

RECOVERY OF NEMATODES FROM BANANA ROOTS AND SOIL SAMPLES [RECOGIDO DE NEMATODOS DE RAICES BANANEROS Y MUESTRAS DE TIERRA]. E. B. Whyte and S. R. Gowen, Scientific Officer-Nematology, Banana Board, Research and Development Department, Kingston, Jamaica and Nematologist, Windward Islands Banana Research Scheme, St. Lucia, West Indies. On loan from the British Ministry of Overseas Development, respectively.

ABSTRACT

The influence of time and condition of storage on the recovery of three genera of nematodes from banana roots and soil were investigated. Recovery of nematodes is dependent upon the type of sample, the species involved, and on storage condition. The recovery of *Radopholus similis* (Cobb, 1893) from roots was greater from refrigerated samples than from samples stored at room temperature. Refrigeration had a depressing effect on nematode recovery of *Helicotylenchus* spp. from soil.

INTRODUCTION

It is an accepted practice that soil and root samples collected for nematode analysis may be stored before processing. The period of storage may vary, or extraction technique or facilities may prevent the processing of large numbers of samples in one day. This paper illustrates the need to standardise the period of storage and the condition under which samples may be stored.

METHODS

Bulk samples of banana *Musa* (AAA Group) 'Robusta' roots and soil from around banana roots were collected from an experimental plot at WINBAN Experimental Farm, St. Lucia.

The roots were washed thoroughly and chopped into 2-3 cm lengths. This bulk sample was then mixed and divided into ten equal parts. Each part was numbered and divided into halves which were placed into polyethylene bags. One-half was stored on the lowest shelf of a refrigerator at 5-8C, the other half was stored at laboratory temperature, 27-30C.

On the day of collection and on the 1, 2, 3, 4, 7, 8, 10, 11, 14th days after collection, five 25g subsamples were taken from each bag, comminuted for 10 sec at the low speed of a kitchen blender and incubated at laboratory temperatures for 2 days in dilute hydrogen peroxide (2), using the piepan modified Baermann funnel technique.

The bulk soil sample was sifted through a 10mm mesh and mixed thoroughly before dividing into 10 parts, each part was then divided evenly into 3, which were placed in polyethylene bags and stored either at laboratory temperature (27-30C), in an air conditioned room (24-27C) or in a refrigerator (5-8C).

On the day of collection and on the 1, 2, 3, 4, 7, 8, 10, 11 and 14th subsequent days, four 100 cm³ aliquots were taken from each bag, placed on a piepan and incubated for 24 hr at laboratory temperature.

RESULTS

Nematodes recovered from roots

Numbers of *Radopholus similis* recovered (Fig. 1) declined during the first 2 days of storage under each regime. There was an increase on the third day at both temperatures but from the fourth day onwards numbers recovered from roots stored at room temperature declined until the fourteenth day when less than 50 nematodes were recovered from 25g roots. The number recovered from the refrigerator stored samples increased dramatically until the tenth day when 1,600 nematodes were recovered, thereafter numbers declined rapidly.

Apart from the sample processed on the second day of storage, the recovery of *Helicotylenchus* spp. (mostly *H. multicinctus*) (Fig. 2) was greater from roots stored at room temperature than those in the refrigerator. This is the reverse of the situation with *R. similis*. At the end of the experiment a greater recovery of *Helicotylenchus* spp. was still obtained from the room temperature stored roots than that on the first day. Many of the nematodes were juveniles which had probably hatched during storage.

Nematodes recovered from soil

The number of *R. similis* recovered (Fig. 3) from refrigerator stored soil steadily declined. None was recovered from the sample stored 14 days.

The number of specimens recovered from the samples stored at the other two regimes increased with storage. Recovery was higher from samples stored at room temperature.

