

Introduction to bees

Bees are fascinating insects that can be found in a broad range of habitats from urban gardens to grasslands and wetlands. There are over 270 species of bee in the UK in 6 families - 115 of these have been recorded in Scotland, with 4 species now thought to be extinct and insufficient data available for another 2 species.

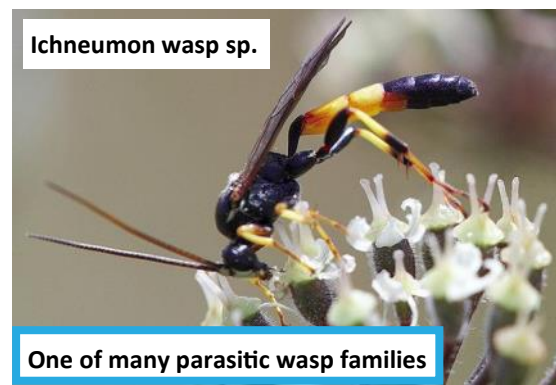
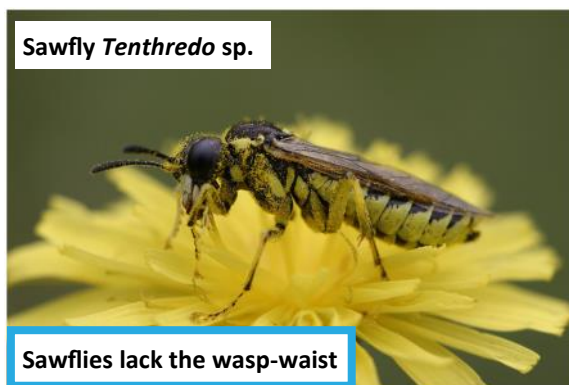
Bees are very diverse, varying in size, tongue-length and flower preference. In the UK we have 1 species of honey bee, 24 species of bumblebee and the rest are solitary bees.

They fulfil an essential ecological and environmental role as one of the most significant groups of pollinating insects, all of which we depend upon for the pollination of 80% of our wild and cultivated plants. Some flowers are in fact designed specifically for bee pollination, to the exclusion of generalist pollinators.

