14

EFFECT OF NATURAL INFECTION OF 'KATTE' ON YIELD OF CARDAMOM: A CASE STUDY

M.N. VENUGOPAL and R. NAIDU

ABSTRACT

Studies on crop loss due to natural infection indicated that virus affected plants yield 38 per cent, 62 per cent and 68 per cent less cardamom in the first, second and third year of infection respectively. The quantity of crop loss is related to the duration over which the plant had been infected. The yield of a well-maintained plot was affected considerably from the very first year of infection. Production of cardamom in the disease-affected plot, experienced a loss of 16 per cent at 37 per cent infection level, 44 per cent at 84 per cent infection level and 59 per cent at 98.5 per cent infection level respectively in the first, second and third year of infection.

INTRODUCTION

In India, cardamom (*Elettaria cardamomum* (L.) Maton) occupies over 93,947 ha (Anon, 1984) with an annual production ha of 2600 to 3000 (metric) tonnes. Widespread occurrence of 'Katte' or 'Mosaic' or 'Marble' disease has been recognised as the major threat to this perennial spice crop (Mayne, 1951; Alexander, 1967; George, 1967; Venugopal and Naidu, 1981). Buchanan (1807) estimated the yield of a healthy garden as 59.0 kg/ha while that of a diseased plantation as only a few kg of dry capsules per ha. Varma (1962) studied the effect of simultaneous infection of

'Katte' on arecanut-based cardamom plantation and reported losses ranging from 10 to 98 per cent. This communication presents the extent of crop loss caused by natural infection of 'Katte' virus under forest-based pure, well-managed cardamom plantation.

MATERIALS AND METHODS

This trial was conducted for four years in Sunticoppa Estate, Sunticoppa. The plantation is located at an altitude of 950 m and receives an average annual rainfall of 125 to 175 cm. The selected plot comprised 1976 planting and gap filled in 1978. Planting material used in this block was seedling progeny of Malabar type. The experimental area was quite isolated and a 'U' shaped coffee plantation encloses this block. Initially all the 'Katte' affected plants which were present in two spots were rogued out in July 1979. A bench survey was conducted in June 1980 and all the 'Katte' affected and healthy plants were marked. As the number of plants was inadequate to continue with this study for two more years, a total of 345 plants of 1978 gap fills which attained a yielding stage were included in this experiment from 1981 onwards. A total of 36 to 10 plants died in 1981 and 1982 respectively.

Fresh surveys were repeated in June 1981 and June 1982 to locate new infections. Infections as on June 1980 and new infections that occurred from 16th June 1980 to 15th June 1981, and 16th June 1981 to 15th June 1982, and healthy clumps were marked in corresponding years. Yields of two treatments in 1980, three treatments in 1981 and four treatments in 1982 were taken separately in six to seven rounds of picking. The block received recommended organic and inorganic (NPK 75:75:150 kg/ha) fertilisers applied in two split doses; irrigation in dry period and two rounds of 1 per cent Bordeaux mixture and four rounds of insecticides to keep major diseases and pests under check.

RESULTS AND DISCUSSION

Comparison of yield data presented in Table 1 and Fig. 1 reveal that the 'Katte' infection on productive clumps reduces the yield to the extent of 38 per cent in the same year of infection, 62 per cent in the second year of infection and 68.7 per cent in the third

Table 1. Effect of 'Katte' disease on the yield of cardamom during different years

(a) Yield of green capsules in 1980

Treatments	No. of plants	Total yield (kg)	Mean yield/ plant	% of reduction over healthy
1. Infection as on 15th June 1980	679	557.400	0.820	35.4
2. Healthy	824	1046.200	1.270	—
3. Total plants in the block	1503*	1603.600	1.070	16.0

*Yield of an additional 345 plants of 1978 gapfills was not considered in 1980.

(b) Yield of green capsules in 1981

1. Infection as on 15th June 1980	674	166.370	0.240	65.75
2. Infection from 16th June 1980 to 15th June 1981	849	375.300	0.440	38.73
3. Healthy	289	209.630	0.730	—
4. Total plants in the block	1812	751.300	0.410	43.84

(c) Yield of green capsules in 1982

1. Infections as on 15th June 1980	671	127.700	0.190	68
2. Infections from 16th June 1980 to 15th June 1981	843	202.760	0.240	59
3. Infections from 16th June 1981 to 15th June 1982	261	92.650	0.385	39
4. Healthy	27	15.850	0.587	—
5. Total plants in the block	1802	438.960	0.242	59

year of infection. Hence it is evident that 'Katte' causes a considerable amount of loss on cardamom and a reduction in yield is related to the duration over which the plant has been diseased. Varma (1962) reported crop losses of 10 to 68 per cent in the

