

Oil and Seed Yield of Sunflower Hybrids on Government Farms in Rabi Season Under Irrigated Conditions

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Received: February 25, 2011 Accepted: April 6, 2011 doi:10.5539/jas.v3n2p275

Abstract

The Field trials on sunflower crop were conducted in different states of India during the year from 2006 to 2008. The RSFPD, Government of India, DADF provided all inputs to conduct the trials in the area under their jurisdiction to evaluate the suitable varieties vs hybrids of sunflower, their sowing season, 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 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. RSFPDs organized sunflower trials in different states to evaluate sunflower production in northern and southern parts of India. The varieties and hybrids 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 while, Haryana, Punjab and Uttar Pradesh experience a sub-tropical type of climate having February and March as spring season in northern India. All India released hybrid varieties TCS-1, LSFH-35, RSFH-1, NDSH-1 and DRSF were grown at south India. Hybrid Variety RSFH-1 performed better with seed yield (2370.7/1995.2 kg/ha). Data shows that oil content (40.5, 42.5%) was higher in the seeds of cultivar NDSH-1. Maximum plant height (168.5, 161.5 cm) in LSFH-35 and head diameter (22.3 cm, 20.9 cm) was higher in the variety RSFH-1.

Keywords: Sunflower, Yield, Irrigation, Seed, Oil, Plant, Hybrid

1. Introduction

Sunflower (*Helianthus annuus* L.) is an important oilseed crop in India. 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. It's 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. **TNAUNSUF-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. Hybrids varieties of sunflower viz TCSH-1, LSFH-35, RSFH-1, and NDSH-1 were grown on Government farm viz Alamadi, TN, Gunegal, AP, Akola, MH, and Hesarghatta, KA, respectively, to study the effect of different locations and irrigation conditions.

3. Results and Discussion

3.1 Effect of Sunflower Hybrid Cultivars in Irrigated Conditions—Effect on Seed and Oil Yield

Location Alamadi: Variety **TCSH-1**-Table 3, Year of release-2000, Notification number-821(E), 13-09-2000, Developed by-AICRP (Sunflower) centre, Tamil Nadu Agriculture University, Coimbatore, Pedigree, CMS-234A × RHA-272, Areas of Adaptation/Recommended ecology, Tamil Nadu. **LSFH-35**-Year of release-2003, Notification number-72(E), 10-01-2008, Developed by Oilseeds Research Station, Latur, Marathwada Agricultural University, Parbhani, Pedigree, CMS-234A × RHA-1-1, Areas of Adaptation/Recommended ecology, Maharashtra, harif/Rabi (rainfed). **RSFH-1**-Year of release-2005, Notification number-2458(E), 16-10-2008, Developed by AICRP (Sunflower) Centre, Regional Agricultural Research Station, Raichur, University of Agricultural Sciences, Raichur, Pedigree, CMS-103A × R-64NB, Areas of Adaptation/Recommended ecology, North-Eastern dry zones of Karnataka. **NDSH-1**-Year of release-2002, Developed by AICRP (Sunflower) centre, Regional Agricultural Research Station, Nandyal, Acharya N.G. Ranga Agricultural University, Hyderabad, Pedigree, CMS-234A × RHA-859, Areas of Adaptation/Recommended ecology, Southern Rayalaseema, North Telangana in Andhra Pradesh. It is observed that hybrid sunflower RSFH-1 produced significantly higher seed yield (2490.2, 2370.7, 1995.2 kg/ha) followed by sunflower hybrid TCSH-1 (2150.7, 2120.7, 1919.7) seed kg/ha at different locations under irrigated during rabi season. Soil moisture plays a great role in photosynthesis and crop yield (Singh & Gupta, 2002).

