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Effect of Nutrient Management on the Yield and Yield Attributing Characters of Wheat (Triticum aestivum L.)

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ABSTRACT

A field experiment was conducted at village Sarawan Bodla, Dist. Sri Muktsar sahib, Punjab to determine the effect of nutrient management on the yield and yield attributing characters of Wheat (Triticum aestivum L.*) variety HD 2967 during rabi season 2016-17. The treatments consisted of different doses of fertilizer (T_1-100 % recommended dose of fertilizer,T_2- 100 % recommended dose of fertilizer + 15 tonnes FYM ha^{-1}, T_3- 150 % recommended dose of fertilizer,T_4- 150 % recommended dose of fertilizer + 15 tonnes FYM ha^{-1} and T_5- Control). Results revealed that T_4 has maximum plant height, dry matter accumulation per plant, 1000 grain weight and grain yield than other treatments applied.*

Keywords: FYM, Nitrogen, Nutrient management, Triticum aestivum* L*, Wheat, Yield.

I. INTRODUCTION

Wheat (*Triticum aestivum*) is the first important and strategic cereal crop for the majority of world's populations. It is the most important staple food of about two billion people (36% of the world population). It supplies about 20 per cent of the food calories for the world's growing population. India has the capacity to become world leader in the production of wheat. India production of wheat estimated is 88.94 million tons during 2014-15 (Argal *et al*, [1]). In India mainly three species of *Triticum* mainly *aestivum, durum* and *dicoccum* are cultivated. *Triticum aestivum* is cultivated in all the regions of the country while *durum* is cultivated in Punjab and Central India and *dicoccum* in Karnataka. Wheat is sown in the beginning of winter and is harvested in the beginning of summer. The time of sowing and harvesting differs in different regions due to climatic variations. The growing period is variable from one agro-climatic zone to other that affects the vegetative and reproductive period leading to differences in potential yield.

The ever increasing population pressure, the land resources per capita are gradually shrinking and simultaneously the food grain demand is increasing. Thus, vertical increase in crop production along with nutritional security is possible only through higher and better use of both organic and inorganic sources. Fertilizers constitute an integral part of improved crop-production technology. Proper amount of fertilizer application is considered a key to the bumper crop production (Jan *et al*, [2]). Efficient use of fertilizer pay back to the farmers more profit per unit investment. To overcome the prevalent threat to the soil fertility, the integrated nutrient management approach is implied because it involves the use of chemical fertilizers in conjunction with the judicious combination of organic manures (crop residues management, green manuring and farm yard manure addition) by effective recycling techniques without any detrimental effect. With this

background in view, the present investigation was therefore, undertaken to study effect of fertilizer management on the yield contributing characters of wheat and the difference in yield.

II. MATERIAL AND METHODS

The experiment was carried out at Village Srawan Bodla, District Sri Muktsar Sahib during *rabi* season 2016-17. Treatments were allocated in five plots with each plot having dimensions of 5 m × 5 m. The treatments consisted of different doses of fertilizer (T_1-100 % recommended dose of fertilizer,T_2- 100 % recommended dose of fertilizer + 15 tonnes FYM ha^{-1}, T_3- 150 % recommended dose of fertilizer,T_4- 150 % recommended dose of fertilizer +15 tonnes FYM ha^{-1} and T_5- Control). For preparation of field, pre sowing irrigation (*rauni*) was given and then field was ploughed once and twice with disc harrow and cultivator respectively followed by planking. Wheat variety HD 2967 was sown on November 20, 2016 with seed cum fertilizer drill. The farmyard manure and fertilizers were applied in the field as per the treatments. Full amount of FYM (15 t ha^{-1}) having N (0.56%), P (0.18%) and K (0.53%) in the corresponding treatments was thoroughly mixed in the soil before sowing of crop. For 100% recommended dose of fertilizer, 125 kg N ha^{-1} was applied in two split doses (half as basal dose at sowing and half at 1st irrigation) whereas, 62.5 kg P_2O_5 was applied as basal dose at sowing. Crop was raised according to the recommended package of practices under irrigated culture. Crop was harvested on April 16, 2017 and threshed on April 17, 2017. Grain yield obtained from plot was then converted to q/ha. Observations recorded were plant height, dry matter per plant, 1000 grain weight and yield.

