

# Studies on Management of a Wild Yam (*Dioscorea alata*) and a Wild Tanier (*Xanthosoma* sp.)<sup>1, 2</sup>

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## ABSTRACT

A wild yam (*Dioscorea alata*) appears to be unaffected by insects or diseases and its vigorous growth smothers all weeds. Total production of over 40 t/ha of tubers, of which 30 t/ha were suitable for human consumption, were produced with the best planting system. Benching alone increased yields from 19.8 to 24.4 t/ha. Benching and staking increased marketable yields from 19.8 to 31.8 t/ha, and total yields from 26.4 to 41.9 t/ha. Higher yields were produced with 1 × 1 m than with 1 × 2 m spacing.

Yields of a wild tanier cultivar harvested at 31 months after planting increased with closer spacing from 34.8 t/ha with 9,200 plants to 99.2 t/ha with 48,900 plants. Intermediate yields were obtained with intermediate spacings. Planting in beds did not increase yields over those for level planting. This root crop can be consumed by humans but is best used as pig feed.

## INTRODUCTION

A yam cultivar (*Dioscorea alata*), known locally as “Ñame de Palo” grows wild throughout the mountainous region of Puerto Rico. The tubers, which can weigh 20 kg or more, are not considered to be of high quality but are eaten by many people. This cultivar apparently does not suffer from major insect attacks, diseases or viruses, and its vigorously growing vines smother weeds and frequently cover entire trees.

A tanier cultivar (*Xanthosoma* sp.), known locally as “Yautía de Palma,” grows wild throughout the coffee plantations in the mountain region of Puerto Rico. Unlike commercial taniers, this cultivar does not produce cormels. The main corm grows above ground, often weighing over 15 kg. Although not considered to be of high quality, it is often consumed by humans and is frequently fed to pigs. The size and apparent resistance to pests suggest that this cultivar has a good yield potential when grown without any insect and disease control practices.

The authors have found no references in the literature concerning research on these yam and tanier cultivars, and no research on them has been conducted in Puerto Rico.

The present study determined the effect of various cultivating practices on the yields of these wild yams and taniers.

<sup>1</sup> Manuscript submitted to Editorial Board December 12, 1979.

<sup>2</sup> This report covers work conducted cooperatively by the Agricultural Research, Science and Education Administration, USDA and the Agricultural Experiment Station, Mayagüez Campus, University of Puerto Rico, Río Piedras, P.R.

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## MATERIALS AND METHODS

All experiments were conducted at the Gurabo Substation located at an elevation of about 60 m. Mean annual temperature is 26° C and mean monthly variations are about 5° C. Average annual rainfall is about 1,600 mm with a well defined dry season from January through April. The soil is fine mixed, non-acid isohyperthermic Coloso clay (Aeric Tropic Fluvaquents) on about a 3% slope. This soil has a pH of 6.6 and 3.0% of organic matter. Total exchange capacity is 33 me/100 g of soil with 29 me of exchangeable bases.

Two experiments were conducted with yams. In one experiment, yams were planted at spacings of 1 × 1 m in beds, and were supported by 2 m high stakes. They were harvested at 4-month intervals over a 3-year period to determine the effect of age on yields.

In another experiment with yams, the effect on yields of supporting the vines with stakes, of planting in beds, and of two plant spacings were determined. Table 1 shows treatments tested and results.

In all experiments, 500 kg/ha of 10-10-10 fertilizer were applied 2 months after planting and again 4 months later. No insecticides, fungicides or herbicides were applied, and the yams were hand-weeded only once. Planting material consisted of tubers gathered from several locations throughout the mountainous region and cut into 150-g sections.

One experiment was conducted with wild taniers to determine the effect of five planting distances on yields. Planting material consisted of corms obtained from taniers growing wild on a coffee plantation in Jayuya and cut into 150-g sections. All plots received 500 kg/ha of 10-10-10 fertilizer 2 months after planting and again 6 months later. No pesticides were applied. Weeds were controlled by weeding three times during the first 8 months. The taniers were planted April 1976 and harvested 31 months later in November 1978.

Treatments in all experiments were replicated four times. Individual plots were 4 × 8 m in the yam experiments and 4 × 4 m in the tanier experiments. All experiments were irrigated whenever about 75% of the available soil moisture was depleted.

## RESULTS AND DISCUSSION

In the first experiment, the yams planted in April grew vigorously covering the soil with a dense (1 m deep) growth of vines and leaves which smothered all weeds. No insects, diseases or virus symptoms were observed. After about 10 months, all leaves were shed and the vines deteriorated. Two to three months later, during the spring, the yams that were not harvested put on new growth for another 10 months and the same cycle was repeated during the third year.

