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Effect of integrated nutrient management on growth and yield of wheat under late sown condition

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ABSTRACT

The field experiment was conducted during winter season of 2015-16 at Agronomy Research Farm of N.D. University of Agriculture & Technology, Narendra Nagar (Kumarganj), Faizabad. The experiment consisted of treatment viz, T_1 (Control), T_2 (Inorganic source of nitrogen), T_3 (100% RDF + 25% N through FYM), T_4 (100% RDF + 25% N through Vermicompost), T_7 (75% RDF through inorganic sources (120N: 60P : 40K), T_8 (75% RDF through inorganic sources +25% N through FYM), T_9 (75% RDF through inorganic sources + 25%N through Vermicompost), T_{10} (75% RDF through inorganic sources + 25% N through FYM + Azotobactor) and T_{11} (75% RDF through inorganic sources 25% N through Vermicompost + Azotobactor) were conducted in Randomized Block Design with three replications. Results revealed that growth parameters such as plant height, number of shoots m^{-2}, total dry matter accumulation m^{-2} were significantly higher in 100% recommended dose of fertilizers and 25% N through Vermicompost + Azotobactor over other treatments. Yield attributes viz., spike length and number of grains spike $^{-1}$ were increased significantly with 100% recommended dose of fertilizers through inorganic source and 25% N through Vermicompost + Azotobactor which was at par with all treatments excepted T_1, T_7,T_8 . Grain and straw yields and nutrient (NPK) uptake were maximum with 100% recommended dose of fertilizers and 25% N through Vermicompost + Azotobactor. Application of 100% of recommended dose of nitrogen through inorganic source + 25 % N Vermicompost + Azotobactor - improved available N P and K content in soil as compared to other treatments. Protein content was maximum with T_6 (100% recommended dose of fertilizers and 25% N through Vermicompost + Azotobactor). Highest gross returns were obtained with 100% recommended dose of fertilizers + 25% N through Vermicompost followed by T_5.The highest B: C ratio (1.78) were calculated with T_6 followed by T_5 (1.73) and lowest T_1 (1.10).

Keywords: *RDF, B:C ratio, Azotobactor, FYM and Vermicompost.*

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INTRODUCTION

Wheat (*Triticum aestivum* L.) belongs to the family Poaceae is a staple food of the world. The important and economic consideration for increasing wheat productivity is the effective use of nitrogen fertilization. Nitrogen fertilization is the most important factor in front of wheat agronomist for achieving high yield targets. Previous research reviewed that number of tillers, spikes m^{-2}, plant height, spike length, number of spikelet's, grains spike^{-1}, grain yield and straw yield of wheat increased with increased nitrogen level (Sobhoel *et al*., 2000). Sufficient supply of nitrogen at optimum planting time also resulted good quality and vigorous seed. The use of organic manure as a renewable source of plant nutrients is assuming importance. In this endeavor proper blend of organic and inorganic fertilizer is important not only for increasing yield but also for sustaining soil health (Weber *et al*. 2007 and Pullicinoa *et. al***.** 2009).

The vermicomposting is bio oxidation and stabilization of organic material involving joint action of earthworm and micro organisms. Although, microbes are responsible for the biological degradation of the organic matter, earthworms are the important drivers of the process, conditioning the substrate and altering biological activity (Aira *et. al.* 2002). Farmyard manure by adding organic matter improves the physical condition of soil by increasing water holding capacity for maximum utilization of water. Application of FYM and inorganic N in integration improved the productivity and monetary returns of wheat and also maintained soil fertility (Sharma *et al*. 2007). Application of farmyard manure (FYM) to soil have been practiced for many centuries and its application to soil have increased crop yield, improved soil fertility, increased soil organic matter, increased microbiological activities and improved

soil structure for sustainable agriculture (Blair *et al*., 2006; Kundu *et al*., 2007). Combination of both organic and inorganic fertilizers delayed days to 50% heading, plant height, yield and yield components and leaf area index of wheat compared with sole organic or inorganic fertilizer (Manna *et al*., 2005). Keeping in view the present investigation was under taken.