III. RESULTS AND DISCUSSION

3.1 Plant height

Plant height is a reliable index of plant growth. It gives an idea to predict the growth rate and yield of crop**.** So, considering its importance, plant height was recorded at 30, 60, 90, 120 days after sowing (DAS) and at harvesting. Due to effect of nutrient levels, plant heights of wheat in T_1, T_2, T_3, T_4 and T_5 treatments 30.28 cm, 31.02 cm, 31.1 cm, 31.9 cm and 29.86 cm respectively were observed after 30 days sowing. Same trend has been observed for all other readings. At time of harvesting the plant height of wheat in T_1, T_2, T_3, T_4 and T_5 were 119.58 cm, 120.6 cm, 122.32 cm, 124.7 cm and 99.8 cm respectively (as shown in Figure 4.1). Khan *et al* [3], Ali *et al* [4] and Ali *et al* [5] have also reported results with similar trend.

3.2 Dry matter accumulation per plant

Dry matter accumulation is the result of total accumulation of photosynthates formed and total nutrient uptake by the plant up to the stipulated growth period. Due to effect of nutrient levels on dry matter accumulation of wheat, T_4 has maximum dry matter per plant (25.8 g) and minimum dry matter per plant in T_5 i.e. 13.2 g (as shown in Figure 4.2). Chopra *et al* [6] and Jat *et al* [7] have also reported the results with similar trend.

3.3 1000 grain weight

The grain weight indicates the nature and extends of grain development. It is the function of various production factors that influence grain development and filling patterns. 1000 grains weight of wheat was 40.5 gm in T_1 treatment, 41.8 gm in T_2 treatment, 43.3 gm in T_3 treatment, 45.5 gm in T_4 treatment and 29.6 gm in T_5 treatment

due to nutrient management. The data of 1000-grain weight have been also presented in Table 4.1. Abedi *et al* [8] and Singh *et al* [9] have also reported the results with similar trend.

3.4 Yield

Grain yield of a crop is the net resultant of interaction of various factors and is a valid criterion for comparing the efficiency of different inputs in a given situation. The efficiency of different factors can be judged mainly by addition they make to yield which is the ultimate aim of the field research investigations. The data of yield per hectare have been presented in table 4.2. The wheat grain yield was maximum (61.25 q ha-1) in T_4 treatment and minimum (35.53 q ha-1) in T_5 treatment. Mazumdar *et al* [10], Kumar *et al* [11] and Singh *et al* [12] have also reported the results with similar trend.

