

# Invertebrate Identification Guide

This guide can be used for the OPAL Bugs Count Survey and OPAL Biodiversity Survey



Invertebrates are animals without a backbone. They come in many shapes, sizes and colours. This chart covers what you are most likely to find during an OPAL survey: insects, arachnids, molluscs, myriapods and crustaceans.

You don't need fancy equipment to survey bugs. Your eyes are your most important tool, but these may help too:



a magnifier



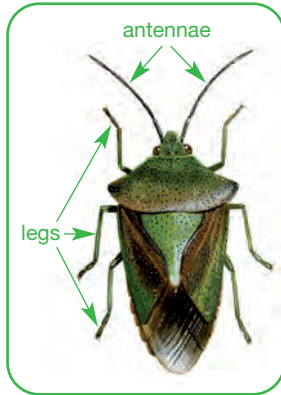
pencil and paper



a camera



a jar  
(to put bugs in while you identify them)



Main features used in this guide

## Start here – how many legs?

no legs



**Molluscs and annelids**

6 legs



**Insects**

8 legs



**Arachnids**

lots of legs



**Myriapods and crustaceans**

Now try to name your invertebrate using this guide →

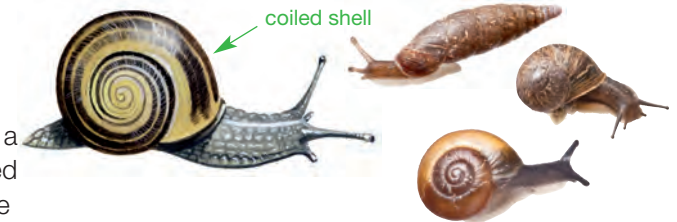
## Molluscs and annelids

No legs

### Snails, slugs and earthworms

#### Snails

- Soft, slimy body
- Hard, coiled shell
- Shell can vary from a sphere, to a flattened disc or a pointed spire



#### Slugs

- Soft, slimy body
- Do not have a hard, coiled shell (although a few species have a tiny disc of shell towards the end of their body)



#### Earthworms

- Long, thin body divided into segments (which look like a series of rings or stripes)
- Thickened 'saddle' visible on adult worms



- There are around 150 species of land snails and slugs in the UK.
- They belong to a group of molluscs called Gastropoda which means 'stomach-foot'!
- Earthworms belong to a group called Annelida – the segmented worms. There are 27 species in the UK.
- Slugs, snails and earthworms all need to keep their skin damp so that they can breathe. They are particularly active at night and when the ground is wet.
- All three groups are a vital food source for many other animals, including birds, mammals and amphibians.

#### Did you know?



Reaching an incredible 16cm long, the Leopard Slug (scientific name *Limax maximus*) is one of the UK's largest slugs.

It eats fungi, rotting plants and other slugs. When mating, a pair of Leopard Slugs will often hang from a thread of mucus (slime).

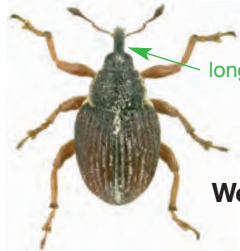
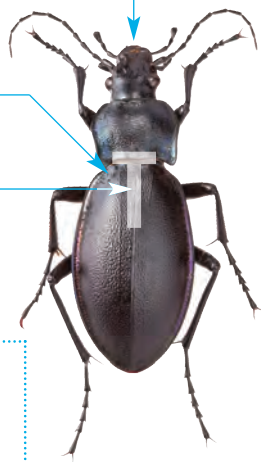


Discover more about slugs and snails on the Conchological Society's website [www.conchsoc.org](http://www.conchsoc.org)  
For earthworms visit [www.earthwormsoc.org.uk](http://www.earthwormsoc.org.uk)

Pincer-shaped jaws (can be hard to see on smaller beetles)

Hard forewing cases (elytra) to protect the delicate hindwings

Wing cases meet in a straight line making a T shape



long thin snout

Weevil



Ladybird

2 or more spots



Other beetle

- There are over 4,000 species of beetle in the UK.
- Beetles belong to a group of insects called Coleoptera.
- Beetles can be found in a wide variety of habitats on land and in freshwater.
- Many beetles help to pollinate plants, reduce pests and recycle nutrients.
- Many beetles eat living plants or fungi, others are active predators of invertebrates, while some eat dead plants and animals – even dung!



