

# Performance of Varieties and Effect of Date of Sowing on Growth and Yield of Wheat

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## ABSTRACT

A field experiment was conducted during the Rabi season of 2019-20 at the Agronomy Research Farm of Tilak Dhari Post Graduate College, Jaunpur (UP) to find out the effect of dates of sowing and different varieties on growth and yield of wheat. Wheat has a prominent position among cereals. It is high source of protein, good source of fibre and good in manganese and magnesium in unrefined state. Its area and productivity is increasing rapidly across the globe, due to its wider adaptability and sustainability under diverse agro climatic conditions. There are various factors, which are responsible for low yield of wheat crop in the country but among these sowing time 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. Selection of suitable crop varieties according to the agro climatic conditions may play crucial role in realizing the optimum production of any crop commodity. Delay in showing 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. Late sowing results in reduction of yield contributing characters like number of tillers and number of grains per spike. 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 in fields. Achieving novel improvements in crop management may require changing inter row distance in cultivated fields. Such changes would benefit from a better understanding of plant responses to the spatial heterogeneity in their environment. Our work investigates the architectural plasticity of wheat plants in response to increasing row spacing and evaluates the hypothesis of a foraging behavior in response to neighboring plants.

**KEYWORDS:** wheat, varieties, late, sowing, row, spike, spacing, field, crop, yield

## INTRODUCTION

Wheat (*Triticum aestivum* L.) is one of the leading food crops of the world farming and occupies significant position among the cultivated cereals. Cultivation of wheat has been the symbolic of green revolution that played pivotal role in making the nation a food surplus nation. It belongs to poaceae family with chromosome number 42 and a self pollinated crop. Wheat crop is one of the most

important cereal crop of the world that has been considered as integral component of food security system of several nations of the world. It is largest grown cereal in the world and it supplements around 19 per cent of our total calories. It ensures the food security and wide adaptability in different agro-climatic conditions. The wheat crop covers nearly 14 percent of the global area which produces about 99.70

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million tonnes of grains with average productivity of 3371 kg/ha, corresponding to 13.64 percent of world production (Ramadas et al., 2019). Farmers usually begin sowing wheat in the month of October and majority of them complete the process of sowing till mid-November. They avoid late-sown varieties because of lesser yields. But at present we have many late-sown wheat varieties developed by agriculture scientists that give good yield to the farmers in less time. Here are some of the late sown wheat varieties; DBW173: This variety is developed by the Indian Institute of Wheat and Barley Research, gives highest yield within a period of 120 days & is also disease-resistant. Average yield of this variety is 47.2 quintal per hectare & if grown in favourable conditions, it can give up to 57 quintals hectare. and brown rust is resistant to reggae. Its grains are sharavati and hard and make good chapati, the average yield of this variety is 30-35 q / ha. HS 490: This medium height variety has been approved for limited irrigation in the lower intermediate mountain areas. Its grains are thick white sarvati and semi hard. This variety is suitable for making biscuits. This variety is ready in 150 days. Its average yield is about 30 q / ha. Him/Snow Palam Wheat. This new variety of high yielding wheat is resistant to yellow and brown rust Pejarium headlight. This variety has been found suitable for backward sowing in rainy conditions in the lower mountainous lowlands of Himachal Pradesh. Snow Palam Wheat gives an average yield of 25-30 q / ha. Its grains are thick and golden colored. The quality of making chapattis has been found good in it. HP W 373 is a better alternative to the previously approved variety HS 490 and a replacement for VL 892.

