

# PLANTING FOR BEES AND OTHER POLLINATORS

## Title frame

This shows the types of bees found in the British Isles. There are 24 species of bumble bees, 12 commonly found (of which 6 are commonly found in Oxfordshire), 1 species of honey bee and over 250 species of small solitary bees. People will be familiar with bumble bees (**bottom right**) and honey bees (**bottom left**) but less so with the small wild solitary bees (examples **top left** and **top right**).

## Frame 2



Self-explanatory, except that it is useful to look at the photo of the **solitary bee** on knapweed (**bottom right in frame** and shown, left, here), which demonstrates how much better these bees can be as pollinators than honey bees and bumble bees.

Honey and bumble bees pack away the pollen they collect into baskets on their back legs for transporting home, making it unavailable for transfer from flower to flower to pollinate flowers. Wild solitary bees with hairy bodies carry the pollen between their body hairs; many of them carry the pollen in a mass in hairs under the abdomen, as can be seen clearly on the underside of the abdomen of this 'bottom up' bee. This pollen is easily dislodged in trips between flowers and thus is very likely to be brushed onto receptive flower stigmas.

## Frame 3

Flies, as well as bees, are very effective pollinators. This frame shows a hairy hoverfly in genus *Criorhina* (**top left** – photo courtesy of Chris Spilling), which looks like a bumble bee, then a real bumble bee (**top middle**) and next a hoverfly *Volucella bombylans* (**top right**), which, again, looks like the real bumble bee. **Bottom row:** a drone fly *Eristalis* sp (**left**), which mimics a honey bee, then a real honey bee (**middle**) and an ant hoverfly *Microdon devius* (**right**), which also mimics a honey bee.

Research published in 2015<sup>1</sup> showed that 67% of all pollination was by flies and only 33% by all other pollinators. **ALL** pollinators are being adversely affected by dwindling food sources. There are about 270 species of hoverflies, which do NOT sting but can be mistaken for bees or wasps. (Mimicry of bees and wasps is a defensive strategy of hoverflies – predators fearful of being stung avoid them.) Some hoverfly larvae feed on greenfly, so they are useful in the garden. **Scorpion weed *Phacelia tanacetifolia* is good for all pollinators** and usefully attracts helpful hoverflies. Some flowers, such as the *Fabaceae*, are only accessible to bees - only a bee can get into a snapdragon.

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<sup>1</sup> In his article [Who's really pollen their weight: Bees, or Flies?](#) posted on the *Biodiversity in Focus* blog, 22 April 2015 Morgan D. Jackson refers to Orford K.A. & J. Memmott (2015). *The forgotten flies: the importance of non-syrphid Diptera as pollinators*, Proceedings of the Royal Society B: Biological Sciences, 282 (1805) 20142934-20142934. DOI: <http://dx.doi.org/10.1098/rspb.2014.2934> Published 25 March 2015

## Frame 4

Self-explanatory. The two bumble bees illustrated are *Bombus pascuorum*, the common carder bee and *Bombus terrestris*, the buff-tailed bumblebee or large earth bumblebee.

## Frame 5

These three main points are all you need to remember really!

Bees are ectothermic. They need warmth to activate the muscles they use for flying and can sometimes be seen shivering, vibrating their flight muscles prior to take-off. A warm place for basking is essential to them, so flowers for bees, and bee-homes for solitary bees, should be in sunny, warm, parts of a garden.

## Frame 6

Homes for bees (not too far from food sources) are very important. Leaf-cutter solitary bees (eg *Megachile* sp.) nest in hollow stems. The Norway Maple leaf (**left**) has had semicircular pieces cut out of the leaf by such bees, which often also target rose leaves in the garden. They need hollow stems in which to place the leaf sections, together with pollen and nectar for each larva. Stems they use can be, for example, the cut ends of species such as bramble and elder. A bundle of such twigs left in a sunny place can provide a nesting site.

