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Varietal Management of Wheat Crop under Late Sown Condition

Vaibhav Vishwakarma[1], Dr. Shrish Kumar Singh[2]

[1]M.sc. (Ag) Agronomy Student, TDPG College, Jaunpur, Uttar Pradesh, India
[2]Associate Professor & Head, Department of Agronomy, TDPG College, Jaunpur, Uttar Pradesh, India

ABSTRACT

Field experiment was conducted at Crop Research Farm (Pili-Kothi) of Agronomy Department, Tilak Dhari Post Graduate College, Jaunpur in the Rabi season of 2019-20. The experiment consisted of 9 treatment combinations comprised of 9 varieties HUW-234, PBW-502, PBW-373, SAIKEDAR PLUS, SGN-303, ML-5660, HD-2967, PBW-343, ANURADHA, tested in Randomized block design (RBD) with three replications. The observation on different growth and yield parameters were recorded and analyzed statistically. The results indicated that different varieties significantly influenced the growth and yield. Among the various varieties being recorded highest plant height, number of tillers m-2, leaf area index, dry matter accumulation, number of spikes m-2, length of spike, grains spike-1 yield and nutrient uptake. Among the tested varieties HD-2967 was found superior than other with maximum economic yield.

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

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INTRODUCTION

It finds a major place in both time meals of common population in major wheat growing states. The cultivation of wheat has also been symbolic of green revolution, self sufficiency in food and sustained production. As a result of technological innovation, the country which produced only 5-6 million tonnes at the time of independence (1947-1948) is now producing 108.75 million tonnes in an area 30.5 million hectare (2020-2021). In India ranks second among wheat producing country in the world in the world .This phenomenal increase in production is by and large attributed to adoption of high yielding varieties. The contribution of wheat is a maximum as a result of this wild adoptability occupying non traditional rice growing area in eastern India as well as late sown and problematic areas about from the amenability to technological innovation. Wheat maintains superiority in area, production and versatility in adopting a wide range of agro climates. It occupies prime position for the nutrition of nearly 36 per cent of the world population.

Nevertheless, the progress should not make us contented as the country face countless challenges in the form of population growth coupled with decreasing arable land, depleting water resources and climate change. As population is increasing leads to an increase demand of with no possibility in further increase in area due to growing urbanization. As per present population growth rate, population of India by 2025 will be around 1.3 billion and assuming 20 per cent more per capita requirement of food grain, due to better standard of living and increase in the demand of processing industries, requires wheat production to be around 109 million tonnes by the year 2025 AD. Wheat is mainly used as house hold cereal.

It is consumed in various forms like Chapaties, Puries, Dalia, Halawa etc. In Northern region of Uttar Pradesh, wheat is grown as a second crop in sequence after Kharif crops. At present the productivity of wheat at national level is around 27 q/ha as against 40.0 q/ha in Punjab and 34.32 q/ha Uttar Pradesh. At present wheat production in state faces large gap in potential and realized yield. In Uttar Pradesh, wheat is

grown in about 9734 ha with production of 30301.9 tonnes and productivity of 34.32 q/ha. Wheat productivity can be increased by providing water at the right time and sowing seed of superior varieties.

Among varieties production factors, sowing time and wheat varieties are the most crucial factor deciding its productivity. Sowing wheat in Uttar Pradesh generally starts from November and end in late December depending on the weather; topography and harvesting of the preceding crop, late sowing wheat seedling face low temperature in the earlier part and high temperature stress in the later part of the growing season and require favourable moisture for better growth and development. Late planting of wheat is one of the major reasons of yield reduction because of rice wheat cropping system. In Uttar Pradesh, late planting of wheat expressed to high temperature at reproductive stage causes reduced grain yield. About 80 % of the wheat crop cultivated at late sowing condition after harvesting the transplanted rice and this problem will be further increased due to global warming.

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

Different varieties on grain yield was sown found significant and data pertaining to this have been presented Grain yield of wheat was significantly reduced beyond all varieties of wheat. Variety HD-2967 produced significantly the highest grain yield at all different varieties. Variety HD-2967 was resulted significantly the highest yield (4.89 t/ha). A perusal of data condensed further indicated that variety HD-2967 recorded significantly highest straw yield. Wheat sown on variety HD-2967 significantly produced highest biological yield of 13.29 t/ha. Among the verities tested, HD-2967 recorded the highest value of harvest index (43.15 %). The highest gross return variety with HD-2967 (132420.00 Rs ha^{-1}). The highest net return (91340.66 Rs ha^{-1}) was recorded with variety HD-2967. The highest benefit: cost ratio (2.14) in case of varieties was obtained from variety HD-2967.

