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Research Paper

Influence of Bio-Chemical Paramerts on Rooting of Air Layering in Guava Cv. Sardar

Horticulture

KEYWORDS : Carbohydrate, Nitrogen, Phenol, Rooting media, Sardar guava, Survival percentage,

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ABSTRACT

An experiment was carried out in division of fruit science, University of Horticultural Sciences, Bagalkot, were fifteen different rooting media were evaluated for their root, growth and survival of guava air layers in cv. Sardar was influenced by biochemical parameters during the year 2014-15. The total carbohydrate (4.91 % dry wt.), phenol (0.58 mg/g dry wt.), C: N ratio (7.05) and lower nitrogen (0.70 % dry wt.) was recorded in cocopeat which is on par with sphagnum moss.

INTRODUCTION

Guava (*Psidium guajava* L.) is one of the most important fruit crops of India. Guava belongs to the family Myrtaceae and of tropical American origin. Owing to its hardy nature it comes up welleven under neglected conditions. At present, guava is propagated on seedlings raised from open pollinated seeds which results in considerable variation in the size, shape, form and quality of fruits (Zamir *et al.* 2003 and Mishra *et al.* 2007) and evidently take longer time to reach to bearing stage when compared to vegetative propagated materials. Among the vegetative methods of guava propagation, air layering with the help of growth substances is a successful method of propagation in guava (Tyagi and Patel, 2004).

In the modern times air layering propagation techniques using growth regulators during rainy seasons are being used to achieve more success. The rooting media like sand, soil, saw dust (Tyagi and Patel, 2004), moss grass (Kumar and Syamal, 2005), poultry manure, Vermicompost and Farmyard manure are being used to improve the scope of air layering in guava. The air layering is also influenced by the presence of carbohydrate, nitrogen, phenol and C: N ratio at the time of layering.

Guava is the fourth most important fruit in area and production after mango, banana and citrus in India. Guava is 5th in productivity among different fruit crops grown in India. Guava shares 3.30 per cent of area and 3.30 per cent of production of total fruit crop grown in India. It is being cultivated in India on 2.68 lakh hectare area with an annual production of 3668 Metric tonnes and productivity of 13.7 Metric tonnes/hectare. Uttar Pradesh leads in area of 45,000 hectare, production of 8.41 lakh Metric tonnesand productivity of 37.6 Metric tonnes/hectare while, Karnataka occupies an area of 6,400 hectare, production of 14.34 lakh Metric tonnes and a productivity of 22.3 Metric tonnes/hectare of guava (Anon, 2014).Therefore the present study were planned to investigate the effect of rooting media on root, growth parameters and survival of air layers in guava cv. Sardar

MATERIAL AND METHOD

The field experiment was conducted at Fruit division block at sector No. 70, UHS, Bagalkot during 2014-2015. After 4-5 months old branches of healthy and pencil thickness shoots were selected. In the selected shoots, a ring of bark about 2-2.5 cm were girdled carefully by giving two circular cuts about 30 cm below the top end of the shoots and the exposed portion was rubbed to delay the healing process. The lanolin paste containing 3000 ppm concentration of Indole-3-butyric acid was applied evenly above the upper portion of the cut ring with the help of glass rod.

In this experiment fifteen different rooting media was taken for evaluation of layers. A sleeve (15 × 20 cm) of black polythene (150 gauges) was wrapped over it with the help of a thread. These air layers were separated from the different intervals as the early rooting appearance and number of layers rooted after layering.

After detachment of air layers, eighteen of the successful rooted shoots were transplanted in the polybag (10 × 15cm) containing Soil: Sand and FYM in the ratio of 1:1:1 in each treatment. These were maintained under polyhouse up to 15 days and after shifted to shade nut. The experiment was laid out in randomized block design. The treatment was replicated thrice; each replication was a unit of six layers. The data were then analyzed as per method of Panse and Sukhatme (1978) for randomized block.

RESEARCH FINDING AND DISCUSSION

Total carbohydrate:

The maximum number of primary and secondary roots was seen with the treatment cocopeat. Higher percentage of total carbohydrate (4.91) which is on par with sphagnum moss (4.79) was observed in cocopeat and sphagnum moss respectively, Use of cocopeat as rooting media reported to be advantageous for emerging more number of primary (8.17) and secondary roots (6.67) whereas, the lesser number of primary (4.00) and secondary roots (2.00) were recorded in coir pith. Similar results were obtained by Venkatesh (1983), Purohit and Shankharappa (1985) and Rao *et al.* (1990) **Table 1.**

Nitrogen (%) :

The presence of lower nitrogen recorded in sphagnum moss (0.70 % dry wt.) and cocopeat (0.70 % dry wt.) which is followed by combination of cocopeat + sphagnum moss (0.76 % dry wt.))

