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Effect of IBA and NAA and their combination on the shooting of stem cuttings of African marigold (*Tagetes erecta* L.) cv. Pusa Narangi Gainda

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Abstract

The experiment was carried out in completely randomized design with three replications and the cuttings were planted on protray and placed at mist chamber and consist of three different concentrations of IBA (100, 200 and 300 ppm), NAA (100, 200 and 300ppm) and IBA+NAA (100+100, 200+200 and 300+300 ppm) along with control were treated for shooting in stem cuttings of marigold under Chhattisgarh plain region. The result revealed that growth regulators IBA and NAA had significantly effect on shooting performance of African marigold. The number of sprouts per cutting (7.55), average length of shoot (8.00 cm), number of leaves per cutting (163.44), fresh weight (1140.55 mg) and dry weight of shoot (159.00 mg) were recorded maximum in NAA 200 ppm at 35 days after planting of cuttings.

Keywords: *Tagetes erecta* L., stem cutting, IBA, NAA, shooting

Introduction

Marigold (*Tagetes erecta* L.) belongs to the family Compositae. This family includes 1,600 genera and 23,000 species, in which herbs, shrubs, climbers and also medicinal plants are included (Hussain *et al.*, 2012). The name *Tagetes* was given after Tages, a demigod, known for his beauty. Neither African Marigold (*Tagetes erecta*) nor French Marigold (*Tagetes patula*) come from Africa or France. It is native to Central and South America specially Mexico. In India Marigold was introduced by Portuguese and it became popular and spread quickly because of its wide adaptability to varying climatic and soil condition. The auxin specially IBA and NAA producing early, easily and healthy shoots in cuttings of Horticultural crops. The information of success of rooting as well as shooting in marigold when cuttings are treated with IBA and NAA and their combination are meager under Chhattisgarh plains. Therefore cuttings of "Pusa Narangi Gainda" had been treated with different concentration of IBA and NAA and their combinations to find out the success of cuttings for shoot initiation and its growth.

Material and method

In this study a commercial cultivar Pusa Narangi Gainda of *Tagetes erecta* L. was used as plant material and two different auxins IBA and NAA were used as plant growth regulator. Three concentrations (100, 200 and 300 ppm) of two plant growth regulator and their combination were tested for shoot growth of marigold cutting. The stem cuttings of the marigold plants were treated with each concentration of each plant growth regulators for 1 min and then simultaneously transferred in the protray under mist chamber. These treatments were compared with the control which did not apply any growth regulator. The experiment was conducted in Completely Randomized Design (CRD) and each treatment was replicated thrice.

Result and discussion

1. Number of sprouts per cutting

The maximum number of sprouts per cutting (7.55) was recorded under 200 ppm NAA followed by 200 ppm IBA, 300 ppm IBA and 100 ppm IBA which was significantly highest than all the treatments. The lowest number of sprouts (4.44 cm) per cutting was recorded under control. These finding agree with the finding of Singh *et. al* (2013)^[3] in night queen (*Cestrum*

nocturnum L), Waseem *et al.* (2011)^[1] in chrysanthemum.

2. Average length of vegetative shoot per cutting (cm)

The maximum average length (8.00 cm) of shoot per cutting was recorded under 200 ppm NAA which was significantly highest than all the tested treatments. The lowest average length (3.29 cm) of shoot per cutting was recorded under control. Similar findings were observed by Ullah *et al.* (2013)^[4] in Marigold, and Girisha *et al.* (2012)^[2] in Daisy.

3. Number of leaves per cutting

The maximum number (163.44) of leaves per cutting was observed under 200 ppm NAA which was found remarkably more than all the treatments of this study. The lowest number (57.77) of leaves per cutting was recorded in control. Similar findings were observed by Narayan (2015)^[6] in Marigold, Waseem *et al.* (2011)^[1] in Chrysanthemum.

4. Fresh weight of shoots per cutting (mg)

Table 1: Effect of IBA and NAA and their combination on number of sprouts and average length of shoots per cutting after 25 and 35 days of planting.

