CARIBBEAN FOOD CROPS SOCIETY

PROCEEDINGS

ELEVENTH ANNUAL MEETING

YAM PLANTING DENSITY TRIALS IN GUADELOUPE

by

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SUMMARY

Planting density experiments with *Dioscorea trifida, Dioscorea alata* and *Dioscorea nummularia* cultivation raised yield by a 50% when going from 14,000 plants to three times more per hectare.

Significant gain in yield was not obtained when planting density was raised by 30 to 50% only. High density planting seems to be economical only with Cush-cush Yam.

INTRODUCTION

In the process of modernisation of West Indian cultivation practices, Yam planting is showing an important shift from "hole", "mound", or "hill" planting to ridge planting, occasionally set with mechanical aid. While for hill planting a number or seed pieces were gathered around a point, for ridge planting seed pieces are set down at regular intervals all along the ridge. Therefore, new trials are needed to ensure that plant distribution makes the best utilisation of the surface.

Moreover, as staking is now common in modern cultivation of great Yams *(Dioscorea alata)* and Cush-cush Yams *(D. trifida),* and as weeding should be more difficult if continued during all the plant's growth, a rapid close up of the canopy is required.

So attention is now paid to planting density. Expecting higher yields with higher density, care must be taken also concerning the amount of tuber harvest used up by the level of planting material required. The problem arises in the case of *Dioscorea alata,* some *D. cayenensis* and D. *esculenta* where the planting material is a part of the commercial production. In most *D. cayenensis* and in *D. trifida,* seed pieces are either the special regrowth of the second harvest, the small tubers or even the undertuberized stoloniferous material which have no other uses.

MATERIALS AND METHODS

I. D. trifida

Two hybrids (see DEGRAS, 1969, DEGRAS et al. 1971), cultivars INRA 25 and INRA 31 were used in 1972 trials. These cultivars are now released in Guadeloupe and Martinique where extensive diffusion is developed.

Both trials were in latin square with the same four planting densities.

	D	C	B	A
Seed pieces/ha	14,000	21,000	28,000	42,000
Spacing (cm)	20 x 142	30 x 142	40 x 142	60 x 142

II. D. alata

The following cultivars were used for short trials (two replicates):
- cv PACALA from our Station, in Guadeloupe
- BARBADOS and ORIENTAL from Trinidad
- BELEP and LUPIAS from Lifu (Pacific Island)

Planting densities were the A, C and D level indicated above.

III. D. nummularia

A little trial with two replicates was done with the recently introduced pacific cultivar WAEL belonging to *D. nummularia* with A, C and D density levels.

RESULTS

Mean results can be seen in Table I

I. Due to soil heterogeneity and poor plot dimensions significant differences occur only between A and D densities for *D. trifida.*

For cv. INRA 25, the relationship between total weight and net (commercial) weight is shown in Figure I. The general relationships expressed through individual plots yield are the same as for the regression slope. But though not tested statistically, a higher production of commercial tubers could apparently be gained with lower densities.

II. The general trends are the same in spite of some fluctuation, due to the same soil and plot characteristics as above, enhanced by the limitation of few replicates.

III. Yield obtained may be seen in Table I.
(About *D. nummularia* see DEGRAS et al., 1971, 1972)

DISCUSSION AND CONCLUSION

In all cases, higher planting densities, in our trials, do not give a yield return in accordance with the increased amount of seed pieces. There is only a 50% more yield for a 300% increase in planting material.

But two specifications must be made.

Table 1

Yam Planting Density Trials In Guadeloupe

(a) Yield in Ton/ha

(b) Yield in % of D

CULTIVAR		A	B	C	D
INRA 25	a	23,2	18,4	19,3	16,2
	b	143	113	119	100
INRA 31	a	20,8	16,7	12,2	12,2
	b	170	137	100	100
BELEP	a	42,7	–	25,0	25,8
	b	165	–	97	100
PACALA	a	25,8	–	21,5	20,2
	b	128	–	106	100
BARBADOS	a	10,2	–	5,8	5,7
	b	179	–	102	100
LUPIAS	a	55,6	–	41,6	37,9
	b	147	–	110	100
ORIENTAL	a	16,3	–	18,7	10,0
	b	163	–	187	100
WAEL	a	23,9	–	21,0	18,0
	b	145	–	127	100
Means					
	a	27,3	–	20,6	18,0
b/a means		151,6	–	114,4	100
b/b means		155,0	–	119,2	100

First, the poor level of precision of our trials does not permit detailed affirmation on the absolute yield levels. We think however, that the general trends could be valuable for deeper investigation.

Secondly, as indicated above, the nature of the seed pieces must be considered.

In *D. alata* (and possibly *D. nummularia)* seed pieces represented a part of the commercial tubers. When considering the yield of BARBADOS for example it could not be admitted that heavy densities cut on its poor yield (under our normal conditions.) But even with LUPIAS, while the A density represents 6.4% of the expected yield, D. density is equal to 13% of the commercial harvest.

In *D. trifida* the case is different. Yields indicated in Table 1 are commercial harvest weight. For each cultivar, total harvest is higher by an amount equal or superior to the needed planting material. The data for cv INRA 25 (tons) is given in Table 2.

From this, it seems feasible to utilize higher levels of seed material in Cush-cush Yams without damage to the commercial harvest. It remains only to estimate the higher cost of planting due to labour charges.

Table 2

Relationship between seed and harvest for *D. trifida*

	Tons/ha			
	D	C	B	A
Seed pieces (1)	4.2	2.8	2.1	1.4
Total harvest (2)	27.2	21.8	21.6	17.7
Commercial harvest (3)	23.2	18.4	18.1	16.2
(2) – (3)	4.0	3.4	3.5	1.5

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