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Influence of plant growth regulators on growth parameters jack fruit (*Artocarpus heterophyllus* Lam.)

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Abstract

Studies on propagation in jack (*Artocarpus heterophyllus* Lam.) was carried out at Department of Horticulture, Faculty of Agriculture, Annamalai University. Twelve genotypes viz., AH-1 to AH-12 were used in the investigation. Based on germination percentage and seed vigour AH-5 was identified as best genotype for rootstock. In order to increase seedling vigour the seeds of AH-5 were treated with bio regulators viz., NAA (100 ppm, 200 ppm, 300 ppm and 400 ppm) and IBA (100 ppm, 200 ppm, 300 ppm and 400 ppm). Among nine treatments soaking of seeds for 24 hours in 400 ppm of IBA gave superior performance. The experiment to find out the optimum age of rootstock for successful softwood grafting revealed that 150 days of old seedlings exhibited highest percentage of successful grafts. Significant interactions were observed for germination per cent, plant height, number of leaves, leaf length, leaf breadth and stem girth etc. The best growth attributes were observed in AH-5 which recorded higher germination percentage, plant height, number of leaves, leaf length, breadth and stem girth. Among the different age of rootstocks tried for softwood grafting, maximum graft union success was recorded in 150 days old rootstocks and it was followed by 120 days old rootstocks.

Keywords: Jack fruit, growth regulators and growth parameters

Introduction

The Jackfruit (*Artocarpus heterophyllus* Lam.),' known as Jack tree, Jackfruit, or sometimes simply Jack or Jak, is a species of tree in the *Artocarpus* genus of the mulberry family (*Moraceae*). The word "Jackfruit" comes from Portuguese jaca, which is derived from the Malayalam language term, Chakka. The Jackfruit tree is a widely cultivated and popular food item in countries viz., India, Bangladesh, Nepal, Sri Lanka, Cambodia, Vietnam, Thailand, Malaysia, Indonesia, and the Philippines. Jackfruit is also found across Africa (Cameroon, Uganda, Tanzania, Madagascar, Sao Tome, Principe and Mauritius), as well as throughout Brazil, western central Mexico and in Caribbean nations viz., Jamaica. Digestible flesh (bulbs); A portion of-The edible Jackfruit is made of, easily 100 g of edible raw Jackfruit provides about 95 calories and is a good source of protein Jackfruit seeds are rich in 13.7 mg of the antioxidant vitamin C, providing protein. The fruit is also rich in vitamin B6, potassium, calcium, and iron. The juicy pulp of the ripe fruit could be eaten either fresh or preserved syrup. The fruit's is flavones, antioxidants, and phytonutrients mean that jackfruit has cancer-fighting properties. It is also known to help cure ulcers and indigestion. The bulbs may then be enjoyed raw or cooked (with coconut milk or otherwise); or made into ice cream, jam, jelly, paste, or canned in sirup made with sugar or honey with citric acid added. The bulb of the unripe fruit is used as a vegetable and the seeds are roasted or fried and is sometimes called "vegetable meat". Seeds of jackfruit can be used in many culinary preparations in boiled or roasted form and the major protein that has been extracted from seed is "Jacalin". Jackfruit seeds have low water and fat absorption capacities hence incorporation of jack seeds to deep fat fried products revealed that it brings down fat absorption to a remarkable extent. Jacalin is strongly mitogen etc for human lymphocytes, and it has proved useful for the evaluation of the immune status of patients infected with human immune deficiency virus-1.

