Recovery of species CR and EN in the oriental Andalusia mountains

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Summary

The main objective of this project is to recover some *taxa* included in Andalusian Legislation as "in danger" (maximum category of risk in this catalog), and regarded as "endangered" (EN) and "critically endangered" (CR) following the the UICN categories (1994). The study area includes mountains of the provinces of *Almería, Granada* and *Málaga*; The ranges studied in this project are: *Sierra Nevada, Sierra de Baza, Sierra de Filabres, Sierra de Gádor, Sierra de la Sagra, Sierra de las Nieves, Sierra de María-Orce*, and *Sierra de Tejeda y Almijara*. The work is carried out with 39 *taxa*, many of them are endemic from our study area (figure 1).

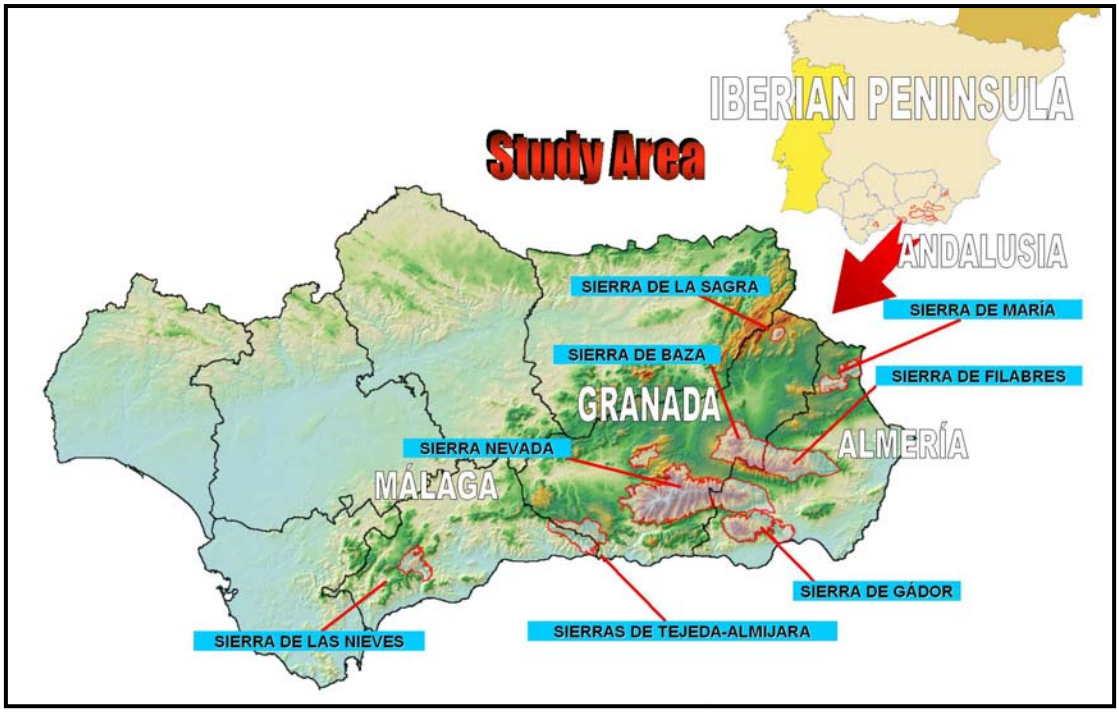

Figure 1. Study area.

Introduction

Consejería de Medio Ambiente of *Junta de Andalucía* began, at the end of 2003, a project which main objective is recovering some *taxa* included in Andalusian Legislation (Anonymous, 2003) as in danger (maximum category of risk of this catalog), and regarded as endangered (EN) and critically endangered (CR) following the categories of the UICN (1994).

