

RESILIENT AGROSILVOPASTORAL SYSTEMS

CGIAR RESEARCH PROGRAM ON LIVESTOCK

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

Managing agrosilvopastoral systems: promoting shrub legume species

Medicago arborea L.: is an important perennial woody leguminous shrub with great forage and nitrogen-fixing potential

Medicago arborea is highly recommended as a model legume for revegetation, regeneration, and the biological reactivation of semi-arid degraded ecosystems. It also provides a source of fodder for livestock and wildlife.

Medicago arborea is a highly palatable shrub that can act as a nutritious and high-quality forage species with 15-19% crude protein, 43.3% neutral detergent fibre (NDF) and 65% In vitro organic matter digestibility (IVOMD). The grazable parts (leaves, herbaceous twigs and pods) contain adequate

Benefits:

- Presents an excellent feed for livestock due to its high protein content
- Drought tolerant
- Has high palatability
- Improves soil fertility (capable of nitrogen fixation)
- Melliferous species



Scientific name:
Medicago arborea L.

Common names:

Tree medic or alfalfa
arborea

(الفصة الشجرية)

Location:

Mediterranean Basin

quantities (0.2-0.7%) of Cu, P, Zn that meet the ruminants' requirement, while the proportion of Ca, Mg, S (more than 0.3%) is more than what animals require. It provides a valuable browsing resource while also preventing soil erosion by increasing soil stability through organic matter accumulation. As a result, it improves land use in areas in danger of progressive abandonment and degradation, while also improving soil fertility by transferring nitrogen to the soil plant system and depositing plant litter. The shrub is used to improve semi-arid rangeland which are characterized by low production.



Medicago arborea mature pods and seeds



Medicago arborea at flowering stage (Muchaqer station, Jordan)



Sheep grazing *Medicago arborea* (Tunisia)

Originating in the Mediterranean region, *Medicago arborea* is a perennial leguminous shrub which can grow between 0.5 and 2 meters (m) in height. It has a main taproot that can reach more than 2 m deep, and a dense network of secondary roots near the soil surface, allowing it to access water in deeper soil zones. It is also able to reduce water loss through transpiration as a result of its leaves which have strong cuticles, a waxy surface, and specialized structures. The plant flowers during the spring and sheds leaves during summer. Its dry matter production is highly variable, depending on environmental conditions, with yields reaching about 3 t DM ha⁻¹ under favorable conditions.

Establishment and Management

Medicago arborea is suited to Mediterranean environments with an annual rainfall of at least 250 mm. Its growing season is mainly after the first autumn rainfall. This shrub is suitable for loam, sandy loam and clay soils with acid to neutral pH. It doesn't perform well under the shade. It grows on dry as well as moist soils. Its seeds are exhibiting physical dormancy, favoring the buildup and evolution of persistent seed banks in the soil. This species requires seed pre-treatments before sowing such as acid treatments, boiling in water, and soaking in water. Direct seeding and seedlings are used when cultivating this species, although seed germination

and seedling emergence need to be optimized, in order to exploit its full potential. The species can withstand defoliation preferably after two years of establishment without damage to its vigor and productivity. During summer as a kind of adaption mechanism *Medicago* shrubs usually speed up the agedness of grown leaves to reduce the transpiration and part or whole leaves may drop off. Thus, the cutting/controlled grazing in spring is recommended as it helps to reduce the effect of water limitation and delay natural defoliation, but this should be avoided in case we aim for seed production.

Effective Management

- Soaking in warm water for 4 min, immersion in sulfuric acid for 2 min, or in water for 20 hours enhance the seed germination
- Prefers neutral to alkaline soils
- Does not tolerate salt or waterlogging
- Make sure the right bacterial strain exists in the soil (nodulation)
- Seeding rate should be about 10 kg ha⁻¹
- Seeds take at least 20 days to germinate
- Newly transplanted seedlings to the field could be subject to grazing by wild rabbit
- Browsing should be controlled to avoid damage to the plant

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ICARDA's Rangeland Ecology and Forages unit (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.