Int.J.Curr.Microbiol.App.Sci (2019) *8*(9): 1525-1534

EXCELLENT PUBLISHERS

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 8 Number 09 (2019)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2019.809.175

Effect of Naphthalene Acetic Acid and Colour Poly Wrappers on Rooting, Survival and Economics of Air Layring of Guava (*Psidium guajava* L.) cv. Gwalior 27

Vikas Mandloi*, Rajesh Lekhi, Devendra Vishvkarma and Amit Patel

Department of Horticulture, College of Agriculture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, (M.P.), India

**Corresponding author*

Keywords

Guava, NAA, Poly wrapper, Rooting, Survival, Economics and Air layering.

Article Info

Accepted:
18 August 2019
Available Online:
10 September 2019

A B S T R A C T

The experiment was carried out to "Effect of NAA (foliar spray) and colour poly wrappers on rooting, survival and economics of air-layering of guava (*Psidium guajava* L.) cv. Gwalior 27" during the season of *Kharif* 2016-17 at the Horticulture nursery, Department of Horticulture, College of Agriculture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, (M.P.). Results revealed that significantly maximum rooting such as number of primary roots per layer (7.46) and secondary roots per layer (9.55), length of primary roots (8.07 cm) and secondary roots (9.04 cm), dry weight of roots per layer (0.209 g), rooting percentage (61.12%) and survival percentage (47.31%) in air layers of guava was recorded with the application of 125 ppm NAA (N_4). Black poly wrapper (W_2) exhibited significantly maximum number of primary roots per layer (6.57) and secondary roots per layer (9.21), length of primary roots (9.74 cm) and secondary roots (10.02 cm), dry weight of roots per layer (0.168 g), rooting percentage (54.79%) and survival percentage (43.75%) at 60 days after layering. Interaction was also significantly maximum under the treatment combination of N_4W_2 (NAA @ 125 ppm + Black poly wrapper) over the N_1W_1 (NAA @ 50 ppm + White poly wrapper). number of primary roots per layer (8.55) and secondary roots per layer (10.85), length of primary roots (10.49 cm) and secondary roots (10.77 cm), dry weight of roots per layer (0.247 g),rooting percentage (65.63%) and survival percentage (50.93%). The maximum net return of Rs 14559.00 and highest cost benefit ratio 1: 3.51 was recorded in treatment N_4W_2 (NAA @ 125 ppm + Black poly wrapper).

Introduction

Guava (*Psidium guajava* L.), is one of the most popular fruits grown in tropical, sub-tropical and some parts of arid regions of India. It is also a cheap and very rich source of vitamin-C, carbohydrate, iron, fat and contains a fair amount of calcium and phosphorus as well. These qualities make guava an important and one of the most popular fruits of India. Guava fruits are rich in pectin content, hence it is extensively used in preparation of jelly.

Besides, its diabetic value, the fruit also is used in preparing cheese, butter, paste, juice, juice concentrate, powder, canned slice/shell, nectar, puree and ice cream. India is the leading producer of guava in the world. Total area and production of guava in India is about 262 thousand hectares and 3648 thousand MT, respectively and productivity of guava is 13.92 MT/ha. Madhya Pradesh ranks second in productivity with 17.27 MT/ha and it is grown 30.31 thousand hectares and produce 523.75 thousand MT. (Anonymous, 2017).

Air- layring is an easy method of propagation of this crop. Auxins particularly IBA and NAA have been reported to induce rooting in many of the plant species with varied success. The response of different growth substances to percent success varied from species to species with changing physiological and environmental conditions. Most of the workers have reported IBA and NAA as better growth regulators than others for inducing rooting in cuttings and air- layring due to their stable nature. Air layering was reported to have given good results (Hartmann and Kester, 1972). Air layering with the help of growth substances is more efficacious and is the best method of vegetative propagation of guava as reported by Mujumdar and Mukherjee (1968). Plastic materials are also widely used in the horticultural industry viz. in glass house propagation of cuttings, for mass propagation in bud grafting and air layering. Polythene was discovered by scientist in the United Kingdom in 1933 and polythene sheet are now available in different gauges and color. Polythene wrapper has properties which in some aspects make in similar to the outer skin of plants. It is water proof, transmits light and allows gaseous exchange of oxygen and carbon-dioxide and low transmission of water vapour.

