IMPACT OF INTEGRATED NUTRIENT MANAGEMENT ON WHEAT (TRITICUM AESTIVUM L.) GROWTH, YIELD ATTRIBUTES

[1]Raghvendra Singh, [2]Ravikesh Kumar Pal, [3]Ashish Srivastava, [4]Rubi Gautam

Faculty of Agricultural Science & Allied Industries, Rama University, Mandhana, Kanpur, Uttar Pradesh, India

drraghvendra.fas@ramauniversity.ac.in

Abstract

The "Impact of integrated nutrient management on wheat (triticum aestivum l.) Growth, yield attributes, and soil quality" in the Rabi season crop of 2023–2024 was the subject of a field experiment conducted at Rama University at Mandhana, Kanpur. N1: Recommended dose fertiliser [RDF] (120:60:40), N2: 100% N through FYM, N3: 100% N through vermi compost, N4: 75% RDF + 25% N through FYM, N5: 50% RDF + 25% N through FYM + 25% N through vermi compost, N6: 75% RDF + 25% vermi compost, and N7: Control (No Fertiliser) were the seven treatments with different INM levels that were included in the experiment. Three replications of each treatment were carried out using a Randomised Blocks Design (RBD). Karan Vandana was the wheat variety used in the experiment (DBW 187). The experimental soil had a pH between 7.2 and 7.8, medium levels of organic carbon, and medium levels of potassium, phosphorus, and nitrogen. greater nutrient uptake was found to be significantly greater in this pattern, and the results seemed to show that the INM level with 50% RDF + 25% N through FYM + 25% N through vermi compost had significant growth, yield qualities, and grain yield varied with the different nutrient levels. The farmer's methods produce the lowest grain yield, growth traits, and yield qualities. The decomposition of crop residues and the use of organic manures resulted in an improvement in soil quality at the INM levels. With 25% FYM, 25% vermicompost, and 50% RDF, the INM levels have the highest net return and benefit cost ratio.

KEYWORDS: INM, growth parameters, yield attributes parameter, wheat.

Introduction

One of the most important cereal crops for both domestic and global food security is wheat (Triticum aestivum L.). With an area of 222.69 million hectares and a production of 785.74 million metric tonnes in 2023–2024, it is the most productive crop in the world, according to USDA (2024). Wheat straw gives animals a significant amount of dry matter in addition to being a vital component of the human diet. In India, it is the second most important staple crop after rice. After China, India is the world's second-largest producer of wheat. On 31.40 million hectares of total cultivated land, India produced 114 million tonnes of wheat in 2023–2024 (Food Corporation of India, 2024).

With a high nutritional composition of protein (12.1%), lipids (1.8%), ash (1.8%), reducing sugars 2.0%, pentose 6.7%, starch 59.2%, total carbohydrates 70%, and 314 Kcal/100 g of food, wheat compares favourably to other cereals in terms of nutritional value. It is extremely high in vitamins and minerals, including vitamin B6 (0.1 mg/100 g), calcium (37 mg/100 g), iron (4.1 mg/100 g), thiamine (0.45 mg/100 g), and nicotinic acid (5.4 mg/100 g).

Applying organic and inorganic fertilisers at the same time increases productivity and production while preserving soil fertility. By carefully utilising the advantages of each potential source of plant nutrition that is pertinent to each crop trend and farming environment, the INM strategy aims to maintain the availability of plant nutrition in order to reach a specific level of crop yield.

To counteract the scarcity and recent spike in the cost of inorganic fertilisers, the use of natural sources such as FYM, vermicompost, and biofertilizers should be encouraged. These sources increase soil fertility and production, improve soil biodiversity, and feed nutrients to plants. Adding organic manure to soil improves its physical, chemical, and biological qualities; it also controls nutrient absorption, promotes growth, and works in concert with crops. The biomass that plants create is primarily responsible for any crop's capacity to absorb nutrients, but the accumulation of various nutrients within the plant system often impacts the overall absorption of those nutrients.

