FURTHER DEVELOPMENTS IN THE CONTROL OF THE ROOT-LESION NEMATODE (*PRATYLENCHUS LOOSI*) IN TEA NURSERIES

P. Sivapalan

For fumigation of nursery soil *in situ*, the currently recommended rate of 2 lb of methyl bromide/100 sq. ft could be reduced to 1 lb/100 sq. ft without any loss in nematode control. As the present method of release of methyl bromide from cans using the "Jiffy" applicator is unsatisfactory, the use of an evaporating trough is recommended.

Introduction

Earlier findings (Kerr & Vythilingam 1966 ; 1967) have shown that methyl bromide (MB) is a superior soil fumigant than D-D (1,3, dichloropropene and 1, 2, dichloropropane) for controlling the root-lesion nematode, *Pratylenchus loosi* Loof, in nursery soil. Besides controlling nematodes, this fumigant was also reported to impart some beneficial side effects. The recommended rate was 2 lb/100 sq. ft, and fumigation *in situ* was found to be significantly better than fumigating the "pre-bagged" soil and nursery beds separately. The present investigation was undertaken to find out if the rate of MB applied could be reduced without adversely affecting nematode control and other beneficial side effects. Investigations were also carried out to find out ways of improving the method of application of the fumigant.

Methods

Nursery bags 9 in. high and 4 in. in diameter and open at both ends were filled with soil heavily infested with the root-lesion nematode, and stacked on long nursery beds, 40 ft by 5 ft. There were approximately 950 bags per 100 sq. ft. The rates of methyl bromide tested were 0, ½, 1 and 2 lb per 100 sq. ft. The treatments were applied to individual beds and were each replicated three times. The chemical was released with the aid of a "Jiffy" applicator, after having pre-heated the methyl bromide cans in a warm waterbath (70-75° C) for about 5 min. The polythene sheets were removed 48 hr after treatment and the bags were planted to cuttings of clone TRI 2024, 72 hr after removing the sheets. Growth assessments and nematode counts within roots were carried out 12 months later. Nematodes were recovered from root samples by the modified method of Hutchinson (1962).

Methods of application of fumigant

In this study, two methods of application were compared for efficacy. 1. *"Cold Method"*—The terminal end of the "Jiffy" applicator tubing was connected to a collecting trough (Fig. 1) which was palced under a clear polythene sheeting. The can was punctured *without prior heating* and the quantity of liquid methyl bromide that collected in the trough was measured. 2. *"Hot Method"*—This was carried out in a manner similar to the above, except that the cans *were pre-heated* in a warm water-bath for about 5 min. prior to puncturing.

Results and discussion

The results are presented in Table 1.

Growth assessments indicated a linear response in both root and shoot weight ($P < 0.001$) with increasing dosage rates of methyl bromide (Fig. 2). Apart from controlling nematodes, methyl bromide appears to stimulate growth and this stimulation is proportional to the amount of chemical used for fumigation.

TABLE 1 — *Growth assessments and nematode counts within roots of plants grown in nursery soil treated with different rates of methyl bromide*

Rate of methyl bromide (lb/100 sq. ft)	Mean shoot weight (g)	Mean root weight(g)	Nematodes/g root (Log. n+1)
2	11.21	6.13	0.00
1	8.89	5.55	0.00
½	4.81	2.90	0.75
0	2.65	1.22	3.46
L.S.D. ($P < 0.5$)	1.89	1.12	0.39

It will be seen from Table 1 that the rate of 2 lb/100 sq. ft gave the best shoot growth, together with excellent nematode control. However, in respect of root weight and nematode control, there were no significant differences between the one and two pound rates. The dosage rate of ½ lb/100 sq. ft (at 1 lb/200 sq. ft) did not control nematodes adequately, although it gave significantly better shoot and root growth than the control. This latter rate, therefore, is not sufficient for fumigating nursery soil *in situ*.

If the beneficial effect on shoot growth is disregarded, then the currently recommended rate of 2 lb/100 sq. ft may be reduced to 1 lb /100 sq. ft without adversely affecting nematode control and still obtain good shoot and root growth. Thus in terms of cost and efficacy, the one pound rate appears to be the most ideal for soil fumigation of nursery beds. It should be emphasized, however, that this reduced rate of application, viz 1 lb/100 sq. ft is recommended only for fumigation of nursery beds *in situ*. If for any special reason nursery beds cannot be fumigated directly, then "pre-bagged" nursery soil should be fumigated at the rate of 2 lb per 100 sq. ft as recommended earlier, taking special precaution to see that the soil is *loosely stacked* to a height of not more than 18 inches.

