

Khejri: A Sacred Tree

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India is a land of diverse flora and fauna, where trees hold immense cultural, ecological, and economic importance. Among the many trees that grace the Indian landscape, the Khejri (*Prosopis cineraria*) stands out for its unique qualities and deep-rooted significance. This deciduous tree, native to the arid regions of India, has been revered for centuries and continues to play a vital role in the country's ecological balance and sustainable development. The tree is frost and drought resistant and tolerates extreme temperature ranging from 40–45 °C in summer to less than 10 °C in winter. It is capable of growing in areas of rainfall ranging from 100–600 mm. The tree can withstand the hottest winds, the driest season and stay alive where other plants cannot survive. It can be safely said that khejri is a tree of the desert.

The tree grows on a variety of soil but prefers alluvial, consisting of various mixtures of sand and clay. It can tolerate moderate salinity of soil but dries up in very high salinity. It also acts as an effective soil binder and is a great stabilising agent in sandy soils. Khejri is known by many local names in zonal districts of Rajasthan, popularly it is called khejri or *khejra*. It is also called *jant* or *janti* in areas like Alwar, Sikar, Jhunjhunu, Churu, Jaipur, Bharatpur, Karoli, Dholpur, Samal village in Udaipur, and Banswara and Dungarpur districts of Rajasthan. Each part of the tree, from root to pod, finds some use or another. The extent of its importance is highlighted in its recognition as the 'state tree' of Rajasthan. Since all parts of khejri are useful it is called the '*kalpavriksha* of the desert'. It is also known as the 'king of the desert' and the 'wonder tree'. It is a symbol of socio-economic development in the area. It is a socially preferred tree species and is regarded as the lifeline of desert dwellers. Owing to its



multiple uses and services rendered, khejri has been the most common agroforestry species for centuries. The unripe pods are green, and locally known as 'sangria' or 'sangar'. The dried green beans of the khejri are stored and used for cooking round the year. It is one of the ingredients of the famous panchkuta, a local dish cooked with five vegetables. The dried mature pods, locally called 'kho-kha', have a sweetish pulp and are also edible and much liked by local children. They are used as fodder for livestock. Even the bark having an astringent bitter taste was reportedly eaten during severe famines of 1899 and 1939. The gum of the tree obtained during May and June is nutritive and good to taste.

The Role of Khejri in Human and Environmental Mitigation

Ecological Significance

Soil Conservation: Khejri plays a vital role in preventing desertification and conserving the fragile soil of the Thar Desert. Its extensive root system helps bind the soil, reducing erosion caused by wind and water. As a result, the tree helps maintain the integrity of the desert ecosystem, preserving the delicate balance of sand dunes and preventing land degradation.



Wildlife Habitat: Khejri serves as a valuable habitat for various desert-dwelling wildlife species. The dense canopy provides shelter and nesting sites for birds, while the tree's pods serve as a source of food for several desert animals, including antelope, gazelles, and camels. The presence of Thar Shobha contributes to the overall biodiversity of the Thar Desert.

- **Fuelwood and Timber:** The dense wood of Khejri is highly valued for fuelwood, providing a sustainable source of energy for cooking and heating in rural households. Additionally, the timber derived from Khejri is used for construction, furniture making, and various local crafts, contributing to rural economies.
- **Fodder for Livestock:** Khejri leaves and pods serve as a nutritious fodder source during times of fodder scarcity. Livestock, particularly camels, goats, and sheep, heavily depend on Khejri foliage for sustenance in arid areas.

Environmental Mitigation and Conservation

Khejri offers numerous environmental benefits, contributing to ecological balance and mitigating environmental challenges:

- **Carbon Sequestration:** Khejri has the ability to sequester carbon dioxide from the atmosphere, helping to mitigate the effects of climate change. Its extensive root system aids in soil carbon storage, enhancing soil fertility and productivity.

- **Soil Conservation:** Khejri's deep-rooted system prevents soil erosion and helps stabilize the desert ecosystem. It aids in maintaining the structure and integrity of the soil, thereby reducing land degradation and desertification.
- **Nitrogen Fixation:** Khejri, through its symbiotic relationship with nitrogen-fixing bacteria, has the unique ability to convert atmospheric nitrogen into a form that can be utilized by other plants. This process improves soil fertility and supports the growth of other vegetation in arid areas.

The Bishnoi community in Rajasthan, known for their deep reverence for nature, has played a crucial role in the conservation of Khejri trees. They have a longstanding tradition of protecting these trees and have even sacrificed their lives to prevent their destruction.

Varieties of khejri in india

Exploring the Varieties of Khejri Trees in India

1. *Prosopis cineraria* var. *cineraria*: This is the most common variety of Khejri found in India. It has a moderate-sized, spreading crown with branches that extend horizontally. The bark is rough and greyish-brown, providing protection against extreme temperatures. The leaves are compound and double-pinnate, composed of numerous small leaflets. It exhibits excellent drought tolerance and is known for its nitrogen-fixing abilities.
2. *Prosopis cineraria* var. *rajasthanica*: This variety is native to the arid regions of Rajasthan, particularly the Thar Desert. It has a distinctive morphology, with a tall, straight trunk and a broad crown that provides ample shade. The leaves are smaller in size compared to other varieties, and the tree exhibits exceptional adaptability to arid conditions. *Prosopis cineraria* var. *rajasthanica* plays a crucial role in



preventing desertification and supporting local biodiversity.

