

SHORT COMMUNICATIONS

A NOTE ON USE OF METHYL BROMIDE FOR CONTROL OF ROOT-KNOT NEMATODES IN CARDAMOM NURSERIES

BY

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Root-Knot nematode, *Meloidogyne incognita* and *M. javanica* have been reported from cardamom (*Elettaria Cardamomum* Meton) plantation and nursery in Kerala (Koshy *et al.*, 1976). Repeated use of the same area for growing nursery under high fertility and irrigation is a common practice in Kerala today, which favours nematode multiplication. Such infested nursery beds have poor germination and stunted seedling, poor tilering, yellowing and dwarfing of leaf tips and margin and heavy galling and excessive branching (witches broom type) of roots.

Nematode damage to cardamom seedlings was not identified and was often attributed to nutritional deficiencies, lack of shade, poor quality of seeds etc. The problem was found to be more serious in secondary nurseries where infested seedlings were transplanted resulting in as high as 40 per cent gap filling. Therefore, a study was taken up to test the use of preplant methyl bromide fumigation.

Primary nursery beds were prepared at the cardamom board nursery, Chithirapuram in Devikulam taluk of Idukki district, Kerala by cultivating the land to a depth of about 30 cm. Beds of 6×1 M were formed and further raised about 5-10 cm by spreading thin layers of humus rich jungle soil. Beds were irrigated to saturation two weeks prior to treatment and irrigated lightly as required to maintain constant moisture status about $\frac{2}{3}$ field capacity.

In the present study, eight beds were treated at a time to suit the slopy terrain and size of plastic tarpaulin (40'×40'). Methyl bromide was distributed from a pressurised cylinder through a net work of polythene tubes (8 mm inner diameter), one such delivery tube per 5 M² inserted to a depth of 15 cm. Furrows (20×20 cm) were opened along the margins of the area and the area was sealed by stretching the tarp over the area and by burying the ends (20-30 cm) of tarp. After ensuring the perfection of sealing, the gas was dispensed @ 500 g/100 sq. ft. Prior exposure of the gas cylinder to bright sunlight for one hour was helpful in increasing pressure and quick release of gas. The dispensing tube was pulled out from under the tarp slowly with care and moved on to the next area to be fumigated. The tarps were left undisturbed for 72 hrs. One end of the tarp was lifted to a length of 2 meter for aeration 30 minutes before the removal of the tarp. Care was taken not to contaminate the treated area with unfumigated

soil during freeing and turning the tarp. Initial population of beds were 48 nematodes per 100 g of soil.

After 15 days, 50 g of seed (10g/sq. M) per bed was sown in line in both treated and untreated beds thereby making 25-30 rows with a row to row distance of 15-20 cm. Mulching was done to a thickness of 2-3 cm with local dried grass. Three months after sowing, seedling counts, their height and leaf size were recorded along with assessment of soil and root population (Table I).

TABLE I

Effect of preplant methyl bromide fumigation on the growth of cardamom seedlings in primary nursery beds

Observations	Fumigated beds	Unfumigated beds
Initiation of germination	30th day	45th day
No. of seedlings per bed	684—829 (773.6)	282—401 (344.4)
Height of seedlings (cm)	4.5—9.0 (6.6)	1.9—6.3 (3.5)
Leaf length (cm)	2.1—4.5 (3.9)	0.8—3.0 (2.0)
Leaf breadth (cm)	1.4—2.4 (1.9)	1.0—1.9 (1.3)
Nematodes/g root wt.	—	302
Nematodes/100 g soil	—	48

In a pot experiment at CPCRI, Kayangulam 80 seeds each were sown in four pots of 30 cm diameter filled with 18 Kg of methyl bromide treated sandy loam soil. Three of these pots were inoculated with *Meloidogyne incognita* larvae 350/Kg and the fourth pot was kept as control. Seedling counts of leaf and height of plants were recorded after 3 months (Table II).

The fumigated beds at Chithirapuram had no weed growth compared to the untreated beds which were full of weeds. The treated beds also had a higher stand of vigorous seedlings (Table I). The pot experiment at Kayangulam also showed similar results (Fig. 1 and Table II).