MATERIALS & METHODS

During the 2023–2024 growing season, the current study, " Impact of integrated nutrient management on wheat (triticum aestivum l.) Growth, yield attributes, and soil quality" is being carried out. An outline of the trial's meteorological and environmental conditions, as well as the tools and methods employed, has been given in this section. The research was conducted during the Rabi season in 2023–2024 on the official campus of Rama University in the rural area of Mandhana, 10 km from Kanpur, in the central region of Uttar Pradesh. The soil is alluvial and partly sodic due to the lower terrain.

The research was conducted during the Rabi season in 2023–2024 on the official campus of Rama University in the rural area of Mandhana, 10 km from Kanpur, in the central region of Uttar Pradesh. The soil is alluvial and partly sodic due to the lower terrain. The experiment site is in the subhumid subtropical zone of the Indo-Genetic plains. At about 125.9 meters above mean sea level, Kanpur (U.P.) is situated on the Gangetic plain. The coordinates are 79º 31} to 80º 34} East and 25º 56} to 28º 58} North. The experimental farm is located beneath the Indo-Gangetic alluvial tract and is tube well irrigated.
Like North India, the region has a subtropical climate. The region receives its typical seasonal rainfall of about 816 mm, mostly from the second or first week of June until mid-October, with a few winter showers. Cold temperatures and sometimes frost are features of winter. The summer

months are hot and dry. The scorching breezes from the west start in April and continue until the monsoon season.

RESULTS & DISCUSSION

According to a statistical analysis of the plant height of the wheat crop at 30 DAS, there was no significant difference in plant height across the various nutrient sources (INM). However, a statistical analysis of the plant height of the wheat crop at 60 DAS revealed that the plant height at 60 DAS was significantly influenced by the various sources of nutrients (INM). The highest plant height was obtained at 60 DAS by treatments N5—50% RDF + 25% N through FYM + 25% N through vermicompost —which were statistically comparable to treatments N1–100% RDF but superior to N6—75% RDF + 25% vermicompost and other treatments. The N7 control plot had the lowest plant height at 60 DAS for the wheat crop.However, a statistical analysis of the plant height of the wheat crop at 60 DAS revealed that the plant height at 60 DAS was significantly influenced by the various sources of nutrients (INM). The highest plant height was obtained at 60 DAS by treatments N5—50% RDF + 25% N through FYM + 25% N through vermicompost—which were statistically comparable to treatments N1–100% RDF but superior to N6—75% RDF + 25% vermicompost and other treatments. The N7 control plot had the lowest plant height at 60 DAS for the wheat crop.At various growth stages, tillage practices had a considerable impact on the accumulation of dry matter. The results of zero tillage were noticeably greater.

A statistical analysis of the plant height at the harvest stage of the wheat crop revealed that the various sources of nutrients (INM) of plant height at 90 DAS produced a significant result. The highest plant height at harvest was recorded by treatments N5 (50 percent RDF + 25 percent N through FYM + 25 percent N through vermicompost), which were statistically comparable to treatments N1 (100 percent RDF), N6 (75 percent RDF + 25 percent vermicompost), N4 (75 percent RDF + 25% N through FYM), N3 (100 percent N through vermicompost), and N2 (100 percent through FYM). In the N7 control plot, the wheat crop with the lowest plant height at harvest stage was identified.

A statistical analysis of the wheat crop's dry weight at 30 DAS revealed no significant results attributed to the various sources of nutrients (INM) in the buildup of dry matter at that point. However, a statistical analysis of the wheat crop's dry weight at 60 DAS revealed that the various sources of nutrients (INM) had a substantial impact on the crop's dry weight. In comparison to treatments N1–100%RDF, the treatments N5–50% RDF + 25% N through FYM + 25% N through vermicompost recorded the highest dry weight at 60 DAS. However, they were statistically superior to N6–75% RDF + 25% vermicompost, N4–75% RDF + 25% N through FYM, N3–100% N through vermicompost, and N2–100% N through FYM.

