Varietal effect of different nitrogen levels on yield attributing charactersand quality parameters of wheat (*Triticum aestivum* L.) crop

Abstract

The field experiment was conducted at Agronomy Research Farm, Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj) Faizabad (U.P.), during *Rabi* season of 2014-2015.The yield components like number of spikes m^{-2}, spike length (cm), number of grain $spike^{-1}$, grain weight $spike^{-1}$(g), grain yield (~~q~~kgha^{-1}), straw yield (kg ha^{-1}) and nitrogen contain in grain (%), nitrogen contain in straw (%), nitrogen uptake in grain (kg ha^{-1}), nitrogen uptake in straw,protein content in grain (%)were maximum under 160 kg N $ha^{-1}$and among the varietiesover PBW-373,NW-1014 being at par with HD-2327.What the study recommends?

Key words- number of spikes m^{-2}, spike length (cm), number of grain $spike^{-1}$, grain weight $spike^{-1}$(g), Test weight (1000-grain weight), N content in grain (%),N content in straw (%),Protein content in grain (%). Minimize keywords. All parameters of the study are not mean keywords.

1. Introduction

Wheat (*Triticum aestivum* L.) belongs to family Poaceae, is a staple food of the world. India is one of the principle wheat producing and consuming country in the world (source/s). Its importance in Indian agriculture is second after rice. About 55% of the world population depends on wheat for intake of about 20% of food calories (Kumar*et al.*, 2020). Globally, according to USDA (2014-15) reported that wheat is grown in the world with an area of 220.88 million hectares, production of 725.47 million tonnes with a productivity of 3.28 tonnes per hectare (source/s). In India it is grown in an area of 30.47 million hectares, production of 95.85 million tonnes with a productivity of 3.15 tonnes per hectare. About 91% of the total wheat production is contributed by six states viz., U.P., Punjab, Haryana, M.P., Rajasthan, and Bihar. Among them, Uttar Pradesh ranks first with respect to area 9.2mha and production 24.50mtwith

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a productivity of 2.7 tonnes per hectare respectively. In India numbers of wheat varieties are cultivated but due to fast changing ecosystem these varieties become susceptible to different insects, pests, and diseases which cause a decline in yield (source/s). It was thus decided to generate a steady flow of new varieties, deriving resistant from diverse sources, to replace the old varieties for sustainable higher production. Wheat revolution was used with the introduction of high yielding dwarf varieties which need high level of management.

Shallow on the existing knowledge presentation

Limitations on the existing knowledge is not properly addressed. For example, the effects of different nitrogen levels were not addressed.

Research questions/objective/ies were not clearly indicated.

2. Materials and ~~methods~~Methods

2.1.Description of the study area

The experiment was laid out in randomized block design with ~~four~~ three varieties (PBW-373, HD-2327, and NW-1014) and six nitrogen levels (0, 40, 80, 120, 160, and 200 kg N ha^{-1}) with three replications ~~using~~Randomized Block Design ~~Experimental design Randomized Block Design (~~Factorial~~)~~arrangement~~,~~with three replications. ~~03, varieties 03, nitrogen levels 06, treatment combinations 18.~~

2.2.Yield and yield related components

2.2.1. Number of spikes per meter square:

Number of spikes per meter square was counted before harvesting of crop at three places and average value was taken and expressed in number of spikes per metre square.

2.2.2. Spike length (cm):

Length of five selected ears from each plot as measured carefully from the neck node to the tip of last grain and averaged out to get the length of single ear.

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2.2.3. Number of grains per spike:

Three randomly selected spikes were threshed and seed were counted and averaged to get the number of grains spikes.

2.2.4. Grain weight spike^{-1} (g):

The total number of grain weight of five selected spikes was measured and averaged to get the grain weight per spike and expressed in grams.

2.2.5. 1000-grain weight (g):

One thousand grains from net plot were counted and weighed to get 1000 grains weight (g).

2.2.6. Nitrogen uptake by crop:

First of all, thoroughly powdered grain and straw of wheat from each plot were analysed by modified micro-Kjeldahls methods, as given by Jackson (1967).

Nitrogen content in grain and straw thus obtained was multiplied separately with respective yields. The values of both were expressed as total nitrogen uptake by the crop in kg ha^{-1}.

$$\text{Nitrogen uptake by grain (kg ha}^{-1}) = \frac{\text{N content in grain (\%) x Grain yield (kg ha}^{-1})}{100}$$

$$\text{Nitrogen uptake by straw (kg ha}^{-1}) = \frac{\text{N content in straw (\%) x Straw yield (kg ha}^{-1})}{100}$$

2.2.7. Protein content in grain:

Total ~~Protein~~ protein content in grain as estimatedmultiplying the nitrogen content with a factor 6.25.

Statistical analysis method should be indicated.

