Himachal Journal of Agricultural Research 48(2): 276-279 (2022)

Short Communication

Performance of new genotype of gobhi sarson (*Brassica napus* L.) 'AKMS 8141' at varying fertility level in mid hills of Himachal Pradesh

B.S. Mankotia*, Uttam Chandel, Adarshbala and Manoj Acharya
CSK Himachal Pradesh Krishi Vishvavidyalaya
Shivalik Agricultural and Research & Extension Centre, Kangra-176 001, India.

*Corresponding author: bsmankotia@gmail.com
Manuscript Received: 18.11.2021; Accepted: 25.05.2022

Abstract

A field experiment was conducted under All India Coordinated Research Project on Rapeseed-Mustard at CSK HPKV, Shivalik Agriculture Research and Extension Centre, Kangra in *rabi* 2019-20. The experiment comprised of one test genotype of *gobhi sarson* 'AKMS 8141' and three checks, *viz*., GSL 1, Kranti & GSC 6 in main plots and three fertility levels *viz*., 100, 125 & 150 % RDF (recommended dose of fertilizers) in subplots were tested in split plot design. The test genotype 'AKMS 8141' (193 cm) was significantly taller than Kranti by 12 cm and GSC 6 by 38 cm. Significantly more seed yield was recorded by the test genotype 'AKMS 8141" (1260 kg/ha) being at par with GSC 6 (1249 kg/ha) compared to GSL 1 (996 kg/ha) and Kranti (910 kg/ha) attributed to the higher value of siliquae per plant (366), seeds per siliqua (23.8) and test weight (3.28g). The test genotype 'AKMS 8141' having seed oil content of 40.8%, resulted in oil productivity 514.4 kg/ha on par with GSC 6. Significant variation in seed and oil yield was not recorded due to varying fertility level. Thus, it may be concluded that the new genotype of *gobhi sarson* 'AKMS 8141' is productive and profitable and may be grown by the farmers of mid hills of Himachal Pradesh.

Key words: Fertility level, genotype, *gobhi sarson* 'AKMS 8141', productivity, profitability

Among various oilseed crops rapeseed-mustard occupies prominent position in terms of total area and production in our country. The efforts to increase the production and productivity of edible oilseed crops at national and state level are being increased as the demand for edible oil is increasing day by day. To overcome the huge gap between production and consumption, which at present is being met by huge imports, exploring genotypes with higher productivity is one of the options. Rapeseed–mustard is the most important among the oilseeds crop in Himachal Pradesh grown on area of 8.61 thousand hectare with the production of 4.90 thousand t and productivity level of 570 kg/ha (Anonymous, 2019-20). As the rapeseed-mustard crops are highly responsive to nutrients (Mankotia and Sharma, 1997), therefore, the present investigation was carried out to study the response of the new genotype to the varying fertility levels.

A field experiment was conducted under All India Coordinated Research Project on Rapeseed-Mustard at CSK HPKV, Shivalik Agriculture Research and Extension Centre, Kangra (32° 092 N, 76°222 E and 700 m altitude above mean sea level), in rabi 2019-20. The experiment comprised of one test genotype of gobhi sarson 'AKMS 8141' and three checks, *viz*., GSL 1, Kranti & GSC 6 in main plots and three fertility levels *viz*., 100, 125 & 150 % RDF (recommended dose of fertilizers -120 kg N, 60 kg P_2O_5 & 40 kg K_2O/ha) in subplots of split plot design with three replications. The soil of the experimental site was acidic in reaction (pH 6.4), silty clay loam in texture, medium in available nitrogen (334.8 kg/ha), phosphorus (18.6 kg/ha) and potassium (208.0 kg/ha). The crop was sown on October 23, 2021, in lines 30 cm apart. The full dose of phosphorus and potash and half of nitrogen was applied as basal at the time of swing and remaining half nitrogen was top dressed at 40-50

days after sowing. Thinning/gap filling was done to maintain a plant to plant distance of 10-15 cm. Pre-sowing irrigation, irrigations on vegetative and flowering stage were given for better crop establishment and development to avoid the moisture stress. Data on growth in terms of plant height and primary & secondary branches per plant, and yield attributes (siliquae per plant and seeds per siliqua) were recorded at the time of harvest of the crop. To work out the economic acceptability of the new genotype, economic analysis (cost of cultivation, gross & net returns and benefit: cost ratio) was carried out using oil productivity data, using prevailing costs of inputs and oil price (Rs 140/ha). The results are presented and discussed hereunder:

Growth and Development

Significantly taller plants (198 cm) were observed in the test genotype 'AKMS 8141', being at par with GSL 1, over Kranti (186 cm, by 12 cm) and GSC 6 (160 cm, by 38 cm). The primary and secondary branches per plant remained statistically at par with each other among genotypes. AKMS 8141 produced 12 primary and 6.9 secondary branches per plant (Table 1).

