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Effect of rooting media and IBA treatments on success of propagation through terminal cuttings in guava (*Psidium guajava* L.) cv. Taiwan Pink

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Abstract
The present investigation was conducted to investigate the effect of three rooting media(coco peat, vermiculite and saw dust) and Indole-3-butyric acid (IBA) treatments [250 ppm, 500 ppm and 750 ppm (in solution form) and 1500 ppm, 3000 ppm and 6000 ppm (in powdered form)] on different rooting and shooting parameters viz., percentage of rooted cuttings, number of shoots per cutting, number of leaves per cutting, dry weight of shoots per cutting, survival percentage of rooted cuttings, percentage mortality of rooted cuttings and establishment of rooted cuttings in terminal cuttings of guava cv. Taiwan Pink. It was observed that coco peat showed highest values among the 3 different rooting media and among 6 different IBA treatments, 3000 ppm showed the best results.

Keywords: Rooting media, IBA, terminal cuttings, guava.

Introduction
Guava (*Psidium guajava* L.), the "Poor man's fruit" or "Apple of the tropics" belongs to tropical and subtropical climate. It is native to the Tropical America stretching from Mexico to Peru. Guava is propagated commercially by means of both vegetative and direct seedling methods, but the fruits of commercial grade can be obtained only when plants are propagated through vegetative progeny. Vegetative propagation of guava can be done by budding (Gupta and Malhotra, 1985; Kaundal *et al*., 1987) [7, 13], air layering (Manna *et al*., 2004) [18], stooling (Pathak and Saroj, 1988) [24] and inarching (Mukherjee and Majumdar, 1983) [21]. In direct seedling method, progeny are not uniform due to segregation and recombination of different characters. Moreover, the plants propagated through seeds come to bearing much later than the plants propagated through cuttings. Clonal propagation of guava is the possible approach to ascertain uniformity among the progeny and to maintain good quality fruits (Giri *et al.*, 2004) [5]. Initially, true-to-type planting material is a basic need in guava orchards to ensure both quality and quantity of guava fruits (Singh *et al.*, 2005) [30].
Propagation through air layering in guava is a time consuming and hence necessitated a search for alternate but effective means of vegetative propagation. Of late, several woody perennials are successfully and rapidly propagated through use of terminal cuttings. In this context, rapid methods of propagation become very important when planting material is limited due to scarcity of a clone or varieties or due to sudden expansion in acreage. Thus it leads to an idea about the utilization of terminal cuttings, rapid propagation method in guava.

Material and Methods
An experiment was conducted on the effect of rooting media and IBA treatments on the root and shoot parameters of guava cv. Taiwan Pink at Kadiyaddha village, under the supervision of College of Horticulture, Dr. Y.S.R. Horticultural University, Venkataramannagudem, West Godavari District, Andhra Pradesh. The experiment was laid out in factorial completely randomized design with two factors *viz.*, Rooting media (3 levels) and IBA treatments (6 levels), making eighteen treatment combinations which were replicated twice. Terminal cuttings were planted in protrays consisting of rooting media *viz.*, coco peat, and vermiculite and saw dust after treating with IBA at 250, 500, 750 ppm in solution form for 5 minutes and 1500, 3000, 6000 ppm in powder form. The terminal cuttings were kept under mist chamber for 35 days, under shade net for 10 days and after that, the rooted terminal cuttings were planted in 8 x10 inches polybag with potting mixture consisting of Red soil and FYM in 2:1 proportion and kept under open conditions, the observations on various parameters at 135 DAP were recorded as presented below.