These bees can also use hollow cardboard tubes or cut garden canes. Other solitary bees that nest in such hollow stems are the mason bees, eg *Osmia* sp. These bees gather damp mud to line and seal hollow stems like those found in the commercially-available homes-in-a-tin; the one here is being used by the red mason bee, *Osmia rufa*. These homes are now full of bee larvae, as can be seen by the mud sealing the entrance to each tube. The larvae will develop and hatch out to mature bees next spring. These solitary bees are thus annual species. Another annual species is the foxy mining bee, *Andrena fulva*, which nests in holes in sandy bare areas in soil and is often seen burrowing on lawns in spring (**middle row - right**). Sandy banks and soil heaps in warm, sunny, positions facing south can be important nest sites for a whole range of solitary mining bees.

**Bottom left:** the lamb's ear, *Stachys byzantina*, a species not only important for the nectar available from its flowers but for the silvery hairs on its leaves. Some solitary bees need to shave such hairs from hairy leaves to line the nest cells for their larvae; one of these is *Anthidium manicatum*, the wool carder-bee.

**Bottom right:** a mouse. Mice play an important role in providing homes for bumble bees that like to make use of their abandoned nests under ground. Other bumble bees, such as the common carder bee, build nests above ground in grass tussocks, so untidy areas of rank grassland in warm sunny situations are needed for this species.

**In very tidy gardens, a lack of nest sites may be more limiting to bees than a lack of flowers to forage from.**

## Frame 7

Double flowers mean no food for bees. Why? Because each of the stamens and ovules/stigmas (for explanation, see drawing of buttercup half-flower) is mutated, in a double flower, to extra petals. Thus there is **no pollen** and the majority of these flowers also lack the nectaries that make **nectar**. Pollen provides the protein essential to the larvae for growth but it is not important for adult bees, which emerge from their cocoons fully-formed and do not grow any further. For the adults, nectar is important, as it provides the energy they need to fly about and collect pollen to take back to their nests for their larvae.

**Grow only 'single' flowers in your bee-friendly garden.**

## Frame 8

What types of flowers are good for bees? 'Those specifically adapted to attract them' is the answer. Flowers need bees to cross-fertilize and ensure a seed set, so they work hard to attract bees and enable them to be covered in pollen. Nectar is, of course, a lure to the bee. The flower does not actually 'want' the bee to rob all its pollen to feed bee larvae. Producing nectar is energetically expensive to the flowers and they produce only just enough to offer an enticement. The bilaterally symmetrical ones, such as the white dead nettle, not only have a 'landing platform' for the bee; in addition, the anthers of the stamens and the stigma are situated under the 'hood' petal in such a position that the pollen is brushed onto the hairy back of the bee, as it drinks nectar by probing its long tongue (proboscis) down the corolla tube and into the base of the flower.

**Closed** flowers like the toadflax (**top right**) can be entered only by bees strong enough to prize the two lips of the corolla tube apart to get at the nectar and pollen inside, so these flowers cannot be used by delicate-bodied flies, butterflies and moths. These other insects (along with bees) do well on radially symmetrical, open, daisy-type flowers. (Each daisy-type 'flower' is strictly a group of many tiny flowers called florets, so the whole thing is an 'inflorescence'.) These flat flowers provide good 'landing platforms'. Each tiny floret in the disc has a minute drop of nectar and pollen in just the right position to brush onto an insect's body as it drinks.

## Frame 9

Flowers to support newly-emerged queen bumble and solitary bees in the spring. The **correct sorts are critically important** for the early spring solitary bees and for queen bumble bees to forage for nectar and pollen to get the nest going and larvae developing as quickly as possible.

**Top - left to right:** dandelion, crocus, red dead-nettle and a newly-emerged queen *Bombus terrestris*.

**Bottom - left to right:** coltsfoot, snakes-head fritillary, Berberis, male willow (pussy willow) and violets. Why male willow? Because male willow catkins produce both pollen and nectar, whilst female willow catkins produce only nectar. The pollen from male willows is a crucial protein source for growth of bee larvae.

## Frame 10

More spring flowers for bees. More examples of what every bee-friendly garden should have.