Love beetles? Why not join the UK Ladybird Survey? [www.ladybird-survey.org](http://www.ladybird-survey.org)

### Common body shapes



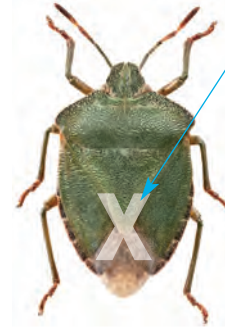
**Top tip:** Not sure if you have a beetle or a true bug? Check how the wing cases meet. Beetles have a T-shape, but true bugs usually have an X- or Y-shape.

### Did you know?



The Stag Beetle (scientific name *Lucanus cervus*) is the biggest beetle in the UK, growing to an amazing 7cm long! Their larvae (young) live in rotting wood for up to seven years, but the adult beetles only live for a few months.

Wing cases usually meet in an X- or Y-shape (not true for some true bugs, like aphids and scale insects)



broad shoulders

Shieldbug

X-shape



young often hide in foam ('cuckoo spit')

adults jump when disturbed

Frog hopper



very small

Aphid

- Over 1,700 species of true bug have been found in the UK.
- They belong to a group of insects called Hemiptera, which means 'half-winged'.
- Most true bugs feed by puncturing their food and then sucking up juices using their tube-like mouthparts.
- Many species feed on plants and some can be important pests (e.g. aphids).
- Aphids feed on plant sap, which is full of sugars. They secrete some of this as honeydew. Ants often feed on this honeydew and in return protect the aphids from predators.



Discover more about true bugs at [www.britishbugs.org.uk](http://www.britishbugs.org.uk)

### Common body shapes



**Top tip:** Unlike true bugs, the wing cases of beetles meet in a T-shape.

### Did you know?



The young of frog hoppers protect themselves from predators and becoming too dry by surrounding themselves in patches of foam bubbles – often called 'cuckoo spit'. They create these bubbles while feeding on plant sap.



Long antennae

Two pairs of  
see-through wings

Most have a narrow waist

Bees are often hairy while  
wasps and ants are not

narrow waist

Wasp

some ants  
have wings  
but most  
do not

Ant



fat furry body

Bumblebee

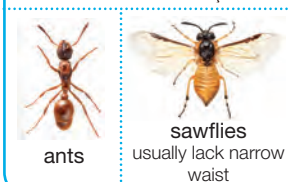
## Common body shapes



bees



wasps



ants

sawflies  
usually lack narrow  
waistTop tip: Don't confuse  
wasps and hoverflies. ➔

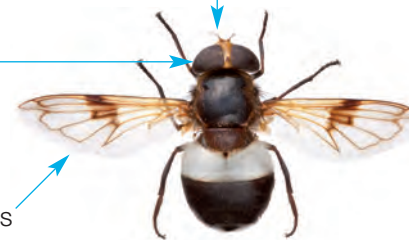
## Did you know?



Ants are one of the most abundant organisms on earth. Colonies can exceed 1 million individuals. This picture shows Wood Ants (scientific name *Formica rufa*) massing outside their nest to absorb heat from the spring sunshine.



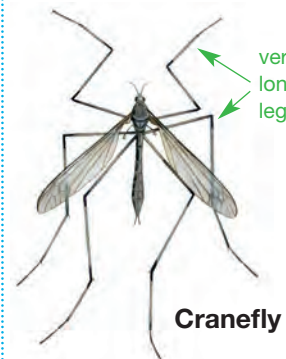
Buzzing about bees? Visit the Bees, Wasps and Ants Recording Society website [www.bwars.com](http://www.bwars.com)

Antennae often  
very shortLarge eyes  
(may almost fill  
the head)One pair of  
see-through wings

Hoverfly

often has black and yellow marks  
on body, imitating a waspbody often  
metallic in  
colour

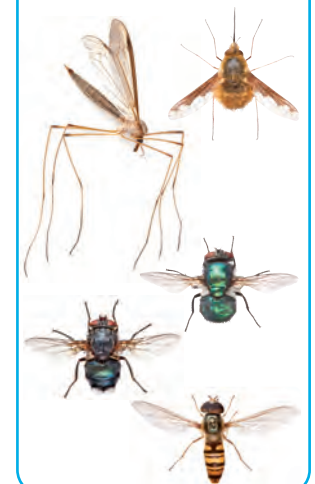
Blowfly



Cranefly

very  
long  
legs

## Common body shapes



Top tip: Hoverflies have  
much shorter antennae  
than wasps and bees.

## Did you know?



Apart from a few hoverflies which can crunch up pollen, all true flies must eat food in liquid form – whether that is nectar, dung, blood, or something else! Mouthparts vary in shape from the long, sucking tubes of mosquitoes and bee flies, to the disc-shaped 'hoovers' of blowflies.



