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Short Communication

EVALUATION OF LINSEED GERMPLASM

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Linseed (*Linum usitatissimum* L.) is being cultivated since antiquity in the Mediterranean coastal lands, Asia minor, Egypt, Algeria, Tunisia, Spain, Italy and Greece for fibre. In India, it is cultivated mainly for oil purpose. It occupies fifth place after groundnut, rapeseed and mustard, soybean and sesame. The seeds of linseed have long been the source of drying oils. It contains 32-45% oil content, which is used chiefly as edible oil and making paints, varnishes, linoleum, soft soaps and printer's ink etc.

A total of 621 accessions including exotic collections from Argentina (63), Australia (24), Japan (2), France (1), USA (3), USSR (3), Belgium (1), Romania (1) and Hungary (3) and indigenous germplasm from Madhya Pradesh (162), Uttar Pradesh (87), Himachal Pradesh (54), Bihar (44), Maharashtra (164), Rajasthan (2), Andhra Pradesh (3) and Karnataka (4) were included in the present study.

The germplasm accessions were grown in augmented block design at NBPGR, R.S. farm, Akola and evaluated in 2 consecutive *rabi* seasons of 1990-91 and 1991-92. Plot size for each accession was 1 row of 3 m with row to row spacing of 60cm. Varieties C-429 and RLC-6 were used as checks and were replicated in each block of 25 accessions. The observations were recorded on days to flowering, days to maturity, flower colour, flower shape, anther colour, plant height, number of primary and lateral branches/plant, number of capsules/plant, number of seeds/capsule, seed colour, seed size, yield/plant, oil content and resistance to powdery mildew and wilt. Data were recorded on five randomly selected plants of each accession, excluding border plants. Mean values were used for the analysis of quantitative data. In case of qualitative data, frequency of each descriptor state was calculated. Oil content of the seed samples was determined by using NMR analyser.

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The linseed germplasm exhibited considerable genetic variability for various characters studied (Table 1).

Table 1. Estimate of variability parameters and morphological variation (% frequency) in linseed germplasm

Character	Range	Mean	Standard deviation	Standard error	CV%
Days to flowering	59-90	61	4.708	0.206	7.718
Days to maturity	95-122	110	6.161	0.270	5.600
Plant height (cm)	13.6-55.5	43.2	7.432	0.326	17.203
No. of primary branches/ plant	11.4-65.0	28.7	7.261	0.318	25.299
No. of lateral branches/ plant	2.3-14.3	6.1	1.073	0.045	17.590
No. of capsules/ plant	3.1-34.2	12.7	4.146	0.188	32.645
No. of seeds/ capsule	2.3-10.0	7.1	1.156	0.049	16.281
Yield/ plant (g)	0.1-2.4	1.3	0.425	0.016	32.692
Oil content (%)	23.74-47.82	41.2	2.801	0.122	6.798
Flower colour	blue (91.47), bluish purple (1.77), light blue (0.32), purple (0.16), white (6.28)				
Flower shape	disc (67.31), funnel (26.89), star (2.42), tubular (3.38)				
Flower size	large (6.28), medium (92.47), small (2.25)				

Yield is a complex inherited character influenced by the yield contributing components. Seed yield has positive correlation with effective capsules/plant, seeds/capsule and 1000-seeds weight (Ghatak *et. al.,*), and plant height (Guan

et. al., 1987, Patel *et. al.*, 1989). In the present study the accessions identified for high number of capsules/plant were IC 59256, IC 60426, IC 96656, IC 10540, EC 41562, and EC 110289. The accession EC 110289 had highest capsules/plant (65.0). High seeds/capsule was observed in IC 53260, IC 60423, IC 60435, 63579, IC 96485 and EC 41481. Early maturing accessions viz. IC 61280, IC 61320, IC 96596, EC 526, EC 1395, EC 41621 and EC 41650 may be suitable for areas with high temperature ranges at the time of maturity and also could be used in hybridization programme to develop early maturing genotypes. Tall genotypes of linseed are considered better for fibre. Tall accessions with more than 50 cm height and less primary branches viz. IC 96534, IC 96535, IC 96549, EC 236, and EC 41774-A are suitable for fibre purpose. IC 96513 and IC 96514 showed high level of field resistance against powdery mildew and wilt. High yield was recorded in EC 236, EC 1413, IC 61289, IC 61223, IC 62335, IC 63578 and IC 96612.

In the present study oil content ranged from 23.7-47.8%. IC 61322, IC 96666, IC 96571 and IC 105404 showed more than 47% oil (Table 2). Naqvi

Table 2. Donor accessions identified for various traits

Trait	Donor accession
Early maturity (<95 days)	IC 61280, 61320, 96596, EC 1537, 2288, 41536
Plant height (> 55.5 cm.)	IC 96534, 96535, 96549, EC326, 22813, 41774A
No. of lateral branches/plant (>25)	IC 96487, 96504, 105405, EC 41720, 41768
No. of capsules/plant (> 45)	IC 59256, 60426, 96655, 105404, EC41562, 110289
No. of seeds/capsule (> 8.8)	IC 63579, 96485, EC 41481
Bold seeds	IC 53269, 54967, 96466, 96536, 96588, 96746, 96752, 96761
	EC 1025, 1050-B, 1395, 11074, 41465, 41567, 41478-B, 41650, 41700, 4164 and 244634.
Field tolerance to powdery mildew	IC 53288, 96513, 96514, 96532, EC 41481, 41495, 41621, 41622
Yield/plant (>2.0 g)	IC 53298, 59011, 59255, 61291, 61315, 61324, 96618, 96629, EC 236, 1413
Oil content (> 47.0%)	IC 61322, 96666, 96751, 105404

et al. (1987) reported range for linseed oil content 33.1-44.5% and negative correlation with protein content. The accessions identified for various useful economic characters viz. high yield, resistance to powdery mildew and wilt and high oil content are of immense value and in hybridization programme.

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