

Opuntia ficus-indica

Mill.

Cactaceae

LOCAL NAMES

Afrikaans (boer(e) turksvy, doringblaar, grootdoringturksvy, kaalblaar); Arabic (beles); English (Indian pricklypear, Indian fig, mission prickly pear, prickly pear, Spanish tuna); French (Indischer Feigenkaktus, Figuier d'Inde); Italian (Pero pungente, fico d'India); Spanish (Tuna, chumbera, higuera de las Indias)

BOTANIC DESCRIPTION

Opuntia ficus-indica is a shrub or tree up to 5 m tall, forming sturdy trunk with age. Joints flattened, narrowly elliptic to ovate, varying in size, 30-60 cm long and 6-12 cm broad, attenuate below, often acute above, fairly thick, glaucous-green; areoles small to large, raised and woolly, with 3-6 radiating, unequally long, greyish white spines up to 3 (-10) cm long, straight or occasionally slightly curved, or spineless (in older plants and some cultivars).

Leaves, if developed, are minute, subulate and early deciduous.

Flowers about 7 cm long; hypanthium broadly cylindrical, contracted below, with numerous raised areoles spirally arranged, densely woolly and filled with glochidia, occasionally also bearing small spines and minute leaves; petaloid segments yellow or orange.

Fruits ellipsoid, about 7 cm long, reddish, succulent, edible.

Seeds about 5 mm long.

There is a distinction between the spiny naturalized pears, which are invasive weeds and the cultivated, spine-less ones. The latter exists in several cultivars eg. *O. ficus-indica* forma *inermis* *O. ficus-indica* forma *amyclaea* and *O. ficus-indica* forma *elongata*.



Flower of *Opuntia ficus-indica*. (Scheinvar L.)



Rooted plant from a cladode 9 months after planting. (Inglese P.)



The red fruit of the 'nudosa' cultivar from South Africa. (Wessels A.)

ECOLOGY

Prickly pears are generally not confined to deserts. Many grow in grasslands, woodlands and some in moist tropical forests. *O. ficus-indica* in particular is native to sub-tropical uplands. The development of *O. ficus-indica* is restricted in the Mediterranean basin by the winter cold temperatures. The spiny, naturalized pear is recorded as a pest in part of South Africa and Australia.

BIOPHYSICAL LIMITS

Altitude: 0-2 600 m.

Mean annual temperature: -18-26 deg C.

Mean annual rainfall: 150-600 mm

Soil type: Drainage is an important ecological factor: *O. ficus-indica* like most cacti, is very sensitive to lack of oxygen in the root zone and therefore cannot withstand any prolonged waterlogging. It thus tends to avoid clay soils which may be temporarily saturated, poorly drained or waterlogged. It generally prefers deep sandy soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: Mexico

Exotic: Algeria, Brazil, Chile, Eritrea, Ethiopia, India, Israel, Italy, Kenya, Libyan Arab Jamahiriya, Morocco, Portugal, South Africa, Spain, Sudan, Tanzania, Tunisia, Uganda, US



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: The prickly pear fruit ranges in flavour from sour to very sweet. The fruit, known as tuna in Spanish and sabra in Arabic, is eaten throughout Latin America, the Mediterranean and the Middle East. There is commercial tuna production in Italy, Spain, Sicily, Tunisia, Mexico and South America, especially Chile. The tender young pads (Nopalitos) are eaten as a vegetable particularly during the lent season.

Fodder: With decline in demand for the tender young pads at the end of the lent, they are alternatively used as dairy cattle fodder. Local dairymen maintain that cactus pads are essential for good lactation, impart a better flavour and quality to the milk and enhance better quality for butter. The most extensive use of cactus occurs in Brazil where *O. ficus-indica* has been grown as a fodder for more than 80 years.

SERVICES

Erosion control: Cactus hedges play a major role in erosion control and land-slope partitioning particularly when established along contours. The hedge is a physical obstacle to runoff, favoring temporary local runoff accumulation and silting, thus preventing regressive erosion. In arid lands subject to wind erosion, cactus hedges are an easy, cheap and efficient way of prevention and control of top soil loss and accumulation of wind-borne deposits.

