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• Mammals • Birds • Reptiles • Insects

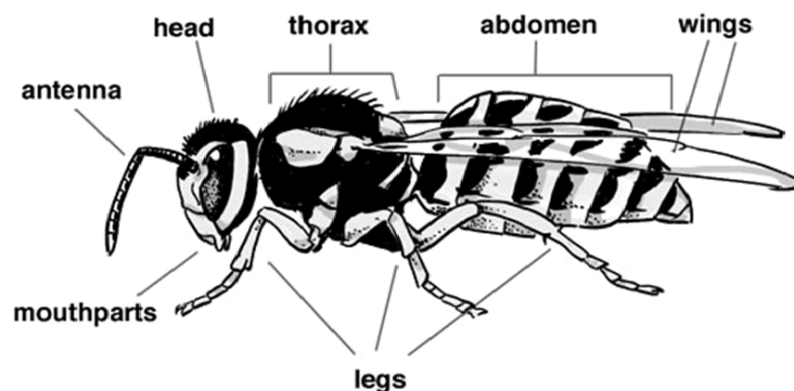


INSECTS

(AMAZING INSECTS)

We are usually drawn to the bigger iconic species when we talk about animals. We must also recognise the little but equally fascinating insects that live in our forests. There are around 7.7 million species of animals currently believed to exist, and insects may make up more than 90% of all animal life on Earth. These millions of different species are found worldwide and come in various shapes and sizes. The majority of them belong to one of six primary groups; beetles (Coleoptera), bees and their relatives (Hymenoptera), bugs (Hemiptera), flies (Diptera), butterflies and moths (Lepidoptera), and grasshoppers and their relatives (Orthoptera).

All insects have jointed legs and a hard exoskeleton. Their bodies are segmented into the head, thorax, and abdomen. Some insects have these pieces fused, making it difficult to distinguish between them, while some immature baby insects only have all three sections once they fully mature. Insects have six legs, except in some larval stages and must shed their entire exoskeleton to grow. This is known as moulting and it happens at a specific point in the insect's life cycle. Most insects consume leaves, seeds, fruit, or wood from plants. Some species consume fungus, and numerous others consume dung. Now, let's have a look at all six primary groups of insects more closely.



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Beetles

Among all insects, beetles are the most varied. Scientists have identified approximately 400,000 species, and tens of thousands are likely more undiscovered. Around the world, beetles can be found both in freshwater and on land. They typically have very sturdy and hard bodies with two pairs of wings. The first pair, which is small and extremely rigid, serves as a shield for the second pair while the second pair of wings is used to fly. Although most adult beetles are black or brown, some are incredibly colourful. The life cycle of beetles includes four distinct phases. Female beetles mate and lay eggs. The hatched eggs develop into wingless larvae. Each larva consumes food, develops, and eventually enters the pupal stage. The pupa is immobile and no food is consumed during this period. The pupa eventually develops into an adult beetle. The majority of beetle species live their entire lives in just one year. Some, particularly the bigger ones, can live for more than a year.



The majority of beetles use chemicals to communicate with one another. Males frequently use pheromones to attract females. Beetles typically have poor vision. Some beetles produce noises by rubbing their legs against one another or scraping their mouthparts together. Some beetles that reside in dead wood vibrate whilst fireflies glow in the dark to communicate. Beetles consume a variety of food like seeds, leaves, wood and other parts of a plant. Some are specialists and only eat specific things. Beetles play a variety of roles. For example, dung beetles help in the removal of waste while wood-eating beetles help in the destruction of dead trees, and some beetles that feed on pollen help in the pollination of flowers.

Bees and their relatives

Following beetles, this is the next group of insects with great diversity. There are about 200,000 recognised species of bees and their relatives worldwide, with many

likely is still undiscovered. The bees and their relatives are widely distributed almost everywhere on land except in the most extreme polar regions. Their relatives include numerous wasp subgroups and other insects that descended from wasp ancestors like ants.



This group comes in a wide range of sizes. Some are tiny, like certain parasitic wasps, they grow into adults inside the eggs of other insects. Others are above 3 cm long, powerful, and fearsome predators. The adults have chewing mouthparts and a tiny connection between the other two body parts (the abdomen and the thorax). All members of this group have four distinct wings as adults, with the front pair being larger than the back pair. The queen and male ants only have wings for a brief period. Ants' antennae are typically permanently bent, but bees' and wasps' antennae are straight. Wasps with stings generally are vividly coloured and have black and yellow or occasionally red stripes. They can sting. Therefore this is a warning to any would-be predators.

