IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 5, Issue 4 (Sep. - Oct. 2013), PP 51-54
www.iosrjournals.org

Effect of Planting Date and Iba Concentration on Rooting Ability of Stem Cutting Of Fraser's Photinia (*Photinia X Fraseri*).

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Abstract: *This study was carried out in the Agricultural College/ Salahalden University during the period between 1st March, 2010 to 1st August, 2010, to investigate the effect of planting dates (1st Mar, 1st Apr, 1st May), and IBA concentrations (0, 2000, 4000, 6000, 8000) mg.l-1 on rooting ability of stem cuttings of Fraser's photinia (Photinia x fraseri). Results show that the best rooting percentage 60.93% and roots number are for cutting propagated in 1st Apr, while the best superior increase in shoot growth number, leave number, and shoot dry weight was in 1st May. 6000 and 8000 mg.l-1 IBA causes significantly increase in rooting percentage 67.11, 68.33% comported with the less (control) 39.00%. Also roots number increased significantly with IBA increase from 2000 to 4000, 6000, 8000 mg.l-1 with increasing percentage 23.81, 33.33, 47.62, and 50.00% when compared with control; the highest significantly increase in mean length of longest roots reach 485.43% for 8000 mg.l-1 than control. Although 2000 and 4000 mg.l-1 IBA causes significantly increase in shoots growth number, all IBA concentration show significantly increase in leave number and root dry weight, while the 4000, 6000 mg.l-1 concentration had significantly effect on shoot dry weight. The interaction between planting dates and IBA concentrations case significantly variance in all rooting parameters and the highest rooting percentage reach72.00% for cutting treated with 4000, 6000, 8000 mg.l-1 and planted in 1st Apr , and the highest shoots growth number and leave number 4.67, 13.33 from cutting treated with 2000, mg.l-1 and planted in 1st May.*
Keywords: *planting dates, IBA concentration, Fraser's photinia .*

I. Introduction

Fraser's photinia (*Photinia* x *fraseri*) a member of the Rosaceae family is a popular, evergreen, woody shrub, with shades of red on new growth. It is a woody ornamental plant species in which vegetative propagation by traditional methods is inefficient since cuttings of this species have been shown to be difficult-to-root (Dirr, 1990). some cultural practices as time of year, media temperature, light level, air temperature, misting, and plant growth regulators (PGRs) are often used to stimulate rooting (promote adventitious rooting which arise from any plant part other than by the normal development and ontogeny of the seedling root and its branches) and reduce the length of time needed to root stem cuttings (Hartmann *et al*, 2002). Fraser's photinia is One of them which is considered difficult to root without an exogenous root promoting (PGRs) (Bonaminio, and Blazich, 1983), which found that 5000, 10000 mg .l^{-1} of IBA solutions applied to terminal, semi-hardwood cuttings of Fraser's photinia (*Photinia x fraseri*) promoted rooting more effective than control, and increase rooting percentage significantly (100.0, 93.3, 30.0) % for 10000, 5000, 0 mg.l^{-1} IBA, respectively, and number of roots per cutting. Fox and Montague, (2004) found that Rooting percentage of Fraser's photinia was highest for cuttings treated with high Drought Conditioning (DC) and plant growth regulators (PGR) treatments, while medium or high Drought Conditioning and plant growth regulators treatment produced the greatest number of roots, and the mean root length was longest for cuttings treated with medium + PGR and high DC + no PGR. Smythe and Smythe, (1989) indicated that a period is starting from October to November causes rooting percentage drops to an unacceptably low level, this being maintained until the end of summer for four ornamental plants *Corokia cotoneaster*, *Cassinia albida*, *Pittosporum tenuifolium* and *Pseudopanax lessonii* propagated by terminal cutting. Biasi *et al* (1990) found that the highest rooting percentage of semi-hardwood cuttings of *Actinida deliciosa* was obtained from cuttings collected in July - August and treated with 2000 – 6000 mg.l^{-1} IBA. While optimum rooting of *Cephalolaxus horringtonia* cuttings occurred when the cutting treated with 10000 mg.l^{-1} of IBA as quick-dip method and planted during December to March with 88, 90, 78, and 70% rooting percentage respectively. Also Roots number and length were highest during these months (South worth and Dirr, 1994). Higher concentrations of IBA were more effective in promoting rooting ability in fall than in spring (Montgomery *et al*., 1994). Conden, (2002) taken stem cuttings of *Castanopsis sclerophylla* at three dates representing three growth stage (softwood, semi-hardwood, or hardwood), treated with IBA from 0 to 10000 mg.l^{-1}. The response of softwood cuttings to IBA was quadratic with the greatest rooting 63% at 7500 mg.l^{-1}. However, roots number and length were not significantly affected by IBA concentrations, Bonaminio, and Blazich, (1983) Indicates that rooting Fraser's photinia cuttings during November may improved when compared with cuttings that taken in August. Hammo et al ,(2009) found that Increase IBA from 750 to 3000

mg.l-1 concentration causes significantly increase in rooting percentage of shoot tip cutting of *Myrtus communis* when compared with other treatments, also increase this factor from 2250 to 3750 mg.l-1 concentration causes significantly increase in total roots length, roots dry weight, shoots number.

