

PASTORAL AND AGRO-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 native tree species

Pistacia lentiscus L.: a multipurpose tree species that withstands drought and protects the soil

Increasing climate variability and the risk of overexploitation of natural resources. The International Center for Agricultural Research in the Dry Areas (ICARDA) is promoting well-adapted 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 is a win-win situation for the rural communities and the environment.

Lentisk is an evergreen tree that is a hardy, drought tolerant plant, which found in scrubland. Its ecological value is related to the ready production of new shoots following fire injury or cutting. The species is deep-rooted, long-lived (more than 100 years), and relatively combustible. Lentisk is unpalatable to most animals except goats and this may confer protection from grazing.

Benefits:

- Multipurpose species with great aromatic feature
- Good regeneration ability after fire injury or cutting
- Lentisk oil and gum are used in the treatment of ulcers, sores, and burns
- Resistant to drought
- Withstands winter temperatures down to -9°C
- Protects soil from erosion and desertification risks



Scientific name:
Pistacia lentiscus L.

Common names:
Lentisk tree, mastic tree,
mastikboom

Locations:
Mediterranean region
& the Canary Islands

For these reasons, lentisk play an important role alleviating soil erosion and desertification. Lentisk prefers siliceous soils. It has separate male and female plants of 1–5 m high, with a strong smell of resin. It is fully grown after 40–50 years. The leaves are alternate and compound (no terminal leaflet) and inflorescences appear alone or in pairs in the leaf axil. The flower is unisexual and without petals, small, appearing during April–June, and arranged in ears. Male and female flowers grow on different shrubs; female flowers are yellow-green and males are dark red. The fruit is a drupe, first red and then black when ripe, about 4 mm in diameter. The stems/trunks are reddish when young and become gray when older. The mastic gum produced is a transparent tear-shaped natural resin. Mastic has a light, fresh, and gentle fragrance. Mature plants can withstand winter temperatures down to -9°C. Reported temperature range for growth is 12–40°C with optimum of 18–24°C. Suitable annual rainfall for growth is 200–2000 mm with optimum of 400–800 mm, and soil pH range is 6.0–8.5.



Biological fixation of sloping land using lentisk, Tunisia



Goats browsing lentisk, Tunisia



Lentisk oil: from the harvest to the cold extraction

Lentisk produces an aromatic resin known as mastic, which has a long history of use. It has been used in the production of varnishes and adhesives, for chewing gum, lithography, dentistry, and in liqueurs and cordials. Mastic oil is also part of distinct perfumes, hair and skin lotions, and the resin is also used in a number of cakes, pastries, sweets, and desserts. The essential oil of lentisk comes from the hydrodistillation of leaves and young twigs, which are collected in the spring when the plants flower. The essential oil and gum are natural antimicrobial, anti-inflammatory, antiseptic, and antioxidant agents and possibly have some anti-fungal properties. Traditional medicine, practiced on both sides of the Mediterranean, attributed lentisk with virtues in the treatment of ulcers, sores, and burns.

The vegetable oil of lentisk is extracted from the ripe fruits. Its richness in unsaturated fatty acids (more than 70%), sterols, and long chain triglycerides gives it a protective role against cardiovascular disease and decreases the risk of infarction and the rate of bad cholesterol. The antioxidant action is due to its richness in tocopherols (more than 65 g/100 g of oil) and antibacterial action in respiratory and dermatological infections is due to its richness in oleic acid (about 46%).

Establishment and management

Sowing is usually in autumn, immediately after collection. Immersion of seeds in water for 2–3 hours before sowing is advisable. For spring sowing, either scarified seed or cold stratified (2–3 weeks) seed is employed.

The seeds are rich in oily substances (about 25%), so the quality of seed, including viability, can be lost in a relatively short time. It is advisable to remove the pulp immediately after collection, completing the operation by washing, which enables the floating (empty) seeds to be removed.

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Lentisk has a very variable germination of 40–80%. The endocarp slows water absorption and thus the germination process. However, this can be overcome by mechanical scarification. Alternatively, cold stratification may be employed, which acts by attacking the integrity of the seed coat rather than by removing any physiological dormancy.

Seeds are harvested from the tree when the fruits are ripe, in autumn–winter. Manual scarification is desirable to accelerate seed germination. The fruit color is strongly associated with seed viability: black fruit usually contains viable seeds, but red fruit usually contains non-viable seeds. The initial stage of seedling development is quite slow and the transplanting of seedlings into pots is a crucial step in their establishment, especially in natural environments. The ability to rapidly develop a deep, well-structured root system is an essential feature after planting. Before transplanting seedlings, Lentisk plants are usually treated in the nursery. This step is needed to alter architecture of the root system to improve their survival when the microbial activity of the soil is reduced.

Effective Management

- Lentisk pulp should be removed quickly after collection
- Manual scarification is desirable to accelerate seed germination
- Mechanical scarification and cold stratification may remove physiological dormancy
- Lentisk prefers siliceous soils
- Sow in autumn right after collection

ICARDA's Rangeland Ecology and Management Unit

ICARDA's Rangeland Ecology and Management Unit aims to address the unsustainable use of resources induced by adverse effect 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, livestock, and the improved management of water resources through close cooperation with farmers and national researchers.

