EFFECTS OF SOLE AND COMBINED APPLICATIONS OF RABBIT DROPPINGS AND NPK FERTILIZER ON PERFORMANCE OF MILLET (Pennisetum thyphoides) VARIETIES IN OGBOMOSO, OYO STATE

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ABSTRACT

Millet (Pennisetum thyphoides L.) is a versatile arable crop known for its high nutritional and economic values in relation to crop/animal husbandry and human welfare, however, its production is majorly limited by soil fertility. Tropical farmers' efforts to reverse such undesirably conditions are majorly focused on incessant application of quick-action inorganic fertilizers like NPK, which had been shown to induce adverse effects on soils, crops, man and the environment. Hence, there is a necessity to direct research attention towards achieving a reduced chemical load on tropical soils, via complementary application of organic materials with chemical fertilizer. The study evaluated the performance of two indigenous millet varieties, under different inclusion levels of rabbit droppings and NPK fertilizer, at the Teaching and Research Farm, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria. It was a factorial experiment with six (6) levels of fertilizer treatment combinations: T0 (the control, which received no fertilizer application), T1 (100% NPK recommended rate at 300kg/ha + 0% Rabbit droppings), T2 (0% NPK+ 100% Rabbit droppings at 4tons/ha), T3 (75% NPK + 25% Rabbit droppings), T4 (50% NPK + 50% Rabbit droppings) and T5 (25% NPK+75% Rabbit droppings) and two (2) levels of Crop variety (V1 = Ogbomoso local and V2 = Baccita local). Crop variety served as the main plots, while different fertilizer treatment combinations served as the sub-plots. Each plot size was = $4m^2$, at a spacing = $50cm \times 50cm$, the trial was laid out in a Randomized Complete Block Design (RCBD), replicated three (3) times. Data collection commenced at four weeks after sowing (4WAS). Data were collected on plant height, number of leaves, number of tillers, shoot fresh and dry weights, fresh and dry root weights and total seed yield. All data collected were subjected to analysis of variance. Means were separated using Duncan Multiple Range Test, at 5% level of probability. The results of the pre-cropping chemical and physical analyses of the soil sample revealed that the soil was slightly acidic (with pH value of 6.00) and texturally sandy loam. Also, the major soil nutrient concentrations were very low: N (0.08g/kg), P (3.86g/kg), and K (0.20cmol/kg). All the sole and combined proportions of NPK and Rabbit droppings significantly improved the growth and yield parameters of the two millet varieties tested. Also, rabbit droppings competed significantly (p=0.05) with NPK fertilizer irrespective of the variety concerned, compared to the control. V1 that received 25% NPK + 75% Rabbit droppings has significantly higher yield value of 8.0 tons/ha, compared with V2 that received 25% NPK + 75% Rabbit droppings with the value of 6.0 tons/ha In conclusion, rabbit droppings could be regarded as a useful organic fertilizer material, for improving millet production under tropical soil conditions. The combined application of 25% NPK + 75% Rabbit droppings significantly improved the performance of the two millet varieties, and it is therefore recommended for optimum performance of the two millet varieties in the study area. In addition, sole application of Rabbit droppings at 100% recommendation level (4 tons/ha) is also recommended for pure organic millet production in the study area.

Keywords: Millet varieties, Rabbit droppings, NPK fertilizer, Sole and combined fertilizer applications

INTRODUCTION

illet (Pennisetum thyphoides L.) is a cereals in the world i.e., after rice, wheat, maize, multipurpose cereal, which is ranked barley and sorghum (Anonymous, 2010). It is a sixth amongst the most important hardy cereal, commonly grown in the arid and

semi-arid tropical regions of Asia and Africa. It is MATERIALS AND METHODS primarily cultivated under rain-fed conditions, Experimental site whereas, soil fertility is a major constraint to its The field experiment was conducted during the production is in West Africa, where it is of major importance (FAO, 2014).

