Himachal Journal of Agricultural Research 38(1): 77-79 (2012)

Short Note

Performance of mustard (*Brassica juncea* L.) hybrids at varying crop geometries in low hills of Himachal Pradesh

K.S. Thakur, B.S. Mankotia, Anirudh Manchanda and Deep Kumar
CSK Himachal Pradesh Krishi Vishvavidyalaya
Shivalik Agricultural Research and Extension Centre, Kangra-176 001, India.

Manuscript Received: 25.03.2012; Accepted: 18.05.2012

Abstract

Three mustard (*Brassica juncea* L.) hybrids *viz*., DMH 1, NRCHB 506 and PAC 432 were evaluated in comparison to Kranti grown at five planting geometries (30×10 cm, 30×15 cm, 60×10 cm, 45×10 cm, 45×15cm) during *rabi* 2010-11at CSKHPKV Hill Agriculture Research & Extension Centre, Dhaulakuan. Number of branches/plant were significantly more in PAC 432 (20.1) which were similar to DMH 1 (19.6).Plants were significantly taller at 30×10 cm (212.4 cm) whereas number of branches per plant was more at wider row spacing (45×15 cm and 60×10 cm). Hybrids DMH 1 and PAC 432 took 128 days to mature followed by NRCHB 506 (120 days) and Kranti (119 days). It was concluded that hybrid DMH 1 was highest yielder (14.65 q/ha) due to higher harvest index and more branching and should be grown at 30 cm×10-15 cm spacing or even at 45×10 cm geometry.

Keywords: Crop geometry, mustard hybrids, productivity.

Indian mustard (*Brassica juncea* L.) accounts 21% of the total area under oilseed crops and 23% of total oilseed production in India (Pasricha, 2010). Oilseed *Brassica* group is the most important oilseed crop of Himachal Pradesh with its average productivity revolving around 400 kg/ha (Anonymous, 2010-11). The compound growth rates of oilseeds in India remained high and positive for area, production and productivity during 1951-86 and 1986-97, whereas growth rate for area was marginally negative during 1997-2005 (Hegde and Babu, 2009). The demand for oilseed is increasing over the years. The demand projections suggest that the edible oil demand in the country to be 19.02 and 40.89 million tonnes for 2025 and 2050, respectively (Singh, 2006). India remained the world's second-largest edible oil consumer after China, meeting more than half of its annual requirement through imports (Babu and Hegde, 2011). India's deficit is likely to continue owing to ongoing production shortage coupled with robust demand growth. Growing of hybrids is one of the ways to increase the productivity and production. Productivity of rapeseed mustard crops is varied significantly due to crop geometry (Mankotia *et al*., 1994; Singh *et al*., 2006). Therefore, investigation was undertaken to evaluate the performance of hybrids at varying plant geometry.

A field trial was conducted to evaluatethe performance of three mustard hybrids *viz*., DMH 1, NRCHB 506, PAC 432 in comparison to cultivar Kranti grown at five planting geometries (30×10 cm, 30×15 cm, 60×10 cm, 45×10 cm, 45×15cm) during *rabi* 2010-11 at CSKHPKV Hill Agriculture Research & Extension Centre, Dhaulakuan. Dhaulakuan is located in the sub-montane low hills sub-tropical zone of Himachal Pradesh at an altitude of 456 m above mean sea level. The spacing was allocated to main plots and genotypes were allocated to sub-plot of split plot design replicated thrice. The crop was sown on 12th November in 12 m^2 sub plots using 6 kg seed/ha. Full dose of phosphorus (SSP 16%), potash (MOP 60%) and half nitrogen (Urea 46%) was applied basally and the remaining half of nitrogen (Urea 46%) was top dressed. Hoeing was carried out at 20 and 40 days after sowing (DAS). Thinning of mustard was done 20 and 35 days after sowing to maintain 10-15 cm intra-row plant spacing as per treatment. Three irrigations were applied on vegetative, flowering and pod formation stage. Cypermethrin (750 ml/ha) and Dithane M 45 (0.25%) were sprayed as plant protection measures. The crop was harvested during second / third week of March at proper stage (Meena and Singh, 2011).

