

Effect of IBA on rooting of grapes cuttings (*Vitis vinifera*)

S Madhavan, S Sivasankar, S Elakkuvan, M Gayathri

Department of Horticulture, Faculty of Agriculture, Annamalai University, Tamil Nadu, India

Abstract

Grapes *Vitis vinifera* is the most famous edible species of grapes which belongs to the family vitaceae is commercially propagated through hard wood cuttings. Hard woodcuttings take more time to sprout that is why success rate is low. To minimize this problem the present study was carried out at Department of Horticulture, Faculty of Agriculture, Annamalai University to evaluate the effect of Indole-3-butyric acid on rooting of grape cuttings with ten treatments at different concentrations namely T₁ – IBA 500 ppm, T₂ – IBA 1000 ppm, T₃ – IBA 1500 ppm, T₄ – 2000 ppm, T₅ – 2500 ppm, T₆ – 3000 ppm, T₇ – 3500 ppm, T₈ – 4000 ppm, T₉ – 4500 ppm, T₁₀ – Control. The obtained results revealed that IBA has significant effect on rooting of grape cuttings. Treatment T₄ - 2000 ppm of IBA for 5 minutes showed maximum results for all root and shoot characters like days required for sprouting, length of roots, number of leaves per shoot, number of roots per cutting, shoot length, rooting percentage and survival percentage with 16.52 days, 6.85 cm, 3.69, 13.69, 15.68 cm, 88.36 % and 94.30 % respectively followed by treatment T₆ - 3000 ppm of IBA for 5 minutes with 16.16 days, 6.57, 3.53, 12.78, 15.08 cm, 83.51 % and 91.99 % respectively when compared with control. The results concluded that IBA 2000 ppm with 5 minute dipping time is best to enhance growth, survival and rooting of grape cuttings.

Keywords: grapes, cuttings, rooting, IBA

Introduction

Grapes (*Vitis vinifera*) belong to the family Vitaceae is a Non climacteric fruit that grows on the perennial and deciduous climbing vine. Grapes is a cross pollinated vine with simple, lobed, cut or toothed leaves with racemes of greenish flowers, the fruit consisting of watery or fleshy pulp stones and skin, four seeded. Grapes is thought to be native to the area near the capisian sea. The distribution of wild species is in North America, Central Asia and South Eastern Europe particularly in the region of Black sea, Capisian sea and Albania. It is believed that there were two main centres later, it was found that a large numbers of wild species are scattered in the Himlayas which is considered as the third centre. The grape vine is generally propagated by vegetative method such as hard wood cutting. Vegetative propagation is preferred because the plants propagated by this method produce fruits early, give more yield and true to type and quality fruit every year. One-year old branch is used to make cuttings. Normally planted cutting take more time to sprout. There number of roots also less and survival percentage is also minimum. Auxin hormones are applied on hard wood cutting for stimulation of adventitious roots. Naturally plant produce Auxin in its different part but artificial Auxin carried it to succession by increasing the rooting. Auxin is familiar in stimulation of rooting and root formation on cuttings of grapes. NAA (Naphthalene acetic acid) and IBA (indol-3-butyric acid) have good effect on cutting then IAA (Indole acetic acid) (Khan *et al.*, 2006) [5]. IBA is well known Auxin hormone which regulate growth of cutting in different aspect like cell elongation and initiation of root formation (Wayne, 2000) [8]. Mostly IBA (indol-3-butyric acid) is used for applying on hard wood cutting to initiate rooting. IBA (indol-3-butyric acid) applied on cutting to initiate rooting and increase number of roots and survival percentage of cutting. IBA has greatest

influence on rooting of cuttings. Which cause increase in number of roots and survival percentage (Singh *et al.*, 2011) [7]. The application of IBA (indol-3-butyric acid) in 2500-4000 mg/l obtain to exciting result in apple, olive and plum rooting from hardwood cuttings (Hartmann *et al.*, 1997) [4]. Maximum numbers of roots were obtained in grapes (*Vitis vinifera*) with 4000 mg/ l IBA (indol-3-butyric acid) (Glavi *et al.*, 2013) [3]. Grapes cutting take more time to sprouting and survival percentage is also low. Grapes are cultivated by hard wood cutting. Normally planted cutting take more time to sprout and the success rate is also low. Auxin (IBA) is one of the most important hormones that is used on the stem cutting for accelerating the formation of adventitious roots and also increase the survival percentage. This study was design to investigate the effects of IBA on grapes cutting, early rooting and survival percentage.

Materials and Methods

The experiment was carried out at Medicinal Unit of Department of Horticulture, Faculty of Agriculture, Annamalai University. Hardwood cuttings of Grapes were collected from a farmer's field at Cumbum of Theni district. Cutting length taken for the study was 30 cm having 3-4 buds on each cutting. Distilled water was used to make solution of IBA with 2000 mg/l. IBA was dissolved by stirrer in distilled water and solution was prepared. IBA solution was prepared by dissolving the powdered hormone in distilled water and stir on magnetic stirrer. The same procedure is followed to prepare nine treatments with different concentrations of IBA namely, T₁ – IBA 500 ppm, T₂ – IBA 1000 ppm, T₃ – IBA 1500 ppm, T₄ – 2000 ppm, T₅ – 2500 ppm, T₆ – 3000 ppm, T₇ – 3500 ppm, T₈ – 4000 ppm, T₉ – 4500 ppm, T₁₀ – Control. One year old hard wood cutting having 30cm length with 3-4 buds was used. Cuttings were prepared by secateurs. A slanting cut was

made at the end and round cut was made on top of cutting and the cuttings are soaked in the different concentrations of

IBA for 5 minutes.