IV. FIGURES AND TABLES

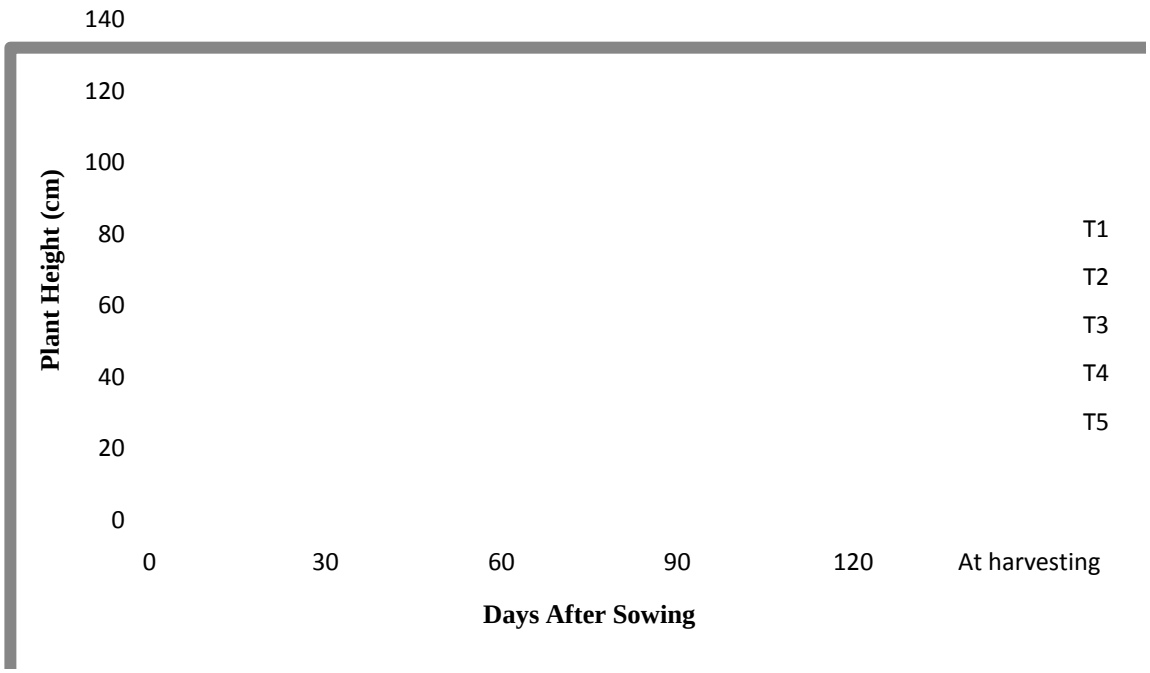

Fig 4.1 Effect of nutrient management on plant height of wheat crop

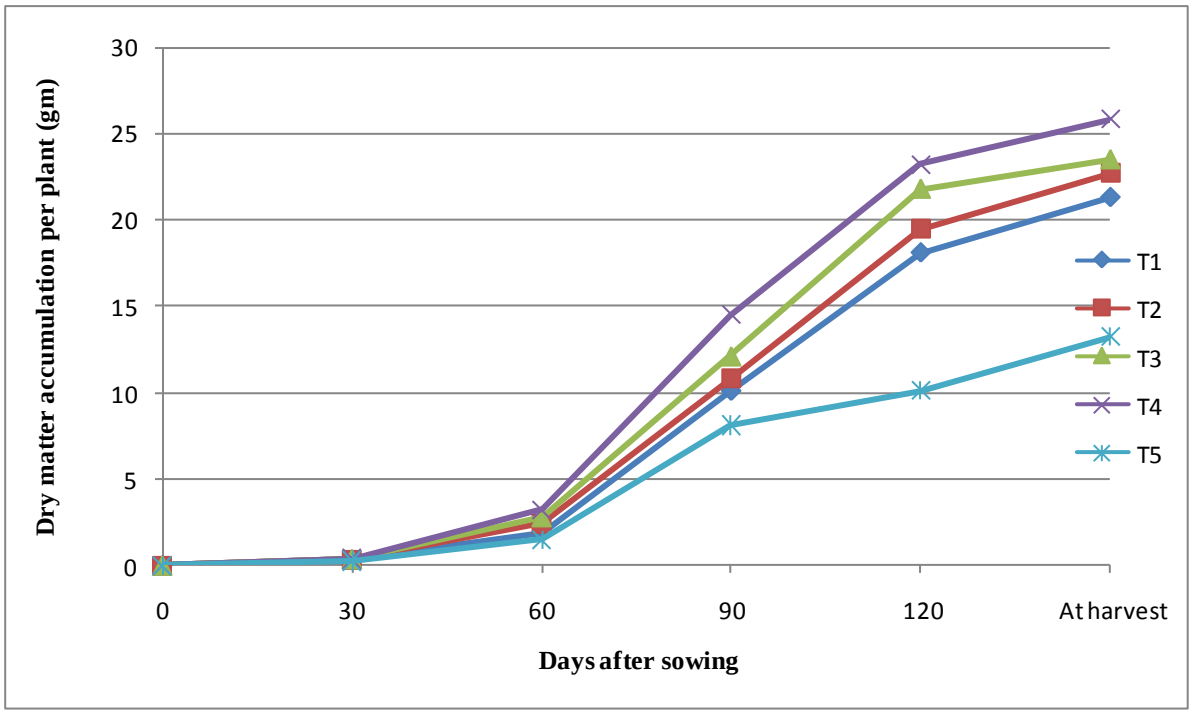

Fig 4.2 Effect of nutrient management on dry matter accumulation of wheat crop

Table 4.1 Effect of nutrient management on 1000 grain weight of wheat crop

Treatments	1000 grain weight (g)
T_1	40.5
T_2	41.8
T_3	43.3
T_4	45.5
T_5	29.6

Table 4.2 Effect of nutrient management on yield per hectare of wheat crop

Treatments	Yield per ha (q)
T_1	52.57
T_2	56.75
T_3	58.50
T_4	61.25
T_5	35.53

V. CONCLUSION

The present experiment was carried out to study the effect of nutrient management on the yield and yield attributing characters of Wheat. The present experiment concluded that the treatment T_4 treatment of wheat (150% RDF + 15tonnes FYM ha^{-1}) is the best treatment for the growth and grains yield characters. Treatment T_4 of wheat exhibited high mean value for characters like, plant height (124.7 cm), dry matter accumulation (25.8 gm), 1000-grain weight (45.5 gm) and yield per hectare (61.25 q). So it can be concluded from the experiment performed that better yield can be obtained by applying 150% RDF + 15tonnes FYM ha^{-1}.

REFERENCES

[1] M. S. Argal, S. K. Verma and P. S. Tomar, Effect of Nutrient Management on Soil Health and Wheat *(Triticum aestivum L.)* Production in Degraded land of Chambal Ravine, *International Journal of Agriculture, Environment and Biotechnology*, *10(2)*, 2017, 189-198.

[2] T. Jan, M. T. Jan, M. Arif, H. Akbar and S. Ali, Response of wheat to source, type and time of nitrogen application, *Sarhad Journal of Agriculture*, *23(4)*, 2007, 871-880.

[3] M. U. Khan, M. Qasim and I. U. Khan, Effect of integrated nutrient management on crop yields in rice-wheat cropping system, *Sarhad Journal of Agriculture*, *23(4)*, 2007, 1019-1026.

