



ISTA seminar
From biodiversity to diversification:
tools and technologies to meet new
challenges

Ex situ conservation and
protection of endangered
plant species: the
experience of Carabinieri
National Centers in Italian
natural State reserves

Verona – 29.5.2023

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Centro Nazionale Carabinieri Biodiversità

Pieve Santo Stefano





Carabinieri National Center for Biodiversity Conservation - Pieve Santo Stefano



- Harvesting, processing, conservation of wild forest species seeds.
- Nursery for plant production.
- *Ex situ* seed conservation of rare and endangered species from State natural reserves



32

RISERVE NATURALI ORIENTATE

13

RISERVE NATURALI INTEGRALI

60

RISERVE NATURALI BIOGENETICHE

41

RISERVE NATURALI, DI POPOLAMENTO
ANIMALE E DI PROTEZIONE

20

FORESTE DEMANIALI ED ALTRE AREE GESTITE

28

REPARTI CARABINIERI BIODIVERSITÀ

Raggruppamento Carabinieri Biodiversità

- 28 Reparti Carabinieri Biodiversità all over Italian territory
- 130 natural state reserves
- 130,000 ha of protected areas



Ex situ and *in situ* conservation

Ex situ stored genetic resources allow *in situ* conservation actions and strategies in State reserves: reforestation, recovery of target species and habitat of Natura 2000 managed sites.

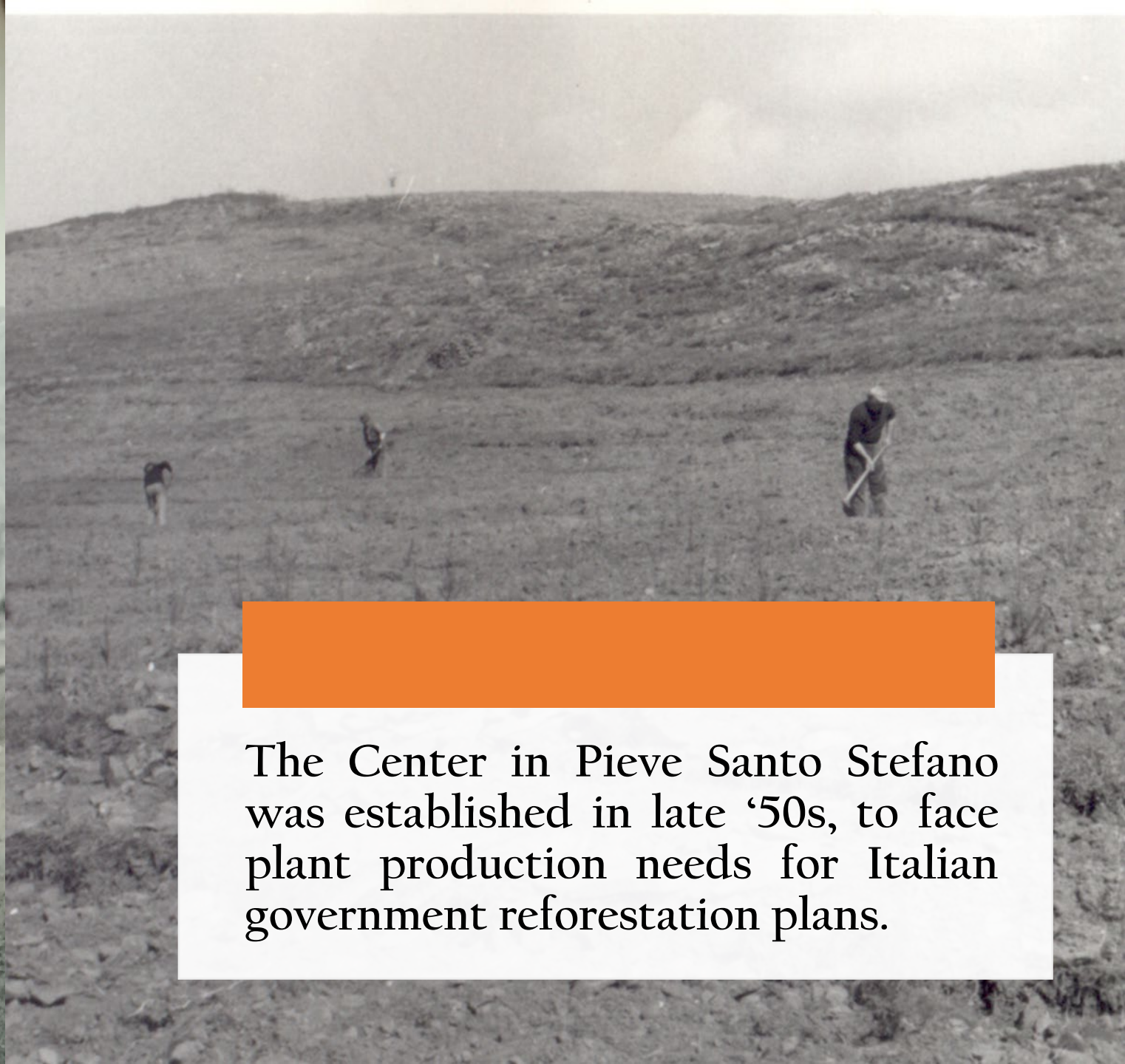


Ex situ and *in situ* conservation

These actions may require:

- Native and certified seed storage
- native and certified plant production capability;
- Target species reproduction (seed storage and germination)





The Center in Pieve Santo Stefano was established in late '50s, to face plant production needs for Italian government reforestation plans.

