

### LOCAL NAMES

Arabic (mesquite); English (western honey mesquite, mesquite, honey mesquite); Spanish (algoroba)

### BOTANIC DESCRIPTION

*Prosopis glandulosa* is a tall shrub or tree of 3-9 m; deciduous foliage; spines axillary, uninodal, 1-4.5 cm long, mostly solitary, sometimes very few, germinate alternately on different nodes of the same twig. It is a plant with a very deep root system (up to 18.3 m).

Leaves glabrous, uni- or bijugate; petiole (with rachis when extant) 2-15 cm long; pinnae 6-17 cm long; leaflets 6-17 pairs, about 7-18 mm distant on the rachis, linear or oblong, obtuse, glabrous, subcoriaceous, prominently veined underside; costa frequently of lighter colour, (min. 1.5) 2-6.3 cm long x 1.5-4.5 mm broad, 5-15 times as long as broad.

Racemes spiciform, about 5-14 cm long, multiflorous; petals 2.5-3.5 mm long; ovary stipitate, villous.

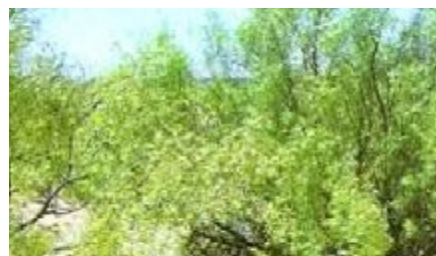
Legume straight, 8-30 cm x 5-13 mm, rarely subfalcate, compressed to subterete, submoniliform, glabrous, straw-yellow or tinged with violet, short-stiped, with strong, short, or elongate acumen, 5-18 seeded; joints subquadrate to oval; seeds oblique to longitudinal.

There are 2 recognized varieties -: *P. glandulosa* var. *torreyana* (Benson) Johnston grows primarily in the deserts and drylands of southwestern USA and northern Mexico; *P. glandulosa* var. *glandulosa* is found from Mexico north to Kansas and east to Louisiana. In North America the common name 'mesquite' (meaning charcoal tree) is used for several *Prosopis* species, whereas in South America the name 'algarrobo' is used commonly. Algarrobo is actually the Old World name for carob (*Ceratonia siliqua*); the conquistadores applied it to *Prosopis* species because of its carob-like appearance.

### BIOLOGY

A long period of consistently low daily minimum temperatures during the winter provides *P. glandulosa* with the chilling requirement that facilitates early bud break. Once the chilling requirement is met, relatively warm minimum daily temperatures can hasten bud break. Fruit-bearing begins in 3-4 years.

Hybridization is common, and the taxonomy of *P. glandulosa* is difficult. Genetic variability is high, with good potential for selection of individuals and ecotypes and plant breeding. The trees are self-fertile. It has been suggested that *P. glandulosa*, or cultivars thereof, hybridizes with *P. laevigata* and *P. velutina*. Highest biomass production among progeny of hybrids, possibly with South American ornamentals, have been reported. Coppicing ability and psyllid resistance are similar to *P. alba*, but the leaf and thorn morphology more closely resemble *P. glandulosa* (chromosome numbers  $2n = 28, 56, 112$ ).



*Prosopis glandulosa* var. *glandulosa*  
Mesquite bushes in population and control studies at Santa Rita Experimental Range, Arizona. (Tropical Forage Legumes, FAO, 1988)

**ECOLOGY**

Moderately salt and frost tolerant. It thrives under high temperatures and survives in areas with very low precipitation but is usually found in areas with groundwater reserves. In its drier, western range, it occurs along streams and in low-lying areas. In areas with more rainfall, it occurs on open range or in chaparral.

It is known as a phreatophyte, a plant with a very deep root system (up to 18.3 m) that can extract moisture from the water table. It often grows in dense thickets near desert washes but also occurs at the base of sand dunes and other areas where the water table is close to the surface.

It is already considered a nuisance, competing with grass for water and reducing the livestock-carrying capacity of 30 million hectares of rangeland in southwestern USA.

**BIOPHYSICAL LIMITS**

Mean annual temperature: 18-21 deg. C.

