PLANT AND SOIL NEMATODES

PLANT-PARASITIC NEMATODES ON SUGARCANE

Sugarcane is attacked by a wide range of plant-parasitic nematodes. This fact sheet focuses on the two most damaging nematode pests in Australia (root-knot nematode, *Meloidogyne* spp. and root-lesion nematode, *Pratylenchus zeae*), and provides a brief overview of the other plant parasites that occur on sugarcane. The management practices that can be used to reduce losses from nematodes are covered in Fact sheet PSN 038.

Root-lesion nematode (*Pratylenchus zeae*)

Root-lesion nematode multiplies readily in all the soil types on which sugarcane is grown, and as sugarcane is an excellent host, it is found in virtually every cane field in Australia. However, problems caused by root-lesion nematode are difficult to diagnose because the root symptoms produced (reddish-purple lesions on new roots, destruction of fine roots) may be caused by other soil-borne pathogens. Thus, soil or root samples must be collected and nematode populations assessed to check whether damage is occurring. If sugarcane is planted into soils containing 100-300 *P. zeae*/200 g soil, or if more than 500 *P. zeae*/200 g soil are retrieved from samples collected during the growing season, the crop will probably be suffering yield losses of 5-20%. However, the extent of losses will depend on soil type and the standard of crop management.

Symptoms caused by root-lesion nematode (*Pratylenchus zeae*) on sugarcane roots

Root-knot nematode (*Meloidogyne* spp.)

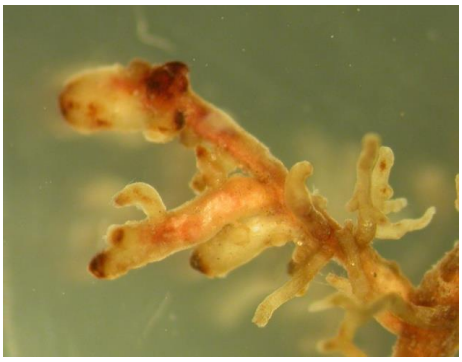
Root-knot nematode occurs in all Australian cane-growing regions but is particularly common on coarse textured sandy soils. Populations are usually very high in soils with a clay content < 15% and are much lower in sandy clay loams, clay loams and clays. Several *Meloidogyne* species have been detected, but the most common species is *M. javanica*.

Root-knot nematode produces distinctive above-ground symptoms on sugarcane. Tillering is reduced and the height of the canopy may vary considerably because shoot elongation is affected. Below ground, swellings and galls are relatively easy to see on primary roots and the fine root system. Since galls often form at the root tip, the primary roots cease to elongate and so root length can be substantially reduced. Crop losses may be very high, particularly in sands and sandy loam soils.

Terminal galls on sugarcane roots caused by root-knot nematode

Other plant-parasitic nematodes

Many other plant-parasitic nematodes are found on sugarcane in Australia, but the most common genera and species are spiral nematodes (*Helicotylenchus dihystera* and *Rotylenchus brevicaudatus*), stubby root nematode (*Paratrichodorus minor*), stunt nematode (*Tylenchorhynchus annulatus*), reniform nematode (*Rotylenchulus parvus*), dagger nematode (*Xiphinema elongatum*) and various ring nematodes in the genera *Criconema*, *Criconemella* and *Ogma*. Symptoms caused by stubby root and dagger nematodes (swelling and malformation of root tips and stunting of roots) are sometimes seen in very sandy soils but the other nematodes probably cause little damage unless populations are very high.



Symptoms caused by dagger nematode (*Xiphinema* spp.) on sugarcane roots

The economic importance of plant-parasitic nematodes on sugarcane

When non-volatile nematicides (aldicarb and fenamiphos) were applied to sugarcane crops in a manner that significantly reduced populations of plant-parasitic nematodes, the average yield responses obtained in 16 field experiments in southern and central Queensland were 15.3% in plant crops and 11.6% in ratoons. These results demonstrated that nematodes were significant pests of sugarcane, with estimates in 2007 suggesting they were costing the Australian sugar industry more than $80 million annually in lost production. The entire community of pest nematodes contributes to these losses, but because root-lesion nematode is so widespread and populations are relatively high, it is probably the major contributor.

Collective effects of plant-parasitic nematodes and other pathogens

Although plant-parasitic nematodes have the capacity to reduce the yield of sugarcane, the root damage they cause always involves a complex of species with different feeding habits and varying degrees of pathogenicity. As many other soilborne pathogens also damage sugarcane roots and interact with nematodes in the root zone, it is very difficult to attribute yield losses to particular organisms or groups of organisms. Nevertheless, the results of research undertaken over many years suggest that fungal pathogens are usually the major factors involved in poor crop establishment and poor early-season growth, whereas the effects of nematodes are usually not seen until stalk elongation is reduced late in the season.

Further reading

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