INDUCTION OF ROOTING IN GRAPE (ARI 516)

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ABSTRACT

Basal cuttings having more than 8 mm diameter showed better rooting than apical sections of the shoots. Cuttings treated with low temperature (4°C) for 24 hrs before planting initially sprouted well, up to 45 days, but could not survive until 90 days. Cuttings from middle portion having the size of 5±1 cm survived better for IBA treatment at 90 days. NAA did not help rooting. Hormones when externally applied did not show any role in promoting roots.

Key words: ARI -516, IBA, NAA, Growth regulators

Introduction

Hybrid Grape ARI-516 (Catawba x Beauty Seedless) developed by Agharkar Research Institute has been released as Punjab MACS Purple by Punjab Agricultural University, Ludhiana (Gill *et al.*, 2008). The multiplication of ARI-516 is done by rooting of the hardwood cuttings. *Vitis rotundifolia* shows better rooting at basal region of hardwood cuttings, followed by middle and apical cuttings (Castro *et al.*, 1994). Cuttings from some grape species and their hybrids however require special treatment to induce rooting (Robbis and Burger, 1968). Present study was undertaken to investigate the effect of different stimulants on rooting in ARI-516 cuttings having different thickness.

Material and Methods

The experiment was conducted with Hybrid ARI-516 cuttings obtained from the vineyard at Agharkar Research Institute's Farm situated at Hol near Baramati in April 2013. The cuttings were taken from basal, middle and apical portions of the shoots. Basal cuttings had diameter of 8±1 mm, while cuttings of the middle and apical regions were 5 ±1 and 3 ±1 mm thick, respectively. The cuttings were brought to laboratory in moist gunny bags. The experiment was laid out with five replications having ten cuttings each, for four treatments comprised of two growth regulators viz. Indol butyric acid (IBA), Naphthaleneacetic acid (NAA) as given in Table 1:

Table 1 : Treatment details

Treatment	Cuttings		
	Basal (8 ±1mm)	Middle (5±1mm)	Apical(3±1mm)
Control	water	water	water
IBA (mg. l-1)	2000	200	20
NAA (mg.l-1)	90	60	20
Temp °C	4	4	4

Three cm long lower portions of the cuttings were immersed in the solutions prepared for each treatment in dark for 24 hours except for 4°C temperature treatment wherein whole cuttings were kept for the

treatment. For Control, distilled water was used for immersing the cuttings. After giving respective treatment, the cuttings were planted in polybags filled uniformly with potting mixture used in nurseries. Basal portion of

cutting was pushed inside the soil to bury at least two nodes in the soil leaving two or three apical buds above the soil surface. Uniform irrigation was given to all cuttings. Observations were recorded after 45 and 90 days of treatment to record survival and sprouting of the cuttings. Percentage survival was calculated, ranked and analyzed using non parametric Kruskal-Wallis test (Kruskal and Wallis (1952).

Results and Discussion

Number of cuttings that survived and sprouted 45 and 90 days after plantation are presented in tables 1 and 2. There were significant differences among treatments except for basal cuttings at 90 days. After 45 days of treatment, basal cuttings showed highest sprouting (74%) with lower temperature treatment (4°C) followed by control (56%), IBA (40%) and NAA (38%). Similarly cuttings taken from middle and apical regions also showed higher sprouting i.e. 64% and 36 % respectively with lower temperature followed by 54% and 34 % respectively in IBA. Control showed 36% and 28 % survival in middle and apical cuttings respectively, while 10% and 8% survival was recorded with NAA.

After 90 days basal cuttings showed highest sprouting (34%) with control followed by NAA (24%), IBA (22%) and low temperature (20%). Cuttings taken from middle portion recorded highest sprouting (50%) with IBA followed by low temperature (26 %), control (14%) and NAA (2 %). Apical cuttings recorded only 16 % survival with IBA and lower temperature, whereas cutting did not survive in control and NAA treatment. Low temperature was more effective to promote root and shoot of basal cuttings when observed 45 days after plantation. Basal cuttings (8±1 cm) responded better than the middle and apical cuttings. Cowart and Savage (1944) experienced that chemical treatment does not favour rooting, which was confirmed during present

investigation. Harmon (1943) showed differences among grape cultivars in respect to the response to IBA. When cuttings were treated for 24 hours, the cultivars responded differently to IBA. Either *Vitis rotundifolia* or *Vitis davidi* did not respond to IBA. Diab *et al.*, (2011), however, regenerated *Vitis* shoots via organogenesis on medium supplemented with IBA 1 mg/lit.

Alley and Peterson, (1977) showed that chemical pre-treatment was not required for good rooting when basal cuttings were used. Similar results were obtained by Cowart and Savage, (1944) for induction of roots in grape cuttings. It was thus concluded that rooting can be achieved from basal region of the root.

During present investigation, NAA did not affected rooting. After 90 days of plantation, survival rate was poor with all the treatments, except for IBA, in case of the cuttings taken from middle portion. IBA and low temperature treatment with middle-sized cuttings showed good response. Castro *et al.*, (1994), observed similar results. Cuttings taken from different regions responded differently to external growth stimulants, hence, the chemical treatment has to be decided based on size of the cutting. No growth promoter was required for sprouting in case of basal cuttings. This could be explained by the basipetal transport of endogenous auxin, which would increase the concentration of this hormone in the basal region (Castro *et al*, 1994). For small sized cuttings (3±1 cm) IBA and lower were found better for rooting in ARI-516.

Thus hybrid ARI-516 sprouted better from basal, followed by middle and apical cuttings. Lower temperature treatment was found to be initially good up to 45 days but could not survive until 90 days. Survival of middle-sized cuttings was better for IBA treatment at 90 days. Based on these results it can be concluded that the treatment for rooting should be decided based on size of cuttings.

Table 1: Number of Grape cuttings sprouted after 45 days after plantation

Condition Treatment	Basal (%)	Middle(%)	Apical(%)
Control	56	36	28
IBA	40	54	34
NAA	38	10	8
Temp	74	64	36
H	11.141**	14.581**	8.443**

Table 2: Number of Grape cuttings sprouted after 90 days after plantation

Condition Treatment	Basal(%)	Middle(%)	Apical(%)
Control	34	14	0
IBA	22	50	16
NAA	24	2	0
Temp	20	26	16
H	0.685	14.576**	16.844**

Figure 1: Percent sprouting in ARI-516 cuttings after 45 days of treatment.

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