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Effects of Nitrogenoeus and Phosphatic Fertilizer on Yield, Nutrient Uptake and Nutritional Values of *Telfairia occidentalis* Hook f.

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ABSTRACT

An experiment was conducted at the Teaching and Research Farm, Ladoke Akintola University of Technology (LAUTECH), Ogbomoso to determine the effect of nitrogen and phosphorus fertilizers on yield, nutrient uptake and nutritional quality of *Telfairia occidentalis*. The treatments consist of four levels of nitrogen fertilizer (0, 40, 60, 80 kg N ha^{-1}) and four levels of phosphorus fertilizer (0, 30, 45, 60 kg P_2O_5 ha^{-1}) and their various combinations. These were laid out in a factorial experiment and fitted into a randomized complete block design with three replications. The growth parameters, yield attributes and nutritional quality of *Telfairia occidentalis* were assessed. The results showed that fertilizers application significantly influenced the number of leaves, vine length, fresh herbage and dry yields. These traits showed a significant increased to applied nitrogen and phosphorus rates with optimum values obtained at 60 kg N ha^{-1} and 45 kg P_2O_5 ha^{-1} when solely applied. Combined application of nitrogen and phosphorus fertilizers at the rate of 40 kg N ha^{-1} by 30 kg P_2O_5 ha^{-1} gave the highest yield and nutritional values of *Telfairia*. The combined application of nitrogen and phosphorus fertilizers significantly influenced the yield and nutritional values of *Telfairia occidentalis*. Therefore, the yield and nutritional qualities of *Telifiaria occidentalis* could be significantly improved by the sole application of 40 kg N ha^{-1} and 30 kg P_2O_5 ha^{-1} in Ogbomoso, South west Nigeria.

Key words: *Telfairia occidentalis*, nitrogen, phosphorus fertilizer, nutrition

INTRODUCTION

Fluted pumpkin (*Telfaira occidentalis* Hook f.) is a creeping vegetative shrub that spread low across the ground with large lobed leaves and a long twisting tendrils (Horsfall and Spiff, 2005). In Africa, indigenous vegetables remain popular in rural areas where they are often considered to be more nutritive than exotic vegetables (Horsfall and Spiff, 2005). It is one of the most important vegetable grown in Southern Nigeria; it is regarded as a seed and leaf vegetable with edible leaves and shoots. The leaf has a high nutritional, medicinal and industrial values being rich in protein (29), fat (18%) and minerals and vitamins (20%) (Akanbi *et al*., 2007). The nutritional value of pumpkin seeds is different from that of leaves, the protein contents of seeds is 20.5 g while that of leaves is 2.9 g, the fat and carbohydrate content of seeds and leaves are: 45.0 g and 1.8; 23.0 and

Table 1: Nutrition composition of *Telfairia occidentalis*

Nutrients	Seeds	Leaves
Water (mL)	6.0	86.0
Calories	543.0	47.0
Protein	20.5	2.9
Fat (g)	45.0	1.8
Carbohydrate (g)	23.0	7.0
Fibre (g)	2.2	1.7
Calcium (mg)	84.0	0.0
Phosphorus (mg)	572.0	0.0

Source: FAO (1988b) curled from vegetables in the tropics (1983)

7.0 g, respectively (FAO, 1988a). Seeds have high nutritive and calorific values which make it necessary in diets. The exception of domestic use of oil and fat as cooking oil, it is also a good source of oleochemicals (Morrison *et al.*, 1995). In Nigeria, farmers realize the need for soil amendments by using available resources such as crop wastes, farmyard manure and poultry waste (Adediran *et al.*, 2003). However, the quantity and quality required of these materials limit their use. In addition, farmers appreciate the use of mineral fertilizers but their ever increasing costs often prohibit their application at recommended rates (Akanbi, 2002). Application of fertilizer has been documented to enhance plant growth and development. Many research activities have reported an increase in the vegetative development of crops with fertilizer application. However, there are contrary views on the role of fertilizer on the quality of crop produced (Akanbi *et al.*, 2007). Despite the importance of *Telfairia occidentalis* in Nigeria diet, farmers are still facing a lot of problems concerning its production on the field. Yield and quality of the leaves and seeds realized by farmers are usually lower than what is being reported under experimental conditions (Fashina *et al.*, 2002). This is probably due to lack of appropriate fertilizers recommendation rates. The objective of this study is to determine the effect of nitrogen and phosphorus fertilizers on yield, nutrient uptake and nutritional values of *Telfairia occidentalis* (Table 1).

