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THE EFFECT OF DIFFERENT PLANTING DEPTHS ON SIZE,  
SHAPE AND WEIGHT OF DASHEEN CORMS

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ABSTRACT

The current recommendation for growing dasheen (Colocasia esculenta) in Dominica for export, failed to produce corms of the desired standard for European and some Caribbean markets - corms weighing 0.9-1.3 Kg of uniform size and pear-shaped. Since plant density and planting depth are known to influence corm characteristics, an initial evaluation was made of the effect of varying the planting depth (15, 20, 25 and 30 cm) while maintaining the recommended density of 0.6 m x 0.6 m. Planting depths of 25-30 cm produced the required market standards with respect to size and weight but the shape was not acceptable. The desirable shape was produced using a planting depth of 28 cm but then the size and weight did not come up to standard. Planting depths of 15 cm did not give any satisfactory results.

INTRODUCTION

Dasheen (Colocasia esculenta) is widely grown in Dominica as a staple. Over the years there has been increased demand for dasheen in the Leewards and Virgin Islands and the ethnic market in the United Kingdom (U.K.). As a result there has been a steady increase in dasheen production and export as shown in Table 1 (Clarke, 1985).

Table 1. The volumes and values of dasheen exports from Dominica to regional and extra-regional markets, 1985-1989

Year	Volume exported (kg)	Value of export (ECS)
1985	261,000	-
1986	281,590	365,350
1987	291,383	459,434
1988	369,389	521,286
1989	550,761	761,354

Source: Statistics Unit, Ministry of Agriculture, Dominica

In 1985 the Caribbean Agricultural Research and Development Institute (CARDI) in its efforts to increase the efficiency of dasheen exports from Dominica embarked on a research program to improve the shelf life, size, shape and weight of dasheen corms.

The first phase of the program was conducted in collaboration with the Overseas Development Natural Resources Institute (now the Natural Resources Institute) in London and resulted in an increased shelf-life of dasheen to four weeks (Adams and Royer, 1986).

The second phase evaluated various agronomic practices needed in order to arrive at the appropriate corm characteristics for export: diameter, 10.4-10.5 cm; length, 15.4-17.0 cm; pear-shaped; and weighing 0.9-1.3 kg. A "tech pack" put together by CARDI researchers in Dominica (Adams, 1986) failed to produce satisfactory results. Evaluation of the tech pack with both farmers and Ministry of Agriculture personnel indicated that the planting depth of 15 cm did produce corms with a desirable shape, but the average size (9.62 cm diameter x 13.06 cm length, and weight 0.69 kg) was far from desirable. Since farmers normally plant at an average depth of 25.4 cm and densities of 0.6 m x 0.6 m, 0.8 m x 0.8 m, 0.8 m x 0.9 m and 0.9 m x 0.9 m, it was decided, as part of the overall strategy, to evaluate initially the effect of different planting depths (15, 20, 25 and 38 cm) while maintaining the density of 0.6 m x 8.6 m.

#### MATERIALS AND METHODS

Experiments were conducted in two major dasheen areas - Soltoun (about 430 m above sea level) and Cochrane (about 450 m above sea level). Both these locations have Allophanoid soils: Podsolis in the Soltoun area with a heavy annual rainfall of 3000 mm and Allophanic latosols under drier conditions (rainfall about 2500 mm per annum) in Cochrane. Both these clay soils have a dark A and B horizon, a high organic matter content, a rather greasy feel, high structural stability and high moisture retention. They tend to dry irreversibly and are difficult to dispense by normal methods (Barker, 1981).

The experimental design used was a randomized complete block with four treatments per block, replicated four times in Soltoun and three times in Cochrane.

Gramoxone was used to control weeds. A graduated "louchette" (a stick 11.25 cm in diameter, traditionally used by farmers for planting dasheen) was used for digging holes to the various required depths.

Lateral suckers (setts) with a basal diameter of 5.5-6.5 cm, which give the quickest initial growth and highest yields, were used as planting material. The suckers were cleaned of all roots, dead tissue and soil, then mildly disinfected in a solution of 2% sodium hypochlorite ("clorox" or any other commercial bleach) for 15-20 minutes. Petioles were cut back to a length of 17-38 cm. Whole leaves attached to the plant sett were also cut off. Under these conditions plants can be stored in cool moist conditions for no more than a week. Setts were placed in holes and partially covered with a layer of soil.

After establishment, three weedings were done by hand; the first, before the second fertilizer application and the other two when necessary. Fertilizer (NPK 16:8:24 + 2MgO) was applied at the rate of 28 g per plant 2 weeks after planting and 56 g per plant 2-3 months after the first application. Moulding was done after each fertilizer application. Weight, diameter and length measurements were taken from 38 corms in each treatment.

## RESULTS AND DISCUSSION

Table 2 shows that the average corm weight differed significantly ( $p < 0.01$ ) when planted at depths of 25 and 30 cm as compared to 15 and 20 cm. The dasheen corm as it matures pushes to the surface. As a result, at shallow depths, the corm reaches the surface more quickly and is unable to obtain the continuous moisture and soil nutrients needed for proper corm development.

Table 2 also indicates significant differences ( $P < 0.01$ ) in corm weights between locations. In Soltoun the average corm weight ranged from 0.76-1.0 Kg while in Cochrane it ranged from 0.62 - 0.86 kg. These differences in corm weights can be attributed to the higher rainfall and higher clay content of the soils in the Soltoun area.

