

## Improved Production Technology of Sesame for Western Uttar Pradesh

**Amit Tomar, A.K. Mishra, S.P. Singh, H.H. Khan, Prachi Patel and R.P. Singh**

Krishi Vigyan Kendra, Gajraula, Amroha  
(Directorate of Extension)

Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut-250110, U.P.,  
India

**ARTICLE ID: 27**

### **Introduction:**

Sesame (*Sesamum indicum* L.) is the oldest indigenous oilseed crop, with longest history of cultivation in India. Sesame or gingelly is commonly known as til (Hindi, Punjabi, Assamese, Bengali, Marathi), tal (Gujarati), nuvvulu, manchi nuvvulu (Telugu), ellu (Tamil, Malayalam, Kannada), tila/pitratarpana (Sanskrit) and rasi (Odia) in different parts of India. The main reasons for low productivity of sesame are its rainfed cultivation in marginal and sub marginal lands under poor management and input starved conditions. However, improved varieties and agro production technologies capable of increasing the productivity levels of sesame are now developed for different agro ecological situations in the country. A well managed crop of sesame can yield 1200 - 1500 kg/ha under irrigated and 800 - 1000 kg/ha under rainfed conditions. The crop is grown in almost all parts of the country. More than 85% production of sesame comes from West Bengal, Madhya Pradesh, Rajasthan, Uttar Pradesh, Gujarat, Andhra Pradesh and Telangana. Sesame seed, commonly known as Til in India is largely produced for its oil and is also used as a flavoring agent. The seeds come in several colours like red, white, black, yellow, depending upon the variety of the seeds. Sesame seeds have high nutritive value and are used in numerous cuisines all over the world, especially in the Middle Eastern countries.

The seeds have high oil content around 55%. Sesame oil is used in cooking and in preparation of salads and also finds its use in the production of margarine, soaps, pharmaceuticals, paints and lubricants. The residue left after the extraction of oil is known as the oil seed cake which is used as cattle feed. The total global production of sesame seed sums up to around 30 lakh tonne annually. The world production of sesame is dominated by a

few countries that lie in the African and Asian continents. China produces the maximum out of them all sharing approximately 25% share in the world's total production. Other producers include Nigeria, Pakistan, Ethiopia, Bangladesh, Central African Republic, Thailand, Tanzania, Egypt, Guatemala, Chad, Paraguay, Iran, Senegal, Turkey and Mexico. India's annual average production hovers around 6,80,000 metric tons contributing to around 22% of the world's total sesame production. Some time ago, India was enjoying the topmost position in the list of major producers but China's improvement in the production and India's slow steady growth allowed China to take over the lead from India. The states of Gujarat, West Bengal, Rajasthan, Tamil Nadu, Orissa, Madhya Pradesh, Andhra Pradesh, Maharashtra, Uttar Pradesh, Punjab and Karnataka are the major producing states. In the world market for sesame, India has a reputation of being a net exporter. The country is one of the largest exporters of sesame exporting between 5 lakh to 6 lakh metric tons of sesame annually. As the production in India is sufficient to satisfy the domestic consumption demand, around 25% of the total production is exported to different countries. India exports sesame to Germany, Turkey, Netherlands, the US, Greece, Hong Kong, Israel, China, the UK and the UAE. The major trading center in India where sesame seed is traded is the Saurashtra region of Gujarat, whereas sesame oil is traded in the states of Tamil Nadu and Kerala. Sesame seed is also traded in the major commodity exchanges in India.



**Fig.-1: Sesame plant and plant parts (Source: [www.sesameencyclopedia.com](http://www.sesameencyclopedia.com))**

**Season and climate:**

Sesame is grown in almost all the states in large or small areas. It can be cultivated up to the latitude of 1600m (India 1200 m). Sesame plant needs fairly high temperature during its life cycle. Normally the optimum temperature required during its life cycle is between 25-35° C. If the temperature is more than 40 degree C with hot winds the oil content reduces. If the temperature goes beyond 45 degree C or less than 15 degree C there is a severe reduction in yield. Kharif in arid and semi-arid tropics and rabi/summer in cooler areas. Semi arid climate of Western India, Central, Eastern and Southern part of India including lower Himalayas.

