

# Methods of monitoring hoverflies (Diptera: Syrphidae) and their fitness conditions in agricultural landscapes in the FInAL-project

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In times of decreasing natural habitats agricultural landscapes become more and more important in supporting populations of insects. They are taking up to 50 % of the land area in Germany and so they have a great impact on the richness of species and the steady declining of insect abundances. Many insects provide important services including pollination, pest control or being a food source for other animals like birds or amphibians.

Adult hoverflies are important pollinators for example of strawberries or fruit trees. Females need pollen for oogenesis and nectar plays a major role for growth and development of adult individuals. 39 % of the larvae are zoophagous and therefore play a major role as biological pest control agents against aphids.

The aim of FInAL (facilitating insects in agricultural landscapes) is to introduce renewable resources into existing cultivation systems which can support local insect populations by providing essential resources, are economically workable and acceptable for farmers. An important role plays the implementing of integrated pest management.

Syrphidae are significant for this project because they are responsible for pollination and pest control. In order to provide these ecological services, it is necessary to research foraging of hoverflies, the abundance and species diversity and how they can be supported by sustainable cul-

tivation systems. The first step is to study the abundance of hoverfly species in the field laboratories before and after planting renewable resources and if this measure is going to have an effect. Therefore, hoverflies are going to be trapped with yellow, blue and white pan and Malaise traps and identified to species level. The second step is to explore several fitness parameters of the hoverfly population in the altered landscape. One factor that we want to study is the use of flower resources provided by the new cultivars by hoverflies and potential effects on fertility and energy resources. Gut analyzes provide information about the acceptance of the new food source and which role it may play in foraging of hoverflies. Pollen analyses will be performed to make statements about how important the cultivars are in proportion to the entire food of hoverflies and how they are going to be accepted as alternative resource. In preliminary tests we are trying to extract the pollen from hoverflies via dissection of the abdomen. This is also possible through examination of fecal pellets, which give us the option of researching the captured individuals alive. Additional analyzes of nutrient, fructose, glucose and lipid levels will give us valuable information about the energy that is available for the hoverflies and which plant is more suitable to support insect populations.