ABSTRACT

The population dynamics of plants with regard to plant-animal interactions is a remarkably complex topic. To look into how individual life stages are influenced in different directions by various animals is beyond the scope of a single paper. For each of the studies described below, I and my co-authors attempted to collect data that would cover as much of the plant life cycle as possible, focusing on interactions between plants and different animals during the flowering period and their consequences for the overall dynamics of the species *Scorzonera hispanica* at the local and landscape scale. Putting all the studies together allowed me to gain a better picture of the network of relationships between plant properties, animal activity and their effects on overall plant performance.

In **Study 1**, we focus on factors influencing germination, early growth and survival. The results show better performance in seedlings from larger seeds and from larger populations. Seed weight affected the germination rate, seedling growth within the first two months and seedling survival. Mother plant traits did not affect any of the variables studied, even though the performance of seedlings from individual mother plants did differ. Because the seed mass was the most important factor affecting germination and seedling growth, in further studies we focused our attention on factors that may affect it.

In **Study 2**, we discuss the results of a field experiment aimed at finding out the preferences of pollinators. Based on a comparison with open-pollinated and supplementally pollinated plants, we examined whether the plants were pollen-limited. We did not record any significant effects of pollinators on the reproduction of *S. hispanica.* Seed number, seed mass and ratio of developed seeds were connected neither with the floral visitation rate nor with supplemental pollination. The number of seeds depended solely on plant height, which was further connected with microsite characteristics, suggesting that the plants studied were likely resource-limited. Even if pollen limitation did occur, none of the flowering traits we measured correlated with the rate of pollinator visitation.

In **Study 3**, we report how by monitoring a population in short intervals we ascertained the preferences herbivores and the effect of herbivory on plant reproduction. We found a significant influence of herbivory on seed production whereas neither flowering in the next season nor survival of flowering plants was affected by the rate of herbivory. Flowering in the following season correlated only with plant height, which was further connected with microsite characteristics, which suggests a tendency towards resource limitation. Herbivores preferred plants with greater numbers of initial flower buds.

In **Study 4**, we present a dynamic, spatially explicit model to predict the prospects of the species at the landscape scale under various levels of herbivory and random population destruction. The results show that the landscape-level population dynamics under the present rate of herbivory are approximately in equilibrium allowing fluctuations of the rate of herbivory on the order of per cent. The extent of herbivory plays a large role in landscape-level population dynamics, especially when combined with disturbance events. The results of our simulation also revealed a higher survival probability of large populations than that of small ones.

Although we revealed some aspects of plant animal interactions driving population dynamics of the species, there is still room for further research into little-known processes such pollinator behaviour at the landscape scale or a direct influence of plant-animal interactions on germination and seedling performance regardless of seed mass