International Journal of Advanced Research in Biological Sciences
ISSN: 2348-8069
www.ijarbs.com
DOI: 10.22192/ijarbs Coden: IJARQG(USA) Volume 6, Issue 12 -2019

Research Article

DOI: http://dx.doi.org/10.22192/ijarbs.2019.06.12.019

Interaction of Promising Wheat Genotypes with Sowing Dates at NWRP, Bhairahawa.

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Abstract

Planting time plays a vital role in yield variation of wheat. To investigate the yield response of promising wheat genotypes with sowing dates, a field experiment was conducted at National Wheat Research Program (NWRP), Bhairahawa during the year 2015 and 2016. Split plot design was used with four dates of sowing (10th November, 25th November, 10th December and 25th December) as main plots and six genotypes (BL 4316, BL 4341, BL 4347, NL 1172, NL 1177 And Vijay) as sub plots with three replications. Experiments revealed that seeding dates had significant effect on wheat grain yield in both years. 10th Nov, 25th Nov and 10th Dec sowing had produced significantly higher grain yield than 25th Dec sowing. The highest mean grain yield (3284 kg/ha) was found with 10th Nov sowing. However, in 2015, no any significant yield difference was found among the tested six genotypes but in 2016 there was significant yield difference among the six genotypes. The highest mean grain yield was produced by the genotypes BL 4347 (3008 kg/ha) followed by BL 4341 (2949 kg/ha), BL 4316 (2947 kg/ha) and NL 1172 (2943 kg/ha), which were statistically at par. It showed that the promising wheat genotypes can be sown from 10th Nov to 10th Dec without significant yield difference.

Keywords: genotype, sowing date, wheat, yield

Introduction

Wheat (*Triticum aestivum* L) is third most important cereal crop largely grown in rice-wheat cropping system, occupies more than 30% of rice area and 80% of wheat area in Nepal (NWRP 2015). The demand of wheat is increasing day by day in the country, to fulfill the demand; National Wheat Research Program (NWRP) Bhairahawa is working for the development of new high yielding wheat varieties. Before recommending a new genotype, NWRP regularly tests the appropriate sowing time for that new genotype. In the context of changing climate, it is very important to find the suitable sowing time for a new genotype because proper planting date is most important factor for wheat production. Different planting dates affect seed development, quality and yield of wheat. Delay planting affect the crop performance in the field and ultimately produce low yield. Delay in planting normally reduces individual plant growth and tiller production (Nazir and Ullah 2004). Low productivity of the wheat is associated with late planting, inappropriate wheat genotypes, declining soil fertility, formation of hardpan close to plough layer, water logging during early growth stage of the crop, weeds, disease and insects. Late planting not only increases production cost but also reduces wheat yield and its quality due to soil moisture deficit, rise in soil and

atmospheric temperature and blowing of hot western wind during post anthesis period. Generally, wheat crop sown during November results in better yield and any delay in sowing reduced tillers, seed index and grain yield that resulted in reduced yield (Ansari et al 1989). Khan et al (2001) also reported the linear reduction in wheat grain yield with delayed planting. Therefore, this research trial was conducted to find the appropriate sowing time for five most promising wheat genotypes.

Materials and Methods

The experiment was conducted at NWRP, Bhairahawa, Nepal during 2015 and 2016. Split-plot design was used with four date of sowing (10^{th} November, 25^{th} November, 10^{th} December, 25^{th} December) as main plots and six wheat genotypes (BL 4316, BL 4341, BL 4347, NL 1172, NL 1177 and Vijay) as sub-plots with three replications. The released variety Vijay was used as check variety. The plot size was $10m^2$ (5m x 2m) with 8 rows of 5m length. Recommended dose of NPK was applied @ 100:50: 50 Kg/ha respectively. Full dose of phosphorus, potash and half of nitrogen was applied at planting time while half of remaining nitrogen was top dressed at crown root initiation (CRI) stage after irrigation and rest nitrogen was top dressed at maximum tillering stage (40-45 DAS). All other agronomic practices were followed as recommended except sowing dates. Data on days to (>50%) heading, days to (>50%) maturity, plant height (at maturity), thousand grain yield and grain yield (leaving 50 cm each side of the plot) were taken. Data was analysed by using the computer software Genstat.

Results

Effect of Sowing Dates

Days to heading, days to maturity, thousand grain weight and grain yield of wheat were significantly affected by sowing dates (Table 1). The grain yield produced by wheat sown on 10^{th} November, 25^{th}November and 10^{th} December were significantly higher than the yield produced by late sown (25^{th} December) wheat. The higher grain yield (3283.5 kg/ha) was produced by 10^{th} Nov planting, although the yield produced by earlier three dates were statistically at par. Days to heading and days to maturity were significantly decreasing with increasing sowing date from 10^{th} Nov to 25^{th} Dec.

Table1: Characteristics of Wheat Genotypes Planted on Different dates at Bhairahawa (2015-2016).

