Rooting response of elite cinnamon (*Cinnamomum verum* Bercht & Presl.) lines[1]

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ABSTRACT

Rooting of terminal cuttings of cinnamon *(Cinnamomum verum)* with indole butyric acid 2000 ppm was standardized. Nine elite lines of cinnamon, superior in their yield and quantity were studied for variability in their rooting capacity. Cinnamon line SL-5 was the best with high rooting percentage and good development of primary and secondary roots.

Key words: cinnamon, *Cinnamomum verum*, propagation, rooting response.

Abbreviations

IAA : indole acetic acid
IBA : indole butyric acid
NAA : ∝ - naphthalene acetic acid

Introduction

Cinnamon (*Cinnamomum verum* Bercht & Presl.) is a tree spice grown extensively for its bark which is used as a spice. Wide variation exists in its yield (Ponnuswami *et al.* 1982), quality and oil content due to natural crossing and segregation. Nine elite lines of cinnamon germplasm at National Research Centre for Spices, Calicut were identified based on quality parameters (Anonymous 1989). In order to get uniformly high yielding population and for producing superior planting material of improved or elite trees, vegetative propagation techniques have to be standardised.

Cultivars of different species exhibit differences in rooting percentage, number of primary roots and length of roots produced and this phenomenon has been reported in many cultivated species like grape (Dorokhor 1983), apple (Eccher & Annoni 1984) and plum (Sharma & Aier 1989). The objective of this study was to standardise an ideal method for propagation of cinnamon by cuttings and to find out the rootability of nine elite lines viz., SL-5, SL-44, SL-53, SL-63, SL-65, In-189, In-203, In-310 and In-312.

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Materials and methods

Shoot terminals of about 15 cm length with two leaves were used for the study during January. The experiment was laid out in a Completely Randomised Block Design (CRBD) with 3 replications and 16 treatments and with 15 cutting in each replication at NRCS Experimental Farm, Peruvannamuzhi (Kozhikode District). Based on the assumption that auxins promote rooting, three auxins namely, IBA, IAA and NAA were chosen and five concentrations i.e., 1000, 2000, 3000, 4000 and 6000 ppm were tried for each of the hormones. The cuttings were given a 1 min dip in the hormone and inserted to a depth of 2 cm in a coir dust media filled in polythene bags. The mouth of the polythene bags was closed to prevent moisture loss and were kept in a cool shady place. The cuttings were evaluated for rooting after 60 days and were considered to have rooted if they possessed roots more than 1mm long. Rooting percentage, number of roots per cutting and root length were also recorded.

To find out the rootability of nine elite lines, terminal cuttings of the elite lines were given the best treatment obtained in the previous experiment and were planted in sterile soil filled in polythene bags. The experiment was laid out in a CRBD with 3 replications and 9 treatments and with 15 cutting in each replication. The experiment was carried out for two consecutive years and observations on rooting percentage, percentage of cultivars forming callus alone, mortality rate, number of primary and secondary roots and length of main roots were recorded after 60 and 90 days in the first and second year of the experiment, respectively.

Results and discussion

IBA and IAA at 2000 ppm proved to be the best with a rooting percentage of 73.2 and 65.1, respectively, followed by IBA 3000 ppm (60.5) (Table 1). The rooting percentage observed in this study was much higher than that reported by Vadivel *et al.* (1981) wherein they observed only 45% rooting with IBA 2500 ppm. This could probably be due to seasonal effects and also due to differences in plant parts, used. The number of roots produced per cutting also appeared to favour IBA 3000 and 2000 ppm with an average of 4.7 and 3.7, respectively. A maximum root length of 6.5 cm was observed in IAA 2000 ppm. The root lengths were on par with that of control for IBA treatments, indicating that root emergence could probably be relatively at a slower rate for IBA. IBA and IAA treatment stimulate rooting effectively. IBA 2000 and 3000 ppm were the most effective because of its higher rooting percentage and root production.

A high variability was observed in the rooting capacity of elite lines, the percentage of rooting ranging between 3.3 to 60.5 (mean of 2 years); maximum success was obtained in SL-5 (60.5) (Table 2). In-312 exhibited very poor rooting (3.3%); SL-44, SL-65 and In-312 exhibited a high tendency for callus formation during both the years without rooting even up to 90 days. Mortality rate was high in In-203 and SL-63. The number of primary roots varied from 1.0 to 4.8 on the 90th day and the length of the primary roots varied from 1.7 cm to 9.2 cm (Table 2). SL-5 and In-189 produced more primary roots with good root length. Number of secondary roots was maximum in In-310 followed by SL-65.