The following study was undertaken to investigate the effects IBA application and planting dates on the rooting of Fraser's photinia stem cuttings.

II. Material and methods

This study was carried out in the plastic house of Oz-has nursery Salahalden governorate from 1st March, 2010 to 1st August, 2010, to investigate the effect of planting date, IBA concentrations on rooting ability of stem cuttings of Fraser's photinia (*Photinia* x *fraseri*). Hardwood cuttings, each 15 ± 2 cm long of Fraser's photinia were planted on (1-Mar, 1-Apr, 1-May), from stock plants growing under uniform climate, The 5 cm leaves basal portion of each cutting removed and dipped in to (0, 2000, 4000, 6000, 8000) mg. l^{-1} concentrations of IBA solution to a depth of 2 cm (quick deep). Each five treated cuttings were cultivated into 780 cm^3 polyethylene propagating container filled with 2:1:1 river soli: peatmose: sand (by volume).The experimental design was a randomized complete block design using 5 cuttings per treatment and 4 replications. Thirteen weeks after the experiment was initiated, cuttings were harvested and data recorded include Rooting percentage%, Mean number of roots/cutting, Mean length of longest root (cm), Number of shoots/cutting, leave number/cutting, dry weight of shoots per cutting (gm), Dry weight of roots (gm)/cutting. The statistical analysis and Means comparison was done by using Duncan's Multiple Ranges Test under 5% (SAS, 2001).

III. Results and Discussion

1- Effect of planting date and IBA on rooting percentage, roots number, and taller roots length, of Fraser's photinia cutting.

Data in table (1) show that hardwood cutting propagated in 1st Apr had superior increase in rooting percentage 60.93% when compared with that propagate in 1st Mar and 1st May 55.00%, 56.80% respectively, although planting date had no significant effect on mean length of longest roots as shown in the previous table, the roots number in 1st Apr and 1st May increased significantly as compared with 1st Mar with increasing percentage reach 34.21%, 27.63% for the two date respectively. IBA concentrations 6000 and 8000 mg.l^{-1} causes significantly increase in rooting percentage 67.11, 68.33% respectively when compared with the less (control) 39.00% and 2000, 4000 mg.l^{-1} that gives 51.44%, and 62.00% respectively. Also the roots number increased significantly with all IBA concentration when compared with control with increasing percentage reaches 23.81, 33.33, 47.62, 50.00% for 2000, 4000, 6000, 8000 mg.l^{-1} respectively, the highest significantly increase in mean length of longest roots obtained for 8000 mg.l^{-1} than control which reach 485.43%. The interaction between planting date and IBA concentration case significantly deference in all rooting parameters ,the highest rooting percentage 72.00, 72.00, 72.00% obtained from cutting treated with 4000, 6000, 8000 mg.l^{-1} respectively and planted in 1st Apr while the lowest percentage for control that planted in the 1st Mar, and 1st Apr 35.00% for the two. The interaction between all treated cutting planted in 1st Apr, 1st May and 8000 mg.l^{-1} for the first planting date gives the highest means 3.00 – 4.17 roots/cutting that varied significantly than other treatment, also the cuttings planted in the three planting date and treated with 8000 mg.l^{-1} of IBA give the highest mean length of longest roots 4.60, 5.50, 4.63 cm for 1st May, 1st Apr, 1st May respectively while the less mean length are for control cutting that planted in 1st Mar, and 1st Apr 0.95, 0.75 cm.

2- Effect of planting date and IBA on shoot growth number, leave number, shoots dry weight, roots dry weight of Fraser's photinia cutting.

Data in table (2) show that cutting planted in 1st May had superior increase in shoot growth number, leave number, and shoot dry weight when compared with another planting date with increasing percentage 23.73, 10.07, 9.08% than 1st Apr and 49.39, 54.00, 25.24% than 1st Mar for the three characters respectively, while this factor had no significant effect on root dry weight. IBA concentrations 2000 and 4000 mg.l^{-1} causes significantly increase in shoots growth number 3.89, 3.75 than other treatment and the less number was for control 2.67, all IBA concentration show significantly increase in leave number when compared with control with increasing percentage reaches 26.95, 26.24, 21.28, 20.57% for 2000, 4000, 6000, 8000 mg.l^{-1} respectively and in root dry weight with increasing percentage 22.70, 22.63, 42.81, 33.68% respectively, while the 4000, 6000 mg.l^{-1} concentration of IBA had significantly effect on shoot dry weight more than other treatment. The interaction between planting date and IBA concentration case significantly deference in all rooting parameters in table (2), and the highest shoots growth number and leave number are 4.67, 13.33 that obtained from cutting treated with 2000, mg.l^{-1} and planted in 1st May while the lowest are for control 2.00, 6.00 that planted in the 1st Mar for the two character respectively. the interaction between cutting planted in 1st May and 2000 mg.l^{-1} give the highest means of shoots dry weight 3.25 gm that varied significantly than other treatment, also the cuttings planted in most planting date and treated with all IBA concentration give the highest mean of root dry weight

