

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 sustainable shrub species

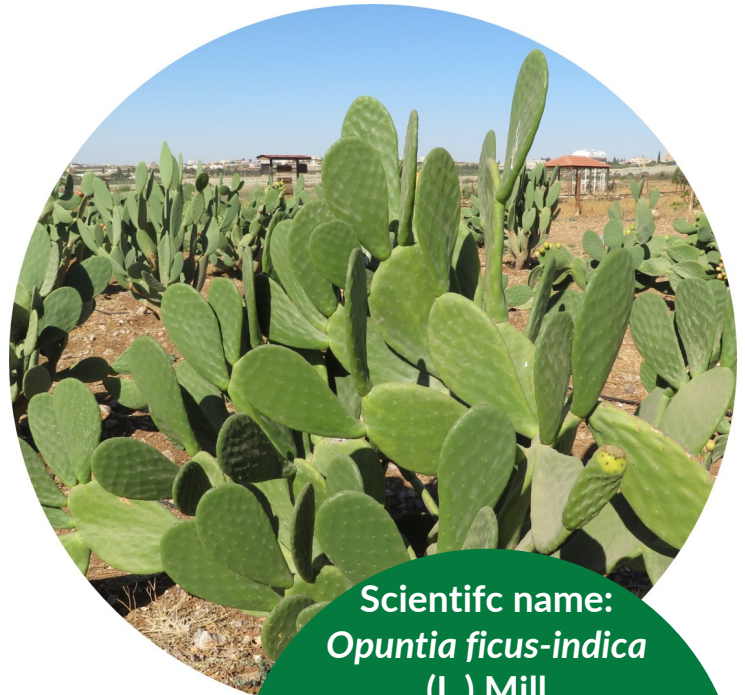
Opuntia ficus-indica (L.) Mill: a sustainable fodder plant for the dry areas

Opuntia ficus-indica (L.) Mill is a drought-tolerant shrubby plant with nutritional and health benefits. Able to acclimate to harsh environments, it can produce fodder with minimum inputs and can be used as a source to fill gaps in the feeding of livestock.

Cactus pear is widely cultivated in arid and semi-arid regions worldwide, with increasing importance as a fodder crop, especially during periods of drought and shortage of other forage plants. It is an evergreen shrubby or tree-like plant up to 6 m high. Stem segments are broadly obovate or oblong to speculate, flattened, green in color, and covered by a very thin waxy layer.

Benefits:

- Drought-tolerant
- Evergreen plant
- Easy to establish, maintain, and use
- Multipurpose species
- High fodder potential
- Resolves livestock watering in the dry areas
- High palatability
- High in soluble carbohydrates



Scientific name:
Opuntia ficus-indica
(L.) Mill

Common names:
Cactus pear, Spineless cactus,
Indian fig

Locations: Mexico, Latin
America, the Mediterranean
Basin, Middle East, northern
& southern Africa

Cactus pear has great potential to improve productivity in arid and semi-arid areas. The Crassulacean Acid Metabolism photosynthetic system results in traits that are adapted to tolerate severe drought conditions. This makes cactus pear an ideal “drought insurance”. Due to its shallow and widespread root system, the plant is willing to exploit limited rainfall to its fullest potential. Cactus pear can provide feed; it can produce a large quantity of palatable green forage in the most difficult seasons throughout the year; and it also provides much needed energy, minerals, and vitamins. The succulent cactus cladodes (pads) also serve as a source of water for livestock in the dry areas.



Cactus pear chopping manually with knives and by choppers



Cows feeding on cactus pear based ration



Goats feeding on cactus pear based ration

Effective utilization

Globally, cactus pear is commonly used as a feed crop in Mexico, South Africa, North Africa, and Latin America. Direct grazing of plants should be avoided, as the plants can easily be destroyed by animals. Cactus pear feeding is instead typically done through cut and carry of adult cladodes. As an evergreen feed crop it can be used in different forms throughout the year. For livestock, cactus chopping can be done either manually with knives or by low-cost, locally made machines propelled using human power however, some choppers are motorized. Cactus cladodes can be cut and fed fresh directly to animals or can be used to make silage or feed blocks.

Nutrient values of cactus pear depend on the accession, the age of the cladode, the cladode order, the harvesting season, and the growing conditions (e.g. fertilization). Cladodes are high in water, carbohydrates, digestible organic matter content (DOMD), ash, calcium, and vitamin A, but they are low in crude protein (5-7%), phosphorus (0.1-0.3%), and fibers (25-35%). Thus, to avoid causing diarrhea and animal weight loss it is necessary to provide protein-rich and fibrous feeds such as hay and straw before or together with the cactus.

Establishment and management

The most common means of propagation of cactus pear is a vegetative one, through the use of cladodes. Robust and healthy cladodes of medium to large size can be collected from healthy plants that are 1–2 years old. These cladodes should be placed in a dry, shaded place for two weeks to form callus tissue over the cut edge. When planting, half to two-thirds of the cladodes must be placed slightly tilted in the soil in the direction that will provide the most sunlight. It is highly recommended to mix manure with soil while planting. Planting in the spring will promote greater root growth and will reduce the risk of frost damage. Planting density for semi intensive forage production systems is from 2,000 plants ha⁻¹ and up. Under natural conditions, a hectare can produce up to 20 t DM year⁻¹. Nevertheless, the fodder production of cactus pear is expected to be variable over the first three years before obtaining a more constant production.

Effective Management

- Planting when the risk of frost is minimum
- Cladodes must be planted to receive full sunlight
- Add 3-5 kg of manure per cactus plant
- Thinning is recommended to increase penetration of sunlight and air
- Avoid direct grazing
- Chop cladodes before feeding
- Supplement with crude protein and fiber

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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.