MATERIAL AND METHODS

Field experiment was carried out during the period of 2007 and 2008 cropping seasons at the Teaching and Research Farm, Ladoke Akintola University of Technology (LAUTECH), Ogbomoso, (8°10'N and 4°10'E) a location in the Guinea savannah zone of South-western Nigeria. Soil sample of the experimental site were collected with soil auger. The soil samples were air dried and sieved with wire mesh of 0.02 mm sieve. The particle size was determined by using the Bouyoucos (1962) hydrometer method. The treatment was laid out in a factorial experiment and fitted into a Randomized Complete Block Design (RCBD) with 3 replicates. The plot were divided into 3 blocks, each containing 16 beds to give a total of 48 beds. The treatments involved fluted pumpkin subjected into 4 nitrogen fertilizer levels (0, 40, 60 and 80 kg N ha^{-1}) applied in form of urea and 4 phosphorus fertilizer levels (0, 30, 45 and 60 kg P_2O_5 ha^{-1}) applied in form of single super phosphate and their various combinations 40 kg N×30 kg P_2O_5 ha^{-1}, 40 kg N×45 kg P_2O_5 ha^{-1}, 40 kg N×60 k g P_2O_5 ha^{-1}, 60 kg N×30 kg P_2O_5 ha^{-1}, 60 kg N×45 kg P_2O_5 ha^{-1}, 60 kg N×60 kg P_2O_5 ha^{-1}, 80 kg N×30 kg P_2O_5 ha^{-1}, 80 kg N×45 kg P_2O_5 ha^{-1}, 80 kg N×60 kg P_2O_5 ha^{-1}. Each bed size was 2.2 m×1.2 m with 0.5 m spacing between beds. The blocks were spaced 1.0 m apart to ease movement during cultural operations. The beds were irrigated before planting to improve soil moisture content, seed germination and seedling emergence (Oladiran, 1986).

Planting was done in early December 2007 and 2008, with fluted pumpkin seeds procured from the Agronomy Department, LAUTECH, Ogbomoso. Two seeds were sown at a spacing of 1.0×1.0 m and later thinned down to one seedling per stand at 4 Weeks After Sowing (WAS). The different fertilizer rates were applied to their respective plots according to the treatment combinations at six weeks after sowing, based on the results of the soil chemical analysis. The application was by band placement. Watering of seedlings was done every morning at 2 days interval during the drought periods to avoid wilting and to improve the growth and development. Staking was also erected to expose leaves to full solar radiation. Weeds were controlled thrice manually by hoeing at 4, 8 and 12 weeks after sowing. Other crop management included spraying with karate at 2 weeks interval after sowing against defoliating insect pests.

Data on growth parameters were collected from 6 plants selected from each plot. Data collected at the early bloom stage (10 WAS) include vine length, number of vines, number of leaves and plant fresh and dry shoot yield per hectare. Dry matter yield was determined by placing the harvested plant in brown envelops and dried in an oven at 65°C till constant weight was obtained. The dried plant and seed samples were separately ground with a Wiley mill and passed through a 0.5 mm sieve. Total N was determined by the macro-kjeldahl procedure as described by IITA (1982). The P and K contents of the plants were determined by wet digestion with a mixture of sulphuric and perchloric acids. Phosphorus concentration was determined by the vanadomolybdate yellow colorimetry method (Jackson, 1964). Digested samples were diluted and used to determine the concentration of K using an atomic absorption spectrophotometer. Concentrations of nutrient were expressed on the basis of percentage dry plant material. Since there was no significant difference between the data collected in 2007 and 2008, the average values of the two years were used. All data collected were subjected to analysis of variance (ANOVA) using the SAS-GLM procedure (SAS, 1989). The differences between treatment means were evaluated using the least significant different at 5% level of probability.

RESULTS

The effect of nitrogen and phosphorus fertilizers on the number of leaves of fluted pumpkin is presented in Table 2. The mean number of leaves increased as the plant aged.

