

EFFECT OF DIFFERENT CONCENTRATIONS OF INDOLE BUTYRIC ACID ON AIR LAYERING OF MANGO (*Mangifera indica*)

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Abstract: The study was done to determine the effect of different concentrations of Indole Butyric Acid (IBA) on air layering of Mango (*Mangifera Indica*). IBA @ 1000, 2000, 3000, 4000, 5000ppm and control (0.000ppm) were applied on two year old shoots of Dusehri, Sindhri, and Chowsa Mango varieties. The data were collected on number and length of roots. Maximum length of roots was recorded in shoots of Sindhri treated with 3000ppm concentration of IBA. Minimum length of roots was observed in shoots of Sindhri and Dusehri treated with 5000ppm concentration of IBA. There were no significant differences in number of roots among shoots treated with IBA concentrations of 2000, 3000, 4000ppm and control, which produced maximum length of roots. Shoots treated with IBA @ 5000ppm resulted in minimum length of roots.

Keywords: Air layering, *Mangifera indica*, mango, Indole Butyric acid, number and length of roots, varieties.

INTRODUCTION

Mango (*Mangifera indica* Linn.) occupies a prominent place amongst the fruit crops grown in Pakistan. It ranks second in area and production after citrus. It was grown on 94.1 thousand hectares, with a total production of 937.7 thousand tones in 1999-2000 [Govt of Pakistan 2001]. Mango is known for its attractive color, savoring aroma, delightful taste and high nutritive value. Mango is propagated both sexually and asexually. Sexually propagated mango varieties do not produce true to type seedlings due to high cross pollination and heterozygous nature. Generally non-descriptive seedlings are used as rootstocks for propagation. Therefore, it is essential to use clonally propagated standard rootstocks in place of non-descriptive type. This is only possible through air layering, a vegetative method of propagation.

Bid and Mukherjee [1969] reported that application of Indole Butyric Acid (IBA) and Naphthalene Acetic Acid (NAA) improved rooting in shoots of Langra, Chowsa and Bombi Green mango varieties. Highest success was recorded in air layering of Dusehri when shoots were treated with IBA @ 1500ppm [Singh and Baghel 2001]. Rajan *et al.* [1989] reported that the rooting percentage and number of roots were increased in shoots treated with IBA @ 0.0735M in Langra variety. Present research was conducted to study the effect of different concentrations of IBA on two years old shoots of Dusehri, Sindhri and Chowsa mango varieties under ecological conditions of Multan.

MATERIALS AND METHODS

The experiment was carried out at Faiz-e-Chamman Mango Orchard, Khanewal Road Multan. Eighteen trees, i. e. six of each of three mango varieties viz. Dusehri, Sindhri and Chowsa, were selected. The trees were 10-12 years old, of uniform height and health. A bark ring of 2.5 cm was removed from two years old shoots of each tree of each variety. The ringed portion was treated with IBA concentrations of 1000, 2000, 3000, 4000, 5000ppm and a control was also included, where no treatment (0.0ppm) was applied. The treated part was covered with moistened soil and farmyard manure wrapped in polyethylene. Nine layers were made on each tree of each variety. The experiment was conducted in a Randomized Complete Block design in a split- plot arrangement having three replications. Main plot was varieties and subplot was different concentrations of IBA. At 10 days interval, layers were checked for moisture, and if needed water was injected through polythene without opening the wrapping. The layers were opened after 12 weeks. Data on number and length of roots were recorded. The data collected were analyzed using Analysis of Variance technique and the treatment means were compared at 0.05 probability level using Least Significant Differences [Steel and Torrie 1984].

RESULTS AND DISCUSSION

EFFECT OF DIFFERENT CONCENTRATIONS OF IBA ON LENGTH OF ROOTS OF DIFFERENT MANGO VARIETIES

When length of roots for different concentrations of IBA was compared within three varieties of mango, the difference was significant among different concentrations of IBA for the variety Dusheri (Table 1). When air layers were made on Dusehri, maximum length of roots was recorded with control. There were no significant difference in length of roots with 1000, 2000, 3000 and 4000ppm concentrations of IBA and control, which resulted in more length of roots than that with 5000ppm treatment. In variety Sindhri, IBA concentration of 1000, 2000, 3000, 4000ppm and control resulted in non- significantly different length of roots. Length of roots in all these treatments was less as compared to that with IBA concentration of 5000ppm. With variety Chowsa, length of roots was non-significantly different among all the treatments except IBA @ 3000 ppm, which had significantly less length of root. Our results do not agree with the findings of Rajan *et al.* [1989] and Bid and Mukherjee [1969]. In their study, application of IBA improved rooting in different mango varieties. The difference in results could be due to different strengths of IBA used by earlier workers and different environmental conditions for the two studies. From these results, it is clear that IBA treatment up 4000ppm had no effect on the length of roots in different mango varieties, whereas 5000ppm had negative effect on Dusehri and Sindhri varieties.