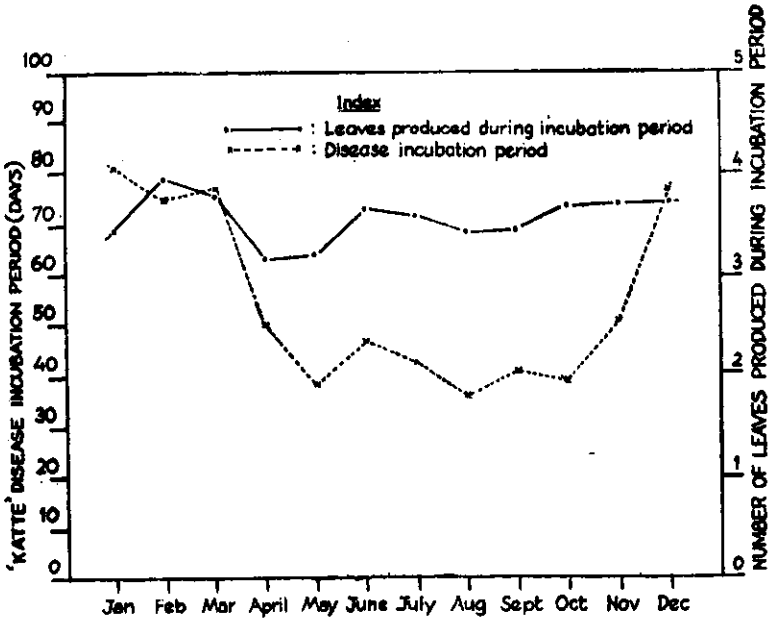

Fig. 1. 'Katte' disease incubation period in relation to number of leaves produced during different months of inoculation

first year of yielding, 26 to 92 per cent in the second year and 82 to 98 per cent in the third year owing to 'Katte' infection. The present study confirms the magnitude of crop loss caused by 'Katte' virus. Basically, the spread of 'Katte' disease follows a compound interest pattern and once it enters, it spreads slowly and centrifugally (Deshpande et al., 1972). There are no reports which ascribe the effect of a centrifugal spread on the total productivity of this perennial crop. This four year study reveals that cardamom production in the affected plot suffered a loss of 16 per cent at 37 per cent incidence level, 44 per cent at 85 per cent incidence level and 59 per cent at 98.5 per cent incidence level respectively in the first, second and third year of infection (Fig. 1). The results obtained from the present yield trial show that it is not economical to keep a diseased plant in the garden, firstly because it yields less, and secondly it serves as a source of inoculum for secondary spread.

ACKNOWLEDGEMENTS

Authors thank Dr. K.V.A. Bavappa, Director, Central Plantation Crops Research Institute, Kasaragod and Dr. G. Subbarao, Scientist-in-Charge, Central Plantation Crops Research Institute, Research Centre, Appangala for encouragement and also to Shri V.P. Hegde, Manager, and his field staff at Sunticoppa Estate, Consolidated Coffee Ltd., for providing necessary facilities.

REFERENCES

Alexander, M.P. 1967. Some of the major problems confronting cardamom. *Cardamom News.* 1: 1-2.

Anon. 1984. *Cardamom Companion*, Cardamom Board, Cochin.

Buchanan, F. 1807. A Journey from Madras through the Countries of Mysore, Canara and Malabar. (cf; Mayne, 1951). 3: 225.

Deshpande, R.S., C. Siddappaji and S. Vishwanath, 1972. Epidemiological studies on 'Katte' disease of cardamom *Elettaria cardamom* (L.) Maton. *Mysore J. Agric. Sci.* 6: 4-9.

George, K.V. 1967. 'Katte' disease threatens the future of the cardamom plantation industry. *Cardamom News.* 1 (6): 113.

Mayne, W.W. 1951. Report on cardamom cultivation in South India. Bull. No. 50. ICAR, New Delhi.

Varma, P.M. 1962. Control of 'Katte' or 'Mosaic' disease of small cardamom in North Canara. *Arecanut J.* 13: 79-88.

Venugopal, M.N. and R. Naidu, 1981. Geographical distribution of 'Katte' disease of small cardamom in India. *Third International Symposium on Plant Pathology*, New Delhi, Dec. 14-18, 1981. Session IX-P:221-222 (Abstract).