METHODOLOGY

An experiment was conducted during winter season of 2015-16 at Agronomy Research Farm of N. D. University of Agriculture & Technology, Kumarganj, Faizabad. The experiment consisted of eleven treatments comprised of T_1 (Control), T_2 (Inorganic source of nitrogen), T_3 (100% RDF + 25% N through FYM), T_4 (100% RDF + 25% N through Vermicompost), T_7 (75% RDF through inorganic sources (120N: 60P : 40K), T_8 (75% RDF through inorganic sources +25% N through FYM), T_9 (75% RDF through inorganic sources + 25%N through Vermicompost), T_{10} (75% RDF through inorganic sources + 25% N through FYM + Azotobactor) and T_{11} (75% RDF through inorganic sources 25% N through Vermicompost + Azotobactor) were conducted in Randomized Block Design with three replications.

RESULTS AND DISCUSSION

Growth parameters such as plant height (Table-1), number of shoots m^{-2}, total dry matter accumulation m^{-2} were significantly higher in 100% recommended dose of fertilizers and 25% N through Vermicompost + Azotobactor over other treatments (Table-2). Yield attributes *viz*., spike length and number of grains spike $^{-1}$ were increased significantly with 100% recommended dose of fertilizers through inorganic source and 25% N through Vermicompost + Azotobactor which was at par with all treatments excepted T_1, T_7,T_8 (Table-3). Grain and straw yields and N uptake were maximum with 100% recommended dose of fertilizers and 25% N through Vermicompost + Azotobactor (Table-3). Application of 100% of recommended dose of nitrogen through inorganic source + 25 % N Vermicompost + Azotobactor - improved available N content in soil as compared to other treatments (Chaudhry, *et. al.* 2014; Hossain, *et. al.* 2006 and Devi, *et. al.* 2011). The highest B: C ratio (1.78) were recorded with T_6 followed by T_5 (1.73) and lowest B:C ratio were recorded in T_1 (Table-3) Chaudhary *et. al.* 1989; Chaudhary *et. al.* 1997, Chauhan 2001; Chauhan and Ram 1993 also reported similar results.

CONCLUSION

On the basis of summarized result it may be concluded that grain and straw yield of wheat improved significantly with the application of nitrogen through organic and inorganic source 100% RDF + 25% N through Vermicompost + Azotobactor.

REFFERENCES:

1. Aira, M.; Monrot, F; Dorninguez, J. and Mato, S. (2002) How earthworm density affects microbial biomass and activity in pig manure,*European J. Soil Biol.,* 38:7-10.
2. Blair, N.R.; D. Faulkner, A.R. Till and P.R. Poult. (2006). Longterm management impacts on soil C. N. and physical fertility. *Soil and Tillage Res*., 91: 30-38.
3. Chaudhary, G. A; Sadiq, M.; Habib, G. and Khan, M. A. (1989). Response of two wheat cultivars to nitrogen and phosphorus application under rainfed conditions. *J. Agric. Res*., 27 (1): 13-17.
4. Chaudhary, N. P.; Vyas, A. K. and Singh, A. K. (1997). Growth and nutrient uptake in wheat as influenced by nitrogen, phosphorus and zinc fertilization. *Ann. of Agric. Res*., 18 (3): 365-366.
5. Chaudhry, S.; Verma, V. K.; Yadav, D. D.; Verma, R. P. And Verma, S. P. (2014). Integrated nutrient management with inorganic fertilizers, vermicompost, biofertilizer and zinc sulphate in wheat (*Triticum aestivum*) *International Journal of Plant Sciences (Muzaffarnagar);* 9 (2):337-341. 12.
6. Chauhan, R. P. S. and Ram, S. (1993). Response of wheat to different fertility levels under partially reclaimed salt affected soil. *Fert. News*, 38 (5): 51-52.
7. Chauhan, R.P.S. (2001). Integrated use of nitrogen sources in wheat grown in partially reclaimed sodic soil. *Ann. Pl. Soil. Res*., 3 (1): 17-25.
8. Devi, K. N.; Singh, M. S.; Singh , N. G. and Athokpam, H. S. (2011). Effect of integrated nutrient management on growth and yield of wheat *(Triticum aestivum* L.). *Journal of Crop and Weed* 7(2): 23-27.
9. Hossain, Md.; Illias, Islam Khairal, Sujain Abu, Meisher, Cracg, Ag and Islam Sayeedul Md. (2006). Effect of planting methods and nitrogen levels on yield and yield attributes of wheat. *J. Biol. Sci*. 14: 127-130.
10. Kundu, S. R.; Bhattacharyya, V.; Parkash, B. N.; Ghosh and H.S. Gupta. (2007). Carbon sequestration and relationship between carbon addition and storage under rainfed soybean-wheat rotation in a sandy loam soil of the India Himalayas. *Soil and Tillage Res*., 92: 87-95.
11. Manna, M.C.; A. Swarup, R.H. Wanjari, H.N. Ravankar, B. Mishra, M.N. Saha, Y.V. Singh, D.K. Sahi and P.A. Sarap. (2005). Long-term effect of fertilizer and manure application on soil organic carbon storage, soil quality and yield sustainability under sub-humid and semi-arid tropical India. *Field Crops Res*., 93: 264-280
12. Pullicinoa, D. S.; Massaccesia, L.;Dixonb, L.; Bolb, R. and Gigliottia,G. (2009). Organic matter dynamics in a compost-amended anthropogenic landfill capping-soil. European J. Soil Sci., 61: 35-47.

