

## High yielding cardamom clones for Wayanad

Radhakrishnan V.V.<sup>1</sup>, Madhusoodanan K.J.<sup>1</sup>, Reji K.<sup>1</sup>, Kuruvilla K.M.<sup>1</sup>, Mohanan K.V.<sup>2\*</sup> and Thomas J.<sup>1</sup>

<sup>1</sup> Indian Cardamom Research Institute, Myladumpara, Idukki, Kerala – 685553, India.

<sup>2</sup> Genetics & Plant Breeding Division, Department of Botany, University of Calicut, Kerala – 673635, India.

\*Corresponding author, email: drkvmohanan@rediffmail.com

**Abstract:** A sizeable area in Wayanad District of Kerala is under cardamom cultivation. However, production and productivity of the crop in Wayanad is very low compared to that of other areas of the cardamom tract in the country. One of the reasons for this situation could be the non availability of clones suited to the agro-climatic conditions of Wayanad. In this background, an evaluation trial incorporating nine improved cardamom clones evolved by the Indian Cardamom Research Institute (Spices Board) was conducted in a planter's field in Kalpetta and compared with the released clone ICRI-2 and the local variety Clone-37 for growth, yield and quality parameters with a view to isolate suitable clones for Wayanad. On analysis of data on growth characters and stabilized yield for three consecutive crop seasons, it is found that the hybrid MHC-18 performed the best with a yield of 1400 kg/ha followed by MCC-73 and MCC-21 indicating their suitability for large scale cultivation to obtain higher yield. MHC-18 is found to be superior with respect to quality characters also.

**Key words:** Cardamom, *Elettaria cardamomum*, evaluation, Wayanad

### INTRODUCTION

Small cardamom (*Elettaria cardamomum* Maton) is a spice crop cultivated on plantation scale in the tropical rainforests of Western Ghats. It is valued for its dried fruits (capsules), the cardamom of commerce. In Kerala, cardamom is cultivated in an area of 41,588 ha and out of which 4,106 ha are in Wayanad. The productivity of cardamom in Kerala is 294 kg/ha. Though a sizeable area in Wayanad is under cardamom cultivation, productivity of the crop is only 124 kg/ha, which is very low compared to that of other zones of the cardamom tract especially the Idukki zone (Spices Board, 2009). One of the reasons for this situation could be the non availability of improved clones suited to the agro-climatic conditions of Wayanad. In this back ground, an evaluation trial incorporating nine improved cardamom clones evolved by the Indian Cardamom Research Institute (Spices Board) was conducted in Wayanad with a view to isolate suitable clones for that area.

### MATERIALS AND METHOD

The study was conducted in Scholar Estate located at Kalpetta in Wayanad during 2003-2009. The experiment was laid out in randomized block design (RBD) with three replications and twelve plants per plot adopting 2.7 m X 2.7 m spacing. Nine improved clones including hybrids and selections evolved by the Indian Cardamom Research Institute *viz.*, MHC-10, MHC-13, MHC-18, MCC-21, MCC-40, MCC-73, MCC-200, MCC-260 and MCC-346 were incorporated in the trial alongwith the released variety ICRI-2 (Madhusoodanan *et al.*, 1993) and the local variety Clone-37 as check. Package of practices recommendations of the Spices Board was followed for cultivation (Spices Board, 2001).

Observations on growth and yield parameters such as total tillers per clump, tiller height, number of leaves on the tallest tiller, number of bearing tillers per clump, number of panicles per clump, number of racemes per panicle, number of capsules per raceme, number of seeds per capsule and stabilized yield for three consecutive crop seasons obtained after three years of planting were recorded and subjected to pooled analysis. Data on quality characters such as recovery percentage, percentage of 7 mm and above sized capsules, volatile oil content and oleoresin content were also recorded and analyzed.

### RESULTS AND DISCUSSION

The performance of cardamom clones varied with regard to growth, yield and quality attributes (Tables 1, 2, 3, 4 and 5). All the parameters except panicles per clump showed significant difference between the clones. Cardamom being a commercial crop, more attention was paid for yield evaluation (George *et al.*, 1981). High variability with regard to yield parameters in cardamom has been reported earlier (Korikanthmath *et al.*, 1997). The yield differed significantly between the clones and the hybrid

MHC-18 performed the best with a yield of 1400 kg/ha followed by selections MCC-73 (1159 kg/ha) and MCC-21 (1131 kg/ha). However, the performance of MCC-73 and MCC-21 was on par. Based on the yield performance MHC-18, MCC-73 and MCC-21 are considered to be the high yielders suited to the agro-climatic conditions of Wayanad area of the cardamom tract. An increasing trend in yield as well as consistency in performance could be observed in all the three high yielders over the three crop seasons studied. Performance of MCC-40 and MHC-10 was poor compared to the local check. All other clones evaluated except MHC-18, MCC-73 and MCC-21 were found to be on par.

Since cardamom is highly heterozygous, vegetative propagation by sucker multiplication is suggested to produce uniform planting materials (Nadgauda *et al.*, 1983). Large-scale cultivation of these identified improved clones by adopting high production technology (Johny and Ravindran, 2002) would substantially enhance the production and productivity of cardamom in Wayanad.

