

Apple

Flower biology

- The flower of apple (*Malus domestica*, *M. pumila*) is hermaphroditic and produces nectar as well as pollen.
- Most varieties are not self-pollinating. This is true not only for fertilization with pollen from the same flower or tree, but also for fertilization with pollen from another tree of the same variety. In this case cross-pollination with pollen from another variety (the "pollenizer") is required.
- It is difficult to see whether the flower has been visited by bumble bees.



NATUPOL hive

- Because the apple flower produces ample nectar, the hive is supplied with just a small quantity of sugar syrup.
- LARGE colonies are available for pollination of this crop.



Introduction schedule

- 6-9 LARGE colonies per hectare are necessary in outdoor crops if no other pollinators are present. For smaller areas (maybe in protected crop), another type of hive may be suggested by your consultant.
- On delivery, one LARGE colony consists of 80-110 worker bees and has a life expectancy of 4-6 weeks.

Use instructions

- Colonies should be introduced when the first flowers are open.
- Colonies should be placed on a sturdy support, about 50 cm above the ground; in spring in a sunny place, and later in the season in the shade.
- Secure the hive so that ants cannot enter it.
- After placement of the hive, let the bumble bees settle down for a while (½ - 1 hour) before opening the flight hole.
- Following their initial orientation flights the bumble bees will immediately start pollinating the crop.
- Bumble bees are active at temperatures between 10 and 30 degrees Celsius. They function best at temperatures between 15 and 25 degrees Celsius.

Crop protection

- Combining the use of bumble bees with natural enemies does not present any problems.
- Agricultural chemicals may have direct or indirect effects on the bumble bees. Direct effects occur when worker bees and larvae die as a result of contact with or digestion of a chemical product, and indirect effects occur when the smell of the treated flower puts off the bumble bees, causing visits to stop.
- Systemic pesticides (pesticides that are absorbed through the roots) often have a long-lasting residual effect. If a flower produces nectar in addition to pollen (e.g. sweet pepper), the damage to the bumble bee population may be much more serious than in a crop that only produces pollen (e.g. tomato).
- You will find detailed information about persistence and compatibility of pesticides with bumblebees and most other beneficials in **Zonda's Side Effects Guide** or online at Koppert's website: www.koppert.nl
- In all cases the BEEHOME option of the hive must be activated before the crop is treated. This option ensures that bumble bees can enter, but not leave the hive. After about an hour the hive can be closed completely, so that it can either be covered or removed from the crop.
- If the hive is temporarily removed from the crop, it should be stored at 18 to 20 degrees Celsius.