All bees and related species undergo full metamorphosis. The egg hatches into a larva. Before changing into a pupa, the larva grows and moults multiple times. It eventually sheds its pupal skin to become an adult. Depending on the species, female wasps, bees, and ants can lay anywhere from a few to thousands of eggs. They build nests and provide food for their larvae. The colony is formed by one or more female bees, also known as queen bees, whereas other female bees do not breed. Instead, they look after the queens' young. Some of the young will fly away to start new colonies which happens a few times a year.

Most bees live for less than a year while some live just for a few months. Different from the queen bees, they have a lifespan of two years. Bees are busy during the day. They are energetic creatures that forage for food by detecting odours and are vital pollinators for many plants. These insects use various communication methods in addition to chemical signals (taste and smell). Pheromones are fragrance molecules

that help males and females locate one another. Ants, social wasps, and bees utilise these molecules to recognise nestmates and communicate danger and other information. They hunt insects and spiders, consume dead animals, and use their sting to paralyse their victims.

True bugs

The true bugs (Hemiptera) order contains about 80,000 species and roughly 134 families. All ecosystems on land and in freshwater are home to true bugs. True bugs are the only insects that have evolved to survive in the ocean. The habitats on land that are wet and contain a lot of plant life have the most incredible diversity and abundance of true bug groups.

True bugs of various types can range significantly in size. Some are only a few millimetres long and the largest, the cicadas, can grow up to 50 millimetres in length. Insects in this order may have four or five segmented, long or short antennae. Their legs are designed for walking, gripping, and occasionally swimming. Some bugs have wings, whereas others don't. On the sides of their thorax, many true bugs have fragrance glands. These glands produce compounds that smell bad to deter predators. Males and females of the true bug species have similar appearances.



True bugs undergo a straightforward transformation. The young bugs resemble their parents almost exactly after hatching, except they lack wings. They go through five cycles of growth and skin shedding. After their final shedding, they will be fully grown, able to breed, and have wings. They don't continue to expand. In colder regions, true bugs like Aphids have a complex life cycle; female Aphids can give birth without mating throughout the summer, and their offspring will migrate to another plant to

spend the winter. The offspring will then return to the original plant species in the spring and restart the cycle.

Depending on the species, certain true bugs are active during the day and some are active at night. True bugs typically live alone and only gather to mate, though some species live in large groups. The larger true bugs tend to stay close to their birthplaces and don't go too far. However, some aquatic bugs will fly to new ponds if their home ponds dry up. Aphids are among the few true bugs that can fly very far when carried by the wind. True bugs frequently communicate by sound and vibration. One group that is well-known for its sounds are the cicadas. They congregate and form choruses when hundreds of insects call from a single location.

Bugs consume liquid nutrients from plants or animals. Some species ingest plant sap, while others digest seeds and some drink the fluid from the leaf cells. Many true bugs are predators who stab their prey and scavenge their blood or bodily fluids. Stink bugs, for instance, eat caterpillars, while other water bugs eat mosquito larvae. In the true bug family, bed bugs are parasitic members that feed on the blood of mammals, including humans.

Flies

The fly order is one of the most diverse families of insects. Over 125,000 species have been recognised worldwide and there are undoubtedly still many that have yet to be discovered. The fly populations are the highest in humid environments with lots of moisture as fly larvae thrive in this environment.

True flies come in a wide variety of forms. Most of them are little less than 1.5 cm long and have soft bodies, but others can grow up to 4 cm. Most insects have multiple pairs of wings, but adult flies only have one. The second pair has developed into tiny, club-like balancing organs. Adult flies consume liquids and have either sponging mouthparts, which are tubes with broader sponges at the end like flower flies and house flies, or thin sucking mouthparts like mosquitoes. Large eyes are a common



feature of adult flies, which assist in flying vision. True flies go through a metamorphosis as well. The females lay hundreds of eggs on their larvae's food source. Adult flies have a keen sense of smell and can locate food from great distances. Most flies only live for a few months. A fly spends the majority of its life

as a larva or pupa and they generally have a short life span as predators frequently consume them.

Adult flies typically fly around during the day when it is warmer and they can see. Compared to other insects, flies rely more on vision. They occasionally pick up on wingbeat vibrations. Like other insects, they use their sense of smell a lot.