Mean annual rainfall: 200-1 000 mm

Soil type: Will grow on a wide range of soils and tolerates moderate salt.

**DOCUMENTED SPECIES DISTRIBUTION**

Native: United States of America

Exotic: Botswana, Kenya, Mexico, Namibia, Pakistan, Sudan



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

**PRODUCTS**

**Food:** *P. glandulosa* pods were a primary food of the residents of the deserts of southwestern USA. Pods are quite sweet; the whole-pod composition is 80% carbohydrate, 13% protein, 25% fibre, and 3% fat. Unlike most beans, the pods are edible without cooking. They are still used as a food and beverage in Mexico. Pods could prove useful for production of flour, wine, tempeh and tofu products. Gum from the bark is edible.

**Fodder:** Grinding improves the use of *P. glandulosa* pods for fodder. Sheep, goats and pigs are able to use a higher percentage of them in their diet than are cattle and horses. Cattle browse leaves of mature trees only on deteriorated rangeland.

**Apiculture:** Bees favour the flowers, and *P. glandulosa* is highly valued for its flavour. The honey is light, of good quality and granulates quickly.

**Fuel:** Wood, chips and charcoal are excellent fuels, and the wood smoke lends a pleasant flavour to cooked foods.

**Timber:** *P. glandulosa* wood is very dense with a specific gravity of 0.7 or more, and its shrinkage on drying is very balanced. These properties make it excellent for woodworking.

**Gum or resin:** Produces quality gums that may have an economic value. Gum from the bark is used for glue in the tree's native range.

**Tannin or dyestuff:** The gum has for long been used as a source of dye.

**Medicine:** *P. glandulosa* has been used for a variety of medicinal purposes, including lice control and treatment of sore throat, skin sores and ulcers. Reported to be a collyrium, emetic and laxative, *P. glandulosa* is a folk remedy for dyspepsia, eruptions, hernias and skin and umbilical ailments.

**SERVICES**

**Erosion control:** A stabilizer of shifting desert sands.

**Shade or shelter:** The shrub could be multibranched and act as a suitable windbreak.

**Nitrogen fixing:** *P. glandulosa* forms symbioses with Rhizobia and Vascular arbuscular mycorrhizae (VAM). There are active root nodules going many metres deep into the soil. The tree, with 30% canopy cover, can fix 30-40 kg atmospheric N/ha.

**Soil improver:** A provider of humus to the soil.

**Intercropping:** Deeply rooted, open canopied trees may provide little competition to field crops. May be established for alley cropping.

**Boundary or barrier or support:** *P. glandulosa* is also used for fencing.

**TREE MANAGEMENT**

Although *P. glandulosa* is very drought tolerant, best growth is achieved in areas where the root system can reach the groundwater. In areas with low rainfall, especially in fast-draining soils, irrigation may be required during establishment. The tree coppices well. Annual production of wood on dry, low-quality sites may be less than 1 t/ha, but with sufficient water (even though slightly saline) trees can grow rapidly and yield over 5 t/ha/yr. Fencing or seedling protectors will usually be needed to protect young transplanted *P. glandulosa* seedlings from rabbits or other browsing and grazing animals.

**GERMPLASM MANAGEMENT**

Seed storage behaviour is orthodox; no loss in viability after 3 years of storage at -15 deg. C. There are about 30 000 seeds/kg.

**PESTS AND DISEASES**

Bruchid beetles such as *Algarobius bottimeri* and *A. prosopis* commonly damage pods; freezing or fumigating the pods may kill the beetles. The young, tender growth of *P. glandulosa* var. *torreyana* from the California desert is very susceptible to psyllid damage. A nematode, *Meloidodera chavis*, has been reported to damage the tree. *P. glandulosa* hosts mistletoe, and parasitization may be extensive on older trees; the mistletoe, in turn, is frequented by the phainopepla, a bird that feeds on mistletoe berries.

**FURTHER READNG**

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**SUGGESTED CITATION**

Orwa C, A Mutua, Kindt R , Jamnadass R, S Anthony. 2009 *Agroforestry Database: a tree reference and selection guide* version 4.0 (<http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp>)