MUSTARD/RAPESEED

(*Brassica spp.)*

Origin: China

Toria, gobhi sarson and *taramira* are categorised as rapeseed while *raya* and African *sarson are* categorised as mustard. *Toria, gobhi sarson* and African *sarson* are sown exclusively under irrigated conditions, whereas *raya* can be grown under both irrigated and rainfed conditions. *Taramira* is grown as rainfed crop only.

Canola is an internationally accepted nomenclature for Brassica varieties having less than 2% erucic acid in the oil and less than 30 micro moles glucosinolates per gram defatted meal. Oil rich in erucic acid is not desirable for edible purposes as it causes thickening of arteries and leads to heart problems. Similarly, the defatted meal of non canola varieties when used as animal feed reduces appetite, reproductivity and affects thyroid activity leading to thyroid associated health problems. Elimination of long chain erucic acid in the canola varieties is accompanied by increase in the proportion of desirable MUFA (oleic acid) from 18-20% to about 60-65%. The oil from canola varieties is healthy oil for human consumption. The defatted meal from such varieties is specially suited as animal feed.

Importance of Brassicas in India

- It is main Rabi season crop in India
- Green tender plant is used as vegetable
- Whole seed is used for preparing pickles and flavoring vegetables and curries
- Oil is used for cooking, frying and making pickles
- Oil is also used for making vegetable ghee, hair oil, soap, lubricating oil, and in tanning industries

Evolution of Brassica species:

B. napus = B. compestris x B. oleracia

B. carinata = B. nigra x B. oleracia

B. juncea = B. nigra x B. compestris

Mustard species:

1. *Brassica compestris* – Sarson
2. *Brassica napus* – Rapeseed
3. *Brassica juncea* – Brown mustard (Indian mustard)
4. *Brassica nigra* – Black mustard (used for condiment purpose)
5. *Brassica carinata* – Ethiopian mustard
6. *Brassica rapa* – Toria (most widely spread in world)
7. *Eruca sativa* – Taramira

Climatic Requirements : The rapeseed and mustard crops grow well in areas having 25 to 40 cm of rainfall. *Taramira* is preferred in low-rainfall areas, whereas *raya, gobhi sarson,* African *sarson* and *toria* are grown in medium to high rainfall areas.

Sowing time: October 3rd week to November 1st week

Seed Rate: Main crop- 4 to 6 kg/ha

Mixed crop- 2 to 3 kg/ha

Spacing: Mustard/Rai- 45 x 15 cm

Toria/Rapeseed- 30 x 10 cm

Soil type : The rapeseed and mustard grow best on well-drained, light-to-medium textured soils. *Raya, gobhi sarson* and African *sarson* may be grown on all soil types, *toria* should be grown preferably on loamy soils. *Taramira* does well on sandy and loamy-sand soils.

Varieties: a. Rapeseed-

- Brown sarson (*Brassica compestris var. sarson*) : Pusa kalyani
- Yellow sarson (*Brassica compestris var. sarson*): Benoy

b. Mustard/Rai/Indian Mustard (*Brassica juncea*): Kranti, Varuna, Krishna

c. Toria: Type-9, 36, Sangam

d. Taramira: T-27

Weed Control : One hoeing to *toria* three weeks after sowing and one or two hoeings preferably with improved wheel hand hoe to *raya, gobhi sarson,* African *sarson* and *taramira* are adequate. First hoeing should be done 3-4 weeks after sowing and second, if required 3 weeks after first hoeing.

Irrigation : 2 irrigations, 20-30 cm water requirement

Critical stages: 1. Rosette stage (20-30 DAS) 2. Siliqua formation stage

Nutrient Management: N:P:K:S:Zn @ 60:30:30:20:10 kg/ha

Yield: 20-25 qt/ha

SUNFLOWER

(*Helianthus annus*)

Family: Compositae

Soil Type : It requires well drained, medium textured soil. Avoid salt affected soils.

Origin: Probably from South - West America

First commercial production for oil -1830-40

Area: Karnataka> Andhra Pradesh> Maharashtra

Production: Karnataka> Andhra Pradesh> Maharashtra

Sowing Time:

- Kharif- July to 1st week of August
- Rabi- November 1st to 2nd week
- Summer- February 2nd week

Seed rate: 5-7.5 kg/ha

Seed Treatment : Treat the seeds before sowing with Tagron 35 WS (metalaxyl) @ 6 g per kg seed.

Spacing:

- Kharif- 45 x 30 cm
- Rabi- 50 x 20 cm
- Summer- 60 x 30 cm

Land Preparation : Two or three ploughings, followed by planking, are necessary to get a fine seed bed for sunflower.

Irrigation:

- Kharif- no need
- Rabi- 3-4 irrigations
- Summer- 5-6 irrigations

Crtical stages:

1. Seedling stage (10-12 DAS)
2. Bud initiation/ Button/ Knee high stage (30-35 DAS)
3. Flowering stage (50-55 DAS)
4. Seed development stage (70-90 DAS)

Varieties: Modern, Jwalamukhi, Sunrise selection, EC 68413, JS-1

Sunflower is **intercropped** with groundnut, arhar, urd etc.

Weed control :

- The first hoeing should be done 2-3 weeks after the emergence followed by second hoeing three weeks thereafter.
- Pendimethalin @ 1.5 kg a.i./ha followed by hoeing at 30 DAS

Harvesting and Threshing : The crop is ready for harvesting when heads turn yellowish-brown at lower surface near the stalk and the discs start drying up. At this stage, the seeds give blackish look and are fully ripe. The harvested sunflower heads can be threshed immediately after harvesting by a sunflower thresher when the heads are relatively moist. However, the performance of the sunflower thresher is better when the crop is dry. After threshing seed should be dried thoroughly before storing, otherwise they are liable to get affected by fungus.

Seed production: The seed should be dried to the maximum moisture content of 9.0%. The packing of seed should be done in moisture proof bags. The seed is to be stored in pucca stores which are moisture free. Under such conditions the seed remains viable for about 10 months and thereafter it losses germinability and cannot be used for next sowing. The seed of sunflower remains dormant for about 45 days after harvesting the crop and thus cannot be used for sowing during this period. The germination of seed must be got tested before sowing and it should be used for sowing only if the germination is 70 per cent or more. On an average 2.5 quintal hybrid seed per acre is obtained.

Yield: 20-30 qt/ha