



Global conservation translocation perspectives: 2021

Case studies from around the globe

Edited by Pritpal S. Soorae



IUCN SSC Conservation Translocation Specialist Group



Global conservation translocation perspectives: 2021

Case studies from around the globe

Edited by Pritpal S. Soorae

The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN or any of the funding organizations concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views expressed in this publication do not necessarily reflect those of IUCN.

IUCN is pleased to acknowledge the support of its Framework Partners who provide core funding: Ministry of Foreign Affairs of Denmark; Ministry for Foreign Affairs of Finland; Government of France and the French Development Agency (AFD); the Ministry of Environment, Republic of Korea; the Norwegian Agency for Development Cooperation (Norad); the Swedish International Development Cooperation Agency (Sida); the Swiss Agency for Development and Cooperation (SDC) and the United States Department of State.

Published by: IUCN SSC Conservation Translocation Specialist Group,
Environment Agency - Abu Dhabi & Calgary Zoo, Canada.

Copyright: © 2021 IUCN, International Union for Conservation of Nature and
Natural Resources

Reproduction of this publication for educational or other non-commercial purposes is authorized without prior written permission from the copyright holder provided the source is fully acknowledged.

Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

Citation: Soorae, P. S. (ed.) (2021). *Global conservation translocation perspectives: 2021. Case studies from around the globe*. Gland, Switzerland: IUCN SSC Conservation Translocation Specialist Group, Environment Agency - Abu Dhabi and Calgary Zoo, Canada. xiv + 353pp.

Edition: 7th Edition

Cover photo: Clockwise starting from top-left:
I. Darwin's rhea (*Rhea pennata pennata*) © Cristián Saucedo
II. Orinoco turtle (*Podocnemis expansa*)
III. Leopard cat (*Prionailurus bengalensis*) © Mei-Ting Chen
IV. White saxaul (*Haloxylon persicum*) © EAD
V. Southern pygmy perch (*Nannoperca australis*) © Michael Hammer

Cover design & layout by: Pritpal S. Soorae, IUCN SSC Conservation Translocation Specialist Group

Printed by: Arafah Printing Press LLC, Abu Dhabi, UAE

Download at: www.iucn-ctsg.org
www.iucn.org/resources/publications



***Horstrissea dolinicola*: a steno-endemic, threatened plant on Mt. Ida (Psiloritis), Crete, Greece**

Christini Fournaraki¹, Panagiota Gotsiou¹, Eleni Markaki¹, Adamantia Kokkinaki¹, Hariklia Kargiolaki² & Efpraxia-Aithra Maria³

¹ - Mediterranean Plant Conservation Unit (MPCU), CIHEAM Mediterranean Agronomic Institute of Chania, 73100 Chania, Crete, Greece

flora@maich.gr; viota@maich.gr; elemar@maich.gr; adamantia@maich.gr

² - Forest Directorate of Rethymno, FDR, Komvos Amariou 74100, Rethymno, Crete, Greece

harkargio@gmail.com

³ - School of Environmental Engineering, Technical University of Crete, Sciences Building-Rm 145B.92 University Campus, 73100 Chania, Crete, Greece efmaria@science.tuc.gr

Introduction

Horstrissea dolinicola Greuter, P. Gerstberger & B. Egli (Apiaceae) is a dwarf perennial, entirely glabrous and extremely geophytic, with a fusiform to cylindrical taproot 1 - 2 cm in diameter. Only about 10% of its total length usually emerges above ground level at flowering time. It is an endemic of Crete, Greece and only found on Mt. Ida (Psiloritis), the mountain range of central Crete, at about 1,500 m a.s.l. This species was first described in 1990 and it is the only species belonging to the genus *Horstrissea*, which is closely related to the genus *Scaligeria*. It co-occurs with many other plants endemic to the calcareous mountains of Crete such as *Arum idaeum*, *Asperula idaea*, *Centaurea idaea*, *Cirsium morinifolium*, *Draba cretica*, *Prunella cretensis*. *Horstrissea dolinicola* has been categorized as CR (Critically Endangered) according to IUCN Red List Criteria B1ab (ii, v)+2ab(ii, v); C2a(i); D ver 3.1.