Results and discussion

Percentage of rooted cuttings (%)

Significant differences were observed among the rooting media, IBA treatments as well as their interactions on percentage of rooted cuttings in terminal cuttings of guava cv. Taiwan Pink at 45 days after planting, the terminal cuttings planted in coco peat were found to record maximum percentage of rooting (73.98%), followed by the vermiculite (70.51%) and minimum percentage of rooting was observed in the terminal cuttings planted in saw dust medium (65.98%). Among the IBA treatments, IBA powder dip @ 3000 ppm performed the best with 79.81 percentage of rooted cuttings and was followed by IBA powder dip @ 6000 ppm (76.19%) while the minimum percentage of rooting (60.13%) was observed with solution dip of IBA @ 750 ppm.

There existed a significant interaction between rooting media and IBA treatments for percentage of rooted cuttings. Significantly highest percentage of rooting (85.19%) was recorded by the terminal cuttings planted in coco peat + dipping in IBA powder @ 3000 ppm (M_1G_5).

Among the three rooting media, terminal cuttings planted in coco peat medium recorded the maximum percentage of rooting which might be perhaps due to the release of phenolic compounds from the coir pith (Lokesha *et al.,* 1988) [15] and also can be attributed to the beneficial physical characteristics of coir pith (Smith, 1995) [31] like aeration and water holding capacity. Presence of leaves on cuttings also could have played an important role in the initiation of roots in many plant species. Leaves considerably influence the rooting of cuttings because of their ability to produce endogenous auxins, carbohydrates by means of photosynthesis (Newton *et al.,* 1992) [23]. Krieken *et al.* (1993) [14] reported that IBA might have enhanced the rooting by increase of internal Auxins, or synergistically modify the action of IAA or due to synthesis of endogenous IAA. Treatment of cuttings with increasing concentrations of IBA coupled with endogenous auxins already present in the cuttings could improve the percentage of rooting in cuttings as reported by Melgarejo *et al*. (2000) [20].

The present results were in harmony with the findings of Mayer *et al*. (2015) [19] who recorded higher percentage of rooted cuttings in 3000 ppm of IBA than in 6000 ppm in softwood cuttings of peach under intermittent mist system. The results are in line with Malik *et al.* (2013) [16] in softwood cuttings of guava. Such observations were also made by Abdul *et al.* (2013) [1] in guava.

According to Habibi, (2010) [8] the increase in auxin concentrations led to increase in oleander plant rooting (*Nerium oleander* L.) up to 3000 ppm of IBA and subsequent increase in IBA was found to decrease in plant rooting. Shadparvar *et al.* (2011) [29] stated that plants should be contained a certain quantity of IBA for successful induction of rooting primordia. The application of IBA might had an indirect influence by enhancing the speed of transformation of rooting primordia and movement of sugars to the base of cuttings and consequently formation of young and active roots.

Number of shoots per cutting

At 135 DAP, the number of shoots per cutting were found significant by the influence of different rooting media, IBA treatments and their interactions. Among the three different rooting media, coco peat exhibited significantly higher number of shoots per cutting (4.41) followed by vermiculite (4.17) and the lowest number of shoots per cutting (3.63) was recorded by the saw dust.

The number of shoots per cutting was highest (4.60) with the terminal cuttings treated with powder dip of IBA at 3000 ppm followed by (4.39) those treated with IBA powder dip @ 6000 ppm, while the minimum (3.54) number of shoots per cutting was observed with solution dip of IBA @ 750 ppm.

There existed a significant interaction between rooting media and IBA treatments for number of shoots per cutting. Significantly maximum number of shoots per cutting (4.82) was found in the terminal cuttings planted in coco peat + dipping in IBA powder at 3000 ppm concentration (M_1G_5).

Terminal cuttings planted in coco peat showed maximum number of shoots which might be due to decomposition of lignins present in coco peat resulting in the formation of humic fractions (Kadalli *et al.,* 2001) [12]. Coco peat had a property of retaining more nutrients and also helpful in increasing the number of shoots per cutting as reflected in the present study. The cuttings treated with IBA 3000 ppm recorded greater number of shoots per cutting which could be attributed to the enhancement of physiological functions in the cuttings favourably (Iqbal *et al*., 1999) [9] at this concentration.