Table 1: Length of roots (cm) produced by air layering in different varieties of Mango with different concentrations of Indole Butyric Acid (IBA) treatment.

Varieties	IBA Concentrations (ppm)*					
	0	1000	2000	3000	4000	5000
Dusehri	41.67aA	37.33aA	34.67aA	35.67aA	32.00abA	7.88bB
Sindhri	36.20abA	46.00abA	43.33abA	57.67aA	42.00aA	10.67bB
Chowsa	40.53aA	39.73abA	31.00abA	28.33abAB	32.53abA	34.33aA

*Means followed by same letter in rows (upper case) and columns (lower case) are not significantly different at 0.05 probability level.

EFFECT OF DIFFERENT CONCENTRATIONS OF IBA ON LENGTH OF ROOTS OF DIFFERENT VARIETIES OF MANGO

When length of roots for three mango varieties, i.e. Dusehri, Sindhri and Chowsa, were compared within different concentrations of IBA, there were no significant differences for length of roots among varieties for IBA concentrations of 1000, 2000, 4000ppm and control (Table 1). With IBA concentrations of 3000ppm, Sindhri produced maximum length of roots. No significantly different root length was found in Dusehri and Chowsa, which had minimum length of roots. With IBA concentration of 5000ppm, root length was significantly different in different varieties. Chowsa had maximum length of roots followed by Sindhri and Dusehri. No significant differences were found between Sindhri and Dusehri. This may be due to different varietal response to IBA treatment. These results agree with the findings of Srivastava *et al.* [1989]. According to their results, air layered plants of Dusehri had slowest rate of root growth. These results do not agree with the findings of Reddy and Singh [1987].

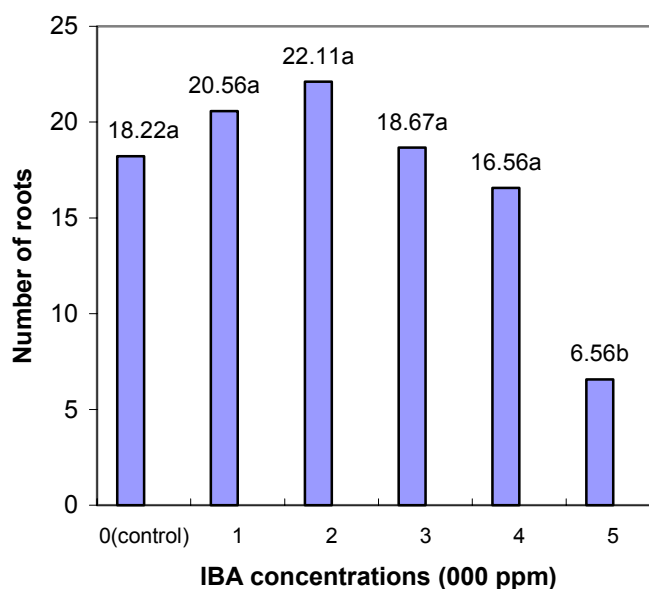


Fig. 1: Number of roots produced by air layering in mango as affected by different concentrations of Indole Butyric Acid (IBA).

EFFECT OF DIFFERENT CONCENTRATIONS OF IBA ON NUMBER OF ROOTS

Minimum number of roots was recorded in IBA concentration of 5000ppm (Fig. 1). When number of roots in different concentrations of IBA treatments was compared, non-significant differences were found in number of roots among the IBA concentrations of 1000, 2000, 3000, 4000ppm and control, which had more number of roots than that in IBA concentration of 5000ppm. These results are different from the findings of Reddy and Singh [1987]. The difference can be attributed to different treatments and the areas where the experiments were conducted.

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