Treatment	Days to Heading		Days to Maturity		Plant Height (cm)		Thousand Grain Wt (g)		Grain Yield (Kg/ha)		Mean GY
Sowing dates											
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	
10^{th} Nov.	88.4	91.7	100.7	128.7	83.8	90.0	40.9	44.9	3291.0	3276.0	3283.5
25^{th} Nov.	85.8	80.4	120.2	115.7	85.7	89.0	41.7	45.0	3029.0	2889.0	2959.0
10^{th} Dec.	75.2	79.3	106.8	108.6	87.4	91.9	42.2	39.2	3105.0	2952.0	3028.5
25^{th} Dec.	68.5	73.7	98.3	102.9	83.7	79.1	32.2	35.4	2255.0	2294.0	2274.5
F test	**	**	**	**	ns	ns	**	**	**	**	
LSD	2.09	4.22	0.922	3.533			2.97	4.22	488..6	439.40	
Genotypes											
BL 4316	80.0	81.3	105.8	114.1	84.8	87.3	36.4	41.5	3111	2782	2946.5
BL 4341	79.8	82.3	106.8	115.1	90.2	89.6	41.8	40.6	2991	2908	2949.5
BL 4347	78.8	82.8	106.5	114.7	88.9	87.8	39.7	40.6	2973	3042	3007.5
NL 1172	81.7	79.3	108.3	113.8	82.3	85.0	35.5	38.3	2947	2940	2943.5
NL 1177	81.0	83.0	106.5	114.3	80.1	86.5	35.7	38.0	2598	2895	2746.5
Vijay	75.8	78.9	105.3	111.9	84.7	88.8	46.3	47.7	2900	2551	2725.5
F test	**	**	**	ns	**	ns	**	**	ns	*	
LSD	1.47	2.30	0.65		2.59		3.29	2.80		245.50	
GM	79.5	81.2	106.51	113.96	85.1	87.4	39.2	41.1	2920.00	2853.00	
CV%	1.30	3.40	0.40	2.20	1.90	4.70	3.80	8.3	8.4	10.4	

Effect of Genotypes

A significant effect of genotypes was found on days to heading, days to maturity and thousand grain weight of wheat (Table 1). In 2015, there was no significant yield difference found among the genotypes, but in 2016, except BL 4316 all other genotypes had produced significantly higher grain yield than check variety Vijay. The highest mean grain yield was produced by BL 4347 followed by BL 4341, BL 4316 and NL 1172.

Discussion

In 25th Dec sowing, the days to heading and maturity was significantly shorter than other earlier sowing and also the thousand grain weight were lowest resulted to significantly lower grain yield. Shahzad et al (2007) had also found lower grain yield with delay in sowing due to shorter duration of growth and development. Tanveer et al (2003) had also observed that early sowing gives high yield than late sowing due to longer growing period. Among the tested genotypes, four genotypes (BL 4341, BL 4347, NL 1172 and NL 1177) had produced significantly higher grain yield than check variety Vijay in 2016, although the combined analysis of two year data showed no significant effect of genotypes on grain yield (Table 2). Based on mean grain yield, BL 4347 was found superior than others. Interaction (sowing time x genotype) had no significant effect on grain yield. Therefore, it is concluded that tested promising wheat genotypes can be sown from 10th Nov to 10th Dec without significant yield difference.

Table 2. Characteristics of Wheat Genotypes Planted on Different Dates (Pooled analysis of two year data).

Sowing dates	Days to Heading	Days to Maturity	Plant Height (cm)	Effective tiller per m^2	Thousand Grain Weight (g)	Grain Yield (kg ha^{-1})
10th Nov.	89.48	114.67	86.88	242.0	32.70	3284
25th Nov.	83.11	117.97	87.37	250.3	32.86	2959
10th Dec.	77.70	107.69	89.64	261.1	30.14	3029
25th Dec.	71.08	100.61	81.44	268.3	25.74	2294
F test	**	**	*	ns	*	**
LSD	3.97	9.68	5.16		2.8	281.8
Genotypes						
BL 4316	80.21	109.96	86.15	250.4	29.88	2947
BL 4341	81.04	110.92	89.84	256.2	30.72	2949
BL 4347	80.75	110.58	88.36	240.9	30.22	3008
NL 1172	80.69	111.00	83.59	294.0	28.02	2943
NL 1177	82.00	110.38	83.24	248.3	27.92	2747
Vijay	77.37	108.58	86.82	242.6	35.41	2755
F test	**	**	**	**	**	ns
LSD	1.20	1.10	2.26	18.79	1.66	
GM	80.34	110.24	86.3	255.4	30.36	2891
CV%	2.6	1.8	4.6	12.8	9.6	14.0

Acknowledgments

We express our gratitude to Nepal Agriculture Research Council for its financial support, National Wheat Research Program, Bhairahawa for its managerial support and all other helping hands for their valuable time to execute this research.

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	Website: www.ijarbs.com
Quick Response Code	Subject: Agricultural Sciences
DOI:10.22192/ijarbs.2019.06.12.019	

How to cite this article:
Himal Prasad Timalsina, Sheshraman Upadhyay, Mathura Yadav, Rajendra P. Yadav and Athar H. Khan. (2019). Interaction of Promising Wheat Genotypes with Sowing Dates at NWRP, Bhairahawa. Int. J. Adv. Res. Biol. Sci. 6(12): 154-157.
DOI: http://dx.doi.org/10.22192/ijarbs.2019.06.12.019