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## RODENT AND FUNGUS INFESTATION ON LOW COST HYDROPONIC SEED GERMINATION TECHNIQUE FOR CITRUS CV. RANGPUR LIME (*CITRUS LIMONIA*)

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### Abstract

Citrus seed being recalcitrant in nature 100% germination are difficult under the field condition. Under low cost hydroponic technique of seed germination, Rangpur Lime seed germination started after 13 days with the germination percentage of 98.9% as compared to 21.4% in the field condition which germinate after 32 days of seed sowing. This experiment proved to be cheap and better seed germination for the citrus seed, for raising rootstock. However, precautions of rodent and fungus infestation are necessary before the germination of the seed under hydroponic technique.

**Key words :** Rangpur Lime, hydroponics, rodent, fungus, seed germination

### Introduction

Rangpur lime (*Citrus limonia*) is most likely a lemon (*Citrus limon*) × mandarin (*Citrus reticulata*) hybrid originating in India. The fruit whose peel is reddish-orange, with large oil glands, thin and easily removed resembles mandarin orange. It is a prolific variety of citrus with well flavoured and highly acidic fruits. The variety has worldwide usage as a rootstock on account of its high resistance to tristiza virus and more tolerant to salts as well as drought than others rootstock. It is an important rootstock for mandarin and sweet orange which are commercially propagated by seed (Parmarch, 2018).

Arunachal Pradesh, which is known for its unique organic khasi mandarin quality and GI (Geographical indication) tag, is facing problems of citrus decline problem due to tristiza virus (quick decline in citrus) in the recent years. In order to control such problems rootstock viz. Rangpur Lime play an important role since Rangpur lime is resistant to citrus tristiza virus (CTV) and tolerant to drought condition (Ray, 2006). However, seed of such rootstock are recalcitrant in nature and germination in the field condition is poor. Therefore, in order to evaluate a better seed germination of the seedling of such rootstock this experiment was done *in-situ* (hydroponic) and *ex-situ* (field) condition for the evaluation.

### Materials and methods

The present investigations were carried out at the Department of Fruit science, College of Horticulture & Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh to evaluate the better seed germination percentage under the field and hydroponic condition. To investigate the experiment, the seeds of Rangpur Lime were collected from the ripe fruit. Fruits were cut into two halves with a sterile knife and seeds were collected over sieves. Extracted seeds were washed in running tap water several times to remove the mucilage. Seeds were dried over filter paper. Extracted seeds were treated with Captan fungicide @ 1g/litre of water for about 1 hour to protect against fungal infestation. Fungicide treated seeds are kept inside the BOD for 25°C in the plastic tray (30x30cm size) which have the capacity around 2200 seeds per tray in which blotting paper are kept in between the thin bamboo stick. In case for the field condition, seeds are sown in the raised



bed with 1 m width and conventional length spacing of 2 x 2 cm at a depth of 2 cm. After sowing seeds are irrigated regularly. Oliveira and Walkyria (2007) also reported that 1-2 cm depth for the trifoliolate seed sowing give better seed germination. The seeds which are germinated in hydroponic method in the tray are frequently treated with fungicide (Captan @1g/litre of water) in order to avoid fungus infection. After the complete germination hardening is necessary in the ambient room temperature in order to develop the chlorophyll to the plants. Development of chlorophyll completed within one week and are transplanted to the polythene bag which are mixed with 2:1:1 (Soil: Sand: FYM) and kept under the insect proof net house for budding purpose.

### Results of the experiments

Low cost hydroponic seed germination technique observed significant seed germination as compared to field condition. Seeds which are sown under the hydroponic method provide moisture through the wet blotting paper which is in contact with the water. Such technique of seed germination starts germination from 13 days and completed within 22 days with the germination percentage of 98.9% whereas under the field condition showed 21.4 % success.

The better success for germination of this method is might be due the continuous moisture supply to the seeds through the absorption by the blotting paper. Further, fungicide is poured over the seed at 2-3 days intervals and it also absorbed by it from the root zone through blotting paper preventing the fungus growth which and maintain at continuously moderate temperature of 25°C provide quick germination and better % of germination as compared with the normal seed sowing in the open field condition. Angel and Maria (2005) also reported that the storage of seeds with 14.7% of moisture content with fungicide treatment resulted higher percentages of germination 59.3% while in seeds without chemical treatment with lower seed germination 33.3% in the field condition.

### Advantages of low cost hydroponic seed germination technique

- Better seed germination
- Early seed germination as compared to filed condition
- Weed free and easy for maintenance

### Disadvantages of low cost hydroponic seed germination technique

- Low seed germination
- Fungus and rodent infestation before the sprouting of the seed
- Weed infestation and difficult for maintenance during rainy season

**Table 1 : Performance of seeds germination of in hydroponic method**

No. of seeds/row in the bamboo strip	No. of bamboo strip in 1 tray (30x30cm)	Total number of seed / tray (30x30cm)	Total germinated seeds	Germinated seeds (%)
50	44	2200	2177	98.9%

**Table 2 : Performance of seeds germination in field condition (Ex-situ condition)**

No. of seeds/row (Spacing 2x2cm)	No. of replication	Total number of seeds	No. of seeds germinated/row (out of 50 seeds)	Total germinated seeds	Germinated seeds (%)
50	10	500	32, 17, 23, 18, 16,12,17,14,16,11	176	21.4%



### Conclusion

Therefore, low cost hydroponic using water as a media under BOD at 25°C is cheap and better seed germination of citrus seeds for raising rootstock. However, precautions are necessary for fungus and rodent infestation before the sprouting of the seeds.

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