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Performance of Air-layering under Various Concentration Level of Auxin in *Azadirachta indica* (A. Juss)

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Key words:

Admixture, propagation, ppm, sphagnum moss

ABSTRACT

Present study was carried out on mature trees at Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola campus, to find out the response of auxins on air layering on *Azadirachta indica.* The air layering was done from first week to second week of August, 2013. Auxins, IAA, IBA and NAA were used at three concentration viz. 1000 ppm, 2000 ppm and 3000 ppm with one control, replicated three replications. IBA at 3000 ppm concentration were significantly superior to other treatments of auxins. From the present investigation it can also be concluded that the air layering is a viable method for mass propagation of *Azadirachta indica.*

INTRODUCTION

Azadirachta indica (Neem) is a versatile tree distributed in tropical region of India. During recent years, neem has gained tremendous importance as bio-pesticides, neem coated fertilizer, anti-microbial agent, and various industrials and medicinal product. This species has proved it's suitability in Agroforestry (Gill and Roy 1993). The tree has adaptability to a wide range of climatic, topographic and edaphic factors. The tree grows naturally in areas where the rainfall is in the range of 450 to 1200 mm. However, it has been introduced successfully even in areas where the rainfall is as low as 150 to 250 mm. Neem grows on altitudes up to 1500 m. It can grow well in wide temperature range of 0°C to 49°C. It cannot withstand water-logged areas and poorly drained soils. The pH range for the growth of Neem tree lies in between 4 to 10 (Troup 1921).

It could be regenerated by seed. However, to develop true to type seedlings with quality traits vegetative methods need to be developed. Vegetative propagation is practiced to obtain true to type plants of desired genetic traits for tree improvement programmes. Air layering is one of the means employed in tree species. Air-layers of woody plants initiate callus development followed by root formation at the physiological base of the incision. These steps can be enhanced with the application of weak auxins. In the present investigation the effect of auxins on air-layers of A. indica was undertaken to enhance the rooting.

MATERIALS AND METHODS

Air layering trials were conducted on mature trees of neem in Dr. P. D. K. V., Akola. Air layering was done in first week of August and completed within one week in the year 2013. Shoots of uniform growth and size i.e. grade 50-60 cm length and 2-3 cm diameter were selected on each tree. A 4.0 cm wide strip of bark around the shoot was removed. Exposed surface was scraped with sharp knife to ensure the complete removal of both phloem and cambium.

The experiment was designed in Randomized Block Design with ten treatments of IAA, IBA and NAA with one control viz. IAA 1000 ppm (T1), IAA 2000 ppm (T2), IAA 3000 ppm (T3), IBA 1000 ppm (T4), IBA 2000 ppm (T5), IBA 3000 ppm (T6) and NAA 1000 ppm (T7), NAA 2000 ppm (T8), NAA 3000 ppm (T9) and control (T10). Treatments were replicated thrice. Well chopped sphagnum moss was soaked in water for three days and subsequently treated with copper fungicide. After air-layering, observations viz. days required for root initiation, rooting per cent, number of root/layer, average root length/layer (cm) and survival percentage recorded after detachment were recorded in the month of August. The data were analyzed as per Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

The study revealed that growth hormone treatments were found statistically effective under the study. Whereas, the replication effect was found non-significant in all treatments indicating the uniform application of the treatment.

Days to root induction: The minimum days (14.53 days) required for root induction in air layering of A. indica were recorded with IBA 3000 ppm followed by IBA 2000 ppm (16.26 days), whereas control took more period (34.86 days) for root induction. (Fig :1)

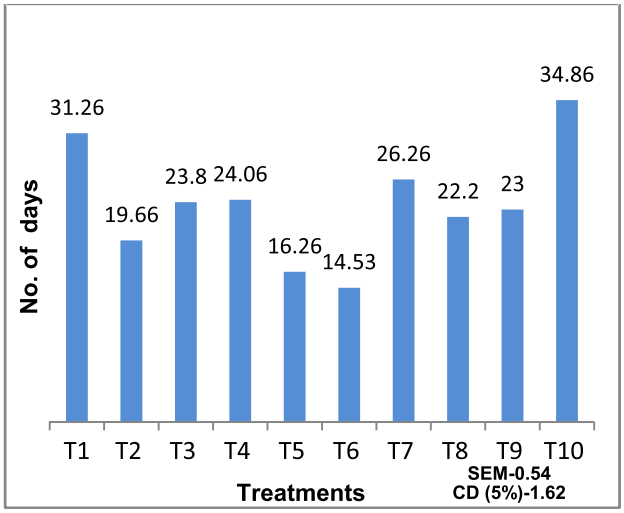

Fig. 1. Effect of auxin concentrations on number of days required to roots initiation in *Azadirachta*