Discover more about true flies at  
[www.dipteristsforum.org.uk](http://www.dipteristsforum.org.uk)

## Butterflies and moths

What is the difference between a butterfly and a moth? Nothing really! They are very closely related and there is no one feature that separates the two. The following tips will help you decide, but there are always a few species that break the rules!

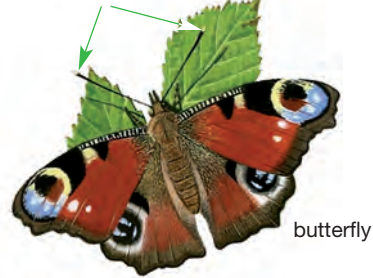


**Butterflies** • usually fly during the day • have 'clubs' (lumps) on the end of their antennae • rest with wings closed vertically above their body



**Moths** • usually fly at night but some fly during the day • have pointed and often feathery antennae • rest with their wings folded flat over their body

'clubs' on antennae



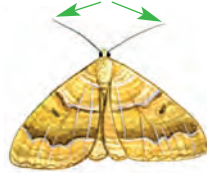
butterfly



caterpillar

caterpillars develop into adult butterflies and moths

no 'clubs' on antennae



moth

## Did you know?



Despite their gentle fluttering flight, some butterflies and moths like this Red Admiral (scientific name *Vanessa atalanta*) migrate all the way from southern Europe or North Africa to the UK. They arrive here in spring, breed over the summer and most leave again in autumn.

Photographs: Robert Thompson, Matt Berry, David Green



Discover more about these insects on the Butterfly Conservation website [www.butterfly-conservation.org](http://www.butterfly-conservation.org)

## Crickets, grasshoppers and earwigs

Crickets and grasshoppers have long back legs that are strengthened for jumping. Earwigs have a pair of pincer-shaped claspers called 'cerci' at the end of their brown body.

**Grasshoppers** have short antennae, much shorter than their body



**Crickets** have long antennae, usually longer than their body



long brown body

Earwig

large pincers at end of body

- There are 33 species of cricket and grasshopper in the UK and seven species of earwig.
- Crickets and grasshoppers belong to a group called Orthoptera, meaning 'straight-winged'. It refers to the way they hold their wings in a line along their back.
- Earwigs belong to a closely related group called Dermaptera.
- Grasshoppers only eat plants, while crickets and earwigs eat other invertebrates as well as plants.
- Crickets sing ('chirp') by rubbing their back legs against their wings, or drumming them on a surface. Grasshoppers chirp by rubbing their wings together.
- Earwigs don't live in ears!

## Did you know?



The Mole Cricket (scientific name *Gryllotalpa gryllotalpa*) is one of the UK's weirdest, rarest and most spectacular invertebrates. Like moles, they use their shovel-like front legs to dig tunnels through the soil. Mole Crickets live almost entirely underground, eating the roots of plants as well as invertebrates that live in soil.



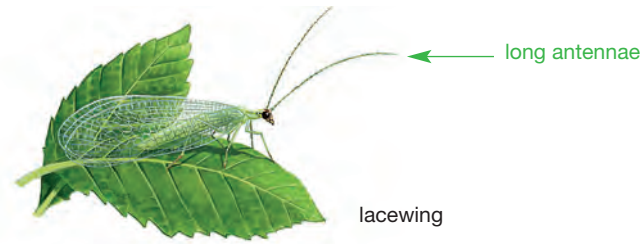
Want to discover more about grasshoppers, crickets and their relatives? Visit [www.orthoptera.org.uk](http://www.orthoptera.org.uk)

6 legs

## Insects

### Lacewings

Lacewings have clear wings, which are held like a tent over the body when resting.



Legs hard  
to see

### Insect larvae (young)

Many insects go through a four stage life-cycle: egg - larva - pupa - adult. The larvae and pupae can be difficult to identify, as they do not always look like the adult.

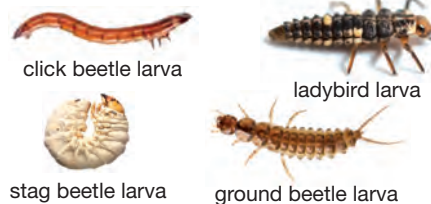
What are insect larvae? Most insects reproduce by laying eggs. The young that hatch from these eggs are of two types:

- 1 Larvae look very different from the adults. They feed and grow, then their skin hardens and they turn into a pupa. Inside the pupa, they undergo a complete change, before hatching as adults.
- 2 Nymphs look quite like small versions of the adult. To grow, they moult their hard skin several times, each time getting bigger and looking more like the adult.