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and sawdust + sphagnum moss (0.77% dry wt.). The lower nitrogen will influence the increasing the number of primary roots (8.17), secondary roots (6.67), diameter of primary roots (1.47 mm) and lengh of primary roots (4.71 cm) in cocopeat. Higher percentage of nitrogen will influence the vegetative growth of plant (leaf area). A similar trend was noted by Rao *et al.* (1990), Karunakara (1997) and Atiyeh *et al.* (2000) opined that low nitrogen and high carbohydrate brings about an increase in the activity of rooting co-factors, thus causing better rooting.

Total Phenol :

The higher total phenol content was observed in cocopeat (0.58 mg/g dry wt.) and sphagnum moss (0.57 mg/g dry wt.). The total phenol content is found to be non significant. Similarly, several workers (Bose *et al.,* 1972; Roy *et al.,* 1972; Reddy and Majumbdar, 1978) were of the opinion that the phenolic compounds act as synergists to the auxin action in root promotion

C : N ratio:

The presence of higher C: N ratio recorded in cocopeat (7.05) which is on par with sphagnum moss (6.81), increasing C: N ratio will help in increasing number of primary roots (8.17), secondary roots (6.67), diameter of primary roots (1.47 mm) and length of roots (4.77 cm) in cocopeat (Uthaiah, 1975 and Telang, 1981).

The maximum leaf area was recorded in cocopeat (5.07cm^2), which is on par with sphagnum moss (4.83 cm^2) and number of side shoots (3.66) was observed in sphagnum moss. The increased total carbohydrate and lower percentage of nitrogen (Table 1) will helps the growth of layer by increasing the leaf area of layers (Table 2).

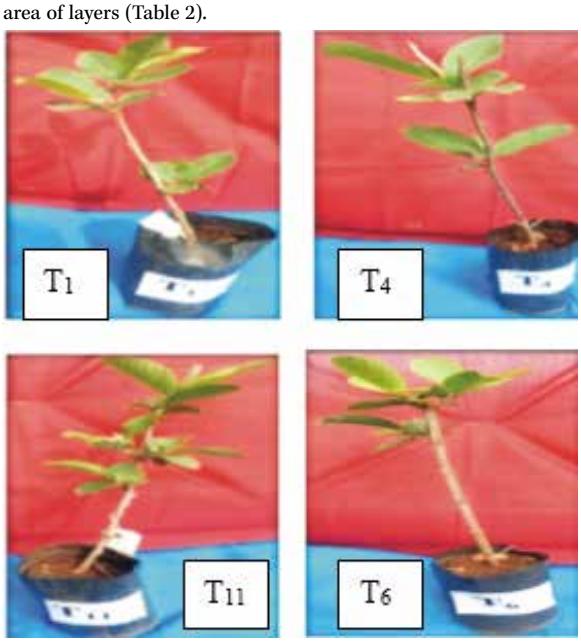

Fig 1: Best rooting media which influence by biochemical parameters

Table 1: Effect of different rooting media and their combinations at separation stage on biochemical constituents of guava (cv. Sardar) air layers

Treatment	Carbohydrates (% dry wt.)	Nitrogen (% dry wt.)	Total Phenol (mg/g dry wt.)	C: N
$T_{1.}$ Sphagnum moss (Control)	4.79	0.70	0.57	6.81
$T_{2.}$ Vermicompost	3.47	0.87	0.56	3.96
$T_{3.}$ Sawdust	3.52	0.84	0.56	4.18
$T_{4.}$ Cocopeat	4.91	0.70	0.58	7.05
$T_{5.}$ Coirpith	3.15	0.83	0.56	3.81
$T_{6.}$ Sphagnum moss +Vermicompost (1:1)	4.31	0.81	0.53	5.30
$T_{7.}$ Sawdust + Vermicompost (1:1)	3.88	0.84	0.50	4.61
$T_{8.}$ Cocopeat + Vermicompost (1:1)	3.72	0.80	0.53	4.66
$T_{9.}$ Coirpith + Vermicompost (1:1)	3.38	0.81	0.56	4.18
$T_{10.}$ Sawdust + Sphagnum moss (1:1)	3.60	0.77	0.52	4.69
$T_{11.}$ Cocopeat + Sphagnum moss (1:1)	4.02	0.76	0.55	5.28
$T_{12.}$ Coirpith + Sphagnum moss(1:1)	3.59	0.81	0.51	4.43
$T_{13.}$ Sawdust + Cocopeat(1:1)	3.78	0.84	0.54	4.48
$T_{14.}$ Sawdust + Coirpith(1:1)	3.93	0.82	0.52	4.81
$T_{15.}$ Cocopeat + Coirpith(1:1)	3.88	0.82	0.55	4.75
S.Em ±	0.08	0.01	0.03	0.13
CD at 5%	0.23	0.04	NS	0.37

