Indian Journal of Agriculture and Allied Sciences

ISSN 2395-1109
e-ISSN 2455-9709
Volume: 4, No.: 3, Year: 2018

www.ijaas.org.in
Received: 10.07.2018, Accepted: 22.09.2018
Publication Date: 30th September 2018

RESPONSE OF NITROGEN MANAGEMENT PRACTICES ON PRODUCTIVITY OF VARIOUS VARIETIES OF LATE SOWN WHEAT (*Triticum aestivum* L.)

Abhinav Kumar[1] and R.A. Singh[2]

[1]Research Scholar, Department of Agronomy, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi-221 005, Email: akbisen.agron@gmail.com and [2]Department of Agronomy, Narendra Deva University of Agriculture & Technology, Faizabad-224 229, Corresponding Author: Abhinav Kumar

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 response of late sown wheat varieties to different nitrogen management practices. Twenty treatments 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 components like number of ears per meter row length, ear length (cm), number of grain ear^{-1}, grain weight ear^{-1}(g), grain yield (kg ha^{-1}), straw yield (kg ha^{-1}) and nitrogen uptake at harvest (kg ha^{-1}) were maximum under 120 kg N ha^{-1} + 25% N through FYM and among the varieties HUW-234 being at par with NW-1014. Harvest index and 1000-grain weight (g) were not influenced significantly due to nitrogen management practices and varieties. The maximum net return (Rs. 75894.50 ha^{-1}) was obtained at 120 kg N ha^{-1} + 25% N through FYM with HUW-234 and B:C ratio 1.59 was computed with the same variety HUW-234 at 120 kg N ha^{-1} + 25% N through FYM. 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 late sown condition for achieving higher yield and economics.*

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

1. 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, total area under wheat is 31.20 million ha with the total production of 95.90 million tonnes and productivity 3.07 t/ha [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 boost 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 has been found to respond better to the application of nitrogenous fertilizers [2]. In the event of widespread energy crisis and deterioration of soil fertility due to intensive agriculture and imbalance 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.

2. 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 response of late sown wheat varieties to different nitrogen management practices. There were twenty treatments 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}).

3. Results and Conclusion/Discussion

Yield is 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 HUW-234 gave higher number of ears per meter row length, grain ear^{-1}, length of ear 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 ear length etc. Minimum yield contributing characters were credited to HP-1633. It was due to less reproductive tillers, less ear length as well as less number of grain ear^{-1}. The results were in conformity [3-4]. The highest grain and straw yield was credited to variety HUW-234 followed by variety NW-1014 (Table 2). The reason behind this may be because of good plant stand, more number of ear bearing tillers, long ear head and more number of grains ear^{-1} with more test weight. Minimum grain yield recorded with variety Raj-3077, might be due to less number of ear bearing tillers, small ear head and less number of grains ear^{-1} and poor grain development. The results obtained in the present investigation in accordance with those obtained [5-6]. The varieties did not differ significantly in harvest index.

Table 1: Effect of different treatments on yield contributing characters of wheat.

Treatments	Number of ears per meter row length	Ear length (cm)	Number of grains ear^{-1}	Grain weight ear^{-1} (g)	Test weight (1000-grain weight)
(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

The yield contributing characters *viz*. number of effective tillers, ear length, number of grains ear^{-1}, grain weight ear^{-1}, test weight (1000-grain weight) increased with increase in nitrogen levels. The significant increase of these characters obtained only upto 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. Similar research findings were reported [7,8,9]

.

