

Salvadora persica (Siwak)

Species identity

Taxonomy

Current name: *Salvadora persica*

Authority: L.

Family: Salvadoraceae

Synonym(s)

Salvadora cyclophylla Chiov.

Salvadora indica Wight

Salvadora wightiana Planch.

Common names

(Afrikaans) : regte mosterdboom

(Amharic) : aday, yeharer-mefaqa

(Arabic) : aarak, arak, arrak, arraka, el Rak, kabats, shaow, shau, siwak

(Bengali) : jhal

(English) : mustard tree, salt bush, toothbrush tree

(French) : arbre a cure-dents, arbre a frotte-dents

(Hindi) : jhak, kharjal

(Somali) : ade, adhei

(Swahili) : msuake, mswaki, musuake

(Tamil) : kalawa, karkol, perungoli, ughaiputtai, vivay

(Tigrigna) : adai, hadai

Botanic description

Salvadora persica is an evergreen shrub or small tree to 6-7 m; main trunk erect or trailing with profusely branched, wide crown of crooked, straggling and drooping branches; young branches green in colour; bark slightly rough, greyish-brown on main stem, paler elsewhere. Leaves oblong-elliptic to almost circular, 3 x 7 cm, light to dark green, rather fleshy, sometimes with wartlike glandular dots and dense, rather loose hairs; apex broadly tapering to rounded, sharp-tipped; base broadly tapering; margin entire; petiole up to 10 mm long; leaves in opposite pairs. Flowers greenish to yellowish, very small, in loose, slender-branched axillary or terminal panicles, up to 10 cm long. Fruit spherical, fleshy, 5-10 mm in diameter, pink to scarlet when mature, single seeded; seeds turn from pink to purple-red and are semi-transparent when mature. The generic name was given in 1749 in honour of an apothecary of Barcelona, Juan Salvador y Bosca (1598-1681), by Dr Laurent Garcin, botanist, traveller and plant collector. The true specimen of this species came, as the specific tree name indicates, from Persia.

Ecology and distribution

Natural Habitat

S. persica is widespread, notably in thorn shrubs, desert floodplains, river and stream bank vegetation, and grassy savannahs. Prefers areas where groundwater is readily available, by riverbanks, on perimeters of waterholes, in seasonally wet sites, and along drainage lines in arid zones. Also found in valleys, on dunes and on termite mounds. The tree is able to tolerate a very dry environment with mean annual rainfall of less than 200 mm. Highly salt tolerant, it can grow on coastal regions and inland saline soils.

Geographic distribution

Native : Algeria, Angola, Cameroon, Chad, Egypt, Eritrea, Ethiopia, India, Iran, Israel, Jordan, Kenya, Libyan Arab Jamahiriya, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Oman, Pakistan, Saudi Arabia, Senegal, Somalia, South Africa, Sri Lanka, Sudan, Syrian Arab Republic, Tanzania, Uganda, Yemen, Republic of, Zambia, Zimbabwe.

Biophysical limits

Altitude: 0-1 800 m Soil type: Prefers clays but is found on loam, black soils and sand. Adapted to alkaline or very saline soils, usually clay-rich, and soils without salt.

Reproductive Biology

Seeds dispersed by animals and man after they eat the fruit.

Propagation and management

Propagation methods

Readily germinates from seed. Seeds exhibit no dormancy but the fruit pulp contains germination inhibitors that should be removed before sowing. The process of seed germination starts with imbibition in water at 30-35 deg. C for 24-72 hours, but under saline conditions the absorption of water is dependent upon osmotic pressure of the media and cell sap. Soaked, depulped seeds of *S. persica* will germinate in 24 hours. Seeds have been raised in the nursery for up to 3 years prior to transplanting in the field.

Tree Management

For high seed settings and seed oil content, harvesting is recommended 3 months after seed setting. This may be due to the utilization of food reserve in the cotyledons for the development of fruit pulp, and can be seen as the pulp content of fruit increases. Coppicing is advantageous for the tree's use as a fuel, and the branches are repeatedly cut to produce short stems that are harvested for toothbrushes. *S. persica* is grown in plantations or hedges. It is generally a slow-growing tree.

Germplasm Management

Seed storage is orthodox; seeds can be stored with low moisture content. There are about 3400 seeds/kg.

Functional uses

Products

Food: Fruits have a sweet, agreeable, aromatic, slightly pungent and peppery taste. They can be eaten raw, cooked, or dried and stored. Fruit with or without seeds is said to contain 1.7-1.86% sugars when ripe. Fermented drinks are also made from the fruit. The leaf is somewhat bitter and aromatic, with a taste likened to mustard. The leaves are also cooked as a sauce and eaten with couscous or as a green vegetable. Tender shoots, seeds and seed oil are also edible. Edible salts are obtained from ashes. Fodder: Leaves and young shoots are browsed by all stock, but normally cattle do not occur in the driest part of the *S. persica* distribution range and hence it tends to be valued more as a camel, sheep and goat forage. Leaves make good fodder as their water content is high (15-36%). The high salt content of the leaves is said to affect the taste of milk, but the leaves are said to increase lactation in cows. Apiculture: *S. persica* is reported as a good source of nectar. Fuel: The wood is sometimes used for firewood and charcoal. However, it is not used for cooking meat, as it leaves a foul taste. Timber: The wood is soft, white, easy to work and is not liable to termite attack. Used for coffins and clubs. Gum or resin: Resin that drips from the tree is supposedly useful for making varnish. Lipids: Seeds of *S. persica* contain 30-40% of a greenish-yellow, non-edible oil that has over 50% lauric and myristic acids. It has a high melting point and a disagreeable odour that disappears on purification. The most important aspect of the oil is the presence of a low percentage of C8 and C10 fatty acids that are of great economic significance. The oil is an alternative source of oil for soap and detergent industries. Medicine: Toothbrushes made from roots and small branches of about 3-5 mm diameter have been used for over

1000 years, especially by Islamic populations in India, Arabia and Africa. Several agents occurring in the bark and wood have been suggested as aids in prevention of dental caries, such as antimicrobial agents that suppress bacterial growth and the formation of plaque. The tooth stick is also said to relieve toothache and gum disease. Roots also are used for cleaning teeth and for relieving toothache. Decoctions of leaves are used as a mouthwash, and masticated leaves for tooth and gum problems. A decoction of the root is used to treat gonorrhoea, spleen trouble and general stomach-ache. Roots are also used for chest diseases or pounded and used as a poultice to heal boils. The bark is scratched and the latex used for treating sores. Seeds are used as a tonic, and seed oil is used on the skin for rheumatism. Other products: Crusted leaves placed in cow urine together with leaves of *Pergularia tomentosa* are used to clear hair from tanned hides, allowing the hair to be removed with a knife. Roots contain salvadorein, a urea derivative.

Services

Shade or shelter: Planted as shelterbelts and windbreaks to protect farm habitation, gardens and orchards. Reclamation: Planted in sand dune reclamation and also useful for reclaiming saline soils.

Pests and diseases

When *S. persica* occurs on river terraces, it is a preferred host of *Cistanche tubulosa*, an obligate phanerogamic root parasite. Defoliating larvae of several beetles attack the tree, and leaves are often attacked by the lepidopteran *Colotis ephiae*. The mite *Eriophyes* causes leaf gall. A number of fungi such as *Cercospora udaipurensis*, *Placosoma salvadorae* and *Sephogloeum salvadorae* damage the leaves.

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