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SOLARIZATION EQUIPMENT FOR TREATMENT OF BANANA PLANTING MATERIAL AGAINST ENDOPARASITIC PHYTONEMATODES

by
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Summary. The use of equipment constructed from locally available material for disinfection of banana suckers and corms is discribed. It has the advantage of using solar energy and once constructed it can be used for a long time. Furthermore, it is mobile and can be used anywhere.

Sanitization of planting material has long been regarded as a feasible component of Integrated Pest Management (IPM). Hot water treatment is an effective way of freeing banana (*Musa* spp.) planting material of nematodes (Stover, 1972) but the energy input required, mainly electricity, gas or fire wood, makes hot-water treatment an unpopular method among many rural subsistance banana growers.

Solar energy is a readily available and inexpensive alternative source of energy but there has been no suitable equipment to harness it. The present study was undertaken to develop equipment which can effectively use solar power for the sanitization of banana planting material.

Materials and method

The structure of the solarization box constructed from locally available materials is shown in Fig. 1. The wooden cover (2) and glass (3) are opened and a banana sucker (8) placed on the weld-mesh platform (7). Then the glass cover (3) is closed and the box oriented to receive maximum sunlight directly by mirror (1) reflection. The black inner surfaces of the metal lining (6) absorb and transform the sun's radiation into heat. When the temperature inside the box reaches 65 °C, as indicated on the metal thermometer (10), the wooden cover is closed to cut off the sunlight. The vent (12) is adjusted to maintain the temperature at 65 °C for 20 minutes. The procedure is then repeated as required. Tests undertaken over a period of five days showed that at an average ambient temperature of 26.2 °C (22.0-30.0) the floor temperature of the box was 76.7 °C (36.0-106.0) and above the floor was 75.9 °C (32.0-100.0).

Before treatment suckers or corms are pared to a depth of half a centimetre to remove all the roots and nematode lesions. Banana suckers and corm splits (Cv. Nyoya) treated in this equipment were planted alongside those treated in hot-water bath at 55 °C for 20 minutes, carbofuran dip (made by mixing 1 kg, of Furadan 5G, in 20 l of water) and untreated plants as controls. Populations of *Pratylenchus goodeyi* Sher *et* Allen were monitored in the banana roots after 300, 450 and 650 days.

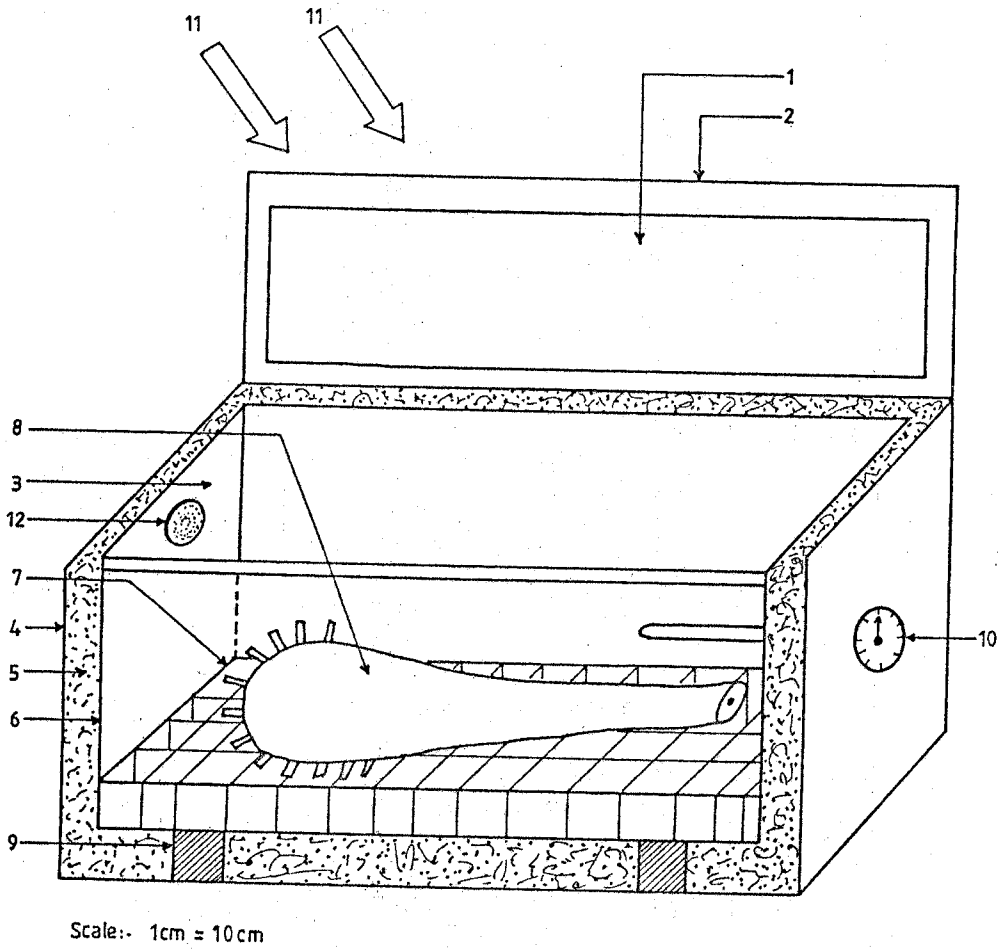

Fig. 1 - Solarization box for sanitization of banana planting material.

Results

Nematode numbers were significantly (P = 0.05) different at 300, 450, and 650 days after planting (Table I). Plants grown from untreated suckers supported the highest numbers of *P. goodeyi* throughout the experimental period. The lowest numbers of *P. goodeyi* 650 days after planting were obtained from pared corms which were subjected to the solarization treatment.

TABLE I - *Effects of treatments on mean numbers of* Pratylenchus goodeyi *in roots of bananas*[1].

Treatments	Nematodes in 100g of fresh roots Days after planting		
	300	450	650
Non-pared sucker	3333a(1)	1400a	29767a
Non-pared sucker+carbofuran	0b	200b	5525ab
Pared sucker	0b	700ab	5027ab
Non-pared sucker+hot water	0b	0b	2375b
Non-pared Sucker+solarization	675ab	360b	4258b
Pared sucker+hot water	0b	0b	2800b
Pared sucker+solarization	955ab	0b	833b
Pared sucker+carbofuran	0b	0b	4438b
Non-paired corm	0b	180b	12017ab
Non-pared corm+carbofuran	700ab	0b	11593ab
Pared corm	0b	105b	6225ab
Non-pared corm+hot water	525b	95b	1533b
Non-pared corm+solarization	0b	85b	8233ab
Pared corm+hot water	0b	0b	2300b
Pared corm+solarization	0b	0b	542b
Pared corm+carbofuran	0b	0b	2558b

(1) Mean of six replicates; numbers followed by the same letter(s) are not significantly (P = 0.05) different with LSD.

Discussion and conclusion

The significantly low (P = 0.05) numbers of *P. goodeyi* in roots of pared and solarized plants implies that solarization markedly reduced the initial nematode inoculum in the planting materials and subsequent populations. It can thus be concluded that this equipment constitutes an effective banana "seed" sterilisation process.

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