

# *Zanthoxylum armatum* DC

Syn. *Zanthoxylum alatum* Roxb.

## Rutaceae

Ayurvedic name	Tejovati, Tumburu (fruit)
Unani name	Kabab-e-Khanda
Hindi name	Tejbal, Nepali dhaniya
Trade name	Timru, Timur
Parts used	Stem bark, fruits, and seeds



*Zanthoxylum armatum*

### Therapeutic uses

Fruits, seeds, and bark of tejbal are used as aromatic tonic in dyspepsia and fever. Fruits and seeds are beneficial in dental troubles, thus used to prepare dental paste and powder. Tender twigs are used to brush teeth and used as a remedy for toothache. The essential oil from fruits (known as Wartara oil) has deodorant and antiseptic properties.

### Morphological characteristics

Timru is an evergreen, thorny shrub or small tree, attaining a height up to 6 m. Leaves are 4–20 cm long, imparipinnate, pungent, and aromatic with glabrous, narrowly winged petiole having two stipular prickles at the base. Leaflets are lanceolate, glabrous on the underside, and occur in two to six pairs. The plant can be recognized by its shrubby habit, dense foliage, with pungent aromatic taste, prickled trunk and branches, and small red, sub-globose fruits.

**Floral characteristics**

Flowers occur in dense terminal or sparse axillary panicles and are green to yellow in colour. Calyx consists of six to eight sub-acute lobes. Stamens are about six to eight in number. Ripe carpels or follicles are usually solitary, pale red, and tubercled. Seeds are globose, shining, and black. Flowering occurs from March to May, while fruiting occurs from July to August.

**Distribution**

The species is found in hot valleys of subtropical Himalayas, from trans-Indus areas to Bhutan, up to an altitude of 2400 m, and between 700 m and 1000 m in the Khasi Hills. It also occurs in the hills of Ganjam and Vizagpatnam at an altitude of about 1500 m.



*Zanthoxylum armatum* – plant

**Climate and soil**

The plant is adapted to subtropical climate of lower warm valleys of the Himalayas with sufficient rainfall. It grows well in open pastures and secondary scrub forests. Loamy or clayey soil rich in organic content is preferred for its cultivation.

**Propagation material**

Freshly harvested seeds are best for the large-scale cultivation of *Zanthoxylum* species. Mature seeds can be collected in June–July. In the absence of sufficient seeds, terminal stem cuttings may be used as propagules.

**Agro-technique<sup>1</sup>****Nursery technique**

- *Raising propagules* The crop can be raised by developing a nursery or by directly sowing in the main field. The seeds are sown in August–September in polybags (nursery) or main field. Stem cuttings may also be planted in the nursery during monsoon in July–August. The

<sup>1</sup> Agro-technique study carried out by

- Regional Station, National Bureau of Plant genetic Resources, Dist Niglat, Nainital, Uttarakhand.
- RRL, CSIR, Itanagar, Arunachal Pradesh

seeds germinate in 20–30 days after sowing. The seedlings attain a height of 20–30 cm by June–July, when they can be transplanted to the main field.

- *Propagule rate and pretreatment* About 2–3 kg seeds are required to raise a nursery for plantation on 1 hectare. Direct sowing may require about 30–50 kg seeds per hectare at a spacing of 50 cm × 50 cm. No seed treatment is necessary before sowing. However, stored seeds may require cold stratification for up to three months and may germinate in February– March.

### **Planting in the field**

- *Land preparation and fertilizer application* Land may be ploughed two to three times using disc harrow and cultivator to make it friable and weed-free. About 10–12 tonnes per hectare of FYM (farmyard manure) should be mixed with the soil as a basal dose before transplantation.
- *Transplanting and optimum spacing* After 10–12 months of growth in the nursery, transplanting in the field can be done during May–June if irrigation facilities are available. Otherwise, it is done in July–August (monsoon season) under rain-fed conditions. A spacing of 50 cm × 50 cm is recommended, which accommodates about 40 000 plants per hectare.
- *Interculture and maintenance practices* Weeding should be carried out during the initial establishment phase, 30–45 days after transplanting, and again at 60–80 days after transplanting. Later, weeding may be carried out only as and when required.
- *Intercropping system* The plant can be grown as a mono crop as well as a mixed crop with herbaceous species.
- *Irrigation practices* The plant requires frequent irrigation during the establishment stage. Once established, the plants are able to survive in rain-fed conditions and only life-support irrigation is required during the summer months.
- *Disease and pest control* The crop is generally free from any disease, insect or nematode attack, and physiological disorders.



*Zanthoxylum armatum* – nursery

**Harvest management**

- *Crop maturity and harvesting* Flowering appears on five-year-old plants in March–May. Fruiting occurs in July–August. The crop, thus, takes five to seven years to mature. Fruits are collected in May–June. Stem pieces, if needed, may be cut during January–February before the flowers appear.
- *Post-harvest management* The herbage and fruits should be dried in shade. The fruits may be cut into pieces for drying and extracting seeds. Well-dried seeds are stored in damp-proof containers.
- *Yield and cost of cultivation* The yield of fresh and dry fruits is approximately 20 quintals per hectare and 6.50 quintals per hectare, respectively. Cost of cultivation is estimated to be Rs 30 000 per hectare.