How semi-natural habitats affect the lifespan and foraging behavior of individual honey bees in farmlands?

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Oral

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Abstract

Agricultural intensification, promoted by the Common Agricultural Policy over the past decades, led to important declines of biodiversity in European farmlands. In particular, the simplification of agricultural landscapes is known to affect insect pollinators, although paradoxically the yield of numerous crops depends on their survival. The Western honey bee (Apis mellifera) is one of the most important pollinators in farmlands. However, honey bee populations suffer high mortality rates, partly related to the loss of semi-natural habitats leading to a decrease in flower diversity and to periods of food shortage. While some studies assessed the link between semi-natural habitats and honey bee mortality at the colony level, it remains poorly investigated at the individual level. Individual worker bees play a critical role in the colony given that they can adjust their life history and foraging behavior to ensure sufficient intake of food according to colony needs. Therefore, assessing whether the loss of semi-natural habitats disturbs the lifespan and foraging behavior of individual honey bees could help to understand the mechanisms underlying colony mortality. To do so, we selected 14 sites along a landscape gradient of semi-natural habitats in a farmland system, in Western France. We monitored the life history of 1427 newly emerged worker honey bees in the study sites over periods of mass-flowering (April and July) or food shortage (May and June). We used the automatic RFID device (Radio Frequency IDentification) to track their lifespan, their flight activity and their allocation to foraging in the different landscapes. We found noticeable effects of semi-natural habitats on the lifespan and foraging behavior of individual honey bees that would help to understand how individual workers adapt their own life history traits to sustain food intake in landscapes with reduced flower availability. These results will be discussed with the general objective to provide recommendations of landscape management to safeguard insect pollinators in farmlands.