Materials and Methods

An investigation was conducted on studies on propagation technique in jackfruit (*Artocarpus heterophyllus* Lam). Was carried out at the Department of Horticulture, Faculty of agriculture, Annamalai University. Seeds from fully ripened fruits were collected from Horticultural Research station and made use in this experiment. Stock solutions of Naphthalene Acetic Acid and IBA were prepared just before soaking the seeds. Required concentrations were prepared by diluting the stock solution with distilled water. Solutions thus prepared were immediately used for soaking the seeds. Healthy and clean seeds were selected

for soaking in different chemical solutions and in water for 24 hours period of time. Seeds were thoroughly washed before soaking in Naphthalene Acetic Acid and IBA. All the seeds of a treatment were divided in 3 lots of 20 seeds each and sown in polythene bags, thus have replicated thrice. The effect of growth regulators on growth parameters on Plant height, stem girth, number of leaves, leaf length, leaf breadth, leaf area (cm²) were analysed (Pance, V.G and P.V. Sukhatme. 1978) [4].

Treatment details

T ₁	:NAA 100ppm
T ₂	:NAA 200 ppm
T ₃	:NAA 300 ppm
T ₄	:NAA 400 ppm
T ₅	:IBA 100 ppm
T ₆	:IBA 200ppm
T ₇	:IBA 300 ppm
T ₈	:IBA 400 ppm
T ₉	:Control(water soaking)

Research and Findings

This experiment was conducted to find out the efficacy of different growth regulators viz., NAA and IBA in various concentration on jack fruit seeds of the genotype AH-5, by soaking the seeds in various concentrations, where the seeds have been stored and sown at periodical intervals. The overall mean germination was found to be high in the treatment T₈ in

which the seeds were soaked in IBA 400 ppm for 24 hrs before sowing followed by NAA 400 ppm (T₄). The possible reason attributed for the higher germination percentage might be due to IBA 400 ppm application, which have accelerated the translocation and accumulation of auxins of normal seeds, than other treatments. This finding was in accordance with, Wittwer and Bucko Vac (1957) [6], Shanmugavelu (1963) and Abd El-Zaher (2008) [1].

Plant height was recorded at 105th and 140th day after sowing. The maximum plant height, stem girth, number of leaves, leaf length, leaf breadth and leaf area were observed in IBA 400 ppm. The next best treatment was NAA 400 ppm. The reason attributed for higher plant height, stem girth, number of leaves, leaf length, leaf breadth and leaf area may be the application of IBA 400 ppm, leading to overall assimilation and redistribution of materials with in the plant enhancing the growth attributes. This is in agreement with the findings reported by Brian *et al.* (1954) [2] and Gangamma Aralikatti (2005) [3] any vegetative propagation method should be easy to adopt and need to help in easy multiplication. Soft wood grafting studies were conducted to find out the optimum age of rootstocks of the best identified genotype AH-5.

Conclusion

Among the various concentration of growth regulators on the genotypes AH-5, maximum plant height, number of leaves, leaf length, Leaf Breath were observed in the treatment, where IBA 400ppm applied. This was followed by NAA400ppm.

Effect of growth regulators on jack fruit genotypes AH-5

Treatment	Plant height (cm) 140 DAS	Stem girth (cm) 140DAS	Number of leaves (cm) 140 DAS	Leaf Length (cm) 140 DAS	Leaf breath (cm) 140 DAS	Leaf area cm ² 140 DAS
T ₁ : NAA 100 ppm	35.18	2.33	5.43	8.23	5.21	43.0
T ₂ : NAA 200 ppm	39.96	2.52	5.25	8.63	5.26	45.5
T ₃ : NAA 300 ppm	36.43	2.30	5.33	9.11	5.12	46.7
T ₄ : NAA 400 ppm	42.16	2.61	5.51	8.73	5.45	47.6
T ₅ : IBA 100 ppm	31.03	2.47	4.56	8.26	5.05	41.8
T ₆ : IBA 200 PPM	37.39	2.31	4.63	8.83	4.96	43.8
T ₇ : IBA 300 PPM	31.85	2.32	5.13	8.16	4.97	33.8
T ₈ : IBA 400 PPM	47.67	2.83	5.63	9.36	5.62	44.4
T ₉ : Control	34.46	2.36	4.73	9.13	5.05	46.2
SED	2.00	0.10	0.19	0.13	0.10	0.55
CD (p=0.05)	4.24	0.22	0.40	0.28	0.20	1.26

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