of food.

The migratory phase continues until the new larvae start to *pupate* (develop). Pupating larvae do not feed, so the demand for food drops again, and the cycle begins anew.

## FOOD & HUNTING

Army ants are *carnivores*, or meat eaters. While marching, they attack any animal within reach, and they work together to overcome prey much larger than themselves. Slow-moving insect larvae, mollusks, and worms are their easiest prey, but army ants

*Left: Soldier ants have powerful jaws that they use against potential predators.*

### DID YOU KNOW?

- Columns of army ants can march 65 feet in an hour.
- The related African driver ants have large, biting jaws that can tear morsels of flesh from animals.

also attack beetles, grasshoppers, spiders, and scorpions. They can kill snakes, lizards, and small mammals by mass stinging and suffocation.

During the migratory period, daily marches start at dawn. Special scout workers test various routes and then form an advance front.

The scouts leave behind a strong scent to guide their followers. The remaining ants march in a dense column, carrying the queen and the larvae. Food seized at the front is passed back down the column to feed the young. Soldier ants at the sides protect the marchers.

*Right: Hundreds of worker ants unite to overcome and dismember a grasshopper.*



*Left: Instead of going around an obstacle, an advancing column of ants forms a bridge to cross a gap on the forest floor.*

*Below: A worker tends a queen ant that is bloated with eggs.*



## BREEDING

The queen produces sterile females for most of the year. But once a year she produces a special generation of fertile females and winged males. About six young queens develop first. A group of workers help the first out of her cocoon, surround her, and move her a short distance from the main colony. When a second queen emerges, another section of

workers switches allegiance from the main queen to her. Queens that hatch later receive less attention.

A batch of up to 3,000 winged males then emerges from the main nest. This event splits the colony in two. The main queen goes in one direction and the eldest of the young queens in another, both surrounded by workers. The younger queens usually follow the latter, but they rarely survive to establish their own colonies.

The winged males wait until evening and then mate with the young queens. A queen mates only once and stores sperm in her body to produce eggs for the rest of her life.

# RED ADMIRAL BUTTERFLY

CARD 31

GROUP 5: INSECTS & SPIDERS

CLASS  
Insecta

ORDER  
Lepidoptera

FAMILY  
Nymphalidae

GENUS & SPECIES  
*Vanessa atalanta*



**The red admiral butterfly belongs to the vanessid group of butterflies. They are among the largest and most colorful butterflies that inhabit the northern temperate regions of the world.**

## KEY FACTS



### CHARACTERISTICS

**Wingspan:** 2-3 in.

**Coloration:** Red, black, and white.

**Legs:** Front legs, stumps covered in brushes. Only uses rear two pairs of legs for walking.



### BREEDING

**Breeding season:** Spring.

**Eggs:** 1-100 per day.

**Egg to chrysalis:** 4-7 days.

**Chrysalis to pupation:** 2-3 weeks.



### LIFESTYLE

**Diet:** Mainly nectar of plants such as nettle, wild daisy, and clover.

Also feeds on rotting fruit.

**Lifespan:** About 10 months.



### RELATED SPECIES

Vast number of different vanessid (genus *Vanessa*) species including painted ladies, peacock butterfly, commodore butterfly, tortoiseshell butterfly, and pansy butterfly.



■ Range of the red admiral butterfly.

### DISTRIBUTION

Found throughout North America, Europe, North Africa, and parts of Central America and the Middle East.

### CONSERVATION

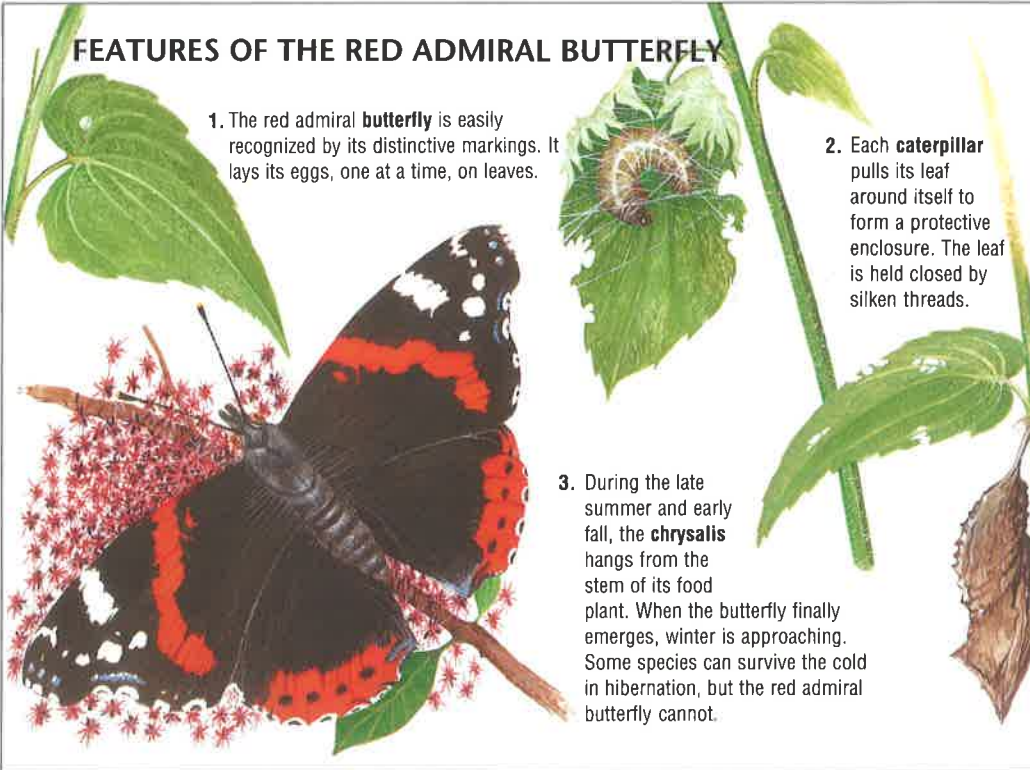
The vanessids (genus *Vanessa*) are among the least endangered of butterflies, especially because they feed on plants that man encourages to grow.