The number of leaves was significantly influenced by the applied mineral N rates. The number of leaves was significantly influenced by the applied P fertilizer rates. The highest number of leaves was obtained at 60 kg P_2O_5 ha^{-1} but not significantly different from the value recorded at 45 kg P_2O_5 ha^{-1}. The combined application of N and P fertilizers significantly increased the number of leaves of *Telfairia occidentalis* more than sole application of P. Combination of 60 kg N ha^{-1} by 60 kg P_2O_5 ha^{-1} gave the highest number of leaves while the least number of leaves was recorded from the control. The length of the vine increases with sampling periods (Table 3) the vine length increased as the sole application of mineral N rates increases with the highest value obtained at 60 kg N ha^{-1}, then decreased when 80 kg N ha^{-1} was applied. The vine length was significantly influenced the applied mineral N rates. The vine length was significantly influenced by applied P fertilizer rates. The longest vine length was obtained at 60 kg P_2O_5 ha^{-1} while the least value was obtained at 30 kg P_2O_5 ha^{-1}. The combined application of N and P fertilizers significantly increased the vine length of *Telfairia occidentalis* more than sole application of P. Combination of 60 kg N ha^{-1} by 45 kg P_2O_5 ha^{-1} gave the longest vine length while the least vine length was recorded from the control. It has a very long stem of 3.4 m average length for both male and female after 100 days of planting (Ibe and Ezedinma, 1979). The minimal leaf number of *Telfairia occidentalis* has not been determined. There is no evidence that No. of leaves alone determines flower initiation in other plant (Bernier *et al.*, 1981).

Table 2: Effect of N and P fertilizers on the No. of leaves of fluted pumpkin at different growth stages

	Weeks		
Treatments (kg ha^{-1})	2	4	6
0 N	18.75	23.50	39.33
40 N	22.17	38.67	63.75
60 N	23.08	41.92	65.58
80 N	20.08	30.67	49.33
30 P_2O_5	20.83	42.17	65.33
45 P_2O_5	21.00	43.83	69.83
60 P_2O_5	24.75	49.50	74.33
40 N×30 P_2O_5	22.50	35.58	52.25
40 N×45 P_2O_5	23.67	45.17	68.42
40 N×60 P_2O_5	25.67	46.67	72.17
60 N×30 P_2O_5	24.83	46.67	72.58
60 N×45 P_2O_5	26.92	48.58	75.25
60 N×60 P_2O_5	22.67	48.43	79.75
80 N×30 P_2O_5	20.64	34.17	54.42
80 N×45 P_2O_5	20.33	44.25	69.92
80 N×60 P_2O_5	24.17	46.75	76.50
$LSD_{0.05}$			
N	0.22	0.19	0.23
P_2O_5	0.22	0.19	0.23
N×P_2O_5	0.045	0.03	0.05

Table 3: Effect of N and P fertilizers on vine length of fluted pumpkin at different growth stages

	Weeks		
Treatments (kg ha^{-1})	2	4	6
0 N	25.04	35.00	53.74
40 N	25.77	39.16	58.78
60 N	27.49	48.28	68.09
80 N	25.84	42.49	59.47
30 P_2O_5	25.61	45.70	62.37
45 P_2O_5	27.44	46.50	68.02
60 P_2O_5	26.99	54.49	74.97
40 N×30 P_2O_5	25.06	40.16	67.66
40 N×45 P_2O_5	26.74	49.24	68.78
40 N×60 P_2O_5	29.55	50.44	71.78
60 N×30 P_2O_5	25.16	53.92	61.81
60 N×45 P_2O_5	27.49	55.10	78.69
60 N×60 P_2O_5	30.08	50.93	67.93
80 N×30 P_2O_5	26.94	46.22	60.36
80 N×45 P_2O_5	25.60	50.84	68.92
80 N×60 P_2O_5	26.26	51.74	71.71
$LSD_{0.05}$			
N	0.18	0.28	0.26
P_2O_5	0.18	0.28	0.30
N×P_2O_5	0.03	0.08	0.07

The fresh shoot yields and dry shoot yields of *Telfairia occidentalis* is presented in Table 4. The mean fresh and dried matter yields increased as the applied mineral N rates increases, with

Table 4: Fresh and dry yield of *Telfairia occidentalis* as affected by N and P fertilizers