#### Butterfly and moth larvae (caterpillars)



#### Beetle larvae



#### True fly larvae and pupae



## Arachnids

8 legs

### Spiders and harvestmen

Spiders and harvestmen have eight legs. Many spiders build webs to catch prey. Harvestmen feed on a range of plant and animal matter.

**Spider** bodies are clearly divided into two parts:

The front part is called the cephalothorax (and includes the head)

The back part is called the abdomen



**Harvestmen** have one small body part which is round or oval shaped (unlike spiders which have two body parts)



- The UK has 27 species of harvestmen and 650 species of spider.
- All UK spiders are predators of invertebrates, especially insects. They immobilise them with venom injected through their jaws ('fangs').
- Not all spiders use silken webs to catch their prey. Some actively hunt, and others are ambush predators that sit in likely places and wait for prey to pass by.
- Harvestmen are at their most abundant and visible during the late summer and early autumn – the traditional crop 'harvest time'.
- Harvestmen do not produce silk or venom, but can produce a pungent smell to put off predators.



Discover more at the British Arachnological Society's website [www.britishspiders.org.uk](http://www.britishspiders.org.uk)

#### Did you know?



Thin, wispy cobwebs in your house, garage or shed may well belong to the Daddy Long-legs Spider (scientific name *Pholcus phalangioides*). Originally a tropical species, it has spread around the world. In the UK it prefers to live indoors and in outbuildings. It eats a wide range of invertebrates, including other spiders!

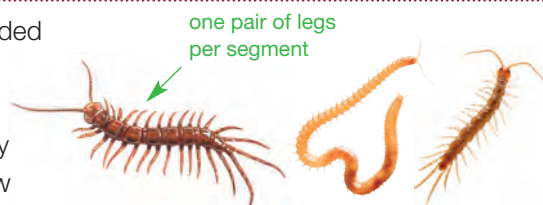


Myriapods (centipedes and millipedes) are often found at ground level, but sometimes climb onto plants. Crustaceans (such as woodlice) have 14 legs and an armoured body.

**Woodlice** • body divided into many segments • 7 pairs of legs • oval shaped body (when viewed from above)  
• some woodlice can roll into a ball



**Centipedes** • long, thin body divided into many segments • at least 15 pairs of legs, but can have many more • 1 pair of legs on each body segment • usually orange or yellow



**Millipedes** • long, thin body divided into segments • usually less than 50 pairs of legs • 2 pairs of legs on each body segment  
• pill millipedes can roll into a ball



- There are 39 species of woodlouse, 57 species of centipede and 60 species of millipede in the UK.
- Woodlice, centipedes and millipedes are not closely related. Centipedes belong to a group called Chilopoda, millipedes to the Diplopoda, and woodlice are crustaceans in a group called Isopoda.
- All have a large number of legs, but not thousands!
- They live on damp ground surfaces, among fallen leaves and decaying logs, and under objects like plant pots.
- Woodlice and millipedes mainly eat dead or damaged plants.
- Centipedes eat other invertebrates, which they immobilise using venom injected from a pair of poison claws near their head.



Discover more at the British Myriapod and Isopod Group's website [www.bmig.org.uk](http://www.bmig.org.uk)

### Did you know?



Eating a woodlouse was once thought to cure stomach ache (but don't try this at home).

Woodlice have been given many different nicknames including **slaters**, **cheeselogs**, **chiggypigs**, **pry lludw** and **gammerzows**!

### Can't find a match?



There are well over 30,000 different species of invertebrate in the UK, so this guide cannot possibly show them all. If you find an invertebrate you cannot identify, record it as 'other' and check our website for further help.

To learn more about UK invertebrates, visit [www.opalexplornature.org/bugscount](http://www.opalexplornature.org/bugscount).

Great resources for identifying bugs include the OPAL iSpot website [www.ispotnature.org](http://www.ispotnature.org), and the Natural History Museum's identification forums [www.nhm.ac.uk/identification](http://www.nhm.ac.uk/identification).



### Look after yourself and the bugs you find

- Handle bugs gently. Only pick them up when necessary and always put them back where you found them.
- If you put a bug in a jar to look at it, don't keep it for too long, or leave it in the sun.
- Always act in a safe and careful manner and tell someone where you are going.
- See the Field Notebook for further advice.

Learn more about insects – join the Amateur Entomologists' Society [www.amentsoc.org](http://www.amentsoc.org).

For more help with identification visit [ispotnature.org](http://ispotnature.org).

Written by John Tweddle, Lucy Carter, Martin Batson, Martin Harvey and Gill Stevens.

Colour artwork © Chris Shields 2010. Photographs © Harry Taylor, Roger Key, Alan Stewart, Martin Hall, Robert Thomson, Matt Berry, David Green.



The Open  
University