Keeping in view an experiment was conducted to identify the best concentration of the growth regulators and colour of poly wrapper which can induce better rooting in air-layers and can improve the survival of guava after detachment.

Materials and Methods

The experiment was carried out to "Effect of different concentrations of NAA (foliar spray) and different colour poly wrappers on air-layering of guava (*Psidium guajava* L.) cv. Gwalior 27" during the season of *Kharif* 2016-17 at the Horticulture nursery, Department of Horticulture, College of Agriculture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, (M.P.). The experimental material for the present investigation was comprised of 12 treatment combinations viz., foliar sprays of four levels of NAA i.e. 50, 75, 100 and 125 ppm and three levels of poly wrappers i.e. white, black and blue were used at the time of layering and were replicated three times in Asymmetrical Factorial Randomized Complete Block Design. On the selected branches a ring bark of about 2.0 cm size is removed by budding knife just below the bud without injuring the under lying woody xylem portion. The as par treatment NAA solution was applied uniformly on all sides of the upper cut of the ring with camel hair brush. After application of growth regulators cut portions were covered with rooting media containing a mixture of farm yard manure and field soil in 1:1 ratio and wrapped with three coloured polythene film (400 gauze) and tied with sutli. The air layers were detached by making a sharp cut with secateurs just below the cut after 65 days of operation. Then polythene cover was removed after dipping them in water for avoiding injury to the roots, and immediately air layers were planted in polythene bags. The observation on number of primary roots per layer, length of primary root (cm), number of secondary roots per layer, length of secondary

root (cm), dry weight of roots per layer (g), rooting percentage, survival percentage were observed and to estimate the economics of the treatments. Observations were recorded on the basis of five random competitive layers and plants selected in each treatment separately for root and shoot characteristics at 30 and 60 days after layering and planting in polybag respectively and were evaluated as per standard procedure. The data were statistically analyses to find out overall total variability present in the material by following procedure as suggested by Panse and Sukhatme (1985).

Results and Discussion

The results revealed that NAA concentrations, colour poly wrappers and their interaction exhibited a significant effect on root parameters. The significantly maximum 4.81 and 7.46 primary roots per layer were recorded in treatment N_4 (NAA @ 125 ppm) followed by N_3 (NAA @ 100 ppm) 4.26 and 5.89, while, it was recorded minimum 2.85 and 4.33 primary roots per layer at 30 and 60 days after layering, respectively (Table 1). These findings are in agreement with the findings of Tomar *et al.*, (1999a), Tomar (2011), Patel *et al.*, (2012) and Singh and Pathak (2012).

Black poly wrapper (W_2) was significantly superior and was recorded maximum 4.90 and 6.57 primary roots per layer as compared to white poly wrapper (W_1) (3.03 and 4.82 primary roots per layer) at 30 and 60 days after layering, respectively.

Interaction effects of different levels of NAA and colour poly wrappers, the treatment combination of N_4W_2 (NAA @ 125 ppm + Black poly wrapper) was recorded significantly maximum 6.0 and 8.55 primary roots per layer followed by N_3W_2 (NAA @ 100 ppm + Black poly wrapper) (5.64 and 7.54) and N_4W_3 (NAA @ 125 ppm + Blue poly wrapper) (4.48 and 7.23) at 30 and 60 days after layering, respectively. While, the minimum 2.17 and 3.88 primary roots per layer were recorded in the treatment combination of N_1W_1 (NAA @ 50 ppm + White poly wrapper) at 30 and 60 days after layering, respectively. These findings are in agreement with the findings of Singh (2001) and Yeboah *et al.*, (2014).

The significantly maximum 4.80 and 8.07 cm length of primary root were recorded in treatment N_4 (NAA @ 125 ppm) followed by N_3 (NAA @ 100 ppm) 4.55 and 7.62 cm at 30 and 60 days after layering, respectively and which were at par with each other at 30 days after layering. While, it was recorded minimum 3.52 and 6.39 cm at 30 and 60 days after layering, respectively(Table 1). These findings are in agreement with the findings of Tomar *et al.*, (1999a), Tomar (2011) and Patel *et al.*, (2012).

Black poly wrapper (W_2) was significantly superior and was recorded maximum 5.57 and 9.74 cm length of primary root as compared to white poly wrapper (W_1) (3.15 and 4.98 cm) at 30 and 60 days after layering, respectively.

