



Performance of High Yielding Varieties of Sunflower (*Helianthus annuus* L.) Released for Different States of India

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Abstract

The Field trials on sunflower crop were conducted in different states of India during the year from 2005-6 to 2006-7. The Regional Stations for Fodder Production and Demonstrations (RSFPD), Government of India, Department of Dairying and Fisheries (DADF) spread all over the country provided all the inputs to conduct the trials in the On the Farms and on farmers Field (OFTs) and Frontline Demonstrations (FLDs) under their jurisdiction to evaluate the suitable varieties of sunflower for its sowing season, sowing time, scheduling irrigations vs rainfed conditions of cultivation including other agronomic package of practices. Government of India has strong feed and fodder development organization. There are several centrally sponsored schemes like establishment of fodder banks, development of forage crops through biotechnology research, minikits distribution in the country. Central government distributed latest variety seeds in the country to a tune of cost of Rs 7.00 crores through all eight RSFPDs. The sunflower is a multi purpose crop and may be good source of animal feeds as a un-conventional feed resource. Sunflower can be grown with forage crops also as forage crop based cropping system. RSFPDs organised sunflower trials in different states to evaluate sunflower production in northern and southern parts of India. The varieties released by AICRP (Sunflower) for different regions were selected for field trials. India has tropical and subtropical climate from south to north, respectively. Tamilnadu and Maharashtra face the tropical climate while, Haryana, Punjab and Uttar Pradesh experience as a sub-tropical type of climate. From February to March as spring season in northern states of India. All India released varieties Morden, GAUSUF-15, TNAUSUF-7, DRSF-108 and DRSF-113 were grown at Pantnagar in Uttarakhand. Variety performed better with seed yield (1820.5 kg/ha). Data shows that oil content (40.4%) was higher in the seeds of cultivar TNAUSUF-7. Maximum plant height (163.8 cm) and head diameter (16.2 cm) was higher in the variety DRSF-108.

Keywords: Sunflower, Yield, Irrigation, Seed, Oil content, Plant height, Variety

1. Introduction

Sunflower (*Helianthus annuus* L.) is an important oilseed crop in India popularly known as "Surajmukhi." The name "Helianthus" is derived from 'Helios' meaning 'sun' and 'anthos' meaning 'flower'. It is known as

sunflower as it follows the sun by day, always turning towards its direct rays. It is one of the fastest growing oilseed crops in India. In early 1970s, only about 0.1 million hectares were under sunflower cultivation, however by 2002-03, it had gone upto 1.63 million hectares. In India, it was used mainly as ornamental crop but in recent past it became an important source of edible and nutritious oil. Sunflower is a major source of vegetable oil in the world. It is used for a variety of cooking purposes (Singh et al., 1987). Sunflower seed contains about 48-53 percent edible oil. The sunflower oil is considered premium compared to other vegetable oil as it is light yellow in colour, high level of linoleic acid and absence of linolenic acid, possesses good flavour and high smoke point. Sunflower oil is a rich source (64 percent) of linoleic acid which is good for heart patients. Linoleic acid helps in washing out cholesterol deposition in the coronary arteries of the heart. The oil is also used for manufacturing hydrogenated oil. Sunflower is also a source of lecithin, tocopherols and furfural. It is used as nutritious meal for birds and animals. It is also used in the preparation of cosmetics and pharmaceuticals (Singh et al., 1995) grown all over the world is originated from former USSR. In India, sunflower as an oilseed crop introduced in 1969.

Sunflower seeds are one of the most nutritious and healthy foods. Sunflower is described as “drenched with sun-vitality” because the head follows the sun, ending up facing the west “to absorb the few last rays of the dying sun”. India is one of the largest producers of oilseed crop in the world. Oilseeds occupy an important position in the Indian agricultural economy. Our country accounted for 4.77 percent (1250 thousand MT) of total world production of sunflower in 2004. Due to source of high quality edible oil, sunflower oil is used as cooking oil in different recipes. Its importance increases as sunflower oil is considered as a heart friendly oil. Besides oil, almost every part of sunflower has commercial value. It is used in the manufacturing paints, resins, plastics, soap, cosmetics and many other industrial products. Sunflower as an oilseed is a newly introduced crop in the country. This crop has gained importance due to its short duration of maturity, containing of excellent quality of oil, photo-insensitivity, wide adaptability into different kinds of cropping pattern, high-energy hull and drought tolerance. It is a short duration crop and can be incorporated in different type of cropping pattern. Sunflower is grown as inter cropping with crops such as Groundnut, Pigeonpea, Castor, Soybean and Urd bean. Since it is a photo-insensitive crop, it can be grown throughout the year. Oil cake is rich in high quality protein (40-44 percent) and used as cattle and poultry feed. This crop is considered valuable from economic as well as ornamental point of view.