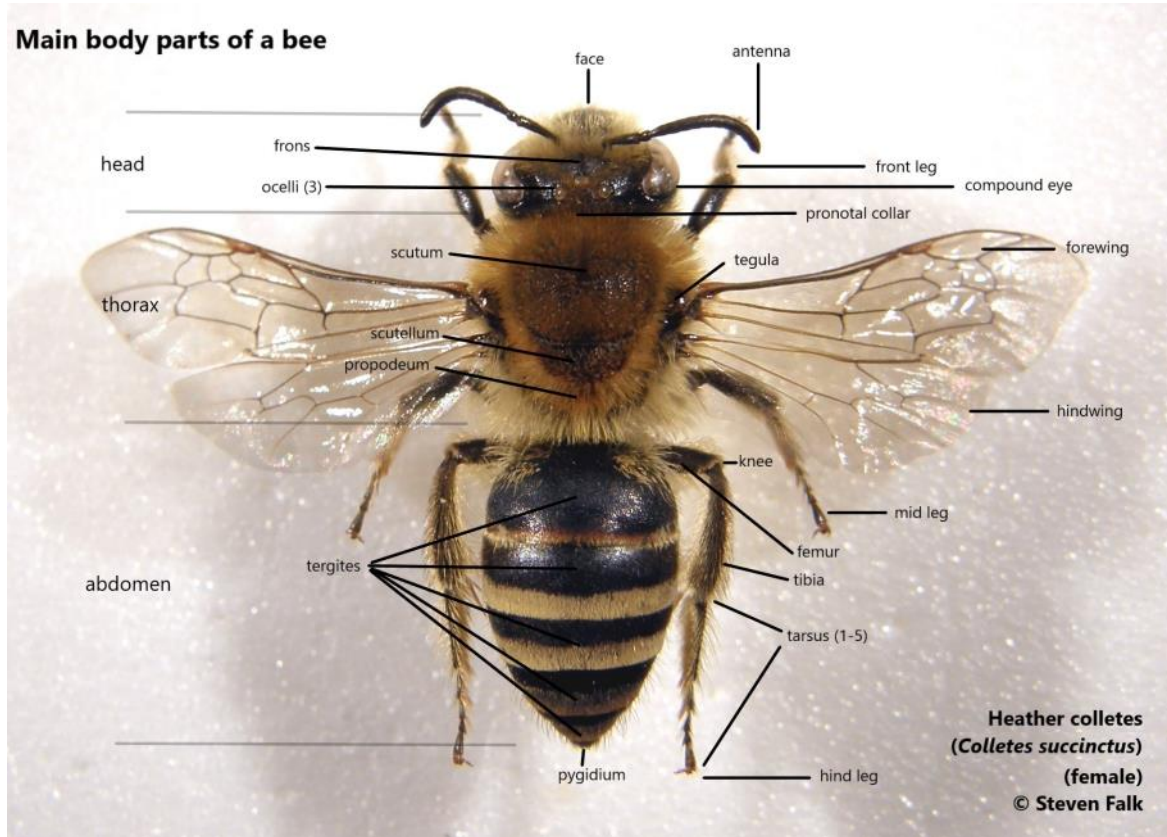
Bees and their relatives

Bees are classified in the complex insect order Hymenoptera (meaning membrane-winged), which also includes many kinds of parasitic wasps, gall wasps, hunting wasps, ants and sawflies. There are about 150,000 species of Hymenoptera known worldwide separated into two sub-orders.

The first is the most primitive sub-order Symphyta which includes the sawflies and their relatives, lacking a wasp-waist and generally with free-living caterpillar-like larvae. The second is the sub-order Apocrita, which includes the ants, bees and wasps which are 'wasp-waisted' and have grub-like larvae that develop within hosts, galls or nests. The sub-order Apocrita is in turn divided into two sections, the Parasitica and Aculeata. The former includes mostly parasitic species which use their ovipositor (egg-laying tube) to inject eggs into their hosts, while the latter includes species with modified ovipositors that form stings. Around 20,000 species of bee are known to science and are classified here within the superfamily Apoidea.



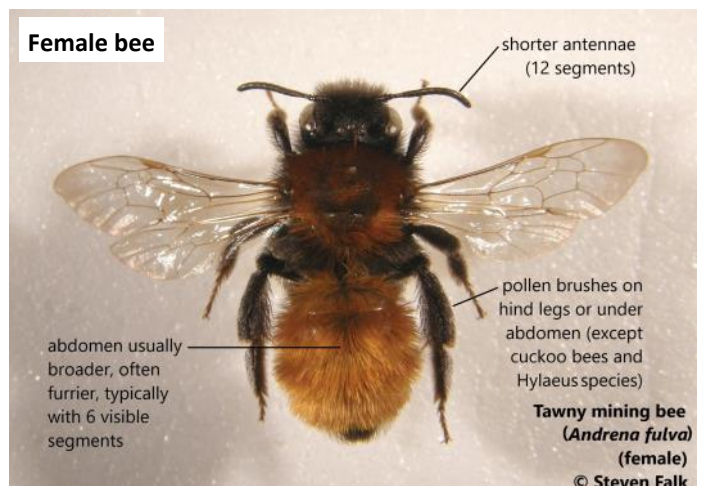
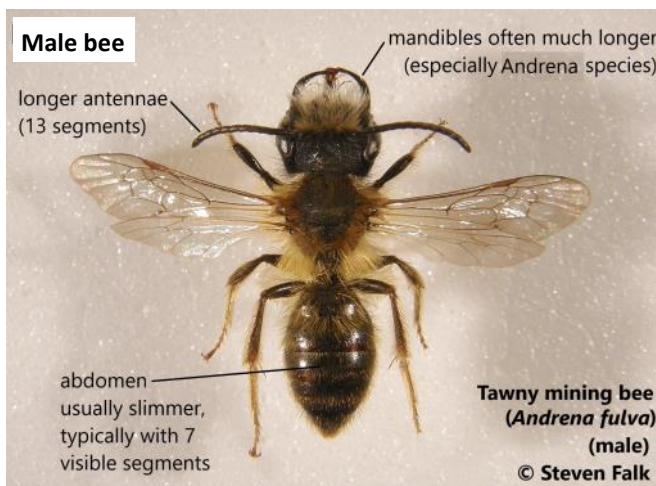
Bee anatomy