A similar pattern was observed with *Helicotylenchus* spp (Fig. 4). Refrigeration checked nematode recovery as compared with other storage condition, there being a substantial increase in numbers recovered on the 7th and 8th days of storage. Storage in an air-conditioned room led to greater recovery than at room temperature.

The number of *Rotylenchulus reniformis* (Linford & Oliveira, 1940) (Fig. 5) recovered from the three storage conditions showed a similar pattern. However, the numbers recovered from samples kept at room temperature were greater. Refrigeration had a depressing effect on nematode recovery.

DISCUSSION

With soil samples in which extraction procedures depending on nematode motility are used, samples should not be refrigerated during storage. An optimum storage temperature of 13C has been reported for some species when Baermann funnel methods are employed (1). However, if a sugar flotation extraction technique is used it has been found that -15C is the best storage temperature for these species. Such storage facilities are generally not available to workers in the tropics.

In the case of root samples the condition of storage over a 14-day period will influence differently the recovery of different species. In such a situation it is doubtful if storage should be contemplated at all.

RESUMEN

Se investigó la influencia del tiempo y el tipo de almacenamiento sobre la extracción de 3 géneros de nemátodos provenientes de raíces de banano y suelo alrededor de éstos. La extracción de los nemátodos depende del tipo de muestra, las especies involucrados y el tipo de almacenamiento. La extracción de *Radopholus similis*, provenientes de raíces, fue mayor en el caso de muestras refrigerados que en el de muestras mantenidos a temperatura ambiente. La refrigeración tuvo un efecto detrimental sobre el numero de *Helicotylenchus* sp. que fueron recobrados del suelo.

LITERATURE CITED

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2. Gowen, S. R. & J. E. Edmunds, 1973. Plant Dis. Repr. 57:678-681.

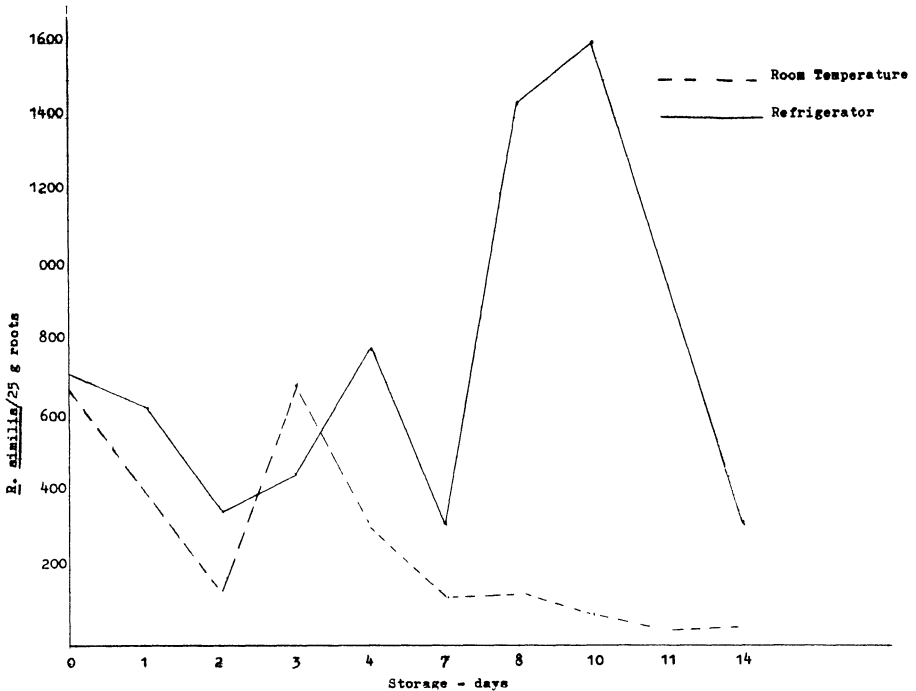


Figure 1: *R. similis* recovered from roots stored at room temperature and in a refrigerator

