

An Analysis of the Factors Affecting Fruit

Production in tomatoes. Part (1)

(Related to Tropical Conditions in Trinidad)

General Introduction

Fruit production by the more common cultivated varieties of tomato in Trinidad is confined to the latter end of the wet season, i.e. December, and the first three months of the dry season i.e. January, February, March. The main crop is planted at the end of October, and planting is continued throughout November and December. The crops planted in Oct.-Nov. are harvested in Jan.-Feb. Subsequently planted crops continue to give a good harvest (by Trinidad standards) but plantings after December give a much reduced yield due to the drought induced blossom drop at the end of the dry season.

Irrigated plants will continue to give an economic yield to the end of the dry season.

Cultivated varieties of tomatoes coming into flower during the wet season (May-Dec.), either fail to produce any fruit, or at the most, have a very low percentage fruit set. For this reason it is the commonly held view that such tomatoes cannot be grown in Trinidad in the wet season.

Amongst the possible factors contributing to the poor yield of cultivated varieties in the wet season, it is possible to single out the following:

- 1) That the high humidity of the wet season is particularly favourable to a high incidence of fungus diseases of the tomato.
- 2) That heavy rainfall may actually cause a reduction in fruit production by damaging and knocking off flower buds.
- 3) That high humidity may be unfavourable to pollination and fruit set.

- 4) That the effect of seasonal differences in maximum and minimum temperature may be reflected in the fruit production.
- 5) That the effect of seasonal differences in Light Intensity may be similarly reflected.

Concerning the first of these possible factors, it is the opinion of observers in Trinidad that even non-diseased plants do not set a high percentage of fruit, so that to some extent this factor may be discounted.

Concerning the second possible factor, it may be said that this^{is}/the most common explanation given by the peasant tomato growers. No investigation has ever been made, but I am informed that some successful fruit-set occurs on tomato plants grown on a small scale under the eaves of houses, where they are presumably sheltered.

Concerning the other three possible factors there is similarly no information available for tropical climates.

In addition to the wellknown varieties of tomato grown in Trinidad there is an indigenous variety known as Local Cherry. This produces small to medium size fruit in large numbers in both wet and dry season. There is reason to believe that it is composed of surviving wild-type segregates of seed saved by cultivators from dry season crops of common cultivated varieties like Marglobe, most of which are derived from original hybrids between other varieties of tomato and the wild species Lycopersicon pimpinellifolium. Strains of this latter type grown in Trinidad have also produced very large numbers of marble sized fruit all the year round. Lycopersicon pimpinellifolium can be hybridised with the cultivated varieties producing an F₁ fruit of intermediate size and intermediate in other characters. F₂ plants show a range of segregation of character, including fruit size, between the parental types. Thus it might well be possible to incorporate the all-year-round production factor with factors for increased fruit size. The resultant hybrid, if satisfactory in other respects, would

be well received in Trinidad as at the present time out of season tomatoes are scarce and expensive.

In the light of the necessity to carry out a large proportion of the experimental work in the dry season, and with regard to the materials available, the following problems were investigated:-

- 1) The yield potentiality of some selected progeny derived from a hybrid between Lycopersicon pimpinellifolium and Lycopersicon esculentum var. Marglobe.
- 2) The yield response of tomatoes to applied sucrose and fluorescein under tropical conditions.
- 3) The effect upon flower formation, anthesis, and fruit set of tomatoes in simulated wet season conditions of humidity and precipitation.
- 4) The relative success of different methods of grafting scions of Lycopersicon esculentum on to stocks of Solanum stramonifolium and the immunity of such grafted plants to Bacterial Wilt, Bacterium solanacearum

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An investigation into the yield potentiality of some selected progeny derived from a hybrid between Lycopersicon pimpinellifolium and Lycopersicon esculentum, var. Marglobe.

Introduction

In 1952 there was, in the possession of the Botany Department, a collection of F7 seed from selected plants of the F6 generation of the continuously selfed progeny of an