

Effect of azotobacter on growth of jack (*Artocarpus heterophyllus* Lam.) Rootstocks and grafts

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ABSTRACT

The present investigation on the effect of media on growth of jack rootstocks and grafts were under taken at the Department of Horticulture, University of Agricultural Sciences, GKVK, Bangalore. The study conducted revealed that plants inoculated with *Azotobacter* (10^7) at 7ml per bag were found best for the maximum growth of jack seedlings and grafts. However the plants inoculated with *Azotobacter* (10^7) at 6ml per bag proved superior for graft union success.

Key words : Jack, Rootstocks, Grafts, *Azotobacter*

Azotobacter is asymbiotic Nitrogen fixing bacteria. This microorganism can secrete phytohormones and also helps to build up organic status of the soil leading to increase in the availability of nutrients. Increased demand of fertilizer and higher price has directed emphasis on the use of bio-fertilizers in Indian Agriculture. The container grown plants when raised in different media can produce better grafts if enriched with nutrients. The present study was undertaken to find out the effect of *Azotobacter* on the growth and success of jack seedlings or grafts raised in container inside the green house.

MATERIALS AND METHODS

The experiment was conducted in Department of Horticulture, UAS, GKVK, Bangalore by using green house facility. The common media used for all the treatments are soil, coirdust and sand in the ratio 1:1:1 (v/v). Six treatments were as indicated in treatment details (Table 1 and 2) were considered for this experiment. To each bag *Azotobacter*(10^7) in different levels was inoculated. This was done after filling the bags and before planting the seedlings. Nitrogen, phosphorous and potassium 2 g/bag was applied to all the treatments at later stage. These treatments were replicated four times in a complete randomized design. The rootstocks were maintained for four months for growth and later wedge grafted. The observations like plant height, number of leaves and stem girth were recorded for the rootstocks and also for grafts. Successful graft union rates were recorded at 120th day after grafting.

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been summarized under following heads.

Growth responses of jack rootstocks:

The results obtained under different treatments are presented in Table 1. The highest plant height (30.82 cm) and stemgirth (2.06 cm) was recorded in plants inoculated with *Azotobacter*(10^7) at 7ml per bag and was significantly superior to all other levels of *Azotobacter*(10^7). Maximum number of leaves were observed in treatment T5 inoculated with 6 ml of *Azotobacter*(10^7). Minimum growth rate was noticed in plants inoculated with 3ml of *Azotobacter*(10^7) per bag. The highest growth rate might be attributed to the conducive effect of *Azotobacter*(10^7) on good physical and chemical properties of media and also for better

Table 1: Effect of *Azotobacter* on growth of jack rootstocks

Treatments	Plant height (cm)	No. of leaves	Stem girth (cm)
T ₁ (NPK 2g)	25.65	6.98	1.83
T ₂ (<i>Azotobacter</i> 3 ml + 2g NPK)	25.06	6.55	1.72
T ₃ (<i>Azotobacter</i> 4ml + 2g NPK)	26.37	6.76	1.79
T ₄ (<i>Azotobacter</i> 5ml + 2g NPK)	25.27	6.97	1.86
T ₅ (<i>Azotobacter</i> 6ml + 2g NPK)	28.84	7.57	1.89
T ₆ (<i>Azotobacter</i> 7ml + 2g NPK)	30.82	7.41	2.06
S.E. ±	0.792	0.064	0.039
C.D. (P=0.05)	2.355	0.192	0.116
C.V. (%)	5.870	1.839	4.229

Table 2 : Effect of *Azotobacter* on growth of jack grafts

Treatments	Plant height (cm)	No. of leaves	Stem girth(cm)	Graft union(%)
T ₁ (NPK 2g)	30.88	8.83	1.99	43.50
T ₂ (<i>Azotobacter</i> 3 ml + 2g NPK)	28.01	7.45	1.96	38.75
T ₃ (<i>Azotobacter</i> 4ml + 2g NPK)	30.87	7.72	1.98	37.25
T ₄ (<i>Azotobacter</i> 5ml + 2g NPK)	31.48	8.36	2.01	44.50
T ₅ (<i>Azotobacter</i> 6ml + 2g NPK)	33.18	8.67	2.08	52.75
T ₆ (<i>Azotobacter</i> 7ml + 2g NPK)	34.27	9.60	2.12	48.25
S.E. ±	0.812	0.062	0.049	0.869
C.D. (P=0.05)	2.415	0.185	0.148	2.582
C.V. (%)	5.169	1.480	4.931	3.935

uptake of the mineral nutrients in the potting medium over other treatments. Obliswami *et al.* (1985) and Kumar *et al.* (1998) in cashew seedlings obtained similar results, Kerni and Gupta (1986) in mango seedlings and Strobel and Nachmias (1985) in almond seedlings obtained similar results.

Growth response and graft union success of jack grafts:

The data obtained in different treatments are presented in Table 2. Maximum plant height (34.27 cm), number of leaves (9.60) and Stemgirth (2.12 cm) was recorded in plants inoculated with 7 ml of *Azotobacter* (10^7) per bag. Minimum plant height and stemgirth was observed in plants inoculated with *Azotobacter*(10^7) at 3ml per bag. The increased growth rate in treatment T₆ may be due to better uptake of the nutrients, higher leaf nutrient status, productive nature of the media and production of biologically active metabolites.

The maximum percentage of graft union success was found in plants inoculated with *Azotobacter*(10^7) at 6ml per bag. It was found at par with the treatments T₆ and T₄. The highest success rate may be due to excellent drainage, more friability, and more aeration of the media and production of some growth promoting substances like auxin, GA3 and cytokinins. In this study rate of graft success was less. This may be due to the rootstocks left for four months for its growth. During this period the

cambial growth may be matured and more latex vessels are formed, this hinders the graft union.

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