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CARIBBEAN FOOD CROPS SOCIETY

PROCEEDINGS

ELEVENTH ANNUAL MEETING

TOMATO VARIETY SELECTIONS AND CULTURAL PRACTICES FOR THE CARIBBEAN

by

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INTRODUCTION

The choice of tomato variety is an important decision for the grower. The selection of a suitable variety can lead to rapid progress without much additional investments. However, the yields of potentially good varieties can be reduced if the right cultural practices are not employed. For this reason varietal selection and cultural practices are closely related.

This paper is the product of several years of research conducted by IRAT since 1963 and INRA since 1964. The trials were conducted at various locations in the islands of Guadeloupe and Martinique. The paper deals only with the large fruited tomato varieties tried at the various locations. The locations were selected to be representative of a wide range of ecological conditions and the results are applicable to areas in other Caribbean Islands.

Selecting a suitable variety

In general varieties which originate in the southern USA (Florida, Texas and Louisiana) are better adapted to the Caribbean ecological

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conditions than varieties originating in temperate areas. Some of the varieties tested were tolerant to physiological disturbances such as fruit cracking and blossom end rot which affected production.

None of the varieties so far tested were very well adapted to the rainy season. Varieties which yielded well in the dry season of the year were also the best at other times during the year.

In our trials the varieties could be grouped as follows:– (a) indeterminate for staking; (b) determinate for bush culture. The suitability of a variety depended on the micro-climate of area and the parasites encountered in the area.

I (A) AREAS WITH PSEUDOMONAS SOLANACEARUM (SOUTHERN BACTERIAL WILT)

In volcanic areas where Pseudomonas is present only varieties resistant to this disease can be successfully cultivated. For many years there were no bacterial wilt resistant large fruited varieties available in the region. This disease problem could only be counteracted by grafting the large fruited varieties on to the pseudomonas resistant rootstock.

Recently, the University of North Carolina released two resistant varieties, Venus and Saturn. In our trails Venus appeared to be the better of the two varieties. Both varieties were resistant to the bacterial wilt but were not very high yielding. At the plant breeding station of INRA (Guadeloupe) we carried on a breeding programme which has so far led to some useful selections. The breeding lines are higher yielding than either Venus or Saturn and are also resistant to bacterial wilt. In addition some of the large fruited lines are also resistant to other diseases and pests such as *Stemphylium Fusarium, Spider mites* and *Rootknot nematodes.* These selections are all indeterminate and are more suitable for staking.

I (B) AREAS FREE OF PSEUDOMONAS SOLANACEARUM

The trials were conducted in two different micro-climate areas which were disease free:– (a) humid areas;(b) dry areas.

(a) Humid areas:–

This condition exists at Matouba in Guadeloupe; this location being at a high altitude. Under these conditions Floradel was the best variety. This variety is resistant to leaf mould *(Cladosporium)* which is prevalent under humid conditions. Floradel was also resistant to Fusarium and Stemphylium diseases. Another, but older variety Manalucie, is suitable for these conditions and its fruits are more resistant to cracking, however, the fruit appearance is less attractive than Floradel. These varieties are both indeterminate and are suitable for staking.

(b) Dry areas:–

These areas have the typical black vertisols soils which contain the montmorillonite clay minerals. Under these conditions Floradel also gave good results in all the trials. However, Louisiana out-yielded Floradel in all the trials. The Louisiana 161.2 has larger fruits than Floradel. In addition, it is resistant to *Fusarium, Stemphylium, Root-knot nematodes* and *fruit cracking.*

A sister line released by the University of Louisiana which was also tested is Pelican (L 210). Pelican is superior to Floradel in both yield and fruit quality. On this basis Pelican is preferred to Floradel, and this variety should be suitable to areas where root-knot disease is a problem.

Tropic is another large fruited variety which was tested but is less productive than either Pelican or Floradel.

The varieties Floradel, Pelican, Louisiana 161.2 and Tropic are all indeterminates and are best for staking and pruning. The determinate bush culture types can be cultivated unstaked and unpruned during the dry

season. These types can be staked or grown on wire tunnels during the wet season. Best varieties of the bush type are Tropi-Red-resistant to Fusarium and Stemphylium, Walter resistant to Fusarium (1 and 2), and Stemphylium.

II TECHNICAL PRACTICES

1. Soil pH:–

Tomatoes require a soil pH between 5.0 and 6.8. Under pH 5 liming is advisable with Calcaro – Magnesium 2 or 3 months before planting.

2. Manuring:–

On Vertisols (Beauport: Guadeloupe – Ste-Ane: Martinique with the variety Floralou) the following formula is advisable:–

$$N\ 200 - P_2O_5\ 150 - K_2O\ 250$$

3. Spacing:–

During the wet season the indeterminate varieties which were staked gave similar yields for plant densities of 24,000 to 34,000 per hectare. The Indian River variety gave a yield of about 17 tons/hectare. At the end of the wet season the yield of the Indian River variety increased significantly. The yields were significantly lower at plant densities of 18,000 plants per hectare and below. The variety ES24 gave yields which increased with density from 18,000 to 34,000 plant/hectare. At the end of the wet season the yield of Marglobe was significantly higher at densities of 24,000 and 34,000 plants/hectare than at 18,000 plants/hectare.

4. Pruning:–

The pruning methods tested on indeterminate varieties were as follows:–

(a) Pruning to one stem, topping to the 5th cluster – 30,000 plants/hectare.

(b) Pruning to two stems over the 3rd leaf topping to the 5th cluster – 20,000 plants/hectare.

(c) Pruning to two stems but each stem topped over each cluster, then vegetation on the lateral bud – 20,000 plants/hectare.

(d) Topping over the 3rd leaf then plants unpruned – 20,000 plants/hectare.

RESULTS

The observations are given in the following table.

TABLE I

The effect of pruning indeterminate varieties of tomato plants on the fruit yield. Vigour and subsequent growth of the plants in Martinique and Guadeloupe

Treatment	Yield Ton/Hectare	Vigour	Foliage	Covering of Fruits by Leaves	Healthy Fruit %	Fruits Over 100 g
1	30	Good	Wide Leaves	Bad	92.6	76
2	33		Medium	Good	86.6	68
3	38		Medium	Good	80.6	70
4	43	Very Good	Smaller leaves	Very Good	72.0	65

When cultivating indeterminate varieties it is desirable to use the first method of pruning (pruning on one stem at a density of 25,000 plants/hectare). This method produces large fruits but requires a great deal of labour.

In all our experiments it appears that one is not obliged to prune the plants. However, if the plants are not pruned special attention must be given to the phytosonitary protection of the crop.

Pests and diseases can develop rapidly among crops with heavy foliage. During the dry season ground culture can be practised with unpruned tomatoes. Under rainy conditions it is preferable to support the plants even when unpruned.

Tomatoes can be grown on flat land in dry conditions, however, it is better to grow the plants on raised beds during humid conditions. Black plastic mulch can be used to control weeds in tomatoes. The cost of this method of control is equivalent to the cost of four hand weedings. Sprinkler irrigation must be used after planting to prevent the plants from burning against the black plastic.

CONCLUSION

The choice of disease resistant and well adapted varieties will facilitate the production of a tomato crop. Similarly, the correct choice of variety can minimise the labour normally required to produce the crop.

The plant breeding station at INRA in Guadeloupe is directing its future effort in this programme towards developing suitable large fruited varieties for rainy season production.