The Andhra Agric. J 59(3): 437-439, 2012

Effect of Pre-sowing Seed Treatments on Germination of Jackfruit (*Artocarpus heterophyllus* Lam.).

Harshavardhan A and Rajasekhar M
Horticultural College and Research Institute, Venkataramannagudem, Andhra Pradesh, India

ABSTRACT

Laboratory experiment was conducted to know the effect of pre-sowing treatments on germination and growth of jackfruit seedlings at Horticultural College and Research Institute, Venkataramannagudem during 2010-2011. Seeds were soaked in gibberellic acid (GA_3) at 100 ppm and 200 ppm; NAA at 25 ppm and 50 ppm ; KNO_3 at 0.25% and 0.5% and water for a period of 12 hours and 24 hours. All treatments promoted significantly earlier germination when compared to control. Among the growth regulators studied, the seeds pre-treated with gibberellic acid (GA_3) 200 ppm for 24 hours recorded significantly higher germination per cent (77.77%), lower number of days taken for germination (4.00 days), completion of 50% germination (11.00 days), maximum seedling length (72.11 cm) and higher internodal length (4.66 cm) compared to other growth regulators.

Key words : Germination, Gibberellic acid, Jackfruit, Seed-soaking.

Jack fruit is indigenous to India and bears İargest edible fruits. It is regarded as "Poor man's food" in Eastern and Southern parts of India. Area under this crop is increasing due to raising consumer interest, despite lack of proper propagation methods and package of practices. Moreover, Lafont *et al*., (1994) have given that the lectin, jacalin, present in jackfruit interacts with CD_4 cell surface and inhibits *in vitro* infection by HIV Type I virus, since it prevents virus binding on host cell.

Jackfruit takes prolonged period for germination, germination per cent is low, seedling growth is slow and it takes time for attaining graftable size. Synchronization and rapid seedling emergence are commonly reported benefits of pre-sowing treatments on germination and seedling growth. Hence, there is need for seed treatments in jackfruit to improve seed germination and seedling growth. The significant enhancement of germination was also noticed in different pre-sowing treatments by Padma and Narayana Reddy (1998), Shalini *et al.,* (1999) and Venkatrao and Reddy (2005) in mango. Hence, an experiment was taken upto enhance the germination and seedling growth in jackfruit with different pre-sowing seed treatments.

MATERIAL AND METHODS

The present investigation was carried out during 2010-2011 at Horticultural Research Station, Venkataramannagudem, Andhra Pradesh. Seeds from fully ripened fruits were collected and thoroughly washed with water before soaking in gibberellic acid (GA_3) at 100 and 200 ppm, naphthalene acetic acid (NAA) at 25 and 50 ppm and potassium nitrate (KNO_3) at 0.25% and 0.5% concentrations. Solutions thus prepared were immediately used for soaking the seeds for 12 hours and 24 hours period of time along with soaking in distilled water. Seeds were sown in the poly bags of size 7" x 4" (250 gauge) containing potting mixture (red earth, FYM and sand in the ratio of 2:1:1). The observations were recorded for germination and growth parameters. The experimental design adopted was randomized block design with three replications and 100 seeds per treatment.

RESULTS AND DISCUSSION

The results obtained on per cent germination, initiation of germination, days taken for 50% germination, seedling length and internodal length in jackfruit seedlings were presented in Table 1. Soaking seeds in giberellic acid (GA_3) 200 ppm for 24 hours recorded highest per cent germination (77.33%), early initiation of germination (4.00 days) and lowest number of days taken for completion of 50 per cent germination (11.00 days). Higher per cent and earlier germination of seeds pre-soaked in gibberellic acid (GA_3) may be due to its antagonizing

Table 1. Effect of pre-sowing seed treatments on germination, seedling length and internodal length in jackfruit.

Treatments	Per cent of germination	Initiation of germination (Days)	Days taken for 50% germination	Seedling length (cm)	Internodal length (cm)
T_1 : GA_3 100 ppm 12 hours	68.33	6.33	16.66	68.48	3.95
T_2 : GA_3 100 ppm 24 hours	70.33	5.33	14.71	70.20	4.15
T_3 : GA_3 200 ppm 12 hours	73.67	4.66	15.60	69.05	4.51
T_4 : GA_3 200 ppm 24 hours	77.33	4.00	11.00	72.11	4.65
T_5 : NAA 25 ppm 12 hours	59.33	7.33	20.33	66.82	3.10
T_6 : NAA 25 ppm 24 hours	62.67	7.00	16.67	67.27	3.26
T_7 : NAA 50 ppm 12 hours	66.33	7.67	20.33	66.54	3.27
T_8 : NAA 50 ppm 24 hours	70.67	5.00	17.66	68.63	3.37
T_9 : KNO_3 0.25% 12 hours	57.67	8.67	20.66	67.91	2.47
T_{10} : KNO_3 0.25% 24 hours	58.00	7.66	14.67	69.86	2.59
T_{11} : KNO_3 0.50% 12 hours	65.67	5.33	19.00	69.82	2.68
T_{12} : KNO_3 0.50% 24 hours	70.67	5.67	14.67	70.67	2.81
T_{13} : Water 12 hours	51.33	8.66	21.66	58.14	2.41
T_{14} : Water 24 hours	53.00	7.67	18.00	63.14	2.59
T_{15} : Control	45.67	9.66	24.08	57.43	2.14
Mean	63.38	6.71	17.68	67.07	3.20
C.D at 5%	1.73	2.29	2.84	3.26	0.34
SE m ±	3.54	0.79	0.98	2.89	0.12