## FEATURES OF THE RED ADMIRAL BUTTERFLY

1. The red admiral **butterfly** is easily recognized by its distinctive markings. It lays its eggs, one at a time, on leaves.

2. Each **caterpillar** pulls its leaf around itself to form a protective enclosure. The leaf is held closed by silken threads.

3. During the late summer and early fall, the **chrysalis** hangs from the stem of its food plant. When the butterfly finally emerges, winter is approaching. Some species can survive the cold in hibernation, but the red admiral butterfly cannot.





**Vanessa butterflies are found throughout much of the world.**

Besides the red admiral butterfly, this group includes the tortoiseshell, painted lady, peacock, Camberwell beauty, and comma butterflies.

### FOOD & FEEDING

The red admiral butterfly feeds mainly on flower nectar. It also feeds on nettles and clover in the spring and summer, as well as on common flowers such as buddleia, Michaelmas daisy, and ice plant.

It particularly likes daisies of the family *Asteraceae* because each flower contains a high concentration of nectar.

The red admiral butterfly also feeds on ivy flowers and the juice of rotting fruit such as apples, which it shares with

wasps and other vanessids (genus *Vanessa*).

All vanessid butterflies have special taste organs located in their feet, but those of the red admiral butterfly are especially sensitive. The organs can distinguish between water and a sugar solution that is so weak that a person cannot tell the difference.

**Top:** A red admiral butterfly rests on a leaf.

**Right:** Painted lady butterfly.

### DEVELOPMENT

The female red admiral butterfly lays her eggs on a wide range of food plants. She generally chooses the leaves of the nettle, or occasionally those of the hop plant, on which to lay her eggs. Each egg is laid singly and placed on the top surface of the leaf.

When the eggs hatch, the caterpillars pull the leaves around them to form a protective enclosure. They then spin silken threads around themselves to serve as protection from predators as they feed.

Once they are fully grown, the caterpillars move to a hidden spot on the plant, usually near the base of a leaf

by its stem, where they shed their skins and *pupate* (go through a non-feeding stage of development). The cocoon they spin (*chrysalis*) has gold-

colored markings.

The chrysalises of other vanessid butterflies often resemble the surfaces on which they rest.



**Left:** An egg about to hatch. The female lays up to 100 eggs per day.



### NATUREWATCH

Red admiral butterflies are a common sight in yards and vacant lots. Planting late-blooming, nectar-rich flowers is a sure way of attracting the butterflies to your yard, as

natural supplies of food are scarce at that time. They are also attracted to nettles.

Inspect leaves of favorite plants from May onward for eggs.

### DEFENSE

The red admiral caterpillar has spiky extensions on its body that deter most birds, except the cuckoo, from attacking them. Still, they are very vulnerable to attack by parasitic wasps and flies.

The red admiral butterfly is

a strong flyer and only the most agile birds can catch it in flight. When it is resting, the butterfly conceals itself from view by closing its colorful wings. Still, the markings on its upper wings remain visible.

### DID YOU KNOW?

- When red admiral butterflies migrate, they fly at five to nine miles per hour.
- The red admiral butterfly's name comes from the word *admirable*—it was admired for its bright coloration.
- Five of the most common vanessids depend on the nettle plant as their primary source of food.
- The painted lady, *Cynthia cardui*, is the world's most common butterfly and one of the most widely distributed insects on earth.
- Tortoiseshell and peacock caterpillars rise up and face their predators to intimidate them.