The treatment combination of N_4W_2 (NAA @ 125 ppm + Black poly wrapper) was recorded significantly maximum 6.13 and 10.49 cm length of primary root followed by N_3W_2 (NAA @ 100 ppm + Black poly wrapper) (5.83 and 10.15 cm) and N_4W_3 (NAA @ 125 ppm + Blue poly wrapper) (4.63 and 7.96 cm), while, the minimum 2.62 and 4.27 cm length of primary root were recorded in the treatment combination of N_1W_1 (NAA @ 50 ppm + White poly wrapper) at 30 and 60 days after layering, respectively. These

findings are in agreement with the findings of Singh (2001) and Yeboah *et al.,* (2014).

The treatment N_4 (NAA @ 125 ppm) was recorded significantly maximum 6.47 and 9.55 secondary roots per layer followed by N_3 (NAA @ 100 ppm) 5.94 and 8.56 at 30 and 60 days after layering, respectively and which were at par with each other at 30 days after layering. While, it was recorded minimum 5.08 and 6.38 secondary roots per layer at 30 and 60 days after layering, respectively(Table 1). These findings are in agreement with the findings of Tomar *et al.,* (1999a), Tomar (2011), Patel *et al.,* (2012) and Singh and Pathak (2012).

Black poly wrapper (W_2) was significantly superior and was recorded maximum 6.59 and 9.21 secondary roots per layer as compared to white poly wrapper (W_1) (5.20 and 7.01 secondary roots per layer) at 30 and 60 days after layering, respectively.

The treatment combination of N_4W_2 (NAA @ 125 ppm + Black poly wrapper) was recorded maximum 7.81 and 10.85 secondary roots per layer followed by N_3W_2 (NAA @ 100 ppm + Black poly wrapper) (6.90 and 9.84) and N_4W_3 (NAA @ 125 ppm + Blue poly wrapper) (5.84 and 9.38), while, the minimum 4.71 and 5.51 secondary roots per layer were recorded in the treatment combination of N_1W_1 (NAA @ 50 ppm + White poly wrapper) at 30 and 60 days after layering, respectively. These findings are in agreement with the findings of Singh (2001) and Yeboah *et al.,* (2014).

Significantly maximum 5.40 and 9.04 cm length of secondary root were recorded in treatment N_4 (NAA @ 125 ppm) followed by N_3 (NAA @ 100 ppm) (4.73 and 8.07 cm), while, it was recorded minimum 3.69 and 6.57 cm at 30 and 60 days after layering, respectively. Similar findings were also reported by Tomar *et al.,* (1999a) and Patel *et al.,* (2012).

Black poly wrapper (W_2) was significantly superior and was recorded maximum 6.05 and 10.02 cm length of secondary root as compared to white poly wrapper (W_1) (3.25 and 5.16 cm) at 30 and 60 days after layering, respectively.

Treatment combination of N_4W_2 (NAA @ 125 ppm + Black poly wrapper) was recorded significantly maximum 6.80 and 10.77 cm length of secondary root at par with N_3W_2 (NAA @ 100 ppm + Black poly wrapper) (6.57 and 10.57 cm) and N_4W_3 (NAA @ 125 ppm + Blue poly wrapper) (5.40 and 10.38 cm), while, the minimum 2.73 and 4.40 cm length of secondary root were recorded in the treatment combination of N_1W_1 (NAA @ 50 ppm + White poly wrapper) at 30 and 60 days after layering, respectively(Table 1). These findings are in agreement with the findings of Singh (2001) and Yeboah *et al.,* (2014).

This may be due to decomposed organic material improve soil fertility by increasing soil aeration, water holding capacity and water infiltration and lower surface crusting resulted in maximum root growth and root length of primary and secondary root.

Application of NAA 125 ppm (N_4) was significantly superior and recorded maximum 0.098 and 0.209 g dry weight of roots followed by N_3 (NAA 100 ppm) (0.060 and 0.160 g) as compared to other treatment, while, it was observed lowest 0.028 and 0.077 g dry weight of roots in the treatment NAA 50 ppm (N_1) at 30 and 60 days after layering, respectively(Table 2).