- Seed bank: -70 forest species, approx. 200 q of seeds.
- Plant production: near 300.000 plants per year, available for reforestation projects, mostly in State reserves.
- Certification of forest reproductive material Dir. 1999/105/CE, D.lvo 386/2003

CONSERVAZIONE
SEMENTI - CELLA N.



INDOSSARE
GLI INDUMENTI
PROTETTIVI



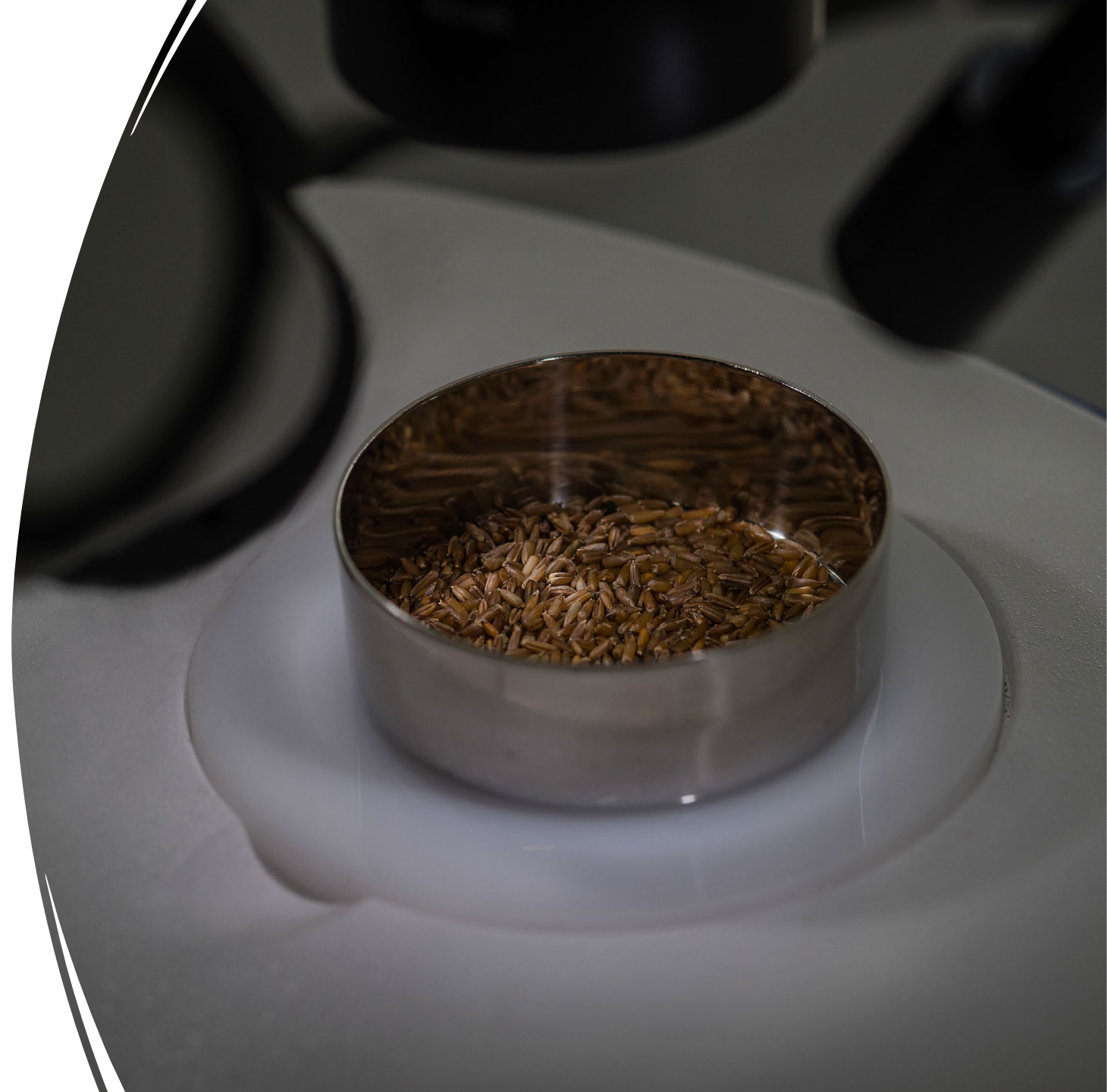
Ex situ conservation of endangered species

- Ex situ conservation of seeds of some of the most rare or endangered species coming from natural state reserves managed by Carabinieri corps



Ex situ conservation of endangered species

- In CNBF laboratories seeds are studied in order to achieve effective protocols for conservation and germination.



