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Influenced of Organic- inputs under Integrated Nutrient Management on Growth and Yield Attributes of Wheat (Triticum aestivum L.) of Dryland Condition in Rewa dist. of M.P.

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ABSTRACT :

The influence of combine application of compost @ 5 tha-1 and or intrigated use of different nitrogen levels with seed inoculation of bio- fertilizers was resulted positive effect, under the topic intitled “Influenced of organic- inputs under integrated nutrient management on growth and yield attributes of Wheat (Triticum aestivum L.) of dryland condition in rewa district of Madhya Pradesh”during *rabi* seasons 2024 in the field of Dryland research station, college of Agriculture,Rewa,. The experiment was laid out in a randomized block design with 09 treatments comprising different combinations of inorganic fertilizers, organic manures and biofertilizers were replicated three times. The details of the treatments were The treatments consisted of T1= Control, T2= 100% NPK Fertilizer, T3= 100% NPK through vermicompost, T4= 50% NPK Fertilizer + 50% NPK vermicompost, T5= 50% NPK Fertilizer + 25% NPK vermicompost, T6= 25% NPK Fertilizer + 50% NPK vermicompost, T7= 50% NPK Fertilizer + 25% NPK vermicompost + *Azotobacter*, T8= 25% NPK Fertilizer + 50% NPK vermicompost + *Azotobacter*, T9= 50% NPK Fertilizer + 50% NPK vermicompost + *Azotobacter*.. The results revealed that the Plant height was significantly influenced by the different treatments. The tallest plants of wheat crop were observed under treatment T_9 (50% NPK Fertilizer + 50% NPK vermicompost + *Azotobacter*) at 30 DAS, 60 DAS,90 DAS and at harvest. Number of tillers was significantly influenced by the different treatments. The tallest plants of wheat crop were observed under treatmentT_3(100% NPK through vermicompost) at 30 DAS, 60 DAS,90 DAS and at harvest. Yield attributes (Ear head length, Harvest index and test weight) were significantly affected by the fertilizer application, along with vermicompost and bio-inoculants. The maximum values for ear head length and test weight were recorded under treatment T_9 i.e. 50% NPK Fertilizer + 50% NPK vermicompost

+ *Azotobacter* while, the minimum was recorded in control. Whereas, value of harvest index was found in T_1

It was concluded that the integrated resource management improved growth and yield attributes of the crop, thus the overall profit of the farmers.

KEYWORDS : Compost, biofertilizers, wheat, integrated nutrient management , Dryland, growth and yield attributes.

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INTRODUCTION:

Dryland farming has a long-standing history in India, with dedicated research and development efforts beginning even before independence. Between 1970 and 1987, the All India Coordinated Research Project for Dryland Agriculture (AICRPDA) conducted agronomic research focusing on essential crop production practices, moisture conservation techniques, suitable varieties, cropping systems, crop substitution, contingency planning, and alternate land use systems.In the period following 1987, while agronomic research continued in these key areas, there was a significant emphasis on ex situ rainwater management to improve water productivity. Other priorities included integrated nutrient management, crop diversification, alternate land use strategies, and integrated farming systems. Researchers also developed location-specific strategies to address climate variability, validated indigenous knowledge, and engaged in action research to demonstrate and refine dryland farming technologies.This overview highlights the agronomic research conducted in dryland farming and offers suggestions for future research directions in this field.

Wheat is second most important cereal crop after rice of India and grown under diverse agro-climatic conditions. India occupying an area of 30.32 million hectare with an annual production of 93.50 million tonnes with an average productivity of 3093 kg ha-1 (2015-16). It plays a vital role in the national food security and would continue to remain so because of its wider adaptability to grow under diverse ecosystem. Wheat contributes 37.07 % (93.50 million tonnes) of total food grain (252.22 million tonnes) and remains the principal

source of livelihood for more than 58% of the population. With the stabilization of area under wheat at around weather like rainfall, lack of irrigation, declining productivity trend.

The INM takes into consideration the nutrient cycle involving soils, crops and livestock, nutrient deficiencies, organic recycling, conjunctive use of organic manures and mineral fertilizers and biological nitrogen fixing potential (Kumar and Sreenivasulu, 2004).

Therefore, the present study was conducted to find out appropriate nutrient management module with the integration of inorganic fertilizers, vermicompost and biofertilizers for wheat productivity and sustainable soil health. Integrated nutrient management practices have come up as effective options for restoring the physical and chemical properties and fertility of soils (Nayak *et al.*, 2012). Hence with respect to the above facts the present investigation entitled "Influenced of organic- inputs under integrated nutrient management on growth and yield attributes of Wheat (Triticum aestivum L.) of dryland condition in rewa district of Madhya Pradesh" was undertaken.