A statistical analysis of the wheat crop's dry weight at 90 DAS revealed that the various sources of nutrients (INM) had a substantial impact on the crop's dry weight. The maximum dry weight

ISSN PRINT 2319 1775 Online 2320 7876

at 90 DAS was recorded by treatments N5 (50 % RDF + 25 % N through FYM + 25 % N through vermicompost), which were statistically comparable to treatments N1 (100 %) and N6 (75 %) RDF + 25% vermicompost, but statistically superior to N4 (75 %) RDF + 25% N through FYM, N3 (100 %) N through vermicompost, and N2 (100 %) through FYM. In the N7 control plot, the wheat crop with the lowest dry weight at 90 DAS was identified.

The wheat crop's dry weight at harvest was statistically examined, and the results showed that the various sources of nutrients (INM) had a substantial impact on the crop's dry weight at harvest. Statistically, the treatments N5 - 50% RDF + 25% N through FYM + 25% N through vermicompost recorded the highest dry weight at harvest, which was statistically comparable to treatments N1 - 100% RDF, N6 - 75% RDF + 25% vermicompost, and N4 - 75% RDF + 25% N through FYM. However, they were statistically superior to N3 - 100% N through vermicompost and N2 - 100% N through FYM. The N7 control plot's wheat crop had the lowest dry weight at harvest.

Different sources of nutrients (INM) did not significantly affect the number of tillers at 30 DAS of the wheat crop, according to a statistical analysis of the numbers of tillers at that point. However, a statistical analysis of the wheat crop's tiller counts at 60 DAS revealed that the various sources of nutrients (INM) had a substantial impact on the number of tillers at that point. The treatments N5 (50 percent RDF + 25 percent N through FYM + 25 percent N through vermicompost) had the highest number of tillers at 60 DAS. These treatments were statistically comparable to N1 (100 percent RDF) and N6 (75 percent RDF + 25% vermicompost), but they were statistically superior to N4 (75 percent RDF + 25% N through FYM, N3-100% Nthroughver micompost and N_2 - 100% N through FYM. The lowest numbers of tillers at 60 DAS wheat crop were notified in N_7 control plot.

The wheat crop's harvest stage and various sources of nutrients (INM) were found to have a substantial impact on the number of tillers at 90 DAS, according to a statistical analysis of the crop's tiller counts. The treatments N5 (50 percent RDF + 25 percent N through FYM + 25 percent N through verm compost) had the most tillers at 90 DAS. These treatments were statistically comparable to treatments N1 (100 percent RDF) and N6 (75 percent RDF + 25% vermicompost), but statistically superior to N4 (75 percent RDF + 25% N through FYM), N3 (100 percent N through vermicompost), and N2 (100 percent N through FYM). The N7 control plot had the fewest number of tillers at 90 DAS wheat crop.

A statistical analysis of the number of tillers at the wheat crop's harvest stage revealed that the various sources of nutrients (INM) had a substantial impact on the number of tillers at harvest. The treatments N5 (50 percent RDF + 25 percent N through FYM + 25 percent N through vermicompost) had the highest number of tillers at harvest, which was statistically comparable to treatments N1 (100 percent RDF), N6 (75 percent RDF + 25 percent vermicompost), N4 (75 percent RDF + 25 percent N through FYM), and N3 (100 percent N through vermicompost), but statistically superior to N2 (100 percent N through FYM). The N7 control plot had the fewest number of tillers at the wheat crop's harvest stage.

