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Performance of DBW 110 and HI 8737 Varieties of Wheat under Limited Irrigation Conditions of Madhya Pradesh

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ABSTRACT

A demonstration of the improved technology of wheat cultivar DBW 110 and HI 8737 was conducted on farmer's fields under limited irrigated conditions in Mandsaur district of Madhya Pradesh during Rabi season of 2015-16 to 2017-18. Results of study revealed that improved technology *i.e.* cultivar DBW 110 and HI 8737 gave higher grain yield (45.03 q/ha) as compared to farmer practice i.e. local variety Lok1. The improvement in grain yield of wheat cultivar DBW 110 and HI 8737 was due to favourable growth and yield attributing characters (plant height, effective tillers per plant, spike length, grains per spike and test weight). This treatment also recorded higher gross return (Rs 84,300/ha), net return (Rs 58,466/ha) and B:C ratio (3.26). The farmers under demonstration were satisfied with improved technology of wheat production and performance of cultivar DBW 110 and HI 8737 under limited irrigation condition of Mandsaur district.

Key words: Wheat, Production technology, variety.

INTRODUCTION

Wheat (*Triticum aestivum* L.) has a prime position among the cereals that supplement nearly one third diet of world's population. It occupies an area of 29.58 m ha with production of 99.7 m t and productivity of 3370 kg/ha in India (Anon, 2018). It is an important crop of rabi season in Madhya Pradesh covering an area of 5.73 m ha area with production of 16.32 m t and productivity of 2843 kg/ha during 2017-18 (Anon, 2018). Many high yielding varieties has been evolved and recommended for general cultivation in the past. These varieties are losing their yield potential due to changes in various edaphic and environmental conditions. Therefore, selection of high yielding genotypes with adaptability to edaphic and environmental conditions is very essential to increase yield per hectare.

Wheat is the one of the major crop of central zone of Indian wheat belt where wheat is grown under warmer climatic conditions due to limited availability of water and higher temperature during crop period. Under these conditions, wheat is exposed to terminal heat stress conditions at early grain filling stage and limited water availability as major abiotic factor. DBW 110 variety of wheat was released by CVRC for timely sown, restricted (limited) irrigation conditions of central zone of Indian wheat (Singh *et al*, 2014). The variety showed potential yield of 50.5 q/ha. DBW 110 flowered in 79 days and matured in 124 days and had a plant height of 89 cm and 1000 grains weight is 43.0 g. DBW 110 variety is highly resistant to brown and black rust and karnal bunt. With respect to quality parameters DBW 110 variety has better chapatti and bread quality with 12.2% protein and 54.0 ml sedimentation value. It also had better nutrition qualities as it posses 38.2 ppm Fe, 41.3 ppm Zn and 3.94 ppm yellow pigments. Durum wheat variety HI 8737 (Pusa Anmol) was released for cultivation under limited irrigated, timely sown condition of Central India zone comprising of the states of Madhya Pradesh, Chhattisgarh, Gujarat, Rajasthan (Kota and Udaipur division) and Uttar Pradesh

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Table 1. Plant height and effective tiller of DBW 110 and HI 8737 cultivars of wheat.

Treatment	Plant height (cm)				Effective tiller/plant			
	2015-16	2016-17	2017-18	Pooled	2015-16	2016-17	2017-18	Pooled
Improved technology	98.4	102.3	99.6	100.1	4.30	4.40	4.60	4.43
Farmer practice	103.8	105.6	106.8	105.4	2.40	2.10	2.20	2.23
S. Em. ±	0.27	0.24	0.54	0.16	0.060	0.032	0.035	0.020
CD 5%	0.85	0.75	1.66	0.47	0.187	0.098	0.110	0.056

(Bundelkhand region). It is rich in –kerotene and essential micronutrients like iron and zinc with a high overall acceptability. HI 8737 showed high levels of resistant to stem and leaf rusts and karnal bunt (Anonymous, 2014). Keeping all these, in mind present demonstration of DBW 110 and HI 8737 varieties of wheat under limited irrigated conditions of Madhya Pradesh was undertaken.

MATERIALS AND METHODS

The present demonstration was conducted at farmer's field during 2015-16 to 2017-18 for demonstration of wheat cultivar under limited irrigation conditions of Mandsaur district of MP. The demonstration was laid out on farmers field in randomized block design with 13 replications (as a farmer's field) having plot size 0.4 ha each farmer. The high yielding variety used in improved practice was DBW 110 during 2015-16 and 2016-17 while, HI 8737 variety of wheat was used during 2017-18. Bahadari, Pipliya Karadiya and Ladusa villages of Mandsaur district were selected as study area during 2015-16, 2016-17 and 2017-18, respectively. The wheat crop was grown with the recommended seed rate of 100 kg/ha and fertilizer dose of 120:60:40 kg NPK/ha under limited irrigated conditions. Need based all the agronomic practices were followed and kept uniform for all farmers.

RESULT AND DISCUSSION

Data presented in Table 1 revealed that improved technology of wheat production gave significantly higher plant height and effective tillers per plant as compared to farmer practice during all the seasons. Further, improved technology treatment gave significantly higher test weight and straw yield of wheat as compared to farmers practice. These data are in close conformity with the results of Singh *et al* (2017).