Harvests at 4-month intervals over a 3-year period showed that the yams attained their maximum growth at the end of the first year just

before shedding their leaves and becoming dormant. The tubers decreased in size following regrowth in the spring and increased in size later in the year.

The following tabulation shows yields of yams at the end of each of the three years of growth. Yields did not increase after the first year.

<i>Harvested at</i>	<i>Yields of tubers t/ha</i>
1 year	42
2 years	44
3 years	40

Although growing yams for more than a year did not increase yields, yams can in a sense be "stored" in the field for additional years at no cost, except for land use.

TABLE 1.—*Effect of staking, benching and spacing on yields of a wild yam cultivar (Dioscorea alata)*

Treatment	Yield of marketable tubers <i>t/ha</i>	Total yield <i>t/ha</i>	Yield of aerial <sup>1</sup> tubers <i>t/ha</i>
1. No stakes-no bench-1 × 1 m	19.8 <sup>2</sup> c	26.4c	2.9
2. No stakes-benched-1 × 1 m	22.4b,c	28.9b,c	4.1
3. Staked-no bench-1 × 1 m	24.2b	34.2b	3.4
4. Staked-benched-1 × 1 m	31.8a	41.9a	3.4
5. Staked-benched-1 × 2 m	25.2b	33.1b	3.9
			N.S.

<sup>1</sup> Used as planting material

<sup>2</sup> Numbers followed by the same letter do not differ significantly at the 5% probability level (Duncan's multiple range test).

In the wild, vines grow unrestricted in all directions developing a huge photosynthetic area that results in the production of very large yams. At the 1 × 1 m spacings used in this experiment the yams weighed an average of only about 2 kg each.

Table 1 shows that benching and staking together significantly increased commercial and total yields from 19.8 to 31.8 t/ha and from 26.4 to 41.9 t/ha, respectively. Table 1 also shows that spacing yams at 1 × 1 m increased yields as compared to those spaced 1 × 2 m (treatment 4 vs. 5).

Yields of aerial tubers, which can be eaten or used as planting material, were not appreciably affected by staking, benching, or plant spacing.

Yams were evaluated by a panel of 10 persons who graded the boiled tubers from +2 (very good) to -2 (indifferent). Acceptance classification averaged +0.8 indicating that the tubers were acceptable. This acceptance

value resembled that obtained with samples from the commercially grown Florido (*D. alata*) and Habanero (*D. rotundata*) varieties.

Unlike commercial yams that are planted as sections of tubers, this wild yam produced an abundance of crowns and aerial tubers that provide a means for easy and fast propagation.

The wild tanier cultivar was affected by leaf spot and in some plots by root rot. It was observed that the taniers continued to grow throughout the 31-month period with a corresponding increase in corm size.

Table 2 shows that yields increased consistently with closer plantings from 34.8 t/ha with 9,200 plants/ha, to 99.2 t/ha with 48,900 plants/ha. Planting taniers in beds did not appreciably affect yields as compared to planting them on level ground.

The very high yields produced by this wild tanier cultivar with little fertilization or care during a 31-month period showed their potential for food production in the tropics.

TABLE 2.—*Effect of spacing and planting in beds on yields of a wild tanier cultivar (Xanthosoma)*

Treatment	Plants/ha	Yield t/ha
Planted on level ground 45 × 45 cm	48,900	99.2a <sup>1</sup>
Planted on level ground 60 × 60	27,500	69.7b
Planted on level ground 60 × 90	18,300	62.2b
Planted on level ground 90 × 90	12,200	47.5b,c
Planted on level ground 90 × 120	9,200	34.8c
Planted in beds 90 × 90	12,200	55.9b

<sup>1</sup> Numbers followed by the same letter do not differ significantly at the 5% probability level (Duncan's multiple range test).

### RESUMEN

Una variedad de ñame silvestre (Ñame de Palo) mantuvo una producción de alrededor de 40 Tm/ha cuando se cosechó 1, 2 y 3 años después de sembrada. La producción aumentó cuando los ñames se sembraron en bancos y se les proveyeron estacas. Asimismo, la producción fue mayor cuando se sembró a 1 × 1 m que a 1 × 2 m. Los ñames hervidos tuvieron buena aceptación al catarse. Esta variedad de ñames es resistente a insectos, enfermedades y virus; produce abundante material de propagación, y su crecimiento vigoroso domina a los yerba-jos.

Una variedad de yautías silvestres (Yautía Palma) cosechada 31 meses después de la siembra aumentó en producción según aumentó la densidad de siembra de 34.8 Tm/ha cuando se sembraron 9,200 plantas/ha a 99.2 Tm/ha cuando se sembraron 48,900 plantas/ha.