Data on the performance of hybrids at varying spacing have been presented in table 1. Hybrids DMH 1 and PAC 432 took 128 days to mature followed by NRCHB 506 (120 days) and Kranti (119 days). Number of branches was significantly more in PAC 432 (20.1) being at par with DMH 1 (19.6) compared to NRCHB 506 (16.9) and Kranti (15.4). DMH 1 was taller (225 cm)followed by PAC 432 (211 cm), NRCHB 506 (200.7 cm) and Kranti. Biological yield of PAC 432 was on par with DMH 1 but significantly higher over NRCHB 506 and Kranti. Due to significantly higher harvest index of DMH 1 (21.9%) over genotypes, it recorded significantly higher grain yield (14.65 q/ha) which was 52.9% higher over Kranti (check).

Significant effect of plant geometries was observed on grain yield, biological yield, harvest index, plant height, branches per plant and days to maturity. Plants were significantly taller at 30×10 cm (212.4 cm) compared to all other geometries. This may be attributed to the fact that dense population might have caused competition for light and due to apical dominance effect the plant was more-tall. Lowest plant height was recorded in 60 × 10 cm geometry (197.1 cm). Whereas, number of branches per plant were more in 45 × 15 cm and 60 × 10 cm geometries. At wider row spacing, the plant might have got the more space and hence the more number of branches at wider row spacing. Also crop took approximately 124.9 days (one more day) to mature in 60 × 10 cm geometry. Biological yield was significantly more at 30 × 10 cm geometry (73.6 q/ ha). Significantly higher grain yield was obtained in 30×10 cm (12.96 q/ha) which was at par with 30 ×15 cm (11.18 q/ha) and 45×10cm (10.86 q/ha) but significantly higher over 45 ×15 cm

Table 1. Plant height, number of branches/plant, grain yield, biological yield and harvest index of mustard as affected by crop geometry and genotypes

Treatments	Grain yield (q/ha)	Biological yield (q/ha)	Harvest index	Plant height (cm)	No of branches per plant (No.)	Days to maturity (No.)
Crop geometry						
30×10cm	12.96	73.61	0.178	212.38	17.26	123.7
30×15cm	11.18	64.93	0.181	205.85	17.48	123.7
45×10cm	10.86	53.47	0.204	203.86	17.56	123.9
45×15cm	8.97	47.22	0.194	210.35	19.15	123.1
60×10cm	9.86	67.36	0.148	197.10	18.63	124.9
CD (P=0.05)	2.23	8.31	NS	0.29	0.42	0.33
Hybrid/ cultivar						
DMH-1	14.65	68.88	0.216	225.05	19.58	128.4
NRCHB 506	9.05	51.94	0.180	200.71	16.92	120.1
PAC 432	9.79	71.11	0.139	211.29	20.10	128.4
KRANTI (check)	9.58	53.33	0.186	186.53	15.46	119.1
CD (P=0.05)	0.84	4.03	0.02	0.77	0.40	0.15

and 60×10 cm geometries.

Thus, hybrid DMH 1 was observed to be highest yielder (14.65 q/ha) and should be grown at 30 cm×10-15 cm spacing or even at 45×10 cm geometry. Similar results have also been reported by DRMR (2011).

References

Anonymous 2010-11. *Statistical Outline of Himachal Pradesh*. Sankheyki Vibhag, Himachal Pradesh, Shimla.

Babu SNS and Hedge DM 2011. Best Managemnet practices for increasing productivity and resource use efficiency in oilseeds. J. Oilseeds Res. **28** (1):1-23.

DRMR 2011. Annual Progress Report AICRP Rapeseed Mustard 2011 No. 18 :CP 12-15.

Hegde DM and Babu SNS 2009. Declining factor productivity and improving nutrient use-efficiency in oilseeds. Indian J. Agron. **54** (1):1-8.

Mankotia BS and Negi PS and Bhopal Singh 1994. Influence of pea intercropping (*Pisum sativum* L.) and fertility levels on gobhi sarson (*Brassica napus* L.) in mid-hill conditions of Himachal Pradesh. Him. J. Agric. Res. **20** (1&2): 5-11.

Meena HP and Singh KH 2011. Assessment of proper stage of harvesting in Indian mustard (*Brassica juncea* L.). J. Oilseeds Res. **28** (1): 65-67.

Pasricha NS 2010. Nutritional management in oilseeds: Present status and future strategies. J. Oilseeds Res. **27**(2): 95-118.

Singh OP 2006. Assessing Agriculture and Livestock Water Demand in 2025/2050: Food Habits, Income Growth and Spatial Pattern. International Water Management Institute Report, Anand.

Singh Thakar, Dahiya Kalu S. and Sidhu MS 2006. Efffect of genotype, seedling age and row spacing on performance of transplanted African mustard (*Brassica carinata*) under late sown conditions. Indian J Agric. Sci. **51** (3): 221-24.