

Traditionally, ecological interactions have been investigated on the species level, with an implicit assumption that all meaningful differences occur between species and individuals within species can be treated as identical. Thus, ecologists usually focused only on their overall abundance. Even when the importance of individual variation was noted, it was mostly in cases of differences associated with sex, age, or body size. However, recent years brought a radical change of this perspective: accumulating evidence suggests that even subtle, cryptic differences among individuals of the same species can exert a considerable influence on the dynamics of ecological interactions. Among these differences, behavioral types (a.k.a. “animal personalities”) are particularly puzzling. It turns out that individuals of the same species often differ in tendencies for particular behaviors, and these behaviors typically occur in predictable associations. For example, highly aggressive individuals usually also have a high level of locomotory activity, a high propensity to take risks when foraging, and are slow to adjust their behavior to changes in the environment relatively to less aggressive individuals.

The phenomenon of behavioral types has the potential to change our understanding of ecological interactions. For example, individuals with different personalities might perform different functions in interactions with other organisms, thus acting like different species. The ecological role of behavioral types became an area of exciting, pioneering research, but such studies have been focused almost exclusively on the importance of behavioral types for predator-prey interactions and the dynamics of biotic invasions.

Animal-mediated seed dispersal represents another widespread and ecologically important interaction. The behavior of seed-dispersing animals determines the number and fate of the disseminated seeds, and thus affects the composition of plant communities, gene flow between habitat fragments, ecosystem recovery after disturbances, the rate of spread of invasive plants, and range shifts in response to climate change. **Behavioral types have the potential to affect all these processes.**

We have assembled a group of Polish and American researchers with expertise in different but complementary fields of biology (animal behavior, plant-animal interactions, mathematical modeling) to investigate the influence of behavioral types on seed dispersal and plant recruitment.

Our goals include:

- Uncovering links between behavioral types and seed dispersal outcomes (e.g. the risk of seed consumption or the probability of placing dispersed seeds in places that are particularly favorable for germination and growth);
- Investigating trade-offs involved in seed dispersal by individuals with particular behavioral types;
- Exploring theoretical consequences of behavioral types for seed dispersal with mathematical models.

To achieve these goals, we will conduct field research in Poland (where we will investigate interactions between the European beech and yellow-necked mice) and in the United States (where we will investigate interactions between the northern red oak and eastern gray squirrels). In addition, we will modify an existing model of animal-mediated seed dispersal to examine how the inclusion of behavioral types changes the dynamics and outcomes of this interaction. Together, the field experiments and the theoretical models will create foundations of **ecology of seed dispersal by individuals.**