Plant height

The data on plant height revealed that during all the three years improved technology affected plant of wheat. Significantly higher plant height of wheat variety (100.1 cm) was recorded when compared with farmer practice on the basis of pooled data. These results are in line with those of Singh *et al* (2017).

Effective tillers per plant

The effective tillers per plant varied significantly under different practice of sowing. Under improved practice of sowing of wheat crop, optimum plant

Table 2.Test weight and grain yield of DBW 110 and HI 8737 cultivars of wheat.

Treatment	Test weight (g)				Grain yield (q/ha)			
	2015-16	2016-17	2017-18	Pooled	2015-16	2016-17	2017-18	Pooled
Improved technology	42.2	41.8	45.6	42.87	41.46	45.00	48.62	45.03
Farmer practice	39.6	36.4	38.2	38.07	34.85	38.00	35.23	36.03
S. Em. ±	0.41	0.28	0.33	0.157	0.33	0.37	0.20	0.13
CD 5%	1.28	0.88	1.03	0.444	1.03	1.13	0.63	0.39

Table 3. Straw yield and gross return of DBW 110 and HI 8737 cultivars of wheat.

Treatment	Straw yield (q/ha)				Gross Return (Rs/ha)			
	2015-16	2016-17	2017-18	Pooled	2015-16	2016-17	2017-18	Pooled
Improved technology	43.85	52.85	59.31	52.00	70961	82569	99369	84300
Farmer practice	37.31	48.31	43.15	42.92	59730	70461	72046	67412
S. Em. ±	0.41	0.47	0.33	0.18	578.0	667.6	427.1	253.3
CD 5%	1.27	1.45	1.04	0.52	1781.2	2057.3	1316.1	716.5

population with timely sowing gave maximum number of effective tillers per plant as compared to farmers practice. Improved practice gave 4.43 effective tillers which were 98.65 per cent higher as compare to farmer practice. These results are in accordance with those of Kumar (2016).

Test weight

The data regarding test weight indicated that test weight of wheat was significantly affected by improved practice treatment. The wheat crop sown with improved technology produced heavier grains (42.87 g) than that of the crop sown with farmer practice (38.07 g). Difference in test weight among genotypes might be contributed to their genetic diversity. These results are in line with those of Singh *et al* (2017).

Grain Yield

Grain yield of wheat crop is the result of combined effect of various yield attributing characters of cultivars. It is evident from the data that cultivar DBW 110 gave higher grain yield (41.46 and 45.00 q/ha) which was 18.96 and 18.42 per cent higher as compared to farmer practice i.e. local variety Lok-1 during 2015-16 and 2016-17, respectively. Further, cultivar HI 8737 gave higher grain yield (48.62 q/ha) which was 38.00 per cent higher as compared to farmer practice i.e. local variety Lok-1 during 2017-18. The cultivar DBW 110 showed their significant difference in all yield attributing characters. Results of present study are in agreement with the findings of Sharma *et al* (2013), Manan *et al* (2015), Kumar (2016), Rani *et al* (2017) and Singh *et al* (2017).

Straw Yield

The straw yield of wheat crop is reflected by growth parameters like total numbers of tiller, leaf area and plant height of crop. The data presented in Table 4.3 indicated that improved practice technique significantly affect the straw yield of crop. The higher straw yield of wheat (52.0q/ha) was observed with improved technology which was 21.16 percent higher as compared to farmer practice. Geneotypically difference in straw yield of wheat can be attributed mainly to their plant height and more number of tillers. Similarly, Rani *et al* (2017) also observed that straw yield of wheat differed significantly due to genetic variation in wheat cultivars.

Economics

Maximum gross and net return with B:C ratio was obtained with DBW 110 cultivar i.e. Rs 84300/ ha, Rs 58466/ha and 3.26 which are 25.05 , 37.31 and 19.85 per cent higher as compared to farmer's practice (Table 4). Results of present study are in agreement with the findings of Sharma *et al* (2013).

CONCLUSION

On the basis of pooled data, it may conclude that improved technology i.e. cultivar DBW 110 and HI 8737 gave higher grain yield (45.03 q/ ha) as compared to farmer practice i.e. local variety Lok-1 under limited irrigation condition of Mandsaur district. The improvement in grain yield of wheat cultivar DBW 110 and HI 8737 was due to favourable growth and yield attributing characters (plant height, effective tillers per plant, spike length,

Table 4.Net return and B:C ratio of DBW 110 and HI 8737 cultivars of wheat.

Treatment	Net Return (Rs/ha)				B:C ratio			
	2015-16	2016-17	2017-18	Pooled	2015-16	2016-17	2017-18	Pooled
Improved technology	48461	55366	71869	58466	3.15	3.00	3.61	3.26
Farmer practice	38230	43966	45546	42579	2.78	2.66	2.72	2.72
S. Em. ±	578.0	667.6	427.1	253.3	0.025	0.024	0.015	0.010
CD 5%	1781.2	2057.3	1316.1	716.5	0.078	0.076	0.047	0.028

grains per spike and test weight). This treatment also recorded higher gross return (Rs 84,300/ha), net return (Rs 58,466/ha) and B:C ratio (3.26).

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