Table 1. Effect of growth regulators on rooting of cinnamon cuttings

Treatment (ppm)	Rooting (%)	No. of roots/ cutting	Root length (cm)
IBA 1000	46.9	2.6	2.06
IBA 2000	73.2	3.7	1.63
IBA 3000	60.5	4.7	1.66
IBA 4000	46.9	2.3	2.06
IBA 6000	28.0	2.7	4.53
NAA 1000	35.2	2.4	3.36
NAA 2000	48.2	2.7	3.83
NAA 3000	24.8	2.3	3.56
NAA 4000	35.2	2.0	3.06
NAA 6000	44.3	2.4	2.96
IAA 1000	43.9	1.1	4.03
IAA 2000	65.1	2.1	6.50
IAA 3000	48.2	1.9	2.63
IAA 4000	48.0	2.1	3.90
IAA 6000	26.3	1.7	3.78
Control	44.3	1.8	2.66
CD at 5 %	11.7	0.9	1.13

In general, SL-5 was the best with high rooting percentage and good development of primary and secondary roots, followed by In-189. Kaundal & Singh (1987) demonstrated that in sand pear rhizogenesis was positively correlated with change in total sugar, C:N ratio and total phenols whereas starch and total nitrogen was negatively correlated with rhizogenesis. Further investigations are proposed to find out the physiological and biochemical basis for variability in rooting capacity of this species.

Table 2. Respose of elite cinnamon line cuttings to IBA 200 ppm

Elite line	Rooting (%)			Callus formation (%)			Mortality (%)			Number of primary roots			Length of primary roots (cm)			No. of secon-dary roots
	I year	II year	Mean	I year	II year	Mean	I year	II year	Mean	I year	II year	Mean	I year	II year	Mean	II year
SL-5	58.4 (49.8)	62.6 (52.3)	60.5	18.6 (25.6)	15.4 (23.1)	17.0	21.9 (27.8)	21.0 (27.2)	21.4	2.6	4.2	3.4	2.2	16.1	9.2	5.5
SL-44	18.6 (25.5)	32.5 (34.8)	25.5	57.8 (49.5)	37.2 (37.6)	47.5	21.2 (27.4)	27.9 (31.9)	24.5	1.2	3.7	2.4	2.2	8.6	5.4	2.1
SL-53	3.4 (10.5)	10.4 (18.7)	6.9	21.6 (27.7)	28.0 (31.9)	24.8	70.2 (56.9)	60.6 (51.1)	65.4	1.3	1.3	1.3	1.2	8.1	4.7	4.5
SL-63	7.8 (16.2)	18.6 (25.6)	13.2	13.4 (21.5)	16.6 (24.1)	15.0	77.0 (61.4)	62.6 (52.3)	69.8	1.0	3.0	2.0	1.4	12.0	6.7	2.3
SL-65	1.7 (7.5)	8.6 (17.1)	5.2	48.8 (44.3)	53.1 (46.8)	51.0	46.7 (43.1)	38.0 (38.0)	42.4	0.3	1.0	0.7	3.0	7.6	5.3	7.4
In-189	14.9 (22.6)	26.5 (30.9)	20.7	48.8 (44.3)	28.4 (32.2)	38.6	35.2 (36.4)	45.0 (42.1)	40.1	1.6	4.8	3.2	1.8	16.6	9.0	6.8
In-203	10.8 (19.2)	21.8 (27.8)	16.4	3.0 (10.1)	8.6 (17.1)	5.8	85.2 (67.3)	69.2 (56.2)	77.2	0.3	2.1	1.3	0.9	12.5	6.6	4.7
In-310	12.0 (20.2)	16.3 (23.8)	14.2	30.1 (33.3)	23.6 (29.1)	26.8	56.2 (48.6)	58.0 (49.6)	57.1	0.6	1.4	1.1	0.2	9.6	4.9	8.7
In-312	0.0 (0.6)	6.6 (14.9)	3.3	28.3 (32.2)	62.2 (52.1)	45.3	71.6 (57.8)	49.8 (44.9)	60.7	0.0	1.3	0.6	0.0	3.3	1.7	1.7
CD at 5%	18.4	13.5		16.2	10.8		19.8	18.3		1.8	1.7		2.5	3.7		5.7

Figures in parentheses are transformed values

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