Perfomance of varieties on growth and yield of wheat(*Triticum aestivum* L.) under prayagraj condition.

INTRODUCTION

Wheat is the second most important crop in India and a principal source of calorie intake. It has been under cultivation in the Indian subcontinent from pre-historic times and is an integral part of the country's economy and food security. Systematic research in the crop has started. Wheat (*Triticum aestivum*) is the most widely cultivated food crop in India after rice. As a *rabi* season (winter) crop, wheat played a vital role in stabilizing the food grain production in the country. It is mostly eaten in the form of *chapaties*. Besides, wheat is also consumed in various other forms such as *poories*, *dalia*, *halwa*, sweet meals etc. In areas where rice is the staple food, wheat is used in the form of *upma* or *poories*. Wheat is also used for manufacturing of bread, flakes, cakes, biscuits etc. Wheat contains more protein [8-15% (grain), 8-13% (flour)] than other cereals. Wheat proteins are of special significance. Besides their significance in nutrition, these are principally concerned with providing the characteristic substance 'gluten', which is very essential for backers. Wheat straw is good source of feed for livestock in our country.

In India it is grown in area of 29.8 million hectares with a total production of 103.60 million tonnes at an average yield of 3.5 thousand kg/ha **GOI, (2019).** Although it is cultivated in more than 15 states in India spread in different agro-climatic conditions.

The continued practice of growing rice-wheat in the Indo-Gangetic plains has resulted in emergence of several problems viz. depletion of ground water resources, exhaustion of soil nutrient supplying capacity, emergence of crop specific pests particularly of weed such as *Phalaris minor* wheat and overall decline in the productivity of the system in recent times.

The technique of soil fertility management is one of the critical components of any cropping system designed to enhance and sustain productivity. Therefore, the technology adaptation for correct dose of fertilizer that can assure economic optimum crop yield as well as sustain soil nutrient reserve, yet not environmentally degrading in the long run is the need of time **Akram *et al.*, (2007).**

Nutrient needs of crop plants can be met through a number of sources. The major sources of plant nutrients are chemical fertilizers, organic manures, recycled wastes and by-products, biological nitrogen fixation (BNF), natural minerals and to a lesser extent nutrients recycled through irrigation waters and precipitation. These supplement the soil nutrient reserves for nourishing the crops. Bio-fertilizers, a term, which refers to micro-organisms, which either fix atmospheric N or enhance the solubility of soil nutrients are becoming increasingly important. Their significance lies in their ability to supplement/mobilize soil nutrients with mineral use of nonrenewable resources and as components of integrated plant nutrition systems. By far, the most important and extensive contribution of bio-fertilizers is in terms of the fixation of atmospheric nitrogen into plant-usable forms.

The organic and biological sources of nutrients have low nutrient contents and are usually not abundantly available. An enormous amount of organic fertilizer would be required to maintain soil fertility levels. Therefore, a combination of both inorganic and organic fertilizers is the answer for sustainability **Zeleke *et al.*, (2004).**

The integrated plant nutrition system (IPNS) involves monitoring all the pathways of plant nutrient supply in crops and cropping systems and calls for a judicious combination of fertiliser, biofertiliser and organic manures. Organic sources of plant nutrients including growing of legumes in cropping systems, green manures, crop residues, organic manures (FYM, compost, vermicompost, biogas slurry, phosphocompost, biocompost, pressmud, cake, etc.) and biofertilisers **Rajendra Prasad, (2008).**

Materials and Methods

The current study was carried out in the Wheat Breeding experimental Field, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Prayagraj, during the Rabi season 2021-22, (U.P.). The experimental field is located approximately 9 kilometers from Prayagraj city, near the Yamuna River, on the left side of the Prayagraj-Rewa Road. Prayagraj is located in the subtropical zone of Uttar Pradesh, with hot summers and pleasant winters. The area's average temperature is 23°C to 38°C, with temperatures seldom dropping below 3°C or 4°C. The relative humidity levels range from 26% to 78%. In this location, the average annual rainfall is 1050 mm. The soil chemistry analysis revealed a sandy loam texture with a (pH 7.1), low amounts of organic carbon (0.48 percent) and potassium (215.4 kg/ha), and a low quantity of accessible phosphorus (13.6 kg/ha). The soil was electrically conductive and had a conductivity of 0.26 dS/m. The experiment was done with ten varieties replicated four times in randamosied block design. HD3440, HD3406, HD2967, HD3411, HD3437, DBW187, HD3436, HD3249, HD2733, HD3086.

Results and discussion :

Growth parameters:

The data presented in (Table 1) revealed the growth parameters of wheat are significantly influenced by the varieties. Significantly higher plant height was observed in variety DBW-187 (118.73) which is statistically at par to HD-3411(117.69), HD-3406(116.36), HD-3437(115.43) HD-3440(115.29) and HD-3436(114.47) The statistical analysis of data between different Genotypes indicates that significant effect on plant height was mainly due to genetic potential of Genotypes and can also affected by environmental factors like temperature, water, sunlight and nutrient uptake during its cropping period. Similar results were also reported by **Reddy *et al.*, (2020).** Significantly higher number of tillers recorded in variety DBW-187(13.63) was significantly at par to HD-3411(13.54), HD-3249 (13.52), HD-3440(13.43), HD-2733(13.31), HD-3436(13.30) and HD-2967(13.25). Increase in growth parameters depends on irrigation by 90 per cent and nutrient uptake during vegetative stage, it is an importance factor during tillers formation stage and yield depends on number of tillers developed during vegetative stage which is mainly due to genetic diversity and higher inheritance of character of seeds. Tillers may contribute negatively or positively to wheat productivity which is maximum in early stages and decrease at harvest **Elhani *et al.*, (2007)** also reported similar result. Significantly higher dry weight was recorded in DBW-187(43.00 g) Due to exposure to light and adequate supply of nutrients and photosynthetic activity increases which results in maximum dry weight of plant. Increase in dry matter production with increase in growth stages which reached maximum at harvest. Different seed rate of wheat may affect the dry matter accumulation in different varieties of wheat these results were supported by **Hussain *et al.*, (2010)**.

Yield parameters:

The data Presented in (Table 2) revealed the yield parameters of wheat are significantly influenced by the varities. Significantly higher No. of grains per spike recorded in DBW-187 variety (100.50). Significantly higher Spike length recorded in DBW-187 variety (14.12), statistically at par to HD-3411 (13.80), HD-3406 (13.68) and HD-3437 (13.19). Significantly higher grain yield recorded in DBW-187 variety (4.21 t/ha), satistically at par to HD-3411 (3.94). Significantly higher Straw yield recorded in DBW-187 variety (6.26 t/ha). Significantly higher Test weight recorded in DBW-187 variety (39.53 g), statistically at par to HD-3411 variety (39.15 g), HD-3440 variety (38.12 g) and HD-2967 variety (37.98 g). Significantly higher Harvest index recorded in DBW-187 variety (41.99 %).

Table 1 Influence of prayagraj conditions on varieties on growth attributes of wheat.

S.no	Varieties	Plant height (cm)	No. of Tillers	Dry Weight (g)
1.	HD-3440	115.29	13.43	31.16
2.	HD-3406	116.36	12.50	29.15
3.	HD-2967	112.04	13.25	33.23
4.	HD-3411	117.69	13.54	41.58
5.	HD-3437	115.43	12.47	38.38
6.	DBW-187	118.73	13.63	43.00
7.	HD-3436	114.47	13.30	35.37
8.	HD-3249	113.81	13.52	38.32
9.	HD-2733	112.31	13.31	40.17
10.	HD-3086	111.88	12.51	27.61
	F test	S	S	S
	SEm (±)	1.48	0.14	0.05

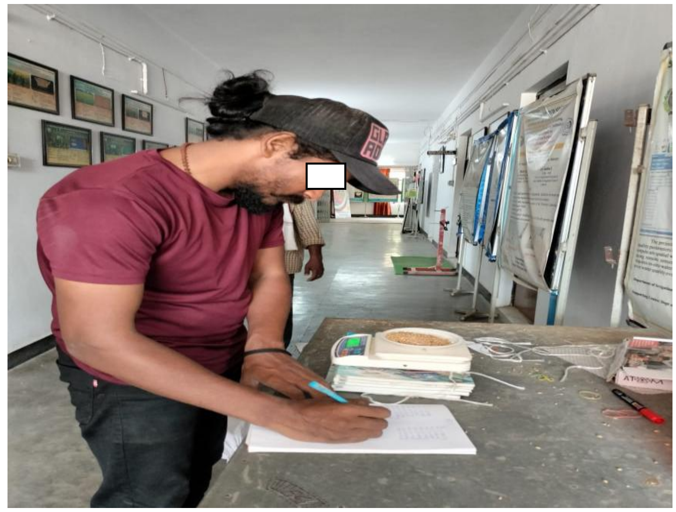
CD (5%)	4.28	0.41	0.16

Table 2 Influence of prayagraj conditions on varieties on yield attributes of wheat at different day intervals.

S.no	Varieties	No.of grains/spike	Spike length (cm)	Grain yield (t/ha)	Straw yield (t/ha)	Test weight (g)	Harvest index (%)
1.	HD-3440	75.00	12.64	3.84	5.41	38.12	41.50
2.	HD-3406	74.00	13.68	3.44	5.18	36.33	40.19
3.	HD-2967	84.75	12.45	3.63	5.16	37.98	38.90
4.	HD-3411	90.00	13.80	3.94	5.48	39.15	41.78
5.	HD-3437	74.00	13.19	3.25	5.23	36.68	38.31
6.	DBW-187	100.50	14.12	4.21	6.26	39.53	41.99
7.	HD-3436	80.00	12.94	3.23	5.11	36.62	38.95
8.	HD-3249	77.50	12.64	3.44	5.26	37.07	39.63
9.	HD-2733	80.75	12.36	3.64	5.18	36.85	40.10
10.	HD-3086	70.25	11.90	3.14	5.04	35.85	37.97
	F test	NS	S	S	S	S	NS
	SEm (±)	7.09	0.36	0.11	0.17	0.65	1.32
	CD (5%)	-	1.04	0.32	0.32	1.88	-

Figure a. Measuring plant height of wheat crop

Figure b. Wheat crop at harvest stage

	
Figure c. Harvested wheat crop	Figure d. Recording test weight of wheat grains

Conclusion

It is concluded that DBW-187 variety recorded higher plant height, number of tillers per plant, dry weight, number of grains/spike, spike length, grain yield, straw yield, test weight.

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