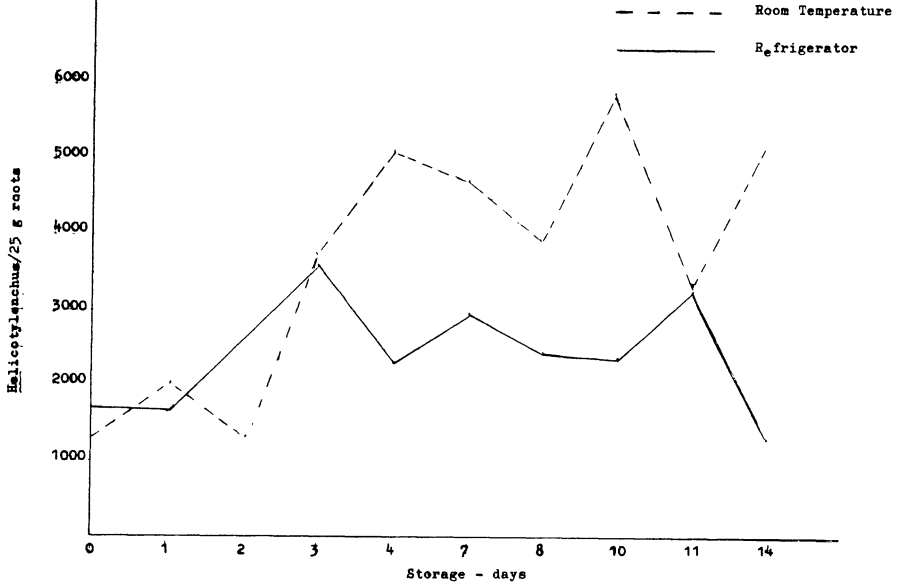


Figure 2: *Helicotylenchus* spp. recovered from roots stored at room temperature and in a refrigerator.

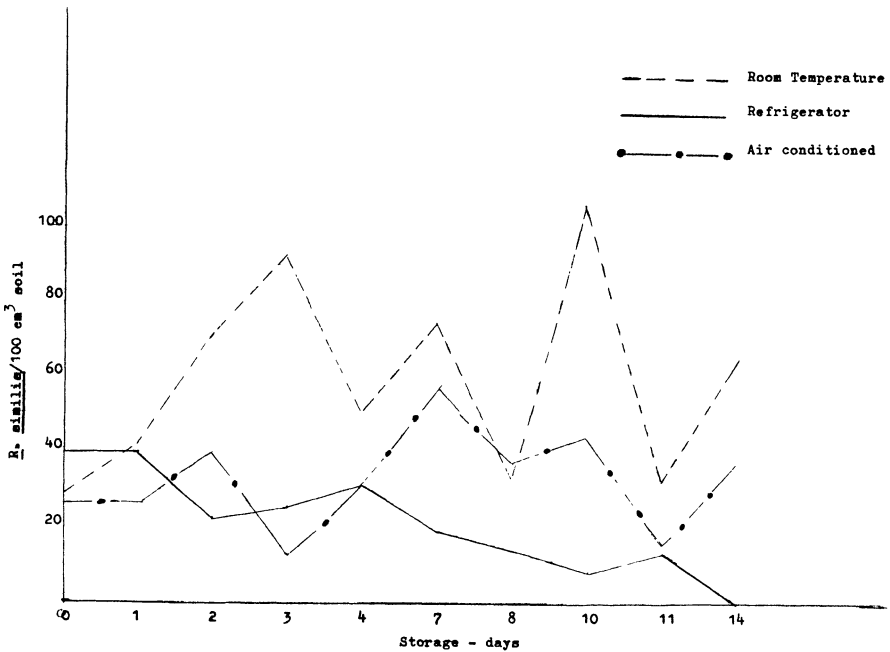


Figure 3: *R. similis* recovered from soil held under three different storage conditions