Methyl bromide fumigation has been reported in literature to control root knot nematodes in black pepper nurseries (Anon, 1974) and cigar filler tobacco seed beds (Madamba *et al.*, 1969). The increase in cost to the present rate of Rs. 1.50 per seedling for fumigating both primary and secondary nursery will only be 50 paise per seedling at a treatment cost of 60 paise/sq ft. This additional cost is worthwhile considering the added advantages of control of weeds, many fold increase in the number of healthy uniform seedlings and cent per cent establishment

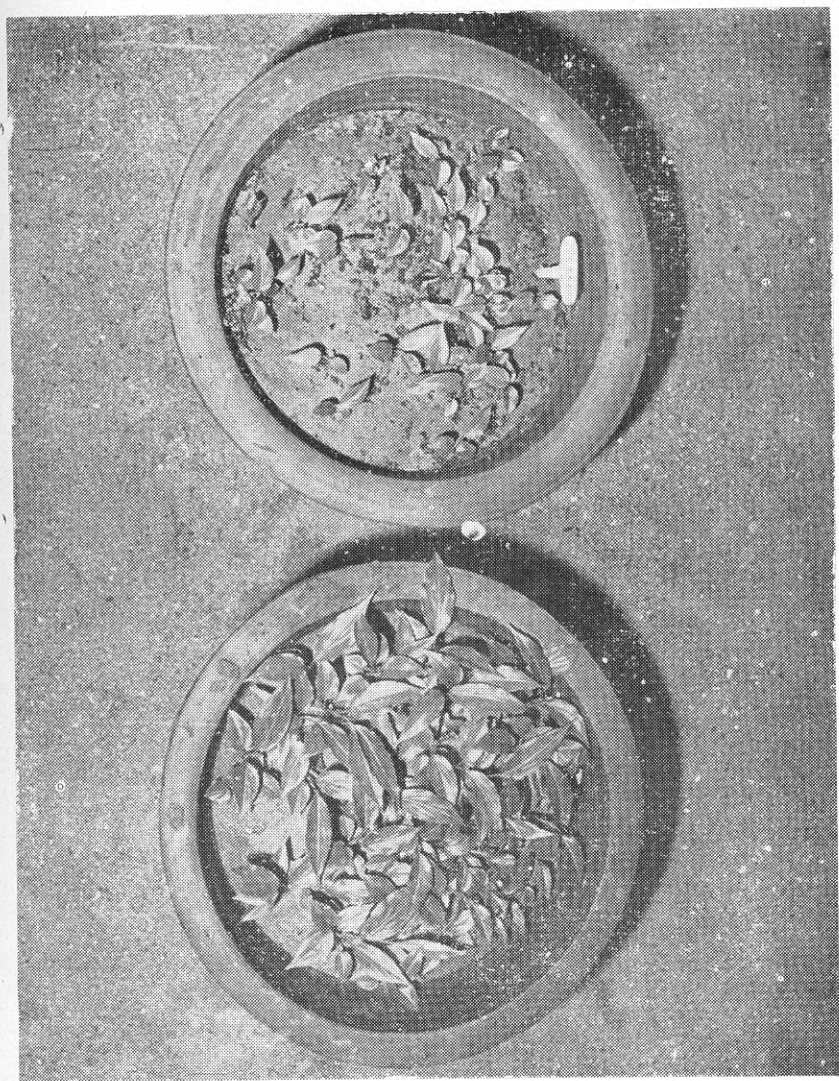


Fig. 1. Cardamom seedlings inoculated with *M. incognita* on left and control on right

TABLE II

Effect of preplant methyl bromide fumigation on the growth of cardamon seedlings in pots

Observations	Inoculated	Control
Initiation of germination	45th day	30th day
Percentage of emergence	34	82
No. of seedlings per pot	23—35 (27)	48—73 (62)
Height of seedlings (cm)	2.0—4.5 (4.0)	5.0—9.0 (8.8)
Leaf length (cm)	1.2—2.5 (2.0)	5.0—6.0 (5.4)
Leaf breadth (cm)	0.7—1.5 (1.1)	1.8—2.3 (2.0)
Nematodes/g root wt.	6391	—
Nematodes/100 g soil	76	—

of transplanted seedling in secondary nursery as well as in the field. Besides, the nursery will not serve as a distribution centre for nematodes and other soil borne pathogens to every planting site in the plantation.

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REFERENCES

- ANONYMOUS, (1974). Nematology. Annual Report for 1973. Central Plantation Crops Research Institute, Kasaragod, Kerala. Page 62.
- KOSHY, P.K., NAIR, C.P.R., SOSAMMA, V.K. & SUNDARARAJU, P. (1976). Note on incidence of root-knot nematode in cardamom nurseries. *Indian J. Nematol.* 6 : 174-175.
- MADAMBA, C.P., GOSECO, C.G. & BAGYO, P.L. (1969). Control of root-knot nematodes and weeds in cigar filler tobacco seed beds by soil fumigation. *Philippine Phytopathology*, 5 : 39-44.