



RESEARCH PAPER

Performance in on farm trials of mustard varieties in Bhind district of Madhya Pradesh

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Abstract : The study was conducted in Bhind district of M.P. during 2014-15 to 2016-17. Total eighty on farm trials at farmers field in different villages *i.e.* Jaganpura, Bospura, Bhikampur, Chiruli, Ruhani Jagir and Devarikala during the years from active participation of district farmers with the to improve the productivity of mustard crop in the district. The improved technologies consist improved varieties *i.e.* NRCDR-02 and Pusha mustard 28 were trials at farmers field during the years. It has been seen that the improved variety of mustard *i.e.* NRCDR 02 recorded average higher yield (16.96 q/ha), while it has been observed 16.01 q/ha. In case of pusa mustard 28. Farmers practice average yield during the years was observed 14.88 q/ha. The average percentage in yield increased over farmers practice during the years was 11.03, while it was observed in case of NRCDR-02 and Pusa mustard 28 *i.e.* 12.57 and 9.48 per cent, respectively over farmers practice during the years. Pusa mustard 28 has taken less maturity days (about 14 to 20 days) as compared to NRCDR 02 and pusa mustard 28. The tabulation, mean, B.C. ratio and percentage have been used to draw the results from the data.

Key Words : On farm trials, Extension gap, Technology gap, Technology index, Production technology of mustard

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INTRODUCTION

Rapeseed mustard (*Brassica* spp.) is one of the most important oil seed crops of the world where India is ranking third in area and production in the world (D.R.M.R., 2015). Among the seven edible oilseeds cultivated in India, rapeseed –mustard contributes 28.65 in the total oilseeds production and ranks second after groundnut sharing 27.8 per cent in the india's oilseed economy (Shekhawat *et al.*, 2012), however, due to more oil content (ranging from 35-45 %) rapeseed mustard ranks in terms of oil among all oilseed crops. Its seed

contain 37 to 49 per cent edible oil (Singh *et al.*, 2009). In India, rapeseed- mustard occupy 5.99 million ha area with production and productivity of 6.31 million tones and 1053 kg/ha, respectively (Indian statistics, 2014-15). Rapeseed is the third most important source of edible oil next to soybean and groundnut in India and in grown in certain tropical and subtropical regions as a cold season crop (Shekhawat *et al.*, 2012). Mustard seed in general contain 30.33 per cent oil, 17 to 25 per cent proteins, 8 to 10 per cent fibres, 6 to 10 per cent moisture and 10 to 12 per cent extractable substance.

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The importance and potential of rapeseed- mustard crop is well known as it is the key oilseed crop that can help in addressing the challenge of demand-supply gap of edible oil in our country. India is the third largest rapeseed- mustard producer in the world after China and Canada with twelve per cent of world's total production. Mustard crop accounts nearly one third of the oil produced in India. Due to gap between availability of edible oil and consumption of it India is importing it from other countries. In rain fed areas rapeseed-mustard is important source of income of all categories of farmers. Water requirement (80-240 mm) of rapeseed –mustard crop fit well in rain fed cropping system.

Indian mustard is predominantly cultivated in the state of Rajasthan, Uttar-Pradesh, Haryana, Madhya Pradesh and Gujarat which contribute about 81.5 per cent area and about 87.5 per cent production. This crop takes 135 to 150 days to mature. Some early maturity varieties is also available in India which takes about 110 days to mature. Pusa mustard -28 is one of this early maturity variety group, it has been tested under on farm trials at farmers field in bhind district of Madhya Pradesh. Each and every part of this plant this plant is important in the human livelihood. It is also utilized for flavoring and preservation purpose since immemorable. The National yield of this crop is 1079 kg per ha, M.P. is 1006 kg/ha and in Bhind district of M.P. is 1180 kg/ha in 2014-15 (Status paper on Rapeseed – Mustard, 2017). About in 1,30,000 ha area with 11.80 q productivity / ha has been cultivated in Bhind district of Madhya Pradesh

Anonymous (2015).

MATERIAL AND METHODS

This study was carried out by Krishi Vigyan Kendra, Lahar, Bhind (M.P.) during the years of 2014-15 to 2016-17 in adopted villages of district during the period. Eighty On farm trials have been conducted during the period in different villages of Bhind district. *i.e.* Bepura, Bhikampura, Chiroli, Jaganpura and Devarikala. The yield (minimum, maximum and average) Number of pods, Number of average grains, coat of cultivation, net return and benefit cost ratio also worked out. For selection of farmers a list of farmers where on farm trials have been conducted were selected purposively for the study. This data have collected through personnel contact with the help of well structured interview schedule. The collected data were classified, tabulated and analyzed using statistical tools *i.e.* mean, percentage and B.C. ratio. Extension gap, technological gap and technology index also calculated as given Kumar (2013 and 2014).

