Organisms obtain information about the surrounding environment through various visual, acoustic or chemical stimuli so they can locate food and mates, as well as to avoid predators and threats. For phytophagous invertebrates finding the proper host is essential for their survival and it was shown that to do so they are often guided by the smell emitted by plants.

Herbivores can be more or less specialized to live on specific host plant species (specialists and generalists, respectively), thus they can react to different types of smells. Moreover, the variety of semiochemicals in the environment may pose a problem in host location abilities. It is especially important in case of small herbivores as they cannot move to new plant and they rely on passive dispersal (e.g. using wind currents). Therefore, they will undertake dispersal only when they smell the host plant presence in the environment, which will enhance the chance of being taken to the right host plant.

One important herbivorous parasite is *Aceria tosichella* (wheat curl mite: WCM), which is an invasive mite that inhabits grasses, including wheat. Currently, it is commonly found on cereal crops on all continents, causing a great difficulties for both food producers and researchers. In fact, WCM is a complex of genetically distinct biotypes differing in host specificity, making the study even more challenging.

The aim of this project is to discover the influence of the level of host specialization and environment heterogeneity on the ability to distinguish between smells derived from different host plant species. The study will be performed using two experimental populations of WCM which differ in the level of host specialization and were obtained through experimental adaptation to one (specialist) or two (generalist) plant species. Individuals from both populations will be exposed to smells emitted by different plants in uniform and mixed environments.

In addition to general and comprehensive knowledge about the relationship between the level of host specialization, environmental diversity and host location, this project will provide knowledge about the ecological mechanisms of herbivore-plant interactions, which may help develop plant protection strategies and ensure their efficient management in the future.