

Navashree and Nithyashree - two new high yielding and high quality cinnamon (*Cinnamomum verum* Bercht & Presl.) selections¹

B KRISHNAMOORTHY, J REMA, T JOHN ZACHARIAH, JOSE ABRAHAM & A GOPALAM²

Indian Institute of Spices Research
Marikunnu P. O., Calicut - 673 012, Kerala, India.

ABSTRACT

Nine elite cinnamon (*Cinnamomum verum*) lines were evaluated for their yield and quality during 1990-95 at the Experimental Farm of Indian Institute of Spices Research at Peruvannamuzhi (Kerala State, India). Two lines, namely, SL 63 and In 189 yielding 55.6 kg and 54.2 kg dry bark/ha per year, respectively, were selected based on their regeneration capacity, yield and quality. These two lines named Navashree and Nithyashree also had higher bark and leaf oil and oleoresin contents and have been recommended for cultivation in all cinnamon growing areas in India.

Key words : *Cinnamomum verum*, cinnamon, high yielding and quality selections.

Introduction

Cinnamon (*Cinnamomum verum* Bercht & Presl.) (Lauraceae) is an important tree spice and the dried inner bark, bark oil, bark oleoresin and leaf oil are the economically important products. Cinnamon is mainly cultivated in Cannanore (Kerala), South Kanara (Karnataka), Nilgiris, Lower Pulneys, Courtallam

and Kanyakumari (Tamil Nadu) in India. The domestic production is about 200 t of bark per year and about 60 t is imported annually causing a drain in foreign exchange for the country. There is vast scope to extend its cultivation in traditional and non traditional areas of the country. Two hundred and ninety one lines of cinnamon are being main-

tained and evaluated at the Experimental Farm of Indian Institute of Spices Research (IISR) at Peruvannamuzhi (Kerala State, India). The selection of two lines (SL 63 and In 189) from open pollinated seedling progenies having high quality and yield is reported here.

Materials and methods

Two hundred and ninety one lines of cinnamon maintained at the Experimental Farm of IISR at Peruvannamuzhi were evaluated for quality parameters, namely, bark oil, bark oleoresin and leaf oil and nine elite lines, possessing better quality characters were selected during 1984. A clonal progeny evaluation trial was laid out in 1986 with these lines, in a Randomised Block Design with five replications per line. The plot size was four clonal progenies per elite line at a spacing of 3m x 3m. Four lines, namely, SL 5, SL 44, In 310 and In 312 were very poor in their growth, while the others, namely, SL 53, SL 63, SL 65, In 189 and In 203 exhibited normal growth. Hence for yield analysis, data from these lines only were considered. The first coppicing was done 3 years after planting (1989-90) but the quantity of bark harvested was very negligible and hence was not included in the analysis. Subsequent coppicings were done during 1990-91, 1991-92, 1992-93 and 1994-95. The package of practices as recommended by NRCS (1989) was followed. The characters recorded during each year were : regeneration capacity (number of shoots which could be coppiced for bark extraction), yield of bark (fresh and dry) and percentage of bark recovery. The analysis for quality was done during 1992 and confirmed during 1995.

Results and discussion

The data on regeneration capacity, yield of fresh and dry bark and percentage of

bark recovery of the five elite lines are presented in Tables 1 to 5. The quality parameters of these lines are presented in Tables 6 and 7. Though both SL 63 and SL 65 were significantly superior for all the yield traits, the former had a higher percentage (2.7%) of bark oil with a good bark oleoresin (8%) and leaf oil (2.8%). Besides, SL 63 had the highest (73%) cinnamaldehyde content in its bark oil and the best regenerating capacity. Organoleptic tests also ranked SL 63 as the best among five lines. Line In 189, in spite of least bark recovery percentage (30.7%) was the highest yielder of fresh bark (142 kg/ha). It had high leaf oil (3%), bark oil (2.7%) and bark oleoresin (10%) contents. The leaf oil also had the highest (78%) eugenol content.

The two elite lines, SL 63 and In 189, possessing good quality and yield parameters were recommended for release as Navashree and Nithyashree for all cinnamon growing areas of the country by the XIII Group Meeting of Research Workers of the All India Coordinated Research Project on Spices, held at Jaipur during August 1995. The morphological and distinguishing characters of these lines are given in Tables 8 and 9. While SL 63 has purple flushes, turning green in 8 to 10 days, in In 189, the emerging leaves exhibit purple pigmentation only for 2 to 3 days and rapidly turn green; a tree in flushing thus appears green, while in the former, the tree in flushing appears purple.

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¹ Contribution No. 227 of Indian Institute of Spices Research, Calicut - 673 012, Kerala, India.

² Present Address : National Academy of Agricultural Research Management, Hyderabad - 500 030, India.

