

Bumblebees

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Introduction

The speakers were volunteers for the Bumblebee Conservation Trust (www.bumblebeeconservation.org), from which website the illustrations below have been derived.

Britain produces 28,000 tonnes of tomatoes annually valued at £175M. The pollen of tomatoes is inside the anther and it has to be shaken or vibrated to release it. Only one insect, the bumblebee, can successfully pollinate tomatoes. 2.0 – 2.5M bumblebees are imported from Belgium and Holland every year to be released in industrial-sized poly-tunnels and the resulting tomatoes are superior in terms of the amount produced and the size of the fruit and they taste better than those produced by any other method of pollination (In Australia, which has no bumblebees, tomatoes are hand-pollinated with a paintbrush). Indeed, bumblebees pollinate around 80% of Europe's crop species.

Why do they need our help?

Climate variation and climate change can have significant effects on bumblebees, as illustrated by the amount of flowers in lavender fields in the good summer of 2011 and the very wet summer of 2012. Bedding plants add colour to a garden or balcony but many bedding plants are hybrids and lack both pollen and nectar. Farming practices have removed habitats and the bumblebees are affected by pesticides and herbicides. Land maintenance in urban public open spaces often involves too frequent mowing, not allowing the flowers to develop.

Bees in the UK

The UK has about 250 species of bees. 24 are bumblebees, of which only 8 can be seen in most places, and there is 1 honeybee. The rest are solitary bees. All bees get nectar from flowers and the protein-rich pollen.

What are bumblebees?

Bumblebees are *Hymenoptera* (a family that includes bees, wasps, ants and sawflies) of the genus *Bombus*. There are 250 species worldwide, predominantly in the northern hemisphere, though South America has a few native species and New Zealand has some introduced from Britain. Bumblebees have an annual life-cycle, feed exclusively on pollen and nectar, are warm-blooded and with high energy requirements. Their essential needs are for somewhere to nest, lots of flowers for food and somewhere to hibernate.

Bumblebees are wild, with 18 social species and 6 cuckoo species in the UK, in contrast to the honeybee, which is domesticated and is only one species. Bumblebee colonies have 50 – 400 workers, while honeybees have 50,000 workers. Bumblebees do not perform the honeybee "waggle dance". Only the bumblebee queen survives the winter, while the honeybee colony does so, albeit with much reduced numbers. Both types are struggling due to flower shortage and habitat loss and honey bees additionally have problems with disease and parasites. The honeybee has a tongue is about 6mm long, bumblebee workers 6 – 13mm and bumblebee queens 9 – 19mm, so the bumblebee can feed from and pollinate a much wider range of flowers.

In the social bees, the Queen is larger than the males and much larger than the workers. The Queen and the workers have “pollen baskets” but the males lack these. Cuckoo bees also lack “pollen baskets”.



Buff-tailed bumblebee
Bombus terrestris



White-tailed bumblebee
Bombus lucorum



Red-tailed bumblebee
Bombus lapidarius



Garden bumblebee
Bombus hortorum



Early bumblebee
Bombus pratorum



Common carder
Bombus pascuorum

Life-cycle of bumblebees

The life-cycle begins in the spring with the awakening of the queen from hibernation underground.



She first feeds on flowers, drinking nectar for energy then searches for a suitable nest site. This varies between species, with some using holes in the ground or under garden sheds, others nesting in tussocky grass, in trees or in nest boxes. Having found a nest site, the queen collects pollen and forms a mound of pollen and wax on which she lays her first eggs. Nectar is stored in a wax pot in front of the mound, from which she sips to maintain energy to incubate the eggs for several days,

keeping them warm by “shivering” her wing muscles. Larvae are fed on pollen and nectar and after 2 weeks spin a cocoon and develop into adult workers (sterile females). Once the first brood of workers appear to guard the nest and feed later-born larvae, the queen does not leave the nest. In the late summer the nest begins to produce new queens and males. The latter leave the nest and do not return but spend their time feeding on nectar and trying to mate. Once mated the new queens feed heavily on pollen and nectar to build up reserves for the long hibernation throughout the winter.

What has happened to bumblebees?

Bumble bees have suffered widespread decline in the last century. Over one third of social bees have declined by more than 70% and 2 species have become extinct in the UK since 1900. For example, the Great yellow bumblebee (*Bombus distinguendus*) was once found throughout Great Britain but is now restricted to the north coast of Scotland and some of the Scottish islands in the flower-rich machair. The Shrill carder bee (*Bombus sylvarum*) was once found in most of England and Wales but there are now only 7 separate populations left in meadows and flower-rich grasslands in South Wales and southern England.

The Short-haired bumblebee (*Bombus subterraneus*) was once widespread across England south of the Humber. Decline since the 1950s led to its population distribution becoming isolated and patchy. It was last seen on Dungeness in 1988 and was declared extinct in 2000. In June 2012, 50 queens collected from Sweden (where its population is strong and with similar climatic conditions to southern England) were released in the Dungeness nature reserve as part of a re-introduction project. In June 2013 a further 50 queens were released and 6 weeks after release the first workers were recorded within 5 km of the release site.

Should we be concerned?

Bumblebees have huge commercial importance as pollinators, with pollination estimated to be worth £440M in 1996 in the UK and €14.2B in the European Union. Many wild plants also depend on them for pollination, they help to support the rehabilitation of semi-natural flower-rich grassland and have their own intrinsic value.

The decline is largely due to the great decline in bumblebee habitat, with 98% of flower-rich grassland lost in the UK since the 1940s, and to agricultural changes to more intensive methods, removal of hedges and areas without crops, cutting grass many times a year and heavy grazing.

What is the Bumblebee Conservation Trust doing?

The Trust has a Conservation team working with farmers and land managers to provide habitat for the rarest bumblebees, focusing on specific zones where several rare species exist, Farmers are being helped to apply for agri-environment scheme grants to fund the provision of bee-friendly habitat. As well as the re-introduction of the Short-haired bumblebee, there are other projects. For example, the RSPB Loch Leven reserve was re-seeded with local wildflower seeds and it is now used by the rare Blaeberry bee from the nearby hills.

The Trust's Outreach team works to stimulate interest in the conservation of bumblebees among the general public through walks and talks, promotes bee-friendly gardening and manages identification training and surveys.

Gardens cover over 1MHa in the UK and many species are now more common in gardens. However, many flowers are unsuitable for bees because they have no nectar or pollen. “Bee kind”

is a web-based assessment of how bee-friendly a garden is. Making space for bumblebees is important and a number of fact-sheets are available on the website on managing land for bumblebees.

“Bee walk” is a national scheme to collect abundance data to help to detect declines and for long-term monitoring. The same individual walks a 1 – 2km route once a month between March and October recording all species seen.