

Ex-situ plant conservation and (re)introduction:

Discussion and synthesis «The Bern consensus»

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Motivation

In-situ conservation has highest priority, ex-situ is second priority. However, it is better to take action than to watch them go!

Ex-situ projects make conservation sense if they have a vision of (re)introduction; therefore in-situ and ex-situ should not be considered independently (and, while ex-situ propagation is possible, long-term ex-situ conservation is not) .

Further motivation:

Ex-situ for outreach, and seed-storage for research and further generations.

Administrative and organisational issues

75% of red-listed species should be kept ex-situ, at least 20% (re)introduced (according to Global Strategy of Plant Conservation GSPC), the participants favour even higher %.

The political obligation via the GSPC is an excellent support for initiating action; so is the Swiss Biodiversity Strategy.

We should think global ex-situ conservation as a >100'000 species project realised as network of regional projects, where regional decisions are taken for which species are to be included.

Ex-situ and (re)introduction have a legal side and require permits by owners and administration. They are possible.

They require transdisciplinary collaboration between administration, land owners/users, conservationists and scientists.

Botanical gardens should seek collaboration with seed producers.

Ex-situ cultures cost from 500 Swiss Franks=Euros per species and year, including (re)introductions up to 10'000.

Population biological issues

Population biology matters at all stages in-situ and ex-situ.

Habitat quality matters most.

Large population size needed against environmental stochasticity.

Promote healthy population structure, also involving reproduction and establishment, not just planted adults.

Reintroduction, re-enforcement and assisted migration all are important, especially given land use change and climate change.

Risks of hybridisation, spread of disease, and new invasion need to be avoided.

Population persistence of introduced populations is a matter of probability, typically much smaller than 50% after many years. Expectations and plans need to be realistic. The success of ex-situ and introduced populations needs to be monitored and documented.

Population genetic issues

Population genetics matters at all stages in-situ and ex-situ.

Drift and inbreeding appear as big problems in-situ and ex-situ. They need to be overcome by large genetic variation and large population sizes.

Local adaptation and outbreeding depression exist, but are less of an ex-situ and introduction problem (unless habitats of origin are very different).

Ex-situ conservation material should represent genetic variation; to capture the diversity and to avoid drift, material should be sampled of 6-15 populations x 30-12 plants, if so many left (depends somewhat on species life-history), i.e. at least 180 plants. If genetically different, also seeds from the soil seed bank should be included.

Different provenances need to be kept separate ex-situ for relic populations, for disjunct distribution ranges, and for ecologically or genetically very different or geographically very distant populations. In other cases, separation could also be done if space allows, but is not absolutely important.

Ex-situ, seeds and plants should be kept, grown and pollinated as natural as possible. Don't pamper, but allow interactions (sometimes support, e.g. hand-pollination, is needed)

(Re)introductions into adequate habitat should involve genetically very diverse propagated material and allow for 10 populations of 500 or more plants. Unless there is very good reason to keep provenances separate (see above), introduced material should consist of population mixes.

Socio-economic dimension

Perception and acceptance differ between actors:

Participative approach mandatory!

Scientists: keep it simple (rules of thumb)

Conservationists: don't worry, if ex-situ propagation and (re)introduction are carried out properly (see previous slides), natural selection is our friend.

Most projects are short term – but should be persistent, which requires stamina and resources.

Land use of introduction sites might need to be adjusted.

Plants are useful, e.g for ecosystem services, and they are enchanting; both facts should be conveyed in outreach/public relations measures accompanying ex-situ and introduction measures.

In short:

Collaborate,

get habitat quality right,
start propagation with >180 genetically
representative plants,
plant out 10 populations with 500 plants

monitor,
document,
and reach out.