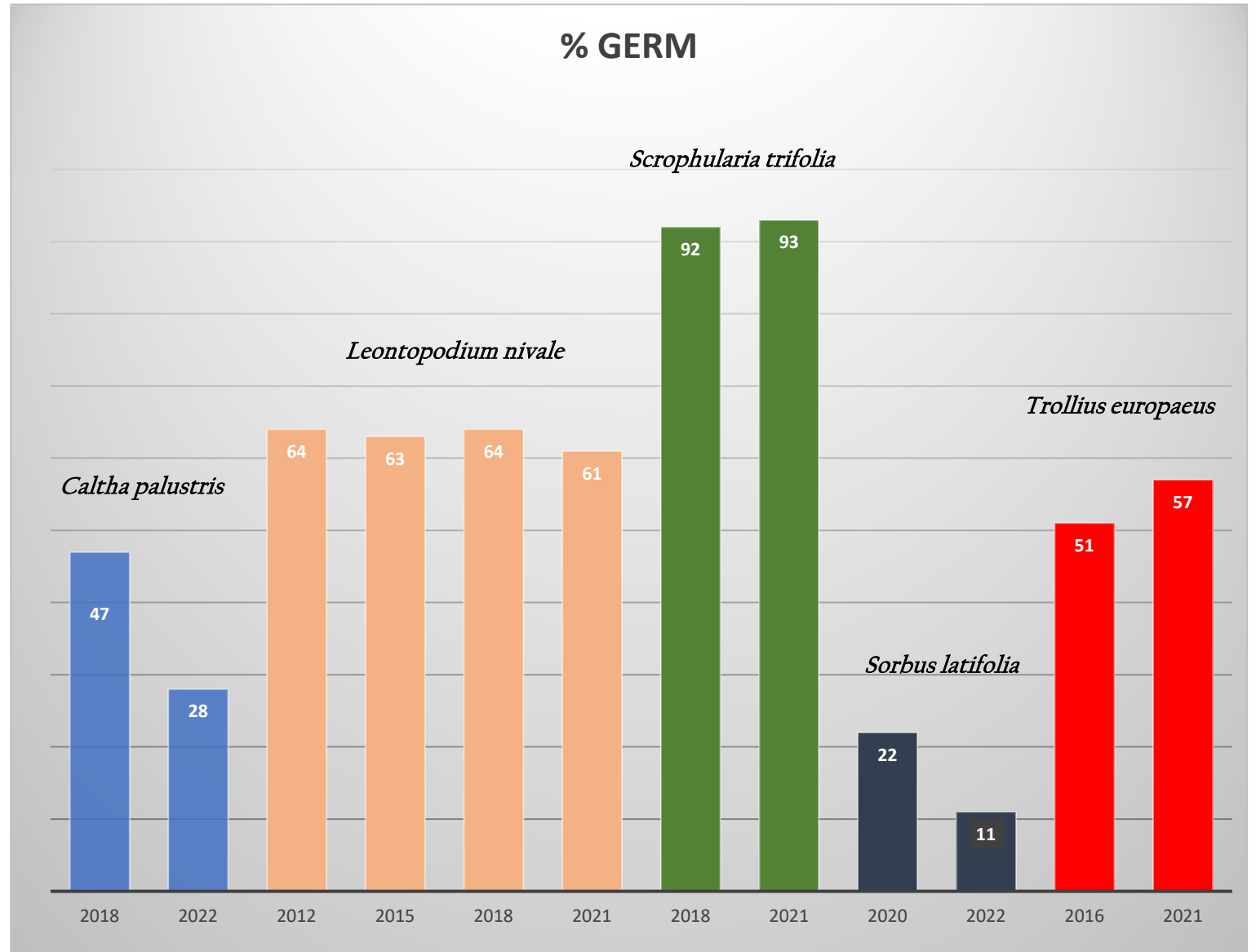
Conservation issues

- Rare species seeds are difficult to achieve.
- In most cases, few information are available about seed dormancy removal and dry tolerance.