Table 2. Effects of planting depth (cm) on the mean weight (kg) of corms produced at Soltoun and Cochrane in Dominica.

Location	Planting depth (cm)				SED
	15	20	25	30	
	-----kg-----				
Soulton	0.76	0.95	0.95	1.00	0.143
Cochrane	0.62	0.60	0.86	0.77	0.165
Overall	0.69	0.78	0.91	0.88	0.108

Table 3 shows a significant difference ( $P < 0.001$ ) between corm lengths at planting depths of 25-30 cm when compared with 15-20 cm. Figure 1 shows the various shapes of the dasheen corms obtained at the various depths. Pear-shaped corms which are the most desirable for marketing since they are easy to pack in the recommended boxes were obtained only at the 20 cm planting depth. However the weights of these corms fell short of the marketing standards and hence a planting depth of 20 cm cannot be recommended.

Table 4 shows no significant difference in corm diameter at the various depths and locations. Therefore the main factor which affected the shape of the corm was the length, which in turn was affected by the depth of planting.

Table 3. Effects of planting depth (cm) on the mean length (cm) of corm at two locations, Soltoun and Cochrane, in Dominica.

Location	Planting depth (cm)				SED
	15	20	25	30	
Soltoun	13.88	15.43	16.07	17.02	0.344
Cochrane	13.04	13.80	16.59	16.93	0.397
Overall	13.86	14.62	16.33	16.98	0.260

Table 4. Effects of planting depth (cm) on mean diameter (cm) of corm at two locations, Soltoun and Cochrane, in Dominica

Location	Planting depth (cm)				SED
	15	20	25	30	
	-----kg-----				
Soltoun	0.76	0.95	0.95	1.0	0.143
Cochrane	0.62	0.60	0.86	0.77	0.165
Overall	0.69	0.78	0.91	0.88	0.108

#### CONCLUSION

The required market standards for export of dasheen corms with respect to size and weight were obtained at planting depths of 25-30 cm, but the shape was not acceptable. On the other hand, the desirable shape was produced using a planting depth of 20 cm but then the size and weight did not come up to standard. Thus although it has been shown that planting depth does affect corm characteristics it may not be the only factor. Planting density, and variations in both intra and inter-row spacings may have an influence (Chandra, 1982). It may then be desirable to study the interactions between planting depths and plant densities. Population studies would seem to be imperative.

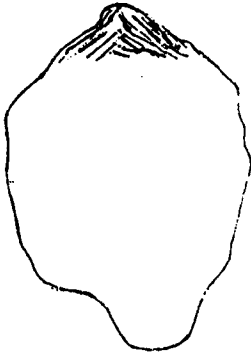


Fig. 1a. Shape of dasheen corm when planted at a depth of 15cm.

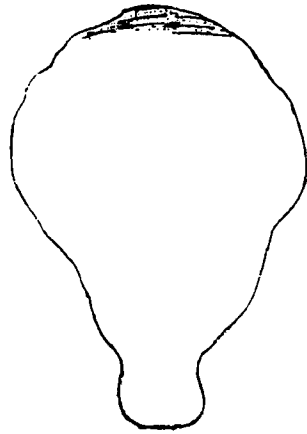


Fig. 1b. Shape of dasheen when planted at a depth of 20cm.

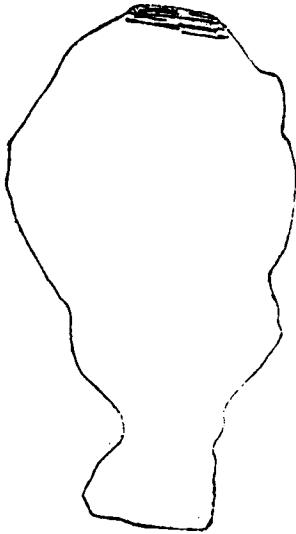


Fig. 1c. Shape of dasheen corm when planted at a depth of 25cm.

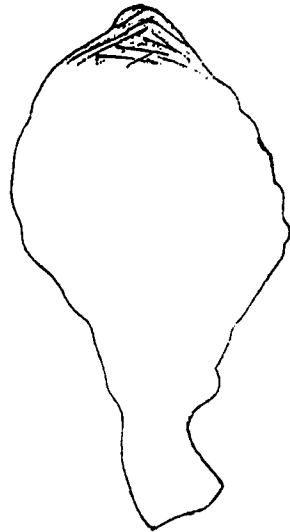


Fig. 1d. Shape of dasheen corm when planted at a depth of 30cm.

Fig. 1. Shape of dasheen corms when planted at various depths.

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## REFERENCES

- Adams, H. 1986. A guide to producing dasheen for export. CARDI Fact Sheet. CARDI. Roseau, Dominica.
- Adams, H., and Royer J. 1986. Post-harvest treatment of dasheen to ensure 4 weeks shelf-life. CARDI Fact Sheet. CARDI, Roseau, Dominica.
- Barker, G.H. 1981. Dominica: An agricultural profile. CARDI, St. Augustine, Trinidad.
- Chandra, S. 1982. Taro research and development in Fiji. Proceedings of the 5th International Symposium on Tropical Root and Tuber Crops. pp. 567-578.
- Clarke, A. 1985. The status of aroids in Dominica. Roundtable Discussion on Storage and Conservation of Roots and Tubers. Puerto Rico. October 27-November 2, 1985.