EFFECT OF SEED YAM WEIGHT ON GROWTH AND TUBER YIELD OF WHITE YAM *(D. ROTUNDATA* POIR)

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Abstract

The effect of different weights of seed yam (250g, 300g and 350g) on growth and tuber yield of white yam were evaluated. The results showed a significant differences (P<0.05) among the three seed weight yam weights in vine length, number and basal diameter, and leaf number measured at 8, 10 and 12 weeks after planting respectively. There were gradual increases in vine length and basal diameter, and leaf number as the seed yam weight increased throughout (he sampling period. The highest mean values of 4.5, 175cm, 8mm and 69.8 were recorded for vine number, length and basal diameter, and leaf number respectively, at 12 weeks after planting. The results showed that there were no significant differences (P<0.05) between seed yam weight of 300g and 350g but they were significantly higher than seed yam weight of 250g for vine number, and basal diameter and leaf number. The results on yield parameters revealed that the tuber number, length and fresh weight increased. The results showed that there were no significant differences (I'<0.05) between seed yam weight of 300g and 350g but they were significantly higher than seed yam weight of 250g for fresh tuber weight, number and length. However, the highest values were recorded in seed yam weight of 350g. There were no significant differences between 300g and 350g. Thus, this study seed yam weight of 300g could be the ideal size for farmers growing white yam in acidic soils of Anwai, Delta State.

Introduction

Yam belongs to the genus Dioscorea which contains about 600 species (Coursey, 1967). Of these, only six species, namely: D. *rotundata* (white guinea yam), D. *alata* (water yam), D. *cayensis* (yellow yam), D. *bulbifera* (aerial yam), D. *esculenta* (Chinese yam), and D. *dumcntorum* (trifoliate yam) are cultivated in Nigeria (Onwueme, 1978; Aighewi *et al* , 2002). World's production of yam amounted to about 23.9 million tonnes in 1991 (FAOSTAT, 1997}. *Dioscorea rolundata* Poir (white yam) is the principal commercial yam and constitutes about 80% of (he total yam produced in Nigeria (Asadu and Akammigbo, 1996; FAOSTAT, 1997; Aighewi *et al*, 2002). White yam contributes more than 200< dietary calories per person each day for an estimated 60 million people, especially in the yam growing zones; from cote d'lvoire to Cameroun (Onwueme, 1978; Brereton, 1986). Nigeria is the largest producer of yam (IITA, I993b; FAOSTAT, 1997; Aihgewi *et al*, 2002).

Yam is a valuable starchy staple food in the tropical and subtropical countries (Asadu and Akammigbo, 1996). It plays an important role in the cultural lives of certain communities in the yam belt of West Africa (Onwueme, 1978; Asadu and Akammigbo, 1996). Yam is the most appreciated staple food by millions of people of West Africa and Sub-Saharan Africa (IITA1993b).

Although, the consumption of yam is on the increase, its production has been constrained by inadequate planting materials. Farmers are discouraged because some of them "milk" their yams immature to enable them produce seed yam as second harvest (Okonmah, 1980; Hahn *et al,* 1987; Asadu *c(at,* 1987). Research efforts at removing this constraint culminated in the development of the minisett techniques, that involves the use of setts of *25g* (Okoli *ct al*\ 1982; Cyansa-Ameyaw *et al,* 1999). The seed yam is preferred for its earlier and more reliable sprouts; also it usually matures earlier than other types of seed pieces (IITA, 1993b; Harm *et al*, 1987). However, scanty information is available on the seed yam size to produce optimum tuber yield. Onwueme (1972) and Asadu *et at,* (3987) recommended yam sett for sizeable "ware yam" production is 250g. Thus, in this study, the effect of different weights of seed yam (250g, 300g and 350g) on growth and tuber yield of white yam were investigated.