this character ranged between 0.37- 0.49 gm while the less mean are for control cutting that planted in 1st Mar 0.25gm. The significantly superior of 1st Apr and 1st May in most studies characters may be related to the Optimum daytime in this month which was satisfactory for rooting cutting of most temperate species (Hartmann et al. 2002).or may be refer to the positive effect of IBA in hastening root initiation, increasing the number and quality of roots produced, and increasing the uniformity of rooting which would be capable of increased nutrient and water uptake (Blazich, 1988 ; Bonaminio, and Blazich, 1983). Also the increases in all characters may be referring to the highly significant positive correlation between them as shown in table (3).

Table (1). Effect of planting date and IBA on rooting percentage and some root characters of Fraser's photinia cutting.

Planting Date		IBA concentrations mg l^{-1}					Planting Date Effect
		0	2000	4000	6000	8000	
Rooting %	1 st Mar	35.00d	53.33c	52.00c	67.33ab	67.33 ab	55.00b
	1 st Apr	35.00d	53.67c	72.00a	72.00a	72.00 a	60.93a
	1 st May	47.00c	47.33c	62.00b	62.00b	65.67 ab	56.80b
	IBA Effect	39.00d	51.44c	62.00b	67.11a	68.33 a	
Roots number	1 st Mar	2.17d	2.50c-d	2.33cd	2.67c-d	3.00a -d	2.53b
	1 st Apr	2.50c-d	3.17a-d	3.50a-c	3.67ab	4.17a	3.40a
	1 st May	2.33cd	3.00a-d	3.50a-c	4.00a	3.33a -d	3.23a
	IBA Effect	2.33b	2.89ab	3.11a	3.44a	3.50a	
length of longest roots cm	1 st Mar	0.95g	2.50c-e	2.25de	3.57b	4.60a	2.77a
	1 st Apr	0.37g	2.50c-e	2.17e	3.27b-d	5.50a	2.76a
	1 st May	1.20fg	2.50c-e	2.07ef	3.33bc	4.63a	2.75a
	IBA Effect	0.84d	2.50c	2.16c	3.39b	4.91a	

Each means in row for one or interactions factors with different letters are significantly different at P = 0.05 using Duncan's multiple range test.

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Table (2). Effect of planting date and IBA on some vegetative characters of Fraser's photinia cutting.

Planting Date		IBA concentrations mg l^{-1}					Planting Date Effect
		0	2000	4000	6000	8000	
shoots growth number	1 st Mar	2.00e	3.00cd	3.00cd	2.67d	3.00cd	2.73c
	1 st Apr	2.50de	4.00ab	4.00ab	3.00cd	3.00cd	3.30b
	1 st May	3.50bc	4.67a	4.25a	4.00ab	4.00ab	4.08a
	IBA Effect	2.67c	3.89a	3.75a	3.22b	3.33b	
Leave number	1 st Mar	6.00h	6.50gh	6.50gh	7.50fg	9.00de	7.10c
	1 st Apr	8.50ef	10.00cd	11.17bc	11.00bc	9.00de	9.93b
	1 st May	9.00de	13.33a	12.00b	10.00cd	10.33cd	10.93a
	IBA Effect	7.83b	9.94a	9.89a	9.50a	9.44a	
shoots dry weight gm	1 st Mar	1.42g	1.71g	2.10f	2.77b-d	2.91a-c	2.18c
	1 st Apr	1.75g	2.15f	3.07ab	3.16a	2.40ef	2.50b
	1 st May	2.59c-e	3.25a	2.96ab	2.52de	2.34ef	2.73a
	IBA Effect	1.92d	2.37c	2.71ab	2.81a	2.55bc	
Roots dry weight gm	1 st Mar	0.25d	0.42a-c	0.36a-d	0.49a	0.46ab	0.39a
	1 st Apr	0.32cd	0.37a-d	0.41a-c	0.41a-c	0.34b-d	0.37a
	1 st May	0.38a-d	0.37a-d	0.40a-c	0.46ab	0.47ab	0.42a
	IBA Effect	0.32b	0.38ab	0.39a	0.45a	0.42a	

Each means in row for one or interactions factors with different letters are significantly different at P = 0.05 using Duncan's multiple range test.

Table (3): correlation between characters.

characters	Rooting %	Roots number	Length of longest roots	shoots number	Leave number	shoots dry weight
Roots number	0.551**					
Length of longest roots	0.757**	0419**				
shoots number	0.245	0.336*	0.178			
Leave number	0.318*	0.510**	0.148	0.773**		
shoots dry weight	0.601**	0.436**	0.326*	0.539**	0.748**	
Roots dry weight	0.509**	0.165	0.451**	0.324*	0.186	0.430**