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Performance of promorising varieties of wheat under late and very late sowing conditions in grid zone of M.P.

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Abstract

A field experiment (crop cafeteria) was conducted during Rabi season 2016-17 and 2017-18 at Krishi Vigyan Kendra, Lahar Bhind (M.P.) intiltled to study the performance of six wheat varieties under late and very late sowing conditions. The experiment was laid out in split plot design with twelve treatment combinations in three replications. Treatments consisted of two sowing conditions i.e. late sown (15.12.2016) and very late sown (10.01.2017) in main plots and six wheat varieties viz. MP 4010, K-7903, WH-1129, GW-273, HD-3059 and WH-1021 in the sub plots. The results revealed that there was no statistical difference among sowing dates for yield and yield attributing characters, but significant differences were observed among different varieties in relation to yield and yield contributing parameters like effective tillers (m-2), number of grains per spike and 1000 grain weight (g). Among varieties, HD3059 was the top yielder (45.28 qha-1) which proved significantly superior rest of the treatment, variety MP-4010 and K-7903 can be considered as best variety for growing in late and very late sowing conditions.

Keywords: Wheat variety, late sown, Very late sown, Weed Management.

Introduction

Wheat crop is an important among cereals. It is high source of protein, good source of fibre and good in manganese and magnesium in the grid zone of Madhya Pradesh.. Its area and productivity is increasing rapidly across the globe, due to its wider adaptability and sustainability under diverse agro climatic conditions (Kumar *et al.,* 2014). There are various factors, which are responsible for low yield of wheat crop in the country but among these sowing time and and varietal selection are of primary importance. Wheat is the main crop of winter season and it has its own definite requirements for temperature and light for emergence, growth and flowering (Dabre *et al.,* 1993).

Selection of suitable crop varieties according to the agro climatic conditions may play crucial role in realizing the optimum production of any crop commodity (Singh *et al.,* 2008). Delay in sowing results in poor tillering and crop growth is generally slow due to low temperature. In late planting the wheat variety should be of short duration that may escape from high temperature at the grain filling stage (Phadnawis and Saini, 1992). Late sowing results in reduction of yield contributing characters like number of tillers and number of grains per spike (Ansary *et al.,* 1989). The release of new varieties is a continuous process and different varieties perform differently under different sowing conditions. Therefore, the present study was conducted to judge the performance of various wheat varieties under late and very late sowing conditions.

Materials and Methods

A field experiment (crop cafeteria) was conducted during Rabi season 2016-17 and 2017-18 at Krishi Vigyan Kendra, Lahar Bhind (M.P.). The experimental soil was loam in texture low in organic carbon, available phosphorus and potash and high in pH and electrical conductivity. The 12 treatments were executed in split plot design with three replications. The treatments comprised of two sowing dates in the main plots and seven varieties in the sub plots. The dates of sowing were 15.12.2016 (Late sown condition) and 10.01.2017 (Very late sown condition). The six varieties viz. MP 4010, K-7903, WH-1129, GW-273, HD-3059 and WH-1021 were grown in the sub plots. The sowing of the varieties were done by hand with the help of kudal method in rows of 22.50 cm spacing and at a depth of 4 -6 cm. The fertilizers

were applied at the rate of 120 Kg N, 60 Kg P_2O_5 and 40 Kg K_2O per hectare.1/3rd N, full phosphorus and potash were applied at sowing time and the remaining 2/3rd N were applied as 1/3rd N at first irrigation and 1/3rd N at second irrigation.

All other agronomic practices were kept normal and uniform for all the treatments. The data for germination count per square meter was recorded at 30 days after sowing. The data for other parameters like effective tillers per square meter, number of grains per spike, 1000 grain weight, biological yield and grain yield were recorded at maturity. For collecting data on effective tillers per square meter, three sites of one square meter each were randomly selected from each plot and mean was calculated. Grains per spike were calculated by randomly selecting ten spikes from each plot and then spikes threshed and total number of grain were calculated and then mean value was taken. A random sample of 1000 grains from each treatment was collected and weighed with digital balance for 1000 grain weight. The biological yield and seed yield were recorded on plot basis and were converted to quintal/hectare. Spray of Sulphosulfuron 75% + Matsulfuron Methyl 5% WG @ 30+2g a.i /ha at 30 DAS.

Results and Discussion

Germination count (m^{-2})

The yield of any crop is determined by its stand count that is function of its initial germination. The germination count was significantly affected by date of sowing. The January sown crop recorded significantly lower germination count (170.0 m^{-2}) as compared to December sown crop (232.74 m^{-2}). This may be due to temperature fluctuation. During the month of January temperature falls and it could not fulfill the requirement for seed germination. Razzaq *et al.,* (1986) also observed the similar findings. The different varieties also showed significant differences in germination count (m^{-2}). Maximum germination count was observed in variety WH1021 (215.30 m^{-2}) which was at par with GW-273 and significantly superior to rest of the varieties. Differences in germination count might be attributed to their genetic diversity. These results are in line with those of Aslam *et al.,* 2003. The interaction between date of sowing and varieties were found to be non-significant.

