

A high oil content sunflower variety CO(SFV) 5

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Abstract : The sunflower population TNHSF 239 was developed from a gene pool involving inter specific cross between *Helianthus annuus* and *Helianthus praecox*. It matures in 85-90 days. This cultivar TNHSF 239 recorded 1360 and 1520 kg ha⁻¹ seed yield under rainfed and irrigated situations respectively. The yield increase over CO 4 and Morden are 18.5 and 37.7 per cent respectively under rainfed condition. Similarly, under irrigated condition this population out yielded CO 4 and Morden by 15.6 and 34.7 per cent respectively. This population has the higher oil content of 40.3 per cent as compared to other released varieties viz. CO 4 (35.6%) and Morden (31.6%) on seed basis. The kernel oil content (after dehulling) is also higher in TNHSF 239 (48.3%) as compared to CO 4 (38.7%) and Morden (36.4%). The hull content of this variety is comparable to the check varieties. In view of its superior performance in respect of high seed and oil yield coupled with high autogamy, this population is released as sunflower variety CO (SFV) 5 for general cultivation in Tamil Nadu during 2006.

Key words : CO (SFV) 5, sunflower, high oil content, population, variety.

Introduction

Sunflower (*Helianthus annuus* L.) is an important oilseed crop in India. It is cultivated in an area of 2.0 million ha with a production of 0.99 million tones. Yugoslavia records the highest yield of 2031 kg ha⁻¹ of sunflower against the lowest yield of 496 kg ha⁻¹ in India, while the world average being 1242 kg ha⁻¹ (Damodaran and Hegde, 2005). The oil content of the present day cultivated varieties is around 37-38 per cent only. With this background, a research programme was initiated at Department of Oilseeds, Tamil Nadu Agricultural University, Coimbatore.

Materials and Methods

The sunflower population TNHSF 239 was developed from the gene pool of interspecific

cross derivative of *Helianthus annuus* x *Helianthus praecox*. Single plant selections were made from the gene pool and promising progenies were evaluated in various station trails between 1997-1999 at Oilseeds Farm, Tamil Nadu Agricultural University, Coimbatore. The culture was tested in MLT at various research stations and ART in farmers holdings of different districts during 2000-'01 and 2002-'04 respectively. Quality parameters for TNHSF 239 and check varieties were estimated as per the standard procedures. Pest and disease reactions were estimated at Coimbatore during *kharif* 2005.

Results and discussion

In station trials, the culture TNHSF 239 recorded 1691 and 2112 kg ha⁻¹ seed yield

Table 1. Overall performance of sunflower population TNHSF 239 in various trials for seed yield (kg ha⁻¹)

Name of the trial	No. of locations	TNHSF 239	CO 4 (c)	Morden (c)
<i>Kharif</i>				
Station trials	6	1691	1431	1122
MLT	9	1326	966	861
ART 2002	21	1237	1121	1055
ART 2004	37	1187	1072	913
AICORPO 2000*	6	1059	955	921
Mean (73)		1360	1148	988
<i>Rabi / Summer</i>				
Station trials	5	2112	1784	1403
MLT	4	2012	1708	1451
ART 2002-03	15	903	795	693
ART 2004-05	29	1053	973	966
Mean (53)		1520	1315	1128

* Not considered for mean

during *kharif* and *rabi* / summer respectively. The increase was 18.2 and 18.4 per cent over CO 4 (1431 and 1784 kg ha⁻¹) and 50.71 and 50.52 per cent over Morden (1122 and 1403 kg ha⁻¹) during *kharif* and *rabi* / summer seasons respectively. In multilocation trials, TNHSF 239 recorded 1326 and 2012 kg ha⁻¹ during *kharif* and *rabi* / summer seasons respectively. It represents an increase of 37.35 and 17.80 per cent over CO 4 (966 and 1708 kg ha⁻¹) and 54.04 and 38.64 per cent over Morden (861 and 1451 kg ha⁻¹) during *kharif* and *rabi* / summer seasons respectively.

In adaptive research trials, the population TNHSF 239 recorded an average seed yield of 1212 and 978 kg ha⁻¹ during *kharif* and *rabi* / summer seasons respectively (Table 2). The increased yield was 10.53 and 10.63 per cent over CO 4 (1097 and 884 kg ha⁻¹) and 23.17 and 17.90 per cent over Morden (984

and 830 kg ha⁻¹) during *kharif* and *rabi* / summer seasons respectively.

Considering the overall performance, the population TNHSF 239 recorded 1360 and 1520 kg ha⁻¹ seed yield under rainfed and irrigated situations respectively. The yield increase over CO 4 and Morden were 18.5 and 37.7 per cent respectively under rainfed condition. Similarly, under irrigated condition this population out yielded CO 4 and Morden by 15.6 and 34.7 per cent respectively.

