Recovery plan and management programm for *Coleanthus subtilis*

K.G. BERNHARDT

University of Natural Resources and Applied Life Sciences Vienna, Department of Integrative Biology, Institut of Botany and Botanical Garden, Gregor-Mendel-Str. 33, 1180 Vienna, Austria

Summary

Coleanthus subtilis was classified as extinct plant species in Austria, following the Red Data Book. A few populations have been recovered during investigations of the soil seed bank of fish ponds in the "Waldviertel" region, and a recovery plan was initiated to stabilize populations. This plan contains a concept of soil seed banks analyses at fish ponds throughout the distribution area of *Coleanthus subtilis.* Additionally, the recovery plan includes a management concept focused on the fish ponds in the "Waldviertel" region, their regulary desiccations and watering (management of water regime) as well as collecting and storing of seeds in an ex-situ seed bank (Botanic Garden) for future re-setting projects of *Coleanthus subtilis* (at new sites).

Introduction

Coleanthus subtilis was classified as extinct species in Austria, following the Red Data Book (NIKLFELD & SCHRATT-EHRENDORFER, 1999). A few populations have been recovered during investigations of the soil seed bank of fish ponds in the "Waldviertel" region in Austria (BERNHARDT et al. 2004).

Subsequently a recovery and conservation plan was worked out to stabilize the populations in Austria (Table 1), as well as to evaluate new sites for seeding etc. (Table 2).

Investigation area

The study area is located in North-eastern Austria (Fig 1) in the "Waldviertel" region and consists of the shorelines of seven fish ponds.

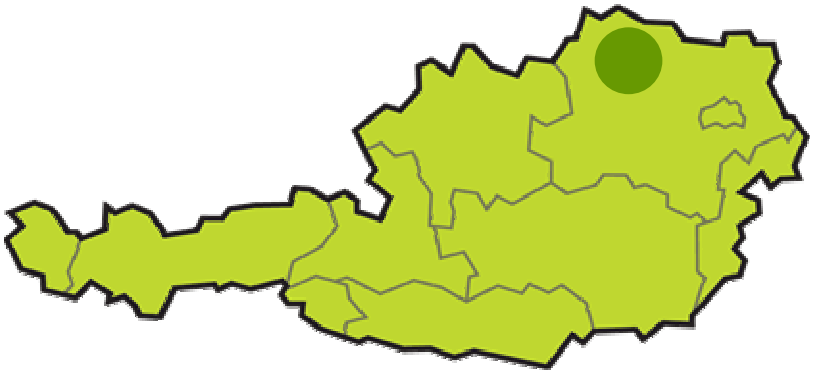

Fig. 1 Investigation Area in the North of Lower Austria (Austria)

Results

Tab. 1: Conditions for recovery (optimum)

environment	
Habitat type	- permanent water retaining - deficient in lime (calcium) - muddy to sandy soils - mesotrophic ponds
Vegetation structure	- open soil (30 to 80 %) - exposed to the sun
Vegetation type	Nano – Cyperion
Evaluation of new sites	
Nutrients	No indicator species for eutrophic soils
Succession	No indicator species for higher succession stages (shrubbing etc.)
Hydrology	- draining in autumn (every two or three years) - dynamic of water level - deposition of fine sediments

Tab. 2: Conditions for conservation of populations (as a result of studies of the population biology of *Coleanthus subtilis)*

Population structure	
Soil seed bank	- > 10.000 seeds per m² - content of seeds in soil depth up to 20 cm
Plant population above soil	- > 10.000 individuals
Life cycle	- as long as possible > 45 days – high seed production > 50 days – necessary for seed dispersal (wind and birds)
watering	- not during first 40 days - starting after end of flowering (water need 5 to 10 days reaching inflorescence)

Discussion

To recover old populations from the soil seed bank or to established new populations the conditions needed are presented. All fishponds of the study area will be investigated where the ponds will be drained, the vegetation and the soil seed bank will be studied for the presence of *Coleanthus subtilis* plants and seeds (Fig. 2).

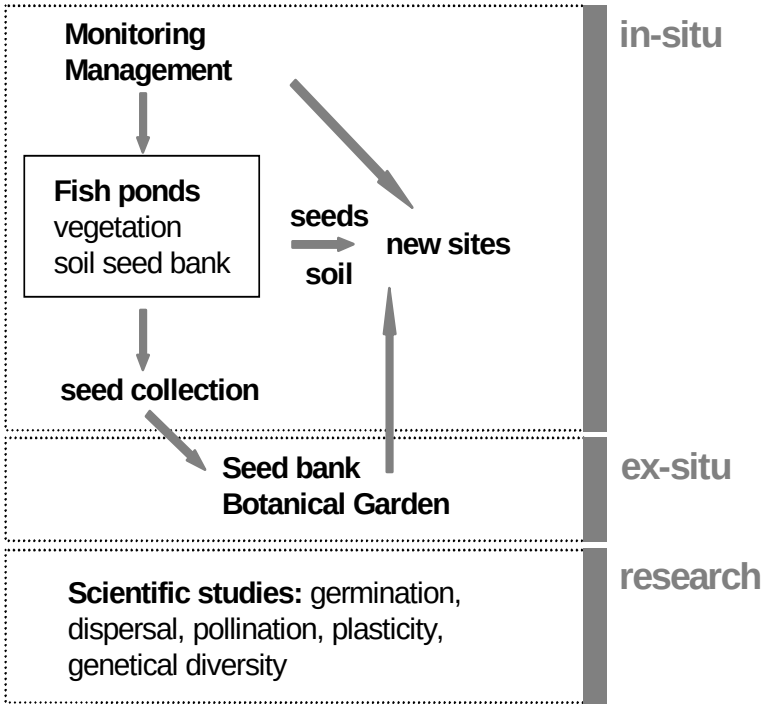

Fig. 2 Recovery and conservation concept for *Coleanthus subtilis*

For all fishponds a management concept, focused on the management of water regime (desiccation and watering) will be worked out. A population monitoring should give information about the in – or decrease of populations. Fishponds which have no populations of *Coleanthus* will be inoculate with seeds or seed containing soils.

For ex situ conservation all populations are stored in a seed bank at our Botanical Garden for future resettling projects.

References

BERNHARDT, K.G.; M. KOCH, E. ULBEL & J. WEBHOFER -2004-. The soil seed bank as a resource for in situ and ex situ conservation of extinct species. *Script. Bot. Belg.* 29.

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