effect on germination inhibitors (Brain and Heming 1958; Wareing *et al.,* 1968) while endogenous gibberellins like substances were also reported to increase due to soaking (Mathur *et al.,* 1971). GA helps in synthesis of α- amylase which converts the starch into simple sugars. These sugars provide energy that is required for various metabolic and physiological activities required for germination. Further, gibberellic acid (GA) weakens the seed coat so that the radical can push through endosperm (Hartmann and Kester, 2007). The results are in agreement with the findings of Shanmugavelu (1968) in jackfruit, Gupta (1989) in citrus, Pawshe *et al.,* (1989) in custard apple and Babu *et al.,* (2004) in papaya.

The observations recorded on seedling length and internodal length at 90th day after sowing showed significant differences among the various treatments. Soaking seed in gibberellic acid (GA_3) 200 ppm for 24 hours recorded maximum seedling length (72.11 cm) and higher internodal length (4.66 cm). However lowest seedling length and internodal length was recorded in untreated control (57.43 cm and 2.14 cm). Gibberellic acid treatment apart from improving germination also increased the subsequent growth of seedling. This may be attributed to cell multiplication and elongation of cells in the cambium tissue of internodal region by gibberellic acid apparently activating the metabolic processes or nullifying the effect of an inhibitor on growth (Barton, 1958). The results of present investigation are further strengthened with the studies done on jackfruit seed by Ratan and Reddy (2004) in custard apple and Yelleshkumar *et al.,* (2007) in mango.

From the aboue regults it can be concluded that soaking jack fruit seed in gibberellic acid (GA_3) at 200 ppm for 24 hours before sowing was the best treatment for higher germination per cent (77.33%), early initiation of germination (4.00 days), days taken for 50% germination (11.00 days), maximum seedling length (72.11 cm) and higher internodal length (4.66 cm).

LITERATURE CITED

Barton L V 1958 Growth response of physiologic dwarfs of *Malus arnoldiana.* to gibberellic acid. Contrib. Boyce Thompson Institute. 18: 311-17.

Brain and Heming 1958 The effect of rain and temperature on germination and growth. *Ecology*, 30: 1-3.

Babu K D, Patel R K, Singh A, Yadav D S and Deka B C 2004 Seed germination, seedling growth and vigour of papaya under North East Indian condition. *Acta Horticulturae,* 851, 299-306.

Gupta O P 1989 Effect of gibberellic acid on seed germination in lime (*Citrus aurantifolia* Swingle). *Progressive Horticulture*, 21: 3-4, 246-248.

Hartmann H T and Kester D E 2007 Plant propagation : principles and practices. Prentice hall of India Pv. Ltd. New Delhi.

Mathur D D, Couvillon H M, Vines C and Hendershott H 1971 Stratification effects of endogenous gibberellic acid (GA) in peach seeds. *Hortscience,* 6: 538-39.

Lafont V, Jacques D, Serge Monier and Jean Fevero 1994 Jacalin, a lectin inhibits in vitro HIV-1 infection via CD_4 in cell lacking the CD_3/ TCR complex. *Journal of Leucocyte Biology,* 56: 521-524.

Padma M and Narayana Reddy Y 1998 Effect of pre-sowing treatment of stones and kernels on mango (*Mangifera indica* L.) germination. *Journal of Research ANGRAU,* 26(2) : 17-21.

Pashew Y H, Patil B N and Patil L P 1989 Effect of pregermination seed treatments on germination and vigour of seedlings in Aonla (Emblica officinalis Gaertn.). PKV *Research Journal*, 21: 2, 152-154.

Ratan P B and Reddy Y N 2004 Influence of gibberellic acid on custard apple (*Annona squamosa* L.) seed germination and subsequent seedling growth. *Journal of Research ANGRAU,* 32: 2, 93-95.

Shalini P, Bagde T R and Bharathi B 1999 Growth of mango (*Mangifera indica* L.) seedlings as influenced by stone treatment. *Journal of soil crops,* 9 (2): 227-230.

Shanmugavelu K G 1968 Effect of plant growth regulators on jack (*Artocarpus heterophyllus* Lam.). *The Madras Journal of Agriculture,* 3 : 4 98-103.

Venkatarao and Reddy YTN 2005 Effect of osmopriming on germination, seedling growth and vigour of mango stones. *The Karnataka Journal of Horticulture,* 1(4) : 29-35.

Wareing P F, Bennett and H A Foda 1968 Growth inhibitors and dormancy in *Xanthium* seed. *Physiologia Plantarum*, 10 (2): 266-69.

Yelleshkumar H S, Swamy G S K, Patil C P and Prasad Kumar 2007 Effect of pre-soaking treatments on germination, growth, vigour index and vigour of rootstocks in mango. *Journal of Asian Horticulture*, 3 (3): 157-164.

(Received on 01.11.2011 and revised on 27.12.2011)