

## Tomato varietal test

### 1. Introduction

Tomato is among the most heavily imported foods to Maldives. Over the years many varieties and cultivars of tomato have been produced by farmers. With the advent of hydroponics production around the early 2000's, various tomato varieties, specific to hydroponics have been in cultivation. The most common varieties include Tomato Precious, F1 Hybrid 438 and Tomato Grand F1 hybrid 168. Lion Seeds and Known You Seeds are the two most common suppliers of tomato seeds to Maldives.

The aim of this study was to test the suitability of three tomato cultivars for production in hydroponics under semi protected greenhouse environments in the Maldives. The three varieties used in this test are namely; Aruru, Montebello and Cheramin.

### 2. Aim and objectives

To test the suitability of three tomato cultivars for production in hydroponics under semi protected greenhouse environments in Maldives. Hence, the objectives of the study are as follows;

- To grow plants using most commonly used hydroponics technologies, techniques and materials.
- To observe all major plant stages including, seedling, flowering and fruiting for a sufficient duration of time.
- To collect data individually on EC, pH, temperature, water uptake and plant growth for all three varieties.

### 3. Materials and methods

This experiment was carried out at Hanimaadhoo Agriculture Center, in the North. The most commonly used hydroponics infrastructure and techniques were used to conduct this test (figure 1). The greenhouse was built in a metal structure with polythene roofing and sides covered with insect proof netting. Irrigation was carried out using a drip irrigation setup (see appendix 2). Seedlings were raised in a nursery housing for 16 days and were moved to cocopeat grow bags in the greenhouse.

#### Seedling preparation

Table 1. Details of major activities during early plant stages

Activity	Date / Age	Details
Seed sowing	26/02/2019	Sown in seedling tray Used cocopeat as a media Watered manually using a sprayer during this stage
First transplant	05/03/2019 5 days old plants	6"x5" poly bags were used Cocopeat as a media Watered manually
Final Transplant	16/03/2019	14"x12" poly bags were used

	16 days old plants	Cocopeat as media Transferred into the green house from nursery. Started irrigation and fertigation with the drip system
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Figure 1. Plant setup in the greenhouse

Alberts Solution is a soluble fertilizer which was used in this test. The fertilizer comes in two packets; stock A and stock B and both stocks are diluted separately. In a two kg Alberts Solution packet there is one kg of stock A and one kg of stock B. For this test, two kg of each stock was diluted in 50 liters of water. During fertigation 500ml of each stock was diluted with water as

needed. Fertigation was carried out twice a day. This dilution was carried out throughout for the plants that were moved from greenhouse to plant nursery. However, during nursery stage, a dosage of 150 ml of the diluted stock was given to each plant per fertigation.

Four plants from each variety were selected for routine data collection. These four plants were the first plants that were placed in the row from each variety (figure 2). See appendix 2 for field layout of the plants arrangement. Plant length, electric conductivity of the fertilizer, temperature and the amount of water given to the plants were checked on every Sunday and Wednesday.



Figure 2. Plant setup and cocopeat growbags in the greenhouse

### **Materials used**

EC Meter (HANNA brand, HI 98192, EC/TDS/NaCl/Resistivity)

Albert's Solution (Hydroponics complete fertilizer)

K40 (Folia fertilizer)

Coco peat

Polythene Bags (6"x5" bags, 14"x12" bags)

Pruning sheer

#### 4. Results:

In terms of the plant growth, the test results yielded as hypothesized. There were no prolonged unexpected complications in terms of a disease, pest or any external factor with potential to halt plant growth. The plants grew to a length of 2- 2.5 m during a period of 17 weeks though the test was planned to be carried out for 20 weeks. Moreover, the plants bared an appropriate amount of tomato clusters and tomatoes were harvested 6 times in a period of 7 weeks (from week 11 to week 17). All of the varieties showed bright red colored tomatoes when fully ripened (figure 3).



Figure 3. fruits of the three varieties

All plants grew well other than some two plants from Cheramin variety, which showed effects of crown burns, thus stunted their growth. At the beginning of flowering stage, it was required to use a fertilizer high in potassium as flowers were not forming fruits. In this case a folia fertilizer called K40 was used on three different days. See appendix 1 for detail of K40. As it was mentioned in the manual, leaves and tomatoes were pruned, though the pruning of tomato bunches and keeping not more than five tomatoes per bunch became difficult for the Aruru variety, as the flower bunch was rather like a bouquet than being in a single stem and flowers from different areas started to bear fruit. Though it was easy in the other two varieties, where the tomato bunches were on a single or double stem and all flowers bore fruits. Montebello variety was most vigorous in terms of vegetative growth as the leaves and flowers were bigger and also the plant stem grew stronger. In this respect, Aruru was the weakest when the three varieties were compared. Figure 4 shows leaves of the three varieties.

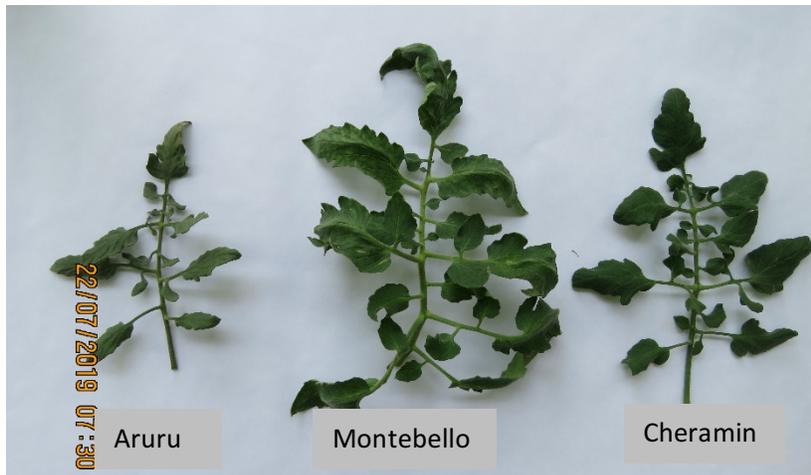


Figure 4: leaves of the three tomato varieties

## 5. Conclusion

The three tomato varieties show good potential for cultivation in Maldives environment. This test showed results as expected in terms of observed growth parameters. General features in growth, pollination and fruit ripening seem fitting for large scale cultivation. However, it is vital to carry out further research and long-term production activity to understand ways to deal with potential pest and disease issues.

## 6. Further research

For comparative results, additional tests can be carried out. Further research is needed looking into yield and fruit quality. Also, these varieties could be tested in other low cost Nutrient Film Technique (NFT) and Deep Water Culture systems. Since Albert's Solution may be expensive, other fertilizers could be tested on preferential basis. Additionally, some sort of commercial production assessment could be useful for large scale commercial production.



**Appendix 2**

**Greenhouse layout**

