

Control of Capsule Rot and Rhizome Rot of Cardamom (*Elettaria Cardamomum Salisb*)

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Capsule rot and rhizome rot of cardamom are the two deadliest diseases attacking cardamom plants in Iddukki district every year during South West Monsoon period. The loss caused by these diseases are severe. As the damage was severe and was not controlled effectively, a fungicidal trial with several readily available and newly formulated fungicides were tried during 1979 and 1980. The results revealed that application of Bay 5072 (Dexon) in dust format the rate of 4 kg/ac was found to be effective against capsule rot and rhizome rot.

Cardamom *Elettaria cardamomum Salisb*) is one of the most important spice crops grown widely in Western Ghats. The weather conditions prevailing in the cardamom estates are very congenial for the incidence of diseases. Every year severe loss is incurred by planters due to capsule rot. The clump is also affected by another disease namely the rhizome rot which also causes death of shoots in large numbers. The former disease has been reported to be caused by *Pythium Vexans* *P. aphanidermatum* (Thomas 1939, Ramakrishnan, 1949, Chattopadhyay, 1967 and Nambiar and Sharma 1976) and *Phytophthora nicotianae* var. *nicotianae* (Thankamma and Pillai, 1973). The latter disease is caused by *P. Vexans* and *P. aphanidermatum* alone. As these two diseases form a major constraint in the cardamom production a trial with different fungicides was conducted in estates where these diseases are prevalent. The results of the same are presented in this paper.

MATERIAL AND METHODS:

Fungicidal trial was conducted in two South West Monsoon periods during 1979 and 1980. The results of the trials conducted in 1979 has been published. (Alagianagalingam and Kandasamy, 1980). Based on the results obtained in the previous trial another trial with the same fungicides but in different doses and mode of application were tried in the subsequent season during 1980. The experiment was conducted in Gandipara area in High Ranges. The treatments were: (1) Control (2) Percloud 4% dust (12 kg/ac), (3) Bordeaux mixture (1%), (4) Emulsicop (0.3%), (5) Morut spray (0.5%), (6) Bay 5072 (Dexon) spray (0.5%), (7) Bay 5072 dust (4 kg/ac), (8) Bay 5072 dust (8 kg/ac), (9) Morut dust (4 kg/ac), (10) Morut dust (8 kg/ac) (11) Percloud 6% dust (12 kg/ac). (12) Percloud 12% dust (8 kg/ac) and (13) Thiride 5% dust (20 Kg/ac.). The spray fluid was mixed with Triton at

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the rate of 1 ml/2 1 of fluid. The treatments were replicated 3 times. Simple randomised design was adopted. The first round of treatments were given during June, 80 just before the commencement of South West Monsoon. Subsequently two rounds of treatments were given at monthly intervals. The fungicides were applied at the base of the clump and on the soil around the clump including the panicles arising from the clump. Observation on incidence of capsule rot and rhizome rot were made before each treatment from the second round of treatments.

In each observation the total number of healthy and diseased capsules in five panicles chosen at random in each clump were recorded and percentage or disease incidence was worked out for each clump and mean incidence of two clumps for each replication was worked out. Similarly the percentage of rhizome rot was also observed and mean percentage for two clumps was worked out for each replication. The percentage value was transferred into angles before the data is subjected to statistical analysis. Pooled analysis of three counts was made.

Results:-

a) Incidence of capsule rot and rhizome rot represented in Table 1. The results were found to be significant. Treatments were found to be better than untreated control. Among the treatments dusting the clump with Bay 5072 at 4 kg formulation per acre was found to reduce the incidence of capsule rot to a minimum of 8.32 as against 27.10 in untreated control.

b) The incidence of rhizome rot was also observed and presented in table-1. The incidence of rhizome rot was considerably reduced by application of fungicides. Rhizome rot incidence was least in the treatment Bay 5072 dust at 4 kg per acre. It recorded an incidence 0.99 as against 2.26 in untreated control. The next treatment which closely follows Bay 5072 dust (4kg/ac) was Perclound 4% dust at 12 kg/ac; registering an incidence of 1.20.

The incidence of capsule rot as well as rhizome rot were least in the treatment with Bay 5072 dust (4 kg/ac).