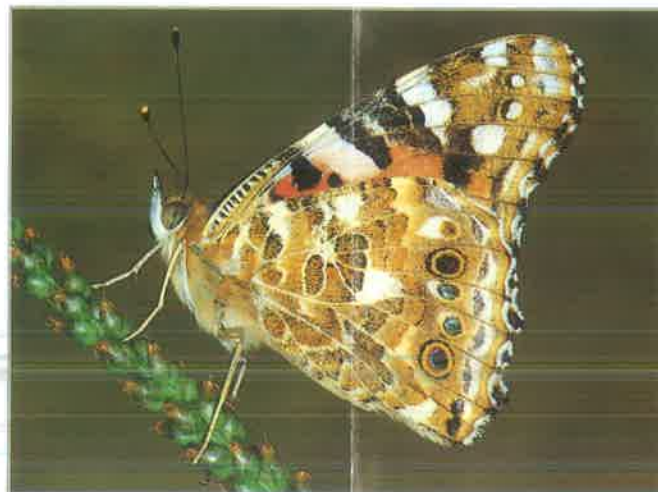
### MIGRATION & HIBERNATION

Although the red admiral butterfly is commonly seen in temperate areas, it is actually a migrant from the Mediterranean regions of Europe and from Guatemala and the Antilles in the western hemisphere. It flies north each spring and lays its eggs when it arrives at its breeding grounds. The offspring remain at the breeding grounds through summer and into the cold winter.

Like the painted lady, which

also migrates, the red admiral butterfly seems to lack the instinct to return south as cold weather approaches. In the winter it attempts to hibernate in tree hollows, rocky crevices, or among plant debris, but the cold weather soon kills it.

Some vanessids are heartier than the red admiral butterfly. The peacock, small tortoiseshell, and comma butterflies, for example, all survive the winter.





# BRITISH WEEVIL

CARD 30

GROUP 5: INSECTS & SPIDERS

ORDER  
Insecta

FAMILY  
Coleoptera

SUBFAMILY  
Curculionidae



**Weevils are not a problem just in the United States. They also make up one of the largest families of British insects. This beetle has a tough outer shell that enables it to survive in many areas.**

## KEY FACTS



### SIZES

**Length:** Up to 1/2 in.

**Coloration:** Varies. Usually mottled brown or black; some species are bright green or red.

**Wings:** Usually 1 pair of *elytra* (wing cases), 1 pair flying wings. Elytra fused in wingless species.



### BREEDING

**Breeding season:** Spring and summer.

**No. of eggs:** Up to 200, depending on species.

**Hatching time:** 5-20 days.



### LIFESTYLE

**Habit:** Mainly nocturnal; solitary.

**Diet:** Nuts, seeds, and plant tissue.

**Lifespan:** 1-7 years, depending on species.



### RELATED SPECIES

More than 500 species of British weevil. Leaf rollers (*Attelabidae*) are close relatives.



**Range of the British weevil.**

### DISTRIBUTION

British weevils are found throughout the British Isles, wherever there is suitable vegetation for them to eat.

### CONSERVATION

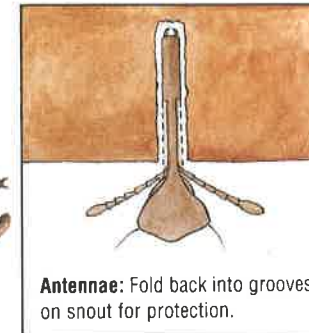
The use of insecticides affects all insects, but weevils are not in danger. Even though pests such as the granary weevil are controlled with insecticides, they remain numerous.

## FEATURES OF THE BRITISH WEEVIL

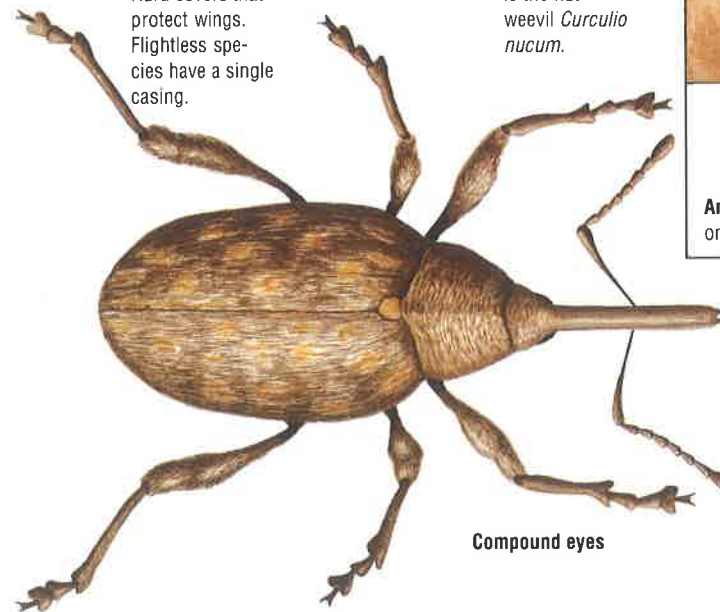
### Wing cases:

Hard covers that protect wings. Flightless species have a single casing.

