



Assessment of Wheat Variety HI-1605 under Limited Irrigation Conditions in Sehore District of Madhya Pradesh

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ABSTRACT

An on farm trial of the improved wheat variety HI 1605 (Pusa Ujala) was conducted at farmer's fields under limited irrigated conditions in Sehore district of Madhya Pradesh during *rabi* season of 2017-18 to 2018-19. Results of study revealed that improved variety *i.e.* HI 1605 (Pusa Ujala) gave higher seed yield (42.20 q/ha) as compared to farmers' practice *i.e.* C-306 and HI-1531. The enhancement in seed yield of wheat variety HI 1605 was due to favourable growth and yield attributing characters like effective tillers per plant, spike length, grains per spike, test weight etc. This treatment also recorded higher net return (Rs 59,090/ha), and B:C ratio (3.34). The farmers were satisfied with improved technology of wheat production and performance of variety HI-1605 under limited irrigation condition of sehore district.

Key Words: B:C ratio, Improved variety, Limited irrigation, Wheat.

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 mt and productivity of 2843 kg/ha during 2017-18 (Anon, 2018). Many high yielding varieties has been evolved and recommended for general cultivation under limited irrigation condition 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. The variety HI 1605 (Pusa Ujala) was identified for release in peninsular zone under restricted irrigation condition. It is a widely adapted high yielding bread wheat genotype, giving 14.1 to 18.8 per cent higher yield over bread wheat checks DBW 93. It has a potential yield of 4.4 t/ha with an average yield of 2.91 t/ha. HI 1605 showed significant increase in grain yield under one irrigation (53.0%) and two irrigations (71.4%) conditions as compared to no irrigation; and showed superior performance over all check varieties of the zone, viz., DBW 93 and HD 2987. It showed good levels of field resistance to stem and leaf rusts, and also to flag smut, Karnal bunt, leaf blight and foot rot. This is a good quality wheat genotype with high protein content (~13%), good grain appearance (~6.5), high sedimentation value (~55 ml), high extraction rate (~74%), good bread, chapatti and biscuit quality with good levels of micronutrients like iron (43.0 ppm) and zinc (35.0 ppm) (Anon, 2016). Therefore, On farm testing of wheat variety HI 1605 (Pusa Ujala) under limited irrigated conditions in sehore district of Madhya Pradesh was undertaken.

Table 1. Effect of varieties on effective tillers and number of kernel of wheat.

| Treatment | No. of effective tillers/plant | | | No. of kernel/ear | | |
|-----------------------------|--------------------------------|---------|--------|-------------------|---------|--------|
| | 2017-18 | 2018-19 | Pooled | 2017-18 | 2018-19 | Pooled |
| C-306 | 3.79 | 4.04 | 3.92 | 43.07 | 42.99 | 43.09 |
| HI-1531 (<i>Harshita</i>) | 4.71 | 4.81 | 4.76 | 43.28 | 43.11 | 43.14 |
| HI-1605 (Pusa Ujala) | 4.96 | 5.21 | 5.09 | 43.30 | 43.60 | 43.44 |
| S Em. \pm | 0.30 | 0.25 | 0.28 | 0.07 | 0.04 | 0.06 |
| CD 5% | 0.92 | 0.77 | 0.85 | 0.21 | 0.12 | 0.17 |

MATERIALS AND METHODS

The present assessment was conducted at farmer's field during 2017-18 and 2018-19 of wheat variety under limited irrigation conditions of sehere district of Madhya Pradesh. The experiment was laid out at farmer's field in randomized block design with 5 replications (as a farmer's field) having plot size 0.4 ha each farmer. The high yielding variety used in improved practice was HI-1605 (Pusa Ujala) during 2017-18 and 2018-19 while, farmers practice C-306 and HI-1531 variety of wheat was used during both year. CRDE- Krishi Vigyan Kendra, sehere adopted Village-Golukhedi, Block-Icchawar of Sehere district were selected as study area during 2017-18 and 2018-19, 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 and plant protection practices were followed and kept uniform for all farmers

RESULTS AND DISCUSSION

The data (Table 1) revealed that improved wheat variety HI-1605 (Pusa Ujala) gave significantly higher effective tillers per plant and number of kernel/ ear as compared to farmers' practice during both years. Further, improved technology treatment gave significantly higher test weight and seed yield of wheat as compared to farmers practice. These data were in close conformity with the results of Shaktawat *et al* (2020).