Table 1. Growth characters of cardamom clones- pooled data (2006-07 to 2008-09)

Sl. No.	Clone	Tillers/ Clump	Tiller height (cm)	Leaves/ Tiller	Bearing tillers/Clump
1	MHC-10	35.91	370.18	18.27	18.94
2	MHC-13	44.34	368.49	18.66	24.60
3	MHC-18	54.86	381.15	19.45	30.30
4	MCC-21	43.48	384.66	18.59	25.00
5	MCC-40	34.94	345.99	18.85	21.13
6	MCC-73	41.46	349.99	19.00	22.86
7	MCC-200	43.36	348.59	18.71	23.29
8	MCC-260	34.50	337.99	18.25	19.74
9	MCC-346	43.40	373.27	17.99	23.22
10	ICRI-2	38.31	353.14	17.92	21.05
11	Clone-37 (check)	38.07	342.22	17.46	21.26
CD (5%)		10.50	11.32	0.98	5.34

Table 2. Yield attributes of cardamom clones- pooled data (2006-07 to 2008-09)

Sl. No.	Clone	Panicles/ Clump	Racemes/ Panicle	Capsules/ Raceme	Seeds/ Capsule
1	MHC-10	34.51	14.96	7.48	18.00
2	MHC-13	37.81	16.12	8.18	17.38
3	MHC-18	48.53	21.47	9.34	21.16
4	MCC-21	42.51	19.94	8.84	18.99
5	MCC-40	35.11	13.59	7.31	15.33
6	MCC-73	42.65	20.79	8.79	19.11
7	MCC-200	39.51	18.18	8.13	17.66
8	MCC-260	34.49	16.75	7.74	18.38
9	MCC-346	39.46	17.24	8.44	17.66
10	ICRI-2	36.09	15.82	7.68	17.38
11	Clone-37 (check)	39.01	17.37	7.54	17.16
CD (5%)		NS	2.33	1.19	3.03

Table 3. Yield of cardamom clones- pooled data (2006-07 to 2008-09)

Sl. No.	Clone	Yield/Plant (kg)	Yield/ha (kg)
1	MHC-10	0.589	765.33
2	MHC-13	0.646	840.00
3	MHC-18	1.077	1400.33
4	MCC-21	0.870	1131.66
5	MCC-40	0.552	718.00
6	MCC-73	0.891	1159.66

7	MCC-200	0.674	877.00
8	MCC-260	0.635	825.33
9	MCC-346	0.670	871.00
10	ICRI-2	0.627	814.33
11	Clone-37 (check)	0.668	868.00
CD (5%)		0.076	108.50

Table 4. Quality characters of cardamom clones- pooled data (2006-07 to 2008-09)

Sl. No.	Clone	Recovery (%)	7 mm capsules (%)	Volatile oil (%)	Oleoresin (%)
1	MHC-10	19.66	66.89	8.09	6.98
2	MHC-13	20.11	55.46	7.85	5.93
3	MHC-18	22.24	69.87	8.84	7.99
4	MCC-21	19.65	61.74	6.20	7.14
5	MCC-40	18.79	58.12	7.85	6.33
6	MCC-73	20.41	67.33	8.65	6.67
7	MCC-200	20.00	59.75	7.04	7.07
8	MCC-260	20.39	67.89	6.56	6.69
9	MCC-346	19.61	61.99	7.93	6.81
10	ICRI-2	19.59	64.00	8.95	7.63
11	Clone-37 (check)	19.99	57.41	6.25	5.75
CD (5%)		1.35	6.29	1.27	0.45

Table 5. Season wise yield performance (kg/ha) of cardamom clones

Sl. No.	Clone	I	II	III	Pooled Mean
		2006-07	2007-08	2008-09	
1	MHC-10	698.66	764.83	833.66	765.33
2	MHC-13	774.66	836.33	911.33	840.00
3	MHC-18	1246.66	1414.33	1542.33	1400.33
4	MCC-21	1038.33	1128.83	1229.33	1131.66
5	MCC-40	660.66	715.00	779.66	718.00
6	MCC-73	1047.33	1163.50	1268.66	1159.66
7	MCC-200	789.00	881.83	961.33	877.00
8	MCC-260	765.33	819.00	894.00	825.33
9	MCC-346	807.00	864.50	942.33	871.00
10	ICRI-2	702.33	834.16	909.00	814.33
11	Clone-37 (check)	830.33	849.33	926.00	868.00
CD (5%)		326.70	155.91	169.60	108.50

#### ACKNOWLEDGEMENT

The authors are grateful to Shri. P.V. Santhiprasad, Cardamom Planter, Scholar Estate, North Kalpetta, Wayanad for providing facilities to conduct the field trial for the study in his estate.

#### REFERENCES

George K.V., Dandin S.B., Madhusoodanan K.J. and Koshy John, 1981. Natural variations in the yield parameters of cardamom (*Elettaria cardamomum* Maton). In: *Proceedings of IV Symposium on Plantation Crops (PLACROSYM-IV)*. (Ed.) Visveswara, S, ISPC, Kasaragod, India: 216-223.

Johny A.K. and Ravindran P.N., 2002. Production technology for cardamom. *Planters' Chronicle* 5: 155-162.

Korikanthmath V.S., Ravindra Mulge and Hosmane M.M., 1997. Preliminary evaluation of elite clones of cardamom (*Elettaria cardamomum* Maton) for yield and yield parameters in clonal nursery. *J. Spices and Aromatic Crops* 6 (1): 57-61.

Madhusoodanan K.J., Kuruvilla K.M., Radhakrishnan V.V. and Naidu R., 1993. Two cardamom selections for high yield and quality. *J. Plantation Crops* 21: 237-240.

Nadgauda R., Mascarenhas A.F. and Madhusoodanan K.J., 1983. Clonal multiplication of cardamom (*Elettaria cardamomum* Maton). *J. Plantation Crops* 11: 60-64.

Spices Board, 2001. *Package of practices for cardamom*. Spices Board, Cochin, Kerala, India. p. 51.

Spices Board, 2009. *Spices Statistics*. Spices Board, Cochin, Kerala, India. p. 108.