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Linking the nutritional states of wild bees to floral resources availability to assess habitat quality

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Abstract

All bees have in common to rely on floral pollen and nectar for their growth, reproduction and survival. Nectar contains carbohydrates fuelling their energetic demands, and pollen provides proteins, amino acids, lipids, and sterols required for their ovary development and larval diets. A decrease in the diversity and abundance of environmental floral resources may therefore generate a nutritional stress for bees. However, besides some studies on model species such as honeybees, little is known about the influence of floral resource abundance and diversity on the nutritional health of wild bees and thus their sensibility to changes in landscape-level floral resources.

To investigate this question, we measured the nutritional state of bees at the community level (26 species from 4 families) in grasslands under different managements in Belgium and Germany. We specifically analyzed the proteins, glycogen and triglycerides contents since they are essential to several life history traits (ex. reproduction, immune functions and diapause) and their storage are essentially generated from pollen and nectar consumption. The variation of those nutritional state indicators will then be analyzed in relation with landscape variables such as the local floral resources density and diversity and the land use intensity.

By measuring the nutritional state of wild bee species sampled on the field, the ultimate goal will be to identify which species are affected by which grassland traits (floral density, diversity, and management practices) and therefore better assist the conservation of wild bees by adjusting floral enhancement schemes.

Keywords: wild bees, health indicators, conservation, landscape gradient

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