

Science for Environment Policy

Which seeds to sow for bees?

Farmers could help to maintain populations of bees and other pollinators by sowing inexpensive seed mixes on their land, a new study suggests. Researchers surveyed pollinators visiting study plots in Berkshire, UK, and explored how sowing different seed mixes and using different management techniques affected the flowers produced and the pollinators visiting them.

Overall, 84% of the [crop species cultivated in Europe depend directly on insect pollinators](#). While completely restoring the grasslands that provide the best habitat for these pollinators can be time consuming and costly, it may be possible to achieve modest gains in their populations just by sowing cheap seed mixes.

To investigate this, the researchers used study plots dominated by grass and sowed flowering legumes and forbs on some plots, and only legumes or only grass on others. Over a four-year period, they followed the establishment of flowering plants on the plots, and the numbers and types of different pollinators that visited them.

On plots sown with legumes and forbs, and those sown with just legumes, plant diversity declined gradually over the four-year period: from four or five different species in 2009 to only two or three different species in 2012. The number of flowers on plots seeded with legumes peaked in the first year, but then decreased. By contrast, numbers of forb flowers increased, although to a fairly low level compared to the legumes.

In general, more bees, butterflies and hoverflies, and a greater variety of species, were recorded on plots that had more flowers. Seed mixes containing both legumes and forbs as well as grasses produced the most flowers and consistently attracted the greatest numbers of pollinators, compared to just legumes or just grass.

The researchers suggest it may be beneficial to sow both legumes and forbs because the increase in numbers of forb flowers over the years may partly compensate for the decline in legume flowers and also because it ensures the preferences of different pollinators are catered for. However, they say it is important to carefully consider which pollinators will be attracted to the plants. For example, hoverflies are not as good at transferring pollen as bees.

The researchers also compared the effects of cattle grazing versus mowing, and found that mowing resulted in higher numbers and greater diversity of pollinators. However, it benefited pollinators to mow only once in May, rather than in May and August, which dramatically reduced the numbers of flowers and pollinators.

The researchers had anticipated that using herbicides and flipping the soil (inversion tillage) would help legumes to establish. However this wasn't the case, possibly because flipping the soil buried the organic top layer, whereas more minimal tilling techniques only broke it up, resulting in increased soil fertility. They suggest, based on previous evidence, that minimal tillage is preferable because it uses less energy and preserves carbon stocks in the soil.

The practical application of this research is clear; these seed mixes were introduced in 2014 as part of a UK agri-environment scheme and are currently being used on over a hundred farms across the country.



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