

Assessing the effects of agricultural landscape and environment on bee size, shape and asymmetry

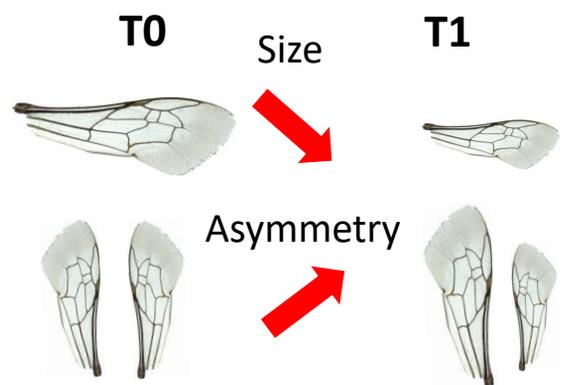
Background: The effects of overuse of pesticides or changes in agricultural landscapes on bee morphology, for example bee size and shape, require more investigations. This topic matters because size and shape changes can have negative effects on important aspects of bee lives, such as their flight and ability to visit flowers. We measured three features of the wings that have importance for flight – size, shape, and the asymmetry between the two forewings. These wing features are important because changes in these features can affect the flight which could lead to changes in the ability of bees to pollinate efficiently.

Question: Do environment, pesticides and agricultural landscape affect size, shape, and asymmetry of the wings?

Experimental set-up

- Two species: Buff tailed bumblebee (*Bombus terrestris*) and honeybee (*Apis mellifera*)
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- 8 countries and 2 type of crops: oilseed rape fields and apple orchards
 - ~ 1000 individuals sampled when the hives/nests were placed in the field by researchers (T0)
 - ~ 1000 individuals sampled several weeks/months after being exposed to the studied fields (T1)
 - Parameters evaluated: fragmentation of habitat, the proportion of grassland and urban area, the quantity of pesticides used by hectares, latitude, etc.

Example of changes in bumblebees between T0 – T1



Impact of the parameters evaluated on the wings?

- None of the parameters related to agricultural landscape had any general effect. The quantity of pesticide or the fragmentation of habitat did not affect the wings

Results and take-home messages

- **Changes** in size, shape and asymmetry can occur in a **very short period**, after encountering new field conditions, in both species
- However, **no strong effect of the pesticides/habitat fragmentation** on wing size, shape or asymmetry

Source: Gérard, M., Baird, E., Breeze, T., Dominik, C., Michez, D. (2022). Impact of crop exposure and agricultural intensification on phenotypic variation of bees. *Agriculture, Ecosystems and Environment*, **338**, 108107. <https://doi.org/10.1016/j.agee.2022.108107>