MATERIALS AND METHODS:

The field experiment was conducted during *rabi* seasons 2024 in the field of Dryland research station, college of Agriculture,Rewa,. The experiment was laid out in a randomized block design with 09 treatments comprising different combinations of inorganic fertilizers, organic manures and biofertilizers were replicated three times. The soil was *Typic Haplustert*, clayey in texture, having pH 7.2, EC 0.14, organic carbon 6.5 g kg^{-1}, available N 220 kg ha^{-1}, available P 17.3 kg ha^{-1}, available K 255 kg ha^{-1}, available S 23.1 kg $ha^{-1}$and available Zn 0.46 mg kg^{-1}.The experiment was laid out in a randomized block design with 09 treatments comprising different combinations of inorganic fertilizers, organic manures and biofertilizers were replicated three times. The details of the treatments were The treatments consisted of T1= Control, T2= 100% NPK Fertilizer, T3= 100% NPK through vermicompost, T4= 50% NPK Fertilizer + 50% NPK vermicompost, T5= 50% NPK Fertilizer + 25% NPK vermicompost, T6= 25% NPK Fertilizer + 50% NPK vermicompost, T7= 50% NPK Fertilizer + 25% NPK vermicompost + *Azotobacter*, T8= 25% NPK Fertilizer + 50% NPK vermicompost + *Azotobacter*, T9= 50% NPK Fertilizer + 50% NPK vermicompost + *Azotobacter*.The data were analysed individually for each year as well as pooled for the years of experimentation as per the standard analysis of variance (ANOVA) technique using the

randomized complete block design (Gomez and Gomaz, 1984). The treatment comparisons were made using t test at P = 0.05 level of significance.

RESULTS AND DISCUSSION:

Plant height

At maturity, the plant height of wheat was significantly greater with the applied fertilizer treatments compared to the control (T_1), ranging from 22.6 to 35.6 cm at 30 days after sowing (DAS). The tallest plants were observed under treatment T_9 (50% NPK Fertilizer + 50% NPK vermicompost + *Azotobacter*), while the shortest were in the control (T_1) (see Table 1). There were no significant differences among the various fertilizer treatments. Overall, the average plant heights for treatments T_8, T_7, T_6, and T_5 were similar, measuring 96.8 cm, 94.5 cm, 94.3 cm, and 93.6 cm, respectively.Kumar *et. Al.*,(2018) also observed that the treatment combination of 5 t vermicompost ha^{-1} + RDF + *Rhizobium* + PSB exhibited the highest values for plant height (30.42 cm) as compared to other treatments in chickpea crop. Jain *et. Al.*,(2003)also reported comparable findings.

Table 1: Effect of INM on plant height at different growth stages of Wheat

Treatments	Plant height (cm)			
	30 DAS	60 DAS	90 DAS	At harvest
T_1 Control	22.6	59.8	61.8	62.8
T_2 100% NPK Fert.	25.9	75.3	86.9	90.8
T_3 100% NPK through vermi.	31.0	81.9	92.1	98.4
$T_4$50% NPK Fert. + 50% NPK vermi.	30.8	80.5	91.4	97.5
T_5 50% NPK Fert. + 25% NPK vermi.	25.3	76.5	89.2	93.6
$T_6$25% NPK Fert. + 50% NPK vermi.	25.9	78.0	89.9	94.3
$T_7$50% NPK Fert. + 25% NPK vermi. + *Azt*	24.9	77.7	89.6	94.5
$T_8$25% NPK Fert. + 50% NPK vermi. + *Azt*	26.8	79.0	90.0	96.8
$T_9$50% NPK Fert. + 50% NPK vermi. + *Azt*	35.6	85.3	94.7	100.1
SEm ±	**0.954**	**1.726**	**1.444**	**1.279**
CD (P=0.05)	**2.861**	**5.175**	**4.330**	**3.833**

Numbers of tillers

Table 2 presents data on the average number of tillers per square meter at 30, 60, 90 days after sowing (DAS), and at harvest for wheat under various integrated nutrient management practices. The results indicate that the lowest number of tillers per m² was recorded in T_1. The highest number of tillers, 371.94 m^{-2}, was observed in T_3, where 100% NPK was applied through vermicompost. This was followed by 369.69 m^{-2} in T_9, which involved 50% NPK through fertilizer combined with 50% NPK through vermicompost and *Azotobacter*. These treatments produced the greatest number of tillers per m^{-2} at 20, 40, and 60 DAS.The effect of integration of N, P and K levels (50%,75% and 100% recommended fertilizer and two levels of nitrogen (30 and 60 kg ha^{-1}) through two organic sources with (FYM and dhaincha) and resulted that an application of 100% recommended dose of fertilizer (120, 26.2,49.8 kg NPK ha^{-1}) increased plant height by 10.3% and also enhanced dry matter accumulation (16.4%), effective tillers m² (12.9%), test weight (8.5%) and straw yield (28%) over the 50% recommended fertilizer dose (Srivastava *et. al.*,2013).