Shown below is the nut weevil *Curculio nucum*.



**Antennae:** Fold back into grooves on snout for protection.



Compound eyes

### Rostrum, or snout:

Tiny gnawing jaws at the tips can penetrate deep into plant tissue, wood, and other foods.



*British weevils spend much of their lives as larvae, munching their way through nuts, grains, or buds. These foods give them the energy they need to change form into adults. They cause extensive damage to crops and stored food.*

### CHARACTERISTICS

A weevil is a type of small beetle with a long beaklike snout. On the tip of the snout is a set of tiny jaws for gnawing into plant tissue. A pair of *antennae* (feelers) is located near the snout's end. In most species the antennae fold back into grooves, allowing the insect to probe deep into hard materials without damaging its feelers.

Most species of weevil can fly. Like all beetles, their wings are concealed beneath a pair

of hard *elytra* (wing cases) that join down the back, giving them a streamlined appearance when they are not flying. In some non-flying weevils, the wing cases are fused together to form a single, strong shell. This armor protects their bodies and helps conserve moisture.

Some weevils are brightly colored by a layer of scales attached to their shells. These scales may be rubbed off over time.

### LIFECYCLE

The British weevil has a four-stage lifecycle. The egg hatches into a larva that spends most of its time eating. After several weeks the larva becomes a *pupa* (enters an inactive, non-feeding state) and eventually transforms into an adult. When the pupa splits open the adult crawls out to find a mate and produce another generation of eggs.

Some adult weevils do not need a mate. The female *Polydrosus mollis*, which lives on tree foliage, can lay eggs

**Left:** *Adult nut weevil Curculio nucum. The jaws are visible at the tip of its snout.*

without mating. All the larvae that hatch from these unfertilized eggs grow into females. Males are not found, except in southern Europe, where the two sexes mate and produce a new generation of both females and males.

In most species the adult female lays her eggs in plant tissue. The nut weevil uses her gnawing jaw to drill a deep hole in a young nut and deposits an egg in the hole. She then pushes it all the way in with her long snout. The hatched larva feeds for about four weeks inside the nut, which falls off the tree.

**Right:** *Larvae of the Cionus weevil feed on a leaf.*

This allows the larva to burrow straight into the ground, where it remains as a pupa for three to four years before emerging as an adult.

The larvae of gorse weevils feed and pupate within the seed pods of gorse. On hot summer days the pods burst with an audible crack and scatter the seeds. The weevils inside are hurled through the air to land on other gorse plants.

**Below:** *Phyllobius pomateus weevils mate.*



### WEEVIL & MAN

Farmers consider many weevil species to be pests. The granary weevil, *Sitophilus granarius*, infests cereal grain, flour, and stored grain products. Like the nut weevil, the female lays her egg in a hole that she bores in the kernel. When the larva hatches it eats the contents of the grain; it then pupates and emerges as an adult beetle, leaving only an empty shell.



### DIET

Each weevil species usually eats only one type of plant: the tiny alfalfa weevil feeds only on alfalfa, and the boll weevil attacks only cotton crops. In New Zealand, gorse weevils have been introduced in an attempt to eradicate the

gorse, which is considered a weed.

In most weevil species the adults and their young have slightly different diets. For example, the adult nut weevil *Curculio nucum* feeds on nectar and pollen from haw-

thorn flowers and nibbles the buds, shoots, and leaves of a variety of trees. But the weevil's larva lives in a hazelnut or acorn, devouring the nut meat and eventually gnawing its way out through the shell.

### DID YOU KNOW?

- Parasitic wasps can detect weevil larvae feeding inside plants. The female wasp stabs through the plant wall and injects her eggs into the helpless grubs. When the wasp larvae hatch they eat the live weevil larvae.
- More than 50,000 species of weevil exist worldwide—more than all mammals, birds, and fish combined.
- Weevils were once used as toothache charms: people believed that wearing the weevil larvae in a locket would drive away their pain.
- In Surinam the large larvae of tropical palm weevils are eaten as a delicacy.

