Global Re-introduction Perspectives: 2016

Case-studies from around the globe

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IUCN/SSC Re-introduction Specialist Group (RSG)

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Cover photo: Clockwise starting from top-left:
i. Bolson's tortoise, USA @ Turner Endangered Species Fund
ii. Wetapunga, New Zealand @ Richard Gibson
iii. Morelos minnow, Mexico @ Topiltzin Contreras-MacBeath
iv. *Silene cambessedesii*, Spain @ Emilio Laguna
v. Tasmanian Devil, Maria Island, Tasmania @Simon DeSalis
vi. Agile frog, Jersey @ States of Jersey Department of the Environment

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Creating new populations to conserve the endangered *Silene cambessedesii* in the Iberian Peninsula

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Introduction

Silene cambessedesii Boiss. & Reut. is a little annual plant, endemic to the coastal dunes of Ibiza and Formentera, Balearic Islands and the Eastern Iberian Peninsula, Spain (Aguilella *et al.*, 2010). Listed as Vulnerable in the Spanish Red List of Threatened Vascular Plants (Moreno, 2008). In late 1980s, the Iberian coast housed four populations, placed on the coastal dunes of southern Castellón province (Valencian Community), but three of them vanished as a result of massive dune movements caused by marine storms and human actions. At the end of the past century, only one population - called 'Platja d'Almenara'- remained. *S. cambessedesii* shows an ephemeral life cycle of 3 to 6 months and has strong interannual fluctuations from 99 to 8,935 individuals, throughout the period 2006 - 2015.

Flowering individual of *Silene cambessedesii*
© Emilio Laguna

The species is strictly protected by the Valencian Community government and the site 'Platja d'Almenara' is legally protected as a Plant Micro-Reserve. The conservation of this species is made by the Valencian Wildlife Service. No recovery plan has been formally drafted.

Goals

- Goal 1: To generate and to re-establish if needed *ex-situ* annual

pools of seed-producer plants, and to obtain enough seed amounts to carry out the translocation project.

- Goal 2: To create neo-populations, planted and regularly monitored, placed on sites close to the unique known native population for the species in the Iberian Peninsula.
- Goal 3: As additional useful information, to test the implantation techniques (planting, sowing) effectiveness as well as the site conditions or other relevant issues to ensure long-term conservation.

Success Indicators

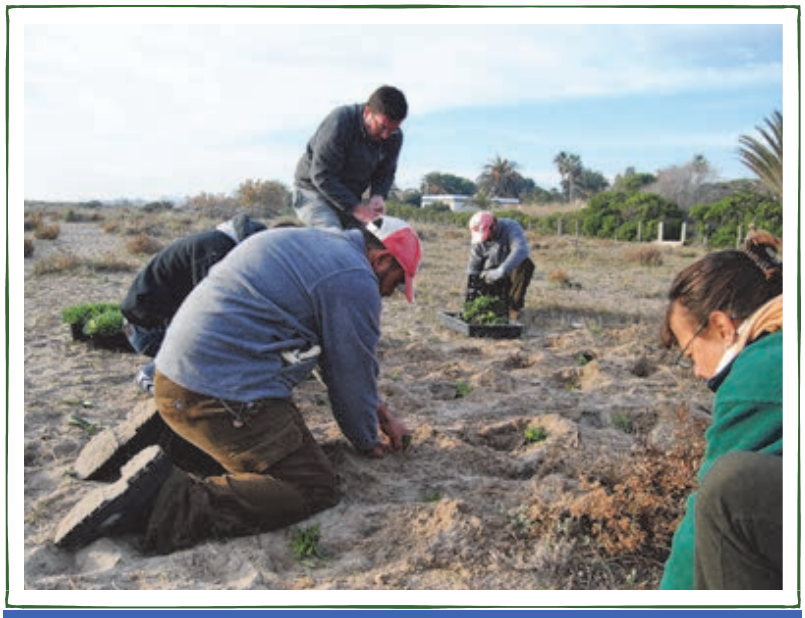
- Indicator 1: Survival and long-term maintenance of the unique native population
- Indicator 2: Six or more new populations (=neo-populations) planted in not less than six 1 km x 1 km quadrates*.
- Indicator 3: Self-maintenance of the established neo-populations for more than five years*

**Target numbers have been proposed by recovery plans for similar species (i.e.* Limonium perplexum*), in order to obtain a mid-term re-evaluation as EN (Endangered) instead of CR (Critically Endangered), using the current IUCN Red List Categories.*

Project Summary

Feasibility: Although a unique population of *S. cambessedesii* remains, the coastline of southern Castellón and the neighbouring sites of the province of Valencia, all of them form a part of the Valencian Community. This is almost 35 km of sand and gravel dunes, containing similar plant communities and belonging to the same chorologic territory, Valencian-Tarraconensean vegetation sector. All the coastal dunes are a public property owned by the Spanish State and managed by the national Coasts Service. The nature conservation tasks are carried out by the regional (Valencian) Wildlife Service, under the Coasts Service permission. Several annual species of Campions (*Silene* spp.) had co-lived and still live together with *S. cambessedessii* i.e. *S. tridentata* and *S. ramosissima*- nevertheless, hybrids have not been found.