Effective tillers (m^{-2})

Tillers mainly depend upon the green photosynthetic area which is responsible for carbohydrate formation, grain filling and final grain yield. The wheat crop sown late recorded more tiller production as compared to very late sown crop condition, however the differences were found to be non-significant, but different varieties showed significant differences in tiller production. Among the varieties, HD-3059 produced maximum number of tillers which were at par with rest of the varieties .The differential variation for tiller production among genotypes might be due to their genetic variability (Aslam *et al.,* 2003; Khaliq, 2018 and Shah *et al.,* 2016) The interactive effects between date of sowing and varieties were non-significant.

Number of grains spike^{-1}

Number of grains per spike is an important yield

Table 1: Effect of date of sowing on yield and yield attributes of wheat Varieties (pooled data of two years)

Treatments	Germination count (m^{-2})	Effective tillers (m^{-2})	No. of Grains/ spike	1000 grain weight(g)	Biological yield (q/ha)	Yield (q/ha)
Date of sowing						
Late	232.74	331.00	33.18	34.90	57.00	41.26
Very late	170.00	322.00	34.08	32.80	85.00	39.86
CD at 5%	16.42	NS	NS	NS	NS	NS
Varieties						
MP-4010	190.28	320.00	41.85	45.53	90.50	38.30
K-7903	195.10	322.00	40.20	43.10	85.65	37.50
WH-1129	198.50	328.00	36.10	37.50	98.50	36.85
GW-273	203.85	312.00	36.19	36.73	70.80	35.15
HD-3059	191.10	325.00	40.95	46.56	103.10	45.28
WH-1021	215.30	332.00	30.50	32.67	85.83	35.10
CD at 5%	12.15	25.03	3.10	1.53	8.20	3.75
Interaction	NS	NS	5.87	NS	NS	NS

attributing character. Data regarding number of grains per spike revealed that sowing dates did not affect significantly the number of grains per spike but significant differences were observed among varieties. The interaction between sowing dates and varieties was found to be significant. The variety HD3059 produced highest grains (41.35) per spike and it remained significantly superior over all other varieties. Variety WH1021 recorded the lowest number of grains (30.32) per spike in late sowing conditions. Differences in number of grains spike-1 among varieties might be due to their genetic variability. Similar results were reported by Haider (2004).

1000 grain weight (g)

The data regarding 1000 grain weight revealed that sowing conditions and different varieties and even interaction of both did not significantly affect the 1000 grain weight. However, the crop sown under very late sowing conditions recorded lower 1000 grain weight as compared to crop sown under late sown conditions. Many workers reported decrease in grain weight due to late sowing (Khan, 2017; Akhtar *et al.,* 2006). This is because, delay in sowing shortens the duration of each development phase which ultimately reduces the grain filling period leading to lower grain weight (Spink *et al.,* 2018). Among varieties, maximum 1000 grain weight was observed in HD-3059 (46.56g) whereas least (32.67 g) was observed in variety WH1021.

Biological yield (qha^{-1})

Table 2: Interactive effect of date of sowing on grains per spike of wheat varieties (pooled data of two years)

	Late Sowing	Vey late Sowing	Mean Value of Sowing
		Grains per spike	
Variety			
MP-4010	41.01	32.93	36.97
K-7903	36.93	35.67	36.30
WH-1129	34.75	36.07	35.41
GW-273	33.88	38.50	36.19
HD-3059	41.36	49.2	45.28
WH-1021	27.38	33.46	30.42
Mean	35.88	37.63	36.76
CD at 5%			
Date of sowing	NS		
Varieties	4.12		
Interaction	5.84		

Biological yield is reflected by growth parameters like leaf area, tiller production and plant height. It is evident from data that biological yield was not significantly affected by date of sowing, but different varieties showed significant effect on biological yield. The variety HD3059 recorded highest biological yield whereas least was observed in variety GW-273. The interaction between date of sowing and variety was found to be non-significant.

Grain yield (qha^{-1})

Grain yield of wheat crop is the combined effect of various yield attributing components. As shown in table 1 that different sowing conditions did not affect grain yield, but significant differences were found among different varieties in relation to grain yield. Among varieties, HD3059 recorded maximum yield (45.28 q/ha) and significantly superior over rest of varieties. The variety WH1021 recorded significantly lower yield (35.10 q/ha) as compared to all other varieties and it was 29.0 percent lower yield than HD 3059. The highest yield of variety HD3059 might be due to maximum number of grain per spike. No interaction effects were observed between sowing dates and different genotypes (Table 2). It can be summarised that variety HD3059 can be considered as best among six genotypes for growing under late and very late sowing conditions.

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