**Top row - left to right:** Corsican hellebore and honeybee, lungwort and hairy-footed flower bee (solitary) and red dead-nettle and bumble.

**Bottom - left to right:** winter-flowering heather *Erica carnea*, English bluebells, cowslips, small narcissi and grape hyacinth *Muscari*. Amongst spring bulbs, grape hyacinths *Muscari*, seem particularly favoured. Why not have them in large numbers in a hot sunny border? Quantities are as important as types of flowers. Bees need LOTS of their favourite flowers, not just one plant.

## Frame 11

Thinking of summer now: the *Asteraceae* include many examples of garden-worthy attractive plants that are good for bees.

**Top left:** yellow Inula. **Top right** a silver-leaved flower similar to wild oxeye daisy.

**Bottom row - left to right:** spear thistle (weed), globe flower *Echinops* and sunflower *Helianthus*.

## Frame 12

Most herb garden species are excellent for bees, as long as you do not harvest so much of the leaves that flowering is inhibited (this happens with my chives). Your garden should definitely include rosemary and lavender, if you are serious about helping bees.

## Frame 13

My favourite flowers for bees that are mainly summer flowering.

**Top row - left to right:** hemp agrimony, *Eupatorium cannabinum*, wild comfrey *Symphytum officinale* (but creeping comfrey *S. grandiflorum* is as good and a spring flowerer), vipers bugloss *Echium vulgare*.

**Bottom - row left to right:** purple loosestrife *Lythrum salicaria* (around your pond), ice plant *Sedum spectabile*, betony *Betonica officinalis* and foxglove *Digitalis purpurea*.

## Frame 14

Garden shrubs for bees - some good examples. All must be in full sun. Note that cherry laurel and dogwood MUST be allowed to flower and not clipped or cut back frequently, so the large common cherry laurel variety is not recommended for small gardens, as it often creates problems. It gets very big and is an evergreen, creating a lot of cold dense shade when not in flower in spring (not good for bees). Best avoided, if space limited. However, the dwarf variety 'Otto Luyken' is great for low informal hedging, and flowers abundantly.

## Frame 15

Excellent trees for bees.

**Top row - left to right,** wild single cherry (any single cherry good) *Prunus avium*, silver pear *Pyrus* sp. apple *Malus* sp. (any single good) red horse chestnut *Aesculus carnea* (don't plant *A. hippocastaneum*, as this is susceptible to the micromoth leaf miner).

**Bottom - left to right:** Limes - any *Tilia* sp. are the best trees ever. In Germany, the Lime is known as 'the honey tree' (What more needs to be said!). Also sweet chestnut *Castanea* and any rowan, *Sorbus* sp.

## Frame 16

Bee-friendly hedges are possible, if a mixture of native and selected garden shrubs are planted. Useful are wild hawthorn, black thorn and crab apple, spindle and buckthorn, with bramble or low plants such as dandelions and white dead nettle at the base in the sun. For a more ornamental hedge add in flowering currants or Escallonia. To allow more flowering, don't cut the hedge back too hard.

## Frame 17

**“Perfect”, weed-free, lawns are not pollinator-friendly.** In my sunny suburban lawn I never use weed-killer - or fertilizer (because wildflowers thrive in low-nutrient soil). Encourage daisies, red and white clover, buttercups, dandelions, bird's foot trefoil, germander speedwell, yarrow, self-heal and mouse-ear hawk weed. You may be surprised to learn that there is a small solitary bee that feeds *only* on speedwell flowers.

Cowslips and primroses can be accommodated, if the mowing is relaxed for long enough just to allow flowering and seeding, then the lawn can be returned to close mowing throughout the autumn and up to the end of March, when these flowers come up again. Warmth and sunshine are essential to the wildflowers, so the meadow area *must not be shaded* and it must be mown (with cuttings collected) between the end of July and the end of August, followed by a second mowing (with cuttings collected) at the end of October.

Such a lawn will be the talk of the neighbourhood because of its beauty, if it is at the front. Maybe you could persuade others in your street to change from the green grass monoculture?