

# Safflower

## Management Practices



Aphids



Caterpillar



Gujhia weevil

- ❖ To reduce gujhia weevil damage, apply Phorate 10G to soil @ 10 kg/ha and foliar spray with chlorpyrifos 20EC @ 1000 ml/ha two to three times depending on level of infestation.

**Management of diseases:** The major diseases of safflower are wilt, root rot and leaf spot.

- ❖ Grow resistant/tolerant varieties like A, Phule Kusuma, SSF 708 in wilt endemic areas.
- ❖ Treat the seed with carbendazim 50WP@ 1 to 2 g/kg or carboxin + thiram 75 WP @ 2 g/kg seed or Trichoderma harzianum @ 10g/kg seed.
- ❖ Treat seeds with thiram or captan or cymoxanil + mancozeb 72.5 WP or carboxin + thiram 75 WP@2-3g/kg seed.
- ❖ Spray mancozeb 75WP @ 2.5g/l or propiconazole 25EC 1ml/l or carbendazim + mancozeb 75WP @ 2-3g/l immediately after disease is noticed and repeat the spray 15 days later depending on the intensity of disease.
- ❖ Treat seeds with carboxin + thiram 75WP@ 2 g/kg seed or cymoxanil + mancozeb 72WP @ 2-3g/kg seed, captan 75 WP 2g/kg seed or Trichoderma harzianum @ 10g/kg seed.



Ramularia leaf spot



Alternaria leaf spot



Wilt

**Bird damage:** Safeguard the crop from bird damage during the period from seed filling to physiological maturity.

**Harvesting and threshing:** Harvest the crop preferably in the early hours. Cut plants with the help of sickles at the base or uproot (black soils) by pulling and stack them in the field in the form of small and well pressed heaps until they are fully dried. Thresh either by beating with sticks or with the help of bullock drawn stone rollers or tractor and the resulting material is winnowed to clean seeds. The threshing and cleaning operation can also be done with power operated thresher used for other crops such as wheat. Combine harvesters used in wheat could also be used for harvesting and threshing of safflower.

**Yield potential:** The seed yield potential ranges from about 320 to 480 kg/acre under scanty moisture conditions and about 600 to 800 kg/acre under favorable moisture conditions. Under minimal irrigation, yield levels of 800 to 1120 kg/acre could be achieved.



In addition to seed yield, (800-1000 kg/acre) under well managed conditions the non spiny safflower cultivars are expected to yield 30-40 kg/acre petals. Presently, the petals are being sold at Pune, Phaltan and Tandur @ Rs 800-1000/kg. Manual petal collection costs around Rs 500-600/kg petals.

Compiled by

K. Alivelu, P. Padmavathi, P. S. Srinivas, R. D. Prasad,  
K. Anjani, N. Mukta, G. D. S. Kumar, C. Sarada and S.V. Ramana Rao



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**ICAR - INDIAN INSTITUTE OF OLSEEDS RESEARCH**

Rajendranagar, Hyderabad- 500 030, Telangana

+91 (040) 24598445, 24598173

Website: [www.icar-iior.org.in](http://www.icar-iior.org.in)

## Safflower

Safflower commonly known as Kardi (Marathi), Kusube (Kannada), Kusum (Hindi) and Kusuma (Telugu) is one of the important *rabi* oilseed crops of the country. India stands in first place in terms of area and production in the world with an area of 1.4 lakh ha and production of 1.13 lakh tonnes. It is mainly grown in Maharashtra, Karnataka, Gujarat, Andhra Pradesh, Orissa and Bihar. The present productivity of 807 kg/ha is very low as compared to the demonstrated productivity of 1109 kg/ha. Poor crop management under input starved conditions is the most important reason for such low productivity. However concerted research efforts made under the AICRP on Safflower and IOR, Hyderabad have resulted in development of hybrids, improved varieties, production and protection techniques capable of boosting the productivity levels of safflower. The following are the improved production practices recommended for different safflower growing areas of the country.

**Soils:** Safflower requires moderate to high fertile, fairly deep, moisture retentive and well drained soils with neutral pH reaction. Heavy soils with poor drainage must be avoided for growing safflower especially under irrigated conditions. The crop is fairly tolerant to saline conditions.

