

# Science for Environment Policy

## Bee-friendly agri-environmental schemes need diverse habitats

**Diverse agri-environmental schemes** which combine flowering crops with semi-natural habitats, such as grasslands and hedgerows, will be best for bees, new research suggests. The researchers examined the foraging behaviour of honey bees, bumblebees and other wild bees and found that all bees used semi-natural habitats, which were particularly important for wild bees, in addition to crops, such as sunflowers.

**The global decline of bees** can have severe consequences: insect pollination is necessary for, or can improve, the yield of over two thirds of the world's major crops and has been valued at €153 billion. Their decline has been linked with [agricultural](#) intensification and, in Europe, agri-environmental schemes have been proposed to combat the collapse of bee populations. These schemes may involve sowing flowers or restoring semi-natural habitats, among other measures. However, to the extent to which different groups of bees use these habitats is not known; this would be useful information when designing agri-environmental schemes.

In this study, researchers examined how five habitats were used by three groups of bees: honey bees (*Apis mellifera*), bumblebees (*Bombus* species) and other wild bees. The habitats included semi-natural habitats: 'woody' (hedgerows and forest edges) and 'grassy' (grasslands and road and field margins), which harbour more diversified food resources combined with more nesting opportunities, as well as the flowering crops oilseed rape (*Brassica napus*), sunflower (*Helianthus annuus*) and alfalfa (*Medicago sativa*), which provide large numbers of flowers over a short period of time.

The researchers carried out the study in western France between 2010 and 2012, during the flowering of oilseed rape in the spring and sunflower in summer. They studied 812 sites spread out across a 500 km<sup>2</sup> intensive agricultural area. Surveys of foraging bees were carried out and the researchers recorded whether bees were present or absent, as well as their abundance if present.

The results show that when oilseed rape was flowering, and woody and grassy habitats were also available, honey bees and bumblebees were equally likely to be present in rape as in woody habitats. However, the abundances for both groups were significantly higher in woody habitats than in rape. Wild bees were more likely to be found in woody habitats and were also more abundant here.

The high use of both rape and woody habitats by honey bees illustrates the need for different habitats; the authors suggest the honey bees may use rape nectar for energy, but also require protein from the pollen gathered in woody habitats.

In the sunflower flowering period, when alfalfa and grassy habitats are also available, honey bees were much more likely to be found in sunflowers and their abundance was significantly higher in this habitat than others. In contrast, wild bees were much less likely to be found in sunflowers and their abundances in this habitat were more than 40 times lower than honeybees'. Wild bees were most likely to be found in alfalfa and grassy habitats and showed similar occurrence and abundances in both.

Overall, these results suggest that diversity in agri-environmental schemes may be beneficial. Flowering crops in combination with regeneration of woody and grassy semi-natural habitats would benefit all three groups of bees. Semi-natural habitats can also be of great benefit to other wildlife, such as birds and rare plants, the authors note.



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