Table 1. Regeneration capacity of elite cinnamon lines

Accession	No. of shoots produced/plot of 4 plants				Mean
	1990-91	1991-92	1992-93	1994-95	
SL 53	3.2	13.8	18.6	27.0	15.65
SL 63	13.6	25.4	26.2	36.6	25.45
SL 65	11.2	23.2	25.6	32.0	23.00
In 189	8.4	19.4	18.6	29.0	18.90
In 203	6.0	19.4	20.4	27.0	18.20
CD at 5%	NS	NS	NS	NS	4.01
CV (%)	90.9	35.8	25.8	18.7	32.01

Table 2. Yield (fresh bark) of elite cinnamon lines

Accession	Yield of fresh bark (g)/plot of 4 plants				Mean (g)
	1990-91	1991-92	1992-93	1994-95	
SL 53	130	85.0	273	537	256.25
SL 63	300	260.8	594	801	488.95
SL 65	167	222.2	478	1008	468.80
In 189	243	232.6	533	1036	511.15
In 203	198	129.8	393	537	314.45
CD at 5%	NS	NS	NS	NS	138.10
CV (%)	75.8	76.7	45	37	53.78

Table 3. Yield (dry bark) of elite cinnamon lines

Accession	Yield of dry bark (g)/plot of 4 plants				Mean (g)
	1990-91	1991-92	1992-93	1994-95	
SL 53	39	25.4	90	246.0	100.1
SL 63	112	87.2	224	381.0	201.1
SL 65	62	67.8	163	457.0	187.4
In 189	78	71.8	183	446.0	194.6
In 203	57	41.8	140	253.4	123.1
CD at 5%	NS	NS	NS	156.3	54.4
CV (%)	75	76.4	45	32.7	53.6

Table 4. Recovery of bark of elite cinnamon lines

Accession	Recovery of bark (%)				Mean (%)
	1990-91	1991-92	1992-93	1994-95	
SL 53	29.56	24.32	31.2	46.4	32.9
SL 63	38.02	34.87	38.2	51.3	40.6
SL 65	35.82	32.02	33.2	45.3	36.6
In 189	19.00	23.96	35.0	44.6	30.7
In 203	24.02	25.40	34.1	47.2	32.7
CD at 5%	13.50	NS	NS	NS	5.3
CV (%)	34.49	32.87	16.7	10.1	24.4

Table 5. Yield evaluation of elite cinnamon lines (pooled)

Accession	Regeneration capacity (shoots/plot of 4 plants)	Fresh weight of bark (g)	Dry weight of bark (g)	Yield of bark/ha (kg)	Recovery of bark (%)
SL 53	15.65	256.25	100.1	27.775	32.9
SL 63	25.45	488.95	201.1	55.555	40.6
SL 65	23.00	468.80	187.4	52.217	36.6
In 189	18.90	511.15	194.6	54.161	30.7
In 203	18.20	314.45	123.1	34.161	30.7
CD at 5%	4.01	138.10	54.4	-	5.3

Table 6. Quality parameters of elite cinnamon lines

Accession	Quality parameters				
	Bark oil (%)	Yield of bark oil (l/ha)	Bark oleoresin (%)	Yield of oleoresin (kg/ha)	Leaf oil (%)
SL 53	2.80	0.778	10.0	2.778	3.00
SL 63	2.70	1.500	8.0	4.444	2.80
SL 65	0.95	0.496	8.6	4.480	2.75
In 189	2.70	1.460	10.0	5.416	3.00
In 203	2.85	0.974	9.0	3.075	1.70

Table 7. Bark and leaf oil constituents of elite cinnamon lines

Accession	Bark oil			Leaf oil			Bark oleoresin (%)
	(%)	CA(%)	EG(%)	(%)	EG(%)	CA(%)	
SL 53	2.80	68	6.5	3.00	75	15	10.0
SL 63	2.70	73	6.0	2.80	62	15	8.0
IN 189	2.70	58	5.0	3.00	78	14	10.0
SL 65	0.95	NA	NA	2.75	NA	NA	8.6
In 203	2.85	NA	NA	1.70	NA	NA	9.0

CA = Cinnamaldehyde

EG = Eugenol

NA = Not analysed

Table 8. Morphological description of SL 63

Character	Observation
Leaf	
Size	Large; larger than inflorescence
Length (L)	13.40 cm
Breadth (B)	4.69 cm
L/B	2.85
Leaf size index	0.63
Shape	Lanceolate
Texture	Glabrous
Venation	Triplinerved from base
Arrangement	Opposite
Colour of emerging flushes	Light purple to purple turning green in 8-10 days
Inflorescence	
Position	Terminal and axillary
Floral characters	
Size	3 mm in diameter
Perianth	6
Fertile stamens	9
Fruit	
Size	1.5 cm (length)
Shape	Round
Nature of perianth cup	Persistent

Table 9. Morphological description of In 189

Character	Observation
Leaf	
Size	Large; larger than inflorescence
Length (L)	15.40 cm
Breadth (B)	5.70 cm
L/B	2.70
Leaf size index	0.88
Shape	Ovate
Texture	Glabrous
Venation	Triplinerved from base
Arrangement	Opposite
Colour of emerging flushes	Light purple turning green in 2 to 4 days
Inflorescence	
Position	Terminal and axillary
Floral characters	
Size	4.5 mm in diameter
Perianth	6
Fertile stamens	9
Fruit	
Size	1.6 cm (length)
Shape	Round
Nature of perianth cup	Persistent

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Reference

National Research Centre for Spices (NRCS) 1989 Package of Practices Tree Spices. National Research Centre for Spices, Calicut.