**Seed bed preparation:** In monocropped black soils of *rabi* areas, harrowing 3 to 4 times during the *kharif* season is as effective as deep ploughing or sub soiling to keep fields weed free.

**Sowing time:** The optimum time of sowing is second fortnight of September to second fortnight of October.

**Hybrids/Varieties:** Suitable hybrids and varieties for important safflower growing states are given below

State	Hybrids	Varieties
Maharashtra	NARI-NH-1, NARI-H-15, NARI-57, NARI-H-23 *DSH-185	Bhima, AKS-207, NARI-6, PKV Pink, Parbhani Kusum(PBNS-12), Phule Kusuma, PBNS-40, SSF-708.
Telangana/ Andhra Pradesh	NARI-NH-1, NARI-H-15 *DSH-185	Manjira, NARI-6, Parbhani Kusum (PBNS-12), Phule Kusuma, PBNS-40, SSF-708,TSF-1.
Karnataka	NARI-NH-1, NARI-H-15 *DSH-185	A-1, A-2, NARI-6, Parbhani Kusum (PBNS-12), Phule Kusuma, PBNS-40, SSF-708.
Madhya Pradesh	NARI-NH-1, NARI-H-15 *DSH-185	JSF-97, JSF-99, JSI-7, JSI-73, Parbhani Kusum (PBNS-12), Phule Kusuma, PBNS-40 NARI-6, JSF-1.

\* Submitted for release

**Seed rate and spacing:** 3 to 4 kg/acre with a spacing of 45x20 cm

**Seed treatment:** Before sowing, the seed should be treated with Thiram 3 g or Captan 2 g or Carbendazim 2 g/kg seed to protect from soil borne diseases.

**Thinning and Inter cultivation:** Thin the excess seedlings within 15-20 days after emergence and maintain the desired plant to plant spacing. Give one or two hand weedings and hoeing/harrowing at 25 to 30 and 45 to 50 days after sowing depending on the length of rosette period and the severity of weed infestation

**Fertilizers:** For adequate and balanced fertilization, incorporate 2 t/acre of well decomposed FYM/compost 2-3 weeks prior to sowing. It is desirable to apply fertilizer based on soil test values. The recommendation of inorganic fertilizer (kg/acre) for different states is as follows

State	N		P <sub>2</sub> O <sub>5</sub>		K <sub>2</sub> O	
	R*	I*	R	I	R	I
TS / AP	16	-	10	-	0	-
Karnataka	14	30	20	30	10	14
W.Maharashtra	20	-	10	-	0	-
Marthwada	16	24	08	16	0	0
Vidarbha	10	20	10	20	0	0

\*R-Rainfed, I-Irrigated

Dual inoculation of *Azospirillum* or *Azotobactor* (25g/kg seed) along with 50% of recommended N provide higher profits under rainfed conditions. 6-12 kgs/acre gives higher seed and oil yield in Sulphur deficient soils.

**Water management:** Give a light pre-sowing irrigation if the soil moisture in the seed zone is not adequate for germination. In soils that crack, apply irrigation well before cracks develop for better control of water. If there is provision for only one irrigation, provide it before soil moisture becomes very critical for crop growth.

**Intercropping systems:** Some of the remunerative intercropping systems for rainfed situations are coriander +safflower (3:1) and chickpea + safflower (6:3) in Karnataka, Telangana, Andhra Pradesh and Maharashtra; linseed + safflower (3:1) in Maharashtra, Madhya Pradesh, Chattisgad and eastern Uttar Pradesh.



**Management of Insect pests:** The major insect pests of economic importance are aphids, leaf eating caterpillars in Karnataka and gujhia weevil in Akola region of Maharashtra.

- ❖ Avoid late sowing and sow moderately aphid resistant varieties like A1 or Bhima.
- ❖ Spray NSKE 5% on border 2m as soon as incidence is noticed to reduce aphid spread. Spray insecticide like dimethoate 30EC @ 1000 ml/ha or acephate 75SP @ 750 g/ha or thiamethoxam 25WDG @ 100 g/ha or chlothianidin 50WDG @ 100 g/ha or acetamiprid 20SP @ 100g/ha two times.
- ❖ For controlling safflower caterpillar, spray Indoxacarb 15 EC @ 150 ml/ha or Spinosad 45 SC @ 100 ml/ha as soon as larvae are noticed.