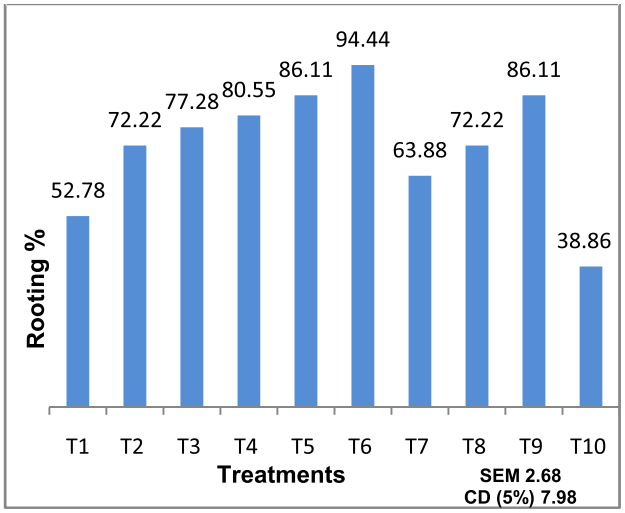

Fig. 2. Effect of auxin concentrations on roots length per layer in *Azadirachta*

(T_1 -IAA 1000 ppm, T_2 -IAA 2000 ppm, T_3-IAA 3000 ppm, T_4 -IBA 1000 ppm, T_5 -IBA 2000 ppm, T_6 -IBA 3000 ppm, T_7-NAA 1000 ppm, T_8 -NAA 2000 ppm, T_9-NAA 3000 ppm and T_{10}-Control)

Number of days to rooting: In an air layering, initiation of early rooting is the primary factors for successful survival of the layers. Initiation of early rooting is dependent on weather conditions prevailing during the period (fig 1).

Rooting percent: The result revealed that per cent rooting was found maximum (94.44%) in air-laeyrs treated with 3000 ppm IBA followed IBA 2000 ppm (86.11%) which was at par with treatment NAA 3000 ppm (86.11%) and IBA 1000 ppm (80.55%). Minimum percentage (38.86%) was in control (Fig. 2).

This might be due to the fact that auxins at specific level are known to induce for regeneration of roots by promotion of hydrolysis, mobilization and utilization of nutritional reserves in the region of root formation. The better performance of IBA may be attributed to their synergistic effect. High rooting and survival percentage was achieved by using IBA 800 ppm in arid region by Kumaran et al. (1992) and Kumar et al. (2002).

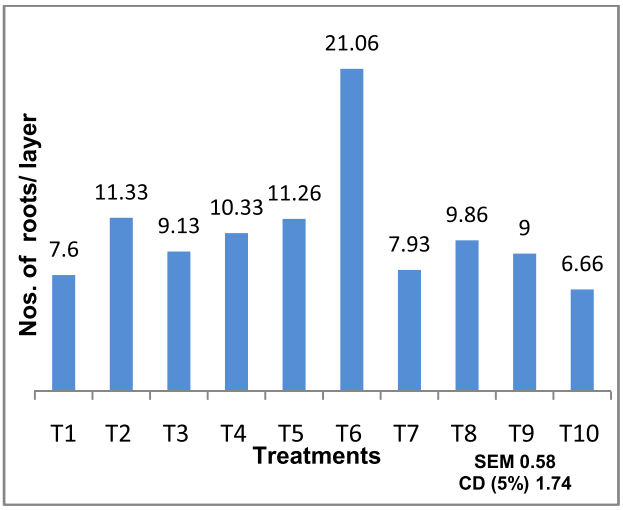

Fig. 3. Effect of auxin concentrations on number of roots per layer in *Azadirachta indica.*

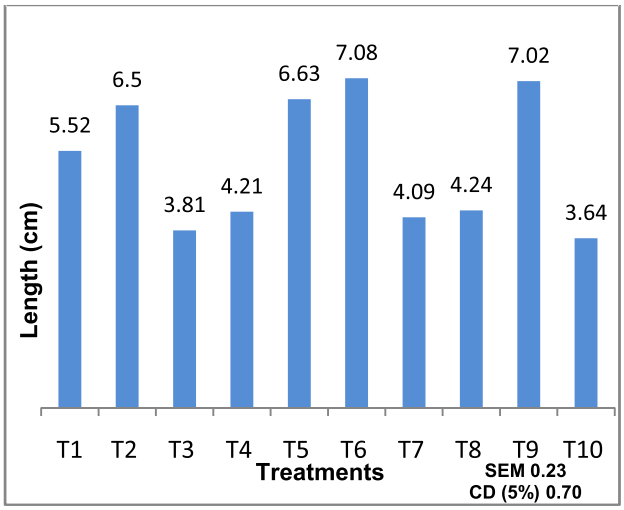

Fig. 4. Effect of auxin concentrations on average root length in *Azadirachta indica*.

