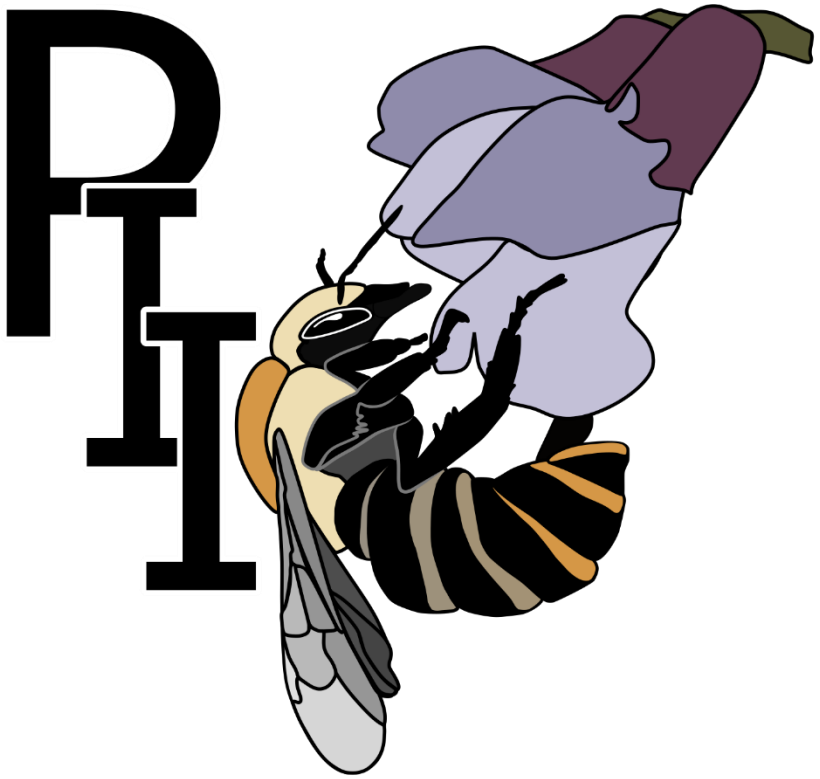
Dear Reader,

here we have collected several possible positions from projects to master thesis. If you need more information, please do not hesitate to contact the responsible person.

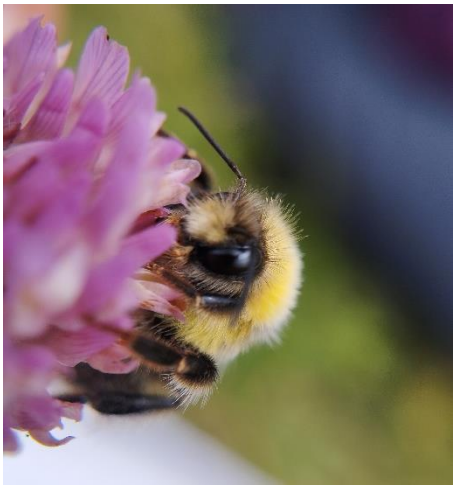
Yours sincerely,

The Team of Plant-Insect-Interactions




Plant-Insect-Interactions

# Internships and master theses in the professorship for Plant-Insect Interactions



Our group studies the interactions between plants and insects. For one of our current projects – IntraFlor, we are looking for enthusiastic students who would like to look at the effects of varying **land use intensity on floral reward quality.** Of course, you can also add on to the topic, depending on your interests, we can decide together what suits you.

**Start: October/November 2024**

**Your tasks include the following:**

- Pollen extraction
- Chemical analysis of pollen samples
- Statistical analysis

**Your profile:**

- Interest in wild bee and botanical research.
- Experience in lab work.
- You should be willing to learn R.

If interested, contact me by email. We can arrange a meeting to discuss your options in detail. We can also include plant pollinator interactions by including pollinator data.

The project dates are flexible. You are welcome to discuss your project duration with me.

Contact: vidisha.bansal@tum.de
Technical University of Munich – Plant-Insect-Interactions

## Bachelor-, Masterarbeit

Plant Insect Interactions |

**Wintersemester 2024**

# Bee Plant Pollution
# Micro plastics in Flower resources

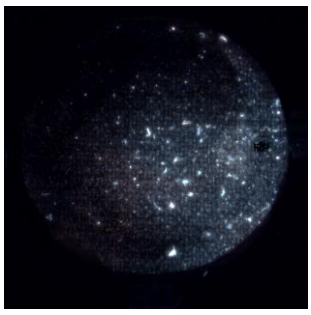
**Background:**

Anthropogenic particles like tire wear, soot and break dusts are constantly released in the air, and therefore can sediment on various surfaces like plants and flowers. As pollinators primarily depend on the floral resources, a pollution of these resources has possibly detrimental effects. First Hazard experiments concluded that plastic particles have negative effects on health and cognition of Bees. However, there is little information on the exposure of Bees as the possible pollution sources e.g. Nectar and Pollen have not been investigated.

**Methodological approach:**
Samples of both Nectar and Bees are collected in the closer area of Freising together with environmental data. The samples are to be processed and analysed with a fluorescent method. The results of the flower resources will be put in a Landscape context, compared with a Flower morphology as well as possibly in context of pollution found in bees. Fieldwork in Spring is possible depending on timing and Weather.

