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THE EVALUATION OF TOMATO VARIETIES IN THE LEEWARD ISLANDS:

A PROGRESS REPORT

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INTRODUCTION

In the Leeward Islands the production of tomatoes is largely in the hands of peasant farmers who make use of commercially available varieties. The crop is established during the period September-November and matures in December-March which coincides with the dry season and also the period of lowest mean minimum temperatures (70-72°F). Even at the peak of production, local market demands in Antigua and St. Kitts are not satisfied, but production levels in Montserrat allow for some export of produce to the New York as well as other Caribbean markets.

The main problems associated with the industry are the evaluation of commercially available varieties according to time of planting, and extending production into the dry season by the introduction of irrigation. At the University of the West Indies research in tomato breeding is aimed at developing varieties for increased yield under dry season conditions and high yielding varieties that will set fruit at night temperatures above 72° for wet season production. However there is a pressing need in the Leeward Islands to examine the performance of the commercial varieties available in the area, especially in relation to time of planting. It is against this background that this work was undertaken.

MATERIALS AND METHODS

Five 6x5 randomised complete block trials were carried out in Antigua, Montserrat and St. Kitts. The varieties tested were: Manalucie, Manapal, Urbana, Rutgers, Indian River, and Oxheart. In one of the trials in Montserrat, Rutgers and Urbana were replaced by Roma and Supermarket. Each gross plot consisted of six rows 32 feet long and 3 feet apart with plants 2 feet apart in the rows. Each end of the row being discarded. A basal dressing of NPK fertilizers mixed to give 60 lb N, 80 lb P₂O₅ and 80 lb K₂O per acre was made to all plots, and a side dressing of 30 lb N/acre applied at formation of first fruits. Planting dates were as follow:

<u>Experiment No.</u>	<u>Location</u>	<u>Date of Planting</u>
1	Antigua, Diamonds Estate	29 September, 1969
2	Antigua, Diamonds Estate	4 December, 1969
3	Montserrat, Trants	22 December, 1969
4	Montserrat, Trants	9 February, 1970
5	St. Kitts, Ottley's	3 October, 1969

Weeds were controlled with diphenamid applied at the rate of 5 lb/acre at transplanting. Sevin and zineb were used to protect the crop from insect and disease attack.

RESULTS AND DISCUSSION

The mean yields of marketable fruit are shown in Table I. The mean yields obtained in Experiment 1 in Antigua were better than those in Experiment 2 which was planted later in the year. The same was true of the earlier planting in Montserrat where both crops had supplementary irrigation applied.

TABLE I Mean yields of marketable tomato fruit in tons/acre.

<u>Experiment No.</u>	<u>Variety</u>	<u>Mean Yields</u>
No. 1 Antigua	Manalucie	12.0
	Manapal	11.9
	Indian River	11.8
	Oxheart	10.4
	Urbana	10.2
	Rutgers	9.6
	C.V *	13.0%
No. 2 Antigua	Manalucie	9.6
	Manapal	9.3
	Indian River	9.1
	Rutgers	8.9
	Urbana	7.7
	Oxheart	6.2
	C.V =	15.3%
No.3 Montserrat	Indian River	13.7
	Oxheart	11.9
	Urbana	11.5
	Manalucie	10.5
	Rutgers	9.4
	Mañapal	9.3
	C.V =	21.5%
No.4 Montserrat	Supermarket	6.5
	Indian River	6.0
	Manalucie	4.8
	Oxheart	4.5
	Manapal	4.4
	Roma	4.4
	C.V =	35.9%
No.5 St. Kitts	Indian River	19.0
	Urbana	18.5
	Rutgers	16.0
	Manapal	15.9
	Manalucie	15.2
	Oxheart	13.2
	C.V =	17.9%

Lines indicate common subsets at the 5.0% level of significance according to Duncan's Multiple Range Test.

