

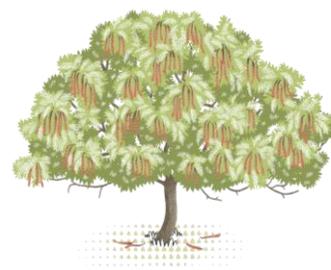
Carob tree

a drought- and saline- resilient crop of WaterMellon project

01

History and origin

- Native to the eastern Mediterranean, likely the Middle East.
- Cultivated for over 4,000 years.
- Spread by ancient Greeks to Greece and Italy, later introduced to North Africa, Spain, and Portugal by Arabs.
- Today, widely grown in Mediterranean basin, as well as in California, Arizona, Mexico, Chile, Argentina, Australia, South Africa, and India.



02

Morphological Characteristics

- **Lifespan:** 100- 150 years, can live up to 500 years.
- **Growth:** Slow- growing, reaching 5-10 meters in height.
- **Trunk & Crown:** Thick, twisted trunk with a broad, rounded crown.
- **Roots:** Deep and extensive (up to 18 meters), contributing to drought resistance.
- **Leaves:** Dark green, leathery, pinnate, with 4-10 oval- shaped leaflets.
- **Flowers:** Small, reddish- brown, occurring in clusters; can be male, female, or bisexual.
- **Pods:** Indehiscent, elongated, 10-30 cm long, containing 4-15 oval seeds.
- **Yield:** Mature trees produce 50-200 kg of pods annually, depending on environmental conditions and tree health.



03

Soil and climate requirements

- **Preferred Ecosystem:** Mediterranean coastal maquis.
- **Soil:** Thrives in limestone soils; tolerates sandy, loamy, rocky, and calcareous soils (pH 6.2- 8.6); struggles in acidic and humid conditions.
- **Climate:** Temperate, subtropical regions, below 500 meter altitude.
- **Rainfall:** Survives with 250-750mm annual rainfall; irrigation enhances yield.
- **Salinity:** High tolerance to saline conditions.

04

Fertilization & Cultivation

- **Fertilization:** Minimal; requires nitrogen (N), phosphorus (P), and potassium (K).
 - P & K applied in winter for root and pod development.
 - N applied in spring for vegetative growth.
- **Planting:** Late winter or early spring; germinated in 2-4 weeks.
- **Density:** 25-45 trees / ha (in rainfed orchard).
- **Flowering:** Late summer to early autumn.
- **Harvesting:** August to October of the next year.
- **Fruit Bearing:** Starts at 6-8 years; full production at 12-15 years.



05

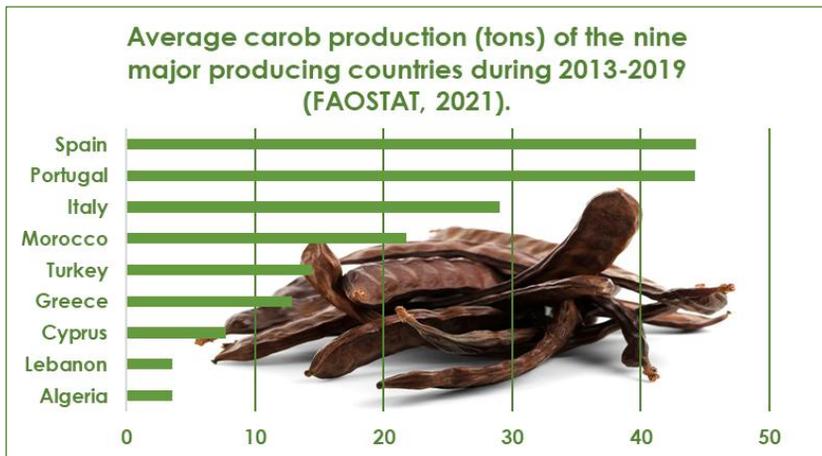
Diseases & Pests

- **Relatively resistance** to diseases and pests.
- **Common threats:** Ceratocystis wilt, root rot, carob moth, scale insects and aphids.

06

World biomass production & Market value

- **Total cultivated area:** 87,485 ha globally.
- **Major producers:** Spain, Portugal, Italy and Morocco (84.81% of the global cultivated area).
- **Annual production (2021):** 51,906.58 tons; (Europe 59.5%, Africa: 21.6%).
- **Market value:**
 - 2023: USD 235.45 million.
 - Projected 2030: USD 337.98 million (+43,4%).



07

Uses of the Carob Tree

- **Food industry**
 - Carob powder, syrup and locust bean gum used as sweeteners and thickeners.
 - High fiber and sugar content make it nutritious livestock feed.
- **Medicinal & Cosmetic Uses**
 - Aids digestion, regulates cholesterol, and blood sugar.
 - Uses in cosmetics for antioxidant and moisturizing properties.



- **Environmental & Industrial Uses**
 - Deep roots prevent soil erosion, aiding reforestation in arid regions.
 - Wood used for fuel and carpentry.



The carob tree is an economically and environmentally valuable crop that significantly contributes to the food, pharmaceutical, and industrial sectors. Its adaptability to poor soils, drought resistance, and diverse applications make it a sustainable choice for agriculture in Mediterranean and arid regions.