Table 1. Performance of Sunflower hybrids at Alamadi (TN), Gunegal (AP), Akola (MH), Hesarghatta (KA) on government farms in rabi season under irrigated conditions, 2006-8

Year	Variety hybrid	Pl. ht. (cm)	Days to flow.	Days to Maturity	Head dia. (cm)	100 seeds wt. (g)	VW (g)	Seed yield	% Oil	Hull %
2007	TCSH-1	166.3	55.2	90.4	16.0	4.8	36.5	2120.7	38.5	27.6
	LSFH-35	161.5	58.9	101.1	15.6	5.5	41.3	2220.5	40.9	28.7
	RSFH-1	159.4	59.9	106.2	22.3	5.0	40.4	2370.7	39.1	28.1
	NDSH-1	142.6	55.4	92.9	17.1	5.0	47.5	1890.6	40.5	25.9
2008	TCSH-1	157.3	54.8	86.7	14.6	4.8	38.6	1919.7	37.5	22.6
	LSFH-35	168.5	61.1	96.3	13.1	5.5	42.3	1720.5	38.9	28.7
	RSFH-1	160.4	59.3	92.5	20.9	4.9	40.3	1995.2	40.1	28.1
	NDSH-1	131.6	52.5	90.9	15.1	4.4	46.2	1818.6	42.5	25.9
Mean		155.9	57.1	94.6	16.8	4.9	41.6	1994.6	39.8	26.9
CD at 0.05		6.3	3.2	1.3	3.7	1.9	4.5	3.6	1.8	2.2

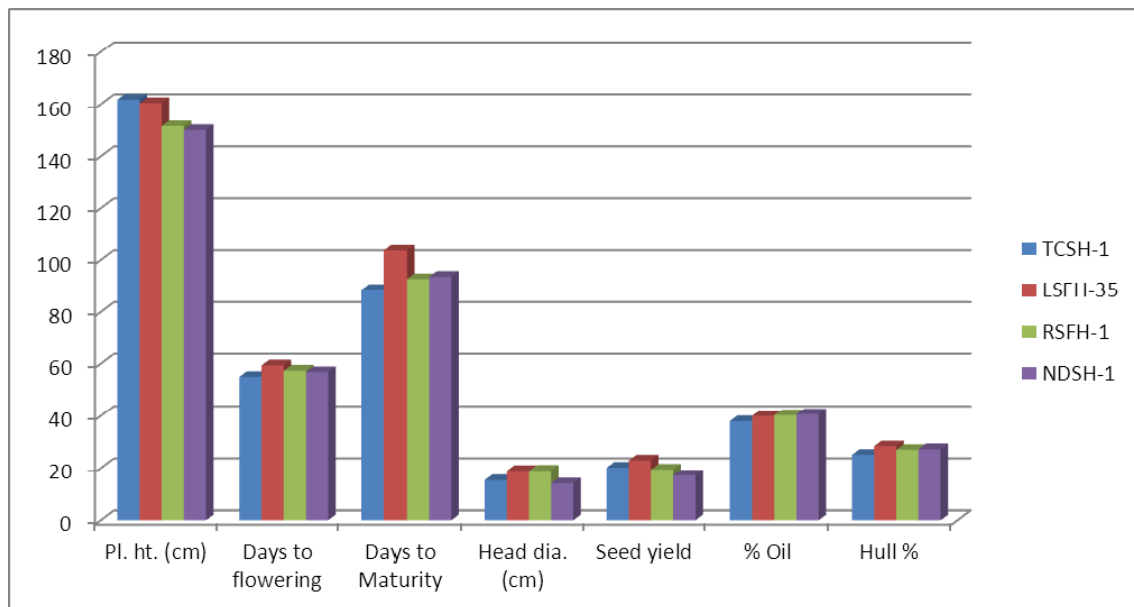


Figure 1. Performance of Sunflower hybrids varieties (pooled data for two years, 2006-2008) at Alamadi (TN), Gunegal (AP), Akola (MH), Hesarghatta (KA)



4. Conclusion

It is concluded that LSFH-35 produced higher seed yield under irrigated conditions and under rabi climatic conditions. NDSH-1 performed lowest at Hsarghata. RSFH-1 may be recommended for better seed yield under irrigated and rainfed conditions at Akola in Maharashtra. Hybrid sunflower TCSH-1 found second suitable cultivar at different locations under irrigated conditions in rabi season. During spring season RSFH-1 hybrid sunflower produced more yield at Gnegal farm, Andhra Pradesh in southern India, where spring winters during February-March not persuid.

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