Number of leaves per cutting

At 135 DAP, terminal cuttings planted in coco peat medium showed significantly maximum number of leaves (24.21) followed by the terminal cuttings planted in vermiculite (20.95), while the minimum number of leaves (16.56) was observed in the terminal cuttings planted in saw dust.

The maximum number of leaves per cutting was found in the terminal cuttings treated with IBA powder @ 3000 ppm (25.40) which was followed by terminal cuttings treated with 6000 ppm of IBA concentration (23.51), while the lowest number of leaves (16.33) was observed in terminal cuttings treated with solution dip with IBA @ 750 ppm.

There existed a significant interaction between rooting media and IBA treatments for the number of leaves per cutting. Significantly maximum number of leaves per cutting (30.14) was found in terminal cuttings planted in coco peat medium + treatment with IBA powder @ 3000 ppm (M_1G_5).

The maximum number of leaves per cutting was produced in terminal cuttings planted in coco peat, which might be due to superior root development in this medium. It could be in turn attributed to the higher moisture retention capacity, porosity and nutrient status of coir pith (Nagarajan *et al.,* 1985) [22] as proven in coco peat medium. Maximum number of leaves was produced in cuttings treated with IBA 3000 ppm which might be due to activation of shoot growth leading to an increased number of nodes that leads to development of more number of leaves. The increase in number of leaves per cutting might be due to the reason that the plant might diverted maximum assimilate quantities to the leaf buds, since the leaves are one of the production sites of natural auxins in them besides being very important for vital processes like photosynthesis and respiration (Wahab *et al.,* 2001) [34].

IBA at 4000 ppm produced healthier, lengthy roots which might have helped in the absorption of water and nutrients. Better nutrient absorption could have encouraged production of more number of leaves by the cuttings. The increase in number of leaves with IBA 4000 ppm might be due to more number of roots, plant height and branches per cutting (Ismail and Asghar, 2007) [10]. The above results are in accordance with by Wahab *et al.* (2001) [34], Malik *et al.* (2013) [16] in

guava. Similar results were reported by Riaz *et al*. (2007) [28] in hardwood cuttings of kiwi.

Dry weight of shoots per cutting (g)

The dry weight of shoots at 135 DAP significantly varied due to rooting media, IBA treatments as well as their interactions. The terminal cuttings planted in coco peat medium recorded significantly maximum dry weight (4.50 g) followed by those terminal cuttings planted in vermiculite (4.30 g). Minimum dry weight of shoot was obtained in terminal cuttings planted in sawdust (3.92 g). Application of IBA powder at a concentration of 3000 ppm performed the best with the highest dry weight of shoots (4.75 g) followed by those treated with IBA powder @ 6000 ppm (4.58 g) while the minimum shoot dry weight (3.63 g) was observed in solution dip with IBA at 750 ppm. These results are in accordance with Thayamini (2015) [33] in dragon fruit.

There was a significant interaction between rooting media and IBA treatments for maximum dry weight of shoots. Significantly maximum dry weight of shoots (5.10 g) was found in terminal cuttings planted in coco peat medium + treatment with IBA 3000 ppm (M_1G_5).

Among the rooting media, terminal cuttings planted in coco peat recorded the maximum dry weight of shoot. It could be attributed due to increase in number of leaves, length and number of shoots per cutting. Among IBA treatments, IBA powder dip @ 3000 ppm performed the best. This might be due to the reason that auxins activated shoot growth could have elongated the stems and leaves through cell division accounting for a higher dry weight of shoot (Abraham, 1996) [3]. The promoting effect of IBA on shoot parameters can be attributed to the reason that the better rooting coupled with a better leaf growth might have led to a higher shoot sprouts and supported their development (Paul and Aditi, 2009) [25]. As discussed earlier IBA at 3000 ppm concentration favoured many shoot parameters in positive direction and at the same time sustained the root strength to continue the vigour and vitality in taking up the nutrients as well as moisture from the growing media. The integrated effect over root and shoot parameters established the merit of IBA powder dip @ 3000 ppm concentration.

