

Promoting pollination with bee houses

Besides the familiar bumble bees and honey bees, which live in colonies, there are approximately 220 species of solitary bees in the UK. They are called 'solitary' because each bee builds individual nests for their larvae, although some may do so communally. Most solitary species nest in tunnels or holes in the ground. Other bees, and some wasps as well, build their nests in naturally occurring cavities, from cracks in stones to hollow stems of dead plants or holes in wood made by wood-boring insects. These cavity-nesting bees and wasps readily occupy artificial nests made of drilled wooden blocks, paper tubes, or bundles of reed or bamboo stems.

Once a bee or wasp occupies a cavity, it begins constructing a series of compartments (brood cells), each provisioned with pollen and nectar (in the case of bees) or paralyzed insects (wasps) as food for its offspring (Figure 1). When the cells are finished, the nest entrance is sealed with a plug made of mud or leaves, depending on the species (Figure 2). The eggs soon hatch and the larvae develop by eating the pollen and nectar mixture (bees) or prey (wasps). The larvae then pupate, and after a period of dormancy, which may extend to the following year for some species, adults emerge to start the cycle over again.

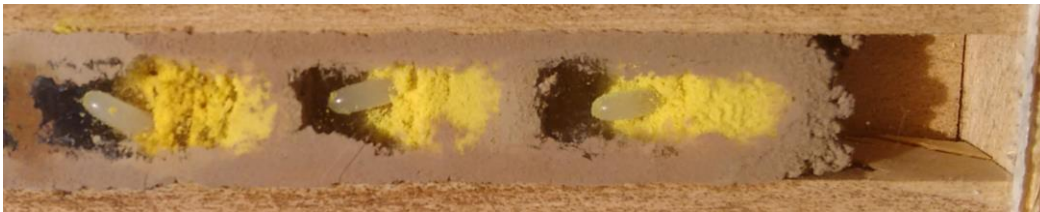


Figure 1. Three brooding cells from a red mason bee nest. Each cell contains pollen-nectar provisions and an egg. Male bees emerge first, therefore their eggs are laid last, closer to the nest entrance.



Figure 2. Red mason bee nests plugged with mud.

A number of cavity-nesting species are common in gardens, and they may be useful as pollinators of fruit crops (bees) and pest-control agents (wasps). Gardeners can encourage them by installing bee houses.

However, occupation of bee houses is not guaranteed: it will only happen if cavity-nesting bees occur naturally in the area. If not, even the nicest bee house will remain empty! (Retailers usually do not inform the buyers about this detail).

How to use a bee house

There are several types of nest for sale, some of them quite expensive. However, many are inadequate and will not be occupied. Even worse, they may be harmful to bees. [Marc Carlton](#), who runs the [Pollinator Garden](#) website, and [Xerxes Society](#) (an American organisation dedicated to the conservation of invertebrates) have provided detailed information of how to choose or build bee houses, and how to maintain them.

These are the main requirements and aspects to avoid:

- Do not use bee houses built with plastic or glass components. These materials trap moisture, which promotes mould and diseases.
- Keep it small: large structures made of stone, tiles, logs, etc. (known as bug hotels) promote unnaturally high concentration of bees, increasing the chance of parasites finding them. Bug houses are difficult to clean and therefore prone to harbour diseases, and some components such as pinecones and straw are hiding places for mites that feed on bees' pollen stores.
- In Scotland, the red mason bee (*[Osmia bicornis](#)*) is the most likely occupier of bee houses. This bee is active from late March to early June, peaking in May, during mass-flowering of fruit trees such as apple and pear. The red mason is spreading rapidly through Scotland. For this species, the internal diameter of tubes or holes should be within 4 to 10 mm, ideally 8 mm, with a length of at least 15 cm. Diameters between 2 mm and 10 mm are suitable for a range of other species.
- The house must be positioned in full sun, facing southeast or south. This is important; bees rely on the sun's heat to warm up and become active.

- Place the house at least a metre off the ground. There must be no vegetation obscuring its entrance. Fix it securely so it does not swing or sway in the wind, so you should not hang it from a branch. Face the house's opening at a slightly downward angle to help keep it dry.



- Wind-blown rain can wet the walls of the house's cells, exposing the young bees to diseases. Thus a bee house should have an overhanging roof to keep it dry. Few commercial products meet this requirement.
- Woodpeckers, tits and other birds may pull out tubes in search of bee larvae. If that happens, fix a piece of chicken wire across the front of the bee house.
- An occupied bee house can be moved somewhere cold, dry and free from mice and other predators at the onset of autumn or winter. An unheated shed, porch, or garage will do, as long as it is cold and dry throughout the winter. The house can be put back in March.
- Replace the house every two years to avoid build-up of mould, mites and parasites.
- Finally, do not buy bees. Bees introduced to a site may disrupt the ecology of local pollinators, and releasing them in the wild may be illegal.

Other species that may occupy bee houses in Scotland are:

- Blue mason bee ([*Osmia caerulea*](#)). A smaller and less common mason bee. The females

sometimes have a shiny, slightly blue body, hence its common name; the males tend to have a greener shade. They can be seen from April to August/September. The blue mason is widespread though southern Britain, with records extending to central Scotland.

- Patchwork leaf-cutter bee ([*Megachile centuncularis*](#)). Leaf-cutter bees look like honey bees, but the underside of their abdomens is orange. They are well known for their habit of cutting neat, rounded circles out of plant leaves which they use to build nest cells and seal their entrance. They are easy to distinguish from other solitary bees, as they hold their wings to the side of their bodies, unlike most bees that hold them folded over the abdomen.
- Mason wasp ([*Ancistrocerus parietinus*](#)). This mason wasp preys on moth and beetle larvae. It can be seen from summer to autumn. Wasps paralyse their prey rather than kill them, so that they will not rot before the larvae eat them. Many people are wary of wasps, but these insects help control some pests such as leaf-rolling caterpillars, leaf beetles and weevils.
- Mournful wasp ([*Pemphredon lugubris*](#)). This entirely black wasp is predatory on aphids. Adults feed on nectar and pollen.
- European potter wasp ([*Ancistrocerus gazella*](#)). This wasp preys almost exclusively on caterpillars. Adults feed on nectar and aphid honeydew. They are often found on house windows, foraging for nectar on gardens, and searching out small cracks or holes in which to nest.

Bee houses may attract unwanted guests as well (that is, from the bee's perspective): ruby-tailed wasps such as [*Chrysis ignita*](#) and cuckoo wasps like [*Pseudomahus auratus*](#) are mostly parasitoids* or cleptoparasites** of other insects, generally other solitary wasps and bees. These tiny and colourful wasps do not occupy bee houses, but rather patrol their surroundings in search of hosts. Some of these wasps are rare and endangered.

* Insect parasitoids have an immature life stage that develops on a host, ultimately killing it.

** Cleptoparasitism (meaning "parasitism by theft") is a form of feeding in which one animal takes food from another that has caught or collected it; in the case of cuckoo bees, they lay their eggs on the pollen of other bees or wasps.