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Yield attributes of wheat (*Triticum aestivum* L.) varieties as influenced by nitrogen management under of late sown condition

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Abstract

A field experiment was carried out at Agronomy Research Farm of Narendra Deva University of Agriculture & Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) during *rabi* season of 2012-13 to study the influence of different nitrogen management on yield attributes of wheat under late sown condition. There were twenty treatment combinations consisted of five doses of nitrogen (90 kg N ha⁻¹, 120 kg N ha⁻¹, 90 kg N ha⁻¹ + 25% N through FYM, 120 kg N ha⁻¹ + 25% N through FYM, 150 kg N ha⁻¹) and four varieties of wheat (HUW-234, HP-1633, NW-1014 and Raj-3077). The experiment was conducted in Randomized Block Design (R.B.D.) factorial with three replications on silt loam soil having low organic carbon (0.38%), nitrogen (203 kg ha⁻¹), medium in phosphorus (15.25 kg ha⁻¹) and potassium (265 kg ha⁻¹). The yield attributes *viz.*, ears per meter row length, ear length (cm), grain ear⁻¹ and grain weight ear⁻¹(g), 1000-grain weight (g) were found maximum under the treatment 120 kg N ha⁻¹ + 25% N through FYM. Among the varieties HUW-234 being at par with NW-1014. 1000-grain weight (g) was not influenced significantly due to varieties.

Keywords: Nitrogen management, *Triticum aestivum*, late sown wheat

Introduction

Wheat (*Triticum aestivum* L.) belongs to family Poaceae, is a staple food of the world. India is one of the principal wheat producing and consuming countries in the world. Its importance in Indian agriculture is second after rice. In India, the total area under wheat is 30.22 million ha with the total production of 93.50 million tonnes and productivity 3.09 t/ha (Directorate of Economics and Statistics, 2017) ^[1]. The late transplanting of rice or use of long duration varieties of rice in low land delays the sowing of wheat from mid-November to December. The preceding crops such as sugarcane, potato, toria etc. and other factors forced to sow the wheat as late as in the month of December and January. Due to delay sowing wheat yield is declined drastically. Low temperature, poor mineral accumulation, less translocation of photosynthates from source to sink, hot desiccating wind during milking stage forced premature drying, unsuitable location specific varieties, imbalanced nutrient management are responsible for low yield under late sown wheat. Different varieties under late sown condition respond variably to various nitrogen management practices. Balanced fertilizer through organic and inorganic sources improves the soil health as well as boosts the productivity of wheat. Organic matter is the substrate for a large number of soil-living beneficial organisms which are essential to keep the plant healthy. The soil which is enriched in organic matter responds better to the application of nitrogenous fertilizers. In the event of widespread energy crisis and deterioration of soil fertility due to intensive agriculture and imbalanced use of fertilizers, it is highly desirable for making massive efforts to adopt organic matter recycling as a source of bioenergy and to supplement the demand gap of N, P and K as well as to enrich the soil in respect to micronutrients. Thus, the combination of FYM with inorganic fertilizers may be highly effective for increasing the yield under late sown wheat as well as better quality of produce in addition to sustaining biological health and maintaining balanced C: N ratio of the soil.

Materials and methods

The field experiment was carried out at Agronomy Research Farm of Narendra Deva University of Agriculture & Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) during *rabi* season of 2012-13 with the objective to study the influence of different nitrogen management on yield attributes of wheat under late sown condition. There were twenty treatment combinations consisted of five doses of nitrogen (90 kg N ha⁻¹, 120 kg N ha⁻¹, 90 kg N ha⁻¹ + 25% N through FYM, 120 kg N ha⁻¹ + 25% N through FYM, 150 kg N ha⁻¹) and four varieties of wheat (HUW-234, HP-1633, NW-1014 and Raj-3077).

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The experiment was conducted in Randomized Block Design (R.B.D.) factorial with three replications on silt loam soil having low organic carbon (0.38%), nitrogen (203 kg ha⁻¹), medium in phosphorus (15.25 kg ha⁻¹) and potassium (265 kg ha⁻¹).

Results and discussion

Yield is the resultant of the co-ordinated interplay of yield attributes. Vigorously growing plants are able to absorb a larger quantity of mineral nutrients through the well-developed root system. The variety HUW-234 gave the highest number of ears per meter row length, grain ear⁻¹, length of ear which was on par with the variety NW-1014 and significantly superior over rest of the varieties (Table 1). It

might be due to the genetic character of the variety like more reproductive tillers producing capacity, more ear length etc. The results were in resemblance with those of Nagarajan and Rane (2002) [2]. 1000-grain weight (g) was not influenced significantly due to varieties.

The yield attributes viz., number of effective tillers, ear length, grains ear⁻¹, grain weight ear⁻¹, 1000-grain weight increased with increase in nitrogen levels. The significant increase of these characters obtained only up to 120 kg N ha⁻¹+25% N through FYM (Table 1). This might be due to enhanced tillering, photosynthetic area and increased sink size in presence of adequate nitrogen. The result is in close proximity to the findings of Singh *et al.* (2010) [3].

Table 1: Yield attributes of wheat varieties as influenced by nitrogen management under of late sown condition

Treatments	Ears per meter row length (No.)	Ear length (cm)	Grains ear ⁻¹ (No.)	Grain weight ear ⁻¹ (g)	1000-grain weight (g)
(A) Varieties					
HUW-234	64.04	8.83	38.84	1.48	37.94
HP-1633	57.94	7.97	35.16	1.33	37.84
NW-1014	62.20	8.56	37.74	1.43	37.89
Raj-3077	59.80	8.23	36.25	1.37	37.79
SEm±	1.06	0.16	0.64	0.03	0.62
CD (P=0.05)	3.03	0.47	1.83	0.10	NS
(B) Nitrogen management levels					
90 kg N ha ⁻¹	56.73	7.80	34.43	1.25	36.33
120 kg N ha ⁻¹	58.55	8.06	35.50	1.31	36.93
90 kg N ha ⁻¹ + 25% N through FYM	61.60	8.48	37.35	1.43	38.33
120 kg N ha ⁻¹ + 25% N through FYM	65.28	9.00	39.60	1.55	39.03
150 kg N ha ⁻¹	62.83	8.65	38.11	1.47	38.73
SEm±	1.18	0.18	0.71	0.04	0.70
CD (P=0.05)	3.39	0.52	2.05	0.11	2.00

Conclusion

Thus, it may be concluded that nitrogen management practice of 120 kg N ha⁻¹ + 25% N through FYM proved as the most suitable practice for exploitation of the yield potential of late sown wheat. Among the varieties, HUW-234 and NW-1014 were found most suitable for cultivation under the late sown condition for achieving better yield attributes.

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