Identifying male and female bees

Male and female bees can generally be separated by looking at the following characteristics:

- Antennae: males tend to have longer antennae, with 13 segments, rather than 12 in females.
- Abdomen: males tend to have slimmer, less hairy abdomens with 7 visible tergites (segments), rather than 6 in females
- Size, structure and appearance: females tend to appear larger, more robust and more colourful
- Pollen brushes: more obviously visible on the hind legs of females
- Mandibles: often much longer in males



Introduction to bee families

This guide is an introduction to each of the 6 bee families, with each family given a section within which characteristic and diagnostic information is featured, as well as examples of species or genera to look out for in Scotland. The species body length is included with each image. Numbers of species and genera refer to those recorded in UK unless otherwise stated.

Please note that of the 270+ species of bee in the UK, many need further examination under a microscope to confirm the species.

Plasterer and yellow-faced bees (Family Colletidae) 21 species in 2 genera

These are short-tongued bees which are particularly well represented in the southern hemisphere. They characteristically line their nest cells with a waterproof, cellophane-like substance produced from a specialised gland which is then filled with a liquid nectar-pollen mass. Two genera represented in the UK include 9 species of Plasterer (*Colletes*) and 12 species of Yellow-faced (*Hylaeus*) bees, with the latter genus including mostly very small similar species with a southerly distribution, and the former including 4 species recorded in Scotland. All colletes bees are visually similar and care is required to reliably identify them, but understanding habitat preference will aide in identification.

Species to look out for:

Heather colletes (*Colletes succinctus*)

One of four colletes bees to be found in Scotland, this species is a dry heathland specialist which is closely associated with heather. It often nests in large, dense aggregations on south-facing sandy slopes and dunes near heathland habitat.

Davies' colletes (*Colletes daviesanus*)

The most likely colletes bee to occur in urban greenspaces, arable margins and gardens, particularly through the central belt of Scotland. This is due to its ability to exploit a wide range of flowers in both coastal and inland habitats.

Northern colletes (*Colletes floralis*)

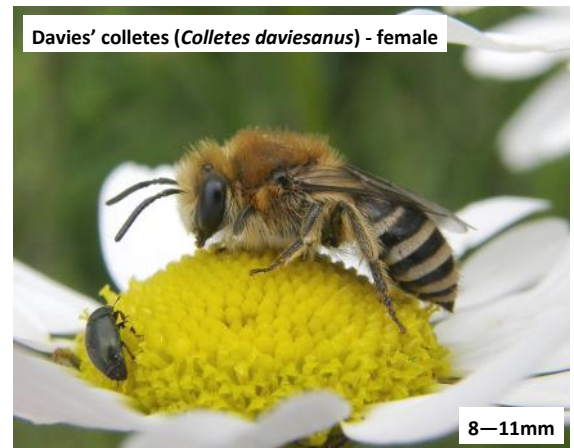
A northern specialist from this family, with its range in Scotland restricted to coastal dunes and machair grassland on a number of Hebridean islands and Ayrshire.

Hairy-saddled colletes (*Colletes fodiens*)

(Not pictured) A more common colletes bee in the south of the UK with a range that extends northwards to coastal sites in south-west Scotland.



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Mining bees (Family Andrenidae)

69 species in 2 genera

A short-tongued family with two genera in the UK, but only the mining bees (*Andrena*) represented in Scotland, with 27 species having been recorded. This is the largest genus of bees in the UK and species are variable in size and colouration. They can be distinguished from superficially similar genera by the velvety hair bordering the eyes on their inner side, extensive pollen brushes on the hind legs and pollen basket hairs at the back of the thorax.