Reclamation: Planting shrubs and particularly cacti is one of the easiest to rehabilitate degraded landscapes. Cacti, because of their easy establishment by vegetative propagation, are amenable to the rehabilitation of lands that could not be reclaimed through conventional agricultural methods because of their steep slope and other physical factor limitations. In Tunisia and Algeria for instance, stony and rocky slope have been rehabilitated by planting cacti on contours.

Soil improver: Cacti help in maintaining soil fertility via their geobiogenic and trace element cycling activities, enriching the top soil in organic matter and improving its structure and the stability of its aggregates, hence permeability and water uptake balance.

Boundary or barrier or support: The thorny varieties of *O. ficus-indica* such as *forma amyclaea* and *forma elongata* are often used as defensive hedges for the protection of gardens, orchards and olive groves throughout North America and in parts of Italy and Spain. These hedges demarcate boundaries as well.

Other services: The cactus hedges when established in double rows, play an important part in landscape organization, and in the local socio-economy, as evidence of land rights and land ownership in countries or regions where no land registry exists.

TREE MANAGEMENT

Plantations are established at different levels according to the utilization and local conditions. In traditional fruit production operations, plants are established quite densely, with some 5 000 or more individual plants/ha. Fodder planting is governed by the conditions under which the exploitation, harvesting and transportation is done: 3 000-5 000 plants/ha is common. Modern plantations, under mechanized cultivation, harvesting and transportation to the site of consumption by tractor and trailer, are planted at a density of 1 000-2 000 plants/ha, with a spacing of 5-7 m between the rows and 1-2 m along the rows.

Maintenance and weeding are done by 2-4 shallow disk plowings per year in the fall and spring, with or without the inclusion of manure.

Plantations are exploitable after 4-5 years and fully grown after 7-10 years; when well managed, some are known to have remained productive for more than 50 years. Irrigation calls for some precautions, direct contact of the aerial parts of the plants with water must be avoided in order to prevent cryptogamic and bacterial diseases.

By pruning and grazing, the plants are encouraged to develop trunks up to 3 m high and are then left to branch freely, in time forming a dense canopy 4-5 m high.

PESTS AND DISEASES

In the Mediterranean basin cacti have no serious enemies, such as the prickly pear moth (*Cactoblastis caatorum*), prickly pear cochineal insect (*Dactylopius opuntiae*) and the prickly pear weevil (*Metamasius opuntiae*). These have been used in some countries for biological control of cactus invasions. These insects, although present in the basin, have had no serious impact.

Other occasional pests of the prickly pear include fruit fly, which may be a limiting factor in fruit production, of greater impact may be the bacterial rot, the snails, and occasionally slugs in the humid and sub-humid zones.

FURTHER READNG

Bein E. 1996. Useful trees and shrubs in Eritrea. Regional Soil Conservation Unit (RSCU), Nairobi, Kenya.

Brutsch MO and HelmuthGZ. 1990. The prickly pear (*Opuntia ficus-indica*[Cactaceae]) in South Africa: utilization of the naturalized weed and of the cultivated plants. *Economic Botany*. 47(2): 154-162.

FAO. 1988. Traditional food plants: a resource book for promoting the exploitation and consumption of food plants in arid, semi-arid and sub-humid lands of East Africa. FAO food and nutrition paper 42. FAO, Rome.

Le Houerou HN. 1994. The role of cacti (*Opuntia* spp.) in erosion control, land reclamation, rehabilitation and agricultural development in the Mediterranean Basin. *Journal of Arid Environments*. 33: 135-159.

Russel CE. 1988. Stabilizing productivity of semi-arid regions: the case for cactus/woody legume silvopastoral systems. Paper presented at the international range land Development symposium. Corpus Christi, Texas, Feb 25, 1988.

SUGGESTED CITATION

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. Agroforestry Database:a tree reference and selection guide version 4.0 (<http://www.worldagroforestry.org/af/treedb/>)