13. Sobhoel M.M., M.S. Sharshar and Soad A. El-Said. (2000). Response of wheat to nitrogen and potassium application and salt affected soil. *J. Prod. and Dev*. 5 (1): 83-98.
14. Sharma, A.; Singh, H. and Nanwal, R. K. (2007). Effect of integrated nutrient management on productivity of wheat (*Triticum aestivum*) under limited and adequate irrigation supplies. *Indian Journal of Agronomy* 52 (3): 120-123.
15. Weber, J.; Karczewska, A.; Drozd, J.; Licmar, M.; Licznar, S. And Jarnroz, E. (2007) Agricultural and ecological aspects of a sandy soil as affected by the application of municipal solid waste composts. Soil Biol. Biochem., 39: 1294- 02.

Table-1 Plant height of wheat as influenced by different treatments.

Symbol	Treatments	Plant height (cm)			
		30 DAS	60 DAS	90 DAS	At harvest
T_1	Control	14.40	41.18	51.12	51.35
T_2	100% RDF (120N:60P:40K)	16.10	59.16	73.44	73.70
T_3	100% RDF + 25% N through FYM	16.80	60.32	74.88	74.45
T_4	100% RDF + 25% N through Vermicompost	16.90	61.48	76.32	76.90
T_5	100% RDF + 25% N through FYM + Azotobactor	17.20	62.64	77.76	77.80
T_6	100% RDF + 25% N through Vermicompost + Azotobactor	17.50	63.22	78.48	80.65
T_7	75% RDF (120N: 60P:40K)	15.10	55.10	68.40	70.75
T_8	75% RDF + 25% N through FYM	15.20	56.84	70.56	71.30
T_9	75% RDF + 25% N through Vermicompost	16.00	58.00	72.00	72.50
T_{10}	75% RDF + 25% N through FYM + Azotobactor	16.30	59.74	74.16	74.20
T_{11}	75% RDF + 25% N through Vermicompost + Azotobactor	16.40	60.32	74.88	74.95
SEm±		**0.68**	**2.42**	**3.16**	**3.21**
CD at 5%		**2.01**	**7.14**	**9.32**	**9.47**

Table-2 Number of shoots and dry matter accumulation of wheat as influenced by different treatments

