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Correlation Studies Between Growth and Survival Percentage of Softwood Grafts in Different Varieties of Aonla (*Emblica officinalis* Gaertn.)

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A B S T R A C T

The present study was conducted to determine correlation for growth and survival percentage of softwood grafts in different aonla varieties. The coefficient of correlation was estimated for growth parameters, which included Graft diameter (mm), Sprout height (cm), Number of leaves (No.), Leaf area per graft (cm^2), Stionic ratio, Length of shoot (cm), Length of tap root (cm), Length of secondary root (cm), Number of secondary roots (No.), Weight of shoot (g) (Fresh & Dry), Weight of root (g) (Fresh & Dry) and Survival Percentage. The results indicated that, the survival percentage was significantly correlated with the growth attributes like number of leaves (0.804), stionic ratio (0.875), fresh (0.877) and dry weight of shoot (0.838) which were highly significant @ 1% level. The sprout height (0.675), leaf area per graft (0.676), length of shoot (0.704), fresh (0.732) and dry weight of root (0.777) was also having positive significant correlation @ 5% level. The other parameters under study like graft diameter (0.066), length of tap root (0.565), length of secondary roots (0.611) and number of secondary roots (0.475) did not shown any significant correlation.

Introduction

Aonla or Indian Gooseberry (*Emblica officinalis* Gaertn.) is known for its medicinal and therapeutic properties from the ancient time in India and considered as a wonder fruit for health conscious population.

It belongs to the family Euphorbiaceae is one of the important minor fruit crops of our country. Aonla is native to tropical region of South-East Asia particularly Central and Southern India (Morton, 1987). It is the richest source of vitamin C (600 mg/100 g). Aonla fruits haves got great potential in processed forms of food items i.e. Ready to Serve (RTS), nectar, squash, syrup, jam, preserve, candy, pickle, sauce, chutney, dehydrated shreads etc. Aonla fruit is acrid cooling refrigerant, diuretic and laxative and hence useful in treating anaemia, diarrhoea, chronic dysentry, jaundice, fever, bronchitis, cough, dyspepsia, diabetes, artherosclerosis, haemorrhages, leukorrhea (Singh, 1997), asthma, tuberculosis of lungs, scurvy, weakness of memory, cancer, tension,

influenza, cold, loss and grayness of hair (Goyal *et al.,* 2008). The fruit is anabolic, antibacterial and resistance building and possess anti carcenogenic, antiemetic, anti-oxidative (due to gallic acid), anti- pyretic, anti tumour, anti-viral, cardiotonic and expectorant activities (Agarwal and Chopra, 2004). Aonla lowers the risk of cancer, increases red blood cells and haemoglobin. Aonla fruit is one of the main ingredient of Chavanprash and one of the three ingredients of triphla which is useful to treat constipation, headache, enlarge liver and billousness. In old scriptures, aonla is known as Amritphal (Chopra *et al.,* 1958).

Aonla is propagated by both sexual (seed) and asexual (vegetative) methods. But the aonla plants raised through seeds do not come true-to-type and there is a high variability. Hence to overcome the disadvantages of seed propagation, multiplication of superior types of aonla has been suggested by adopting vegetative methods like budding, grafting, inarching etc. as the vegetatively propagated fruit trees are true-to type and they come to bearing early (Hartmann *et al.,* 1993).

Though shield/patch budding in aonla gives fairly higher percentage of success, it is cumbersome, time and labour consuming process and can only be done on seedling rootstocks of age, more than one year. Softwood grafting is reported to be easy, convenient to practice, involves simple skills and is a quick method of grafting (Kulwal and Tayde, 1989) and more successful than other methods of grafting (Amin, 1978; Panicker and Deasi, 1989; Ram, 1997).

Beside this, the grafted plants occupy smaller area with the benefit of accommodation of more plants per unit area and start bearing earlier than the plants raised from seed, providing the owner earlier and much higher economic benefit. The present investigation was undertaken to study the correlation between growth and survival percentage of softwood grafts of different aonla varieties at nursery stage.

Materials and Methods

The present investigation “correlation studies between growth and survival percentage of softwood grafts in different aonla varieties at nursery stage” was undertaken in 50% shade net house conditions at Department of Horticulture, College of Agriculture, Latur, during February 2014 to January 2015. The experiment consist nine different aonla varieties viz. Banarasi, Chakaiya, NA-4 (Kanchan), NA-5 (Krishna), NA-6, NA-7, NA-10, Anand-1 and Anand-2 at nursery stage as treatments and replicated thrice in Completely Randomized Design (CRD). Seeds for raising of rootstock were collected from the fruits of single local aonla tree having healthy growth and high productivity. The vigorously growing rootstocks seedlings of eight months old age having uniform size and thickness were selected for grafting. The scion sticks were selected from the non-flowering shoots of fresh growth having dark green colored leaves, about 15 cm long, straight, smooth, healthy, pest and disease free and of same thickness of rootstock were used for the study. These grafts were placed in polythene bags filled with potting mixture and kept under net house conditions. The observations on days required for sprouting and initial graft success were recorded. The growth observations like graft diameter, sprout height and number of leaves were recorded at 30 days interval. The observations on the leaf area, survival percentage of grafts, stionic ratio were recorded at 120 DAG. The final data of each characters recorded during the investigation were analysis statistically by the method of "Analysis of variance". The significance of various treatments was judged as suggested by Panse and Sukhatme (1967).