**Cropping systems:**

State	Crop Sequence
Andhra Pradesh	Rice-Groundnut-Sesame, Sesame - Horsegram, Finger millet/Sorghum/Horsegram - Sesame, Sesame - Upland Rice
Bihar	Early Rice - Potato-Summer Sesame/Green gram, Kharif Sesame-Maize/Pigeonpea/Chickpea, Wheat-Summer Sesame/Green gram
Gujarat	Sesame-Wheat/Mustard
Karnataka	Sesame-Horsegram/Chickpea
Madhya Pradesh	Cotton-Sesame-Wheat, Rice -Summer Sesame, Sesame-Wheat
Maharashtra	Sesame (Early)-Rabi Sorghum/Safflower, Cotton-Sesame-Wheat
Odisha	Rice/Potato-Sesame, kharif Sesame-Maize/Pigeonpea/Chickpea
Rajasthan	Sesame-Wheat/Green gram/Barley
Tamil Nadu	Rice/Groundnut-Sesame, Sesame-Black gram, Sesame-Rabi Sorghum, Sesame-Green gram, Cowpea-Sesame
Uttar Pradesh	Sesame (Early)-Chickpea/Rapeseed & Mustard/Lentil/Pea
West Bengal	Potato-Sesame (Late Jan./Early Feb), Rice – Sesame

**Varieties:**

For upland cultivation use varieties with long duration of 100-110 days and for low land, use varieties with duration of 80-99 days.

**Sesame varieties:**

State	Varieties	Seed Colour
Gujarat	Guj. Til-1, 2, 3, Guj. Til-10	White seed, Black seed
Madhya Pradesh	TKG-21, 22, 55, 306, 308 and JTS – 8, PKDS-11, 12, PKDS-8	White seed, Dark brown seed, Bold black seeded
Rajasthan	RT-46, 103, 125, 127, 346, 351, RT-54	White seed, Light brown seed
Maharashtra	AKT-64 , AKT-101, JLT-408, PKVNT-11	White seed
Uttar Pradesh	T-78, Sekhar, GJT-05, GJT-06	White seed
Tamil Nadu	TSS-6, Co-1, Paiyur-1, VRI-1, VRI-2, TMV-7	White seed, Black and Brown seed
West Bengal	Rama, Savitri	Brown seed
Odisha	Nirmala, Shubhra, Prachi, Amrit, Smarak	White seed, Brown / Black seed, Golden yellow and bold seed
Andhra Pradesh	Varaha, Gautama, Chandana, Swetha Til, Hima	Brown seed, White seed
Karnataka	DS-1, DSS-9	Dark brown seed, White bold seed

**Soil:**

Sesame can be grown on a wide range of soils but well drained light to medium textured soils are preferred. The optimum pH range is 5.5 to 8.0, acidic or alkaline soils are not suitable.

**Seed rate:**

A seed rate of 5 kg/ha is adequate to achieve the required plant population.

**Sowing:**

For prevention of seed borne diseases, use seed treated with Bavistin 2.0 g/kg seed. Wherever bacterial leaf spot disease is a problem, soak the seed for 30 minutes in 0.025% solution of Agrimycin-100 prior to seeding.

**Preparation of land:**

Prepare the soil into a fine tilth by ploughing 2-4 times and breaking the clods. Broadcast seeds evenly. To facilitate easy seeding and even distribution seed is mixed with either sand or dry soil or well sieved farm yard manure in 1:20 ratio. Work with harrow, followed by pressing with wooden plank so as to cover the seed in the soil.

**Sowing Time and Spacing:**

State	Season	Sowing time	Spacing (cm)
Uttar Pradesh & Uttarakhand	Kharif	Second fortnight of July	30-45 x 15

**Manuring:**

Apply cattle manure/compost as basal dressing and incorporate into the soil along with last ploughing. Apply fertilizers as basal dose when there is enough moisture in the soil. Urea is preferable to ammonium sulphate. Nitrogen may be applied in split doses, 75 per cent as basal and the balance as foliar spray at 3 per cent concentration, 20-35 days after sowing keeping the discharge rate at 500 l ha<sup>-1</sup>.