Table 2: Effect of INM on Number of tillers at different growth stages of Wheat

Treatments	**No. of tillers(m^{-2})**			
	30 DAS	**60 DAS**	**90 DAS**	**At harvest**
T_1 Control	186.7	224.9	215.1	217.6
T_2 100% NPK Fert.	209.4	279.7	286.2	288.7
T_3 100% NPK through vermi.	229.4	352.9	369.4	371.9
$T_4$50% NPK Fert. + 50% NPK vermi.	221.2	322.6	329.3	331.8
T_5 50% NPK Fert. + 25% NPK vermi.	215.0	276.6	288.0	290.5
$T_6$25% NPK Fert. + 50% NPK vermi.	216.9	277.9	288.5	291.0
$T_7$50% NPK Fert. + 25% NPK vermi. + *Azt*	217.6	280.6	292.7	295.2
$T_8$25% NPK Fert. + 50% NPK vermi. + *Azt*	218.4	285.6	295.2	297.7
$T_9$50% NPK Fert. + 50% NPK vermi. + *Azt*	231.4	354.0	367.1	369.6
SEm ±	**2.715**	**2.772**	**3.915**	**3.915**
CD (P=0.05)	**8.141**	**8.312**	**11.738**	**11.738**

Ear head length

The data on ear length are given in Table 3. These parameters were significantly influenced with applied fertilizer treatments over control. The highest ear length was recorded under treatment T_9 i.e. 50% NPK Fertilizer + 50% NPK vermicompost + *Azotobacter* followed by T_4 (50% NPK Fertilizer + 50% NPK vermicompost), T_3(100% NPK through vermicompost) treatments and lowest with T_1(control) treatment.Singh *et. al.*,(2008) observed a significant improvement in yield attribute characters i.e. number of pods plant^{-1} (29.8), 1000 grain weight (29.2 g) and number of grains pod^{-1} due to application of 5 t FYM ha^{-1} in black gram. Similar results were found by Kalegore *et. al.*,(2018).

Table 3: Effect of INM on Ear head length, harvest index and test weight of Wheat.

Treatments	Ear head length(cm)	Harvest index (%)	Test weight (g)
T_1 Control	5.23	44.97	35.83
T_2 100% NPK Fert.	6.42	42.58	41.67
T_3 100% NPK through vermi.	7.84	42.54	47.07
$T_4$50% NPK Fert. + 50% NPK vermi.	7.97	42.77	47.33
T_5 50% NPK Fert. + 25% NPK vermi.	6.18	42.57	42.50
$T_6$25% NPK Fert. + 50% NPK vermi.	6.43	42.94	44.50
$T_7$50% NPK Fert. + 25% NPK vermi. + *Azt*	6.27	42.94	44.97
$T_8$25% NPK Fert. + 50% NPK vermi. + *Azt*	6.81	42.96	46.40
$T_9$50% NPK Fert. + 50% NPK vermi. + *Azt*	8.27	43.59	49.53
SEm ±	**0.343**	**1.745**	**0.672**
CD (P=0.05)	**1.030**	**5.231**	**2.014**

Harvest index

The harvest index (%) of wheat form percentage of grain yield to biological yield and is given in Table 4.6. It is evident from that harvest index 44.97% was maximum in T_1. lower harvest index 42.54% was observed in T_3 (100% NPK through vermicompost). Similarly, Arif *et. Al.*,(2014) evaluated the integrated use of organic sources as FYM, poultry manure,

rice straw, sesbania, compost and mung bean residues alone and inorganic manures and in combinations with 50% of recommended dose of fertilizer and observed the maximum number of fertile tillers per plant (16.79), number of panicles per hill (8.41), 1000-grain weight (21.12g), biological yield (10.19 t ha^{-1}), grain yield (4.47 t ha^{-1}) and harvest index (43.76%) were recorded from receiving poultry manure @ 10 t ha^{-1} in combination with 50% of RDF followed by 100% RDF.

Test weight

The weight of 1000 grains of wheat are given in Table 4.6. Among the different treatments, significantly higher test weight was noted under the treatment T_9 (50% NPK Fertilizer + 50% NPK vermicompost + *Azotobacter*) followed by T_4 (50% NPK Fertilizer + 50% NPK vermicompost) over control treatment (T_1) i.e. N.P.K. whereas no significant variation was observed with respect to rest of treatments on weight of 1000 grains of wheat. Singh *et. al.*,(2008) were also observed a significant improvement in yield attribute characters i.e. number of pods $plant^{-1}$ (29.8), 1000 grain weight (29.2 g) and number of grains pod^{-1} due to application of 5 t FYM ha^{-1} in black gram.

CONCLUSION :

It may be concluded that substitution of 50% NPK in recommended chemical fertilizer dose through organic manures improved the growth and yield attributes significantly. This improvement was further improved by the inclusion of biofertilizers. Thus, integrated nutrient management practices was increased the productivity of wheat, improved the nutrient utilization by the crop, reduced the use of chemical fertilizers. Ultimately, it is more beneficial when the rate of nutrients application instigated manner.

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