Survival percentage of rooted cuttings (%)

There were significant differences in respect of survival percentage of rooted terminal cuttings among the different rooting media and IBA treatments as well as their interactions at 135 DAP, the terminal cuttings planted in coco peat medium were found to have maximum survival percentage of rooted cuttings (68.33%) followed by those planted in vermiculite (63.50%) whereas, the minimum survival percentage of terminal cuttings was noticed in saw dust (61.67%).

Among IBA treatments, the highest survival percentage (74.33%) was noticed in IBA powder dip @ 3000 ppm followed by (70.33%) those treated terminal cuttings with IBA powder dip @ 6000 ppm and the minimum survival percentage of rooted terminal cuttings was noticed in solution dip of IBA @ 750 ppm (54.67%).

There existed a significant interaction between rooting media and IBA treatments with respect to survival percentage of rooted terminal cuttings. Significantly maximum survival percentage of rooted terminal cuttings (79.00%) was found in terminal cuttings planted in coco peat medium + treatment with IBA powder dip @ 3000 ppm (M_1G_5).

The cuttings planted in coco peat medium gave highest survival percentage might be due to its corresponding merit in root and shoot growth and sustenance over a period of time. The advantages with coco peat might be due to incorporation of coarser material which would improve the aeration status of medium (Awang *et al*., 2009) [4]. Aeration is necessary for the gaseous exchange between the soil and atmosphere to remove CO_2 released by roots and microorganisms in the soil to external atmosphere and supply of O_2 from the external atmosphere to the growing roots leading to better respiration and survival of plants (Jeyaseeli and Paul, 2010) [11].

The highest survival percentage was recorded in the cuttings treated with IBA powder dip @ 3000 ppm, which might due to development of effective root system and increase in number and length of roots per cutting as influenced by the uptake of nutrients and water (Reddy *et al*, 2008) [27]. The survival of the sprouted cuttings might be directly linked to the formation of adventitious roots on cuttings.

Auxins role in inducing roots in the cuttings as described by many researchers is in consistency with the results of the study. The possible explanation to these findings lies in better development of root system with more number of roots, greater root length, fresh and dry weight of roots which would have enabled the rooted cuttings to survive till the end in the polybag thereby recording the highest survival (Goudappa, 2016) [6]. The above results are in accordance with Abdul *et al.* (2013) [1] in guava, Abdullah *et al*, (2006) [2] in guava Sukhjit (2015) [32] in hardwood cuttings of peach. Riaz *et al*. (2007) [28] reported the highest survival percentage in 3000 ppm of IBA than 6000 ppm of IBA in hardwood cuttings of kiwi.

Percentage mortality of rooted cuttings

There were significant differences in respect of percentage mortality of rooted cuttings among the rooting media and different IBA treatments at 135 days after planting the rooted cuttings in the field. The terminal cuttings planted in coco peat medium recorded lowest percentage mortality of rooted cuttings (2.26%) followed by terminal cuttings planted in vermiculite medium (4.32%), highest percentage mortality of rooted cuttings was observed by those planted in saw dust (6.89%).

Among the IBA treatments, IBA powder dip @ 3000 ppm recorded the lowest percentage mortality of rooted cuttings (1.36%) which was followed by (2.29%) those terminal cuttings treated with IBA powder @ 6000 ppm and the highest percentage mortality of rooted cuttings (7.56%) observed in solution dip of IBA 750 ppm. There existed a non-significant interaction between rooting media and IBA treatments for percentage of establishment of rooted terminal cuttings. The results are in line with Mayer *et al*. (2015) [19].

Percentage establishment of rooted cuttings (%)

There were significant differences in respect of percentage establishment of rooted cuttings among the rooting media and different IBA treatments at 90 days after planting the rooted cuttings in the main field.