Tr. No.	Treatment	No. of sprouts		Av. length of shoots (cm)	
		25DAP	35DAP	25DAP	35DAP
T1	IBA100	4.10 (2.25)	6.55 (2.74)	4.00	6.78
T2	IBA200	4.99 (2.43)	7.21 (2.86)	4.30	7.84
T3	IBA300	4.21 (2.28)	6.55 (2.74)	4.04	6.84
T4	NAA100	3.99 (2.22)	5.33 (2.15)	3.78	6.55
T5	NAA200	5.55 (2.55)	7.55 (2.92)	4.48	8.00
T6	NAA300	3.44 (2.10)	4.77 (2.39)	3.31	5.77
T7	IBA+NAA100	3.55(2.12)	4.99 (2.43)	3.67	6.10
T8	IBA+NAA200	3.77 (2.18)	4.99 (2.43)	3.68	6.21
T9	IBA+NAA300	3.99(2.22)	6.10(2.65)	4.00	6.72
T10	CONTROL	2.21 (1.79)	4.44 (2.33)	2.74	3.29
SEm ±		0.11	0.13	0.35	0.73
CD (P=0.05)		0.33	0.39	1.03	2.15

Table 2: Effect of IBA and NAA and their combination on number of leaves per cutting after 25 and 35 days of planting.

Tr. No.	Treatment	No. of Leaves	
		25DAP	35DAP
T1	IBA100	71.33 (8.47)	123.66 (11.15)
T2	IBA200	75.11 (8.71)	151.33 (12.28)
T3	IBA300	71.77 (8.46)	144.44 (12.05)
T4	NAA100	66.66 (8.11)	121.89 (11.05)
T5	NAA200	87.11 (9.37)	163.44 (12.73)
T6	NAA300	53.55 (7.06)	110.22 (10.53)
T7	IBA+NAA100	64.89 (8.11)	112.33 (10.60)
T8	IBA+NAA200	66.66 (8.21)	114.44 (10.65)
T9	IBA+NAA300	67.11 (8.23)	123.33 (11.12)
T10	CONTROL	22.77 (4.86)	57.77 (7.56)
SEm ±		0.68	0.71
CD (P=0.05)		2.02	2.12

Table 3: Effect of IBA and NAA and their combination on fresh and dry weight of cutting after 25 and 35 days of planting.

Tr. No.	Treatment	Fresh wt. of shoot		Dry wt. of shoot (mg)	
		25DAP	35DAP	25DAP	35DAP
T1	IBA100	577.78 (24.03)	925.89 (30.26)	87.22	139.66
T2	IBA200	679.66 (26.00)	1096.66 (32.99)	102.66	142.11
T3	IBA300	671.66 (25.88)	1000.33 (31.59)	95.77	140.88
T4	NAA100	532.00 (23.01)	879.33 (29.56)	79.33	120.22
T5	NAA200	699.66 (26.46)	1140.55 (33.73)	105.22	159.00
T6	NAA300	476.89 (21.75)	611.00 (24.52)	73.11	86.77
T7	IBA+NAA100	481.33 (22.35)	811.11 (28.38)	75.22	95.89
T8	IBA+NAA200	501.11 (21.70)	815.44 (28.48)	76.44	109.88
T9	IBA+NAA300	560.55 (23.67)	889.88 (29.48)	80.33	132.00
T10	CONTROL	417.55 (20.45)	569.33 (23.76)	70.77	86.66
SEm ±		1.25	2.01	7.28	17.48
CD (P=0.05)		3.73	5.99	21.49	51.56

Conclusion

This study indicated that, the vegetative growth like number of sprouts, average length of shoot, number of leaves, fresh and dry weight of shoot is recorded maximum under 200 ppm NAA treated cuttings. Fresh and dry weight of shoot portion per cutting were observed maximum with the treatment of NAA 200 ppm, which was found significantly similar with IBA 200 ppm, IBA 300 ppm and IBA 100 ppm.

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