

## AGRO-SILVO-PASTORAL SYSTEMS

### CGIAR RESEARCH PROGRAM ON LIVESTOCK

Aims to increase the productivity of livestock agri-food systems in sustainable ways across the developing world.

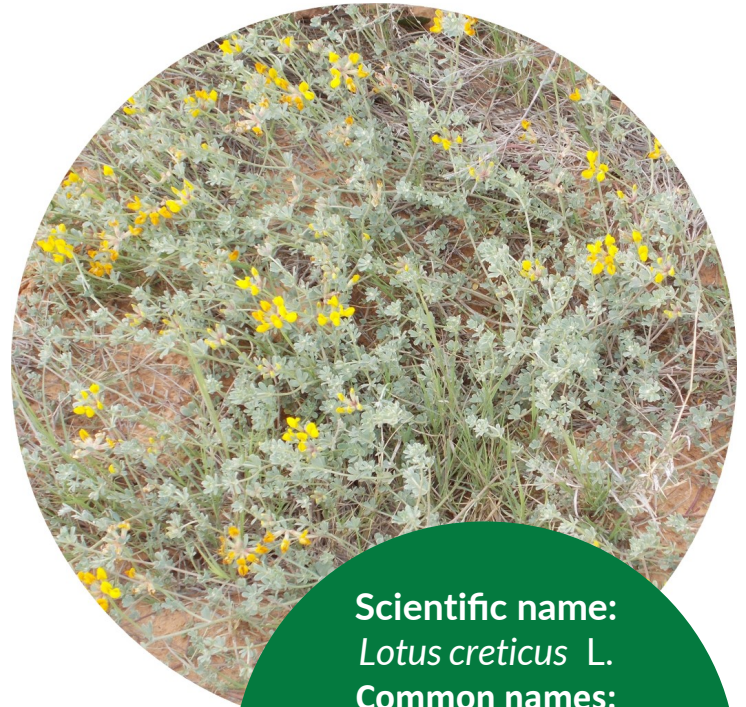
## Managing rangelands: promoting highly palatable species with good nutritive value

### *Lotus creticus* L.: high forage quality and greatly salinity tolerance

Arid and semi-arid regions are characterized by many conditions that limit establishment and growth of species. Salinity is one of major factors hampering many crops and forage systems. Legumes, which are known by their high nutritional values and good forage qualities, comprise glycophytes and several species adapted to extreme environments. Among these, the genus *Lotus* is widely distributed around the world and some species are limited in specific areas, such deserts, mountains and coasts. Possessing a range of adaptive attributes, makes the genus well suited for reclamation, renovation and restoration of marginal areas.

### Benefits:

- Easy and quick to establish
- Potential fodder plant used in reclamation of saline soils
- Adapted to salinity, drought, temperature and severe winds
- Adapted to saline-alkaline, rocky and sandy soils
- Used for soil conservation purposes
- Seeds with high protein levels and natural antioxidants



#### Scientific name:

*Lotus creticus* L.

#### Common names:

Cretan trefoil,  
Lotier de crête,  
الخيطاء

#### Location:

Mediterranean basin

*Lotus creticus* is among recommended species on restoration of marginal and degraded lands in arid areas. It is used in sand dune stabilization thanks to its creeping canopy and root system fairly developed. As common property of legumes, symbiotic nitrogen fixation allow it to improve soil fertility. *Lotus creticus* is a perennial species, with 10 to 30 cm height, flowering in March-April and seeds are dispersed by autochory. This species is highly palatable. It is able to grow in poor soils, which can thrive under stressful conditions (salinity and drought) and even waterlogged soils. It is diversified grouping some subspecies, mainly present in large bioclimatic stages from lower arid preferring sandy soils with coarse sand.



*Lotus creticus* seedlings, Southern Tunisia



*Lotus creticus* flowers



*Lotus creticus* pods and seeds  
Photos credit: Isabel Ferrero & Jose' Quiles

*Lotus creticus* is known by its rapid growth and little need of water. Under water stress, leaves of *L. creticus* are covered by dense hairs, which play an important role in foliar water uptake.

It can grow at pH 5.6 to 7.5 with an optimum at 6.5, its optimal temperature of growth is between 20 to 30 °C, and at early seedling time, temperature should be at 15 °C.

*Lotus creticus* is able to tolerate salinity around 300 mM at germinative stage and 150 mM at growth stage. At high salinity, it can survive but biomass production decreased significantly.

At 300 to 400 mm of rainfall, *L. creticus* is able to produce 600 to 800 kg dry matter per hectare per year. Associated with grasses, it constitutes a good pastoral species allowing the improvement of long-term grazing. Usually edaphic factors influence legumes yield through the distribution of symbiotic rhizobia. Its fodder is characterized by a high nitrogen content, low crude fiber correlating to high digestibility. Their use is very beneficial in mixture with other types of feed like grasses and *Atriplex* species commonly less digestible.

## Establishment and Management

*Lotus creticus* growth is optimal in areas receiving more than 100 mm/year of rainfall in salt-affected soils, waterlogged and/or poor soils. The better establishment of this species can be by seedling. The optimal temperature for *L. creticus* seed germination is at 25°C and inhibited from 35°C.

In order to break dormancy, seeds of this species may need pretreatment by soaking in sulfuric acid (70%) during 30 min before seeding.

Generally, grazing is suitable 1 year after seedling, supporting stocking rate to 11-12 sheep per hectare per year.

Grazing in winter is not recommended, since it reduces its recovery, its forage quality and seed production.

## Effective Management

- Seeds should be treated using sulfuric acid to remove dormancy
- Seeds should be stored under dry (humidity <5%) and cool location (at 15°C)
- Stored seeds can remain viable for more than 10 years
- Light grazing is recommended late in the spring
- In arid areas irrigation during early months is recommended after seedlings emergence

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### ICARDA's Rangeland Ecology and Forages (REF)

The REF team promotes advances in rangeland ecology and pasture management in the dry areas. This series of factsheets is dedicated to the characterization of promising range and forage species aimed at alleviating the feed gap, limiting water runoff and soil erosion, restoring degraded rangelands and maintaining a healthy ecosystem.