

RELATIONSHIP BETWEEN NEMATODE POPULATIONS AND CORM ROT IN 'BUN LONG' TARO PRODUCTION

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Introduction

Commercial taro production is becoming more important in Hawai'i as consumption continues to increase. There is an increased demand for uses in traditional food products as well as new products currently being developed.

In 1990, commercial producers on Moloka'i started to experience increasing levels of corm rot in their fields. Corm rots were also present in extension field demonstrations and trials. Today corm rots of 'Bun Long' have been recorded as high as 50 percent or more of a field. These high percentages have also been recorded in our trials. This situation is a threat to the sustainability of 'Bun Long' taro production at a commercial level.

Samples were collected for analysis, but there was not much success in identifying a primary causal agent. Nematodes were the only positively identified agent. Other pathogens identified from the samples were considered secondary.

A hypothesis was developed that the corm tissue breakdown or rot was the result of root damage caused by nematodes that resulted in a restricted uptake of calcium by the roots and hence a calcium nutrient deficiency. A multidisciplinary working group of researchers was established, including Robert Coltman (plant physiologist), James Silva (soil scientist), Donald Schmitt (nematologist), Robert Paull (plant molecular physiologist), Jeri Ooka (plant pathologist), and Alton Arakaki (Maui County extension agent).

Results

Fifty-one samples were taken from the experiment and tested for nematodes (see Fig 1). Of these, 78 percent were infected with nematodes. In the fumigated plots, 51 percent of the samples were recorded with less than 50 nematodes present. In the nonfumigated plots, only 27 percent of the samples had less than 50 nematodes. Fumigants were, therefore, only partially successful in controlling the nematode population. There may have been some contamination from planting material and soil

movement between plots during field maintenance or rain storms.

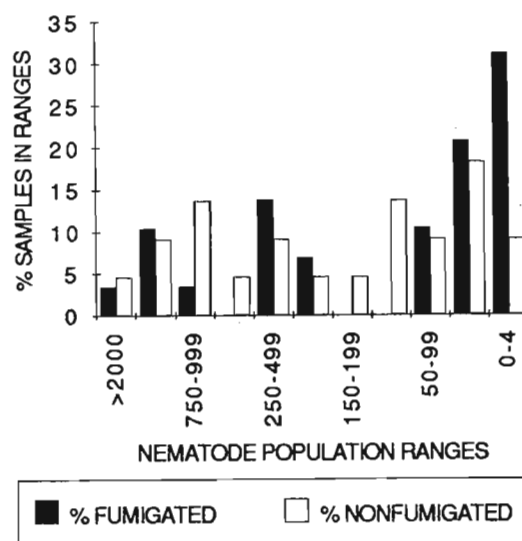


Fig. 1. Percentage of samples in nematode population ranges.

There is not a clear relationship, however, between rot and nematodes (see Fig. 2). Fifty percent of the rotted corm samples were infected with less than 49 nematodes per 250 cc of soil. Fifty percent of the samples that were not rotted were infected with more than 250 nematodes per 250 cc of soil. Thirty-one percent of the rotted samples recorded zero nematode infestation. Nine percent of the nonrotted samples recorded zero percent infestations.

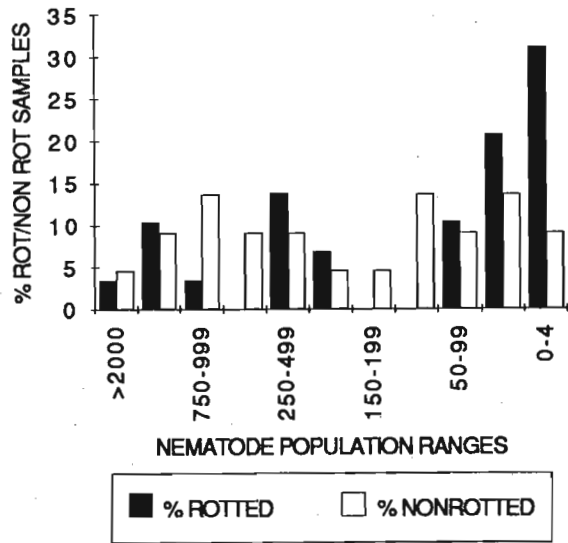


Fig. 2. Relationship between corm rots and nematode population.

Preliminary Conclusions

The variety 'Bun Long' is very susceptible to nematodes. Field fumigation is only marginally effective if other cultural precautions are not observed. The incidence of corm rot is independent of nematode infestation. Other experimental findings by Jeri Ooka showed the presence of other pathogens, including *Rhizoctonia*, *Ceratocystis*, *Phoma*, and *Fusarium*. Other experiments are being conducted on yield and calcium relationships.

Nematode-free planting material should be used. It is possible that better control could be achieved if fumigant is shanked 10 to 12 inches below the surface so that the gas is able to move upwards through the soil.

The Editor

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