Table 2: Influence of biochemical parameters on rooting of guava air layers cv. Sardar

Treatment	Number of Primary roots	Length of Primary roots (cm)	Length of longest Primary roots (cm)	Diameter of Primary roots (mm)	Number of secondary roots	Number of leaves	Number of side shoots	Leaf area (cm^2)
$T_{1.}$ Sphagnum moss (Control)	5.67	4.34	5.00	1.43	5.00	12.33	3.66	4.83
$T_{2.}$ Vermicompost	4.67	2.35	2.67	1.33	2.67	1.89	1.22	3.80

T_{3-} Sawdust	5.00	3.11	3.50	1.40	3.33	3.44	1.33	3.75
T_{4-} Cocopeat	8.17	4.77	6.00	1.47	6.67	10.00	3.55	5.07
T_{5-} Coirpith	4.00	2.33	2.67	1.30	2.00	1.66	1.02	3.30
T_{6-} Sphagnum moss +Vermicompost (1:1)	5.50	4.22	4.67	1.37	4.67	7.33	2.00	3.48
T_{7-}Sawdust+Vermicompost (1:1)	5.00	2.72	3.17	1.40	3.67	2.88	1.05	3.64
T_{8-} Cocopeat+ Vermicompost (1:1)	5.33	3.88	4.33	1.43	4.33	1.89	1.55	3.63
T_{9-}Coirpith+Vermicompost (1:1)	4.33	2.39	3.00	1.37	2.67	1.89	1.27	3.33
T_{10-}Sawdust+Sphagnum moss (1:1)	5.00	3.61	3.83	1.37	3.67	5.00	1.55	3.83
T_{11-}Cocopeat+Sphagnum moss (1:1)	5.60	4.30	5.00	1.43	4.93	7.55	2.67	4.00
T_{12-}Coirpith+Sphagnum moss (1:1)	4.17	2.38	2.83	1.40	2.33	1.83	1.22	3.55
T_{13-}Sawdust+Cocopeat (1:1)	4.67	2.66	3.00	1.40	4.67	3.55	1.55	3.47
T_{14-}Sawdust+Coirpith (1:1)	4.33	3.44	3.83	1.37	4.67	3.88	1.44	3.75
T_{15-}Cocopeat+Coirpith (1:1)	5.33	2.83	3.17	1.37	4.33	4.33	2.11	3.71
S.Em ±	0.67	0.33	0.39	0.11	0.65	1.20	0.50	0.17
CD at 5%	1.94	0.97	1.12	NS	1.89	3.47	1.50	0.48

Table 3: Influence of biochemical parameters on survival of guava air layers cv. Sardar

Treatment	Survival percentage (%)
T_{1-} Sphagnum moss (Control)	72.22
T_{2-} Vermicompost	22.22
T_{3-} Sawdust	27.77
T_{4-} Cocopeat	66.66
T_{5-} Coirpith	22.11
T_{6-} Sphagnum moss +Vermicompost (1:1)	38.89
T_{7-}Sawdust+Vermicompost (1:1)	22.11
T_{8-} Cocopeat+ Vermicompost (1:1)	27.66
T_{9-}Coirpith+Vermicompost (1:1)	22.22
T_{10-}Sawdust+Sphagnum moss (1:1)	38.89
T_{11-}Cocopeat+Sphagnum moss (1:1)	41.11
T_{12-}Coirpith+Sphagnum moss(1:1)	24.33
T_{13-}Sawdust+Cocopeat(1:1)	33.33
T_{14-}Sawdust+Coirpith(1:1)	27.66
T_{15-}Cocopeat+Coirpith(1:1)	33.33
S.Em ±	5.86
CD at 5%	16.96

The maximum survival percentage were observed in sphagnum moss (72.22 %) and cocopeat (66.66 %). The increased in survival percentage it might be due to the better water holding capacity of sphagnum moss for long time. Sphagnum moss have better absorption of water and minerals from the growing media as well as created more favourable environment for root and shoot growth resulting in higher survival percentage of guava air layers. The similar results were obtained by Rymbai and Reddy (2012), Tryambake and Patil (2002), Bhosale *et al,* (2009), Maurya *et al,* (2012) and Patel *et al,* (2012) Table 3.

Conclusion

The biochemical parameters like carbohydrate, nitrogen, phenol and C: N ratio are play important role in rooting of guava air layers at the time of layering.

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