Significantly more number of days taken to 50 % flowering were observed by test genotype 'AKMS

Table 1. Growth, development and yield attributes as affected by rapeseed-mustard genotypes and fertility levels

Treatment	Plant height (cm)	Primary branches per plant (No.)	Secondary branches per plant (No.)	Das to 50% flowering (No.)	Siliquae per plant (No.)	Seeds per siliqua (No.)	Test weight(g)
Genotypes							
AKMS 8141	198	6.9	6.9	94	366	23.8	3.28
GSL-1	198	7.1	7.1	99	360	22.9	2.79
GSC 6	160	7.1	7.1	87	387	22.9	3.24
Kranti	186	6.1	6.1	90	297	19.8	3.34
SE m±	1.97	0.40	0.34	0.36	3.42	0.42	0.08
CD (P=0.05)	7	NS	NS	1	12	1.4	0.09
Fertility level							
100%RDF	182	10.3	6.6	93	344	22.2	3.11
125%RDF	186	11.4	7.0	92	359	22.3	3.25
150%RDF	188	11.1	6.8	93	354	22.5	3.29
SE m±	1.09	0.39	0.24	0.37	2.52	0.38	0.26
CD (P=0.05)	NS	NS	NS	NS	7	NS	0.07

Table 2. Seed yield (kg/ha) of rapeseed-mustard genotypes at varying fertility level

Genotype	Fertility level			
	100%RDF	125%RDF	150%RDF	Mean
AKMS 8141	1065	1249	1465	1260
GSL-1	1033	1104	850	996
GSC 6	1206	1244	1296	1249
Kranti	952	896	883	910
Mean	1064	1123	1124	
	S E m±	CD		
Genotype (G)	15.97	55		
Fertility level (F)	23.80	NS		
Two fertility levels at same genotype	47.36	142		
Two genotypes at same/different fertility levels	41.69	125		

8141' (94 d) than Kranti (490 d) and GSC 6 (87 d) which but significantly less than GSL (99 d).

Increase in fertility level did not significantly vary plant height, primary & secondary branches per plant and days taken to 50 % flowering.

Yield attributes and seed yield

Significantly higher number of siliquae per plant were recorded in GSC 6 (387) followed by AKMS 8141 (366) which was at par with GSL 1 (360) while Kranti (297) recorded significantly lower number of siliquae per plant. AKMS 8141 (23.8) being at par with GSL 1 (22.9) and GSC 6 (22.9) recorded more seeds per siliqua than Kranti (19.8). Test weight value of Kranti (3.34 g) being at par with test genotype 'AKMS 8141' (3.28 g) was significantly more than GSC 6 (3.24 g) and GSL 1 (2.79 g). Application of 125 % RDF produced more siliquae per plant and test weight over 100% RDF. The number of seeds per siliqua was not varied due to variation in fertility level.

Significantly more seed yield was recorded by the test genotype 'AKMS 8141" (1260 kg/ha) being at par with GSC 6 (1249 kg/ha) compared to GSL 1 (996 kg/ha) and Kranti (910 kg/ha). Higher yield of the test genotype is attributed to the higher value of siliquae per plant (366), seeds per siliqua (23.8) and test weight (3.28g). Out performance of AKMS 8141 was also observed at Bajaura, Dhaulakuan and Ludhiana (Anonymous, 2019). Average over the genotypes, no significant variation in seed yield was recorded due to increase in fertility level beyond 125% RDF which is in conformity with Anonymous (2019).

Oil productivity and economics

Analysis of seed oil content (%) done at Kangra (Table 3) revealed that averaged over the fertility levels, test genotype 'AKMS 8141' recorded 40.8%, 'Kranti' 40.4, 'GSL1' 40.9 & 'GSL6' 41.3% values. Primarily due to the higher seed yield of the test genotype, it recorded significantly higher oil productivity (514.3 kg/ha; 515.4 kg/ha that of of GSC 6) over Kranti (by 146.6 kg/ha; 39.8%) & GSL 1 (by 106.8 kg/ha, 20.8%). The gross (Rs. 72002/ha) and net (Rs. 45401) returns/ha and benefit: cost ratio (1.70) was more with test genotype 'AKMS 8141' than Kranti (Rs. 51485, 24884, 0.94) and GSL 1 (Rs. 57044, 30443, 1.15). Averaged over the genotypes, oil content (%) was not varied significantly due to variation in fertility level. Significant variation in oil productivity was not observed due to the variation in fertility level.

Thus, it may be concluded that the new genotype of

Table 3. Oil content (%), oil yield and economics of rapeseed-mustard genotypes at varying fertility levels

Treatment	Oil content (%)	Oil yield (kg/ha)	Gross returns/ha (Rs/ha)	Net returns (Rs/ha)	Benefit: cost ratio
Genotype					
AKMS 8141	40.9	514.3	72002	45401	1.15
GSL-1	40.4	407.5	57044	30443	1.70
GSC 6	41.0	515.4	72152	45551	1.71
Kranti	40.3	367.8	51485	24884	0.94
SE m±	0.34	7.27			
CD (P=0.05)	NS	25.1			
Fertility level					
100%RDF	40.7	432.8	60586	34393	1.31
125%RDF	40.9	459.7	64363	37762	1.42
150%RDF	41.0	461.2	64563	37553	1.39
SE m±	0.36	10.8	-	-	-
CD (P=0.05)	NS	NS	-	-	-

Price of oil Rs. 140/kg

gobhi sarson 'AKMS 8141' is productive and profitable and may be grown by the farmers of mid hills of Himachal Pradesh.

Conflict of interest: The authors declare that there is no conflict of interest in this research paper.

References

Anonymous. 2019. Annual Progress report All India Coordinated Research Project on Rapeseed-mustard 2020 CP-4

Anonymous. 2019-20. Directorate of Economics & Statistics (DAC&FW) Department of Agriculture cooperation, GOI.

Mankotia BS and Sharma H. 1997. Yield attributes and yields of gobhi sarson (*Brassica napus* ssp. *oleifera*) under different levels of nitrogen, phosphorus and farmyard manure in mid-hills of north-western Himalayas. Indian Journal of Agricultural Sciences **67** (3): 106-109.