Effect of different INM levels on yield attributes:

The no. of spikelets of wheat crop were statistically analysed and reported that there was significant result was observed due to different sources of nutrient (INM) on no. of spikelets of wheat crop. The treatments N_5 - 50% RDF + 25% N through FYM + 25% N through vermi compost recorded maximum no. of spikelets/ ear which were statistically at par with treatments N_1 - 100%RDFand , N_6 - 75% RDF + 25% vermicompost but statically excellent than N_4 - 75% RDF + 25%NthroughFYM, and N_3 - 100% Nthroughvermicompost and N_2 - 100% N through FYM. The lowest no. of spikelets/ ear wheat crop was notified in N_7 control plot. According to a statistical analysis of the wheat crop's spike length, the impact of various nutrient sources (INM) on the crop's spike length was found to be substantial. The longest spikes were recorded by treatments N5 (50 % RDF + 25 % N through FYM + 25 % N through vermicompost), which were statistically comparable to treatments N1 (100 % RDF and N6) but statistically superior to N4 (75 % RDF + 25% N through FYM), N3 (100 % N through vermicompost), and N2 (100 % N through FYM). The N7 control plot had the shortest spike length on the wheat crop. The statistical analysis of the wheat crop's spike weight revealed a substantial effect of the various nutrient sources (INM) on the wheat crop's spike length. Maximum weight of spike was recorded by treatments N5 (50 % RDF + 25 % N through FYM + 25 % N through vermicompost), which were statistically comparable to treatments N1 (100 % RDF) and N6 (75 % RDF + 25% vermicompost) but statistically superior to N4 (75 % RDF + 25% N through FYM), N3 (100 % N through vermicompost), and N2 (100 % N through FYM). The N7 control plot had the lowest spike weight on the wheat crop.

A statistical analysis of the wheat crop's number of grains and spikes revealed that the impact of various nutritional sources (INM) on the crop's number of grains and spikes was considerable. The highest number of grain/spikes was recorded by treatments N5 (50 % RDF + 25 % N through FYM + 25 % N through vermicompost), which were statistically comparable to treatments N1 (100 % RDF and N6) but statistically superior to N4 (75 % RDF + 25% N through FYM), N3 (100 % N through vermicompost), and N2 (100 % N through FYM). The N7 control plot had the lowest number of grains or spikes on the wheat crop. A statistical analysis of the wheat crop's test weight revealed that the impact of various nutritional sources (INM) on the crop's test weight was substantial. The maximum test weight was recorded by treatments N5 (50 % RDF + 25 % N through FYM + 25 % N through vermicompost), which were statistically comparable to treatments N1 (100 % RDF and N6) but statistically superior to N4 (75 % RDF + 25% N through FYM), N3 (100 % N through vermicompost), and N2 (100 % N through FYM). In the N7 control plot, the wheat crop with the lowest test weight was identified.

Effect of different INM levels on yield:

A statistical analysis of the wheat crop's grain yield revealed that the impact of various nutrient sources (INM) on wheat crop grain yield was considerable. The highest grain yield was recorded by treatments N5 (50 percent RDF + 25 percent N through FYM + 25 percent N through vermicompost), which were statistically comparable to treatments N1 (100 percent RDF and N6) but statistically superior to N4 (75 percent RDF + 25 percent N through FYM), N3 (100 percent N through vermicompost), and N2 (100 percent N through FYM). The N7 control plot had the lowest wheat crop grain yield. A statistical analysis of the wheat crop's straw yield revealed that the impact of various nutrient sources (INM) on the crop's straw production was considerable. The highest straw yield was recorded by treatments N5 (50 percent RDF + 25 percent N through FYM + 25 percent N through vermicompost), which were statistically comparable to treatments N1 (100 percent RDF and N6) but statistically superior to N4 (75 percent RDF + 25 percent N through FYM), N3 (100 percent N through vermicompost), and N2 (100 percent N through FYM). The N7 control plot had the lowest straw yield on the wheat crop.