Table.1 Correlation matrix (r) of survival percentage with various growth parameters of aonla

Characters		Graft diameter (mm)	Sprout height (cm)	Number of leaves (No.)	Leaf area per graft (cm^2)	Stionic ratio	Length of shoot (cm)	Length of tap root (cm)	Length of secondary root (cm)	Number of secondary roots (No.)	Weight of shoot (g)		Weight of root (g)		Survival percentage (%)
											Fresh	Dry	Fresh	Dry	
Graft diameter (mm)		1.000	0.298	0.163	0.073	0.262	0.372	0.070	0.082	-0.076	0.090	0.089	0.225	0.084	0.066
Sprout height (cm)			1.000	0.919**	0.387	0.725*	0.948**	0.482	0.406	0.262	0.595	0.538	0.490	0.546	0.675*
Number of leaves (No.)				1.000	0.631	0.697*	0.847**	0.460	0.432	0.292	0.774*	0.723*	0.582	0.647	0.804**
Leaf area per graft (cm^2)					1.000	0.436	0.441	0.359	0.386	0.336	0.922**	0.931**	0.563	0.562	0.676*
Stionic ratio						1.000	0.739*	0.499	0.547	0.391	0.725*	0.691*	0.648	0.664	0.875**
Length of shoot (cm)							1.000	0.503	0.409	0.281	0.638	0.597	0.476	0.523	0.704*
Length of tap root (cm)								1.000	0.974**	0.949**	0.416	0.342	0.887**	0.898**	0.565
Length of secondary root (cm)									1.000	0.962**	0.445	0.374	0.949**	0.945**	0.611
Number of secondary roots (No.)										1.000	0.337	0.276	0.863**	0.884**	0.475
Weight of shoot (g)	Fresh										1.000	0.994**	0.617	0.635	0.877**
	Dry											1.000	0.554	0.568	0.838**
Weight of root (g)	Fresh												1.000	0.978**	0.732*
	Dry													1.000	0.777*
Survival Percentage															1.000

* Significant at 5% and ** Significant at 1% level

Data on simple correlation between survival percentage of grafts as depended variable (Y) and graft diameter (mm), sprout height (cm), number of leaves (No.), leaf area per graft (cm^2), stionic ratio, length of shoot (cm), length of tap root (cm), length of secondary root (cm), number of secondary roots (No.), fresh weight of shoot (g), dry weight of shoot (g), fresh weight of root (g) and dry weight of root (g) as independent variable (Xn) is presented in Table 1.

Results and Discussion

In the present study correlation between different growth parameters and survival percentage of grafts was worked out. The results indicated that the survival percentage was significantly correlated with some of the growth attributes like number of leaves (0.804), stionic ratio (0.875), fresh (0.877) and dry weight of shoot (0.838) which were highly significant (at 1% level). The sprout height (0.675), leaf area per graft (0.676), length of shoot (0.704), fresh (0.732) and dry weight of root (0.777) was also having positive significant correlation but it is at 5% level. The other parameters under study like graft diameter (0.066), length of tap root (0.565), length of secondary roots (0.611) and number of secondary roots (0.475) did not shown any significant correlation. It is obvious that for survival of plant food material is essential. Hence, the graft with more number of leaves and ideal stionic ratio have the vigorous growth on account of production of more quantum of carbohydrates and their effective translocation to the different plant parts which ultimately leads to higher survival percentage. The other growth parameters like length of shoot, leaf area are also important but they have shown their significance under study except fresh and dry weight of root have non-significant effect could be due to low water requirement of the grafts during initial stages of growth. The higher fresh weight and dry weight is the result of vegetative growth due to production and accumulation of carbohydrates in the shoots, hence, the parameters like fresh weight of shoot and root and dry weight of shoot and root have shown positive and significant correlation with the survival percentage. These results are in accordance with the findings of Reshma *et al.*, (2017) in Guava.

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References

Agarwal, S. and Chopra, C.S. 2004. Studies on changes in ascorbic acid and total phenols in making aonla products. *Beverage and Food World*, 31: 32-34.

Amin, R. S. 1978. Softwood grafting - A new technique for hardwood plants. *Current Science*, 47(13): 468-469.

Chopra, C., Sir, R.N., Chopra, I.C., Handa, K.L. and Kapoor, L.D. 1958. *Indigenous Drugs of India*. Dhur & Sons, Private Limited, Calcutta. sp.

Goyal, R.K., Patil, R.T., Kingsly, A.R.P., Walia, H. and Kumar, P. 2008. Status of Post-harvest Technology of Aonla in India-A Review. *American Journal of Food Technology*, 3: 13-23.

Hartmann, H. T., Kester, D. E. and Davies, F. T. 1993. *Plant Propagation Principles and Practices (2nd edn.)* Prentice Hall of India Private Limited, New Delhi.

Kulwal, L. V. and Tayade, G. S. 1989. Studies on propagation of mango varieties by softwood grafting under Akola condition. *Acta Horticulture*, 231: 256-258.

Morton, J. 1987. *Emblica.* In: Fruits of warm climates. Miami, Florida. pp. 213–217.

Panicker, P. and Deasi, A. B. 1989. Effect of age of scion mother tree, different flushes of rootstock and in-situ grafting on the success and growth of softwood grafts of Alphonso mango. *Progressive Agriculture,* 21(1&2): 141-144.

Panse, V. G. and Sukhatme, P. V. 1967. Statistical methods for Agricultural workers, *I.C.A.R. Publication*, New Delhi, pp.381.

Ram, S. 1997. *The Mango: Botany Production and Uses*. In: RE Litz (Editor). Cambridge University Press, U.K. pp. 328-363.

Reshma UR, Bharad SG, Satkar K. 2017. Correlation studies of guava graft compatibility and its growth performance in relation with different nature of scion. *Agric. Update*, 12(Techsear-3): 743-748.

Singh, R. and Kumar S. 1997. Effect of different storage conditions on the shelf life of aonla (*Emblica offiinalis* G.) Cv. Chakaiya. *Haryana J. Hort. Sci.,* 26(1-2): 12-15.

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