Species to look out for:

Tawny mining bee (*Andrena fulva*)

One of the most distinctive mining bees and relatively common further south. Worth looking out for as its range has expanded to central Scotland where it is thought to be increasing since being discovered in 2010.

Chocolate mining bee (*Andrena scotica*)

One of Scotland's commonest mining bees with a range that extends as far north as Ross and Cromarty. Able to exploit a wide range of flowers and habitats. Often plays host to the cleptoparasitic nomad bees *Nomada fulva*, *N. marshamella* and the bee-fly *Bombylius major*.



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Sweat bees (Family Halictidae)

62 species in 5 genera

Known as sweat bees because many tropical Halictid bees are attracted to sweat. A large and diverse family, of which 20 species from the following 3 genera have been recorded in Scotland: End-banded furrow bees (*Halictus*), Base-banded furrow bees (*Lasioglossum*) and blood bees (*Sphecodes*). This family features some species of particular interest that demonstrate primitively eusocial behaviour (sterile females acting as workers to serve a queen or queens) usually associated with members of the Apidae family. The blood bees have a red and black abdomen and are cleptoparasites (cuckoos) of various ground nesting bees, including other members of this family.

Species to look out for:

Orange-legged furrow bee (*Halictus rubicundus*)

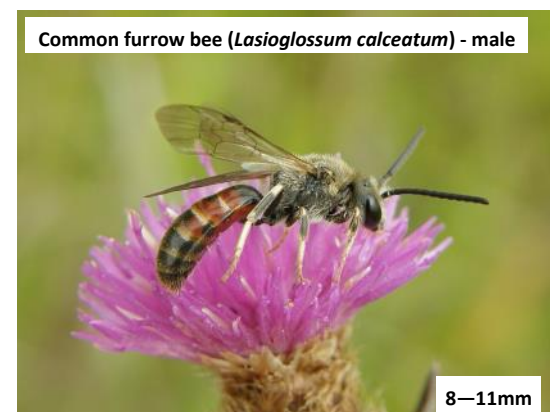
Widespread and locally common throughout most of UK, including parts of central and northern Scotland. Known to be eusocial in the south, but solitary and single-brooded further north, although often in larger aggregations in the north.

Common furrow bee (*Lasioglossum calceatum*)

Frequent in urban greenspaces throughout Scotland where it is able to utilise a wide variety of flowers. Some males can have a distinctive broad red band on the abdomen. Often parasitised by various blood bees and nomad bees.



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Blunthorn bees and allies (Family Melittidae)

6 species in 3 genera

This is a small, but diverse and widespread family of short-tongued bees with around 160 species described worldwide. Of the 6 UK species, only 1 from the genus *Melitta* has been recorded in Scotland. They tend to be reliant on particular plant species as a source of pollen and can be separated from the superficially similar genus *Andrena* by the blunt ended antennae, the more swollen final segment of the tarsi and the lack of velvety hair (foveae) between the eyes.

Species to look out for:

Gold-tailed melitta (*Melitta haemorrhoidalis*)

Widespread but local distribution with scattered records as far north as East Lothian. Distinguished from other *Melitta* bees by the orange-haired tip to its abdomen. As a bell-flower specialist, it is often found collecting pollen from harebell and it can be found sheltering inside the bells in less favourable conditions.



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Mason bees and allies (Family Megachilidae)

40 species in 8 genera

A large family of long-tongued bees with over 3,000 species described worldwide. 14 species have been recorded in Scotland, representing 5 of the 8 genera found in UK. Two species of mason bee (Mountain *Osmia inermis* and Pinewood *O. uncinata*) are recorded only in the Scottish Highlands. 5 species of the leafcutter bee (*Megachile*) genus also occur in Scotland and derive their common name from their use of cut leaves in the construction of nest cells. Key identification features for this family include two (rather than three) submarginal wing cells, a rectangular labrum (lower part of the face) and broad mandibles.

