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Evaluation of cardamom accessions in relation to yield, recovery and oil content

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INTRODUCTION

Cardamom (*Elettaria cardamomum* Maton) is most precious and export-oriented spice crop. The important reason for the low productivity of cardamom in India is the use of unselected planting material. Large-scale propagation of cardamom is done through seeds and heterogenous progeny is genetically not uniform due to cross-pollination (Korikanthimath, 3). The high degree of variability in yield in seedling population necessitates selection and use of high-yielding clones to increase the yield (Madhusoodanan, 4). Fluctuating market prices are evident in the recent past. It is reported that cardamom oil has made breakthrough in export front. It is also fetching remunerative prices conducive to the growth of cardamom oil extraction industry. Development of high-yielding, location-specific clones with high oil content is the need of the hour to get high market price. In view of this, an experiment was conducted to find out the adaptability and to select cardamom clones for high yield with high percentage of essential oil content.

MATERIAL AND METHODS

The trial was laid out at the Indian Institute of Spices Research, Cardamom Research Centre, Appangala, Kodagu district in Karnataka in a randomized block design with 2 replications consisting of 16 lines/replication under rainfed condition in valley bottom. Out of 16 entries, 15 lines, viz. S.1271-2, S.1272-5, S.1286-37, AS6/13, AS 7/12, AS 7/13, Cl.664, Cl. 688, Cl. 731, Cl. 779, Cl. 781, Cl. 671, Cl. 730, S 1286-35 and Cl. 676 were obtained from the Regional Research Station, UAS, Mudigere. Local malabar type was used as the control. The trial was planted with a spacing of 2 m × 2 m. Each treatment plot (12 m × 6 m gross) was accommodated with 10 experimental plants surrounded by guard rows. Regular management practices were carried out and the observations were recorded on number of capsules picked at physiological maturity, corresponding wet (soon after harvesting) and dry weight (after drying Flume pipe conventional curing house at 40°C). The percentage of recovery was worked out after drying. The seeds obtained from the dehusked capsules of each line were mildly crushed in wareing blender and 25 g material of each line was distilled for 30 min. and the oil content determined by using the clevenger trap.

RESULTS AND DISCUSSION

The data recorded on number of capsules, wet (fresh) weight of capsules, corresponding dry weight, recovery percentage and essential oil content and its pooled mean are presented in Table 1. The statistical analysis of the data revealed that the treatment differences were significant for number of capsules, wet and dry weight of capsules of cardamom. The line, AS 6/13, recorded highest

Table 1. Number of capsules, wet weight, dry weight, recovery percentage and essential oil content of cardamom accessions.

Line	No. of capsules/	Wet (fresh) weight/ plant	Dry weight/ plant (g)	Recovery (%)	Essential oil content (%)
S 1271-2	368.90	244.55	45.59 (115.0)*	18.87 (25.74)**	7.5
S 1272-5	1431.35	1172.30	242.35 (605.0)	20.70 (27.07)	7.0
S 1286-37	923.85	706.90	148.20 (370.0)	20.97 (27.25)	7.4
S 1286-35	891.05	769.20	153.75 (385.0)	20.07 (26.62)	7.5
AS 6/13	1467.55	1189.50	253.20 (632.5)	21.20 (27.41)	7.8
AS 7/12	507.20	375.85	79.80 (200.0)	21.14 (27.37)	8.3
AS 7/13	385.25	301.55	59.25 (147.5)	19.74 (26.38)	8.2
Cl.664	679.05	550.90	113.00 (277.5)	20.44 (26.88)	8.3
Cl.676	405.25	352.70	72.45 (180.0)	20.45 (26.88)	8.3
Cl.688	559.25	449.30	93.30 (232.5)	20.65 (27.03)	8.0
Cl.731	652.25	454.05	91.90 (230.0)	20.13 (26.66)	8.5
Cl.779	1420.45	1169.00	244.85 (612.5)	20.88 (27.19)	8.5
Cl.781	935.45	874.60	181.05 (452.5)	20.47 (26.90)	8.4
Cl.671	825.90	552.75	110.95 (277.5)	20.07 (26.62)	8.5
Cl.730	1148.25	870.50	169.60 (425.0)	19.34 (26.09)	8.2
Local Malabar	891.50	727.00	154.25 (385.0)	21.22 (27.43)	7.6
CD (P = 0.05)	593.84	556.81	119.28	-	-

* Values in bracket are dry weight of capsules (kg/ha), ** Values in bracket are angular transformed values.

number of capsules (1467.55/plant), followed by S. 1272-5 (1431.35) and Cl. 779 (1420.45). The lowest number of capsules was recorded in S. 1271-2 (368.90). The line AS 6/13 recorded significantly highest wet weight/plant, followed by S 1275-5 and Cl.779 respectively. Similarly, the lines S.1272-5, AS 6/13 and Cl. 779 recorded more than 100 g wet capsules/plant in trials conducted at Mudigere (Anon., 1). Lowest wet weight was recorded in S. 1271-2.

The line AS 6/13 recorded highest dry weight of 253.20 g/plant (632.5 kg/ha), followed by 244.85 of Cl. 779 (612.5 kg/ha) and 242.35 of S. 1272-5 (605.0 kg/ha). Lowest dry weight of 45.59 g/plant was recorded in S. 1271-2 (115.0 kg/ha). The local Malabar type recorded 385.0 kg/ha.

Care should be exercised in picking cardamom capsules at the physiologically matured stage. It would help in getting higher percentage of recovery and retention of green colour which fetches premium price. The percentage of recovery varied from 18.87 in S.1271-2 to 21.20 in AS 6/13. The mean percentage recovery was 20.40.

The cardamom oil mainly derived from seeds is used in food and pharmaceutical industry. Lines

Cl. 671, Cl. 779 and Cl. 731 contain the highest percentage of oil (8.5) followed by Cl. 781 (8.4). Lowest percentage of oil (7.0) was recorded in S. 1272-5. This is in confirmation with Lewis and Natarajan (2) who reported that oil percentage vary from 4 to 9 in *Elettaria* species and 2.5 to 3.0 in *Amomum* species. Based on the above study, the promising clones AS 6/13, S 1272-5 and Cl. 779 are included in the germplasm repository and further evaluation studies are in progress.

SUMMARY

Fifteen promising lines of cardamom along with local Malabar were studied for yield, recovery percentage and essential oil content. Treatment differences were significant for number of capsules, wet and dry weight of capsules/plant in cardamom. The line AS 6/13 recorded the highest values for number of capsules, wet weight of capsules and corresponding dry weight/plant, followed by S. 1272-5 and Cl. 779. Highest yield was recorded in AS 6/3 (632.5 kg/ha) followed by Cl. 779 (612.5 kg/ha) and S. 1272-5 (605.0 kg/ha). The mean percentage of recovery was 20.40%. The highest percentage of oil (8.5%) was recorded in Cl.671 Cl, 779 and Cl. 731.

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