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Short Note

Performance of new wheat genotypes under late sown mid-hill conditions of Himachal Pradesh

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Abstract

A field experiment was carried out during *Rabi* 2008-09 at Research Farm of Rice and Wheat Research Sub Station, Malan of CSK HPKV, Palampur to study the effect of sowing dates (27 November and 16 December) and varieties (HS-502, Sonalika, HS-295, VL-892, HS-490 and VL-804) on productivity of wheat crop and to ascertain the optimum dates of sowing for some newly evolved wheat genotypes under delayed sowing conditions. The date of sowing had no significant influence on the yield attributes and yield of wheat. Among genotypes HS-490 being at par with VL-804, resulted in significantly higher biological and straw yield with maximum grain yield over all the remaining genotypes. The data also revealed that the dates of sowing and genotypes interacted significantly in influencing the 1000-grain weight and grain yield of wheat. Genotype HS-295 sown on 16 December gave yield which was at par to HS-490, VL-804 and VL-892 genotypes when sown on 27 November. This shows that HS-295 is a better option for very late sown conditions, whereas HS 490 should be preferred for sowing under normal late sown conditions.

Key words: Dates of sowing, genotypes, late sown, production, wheat.

Wheat is an important food crop of Himachal Pradesh, occupying the highest area (366.59 thousand hectares) with a production of 562.01 thousand tonnes next to maize among cereals (Anonymous, 2009). The major limitation of wheat production is late onset of winter rains and drought like conditions upto mid January especially under rainfed conditions, which compel farmers for late sowing of wheat. Secondly, there is occurrence of high temperature stress during grain filling stage of the wheat under late sown conditions. High temperature upto 30/25^{o} C after anthesis reduces yield largely through adversely affecting the grain development, grain growth rate and grain growth period (Rane and Nagarajan, 2004; Sharma and Tandon, 1997). Each day delay in sowing from 20 November onward decreases grain yield @ 39 kg/ha/day (Singh and Uttam, 1994).

Being a thermo sensitive crop, choice of suitable cultivars for different sowing time further gets prime importance. As the tolerance of genotypes to temperature is due to the cell membrane thermo-stability and different genotypes show considerable variation in their performance with respect to different dates of sowing, this study was therefore under taken to ascertain the performance of some newly evolved wheat genotypes under late as well as very late sowing conditions.

A field experiment was conducted at Research Farm of Rice and Wheat Research Sub-Station, Malan of CSK HPKV, Palampur during *Rabi* 2008-09. The experiment was laid out in split-plot design with twelve treatments, keeping two dates of sowing (*viz.* 27 November, normal late sown and 16 December, very late sown) in main plots and six genotypes (*viz.* HS-502, Sonalika, HS-295, VL-892, HS-490 and VL-804) in sub plots. The soil of the experimental site was silty clay loam in texture, acidic in reaction (pH 5.1), medium in available nitrogen (426 kg/ha) and low in available phosphorus (8.0 kg/ha) & potassium (74 kg/ha). The crop was raised by following all recommended package of practices. Data on different yield and yield-contributing traits were recorded and analyzed. The economics of different treatments was calculated based on the prevailing market price of the grain yield.

The results revealed that although, dates of sowing had no significant influence on the yield and yield attributes of wheat but numerically higher plant count/m^2, 1000-grain weight, grain, straw and biological yield was recorded in 27 November as compared to 16 December sowing. The delayed sowing upto 16 December resulted in decreased 1000-grain weight, grain yield and biological yield by 1.73, 1.76 and 2.44%, respectively as compared to sowing

on 27 November (Table-1). Under both conditions, similar conditions of high temperature and desiccating winds during the month of April might have resulted in obtaining almost similar yields.