2. Material and Methods

Pantnagar location (UA): Table 1: **Morden** Variety was released in the year of 1978 by AICRP (Sunflower) Centre University of Agricultural Sciences, Bangalore, areas of adaptation/recommended ecology, in all sunflower growing states of India. **GAUSUF-15**-Year of release-1993, notification number-408(E), 04-05-1995, developed by AICRP (Sunflower) centre, Amreli Junagadh Agricultural University, Junagadh, pedigree-selection through mutation breeding, areas of adaptation/recommended ecology, all states of India. **TNAUSUF-7**-Year of release-1995, notification number-408(E), 04-05-1995, developed by AICRP (Sunflower) centre, Tamil Nadu Agricultural University Coimbatore, pedigree, derivative of Dwarf × Surya, areas of adaptation/recommended ecology, all states of India. **DRSF-108**-Year of release-2004, notification number-122(E), 02-02-2005, developed by Indian Institute of Oilseeds Research, Hyderabad, pedigree, selection from gene pool, areas of adaptation/recommended ecology, rainfed areas of all sunflower growing states of India. **DRSF-113**-Year of release-2007, notification number-1703 (E), 05-10-2007, developed by Indian Institute of Oilseeds Research, Hyderabad, pedigree, selection from gene pool, areas of adaptation/recommended ecology, rainfed areas of all sunflower growing states. The sunflower trails were raised as per recommended agronomic package of practices. Treatments were followed as per the technical programme.

3. Results and Discussion

3.1 Effect of Variety under Irrigated Conditions

Sunflower (*Helianthus annuus* L.) belongs to the family compositae. It is an annual, erect and herbaceous plant with leaves simple, alternate with stout petioles and lanceolate in shape. Leaves are rough on both surfaces. A single head produces 350 to 2000 seeds. Seeds are pointed at base and round at end. Colour of the seed varies from black to white but brown, striped or, mottled seed may also occur.

Data given in table-1 shows that plant height was found maximum in case of variety DRSF-108 which produced higher seed mean yield kg/ha (182.6 kg/ha) followed by TNAUSUF-7 (1738.5kg/ha) under irrigated conditions. Variety GAUSUF-15 performed better (1210.9 kg/ha) at pantnagar. Irrigation might increased yield potential of the crop. Effect of irrigation was also observed on the yield performance of the crop (Singh & Gupta, 2002; Singh 2004).



Table 1. Performance of different varieties under irrigated conditions at Pantnagar (Uttaranchal) 2005-06-2006-07

Year	Variety	Pl. ht. (cm)	Days to flow.	Days to Matu.	Head dia. (cm)	100 seeds wt. (g)	Vw (g)	Seed yield (kg/ha)	Oil %	Hull %
2006	MORDEN	105.3	56.6	90.3	14.3	4.8	35.1	1340.2	35.3	33.1
	GAUSUF-15	158.4	61.3	98.2	13.4	5.7	34.2	1503.6	36.4	34.2
	TNAUSUF-7	158.3	60.4	90.2	16.2	5.5	35.5	1750.1	40.6	30.5
	DRSF-108	165.6	62.5	100.1	16.2	5.5	41.6	1780.5	39.3	29.2
	DRSF-113	156.4	63.3	98.7	15.6	5.0	36.6	1702.9	39.1	30.6
2007	MORDEN	104.6	57.4	90.4	13.8	4.8	35.1	1210.1	35.6	34.1
	GAUSUF-15	159.6	60.6	99.2	12.9	5.2	35.7	1601.5	38.5	34.7
	TNAUSUF-7	156.2	58.1	88.6	16.1	5.5	35.5	1720.6	40.3	30.5
	DRSF-108	161.9	62.3	102.2	16.2	5.5	40.5	1860.8	39.7	27.9
	DRSF-113	159.3	65.6	99.5	15.9	5.0	39.3	1802.4	39.0	32.4
Mean		148.6	54.8	95.7	15.1	5.3	36.9	1627.3	38.4	31.7
CD at 0.05		9.2	6.3	3.3	2.4	3.	2.1	12.4	3.7	1.2