A statistical analysis of the wheat crop's biological yield revealed that the impact of various nutrient sources (INM) on the crop's biological output was considerable. The highest biological yield was recorded by treatments N5 (50 % RDF + 25 % N through FYM + 25 % N through vermicompost), which were statistically comparable to treatments N1 (100 % RDF and N6) but statistically superior to N4 (75 % RDF + 25% N through FYM), N3 (100 % N through vermicompost), and N2 (100 % N through FYM). The N7 control plot had the lowest wheat crop biological yield. According to a statistical analysis of the wheat crop's harvesting index, the impact of various nutrient sources (INM) on the index was shown to be substantial. In comparison to treatments N7-Control, N4-75 percent RDF + 25% N through FYM, N3-100 percent N through vermicompost, N2-100 percent N through FYM, and other treatments, the treatments N1-100 percent RDF recorded the highest harvesting index, which was statistically comparable to treatments N5-50 percent RDF + 25% N through FYM + 25% N through vermicompost. The N6- 75% RDF + 25% vermicompost control plot had the lowest harvest index number for the wheat crop.

Effect of different INM levels on soil health parameter:

The highest pH values were recorded by treatments N5 (50 % RDF + 25 N through FYM + 25 % N through vermi compost), which were statistically comparable to treatments N1 (100 % RDF) and N6 (75 % RDF + 25% vermicompost) but statistically superior to N4 (75 % RDF + 25% N through FYM), N3 (100 % N through vermicompost), and N2 (100 % N through FYM). The N7 control plot had the lowest soil pH value. According to a statistical analysis of the soil electric conductivity, the impact of various nutrient sources (INM) on soil electric conductivity was shown to be substantial. The highest soil electric conductivity was recorded by treatments N5 (50 percent RDF + 25 percent N through FYM + 25 percent N through vermicompost), which were statistically comparable to treatments N1 (100 percent RDF and N6) but statistically superior to

N4 (75 percent RDF + 25 percent N through FYM), N3 (100 percent N through vermicompost), and N2 (100 percent N through FYM). The N7 control plot has the lowest recorded soil electric conductivity.

According to a statistical analysis of the soil organic carbon, the impact of various nutrient sources (INM) on soil organic carbon was shown to be considerable. The highest soil electric conductivity was recorded by treatments N3–100% N through vermicompost, which were statistically comparable to treatments N2–100% N through FYM and N5–50% RDF + 25% N through FYM + 25% N through vermicompost, but statistically superior to N1–100% RDF, N6–75% RDF + 25% vermicompost, and N4–75% RDF + 25% NthroughFYM. The N7 Control plot has the lowest soil organic carbon.

The N3-100 percent N through vermicompost had the highest amount of available nitrogen, followed by N2-100 percent N through FYM, N5-50 percent RDF + 25% N through FYM + 25% N through vermicompost, and N1-100 percent RDF. N4-75 percent RDF + 25% N through FYM and N6-75 percent RDF + 25% vermicompost had the lowest amount of N. Significant differences were seen between all other Ncontaining treatments. While the lowest N was recorded under the N4 - 75% RDF + 25% N through FYM, the highest available P was found under the N5 - 50% RDF + 25% N through FYM + 25% N through vermicompost, followed by N3 - 100% N through vermicompost and N6 - 75% RDF + 25% vermicompost and N2 - 100% N through FYM and N1 - 100%RDF and N7 Control.Significant differences were found between all other P-containing treatments. The N3-100 percent N through vermicompost had the highest available K, followed by N2-100 percent N through FYM, N5-50 percent RDF + 25% N through FYM + 25% N through vermicompost, N6-75 percent RDF + 25% vermicompost, N4-75 percent RDF + 25% N through FYM, and N1-100 percent RDF. The N7 control had the lowest K. Significant differences were observed between all other Kcontaining treatments.

Effect of different of INM levels on Economic:

Under farmer practice, the highest cultivation cost was noted. N5: 50% RDF plus 25% N from FYM plus 25% N from vermicompost, as determined by farmer practice The cultivation costs were lower for N1 (100 percent RDF), N6 (75 percent RDF + 25 percent vermicompost), N4 (75 percent RDF + 25 percent N through FYM), N3 (100 percent N through vermicompost), N2 (100 percent N through FYM), and N7 (control).
50% RDF + 25% N through FYM + 25% N through vermicompost, followed by farmer practice, yielded the highest value gross return under N5. The gross return was lower for N1 (100 percent RDF), N6 (75% RDF + 25% vermicompost), N4 (75% RDF + 25% N through FYM), N3 (100 percent N through vermicompost), N2 (100 percent N through FYM), and N7 (control).