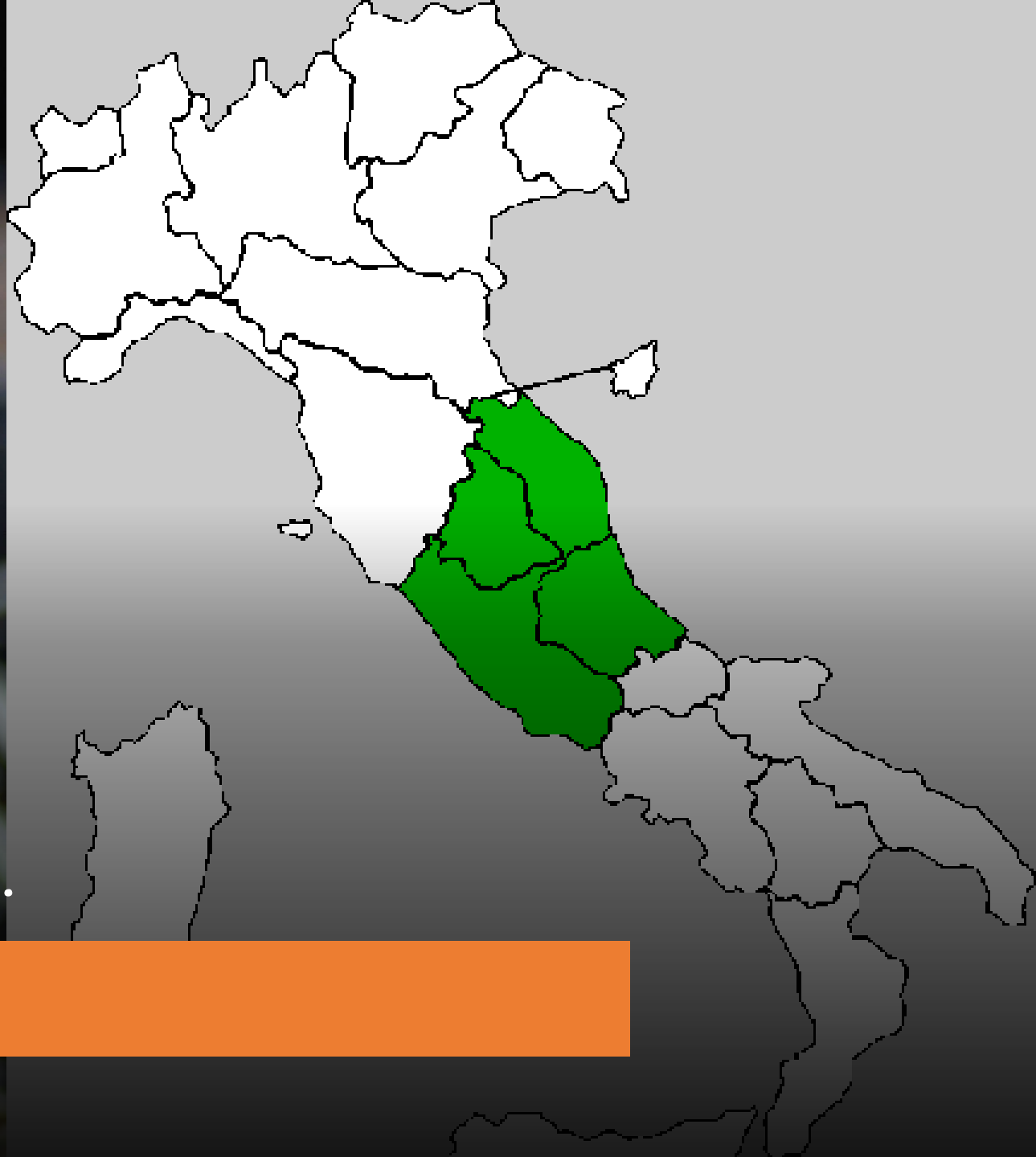
Desiccation tolerance

Many of the species seem to show good tolerance to dry conservation at -20°C



