

Lupinus hispanicus Boiss. & Reut. in the Iberian Peninsula: a crop wild relative traditionally harvested for fodder

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The importance of *Lupinus hispanicus* as a CWR

Lupinus hispanicus, an annual herb, belongs to the group of 12 Old World *Lupinus* species found in the Mediterranean area. Due to their importance as nitrogen-fixing symbionts and their high protein content, economically, there has always been a growing interest and demand for lupins. *L. hispanicus* has been traditionally cultivated by farmers as sheep fodder and for soil improvement. In the last 10 years this plant has been included in breeding programmes of lupins as it is the closest wild relative

Taxonomy and biology

Family: Leguminosae

Scientific name: *Lupinus hispanicus* Boiss. & Reut. P.É. Boissier & G.F. Reuter 1842 Diagnoses plantarum novarum hispanica-rum.

Common names: altramuz, alberjón, titones, haba de lobo, haba de lagarto (Spanish), favaca (Portuguese).

The genus *Lupinus* is commonly known as bluebonnets in English, due to its attractive flowers.

Biology: *L. hispanicus* is an annual auto-gamous plant with hermaphrodite flowers that bloom from April to August.



Ecogeographic features of *Lupinus hispanicus*

Geographical distribution: Spain and Portugal. *L. hispanicus* is endemic to the Iberian Peninsula. It is found in the Central and mid-Western regions as show on the map.

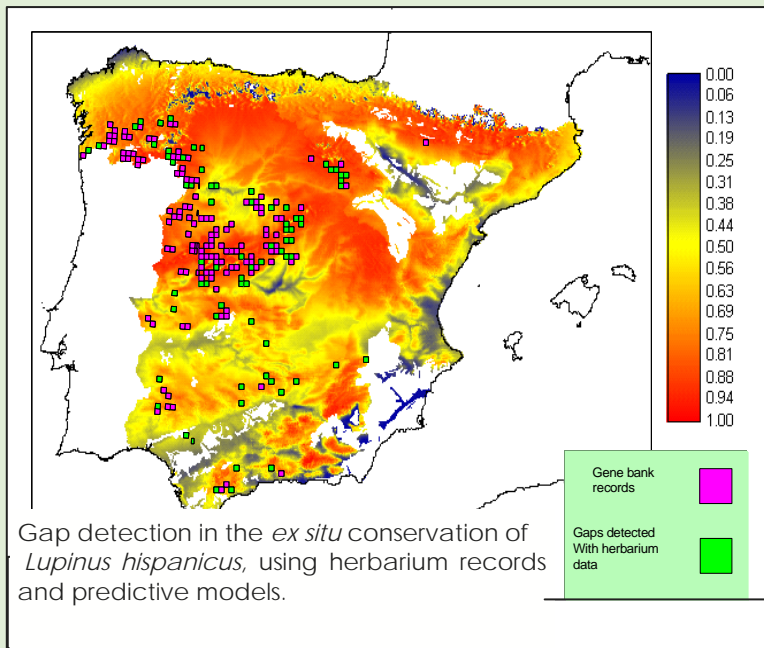
Habitat: This species occurs on neutral and acidic soils (pH 5-6.5) with a silty to sandy texture. It grows at altitudes between 600-1600 m.



Threats

Major threats to *L. hispanicus* are habitat alteration and loss, changes in agricultural practices and genetic pollution.

The natural populations of *Lupinus hispanicus* occur in cereal fields, vineyards, olive orchards, road edges and shrubby land. Many populations are now in severe decline due to agricultural abandonment and human intervention (urbanization, road widening, etc). The photograph shows road widening in Casavieja, Spain, which partially destroyed a *L. hispanicus* population



Conservation

In situ

Half of the known 174 *L. hispanicus* populations are located in the Natura Network of Sites of Community Interest. Predictive distribution models have been used to assess the overall occurrence of *L. hispanicus* in protected areas (shown on the left).

Ex situ

A large collection of *L. hispanicus* seeds is maintained in European and Australian national seed banks. GIS-based methodologies have been used to detect biases in collections and to identify additional collection sites to capture greater genetic diversity for *ex situ* collections.

The role of *L. hispanicus* in agriculture and sustainable development

- This crop wild relative was traditionally harvested by farmers for use as fodder. However, the high proportion of toxic, bitter alkaloids found in this species has limited its wider use.
- *Lupinus hispanicus* as a crop for sustainable development: As this species has nitrogen-fixing nodules on its roots, it assimilates nitrogen and fixes it in the soil, thereby reducing fertilizer requirements in subsequent crops. Thus, it has the potential to increase the efficiency of N use in arable rotations and in mixed arable livestock systems.
- Breeding qualities of *Lupinus hispanicus*: the species has a high oil content in seeds, and both the plant and its seeds have a 30-50% protein content. *Lupinus hispanicus* has a high tolerance to many pests and diseases, requiring fewer insecticides and fungicides than other high-protein crops such as soybean and peas. Other traits include cold tolerance and adaptation to poor soils.
- Experimental cultivation of *L. hispanicus* began in 1988 using seeds from natural populations to provide summer pastures for sheep and goats.

Literature cited

Castroviejo, S. et al. 1999 Flora Iberica

Parra-Quijano, M. et al. 2003 Assessing conservation of *Lupinus* spp. in Spain through GIS. *Crop Wild Relative* 1: 8-9.