fertilizers mostly in order to quickly reverse the undesirable soil fertility conditions which Sources of Materials toxins, as well as to improve soil structure, analysis (IITA, 2004). enhance the availability of groundwater and Experimental Treatments and Design enhance the absorption of nutrients from the The experiment was a factorial combination of added chemical fertilizers (Babajide et al., 2012). six (6) levels of fertilizer treatments and two animal residues having relatively high fertilizer treatment combinations introduced concentrations of essential nutrients is the rabbit were: T0 (the control, which received no droppings or rabbit manure which is considered fertilizer application), T1 (100% NPK suitable for use as solid growing media because recommended rate at 300kg/ha + 0% Rabbit of its relatively low moisture content, low heavy droppings), T2 (0% NPK+ 100% Rabbit metal toxins, high ligno-cellulose, which equally droppings at 4tons/ha), T3 (75% NPK + 25% promotes better porosity (Lu et al., 2009). Rabbit droppings), T4 (50% NPK + 50% Rabbit Therefore, this research was designed to evaluate droppings) and T5 (25% NPK+ 75% Rabbit the performance of two (2) indigenous millet droppings). The two (2) levels of Crop variety varieties under different inclusion levels of rabbit introduced were: (V1 = Ogbomoso local and V2 droppings and NPK fertilizer in Ogbomoso, Oyo = Baccita local). Crop variety was regarded as the State, Nigeria.

sustainable production, which is also majorly rainy season of 2024, at the Teaching and aggravated by the harshly environmental Research experimental plot, behind Bee-Hall, conditions, particularly the drought and drought- Ladoke Akintola University of Technology, induced heat stress (Nelson et al., 2009). It is a Ogbomoso, Oyo State. Ogbomoso falls on good source of income for approximately 120 latitude 80 10'N and longitude 40 10'E. This also million people in semi-arid areas of West and falls under the Southern guinea savanna eco-Central Africa (Li et al., 2010). It is commonly region of the South-western Nigeria. It has a and widely cultivated in Africa and India, with bimodal rainfall distribution pattern i.e. having 24.2 million ha as the estimated area of global the early rainy season which usually starts yearly production. Approximately 45% of the world's from late March and ends in late July or early August. It is normally followed by a short dry spell in the month of August. Finally, the late rainy season starts from August to November However, local farmers applied chemical every year (Babajide et al., 2008).

consequentially worsened the soil conditions by The materials used were; seed of Indigenous manifestations of more unpleasant soil millet varieties of Ogbomoso and Baccita locals, conditions like poor vegetative cover, reduced obtained from KAL Farmers' shopping centre soil organic matter content, accelerated wind and Baccita local market respectively. Rabbit water erosion, increased soil acidity, low Cation manure (obtained from the Rabbitry unit of Exchange Capacity, poorer soil texture, structure LAUTECH'S Teaching and Research Farms, and colour etc. Hence, researching into organic Ogbomoso), N.P.K 15:15:15 fertilizer, watering means of boosting soil fertility may be beneficial can, cutlass, knapsack sprayer, wheel barrow, in the aspects of enhancement of soil fertility with hoe and insecticide (cypermethrin) obtained little or no chemical inputs. Combined from SOLOKAD ventures, Ogunpa, applications of both organic and inorganic I b a d a n, N i g e r i a. fertilizers, can also ensure maximization of soil Land clearing and preparation. The land was resources,improved soil physical and chemical manually cleared and prepared, using local conditions. Naturally, the properly decomposed farmers' conventional method, using cutlass and plant and animal residues are potential fertilizer hoe sampling and analysis Pre planting materials which have the ability to considerably collection of soil sample was carried out using neutralize both the soil pH and heavy metal auger at a depth of 0-30cm, for laboratory routine

Amongst the underutilized but readily available levels of crop variety. The six (6) levels of main plots, while different fertilizer treatment

Block Design (RCBD), replicated three (3) T0 (Control) had the least mean value of 97.1cm times.

Data collection and Analysis

sowing (4WAS). Data were collected on plant 248.2cm and 224.5cm respectively and the value subjected to analysis of variance (ANOVA). Range Test (DMRT) at p<0.05.

THE RESULTS AND DISCUSSIONS

Pre-croppingphysical and chemical properties of different from all other treatment applied while s a m p l e t h e s o i l The pre-cropping chemical and physical analysis and 126.3cm. (Table 4.2). of the soil sample showed that the soil pH was 6.00, which is slightly acidic and the sample is 4.2.2 Number of Tillers also low in major essential nutrient particularly Application of sole and combined of rabbit which indicated that the soil samples in the study will require regular fertilizer application, to improve its fertility, for improving arable crop production.

of rabbit droppings and NPK fertilizer on growth parameters of Millet (Pennisetum typhoides) varieties at different weeks after sowing.