Treatments (kg ha^{-1})	Fresh shoot yield	Dry matter yield
0 N	96.67	19.25
40 N	213.33	50.89
60 N	463.33	80.90
80 N	313.33	69.75
30 P_2O_5	386.67	70.61
45 P_2O_5	520.00	82.48
60 P_2O_5	333.33	65.67
40 N×30 P_2O_5	363.33	70.12
40 N×45 P_2O_5	376.67	71.84
40 N×60 P_2O_5	383.33	72.44
60 N×30 P_2O_5	316.67	63.52
60 N×45 P_2O_5	660.00	98.95
60 N×60 P_2O_5	393.33	80.48
80 N×30 P_2O_5	366.67	71.97
80 N×45 P_2O_5	420.00	84.06
80 N×60 P_2O_5	500.00	87.87
$LSD_{0.05}$		
N	24.22	0.16
P_2O_5	24.22	0.16
N×P_2O_5	586.61	0.02

Table 5: Effect of N and P fertilizers on nutritional values of *Telfairia occidentalis* leaves

Treatments (kg ha^{-1})	N (%)	P (%)	Ca (%)	Mg (%)	K (%)	Fe (mg kg^{-1})	C.P
0 N	2.26	0.72	0.37	0.35	0.51	22.50	14.13
40 N	2.51	0.84	0.53	0.39	0.65	21.90	15.68
60 N	2.53	0.88	0.55	0.41	0.68	22.70	15.81
80 N	2.57	0.81	0.61	0.35	0.71	22.90	16.06
30 P_2O_5	4.47	1.32	0.78	0.62	0.45	62.38	27.94
45 P_2O_5	3.58	1.21	0.68	0.57	0.38	41.47	22.38
60 P_2O_5	3.26	0.38	0.86	0.65	0.48	51.69	20.38
40 N×30 P_2O_5	4.39	0.38	0.67	0.58	0.38	43.49	27.44
40 N×45 P_2O_5	2.19	0.46	0.71	0.60	0.40	53.28	13.68
40 N×60 P_2O_5	3.38	0.36	0.82	0.59	0.38	51.35	21.13
60 N×30 P_2O_5	3.26	0.40	0.63	0.48	0.35	46.01	20.33
60 N×45 P_2O_5	3.14	0.32	0.68	0.58	0.40	58.49	19.63
60 N×60 P_2O_5	3.67	0.41	0.72	0.57	0.37	48.36	22.94
80 N×30 P_2O_5	3.21	0.38	0.62	0.49	0.34	40.41	20.06
80 N×45 P_2O_5	3.44	0.40	0.85	0.60	0.39	48.39	21.50
80 N×60 P_2O_5	3.02	0.36	0.91	0.70	0.49	66.28	18.88
$LSD_{0.05}$	0.04	0.02	0.01	0.00	0.00	0.07	1.77

the highest value obtained at 60 kg N ha^{-1}, then there is a declined at 80 kg N ha^{-1}. The fresh and dried matter yields of *Telfairia occidentalis* were significantly influenced by the applied fertilizer N rates. When P fertilizer was applied, 45 kg P_2O_5 ha^{-1} gave the highest values for fresh and dried matter yields while 60 kg P_2O_5 ha^{-1} recorded the least values. The highest fresh and dried matter yields were obtained at combined application of 60 kg N ha^{-1} by 45 kg P_2O_5 ha^{-1} while the combined application of 60 kg N by 30 kg P_2O_5 ha^{-1} gave the least value. There is a significant effect of combined application of N and P on the fresh and dried matter yields of *Telfairia occidentalis*. Table 5 showed the nutritive values of *Telfairia occidentalis* leaves. It has

been observed from the Table that as the N rate applied increases, the value of nutrient also increases. Unlike P fertilizer as the P rate applied increase the nutrient element present in the leaves decreases, then in increased when 60 kg P_2O_5 ha^{-1} was applied. At %N column, the highest value was obtained at 60 kg N ha^{-1} but not significantly different form the values recorded at 40 kg N ha^{-1} and 60 kg N ha^{-1}. When P was applied, the highest value was obtained at 30 kg P_2O_5 ha^{-1} while the least was recorded from the control. At various combinations, the highest value was obtained at 40 kg N ha^{-1} by 30 kg P_2O_5 ha^{-1} while the least value was obtained at 40 kg N ha^{-1} by 45 kg P_2O_5 ha^{-1}. At %P and %Mg column, the nutritive value of *Telfairia occidentalis* leaves increased as the sole application of mineral N rates increases when 80 kg N ha^{-1} was applied. When mineral P rates was applied solely, the value obtained decreased as the level mineral P rates increases with the highest value obtained at 30 kg P_2O_5 ha^{-1} and 60 kg P_2O_5 ha^{-1} at %P and %Mg, respectively while the least value was obtained from the control. Combination of 40 kg N ha^{-1} by 45 kg P_2O_5 ha^{-1} gave the highest value at %P column while the least value were recorded from 40 kg N ha^{-1} by 60 kg P_2O_5 ha^{-1} and 80 kg N ha^{-1} by 60 kg P_2O_5 ha^{-1}. The nutritive values of *Telfairia occidentalis* leaves was significantly influenced by applied fertilizers level. At Ca and %K column, the nutritive values of *Telfairia occidentalis* level increased as the sole application of mineral N rates increases with the highest value of P at 80 kg N ha^{-1} from both column. When mineral P rates was applied, the value obtained decreased as the level of mineral P rates increases with the highest value obtained at 60 kg N ha^{-1} at both column, then increased when 60 kg P_2O_5 ha^{-1} was applied. Combine application of 80 kg N ha^{-1} by 60 kg P_2O_5 ha^{-1} gave the highest value while the least value was recorded when 80 kg N ha^{-1} was combined with 30 kg P_2O_5 ha^{-1} from both column but there is no significant different from the value obtained.

