

Nardostachys grandiflora DC

Syn. *Nardostachys jatamansi* DC

Valerianaceae

Ayurvedic name	Jatamansi
Unani name	Sumbul-ut-teeb
Hindi name	Jatamansi
Trade name	Jatamansi, Spikenard
Parts used	Rhizomes and roots



Nardostachys grandiflora –
a plant

Therapeutic uses

Jatamansi is a nervine tonic, hypotensive, antiseptic, stomachic, carminative, tranquilizer, sedative, anti-bacterial, antispasmodic, and stimulant. It is useful in the treatment of insomnia, hysteria, convulsions, vertigo, and is also used as a cardiac tonic.

Morphological characteristics

Nardostachys species is an erect, hairy, perennial rooted herb, 10–60 cm high, with stout woody main root. Rootstock is thick, long, covered with remnants of petioles of withered leaves. Stems are generally pubescent upward, and glabrate below. Leaves are radical as well as cauline. Radical leaves are large (15–22 cm × 1.5–2.5 cm), six to eight in numbers, longitudinally nerved, slightly pubescent, and narrow down into the petiole, while cauline leaves are sessile, occur in two to three pairs, 2.0 cm × 0.6 cm in size, decrease in size from base to top, and are oblong or sub-ovate



Nardostachys grandiflora—
closer view

in shape. Rhizome is dark brown, tapering, and densely covered with the remains of old leaves' bases, giving the appearance of a heavy beard, and hence the name *jatamansi*. The fibrous rhizome may be 6–9 cm long with about 20–30-cm-long yellowish taproot. A single root may bear 30–50 rhizomes.

Floral characteristics

Flowering shoot is 30–40 cm high and bears 40–50 flowers at summit in three to seven condensed cymes. Flowers are campanulate, pinkish red to bluish white. Corolla tube is 6 mm long and hairy. Fruit is covered

with 4-mm-long hairs and crowned by the acute, often dentate, calyx teeth. Flowering occurs from June to August, according to elevation, while fruiting occurs from September to October. Seeds are collected in October when they turn pale brown in colour.

Distribution

The species occurs in montane and sub-alpine zones of the Himalayas, from Kumaon to Sikkim, Nepal, and Bhutan, from 3000 m to 5000 m altitude in steep open areas. It is more frequent on the western aspects in alpiners, on moist rocky and undisturbed slopes or on stones with coarse sandy loam soils, occurring usually in random forms.

Climate and soil

The plant generally grows in steep hills with 40°–70° inclined slopes and is more frequent on open, stony, and grassy slopes. It is more abundant in the western cooler slopes. Usually it occurs on primary litter and soil deposits as pioneer species. For the cultivation of *Nardostachys jatamansi*, loamy porous soil rich in organic matter like humus is considered the best. Thick humus layer promotes rapid growth and profuse branching.

Propagation material

Seeds are the best propagation material, although vegetative propagation may be undertaken to get a crop within two to three years, if sufficient mother plants are available. However, initially the planting stock has to be raised through seeds only. Seeds have 80% germination rate when sown in a mixture of soil, sand, and FYM (farmyard manure)/compost in equal quantities in styrofoam trays.

Agro-technique¹

Nursery technique

- *Raising propagules* The crop can be grown by raising a nursery in May, from seeds or vegetative rhizomes separated from the mother plants. Seeds may be sown manually in small plots of 1 m × 1 m size or in styrofoam trays in the polyhouse. Seed germination varies between 74% and 80%, and occurs within 12–30 days when planted at a depth of 0.5 cm in sandy soil inside the polyhouse.
- *Propagule rate and pretreatment* Approximately 600 g of seeds are required for raising seedlings for transplanting in 1 hectare of land. Both seeds and rhizomes are treated with GA₃ (gibberellic acid; 100 PPM [parts per million] and 200 PPM) for 48 hours for rapid germination/sprouting.



Nardostachys grandiflora –
crop view

Planting in the field

- *Land preparation and fertilizer application* For cultivation, land is prepared by digging or ploughing well, prior to summer season. Soil is tilled thoroughly and beds are left open for a week for solarization. After the land preparation, forest leaf litter/compost/FYM is added to the beds before seedlings or vegetative rhizomes are transplanted.

¹ Agrotechniques study carried out by High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar, Garhwal, Uttarakhand

Raised beds are found suitable for good biomass production at high altitudes. A minimum of about 40 quintals FYM/forest leaf litter as basal dose is required for the better growth of plants and good biomass production. Only well-decomposed FYM may be used if sufficient forest leaf litter is not available.

- *Transplanting and optimum spacing* The seedlings may be transplanted to the main field about 50–60 days after germination at a spacing of 20 cm × 20 cm or 20 cm × 30 cm. Manuring should be done about 15 days before the commencement of transplantation work. After manuring, hoeing and earthing-up may be carried out. In all, 0.2–0.25 million saplings are needed per hectare. There is considerable mortality during plantation and early growth (20%–30%). So additional nursery plants may be kept ready for filling gaps in the second year.



Nardostachys grandiflora –
tender growth stages

- *Intercropping system* The plant is grown as a mono crop, and intercropping practices have not been found suitable due to harvesting of roots and rhizomes; hence, intercropping is not recommended.
- *Interculture operations and maintenance practices* Manure or forest litter (60–80 quintals) is recommended for 1 hectare of land. Fifty per cent manure is used during the first year and rest is applied in two divided doses during the second and third years.
- *Irrigation practices* Initially, watering should be done on alternate days at lower altitudes (2000 m) till proper rooting is developed. Later, watering is done at weekly intervals during dry season. Constant humidity should be maintained in the soil avoiding waterlogging.
- *Weed control* Manual weeding is carried out (fortnightly) during early growth season, and later at monthly intervals or as and when required to keep the crop weed-free.
- *Disease and pest control* No diseases, insects, nematodes or physiological disorders have been observed in this crop.

Harvest management

- *Crop maturity and harvesting* Maturity period of the plant depends on the propagules used. Plants raised through seeds may take three to four years to mature, while the plants raised through splitting of

rhizomes mature in two to three years and are ready for harvesting earlier. To obtain good active chemical ingredients, plants must be collected after senescence in October.

- *Post-harvest management* After harvesting in October, the roots should be washed and well dried in shade to reduce their moisture content to 8%–10%. Dried material should be filled in jute bags or wooden boxes, which can be stored in dry godowns. During storage, hairs on root separate due to rubbing, and are often used as *dhoop*.
- *Chemical constituents* The dried rhizomes are steam-distilled to yield 1.5%–1.9% of a pale yellow essential oil, commercially known as spikenard oil, emitting a pleasant odour.
- *Yield and cost of cultivation* At the experimental site at an elevation of 3600 m, the recorded yield was 835 kg/hectare dry roots; plantation was raised through seedlings. At lower altitudes (2200 m), the recorded yield was 670 kg/hectare dry weight after third year of cultivation; plantation was raised through seedlings. The yield may increase in subsequent years if the plant is not harvested for one more year. Input cost is estimated to be Rs 202 000 hectare for three years at lower altitudes.

Market trend – 2006/07

- Market price: Rs 170 per kg
- Market demand: 600 tonnes