

Phog: A Glorious Shrub of Hyper Arid Zone

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Phog (*Calligonum polygonoides* L.) is a woody perennial shrub predominantly found on sand dunes and sandy plains in the hyper-arid regions of Rajasthan. Ecologically, it is a vital species for the Thar Desert due to its remarkable adaptive traits and resilience to various abiotic stresses. Phog thrives in areas receiving annual rainfall between 150-400 mm, demonstrating tolerance to temperature extremes—from 0°C during winter to as high as 50°C in summer. Its in-built mechanism to combat multiple environmental stresses make it an essential species for the region.



Phog plant on sand dunes in Bikaner District

With a deep and expansive root system, Phog acts as an effective 'sand binder,' preventing erosion and stabilizing sand dunes. This slow-growing, multi-branched shrub typically reaches 1-2 meters in height, but its roots can penetrate as deep as 7 meters, making it perfectly suited for the xeric environment.

Phog holds considerable ecological and economic value, as various parts of the plant serve diverse purposes. During drought and famine, it provides critical fodder. Its ability to stabilize sand dunes and conserve soil makes it integral to the arid ecosystem. Phog also serves as a live hedge around agricultural fields, acting as a shelterbelt. Its thick stems and roots are highly valued as fuelwood, especially for industries, owing to their high calorific value and minimal smoke production. Phog wood is in high demand for Plaster of Paris industries, while the charcoal made from its wood is preferred by goldsmiths. The wood is also used by local inhabitants for building huts, animal sheds, and scaffolding for wells.

The plant reproduces through root suckers and is easily propagated by cuttings, layering, and seeds. Farmers plant Phog on farm bunds and field boundaries to demarcate agricultural land and protect crops from stray animals. In an alley cropping system, the ideal planting geometry in hyper-arid zones is 1m x 5m. After two years of establishment, Phog can be



grazed by livestock. It produces 1-2 kg of green fodder per plant, which is palatable to goats, sheep, camels, and cattle. A mature 6–7-year-old Phog plant yields approximately 15 kg of biomass annually, including fuelwood, foliage, and flower buds. In December-January, the plant sheds 70–80% of its foliage, behaving as a deciduous species.

By late February, when the night temperature exceeds 12°C, Phog enters a phase of rapid growth, producing abundant flowers and seeds from March to May. This period marks the harvest of Phog's flower buds, known as "Phogala." Pruning in June leads to a post-monsoon flush of foliage in August-September, doubling the biomass harvest.

Phog's flower buds, locally called Phogala, are consumed in dried form, often with curd-based dishes. A traditional dish called "Rayata" is made by mixing Phogala with curd after light boiling or frying. In addition to being a food source, Phogala possesses medicinal properties. Rich in phenolic compounds and antioxidants, it has a cooling effect and is used to treat sunstroke. Phog has also been included in the 'Charak Programme,' aimed at helping army personnel in the arid region combat the effects of extreme heat.

Despite its numerous benefits, Phog is now endangered due to overexploitation for fuelwood and changes in traditional farming practices. Farmers in western Rajasthan are removing Phog from sandy terrain to grow crops, especially in areas with increased irrigation infrastructure. Consequently, Phog's natural populations have declined, making it vulnerable in its habitat.

Given its exceptional adaptive traits, its role in sand dune stabilization, fuelwood provision, fodder production, human consumption, and medicinal properties, Phog's natural habitat must be conserved. Promoting Phog plantations is crucial for the welfare of desert dwellers and the sustainability of the desert ecosystem in the face of climate change.