Table: 1 Plant height (cm) as affected by varieties at successive growth stage

Treatments	Plant height (cm)			
	30 DAS	60 DAS	90 DAS	At harvest
Varieties				
T_1 - HUW-234	14.80	48.00	85.727	90.967
T_2 - PBW-502	15.39	46.840	90.540	95.447
T_3 - PBW-373	15.217	49.270	92.347	96.783
T_4 - SAIKEDAR PLUS	15.533	48.173	92.183	94.920
T_5 - SGN-303	15.527	51.663	96.183	100.230
T_6 - ML-5660	14.317	49.580	93.400	96.067
T_7 - HD-2967	16.077	50.620	98.020	102.527
T_8 - PBW-343	14.177	53.753	95.703	99.857
T_9 - ANURADHA	15.137	52.490	94.150	98.213
SE(m)±	0.247	0.495	0.244	0.457
C.D. at 5%	0.745	1.498	0.737	1.382

Table: 2 Numbers of tillers/m^2 as affected by different varieties at successive growth stage.

Treatment	Number of tillers m^2		
	30 DAS	60 DAS	90 DAS
Varieties			
T_1 - HUW-234	135.33	335.66	336.66
T_2 - PBW-502	137.00	335.00	332.00
T_3 - PBW-373	136.66	340.00	336.66
T_4 - SAIKEDAR PLUS	131.66	343.33	341.66
T_5 - SGN-303	143.66	341.00	340.00
T_6 - ML-5660	142.33	341.33	339.33
T_7 - HD-2967	150.00	346.66	344.66
T_8 - PBW-343	147.66	342.00	339.33

T_9 - ANURADHA	146.33	341.00	338.00
SE(m)±	1.13	1.74	1.62
C.D. at 5%	3.44	5.27	4.91

Table: 3 Leaf Area Index (LAI) as affected by different varieties at successive growth stage.

Treatment	Leaf Area Index		
	30 DAS	60 DAS	90 DAS
Varieties			
T_1 - HUW-234	1.19	3.46	4.60
T_2 - PBW-502	1.52	3.54	4.61
T_3 - PBW-373	1.70	3.44	4.65
T_4 - SAIKEDAR PLUS	1.53	3.53	4.69
T_5 - SGN-303	1.45	3.56	4.73
T_6 - ML-5660	1.35	3.59	4.65
T_7 - HD-2967	1.93	3.76	4.87
T_8 - PBW-343	1.81	3.60	4.76
T_9 - ANURADHA	1.62	3.52	4.72
SE(m)±±	0.019	0.02	0.03
C.D. at 5%	1.62	0.06	0.09

Table: 4 Dry matter accumulation (g m^{-2}) as affected by different varieties at successive growth stage

Treatment	Dry matter accumulation			
	30 DAS	60 DAS	90 DAS	At harvest
Varieties				
T_1 - HUW-234	72.333	495.00	825.00	976.66
T_2 - PBW-502	73.333	493.33	820.33	986.66
T_3 - PBW-373	74.00	493.67	819.66	981.66
T_4 - SAIKEDAR PLUS	74.00	491.66	845.00	992.66
T_5 - SGN-303	76.66	490.66	812.00	1006.33
T_6 - ML-5660	72.66	491.00	810.67	998.33
T_7 - HD-2967	76.33	507.66	863.33	1053.33
T_8 - PBW-343	74.66	494.00	851.00	1031.00
T_9 - ANURADHA	74.33	500.00	810.66	996.00
SE(m)±	0.38	3.03	5.61	3.7
C.D. at 5%	1.17	9.16	16.98	11.18

Table: 5 Yield attributing characters of wheat as affected by different varieties

Treatment	Effective Tillers(m^2)	Length of spike (cm)	No. of grains $spike^{-1}$	Grain weight $spike^{-1}$ (g)	Test weight (g)
Varieties					
T_1 - HUW-234	356.56	7.41	39.00	1.42	39.33
T_2 - PBW-502	355.52	7.37	42.00	1.43	39.66
T_3 - PBW-373	365.57	7.43	42.66	1.43	38.33
T_4 - SAIKEDAR PLUS	370.07	7.50	44.33	1.46	38.00
T_5 - SGN-303	366.33	7.48	43.33	1.56	38.33
T_6 - ML-5660	362.33	7.53	44.66	1.61	38.66
T_7 - HD-2967	370.00	7.59	47.00	1.63	41.00
T_8 - PBW-343	364.33	7.55	44.66	1.53	40.00
T_9 - ANURADHA	356.66	7.47	43.66	1.55	38.66
SE(m)±	3.46	0.012	0.83	0.012	0.527

