Bachelor / Master Thesis Topic: The effects of arthropod natural enemies on pollination and pest control services in the context of restoration measures

Background:

Natural enemies at higher trophic levels can suppress primary consumers including both plant antagonists to mutualists, potentially generating cascading effects on plant fitness. Restoration measures (i.e., flower strips and hedgerows) aim to restore and enhance pollinator habitats are also likely to benefit natural enemies. This raises the question of whether natural enemies living under different restoration measures (designed by scientists versus co-designed with stakeholders) exert varying impacts on pollinators and herbivores in the local community, potentially leading to changes in pollination and pest control services. The answers of which will also provide insights into whether co-designed measures can achieve a more holistic balance between the needs of farmers and biodiversity.

Methods:

We will monitor the abundance and diversity of Hymenoptera natural enemies using trap nests and field surveys across multiple agricultural sites surrounding Freiburg, which are implemented with varying levels of restoration measures. The trap nests will provide insights into the trophic interactions between antagonists and herbivores/pollinators. Additionally, field surveys will assess herbivore population sizes and parasitism rates, enabling us to estimate the effects of predatory and parasitoid wasps on herbivores and pollinators. Trap nests will be collected, and surveys conducted multiple times throughout the year to account for temporal variations in interactive networks. Student can expect supervision and guidance during all aspects of thesis and will have the flexibility to develop research questions related to natural enemies in this setting.

Thesis involves: Field work, lab work, and data analysis
Start date: March 2025 with field work throughout summer

If interested, please contact Zixuan Huang (hzixuan@smail.nju.edu.cn) or Dr. Nick Rosenberger (nick.roseneberger@nature.uni-freiburg.de) with your CV and write shortly about your interest in the project.