Among genotypes, although, the genotype VL-892 had recorded significantly higher plant count/m^2 and earhead/m^2 but due to lower 1000-grain weight could not contribute to higher grain yield as compared to other genotypes. Significantly highest 1000-grain weight and earhead/m^2 was recorded with genotype HS-295 and VL-892, respectively. However, all other genotypes except VL-892 and HS-502 for 1000-grain weight and HS-502 and VL-804 for plant count/m^2 and HS-502 for earhead/m^2 were at par with each other for these characters. Behaving of these different genotypes in such a manner resulted in non-significant influence on the grain yield of different genotypes, but numerically HS-490 recorded highest grain yield (32.80 q/ha) followed by VL-804 (31.17 q/ha). However, straw and biological yield was influenced significantly by different genotypes. The genotype HS-490 behaved statistically similar to VL-804 in recording significantly higher biological and straw yield over all the remaining genotypes which were at par with each other (Table-1). Similarly, in one of the study conducted in H.P., the genotype HS-490 recorded the higher yield, however, the effect was significant for grain yield (Anonymous, 2008). The highest B:C ratio of 1.22 was obtained with genotype HS-490 followed by VL-804 (1.11).

Genotypes and dates of sowing interacted significantly in influencing the 1000-grain weight and grain yield of wheat. Interaction effect of the treatments on 1000-grain weight revealed that while, on 27 November sowing, all the genotypes except HS -502 and VL-892, being at par with each other recorded significantly higher test weight, on 16 December sowing, the genotype HS-295 was proved to be significantly superior over rest of the genotypes. It is further found that, genotypes HS-295 and Sonalika sown on 27 November behaved statistically similar to HS-490 and VL-804 sown on 16 December

Table 1. Effect of treatments on plant count/m^2, yield attributes & yield (grain, straw and biological) and B: C ratio of wheat

Treatments	Count/m^2 (Plant stand)	Earhead/ m^2	1000-grain weight (g)	Grain yield (q/ha)	Biological yield (q/ha)	Straw yield (q/ha)	B:C ratio
Dates of sowing							
27 November	286.08	282.25	47.53	30.55	93.91	63.36	1.06
16 December	278.07	300.94	46.71	30.02	91.62	61.60	1.03
CD (P=0.05)	NS	NS	NS	NS	NS	NS	-
Genotypes							
HS-502	245.87	250.85	40.24	29.30	88.50	59.20	0.98
Sonalika	299.77	287.97	47.24	28.50	86.03	57.53	0.93
HS-295	303.82	292.58	55.16	29.32	85.79	56.48	0.98
VL-892	317.87	348.43	41.77	30.64	86.43	55.78	1.07
HS-490	271.63	276.28	49.58	32.80	109.22	76.43	1.22
VL-804	253.52	293.47	48.74	31.17	100.64	69.47	1.11
CD (P=0.05)	51.72	37.37	5.17	NS	11.07	9.09	-

in registering significantly higher 1000-grain weight over rest of the genotypes (Table 2).

Interaction data with respect to grain yield of wheat presented in table 2 revealed that on 27 November date of sowing, the genotypes VL-892, HS-490 and VL-804 being at par with each other recorded significantly higher grain yield over other genotypes, while, on 16 December date of sowing, HS-295 and Sonalika behaved statistically similar in getting higher grain yield over other genotypes. The data further revealed that sowing of genotype HS-295 on 16 December produced yield which was at par to HS-490, VL-804 and VL-892 genotypes when sown on 27 November.

This shows that HS-295 is a better option for very late sown conditions, whereas HS-490 should be preferred for sowing under normal late sown conditions.

Table 2. Interaction effect of treatments on 1000-grain weight (g) and grain yield (q/ha) of wheat

Genotypes / Dates of sowing	HS-502	Sonalika	HS-295	VL-892	HS-490	VL-804
			1000-grain weight (g)			
27 November	43.41	52.26	49.82	44.46	47.36	47.85
16 December	37.07	42.22	60.50	39.09	51.79	49.63
CD (P=0.05)						
To compare two genotypes at same date of sowing						7.32
To compare two dates of sowing for same or different genotypes						7.78
			Grain yield (q/ha)			
27 November	29.57	27.42	24.19	32.25	36.56	33.33
16 December	29.03	29.57	34.44	29.03	29.03	29.01
CD (P=0.05)						
To compare two genotypes at same date of sowing						5.00
To compare two dates of sowing for same or different genotypes						5.59

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