Materials and Methods

The experiment was conducted at the Teaching and Research Farm of the Faculty of Agriculture,

Delta State University, Asaba Campus, Anwai Delta State. Asaba Campus is located at 06° 14[1] N and 06 ° 49'E of the equator. It lies in the tropical rainforest zone, characterized by seven months of rainy season between April and October, punctuated by a short break in August. An annual rainfall range of 1500mm to 1849.3mm (Asaba Metrological Bulletin, 2004). The study conducted during 2003 and 2004 cropping seasons. The land was cleared, ploughed and harrowed. An experimental area of 10m x 10m was mapped out and plotted in to 1m x 1m with a border line of 1m, fitted in to a randomized complete block design and replicated three times. Composite soils (0-15cm depth) samples were taken from the site. It was air dried at room temperature and passed through a 2mm sieve before it was taken to ILTA laboratory, Ibadan, Nigeria for analysis. The chemical and physical characteristic of the soil at the experimental site showed that the soil is sandy loam and it had thepH (6.3), available P (l().4ppm). Organic carbon (0.71%). Organic matter (1.24%), Total Nitrogen (0.08%), Sand (69.41%), Silt (22.25%) and Clay (8.40%). Treatments of three different weights of seed yam (250g (as control), 300g and 350g) were randomly planted on flat ground. White yam was collected from NRCRI (National Root Crops Research Institute) Umudike. It was selected for this work on the basis of its yielding ability in Delta State. Plants were grown rainfed under native soil fertility conditions. Fields were kept free of weeds by regular hand-weeding.

Data collected include: vine length, number and basal diameter, and leaf number measured at 8, 10 and 12 weeks after planting. While till 6 months after planting, sequel to senescing of the leaves and vines, yield parameters for fresh tuber weight, number and length were collected. Data collected were subjected to statistical analysis using procedures outlined in the general linear model (SAS, 1996) and means differences determined by L.S.D. at 5% level of significance.

Result and Discussion

The result showed significant differences (PO.05) among the different weights of seed yam (250g, 300g and 350g) in vine length, number and basal diameter, and leaf number measured at 8, 10 and 12 weeks after planting respectively (Table 1). There were no significant differences (P<0.05) between seed yam weight of 300g and 350g but they were significantly higher than seed yam weight of 250g for all the growth parameters measured (Table 1). The numbers of vines/ plant for seed yam weights 350g and 300g were not significantly different but higher numbers of vines were recorded in seed yams-weighing 350g. This result agreed with earlier findings of Onwueme (1972), Asadu *et al,* (1987) and Cyansa - Ameyaw *et al,* (1999) who reported that larger setts established quicker and are more vigorous in developing growth parameters such as vine length, number and basal diameter, and leaf number.

There were gradual increases in vine length, number and basal diameter, and leaf number as the weight of seed yam increased throughout the sampling period. The highest mean values of 4.5, 175cm, 8mm and 69.8 were recorded for vine length, number and basal diameter, and leaf number respectively, at 12 weeks after planting (Fig. 1).

The results on yield parameters revealed that the number, length and fresh weight of tuber? increased as the weight of seed yam increased from 250g to 350g (Table 2). The highest mean value of 1.75kg/plant, 2.93 and 36.86cm for fresh tuber weight, number of tubers and length of tuber? respectively were recorded ;it 6 months after planting (Table 2). The results showed that there were no significant differences (P<0.05) between seed yam weight of 300g and 350g but they were significantly higher than seed yam weight of 250g for fresh tuber weight, number of tubers and length of tubers. However, the highest values were recorded in seed yam weight of 350g; This agrees with other reports, that larger setts (or seed yams) produce greater yield of tubers in yam (Onwueme, 1972; Nwoke *et al*$_A$ 1974; Obigbesan, 1980; IITA, 1993b). This result revealed that increase in number **of** tubers and length of tubers reached a maximum at seed yam weight of 300g, after which further increase in weight of seed yam does not increase the number of tubers or length of tubers at harvest Consequently, there were no significant differences between 3()0g and 350g. Thus, this study show^ that seed yam weight of 300g is ideal size for farmers growing while yam in acidic soils of Anwai, Delta State.