Extension gap = Demonstration yield - Farmers practices yield
 Technology gap = Potential yield - Demonstration yield
 Technology index = Technology gap x 100 / potential yield

RESULTS AND DISCUSSION

The average yield of on farm trials was 16.49 q/ha, whereas in case of farmers practices it was 14.88 q/ha the average yield increased over farmers practices 11.03 per cent during the years. Highest yield 22.0 q/ha has

Table 1: Yield of technologies/ varieties as compared to farmers practices (FP) at farmer's field

Years	Technologies FP	No. of trials	Yield (q/ha)			Yield difference (q/ha)	% increased over FP
			Maximum	Minimum	Average		
2014-15	NRCDR-02	10	12.0	11.5	11.89	0.42	3.29
2014-15	Pusa M-28	10	15.0	14.0	14.76	3.29	28.67
2014-15	FP		11.8	11.0	11.47	-	-
2015-16	NRCDR-02	10	18.5	17.0	17.8	3.1	21.08
2015-16	Pusa M-28	10	16	14	15.2	0.5	3.02
2015-16	FP		15.5	14.0	14.7	-	-
2016-17	NRCDR-02	10	22.0	21.0	21.2	2.5	13.36
2016-17	Pusa M-28		19.0	17.8	18.09	-0.61	-3.26
2016-17	FP	50	20	18	18.70		
Av. Mean of both Tech. (2014 to 2017)			17.08	15.88	16.47	3.06	11.03
Av. Mean of NRCDR-02 (2014 to 2017)			17.50	16.50	16.96	2.0	12.57
Av. Mean of Pusa M 28 (2014 to 2017)			16.66	15.26	16.01	1.06	9.48
Av. Mean of FP (2014 to 2017)			12.43	14.33	14.88	-	

FP = Farmers practices

been recorded in case of NRCDR-02 variety, while in case of Pusa mustard -28 it was 18.0 q/ha. The highest average yield also observed in case of NRCDR-02 (21.20 q/ha) in the year of 2016-17, while in same year it was 18.09 q/ha in case of Pusa mustard -28. The average yield difference of both the varieties over farmers practices was 3.06 q/ha. While it has been increased 2.0 q/ha and 1.06 q/ha in case of NRCDR-02 and Pusa mustard-28, respectively over farmers practices yield. Lalit *et al.* (2015); Kushwah *et al.* (2018); Patel *et al.* (2014); Kumar (2013); Ahmed *et al.* (2013); Dayanand *et al.* (2012); Dutta (2014) and Singh *et al.* (2014 and 2017).

Average highest pods / plants observed in NRCDR-02 (299 pods/plants), while, it was less in case of pusa mustard-28 (245 pods/ plant), it may be due to short duration variety (Pusa mustard -28). Pusa mustard -28 variety taken about 14 to 20 days less in maturity in comparison to NRCDR-02 and farmers practices adopted by the farmers during the years in the areas. Pusa mustard -28 variety could be more suitable for growing early vegetables after harvesting of crop.

Average highest per pods (11.4 grains/pod) also recorded in case of NRCDR-02, while it was 9.49 and 9.80 in case of Pusa mustard 28 and farmers practices, respectively.

Extension gap:

The average extension gap 1.60 q/ha has been seen during 2014-15 to 2016-17. The variety NRDR-02 has shown highest extension gap 9 2.08 q/ ha during the years, while, it was found 1.13 q/ha in case of Pusa mustard -28. The findings of the study are similar with Kushwah *et al.* (2018) ; Patel *et al.* (2014); Kumar (2013); Ahmed *et al.* (2013); Dayanand *et al.* (2012); Dutta (2014) and Singh *et al.* (2014 and 2017).

This wider extension gap emphasizes that need to educate the farmers about the available as well as recommended technologies of mustard crop for the area, so that it will facilitate adoption of improved varieties. Use of the latest improved varieties with recommended package of practices for the area can bridge this extension gap between demonstration yield and farmer's practices yield.