## MATERIALS AND METHODS

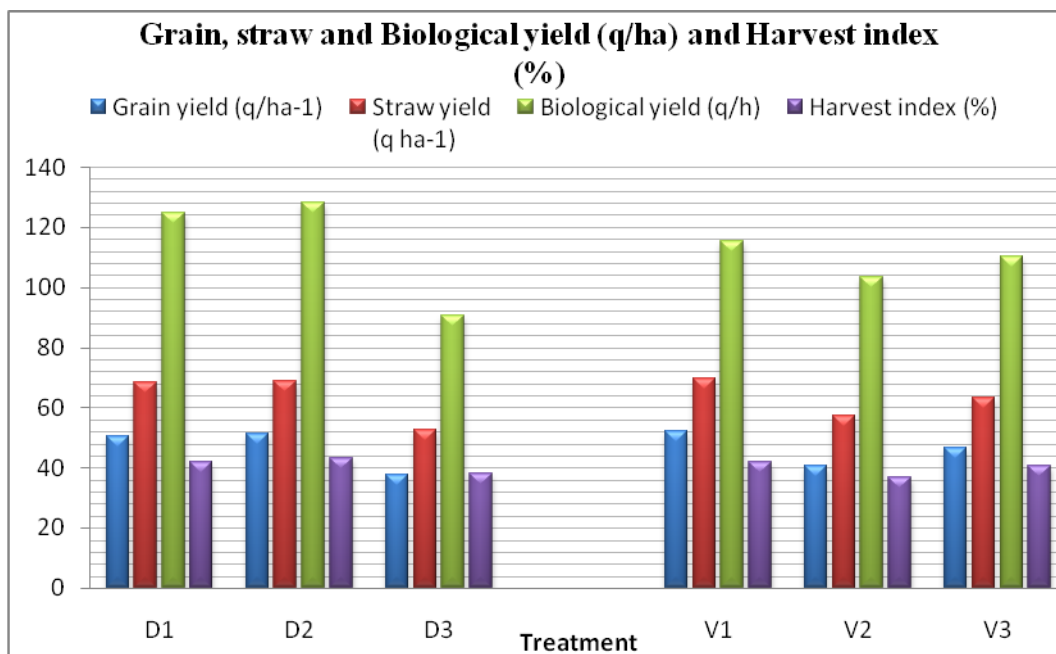
The field was prepared by tractor drawn implement with one deep ploughing by soil turning plough and two cross harrowing by disc harrow followed by leveling. In create to create ideal condition for good germination. Pre-sowing irrigation was given 10 day before sowing. The seed rate of 125 kg/ha. Required quantity of seed for each row was weight separately and sown in the furrows opened with the help of furrow opener maintaining 22.5 cm row distance.

## RESULTS

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. 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. Among varieties, maximum 1000 grain weight was observed in HD-2967 (38.01g) whereas least (33.47 g) was observed in variety PBW-373, under different row spacing in fields. 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 HD-2967 recorded highest biological yield whereas least was observed in variety PBW-373 in fields. It can be summarised that variety HD-2967 can be considered as best among seven genotypes for growing under late and very late sowing conditions in fields.

**Table: 1: Grain, straw and biological yield (q/ha) and harvest index (%) as affected by Dates of sowing and varieties of wheat.**