# TERMITE

CARD 26

GROUP 5: INSECTS & SPIDERS

CLASS  
*Insecta*

ORDER  
*Isoptera*

FAMILY  
*Termitidae and others*



**Termites lead highly organized lives in vast colonies. Each individual plays a specialized role, but all of the termites work together for the benefit of their colony.**

## KEY FACTS



**SIZES**  
**Length:** Up to 1 in. Queens up to 5½ in.

**Mouth:** Biting parts for chewing plant material. Soldier has razor-sharp jaw.

**Wings:** 2 pairs, ½ - 3½ in. Found only on reproductive adults.



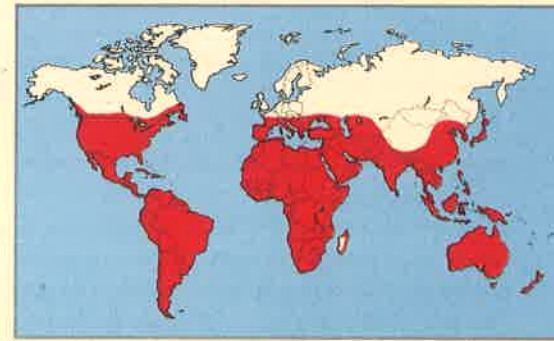
**BREEDING**  
**Eggs:** Up to 30,000 in a day.  
**Larval development:** Up to 3 months. Adultlike larvae.



**LIFESTYLE**  
**Habit:** Large colonies with rigid social structure.  
**Diet:** Dead and living plant material, especially wood.  
**Lifespan:** Queen and king can live 10 years or more. Some colonies are several decades old.



**RELATED SPECIES**  
About 2,300 species, grouped into several families. Closest relatives are cockroaches.



■ Range of the termite species.

### DISTRIBUTION

Mostly tropical and subtropical, but also in temperate regions.

### CONSERVATION

Termites are some of the most common and numerous of all insects. Some tree-dwelling species are threatened by loss of habitat.

## FEATURES OF A TERMITE COLONY

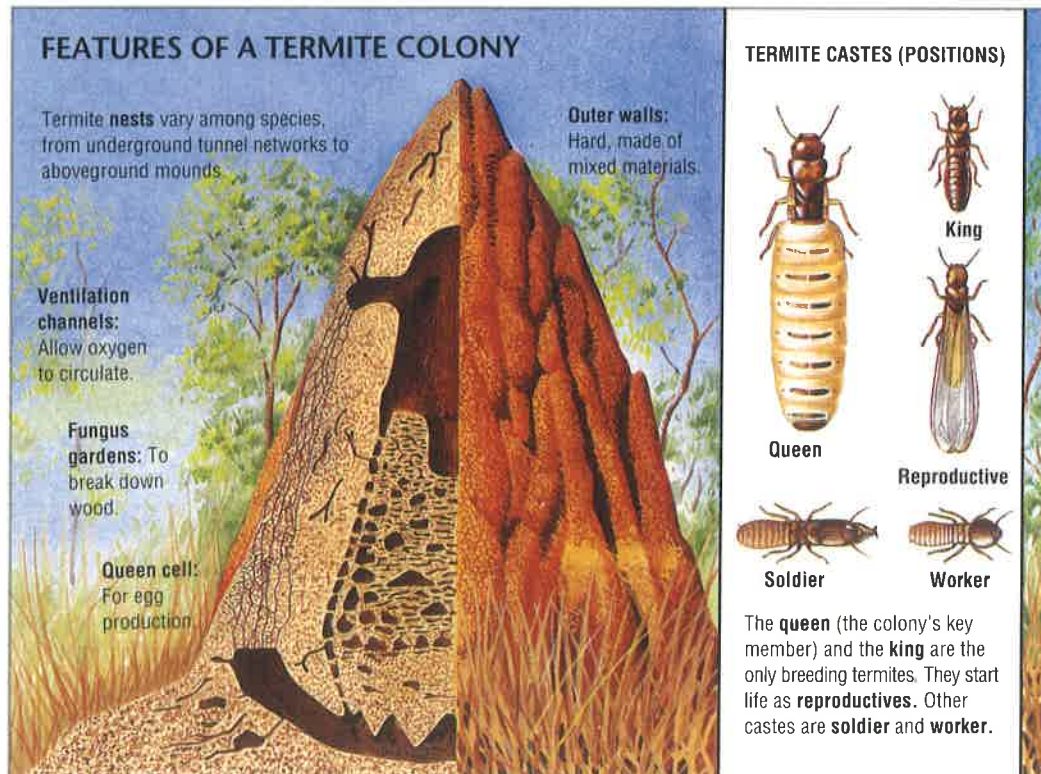
Termite **nests** vary among species, from underground tunnel networks to aboveground mounds.

**Ventilation channels:** Allow oxygen to circulate.

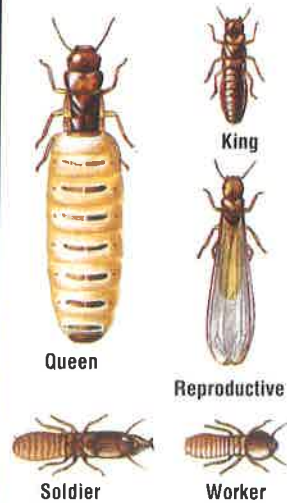
**Fungus gardens:** To break down wood.

