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Performance of hybrids, open pollinated progenies and inbreds of cardamom (*Elettaria cardamomum*) under nursery conditions

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Cardamom (*Elettaria cardamomum Maton*) commonly known as the Queen of Spices has a good internal demand in India. Some of the limiting factors in the production of cardamom in India are the susceptibility of the crop to diseases such as cardamom mosaic disease and rhizome rot .Cardamom mosaic disease which is a serious viral disease at present and causes severe yield losses to cardamom. The yield loss due to katte ~~give scientific name with authority at press stage~~ is estimated to be as high as 69% during the third year of planting and total decline occurs after 3–5 years of infection.

Cardamom is generally propagated through seeds and suckers and genetic improvement is through selection of clones and open pollinated seedlings.

All the improved varieties of cardamom at present are selections(Edison and Johny 1997). Though cardamom is adapted to cross-pollination, selfing takes place usually and the selfed progenies also exhibit considerable variations due to the release of residual heterozygosity (Sasikumar *et al.* 1999). Coupled with the twin advantages of vegetative propagation and sexual reproduction, cardamom offers good scope for exploitation of heterosis for yield and disease resistance. Since heterosis has been commercially exploited in cross-pollinated species by crossing inbred lines (Singh 1997), an attempt has been made to study the comparative performance of eight inbred lines, their open pollinated progenies and 54 random cross hybrids of the 8 parents of 'Malabar' cardamom under nursery conditions. These parental lines were high yielding, *katte* resistant and or rhizome rot tolerant types. *Katte* disease is caused by car mosaic virus which is an aphid transmitted poty virus.

The experimental material consisted of 6 natural *katte* escapes, viz 'NKE 19','NKE 27','NKE 34','NKE 3','NKE 9','NKE 12', 1 rhizome rot tolerant type (RR 1) and a high yielding line 'CCS 1', their open pollinated progenies as well as 54 random cross hybrids of the inbreds. The experiment was conducted at the Centre, Appangala during 1996–98 using hybrids, open pollinated progenies and inbred lines in micro-plots adopting completely randomised block design with 2 replications. Recommended cultural practices were followed. Observations were recorded on plant height, number of leaves/plant, leaf length and leaf breadth from ten randomly selected plants from each plot after 4 months of transplanting (transplanted at 3 leaf stage) to micro-plots and the data statistically analysed.

The mean performance of the inbred lines, open pollinated progenies and the hybrids has been presented in Table 1.The analysis of variance indicates that the values were significant for all the characters in the inbred lines, open pollinated progenies except for leaf number. For the character, plant height, the highest mean was recorded in hybrids (18.51 cm) which was highly significant followed by open pollinated progenies (12.04 cm) and inbred lines (10.52 cm). For the character number of leaves the highest mean recorded was 8.35 in hybrids, followed by 8.13 in inbred lines and 7.99 in open pollinated progenies. Though, there was no significant difference between the treatments for this character. With regard to leaf length also, the maximum leaf length was recorded in hybrids (13.44 cm) followed by the open pollinated progenies (10.21 cm) and inbred lines (9.57 cm). In the case of leaf breadth, the hybrids recorded

Table 1 Mean performance of inbreds, open pollinated progenies and hybrids of cardamom

Character	Treatments				
	Inbreds	OP	Hybrids	CD (P=0.05)	CD (P=0.01)
Plant height(cm)	10.52	12.04	18.51**	4.00	5.32
No of leaves	8.13	7.99	8.35	0.94	1.25
Leaf length(cm)	9.57	10.21	13.44*	2.58	3.43
Leaf breadth(cm)	3.14	3.16	3.86**	0.45	0.60

*,** Significant at P=0.05 and P=0.01 respectively

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the highest leaf breadth (3.86 cm) which was highly significant followed by open pollinated progenies (3.16 cm) and inbred lines (3.14 cm).

In general, the performance of hybrids was superior to open pollinated progenies and selfed parents for all the traits indicating the expression of hybrid vigour in the early stages of seedling growth.

The 6 hybrids, 'NKE 27 × NKE 34', 'NKE 19 × NKE 12', 'NKE 19 × CCS 1', 'NKE 19 × NKE 27', 'NKE 19 × NKE 9' and 'NKE 34 × NKE 19' recorded significant values for all the characters, viz plant height, number of leaves, leaf length and leaf breadth as compared to the parental lines and open pollinated lines. Open pollinated progenies performed better as compared to the inbreds indicating the release of residual variability.

To conclude, hybrids perform better than open pollinated types and selfed parents indicating the hybrid vigour in these crosses which could be exploited. Certain cross combinations are found superior to other cross combinations indicating the high specific combining ability of parental lines. Attempts to correlate hybrid vigour in the nursery with the field performance of a perennial crop like cardamom will be of great significance in the early identification of elite lines. Since such studies have not yet been attempted in cardamom, all the 54 hybrids have been planted in the mainfield for further evaluation to obtain desirable heterotic recombinants for yield and resistance to and rhizome rot along with the inbred lines and open pollinated progenies.

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