

To assess the accomplishment of new wheat varieties (*Triticum aestivum* L.) under various dates of sowing and agro-ecosystem of northern part of Madhya Pradesh

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ABSTRACT: The present experiment was conducted at Research Farm, All India Coordinated Wheat Improvement Project, RVSKVV, College of Agriculture, Gwalior (M.P.) during the year 2017- 2018, to evaluate the new varieties of wheat (*Triticum aestivum* L.) in various dates of sowing under irrigated condition. For this research in total six wheat varieties namely- HS 562, HD 2967, HD 3086, HI 1544, MACS 6222, WR 544 were taken and the same were evaluated under two dates of sowing dates viz 10 November and 15 December 2017. The pooled data professed that crop sown on 10 November showed promising results in terms of grain yield i.e. 5720 kg/ha while the crop sown on 15 December results in reduced grain yield (5292 kg/ha). Out of six wheat varieties, Variety HD 2967 resulted in significantly highest grain and straw yield per hectare.

Key words: *Triticum aestivum*, different sowing dates, grain yield, irrigated conditions

INTRODUCTION

Wheat [*Triticum aestivum*(L.)] is one of the major cereal crop of India and it has a leading position amongst the important cereals that substantially feed nearly one third of the entire world population by providing half of the dietary protein and calories, Dhanda *et al.* (2004). Wheat is considered as one of the major *Rabi* crop of Madhya Pradesh, under irrigated condition, and it holds second position both in terms of area and production in India. Wheat varieties suits a broad range of sowing condition under irrigated condition, even in late sown condition it withstand a good level of grain yield which is due to its photo-thermo-insensitive nature (Anonymous 2016-17). Modern varieties of wheat have possibilities to replace the former traditional varieties for northern region of Madhya Pradesh. Plant growth, yield attributes, grain and straw yields are significantly influenced by sowing time. Untimely planting of the crop is one of the major factor which influence yield and quality of crop, Saini *et al.* 1988, So another foremost aspect of low yield is shortage of advanced varieties, under late sown condition. Newly developed wheat varieties, along with the agronomical manipulation of sowing time will help to improve the yield of wheat in northern Madhya Pradesh. In account of the aforesaid facts the present research is conducted to assess the accomplishment of new varieties in various date of sowing, under agro-ecosystem of northern part of Madhya Pradesh.

MATERIALS AND METHODS

Experimental Site, climate and season: The current experimentation was carried out at the Research Farm, All India Coordinated Wheat Improvement Project, R.V.S.K.V.V, College of Agriculture, Gwalior (M. P.) and the meteorological data was registered during the period of observation from the meteorological observatory of College of Agriculture, Gwalior. The terrain of the field was almost steady with marginal slope from East to West direction with well drainage. The experiment comprised of six wheat varieties (HS 562, HD 2967, HD 3086, HI 1544, MACS 6222, WR 544) and two dates of sowing viz 10 November and 15 December with three replications and net plot size 1.40m × 7.0 m, plotted in split plot design. A regular dose of N, P and K fertilizer 120, 60 and 40 kg respectively applied in the experimental field during the research. At the time sowing all the treatment have been applied with full quantities of phosphorus and potash along with half quantity of nitrogen (basal dose), the leftover nitrogen was applied as two split top dressing at 30 DAS and 60 DAS. Small furrows in the field are opened at a row spacing of 20 cm with the help of wooden marker and 100 kg/ha seed were line sowed in that small furrows on 10th Nov and 15th Dec. In addition to pre sowing irrigation practice, six irrigations were given during the entire crop growing period. The irrigation practices is done timely, whereas all the agricultural practices were kept usual and consistent for all the treatments. The observations noted during pre-harvest covers plant population / m², plant height in cm, number of tillers/ m², number of leaves/ 25 cm row length, dry weight/ 25 cm row length (g), number of ear heads/ m², number of days to ear head emergence, and number of days to maturity while post harvest observations include length of earhead in cm, number of grains/ earhead, weight of ear head (gm), test weight (g), grain yield q/ha and straw yield q/ha, biological yield(kg/ ha) and harvest index (%). The data which is recorded during the research work were statistically analyzed as per the method given by Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

Sowing dates seriously influence the yield and yield components. Wheat varieties planted on 10 November showed promising

results in terms of terms of plant population / m², plant height (90.9cm), no. of tillers/ m² (339.07) no. of leaves/ 25 cm row length (27.14), dry weight/ 25 cm row length (103.55 g), no. of ear heads/ (332 m²), no. of days to ear head emergence (68.8) and no. of days to maturity (122.6), length of ear head (14.4 cm), no. of grains/ ear head (34.8), weight of ear head (1.4 gm), test weight (37.8g), biological yield (14073kg/ ha) and harvest index (40.7%) as compare to the crop sown on 15th December. The varieties sown on 10th November showed maximum grain and straw yield i.e. (5720 kg/ha and 8353 kg/ha) and justified to be superior over the crop sown on 15th December which produced poor grain yield (5292 kg/ha) and straw yield (7842 kg/ha). The result are in accordance with those of Nainwal Singh *et al.*, (2000), Dhaka *et al.* (2006) and Sharma Janmejy *et al.* (2016). Out of six varieties production of variety HD 2967 proved to produce highest grain and straw yield per hectare. The findings also collaborated with the result obtained Singh and Dhaliwal (2000) , Chaudhary and Singh (2007). The superior grain yield in HD 2967 was achieved due to more number of tillers/ m², ear heads/m², number of grains/ear head, higher test weight and days to maturity due to inherent characters as compared to other varieties.



