INTER-RELATIONSHIPS BETWEEN NEMATODE COMMUNITIES AND SUGARCANE VARIETIES IN THE MIDLANDS OF KWAZULU-NATAL

P CADET [1,2], VW SPAULL [2] AND DG MCARTHUR [3]

[1]Institute de Recherche pour le Development,213 rue La Fayette, 75480 Paris, France, [2]South African Sugar Association Experiment Station, P/Bag X02, Mount Edgecombe, 4300 and [3]Union Co-operative Limited, PO Box 1, Dalton 3236.

Plant-parasitic nematodes limit yield of sugarcane over a large area of the South African Sugar Industry. Currently carbamate nematicides are used to good effect to reduce crop loss from nematodes. However these chemicals affect more than their target pests and it is possible that their future use will be restricted. Alternatives to these chemicals are required. Plant-parasitic nematodes do not live in isolation in the soil, but as communities of species. These populations interact with each other and with other components of the soil biota, and are influenced by their abiotic environment. An understanding of how they interact and of their relationship with their crop hosts may lead to new methods of reducing their effect on the crop.

Here we investigate a hypothesis that is derived from a comparative study of the mechanism of crop loss in sugarcane in South and West Africa and also from a pot trial with millet and three species of plant-parasitic nematodes, including *Helicotylenchus dihystera*. The hypothesis proposes that when *H.dihystera* occupies a large proportion of the ectoparasitic nematode fauna, it can mitigate the pathogenicity of other more pathogenic species.

Using data from the first and second ratoon crops of a variety-x-nematicide trial a study was made of the relationships between nematode species and between the species and the cane varieties. The trial was conducted in the KwaZulu-Natal Midlands with varieties N12, N17 and N21. The soil was a Cartref with a clay content of 6%. The crops were cut in May in 1994 and in 1996 on a two year cycle and the nematicide treated plots received Temik (15% aldicarb) at 20 kg/ha after harvest of the preceding crop. Soil and root samples for nematode assay were collected two weeks after cutting the plant crop and first ratoon, before the Temik was applied.

Treatment with Temik increased the mass of cane and sucrose of all the varieties in both crops with the best yields coming from N12 and N17. There was no correlation between the number of all the nematodes in the soil and yield of cane. Greater yields were obtained from plots where no *Meloidogyne* spp were recovered. The proportion of *H.dihystera* in the ectoparasitic community was higher and the proportion of *Xiphinema elongatum* lower where cane yields were higher and vice versa. Principle component analysis of the data showed that the numbers of *H.dihystera* in the soil were strongly opposed to the numbers of *Meloidogyne*. They were, however, positively associated with the yield of the two ratoon crops. Numbers of *Meloidogyne* spp, and, to a lesser extent, *Pratylenchus zeae* and *X. elongatum*, showed no such tendency. The data from the trial lend support to the hypothesis that *H.dihystera*, in some way, mitigates the pathogenicity of other more pathogenic nematode species.