Balanced diet can mitigate negative impact of pests for bumblebees

January 21 2022

Experimental set-up: two bumblebee colonies each were placed in the center of the study landscapes and the reproductive success as well as the pollen input were investigated. Credit: S Schweiger

Bumblebees are important pollinators because they pollinate many different plant species and are extremely resilient. They can still manage to fly at temperatures that are too cold for other pollinators. Like many other insects, they are in sharp decline. This makes it even more important to find out what bumblebees need to reproduce successfully. A team from the University of Göttingen has shown that a diverse landscape and a diverse pollen diet, which the bumblebees collect as a protein source to nourish their offspring, play a significant role in this. A more diverse diet could even mitigate negative effects of infestation with parasitic wax moth larvae. The results were published in the journal *Agriculture, Ecosystems and Environment*.

The researchers established bumblebee colonies in Central and Northern Germany and collected pollen from bumblebees returning to their hives in order to investigate the importance of pollen nutrition and habitat diversity in agricultural landscapes on reproduction. The influence of mass flowering monocultures with a short flower period that provides unilateral nutrition for bees, as well as landscape elements characterized by a continuous and diverse flower supply, were analyzed.

"Our study shows that it is not individual habitats, such as flower-rich gardens, or semi-natural habitats (such as hedgerows or flower strips), that contribute to reproductive success for the large earth bumblebee Bombus terrestris. In fact, it is rather the diversity of habitats across the entire study landscape that is important," says first author Sandra Schweiger, a researcher in Functional Agrobiodiversity at Göttingen University. "So a wide variety of flower-rich landscape elements must be present. In addition, a diverse pollen diet can contribute to better colony growth and more offspring, especially for young queens." The head of the group, Professor Catrin Westphal, adds that "in addition, a balanced pollen diet reduces the negative effects of infestation of the colonies with parasitic wax moth larvae, which can severely harm the reproductive success of the bumblebees."

A large earth bumblebee (Bombus terrestris) colony, including brood cells and young queens that have already hatched. Credit: S Schweiger

More information: Sandra Elena Schweiger et al, Pollen and landscape diversity as well as wax moth depredation determine reproductive success of bumblebees in agricultural landscapes, *Agriculture, Ecosystems & Environment* (2021). DOI: 10.1016/j.agee.2021.107788

Provided by University of Göttingen