

Título: EVOLUTIONARY ORIGIN AND ECOPHYSIOLOGY OF METALLICOLOUS POPULATIONS OF CISTUS LADANIFER L.

Nombre: Quintela Sabarís, Celestino

Universidad: Universidad de Santiago de Compostela

Departamento: Botánica

Fecha de lectura: 28/06/2011

Programa de doctorado: 2115-01-1 Biología e Fisiología Celular

Dirección:

> **Director:** María Isabel Fraga Vila

Tribunal:

> **presidente:** JUAN SEGURA GARCIA DEL RIO

> **secretario:** María del Carmen Monterroso Martínez

> **vocal:** Maria Margarida Ribeiro

> **vocal:** Petra Susan Kidd

Descriptores:

> ECOLOGIA VEGETAL

> GENETICA VEGETAL

> FISIOLOGIA VEGETAL

El fichero de tesis ya ha sido incorporado al sistema

> 2011quintevolu.pdf

Localización: BIBLIOTECA XERAL USC

Resumen: *Cistus ladanifer* seems to be a promising species in phytoremediation procedures in the Mediterranean region and is also an interesting model species for the study of the process of colonisation of metalliferous areas by plants.

Within this framework, and with the aim of improving the knowledge about *Cistus ladanifer* and its relationships with metals, we have developed a series of investigations using populations sampled from nearly the entire distribution area, in order to deal with the following topics:

- In order to infer the effects of the metals on the genetics of the species, it is first of all essential to understand the interplay of processes that creates its phylogeography, or genetic landscape. Using neutral maternally-inherited markers (cpSSRs) we inferred the phylogeography of *Cistus ladanifer* (Chapter 2).
- Then we integrated the soil type (metalliferous or non-metalliferous) and the phylogeographic information in a population-genetics approach to the tolerance of *Cistus ladanifer* to metals: are the metallicolous populations mono- or polyphyletic? Is the colonisation of metalliferous areas accompanied by a reduction in genetic diversity? (Chapter 3).

- A species range is not homogeneous, but it is often subdivided into genetic subgroups. If metalicolous populations have evolved independently within different subgroups, it is interesting to infer whether the parallel evolution resulted in similar or different strategies of tolerance (exclusion, accumulation?). We assessed this theme, within the framework provided by cpSSR, through the analysis of field-collected soils and *C. ladanifer* leaves (Chapter 4) and through hydroponic-based experiments of tolerance to Co, Ni and Zn (Chapter 5).
- As a basis for future research, the identification of markers potentially linked to tolerance to metalliferous soils is especially needed in non-model plants such as *C. ladanifer*. We address this topic applying generalized estimating equations (GEE) to AFLP markers and data of total metal contents in soils (Chapter 6). We also compared the information on population genetics provided by AFLP markers (from nuclear DNA) and cpSSRs.