At crude protein column, the value obtained increased as the sole application of mineral N rates increases with the highest value obtained at 80 kg N ha^{-1} but not significantly different from the value recorded at 60 kg N ha^{-1} while the least value was recorded from the control. Unlike mineral P rates which decreased as the level of P rates applied increases with the highest value obtained at 30 kg P_2O_5 ha^{-1} while the least value was recorded from the control. The combined application of N and P fertilizers significantly increased the nutritive values of *Telfairia occidentalis* leaves. At various combinations, the highest value was obtained at 40 kg N ha^{-1} by 30 kg P_2O_5 ha^{-1} while the least value was recorded at 40 kg N ha^{-1} by 45 kg P_2O_5 ha^{-1}. Application of N and P fertilizers significantly influenced the crude protein presents in *Telfairia occidentalis* leaves. Table 6 showed the nutrient uptake of *Telfairia occidentalis*, the values obtained from all the column increased with increasing level of mineral N, then decreased when 80 kg N ha^{-1} was applied. The highest value was obtained when 60 kg N ha^{-1} was applied while the least value was recorded from the control. When P rates was applied, N uptake decreases as the applied P rates increases while Ca uptake increases at the applied mineral P rates increases. There is significant different among the values obtained from column N. the highest value was obtained from 30 kg P_2O_5 ha^{-1} while the least value was obtained at 60 kg P_2O_5 ha^{-1} at N column. At Ca column, the highest value was obtained from 60 kg P_2O_5 ha^{-1} but there is no significant difference from the value recorded at 30 kg P_2O_5 ha^{-1}. Combination of 40 kg N ha^{-1} by 30 kg P_2O_5 ha^{-1} gave the highest value at N column while combined application of 40 kg N ha^{-1} by 45 kg P_2O_5 ha^{-1} gave the least value. At Ca column, the highest value was obtained at 80 kg N ha^{-1} by 60 kg P_2O_5 ha^{-1} and the least value was gotten from 60 kg N ha^{-1} by 30 kg P_2O_5 ha^{-1}. At P and Mg column, the values increases as the mineral P rates increase with the highest value obtained from 45 gk P_2O_5 ha^{-1} then decreased when 60 kg P_2O_5 ha^{-1} was applied. The nutrient uptake was significantly influenced by the application of mineral P rates. Combine application of 80 kg N ha^{-1} by 40 kg P_2O_5 ha^{-1} gave the highest

Table 6: Effect of N and P fertilizers on nutrient uptake of fluted pumpkin

Treatments (kg ha^{-1})	N	P	K	Ca	Mg
0 N	43.50	13.86	9.81	7.12	6.73
40 N	127.73	42.74	33.07	26.97	19.84
60 N	204.67	71.19	55.01	44.49	33.16
80 N	179.25	56.49	49.52	42.58	32.27
30 P_2O_5	315.62	93.20	31.77	55.07	43.77
45 P_2O_5	295.27	99.80	31.34	56.08	47.01
60 P_2O_5	214.08	24.95	31.52	56.47	42.68
40 N×30 P_2O_5	318.01	27.52	27.52	48.53	42.01
40 N×45 P_2O_5	1547.32	33.04	28.73	51.00	43.10
40 N×60 P_2O_5	237.00	25.24	26.64	57.49	41.37
60 N×30 P_2O_5	207.07	25.40	22.23	40.01	30.4e8
60 N×45 P_2O_5	310.70	31.66	39.58	67.28	57.39
60 N×60 P_2O_5	259.25	32.96	29.76	60.32	47.46
80 N×30 P_2O_5	231.02	27.34	24.46	44.62	35.26
80 N×45 P_2O_5	289.16	33.62	32.78	71.45	50.43
80 N×60 P_2O_5	265.36	31.60	43.05	79.96	61.50
$LSD_{0.05}$	0.10	0.02	0.02	0.01	0.03

