Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(4): 1151-1153
Received: 04-05-2019
Accepted: 06-06-2019

MG Gohil
Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat, India

KD Patel
Principal, Polytechnic in Horticulture, Junagadh Agricultural University, Junagadh, Gujarat, India

BC Gohel
Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat, India

ML Der
Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat, India

Correspondence
MG Gohil
Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat, India

Effect of pre-soaking treatments and wrapping materials on growth of graft in softwood grafting in mango

MG Gohil, KD Patel, BC Gohel and ML Der

Abstract
The experiment was conducted at Fruit Research Station, Lal Baug, Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh during the year 2017-18. The treatment comprise of five pre-soaking treatments and two wrapping materials. The experiment was laid out in a Completely Randomized Design with factorial concept with three replications. The results revealed that pre-soaking with panchagavya 3% gave significantly highest result in shoot length of scion, number of leaves, plant height and scion girth. While, shoot length of scion and number of leaves observed significantly higher in graft tied with degradable tape as wrapping materials.

Keywords: Mango, pre-soaking treatments, wrapping materials

Introduction
The Mango (*Mangifera indica* L.) is belongs to family *Anacardiaceae* originated in South East Asia. The mango is one of the most common and important fruit crop cultivated all over India. It is also called the king of fruits and known as national fruit of India. The fruit can be grown in Indian sub continents for well over 4000 years (De Candolle, 1984) and has been favourites for king and commencer. India is the major producer of mango in the world with an area of 22.12 lakh hector and annual production is 195.6 lakh MT. In Gujarat total area under mango cultivation is about 1.42 lakh hector and production about 11.25 lakh MT (Anon., 2017) [1]. Mostly, mangoes are vegetative propagated by inarching, veneer grafting, epicotyl grafting, softwood grafting etc. Among different method softwood grafting has distinct advantages over other methods of propagation which is an efficient, economics; rapid method and grafts can be ready within a year. So, softwood grafting gives an excellence response in initial success with least possibility of mortality, better and uniform orchard establishment (Ram and Pathak, 2006). Best pre-soaking treatment was stone soaked with panchagvya. Wrapping material also play a most important role as from which wrapping material are used in grafting operation can be done for maximum success and its subsequent growth. Hence, considering the above facts, it is highly essential to standardize the pre-soaking treatments and wrapping materials on softwood grafting in mango.

Materials and Methods
The present investigation entitled "Effect of pre-soaking treatments and wrapping materials on softwood grafting in mango" was conducted at Fruit Research Station, Lal Baug, Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh during the year 2017-18. It was laid out in completely Randomized Design (FCRD) with Factorial concept having three repetitions. Ten treatment combinations involve two factors among these first factor contains five pre-soaking treatments of water soaking (S_1), KNO_3 @ 1% (S_2), GA_3 100 ppm (S_3), cow urine (S_4) and panchagavya at 3% (S_5). Second factor contains two wrapping materials of polythene stripe [200 gauge (W_1)] and degradable [tape 25 mm (W_2)]. Regular clear polythene strip of 200 gauge having width of 1.5 – 2.0 cm which normally nurserymen uses for grafting and a newly introduced degradable tape of 25mm roll contains 1000 perforated sections each of 40 mm length which is self-adhesive, stretches easily up to 6 times of its original length. Self-adhesion is activated when stretched and shrinks to fit after application. It degrades after 4-5 months thereby eliminating the need for tape removal purpose was used to tied scion and root stock at the graft union. For experiment purpose twenty grafts were prepared in each treatment. For rootstock purpose the stone are removed from the pulp and they were immediately planted on the polythene bags of 12 inch x 10 inch and 300 gauge thicknesses containing potting mixture of soil and F.Y.M. in the ratio of 2:1.

The stones were sown in the 25th may 2017 and the seedlings were ready for grafting on 4 month after sowing. The mature healthy, terminal, vigorous and 3-4 month old shoots were selected for scion and leaves were defoliated 7-10 days before for grafting. The tree scion shoots were collected from mother trees in the morning time on the day of grafting. Immediately after separation of the scions from the mother tree, they were wrapped in moist cloth and carried in polythene covers to the site of grafting. Grafting was performed on the same day of separation. Five representative plants from each treatment were selected and observed for different growth characters, viz. shoot length of scion, number of leaves, plant height, scion girth and stock girth. The observation was recorded 30 days after grafting operation at intervals of 30 days until 90 days after grafting. The data were analyzed as per method suggested by Panse and Sukhatme (1985) [6].

