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Bees could potentially spread pollen from genetically modified (GM) crops to wild plants within a ten kilometre radius of the GM crop, according to recent research conducted in Kenya. Pollen movement is the main route for transferring genes between insect-pollinated plants and this research provides key insight into bee behaviour which can help us understand the ecological impact of GM crops on their wild relatives.

The cowpea (*Vigna unguiculata*) is one of the most important food legume crops in semi-arid tropical regions, especially in African lowlands. The planned introduction of insect-resistant GM cowpea crops is likely in West Africa, with Burkina Faso, Ghana and Nigeria targeted by the AATF programme. Transgenes in the pollen of GM crop plants can be transferred to closely related wild plant species via pollinating insects so determining the foraging range of bees is of major importance.

The researchers attached minute radio transmitters to carpenter bees (the main cowpea pollinator) to establish the distance these insects can travel to find nectar. A total of 134 "flower to nest" flights of carpenter bees were recorded, with distances ranging from 50 metres to 6040 metres. Homing tests were also carried out, where bees were captured, marked and released at a range of distances from their nests. These tests showed a potential flight range of up to 10 kilometres, but for most flights bees travelled no further than 5 kilometres.

They found that bees were attracted from further afield by large quantities of flowers. These large floral displays are more likely to take place in cultivated cowpea fields, where the flowers bloom at the same time, than in the wild populations which have fewer blooms.

Individual flight records showed that foraging bees rarely moved between wild and domesticated patches of cowpea on the same trip, provided the patches are clearly separated and the two groups of plants are not mixed. However, the researchers do not believe that strict isolation of GM cowpea crops from their wild relative is feasible as a way of ruling out the escape of transgenes into the wild. These data, along with many others, suggest that transgene escape would be inevitable if GM-cowpea was cultivated in West Africa. It is therefore considered important to ensure that escaped transgenes do not have a negative impact on wild plants.

The research was carried out over a period of three years, under a variety of weather conditions. The researchers believe that radio-tracking is an effective way to measure pollinator foraging distances, particularly as transmitters become smaller. The transmitters used in this experiment weighed 0.35g (around a third of a bee's weight), and had a 14cm antenna. The results are very similar to those obtained in studies of other species of bee, including honey bees and bumble bees.

1. The African Agricultural Technology Foundation (AATF) is coordinating the Cowpea Productivity Improvement project. For details see: http://www.aatf-africa.org/aatf_projects.php?sublevelone=10&subcat=5


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