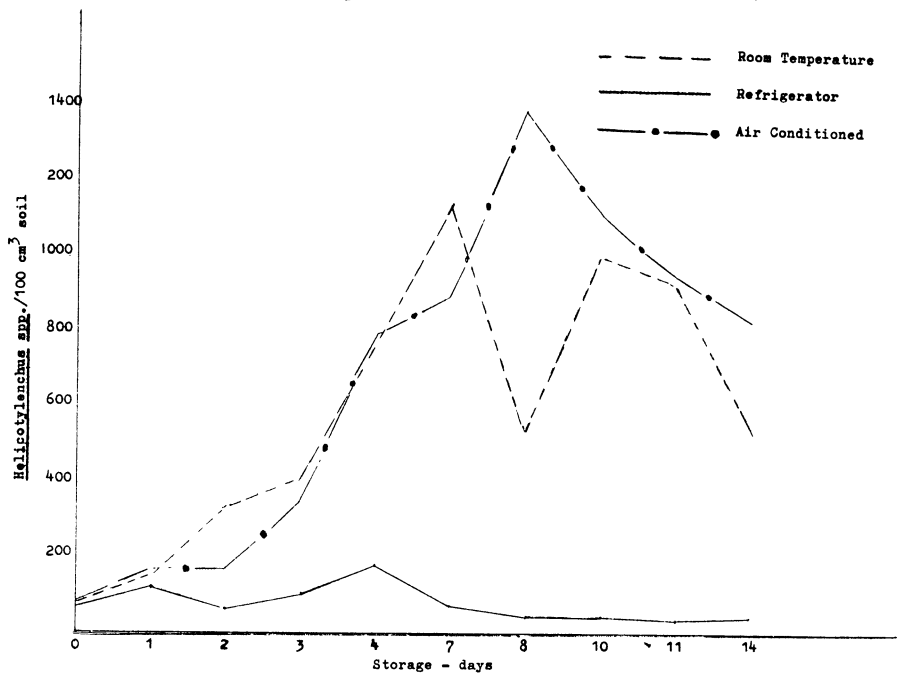


Figure 4: *Helicotylenchus* spp. recovered from soil held under three different storage conditions

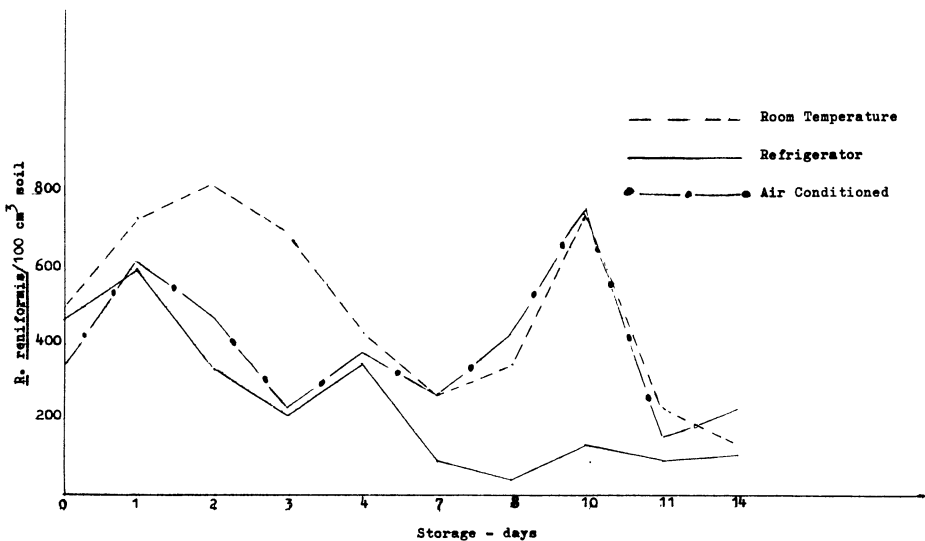


Figure 5: *R. reniformis* recovered from soil held under three different storage conditions