This project has two main parts. One of them imply some civil engineering tasks. The second part, involves technical support with a two years approximate duration. There are three Graduates in Biology and three field assistants working in this project; We also rely on the collaboration of the *Red de Jardines Botánicos* of *Junta de Andalucía* (*Jardín Botánico de la Hoya de Pedraza, el J. B. de la Cortijuela, J. B. Umbría de la Virgen, J. B. El Castillejo y J. B. Torre del Vinagre*) staff.

The study area of this project includes mountains of the provinces of *Almería, Granada* and *Málaga*; The ranges studied in this project are: *Sierra Nevada, Sierra de Baza, Sierra de Filabres,*

Sierra de Gádor, Sierra de la Sagra, Sierra de las Nieves, Sierra de María-Orce, and *Sierra de Tejeda y Almijara*. The work is carried out with 39 *taxa*, many of them are endemic of our study area. The main tasks to be carried out are: detailed cartographical delimitation of populations (with annual pursuit), retrieval of descriptive data about any population (ecological data, threats, etc.), the study of mycorrhizas associated to some species, populations' genetic study of other, propagation of threatened species, works oriented to increase the population (reintroductions, introductions, reinforcements, etc.) and develop of an Experimental Unit of Propagation dedicated to obtain the necessary protocols to take place of threatened species and, lastly, evaluate not classified species.

All these works contribute to complete and to extend the work carried out by *Red de Jardines Botánicos* and *Red de Viveros* of *Junta de Andalucía*, coordinating all the efforts in an only working team. The information generated by this project is being incorporated to *REDIAM* (Andalusian Environmental Information Network) to get a good efficiency in the managing of the environmental administration carried out from *Consejería de Medio Ambiente*.

Essentials tasks

Evaluation of species. There are some species which current status is unknown, although they are suspected to be in serious risk (*Astragalus cavallinesi, Eryngium huteri, Hippocrepis nevadensis, Hippocrepis prostata, Ophioglossum vulgatum, Pulsatilla alpina, Saxifraga longifolia, Sempervivum tectorum* and *Sparganium angustifolium*); all of these will be evaluated according to the UICN (2001). At the same time, the rest of species of the project will be evaluated again, so much at regional level (those with a bigger area than the study area of the project) like at global level (those with the occupation area inside the working area).

Localization of the populations. Localization of populations with GPS (approach 15 - 4 m), elaboration of punctual and polygonal detailed cartography (E 1:10.000). It is included retrieval of ecological data (altitudinal range, slope, geology, etc.), corology (cartography, distribution...), demographic (total number of indivuduals, demographic structure...), biology of the reproduction (polinization data, particular characteristics, etc.), risks and interference agents (current and potential threats).

Taking of data it has more than enough biology of the reproduction. For the later realization on detailed studies on biology of the reproduction of threatened species the work embrace all development phases of the species, in order to identify critical stages in their life cycle.

Reintroductions and reinforcements. To increase the number of individuals in the populations by means of sowings and plantations in their distribution area.

Experimental unit of propagation. Gathering and spreading seeds for their later multiplication. When most of the species of the project has no protocols, it becomes necessary their study and improval to get effective multiplication protocols which optimize future managing tasks, decrease the necessity of natural populations' seeds and favoring their populational dynamics.

Evaluation of seeds. By means of germination tests, evaluate the potential of the seeds, detect viability problems and to find solutions to obviate these problems or, at least, to decrease their damages.

Pursuit and evaluation of the adopted measures. Registration, pursuit and evaluation of all measures carried out (fenced, plantation, etc.) to know the obtained success and the causes of that success for, in this way, repeat those works and to be able to correct those other less fortunate.

Genetic study. We want to analise the genetical features of *Arenaria nevadensis*, *Astragalus tremolsianus, Hieracium texedense, Laserpitium longiradium, Odontites granatensis* and *Atropa baetica*. The main aims of this study are: (1) Get information about the minimal viable populationial size. (2) Estimate the genetic distance between populations.

Associate mycorrhizas study. The main aims of this study are: (1) Characterization of mycorrhizas associated to species (*Abies pinsapo, Atropa baetica, Ilex aquifolium, Laserpitium longiradium,*

Quercus alpestris and *Sorbus hybrida*); (2) Evaluate the importance for its survival and establishment; (3) Design methods for application on species´ s conservation.

