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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 × 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

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

semi-arid tropical regions of Asia and Africa. It is primarily cultivated under rain-fed conditions, whereas, soil fertility is a major constraint to its sustainable production, which is also majorly aggravated by the harshly environmental conditions, particularly the drought and drought-induced heat stress (Nelson et al., 2009). It is a good source of income for approximately 120 million people in semi-arid areas of West and Central Africa (Li et al., 2010). It is commonly and widely cultivated in Africa and India, with 24.2 million ha as the estimated area of global production. Approximately 45% ofthe world's production is in West Africa, where it is of major importance (FAO, 2014).

However, local farmers applied chemical fertilizers mostly in order to quickly reverse the undesirable soil fertility conditions which consequentially worsened the soil conditions by manifestations of more unpleasant soil conditions like poor vegetative cover, reduced soil organic matter content, accelerated wind and water erosion, increased soil acidity, low Cation Exchange Capacity, poorer soil texture, structure and colour etc. Hence, researching into organic means of boosting soil fertility may be beneficial in the aspects of enhancement of soil fertility with little or no chemical inputs. Combined applications of both organic and inorganic fertilizers, can also ensure maximization of soil resources,improved soil physical and chemical conditions. Naturally, the properly decomposed plant and animal residues are potential fertilizer materials which have the ability to considerably neutralize both the soil pH and heavy metal toxins, as well as to improve soil structure, enhance the availability of groundwater and enhance the absorption of nutrients from the added chemical fertilizers (Babajide et al., 2012). Amongst the underutilized but readily available animal residues having relatively high concentrations of essential nutrients is the rabbit droppings or rabbit manure which is considered suitable for use as solid growing media because of its relatively low moisture content, low heavy metal toxins, high ligno-cellulose, which equally promotes better porosity (Lu et al., 2009). Therefore, this research was designed to evaluate the performance of two (2) indigenous millet varieties under different inclusion levels of rabbit droppings and NPK fertilizer in Ogbomoso, Oyo State, Nigeria.

MATERIALS AND METHODS

Experimental site

The field experiment was conducted during the rainy season of 2024, at the Teaching and Research experimental plot, behind Bee-Hall, Ladoke Akintola University of Technology, Ogbomoso, Oyo State. Ogbomoso falls on latitude 80 10' N and longitude 40 10' E. This also falls under the Southern guinea savanna eco-region of the South-western Nigeria. It has a bimodal rainfall distribution pattern i.e. having the early rainy season which usually starts yearly 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 every year (Babajide et al., 2008).

Sources of Materials

The materials used were; seed of Indigenous millet varieties of Ogbomoso and Baccita locals, obtained from KAL Farmers' shopping centre and Baccita local market respectively. Rabbit manure (obtained from the Rabbitry unit of LAUTECH'S Teaching and Research Farms, Ogbomoso), N.P.K 15:15:15 fertilizer, watering can, cutlass, knapsack sprayer, wheel barrow, hoe and insecticide (cypermethrin) obtained from SOLOKAD ventures, Ogunpa, Ibadan, Nigeria. Land clearing andpreparation. The land was manually cleared and prepared, using local farmers' conventional method, using cutlass and hoe sampling and analysis Pre planting collection of soil sample was carried out using auger at a depth of 0-30cm, for laboratory routine analysis (IITA, 2004).

Experimental Treatments and Design

The experiment was a factorial combination of six (6) levels of fertilizer treatments and two levels of crop variety. The six (6) levels of fertilizer treatment combinations introduced were: 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). The two (2) levels of Crop variety introduced were: (V1 = Ogbomoso local and V2 = Baccita local). Crop variety was regarded as the main plots, while different fertilizer treatment

combinations were used as the sub-plots. The trial was laid out in a Randomized Complete Block Design (RCBD), replicated three (3) times.

Data collection and Analysis

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 (ANOVA). Means were separated using Duncan Multiple Range Test (DMRT) at $p<0.05$.

