Dryland Systems Solutions

Producing More with Less

Pastoral Systems

Managing rangelands: promoting sustainable shrub species

Scientific name: *Retama raetam* (Forsk.) Webb
Common names: R'tem, Raetam, White weeping broom, or Bridal broom
Location: The species is native to the grasslands and deserts of northern Africa and Western Sahara, Sicily, and the Middle East.

Retama: A resilient, pioneer plant for rangeland rehabilitation and stable ecosystems

Arid and semi-arid rangelands face increasing climate variability and grazing pressure as the world's demand for food increases. ICARDA is promoting drought-tolerant species as a crucial means of assisting rangeland rehabilitation efforts, helping to conserve rapidly-depleting water resources and maintain grazing at sustainable levels. The result: a win-win situation for rural communities and the environment.

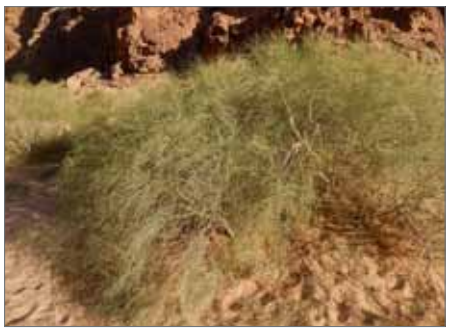
Retama is noted as an important multi-purpose species in need of conservation. It is a drought-tolerant legume species native to the Mediterranean, which is beneficial for dune stabilization and rangeland rehabilitation. Retama can also establish itself on nutrient-poor to fertile well-drained soils, and plays a prominent role in rehabilitation efforts, acting as a pioneer plant in the ecological succession of barren lands. It can produce a 'scrub layer' with smaller plants - providing there is sufficient water – and has an ability to fixate nitrogen, helping to improve soil fertility and create microclimates for future plant establishment.

A perennial shrub with many branches, Retama can grow to approximately 3 meters (m) in height and reach up to 6m in width. Its small leaves – approximately 5 millimeters (mm) long and 1mm wide –grow immediately after rainfall and fall off within 1-2 weeks to reduce water loss, an adaptation that enables the plant to survive in dry, harsh conditions where other plants may struggle to survive.

The hard coatings render most seeds dormant initially, but as the seed coat wears away germination can take place. This characteristic also enables seed to remain viable in soil for a long period of time. While hard coatings may act as a barrier to human-induced propagation, the seeds can also be processed if cultivation is required within a set period of time. The plant is also noted to have medicinal properties.

Retama benefits:

- Ability to fix sand dunes and stabilize ecosystems
- Ability to survive dry, harsh conditions
- Resilient, drought-tolerant legume species with well-developed root system
- Ability to fixate nitrogen in soils and produce scrub layer
- Produces significant number of seeds
- Seeds remain viable in soil for long periods.



A self-generating Retama shrub in Wadi Rum, Jordan

Mature, edible Retama fruits

Retama is ideal for fixing sand dunes

Establishment and management

Effective propagation depends upon a combination of factors, including water availability, plant age for seed harvesting, and seed scarification for increased germination. Flower and seed creation takes two years to establish, and growth and production are significantly affected by seasonal variations in rainfall, which is often more important than specific site property variations such as soil texture and organic matter content.

Each plant produces hundreds of seed pods - and up to a thousand seed pods on larger plants. Given that seeds are consumed by many animals, fencing is recommended for seed production. As a result of the hard coating and low germination rate (6%), scarification is also recommended, an action that increases the germination rate to 70%. It is further recommended that seeds are harvested in May-June when mature pods are easily detached from plants and fall to the ground.

If seed storage and processing is available it is recommended to thresh the seeds with sieves of 5 mm diameter – mechanically or manually. After threshing the seeds can be cleaned with a cleaner seed selector, while ensuring proper adjustment of the vibration, fan speed, and the use of a sieve that has a 3.73 mm rectangular mesh below a sieve with a 5.75 mm circular mesh. Ventilation is recommended to extract debris. Once the seeds are cleaned and dried – 5% moisture – they should be stored in containers, outdoors, at temperatures below 15 degrees.

Aside from serving as a pioneer plant in the rehabilitation efforts of barren lands the leaves and seeds can be used for grazing. Leaves need to be grazed upon their emergence after rain events since they fall off after 1-2 weeks. Although animals can serve as dispersal agents, germination rates in animal manure remain low without scarification.

Due to the social, ecological, and economic benefits of the plant, inventories may be necessary to assist in the further development of protection/conservation, production, transportation, and marketing policies.

Effective maintenance:

- Fencing to prevent animals consuming seed
- Harvest in May-June when mature pods are easily detached
- Dry seeds and store in containers outdoors, at temperatures below 15°C
- Scarification required to increase germination rates

Rangeland plant factsheets:

This series of flyers is designed to build awareness of sustainable rangeland species among extension workers and those working in the agricultural research and policy sector.

ICARDA's Rangeland Ecology and Management Unit

ICARDA's Rangeland Ecology and Management Unit aims to address the unsustainable use of resources induced by mis-management, the adverse effects of climate change, and an increasing demand for food and feed in the dry areas. ICARDA programs promote the enhanced quality and productivity of crop, forage, and livestock, and the improved management of water resources through close cooperation with farmers and national researchers.

RESEARCH PROGRAM ON Dryland Systems

CGIAR

ICARDA Science for Better Livelihoods in Dry Areas

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