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EFFECT OF PLANT GROWTH REGULATORS AND ORGANIC SUBSTANCES ON SURVIVAL PERCENTAGE OF GUAVA CUTTING CV. LUCKNOW-49

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Abstract

An experiment was conducted in Floriculture unit, Department of Horticulture, Faculty of Agriculture, Annamalai University to study the influence of plant growth regulators and organic substances on rooting of Guava cutting Cv. Lucknow-49. The experiment was laid out by completely randomized design (CRD) with 13 treatments which were replicated thrice. The treatment schedule consisted of different growth regulators and organic substances *viz.,* Indole butyric acid with the concentrations of 3000, 4000, 5000 ppm, Naphthalene acidic acid with the concentration of 1000, 2000, 3000 ppm, Humic acid @ 1 %, 2 %, 3% and Seaweed extract @ 1 %, 2%, 3%. The results of study revealed that the cuttings treated with Indole butyric acid @ 5000 ppm significantly increased the length of shoot, width of leaf, number of leaves, diameter of shoot, percentage survival of cuttings when compared to control. From the above results, it can be concluded that the cuttings dipped in IBA @ 5000 ppm improved the highest percentage survival of cutting in guava cv. Lucknow-49.

Key words : Humic acid, *Psidium guajava*, growth regulators, survival percent.

Introduction

Guava (*Psidium guajava* L.) a member of family Myrtaceae which is widely grown all over the tropics and sub tropics, popularly known as "Poor man's apple" or "Apple of tropics. It is grown in the homestead gardens throughout the country even without or with little care. Guava fruit is a rich source of Vitamins A, B_1, B_2, and vitamin C, and contains approximately 260 mg of vitamin C in 100 grams of guava fruit and good source of calcium and phosphorous. Moreover, guava bears highly economic crop every year. It succeeds under a wide range of climatic conditions ranging from sea level to an altitude of 1515 m (5000 ft). Thus, there is need to standardize vegetative propagation methods, especially cutting is the most economical method of vegetative propagation (Hartman and Kester,1983). Organic substances like seaweed extract and Humic acid offer an economically attractive and ecologically sound means of reducing external inputs and improving the quality and quantity of internal resources. (Bhagat *et al.,* 1998). Organic substances are inputs containing micro-organism which are capable of mobilizing nutritive elements from non-usable to usable biological processes. They are less expensive, eco-friendly and sustainable and do not require non-renewable source of energy during their production and improve crop growth and quality by producing growth regulators (Pandey and Sinha, 1994).

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Materials and Methods

This experiment was carried out to "Study the influence of plant growth regulators and organic substances on rooting of Guava cv. Lucknow-49" in the Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar. The experiment was laid out by following the principles of completely randomized design (CRD) with 13 treatments which were replicated thrice. The treatment included different plant growth regulators an organic substance *viz.,* Indole butyric acid with the concentrations of 3000, 4000, 5000 ppm, Naphthalene acidic acid with the concentration of 1000, 2000, 3000 ppm, Humic acid @ 1 %, 2 %, 3% and Seaweed extract @ 1 %, 2%, 3%.

Results and Discussion

The maximum shoot length (11.23 cm and 17.56 cm) at 45 and 60 DAP was observed in T_3 (IBA @ 5000 ppm) followed by T_2 (IBA @ 4000 ppm (10.84 cm and 16.97 cm) at 45 and 60 DAP. The lowest shoot length was seen in T_{13} (Control) (6.92 cm and 10.43cm) at 45 and 60 DAP. The results are in agreement with Tripathi and Shukla (2004).

Treatment details

Treatment No.	Particulars
T_1	Indole butyric acid (IBA) @ 3000 ppm
T_2	Indole butyric acid (IBA) @ 4000 ppm
T_3	Indole butyric acid (IBA) @ 5000 ppm
T_4	Naphthalene acetic acid (NAA) @ 1000 ppm
T_5	Naphthalene acetic acid (NAA) @ 2000 ppm
T_6	Naphthalene acetic acid (NAA) @ 3000 ppm
T_7	Humic acid @ 1%
T_8	Humic acid @ 2%
T_9	Humic acid @ 3%
T_{10}	Seaweed extract @ 1%
T_{11}	Seaweed extract @ 2%
T_{12}	Seaweed extract @ 3%
T_{13}	Control