4.2.1 Plant height

droppings and NPK fertilizer increase the plant height. At 4 week after sowing, variety 2 (Baccita local) and variety 1 (Ogbomoso local) (25% NPK+ 75% Rabbit droppings) had the least mean value of 11.5 and 11.0. (Table 4.3). highest mean value of 154.0cm and 148.5cm 4.2.3 Number of Leaves

combinations were used as the sub-plots. The respectively and the value was not significantly trial was laid out in a Randomized Complete different from all other treatment applied while and 94.8cm. At 8 week after sowing, variety 2 (Baccita local) and variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit Data collection commenced at four weeks after droppings) had the highest mean value of height, number of leaves, number of tillers, shoot was not significantly different from all other fresh and dry weights, fresh and dry root weights treatment applied while T0 (Control) had the and total seed yield. All data collected were least mean value of 119.4cm and 117.8cm. At 10 week after sowing, variety 2 (Baccita local) and Means were separated using Duncan Multiple variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the highest mean value of 276.2cm and 262.5cm respectively and the value was not significantly u s e d T0 (Control) had the least mean value of 129.0cm

N (0.08gkg-1), P (3.86mgkg-1) and K droppings and NPK fertilizer increase the (0.20cmolkg-1) (Table 4.1). Also, the soil was numbers of tillers. At 4 week after sowing, texturally sandy loamy. The result corresponds variety 1 (Ogbomoso local) that received T1 with the earlier findings of (Babajide et al., 2012) (100% NPK) had the highest mean value of 8.0 and the value was not significantly different from area are grossly low in essential nutrients, which all other treatment applied while T0 (Control) had the least mean value irrespective of the varieties and treatments. At 6 week after sowing, variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the Effects of sole and combined applications highest mean value with 14.6 and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value irrespective of the varieties and treatments. At 8 week after sowing, variety 2 (Baccita local) and variety 1 (Ogbomoso local) Application of sole and combined of rabbit that received T5 (25% NPK+ 75% Rabbit droppings) had the highest mean value of 23.6 and 23.5cm respectively and the value was not significantly different from all other treatment that received T5 (25% NPK+ 75% Rabbit applied while T0 (Control) had the least mean droppings) had the highest mean value of value of 9.0 and 10.2. At 10 week after sowing, 115.5cm and 108.6cm respectively and the value variety 2 (Baccita local) and variety 1 was not significantly different from all other (Ogbomoso local) that received T5 (25% NPK+ treatment applied while T0 (Control) had the 75% Rabbit droppings) had the highest mean least mean value of 66.8cm and 64.5cm. At 6 value of 28.3 and 27.0 respectively and the value week after sowing, variety 2 (Baccita local) and was not significantly different from all other variety 1 (Ogbomoso local) that received T5 treatment applied while T0 (Control) had the

Application of sole and combined of rabbit significantly different droppings and NPK fertilizer increase the plant from all other treatment applied while T0 variety 2 (Baccita local) and variety 1 value of 80.0cm and 76.6 respectively and the value was not significantly different from all other treatment applied while T0 (Control) had sowing, variety 2 (Baccita local) and variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 60.2 and 56.0. At 10 week after sowing, variety 2 (Baccita local) and variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the highest mean value of 88.9 and 88.0 respectively and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 65.5 and 61.0. (Table 4.4).

Effects of sole and combined applications of rabbit droppings and NPK fertilizer on yield parameter of Millet (Pennisetum typhoides) varieties at different weeks after sowing.

droppings and NPK fertilizer had a significant influence on the yield parameter of millet. For shoot fresh weight, variety 2 (Baccita local) and highest mean value of 391.8gplant-1 and 380.5 significantly different from all other treatment 1. applied while T0 (Control) had the least mean value of 108.2 gplant-1 and 112.6 gplant-1. For *CONCLUSION AND RECOMMENDATION* shoot dry weight, variety 2 (Baccita local) and All treatment applied significantly enhanced the variety 1 (Ogbomoso local) that received T5