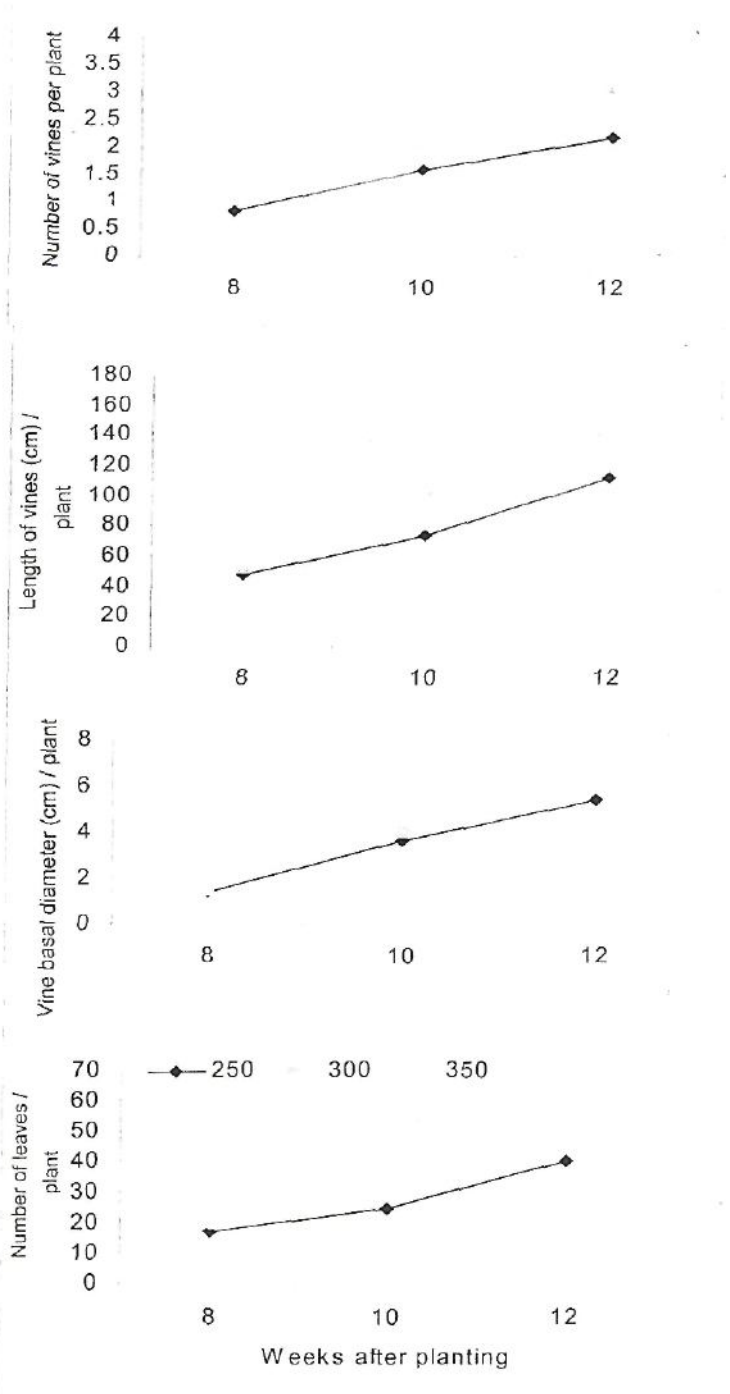

Fig. I. Effect of weight of seed yams (250, 300 and 35()g) on growth pattern (number of leaves, vine basal diameter, length of vines and number of vines) of white yam at 8, 10 and 12 weeks after planting.

Table 1: Effect of Weight of Seed Yams on number of Vine/ Plant, Length of Vines (cm), Vine **Basal Diameter (mm), number of Leaves at 12 week after Planting (WAP).**

Seed yam weight(g)	Number of vines per plant	Length of vine (cm)	Vine basal diameter (cm)	Number of leaves /plant
350	3.5	165.0	7.0	59.8
300	3.0	138.6	6.3	46.7
250	2.2	112.1	5.4	23.7

LSD (0,05)	0.60	15.34	0.40	15.87

Table 2: Effect of Weight of Seed Yams on Fresh Tuber Weight, Number of Tubers and Length of Tubers at 6 Months after Planting.

Seen yam weight (g)	Tuber Yield (kg) plant	Number of tubers / plant	Length of tuber (cm)
350	17.5	2.93	36.86
300	12.7	2.65	36.48
253	7.0	2.03	22.93
LSD (0.05)	0.23	0.31	5.57

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