

# Methods to assess host-parasitoid-complexes in meadows as indicators of insect diversity in an agricultural landscape

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Meadows and pastures can act as reservoir habitats for insects in agricultural landscapes. Especially beneficial insects like parasitoid wasps may find better habitat conditions due to food provision by nectar and pollen producing plants, alternative prey and no disturbances evoked by pesticide use or soil cultivation. However, intensification through higher fertilizer inputs and more cuts per year can lead to a decrease in plant species and flower abundance, which in turn can negatively influence the insect community. This loss is more severe for specialized species, which are often important for the natural control of pests. To test the influence of management practices (fertilizer input, cutting frequency/timing) on the insect diversity and abundance, a number of classical monitoring methods is available (e.g. suction sampling, pan traps). The complexity of multi-trophic interactions - like host-parasitoid-complexes - could act as surrogate for the overall insect diversity. Monitoring of these interactions is less time consuming, more detailed and often produces strong site-specific results. Especially endoherbivores and their parasitoids, which are dependent on a specific plant organ that they normally do not leave during development, can be highly site-specific, sensitive to habitat change and abundant in agroecosystems. Because of this fact, standardized methods to assess the species richness of endo-

phagous herbivores and their parasitoids could be used to study the complexity of a meadow insect community and influences of management and the surrounding landscape structure thereon.

In preliminary trials, methods to assess the diversity and abundance of two different host-parasitoid-complexes, typically found on meadows in agricultural landscapes, were tested:

1) *Centaurea* - Tephritidae - parasitoids  
*Centaurea* flower heads were collected from meadows and incubated under controlled conditions. Emerged flies and hymenopteran parasitoids (mainly Chalcidoidea) were extracted every second day. 10% of the flower heads were dissected, larvae/pupae counted, identified and put in gelatine capsules for further development. Together with sweep net samples from the *Centaurea* patches, the diversity/abundance of the tephritid flies and their parasitoids is analysed and correlated with influencing factors and the overall insect diversity.

2) *Capsella* - Curculionidae - parasitoids  
The cabbage seedpod weevil (*Ceutorhynchus obstrictus*) is an important pest of canola and can use several wild Brassicaceae as alternative hosts. The siliques of *Capsella bursa-pastoris* were collected from meadows and incubated in self-built photoelectors. Emerged weevils and their parasitoids are identified and their diversity/abundance is correlated to the overall diversity and other factors.