height. At 4 week after sowing, variety 2 (Control) had the least mean value of 49.3 gplant-(Baccita local) and variety 1 (Ogbomoso local) 1 and 45.9 gplant-1. For grain yield, variety 2 that received T5 (25% NPK+ 75% Rabbit (Baccita local) and variety 1 (Ogbomoso local) droppings) had the highest mean value of 71 .9 that received T5 (25% NPK+ 75% Rabbit and 69.4 respectively and the value was not droppings) had the highest mean value of significantly different from all other treatment 2.9tonsha-1 and 2.8tonsha-1 respectively and the applied while T0 (Control) had the least mean value was not significantly different from T2 (0% value of 42.0 and 37.5. At 6 week after sowing, NPK+ 100% Rabbit droppings) with the mean value of 2.9 tonsha-1 and 2.9tonsha-1 but (Ogbomoso local) that received T5 (25% NPK+ significantly different other treatment applied 75% Rabbit droppings) had the highest mean including T0 (Control) that had the least mean value of 0.3tonsha-1 and 0.4tonsha-1.

Table 4.5: Effect of sole and combined the least mean value of 47.2 and 46.4. At 8 week applications of rabbit droppings and NPK on nutrients uptakes of millet (Pennisetum typhoides) varieties

highest mean value of 88.6 and 87.0 respectively Application of sole and combined of rabbit droppings and NPK fertilizer increase and greatly had influence on the nutrients uptake of millet (Pennisetum typhoides). For N, variety 2 (Baccita local) and variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the highest mean value of 64.4gkg-1 and 66.8gkg-1 respectively and the value was not significantly different from all other treatments applied while T0 (Control) had the least mean value of 6.1gkg-1and 6.3gkg-1. For P, variety 2 (Baccita local) and variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the highest mean value of 32.9gkg-1 and 30.1gkg-1 respectively and the value was not significantly different from all other treatment applied while T0 (Control) Application of sole and combined of rabbit had the least mean value of 0.7gkg-1and 0.6gkg-1. For K, variety 2 (Baccita local) and variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the highest mean variety 1 (Ogbomoso local) that received T5 value of 35.1gkg-1 and 31.1gkg-1 respectively (25% NPK+ 75% Rabbit droppings) had the and the value was not significantly different from all other treatment applied while T0 (Control) gplant-1 respectively and the value was not had the least mean value of 0.8gkg-1 and 0.6gkg-

growth and yield parameters of Indigenous (25% NPK+ 75% Rabbit droppings) had the Millet irrespective of the varieties. Nutrient highest mean value of 198.3gplant-1 and uptake particularly N, P and K were also 190.8gplant-1 respectively and the value was not significantly enhanced through the application of *'Ashifat A. A; Babajide, P. Akintoye; Ojo O. P; Oyebisi K. R. Oyeleye, A. David and Iyiola Rasidat B.

T5 = (25% NPK+ 75% Rabbit droppings). T5 =
(25% NPK+ 75% Rabbit droppings)
significantly enhanced the harvested millet,
while T0 (Zero application of fertilizer) had the
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least mean values across all the parameters
measured. Since, $T5 = (25\% NPK + 75\% Rabbit$
droppings) significantly enhanced the growth
and yield parameters of Indigenous Millet
irrespective of the varieties and values obtained
were not significantly different to all other
treatments except T0 (Controls) that had the least
mean values. Therefore, $T5 = (25\% NPK + 75\%)$
Rabbit droppings) is recommended to improve
growth and yield of Indigenous millet
(Pennisetum Typhoides) and also boost the
physical and chemical properties of soil in the
study area.

Table 4.1: Physical and chemical analysis of the soil sample used

Soil Properties	Values
pH (H ₂ O)	6.00
Organic Carbon (gkg ⁻¹)	2.76
Total N (gkg-1)	0.08
Available P (mgkg ⁻¹)	3.86
Fe (mgkg-1)	10.60
Cu (mgkg-¹)	3.22
Zn (mgkg ⁻¹)	3.25
Exchangeable K (cmolkg ⁻¹)	0.20
Exchangeable Na (cmolkg ⁻¹)	0.18
Exchangeable Ca (cmolkg ⁻¹)	3.16
Exchangeable Mg (cmolkg ⁻¹)	2.66
Sand (gkg ⁻¹)	750.20
Silt (gkg ⁻¹)	149.12
Clay (gkg ⁻¹)	100.68
Textual Class	Sandy loam

