

# Insects on display

Seventy five per cent of all animal species are insects. They are probably the most important and diverse group of animals on Earth. The Oxford collections are among the top ten worldwide, and the displays in the Museum reflect this.



The entomology displays in the Museum

Insects are the most diverse group of animals on Earth and their diversity is reflected in the taxonomic displays that run along the upper gallery of the main court. These cases detail the thirty or so orders of insects, ranging from minute wingless fleas to some of the larger winged species - beetles, cockroaches, butterflies and bugs. While the taxonomic displays give us an understanding of the scope of the insect world, the live displays, also located on the upper gallery, lend an insight into the behaviour of these animals. Cockroaches, beetles, stick insects and some non-insect arthropods are kept in a series of glass tanks - giving visitors a unique opportunity to interact with these amazing creatures.

## What is 'Learning more'?

'Learning more' presents a series of articles about the Museum and its collections. It is designed for older students, teachers, researchers, and anyone who wants to find out more about particular aspects of the Museum's work and its history.

This article introduces the live displays and the bee hive that are maintained by the Museum's entomology collections.

'Learning more' articles are free, and available to all for educational, non-profit purposes. The Museum retains copyright of all material used in this leaflet.

## Looking after live insects

Insects make ideal pets. The following lists a few points to get you started.

- Housing and equipment needed to look after insects is usually cheap, hardwearing and relatively easy to obtain (you may even have most of it around your house already).
- Insects are easy to look after: most insects can be fed on either leaves or fruit which only take a few minutes to find and cost virtually nothing!
- Insects have short life cycles so you can see your pet mature from larvae/egg to adult.
- They are easy to breed if you decide you want some more.
- Lots of insects are active throughout the day and often at night too. You can watch their interesting behaviour any time on "Insect T.V."!

## What to feed insect pets

Beetles, millipedes and cockroaches need soft fruit such as bananas or strawberries, and cat biscuits to give them protein. Stick insects eat bramble so you must ensure they have a fresh supply at all times. Further information on keeping insects is available from the Museum.



Hissing cockroaches



Stick insects



Fruit chafers

## Live displays in the gallery

The Museum's upper gallery is home to four large vivariums containing live insects, spiders and scorpions. You never know what you might find in them, but the following gives a brief description of their most common inhabitants.

### *Burrowing cockroach*

The burrowing cockroach (*Blaberus discoidalis*) is found throughout the northern part of South America. In the wild this species can be found in caves, in holes in trees and under bark. Before mating the males 'pump' their wings, moving them up and down to attract the attention of the female.



Burrowing cockroach  
*Blaberus discoidalis*

Like many other cockroaches, this species produces a distinctive smell when attacked; in some countries it is considered to be a household pest.

### Giant spiny stick insect

The giant spiny stick insect (*Eurycantha calcarata*) originates from Papua New Guinea. They live in hollow tree stumps and logs, coming out at night to feed on the leaves of trees. The males of this species have large spines on their back legs, which they use to defend themselves against attack or during combat with other males. These spines are used by local fishermen as hooks to catch fish.



Giant spiny stick insect  
*Eurycantha calcarata*

This is one of several species of stick and leaf insect that is kept on the gallery; see if you can spot them all!

### Madagascan hissing cockroach

The Madagascan hissing cockroach (*Gromphadorhina* sp.) is only found on the island of Madagascar. As the name implies this cockroach can hiss loud enough for you to hear! This happens during mating and when they are frightened. Cockroaches are omnivorous, meaning that they eat all manner of animal and vegetable material. At the Museum they are fed a diet of banana and protein/cereal mix.



Madagascan hissing cockroach  
*Gromphadorhina* sp.

The cockroaches are kept in one of the cases on the gallery, and often startle visitors who are not accustomed to seeing these insects in such vast numbers.

### *Emperor scorpion*

The emperor scorpion (*Pandinus imperator*) is found in West Africa. The Latin name means 'terrible forest emperor'. This scorpion lives in tropical rainforests, where it hides in burrows which can be up to 30 cm. long. All scorpions are predatory; they catch small insects and other invertebrates using their pincers to crush them to death. Emperors are harmless to humans, as they are only mildly venomous, but their claws can give you a very painful pinch! All scorpions glow either luminous green or blue under ultra violet light, this is because of luminescent minerals deposited in their exoskeleton. Although we know how this happens, nobody knows why.



Emperor scorpion *Pandinus imperator*, under natural light (left), and luminescing under ultra violet light (right)



## The Museum hive

The Museum maintains a small hive of honey bees located on the south west stairwell of the building. Visitors can peek into the glass fronted case and get an insight into the life of these amazing insects.

### A worker's life

Worker bees are sterile females. During the summer an adult worker bee lives for six weeks or so.

When newly emerged the young bee spends her first two days eating pollen and honey. After this, she spends three weeks working inside the hive as a nurse feeding larvae with royal jelly, which she secretes from glands in her head. Bee larvae, which are going to become workers or drones (males), only get royal jelly for the first few days and then are fed on pollen and honey. Larvae that are going

### Did you know?

One kilogram of honey represents around twenty million foraging trips.

### Did you know?

A queen can lay up to 1,500 eggs in a day and in her life of 4 years may lay one million eggs.

to become queens are fed on royal jelly throughout their development.

When young, the nurse bee also has active abdominal wax glands in her

abdomen which are used to build new cells and repair the comb. For the last weeks of her life the worker is a forager. She gathers nectar and pollen from flowers.



The Museum bees Bees that are managed in hives do not need to start building from scratch. The hive in the Museum is set up with a foundation sheet pressed out of beeswax, reinforced with wire and mounted in a frame.

### Bee engineers

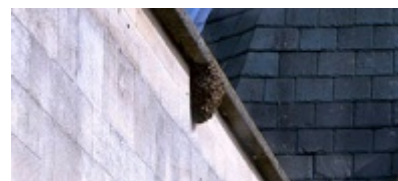
The hexagonal shape of bee's cells is no accident. Evolution has determined the most economical shape and configuration for each cell. If cells had more than six sides, or were round, there would be spaces between them which would need more wax for the extra walls. Square or triangular cells could fit together neatly but a hexagon has the smallest circumference for its area and therefore uses least wax per unit. The hexagonal array also gives the comb great mechanical strength.

### Did you know?

Cells are built at a constant slope of 13° to keep the honey from running out.

### New colonies

When a queen ages, the colony gets too crowded, or when there is not enough food, the workers nurse selected larva on a diet of royal jelly to produce new queens. Just before the first new queen emerges, the old queen and about half the workers leave the colony as a swarm. The first queen to emerge stings any other unemerged queens to death and then leaves the hive for a mating flight. The queen may mate with several drones. The drones die after mating, but the queen will use their sperm to fertilise the eggs she lays during her life.



The museum bees usually swarm once a year and gather in a mass somewhere around the building.



### What is honey?

Honey is concentrated nectar. The worker bee sucks nectar up from flowers and stores it in a special part of the gut called the honey crop. Enzymes in the gut act on the nectar and when back in the nest she 'pants' to evaporate water from the nectar. She then regurgitates all of the nectar into storage cells. The nectar is then further thickened by evaporation.