METHYL BROMIDE SUBSTITUTES IN TEA PLANTATIONS OF SRI LANKA

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Methyl Bromide has been used in Sri Lanka since 1965 to eradicate tea nematodes, diseases and weeds from tea soils both in the nursery and in the field. There are several species of phytophagous nematodes that live in tea lands. However, *Pratylenchus loosi* Loof, *Radopholus similis* Cobb and *Meloidogyne brevicauda* (Chitwood) are of economic importance to tea, and methyl bromide has been the most effective against them. These nematodes can cause heavy casualties in tea nurseries and young tea and severely debilitate the older tea. The different situations where nematode eradication is needed are: nursery at preparation, infested nursery, at planting of tea in a new area, in the infested young tea field and in the infested mature tea fields. The current study investigated the efficacy of nematicidal agents independently and in combination with one another, and under the above different situations.

Experimentation

Alternatives evaluated and reported in the current study were:

i. Soil sterilization- a. with steam b. with dry heat c. with chemical
ii. Soil solarization under polythene mulch
iii. Soil substitutes- a. Tea waste (Refuse tea) b. Coir dust c. Rice paddy husk
iv. Chemicals nematicides for infested nursery and for direct planting of infested land: Phenamifos, Metam Sodim and Neem formulations
v. Tea clones resistant to nematodes
vi. Intercropping of new tea lands upto 12-24 months, with nematode trap crops *Tithonia diversifolia, Vettiveria zizanoides or Tagetes erecta*
vii. Organic amendments for infested mature tea - *Tithonia diversifolia* (Wild Sunflower), Neem, tobacco waste, *Vettiveria zizanoides*, *Adathoda vasica*

All experiments were statistically designed.

In the nursery, Metam sodium was diluted with water and mixed into the soil just the same way as Dazomet is used; An injector was adopted at application of metam sodium in the field; Granular nematicides ("Rugby" and "Nemacur") were worked into the soil; Diluted neem formulations were applied using a 50ml syringe minus the needle; Green mulch was applied immediately after lopping the plants and spreading the material in the inter-row.

Tea exhibited increased plant growth responses (IGR) under solarization conditions. Soil solarization of urea supplemented soil resulted in the best IGR.

The soil substitutes used in the nursery included well decomposed tea waste (refuse tea), well decomposed coir dust and un-decomposed paddy husk. Tea waste and coir dust were used in different ways: mixed with infested soil at 1:1 proportion by volume, in two layers (1/1) with organic matter at the bottom, and 100% only in the case of coir dust. Paddy husk was used only in mixture (1:1) with soil.

Other conventional nematicides (cadusaphos ("Rugby") and Sodium N-methyldithiocarbamate (“Metam sodium”) and two neem based formulations, "Neemazal 1%TS and "Multineem", have been tested.

Conclusions

There is no single alternative that can be used under the different growth stages of tea. Several alternatives could be used at different stages as given below.

1. Soil solarization is applicable only in nurseries. The recommendation is 6-week soil solarization of soil treated with Urea @ 2kg per cube of soil.
2. Well decomposed Refuse tea / Coir dust and Paddy husk can be used as partial soil substitutes at 1:1 ratio; first two are preferably used in layer arrangement with soil at the top; Paddy husk has to be mixed with soil.
3. Metam sodium can be used both in the nursery and in the field @ 500ml per cube of nursery soil or @ 40ml per plant in the field injecting it into soil round the plant.
4. Inter-row planting of Vettiver grass upto 12-24 months can eradicate nematodes in newly planted field. The grass can compete with the tea after 24 months.
5. Regular mulching with loppings of Wild Sunflower eradicates nematodes in mature tea.
6. In an infested nursery, "Neemazal 1%TS" or "Multineem 10%" made into a dilution with 3ml of concentrate in one liter of water can be applied @ 30ml of the dilution per plant, at 2-3 month intervals.
7. Phenamiphos can be applied @ 2g / plant in the infested nursery once or twice, at 3 month intervals, to eradicate nematodes.
8. Neem formulations can give synergistic effect to other agents by way of enhancing plant tolerance.