

Response of number of air layers per shoot in pomegranate (*Punica granatum* L.)

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ABSTRACT

The experiment was carried out at Akola with the objectives to study the effect of number of air layers per shoot and to find out the retention of appropriate number of air layers per shoot for higher success in pomegranate. The pomegranate propagation significantly influenced by number of air layers per shoot treatment. Results revealed that two layer per shoot significantly showed better response for root initiation, rooting percentage, length of root, fresh weight of root, dry weight of roots and number of leaves. However, number of roots, root volume, height of rooted air layered, survival percentage was maximum in four layer per shoot.

Keywords : Air layering, IBA, DAP, DAT, Pomegranate.

INTRODUCTION

The pomegranate (*Punica granatum* L.) is one of the ancient and highly praised favorite fruit. It is commercially grown, apart from India, in a number of countries for its sweet acidic fruits, which provide cool refreshing juice, and is valued from its medicinal properties its popularity is also due to the ornamental nature of the plant which bears bright red, very attractive flowers. The area under pomegranate is increasing day by day due to its export potential as well as demand in domestic market. The pomegranate is propagated through cutting and layering on commercial scale but the rooting and survival success is very less. In the recent years the area under pomegranate is increasing day by day in state of Maharashtra state especially in western Maharashtra and Vidarbha region. Present area 90,000 ha, production 9,45,000 MT and productivity 10.5 MT/Ha. There is a heavy demand for planting materials so there is need to produce large planting material in shortest possible time so there is need to do multiple air layers per shoot so one can get maximum number of air layers per shoot per tree. At present there is no standard available with pomegranate growers to perform air layers per shoot and it's retention per shoot. Therefore present investigation will be undertaken to study and to find out the response number of air

layers per shoot in pomegranate for correct and precise advice to pomegranate growers.

MATERIAL AND METHOD

The present investigation was carried out during the year 2015-16 at Commercial Fruit Nursery unit, College of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (MS). The materials used and methodologies adopted in the investigation given below:

The experiment was laid out in Randomized Block Design (RBD) with four treatment i.e. number of air layers per shoot viz., L₁ two layer per shoot, L₂ four layer per shoot, L₃ six layer per shoot and L₄ eight layer per shoot and four replication. The layering operation in all the four treatments was made in July.

Selection of plants and branches

The uniformed sized, healthy and vigorous growth of 8 year old trees of *Punica granatum* cv. Bhagwa grown at Commercial Fruit Nursery Unit, were selected. On these plants, well-matured and healthy branches of pencil thickness were selected for air layering. The average length of branches was 60 cm for each replication and each treatment, total 20 plants were selected and 20 air layers were taken on each plant's branch for each treatment.

Preparation of plant growth regulators (IBA) in lanolin paste

For preparation of 5000 ppm lanolin paste of IBA 500 mg of IBA was weighed on a chemical balance and was transferred in a beaker. Thereafter, 5 ml of ethyl alcohol (95 %) was added to it and shaken thoroughly to dissolve properly. Then 100 g lanolin was taken in petri dish and heated. The dissolved growth regulator was transferred into the melted lanolin paste and stirred firmly with clean glass rod until evaporation alcohol. In this way, harmonious mixture of growth regulator and lanolin paste was prepared.

RESULTS AND DISCUSSION

The result obtained from the present investigation as well as relevant discussion have been summarized under following sub heads and given in Table. 1.

Days required for root initiation

The result obtained in respect of short period required for root initiation significantly influenced by number of air layers per shoot on minimum days for rooting (22.54 days) was observed in L₁ treatment *i.e.* two layer per shoot. However, treatment L₄ *i.e.* eight layer per shoot took maximum days (26.48) for rooting as compare to other treatment. It clearly indicated that, treatment L₁ *i.e.* two layers per shoots found to be significantly minimum days required for root initiation.

Rooted air layers (%)

The result obtained in respect of maximum percentage of rooted air layers (70.44%) was recorded in L₁ treatment *i.e.* two layer per shoot. However, minimum percentage of rooted air layers (59.88%) was recorded in treatment L₄ *i.e.* eight layers per shoot.