When the efficacy of the two methods of release of MB was investigated, it was found that in the "Cold Method" about 100 ml of liquid MB collected in the trough, whereas in the "Hot Method" this quantity was about 50 ml. Thus, in both methods, a good proportion of the chemical was released as liquid and would have drenched the soil if an evaporating trough was not used. Such drenching is not desirable because the soil in some of the bags could get saturated with the highly phytotoxic Chloropicrin, incorporated with the MB as a warning agent. This may possibly be the reason for the scorching of cuttings observed recently in some nurseries fumigated with MB. It is therefore advisable to use an evaporating trough when nurseries are fumigated *in situ* with MB. Alternatively, the "Jiffy" applicator could be dispensed with and the can placed directly inside a trough provided with puncturing pins, and the system set under the polythene sheet. The can could be punctured by applying pressure from outside. Such a trough should be provided with a stand, so that the height of the trough could be varied by merely pushing the stand to varying depths.

FIGURE 1—*Picture shows method of trapping liquid methyl bromide*

References

HUTCHINSON, M. T. (1962). Rehabilitating tea soils : Susceptibility of plants now in use to the root-lesion nematode, *Pratylenchus loosi*. *Tea Q.* **33.** 138-140.

KERR, A. & VYTHILINGAM, M. K. (1966). Fumigation of nursery soils with methyl bromide. *Tea Q.* **37,** 162.

KERR, A. & VYTHILINGAM M. K. (1967). The occurrence and control of the root-lesion eelworm (*Pratylenchus loosi*) in nurseries. *Tea Q.* **38,** 22-28.

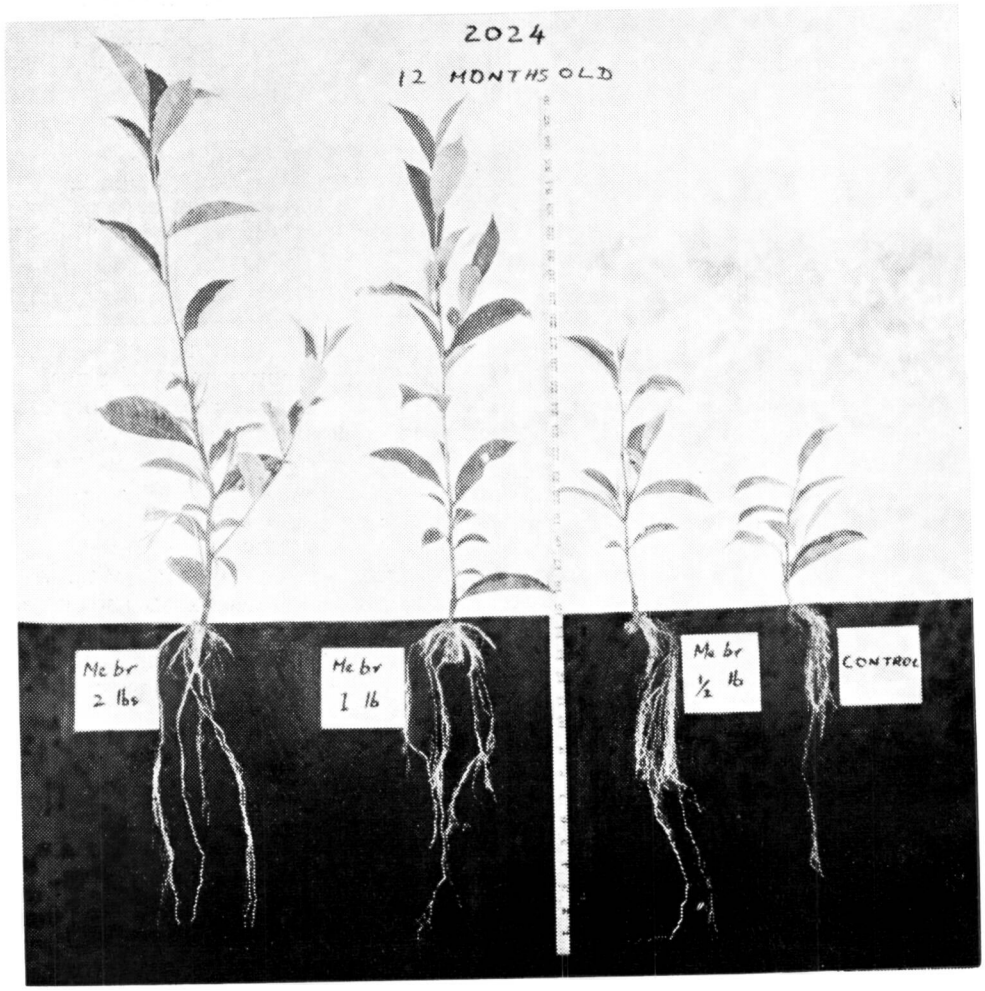

FIGURE 2—*Growth response of young tea plants to different rates of application of methyl bromide*