

The nesting ecology of British bumblebees

Gillian Lye

This information sheet has been compiled in response to the questions that I am regularly asked regarding bumblebee colonies found in gardens. I hope that it proves useful and/or interesting!

The Bumblebee Life Cycle

The bumblebee lifecycle is annual. A queen founds her nest in the spring and lays eggs which will become workers (non-viable females as in honeybees). At this time she must single-handedly feed and incubate her first brood, so this is a particularly dangerous time in the bumblebee life cycle. Once the first workers emerge as adults, they take over foraging duties for the colony whilst the queen focuses her efforts into producing more workers. Once the colony has reached a suitable size (usually around July to September in the UK) the queen will start laying eggs that will give rise to males and queens. Emerging adult males leave the nest never to return again, spending their time searching for mates, feeding and sleeping on flower heads. New adult queens stay around the nest for a couple of weeks and may be observed entering and leaving the colony with the workers at the end of the season. During this time they will mate and feed up on pollen and nectar before going into hibernation for the winter. The old nest, old queen and males will die off soon after the new queens have been produced.

What does my nest look like? Do bumblebees make honey?

A bumblebee comb is a series of yellowish brown oval shaped hollow wax balls (cells) clumped together. Some of these are closed at the top and these will contain bumblebee larvae. Others are open and are used to store pollen and honey. Bumblebee workers run busily across the tops of the clumps of cells, feeding larvae and keeping the nest clean.

Bumblebees do produce honey but in far smaller quantities than honeybees. This is because honeybees must store enough honey to see them through the winter, whilst bumblebees only store honey for rainy days. It is said that bumblebee honey is tastier than that of honeybees, but it would take so many colonies to produce a single jar of bumblebee honey that (to my knowledge) no such product has ever been marketed!

Why does a single colony have so many different sized bees?

Like butterflies and moths, bumblebees start their lives as larvae within the bumblebee colony and emerge from their cocoons as fully grown adults. Therefore it is not true that tiny bees are simply young bees. Queens tend to look identical to worker bumblebees except that they are much larger, so if an exceptionally large bee is seen entering or leaving a nest site, it is likely that this will be a queen. However, within an individual colony, bumblebee workers come in a range of sizes. Why there is so much variation in size among sister workers, no one is quite sure but we believe that it may be to do with division of labor. The smallest workers in a bumblebee colony tend to stay within the nest to keep it clean and to nurse the larvae whilst the larger bees go out to forage. Even among the foragers, there is considerable variation in size and this may allow the colony to exploit a range of different floral resources, with large bees foraging on large flowers and smaller bees foraging on small flowers. However, bumblebees are plastic in their behaviour so that if all of the large forager bees were destroyed for some reason, the smaller nest bees would begin to forage.

Is my bumblebee nest a danger to myself, my children or my pets?

Bumblebees are very docile creatures and will generally never sting unless they feel threatened. Since bees collect all of their food from flowers, their stings are purely defensive and are only used

as a last resort. Children and pets are only really at risk of being stung if they aggravate the nest, or through accidentally but forceful contact (e.g. by treading on a bee with bare feet) . Unlike honeybees, bumblebees never swarm so there is no risk from that point of view, and workers will disperse far from the nest to feed on flowers so the presence of a colony does not necessarily result in an increase in the number of bees in the garden. For these reasons, it is usually quite safe to allow a colony to remain in close proximity to people, even if they are close to an area that is frequently used such as decking, near a through-way or in an outbuilding.

I'm really not happy with my bumblebee colony in the position it is in...

If a bumblebee nest is accessible, it is usually quite possible to relocate it with minimal harm to the colony. This is best done at night, since the majority of the bees should be safely inside the colony and also because bumblebees will not fly in the dark, making it very much easier to interfere with the nest! Since bumblebees can't see red light, a red head torch is very useful as it allows you to see what you're doing. However, red cellophane over a standard torch should do just as well. The easiest thing to do is to capture as many of the individual bees as you can before relocating the comb. Bumblebees will often cling on to sticks or other items inserted into the colony which can make this job a little easier. The comb should then be carefully transferred into a suitable receptacle, perhaps a cardboard or wooden box, lined with some form of insulating material such as dried shredded moss or grass, being sure to keep it upright so that the honeypots do not leak. The bees can then be reunited with the comb in their new home. The box should be taken to the new site (preferably somewhere well sheltered from rain, blocked up for the night giving the bees a chance to settle, before opening in the morning. The workers should resume foraging duties as normal. However, it should be noted that some bees may return to the original site if the new site is close to the old site. If possible it is better to move colonies at least a couple of miles from their original site.

Relocating colonies can be very safe if caution is taken, but thick gloves provide extra protection and peace of mind. It is also sometimes possible to find a friendly local beekeeper who will help out with the job. (Details can often be found in a phone book or online.)

I'm happy for the bees to stay this year but how can I prevent them from returning?

This is a common question as colonies are often founded in composters or within buildings where they are not especially convenient. If you do not wish bumblebees to return the following year, the best method is to prevent the bees getting access to the cavity they were using. This is often as simple as blocking up the entrance hole that they were using. This can safely be done in the Autumn, as soon as you notice that there is no longer traffic in and out of the nest.

I want my bees to return next year. Is there anything I can do to help? Should I clean out my bumblebee nesting box?