Table.1 Effect of different concentrations of NAA and colour poly wrappers on number of primary and secondary roots per layer and length of primary and secondary root (cm) in air layers of guava

Treat. Symb.	Treatment	No. of primary roots per layer		Length of primary root (cm)		No. of secondary roots per layer		Length of secondary root (cm)	
		30 Days	60 Days	30 Days	60 Days	30 Days	60 Days	30 Days	60 Days
N_1	NAA @ 50 ppm	2.85	4.33	3.52	6.39	5.08	6.38	3.69	6.57
N_2	NAA @ 75 ppm	3.32	4.78	4.08	6.97	5.39	7.29	4.45	7.42
N_3	NAA @ 100 ppm	4.26	5.89	4.55	7.62	5.94	8.56	4.73	8.07
N_4	NAA @ 125 ppm	4.81	7.46	4.80	8.07	6.47	9.55	5.40	9.04
	SEm±	0.12	0.02	0.11	0.02	0.19	0.01	0.11	0.10
	CD at 5% level	0.36	0.06	0.34	0.06	0.58	0.04	0.33	0.30
W_1	White poly wrapper	3.03	4.82	3.15	4.98	5.20	7.01	3.25	5.16
W_2	Black poly wrapper	4.90	6.57	5.57	9.74	6.59	9.21	6.05	10.02
W_3	Blue poly wrapper	3.51	5.45	3.99	7.07	5.37	7.62	4.41	8.15
	SEm±	0.11	0.02	0.10	0.03	0.17	0.01	0.09	0.09
	CD at 5% level	0.32	0.05	0.30	0.09	0.51	0.03	0.28	0.26
N_1W_1	NAA @ 50 ppm + White poly wrapper	2.17	3.88	2.62	4.27	4.71	5.51	2.73	4.40
N_1W_2	NAA @ 50 ppm + Black poly wrapper	3.81	5.03	4.75	8.73	5.64	7.55	4.95	8.92
N_1W_3	NAA @ 50 ppm + Blue poly wrapper	2.58	4.06	3.18	6.17	4.89	6.08	3.40	6.38
N_2W_1	NAA @ 75 ppm + White poly wrapper	2.67	4.30	2.98	4.62	4.98	6.30	2.80	4.78
N_2W_2	NAA @ 75 ppm + Black poly wrapper	4.14	5.48	5.57	9.59	6.01	8.58	5.87	9.83
N_2W_3	NAA @ 75 ppm + Blue poly wrapper	3.13	4.58	3.70	6.69	5.19	7.00	4.68	7.65
N_3W_1	NAA @ 100 ppm + White poly wrapper	3.30	4.81	3.38	5.27	5.35	7.81	3.48	5.47
N_3W_2	NAA @ 100 ppm + Black poly wrapper	5.64	7.54	5.83	10.15	6.90	9.84	6.57	10.57
N_3W_3	NAA @ 100 ppm + Blue poly wrapper	3.83	5.63	4.43	7.44	5.56	8.01	4.15	8.18
N_4W_1	NAA @ 125 ppm + White poly wrapper	3.97	6.30	3.63	5.76	5.75	8.41	4.00	5.97
N_4W_2	NAA @ 125 ppm + Black poly wrapper	6.00	8.55	6.13	10.49	7.81	10.85	6.80	10.77
N_4W_3	NAA @ 125 ppm + Blue poly wrapper	4.48	7.23	4.63	7.96	5.84	9.38	5.40	10.38
	SEm±	0.21	0.03	0.20	0.03	0.34	0.02	0.19	0.18
	CD at 5% level	N.S.	0.10	0.59	0.09	N.S.	0.07	0.57	0.53

Table.2 Effect of different concentrations of NAA and colour poly wrappers on dry weight of roots/ layer, rooting and survival per cent in air layers of guava