N5 had the highest net return, with 50% RDF + 25% N from FYM + 25% N from vermicompost, followed by farmer practice. 100 percent RDF, 75 percent RDF plus 25 percent vermicompost, 75 percent RDF plus 25 percent N through FYM, 100 percent N through vermicompost, 100 percent N through FYM, and N7-Control all had lower net return values. The N5- 50% RDF + 25% N via FYM + 25% N through vermicompost, followed by farmer practice, had the highest benefits-cost ratio value. The benefits cost ratio was lower for N1 (100 percent RDF), N6 (75 percent RDF + 25 percent vermicompost), N4 (75 percent RDF + 25 percent N through FYM), N3 (100 percent N through vermicompost), N2 (100 percent N through FYM), and N7 (control).

REFERENCES

Anonymous, (2023). MinistryofAgricultureandFarmerwelfareofIndia.

Shahid, M., Saleem, M. F., Khan, H. Z., Wahid, M. A. and Sarwar, M. (2015). Improvingwheat (*Triticum aestivum* L.) yield and quality by integration of urea with poultrymanure.*SoilEnviron.***34**(2):148-155.

Lehman,M.,Cynthia,R.,Cambardella,Diane,A.,Stott,Veronica,E.,Martinez,A.,Manter,D., Jeffrey, K., Buyer, Jude, S., Maul, Jeffrey, E., Smith, Harold, L., Collins, Jonathan, P.,Halvorson, Robert, J., Kremer, Jonathan, J., Lundgren, Tom, G., Ducey, Virginia, F.,Jin, L. and Karlen,D.L. (2015). Understanding and Enhancing Soil Biological Health:TheSolution forReversing SoilDegradation.*Sustainability*. **7**:988-1027.

Meena, R.P., Sharma, R.K., Tripathi, S.C., Gill, S.C., Chhokar, R.S., Meena, A and Sharma, I. 2015. Influence of hydrogel, irrigation and nutrient levels on wheat productivity. *Journal of Wheat Research***7**(2): 19-22.

Tyagi, V., Singh R. K. and Nagargade M. 2015. Effect of hydrogel, NPK and irrigation levels on yield, nutrient uptake and water use efficiency of wheat (*Triticum aestivum L.*). Res. On Crops **16** (4) : 653-656.

Maurya, A.K., Maurya, D.C., Maurya, V.K. and Verma, R.K. 2015. Effect of Zinc application methods on yield attributes, yield and nutrient uptake in wheat (*Triticum aestivum L.*) varieties under sodic soil. *Indian Journal of Agronomy***60**(1): 82-86.

Essam,A.andLattief,A.(2016). Influenceofnutrientmanagementoneconomicreturnofwheatunderupper Egyptconditions. *InternationalJ.ofAdvanced Res.EngineeringandAppliedSci*. **5**(1):3-6.

Mahla, S.K. and Wanjari, S.S. 2017. Response of wheat to irrigation and hydrogel with nutrient management. *Int. J. Agril. Sci. and Res. (IJASR)* Vol. **7**(2): 267-272.

Khan,H.Z.,Shabir,M.A.,Akbar,N., Iqbal,A.,Shahid,M.,Shakoor,A.,&Sohail,M.(2017). Effectofdifferenttillagetechniquesonproductivityofwheat(*Triticumaestivum* L.).*JournalofAgricultureandBasicSciences*,**2**:1.

Singh,G.,Kumar,S.,Sidhu,G.S.andKaur,R.(2018). Effectofintegratednutrient managementon yield of wheat (*Triticum aestivum* L.) under Irrigated conditions. *InternationalJournalofChemicalStudies*. **6**(2):904-907.

