

Abstract

In present thesis, I treat the topic of impacts of plant-animal interactions, namely herbivory and pollination, on plant life cycle and lifetime fitness. First, I identify the components of the impact of plant-animal interactions: i) interaction frequency; ii) per-interaction effect; iii) sensitivity of the plant's life cycle to the changes in vital rate impacted by the animals. Furthermore, I also classify other causes changing the outcome of a plant-animal interaction into two categories: i) plant's traits; ii) plant's environment. A review of extant literature on the topic revealed that especially the role of plant's environment in changing the outcome of plant-animal interactions is largely understudied and I attempt to reduce this gap in knowledge in the five detailed studies encompassed in this thesis.

The detailed studies focus on a model system of Central European wet grasslands and especially on three species typical to it: *Succisa pratensis*, *Achillea millefolium* and *A. ptarmica*. The first two studies examine the effects of environment on frequency of plant-animal interactions. The next two studies are more integrative, one focusing on the impacts of different herbivore groups on the complete life cycle and the other on interaction of herbivory and pollination on plant lifetime fitness. The fifth detailed study focuses on factors at landscape scale influencing the frequency of pollination interaction and reproductive success of common wet grassland plant species.

The studied components of plant's environment affected mainly the interaction frequency in case of pollinators, while in case of herbivores the effect of plant's environment affected more the per-interaction effect. We also bring evidence of considerable effects of plant's environment on sensitivity of plant's life cycle to herbivory. The detailed studies brought also some interesting results, which are more specific to study systems examined: i) Herbivores conferred long-term fitness advantage to plants distributing the same reproductive effort into more flowering events suggesting potential of plant-animal interactions to shape plant life history strategies; ii) Generalist and specialist invertebrate folivores were influenced in their occurrence by surrounding vegetation to a similar degree; iii) Pollinator assemblages of the same plant species can differ to a high degree at the scale of tens of metres within one population; iv) Management induced changes in reproductive timing can cause a temporal mismatch of a plant and its pollinators, whose effect is an order of magnitude greater than effect of site quality, isolation or attractiveness to pollinators; v) The interactions of herbivores and surrounding vegetation cause non-systematic changes in sensitivity of life cycle transitions opening thus numerous possibilities for higher order interactions with other components of plant's environment.

Keywords

plant-animal interactions, pollination, herbivory, plant-pollinator-environment interaction, plant-herbivore-environment interaction, Succisa pratensis, Achillea millefolium agg., Achillea ptarmica, Euphydryas aurinia, flowering strategies, integral projection models, Syrphidae