

Solitary Bees in your Garden

What's the Difference between Solitary Bees and Other Bees?

Bees can be broadly categorised into three groups:

HONEY BEES – These are managed and semi-domesticated, form long-lived social colonies that live in hives and are cared for by beekeepers. They are the source of the food we call honey. There is one (very variable) species. They can sting aggressively if the hive is attacked. In the UK feral colonies (i.e. not managed by a beekeeper) can occasionally be found in hollow tree trunks and similar cavities. At present these feral colonies are often short-lived due to the presence of the *Varroa* parasite. Honey bees have been present in the UK as a managed species for several millennia, but the latest archaeological evidence suggests that they were not truly native.

BUMBLEBEES – are wild, form short-lived social colonies (typically up to 3 months) and construct their own nests in cavities in hedgerows, under rocks, in disused mouse or birds' nests, or in cavity walls. There are about 25 species in Britain and over 200 across the world. They are docile although females can sting if aggravated.

SOLITARY BEES – this is a collective term for about 240 other species of bees in Britain, that are not social (i.e. do not co-operate in a group), but each individual female lays its own eggs, usually in small cracks or tunnels in dead plant stems, dead wood, walls, or in the ground. They have weak or ineffectual stings. Many are very small, and people don't even realise that they are bees. Well-known examples include Mason Bees, Leafcutter Bees, and Mining Bees. The majority of species are Mining Bees, making nest sites in soil or in sandy banks or cliffs. They are closely related to solitary wasps. Scientists believe that bees evolved from wasps, over 80 million years ago. Wasps feed their larvae on live prey, bees feed theirs on pollen. This is the key difference between bees and wasps.

Although there are about 240 species of solitary bees in Britain in fact we have a relatively small bee fauna compared to the rest of Europe, where there is a greater diversity of species. In Britain and Ireland we are on the very edge of the distribution range of many species of solitary bees. This may be because of our climate. The greatest diversity of solitary bee species is found in south east England, especially Surrey which has areas of sandy soil very suitable for Mining Bees. A number of the best-known species are absent from Ireland and some are also rare or absent from Scotland, however it is likely that some gaps in the distribution maps are simply due to lack of recording effort in the past.

In recent years the development of digital photography and the internet mean that the submission of records for some groups of insects has been made be very much easier. This is particularly true for species that are easy to identify, such as many butterflies. As well as [iRecord](#), which is a general recording scheme, there are a number of specialist on-line

recording schemes. Bumblebee records for example can be submitted to the Bumblebee Conservation Trust's [Bee Watch](#) scheme.

The potential for on-line recording of solitary bees is less straightforward however, because most of the species cannot be identified without taking a specimen and comparing it to a key, which generally needs recourse to a hand lens or binocular microscope to study diagnostic features such as the vein pattern on the wings.

Fortunately for the garden owner, there are some distinctive and easy to identify kinds of solitary bees that are common in gardens, and these form the subject of this fact sheet. The organisation called [BWARS](#) is a mainstay in the conservation of British bees, as they collect the distribution data on which conservation strategies have to be based. They recently introduced on-line recording schemes for some easily identified solitary bees that may be seen in gardens. In the species descriptions below I have provided links to various BWARS recording pages for distinctive species.

If you live in Ireland (Northern or Republic) there is on-line help with identification plus you can submit on-line records of bumblebees and several easy-to-identify solitary bees at the [National Biodiversity Data Centre](#).

See my [Citizen Science](#) web page for general details of recording schemes and where to submit records in the UK and Ireland.

Despite media panics about 'disappearing bees', which are mainly generated by problems suffered by intensively managed honey bee colonies in the USA, many solitary bees in the UK seem to be doing well. Away from intensively managed farmland where insecticides are widely used, suburban gardens and allotments and areas such as road and railway embankments provide varied nesting and foraging opportunities for solitary bees. Some species seem to be currently expanding their range northwards, possibly due to climate change. We now have an autumn-flying species that is new to Britain and is rapidly spreading northwards. This is the Ivy Mining Bee (*Colletes hederæ*). This is likely to be seen in gardens visiting flowering ivy bushes, and gardeners can help scientific knowledge by reporting sightings.

Most of solitary bees have a short flying season, perhaps a month or two, when they can be seen flying in the garden as adults. All the collection of pollen and construction of cells for the eggs is done by females. The only function of males is to facilitate sexual reproduction through mating with females.