C.D. at 5%	10.47	0.038	2.50	0.013	1.594

Table: 6 Grain yield, Straw yield, Biological yield and Harvest Index by influence row spacing and varieties on wheat crop

Treatment	Yield (t ha^{-1})			
	Grain Yield	Straw Yield	Biological Yield	Harvest Index (%)
Varieties				
T_1 - HUW-234	3.83	5.20	9.55	41.83
T_2 - PBW-502	3.76	5.56	10.33	42.45
T_3 - PBW-373	3.77	5.76	9.96	42.36
T_4 - SAIKEDAR PLUS	3.97	5.83	11.14	41.96
T_5 - SGN-303	4.14	5.95	11.57	42.93
T_6 - ML-5660	4.20	6.11	11.96	42.59
T_7 - HD-2967	4.89	6.27	13.23	43.15
T_8 - PBW-343	4.35	6.11	12.77	43.05
T_9 - ANURADHA	4.56	5.97	12.30	42.93
SE(m)±	0.013	0.017	0.017	0.021
C.D. at 5%	0.041	0.050	0.052	0.063

Table: 7 Effect of varieties on nitrogen content and uptake of wheat

Treatment	Nitrogen content (%)		Nitrogen uptake (kg ha^{-1})	
	Grain	Straw	Grain	Straw
Varieties				
T_1 - HUW-234	1.67	0.63	67.17	29.56
T_2 - PBW-502	1.63	0.62	73.73	28.96
T_3 - PBW-373	1.44	0.57	72.34	30.01
T_4 - SAIKEDAR PLUS	1.58	0.63	75.58	32.31
T_5 - SGN-303	1.61	0.71	76.24	33.45
T_6 - ML-5660	1.62	0.6	77.95	34.49
T_7 - HD-2967	1.70	0.78	79.64	36.64
T_8 - PBW-343	1.65	0.68	72.63	35.66
T_9 - ANURADHA	1.63	0.65	74.05	35.03
SE(m)±	0.012	0.014	0.610	0.119
C.D. at 5%	0.038	0.042	1.846	0.360

Table: 8 Effect of Varieties on phosphorus content and uptake of wheat crop

Treatment	Phosphorus Content (%)		Phosphorus Uptake (kg ha^{-1})	
	Grain	Straw	Grain	Straw
Varieties				
T_1 - HUW-234	0.34	0.034	14.30	7.30
T_2 - PBW-502	0.33	0.034	14.37	8.37
T_3 - PBW-373	0.33	0.033	15.27	7.27
T_4 - SAIKEDAR PLUS	0.29	0.029	15.36	8.36
T_5 - SGN-303	0.34	0.041	14.92	9.58
T_6 - ML-5660	0.37	0.037	14.86	8.86
T_7 - HD-2967	0.35	0.045	16.58	10.58
T_8 - PBW-343	0.34	0.036	15.80	9.80
T_9 - ANURADHA	0.28	0.028	14.94	8.94

SE(m)±	0.009	0.002	0.122	0.178
C.D. at 5%	0.027	0.005	0.368	0.540

Table: 9 Effect of Varieties on gross return, net return and BC ratio

Treatment	Gross return (Rs ha^{-1})	Net return (Rs ha^{-1})	B C ratio
Varieties			
T_1 - HUW-234	99094.00	57458.00	1.36
T_2 - PBW-502	111885.70	70299.00	1.54
T_3 - PBW-373	108667.70	79875.00	1.22
T_4 - SAIKEDAR PLUS	98095.66	79853.00	1.83
T_5 - SGN-303	111180.00	78570.00	1.95
T_6 - ML-5660	70793.34	65277.33	1.36
T_7 - HD-2967	132420.00	91340.66	2.14
T_8 - PBW-343	125442.00	80846.66	1.92
T_9 - ANURADHA	113021.30	77633.00	1.65
SE(m)±	10105.353	333.209	0.103
C.D. at 5%	30556.700	1007.561	0.312

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 (11.96 t/ha) followed by rest of varieties. 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 which was followed by rest of varieties. Variety HD-2967 recorded the maximum net income (132420.00 Rs ha^{-1}). 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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