# universität freiburg

# **Master thesis**

Chair of Nature Conservation & Landscape Ecology

Do bee species differ in their sensitivity to pesticides? - Effects of pesticides on wild bee survival and pollination

**Start: March/early April 2025** Preferably as a Master's thesis, but also possible as a Bachelor's thesis.



## Background and goal

Pesticides are one of the causes of pollinator and biodiversity loss. Yet, studies investigating the effects of pesticides on bees are mostly focused on honey bees. At the same time, the sensitivity of wild pollinators to chemical stressors and how they affect their life cycle and behaviour are poorly understood. Studies have shown that different bee species react differently to pesticides. About 30% of the wild bee species in Germany that collect pollen are pollen specialists, meaning they only collect pollen from a specific plant family. This group of bees has been largely overlooked, and the effects of pesticides on pollen specialists are unknown. Our laboratory study suggests that the specialized bee species *Osmia brevicornis*. In the 2025 field season, we will compare those two species' sensitivity under semi-field conditions (field in Freiburg, near Messe) to see if trends found under laboratory conditions can also be observed under more realistic conditions.

**Possible research questions** Do the species differ in their sensitivity towards pesticides under semi-field conditions? Do the mixtures/combined treatments show potential interactions (potentiation, synergism, antagonism) on *Osmia* mortality? How does exposure to pesticides affect pollination services of *Osmia*?

• Two different theses with a focus on either survival or pollination possible

### Methodology

- Adult bees will be exposed to pesticides under field-realistic conditions in flight cages (see picture).
- The insecticide acetamiprid and the fungicide tebuconazole, and their combinations will be tested compared to control groups.
- The effects on survival, pollination services and/or other sublethal effects will be quantified for around 10 days post exposure.

### Requirements

- Independence and thoroughness.
- Prior work with bees is desirable but not required.

If interested, please contact Dimitry Wintermantel (<u>dimitry.wintermantel@nature.uni-freiburg.de</u>) or Alicia Kling (<u>alicia.k00@gmx.de</u>).