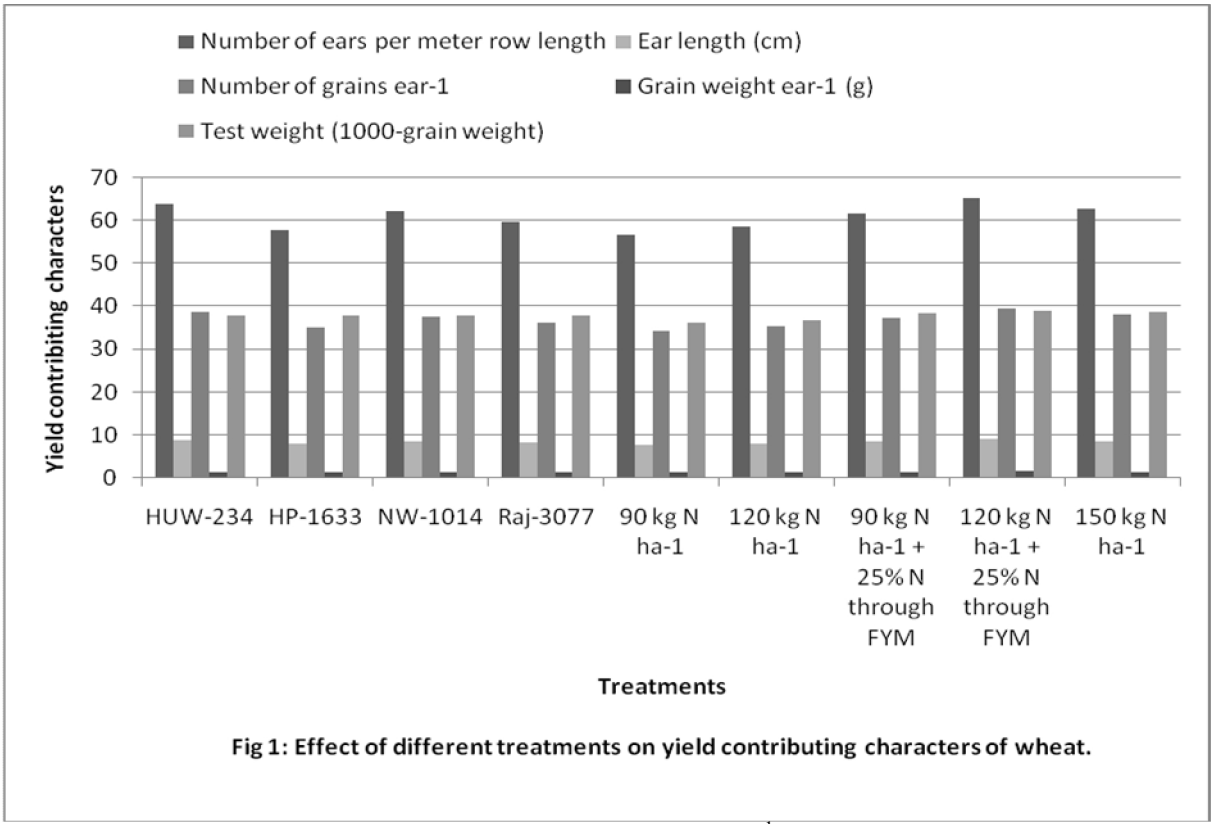

Fig 1: Effect of different treatments on yield contributing characters of wheat.

Yield of crop at various nitrogen levels can be attributed to produce the dry matter and its partitioning to economically important plant parts like ear. The capacity of plant to produce dry matter depends not only upon the size of photosynthetic system, but also depends upon efficiency and length of time for which it remains active. The grain yield significantly increased only up to 120 kg N ha^{-1} +25% N through FYM (Table 2). This might be due to more ear length, number of grains ear^{-1}, grain weight ear^{-1} and 1000 grain weight. Similar findings were reported [10-11]. Straw yield influenced significantly only up to 120 kg N ha^{-1}+25% N through FYM (Table 2). This may be probably due to higher shoots and increased rate of dry matter accumulation. Also reported similar results [12], harvest index of wheat was not affected significantly due to nitrogen management practices (Table 2). Similar results were given [5]

Table 2: Effect of different treatments on grain yield, straw yield and harvest index.

Treatment	Grain yield (q ha^{-1})	Straw yield (q ha^{-1})	Harvest index (%)
(A) Varieties			
HUW-234	33.93	44.66	43.12
HP-1633	30.02	40.23	42.69
NW-1014	32.12	43.64	42.24
Raj-3077	29.26	40.59	41.83
SEm±	0.52	0.83	0.77
CD (P=0.05)	1.50	2.39	NS
(B) Nitrogen management levels			
90 kg N ha^{-1}	24.65	34.24	41.85
120 kg N ha^{-1}	27.43	36.83	42.53
90 kg N ha^{-1} + 25% N through FYM	31.30	42.92	42.14
120 kg N ha^{-1} + 25% N through FYM	31.30	42.92	43.02
150 kg N ha^{-1}	37.31	49.51	42.80
SEm±	0.58	0.93	0.86
CD (P=0.05)	1.67	2.67	NS

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 late sown condition for achieving higher yield and economics.