Discussion:

Information on control of rhizome rot and capsule rot are limited. Rhizome rot was controlled through change of agronomic practices and by adopting field sanitary measures. Removal and disposal of infected parts of clumps and application of lime in the pits were found to be successful (Anonymous 1940). Judicial application of fertilizers like ammonium phosphate or calcium phosphate or super phosphate at 50.70 g/clump were also found to mitigate the disease incidence (Marutharajan, 1948; Ramakrishnan, 1949 and Abraham, 1957). Very recent work on the control of capsule rot with different fungicides revealed that spraying the clump during June and August with Bordeaux mixture 1% copper oxychloride 0.25% with proper wetting agent was found to control the same effectively (Nambiar and Sharma, 1974 and Anonymous 1976). Since an effective control was felt necessary some formu-

lated new chemicals were also included. In the present study, application of Bay 5072 dust at 4 kg/ac was found to be effective against the capsule rot and rhizome rot which are associated with pathogens like *Pythium* sp. and *Phytophthora* sp. The fungicide Bay 5072 is specific against soil borne *Pythium* sp and *Phytophthora* sp. Similar results were obtained by several other workers. The effectiveness of Bay 5072 (Dexon) in the control of *Phytophthora* root rot of avocado has also been proved by Zentmyer (1973) and Zentmyer and Gilpatrick (1960). Dexon (Bay 5072) was found to be useful in the control of *Pythium* root rot and basal stem rot of *Chrysanthemum morifolium* Tammen and Muse (1961).

REFERENCES

- ABRAHAM, P. 1957. Now better possibilities with cardamom. *Plant chron.* 52 (3): 65-73.
- ALAGIANAGALINGAM, M. N. and KANDASWAMY, T. K. 1980. Pod rot of Cardamom and its control by fungicides, Paper presented in Seminar on Diseases of Plantation crops held at Agricultural College and Research Institute, Madurai (Tamil Nadu Agricultural University) on May 29, 1980.
- ANONYMOUS, 1940. Cardamom cultivation in South India. ICAR, New Delhi, 62 pp.
- ANONYMOUS, 1976. Campaign for the control of 'Azhukal' disease. *Cardamom News* 8:21-22.
- CHATTOPADHYAY, S. B. 1967. Diseases of Plants yielding drugs, dyes and Spices. ICAR New Delhi, 100 pp.
- MARUTHARAJAN, D. 1948. Administrative Report of Govt. Mycologist, Madras, 1947-48.
- MENON, M. R., B. V. SAJOO, C. K. RAMAKRISHNAN and L. R. DEVI. 1974. Control of Phytophthora disease of Cardamom. *Agric Res. J. Kerala* 11: 93-94.
- NAMBIAR, K. K. N. and Y. R. SHARMA. 1974. Chemical control of capsule rot of cardamom. *J. Plantation crops* 2: 30-31.
- RAMAKRISHNAN, T. S. 1949. The occurrence of *Pythium vexans* de Bary in South India. *Indian Phytopath.* 2:27-30.
- TAMMEN J. and D. F. MUSE. 1961. Control of *Pythium* root rot and Basal stem rot of *Chrysanthemum morifolium* with Dexon. *Plant Dis Repr.* 45: 863-85.
- THANKAMMA, L. and P. N. R. PILLAI, 1973. Fruit rot and leaf rot diseases of Cardamom in India. *FAO. Plant prot Bull.* 21: 83-84.
- THOMAS, K. M. 1939. Report of subordinate Officers Dept. Agric. 1938-39. 130, pp.
- ZENTMYER, G. A. 1973. Control of phytophthora root rot of avocado with P. Dimethylamino benzene diazo sodium sulfonate (Dexon) *Phytopathology* 63: 267-72.
- ZENTMYER, G. A. and J. D. GILPATRICK 1960. Soil fungicides for prevention and therapy of *Phytophthora* root rot of avocado. *Phytopathology* 50: 660.

Treatments	Mean incidence of capsule rot (transformed value)	Mean incidence of rhizome rot (transform value)
Control	27.10	2.26
Perecloud 4% Dust (12 kg/ac)	19.23	1.20
Bordeaux mixture 1%	16.11	1.58
Emulsicop (0.3%)	23.81	2.43
Morut (spray (0.5%))	21.75	2.73
Bay 5072 (0.5%)	23.96	1.63
Bay 5072 dust (4 kg/ac)	8.32	0.99
Bay 5072 Rust (8 kg/ac)	11.71	1.73
Morut dust (4 kg/ac)	13.77	1.74
Morut dust (8 kg/ac)	23.02	3.04
Perecloud 6% dust (12 kg/ac)	12.46	2.51
Perecloud 12% dust (8 kg/ac)	10.78	2.88
Thiride 5% dust (20 kg/ac)	15.05	2.44
CD ($P=0.05$)	6.56	0.81
Treatments		
Counts	—	0.39