Effective tillers per plant

The effective tillers per plant varied significantly under different treatments. Under improved variety (HI-1605) of sowing of wheat crop, optimum plant population with timely sowing, found maximum number of effective tillers per plant as compared to farmers practice. Improved variety (HI-1605) found 5.09 effective tillers per plant which were 29.84 per cent higher as compare to farmer practice. These results were in accordance with those of Kumar (2016).

Table 2. Effect of varieties on test weight and seed yield of wheat.

| Treatment | Test weight (g) | | | Seed yield (q/ha) | | |
|-----------------------------|-----------------|---------|--------|-------------------|---------|--------|
| | 2017-18 | 2018-19 | Pooled | 2017-18 | 2018-19 | Pooled |
| C-306 | 42.66 | 42.72 | 42.69 | 29.92 | 31.62 | 30.77 |
| HI-1531 (<i>Harshita</i>) | 42.93 | 42.99 | 42.96 | 37.48 | 38.31 | 37.90 |
| HI-1605 (Pusa Ujala) | 44.15 | 44.07 | 44.11 | 41.03 | 43.37 | 42.20 |
| S Em. \pm | 0.09 | 0.10 | 0.10 | 2.52 | 2.23 | 2.38 |
| CD 5% | 0.27 | 0.30 | 0.29 | 7.56 | 6.69 | 7.13 |

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Table 3. Effect of Varieties on Net return and B:C ratio of wheat.

| Treatments | Net return (Rs/ha) | | | B:C ratio | | |
|----------------------|--------------------|---------|--------|-----------|---------|--------|
| | 2017-18 | 2018-19 | Pooled | 2017-18 | 2018-19 | Pooled |
| C-306 | 40685 | 37951 | 39318 | 2.62 | 2.50 | 2.56 |
| HI-1531 (Harshita) | 49736 | 51131 | 50434 | 2.97 | 3.01 | 2.99 |
| HI-1605 (Pusa Ujala) | 56520 | 61660 | 59090 | 3.21 | 3.46 | 3.34 |

Number of kernel per ear

The data on number of grains per ear revealed that during both years in improved variety HI-1605 (Pusa Ujala) was influence. Significantly higher number of grains per ear (43.44) was recorded under variety HI-1605 (Pusa Ujala), compared to farmers practice on the basis of pooled data. These results were in line with those of Singh *et al* (2017).

Test weight

The data indicated that test weight of wheat was significantly affected by improved variety (HI-1605). The wheat crop sown with improved technology produced heavier grains (44.11 g) than that of the crop sown with C-306 and HI-1531 (42.69 & 42.96 g) and Difference in test weight among genotypes might be contributed to their genetic diversity. These results were in line with those of Shaktawat *et al* (2020).

Seed yield

Seed yield of wheat crop is the result of combined effect of various yield attributing characters of varieties. It was evident from the data that variety HI-1531 gave higher grain yield (37.48 and 38.31 q/ha) which was 25.26 and 21.15 per cent higher as compared to farmers practice i.e. C-306 during 2017-18 and 2018-19, respectively. Further, improved variety HI-1605 gave higher grain yield (41.03 and 43.37 q/ha) which was 37.13 and 37.16 per cent higher as compared to farmers practice *i.e.*, C-306 during 2017-18 and 2018-19, respectively. The variety HI-1605 showed their significant difference in all yield attributing characters. Results of present study were in agreement with the findings of Sharma *et al* (2013), Manan *et al* (2015), Kumar

(2016), Rani *et al* (2017) , Singh *et al* (2017) and Shaktawat *et al* (2020).

Economics

On the basis of two year mean data showed that maximum net return and B: C ratio was obtained under improved variety HI-1605 i.e. Rs 56520/ha, Rs 61660/- ha and 3.21, 3.46 which are 38.92 per cent higher as compared to farmer's practice (Table 3). Results of present study were in agreement with the findings of Sharma *et al* (2013).

CONCLUSION

On the basis of pooled data, it may be concluded that improved variety HI-1605 (Pusa Ujala) recorded higher seed yield (42.20 q/ha) as compared to HI-1531 and farmers practice i.e. C-306 under limited irrigation condition of Sehore district. The enhancement in seed yield of wheat variety HI-1605 (Pusa Ujala) was due to favourable growth and yield attributing characters (effective tillers per plant, spike length, grains per spike and test weight). This treatment also recorded higher net return (Rs 59,090/ha) and B: C ratio (3.34).

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