Table 1: Treatment combination of different pre-soaking treatments and wrapping materials

S. No	Treatments	Treatment details
1.	S_1 W_1	Water soaking + Polythene strip
2.	S_2 W_1	KNO3 + Polythene strip
3.	S_3 W_1	GA_3 + Polythene strip
4.	S_4 W_1	Cow urine + Polythene strip
5.	S_5 W_1	Panchagavya + Polythene strip
6.	S_1 W_2	Water soaking + Degradable tape
7.	S_2 W_2	KNO3 + Degradable tape
8.	S_3 W_2	GA_3 + Degradable tape
9.	S_4 W_2	Cow urine + Degradable tape
10.	S_5 W_2	Panchagavya + Degradable tape

Result and Discussion

Table 2: Effect pre-soaking treatments on shoot length of scion and number of leaves of mango graft

Treatments	Shoot length of scion			Number of leaves		
	Days after grafting			Days after grafting		
	30	60	90	30	60	90
S_1: Water soaking	11.74	12.80	13.93	5.98	7.39	9.53
S_2: KNO_3 1%	11.97	12.93	14.10	6.83	8.11	9.96
S_3: GA_3 100 ppm	12.66	13.57	14.76	7.16	9.01	11.08
S_4: Cow urine	12.20	13.11	14.15	6.92	8.42	10.19
S_5: Panchagavya 3%	12.71	13.81	15.20	7.36	9.69	12.01
S.Em±	0.25	0.91	0.20	0.11	0.22	0.24
C.D. at 5%	0.73	0.57	0.58	0.32	0.65	0.70
C.V. %	4.94	3.60	3.35	4.0	6.29	5.5

Table 3: Effect pre-soaking treatments on plant height and scion girth of mango graft

Treatments	Plant height			Scion girth		
	Days after grafting			Days after grafting		
	30	**60**	**90**	**30**	**60**	**90**
S_1: Water soaking	36.83	38.68	41.50	4.99	5.72	6.32
S_2: KNO_3 1%	37.24	39.89	42.42	5.18	5.90	6.70
S_3: GA_3 100 ppm	38.57	41.06	44.82	5.23	6.20	7.01
S_4: Cow urine	38.07	40.27	43.00	5.25	5.99	6.79
S_5: Panchagavya 3%	39.17	42.18	46.08	5.65	6.56	7.54
S.Em±	0.50	0.41	0.69	0.11	0.14	0.10
C.D. at 5%	1.49	1.22	2.05	0.32	0.42	0.29
C.V. %	3.25	2.50	3.91	4.92	5.70	3.48

Table 4: Effect of wrapping materials on shoot length of scion and number of leaves of mango graft

Treatments	Shoot length of scion			Number of leaves		
	Days after grafting			Days after grafting		
	30	**60**	**90**	**30**	**60**	**90**
W_1: Polythene strip	12.02	13.05	14.24	6.75	8.32	10.22
W_2: Degradable tape	12.49	13.43	14.61	6.95	8.73	10.89
S.Em±	0.16	0.12	0.12	0.07	0.14	0.15
C.D. at 5%	0.46	0.36	0.37	0.21	0.41	0.44
C.V. %	4.94	3.60	3.35	4.0	6.29	5.5

The experimental results revealed that the success of grafting was found to be significantly influenced due to pre-soaking treatments and wrapping materials.

Effect of pre-soaking treatments

Significantly maximum shoot length of scion (12.71, 13.81 and 15.20 cm) were recorded in panchagavya 3% (S_5) which was statistically at par with GA_3 @ 100 ppm (S_3) at 30, 60 and 90 DAG, respectively. Probably this may be due to better growth of grafts and weather condition like temperature and humidity, which played important role in growth of grafts. Similar results were observed by Sappandi (2005) [8] in wood

apple and Devechandra, (2006) [2] in jamun.

The result was also found significant and maximum number of leaves (7.36, 9.69 and 12.01) were noted in panchagavya 3% (S_5) which was statistically at par with GA_3 @ 100 ppm (S_3) at 30, 60 and 90 DAG, respectively. This might be related to vigorous growth of grafts induced by stimulative organs and also influenced by maximum number of sprouts leading to maximum number of leaves.