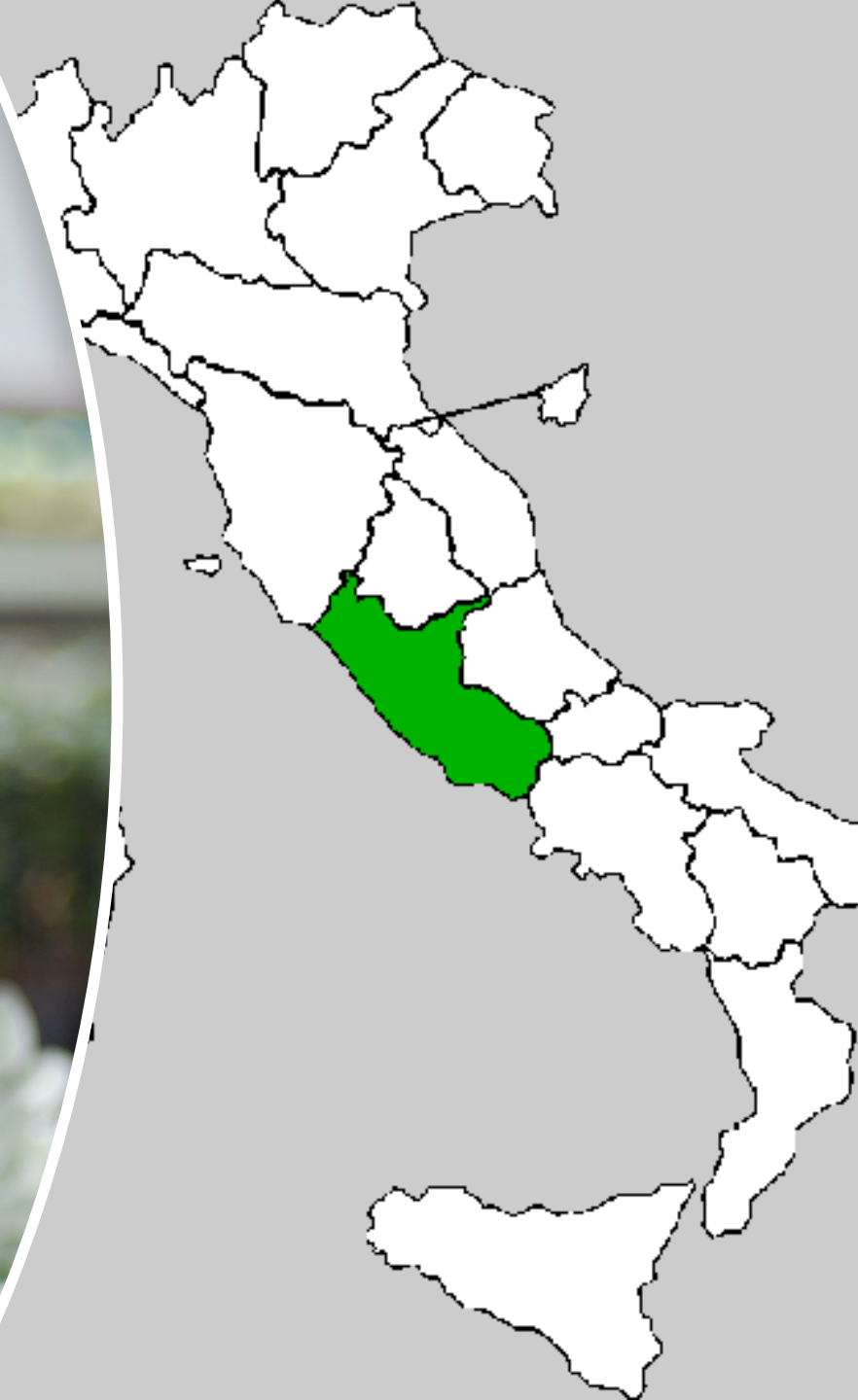


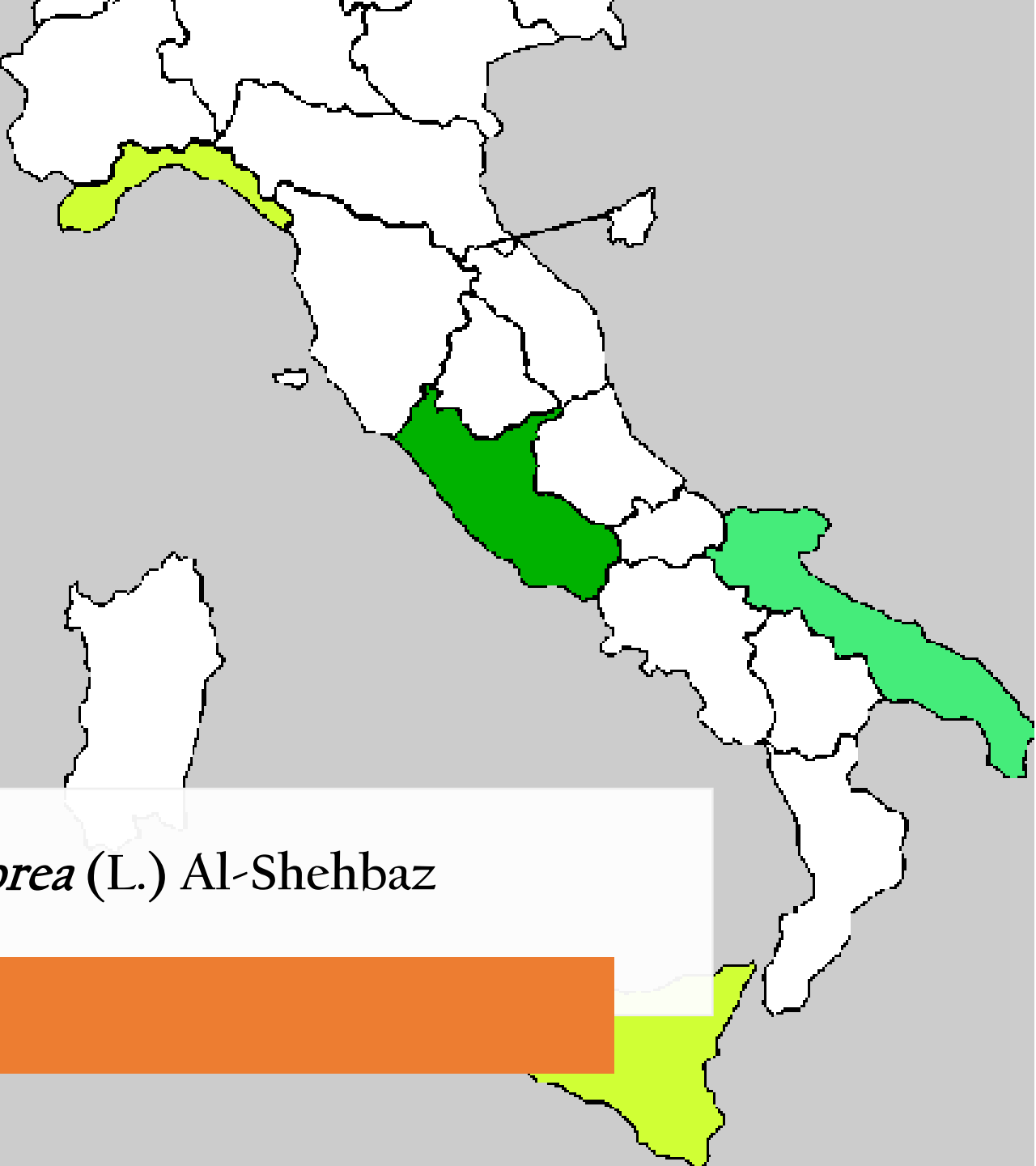
Leontopodium nivale (Ten.) É.
Huet & A. Huet ex Hand.-Mazz.