Some information about target species

Atropa baetica – It inhabits the north of Morocco and east-center of Iberian Peninsula (in calcareous mountains of *Andalucía* and *Castilla- La Mancha*). It frequently appears on way in clear of forest and borders, always in calcareous bases with certain interference between 900 and 1.800 m of altitude. Populations very meteorized, being most of them of one or two individuals; in the peninsula 139 are counted in total (in 28 populations). Evaluated as endangered (EN), being their biggest threat for natural causes, the due populational fragmentation to their ecological specificity and dispersion way; although it has great incidence on their populations the action of livestock (wild and domestic) and vicinity to very trafficked roads.

Narcissus nevadensis – Endemic taxa in Sierra Nevada and Filabres. It lives in temporary wet or inundated grasslands between 1300 - 2500 m. of altitude. Nine populations have been found belonging to this taxa, which sum a total of 24.000 - 25.000 reproductive individuals. Evaluated as endangered (EN), main threat of its populations is scarce ecological plasticity and over-grazing, it also could be affected by alterations of hydrological regime or even by illegal collecting.

Astragalus tremolsianus – Endemic species in *Sierra de Gádor* (Almería), it inhabits the background grasses of doline in understood heights between 2.100 and 2.200 m of altitude. Their only population has about 16.000 individuals. She is critically endangered (CR) mainly for their scarce area of occupancy, however they have influenced in their state the breaking new ground of most of habitat that population can have reduced until 70% for loss and habitat degradation.

But the total of species is: *Arenaria nevadensis, Armeria filicaulis* subsp. *trevenqueana, Armeria villosa* subsp. *carratracensis, Artemisia alba* subsp. *nevadensis, Artemisia granatensis, Artemisia umbelliformis, Astragalus cavanillesii, Astragalus tremolsianus, Atropa baetica, Betula pendula* subsp. *fontqueri, Coronopus navasii, Crataegus laciniata, Crepis granatensis, Eryngium grosii, Eryngium huteri, Hieracium texedense, Hippocrepis nevadensis, Hippocrepis prostrata, Iberis carnosa* subsp. *embergeri, Ilex aquifolium, Laserpitium longiradium, Moehringia intricata* subsp. *tejedensis, Narcissus bugei, Narcissus nevadensis, Odontites granatensis, Ophioglossum vulgatum, Papaver lapeyrousianum, Pseudoscabiosa grosii, Pulsatilla alpina, Quercus alpestris, Salix caprea, Salix hastata* subsp. *sierrae-nevadae, Sarcocapnos baetica* subsp. *baetica, Sarcocapnos baetica* subsp. *integrifolia, Saxifraga longifolia, Sempervivum tectorum, Seseli intricatum, Sorbus hybrida, Sorbus torminalis, Sparganium angustifolium, Taxus baccata*.

Integration of the information in the REDIAM

The Andalusian Environmental Information Network (*REDIAM*) of *Junta de Andalucía* was created 20 years ago and is regarded as one of the most important of Spain. The principal aims of this Information System are:

- Facilitate access to appropriate, selective, outstanding and reliable information to public agents in general, in order to support environmental decision making.

- Allow the use of the abovementioned information by all of the agencies involved in environmental management in Andalusia.

- Improve the scientific research in the environemntal fields by using new information technologies (such GIS, teledetection, ...).

In this project, as in other, the information is integrated in the logical devices of *REDIAM*, however, is carried out in a novel way in our *Comunidad Autónoma* for two reasons; first, the use of a Geodatabase: a new data model that allows the storing of cartographic and alphanumeric information in a single file. This Geodatabase works under Microsoft Access 2000 and ArcGIS 8.3. By the other hand, the file is accessible by people working in this project thanks to the *Consejería de Medio Ambiente* local network.

References

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