THE RESULTS AND DISCUSSIONS

Pre-croppingphysical and chemicalproperties of the soil sample used

The pre-cropping chemical and physical analysis of the soil sample showed that the soil pH was 6.00, which is slightly acidic and the sample is also low in major essential nutrient particularly N (0.08gkg-1), P (3.86mgkg-1) and K (0.20cmolkg-1) (Table 4.1). Also, the soil was texturally sandy loamy. The result corresponds with the earlier findings of (Babajide et al., 2012) which indicated that the soil samples in the study area are grossly low in essential nutrients, which will require regular fertilizer application, to improve its fertility, for improving arable crop production.

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

4.2.1 Plant height

Application of sole and combined of rabbit droppings and NPK fertilizer increase the plant height. At 4 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 115.5cm and 108.6cm respectively and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 66.8cm and 64.5cm. At 6 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 154.0cm and 148.5cm respectively and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 97.1cm and 94.8cm. At 8 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 248.2cm and 224.5cm respectively and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 119.4cm and 117.8cm. 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 276.2cm and 262.5cm respectively and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 129.0cm and 126.3cm. (Table 4.2).

4.2.2 Number of Tillers

Application of sole and combined of rabbit droppings and NPK fertilizer increase the numbers of tillers. At 4 week after sowing, variety 1 (Ogbomoso local) that received T1 (100% NPK) had the highest mean value of 8.0 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 6 week after sowing, variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the 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) 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 applied while T0 (Control) had the least mean value of 9.0 and 10.2. 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 28.3 and 27.0 respectively and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 11.5 and 11.0. (Table 4.3).

4.2.3 Number of Leaves

Application of sole and combined of rabbit droppings and NPK fertilizer increase the plant height. At 4 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 71 .9 and 69.4 respectively and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 42.0 and 37.5. At 6 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 80.0cm and 76.6 respectively and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 47.2 and 46.4. At 8 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 88.6 and 87.0 respectively 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).

4.3 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.

Application of sole and combined of rabbit droppings and NPK fertilizer had a significant influence on the yield parameter of millet. For shoot fresh weight, variety 2 (Baccita local) and variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the highest mean value of 391.8gplant-1 and 380.5 gplant-1 respectively and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 108.2 gplant-1 and 112.6 gplant-1. For shoot dry weight, variety 2 (Baccita local) and variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the highest mean value of 198.3gplant-1 and 190.8gplant-1 respectively and the value was not significantly different
from all other treatment applied while T0 (Control) had the least mean value of 49.3gplant-1 and 45.9 gplant-1. For grain yield, variety 2 (Baccita local) and variety 1 (Ogbomoso local) that received T5 (25% NPK+ 75% Rabbit droppings) had the highest mean value of 2.9tonsha-1 and 2.8tonsha-1 respectively and the value was not significantly different from T2 (0% NPK+ 100% Rabbit droppings) with the mean value of 2.9 tonsha-1 and 2.9tonsha-1 but significantly different other treatment applied 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 applications of rabbit droppings and NPK on nutrients uptakes of millet (Pennisetum typhoides) varieties

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) 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 value of 35.1gkg-1 and 31.1gkg-1 respectively and the value was not significantly different from all other treatment applied while T0 (Control) had the least mean value of 0.8gkg-1 and 0.6gkg-1.

CONCLUSION AND RECOMMENDATION

All treatment applied significantly enhanced the growth and yield parameters of Indigenous Millet irrespective of the varieties. Nutrient uptake particularly N, P and K were also significantly enhanced through the application of

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 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_2O)	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 ($p \leq 0.05$), 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 4.3: 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

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 12
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 ($p \leq 0.05$), 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 4.5: 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 Weight (gplant^{-1})	Shoot Dry Weight (gplant^{-1})	Grain Yield (tonsha^{-1})
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% Rabbit droppings), T5 = (25% NPK+ 75% Rabbit droppings)

Table 4.5: Effect of sole and combined applications of rabbit droppings and NPK on nutrients uptakes of millet (Pennisetum typhoides) varieties

WEEKS AFTER SOWING (WAS)

	gkg^{-1}		mgkg^{-1}							
Treatment	N	P	K	Ca	Mg	Na	Fe	Cu	Mn	Zn
6.3V1T0		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	18.3bc	2.8b	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	19.9bc	2.7b	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) @4tons/ha, T3 = (75% NPK + 25% Rabbit droppings), T4 = (50% NPK + 50% Rabbit droppings), T5 = (25% NPK+ 75% Rabbit droppings)

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