BIODIVERSITY CONSERVATION AND ECOSYSTEM RESTORATION

Dr. Silvy Mathew
Dr. Jayalakshmi M
Dr. Sheeja T Tharakan

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CHAPTER 11
A STUDY ON VARIATION IN GROWTH PERFORMANCE OF SYZYGIUM GARDNERI THW. SEEDS STORED AT DIFFERENT CONDITIONS

Chithra S G[1], Neethu S Kumar[2], Santhoshkumar R[3]

[1]Post Graduate Department and Research Centre of Botany, M.G. College, Trivandrum, Kerala

[2]Dept of Botany, HHMSPB NSS College, Neeramankara, Trivandrum, Kerala

[3]Dept of Botany, NSS College, Pandalam, Pathanamthitta, Kerala

Email :chithra307@gmail.com

ABSTRACT:

Recalcitrant seeds have short life span. So, a suitable storage medium is necessary to increase the seed viability. Favourable environmental conditions are very much necessary for the long-time conservation of seeds. It mainly depends on moisture content, quality of seeds and also temperature, humidity etc. *Syzygium gardneri* Thw. are lofty buttressed trees upto 60m tall and belongs to family Myrtaceae. The present study is to identify the most appropriate storage medium for the recalcitrant seeds. The seeds were stored at five different conditions and their germination percentage and growth performance were noted at regular intervals. And among them refrigerator is found to be the most appropriate storage medium in which the seeds shown a life span of 15 days although its growth performance was poor.so the above-mentioned factors play a crucial role in enhancing the viability period.

Keywords: *Syzygium gardneri,* recalcitrant, viability

INTRODUCTION

Syzygium gardneri Thw. belongs to family Myrtaceae. They are evergreen trees which bears ovoid fruit, rarely globose which turns to purple on ripening. Recalcitrant seeds have short life span, especially when they are kept in open condition. They are desiccation sensitive and when their moisture content declines below 20-30% the seed will lose the viability. In short moisture content and temperature play a vital role in seed viability during storage. When desiccation reaches the critical level, the seed will gradually loss its vigour and viability. When seeds are stored in an ambient condition there are chances of fungal attack which will be another cause for viability loss. The storage life varies with species. Among that the seeds had shown a maximum life span when they are kept dry and at low temperature.

The basis for enhancing the shelf life of seeds is by maintaining proper storage atmosphere. There is a considerable impact between temperature, moisture content and storage time.

MATERIALS AND METHODS

The plant materials were collected from Ponmudi, Thiruvananthapuram, Kerala and it was identified with the help of Flora of Presidency of Madras (Gamble and Fisher,1928). The collected seeds were cleaned and the damaged seeds were removed and further used for the storage purpose on following conditions

condition 1: Stored in Room temperature
condition 2: Stored in Refrigerator
condition 3: Stored in Freezer
condition 4: Stored in Glass bottle
condition 5: Stored in Dessicator containing silica gel

Determination of Germination Percentage

The germination percentage is simply the proportion of seeds that germinate from all seeds subject to the right conditions for growth. Five seeds from each storage condition were sowed in field containing briquette. This process of germination was repeated continuously until the germination is completely stopped in all storage conditions.

The percentage of germination was calculated using the following formula:

$$\text{Percentage of germination} = \frac{seeds germinated}{total\ seeds\ sowed} \times 100$$

Rooting potential

The number of rootlets was counted from each seedling and the mean value of rooting potential was calculated by using the following equation

Rooting potential = Root length x No.of rootlets

RESULTS

The seeds stored at various conditions were analysed for their storage ability and growth performance. The results revealed that the germination percentage was decreased as days progressed. The variation on growth performance were studied at regular intervals. Shoot length, root length, leaf area, and rooting potential of seeds stored at all the conditions are found to be reduced day by day. Among them refrigerator has given a maximum life span of 15 days although its growth performance was poor (Table 1-5).

DISCUSSION

In many species compared to ambient temperature, lower temperature had shown a progress in life span. But beyond the limit of low temperature there is chance of chilling injury. Chilling temperature is found to be harmful in many species like

Drybalanops aromatic, Shorea curtesii, Shoreaplaty cladus, Shorea ovalis and Hopeao dodrata. As storage time increases there should be a reduction in germination percentage. Temperature is one of the major factors that regulates ageing of the seeds. The germination rate of *P. falcatus* was favourable at low temperature but declines as temperature increased.

CONCLUSION

Over many decades researches has been progressing on storage physiology and found only a little success in improving or extending the shelf life of the seeds. Storage time and temperature affects both germination percentage and rate of germination. The best way to improve the life span of recalcitrant seed is by maintaining them at suitable low temperature and modification of the storage atmosphere.

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Condition 1- Room temperature

	Germination percentage	Shoot length (cm)	Root length (cm)	Leaf area	Rooting potential
1 day	80	8.5	4.5	1.41	9.5
3 day	70	8.45	4.25	1.56	9.3
5 day	40	6.35	3.9	1.25	5.5
7 day	10	4.5	4.2	0.6	5
9 day	0	0	0	0	0
12 day	0	0	0	0	0
15 day	0	0	0	0	0

Condition 2- Refrigerator

	Germination percentage	Shoot length (cm)	Root length (cm)	Leaf area	Rooting potential
1 day	80	8.4	4.5	1.47	12
3 day	60	7.4	4.75	1.47	11.5
5 day	40	5.25	3.25	0.79	5
7 day	10	4	3.5	0.36	3
9 day	20	4	4	0.1	3
12 day	10	2	2.5	0	2
15 day	10	2.5	2.5	0	1

Condition 3- Freezer

	Germination percentage	Shoot length (cm)	Root length (cm)	Leaf area	Rooting potential
1 day	40	7.1	4.25	1.15	9
3 day	20	3.25	3	0.72	3
5 day	10	1.2	2	0	2
7 day	0	0	0	0	0
9 day	0	0	0	0	0
12 day	0	0	0	0	0
15 day	0	0	0	0	0

Condition 4- Dessicator

	Germination percentage	Shoot length (cm)	Root length (cm)	Leaf area	Rooting potential
1 day	70	6.3	4.95	1.4	9.5
3 day	40	6.25	3.5	1.38	8
5 day	10	1.7	1.7	0.16	3
7 day	0	0	0	0	0
9 day	0	0	0	0	0
12 day	0	0	0	0	0
15 day	0	0	0	0	0

Condition 5- Glass bottle

	Germination percentage	Shoot length (cm)	Root length (cm)	Leaf area	Rooting potential
1 day	70	6.5	4.1	1.38	10
3 day	40	6.5	4	0.76	9
5 day	20	3.5	3.25	0.14	4
7 day	0	0	0	0	0
9 day	0	0	0	0	0
12 day	0	0	0	0	0
15 day	0	0	0	0	0