Plant population per metre square of wheat was recorded Sample is taken from field at 90 days for dry weight observation. with the help of Meter Square device.

Table 1: Grain yield and straw yield as influenced by different sowing dates, varieties and their interaction.

| Treatment Date of sowing/ Varieties | Grain yield (kg/ ha) | | | Straw yield (kg/ ha) | | |
|---|----------------------|----------------|--------------|----------------------|----------------|--------------|
| | D ₁ | D ₂ | Mean | D ₁ | D ₂ | Mean |
| V ₁ | 5572.7 | 5045.7 | 5309.2 | 8043.0 | 7314.7 | 7678.8 |
| V ₂ | 5935.3 | 5590.0 | 5762.7 | 8910.0 | 8815.7 | 8862.8 |
| V ₃ | 5658.0 | 5432.0 | 5545.0 | 8321.7 | 7916.3 | 8119.0 |
| V ₄ | 5791.3 | 5513.3 | 5652.3 | 8312.0 | 7901.3 | 8106.7 |
| V ₅ | 5859.0 | 5273.3 | 5566.2 | 8811.7 | 7830.3 | 8321.0 |
| V ₆ | 5505.7 | 4902.7 | 5204.2 | 7720.0 | 7275.0 | 7497.5 |
| Mean | 5720.3 | 5292.8 | | 8353.1 | 7842.2 | |
| Comparing the mean of | S.E. (m) ± | | C.D. (at 5%) | S.E. (m) ± | | C.D. (at 5%) |
| Dates of sowing | 64.952 | | 395.194 | 99.951 | | NS |
| Varieties | 52.724 | | 155.514 | 208.841 | | 615.997 |
| V within D | 74.563 | | NS | 295.345 | | NS |
| D within V | 94.083 | | NS | 287.543 | | NS |

Note: D₁ = 10th November, D₂ = 15th December, V₁=HS 562, V₂=HD 2967, V₃=HD 3086, V₄=HI 1544 , V₅=MACS 6222 and V₆=WR 544.

Table 2: Biological yield, Harvest Index, affected by sowing dates and varieties.

| Treatment Date of sowing/ Varieties | Biological yield | | | Harvest index | | |
|---|------------------|----------------|--------------|----------------|----------------|--------------|
| | D ₁ | D ₂ | Mean | D ₁ | D ₂ | Mean |
| V ₁ | 13615.7 | 12360.3 | 12988.0 | 40.9 | 41.1 | 41.0 |
| V ₂ | 14845.3 | 14405.7 | 14625.5 | 40.0 | 38.8 | 39.4 |
| V ₃ | 13979.7 | 13348.3 | 13664.0 | 40.5 | 40.7 | 40.6 |
| V ₄ | 14103.3 | 13414.7 | 13759.0 | 41.1 | 41.1 | 41.1 |
| V ₅ | 14670.7 | 13103.7 | 13887.2 | 39.9 | 40.2 | 40.1 |
| V ₆ | 13225.7 | 12177.7 | 12701.7 | 41.6 | 40.3 | 41.0 |
| Mean | 14073.4 | 13135.1 | | 40.7 | 40.4 | |
| Comparing the mean of | S.E. (m) ± | | C.D. (at 5%) | S.E. (m) ± | | C.D. (at 5%) |
| Date of sowing (D) | 140.635 | | 855.687 | 0.302 | | NS |
| Varieties (V) | 235.973 | | 696.028 | 0.591 | | NS |
| V Within D | 333.717 | | NS | 0.836 | | NS |
| D Within V | 335.535 | | NS | 0.821 | | NS |

Note: D₁ = 10th November, D₂ = 15th December, V₁=HS 562, V₂=HD 2967, V₃=HD 3086, V₄=HI 1544 , V₅=MACS 6222 and V₆=WR 544.

CONCLUSION

The varieties experimented under normal (10th November) and delayed sown conditions (15th December) disclosed that all the varieties sown under delayed condition showed significant decline in 1000 –seed weight (Test weight) , this may be allocated due to short duration of grain growth under delayed sown condition. Normal sown crop produce superior grain yield along with good quality parameters. Variety HD 2967 followed by MACS 6222 produced higher grain yield under both standard and delayed sown condition.

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