Kaur, R., Kumar S., Singh G. 2018. Effect of Irrigation scheduling and mulches on growth and yield of wheat (*Triticum aestivam L.*) in Central Punjab. *International Journal of Chemical Studies 2018*; **6**(5): 723-726.

Rummana, S., Amin, A.K.M.R., Islam, M.S. and Faruk, G.M. 2018. Effect of irrigation and mulch materials on growth and yield of wheat. *Bangladesh Agron. J. 2018*, **21**(1): 71-**76 .**

Singha, P., Mondal, T., Patra, K. and Mitra, B. 2018. Straw mulch and restricted irrigation effect on productivity, Profitability and water use in wheat (*Triticum aestivum L.*) under various crop establishment techniques in Eastern Sub-Himalayan plains of India. *Int .J. Curr. Microbiol. App. Sci (2018)* **7**(2): 1521-1533 .

Firdous, S., Agrawal B.K. and Chhabra V. 2018. Zinc-fertilization effects on wheat yield and yield components. *Journal of Pharmacognosy and Phytochemistry 2018*; **7**(2): 3497-3499.

Ladislav, H., Hlisnikovsky L., Kunzova E. 2018. The effect of mineral fertilizers and farmyard manure on winter wheat grain yield and grain quality. *Plant Soil Environ*., **64**: 491-497.

Singh, G., Kumar, S., Singh, G. and Singh, N. (2019). Effect of integrated nutrientmanagement on nutrient uptake and grain yield of wheat (*Triticum aestivum* L.)underirrigatedconditions.*JournalofPharmacognosyandPhytochemistry*.**8**(1):1077-1080.

Goda,D.D.(2019). ResponseofWheattoIntegratedNutrientManagement:AReview .*Journal ofPlantScience&Research*.**Vol.6**,Issue-1.

Roy, T., Kumar, S., Chand, L., Kadam, D.M., Bihari, B., Shrimali, S.S., Bishnoi, R., Maurya, U.K., Singh, M., Muruganandam, M., Singh, L., Sharma, S.K., Kumar, R. and Malik, A. 2019. Impact of Pusa hydrogel application on yield and productivity of rainfed wheat in North West Himalayan region. *CURRENT SCIENCE*, VOL. **116**, NO. 7, APRIL 2019.

Singh, P., Agrawal V.K., and Singh Y.V. 2019. Effect of potassium and FYM on growth parameters, yield and mineral composition of wheat (*Triticum aestivum L.*) in alluvial soil. *Journal of Pharmacognosy and Phytochemistry 2019*; **8**(3) : 24-27.

Kumar, M. and Singh, B. 2020. Evaluation of irrigation levels and hydrogels on the growth, yield and profitability of wheat. *International Journal of Chemical Studies 2020*; **8**(4): 1641654.

Table No. 1 Effect of INM on initial plant population of wheat crop at different stages

S.N.	Treatments	Initial plant population
N_1	100%RDF	21.98
N_2	100%Nthrough FYM	19.74
N_3	100% Nthroughvermi compost	20.10
N_4	75% RDF + 25%NthroughFYM	20.65
N_5	50% RDF + 25% N through FYM + 25% N through vermi compost	22.30
N_6	75% RDF + 25% vermi compost	21.20
N_7	Control (No Fertilizer)	18.23
	SEm±	2.92
	CDat5%	NS

Table No. 2 Effect of INM on plant height (cm) of wheat crop at different stages

S.N.	Treatments	Plant height			
		30 DAS	60 DAS	90 DAS	At Harvest
N_1	100%RDF	29.98	44.76	94.10	100.98
N_2	100%Nthrough FYM	28.76	43.12	92.93	99.10
N_3	100% Nthroughvermi compost	28.89	43.34	93.43	99.29
N_4	75% RDF + 25%NthroughFYM	29.12	43.97	93.84	99.62
N_5	50% RDF + 25% N through FYM + 25% N through vermi compost	30.16	45.14	94.31	106.36
N_6	75% RDF + 25% vermi compost	29.43	44.28	93.96	99.87
N_7	Control (No Fertilizer)	27.48	42.40	92.17	98.89
	SEm±	0.98	1.45	1.23	2.46
	CDat5%	NS	3.32	3.78	2.93