3. Results and Discussion

~~the~~ The effect of treatments on growth and yield of crop, the influence of soil and climate on crop yield is also concerned, which cannot be ignored. Therefore, the existing edaphic and weather conditions of the experimental area were also taken in to consideration prior to

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discussing the findings of treatments obtained during the investigation. Yield was the resultant of co-ordinated interplay of yield attributes. Vigorously growing plants are able to absorb larger quantity of mineral nutrients through well-developed root system. The variety NW-1014 gave higher number of spikes m^{-2}, length of spike, number of grain $spike^{-1}$ and 1000 grain weight than other varieties (Table 1). It might be due to the genetic character of the variety like more reproductive tillers producing capacity, more spike length etc. Minimum yield contributing characters were credited to PBW-373. It was due to less reproductive tillers, less spike length as well as less number of grains $spike^{-1}$. The results were in conformity with those of Singh and Singh (1991) and Brijkishor (1998). Text citation should be updated as it is too old!!!

The highest grain and straw yield ~~was~~were credited to variety NW-1014 followed by variety HD-~~232.~~232. The reason behind this may be because of good plant stand, more number of spike bearing tillers, long shoots head and more number of grains $spike^{-1}$ with more test weight. Minimum grain and straw yield recorded with variety PBW-373 might be due to less number of spike bearing tillers, small shoots head and less number of grains $spike^{-1}$ and poor grain development. The results obtained in the present investigation in accordance with those obtained by Singh (1998) and Sardana *et al.* (1999).More citation should be included!!!

~~number~~ Number of effective shoots, spike length, number of grains $spike^{-1}$, grain weight $spike^{-1}$, , and test weight (1000-grain weight) increased with increase in nitrogen levels. The significant increase of these characters obtained only up to 160 kg N ha^{-1} (Table 1). This might be due to enhanced shoots, photosynthetic area and increased sink size in presence of adequate nitrogen. Similar research findings were reported by Singh and Singh (1989), Patel *et al.* (1994) and Patel *et al.* (1995).The text citation should be updated as it is too old.

Interaction effect between varieties and nitrogen levels was not found significant. This might be due to the fact that short statured high yielding wheat varieties performed equally good

to optimum level of nitrogen. The similar findings were reported by Singh and Uttam (1992) and Singh(1998).The text citation should be updated as it is too old.

Table 1: Different ~~Yield~~ yield attributing characters of wheat crop

Treatments	Number of spikes (m^{-2})	spike length (cm)	No. of grains $spike^{-1}$	Grain weight $spike^{-1}$ (g)	Test weight (1000-grain weight)	N content in grain (%)	N content in straw (%)	Protein content in grain (%)
(A) Varieties								
PBW-373	280.04	10.66	49.17	1.52	35.11	1.80	0.50	11.25
HD-2327	303.88	10.77	49.67	1.64	35.25	1.78	0.49	11.14
NW-1014	309.85	11.20	51.67	1.66	36.00	1.84	0.51	11.44
SEm±	4.19	0.14	0.66	0.03	0.48	0.01	0.00	0.075
CD (P=0.05)	12.05	0.42	1.90	0.1	1.39	0.03	0.01	NS
Nitrogen levels (kg ha^{-1})								
0	262.17	9.78	45.50	1.00	34.50	1.70	0.46	10.65
40	281.13	10.52	48.50	1.40	35.07	1.75	0.49	10.95
80	297.92	10.78	49.50	1.62	35.57	1.79	0.50	11.18
120	310.80	11.40	52.50	1.87	35.98	1.83	0.51	11.45
160	321.75	11.60	53.50	1.96	35.99	1.87	0.52	11.68
200	321.80	11.62	53.60	1.98	35.61	1.89	0.53	11.83
SEm±	5.93	0.20	0.93	0.05	0.68	0.01	0.005	0.405
CD (P=0.05)	17.04	0.60	2.68	0.1	1.96	0.05	0.01	NS

Conclusion

Yield attributes viz. number of spikes per square meter, length of spike, number of grain $spike^{-1}$ and weight of grains $spike^{-1}$ were significantly higher with variety NW-1014 followed by variety HD2327. 1000-grain weight was not influenced significantly by different varieties. ~~number~~ Number of spikes per square meter, length of spike, number of grains $spike^{-1}$ and weight of grains $spike^{-1}$ were significantly higher with 160 kg N ha^{-1} being at par with 120 and 200 kg N ha^{-1} while significantly superior over rest of the nitrogen levels. 1000-grain weights were significantly higher with 160 kg N ha^{-1} being at par with 120 and 200 kg N ha^{-1} while significantly superior over rest of the nitrogen levels. Protein content in grain was not influenced significantly with nitrogen levels. Among the varieties NW-1014 was found most appropriate for eastern plain zone

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