

DAVANA



Plant Profile

Family : *Asteraceae*

Indian name : **Davanam (Sanskrit)**

Davana (Hindi)

Davana (Kannada)

Davanam (Tamil)

Species : *Artemisia pallens*

Distribution : **India**

- Davana is an important annual aromatic herb, much prized in India for its delicate fragrance.

Uses

- **Cosmetics, Flavouring beverages, confectionery, tobacco and perfumery**
- Davana sprigs are commonly used in garlands, bouquets and religious offering in most part of the year.
- The leaves and flowers contain essential oil valued for its exquisite and delicate aroma and is used in high grade perfumes and cosmetics.

- The oil of davana contains hydrocarbons (20%), ester (65%) and oxygenated compounds (15%). The esters are the major constituent responsible for the characteristic smell of davana.
- The other constituents isolated from the oil include a sesquiterpene ketone named 'artemone', novel sesquiterpenoids named 'davanafurans' and another ketone named 'isodavanone'.
- The essential oil of davana which is a brown viscous liquid with rich fruity odour has acquired considerable reputation in the International trade particularly in USA and Japan where it is being used for flavouring cakes, pastries, tobacco and beverages.

Soil

- The crop is found growing on various types of soils from sandy loam to medium black. However, a rich sandy loam soil which is rich in organic matter and with a good drainage is ideal.

Climate

- Season is an important aspect to be considered when davana is grown for extracting the essential oil. The oil content in plant was observed maximum when the crop was grown during winter season compared to other seasons.
- When the crop is grown for the production of oil, it should be planted during the first week of November. A few light showers with moderate winter conditions and no frost helps in allowing the plant to put on good growth.
- High temperatures and heavy rains at the time of flowering have not only been found to affect the plant growth but also reduce the oil content and ultimately the oil yield.

VARIETIES

- There are no named commercial varieties available in this crop.
- Seeds available from Division of Horticulture, GKVK Campus, University of Agricultural Sciences, Bangalore – 560065 Ph: 080-23330153

INPUTS

Sl.No.	Materials	Per acre	Per hectare
1.	Seeds (kg)	0.6	1.5
2.	Farm Yard Manure (t)	2.5	6.0
3.	Fertilizers (kg)		
	N	48	120
	P ₂ O ₅	16	40
	K ₂ O	16	40

Note:

Prior to transplanting of the seedlings, full dose of FYM, phosphorous and potash is incorporated into the soil. Nitrogen is applied in three equal split doses, the first being 10 days after transplanting and the subsequent two doses being at 15 days interval.

Propagation

Nursery raising

- Davana is propagated by seeds. As the seeds lose the viability rapidly, seeds from the previous season's crop should only be used for sowing.
- About **1.5 kg of seed** is required to produce enough seedlings to transplant in an area of one hectare.
- Usually nursery beds of 2 m long and 1 m wide are preferred. The surface of the beds should be clod free. It is then incorporated with the finely prepared farm yard manure at the rate of 10 kg per bed.
- Sowing of seeds at the rate of 1 g per sq.m. is desirable.
- The seeds may be sown either dry or after wetting them with sand for about 48 hrs.
- In the later case, the seed is thoroughly mixed with sand at the rate of 4-5 times its volume. To this mixture, water is added so that the sand is sufficiently wet.
- It is then tied in a cloth bag and stored in a warm condition for 48 hrs. This will hasten the sprouting of seed and radicle will emerge at the end of 48 hrs. The

nursery bed is then flooded with water to provide a pool and the sprouting seed and sand mixture is broadcasted all over the bed, homogeneously. This method helps in uniform distribution of seeds. When the seeds have settled down a thin layer of sand is spread over just to cover them.

Transplanting

- The seedlings will be ready for transplanting in about 6-8 weeks from the date of sowing. At this stage the seedlings will be about 10 cm tall.
- Before transplanting, the field is thoroughly prepared by bringing the land to a fine tilth with repeated ploughings. It is then laid out into plots of convenient size by laying out bunds and channels. The size of the plot depends on the conditions prevailing locally.
- Generally a plot of 3-4 m x 1.5-2.5 m size is preferred as it helps in proper management of irrigation, weeding and other inter-cultural operations. After the preparation of plots, the soil is incorporated with 6 tonnes of well decomposed farm yard manure or compost. The plots are irrigated a day prior to transplanting.
- The seedlings are then transplanted at a spacing of 15 cm between rows and 7.5 cm between plants. Trails have shown that transplanting davana at closer spacing results in higher herbage yield and subsequently higher oil yield compared to wider spacing which results in larger plants but lower herbage and oil yield per unit area.

Irrigation

- After transplanting, the plots are immediately provided with light irrigation, later, the irrigation is given daily till the seedlings are well established (10-12 days) and subsequently once in 3-4 days depending on the weather conditions.

Interculture

- The field is kept weed free by regular weeding as and when required. In all about 2-3 hand weedings during early period of growth will help to keep the weeds down.

Growth regulator application

- Application of GA₃ at 200 ppm after five weeks of transplanting has been found to increase the herb and essential oil yield per unit area.

PLANTPROTECTION

Major insects : Ants and aphids

Major disease : Damping off

Schedule

1. Ant menace can be minimized by mixing about 10 kg of 6% Heptachlor per hectare into the soil.
2. To control aphids spray Rogor at the rate of 1ml per litre.
3. Damping off can be overcome by adjusting the sowing time, so that bright weather prevails during the first few days of the early seedlings stage or by seed treatment with Captan at the rate of 5 g per kg of seed.

Harvesting

- The crop starts flowering after 110-115 days of sowing which will be around 2nd or 3rd week of February.
- In order to obtain the maximum essential oil yield, the plants should be harvested when about 50 per cent of them have come to flowering. This stage will be reached by the end of February or 1st week of March at 120-125 days after sowing.
- Harvesting is done by cutting the plants from the base. Although there are reports about the possibility of obtaining a ratoon crop in davana, nowhere it is being followed practically.
- The main crop is harvested only during the month of March and the ratoon starts sprouting by the end of March or beginning of April which due to the high temperatures prevailing during these periods results in poor growth of plant and mutilated flower buds which fail to open.
- The crop thus obtained becomes uneconomical as flower heads are the major contributors of oil.

Yield and oil content

- The yield of fresh herbage including flower heads is around 12-13 tonnes per hectare.
- Though under laboratory conditions, the oil content in whole plant after drying it in shade for 2 days is 0.29 per cent, an average recovery of around 0.2 per cent under large scale distillation yielding 12-13 kg of oil per hectare may be considered satisfactory.
- When oil is extracted from the whole plant, flower heads contribute the major portion of the oil. The contribution of leaf and stem towards percentage oil content in a whole plant is very less.