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 12, Iss 07, 2023

Table No. 3 Effect of INM levels on Dryweight(gm^{-2}) ofwheat crop

S.N.	Treatments	Dry matter accumulation			
		30 DAS	60 DAS	90 DAS	At Harvest
N_1	100%RDF	8.67	22.96	187.36	229.82
N_2	100%Nthrough FYM	7.76	21.78	184.43	228.56
N_3	100% Nthroughvermi compost	7.88	22.10	184.86	229.10
N_4	75% RDF + 25%NthroughFYM	8.12	22.31	185.10	229.18
N_5	50% RDF + 25% N through FYM + 25% N through vermi compost	9.20	23.43	189.49	230.56
N_6	75% RDF + 25% vermi compost	8.23	22.78	185.20	229.32
N_7	Control (No Fertilizer)	6.98	21.11	184.24	215.46
	SEm±	0.72	2.98	1.56	1.20
	CDat5%	NS	4.53	5.96	8.54

ISSN PRINT 2319 1775 Online 2320 7876
Research Paper UGC CARE Listed (Group -I) Journal Volume 12, Iss 07, 2023

Table No. 4 Effect of INM levels on number of tillers of wheat crop

S.N.	Treatments	Number of tillers			
		30 DAS	60 DAS	90 DAS	At Harvest
N_1	100%RDF	48.67	98.87	86.45	83.98
N_2	100% N through FYM	47.29	97.64	84.39	80.22
N_3	100% Nthroughvermi compost	47.63	97.92	84.68	80.40
N_4	75% RDF + 25%NthroughFYM	47.97	98.45	85.19	82.92
N_5	50% RDF + 25% N through FYM + 25% N through vermi compost	49.23	99.89	98.12	96.30
N_6	75% RDF + 25% vermi compost	48.12	98.62	85.43	83.20
N_7	Control (No Fertilizer)	46.20	95.60	79.24	76.45
	SEm±	0.89	1.58	1.98	1.96
	CDat5%	NS	5.67	5.76	5.75

IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES
ISSN PRINT 2319 1775 Online 2320 7876
Research Paper UGC CARE Listed (Group -I) Journal Volume 12, Iss 07, 2023

. Table No. 5 Effect of INM on number of spike, spike length, weight of spikes, number of grains per spike, grain weight per spike and test weight of wheat crop

S.N.	Treatments	Yieldattributes					
		No. of spike(m^2)	Spike length(cm)	Weight of spike(g)	No. of grain per spike	Grain weight per spike	Test weight
N_1	100%RDF	20.79	13.38	1.96	48.97	0.76	44.45
N_2	100% N through FYM	18.96	12.17	1.32	43.67	0.42	41.10
N_3	100% Nthroughverm i compost	19.10	12.79	1.48	44.10	0.45	41.48
N_4	75% RDF + 25%NthroughFYM	19.76	13.12	1.68	45.38	0.56	42.67
N_5	50% RDF + 25% N through FYM + 25% N through vermi compost	21.48	13.65	2.15	50.10	0.89	45.38
N_6	75% RDF + 25% vermi compost	19.98	13.24	1.73	46..54	0.66	43.10
N_7	Control (No Fertilizer)	18.54	11.56	1.10	40.16	0.30	38.78
	SEm±	2.97	2.79	2.37	1.57	1.65	2.56
	CDat5%	1.10	0.56	1.86	2.52	2.99	1.76

IJFANS International Journal of Food And Nutritional Sciences
Official Publication of International Association of Food and Nutrition Scientists