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Effect of Sowing Dates and Wheat Genotypes on Growth, Yield and Production Economics

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A B S T R A C T

An experiment was conducted at research farm of Rajendra Agricultural University, Pusa (Samastipur), Bihar during rabi season of 2003-04 with four sowing dates i.e., 27th November, 11th December, 25th December and 8th January along with four test varieties i.e., K 9107, PBW 343, HP 1744 and NW 1014 under split plot design to find out suitable sowing time for newly released wheat varieties under irrigated condition of Bihar and their economics of production. It was found that delay in sowing beyond 11th December drastically reduced the grain yield to the tune of 47.5 and 70.6 per cent, respectively when sown on 25th December and 8th January with respect to normal sowing on 27th November. Among varieties, K 9107 and PBW 343 achieved significantly higher grain yield than HP 1744 and NW 1014 varieties. Net return and B:C ratio were also significantly higher when wheat was sown on 27th November and followed by 11th December. Beyond 11th December, it registered 334 and 337 per cent decrease in net return/ha. Sowing of wheat on 8th January was found uneconomical. Wheat varieties K 9107 and PBW 343 were found suitable for irrigated condition of Bihar.

Introduction

Wheat (*Triticum aestivum* L.), the queen of cereals, is an important crop in the world farming. Globally, wheat occupies over 30 per cent of the area under all food grain crops and serves as an staple food over billions of people in 43 countries.

In Bihar, wheat sowing stretches from mid November to first week of January. Good crop yield depends on a set of eco-physiological factors coupled with the inherent yield capacity of the crop variety. It is a known fact that genetic make-up limits the expression of yield in response to existing environmental conditions.

On the contrary, unfavourable environmental parameters do not allow the full expression of the yielding ability of a variety. Keeping above fact in view the present experiment was

conducted at research farm of the then Rajendra Agricultural University, Pusa (Samastipur), Bihar.

Materials and Methods

The field experiment was conducted at research farm of Rajendra Agricultural University, Pusa (Samastipur), Bihar during rabi season of 2003-04. The soil of the experimental plot was silty clay loam in texture, medium in organic carbon (0.63 %), low in available nitrogen (247.9 kg/ha), potash (128.0 kg/ha), medium in available phosphorus (26.80 kg/ha) with pH 7.8. The treatment comprised of four sowing dates i.e., 27th November, 11th December, 25th December, and 8th January along with four test varieties i.e., K 9107, PBW 343, HP 1744 and NW 1014. The treatments were replicated thrice under split plot design. The crop was sown 20 cm apart using 125 kg seed /ha. The crop was uniformly fertilized with 120 : 60 : 40 kg N : P : K/ha.

Results and Discussion

The data presented in table 1 had shown significant effect of sowing dates as well as different genotypes on plant height, leaf area index, crop growth rate and number of tillers per metre linear length.

Plant height recorded at harvest under sowing on 27th November was found significantly superior than the plant height under sowing on 25th December, and 8th January but was found at par with the plant height under sowing on 11th December which may be due to more congenial environmental amplitudes that resulted in more cell elongation and hence the plant height. Nainwal and Singh (2000) and Lathwal and Thakrapal (2000) also observed that growth of wheat plant was stunted under late sown condition. Varieties had also significant effect on plant height and significant highest value of 100.27 cm was recorded by K 9107 and closely followed by NW 1014 and lowest in PBW 343 which may be their genetic features.

Similar effect of dates of sowing was observed on number of tillers per metre linear length. Effect of dates of sowing on leaf area index and crop growth rate was more pronounced. 27th November sown crop proved superiority over other dates of sowing and the values of leaf area index and crop growth rate decreased with further delay in sowing the crop. Different genotypes of wheat did not show much difference with respect to leaf area index. Significant lowest values of crop growth rate and number of tillers per metre linear length were recorded by the variety HP 1744.

The yield attributing characters were found to have better expression in crop sown on 27th November followed closely by 11th December and the value declined drastically with delayed sowing. The crop sown on 27th November produced the highest grain yield which drastically reduced to 47.5 and 70.6 per cent when sowing was delayed to 25th December and 8th January, respectively which might be due to rise in temperature above 15 ºC during grain filling stage in delayed sowing and also due to reduction in duration of grain filling because, grain yield decreases by about 3-4 per cent for each 1ºC rise in temperature above 15 ºC during grain filling stage (Wardlaw and Wringley, 1994). Varieties had also significant effect on grain yield. Similarly, highest grain yield was obtained in K 9107 which was at par with PBW 343 and significantly higher than HP 1744 and NW 1014. The grain yield of wheat varieties, K 9107 and PBW 343 reduced drastically when sowing was beyond 25th December.

Table.1 Effect of sowing dates and different genotypes on plant height, leaf area index, crop growth rate and number of tillers per metre linear length.

Treatments Date of sowing	Plant height at harvest (cm)	Leaf Area Index (LAI) at 90 DAS	Crop Growth Rate (60–90 DAS)	Number of tillers/ metre linear length at harvest
27th November,	93.78	3.96	3.06	65.92
11th December	92.19	3.74	2.49	63.08
25th December	85.83	3.49	2.31	52.33
8th January	84.00	3.24	1.20	45.83
CD (p=0.05)	4.02	0.21	0.39	3.83
Varieties :				
K 9107	100.27	3.60	1.72	58.25
PBW 343	79.22	3.41	1.82	55.58
HP 1744	81.19	3.46	1.41	53.58
NW 1014	95.11	3.58	1.48	59.75
CD (p=0.05)	4.02	NS	0.39	3.83

Table.2 Effect of sowing dates and different genotypes on yield, gross return, net return and B : C ratio of different wheat genotypes.

Treatments Date of sowing	Grain yield (q/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	B : C Ratio
27th November,	30.68	26579	16188	1.56
11th December	28.29	24565	14174	1.37
25th December	16.12	14043	3653	0.35
8th January	8.77	768	(-) 2709	-0.26
CD (p=0.05)	1.11	962	1040	0.10
Varieties :				
K 9107	22.39	19430	9039	0.87
PBW 343	21.60	18764	8373	0.81
HP 1744	19.55	17000	6610	0.64
NW 1014	20.33	17680	7283	0.70
CD (p=0.05)	1.11	962	1040	0.10

However, The NW 1014 produced maximum grain yield when sowing was delayed to 8th January. Wheat varieties - K9107 and PBW 343 also earned higher net return (Table 2). K 9107 and PBW 343 recorded higher yield under timely sown condition while NW 1014 performed better when sown on 8th January. Gross return, net return and B : C ratio follow the same trend to that of grain yield and all these three economic parameters were found significantly superior under 27th November sowing than later delayed sowings. Among varieties, K 9107 showed its superiority over other varieties with respect to gross return, net return and B : C ratio. Grain yield of wheat varieties reduced drastically when sowing was done beyond 25th December and hence, sowing of wheat beyond 25th December was not found economical.

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