Symbol	Treatments	Number of shoots m^{-2}				Dry matter accumulation(g m^{-2})			
		30 DAS	60 DAS	90 DAS	At harvest	30 DAS	60 DAS	90 DAS	At harvest
T_1	Control	188.19	258.02	266.00	250.04	1.48	194.88	324.80	406.00
T_2	100% RDF (120N:60P:40K)	194.82	445.23	459.00	431.46	73.95	362.40	604.00	755.00
T_3	100% RDF + 25% N through FYM	195.84	453.96	468.00	439.92	75.40	382.56	637.60	797.00
T_4	100% RDF + 25% N through Vermicompost	196.86	462.69	477.00	448.38	76.85	388.80	648.00	810.00
T_5	100% RDF + 25% N through FYM + Azotobactor	196.35	471.42	486.00	456.84	78.30	405.60	676.00	845.00
T_6	100% RDF + 25% N through Vermicompost + Azotobactor	194.31	475.79	490.50	461.07	79.03	419.04	698.40	873.00
T_7	75% RDF (120N: 60P:40K)	193.29	414.68	427.50	401.85	68.88	318.72	531.20	664.00
T_8	75% RDF + 25% N through FYM	196.35	427.77	441.00	414.54	71.05	333.60	556.00	695.00
T_9	75% RDF + 25% N through Vermicompost	195.84	436.50	450.00	423.00	72.50	350.88	584.80	731.00
T_{10}	75% RDF + 25% N through FYM + Azotobactor	193.80	449.60	463.50	435.69	74.68	373.44	622.40	778.00
T_{11}	75% RDF + 25% N through Vermicompost + Azotobactor	194.31	453.96	468.00	439.92	75.40	379.68	632.80	791.00
SEm±		**8.47**	**16.09**	**18.85**	**17.63**	**3.18**	**13.16**	**26.46**	**27.58**
CD at 5%		**NS**	**47.46**	**55.62**	**52.02**	**NS**	**38.83**	**78.06**	**81.36**

Table -3 Yield attributes, yield, N uptake and B:C ratio of wheat as influenced by different treatments

Treatments	No. of Spike m^{-2}	Spike Length (cm)	No. of grains $spike^{-1}$	1000-grain weight (g)	Grain yield (q ha^{-1})	Straw yield (q ha^{-1})	N uptake (kg ha^{-1})		B:C ratio
							Grain	Straw	
T_1 Control	240.68	6.10	29.20	33.95	19.50	37.07	34.49	13.72	1.10
T_2 100% RDF (120N:60P:40K)	429.82	8.10	35.90	35.60	32.96	54.98	57.60	21.09	1.73
T_3 100% RDF + 25% N through FYM	438.64	9.00	37.60	36.70	34.49	56.18	63.51	23.05	1.70
T_4 100% RDF + 25% N through Vermicompost	447.46	9.10	38.70	37.00	34.72	56.83	65.86	24.08	1.71
T_5 100% RDF + 25% N through FYM + Azotobactor	456.28	9.25	39.80	37.20	37.47	59.19	70.64	25.04	1.73
T_6 100% RDF + 25% N through Vermicompost + Azotobactor	460.69	9.30	40.20	37.50	38.79	60.32	74.67	26.33	1.78
T_7 75% RDF (120N: 60P:40K)	398.95	7.60	34.00	34.40	28.01	50.07	47.44	18.53	1.50
T_8 75% RDF + 25% N through FYM	410.18	7.70	34.20	34.70	29.66	51.34	50.77	19.70	1.49
T_9 75% RDF + 25% N through Vermicompost	421.00	7.90	35.70	35.20	31.75	53.63	54.92	20.57	1.62
T_{10} 75% RDF + 25% N through FYM + Azotobactor	434.23	8.50	36.20	35.80	33.95	56.22	59.65	22.08	1.63
T_{11} 75% RDF + 25% N through Vermicompost + Azotobactor	438.64	8.70	36.90	36.10	34.50	57.27	61.73	22.21	1.65
SEm±	**14.83**	**0.36**	**1.59**	**1.33**	**1.55**	**2.20**	**2.69**	**1.02**	
CD at 5%	**43.76**	**1.06**	**4.70**	**NS**	**4.57**	**6.50**	**7.93**	**3.00**	

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