The germination rates of *S. cambessedesii* are low, not less than 40% under standard lab conditions, reaching 78.60% under



Plantation of *Silene cambessedesii* © Emilio Laguna

Second generation plants © Emilio Laguna

Lithium Chloride atmosphere in Petri dishes (Ferrer-Gallego *et al*., 2013). However the species yield a massive seed production *ex-situ*, so enough plants to carry out conservation translocations can be produced using single nursery techniques, such as traditional seedbeds. Plant culture in nurseries is easily performed using standard substrata for wild plants (Ferrer-Gallego *et al*., 2013). The site 'Platja d'Almenara' has been affected in the past by several beach management practices such as sand leveling, building of bath infrastructures, etc. progressively solved through agreements between the Valencian Wildlife Service and the Spanish Coasts Service.

Implementation: The conservation strategy is based on the creation of 'neopopulations', new populations which are set up for safety reasons, Laguna & Ferrer-Gallego (2012), near the unique remaining site Platja d'Almenara. The suitable sites must be free of the strong effects caused by marine storms. Since 2012, seven plantations and one sowing experience have been carried out by the Wildlife Service, along 30 km of coastline from Moncofa (Castellón) to Sagunto (Valencia). The plants amount varied from 52 to 816 individuals, depending on the *ex-situ* production availability (Navarro *et al.*, in press). Due to the dune microclimate, the night sea spray is ensured during the whole year, and only initial water supplies are needed.

The germination and culture of new plants are made in the nursery of the Centre for Forestry Research and Experimentation, Generalitat Valenciana (CIEF in Spanish). In order to avoid the extreme seed collection in Platja d'Almenara site, a part of them are obtained *ex-situ* every year are used to produce the next generation. However, it has been noticed that the vigor of new plants is reduced after 3 - 4 *ex-situ* generations. As a result of that, new culture lines must be started using the remaining part of the initial seed accessions, or picking up new seeds from the natural population.

Post-plantation monitoring: All the plantation sites are monitored annually and 4 plantations were established throughout 2012 - 2013 have yielded apparently stable neopopulations. As also noticed with other annual species planted by the Wildlife Service (i.e. *Limonium perplexum*, see the specific sheet in this book) each neopopulation shows a weak recruitment within the 1st and/or 2nd year,

followed by a quick increase after the 3rd year. This behavior can be related to the need to create and store a soil seedbank, able to ensure a regular recruitment for the next generations. For the oldest plantation, where only 52 plants were initially planted, 2,863 reproductive individuals have been censed in 2015. Summing the data for the four plantations carried out before 2014, a total amount of 1,105 individuals were planted, the census of 2015 yields 3,461 individuals, still far from the native site 'Platja d'Almenara' (7,487 individuals counted in 2015). More recent plantations are still too young to obtain reliable results. Reporting the initial population 'Platja d'Almenara', no relevant recent impacts have been recorded and its maintenance can be long-term ensured.

However, both natural and planted populations are placed on beaches intensively used in summer when *S. cambessedesii* only remains as seeds, for tourists and local bathers. The maintenance of some standards and quality labels –i.e. 'blue flags' granted to the European Commission to the best bath beaches, often forces the local and national authorities to carry out conditioning practices i.e. sand leveling, removing natural organic matter deposited by sea waves, etc. which can degrade the habitat quality of this species.

Major difficulties faced

- Recent plantations could contain plants obtained after 3 - 4 successive generations from *ex-situ* culture, so germination and vigor of the new plants born *in-situ* will need an accurate monitoring.
- Some plantation sites, where the plants live from winter to late spring, are placed on beaches which can be intensively used by bathers and other tourists in summer. To maintain the naturalness of these areas i.e. avoiding beach cleaning or other conditioning practices, a more intensive commitment must be obtained from the municipal and national authorities.
- The germination times can vary notably intra- and inter-populations, and between successive years. The species census often requires more than one visit to the plantation site.

Major lessons learned

- Plantations are self-maintained without further human intervention. No regular water supply, fencing or other common practices for plant conservation are needed.
- As for other annual endangered species, the complete disappearance of the species during 1 - 2 years after plantation cannot be interpreted as a translocation failure. Managers must wait for the recruitment of new individuals from seeds, which can be done within the next years.
- Alternative techniques such as sowing seeds must be tested, in order to compare its effectiveness and costs in the near future.

Success of project

Highly Successful	**Successful**	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- Success is apparently facilitated by the local conditions of coastal dunes (high levels of air moisture) and the biological traits of the endangered species.
- Long-term conservation of the site for the original population can be reasonably ensured, but a more effective cooperation between local, regional and national authorities should be established in the near future.
- Future failures in the more recent plantations could be explained by the lack of genetic renewal of the seed orchard. This issue must be monitored throughout the following years.

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