Table 4.2: Effect of sole and combined applications of rabbit droppings and NPK on plant height(cm) of millet (Pennisetum typhoides) varieties at different weeks after sowing (WAS)

Treatments	WK 4	WK 6	WK 8	WK10			
V1T0	66.8b	94.8b	119.4c	126.3d			
V1T1	107.2a	143.5a	168.2b	192.1b			
V1T2	106.0a	140.6a	220.5a	264.1a			
V1T3	104.5a	135.9a	179.2b	193.0c			
V1T4	104.2a	130.8a	188.8b	196.4bc			
V1T5	108.6a	148.5a	224.5a	262.5a			
V2T0	64.5b	97.1b	117.8c	129.0d			
V2T1	114.6a	146.0a	179.8b	195.2c			
V2T2	111.5a	141.6a	228.2a	295.6a			
V2T3	106.2a	140.4a	178.5b	196.2b			
V2T4	102.3a	143.8a	180.6b	201.1b			
V2T5	115.5a	154.0a	248.2a	276.2a			
Means followed by the same letter are not significantly different ($p \le 0.05$), using analysis of variance (Anova), To = (Zero application of fertility, T1 = $(100^8$ A NPK + 98 ° Rabbit droppings) @3040s, T1 = $(0^8$ A NPK + 100^8 s. Rabbit droppings) @4tons/ha, T3 = $(75^8$ NPK + 25^8 ° Rabbit droppings) (34tons/ha, T3 = $(75^8$ NPK + 25^8 ° Rabbit droppings), T4 = $(50^8$ NPK + 50^8 ° Rabbit droppings), T5 = $(25^8$ °							

Table 4.3: Effect of sole and combined applications of rabbit droppings and NPK on number of tillers of millet (Pennisetum typhoides) varieties at different weeks after sowing (WAS)

Treatment	WK 4	WK 6	WK 8	WK 10
V1T0	4.0b	7.2b	9.0c	11.0c
V1T1	8.0a	12.0a	19.0b	20.3b
V1T2	6.0a	14.0a	22.5a	26.0a
V1T3	6.0a	12.0a	15.1ab	17.0b
V1T4	6.4a	12.2a	16.2ab	18.5b
V1T5	7.4a	14.6a	23.5a	27.0a
V2T0	3.5b	6.4b	10.2c	11.5c
V2T1	7.0a	13.7a	18.0ab	20.0b
V2T2	6.0a	14.0a	22.0a	27.6a
V2T3	6.0a	11.2a	15.0ab	16.0bc
V2T4	7.0a	11.8a	15.0ab	19.5b
V2T5	7.0a	14.0a	23.6a	28.3a

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Means followed by the same letter are not significantly different (p \leq 0.05), using analysis of variance (Anova), T0 = (Zero application of fertilizer), T1 = (100% NPK +0% Rabbit droppings) @300kg/ha, T2 = (0% NPK+ 100% Rabbit droppings) @4tons/ha, T3 = (75% NPK + 25% Rabbit droppings), T4 = (50% NPK + 50% Rabbit)droppings), T5 = (25% NPK + 75% Rabbit)droppings)

Table 4.4: Effect of sole and combined applications of rabbit droppings and NPK on number of leaves of millet (Pennisetum typhoides) varieties at different weeks after sowing (WAS)

Treatment	WK 6	WK 8	WK 10	WK 1
V1T0	42.0b	47.2b	56.0c	61.0c
V1T1	68.0a	72.1a	87.0a	88.0b
V1T2	56.0ab	74.0a	82.5a	86.0a
V1T3	52.0ab	65.9ab	75.1ab	80.0a
V1T4	51.4ab	68.2ab	75.2ab	82.5a
V1T5	69.4a	76.6a	78.5a	88.1a
V2T0	37.5b	46.4b	60.2c	65.5c
V2T1	69.4a	75.7a	83.0a	88.0a
V2T2	61.2a	71.0a	82.0a	87.6a
V2T3	62.0a	74.2a	85.1a	86.0a
V2T4	67.0a	74.8a	85.0a	83.5b
V2T5	71.9a	80.0a	88.6a	88.9a