**Research question:**
What is the extend of micro plastic pollution found in nectar on various road edges close to Freising. What factors (e. g. distance to road, flower morphology) influence the pollution

**Time frame:**
Starting between November-February, duration adjusted on the degree between 6 weeks up to 6 months.



**Requirements:**
Very clean working in Lab and independent working are required. Basics of R would be good. Use of Fiji and prior work on Research microscopes are a plus.

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**Contact:**

Plant Insect Interactions, TUM:
Kenneth Kuba (Kenneth.kuba@tum.de)

# Project-, Bachelor Thesis

Plant Insect Interactions

**Winter Semester 2024/25**

# Arthropod identifying of pitfall traps on different flowering field types

**Background:**

Flowering fields are a popular scheme for ecological reassessment of agricultural land. Many studies report about their ecological use compared to other agricultural structures. However, little is known about the comparison between different arrangement methods. The project BlüDiv is comparing different arrangement methods (e.g. fallow, commercial seed mixture) of flowering fields with focus on the optimization of plant and insect diversity.

**Methodological approach:**

This summer we collected arthropod samples from pitfall traps. These samples will be identified in the lab via morphological traits. The focus for the internship will be on one specific group within the trap samples (e.g. ground beetles).

**Research question:**

(How much) Do the arrangement methods differ in their arthropod diversity (of a specific group)?

**Time frame:**

January/February approx. 6 weeks for internship; can maybe extended to a bachelor thesis

**Requirements:**

Self-sufficient, clean and reliable work in the lab, no statistical knowledge required, knowledge of a specific arthropod group (e.g. ground beetles) is beneficial

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**Contact:**

Plant Insect Interactions, TUM,
Restoration Ecology, TUM:
Franziska Mück (Franziska.mueck@tum.de)

# Project-, Bachelor-, Master Thesis

Plant-Insect Interactions

**Winter Semester 2024/25**

## Not all nectar is the same:

## Quantity and quality analyses of nectar in flowers

**Background:**

Flowers produce nectar predominantly to attract pollinators, bees among them. But not all nectar is equally good for all pollinators. And nectar production in flowers varies greatly in quantity. We, therefore, would like to analyse the quantity and quality of nectar in flowers growing close to agriculturally significant areas. These flowers especially are important, as they sometimes can be the only food resource in areas where non-flowering crop plants are grown.

**Methodological approach:**

Nectar will be collected from flowers with several (flower shape appropriate) methods: centrifuge, pipettes, and micro-capillaries. Before extraction flowers will be bagged for 24hrs to exclude pollinator access (and to guarantee full nectaries). The internship will depend on favorable weather and on the flowering plants.

**Research question:**

How much does nectar quantity and quality vary between flower species growing in agricultural landscapes?

**Time frame:**

February/March approx. 6 weeks for internship and can be extended for bachelor/master thesis up to 6 months (with increased scope, e.g., more plant species). The project can also be started later and run into the summer semester (grades will then apply to the summer semester)

**Requirements:**

Self-sufficient and reliable work in the field, precise and clean working in the lab, no statistical knowledge required, no plant knowledge required but it is beneficial (bonus: knowledge about Freising and surrounding area).

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**Contact:**

Plant Insect Interactions, TUM:
Carmen Nebauer (carmen.nebauer@tum.de)

## Project-, Bachelor-, Master Thesis

Plant-Insect Interactions

**Winter Semester 2024/25**

# Pollen limitation:

# Quantity assessment of pollen in flowers

**Background:**

Flowers produce pollen for reproduction and not for pollinators. However, pollinators depend on pollen mostly to feed their brood. The production of pollen within flowers varies greatly, and therefore, pollinators need to take this variation into account during foraging. Because the pollen quantity is not known for many plants, we, therefore, would like to analyse the pollen quantity in plants growing in agricultural areas.

**Methodological approach:**

Flowers from various plants have already been collected and dried in the summers of 2023/24. The pollen needs to be extracted now with 2 sieves and cleaned of any small particles (small hairs, dirt, etc.). For quantification the extracted pollen will be weighed.

**Research question:**

How much does pollen quantity vary between flower species growing in agricultural landscapes?

**Time frame:**

The project can occur between now (October 2024) and March 2025. It will take approx. 6 weeks for an internship. Bachelor/Master thesis will increase the scope and expand the research question.

**Requirements:**

Self-sufficient, reliable, precise, and clean working in the lab, no statistical knowledge required, no plant knowledge required.

Plant-Insect-Interactions


**Contact:**

Plant Insect Interactions, TUM:
Carmen Nebauer (carmen.nebauer@tum.de)

## Project, Bachelor thesis, Master thesis

Plant-Insect Interactions

# CityBees:

# Reproductive fitness of wild bees in cities

**Background:**

Urbanization affects wild bees in several different ways, but one thing that remains unclear is how well bees can reproduce in cities. In this project we want to study the reproductive fitness of wild bees in urban areas and which factors are important for their reproduction.


**Methodological approaches:**

We collected nests from wild bees and wasps in 32 community gardens in Munich and Berlin. We are looking for someone to open these nests in the lab, to measure (among other factors):

- Species composition and abundance
- Survival rate
- Parasitism

**We offer a student project and/or thesis (bachelor or master) in this topic.**

**Time frame:**

Start winter semester 2024/2025

**Requirements:**

- Interest in ecology and urbanization
- Interest in doing labwork
- Independent and reliable working attitude
- Good knowledge of the English language

**Contact:**

Plant Insect Interactions, TUM:
Gaya ten Kate (gaya.ten-kate@tum.de)

**More information about the CityBees project**