Treat. Symb.	Treatment	Dry weight of roots/ layer (g)		Rooting percentage	Survival percentage
		30 Days	60 Days		
N_1	NAA @ 50 ppm	0.028	0.077	35.39	33.52
N_2	NAA @ 75 ppm	0.047	0.113	46.74	38.36
N_3	NAA @ 100 ppm	0.060	0.160	51.53	40.74
N_4	NAA @ 125 ppm	0.098	0.209	61.12	47.31
	SEm±	0.003	0.003	0.40	0.48
	CD at 5% level	0.009	0.007	1.14	1.43
W_1	White poly wrapper	0.038	0.111	42.64	37.10
W_2	Black poly wrapper	0.078	0.168	54.79	43.75
W_3	Blue poly wrapper	0.058	0.140	48.66	39.10
	SEm±	0.003	0.002	0.35	0.42
	CD at 5% level	0.008	0.006	0.99	1.23
N_1W_1	NAA @ 50 ppm + White poly wrapper	0.013	0.057	30.57	32.30
N_1W_2	NAA @ 50 ppm + Black poly wrapper	0.037	0.097	42.00	35.13
N_1W_3	NAA @ 50 ppm + Blue poly wrapper	0.033	0.077	33.60	33.13
N_2W_1	NAA @ 75 ppm + White poly wrapper	0.037	0.087	37.93	34.90
N_2W_2	NAA @ 75 ppm + Black poly wrapper	0.057	0.140	53.47	42.77
N_2W_3	NAA @ 75 ppm + Blue poly wrapper	0.047	0.113	48.83	37.40
N_3W_1	NAA @ 100 ppm + White poly wrapper	0.047	0.133	45.30	36.50
N_3W_2	NAA @ 100 ppm + Black poly wrapper	0.097	0.213	60.97	46.30
N_3W_3	NAA @ 100 ppm + Blue poly wrapper	0.057	0.157	51.23	39.57
N_4W_1	NAA @ 125 ppm + White poly wrapper	0.057	0.167	56.77	44.70
N_4W_2	NAA @ 125 ppm + Black poly wrapper	0.140	0.247	65.63	50.93
N_4W_3	NAA @ 125 ppm + Blue poly wrapper	0.077	0.190	58.07	46.17
	SEm±	0.005	0.004	0.70	0.73
	CD at 5% level	0.015	0.013	1.97	2.47

Table.3 Economics of different concentrations of NAA and colour poly wrappers in air layers of guava

Treat. Sym.	Survival of air layers	Gross income (Rs)*	Expenditure (Rs)	Net return (Rs)	C:B ratio
N_1W_1	323	12920	5900.40	7019.60	1: 2.19
N_1W_2	351	14040	5800.40	8239.60	1: 2.42
N_1W_3	331	13240	5850.40	7389.60	1: 2.26
N_2W_1	349	13960	5900.60	8059.40	1: 2.37
N_2W_2	428	17120	5800.60	11319.40	1: 2.95
N_2W_3	374	14960	5850.60	9109.40	1: 2.56
N_3W_1	365	14600	5900.80	8699.20	1: 2.47
N_3W_2	462	18480	5800.80	12679.20	1: 3.19
N_3W_3	396	15840	5850.80	9989.20	1: 2.71
N_4W_1	447	17880	5901.00	11979.00	1: 3.03
N_4W_2	509	20360	5801.00	14559.00	1: 3.51
N_4W_3	463	18520	5851.00	12669.00	1: 3.17

Note: Sale rate of plants Rs. 40/plant

Similar findings were also reported by Tomar *et al.,* (1999a), Tomar (2011) and Patel *et al.,* (2012).

Significantly maximum 0.078 and 0.168 g dry weight of roots was observed under the treatment W_2 (Black poly wrapper) and lowest 0.038 and 0.111 g dry weight of roots in the treatment W_1 (white poly wrapper) at 30 and 60 days after layering, respectively.

The treatment combination of N_4W_2 (NAA @ 125 ppm + Black poly wrapper) was recorded significantly maximum 0.140 and 0.247 g dry weight of roots followed by N_3W_2 (NAA @ 100 ppm + Black poly wrapper) (0.097 and 0.213 g) and N_4W_3 (NAA @ 125 ppm + Blue poly wrapper) (0.077 and 0.190 g), while, the minimum 0.013 and 0.057 g dry weight of roots were recorded in the treatment combination of N_1W_1 (NAA @ 50 ppm + White poly wrapper) at 30 and 60 days after layering, respectively. This may be due to increased synthesis and accumulation of growth promoting substance as well as availability of more nutrients under this treatment, which enhance the dry weight of roots.

As regards to concentrations of NAA, treatment N_4 (NAA 125 ppm) was significantly superior and recorded highest 61.12% rooting followed by N_3 (NAA 100 ppm) (51.53%) as compared to other treatment, while, it was observed lowest 35.39% rooting in the treatment NAA 50 ppm (N_1) (Table 2). Similar findings were also reported by Shrivastava (2000), Tomar (2011), Singh and Pathak (2012) and Raut *et al.,* (2015).