Species to look out for:

Red mason bee (*Osmia bicornis*)

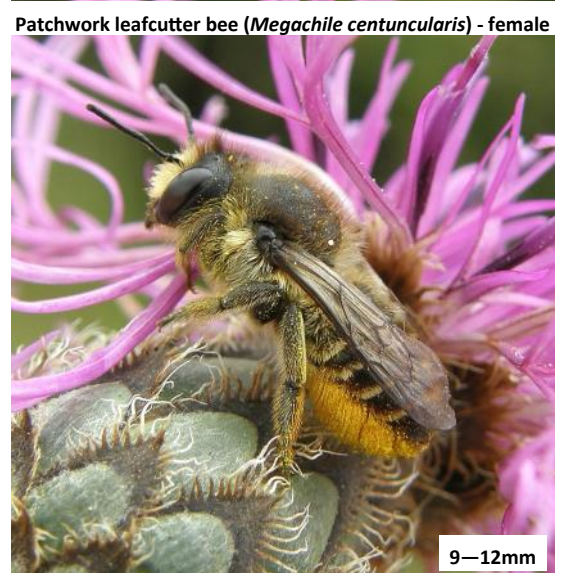
The most common of our British mason bees, with a distribution that extends to southern Perthshire. One of the commonest solitary bees of gardens and urban greenspaces through the spring and will often be among the first to nest in bee hotels.

Patchwork leafcutter bee (*Megachile centuncularis*)

The leafcutter bee most likely to be seen in Scotland, this species frequents urban greenspaces and will often nest in bee hotels. The female has a distinctive bright orange pollen brush on the underside of the abdomen extending all the way to the tip. Look out for bees carrying green leaf segments back to nests from June to September.



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Bumblebees and allies (Family Apidae)

76 species in 9 genera

The largest of the 6 bee families found in the UK, with over 6,000 species described worldwide. A diverse family which includes bumblebees, the honey bee, carpenter bees, flower bees and nomad bees. 35 of the 76 UK species have been recorded in Scotland, representing 5 of the 9 genera. A long-tongued family with varying characteristics including the cleptoparasitism of cuckoo bumblebees and several other genera, and a range of sociality including the most eusocial of all, the honey bee, which is well known for having many thousands of sterile female worker bees that fulfil various roles to assist in the reproductive process of a fertile queen bee. Some social bumblebees and the honey bee are also known as corbiculate bees, after the corbiculae, or modified hind tibiae used as 'pollen baskets'.

Species to look out for:

Tree bumblebee (*Bombus hypnorum*)

A recent colonist having first arrived in the UK in 2001 and has subsequently spread rapidly north. It was first recorded in Scotland in 2013 and is now common up to the central belt. It often swarms around nest locations in trees, but also around human habitation where it has been known to behave rather aggressively when disturbed.

Gypsy cuckoo bee (*Bombus bohemicus*)

Female cuckoo bees are readily separated from social bumblebees by the lack of pollen baskets on the hind tibia. This species is the most commonly encountered cuckoo bumblebee in the Highlands and islands of Scotland, where the females parasitise nests of Northern white-tailed bumblebees (*Bombus magnus*) by entering a nest, killing or subduing the queen and laying her eggs in the cells for workers of the host species to rear as their own.

Panzer's nomad bee (*Nomada panzeri*)

A common nomad bee with a wide distribution stretching north to Inverness. Easily confused with the similar Flavous nomad bee (*Nomada flava*) in the south, but the latter is absent from Scotland. Parasitises the nests of various spring-flying mining bees.

Marsham's nomad bee (*Nomada marshamella*)

Another common nomad bee which is closely associated with the Chocolate mining bee (*Andrena scotica*) which is its preferred host species. This species is known to visit a wide variety of spring and early summer flowering plants in a variety of habitats and is the most frequently encountered nomad bee in urban areas of Scotland.



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