There is some evidence to suggest that the presence of a bumblebee colony in one year increases the likelihood of the presence of another colony in the following year but the mechanism for this is unclear. We don't know if it is daughter bumblebee queens returning to the site of their maternal colony or if it is just that the presence of a colony indicates a good site which will by chance be used again by a bumblebee queen in the next year. We also don't know whether or not cues from a nest from the year before influence the decision of a bumblebee queen to use a site or not. Perhaps the presence of the remains of a bumblebee colony attract a new queen as it shows that the site was successfully used in previous years, but on the other hand, old nest material might suggest that bumblebee parasites may be lurking in and around the site, which would be very bad for the newly founded colony. If a bumblebee colony is founded in a bird box or bumblebee box, I would be inclined to clear out the old remains of the nest and add fresh nest material in late winter since some studies suggest that bumblebees may prefer to use clean material as insulation for

their brood. However there is still a lot of scope for research in this area and the best course of action is by no means clear!

How do I protect my colony against disturbance by lawn mowers etc.?

If you find a bumblebee colony in an area where it is likely to be disturbed by lawnmowers, pets or even your own movement through your garden, the simplest way to protect it is to place a marker by the colony or to build a shelter around the colony so that it cannot be missed or damaged. Bumblebees are extremely adaptable creatures and if when leaving the colony, they notice that the entrance to the nest appears very different to the last time they left, they will relearn the image of the nest entrance so that they are able to return safely.

My nest has been dug up. By what? How can I protect the exposed bees?

In the UK, badgers are the most likely culprits for digging up and destroying bumblebee nests. Badgers love to eat bumblebee nests and probably dig up many hundreds of colonies per year. However, mice and weasels are among other mammalian predators that have also been suggested to destroy bumblebee colonies.

Bumblebees are very robust creatures and depending on the degree of damage, the colony can often be saved. If a recently disturbed colony is found, covering the exposed remains of the colony with some kind of shelter (such as an upturned flower pot) will protect it from the elements whilst the bees rebuild their nest. Be sure to leave an entrance hole so that the bees can get in and out.

My nest has yellow larvae/silk all over it.

Whitish yellow grubs inside a bumblebee colony or strands of white silk across the nest are sure signs that bumblebee wax moths (*Aphomia sociella*) have invaded. Female moths enter bumblebee colonies and lay eggs in the detritus at the base of the nest. These then hatch and the resultant caterpillars slowly eat their way through the comb, the food supplies, and even the young bees themselves. Unfortunately, this is usually lethal to the colony and there's not much that can be done to help them.

It is likely that most garden nests eventually succumb to attack by wax moths, but hopefully for most, the invasion will be late in the year so that the caterpillars will not finish off the colony until new males and queens have been produced. Since the production of males and queens is the ultimate goal of a bumblebee colony, this is a happy ending for the bees.

How can I encourage bumblebees to nest in my garden?

Bumblebees often nest in a range of garden features including compost heaps, bird boxes and rockeries. They also like to nest in long unkempt grass, under decking and patio slabs and in and under outbuildings such as sheds. Therefore most gardens provide at least some areas that might be chosen as nest sites by bumblebees. The best way to increase the chances of them selecting these sites in your garden is likely to be growing flowers that might attract queens into your garden in spring. Since bumblebee queens must single-handedly feed and incubate their broods in early spring, a good source of forage in close proximity to their selected nest site is likely to be vital. Plants that can provide good spring forage for bumblebees include apple, bluebell, broom, bugle, cherry, spring-flowering heather, flowering currant, pulmonaria, pear, plum, pussy willow, red dead nettle, rosemary, white dead nettle and mahonia. A good range of forage plants throughout the spring, summer and autumn will allow local bumblebee colonies to thrive producing a greater number of queens which may then increase the number of colonies present the following year. A list of plants that can provide forage throughout the period of bumblebee

activity can be found at

http://www.bumblebeeconservation.org.uk/gardening_for_bumblebees.htm.

Are artificial nest boxes good?

Artificial nest boxes for bumblebees can and do attract bumblebees to nest, but the chances of finding a nest in your artificial bumblebee box seems to be low (perhaps 1 in 100). Where bumblebees do found nests in commercially available bumblebee boxes, these tend to have been outside for several years already and are often in very sheltered locations such as under a bush. It is likely that the attractiveness of an artificial nest box for bumblebees increases over time because the begins to lose it's unnatural odours and striking appearance as it takes on the odours around it and becomes dirty and weathered. These things will make the box less prominent in the environment and may therefore make it more suitable for hosting a bumblebee colony. It may also be that previous occupancy by mice or other animals may render the box more attractive to nest site searching queens, since bumblebee colonies are often founded in the abandoned homes of such creatures.

One thing that is certain is that supplying the right sort of nest material is key. Many commercially available bumblebee boxes come with chopped hay as a nest material but this will be too coarse for a bumblebee queen to manipulate. Dried moss or very finely shredded dried grass can provide more suitable material, though I usually use viscose fibre hamster bedding (like cotton wool but not – cotton wool should not be used since it contains synthetic fibres that can tangle the legs of bumblebees causing them to be trapped). Since most of the common British bumblebee species prefer to nest underground, it may also be helpful to add a tube attachment to the nest box and either bury the box a little way down, or (better for the life of the box) create the illusion that the entrance of the tube leads to a subterranean chamber, perhaps by building up mud or stones around the hole. Home-made nesting sites can be equally as effective as commercial boxes and can cost a lot less. For example, provisioning an excavation in the ground with suitable nest material and placing a concrete slab on top (using a tube or small excavation at the side of the concrete slab to create an entrance hole) can attract a range of species to nest.

Whilst the success of artificial nest boxes for bumblebees can be low, artificial solitary bee nests can provide far better value for money. If sited correctly, these are almost always used, and the results are extremely satisfying. These should be placed in a sunny spot facing south or south east.