Centaurea cineraria L.
subsp. *circae* (Sommier)
Cela Renz. & Viegi





Marcus-kochia littorea (L.) Al-Shehbaz



Goniolimon tataricum (L.) Boiss. subsp. *italicum*
(Tammaro, Pignatti & Frizzi) Buzurović



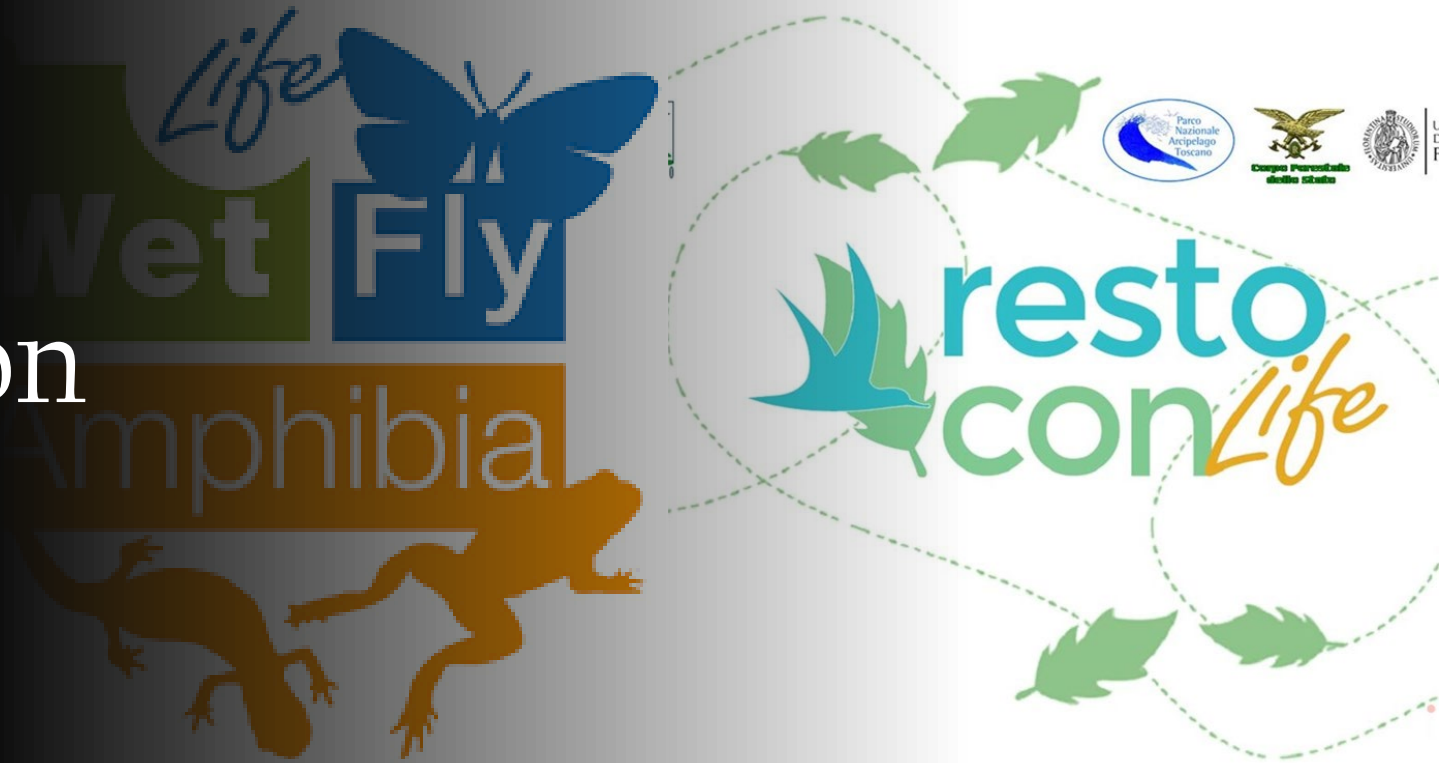


Woodwardia radicans (L.) Sm.

