

**Department of Crop Sciences**  
Institute of Plant Protection

These two master-theses will be conducted within the scope of the research project “The good, the bad and the ugly: are beneficial mites threatened in apple orchards due to climate change and pesticides?” and are strongly interrelated so that the tasks of the students are done together in the lab of the Institute of Plant Protection.

**Does climate warming reduce the mite diversity in extensively managed meadow apple cultures in Styria?**

Climate warming is considered to be one of the main drivers for the global decline of the biodiversity. In agroecosystems, such a biodiversity loss can result in the reduction of biological control, when the diversity and abundance of pest species are less sensitive to climate warming than their natural enemies. Mite species on apple trees from extensively managed meadow cultures are used to evaluate this assumption, because mites are very common in apple both as pest species and also as their natural enemies (predatory mites). The abundance and the functional diversity of predatory and herbivorous mites will be compared between the historical mite data from 1985 and the mite data from 2024 in extensive managed meadow orchards. This allows the evaluation of the climate warming effects on mite diversity. The main questions are: (1) Did climate warming reduce the mite diversity? (2) Are predatory mites more affected by climate warming? (3) Do apple varieties affect mite diversity?

**Management effects on mite diversity in organic and integrated apple cultures in Styria**

Apple is the most popular and dominant fruit species in Austria. However, apple orchards in Austria are also characterized by an extreme high input of pesticides compared to other permanent crop systems. This aspect of agricultural intensification also contributes to the decline of the arthropod diversity. In agroecosystems, such a biodiversity loss can result in the reduction of biological control, when the diversity and abundance of pest species are less sensitive to agricultural intensification than their natural enemies. Mite species (pest mites and their natural enemies, the predatory mites) on apple trees from organic and integrated cultures are used to evaluate this assumption, because the degree of agricultural intensification is assumed to be higher in integrated apple cultures. The abundance and the functional diversity of predatory and herbivorous mites will be compared between organic and integrated apple orchards in 2024. The main questions are: (1) Do management methods (organic versus integrated) affect the mite diversity? (2) Are predatory mites more affected by agricultural intensification? (3) Do apple varieties affect mite diversity?

Tasks of both students

- Washing the mites from the sampled apple leaves, separating them to family level
- Self-dependent identification of the mites at species level
- Knowledge of the biology of the pest mites and predatory mites in apple (literature data)
- Data input in the program SPSS and preliminary statistical analyses
- Data are available for publishing within 9 months
- Writing of the master thesis
- Start of the theses: March 2024

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