

Seed Size Studies in relation to Yield Attributing Parameters in Indian Mustard [*Brassica juncea* (L) Czern and Coss]

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ABSTRACT Studies on size grading in six cultivars of mustard for two years revealed that size grading significantly influences yield contributing characters. Among the six cultivars, RH-30 performed better for most of the yield characters viz. number of siliqua/plant, 1000-seed weight, seed yield/plant, length of main raceme and harvest index followed by the cv. Laxmi. A pronounced effect of seed size was observed in large seed size category by having higher values of yield attributing parameters. Even the ungraded seed category was observed to be better for sowing purpose than small size of seed.

Keywords: Indian mustard, *Brassica juncea*, yield characters, seed size

Brassica is wide spread and constituting the main oil seed crop in the world of temperate climate. The Brassica crops are major source of edible oil occupying the fifth position in world and second in India. These crops are also used for food (condiments, pickles etc.), feed (mustard cake), fodder and in several religious ceremonies. About 70% of area occupied by important oilseeds in India is rain fed, thereby, causing low productivity. Though the application of better technology and adaptation of certain agronomical practices play a vital role in better production but good quality seed of improved variety is pre-requisite to enhance the production. The boldness of seed is also an important quality parameter as larger is the seed, more the food material it will contain and thus more will be the availability of energy to the plant for its initial growth and to withstand the adverse environmental conditions. Therefore, attempts were made to study the yield attributing parameters in different seed size cultivars of Indian mustard.

MATERIAL AND METHODS

Six varieties [RH-30, Laxmi (RH-8812), Varuna (T-59), RH-819, RH-8113 and Kranti (PR-15)] of

known pedigree were used to conduct the experiment at the Research Farm of Seed Technology, CCS Haryana Agricultural University, Hisar. The experiments were conducted in completely Randomized Block Design replicating thrice for two years with the plot size of 5 x 2.4 m².

The size grades in the cultivars were made as under :

- (A) Bold seeded cultivars RH 30, Laxmi, Varuna
Large > 2.0 mm
Small 1.25-2.0 mm
- (B) Small seeded cultivars RH 819, RH 8113, Kranti
Large > 1.5 mm
Small 1.0-1.5 mm

The ungraded seeds of each cultivars was used as control.

The yield attributing parameters were recorded at the time of harvest. The number of siliquae per plant recorded as mean of number of siliquae taken from five randomly selected plants. Length (cm) and width (mm) of siliqua was recorded as the mean value of 20 siliquae from each plant. Seed per siliqua were counted after threshing 50 siliquae from each of five selected plants. 1000-seed from the produce

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Table 1. Effect of seed size on seed yield attributes in Indian mustard cultivars

Treatment	No. of siliquae per plant		Length of siliqua (cm)		Seeds per siliqua		Height of fertility zone (cm)	
	1993-94	1994-95	1993-94	1994-95	1993-94	1994-95	1993-94	1994-95
Varieties								
RH-30	241.50	208.50	4.83	4.80	11.33	11.11	73.59	68.67
Laxmi	234.00	199.40	5.00	4.84	11.89	11.17	70.33	66.50
Varuna	238.00	204.10	4.76	4.74	11.11	10.97	68.56	65.78
RH-819	226.30	183.90	5.11	5.13	12.56	12.24	72.84	64.00
RH-8113	232.10	191.90	4.76	4.63	12.11	12.06	75.11	65.11
Kranti	233.40	194.50	4.51	4.58	11.00	11.00	66.29	64.44
SEm±	2.52	3.42	0.05	0.03	0.24	0.27	0.93	0.48
CD (P=0.5)	7.20	9.82	0.14	0.08	0.70	0.77	2.66	1.37
Seed size								
Large	265.50	231.90	5.10	5.03	11.48	11.22	75.60	71.31
Small	199.60	162.50	4.65	4.52	11.86	11.68	65.68	59.83
Ungraded	237.60	196.50	4.84	4.82	11.67	11.37	71.68	66.11
SEm±	1.78	2.42	0.03	0.02	0.17	0.19	0.66	0.34
CD(P=0.5)	5.10	6.95	0.10	0.06	NS	NS	1.88	0.97