Table 2. Climatological data recorded at experimental sites

Month	ANTIGUA			MONTSEERRAT			ST. KITTS		
	Air	Rain-	P.E. ¹	Air	Rain-	P.E. ¹	Air	Rain-	P.E. ²
	Temp.	fall	in.	Temp.	fall	in.	Temp.	fall	in.
	°F	in.		°F	in.		°F	in.	
	Mean			Mean			Mean		
	Min			Min			Min		
1969									
Sept.	74.7	4.08	6.8	77	1.46	5.81	77	8.10	6.80
Oct.	72.6	6.25	5.4	74	9.12	5.70	75	11.55	5.35
Nov.	72.3	4.33	4.8	75	11.01	5.08	74	7.39	5.11
Dec.	70.9	1.09	4.3	71	4.82	4.61	73	5.44	6.06
1970									
Jan.	70.4	1.07	4.0	70	2.96	4.03	77	0.78	5.44
Feb.	68.5	1.01	3.8	69	1.14	4.10	69	2.49	4.68
March	69.1	0.84	4.3	70	0.48	4.64	70	2.70	4.47
April	72.6	1.78	5.4	72	3.34	5.36	73	4.25	5.32

1 Estimated by Thornthwaite's Method. 2 Measured in Evapotranspiration from Zoysia grass.

With the exception of Experiment 4 the yields shown in Table I were very satisfactory with averages being 8 to 11, 11 and 16 tons/acre in Antigua, Montserrat and St. Kitts respectively. Indian River and Manalucie gave the best results.

The varieties were also assessed for acceptability by consumers on the basis of the following fruit characteristics: shape and size, seed content, colour (both interior and exterior), and flavour. In Indian River and Manalucie were the varieties preferred. Because of its large fruit size, there was a strong preference on the part of hoteliers for Oxheart, but it has been dropped from further testing since it did not stand up well to packing for shipment and was very susceptible in the field to damage by rats. Urbana has also been dropped because the fruit appears to be affected by a spotting condition which is associated with a bacterial infection.

Climatological data taken at the experimental sites is given in Table 2. An examination of mean minimum temperatures and rainfall during the period of active growth of the crop would suggest that the most important factor limiting production in the dry season was soil moisture. This was especially true in Antigua where soil moisture deficits ranged from 2.96 inches in December to 3.46 inches in March. In Montserrat where sprinkler irrigation was at times available, the amount of water applied was not measured, and there is therefore an indication that more work is needed to determine the water requirements of various crops grown under irrigation.

It should be noted that even if there may be some association between poor fruit setting and high night temperatures during the period April-June when mean minimum temperatures range from 74-76°F at this time there is a pronounced scarcity of tomatoes on the local markets. Even with reduced yields, it would be economical to make the produce available because of high market demands.

In Appendix I, an estimate is given of the costs of production and net returns per acre from tomatoes in Antigua. Labour rates are based at \$0.80 per hour and the cost of fruit at \$0.30 which is the price paid to producers by the marketing depot in Antigua. At these rates, and with a minimum yield of 20,000 lb fruit/acre, the net returns would be about \$4,700. It is also worth noting that in Antigua, it requires a minimum yield of 4,280 lb of marketable fruit per acre in order to meet costs of production.

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RESUMEN

En las Islas Leeward hay un potencial para desarrollar la producción de tomates frescos al igual que otros mercados cercanos al Caribe. El problema principal de centros de producción en relación a la evaluación de variedades y su desarrollo con el tiempo de siembra. Variedades comerciales de tomates que estaban a disposición fueron examinadas en cinco ensayos llevados a cabo en Antigua, Montserrat y St. Kitts hacia el final de 1969. Rendimientos promedios fueron de 8.5 a 19.0 tons/acre de fruta para el mercado con el Río Indio y Malucie siendo estos los mejores.

Estimated Costs of Production and Net Returns per
acre of Tomatoes: Antigua.

COST	Amount (Man-Hours)	Cost and Value \$
(a) LABOUR per acre		
Nursery	35	28
Transplanting	80	64
Weed Control (Chemical and Mechanical)	100	80
Pest & Disease Control (knapsack sprayers)		
Fertilizer application	20	16
Harvesting	280	224
Sorting for Market	100	80
Value of Supervision		<u>300</u>
Total Cost of Labour		<u>840</u>
(b) SUPPLIES		
Seeds		5
Chemicals - Weedicides		55
- Insecticides		25
- Fungicides		52
Fertilizers		<u>50</u>
Total Cost of Supplies		<u>187</u>
(c) SERVICES		
Ploughing		40
Harrowing		10
Rent - 6 months		6
Transport		<u>200</u>
Total Cost of Services		<u>256</u>
TOTAL COSTS (a+b+c)		1,283
MINIMUM EXPECTED YIELD 20,000 lb.		6,000
NET RETURN		4,717

Labour rate \$0.80/hr.