The nest cells contain a store of pollen, sometimes mixed with nectar. The egg hatches quickly and eats the pollen before it spoils, growing in the nest cells as a larvae. The larvae go through metamorphosis and eventually pupate (rather in the manner that caterpillars do). They then stay dormant in their cells, as pupae until they emerge next season as adults. The exact details of this larval history depend on the species, but the principle is the same.

A number of the solitary bees are extremely effective pollinators of fruit bushes and trees. In recent years gardeners have better appreciated this and it is possible to buy sets of

nesting tubes that can be fixed to a fence or wall. These are very popular with Mason Bees (*Osmia*). Homemade 'bee-houses' can be constructed by drilling small tunnels in bricks and blocks of old, dry, untreated wood, or tying bundles of sections of chopped bamboo canes or dead *Miscanthus* stems together. Leave them in a dry sunny place, not on the ground but at least a metre above ground level, and protect from rain. These will be occupied by Mason Bees and Leafcutter Bees. There is no point in buying expensive and ineffective bee houses from catalogues when you can make your own that will really work and cost very little. Bear in mind however that you have to manage these bee houses, removing diseased and dead cocoons in the early spring and replacing drilled blocks every two years. See my web page about [How to Make a Bee Hotel](#) for instructions.

It is important to consider planting for solitary bees. Lists of so-called 'bee plants' are usually aimed at beekeepers and usually concentrate on the flowers that are attractive to honey bees. Honey bees are generalists, are adaptable and adventurous in their flower choice, and can fly long distances to a source of forage. They can often forage from exotic flowers like *Fuchsia* and *Kniphophia*, which produce copious nectar. Most solitary bees are different – they cannot fly long distances for forage and look for forage near their nest sites. They often have fairly specialised foraging preferences, and this may be connected with the fact that many of them are very small and have small mouth parts, and can only access very small flowers or florets. So flowers labelled as 'bee plants' and 'bee-friendly seed mixes' may not be suitable for many types of solitary bees.

A range of flowers from our native region (Western Europe), typically perennials, especially those with small or bunched flowers in the Umbellifer family (Apiaceae), Daisy family (Asteraceae), and Salvia family (Lamiaceae), also various kinds of Scabious and Campanulas are typical of the flowers you should plant. This includes many culinary herbs and traditional cottage garden plants. They don't have to be strictly native to Britain, close relatives of our wild flowers hailing from the Continent are just as good, and give you more planting choice. Aromatic herbs and sub-shrubs from southern Europe are a good planting choice. And if you can find space in your lawn for yellow Hawkweeds and Hawkbits (perhaps by mowing one area of lawn less regularly) you will be doing solitary bees a great favour.

Many types of bees scent-mark flowers when they visit them, using special scent glands. This conveys to other bees that the flower has just been visited and that nectar may be temporarily depleted.

Below are some solitary bees that are common in gardens in parts of the UK and easy to identify. The 'current distribution' notes show if they have been recorded in your area. The English names are mainly those used in Falk & Lewington's [Field Guide](#) to the Bees of Britain and Ireland (2015).

Small Scissor Bee, or Harebell Bee (*Chelostoma campanularum*)



This is Britain's smallest bee, and is dependent on Bellflowers or Harebells (*Campanula* species). It is very small, and black in colour. It nests in tiny tunnels ('woodworm' holes) in dead wood, and will readily take to drilled blocks of wood in bee houses so long as they contain tunnels that have been drilled with the smallest of drill bits, and *Campanulas* must be growing nearby.

A good example of a 'specialist' forager, which is dependent on a few species of *Campanula*. It seems to be particularly fond of the Nettle Leaf Bellflower, *Campanula trachelium*, an attractive plant that is very easy to grow in gardens.

Current Distribution

This tiny bee appears to be only found in south east England, the English Midlands, East Anglia and eastern Wales. It is easy to identify because of its tiny size and its close association with *Campanulas*. Another species, *C. florisomne*, is strongly associated with Buttercups (*Ranunculus*).

Large Yellow-face Bee (*Hylaeus signatus*)

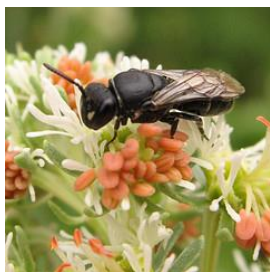


Image by Nigel Jones

A few species of bees feed on the pollen of a single species or genus of plants. *Hylaeus signatus* is one of these, restricted to the pollen of *Reseda*, a genus which includes the wild flower called Dyer's Weld, and the aromatic flower called Mignonette. If you live in the southern half of Britain and grow *Reseda* in your garden you may well see this tiny bee visiting.