Number of primary and secondary roots

Observation in respect of maximum number primary roots (14.56) and secondary roots (32.75) per layers was observed in treatment L₂ *i.e.* four layer per shoot. However, minimum number of primary roots (11.21) and secondary roots (29.38) per layers were observed in treatment L₄ *i.e.* eight layers per shoot.

Table : 1. Response of number of air layers per shoot in Pomegranate.

Treatment	Days required for root initiation	Rooted air layer (%)	Number of primary roots after 90 DAL	Number of secondary roots after 90 DAL	Length of primary roots (cm) after 90 DAL	Length of econdary roots (cm) after 90 DAL	Fresh weight of roots (g) after 90 DAL	Dry weight of roots (g) after 90 DAL	Root volume (cm ³) after 90 DAL	Height of rooted air layered (cm) after 60 DAT	Number of leaves per layer after 60 DAT	Fresh weight of shoot (g) after 60 DAT	Dry weight of shoot (g) after 60 DAT	Survival percentage (%)
L ₁ - Two layer/shoot	22.54	70.44 (57.06)	20.94	36.25	12.00	2.36	2.04	0.59	3.69	25.84	42.00	10.14	3.93	75.31 (60.21)
L ₂ - Four layer/shoot	23.83	67.83 (55.17)	22.32	37.79	11.00	2.13	1.74	0.42	4.04	27.41	40.69	10.57	4.66	77.13 (61.43)
L ₃ - Six layer/shoot	25.14	63.59 (52.89)	19.53	35.31	9.46	2.06	1.52	0.29	2.95	25.13	38.33	9.53	3.92	70.13 (56.87)
L ₄ - Eight layer/shoot	26.48	59.88 (50.70)	18.34	34.87	10.31	1.88	1.43	0.24	2.83	23.84	37.44	9.24	3.66	67.88 (55.48)
F Test	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	NS	NS	Sig
SE (m)±	0.54	1.31	0.95	0.88	0.48	0.14	0.10	0.6	0.34	0.84	1.34	0.63	0.42	1.20
CD at 5%	1.33	3.23	2.34	2.17	1.19	0.34	0.23	0.15	0.84	2.06	3.30	-	-	2.94

Note – Figures in parenthesis denote the arc sign transformation value DAL- Days after layering DAT- days after transplanting

Length of primary and secondary roots

Observation in respect of maximum length of primary roots (12cm) and secondary roots (2.36 cm) per layers were observed in L₁ i.e. two layer per shoot. However, minimum length of primary roots (9.46 cm) and secondary roots (1.88 cm) per layer was observed in L₃ i.e. six layers per shoot (9.46cm).

Fresh and Dry weight of roots

Observation in respect of maximum weights of fresh root (2.04 g) and dry weights (0.59 g) was found to be maximum in treatment L₁ i.e. two layer per shoot. However, minimum fresh weight of root (1.43g) and dry weight of roots (0.24g) was recorded in treatment L₄ i.e., eight layer per shoot.

Root volume

Observation in respect of maximum root volume was found in treatment L₂ i.e. four layer per shoot (4.04 cm³). However, minimum root volume was recorded in treatment L₄ i.e. eight layer per shoot (2.83 cm³).

Heights of rooted air layer

Observation in respect of heights of rooted air layer at the stage of 60 DAT, significantly maximum height of rooted layer was observed in L₂ (27.41cm). Whereas, minimum height of rooted layer was observed in L₄ (23.84 cm).

Number of leaves per layer at final survival

Observation in respect of Number of leaves per layers at final survival L₁ i.e. two layer per shoot (42.00) had recorded significantly higher number of leaves at final survival. and minimum number of leaves at final survival was registered in treatment L₄ i.e. eight layer per shoot (37.44).

Fresh and Dry weight of shoot

Observation in respect different treatments of number of air layer per shoot of fresh and dry weights of shoot showed non significant results.

Survival percentage

Observation in respect of final survival percentage treatment L₂ i.e four layers per shoot had recorded significantly higher survival percentage (61.43%) and minimum survival percentage was recorded in treatment L₄ i.e. eight layers per shoot (55.48%).

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