

Radopholus similis associated with the giant swamp taro on the island of Yap

Introduction

A corm rot disease, caused by nematodes, gradually became a serious threat for giant swamp taro (*Cyrtosperma merkusii*) production on the island of Yap in Micronesia. Although the presence of *R. similis*, associated with infected corms, was known a detailed investigation was started to evaluate the life of the nematode in such a unique swamp environment.

Materials and Methods

Infected corms were collected from knee deep swampy taro patches, washed in the laboratory and small pieces of the corm sent to ARC-PPRI, Pretoria for further processing and nematode identification.

Island of Stone Money



Radopholus similis in Taro corm. A, D, E. Different views of the nematodes in the corm tissue; B: Concentration of eggs; C: Large dorylaimid nematode found in the tissue together with the *Radopholus*. (Scale bars: A, B, D = 100 µm, C, E = 200 µm)

Results

Morphological studies with the light microscope and SEM showed that the nematodes present, were indeed *R. similis*. Taro is the staple food with every adult Yapese consuming 2-3Kg cooked corm per day. It is also very important for Yapese culture such as funerals and other ceremonies. Damage such as corm rot, brown necrotic centers and external cavities all reduce corm quality. Further studies to solve these problems are therefore already underway.



Taro patch and damage.



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Plant Protection Centre in Ambo, Ethiopia, and sent to the ARC-Plant Protection Research Institute for species identification. Thirty-five different species were identified. Specimens that could belong to unknown species were also found. Taxonomic studies on the nematode fauna of Ethiopia are almost non-existent. Some species known to occur in neighbouring countries were recorded in Ethiopia for the first time. Two relatively scarce nematodes are illustrated in SEM photographs. *Paratylenchus pandatus* was found for the first time after its original description. Taxonomic studies are underway on some of the material and a new *Helicotylenchus* sp. is being described.

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A corm rot disease caused by nematodes gradually became a serious threat to the production of giant swamp taro (*Cyrtosperma merkusii*) on the island of Yap. Although the association of *Radopholus similis* with infected corms was known, it is only now that a detailed investigation is being carried out of biology of the nematode in such a unique, anaerobic swamp environment. Small pieces of infected corm were sent to the ARC-Plant Protection Research Institute in Pretoria for further processing and identification. Morphological studies confirmed the nematode species to be *R. similis*. Plants seldom show aboveground symptoms. *C. merkusii* is a perennial crop and the disease becomes more severe with age. The corm rot is wet, brown with a loose mass of dead tissue hosting thousands of nematodes. By the time corms are harvested from the third year onward there are cavities of dead tissue visible, with an unpleasant odour. Deep brown necrotic centres develop in the corms and the cavities advance

towards the edible portion of the corm, leaving a perforated exterior that greatly reduces corm quality. Further investigations are underway to establish the life-cycle and spread of *R. similis* in this environment. Large actinolaimid nematodes were also found in the corm and their role will be investigated.

Inhibitory effects of culture filtrates of endophytic Fusarium oxysporum isolates on motile stages of the banana nematode, Radopholus similis

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The burrowing nematode, *Radopholus similis*, is one of the most damaging pests of *Musa* spp. worldwide. Effective control is mainly achieved by the use of nematicides although costs for subsistence farmers and adverse environmental effects are matters of concern. A promising alternative to nematicides is the use of mutualistic endophytic fungi. Some endophytic strains have been demonstrated to possess potential as biological control agents, protecting their host plant against pests and diseases. Currently, research at the IITA focuses on the isolation and screening of endophytic fungi from banana plant tissue to identify potential isolates for nematode control. Culture filtrates (CF) of nine endophytic *Fusarium oxysporum* isolates from Uganda were tested for their effect on the mobility and mortality of *R. similis* females, males and juveniles. Nematodes were added to 100 % CF for 3, 6 and 24 hours and mobility assessed on each occasion. Mortality rates were determined after 24 hours. Two isolates were tested further at six CF concentrations (2.5, 5, 10, 25, 50 and 100 % v/v). Undiluted CFs of all isolates immobilised 39.4–100 % of the nematodes. The effect on nematode mobility increased with longer exposure periods and with higher CF concentrations. More males were immobilised than females. For all isolates tested, 76.4–100 % mortality rates were observed in the undiluted CFs. Nematode mortality increased with higher CF concentrations. Results demonstrated the production of metabolites by *F. oxysporum* endophytes that are toxic to *R. similis* and the potential of endophytic *F. oxysporum* isolates as commercial biological control agents.