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## Performance of Different Ornamental Plants for Stem Cutting with IBA

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**Abstract:** The performance of stem cutting with IBA in different ornamental plants was investigated. The ornamental plants under study showed significant variation in respect of all the parameters, viz. number of leaves and roots per cutting, fresh and dry weight of leaves and shoots, length of roots per cutting, fresh and dry weight of roots per cutting, number of shoots per cutting after 15, 25, 35, 45 and 55 days. *Ixora* (*Ixora chinensis*) performed the best in respect of highest number (40.10) of leaves per cutting, longest roots (5.15cm) and fresh and dry weight of roots per cutting (1.35 fresh weight and 0.29gm dry weight). Both fresh and dry weight of leaves and shoots per cutting were highest in Poinsettia (*Poinsettia pulcherima*). Poinsettia also produced highest number (46.97) of roots per cutting. *Mussaenda* (*Mussaenda erythrophylla*) and Night Jasmine (*Nyctanthes arbor-tristis*) failed to produce any root.

**Key words:** Stem cutting, IBA, ornamental plants, fresh and dry weight, leaves, roots

### Introduction

Ornamental plants are usually propagated by two means, sexual and asexual propagation. Many ornamental plants do not normally produce viable seeds. Multiplication of these plants is possible only if vegetative method of propagation is adapted. There are various means of vegetative propagation. Among those stems cutting is the most important, easiest, cheapest, convenient, simple and rapid for multiplying ornamental shrubs (Bose and Mukherjee, 1977). Stem cutting is a process in which plants are reproduced by severing a portion of stem from the parent plant and rooting in a favorable medium under optimum conditions. Stem cutting has numerous advantages such as plant propagation by cutting gives early bearing of quality products. It also eliminates stock-scion incompatibility (Crockett, 1978). Many new plants can be obtained in limited space from few stock plants. The chemical substances, which are produced inside the living plants having specific functions, are called plant growth regulators or simply hormone or phytohormone (Parihar, 1961). Growth regulator, mainly IBA, is commonly used to achieve high percentage of success for ornamental species (Kundu *et al.*, 1987). Performance of stem cutting in different ornamental plants with the use of IBA has not been investigated properly in Bangladesh. The present experiment was therefore undertaken to assess the performance of stem cutting with IBA in different ornamental plants.

### Materials and Methods

The experiment was conducted in Horticulture Department, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh during the period of June to September 2000. Nine ornamental plants, *Ixora*, China box, Poinsettia, *Mussaenda*, Oleander, Magnolia, Arabian Jasmine, Night Jasmine and Kunda were used in the investigation. Ten to fifteen centimeter long stem cuttings, each having at least two nodes were made from healthy stems growing in full sun. The stem cuttings were pencil like in diameter. Slant cut was made at the proximal end of the stem cutting. Before placing in rooting media (50% loamy soil + 50% fine sand) the proximal ends of the cuttings were dipped in 500 ppm IBA solution for 24 hours. The stem cuttings were placed in rooting media at an angle of 45°. The experiment was laid out in RCBD with three replications. Data were collected on number of shoots per cutting at different dates, number of leaves per cutting, fresh weight of leaves and shoots per cutting (g), dry weight of leaves and shoots per cutting (g), number of roots per cutting, length of roots per cutting (cm), fresh and dry weight of roots per cutting (g) after 55 days of planting the cuttings. The data were analyzed statistically. The analysis of variance for the characters studied was performed by F-test. The significance of the difference between means was evaluated by DMRT.

