

Abstract:

Anther smuts (*Microbotryum violaceum* s.l.) represent a well-known system for studying pathogens of wild plants and coevolution between pathogens and hosts. Infected plants produce sterile flowers with anthers filled with fungal spores which are transmitted to other host plants by pollinators. Data from existing research come mainly from the genus *Silene*. However, the applicability of these findings to other host plants of anther smuts is largely unknown. Therefore, this thesis focuses on a different host species – *Dianthus carthusianorum*.

First, the pattern of disease was surveyed in natural populations of *D. carthusianorum* in a small area in Střední Povltaví. Most populations were infected to various degrees and only a few populations remained completely healthy. The prevalence of disease was positively correlated with size and density of host populations. On the other hand, environmental factors and the degree of connectedness had very little effect on disease prevalence.

Second, additional data were collected from a subset of populations to determine plant resistance and densities of pollinators. Differences in resistance among populations (as inferred from flower inoculations) were not significant. Populations differed in densities of pollinators, but there was no correlation between densities of pollinators (i.e. vectors of the disease) and disease prevalence.

Third, a cross-inoculation experiment was carried out to determine whether the anther smut was locally adapted to its host population as is the case with most pathogens. Plants from three populations were inoculated with pathogen sampled from their own population (sympatric) and from two other populations (allopatric). The results showed a clear pattern of local maladaptation, i.e. the infection success was significantly lower on sympatric host than on allopatric hosts. This unusual situation can probably be explained by the high selfing rate and long generation time of the anther smut which lower its evolutionary potential relative to that of its host. During the inoculation experiment, phenology of plants was also followed. Diseased plants initiated flowering earlier than healthy plants possibly as a result of manipulation by the pathogen.

The findings from the *Dianthus carthusianorum*-*Microbotryum* pathosystem correspond well to other anther smuts systems. However, several differences were noticeable, e.g. the higher average disease prevalence in natural populations and the low effect of pollinators densities on disease prevalence.

Key words: anther smut, *Microbotryum*, *Dianthus*, Caryophyllaceae, epidemiology, pollinators, resistance, inoculation, coevolution, local adaptation.