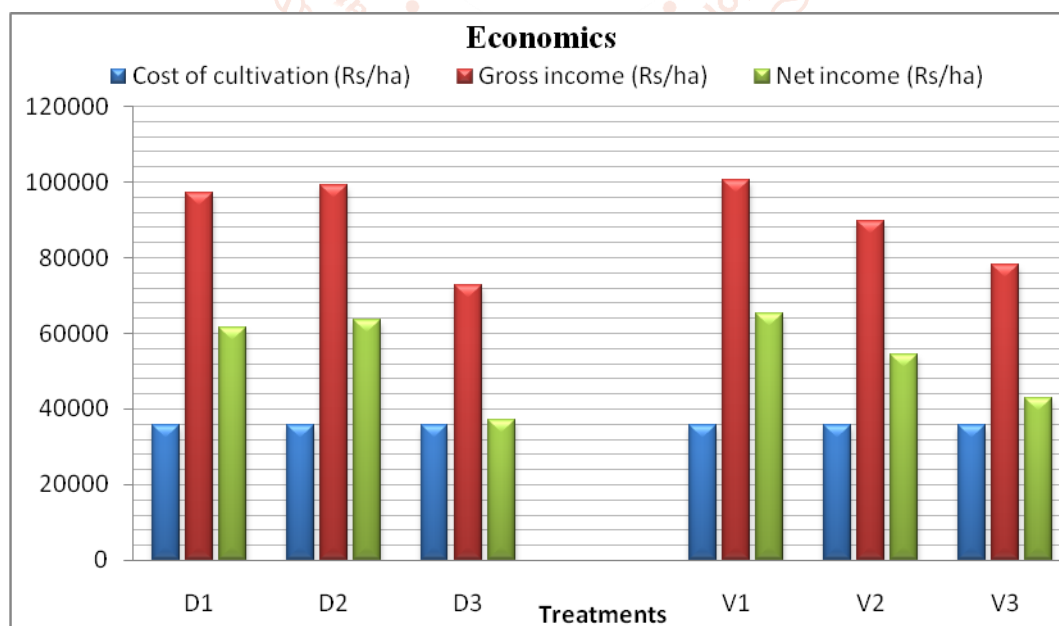
Treatments	Grain yield (q/ha)	Straw yield (q/ha)	Biological yield (q/ha)	Harvest index (%)
<b>Date of Sowing</b>				
18-11-2019	50.40	68.57	124.80	41.86
28-11-2019	51.46	68.78	128.46	43.35
18-12-2019	37.71	52.77	90.47	37.87
SEm±	<b>1.25</b>	<b>1.59</b>	<b>1.13</b>	<b>0.86</b>
CD at 5%	<b>3.18</b>	<b>4.05</b>	<b>4.57</b>	<b>3.49</b>
<b>Varieties</b>				
HD-2967	52.29	69.75	115.56	41.76
PBW-373	40.65	57.10	103.30	36.70
PBW-343	46.63	63.27	110.12	40.49
SEm±	<b>0.78</b>	<b>0.32</b>	<b>1.59</b>	<b>2.96</b>
CD at 5%	<b>3.15</b>	<b>1.29</b>	<b>6.44</b>	<b>0.73</b>



**Fig. 1: Grain, straw and Biological yield (q/ha) and Harvest index (%) as affected by Dates of sowing and varieties of wheat**

**Table :2 Economics as affected by Dates of sowing and varieties of wheat.**

Treatments	Cost of cultivation (Rs/ha)	Gross income (Rs/ha)	Net income (Rs/ha)	Benefit: Cost ratio
<b>Dates of sowing</b>				
Nov.18	35550	97020.00	61470.00	2.72
Nov.28	35550	99060.50	63510.00	2.78
Dec.18	35550	72591.75	37041.75	2.04
<b>Varieties</b>				
HD-2967	35550	100658.25	65108.25	2.83
PBW-343	35550	89762.75	54212.75	2.52
PBW-373	35550	78251.25	42701.25	2.20



**Fig. 2: Economics as affected by Dates of sowing and varieties of wheat**

**SUMMARY**

Variety HD-2967 produced significantly the tallest plant. The highest amount of dry matter accumulation was recorded significantly with variety HD-2967 over rest of the varieties under study at all stages of crop

growth. Variety HD-2967 produced significantly maximum number of tillers as compared to rest varieties at all stages of crop growth at 30, 60 and harvesting stage. Variety HD-2967 recorded significantly the highest relative growth rate, crop

growth rate and net assimilation rate at 30, 60 and 90 days after sowing over rest of the varieties at all stages of crop growth. The highest value of yield attribute was significantly recorded with variety HD-2967. Variety HD-2967 produced significantly highest grain yield (4.89 t/ha) over rest of the varieties. Straw yield also exhibited similar trends of results as in case of grain yield. Variety HD-2967 increased the straw yield to over rest of varieties. Variety HD-2967 produced significantly the maximum biological yield (128.46 q/ha). The content (%) of N and P in grain and straw was significantly the highest with HD-2967 followed by rest of varieties. Variety HD-2967 recorded significantly the maximum amount of N and P uptake through grain and straw. Variety HD-2967 recorded the maximum net income (63510.00 Rs ha<sup>-1</sup>). Wheat varieties HD-2967 may be used for sown to obtain maximum, growth, yield attributes, yield and net profit and benefit: cost ratio. To earn maximum profit, variety HD-2967 may be grown.

#### CONCLUSION:

Variety HD-2967 should be done to obtain higher yields, maximum net income and benefit: cost ratio under eastern-plain zone condition of U.P.

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