(T1 -IAA 1000 ppm, T2 -IAA 2000 ppm, T3 -IAA 3000 ppm, T4 -IBA 1000 ppm, T5 -IBA 2000 ppm, T6 -IBA 3000 ppm, T7-NAA 1000 ppm, T8 -NAA 2000 ppm, T9 -NAA 3000 ppm and T10 -Control)

Rooting numbers: The maximum number of roots (21.06) per layer was recorded with IBA 3000 ppm which is at par with IAA 2000 ppm (11.33) and IBA 2000 ppm (11.26). Minimum number of roots (6.66) per layer recorded in control (fig 3). This might be due to the fact that positive response of plant growth regulator induces an accelerated rate for initiation and consequent production of more number of roots. Similar result was observed by Puri and Nagpal (1988).

Length of root: Figure 4, depicts the average root length observed after 60 days of treatment. IBA 3000 ppm significantly induced maximum average root length (7.08 cm) per layer which was at par with NAA 3000 ppm (7.02 cm) and IBA 2000 ppm (6.63 cm). Minimum length of root per layer was recorded in control (3.64 cm). The increase in root length with IBA may be attributed to its primary physiological effect which is to promote the elongation of cells in the apical region (Singh et al. 2009).

Survival percentage: All treatments of auxins showed significant response in air-layering (Fig. 5). Significantly maximum survival percentage (95.37 %) was observed in the treatment IBA 3000 ppm followed by IAA 2000 ppm (88.88 %) and IAA 1000 ppm (87.96 %). Minimum survival percentage (38.88%) was recorded in control. Better survival of rooted layers is obviously due to profuse rooting with longer roots having increased accumulation of dry matter by Kumar et al. (2002), Mishra et al. (2002) and Palanisamy K (1999).

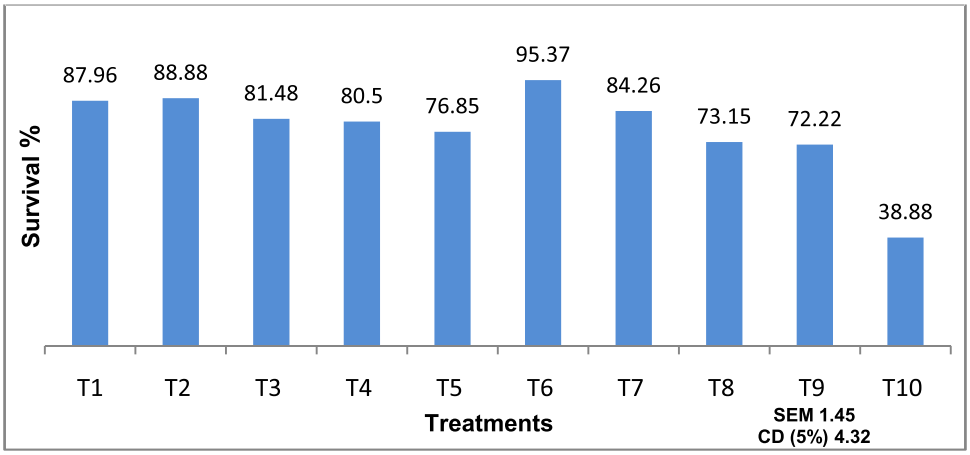

Fig. 5. Effect of auxins in *Azadirachta indica* on survival percentage of layerings

(T1 -IAA 1000 ppm, T2 -IAA 2000 ppm, T3 -IAA 3000 ppm, T4 -IBA 1000 ppm, T5 -IBA 2000 ppm, T6 -IBA 3000 ppm, T7-NAA 1000 ppm, T8 -NAA 2000 ppm, T9 -NAA 3000 ppm and T10 -Control)

CONCLUSION

The present study evinced that among different concentration of auxins, IBA 3000 ppm was found better w.r.t. minimum days required for root initiation, maximum percent of rooting, maximum number of root per layer, average root length per layer (cm) and survival percentage recorded after detachment.

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