

## Studies On Stock- scion Compatibility In Citrus

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### Introduction

For good yield and vigorous growth, most modern citrus farm use bud grafted trees. In bud grafting, two components are needed, the stock plant which is the rootstock and the scion, which is the required clone to be grown. Scientist are always looking for the right rootstock which is compatible to the right scion. Both the rootstock and scion must be compatible and resistance to diseases. Three citrus genera ( Citrus, Poncirus, Fortunella ) are sources of rootstocks. Budded Citrus began on 1842 because of Phytophthora Foot Rot. Initially sour orange was chosen as rootstock, later Rough Lemon was chosen. In 1942, Tristeza was identified as the pathogen causing stock decline in sour orange. *Citrus limonia* replaced sour orange (Brazil), but generally, now it is *Citrus sinensis/ Poncirus trifoliata* is used in California. Grapefruit or Cleopatra mandarin was also used as rootstock. In Malaysia, the dessert orange, limau Langkat and limau Madu are now using *Poncirus trifoliata* and Cleopatra as the major rootstock. In Malaysia, many previous attempt to plant the right combination of citrus scion and their rootstock had med scant success. Although some growers have succeeded, many plantations have failed in growing citrus. Golden Hope Plantation had tried commercial growing of limau Kasturi for juice extraction but had to abandon the farm due to some major problems. MARDI had also conducted various research on the growing of limau Langkat, and later, limau Madu in Terengganu. Lately, growers have been growing these orange in scattered areas in Terengganu.

### Materials and Methods

The research approach applies the concept of screening for the best genotypes to be the rootstock. From a wide array of germplasm, in Malaysia, these plants species (*Citrus, Poncirus, Fortunella*) will be collected and screened for use as rootstock. They will be tested to survive several environmental stresses (drought, salinity, soil types). Only the best genotypes will be chosen as rootstocks for further tests. Seeds from various Citrus species will be germinated. Seedlings from cuttings of the various species will be rooted. Seedlings will be subjected to screening for good root growth resistance to pests and diseases, tolerant to drought and saline soils. Appropriate scion materials will be grafted to selected rootstocks. Grafted seedlings will be field- grown and evaluated.

### Results and Discussion

Several varieties of Citrus were field grown. The varieties are 10 limau Kasturi, 20 limau Madu, 26 limau Langkat and 10 limau Purut. The several varieties that were carried out included some fertilizer trials, using several organic and inorganic fertilizers. The results showed that organic fertilizer plus potash showed increased flowering in the Citrus, limau Kasturi. Several experiment carried out to control the fruit fly pest showed that a biological control technique was effective in controlling the pest. The biological factor used was a selaseh plant which when mixed with water attracted the fruit fly pest. In field test of resistance to the stem canker disease, the result showed that limau Purut trees showed marked susceptibility to the Fungus, *Phytophthora palmivora*, while limau Kasturi, limau Langkat and limau Madu showed tolerance. In terms of water stress test, limau Purut was more susceptible to flooding compared to limau Langkat, limau Madu and limau Kasturi.

### Conclusions

Result on the resistance stock plants to *Phytophthora* showed that limau Purut was susceptible compared to limau Kasturi, limau Langkat and limau Madu. With water stress, limau Purut also showed poor tolerance. Limau Kasturi showed promise as possible stock plant for resistance to stem canker and water stress. In test with organic Fertilizers, limau Kasturi showed increased flowering. Further test should be carried out to test the potential of limau Kasturi as stock plant.

### Benefits from the study

The project brought to light some understanding of field grown Citrus tolerance to stem canker. Some genotype showed tolerance, while some genotypes were not. Limau Kasturi is a popular Citrus used as flavoring in food and offer potential for further test as stock plant. In water stress studies, it does show promise as tolerance to flooding. However, further tests need to be carried out to see the potential of other seedlings grown from seeds. The result will be beneficial for nursery owners and Citrus growers.

**Patent(s), if applicable :**

Nil

**Stage of Commercialization, if applicable :**

Nil

**Project Publications in Refereed Journals:**

Nil

**Project Publications in Conference Proceedings:**

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