Table 1: Effect of IBA on Rooting of Grapes Cuttings (*Vitis Vinifera*)

Treatments	Days for sprouting (days)	Root length (cm)	No. of leaves/shoot	No. of Roots/cutting	Shoot length (cm)	Rooting percentage (%)	Survival percentage (%)
T ₁ IBA 500 ppm	14.87	5.73	3.05	10.05	13.28	68.96	85.06
T ₂ IBA 1000 ppm	15.30	6.01	3.21	10.96	13.88	73.81	87.37
T ₃ IBA 1500 ppm	14.01	5.17	2.73	8.23	12.08	59.26	80.44
T ₄ IBA 2000 ppm	16.52	6.85	3.69	13.69	15.68	88.36	94.30
T ₅ IBA 2500 ppm	13.58	4.89	2.57	7.32	11.48	54.41	78.13
T ₆ IBA 3000 ppm	16.16	6.57	3.53	12.78	15.08	83.51	91.99
T ₇ IBA 3500 ppm	13.15	4.61	2.41	6.41	10.88	49.56	75.82
T ₈ IBA 4000 ppm	15.73	6.29	3.37	11.87	14.48	78.66	89.68
T ₉ IBA 4500 ppm	14.44	5.45	2.89	9.14	12.08	64.11	82.75
T ₁₀ IBA 5000 ppm	12.72	4.33	2.25	5.5	10.28	44.71	73.51
CD 0.05%	0.24	0.15	0.09	0.52	0.32	3.86	1.67
S Ed.	0.48	0.30	0.18	1.04	0.64	7.72	3.34

Results and Discussion

Statistical results showed that the application of IBA increased the rooting of Grapes cuttings. Application of IBA on hardwood cuttings of grapes has significant effect on days required for sprouting, length of roots, number of leaves per shoot, number of roots per cutting, shoot length, rooting percentage and survival percentage. Among the various treatments used, treatment T₄ - 2000 ppm of IBA for 5 minutes showed maximum results for all the above characters with 16.52 days, 6.85 cm, 3.69, 13.69, 15.68 cm, 88.36 % and 94.30 % respectively followed by treatment T₆ - 3000 ppm of IBA for 5 minutes with 16.16 days, 6.57, 3.53, 12.78, 15.08 cm, 83.51 % and 91.99 % respectively when compared with control.

In this research Indole-3-butyric acid (IBA) with 2000 ppm concentration with 5 minutes dipping time of grapes cutting is best for earlier sprouting, maximum number of roots, root length, number of leaves, rooting percentage and survival percentage. In the research of McGuire *et al.*, (1998) ^[6] highest root length was obtained in oleander cutting was with 2000 and 3000 mg/l NAA, and 400mg/l showed negative effect on the root cutting. In this research highest root length was obtained in grapes cutting with 2000mg/l with 10 second dipping time best was obtained due to prolonged the dipping time. In the research of Farooqi *et al.*, (1994) ^[2] on Rosa damascena Mill and studied the effect of IBA. They found the increasing trend of rooting percentage, number of roots per cutting, length of the longest root (cm), thickness of the root (cm), fresh weight of root and dry weight of root with increasing concentration of IBA from 100 mg/l to 300 mg/l. Chalapathi *et al.*, (2001) ^[1] reported that cuttings treated with IBA 500 mg/l was found to be superior with respect to shoot length, number of branches, number of leaves and root length, survival percentage and sprouting percentage. He also stated that better rooting and sprouting of stevia cuttings can be obtained through prolonged dipping of stevia cuttings in 50 mg/l IBA solution. Glavi *et al.*, (2013) ^[3] found the result in his research that the maximum number of roots, root length, and root fresh and dry weight was obtained by applying 4000 mg/l IBA.

References

- Chalapathi MV, Thimmegowda ND, Kumar S, Gangadhar G, Rao E, Mallikarjun K. Influence of length of cutting and growth regulators on vegetative

propagation of Stevia (*Stevia rebaudiana* Bert.). Crop Res,2001:21:53-56.

- Farooqi AA, Shenoy R, Ramu BS. Influence of planting material and growth regulators on the rooting of cutting of Rosa damascena Mill. Indian Perfumer,1994:38:133-143.
- Glavi M, Karimian MA, Mousavi SR. Effects of Different Auxin (1 IBA) Concentrations 2 and PlantingBeds on Rooting Grape Cuttings (*Vitis vinifera*).Annual Review & Research in Biology,2013:3(4):517-523.
- Hartmann HT, Kester DE, Davis FT, Geneve RL. Plant Propagation: Principles and Practices, Prentice Hall, Upper Saddle River, NJ, USA, 6th edition, 1997.
- Khan MS, Khan RU, Waseem K. Effect of some auxins on growth of Damask rose cuttings in different growing media. J. Agric. Soc. Sci,2006:2(1):13-16.
- Mc Guire JJ, Albert IS, Shutak VK. Effect of foliar applications of 3-indolbutyric acid on rooting of cuttings of ornamental plants. American Society for Horticultural Science,1998:93:699-704
- Singh KK, Rawat, JMS, Tomar YK. Influence of IBA on rooting potential of Torch Glory Bougainvillea glabraduring winter season. Journal of Horticultural Science and Ornamental Plants,2011:3(2):162-165.
- Wayne SJ. Areview of factors affecting plant growth. Univ. of Nevada. Ren, Marianne ames. Graduate Fellow, 2000, 5-19.