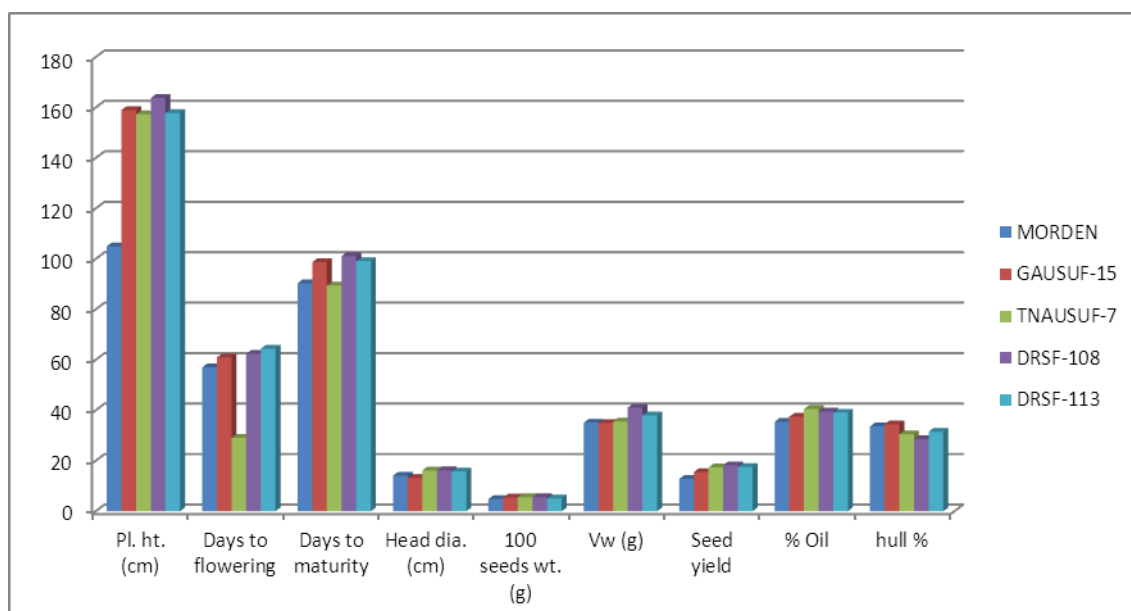


Figure 1. Performance of sunflower varieties (pooled data for two years, 2005-6 and 2006-7) at Pantnagar

3.2 Effect of Variety under Different Locations in Tamilnadu and Maharashtra

Location Tamilnadu (Alamadi) and Maharashtra (Akola): Table 2: Tamilnadu/Alamadi location-Variety **TNAUSUF-10**: Year of release-1995, Notification number-360(E),01-05-1997, Developed by AICRP (Sunflower) centre, Tamil Nadu Agricultural University, Coimbatore, Pedigree, Mutant from CO₂ (5 KR of gamma rays), Areas of Adaptation/Recommended ecology, Tamil Nadu. **COSFV-5**-Year of release 2005, Notification number-1178(E), 20-07-2007 Developed by AICRP (Sunflower) centre, Tamil Nadu Agricultural University, Coimbatore, Pedigree Gene pool *Helianthus annuus* × *H. praecox*, Areas of Adaptation/Recommended ecology, Tamil Nadu. **Akola LSF-8**-Year of release-2006, Notification number-122(E), 06-02-2007, Developed by AICRP (Sunflower) centre, Oilseeds Research Station, Latur, Marathwada Agricultural University, Parbhani, Pedigree, Interspecific cross derivative (*H. tuberosis* × Morden), Areas of Adaptation/Recommended ecology, Maharashtra, kharif/rabi (rainfed). **TAS-82**-Year of release-2006, Notification number-1703 (E), 05-10-2007, Developed by AICRP (Sunflower) centre, Dr. Punjabrao Deshmukh Krishi Vishwa Vidyalaya, Akola, Pedigree, Parent variety surya, mutation and selection, Areas of Adaptation/Recommended ecology, Vidarbha region of Maharashtra.

It is observed from the table 2 that plant height of TNAUSAF-10 plant was found maximum. The variety COSFV-5 produced higher seed yield (1856.0 kg/ha) followed by TNAUSAF-10 (1767.5 kg/ha) in rabi season under irrigated conditions. Variety COSFV-5 found to be beter under rainfed (1456.6 kg/ha) conditions. Similar results were reported by Singh and Gupta,2003,Singh and Gupta 2001.The oil content % was found higher in LSF-8 variety followed by TAS-82.