Means followed by the same letter are not significantly different ($p \le 0.05$), using analysis of variance (Anova), T0 = (Zero application of fertilizer), T1 = (100% NPK)+0% Rabbit droppings) @300kg/ha, T2 = (0% NPK+ 100% Rabbit droppings) @4tons/ha, T3 = (75% NPK + 25% Rabbit droppings), T4 = (50% NPK + 50% Rabbit droppings), T5 = (25% NPK+ 75% Rabbit droppings)

Table 4.5: Effect of sole and combined applications of rabbit droppings and NPK on yield parameters of millet (Pennisetum typhoides) varieties at different weeks after sowing (WAS)

Treatment	Shoot Fresh Weig		
	(gplant-)	(gplant-)	Yield (tonsha-)
V1T0	108.2c	45.9c	0.3d
V1T1	377.6a	182.1ab	2.0b

V1T2	365.8a	175.2b	2.9a
V1T3	316.4b	153.9c	1.7bc
V1T4	319.8b	158.0c	1.9b
V1T5	380.5a	190.8a	2.8a
V2T0	112.6c	49.3c	0.4d
V2T1	367.5a	166.6b	2.1b
V2T2	383.0a	176.8ab	2.9a
V2T3	325.2b	157.9c	2.0b
V2T4	324.7b	156.4c	2.0b
V2T5	391.8a	198.3a	2.9a

Means followed by the same letter are not significantly different (p \leq 0.05), using analysis of variance (Anova), T0 = (Zero application of fertilizer), T1 = (100% NPK + 0% Rabbit droppings) @300kg/ha, T2 = (0% NPK + 100% Rabbit droppings) @4tons/ha,T3 = (75% NPK + 25% Rabbit droppings), T4 = (50% NPK + 50% NPK)Rabbit droppings), T5 = (25% NPK+75% Rabbit droppings)

Table 4.5: Effect of sole and combined applications of rabbit droppings and NPK on

uppucuuon nutrients typhoides)	uptakes		11 0		
	WEEK	S AFTER	SOWING (WA	S)	
← — ^{gk}	xg ⁻¹ mgkg ⁻¹ ←				→

	←	kg" mgk	<u>g``</u>	•			-			→
Treatment	N	Р	K	Ca	Mg	Na	Fe	Cu	Mn	Zn
6.3 V1T0		0.6b	0.6d	0.5e	0.8d	1.0a	37.7d	2.7c	66.4a	54.6a
V1T1	64.3a	25.4a	17.4c	12.3d	1.3c	0.9a	68.3c	6.8a	66.0a	52.7a
V1T2	46.9b	26.9a	17.5c	16.9c	2.9b	0.4b	103.2b	6.7a	43.6b	25.5b
V1T3	61.4a	28.4a	23.5b 1	18.3bc 2.8	8b	0.4b	130.8a	6.3a	33.3c	26.6b
V1T4	66.4a	26.9a	28.9a	22.6a	3.5a	0.4b	140.5a	5.7b	23.9d	23.9b
V1T5	64.4a	30.1a	31.1a	19.4b	2.7b	0.4b	140.0a	5.5b	23.6d	21.2b
V2T0	6.1c	0.7b	0.8d	0.6e	0.8d	1.2a	37.2d	2.6c	61.9a	53.5a
V2T1	65.5b	27.9a	18.9c	10.8d	1.2c	1.0a	68.9c	7.6a	63.7b	50.8a
V2T2	48.0a	30.1a	18.1c	17.0c	2.9b	0.5b	106.1b	6.8a	44.4b	24.7b
V2T3	60.7a	28.1a	25.8b 1	19.9bc 2.7	7b	0.4b	136.2a	5.9a	35.9c	27.9b
V2T4	67.9a	32.0a	30.7a	25.5a	3.7a	0.5b	140.9a	5.9b	24.7d	22.8b
V2T5	66.8a	32.9a	35.1a	26.4b	2.7b	0.5b	147.0a	6.2b	25.8d	25.4b

Means followed by the same letter are not significantly different (p \leq 0.05), using analysis of variance (Anova), T0 = (Zero application of fertilizer), T1 = (100% NPK + 0% Rabbit droppings) @300kg/ha, T2 = (0% NPK + 100% Rabbit droppings) @41ons/ha. T3 = (75% NPK + 25% Rabbit droppings), T4 = (50% NPK + 50% Rabbit droppings), T5 = (25% NPK + 75% Rabbit droppings)

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