

Cultivation Protocol For
Jurinea dolomiaea



Family: Compositae (Asteraceae)

Local/common names: Guggal
dhup, guggal, dhup

Supported by:

Status: Depleted in most areas (CIMAP, 1997)

Distribution and habitat: The species is naturally found in the high altitude Himalayas between 3500-5000 m in open alpine slopes. In Himachal Pradesh the plant is found in alpine and sub-alpine pastures of Pangi-Bharmour, Dainasar, Thamsar of Kangra, Rorag of Kullu, Chitkul, Sangla valley and Mangjiban Kandas of Kinnaur, Chandranahan, Chansal, Gorju, Kelgapattan and Muraldanda of Shimla district.

Environment for growth: The species is most comfortable with an annual rainfall of 50-100 cm and temperature not going above 28-35°C. Optimal growth of the plant is observed under the range of 15-25°C in the high altitude regions of the Himalayas. Deep sandy porous soil is considered best for the cultivation of *Jurinea* as the plant develops a thick rootstock.

Parts used: Root, entire plant

Market rate: The estimated yield is about 12-15 quintal per ha after the plants complete 3 years of growth. The dry roots are sold in the markets of Tanakpur, Ramnagar, Rishikesh (Uttarakhand), Saharanpur and Bareilly (UP) at a rate of Rs. 150-180/- per kg.

Agro-technology

- **Means of propagation:** Both seeds and rootstock segments are good and effective propagation material for *Jurinea dolomiaea*.
- **Collection of seeds:** The seeds are collected during September-October depending upon the climatic condition and the elevation. For example the seeds are collected in Lahaul during September while the proper collection time in high altitudes of Uttarakhand is October.
- **Seed treatment and germination:** Seed germination of 50-55% has been reported.
- **Land preparation and soil work:** Land preparation is done in spring to transplant the saplings from the nursery to the field. For sowing in the nursery the bed preparation is done during October-November during the pre winter season. The land is ploughed into a fine tilth and rock boulders and deep-rooted sedges are to be removed from the field. The grasses belonging to Cyperaceae family generally have a very strong root system and compete for food and nutrition and hence must be uprooted and thrown to a distance to minimize the chance of weed spread. The clods or hardened masses of soil must be broken, as they tend to impede seed germination. The land is ploughed 2-3 times so that the soil becomes powdery and soft and well-decomposed FYM is then thoroughly mixed with the soil. The soil is flattened by spading, leveling with a wooden plank or iron roller. The application of inorganic fertilizers like urea is discouraged in case of medicinal and aromatic plants cultivation as it hampers the fertility of the soil as well as reduces the efficacy of the plants' active ingredient content. Thus, bio-fertilizers are recommended for MAP cultivation. Generally 12-15 quintals of FYM is applied to 1 bigha (800 m² land area). Application of compost and vermi-compost has also been found very effective and a mixed

application of vermin-compost and FYM 1:4 to 1:3 (w/w) also yields good results.

- **Nursery preparation:** At lower altitudes seeds are sown during October or November (preferably inside a greenhouse) so that by the end of March or beginning of April, the seedlings are well developed and ready for transplanting. For seedling establishment, the seeds are generally sown 30 cm apart in a line. The right time of thinning is when the plants attain an age of 2 years. After thinning, the plants should be of 45 cm apart from each other. In case of nursery raised plants, the beds should be raised during the rainy season to avoid the waterlogging. For large-scale cultivation, about 6500 plants can be accommodated in one bigha (800 sq.m.) of land area. Maintaining a distance of 45-50 cm between the rows and between the plants is recommended.
- **Transplantation:** The plants attain 2 leaved stage within the first two months of germination. The 3-leaf stage with 5-6 inches height is the minimum stage for transplanting. Ideally, three months after germination, the plants can be transplanted to the field. The favoured time of transplantation is May-June when rain occurs since soil moisture helps the plants survive well.
- **Vegetative propagation:** The rootstocks are divided at collar level or at the root-stem transition zones. The upper portion (2-3 inches) of the harvested roots are separated, cleaned in running water, dried properly and then stored in gunny bags. During early spring, the cut portions are transplanted in the field maintaining a spacing of 45 cm within the line and 45-60 cm between the lines. The land must be well ploughed and soil must be fertilized well with bio-manure (like FYM or compost and vermicompost) depending on requirement of the soil. Care should be taken to make sure that the root cuttings should be devoid of any infection and be very healthy.
- **Water management:** Irrigation is much required during spring and summer as well as the rainy season. During spring and summer, irrigation must be done twice a week because the plant is not highly hydrophilic although the lack of water hampers the growth of plants especially in the early stages of growth. Care should be taken that water used for irrigation should not be contaminated with any chemical or toxic material. Sprinkling irrigation is the best option because it removes the dust and dirt accumulated on the plant as well as insect eggs, larvae and pupae.
- **Weed control:** Weeding is required frequently during the early growth and seedling stages. However, only hand weeding is recommended to avoid any kind of damage. From the second year of growth weeding once a month is sufficient.
- **Maturity and harvesting:** The plant produces flowers after completion of vegetative growth for three or four years. Flowering starts in July end and carries on upto mid September. This cycle varies according to the edapho-climatic condition and altitude. The seeds attain maturity in September-October especially in the alpine region. In lower altitudes, flowering and fruiting is completed earlier and the seeds are harvested by September. Harvesting of the roots is generally done after the seeds are harvested.

- **Post harvest techniques:** After harvesting, the roots are divided into slices and allowed to dry completely in the sun before packing.