State/ Situation	Recommended dose of N:P:K (kg/ha)	Specific recommendation
Uttar Pradesh /Uttarakhand	20-10-0	Half N + full P <sub>2</sub> O <sub>5</sub> as basal, remaining half N at 30-35 DAS.

**Interculture:**

The crop is very sensitive to weed competition during the first 20-25 days. Two weeding, one after 15-20 days of sowing and other at 30-35 days after sowing are required to keep the field weed free and to make moisture and nutrients available to the crop. When the plants are about 15 cm in height, thin the crop so as to give a spacing of 15-25 cm between plants.

**State-wise intercropping:**

State	Intercropping System
Uttar Pradesh	Sesame+Green gram (1:1), Sesame+ Pigeonpea (3:1)

**Irrigation:**

- Usually the crop is grown under rainfed conditions. When facilities are available, the crop may be irrigated to field capacity after thinning operation and thereafter at 15-20 days interval.
- Stop irrigation just before the pods begin to mature. Surface irrigation at 3 cm depth during the critical stages, viz., 4-5 leaves, branching, flowering and pod formation will increase the yield by 35-52 per cent.
- Two irrigations of 3 cm depth each in the vegetative phase (4-5 leaf stage or branching) and in reproductive phase (at flowering or pod formation) are the best, registering maximum yield and water use efficiency.
- In the case of single irrigation, it can be best given in the reproductive phase.
- In the tail end fields in command area, best use of the sparingly available water can be made for augmenting sesame production.

**Plant protection:**

- For control of leaf and pod caterpillar, remove affected leaves and shoots and dust with carbaryl 10 per cent.
- Azadirachtin 0.03 per cent at 5 ml per litre spray at 7th and 20th DAS and thereafter need based application can manage the incidence of leaf and pod caterpillar, pod borer infestation and phyllody incidence.
- For control of gall fly, give preventive spray with 0.2 per cent carbaryl.
- For control of leaf curl disease, remove and destroy disease affected sesame plants as well as the diseased collateral hosts like chilli, tomato and zinnia.
- Remove plants affected with phyllody and destroy them. Do not use seeds from affected plants for sowing.

**Harvesting:**

- Harvest the crop, when the leaves turn yellow and start drooping and the bottom capsules are lemon yellow by pulling out the plants. Harvest during the morning hours.
- Cut the root portion and stack the plants in bundles for 3-4 days when the leaves will fall off. Spread in the sun and beat with sticks to break open the capsules.

- Repeat this for 3 days. Preserve seeds collected during the first day for seed purposes. Clean and dry in sun for about 7 days before storing.
- **Storage of seeds:**
- By keeping sesame seeds in poly bags, tin bins, wooden receptacles or in earthen pots, the viability can be maintained for about one year.
- Admixture of seeds with ash will drastically reduce germination.

**Conclusion:**

Sesame varieties have adapted to many soil types. The high-yielding crops thrive best on well-drained, fertile soils of medium texture and neutral pH. However, these have low tolerance for soils with high salt and water-logged conditions. Commercial sesame crops require 90 to 120 frost free days. Warm conditions above 23 °C (73 °F) favor growth and yields. While sesame crops can grow in poor soils, the best yields come from properly fertilized farms. Initiation of flowering is sensitive to photoperiod and sesame variety. The photoperiod also affects the oil content in sesame seed; increased photoperiod increases oil content. The oil content of the seed is inversely proportional to its protein content. Sesame is drought-tolerant, in part due to its extensive root system. However, it requires adequate moisture for germination and early growth. While the crop survives drought and presence of excess water, the yields are significantly lower in either condition. Moisture levels before planting and flowering impact yield most. Most commercial cultivars of sesame are intolerant of water-logging. Rainfall late in the season prolongs growth and increases loss to dehiscence, when the seedpod shatters, scattering the seed. Wind can also cause shattering at harvest.