

I N T R O D U C T I O N

The tomato, botanically known as *Lycopersicon esculentum Mill.* belongs to the family Solanaceae (L). The distribution is world wide and it is well represented, both in the tropical and temperate countries.

The fruit universally forms one of the most important and popular vegetables. It is mostly water, with small amounts of carbohydrates, fats, proteins and minerals particularly phosphorous, potassium and calcium and a high content of vitamin C, or ascorbic acid and of vitamin A. It is digestible both raw and cooked, but though cooking destroys part of the vitamin content, it still remains a valuable food and a suitable inclusion in the diet of people in nutritionally deficient areas.

The temperate countries notably the United States and Europe represent by far the areas of greatest production, although the plant is a native to the South and Central American tropics. Export of the fresh fruit to distant places is limited by virtue of its perishable nature, but it is canned whole and processed as juice, catchup, sauces, pastes and relishes and widely exported. In the British West Indies, tomatoes are grown in the Bahamas, Bermuda, Jamaica, Montserrat and St. Vincent for export. The small trade that existed before the second world war between Canada and the British West Indian islands especially Montserrat, has declined because of shipping difficulties. But Montserrat is now trading its tomatoes with the Eastern Caribbean notably Trinidad and British Guiana. Trade between the U.S.A. and the Caribbean has also considerably declined owing to increased production of early season tomatoes in Florida but the Bahamas, Cuba and Jamaica are still exploiting the North American market to some extent.

In the other British West Indian islands such as Trinidad, tomatoes are grown on a considerable scale for local consumption. The annual production in Trinidad is estimated at some six to seven million

pounds coming from about 1,000 acres of land. But to satisfy the local demand, this has to be supplemented by increasingly large imports of fresh fruit, canned fruit and tomato juice. This was valued at over \$100,000 in 1958.

The local market is supplied chiefly by peasant farmers and small gardeners whose cultivation practices are unsatisfactory on the whole. Although tomatoes are produced on a diversity of soils, a considerable area of the rice lands is devoted to dry season production following the rice harvest in November. There is little or no land preparation other than cutting the weed growth or rice stubble to ground level. The cut material is removed or burnt. Holes are dug with a hoe or cutlass, then tomatoes planted up to 3 per hole. Seedlings are raised in the open on 2 - 3 feet wide raised seed beds which normally receive a little forking up and some pen manure. The seed is broadcast at rates as heavy as $\frac{1}{2}$ oz. per 16 square feet which result in the production of poor seedlings. The practice of transplanting seedlings when about a month old and too advanced and stunted, further aggravates the situation. The careless practice of pulling seedlings and deliberately shaking them to remove all the soil leaves the planting material with few roots. Spacing between plants is 3.5 to 4 feet between the rows and 2 feet within the row. Little fertilisation is carried out save the addition of some manure in the hole and perhaps of a small quantity of sulphate of ammonia. Fungicidal spraying is almost absent. Consequently yield per plant remains as low as 0.5 to 1 pound.

Tomatoes in Trinidad are grown throughout the year, but the dry season which lasts from December to May is the best season and coincides with the winter months in North America. During the first four months of the year, the monthly rainfall ranges from $1\frac{1}{2}$ to 3 ins. and the mean monthly minimum temperature from 67°F to 69°F. The corresponding figures for the wet season, May to December are 6 - 14 inches of rain and 70 - 72°F. In the tropics in general, including Trinidad, tomatoes are produced with great difficulty during the wet season owing to damage of the blossoms by heavy

rains and a higher incidence of diseases. Night temperature has been shown to be a very important factor affecting growth, flower production and fruit set of the tomato. According to Went (1945), night temperature is actually the most critical factor compared with such factors as the relative humidity of the air, day length or even day temperature. A range in night temperature between 59 - 68°F is the most favourable one for maximum fruit set and optimal stem elongation. Heavy rains and high night temperatures during the wet season are therefore important limiting factors for tomato production in Trinidad. But while the dry season is more favourable, tomato prices are lowest at this time of the year. There is the possibility of processing the dry season produced fruits, providing costs can be reduced.

On the whole, the soils and climate of Trinidad are comparatively less suitable for tomato production than the neighbouring territories. But against this difficult background, recent work at the Imperial College of Tropical Agriculture and the St. Augustine Station of the Ministry of Agriculture has proved beyond doubt that vast improvements in yields are possible by attention to cultural practices such as the raising and the transplanting of tomato seedlings and applying starter solutions at planting out. There also exists the possibility of using cloth shade as a means of protection against high temperature, intense sunshine, drying winds and low humidity. Romshe (1939) in Oklahoma has used this technique successfully in obtaining a larger number of flowers developed per cluster, a higher percentage fruit set and a greater total weight of fruit.

In the West Indies and in Trinidad as well, comparatively little work exists on the fertilizer requirements of tomatoes. Some research has been done at the College, yet conclusions and recommendations remain rather unsatisfactory. The purpose of this present work is a further attempt to provide some additional information concerning the major nutrients requirements of the tomato under local conditions. Apart from being fairly similar to those experiments conducted previously here, it has been extended to cover analysis of the tissues which, it is hoped, will serve as a preliminary step for further investigation along this line.