



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(5): 488-489
Received: 19-07-2018
Accepted: 21-08-2018

RV Nainwad

Horticulture section, College of
Agriculture, Badnapur, Jalna,
Maharashtra, India

BM Kalalbandi

Horticulture section, College of
Agriculture, Badnapur, Jalna,
Maharashtra, India

SM Hade

Horticulture section, College of
Agriculture, Badnapur, Jalna,
Maharashtra, India

GS Pokharna

Horticulture section, College of
Agriculture, Badnapur, Jalna,
Maharashtra, India

Effect of different media and bio-inoculants on seed germination of Rangpur lime (*Citrus limonia* Osbeck.)

RV Nainwad, BM Kalalbandi, SM Hade and GS Pokharna

Abstract

The present investigation was carried out at Department of Horticulture, College of Agriculture, Badnapur, during the year 2016-2017. The experiment was laid out in Factorial Randomized Block Design with twenty treatment combinations replicated twice. Freshly extracted Rangpur lime seeds were sown into different media with bio-inoculants treatment including control to study their effect on germination. The results of the investigation revealed that, amongst the different media treatments, the medium M₁ i.e. Soil: Sand: Vermicompost (2:1:1) recorded earliest germination (12 days) with maximum germination percentage (82.50%) and took minimum days (13.25) to reach 50 per cent germination and whereas under the bio-inoculants treatments, the treatment B₃ (*Azotobacter*) recorded earliest germination (14 days) with maximum germination percentage (82%) and took minimum days (15.80) to reach 50 per cent germination. Interaction effect of different media and bio-inoculants on seed germination showed non-significant differences.

Keywords: Media, bio-inoculants, seed germination, Rangpur lime

Introduction

Rangpur lime rootstock is reasonably satisfactory for the yield and quality of Nagpur mandarin. The rootstock is healthy, semi-vigorous, productive, tolerant of salt, exchangeable for sodium percentage in soil, greening disease and resistant to tristeza virus (Nagpal, 1959) [5]. Rangpur lime, therefore, holds good promise for its commercial utilization as rootstock for future Mandarin and Sweet orange plantation. The seeds of Rangpur lime take about 20-40 days to germinate and seedling growth in nursery stage are also very slow and hence it takes longer time near about 18-24 months to attained buddable size (Kawthalkar and Kunte, 1974) [4]. In order to make nursery practice efficient, Rangpur lime seedlings must attain good health, vigour and better size for budding. Growing media and bio-inoculants plays an important role in germination of seeds and further growth and development of seedlings through atmospheric nitrogen fixation, adequate moisture retention, solubilizing inorganic and organic phosphorus and other nutrients, root proliferation, synthesizing plant growth substances and suppressing plant disease (Atefe *et al.*, 2012) [1].

In view of the above specific problems of Rangpur lime and considering its importance, it was felt necessary to assess the effect of media and bio-inoculants on seed germination of Rangpur lime.

Material and Methods

The present investigation was carried out at Department of Horticulture, College of Agriculture, Badnapur, during the year 2016-2017. The experiment was laid out in Factorial Randomized Block Design with twenty treatment combinations replicated twice, comprising of two factors i.e. Factor A and Factor B. Factor A comprising five different media compositions *viz.* M₀ {Soil: Sand: FYM (control) (2:1:1)}, M₁ {Soil: Sand: Vermicompost (2:1:1)}, M₂ {Soil: Sand: Coco peat (2:1:1)}, M₃ {Sand: Coco peat: FYM (2:1:1)} and M₄ {Sand: Coco peat: Vermicompost (1:1:2)} while factor B consisted of four bio-inoculant treatments including control *viz.* B₀ {Control (Water soaking)}, B₁ (*Trichoderma viride*), B₂ (*Pseudomonas fluorescens*) and B₃ (*Azotobacter*). The Bio-inoculants solution was prepared by mixing individual bio-inoculant in jaggery solution separately. Jaggery solution was prepared by boiling 1 litre of water with 2 kg of jaggery. After cooling the jaggery solution, 15 g of bio-inoculants per kg of seed were added to the jaggery solution individually. The respective bio-inoculant solution was poured on to the extracted Rangpur lime seeds and mixed to form uniform coating followed by overnight shade drying. Bio-inoculant treated seeds were sown in different media combinations as per given in treatment and observations were recorded.