It is also considered one of the Top 50 Mediterranean Island Plants (update 2017)

by the IUCN/SSC Mediterranean Plant Specialist Group. As a threatened and endemic species to Crete, it is protected by the Greek Law 3937/2011. The unique population of the species is found within the Natura 2000 site GR4330005 - Oros Idi (Vorizia, Geranoi, Kali Madara).



Horstrissea dolinicola flower



Goals

- Develop tools for assessing the conservation status of the species in the long-term
- Develop a protocol for translocation to reinforce the population.
- Actively involve the local stakeholders in the conservation of the species.
- Improve the legal protection status of the species.
- Removal/Limitation of the pressures on the population.

Success Indicators

- Production of a detailed distribution map of the species.
- Establishment of permanent monitoring plots and elaboration of the monitoring methodology.
- Successful results of the protocol for translocation experienced.
- Plant Micro-Reserve established and legally secured.
- Legal measures for the restriction of livestock activities in the area.

Project Summary

Feasibility: *Horstrissea dolinicola* grows in a few limestone sinks (dolines) in a region where many goats and sheep graze during the summer season. Its unique population is confined to an area where livestock farming is promoted by policies that support livestock development in the region. The species (and most of its co-occurring plants) is well adapted to withstand extreme grazing pressure, however livestock installations such as small containers for animal feeding and watering establishments, present a threat to the species' survival. In addition, places where it is located are adjacent to the road network. These sites also face the greatest pressure as they are used as car parking areas and illegal deposition sites (stones, etc.); they are also threatened with a possible widening of the road network.

Concrete *in situ* and *ex situ* conservation actions have been planned and implemented in the framework of the project CARE-MEDIFLORA, funded by the MAVA Foundation (2016 - 2019). Initially, a detailed distribution map of the species population was created and the size of the population was more accurately estimated (approximately 300 individuals); a management plan was elaborated for *in situ* translocation actions in the area. At the same time, a close collaboration was developed with the local stakeholders, mainly managing authorities and farmers: despite initial hesitations, the Municipal Authority and the local farmers concluded that this unique element of the area's natural environment should be protected; it was agreed to move part of the livestock installations to adjacent areas and administrative measures to be adopted according to the national biodiversity legislation for protected species and areas by the Decentralized Administration of Crete - Forest Directorate of Rethymnon. More specifically the establishment of a Plant Micro-Reserve (PMR) for the species was planned taking the legal status of a "Protected natural formation" (Greek Law 1650/1986 as amended by Law 3937/2011). The official



Horstrissea dolinicola habitat

decision for the creation of the PMR of 3.8 ha was made by the Decentralized Administration of Crete (Government Gazette of Greece: FEK D/250 18-5-2020).

Following the project CARE-MEDIFLORA, a new project funded by the Mohamed bin Zayed Species Conservation Fund was initiated in May 2020 in order to continue conservation actions for

this plant until 2022. An information sign has been placed at the established Micro-Reserve and monitoring and reinforcement actions will be continued.

Implementation: For *in situ* conservation actions, namely the reinforcement of the natural population, seeds of an accession of 2007 from the same area, stored in the Seed Bank of MAICH, were used. The ecophysiology of seed germination of this species is already well studied (Fournaraki & Thanos, 2009; Fournaraki, 2010): the seeds of this species have developed a rare germination strategy characterized by double morpho-physiological dormancy; during the first year, after an extended period of low temperatures (5 - 10°C), the release from morphological dormancy is observed, followed by elongation of the underdeveloped embryo, radicle emergence and development of a single cotyledon (pseudomonocotyl). However, the epicotyl remains dormant. By the end of spring, the above ground part (cotyledon) dries out while a small tuber has already developed. During the second year, again under low temperatures, the tuber sprouts (removal of epicotyl dormancy) and produces long petiolate, lobed leaves. According to all experimental evidence, seedling establishment takes place during the second spring after seed dispersal (occurring in autumn).

For the production of seedlings used in this project, 230 seeds were sown on agar gel and incubated in growth chambers at optimum germination conditions in October 2016. After about four months, 61% (142 seeds) of the seeds germinated while 20% were characterized as “dead” or “empty”. Germinated seeds were placed in cell trays with enriched substrate consisting of white sphagnum peat and remained in the nursery for about 2 - 3 months. In the beginning of May 2017, they were transplanted into 90 paper pots and transferred to the field, in three locations of one site; they were covered with a wire cage for protection from grazing and other activities. In addition, seeds were directly sown in small paper pots in November 2017 in three locations of another site. At each location, 60 seeds were sown (180 seeds in total) and they were also covered with a protective cage. All planting locations were recorded with a GPS, and mapped in order to be easily identified for long-term monitoring. Moreover, a small area of



330 m² of the natural population was fenced for the purposes of long-term monitoring of the effect on the population after removing grazing pressure.