There are a number of other similar *Hylaeus* species that visit other kinds of flowers. A specialist key is required in order to identify them, and you will normally need to study a specimen under a microscope or lens. They are known as Yellow-face bees because the males have yellow or white markings on their faces.

The Hairy-footed Flower Bee (*Anthophora plumipes*)



This emerges very early in the season (typically on the wing from mid-March). The males have yellowish faces and the females are larger and black, looking superficially like black bumblebees. They dart around and can hover in front of flowers (unlike the rather slow flight of bumble bees, which tend to land on flowers). The males are territorial and will chase each other (and other flying insects!) off their patch. The males are sexually aggressive and will chase and pounce on females of the species. Males do not collect pollen and play no part in provisioning nests for the young.



This long-tongued bee absolutely adores the tubular flowers of early-flowering Comfrey (*Symphytum* Hidcote Blue, and *S. grandiflorum*) as a nectar source. Plant either of these and you will see this bee if it lives in your area. It also particularly likes *Pulmonaria*, *Cerithe*, and *Pentaglottis* (Green Alkanet). This bee nests in tunnels in dry ground, or in old walls. It does not come to artificial bee houses. It is on the wing until late May. This bee is very distinctive, and if you plant *Pulmonaria* or an early flowering form of *Symphytum* you are likely to attract it if it lives in your area.

This would be a good species to attract and study in school gardens, and pupils can submit [records to BWARS](#) or I-Record. If this bee has not been recorded in your area before, the kids will have the satisfaction of contributing to scientific knowledge.

Current Distribution

Anthophora plumipes has been recorded in the south and east of England, the English Midlands, and Yorkshire. It has also been recorded from parts of Wales, but is probably under-recorded in Wales. It has not yet been recorded in Scotland or Ireland. If you live in these areas, please keep an eye for this bee when you pass Lungwort or Comfrey in the spring.

Sightings of *Anthophora plumipes* can be submitted on-line to BWARS.

Outside of the UK this species is widely distributed across Eurasia as far as Japan.

The English name is a translation of this bee's Latin specific name *plumipes*.

Mason Bees (*Osmia* species)



These are mainly on the wing from April until late June or July. There are a number of species. They nest in small holes or tunnels in old mortar, crumbling walls, dry dead wood, etc. The female makes a number of egg cells in each tunnel, walling each one up with mud.

Unlike *Anthophora* and bumblebees and honey bees, *Osmia* females collect pollen on hairs under their abdomen, the so-called 'pollen brush' or *scopa*. Males do not collect pollen and play no part in provisioning nests for the young.



They will construct a series of 'cells' in each tunnel. In each cell they leave a block of pollen that they have collected from nearby flowers, lay an egg, and wall it up with mud they have collected from the ground nearby, where they usually create a 'quarry' for mud. In dry weather you should make a small mud patch for them, and water it occasionally if the weather stays dry.

Their habit of using mud as a plaster to wall up their cells led them many years ago to be named Mason Bees, 'mason' being an old word for a builder or plasterer. Their name has nothing to do with 'masonry', in fact they do not live in brick walls as a rule.

Different species of Mason Bees (e.g. *Osmia bicornis*, *Osmia leaiana*, and *Osmia caerulescens*) occupy different diameters of tunnels. The latter two species wall up cells with a mastic of chewed leaves.

Osmias are very good pollinators of fruit trees and bushes, and well worth encouraging in a garden. You can buy commercial bee tubes to house them, or use bundles of cut canes, or blocks of wood or bricks into which you have drilled small tunnels. See my web page about How to Make a Bee Hotel for detailed instructions.

Osmias will come to a broad range of pollinator-friendly flowers. *Osmia bicornis* used to be called *O. rufa* and you may still see it called this in some books.

Current Distribution

Osmia bicornis is found throughout England and Wales and in Scotland as far as the central belt. It is spreading northwards in Scotland. It has only been recorded once in Ireland. *O. leaiana* has been recorded in Southern and Eastern Britain and Wales, but not in Scotland or Ireland. *O. caerulescens* has a similar distribution but there are two recent records from Scotland. It is likely that all these species are under-recorded. There are a number of other *Osmia* species in the UK.

Sightings of *Osmia bicornis* can be submitted [on-line to BWARS](#).