Table 2. Performance of Sunflower Varieties at Alamadi (TN) and Akola (MH) on Government farms in rabi season under irrigated conditions 2005-6 and 2006-7

Year	Variety	Pl. ht. (cm)	Days to flow.	Days to maturity	Head dia. (cm)	100 Seeds wt. (g)	VW (g)	Seed yield (Kg/ha)	% Oil	Hull %
2006	TNAUSAF-10	165.1	55.3	92.2	14.9	6.0	33.5	1723.5	36.9	30.3
	COSFV-5	165.3	55.2	91.1	14.0	5.1	32.9	1910.6	39.2	34.8
	LSF-8	145.2	60.1	95.8	15.4	5.6	42.5	1702.2	36.9	34.1
	TAS-82	160.5	55.3	101.5	14.5	5.1	31.2	1630.9	38.1	38.6
2007	TNAUSAF-10	166.2	55.4	90.8	14.6	6.1	31.5	1811.5	36.9	31.3
	COSFV-5	164.3	55.1	91.6	14.3	5.0	33.9	1830.6	39.2	35.8
	LSF-8	146.2	60.3	95.7	16.1	5.6	41.9	1560.2	36.9	35.6
	TAS-82	161.2	55.2	103.4	13.2	5.4	30.2	1602.9	37.1	37.6
Mean		159.3	56.5	95.3	14.6	5.5	34.7	1721.6	37.7	34.8
CD at 0.05		4.3	3.4	5.5	2.6	1.8	2.9	11.2	2.7	2.3

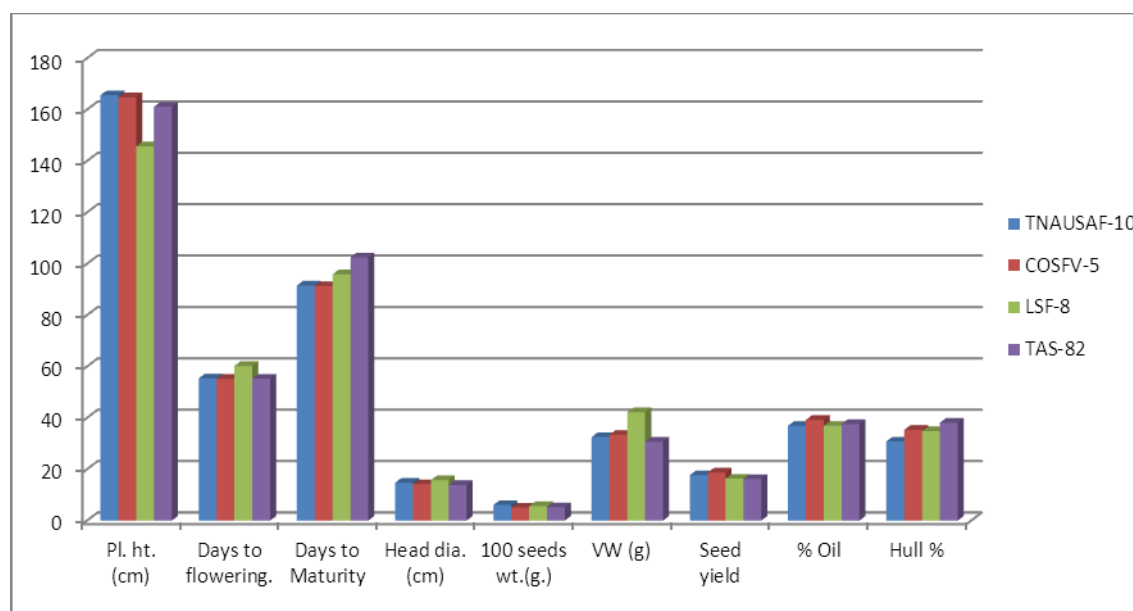


Figure 2. Performance of Sunflower Varieties (pooled data for two years, 2005-06 and 2006-07) at Alamadi (TN) and Akola (MH)

4. Conclusion

It is concluded that COSFV-5 produced higher seed yield under irrigated conditions and performed better in south. COSFV-5 may be recommended for better seed yield under irrigated conditions. Variety sunflower GAUSUF-15 found suitable under irrigated conditions at Pantnagar. During spring season GAUSUF-15 sunflower produced more yield than DRSF-113 in northern India, where spring-winter season from February to March is observed at Pantnagar. COSFV-5 variety found good for higher oil % content followed by TAS-82 in south and TNAUSUF-7 in north followed by DRSF-108 and DRSF-113.

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