The terminal cuttings planted in coco peat medium recorded maximum percentage establishment of rooted cuttings (81.67%) followed by terminal cuttings planted in vermiculite medium (75.42%), minimum percentage establishment of rooted terminal cuttings was observed by those planted in saw dust (67.50%).

Among the IBA treatments, IBA powder dip @ 3000 ppm recorded the best percentage establishment of rooted cuttings

(90.00%) followed (84.17%) by those treated terminal cuttings with IBA powder dip @ 6000 ppm and the minimum (61.67%) percentage establishment of rooted terminal cuttings observed in solution dip of IBA 750 ppm. There existed a non-significant interaction between rooting media and IBA treatments for percentage establishment of rooted terminal cuttings.

Among the three rooting media, the terminal cuttings planted in coco peat recorded the maximum field survival at 90 days after planting. It might be due to its corresponding merit at early stages because of rich nutrient content, high water holding capacity, good drainage and high porosity of coir pith. These qualities facilitated for an early advantage of sprouting and gaining good amount of strength by terminal cuttings that would have helped further during the development of root system resulting in higher chances for their better field establishment. The cuttings treated with IBA powder dip @ 3000 ppm recorded maximum percentage of establishment of rooted cuttings in the main field which was mostly dependent on root and shoot characters (Ratnakumari, 2014) [26].

A good rooted cutting should have reasonable amount of dry matter partitioned into roots and could win the race in better search and imbibition of food material from the growing media thus leading to better survival as well as field establishment at later stages of study. The positive effect of IBA on survival percentage and field establishment was explained by the corresponding superiority on rooting percentage, number of roots, length of primary roots, length of longest root, fresh and dry weight of roots, root-shoot ratio by several workers and the effect was attributed to the promotive effect of auxins (Manish Kumar, 2009) [17].

Table 1: Effect of rooting media and IBA treatments on percentage of rooted cuttings (%) of terminal cuttings in guava cv. Taiwan Pink at 45 DAP.

IBA treatments (G)	Percentage of rooted cuttings (%)			Mean
	Rooting media (M)			
	Coco peat (M_1)	Vermiculite (M_2)	Saw dust (M_3)	
250 ppm (G_1)	71.06 (57.43)	68.94 (56.11)	64.72 (53.54)	68.24 (55.69)
500 ppm (G_2)	67.52 (55.23)	65.00 (53.70)	61.30 (51.51)	64.60 (53.48)
750 ppm (G_3)	62.68 (52.32)	62.02 (51.93)	55.71 (48.26)	60.13 (50.84)
1500 ppm (G_4)	75.89 (60.57)	71.91 (57.97)	68.09 (55.58)	71.96 (58.04)
3000 ppm (G_5)	85.19 (67.35)	79.85 (63.30)	74.40 (59.58)	79.81 (63.41)
6000 ppm (G_6)	81.53 (64.53)	75.37 (60.22)	71.69 (57.83)	76.19 (60.86)
Mean	73.98 (59.57)	70.51 (57.21)	65.98 (54.38)	70.15 (57.05)
Factor	M	G	M x G	
S Em±	0.19	0.27	0.47	
CD at 5%	0.57	0.80	1.39	

Cuttings (%) of terminal cuttings in guava cv. Taiwan Pink at 45 DAP.
G1, G2 and G3 are treatments of guava terminal cuttings with IBA in solution form.
G4, G5 and G6 are treatments of guava terminal cuttings with IBA in powder form.
* Figures in parenthesis indicate transformed values.

Table 2: Effect of rooting media and IBA treatments on number of shoots per cutting of terminal cuttings in guava cv. Taiwan Pink at 135 DAP.