[4] L. Ali, Q. Mohy–ud–din and M. Ali, Effect of Different Doses of Nitrogen Fertilizer on the Yield of Wheat, *International Journal of Agriculture & Biology*, *5(4)*, 2003, 438-439.

[5]A. Ali, A. Ahmad, W. H. Syed, T. Khaliq, M. Asif, M. Aziz and M. Mubeen, Effects of nitrogen on growth and yield components of wheat, *Science Internatioal*, *23(4)*, 2011, 331-332.

[6] R. Chopra, M. Sharma, S. K. Sharma, V. Nepalia, H. K. Jain and A. Singh, Effect of integrated nutrient management on growth and yield of wheat (*Triticum aestivum* l.) in *haplustepts, International Journal of Science and Natutre*, *7(3)*, 2016, 622-628.

[7] L. K. Jat, S. K. Singh, A. M. Latare, R. S. Singh and C. B. Patel, Effect of dates of sowing and fertilizer on growth and yield of wheat (*Triticum aestivum*) in an *Inceptisol* of Varanasi, *Indian Journal of Agronomy*, *58(4)*, 2013, 611-614.

[8]T. Abedi, A. Alemzadeh and S. A. Kazemeini, Wheat yield and grain protein response to nitrogen amount and timing, *Australian Journal of Crop Science*, *5(3)*, 2011, 330-336.

[9] R. K. Singh, R. L. Agarwal and S. K. Singh, Integrated nutrient management in wheat (*Triticum aestivum*), *Annals of Agricultural Research*, *28(1)*, 2007, 20-24.

[10] S. P. Mazumdar, D. K. Kundu, D. Ghosh, A. R. Saha, B. Majumdar and A. K. Ghorai, Effect of Long-Term Application of Inorganic Fertilizers and Organic Manure on Yield, Potassium Uptake and Distribution of Potassium Fractions in the New Gangetic Alluvial Soil under Jute-Rice-Wheat Cropping System, *International Journal of Agriculture and Food Science Technology*, *5(4)*, 2014, 297-306.

[11] R. Kumar, V. K. Singh, R. P. Sharma, A. Kumar and G. Singh, Impact of Nitrogen, Phosphorus, Potash and Sulphur on Productivity of Rice-Wheat System in Sub-humid Region, *12(1)*, 2012, 84-88.

[12] M. Singh, M. K. Singh, S. P. Singh and R. Sahu, Herbicide and nitrogen application effects on weeds and yield of wheat, *Indian Journal of Weed Science, 47(2), 2015,125-130.*