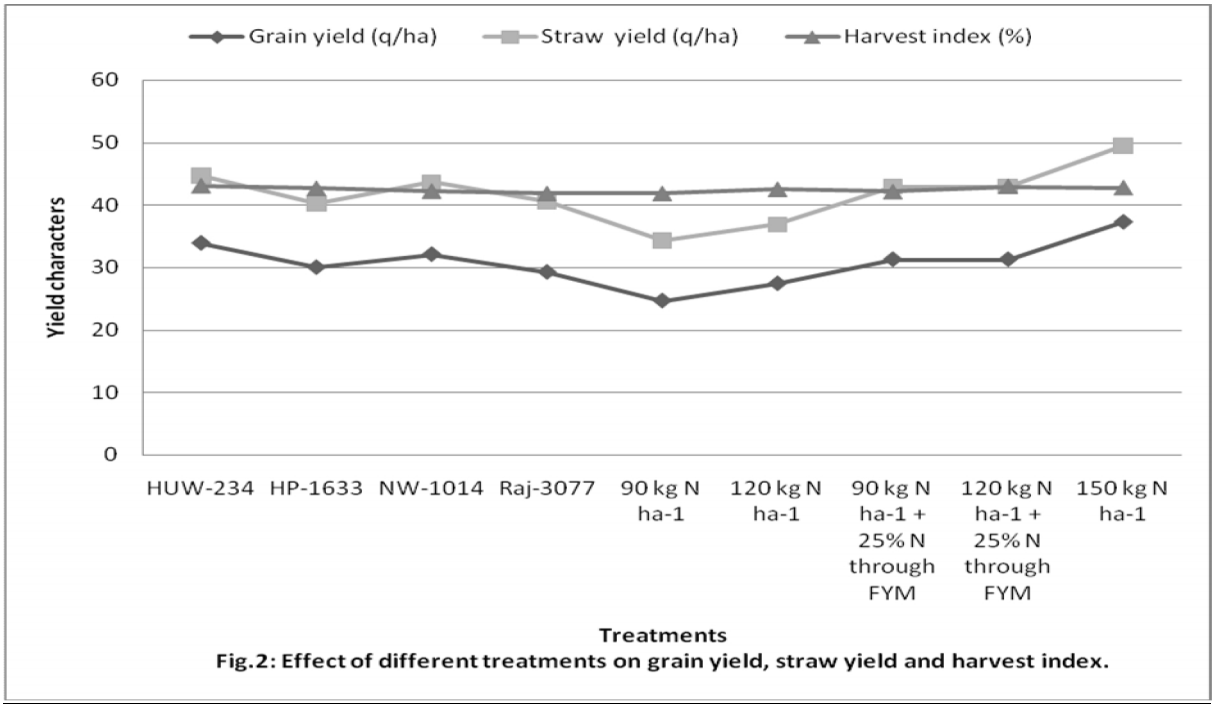

Fig.2: Effect of different treatments on grain yield, straw yield and harvest index.

References

1. Economic Survey. (2015-16). Directorate of Economics & Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Government of India.
2. Subbiah, B. V. and Bajaj, J. C. (1968). Association of certain soil factors with higher paddy yields. *Journal of Indian Society of Soil Science,* 16(3):297-300.
3. Singh, S. P. and Singh, H. B. (1991). Productivity of late sown wheat as influenced by seed condition and variety. *Indian Journal of Agronomy,* 36(1):38-40.
4. Brijkishor. (1998). To assess the performance of newly developed strains of wheat under zero tillage condition with varying nitrogen levels. M.Sc. (Ag.) thesis submitted to N.D.U.A & T., Kumarganj, Faizabad.
5. Singh, B. (1998). To assess the performance of new wheat varieties under late-sown condition with different nitrogen levels. M.Sc.(Ag) thesis submitted to N.D.U.A.&T., Kumarganj, Faizabad.
6. Sardana, V., Sharma, S. K. and Randhawa, A. S. (1999). Performance of wheat cultivars under different sowing dates and levels of nitrogen under rainfed conditions. *Annals of Agricultural Research,* 20 (1): 60-63.
7. Singh, B. and Singh, G. (1989). Effect of nitrogen on wheat cultivars under late-sown conditions. *Indian Journal of Agronomy,* 34(3):387-389.
8. Patel, N. R., Thaker, K. R. and Barevadia, T. N. (1994). Influence of different proportions of organic and inorganic nitrogen on irrigated wheat (*Triticum aestivum*). *Indian Journal of Agronomy,* 39(4):641-643.
9. Patel, N. M., Sadaria, S. G., Keneria, B. B. and Khanpara, V. D. (1995). Effect of nitrogen, potassium and zinc on growth and yield of wheat. *Indian Journal of Agronomy* 40(2):290-292.
10. Nakhtore, C. C. and Kewat, M. L. (1989). Response of dwarf wheat to varying fertility levels under limited and adequate irrigation conditions. *Indian Journal of Agronomy,* 34(4):508-509.
11. Jain, R. C. and Jain, P. M. (1993). Effect of preceding rainy season crop on yield and nutrient uptake of wheat under different fertility levels of nitrogen. *Indian Journal of Agronomy,* 38(4):643-644.
12. Roy, S. K., Mmaniruzaman, A. F. M. and Saifuzzaman, M. (1991). Effect of planting geometry and nitrogen application on the growth and yield of wheat. *Indian Journal of Agronomy,* 36:33-37.