- Natural state reserve Valle delle Ferriere - NA

In situ conservation and plant production

Support specific actions in LIFE Nature
and biodiversity projects carried out in
state reserves



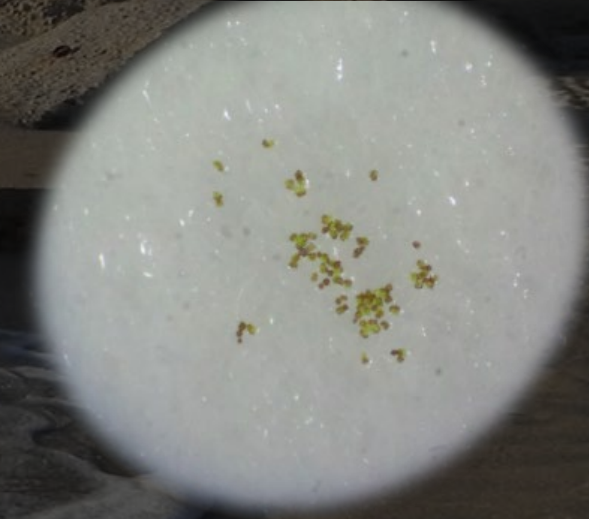
LIFE 14-NAT-IT-000759 WFA - Azione C3 – RCB Pratovecchio

Seed harvest and production of 15,000 wetland plants for botanic restoration of 6430 habitat.



LIFE 13-NAT/IT/000471 -
Montecristo 2010 «Resto con LIFE»
- Azione C5 – RCB Follonica

Seed harvest and production of
species of the island flora, including
the rare fern *Dryopteris tyrrhena*
Fraser-Jenk. & Reichst.

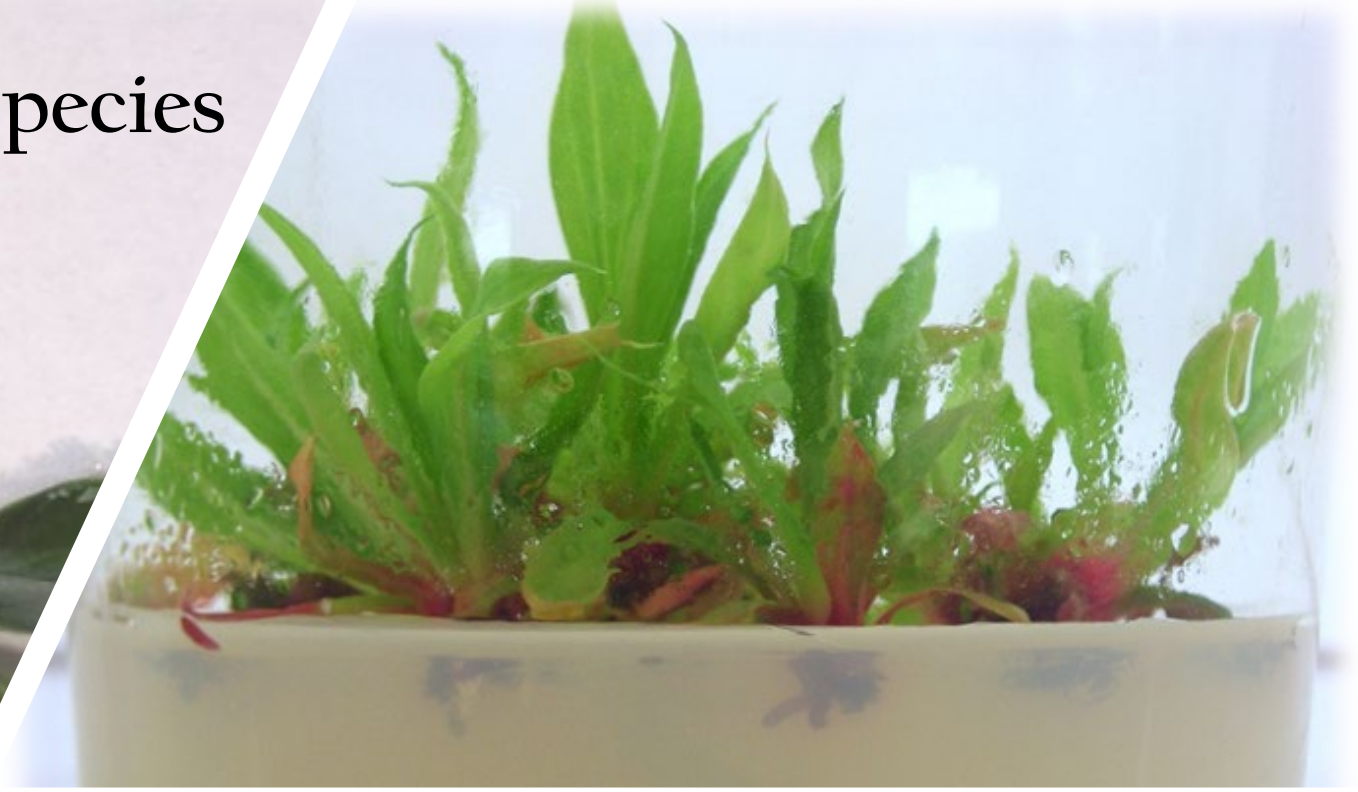
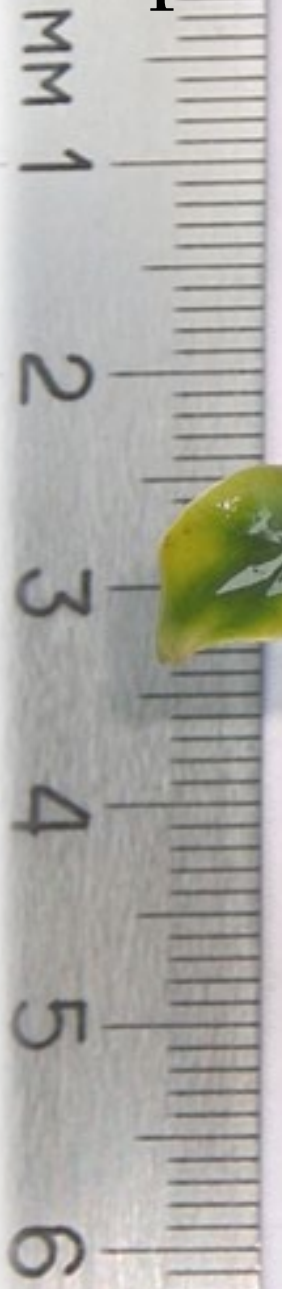


