

PICENNI Gabrielle (2021): Conservation of endangered plants : soil and vegetation characterization of a Lady's Slipper Orchid (*Cypripedium calceolus* L.)

Abstract

We are now experiencing a 6th mass extinction, going along with a massive biodiversity loss. Moreover, habitat fractioning by Humans leads to surface losses and altered connectance. Thus, it is not sufficient to protect existing natural habitats, and integrated conservation strategies should be applied. In light of endangered plants conservation, a holistic approach aiming to gather fundamental knowledge on the species ecology is to date the better way of developing effective conservation measures.

For instance, we can hypothesize that endangered rare species are declining because general biodiversity is also declining. Therefore, we could predict that the population health of the endangered species is linked to local biotic and abiotic niches. Vegetation diversity reflects part of the local biotic niche, while environmental and edaphic parameters reflect the local abiotic niche. Plant communities surrounding a species are a key indicator on its survival and on the whole ecosystem functioning (Heywood and Iriondo, 2003). Soil parameters are also determining with regard to the stational conditions allowing the presence of a specific species. To address these hypotheses, we studied the stational vegetation and edaphic parameters surrounding *Cypripedium calceolus*, a terrestrial endangered orchid. Our choice of species was driven by its emblematic status in Europe, and by the great extinction threat hanging over the Orchidaceae family (Fay, 2018).

Among our main findings, we identified plant size, number of leaves, leaf area and number of stems as significant indicators of a population fitness.

No correlation among population sizes could be identified regarding plant communities' diversity. However, we confirmed semi-shading and disturbed habitats to be preferential environments for *C. calceolus* growth and persistence.

On the other side, we found that some soil parameters, namely pH, CEC, nitrate levels and total nitrogen content, do have a significant influence on the population fitness traits.

Populations of a same size range have smaller difference in these edaphic properties. Soil seems to be involved in *C. calceolus* populations health, through these particular parameters.

The aim of the present study was to fill the gaps of knowledge on plant communities' diversity

and structure along with the edaphic properties of *C. calceolus* Swiss populations. The answers to these problematics led us to a better understanding of *C. calceolus* decline causes, helping to establish adapted conservation action plans in the country but also throughout the species distribution territory.

Key words:

Conservation biology

Cypripedium calceolus

Endangered species

Ecological niche

Soil parameters

Plant community structure