Pre-soaking treatments had significantly influenced on plant height of graft. The result reveled that panchagavya 3% (S5) recorded maximum plant height (39.17, 42.18 and 46.08 cm) which was statistically at par with GA3 @ 100 ppm (S3) at 30, 60 and 90 DAG, respectively. The minimum plant height was noted in water soaking (S1). It could be attributed to weather conditions at the time of the grafting season leading to more accumulation of food material of the stored metabolites thereby increasing plant height. These results are in agreement with Padma and Narayan Reddy (1998) [5] and Santosh (2004) [7] in mango.

Highest increment of scion girth (5.65, 6.56 and 7.54 mm) were found in panchagavya 3% (S5) which was at par with GA3 @ 100 ppm (S3) at 30, 60 and 90 DAG, respectively as compared to other treatments. This could be attributed to the vigorous growth of stock, which increased the growth and leads to maximum accumulation of stored metabolites at the time of grafting. Similar results were observed by Sappandi (2005) [8] in wood apple and Devechandra (2006) [2] Devechandra in jamun.

Effect of wrapping materials

The maximum shoot length of scion (12.49, 13.43 and 14.61 cm) was recorded when grafts tied with degradable tape 25 mm (W_2) at 30, 60 and 90 days DAG, respectively. The degradable tape is elastic tying or wrapping material which prevents humidity loss and drying of scion stick. Due to this callus is produced more easily for healing of wound and due to increase in callus formation there is earliest and good wound healing tissue formation on cut surfaces, cambial connectivity between stock and scion set rapidly, enabling water and mineral nutrient supply easily via rootstock; (Hartmann *et al*. 1990) [3] thus, growth and development of scion may have increased resulting in more shoot length of scion/bud as compared to polythene strip. This finding is in conformity with the results of Khopade and Jadav (2013) [4] and Wazarkar (2009) [9].

Significantly maximum number of leaves (6.95, 8.73 and 10.89) was recorded when grafts were tied with degradable tape 25 mm (W_2) as compared to polythene strip 200 gauge (W_1), at 30, 60 and 90 DAG, respectively. This might be due to the maximum cambial connectivity between stock and scion enabling water and mineral supply easily via rootstock which resulted maximum vegetative growth and more number of leaves. This finding was conformity with the results of Hartmann *et al.,* (1990) [3].

References

1. Anonymous. NHB Database, National Horticulture Board, Ministry of Agriculture, Govt. of India, 2017.
2. Devechandra D. Synergestic effect of AM fungai in combination with bio-formulationon germination; graft-take, growth and yield of Jamun. M.Sc. (Hort.) Thesis, Univ., Agric. Sci. Dharvad, 2006.
3. Hartmann HT, Kester D, Davies FT. Plant Propagation Principles and Practices. Fifth Edition. Regents/Prentice Hall, Englewood Cliffs, New Jersey, 1990.
4. Khopade, Rohan, Jadav RG. Effect of different grafting date and wrapping materials on success of softwood grafting in custard apple (*Annona squamosa* L.) cv. Local selection. Internet. J Agric. Sci. 2013; 9(2):806-808.
5. Padma M, and Reddy YN. Effect of pre-sowing treatment of stones and kernals on mango (*Mangifera indica L.*) germination. J Res. Agric. 1998; 26(2):17- 21.
6. Panse VG, Sukhatme PV. Statistical methods for agricultural workers. Indian Council of Agricultural Research, New Delhi, 1985.
7. Santosh. Enhancement of germination, growth, graft take and stress tolerance mango Rootstock using bioformulation. M.Sc. (Horti.) Thesis, Univ. Agric, Sci., Dharvad, 2004.
8. Sappandi S. Survey, evaluation and softwood grafting of wood apple (*Feronia limonia* L.) genotypes. M.Sc. (Hort.) Thesis, Univ. Agric. Sci. Dharwad (India), 2005.
9. Wazarkar SS. Effect of grafting dates and grafting materials on softwood grafting in Sapota (*Manilkara acharas* Mill) under middle Gujrat agroclimatic conditions, M.Sc. Thesis submitted to AAU, Anand, 2009.