Indian J. Genet., **66**(1): 51-52 (2006)

Short Communication

Evaluation of elite sesame (*Sesamum indicum* L.) lines for oil quality and quantitative traits

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(Received: February 2005; Revised: February 2006; Accepted: March 2006)

Sesame (*Sesamum indicum* L.) is perhaps the oldest oilseed crop known and used by man. It is called as the "Queen of Oilseeds" because of its excellent qualities of the seed, oil and meal. Sesame seed is a vital nourishing food and used as a flavouring agent. Sesame oil has desirable fatty acid composition and excellent stability against oxidative rancidity. The crop has a large diversity in cultivars and cultural systems. The present investigation aims to study the variability and to evaluate the yield and oil quality traits in some elite sesame lines.

Nineteen promising sesame lines of Initial Varietal Trial (IVT) of All India Coordinated Research Project including three check varieties were evaluated during *kharif* 2003 for grain yield and nine related traits. The oil content was estimated by Oxford NMR Analyzer and fatty acid composition by Agilent Gas Chromatograph model 6890 N [1]. Oil stability index (OSI) i.e. ratio of monounsaturated to polyunsaturated fatty acids (18:1/18:2) and nutritional quality index (NQI) i.e. ratio of polyunsaturated to saturated fatty acids [18:2 (16:0+18:0)] of the oil were calculated from the fatty acid composition [2].

A significant variation amongst sesame genotypes was found for all the traits studied (Table 1).

The highest yield was observed in PKDS-37 (1756 kg/ha) followed by local check MACSS 01 (1734 kg/ha) and JCS-399 (1699 kg/ha). For oil content OS-Sel-84 (51.89%) was superior to all lines followed by AKT-160 (51.18%) and OS-Sel-117 (51.17%). Oleic acid content was significantly higher than mean in OCS-3 6/2002(47.42%), OS-Sel-117 (44.21%) and TAG 89-309 (43.13%). Linoleic acid content was significantly higher than mean in OS-Sel 84 (46.20%), JCS-399 (46.05%) and RT-338 (46.00%). The genotype PKDS-37 which showed highest grain yield per hectare also showed good performance for primary branches (4.0), productive capsules/plant (40.0), oil content (49.72%) and plant height (107 cm). Local check MACSS 01 showed maximum 1000 grain weight (3.47 g) and also recorded high yield (1734 kg/ha) and oil content (50.03%). The zonal check Uma was superior for primary branches (4.1) and productive capsules (50.33) also recorded high yield (1593 kg/ha) and linoleic acid content (45.27%). One of the early genotypes TAC-89-309 showed high yield (1574 kg/ha), 1000 grain weight (3.33 g), productive capsules (40.20) and oleic acid content (43.13%). The genotype OCS-36/2 recorded the highest oleic acid content (47.42%) and oil stability index (1.19) followed by OS-Sel-117 (1.02).

Table 1. Range (minimum, maximum) and mean for various characters in sesame genotypes

S. No.	Character	Range		Mean
		Minimum	Maximum	
1.	Days to first flowering	29.00	41.33	35.79
2.	Days to 50% flowering	36.00	45.00	40.47
3.	Days to maturity	80.67	88.33	84.54
4.	Plant height (cm)	70.27	116.63	86.65
5.	No. of primary branches	2.23	4.07	3.15
6.	No. of productive capsules/plant	28.27	50.33	40.01
7.	1000 grain weight (g)	2.33	3.47	3.06
8.	Oil content (%)	43.45	51.89	49.53
9.	Total dry matter (g)	17.75	47.01	30.42
10.	Harvest index (%)	31.22	48.02	41.96
11.	Grain yield (kg/ha)	9.74	17.56	14.36
12.	Palmitic acid (16:0) (%)	7.57	8.61	8.27
13.	Stearic acid (18:0) (%)	3.87	5.18	4.34
14.	Oleic acid (18:1) (%)	40.26	47.42	42.25
15.	Linoleic acid (18:2) (%)	39.50	46.20	44.78
16.	Oil stability index (OSI) (18:1/18:2)	0.87	1.19	0.939
17.	Nutritional quality index (NQI) [18:2 (16:0+18:0)]	3.12	3.90	3.58

Correlation studies revealed positive significant correlation between number of capsules per plant and average branches/plant. Grain yield (kg/ha) showed highly significant positive correlation with total dry matter

and also a significant positive correlation with plant height. Oleic acid showed a highly significant positive correlation with oil stability index and a highly significant negative correlation with linoleic acid content. Linoleic acid showed significant positive association with nutritional quality index and a negative correlation with stearic acid.

It is therefore, concluded that there is a wide range of variability in the lines studied for the yield and related traits. This can be further utilized for the development of high yielding varieties with improved oil content and oil stability index. Nutritional quality of the sesame oil can be improved by increasing the linoleic acid content which simultaneously reduces the saturated fatty acid mainly stearic acid. Oil stability can be improved by improving the oleic acid content. However, it is difficult to improve both oleic and linoleic acid content simultaneously. More emphasis should be given on primary branches/plant, plant height, total dry matter, 1000 grain weight and oil content to increase the yield. For this purpose PKDS-37, MACSS 01, Uma and TAC-89-309 can be used. The genotype OCS-36/2002 and OS-Sel-117 can be used to develop high oleic variety with high oil stability index.

Acknowledgements

Authors are thankful to Dr. S.S. Duhoon, Project Coordinator, AICRP (Sesame & Niger) for providing the material and Dr. V.S.P. Rao, Director for facilities and valuable suggestions.

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