Post-planting monitoring: For the year 2018 the conservation actions were monitored during four visits (in May, August, September and October). In every monitoring visit:

- The introduced individuals were counted i.e. the number of plants found.
- The status of the protective cages was also recorded.

The last monitoring of May 2019 showed 70% success in seedling survival, while only 8% of seeds germinated.

After the end of the CARE-MEDIFLORA project, monitoring of the actions is planned to be performed twice per year by MAICh and with the active involvement of the management authorities of the area (Forest Directorate of Rethymno and/or Management Body of Protected Areas of Central and East Crete). For long-term monitoring, permanent monitoring plots have also been established within the pre-existing population, in order to evaluate the impact from eventual future degradation of the natural environment.

Major difficulties faced

- Restore the habitat after removing pressures affecting it.
- Convince local stakeholders to take action for this species.
- Bureaucracy in legal procedures.
- The time needed for getting the results of the monitoring actions.

Major lessons learned

- Consensus and active involvement of local stakeholders and authorities is a pre-requisite for successful conservation actions.
- Good knowledge of plant biology and ecology significantly contributes to successful recovery actions.
- Time is needed in order to have a clear figure of the success of any *in situ* action.
- The knowledge and material gained from *ex situ* conservation of plant species contributes to the success of translocation (recovery) actions.



Success of project

Highly Successful	Successful	Partially Successful	Failure

Reason(s) for success:

- Development of good collaboration with local stakeholders after extensive consultation and mutual agreements.
- Knowledge of the species' biology and ecology after long-term studies.
- Available material from prior *ex situ* conservation of the species in the Seed Bank of MAICH.
- Exchange of knowledge and experiences among the partners of the international project CARE-MEDIFLORA and available resources by the project.
- Networking: steady exchanges over an extended period among the partners of the GENMEDA - Network of Mediterranean Plant Conservation Centers.

Acknowledgments

We thank the MAVA Foundation for supporting the CARE-MEDIFLORA project. We also thank all the people who helped us with the restoration of *Horstrissea dolinicola* in Crete and particularly, the staff of the Forest Directorate of Rethymno and of the Municipality of Anogeia and the local farmers in the area. Finally, we thank the Mohamed bin Zayed Species Conservation Fund for funding the continuation of our conservation actions for this plant.

References

- Egli, B. (1995) *Horstrissea dolinicola* Greuter, Gerstberger & Egli *In*: Phitos D. Strid A., Snogerup S., Greuter W. (eds). The Red Data Book of Rare and Threatened Plants of Greece. pp. 312-313. World Wide Fund for Nature, K. Michalas S.A., Athens.
- Egli, B., Gerstberger, P., Greuter, W. & Risse, H. (1990) *Horstrissea dolinicola*, a new genus and species of umbels (Umbelliferae, Apiaceae) from Kriti (Greece). *Willdenowia* 19, 389-399.
- Fournaraki, C. (2010) Conservation of threatened plants of Crete - Seed ecology, operation and management of a Seed Bank. PhD thesis. Department of Botany, Faculty of Biology, National and Kapodistrian University of Athens.
- Fournaraki, C. & Thanos, C.A. (2009) Germination strategy of *Horstrissea dolinicola* (Umbelliferae), an endemic and threatened plant of Crete. Hellenic Botanical Society. 11th Hellenic Scientific Conference. University of Athens, 8 - 11th October 2009.
- Pasta, S., Perez-Graber, A., Fazan, L. & Montmollin, B. de (Eds). 2017. The Top 50 Mediterranean Island Plants UPDATE 2017. IUCN/SSC/Mediterranean Plant Specialist Group. Neuchâtel (Switzerland). E-book and on line. 141 pp. top50.iucn-mpsg.org



**INTERNATIONAL UNION
FOR CONSERVATION OF NATURE**

WORLD HEADQUARTERS
Rue Mauverney 28
1196 Gland, Switzerland
Tel +41 22 999 0000
Fax +41 22 999 0002
www.iucn.org