**Queen cell:** For egg production.

**Outer walls:** Hard, made of mixed materials.



## TERMITE CASTES (POSITIONS)



The **queen** (the colony's key member) and the **king** are the only breeding termites. They start life as **reproductives**. Other castes are **soldier** and **worker**.

*Most termites are small, white, blind insects that never go outside of their nests. Even so, countless numbers of termites play a vital role in recycling dead plants.*

### BEHAVIOR

There are more than 2,300 termite species; most live in tropical and subtropical regions. The various species occupy many habitats, from the edges of deserts to mountain slopes. Termites live in huge colonies, in which each insect's *caste*, or position, is well defined. The colony's central figure is the queen. She is much larger than the others and has a huge, or *distended*, abdomen. Her role is to produce eggs and control the number of termites born into each caste. The king, her

regular mate, assists her.

The workers form the largest caste. They maintain the nest, care for the eggs and young, and collect food for the colony. Specialized soldier termites defend the colony.

Nests vary greatly from species to species. They may be hollowed-out branches or networks of tunnels in the soil. Some complex nests have large underground chambers with partitions. The most unusual nests rise 20 feet from the ground.

**Right:** Rock-hard termite mounds are a mix of earth, saliva, and waste. The mounds maintain constant temperature and humidity.



### DID YOU KNOW?

- A termite mound found in northern Australia was 20 feet high and 100 feet around at its base.
- The Australian magnetic termite builds a long flattened mound with narrow edges that face north and south.
- Some termites in dry regions keep their mounds humid by spreading water on the walls.
- The queen termite controls the development of castes by emitting special chemicals. Workers swallow these chemicals as they groom her and pass them on to developing larvae during feeding.



### FOOD & FEEDING

Swarms of termites journey from their nests to feed on dead wood, roots, and leaves. Some species prefer sap or parts of living plants.

Wood's main chemical component is *cellulose*, which is hard to digest. But microscopic organisms live in the termite's stomach and convert cellulose into a more

readily digestible substance.

Other species rely on *fungus gardens*, which are special areas in their nests where fungi grow. The termites deposit their waste matter here. The fungi break down the cellulose in the waste, and the termites feed on the products released by the fungi.

### BREEDING

Swarms of large, sexually mature male and female termites appear aboveground when they are ready to mate. They are called *reproductives*, and they have been developing within the nest for months. They can fly only a short distance on their weak wings. In most termite species, the reproductives then rub or break their wings off on the ground and find mates. Each pair then searches for a nesting site. Although most of these termites fall prey to other creatures, some succeed at starting new colonies.

The new queen and king create a sealed chamber where they mate. They carry each fertilized egg to an incubation cell and tend to the larvae that hatch from the eggs. These later develop into the first group of worker termites. From then on the workers tend the next batches of young. The queen and king concentrate on mating and increasing the colony's size. During this time the queen's abdomen swells until she can produce 30,000 eggs a day.



**Left:** Young termites in a nursery.

**Center:** Workers transport eggs to individual incubation cells.

**Below:** The queen's abdomen grows so large that she can produce up to 30,000 eggs a day.



### PREDATORS

Centipedes, spiders, and ants often penetrate termite nests to prey on the insects. Soldier termites attack these intruders to ward them off. Most soldiers have huge heads and powerful jaws. Some have special glands from which they squirt sticky fluid to ensnare small predators.

But many termites and their eggs fall prey to intruders. Invading colonies of army ants are known to be capable of destroying a termite nest.

Large predators like anteaters, pangolins, and armadillos can rip through the walls of nests and scoop out the insects with their long tongues.