Significantly highest 54.79% rooting was observed under the treatment W_2 (Black poly wrapper) and lowest 42.64% rooting in the treatment W_1 (white poly wrapper). Black polythene significantly increased the percentage of rooting in minimum period in comparison to other treatment. It can be use successfully to hold moisture with rooting media around the part to be rooted and the same time covered by layered area to protect against damage as well as keeping the portion from becoming too hard. Similar findings were also reported by Patel *et al.,* (1989), Baghel (1989) and Verma and Patel (2004).

Amongst interaction of both the factor, the treatment combination of N_4W_2 (NAA @ 125 ppm + Black poly wrapper) was recorded significantly highest 65.63% rooting followed by N_3W_2 (NAA @ 100 ppm + Black poly wrapper) (60.97%) and N_4W_3 (NAA @ 125 ppm + Blue poly wrapper) (58.07%), while, the lowest 30.57% rooting was recorded in the treatment combination of N_1W_1 (NAA @ 50 ppm + White poly wrapper). This may be due to increased level of growth promoting substances, available nutrients with the application 125 ppm NAA. Similar findings were also reported by Sen *et al.,* (1972) and Yeboah *et al.,* (2014).

It is evident from the results (Table 2) that the survival percentage gradually increased in concentrations of NAA N_1 to N_4. Treatment N_4 (NAA 125 ppm) was recorded highest 47.31% survival followed by N_3 (NAA 100 ppm) (40.74%) as compared to other treatment, while, it was observed lowest 33.52% survival in the treatment NAA 50 ppm (N_1) at 60 days after planting of air-layering. These findings are in agreement with the findings of Tomar *et al.,* (1999a), Shrivastava (2000), Tomar (2011), Patel *et al.,* (2012), Singh and Pathak (2012) and Raut *et al.,* (2015).

Significantly highest 43.75% survival was observed under the treatment W_2 (Black poly wrapper) and lowest 37.10% survival in the treatment W_1 (white poly wrapper) at 60 days after planting of air-layering.

Similar findings were also reported by Patel *et al.,* (1989) and Baghel (1989) reported that this beneficial response obtained by black polythene may be due to effect of etiolation.

Amongst interaction of both the factor, the treatment combination of N_4W_2 (NAA @ 125 ppm + Black poly wrapper) was recorded significantly highest 50.93% survival followed by N_3W_2 (NAA @ 100 ppm + Black poly wrapper) (46.30%) and N_4W_3 (NAA @ 125 ppm + Blue poly wrapper) (46.17%), while, the lowest 32.30% survival was recorded in the treatment combination of N_1W_1 (NAA @ 50 ppm + White poly wrapper) at 60 days after planting of air-layering.

This may be due to increased level of growth promoting substances, available nutrients with the application 15000 ppm IBA. Similar findings were also reported by Sen *et al.,* (1972), Singh (2001) and Yeboah *et al.,* (2014).

The economics of air layers was worked out on the basis of 1000 layers considering the cost of media, growth regulators i.e. NAA, different colour poly wrappers, materials for air layer, as well as labour cost.

It is revealed from the data (Table 3) obtained that the total cost and net CBR for making 1000 air layers were ranged from Rs. 5800.40 to Rs. 5901.00 with net return varied from Rs. 7019.60 to Rs. 14559.00 and C:B ratio between 1: 2.19 to 1: 3.51. The maximum net return of Rs 14559.00 and highest cost benefit ratio 1: 3.51 was recorded in treatment N_4W_2 (NAA @ 125 ppm + Black poly wrapper).

While, least net return of Rs 7019.60 and cost benefit ratio (1:2.19) was observed in treatment N_1W_1 (NAA @ 50 ppm + White poly wrapper) due to low plant survival and expenditure as compared to other treatments. These findings are in agreement with the findings of Azad and Matin (2015), Mali *et al.,* (2015) and Soni *et al.,* (2015).

References

Anonymous (2017). Horticulture statistics at a glance 2017. Published by Department of Agriculture, Cooperation and Farmers Walfare, Ministry of Agriculture and Farmers Walfare, Govt. of India. pp. 185.

Azad, Md. Salim and Matin, Md. Abdul (2015). Effect of Indole-3-Butyric Acid on clonal propagation of *Swietenia macrophylla* through branch cutting. *Journal of Botany*. Volume 2015, Article ID 249308, 1-7.

Baghel, K.S. (1989). Effect of plant growth substances and polythene wrapper on air-layering of different varieties of Mango (*Mangifera indica* L.). Unpublished thesis submitted to J.N.K.V.V. Jabalpur for the degree of M.Sc. (Ag.).