IBA treatments (G)	Number of shoots per cutting			Mean
	Rooting media (M)			
	Coco peat (M_1)	Vermiculite (M_2)	Saw dust (M_3)	
250 ppm (G_1)	4.34	4.13	3.47	3.98
500 ppm (G_2)	4.14	3.93	3.15	3.74
750 ppm (G_3)	4.02	3.65	2.97	3.54
1500 ppm (G_4)	4.43	4.25	3.84	4.17
3000 ppm (G_5)	4.82	4.64	4.34	4.60
6000 ppm (G_6)	4.71	4.44	4.03	4.39
Mean	4.41	4.17	3.63	4.07
Factor	M	G	M x G	
S Em±	0.01	0.01	0.02	
CD at 5%	0.02	0.03	0.05	

G_1, G_2 and G_3 are treatments of guava terminal cuttings with IBA in solution form.
G_4, G_5 and G_6 are treatments of guava terminal cuttings with IBA in powder form.

Table 3: Effect of rooting media and IBA treatments on number of leaves per cutting of terminal cuttings in guava cv. Taiwan Pink at 135 DAP.

IBA treatments (G)	Number of leaves per cutting			Mean
	Rooting media (M)			
	Coco peat (M_1)	Vermiculite (M_2)	Saw dust (M_3)	
250 ppm (G_1)	26.40	23.81	21.15	23.78
500 ppm (G_2)	24.28	20.13	18.62	21.01
750 ppm (G_3)	21.39	19.65	17.47	19.50

1500 ppm (G_4)	30.50	26.24	22.39	26.37
3000 ppm (G_5)	33.77	30.22	25.39	29.79
6000 ppm (G_6)	31.43	28.31	24.27	28.00
Mean	27.96	24.72	21.55	24.74
Factor	M	G	M x G	
S Em±	0.115	0.163	0.282	
CD at 5%	0.342	0.484	0.838	

G_1, G_2 and G_3 are treatments of guava terminal cuttings with IBA in solution form.
G_4, G_5 and G_6 are treatments of guava terminal cuttings with IBA in powder form.

Table 4: Effect of rooting media and IBA treatments on dry weight of shoots per cutting (g) of terminal cuttings in guava cv. Taiwan Pink at 135 DAP.

IBA treatments (G)	**Dry weight of shoots per cutting(g)**			**Mean**
	Rooting media (M)			
	Coco peat (M_1)	**Vermiculite (M_2)**	**Saw dust (M_3)**	
250 ppm (G_1)	4.36	4.24	3.83	4.14
500 ppm (G_2)	4.13	4.00	3.65	3.92
750 ppm (G_3)	3.81	3.65	3.43	3.63
1500 ppm (G_4)	4.77	4.47	4.09	4.44
3000 ppm (G_5)	5.10	4.84	4.32	4.75
6000 ppm (G_6)	4.87	4.64	4.22	4.58
Mean	4.50	4.30	3.92	4.24
Factor	M	G	M x G	
S Em±	0.01	0.01	0.01	
CD at 5%	0.02	0.02	0.04	

G_1, G_2 and G_3 are treatments of guava terminal cuttings with IBA in solution form.
G_4, G_5 and G_6 are treatments of guava terminal cuttings with IBA in powder form.

Table 5: Effect of rooting media and IBA treatments on survival percentage of rooted cuttings (%) of terminal cuttings in guava cv. Taiwan Pink at 135 DAP.

IBA treatments (G)	**Survival percentage of rooted cuttings (%)**			**Mean**
	Rooting media (M)			
	Coco peat (M_1)	**Vermiculite (M_2)**	**Saw dust (M_3)**	
250 ppm (G_1)	66.00(54.32)	60.00(50.75)	60.00(50.75)	62.00(51.94)
500 ppm (G_2)	62.00(51.92)	57.00(49.00)	59.00(50.17)	59.33(50.36)
750 ppm (G_3)	58.00(49.58)	54.00(47.27)	52.00(46.13)	54.67(47.66)
1500 ppm (G_4)	71.00(57.40)	65.00(53.71)	63.00(52.52)	66.33(54.54)
3000 ppm (G_5)	79.00(62.71)	75.00(59.98)	69.00(56.15)	74.33(59.61)
6000 ppm (G_6)	74.00(59.32)	70.00(56.77)	67.00(54.92)	70.33(57.00)
Mean	68.33(55.87)	63.50(52.91)	61.67(51.77)	64.50(53.52)
Factor	M	G	M x G	
S Em±	0.24	0.34	0.59	
CD at 5%	0.72	1.01	1.76	