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Adult flies frequently consume nectar and nutrient-rich liquid. Additionally, they can "spit" onto dry food before sucking up the spit and some additional nutrition. That is how they contaminate human food. Many flies eat primarily as larvae. Some eat plants or fungi while other species consume dung and dead animals. The majority of the flies are parasitic. The larvae can feed on the interior's interior while it is still alive. A few species enter wounds or the skin as parasites of vertebrates like mammals and birds. Their ability to fly at high speed helps them to avoid predators. Many flies mimic stinging insects like wasps or bees, so predators stay away from them. Some species of flies greatly aid pollination. Not only that, a large number of fly larvae help to remove animal carcasses and faeces. Flies are an essential source of food for many other creatures.

Butterflies and moths

Butterflies and moths can be found in practically every ecosystem on land. All adult

moths and butterflies have broad wings that are scaled all over. These insects have incredible wing designs due to the combination of their individual-coloured scales. Moths often hold their wings flat, while butterflies hold them up over their backs. Although there are many different colour patterns, they are usually camouflaged or visible with warning colours, just like caterpillars. Caterpillars of moths and butterflies have a similar appearance. They have long, soft bodies occasionally covered with spikes or fur, and their heads have mouths for chewing. They have six jointed legs and one to five pairs of prolegs, or soft unjointed legs, depending on the group. Caterpillars typically have colour patterns that help them blend in like green or brown. All species of butterflies and moths have sucking mouthparts that coil up into a little spiral. These coiling mouthparts are unique among them and no other insect species have them.



Moths and butterflies have a single antennae pair and big eyes. The tip of a butterfly's antenna is thick but the rest is slender. Moth antennae are either quite thin to the end or contain several side branches that make them resemble feathers.

Butterflies and moths undergo full metamorphosis. The caterpillars consume food and develop quickly. Eventually, they stop feeding and change into pupae, which are immobile resting stages. The caterpillar will frequently create a cocoon to shelter itself before changing. The moth or butterfly completes its change inside the pupal case and emerges as an adult with wings.

Most butterflies and moths only have a one-year lifespan. Some survive for two or three years, while others just live for a few months. Moths fly at night, while

butterflies are active throughout the day. However, some moths fly during the daytime. Butterflies rely more on their vision and are busy during the day. The majority of moths and butterfly caterpillars consume plant leaves and flowers. A few moth caterpillars eat animal foods like beeswax or fur, while others consume fruit and seeds. Adults typically consume sap or nectar.

Adult butterflies use flying and camouflage to escape predators. Some moth species possess ears that enable them to detect bat sonar calls. One family of moths has transparent wings that resemble wasps. They fly during the day and mimic stinging insects to confuse predators. Butterflies and moths are useful pollinators while caterpillars are food for many other animals and can be significant herbivores.

Grasshoppers and their relatives



Grasshoppers and their relatives are primarily large or medium-sized insects. Few species have bodies less than 10 mm long, while the majority are longer than 50 mm, with some species having bodies longer than 100 mm and 200 mm wingspan or more. They are abundant and distinctive in deserts, grasslands, dense woods, and other habitats. There aren't many aquatic forms, although wetlands and different semi-aquatic settings are home to many. They are characterised by their elongated back legs, which they use for jumping. Most species use their rear wings for flight and have leathery front wings. They can easily be found everywhere except in extremely

cold temperatures and high mountaintops. The females produce eggs, and the growing young are called nymphs. These groups have an incomplete metamorphosis, meaning they don't have a pupal stage which is why their young or nymph resembles the adults. They lose their exoskeleton as they grow, usually 5 or 6 times. They don't get wings until after their final shedding when they come out as adults. The development of nymphs takes about two months.

The antennae are often lengthy and threadlike, made up of fewer than ten to several hundred segments. Grasshoppers can leap about 2.6 m repeatedly without showing any obvious indications of tiredness. The inner surface of the hind leg has been altered to produce a sound known as stridulation. These calls are made to announce territory, attract mates, or raise the alarm. The calls males typically make distinctive to each species and assist in interspecies identification.

Nearly all terrestrial ecosystems benefit from the presence of these groups, but too many of them can cause massive problems. For instance, massive grasshopper outbreaks and less frequently, katydid and cricket populations can result in significant losses for the forestry and food industries. Due to a better understanding of their population dynamics and the use of various chemical and biological controls, they are less of a problem today than they were a few hundred years ago.

Insects play a huge ecological role as pollinators in the animal kingdom. It would be impossible for many plant species to survive without these tiny creatures. Without pollination, many plant species would cease to exist. Additionally, insects are important decomposers in the ecosystem. They contribute to the process of rotting organic matter and recycling waste materials back into the environment. Therefore, it's vital to understand how useful insects are despite the inconveniences they present for humans.