# LONGHORN BEETLE

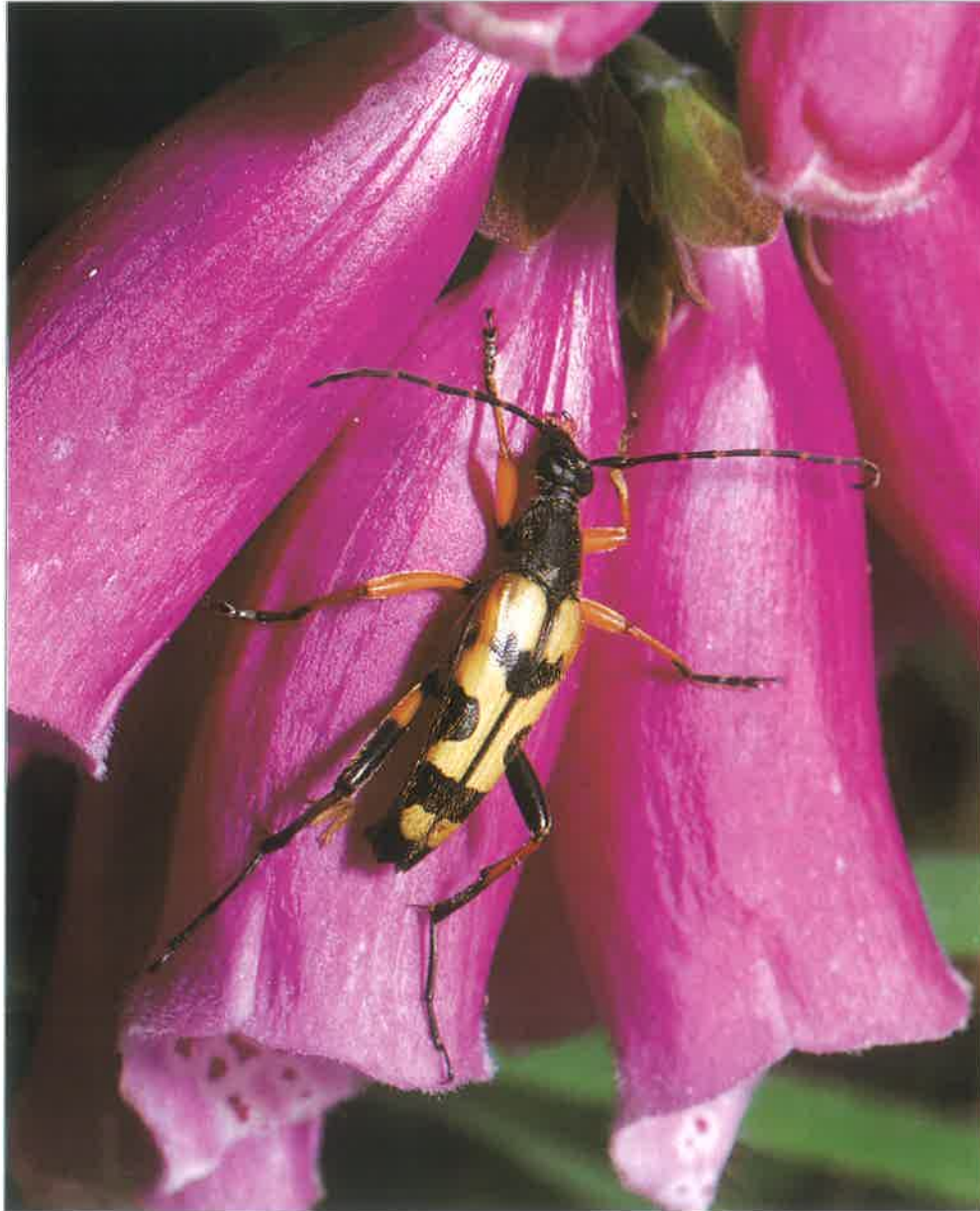
CARD 24

GROUP 5: INSECTS & SPIDERS

CLASS  
Insecta

ORDER  
Coleoptera

FAMILY  
Cerambycidae



**Despite its name, the longhorn beetle does not really have horns. Instead, it has unusually long antennae that can grow to five times the length of its body.**

## KEY FACTS



### CHARACTERISTICS

**Length:** Up to 6 in.  
**Coloration:** Many species are brightly colored and patterned; others are dark or plain.  
**Mouthparts:** Powerful jaws, capable of biting through wood.  
**Wings:** 2 pairs, 1 pair folded beneath the other.



### BREEDING

**No. of eggs:** 150-300, laid either singly or in groups.  
**Hatching time:** Varies according to species and location.



### LIFECYCLE

**Habit:** Solitary.  
**Diet:** Larvae, living and dead trees. Adult beetles, tree sap, plants, and flowers.



### RELATED SPECIES

The largest longhorn beetle is *Titanus giganteus* at 6 in. in length (excluding antennae).



Range of the longhorn beetle.

### DISTRIBUTION

The 20,000 species of longhorn beetle are spread throughout the world but are concentrated mostly in tropical regions.