### Results and Discussion

**Number of shoots per cutting at different dates:** Significant variation was found in producing number of shoots per cutting

among different ornamental species after 55 days of planting the cuttings in rooting media (Table 1). In this regard *Ixora* overshadowed all other species and produced the remarkably highest number of shoots (6.14) per plant throughout the study period. This result is in conformity with the findings of Gupta and Kher (1989). The increase in number of shoots per cutting in *Ixora* may be due to higher number of nodes and vegetative buds in each cutting. The second highest number of shoots (4.50) per plant was obtained from Poinsettia, which was followed by that of Oleander (3.62) and Kunda (3.57). On the other hand, China box resulted the lowest number of shoots (0.32) per plant at all the dates which was statistically identical with that of *Mussaenda* (0.57) and Night Jasmine (0.64), but significantly lower than that of any other species, Magnolia and Arabian Jasmine produced significantly lower number of shoots per plant than those of *Ixora*, Oleander, Poinsettia and Kunda, and higher number of shoots per plant than those of China box, *Mussaenda* and Night Jasmine.

**Number of leaves per cutting:** There was a significant variation in respect of number of leaves per cutting in different ornamental species (Table 2). *Ixora* gave the highest number of leaves per cutting (40.10), which was significantly higher than those of any other species. This finding is in accord with the results of Henting and Gruber (1988). Kunda produced the second highest number of leaves (23.90) per plant followed by Oleander (20.10). On the other hand, *Mussaenda* produced no leaves and the lowest number of leaves was in Night Jasmine (0.71). Poinsettia gave the moderate number of leaves (15.50) per cutting, followed by Arabian Jasmine (10.98) but significantly higher than that of Magnolia.

**Fresh weight of leaves and shoots per cutting:** The fresh weight of leaves and shoots significantly varied in different ornamental plant species (Table 2). Unlike the number of leaves per cutting, the heaviest weight (3.0g) of fresh leaves and shoots was found from Poinsettia, which was statistically similar to that of *Ixora* (2.8g) followed by Magnolia (1.5g). *Mussaenda* could not produce leaves. Fresh weight of leaves and shoots from Arabian Jasmine (0.70g) and Oleander (0.82g) were statistically similar. China box produced the lowest weight (0.20g) of fresh leaves and shoots per cutting. Increase in fresh weight of leaves and shoots per cutting in Poinsettia were due to larger leaves and shoots.

**Dry weight of leaves and shoots per cutting:** Almost a similar pattern of fresh weight of leaves and shoots was also noticed in case of dry weight of leaves and shoots. In both the cases, Poinsettia retained its superiority (0.75g). The second highest dry weight of leaves and shoots was observed in *Ixora* (0.65g) followed by Kunda (0.56g) and Magnolia (0.54g). On the other hand the lowest (0.03g) dry weight of leaves and shoots was produced by China box and Night Jasmine. *Mussaenda* did not produce any dry weight of leaves and shoots.

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Table 1: Performance of different ornamental plants for stem cutting with IBA in producing number of shoots per cutting

Ornamental Plants	Number of Shoots per cutting after				
	15 days	25 days	35 days	45 days	55 days
Arabian Jasmine ( <i>Jasminum sambac</i> )	0.20d	2.00c	2.73d	2.73d	2.81d
Mussaenda ( <i>Mussaenda erythophylla</i> )	0.14d	0.27d	0.26e	0.56e	0.57e
Poinsettia ( <i>Poinsettia pulcherima</i> )	2.98ab	3.50b	4.40b	4.41b	4.50b
China box ( <i>Murraya exotica</i> )	0.08d	0.26d	0.27e	0.28e	0.32e
Oleander ( <i>Nerium oleander</i> )	2.50abc	3.07b	3.38c	3.60c	3.62c
Magnolia ( <i>Magnolia pumila</i> )	1.78c	2.40c	2.45d	2.47d	2.49d
Ixora ( <i>Ixora chinensis</i> )	3.28a	4.20a	5.32a	5.62a	6.14a
Night Jasmine ( <i>Nyctanthes arbortristis</i> )	0.42d	0.60d	0.62e	0.63e	0.64e
Kunda ( <i>Jasminum pubescens</i> )	2.36bc	3.21b	3.28e	3.53e	3.57c
LSD at 5% level of significance	0.750	0.477	0.486	0.709	0.541

Means bearing the same letter(s) do not significantly differ at 5% level of probability.