Leafcutter Bees (*Megachile* species)



On the wing later in the season, these also nest in tunnels or tubes, but wall up their cells with small pieces of leaf which they cut from wild rose bushes, leaving perfect circular cuts in the rose leaves. They readily occupy tubes in artificial bee houses. They can be seen flying across the garden carrying circular pieces of leaf, in the second part of the summer from July onwards. They typically cut the circles from the leaves of Roses.



Like *Osmia* the females also collect pollen on hairs on the lower side of their abdomen. They typically point their abdomen upwards when delving into flowers such as Knapweeds and Thistles, revealing the lower side covered in pollen and this is a good clue to their identification as *Megachile*.



The species *Megachile centuncularis* and *M. willughbiella* are very common in gardens, and some other species can be found in gardens. Identification to species level is difficult without examining a specimen under a microscope and using an identification key.

They will visit a wide range of flowers.

Current Distribution

Megachile centuncularis is one of the commonest species in gardens. It is widespread in Britain, although it is more frequently recorded from the south. It also occurs in the east of Ireland.

Megachile willughbiella also has a widespread distribution in Britain although does not appear to have been recorded in Ireland. Apparent gaps in distribution may well be due to lack of recording effort in the areas where it appears to be absent.

Tawny Mining Bee (*Andrena fulva*)



This is a Mining Bee, which means that it makes its nest in a tunnel in the ground among short dry grass, and likes garden lawns. It does not live in tubes or tunnels in artificial bee houses. When the adult emerges, a tiny volcano-like hole is left in the lawn, which is an easy way to tell that this bee is nesting in your lawn. It is extremely common in garden lawns, especially old sparse lawns with bare patches, and on light soil.



The female has a distinctive reddish coat and is easy to identify. If you see these on your lawn, remember that they do not have painful stings and are completely harmless. They do not make social nests and they do not swarm like honey bees. Several other common species of *Andrena* live in the ground. In the winter urban foxes dig small holes in lawns as they search for the Lawn Bee larvae in their underground cells.

Current Distribution

Generally distributed throughout England and Wales, appears to be absent or very rare in Scotland and Ireland.

Sightings of *Andrena fulva* can be submitted [on-line to BWARS](#). If you live in Ireland (Northern or Republic) there is on-line help with identification plus you can submit on-line records of this species to the [National Biodiversity Data Centre](#).

Ashy Mining Bee (*Andrena cineraria*)



Andrena is a large genus of Mining Bees. This particular species is distinctive due to its silver coloration and can be identified with the naked eye. It flies in the spring and forages from a range of flowers, including fruit trees.



It lives in the ground, typically in sloping banks or sparse lawns on light soil, often in built-up areas. It can nest in large aggregations, although passers-by often have no idea the bee is there. The illustrations on the left show a nesting area for this bee on a sloping bank in the town where I live.



Distribution

Found in England, Wales and Ireland. May spread northwards with climate change. Worth searching for if you live in Scotland. Sightings of *Andrena cineraria* can be submitted [on-line to BWARS](#). If you live in Ireland (Northern or Republic) you can submit on-line records of this species to the [National Biodiversity Data Centre](#).

Wool Carder Bee (*Anthidium manicatum*)



Very common in gardens in England, this can be found in the summer visiting its favourite flower, 'Lamb's Ear' (*Stachys byzantina*), although it will actually collect pollen from a range of small, lipped flowers in the Lamiaceae and Apiaceae (Legume) plant families, such as Bird's Foot Trefoil. Females cut the silky hairs from the Lamb's Ear leaf and use them to line nest-cells, rather like the fleece lining of a sleeping bag. Although they make nests in tubes and cavities they do not usually come to bee houses.

The [BWARS web page](#) about this species has videos of the hair-collecting behaviour. Males are territorial and will regularly patrol a patch of good forage plants, especially clumps of Lamb's Ear, darting around their territory in a purposeful manner. They conspicuously attack other insects that approach their territory, even large bumblebees, attacking them with spines at the end of their abdomen and can kill small insects. They also mate with females at these sites. This behavior is fascinating to watch and these harmless bees make a good subject of study for children. Lamb's Ear is a trouble-free plant and this bee would be a good species to attract and study in school gardens, and pupils could submit records to BWARS or iRecord. If this bee has not been recorded in your area before, the kids would have the satisfaction that they were contributing to scientific knowledge.

It visits a wide range of flowers, but seems to especially like Asteraceae (daisy family), all kinds of *Stachys*, small-flowered foxgloves such as *Digitalis ferruginea* and *D. lutea*, and Bird's Foot Trefoil (*Lotus corniculatus*).