Treatment	Width of siliqua (mm)		Test weight (g)		Seed yield (g/plant)		No. of siliquae of main raceme	
	1993-94	1994-95	1993-94	1994-95	1993-94	1994-95	1993-94	1994-95
Varieties								
RH-30	3.30	3.40	6.22	6.26	11.20	9.27	41.78	38.56
Laxmi	3.40	3.30	5.41	5.48	10.71	8.73	42.56	37.78
Varuna	3.20	3.40	5.55	5.61	9.86	8.40	41.44	37.44
RH-819	2.90	2.90	4.34	4.25	8.64	7.32	47.67	38.22
RH-8113	2.80	2.90	4.10	4.14	8.72	7.98	48.22	40.11
Kranti	2.90	3.00	4.26	4.27	8.80	7.47	42.44	38.33
SEm±	0.04	0.04	0.04	0.05	0.17	0.23	0.40	0.23
CD (P=0.5)	0.10	0.10	0.12	0.13	0.48	0.67	1.15	0.66
Seed size								
Large	3.20	3.30	5.33	5.33	11.19	9.77	47.56	42.06
Small	3.00	3.10	4.65	4.69	8.04	6.76	40.37	34.89
Ungraded	3.10	3.20	4.97	4.99	9.74	8.09	44.17	38.28
SEm±	0.04	0.04	0.03	0.03	0.12	0.16	0.28	0.16
CD (P=0.5)	0.10	0.10	0.08	0.10	0.34	0.47	0.81	0.47

Treatment	Length of main raceme (cm)		Seed yield (q/ha)		Stover yield (q/ha)		Harvest index (%)	
	1993-94	1994-95	1993-94	1994-95	1993-94	1994-95	1993-94	1994-95
Varieties								
RH-30	70.00	65.33	21.74	18.27	64.15	56.22	25.28	24.45
Laxmi	68.78	64.33	20.40	16.87	64.34	56.81	24.03	22.88
Varuna	66.44	63.89	19.46	15.73	63.23	56.72	23.49	21.70
RH-819	62.33	58.00	15.80	14.10	61.07	54.37	20.51	20.55
RH-8113	61.67	56.22	17.20	14.82	62.18	54.28	21.65	21.38
Kranti	61.11	65.44	17.12	14.35	56.77	53.22	23.14	21.16
SEm±	0.44	0.35	0.26	0.26	0.65	0.90	0.15	0.20
CD (P=0.5)	1.20	0.99	0.75	0.73	1.88	2.57	0.43	0.57
Seed size								
Large	70.05	65.94	20.57	18.13	65.75	61.68	23.79	22.73
Small	59.22	55.72	16.62	13.37	57.86	49.38	22.31	21.23
Ungraded	65.89	60.44	18.63	15.58	62.26	54.80	22.96	22.10
SEm±	0.31	0.24	0.18	0.18	0.46	0.60	0.11	0.14
CD (P=0.5)	0.88	0.70	0.53	0.52	1.33	1.82	0.31	0.40

of each plot were taken and weighed to record test weight. The height from basal siliqua to top of the plant was recorded as height of fertility zone. Similarly total numbers of siliquae were counted on main raceme from the sample and the mean value was recorded as number of siliquae of main raceme.

Seed yield (g) per plant was recorded from five randomly selected plants in each plot and seed yield per plot was recorded and converted per hectare. The weight of seed yield per plot was subtracted from total biological yield from individual net plot to work out stover yield per plot and converted in to q/ha. The harvest index was expressed in percentage as ratio of economic yield to biological yield.

RESULTS AND DISCUSSION

The two years comparative field study has indicated that different cultivars differed significantly for the yield attributing parameters (Table 1). However, the cultivar RH-30 has performed better for most of the characters viz. number of siliquae per plant (241.50 and 208.60), test weight (6.22 and 6.26) followed by Varuna; seed yield per plant (11.20 and 9.27), length of main raceme (70.00 and 65.33), seed yield per hectare (21.74 and 18.27) and harvest index (25.28 and 24.45) followed by Laxmi during both the years.

The cultivar RH-8113 has shown maximum number of siliqua on main raceme (48.22 and 40.11) during both years and maximum height infertile zone (75.11) during the first year. The cultivar RH-819 has recorded maximum number of seed per siliqua (12.56 and 12.24) and length of siliqua (5.11 and 5.13). The cultivar Kranti has resulted poorest performance among all the cultivars under study. These results are in confirmation to Saran and Giri [1], Bhardwaj [2] and Tyagi [3] in various *Brassica* cultivars.

Number of siliquae per plant, number of seeds per siliqua, test weight, seed yield per plant, height of fertility zone, length of siliqua and number of siliquae on main raceme are the characters that directly affect the final productivity of plant. These entire yield parameters were found to be affected by seed size. The yield parameters were maximum in large seed except for seeds/siliquae which were at par with ungraded and small size seeds as shown by Ahmed [4] in Indian mustard, Yassen *et al.*, [5] in cotton, Kant and Tomer [6] in mustard and Bevinagiadad and Shashidhara [7] in Sunflower.

Conclusively, the results have shown that cultivar RH-30 or Laxmi were better cultivars for this zone and in all varieties large seed size should be used for better yield.

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