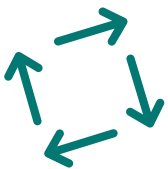


# MOVEMENT ECOLOGY MEETS BIODIVERSITY

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From the field to the microscope: studying the dispersal of phytopathogenic fungi



Active and passive movements of organisms have extensive consequences for the occurrence, development, composition and time dynamics of biological communities. The movement and dispersal abilities of different organisms do not only influence the respective populations, but also have direct and indirect effects on other organism groups (e.g. predator-prey interactions, disease dispersal). Nowadays, anthropogenic activities are changing these interactions. The degradation and fragmentation of habitats may directly lead to behavioral changes influencing organism development, limiting their movement or modifying their interactions with the environment, and thus strongly influence all tightly connected ecological communities of an ecosystem.

Some of the BIOMOVE projects study animals and their behaviour, such as the movement patterns of hares in landscapes of different complexity, changes in the movement of prey populations in relation to their predators and their risk behaviour (so called »landscape of fear«), or the influence of different individual behaviour of small rodents on their movement choices. Other projects study the metacommunities of water organisms living in small water ponds (kettle holes) or the passive dispersal of nectar yeasts through pollinators. Some of the projects develop and expand model-based analyses of movement and population data to simulate different drivers, e.g. related to the impact of resource availability on the movement paths of migratory birds.

In the BIOMOVE project conducted by ZALF, the passive dispersal of phytopathogenic fungi in wheat fields is investigated,

The DFG-funded research training group BIOMOVE links »biodiversity research« and »movement ecology«; two research areas which are mostly pursued separately from each other. A solid theoretical framework is required to understand how the movements of individuals influence the population and community dynamics of different organisms. The twelve projects of the first doctoral cohort investigate behavioral effects, diversity patterns and influencing factors in a dynamic agricultural landscape in the AgroScapeLab Quillow.

focusing on two fungal genera responsible for yield losses and critical for food security due to their ability to produce mycotoxins. The project aims to describe possible distribution patterns in the field and to identify the main driving factors. When comparing the two fungal genera, differences in their dispersal abilities (e.g. due to different spore shapes) and differences in the nutrient availability throughout the field seem to play a bigger role for a successful infection of the wheat ears than the spreading rate of the fungal spores. The influence of antagonistic bacteria on fungal growth and mycotoxin formation shown in laboratory experiments has not yet been demonstrated in the field.

By linking movement and diversity patterns, all of the BIOMOVE projects contribute to a better understanding of the biotic interaction mechanisms of complex communities in agricultural landscapes and to the identification of key drivers.

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