Correspondence**RV Nainwad**

Horticulture section, College of
Agriculture, Badnapur, Jalna,
Maharashtra, India

Results and Discussion

The results of the investigation revealed that, there were significant variations in germination due to different media compositions, pre-sowing treatments with different bio-inoculants. Amongst the different media treatments, the medium M₁ i.e. Soil: Sand: Vermicompost (2:1:1) recorded earliest germination (12 days), took minimum days (13.25) to reach 50 per cent germination and maximum germination percentage (82.50%), whereas under the bio-inoculants treatments, the treatment B₃ (Azotobacter) recorded earliest germination (14 days), took minimum days (15.80) to reach 50 per cent germination and maximum germination percentage (82%).

Early and increased germination due to application of Soil: Sand: Vermicompost (2:1:1) could be due to presence of vermicompost in the medium making it rich in

macronutrients, micronutrients and nitrogen fixers present in organic media (Bano *et al.*, 1987) [2]. The presence of essential nutrients like phosphorus and potassium in vermicompost might have beneficial effects that could be attributed to modified root permeability in the germination media for better uptake of minerals in the plant system (Jagadeeshwari, 2002) [3].

Early germination reported with bio-inoculant Azotobacter attributed to creating favourable conditions like optimum moisture retention, temperature and secretion of plant growth regulators like gibberellins, vitamins and water absorption (Rakesh Kumar Yadav *et al.*, 2012) [6].

Interactions between media and bio-inoculants were found non-significant with regard to initiation of germination, days taken to reach 50 per cent of germination and germination percentage.

Table 1: Effect of media and bio-inoculants on days taken for initiation of germination, 50 per cent germination and germination percentage

Treatment	Days taken for initiation of germination					Days taken for 50 per cent germination					Germination percentage				
	B ₀	B ₁	B ₂	B ₃	Mean	B ₀	B ₁	B ₂	B ₃	Mean	B ₀	B ₁	B ₂	B ₃	Mean
M ₀	20.50	18.50	19.00	17.00	18.75	23.50	21.50	22.00	18.00	21.25	65.00	70.00	70.00	80.00	71.25
M ₁	14.50	11.50	11.50	10.50	12.00	15.00	12.00	14.50	11.50	13.25	75.00	80.00	80.00	95.00	82.50
M ₂	18.00	15.50	15.50	14.00	15.75	20.50	16.50	17.50	15.50	17.50	60.00	70.00	65.00	70.00	66.25
M ₃	15.00	11.00	13.50	12.50	13.00	19.50	16.00	17.00	15.50	17.00	70.00	80.00	75.00	85.00	77.50
M ₄	18.50	16.50	17.50	16.00	17.13	22.50	19.00	20.00	18.50	20.00	65.00	75.00	70.00	80.00	72.50
Mean	17.30	14.60	15.40	14.00		20.20	17.00	18.20	15.80		67.00	75.00	72.00	82.00	
	M	B	M × B			M	B	M × B			M	B	M × B		
SE±	0.48	0.43	0.96			0.24	0.22	0.49			1.58	1.42	3.17		
CD @ 5%	1.42	1.27	NS			0.48	0.65	NS			4.74	4.25	NS		

References

1. Atefe Ameri, Ali Tehranifar, Mohmoud Shoor, Gholam Hossein. Study of the effect of Vermicompost as one of the substrate constituents on yield indexes of strawberry. *Journal of Horticultural Sciences and Ornamental Plants*. 2012; 4(3):241-246
2. Bano K, Kale RD, Gajan GS. Culturing of earth worm *Eudrillus eugeniae* for cost production and assessment of worm cast as biofertilizer. *J Soil Biol. Ecol*, 1987; (7):98-105.
3. Jagdeeshwari V. Standardization of potting media with the use of biofertilizers for the production of quality rooted cuttings in Grape (*Vitisvinifera* L.) var. Thompson Seedless. M. Sc. (Hort.) Thesis, Tamil Nadu Agricultural University, Horticulture College and Research Institute, Periyakulam, 2002.
4. Kawathalkar MP, Kunte YN. Effect of certain management practices on growth of Rangpur lime (*Citrus limonia* Osbeck). *South Indian Hort*. 1974; 22(3, 4):106-111.
5. Nagpal RL. Tristeza found in Bombay state. *Calif. Citrogr*. 1959; 44(392):402-405
6. Rakesh Kumar Yadav, Jain MC, Jhakar RP. Effect of media on growth and development of acid lime (*Citrus aurantifolia* Swingle) seedling with or without *Azotobacter*. *African J Agri. Res*. 2012; 7(48):6421-6426