Stud Home Com Sci, 1(1): 27-29 (2007)
PRINT: ISSN 0973-7189 ONLINE: ISSN 2456-6780
DOI: 10.31901/24566780.2007/01.01.03

Comparative Marketable Leaf Yield of Staked and Unstaked Pumpkin *(Telfaria occidentalis)* in a Tropical Utisoils

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KEYWORDS Stakes; Orogodo; *Telfaria occidentalis;* urbanization

ABSTRACT Availability of stakes for staking tendering/climbing vines are diminishing at an alarming rate as a result of urbanization, road construction, industrialization and bush fire. Fluted pumpkin (*Talfaria Occidentalis*) is one of the crops that are staked. This study examined the relative marketable leaf yield of fluted pumpkin on staked and unstaked bases using 4 x 4 randomized complete block design for three planting seasons (2003 – 2005). The result revealed no significant difference (t – test: $p > 0.05$) in marketable leaf yield between the staked (500.0 – 500.5g) and unstaked (498.3 – 499.5g) plants and better economic return on revenue to farmers with the elimination of cost of stakes and staking operation.

INTRODUCTION

Fruit and vegetable production in the tropics is an ancient practice. Farmers grow vegetables and fruit tree crops around their compound in villages, towns or cities on subsistent levels while others grow their crops in semi-commercial level. (Ojeifo et al., 2006).

Most of the vegetables consumed are from the market gardens grown in fadama, flood plains, river banks and on flat land close to source of water supply. The purpose of market gardens is to produce economic crops for sale thus guaranteeing the farmer a steady income especially when operated on a full time basis. Vegetables are also good source of regular food, being relatively cheep and rich in necessary vitamins.

With the increase in the awareness of the importance of vegetables as source of vitamins and minerals in human diets, the cultivation of leafy vegetables has been on the increase (Ojeifo and Lucas, 1986).

Fluted pumpkin (Telfaria Occidentalis) is one of the popular and widely grown vegetable crop in Nigeria particularly in the eastern (Anambra, Imo, Abia and Ebonyi States) and mid western areas (Edo, and Delta States) and to an appreciable degree in the south western states (Ondo, Ogun, Ekiti, Oyo and Lagos) (Okoli and Mgbeogu, 1982). It is a pot-herb (Akobundu 1987); cultivated mainly for its succulent young leaves and shoots which are used as vegetables. It is a high-climbing perennial with partial drought tolerance and parenting root system (Tindall, 1968). Akoroda (1988) observed that Telfaria occidentalis is a common homestead garden crop in southern Nigeria, mostly cultivated by women. The crop is grown close to trees, walls, fences and structures on which the shoots are allowed to climb (Okoli and Mgbeogu, 1982). It could be allowed to creep on the ground or staked (Akoroda, 1988; NIHORT, 1986). Oyenuga (1968) recommended staking as the leaves of Telfaria spp are palatable and nutritious and are very much cherished by goats, while Akoroda et al (1990) supported staking because it facilitates harvesting of the leaves and pods.

Staking exposes the leaves for effective light reception as light is one of the factors needed by leafy vegetables (Trenbath, 1976). Telfaria Occidentalis is not the only crop that is staked. Staking is practiced on crops like yam (Phillips, 1964; Onwueme, 1979), beans (Vigna spp) (Akobundu, 1987), cucumber (Kwarteng and Towler 1994) and tomato. In yam, staking has enclouraged the yield in clayed soils (Adams, 2002) while it reduced the incidence of Blossom End Rot and Fruit Crack in Tomato (Anyanwu et al. 1979). However, Amah (1997) conclude that staking increased the lost of yam production by 30 – 35%.

The availability of stakes for staking tendering/ climbing vines are diminishing at an alarming rate as a result of factors of urbanization, road construction, industrialization, bush fire and harvesting for fuel wood. The objective of the experiment was to find out the effect of staking on the marketable leaf yield of the crop (*Telfaria occidentalis*) in line with increasing difficulty of stake procurement cost.

MATERIALS AND METHODS

The experiment was designed to investigate the effect of staking on the leaf yield of *Telfaria occidentalis.* The experiment was carried out from January to June in the years 2003, 2004 and 2005. The materials (Seeds) were obtained locally from harvested guard. Clearing of site was by cultural method of hoeing and hand pulling done in January in the years.

The experiment was carried out in the field located on level land by Orogodo river. 6¼ N^0 6¼ E^0, in order to ensure that adequate supply of water was maintained through irrigation. For the duration of the experiment, weed control was maintained by cultural method of hand pulling and hoeing. The nutrient status of the field (soil) is shown in Table 1.