value while the least value was obtained from combination of 40 kg N ha^{-1} with 60 kg P_2O_5 ha^{-1} at P column. From Mg column, combination of 80 kg N ha^{-1} with 60 kg P_2O_5 ha^{-1} gave the highest value while the least value was gotten from 60 kg N ha^{-1} by 30 kg P_2O_5 ha^{-1} combination.

At K column the value obtained decreases as the applied P rates increases with the highest value obtained from 30 kg P_2O_5 ha^{-1} but not significantly difference from the value recorded at 45 kg P_2O_5 ha^{-1}. Combination of 80 kg N ha^{-1} by 60 kg P_2O_5 ha^{-1} gave the highest value while the least value was obtained from combined application of 60 kg N ha^{-1} with 30 kg P_2O_5 ha^{-1}. There is significant difference among the values gotten from the combinations of N and P fertilizers at K column.

DISCUSSION

The results showed that there is significant difference in the growth parameters by the application of N fertilizer and these confirmed the role of N as essential nutrient for proper vegetation of *Telfairia occidentalis* which must be applied before planting (Adelaja, 1978). Also, there was increase in the growth parameter as the N application rates increases in accordance with the findings of Okoro (2007) who reported a significant increase in the growth parameters of *Telfairia occidentalis* with applied N rates. Phosphorus fertilizer also significantly influence the growth of *Telfairia occidentalis*, this is because almost all vegetables require P for proper root development. Therefore, combination of N and P fertilizers increased both vegetative part of *Telfairia occidentalis* and allows the root to go down into the soil to tap more nutrients. Nitrogen and Phosphorus fertilizers can be applied solely to *Telfairia occidentalis* but the best yield can be gotten when 60 kg N ha^{-1} is combined with 60 kg P_2O_5 ha^{-1}. Considering the cost implication, 60 kg P_2O_5 ha^{-1} can be applied to minimize the cost of production. Most vegetable plants require some nutrient elements for proper germination and emergence, example of these elements are; N, P, K, Ca, Mg etc., The rates at which vegetables absorb N is much higher than other nutrient elements.*Telfairia occidentalis* leaves have various nutrients embedded in it which are: Ca, Mg, Fe, P, C.P etc. From Table 6, crude protein is the highest nutrient present in *Telfairia occidentalis*

leaves followed by Mg, K and Fe while there is no significant difference between the nutritional values obtained at P, Ca, Mg and %K column. The combined application of mineral N rates and P rates fertilizer significantly increased the parameters more than sole application of the 2 fertilizers. Leaf and shoot yields of 0.5-1 kg per plant may be obtained, up to 15 harvests of leaves and shoots may be obtained during a period of 120-160 days. About 30-70 seeds are produced per fruit and 2-5 fruits are produced per plant.

CONCLUSION AND RECOMMENDATION

Sole application of N and P was at the peak at 60 kg N ha^{-1} and 45 kg P ha^{-1} in *Telfairia occidentalis*, respectively. It has been observed that combined application of mineral N and P fertilizers gave better growth and yield performance on *Telfairia occidentalis*. The highest yield and growth parameters were obtained at 60 kg N ha^{-1} by 45 kg P ha^{-1}. This shows that combine application of 60 kg N ha^{-1} by 45 kg P ha^{-1} has significant effect on yield of *Telfairia occidentalis*.

In conclusion, 60 kg N ha^{-1} by 45 kg P ha^{-1} has more significant effect on the production of *Telfairia occidentalis*, this is because it produces highest yield when compared with sole application of N and P fertilizers. It is therefore recommend, the combination of nitrogen and phosphorus fertilizer at the rate of 60 kg N ha^{-1} by 45 kg P ha^{-1} because, it is highly effective when compared with sole application of fertilizer. Also, the cost implication is lower than that of 80 kg N ha^{-1} by 60 kg P ha^{-1} and it gives highest production rate of *Telfairia occidentalis*.

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