The population TNHSF 239 has higher oil content of 40.3 per cent as compared to other released varieties *viz.*, CO 4 (35.6%) and Morden (31.6%) on seed basis. The kernel oil content (after dehulling) of 48.2 per cent in TNHSF 239 is also higher when compared to CO 4 (38.7%) and Morden (36.4%). The hull content of this variety is comparable to the check varieties.

Table 2. District performance of sunflower population TNHSF 239 in Adaptive Research Trial - Mean seed yield (kg ha⁻¹)

District	Location	TNHSF 239	CO 4 (c)	Morden (c)
<i>Kharif 2002</i>				
Madurai	2	1125	1069	938
Salem	2	2619	1824	1808
Thoothukudi	2	919	912.5	690
Tiruchirapalli	2	1242	1134	1026
Dharmapuri	2	744	837	800
Vellore	2	706	700	813
Pudukkottai	2	1088	1130	1092
Dindigul	2	1508	1438	1188
Theni	2	1196	955	1099
Tiruvannamalai	2	958	945	960
Virudhunagar	2	1255	1140	830
Mean		1237	1121	1055
<i>Kharif 2004</i>				
Vellore	4	1159	1086	1062
Tiruvannamalai	4	803	861	698
Dharmapuri	4	753	665	681
Namakkal	4	1490	1404	1071
Tiruchirapalli	4	1242	893	682
Coimbatore	4	1242	1075	666
Perambalur	4	1190	116.8	792
Pudukkottai	4	1306	1188	1256
Madurai	4	1278	1176	1073
Tuticorin	4	797	724.5	596
Mean		1187	1072	913
<i>Rabi/Summer 2002-03</i>				
Vellore	2	708	613	738
Tiruvannamalai	2	860	751	575
Namakkal	2	1274	1103	873
Coimbatore	2	985	489	338
Madurai	2	855	844	937
Theni	2	945	870	825
Thoothukudi	2	563	437	400
Tirunelveli	2	856	1142	753
Mean		903	795	693
<i>Rabi/summer 2004-05</i>				
Vellore	4	648	653	789
Tiruvannamalai	4	976	870	947
Salem	4	1210	1201	1045
Namakkal	4	1323	1141	1250
Tiruchirapalli	4	1006	884	881
Virudhunagar	4	1225	1208	984
Tuticorin	2	909	775	638
Tirunelveli	4	903	831	835
Mean		1053	973	966

Table 3. Morphological and quality description of sunflower culture TNHSF 239

Pedigree	:	Single plant selection from the gene pool of interspecific cross derivative of <i>Helianthus annuus</i> x <i>Helianthus praecox</i>
Duration	:	85 - 90 days
Plant height (cm)	:	145 - 165
Leaves	:	Moderately serrated leaves ; Green colour leaves.
Head diameter	:	Medium head size, flat to convex head
Days to 50% flowering	:	50-55 days
Seed colour	:	Dark brown, occasional longitudinal stripes can be seen on the seed surface.
100-seed weight (g)	:	4.8 - 5.0
Hull content (%)	:	26.0 - 28.0
Oil content (%) (seed)	:	40-42
Oil content (%) (kernel)	:	47-48
Volume weight (g/100 ml)	:	45-48
Palmitic acid (%)	:	5.3
Stearic acid (%)	:	1.8
Oleic acid (%)	:	29
Linoleic acid (%)	:	64
O/L ratio	:	0.41

With regard to pest and disease reactions, the population TNHSF 239 recorded moderate resistance reaction to *Alternaria* leaf spot and rust while the check varieties CO 4 and Morden. Rot recorded susceptible reaction under field condition. The culture TNHSF 239 (8%) also recorded low incidence of necrosis when compared to check varieties CO 4 (10%) and Morden (15%).

The morphological characters are presented in Table 3. The culture TNHSF 239 has 145-165 cm as plant height with moderately serrated green leaves and medium sized mono head. It flowers and matures in 50-55 and 85-90 days respectively. The seeds have dark brown colour with occasional longitudinal stripes on the surface. The 100-kernel weight and hull

content are 4.8 – 5.0 g and 26.0 – 28.0 per cent respectively. The volume weight is between 45-48 g / 100 ml. The seed oil and kernel oil content are 40-42 and 47-48% respectively. The O/L ratio of TNHSF 239 is 0.41.

Hence, in view of its superior performance in respect of high seed and oil yield coupled with high autogamy, this population was released as sunflower variety CO (SFV) 5 for general cultivation in Tamil Nadu during 2006.

References

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