Table 2 : Extension gap, technological gap and technology index of technologies / varieties as compared to farmers practices

Technologies (2014-15 to 2016-17)	Av. Pods/ plant	Av. Grains/ pod	Technology gap (kg/ ha)	Extension gap (kg/ha)	Technology index (%)
FP	253	9.8	-	-	-
NRCDR-02	299	11.4	517	208	23.36
Pusa mustard 28	245	9.4	497	113	23.68
Mean of both technologies	272	10.40	507	160	23.52

Table 3 : Economic analysis of varieties as compared to farmers practices at farmer's field

Years	Technologies	Cost of cultivation (Rs./ha)		Gross return (Rs./ha)		Net return (Rs./ha)		B.C. ratio	
		OFTs	FP	OFTs	FP	OFTs	FP	OFTs	FP
2014-15	NRCDR-02	26000	24800	35670	34200	9670	9400	1.37	1.37
2014-15	Pusa M -28	26000	24800	44280	34200	18280	9400	1.70	1.37
2015-16	NRCDR-02	27000	26500	62300	51450	35300	24950	2.30	1.94
2015-16	Pusa M -28	27000	26500	53200	52450	26200	24950	1.97	1.94
2016-17	NRCDR-02	28000	28000	74200	65540	46200	37450	2.65	2.35
2016-17	Pusa M -28	28000	28000	63315	65540	35315	37450	1.9	2.35
Av. mean of both the technologies (2014-2017)		27000	26433	55494	50397	28494	23947	1.98	1.88
Av. mean of NRCDR-02 (2014-17)				57390		30390		2.10	
Av. mean of Pusa mustard -28(2014-2017)				53598		26598		1.85	
Av. additional returns over FP of both the technologies (2014-17)		567		5097		4547			
Av. additional returns of NRCDR -02 over FP (2014-17)				6993		6443			
Av. additional return of Pusa mustard -28 over FP (2014-17)				3201		2651			

Technology gap:

The average technology gap during (2014-15 to 2016-17) the years it was 507 kg /ha, it has been found highest in case of NRCDR-02 (517 kg/ha), whereas it was less (497 kg/ha) in case of Pusa mustard -28. This gap might be attributed to the dissimilarities in soil fertility status and weather conditions.

Technology index:

Technology index shows feasibility of the technology at farmers field. The lower the value of technology index more is the feasibility. The results of the study presented in Table 2, revealed that the technology index values were almost similar in both the varieties. The variety NRCDr-02 shows lower value (23.36%) rather than Pusa mustard-28 (23.68%). The results of the study are in recurrence with the findings of Bar and Das (2015) and Kushwah *et al.* (2018).

Economic analysis:

The economics of mustard production has been presented in Table 3. The input and out put prices of commodities prevailed during each year of trial were taken for calculating the cost of cultivation, net return as well as benefit cost ratio. The average mean value of cost of cultivation of on farm trials was Rs. 27000/ha as compared to farmers practices *i.e.* Rs. 26433/ha during the years. The cost of cultivations were varies from Rs. 26000 to 28000/ ha in study periods. The cost of cultivation was higher (Rs. 567/ha) in on farm trials as compared to farmers practices. The average gross return is higher during the years of both trials (Rs. 55494/ha) as compared to farmers practices (Rs. 50397/ ha). The average gross returns were Rs. 57390/ ha and Rs. 53598 / ha in case of NRCDR-02 and Pusa mustard-28, respectively. Average additional gross return was Rs. 5057/ha as compared to farmers practices. Highest average additional gross return was observed Rs. 6993 and Rs. 3020/ha in case of NRCDR-02 and Pusa mustard -28, respectively over farmers practices.

Net return during the years are varied from Rs. 18280 to Rs. 46200/ ha, while in case of farmers practices it was Rs. 9400 to Rs. 37459/ ha. The average net return during the years in the trials was higher (Rs. 28494/ha) as compared to farmers practices (Rs. 23947/ ha). The average highest gross return has been seen in case of NRCDR-02(Rs. 30390/ ha), while it was observed less in case of Pusa mustard -28 (Rs. 26598 / ha). In relation

to average B:C. ratio of both the technologies was 1.98, as little higher than the farmers practices (Rs. 1.88), whereas, it has been observed higher 2.10 in case of NRCDR-02. B:C ratio lowest has been observed in case of Pusa mustard 28(1.85). The findings is in corroboration with the with the finding of Kushwah *et al.* (2018); Patel *et al.* (2014); Kumar (2013); Ahmed *et al.* (2013); Dayanand *et al.* (2012); Dutta (2014); Singh *et al.* (2014 and 2017) and Pandey *et al.* (2013).

Conclusion:

Rapeseed – mustard crop offers immense scope for further yield enhancement in Bhind district of M.P. This stems from the fact that the existing yield at the national level is less than the varieties performed at farmer's field with improved package of practices.

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