The maximum leaf width (7.23 cm and 10.23 cm) at 45 and 60 DAP was observed in T_3 (IBA @ 5000 ppm) followed by T_2 (IBA @ 4000 ppm (6.97 cm and 9.82 cm) at 45 and 60 DAP. The results are in agreement with Singh and Tomar (2015). This might be due to the vigorous rooting induced by the growth regulators enabling the cuttings to absorb more nutrients. The lowest leaf width were seen in T_{13} (Control) (3.81 cm and 5.14 cm) at 45 and 60 DAP The results are in agreement with Reddy *et al*.(2008). The highest number leaves per shoot (8.27 and 10.23) at 45 and 60 DAP was observed in T_3 (IBA @ 5000 ppm) followed by T_2 (IBA @ 4000 ppm (7.79 cm and 9.91 cm) at 45 and 60 DAP. The lowest Number of leaves per shoot were seen in T_{13} (Control) (2.53 and 6.32) at 45 and 60 DAP. The maximum fresh weight of leaves (2.53 and 4.35) at 45 and 60 DAP was observed in T_3 (IBA @ 5000 ppm) followed by T_2 (IBA @ 4000 ppm) (2.44 and 4.15) at 45 and 60 DAP. The lowest fresh weight of leaves were seen in T_{13} (Control) (1.61 and 2.62) at 45 and 60 DAP. The results are in agreement with Milind(2008). Among the different treatments of growth regulators and organic substances the diameter of shoot is higher in T_3 (IBA @ 5000 ppm) (3.82 cm and 5.24 cm) at 45 and 60 DAP followed by T_2 (IBA @ 4000 ppm) (3.64 cm and 5.07cm) at 45 and 60 DAP. The results are in agreement with Saroj *et al*.(1997). Maximum survival percentage of rooted cuttings

Table 1: Effect of growth regulators and organic substance on width of leaf, length of shoot, number of leaves per cuttings in guava (*Psidium guajava* L.) cv. Lucknow-49.

Treatments	Width of leaf (cm)		Length of shoot (cm)		Number of leaves per cuttings	
	45th day	65th day	45th day	60th day	45th day	60th day
T_1 - IBA @ 3000 ppm	5.61	8.43	9.23	15.01	6.16	8.54
T_2 - IBA @ 4000 ppm	6.97	9.82	10.84	16.97	7.79	9.91
T_3 - IBA @ 5000 ppm	7.23	10.23	11.23	17.56	8.27	10.23
T_4 - NAA @ 1000 ppm	4.77	7.53	8.11	13.63	4.97	7.55
T_5 - NAA @ 2000 ppm	5.66	8.48	9.31	15.06	6.21	8.58
T_6 - NAA @ 3000 ppm	6.12	8.94	9.73	15.69	6.69	9.07
T_7 - Humic acid @ 1%	4.21	6.63	7.36	12.36	3.74	6.75
T_8 - Humic acid @ 2%	4.48	7.06	7.66	12.97	4.38	7.07
T_9 - Humic acid @ 3%	6.66	9.39	10.14	16.34	7.25	9.46
T_{10} - Seaweed extract @ 1%	3.94	6.16	7.02	11.74	3.02	6.39
T_{11} - Seaweed extract @ 2%	4.75	7.49	8.01	13.59	4.92	7.52
T_{12} - Seaweed extract@ 3%	5.13	7.98	8.53	14.36	5.48	8.09
T_{13} – Control	3.81	5.14	6.92	10.43	2.53	6.32
Mean	5.33	7.94	8.77	14.28	5.49	8.11
SE d	0.263	0.391	0.331	0.546	0.441	0.300
CD at 0.05%	0.526	0.783	0.663	1.093	0.883	0.601

Table 2: Effect of growth regulators and organic substance on percentage survival of cuttings, fresh weight of leaves, diameter of shoot in guava (*Psidium guajava* L.) cv. Lucknow-49.

Treatments	Percentage survival of cuttings (%)	Fresh weight of leaves (g)		Diameter of shoot (cm)	
		45th day	60th day	45th day	60th day
T_1 - IBA @ 3000 ppm	85.95	2.18	3.41	3.01	4.56
T_2 - IBA @ 4000 ppm	90.68	2.44	4.15	3.64	5.07
T_3 - IBA @ 5000 ppm	92.20	2.53	4.35	3.82	5.24
T_4 - NAA @ 1000 ppm	81.23	2.01	3.04	2.58	4.18
T_5 - NAA @ 2000 ppm	84.95	2.19	3.48	2.96	4.53
T_6 - NAA @ 3000 ppm	87.53	2.27	3.73	3.21	4.73
T_7 - Humic acid @ 1%	77.58	1.84	2.70	2.26	3.81
T_8 - Humic acid @ 2%	79.47	1.92	2.83	2.40	3.98
T_9 - Humic acid @ 3%	89.11	2.35	3.96	3.42	4.90
T_{10} - Seaweed extract @ 1%	75.72	1.76	2.69	2.13	3.64
T_{11} - Seaweed extract @ 2%	81.14	2.00	3.01	2.53	4.15
T_{12} - Seaweed extract@ 3%	83.13	2.09	3.23	2.77	4.36
T_{13} – Control	72.51	1.61	2.62	2.06	3.12
Mean	83.16	2.09	3.32	2.83	4.32
SEd	1.514	0.07	0.13	0.135	0.163
CD at 0.05%	3.029	0.14	0.26	0.270	0.326

(92.20 %) was observed in T_3 (IBA @ 5000 ppm) followed by T_2 (IBA @ 4000 ppm) (92.20) and Minimum survival percentage was observed in T_{13} (Control) (72.51 %). The results are in agreement with Roberto *et al*., (2004). Increased length, maximum number of primary roots and early sprouting might be resulted in more thickness of the roots, perhaps the ability of regenerating further new fibrous roots from main roots, which probably absorb more nutrients and water from the soil under low transpiration losses as reported by Geiss *et al*., (2009); Shukla *et al*., (2010).

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