Table 2: Performance of different ornamental plants for stem cutting with IBA in producing different growth parameters

Ornamental plants	No of leaves per cutting	Fresh weight of leaves and shoots per cutting (g)	Dry weight of leaves and Shoots per cutting (g)	No of roots per cutting	Length of roots per cutting (cm)	Fresh weight of roots per cutting (g)	Dry weight of roots per cutting (g)
Arabian Jasmine ( <i>Jasminum sambac</i> )	10.98e	0.70c	0.13e	2.51f	2.29e	0.13d	0.01c
Mussaenda ( <i>Mussaenda erythrophylla</i> )	0.00g	0.00d	0.00f	0.00g	0.00g	0.00d	0.00c
Poinsettia ( <i>Poinsettia pulcherima</i> )	15.50d	3.00a	0.75a	46.97a	3.65c	0.98b	0.28a
China box ( <i>Murraya exotica</i> )	2.25g	0.20d	0.03f	1.02fg	0.99f	0.15d	0.01c
Oleander ( <i>Nerium oleander</i> )	20.10c	0.82c	0.29d	11.28d	4.21b	0.47c	0.12bc
Magnolia ( <i>Magnolia pumila</i> )	7.86f	1.50b	0.54c	8.50e	3.15d	0.43c	0.08bc
Ixora ( <i>Ixora chinensis</i> )	40.10a	2.80a	0.65b	24.02b	5.15a	1.35a	0.29a
Night Jasmine ( <i>Nyctanthes arbortristis</i> )	0.71g	0.13d	0.03f	0.00g	0.00g	0.00d	0.00c
Kunda ( <i>Jasminum pubescens</i> )	23.90b	2.50a	0.56bc	19.00c	5.10a	0.90b	0.18ab
LSD at 5% level of significance	2.233	0.486	0.094	1.898	0.444	0.238	0.109

Means bearing the same letter(s) do not significantly differ at 5% level of probability.

**Number of roots per cutting:** The highest number of roots per cutting (46.97) was found in Poinsettia followed by Ixora (24.02) and Kunda (19.00), while the lowest number of roots (1.02) was produced by China box (Table 2). On the other hand, Mussaenda and Night Jasmine did not produce any roots. Moderate number of roots per cutting was produced by Oleander (11.28) followed by Magnolia (8.50). In case of stem cutting, there is a relation between number of newly formed shoots and roots. More the number of shoots, more the number of roots. Poinsettia and Ixora produced a good number of shoots and leaves. As a result these two species produced a good number of roots per cutting. Increase in number of roots with the increase in number of shoots and leaves were also recorded by Bose and Mukherjee (1977).

**Length of roots per cutting:** Significant variation was observed in respect of length of roots in different ornamental plants. Ixora produced the longest roots (5.15cm) followed by Kunda (5.10cm) and Oleander (4.21cm). China box produced the shortest roots (0.99cm). This finding was in agreement with that of Gupta and Kher (1989) and Henting and Gruber (1988) who observed the longest roots in Ixora. Poinsettia produced moderately long roots (3.65cm) followed by Magnolia (3.15cm). Mussaenda and Night Jasmine could not produce any roots.

**Fresh weight of roots per cutting:** In respect of fresh weight of roots per cutting Ixora gave the best result (1.35g). Poinsettia and Kunda gave statistically similar result (0.98g and 0.90g respectively) for fresh weight of roots per cutting. Oleander and Magnolia produced statistically similar (0.47g and 0.43g respectively) moderate fresh weight of roots per cutting. Arabian

Jasmine and China box are the poor performer (0.13g and 0.15g respectively) regarding fresh weight of roots per cutting.

**Dry weight of roots per cutting:** Like fresh weight of roots per cutting a similar pattern was found in case dry weight of roots per cutting. Ixora produced the highest amount (0.29g) of dry weight of roots per cutting followed by Poinsettia (0.28g) and Kunda (0.18g). Oleander (0.12g) and Magnolia (0.08g) produced statistically similar dry weight of roots per cutting. Arabian Jasmine and China box are the poor performer (0.01g) in respect of dry weight of roots per cutting.

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