Current Distribution

This bee is recorded across Southern Britain as far north as Dumfries and Galloway. There are large gaps in its distribution map however. This bee is certainly under-recorded, especially in Wales. It was recorded for the first time in Ireland in 2015. Well worth searching for wherever you live. You should inspect Lamb's Ear plants and submit your records of this bee [on-line to BWARS](#). This bee is distinctive and easy to identify from its behavior.

Members of the genus *Anthidium* are known as Wool Carder Bees because of their habit of combing hairs together to line their nest cells. This Wool Carder Bee is the only species found in the UK, but the genus is distributed across the northern hemisphere.

Wool Carder Bees should be distinguished from the 'Carder Bumblebees'.

Ivy Mining Bee (*Colletes hederæ*)



This interesting bee was completely new to science in the 1990s, being discovered in Germany. It is distinctive and easy to identify because it only forages from flowering bushes of Common Ivy (*Hedera helix*), and Ivy does not flower until September/October, when other similar species of *Colletes* are not flying. This bee has orange-yellow and black stripes on its abdomen, and ginger hair on the upper side of the thorax. You can distinguish it from wasps that also forage (for nectar) on Ivy blossoms because the wasps do not have hair on their bodies, and also their stripes are wider and a brighter yellow. Females of the Ivy Mining Bee collect pollen in 'pollen baskets' on their legs, whereas wasps do not collect pollen.

This species was first found in the UK on the Dorset coast in the early 2000s, presumably having crossed the channel from France. Since then it has steadily spread throughout southern England, and is now spreading northwards. If you find it you should take a digital photograph and submit on-line to the [BWARS Colletes hederæ mapping project](#). This is monitoring the progress of this species as it spreads throughout the UK.

Mining Bees typically make their nests in cliffs, earth banks, sandy soil or soft mortar in old walls. They do not nest in cardboard tubes or dead wood.

Grow these special plants

Some other bees are restricted to the pollen of just one plant species. Examples are The Yellow Loosestrife Bee *Macropis europea*, which forages from Yellow Loosestrife (*Lysimachia vulgaris*), and The Bryony Mining Bee *Andrena florea* which forages from White Bryony (*Bryonia dioica*). It is worth growing both of these wild flowers in your garden in order to attract these bee species.

As explained above, you should also grow Lamb's Ear to attract the Wool Carder, and Lungwort and early-flowering varieties of Comfrey to attract the Hairy-footed Flower Bee. Mignonette or Weld (*Reseda*) will attract the Large Yellow-face Bee.

Bellflowers (*Campanula*) will attract the Small Scissor Bee, and also the Gold-tailed Melitta (*Melitta haemorrhoidalis*), a distinctive mining bee with an orange tip to the abdomen.

If you grow Buttercups in your garden, or they grow nearby, look out for the Large Scissor Bee (*Chelostoma florissomne*). Females collect pollen from Buttercups and males can be seen resting in the flowers.

To attract other solitary bees in general, plant Knapweeds (*Centaurea*), garden-worthy types of thistles such as *Cirsium* 'Mt Etna', and yellow composites such as Tansy (*Tanacetum vulgare*) and the bedding plant *Bidens ferulaefolia*. Also of value are small flowers in the pea family such as Birds Foot Trefoil and Sainfoin, and umbellifers such as *Angelica*, *Eryngium*, and Wild Carrot. Early in the season various solitary bee species can be seen foraging from fruit tree blossom.

Books and further information about solitary bees

The essential reference work and ID guide is **The Field Guide to the Bees of Britain and Ireland** by Steven Falk, illustrated by Richard Lewington. (Published by Bloomsbury, 2015). This is totally up-to-date, full of illustrations, photographs, distribution maps and interesting information. It is suitable for all levels of reader from the absolute beginner to the expert, and covers bumblebees as well as solitary bees. It is over 100 years since the last field guide to British Bees was produced, so there was a great need for this book, and Falk and Lewington have done us proud.

Otherwise for basic info and illustrations of common species you have to look in general insect guides. Various books by Michael Chinery, such as Complete British Insects (Collins 2005) are a good place to start.

The best general book (not an ID guide) about bees throughout the world is **Bees: a Natural History** by Christoph O'Toole (Firefly Books, 2013). Really worth reading, full of information.

Visit my [Links](#) page for details of websites where you can view large numbers of images of solitary bees found in the UK and Ireland.

More information and individual fact sheets about the conservation of various species wild bees in the UK and Ireland are available from [Hymettus Ltd](#), a conservation charity for wild bees and related insects.

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