3. *Prosopis cineraria* var. *microphylla*: This variety is found in the arid regions of Gujarat and parts of Maharashtra. It is characterized by smaller-sized leaves and a more compact growth habit. *Prosopis cineraria* var. *microphylla* is known for its ability to withstand high salinity levels in the soil, making it suitable for coastal regions with saline conditions. It plays a crucial role in stabilizing coastal ecosystems and providing protection against coastal erosion.
4. *Prosopis cineraria* var. *albida*: This variety is found in parts of South India, particularly in the arid regions of Karnataka and Andhra Pradesh. It is characterized by a smaller stature and a bushier appearance compared to other varieties. *Prosopis cineraria* var. *albida* is highly valued for its nitrogen-fixing abilities, contributing to soil fertility and supporting agricultural practices in these regions.

Characteristics of Thar Shobha:

1. **Drought Tolerance:** Thar Shobha showcases exceptional resilience to prolonged droughts, which are a common occurrence in the Thar Desert. It possesses deep-rooted systems that allow it to access water from deeper layers of the soil, ensuring its survival during prolonged dry spells.

2. **Leaf Morphology:** Thar Shobha exhibits distinct leaf morphology compared to other Khejri varieties. Its leaves are smaller in size and have a unique shape, resembling elongated and feathery structures. These modified leaves help reduce water loss through transpiration, enabling the tree to conserve moisture in the arid environment.
3. **Canopy Structure:** The canopy of Thar Shobha is denser and more compact compared to other Khejri varieties. This unique structure provides increased shade and helps protect the tree from excessive heat and intense sunlight, a crucial adaptation for survival in the scorching desert.



Propagation

Khejri mainly propagates through seed germination. Regeneration through seeds is confined to moist climate; in places that are dry, the tree regenerates itself using root suckers, which are also produced on removal of the main trunk. The trees can also be successfully raised by sowing, in conjunction with field crops in irrigated lands. The root system of khejri is long and well-developed and penetrates deeper and deeper for subsoil water. Growth above the ground is slow. Very deep roots help in securing firm footing and in obtaining moisture from deep soil layers.

Diseases of khejri and their management

Khejri (*Prosopis cineraria*) is a hardy tree species native to arid and semi-arid regions of India. While it exhibits natural resilience to various environmental stressors, it can be susceptible to certain diseases that can impact its health and productivity. Effective disease management strategies are crucial for preserving the health and vitality of Khejri populations.

1. **Gummosis** (Bacterial Infection): Gummosis is a bacterial infection caused by *Xanthomonas albilineans*. It is characterized by the formation of gummy exudates on the branches and trunk of Khejri trees. Gummosis can weaken the affected tree, leading to reduced growth and productivity.

Management

- Pruning: Infected branches and trunks should be pruned and removed to prevent the spread of the bacteria.
 - Sanitation: Proper sanitation practices, such as removing and disposing of infected plant material, can help reduce the disease's prevalence.
 - Chemical Control: In severe cases, copper-based bactericides may be applied to affected trees following appropriate guidelines.
2. **Wilt** (*Fusarium oxysporum*): Wilt disease caused by the fungus *Fusarium oxysporum* affects the vascular system of Khejri trees, leading to wilting, yellowing of leaves, and eventually tree death. It primarily spreads through contaminated soil or infected plant material.

Management

- Soil Sterilization: Soil sterilization techniques, such as solarization or fumigation, can help reduce the pathogen load in the soil and limit disease transmission.

- Crop Rotation: Practicing crop rotation with non-host plants can help break the disease cycle.
 - Resistant Varieties: Selecting and promoting disease-resistant Khejri varieties can be an effective long-term strategy for disease management.
3. **Leaf Spot** (*Alternaria* spp. and *Cercospora* spp.): Leaf spot diseases caused by *Alternaria* and *Cercospora* fungi can lead to the development of circular or irregular lesions on Khejri leaves. Severe infections can cause premature leaf drop, defoliation, and reduced photosynthetic capacity.

Management

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Insect pests of khejri

Khejri (*Prosopis cineraria*) can face insect pest infestations that can impact its growth and productivity.

4. **Stem Borer** (*Adetomyrrhynchus* sp.): Stem borers are the larvae of certain beetles that tunnel into the stems of Khejri trees, causing damage to the vascular tissues. Infestation by stem borers can lead to wilting, dieback, and even tree mortality.

Management:

- Cultural Practices: Regular pruning and removal of infested branches can help control the spread of stem borers.
- Biological Control: The use of natural enemies such as parasitic wasps or predators that prey on stem borers can be effective in managing their populations.

5. **Pod Borer** (*Maruca vitrata*): Pod borers are the larvae of moths that infest the pods of Khejri trees, leading to damage and reduced pod quality. Infested pods often show signs of tunneling and frass (excrement) inside.

Management

- Cultural Practices: Regular inspection and removal of infested pods can help reduce pod borer populations.
- Biological Control: Encouraging natural predators and parasitoids that attack pod borers can provide effective control.
- Chemical Control: In severe cases, insecticides approved for use on Khejri may be used following recommended application rates and timing.

6. **Leafhoppers** (*Empoasca* spp.): Leafhoppers are sap-feeding insects that can cause yellowing and curling of Khejri leaves. Heavy infestations can lead to reduced photosynthetic activity and stunted growth.

Management

- Cultural Practices: Regular monitoring and early detection of leafhopper populations can help prevent outbreaks.
- Biological Control: Beneficial insects, such as ladybugs and predatory wasps, can naturally control leafhopper populations.

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