Hartmann, H.T. and Kester, D.E. (1972). Plant propagation: Principles and practices. Practice Hall of India New Delhi 3 (9): 270.

Majumdar, P.K. and Mukherjee, S.K. (1968). Guava a new vegetative propagation method. *Indian Horticulture*, (12): 11-35.

Mali,D.S.; Ranpise,S.A.; Shirsath, H.K. and Kharde, R.P. (2015). Effect of pruning techniques on yield and economics in high density plantation of guava cv. Sardar. *International Journal of Tropical Agriculture*. 33 (4): 2731-2734.

Panse, V.C. and Sukhatme P.V. (1985). Statistical methods for agricultural workers. ICAR Publications, New Delhi. pp 155.

Patel, D.M.; Nehete, D.S.; Jadav R.G. and Satodiya B.N. (2012). Effect of PGR's and rooting media on air layering of

different pomegranate (*Punica granatum* L.) cultivars. *The Asian Journal of Horticulture*. 7 (1): 89-93.

Patel, R.M.; Patel, R.B. and Patel, M.P. (1989). Effect of growth regulators and on rooting of air layers of guava. *Bhartiya Krishi Anusandhan Patrika.* 4(3):145-148.

Raut, U.A.; Jadhav, G.G.; Bhogave, A.F. and Deshmukh, M.S. (2015). Effect of different IBA levels on air layering of karonda (*Carissa carandas* L.). *Research on Crops*. 16 (3): 537-541.

Sen, P.K.; Bose,T.K. and Chakraborty, S.P. (1972). Effect of growth regulators on air-layering of cashew. Tropical and subtropical symposium. *Plant Sciences*. 12 (2): 535-538.

Shrivastva, P.K. (2000). Effect of growth regulators in combination and different rooting media on rooting and survival of air layers of Guava (*Psidium guajava* L.) var. Gwl.-27. Unpublished thesis submitted to JNKVV, Jabalpur for the M.Sc. (Ag.) Degree.

Singh, D. and Pathak, S (2012). Effect of IBA and NAA on propagation of Barbados cherry through layering. *Crop Res.* 43 (1, 2 & 3): 120-122.

Singh, M. (2001). Efficacy of plant growth regulators, and their concentration and wrapper on rooting success and survival of air-layered guava twigs. *Crop Research Hissar.* 21 (2): 153 156.

Soni, Nitin; Pandey,S.K.; Singh, S.S.; Singh, S.R.K.; Mishra, A.; Baghel S.S. and Kaurav, Pavan Kumar (2015). Production of true- to-type guava plants through clonal propagation. *International Journal of Applied and Pure Science and Agriculture*. 1 (12): 131-136.

Tomar, K.S.; Gurjar, B.S. and Tomar R.S. (1999a). Study on the effect of wood maturity and IBA on asexual propagation of kagzi lime (*Citrus aurantifolia* Swingle) by air layering. *Advances in Plant Sciences*. 12 (2): 583-588.

Tomar, Y.K. (2011). Effect of various concentrations of bio-regulators and time of airlayering on the multiplication of jackfruit (*Artocarpus heterophyllus* Lam.). *International Journal of Current Research*. 33 (6): 316-318.

Verma, L.R. and Patel, K.B. (2004). Effect of etiolation and various concentration of IBA on air layering in guava cv. Dholka. Abstracts of first Indian Horticulture Congress held at New Delhi, 6-9th Nov. 2004. pp140.

Yeboah Julius; Ben Kwaku Branoh Banful; Peter Yaw Boateng; Frank Manu Amoah; Bonaventure Kissinger Maalekuu and Samuel Tetteh Lowor (2014). Rooting response of air-layered shea (Vitellaria paradoxa) trees to media and hormonal application under two different climatic conditions. *American Journal of Plant Sciences*. 5: 1212-1219.

How to cite this article:

Vikas Mandloi, Rajesh Lekhi, Devendra Vishvkarma and Amit Patel 2019. Effect of Naphthalene Acetic Acid and Colour Poly Wrappers on Rooting, Survival and Economics of Air Layring of Guava (*Psidium guajava* L.) cv. Gwalior 27. *Int.J.Curr.Microbiol.App.Sci.* 8(09): 1525-1534. doi: https://doi.org/10.20546/ijcmas.2019.809.175