G_1, G_2 and G_3 are treatments of guava terminal cuttings with IBA in solution form.
G_4, G_5 and G_6 are treatments of guava terminal cuttings with IBA in powder form.
*Figures are in parenthesis indicate transformed values.

Table 6: Effect of rooting media and IBA treatments on percentage mortality of rooted cuttings during hardening process (%) of terminal cuttings in guava cv. Taiwan Pink at 135 DAP.

IBA treatments (G)	**Percentage mortality of rooted cuttings during hardening process (%)**			**Mean**
	Rooting media (R)			
	Coco peat (M_1)	**Vermiculite (M_2)**	**Saw dust (M_3)**	
250 ppm (G_1)	1.61(11.88)	4.37(16.04)	7.72(5.17)	4.57(11.03)
500 ppm (G_2)	6.06(14.24)	6.30(17.97)	9.53(14.09)	7.30(15.43)
750 ppm (G_3)	1.85(5.54)	9.38(19.73)	11.45(17.83)	7.56(14.37)
1500 ppm (G_4)	2.74(9.52)	3.08(13.92)	5.79(10.10)	3.78(11.18)
3000 ppm (G_5)	0.00(0.00)	1.31(6.82)	2.78(4.66)	1.36(3.83)
6000 ppm (G_6)	1.31(4.66)	1.47(11.52)	4.09(4.93)	2.29(7.04)
Mean	2.26(7.64)	4.32(14.33)	6.89(9.46)	4.48(10.48)
Factor	M	G	M x G	
S Em±	0.59	0.29	1.45	
CD at 5%	1.76	0.91	N.S.	

G_1, G_2 and G_3 are treatments of guava terminal cuttings with IBA in solution form.
G_4, G_5 and G_6 are treatments of guava terminal cuttings with IBA in powder form.
* Figures in parenthesis indicate transformed values.

Table 7: Effect of rooting media and IBA treatments on percentage establishment of rooted cuttings (%) in guava cv. Taiwan Pink at 90 days after planting in the main field.

IBA Treatments (G)	Percentage establishment of rooted cuttings (%)			Mean
	Rooting media (R)			
	Coco peat (M_1)	Vermiculite (M_2)	Saw dust (M_3)	
250 ppm (G_1)	80.00(63.41)	70.00(56.77)	62.50(52.23)	70.83 (57.47)
500 ppm (G_2)	72.50(58.37)	65.00(53.71)	60.00(50.75)	65.83 (54.27)
750 ppm (G_3)	67.50(55.24)	60.00(50.75)	57.50(49.30)	61.67 (51.76)
1500 ppm (G_4)	82.50(65.30)	77.50(61.69)	70.00(56.77)	76.67 (61.25)
3000 ppm (G_5)	95.00(77.05)	92.50(74.29)	82.50(65.30)	90.00 (72.21)
6000 ppm (G_6)	92.50(74.29)	87.50(69.36)	72.50(58.37)	84.17 (67.34)
Mean	81.67(65.61)	75.42 (61.09)	67.50 (55.45)	74.86 (60.72)
Factor	M	G	M x G	
S Em±	0.62	0.88	1.52	
CD at 5%	1.85	2.61	N.S.	

G_1, G_2 and G_3 are treatments of guava terminal cuttings with IBA in solution form.
G_4, G_5 and G_6 are treatments of guava terminal cuttings with IBA in powder form.
* Figures in parenthesis indicate transformed values.

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