The nutrient status was evaluated and maintained before subsequent cultivation after the first year with the addition of Nitrogen as urea and potassium as nutrients of potash 3 WAP on each plot. Each plot also received blanket application of 25 kg P_20_5/ ha as single layer phosphate at the same time as nitrogen and potassium fertilizers were applied.

Plant spacing was 1m by 1m.10 plants were sampled from each plot per year of cultivation, bringing sample size per plot to 40 plants each for staked and unstaked each year. Thus 120 plants of staked and 120 unstaked plants served as total sample size for the 3yrs of the experiment. Harvesting was done on 12th June of each year; with careful uprooting of the plant and morphological characteristics such as height, leaf area, number of leaves and branches numbered in the field. Separation of the plant into various parts as leaves, stem and roots were done in the laboratory and drying carried out in the oven and weight recorded (Table 2). This process was repeated for the 3 yrs of experiment.

Table 1: Characteristics of experimental field at monthly rainfall

Properties	*Years*		
	2003	*2004*	*2005*
1. Mechanical Properties of Soil			
a. Sand (%)	68.0	67.8	67.2
b. Clay	26.0	25.6	25.0
Salt	6.0	6.6	7.2
2. Textural Class	Sandy, clay, loamy	Sandy, clay, loamy	Sandy, clay, loamy
3. Chemical Property of Soil:			
Total N(%)	0.180	0.170	0.17
Total P(ppa)	25.00	24.00	24.90
Organic matter (%)	3.48	3.46	3.46
4. Exchangeable Cation (Meg/100g soil)			
Ca	1.83	1.66	1.65
K	0.46	0.43	0.41
Mg	1.54	1.51	1.51
Na	0.08	0.08	0.079
5. Monthly Rainfall (mm)			
April	253	286.2	243
May	265	289	251
June	258	293	248

Source: Field work 2003 - 2005

Table 2: Year total mean weight of leaf yield (gm)

Year	*Plot*	*Staked (not in gm)*	*Unstaked Not in gm)*
1	1	506	498
	2	504	496
	3	504	504
	4	502	495
Total		201.6	200.3
Mean		509.5	500.8
2	1	497	502
	2	503	498
	3	503	497
	4	498	498
Total		2001	199.5
Mean		500.3	498.8
3.	1	496	502
	2	506	497
	3	498	498
	4	502	501
Total		200.2	199.8
Mean		500.5	499.5
Grand Total		601.9	599.6
Grand Mean		501.5	499.8

RESULT AND DISCUSSION

The result showed that application of urea increased shoot dry matter in Telfaria. This is in line with Tsuna and Fujise (1984) and Stino (1953) when they reported that nitrogen increased dry matter production of sweet potato by increasing the leaf expansion (the reason for which it is cultivated). Nitrogen is usually ascribed or associated with the building up of leaf tissue while

Table 3: t-test for significant difference between staked and unstaked marketable leaf yield of pumpkin *(Telferia occidentalis)*

Treatment	*X*	*SD*	*t-cal*	*Table – t at 0.05*
Staked	501.52	3.07	1.48	1.96
Unstaked	499.67	2.78		

N.S. at 0.05 = 1.96

Table 4: Estimated revenue from staked and unstaked marketable leaf yield of pumpkin (*Telfaria occidentalis*)

Treatment	*Total Yield (Marketable Leaf) 19/*	*Cost of staking*	*Marketable value of leaf (N)*	*Estimate Revenue (N)*
Staked	6041	340	2065	1725
Unstaked	5996	0	1942	1942

potassium is essentially for meristematic and photosynthetic activities – factors important for crop growth and yield (Forbes and Watson, 1994; Hahn, 1984; Tsuno and Fujise, 1984).

Table 4 reveals slight variation in leaf yield over the period, especially in the second year. Yield reduction (Mean 498.5) could be attributed to high rainfall with attendant cloud cover affecting radiation during the growth period. Martins (1986) has observed that thick cloud cover reduces vegetative growth in horticultural crops. Table 3 also shows that the slight difference recorded in the means (501.52: 499.67) is not significant as t-cal is less than table value at 0.5 level. Staking materials (bush stakes) are becoming increasingly difficult to obtain as the construction of roads, building of industries/houses and increased harvest of trees as fuel wood persist. Economically, the unstaked pumpkin gave more return as it eliminated the cost of staking materials (Table 4).

CONCLUSION

From the result of the study, the following conclusion can be drawn:

1. That there is no significant difference between the marketable leaf yield of staked and unstaked pumpkin *(Telfaria occidentalis)* when the soil minerals are properly maintained (Table 3)
2. That revenue (farmers income) will increase as the cost of staking is eliminated.

Consequently, it is the opinion of this paper that non-staking method as applied to yam cultivation in Benue State be adopted. (Iwueke, 1987).

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