When seeds are not enough:
In vitro culture of
endangered species

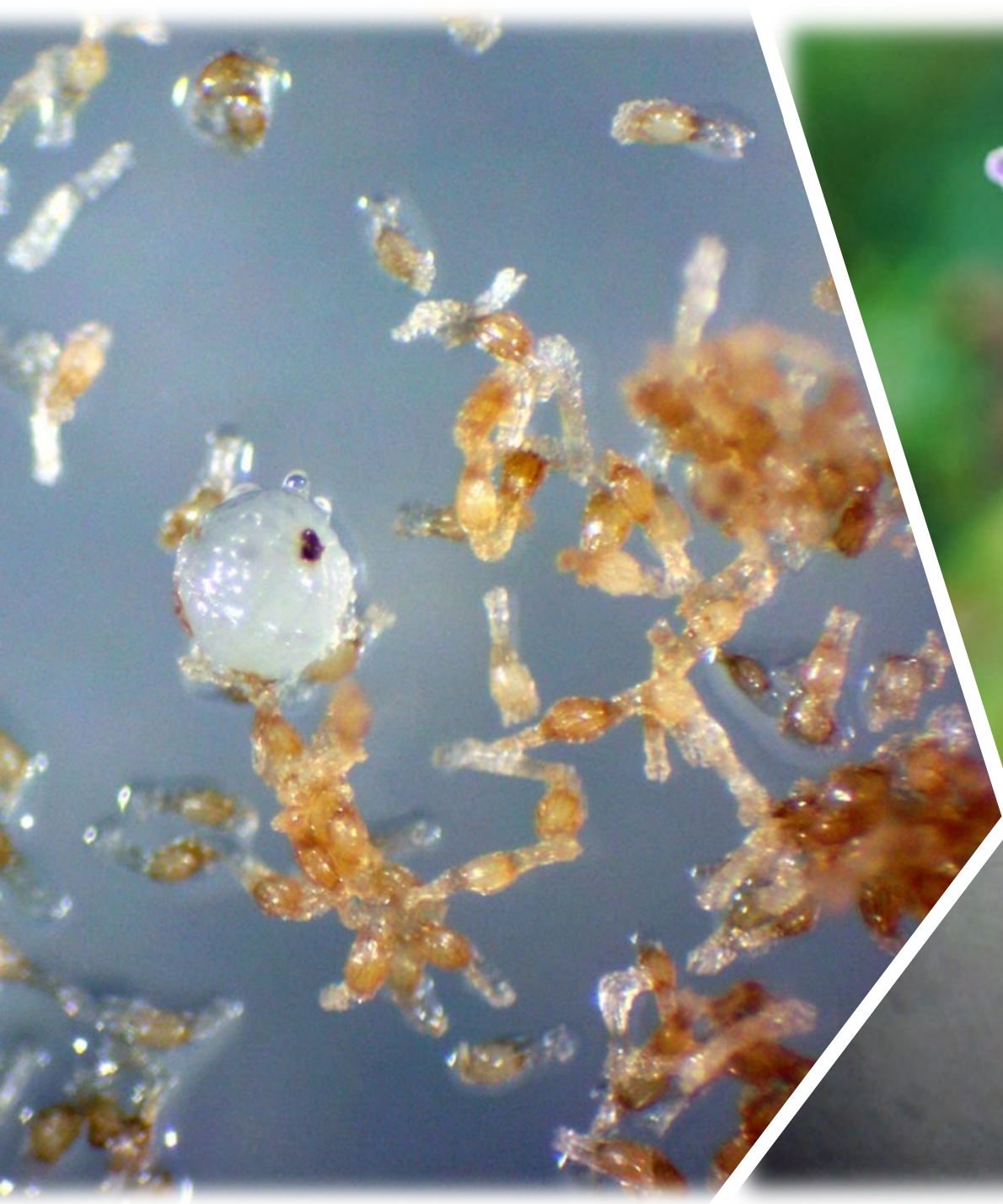
- Allows germoplasm conservation and plant production if seeds are not available: rare species, hard dormancy, not productive interesting specimen



Reproduction of endangered species



Goniolimon tataricum (L.) Boiss. subsp. *italicum* (Tammaro, Pignatti & Frizzi) Buzurović



Native orchid seed germination

Monumental trees cloning





Lilium ssp. *in vitro* propagation

Thank you