### CONSERVATION

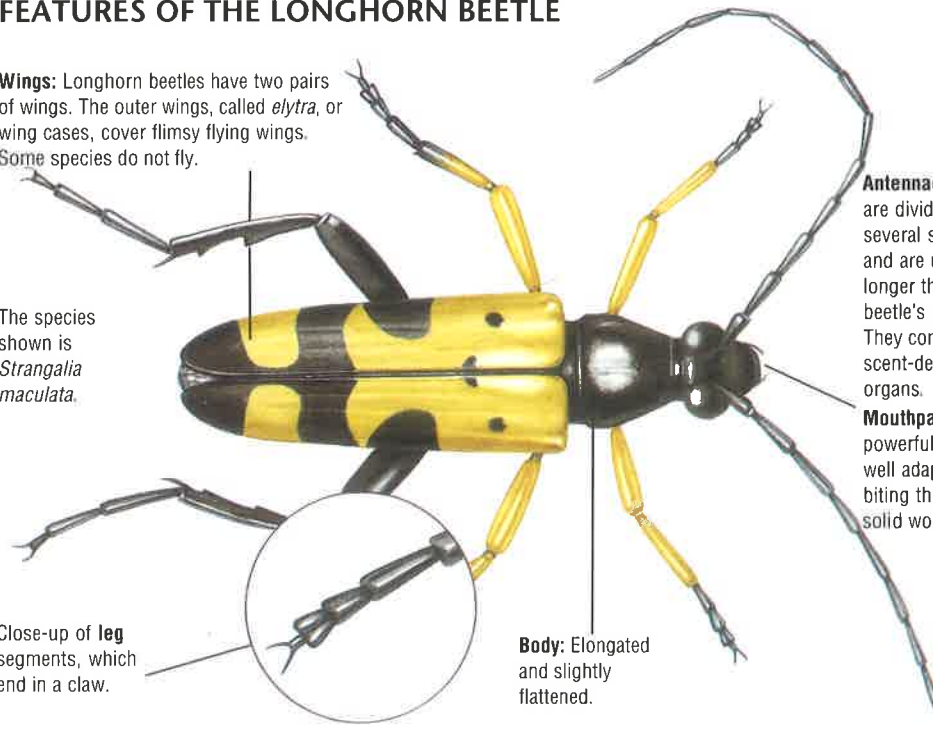
Several species are now legally protected in some countries. Tropical species are threatened by loss of habitat.

## FEATURES OF THE LONGHORN BEETLE

**Wings:** Longhorn beetles have two pairs of wings. The outer wings, called *elytra*, or wing cases, cover flimsy flying wings. Some species do not fly.

The species shown is *Strangalia maculata*.

Close-up of leg segments, which end in a claw.



**Antennae:** These are divided into several segments and are usually longer than the beetle's body. They contain scent-detecting organs.

**Mouthparts:** The powerful jaws are well adapted for biting through solid wood.

**Body:** Elongated and slightly flattened.



*The longhorn beetle family, Cerambycidae, includes approximately 1,200 North American species. They are found in all types of woodland, since their larvae usually develop inside tree trunks.*

## DEFENSES

Longhorn beetles have several defense mechanisms. Some species, such as the European wasp beetle and the African *Dirphya* species, mimic the behavior of wasps. The larvae of some of the small species of longhorn beetle feed on plants that contain toxins. When they become adults the insects secrete these poisonous substances if they are attacked. The North American *Tetraopes femoratus*, for example, feeds on poisonous milkweed.

Other species defend themselves with camouflage. Adult beetles often resemble the bumps on a tree trunk, or they lie flat on leaves to look like bird droppings. Still, the larvae fall prey to many birds.



*Above and right: Longhorn beetles vary in color. Some brightly colored species use poison to deter predators; others rely on camouflage.*



## NATUREWATCH

Most species of longhorn beetle live in woodland, although many are also found in parks and yards. They are easily identified by their long antennae and their long, flat bodies. Some species, such as the black and yellow wasp beetle and the blue musk beetle, are brightly colored.



## BREEDING

Adult longhorn beetles are usually solitary insects. During breeding season the males must track down the females by scent, using their long antennae. When a male locates a female, he may mate

with her for several hours.

Most species lay their eggs in trees. The female bites a groove in the wood with her strong jaws and lays one or more eggs in it.

The hatched larva does not

change into an adult beetle until two to three years later, when it has absorbed enough nutrients from eating the wood. Once transformation is complete, the adult beetle gnaws its way out of the tree.

## DID YOU KNOW?

- The larvae of many tropical longhorn beetles feed for as long as 30 years before they become adults.
- The larvae of *Titanus giganteus* from South America can be six inches long.
- Many longhorn beetles squeak when handled. They produce the sound by rubbing the rear of the thorax (upper body) against the front of the wing cases. The loudest species is the tropical harlequin beetle, *Acrocinus longimanus*.
- Several European woodland species, once considered pests, now have small populations and are endangered.
- The larvae of several tropical species are regarded as a delicacy by local inhabitants.

## FOOD & FEEDING

Most longhorn beetles fly from plant to plant in search of food. Many adult beetles, particularly the tropical species, eat the sap from damaged tree trunks. A large sap supply attracts clusters of

beetles from several families.

In temperate areas longhorn beetles eat mainly flowers and leaves. Their preferred food plants include parsley, dog rose, blackberry, and members of the daisy family.



*Left: Mating often continues for several hours, during which time other males may fight to mate with the female.*

*Right: Sap oozing from a damaged tree trunk attracts hungry longhorn beetles.*

