

## A needle nematode (*paralongidorus* sp.) causing poor growth of rice in North Queensland

G.R. Stirling<sup>1</sup>, E.L. Shannon<sup>2</sup> and R. Grattidge<sup>3</sup>

<sup>1</sup> Queensland Department of Primary Industries - 1. Meiers Road, Indooroopilly, 4068,

<sup>2</sup> P.O. Box 591, Ayr, 4807,

<sup>3</sup> P.O. Box 931, Townsville, 4810

During the last few years, poor growth has been observed in summer rice crops grown on the impermeable clay flood plain soils of the lower Burdekin River in north Queensland. Seedlings emerge and grow normally for a few weeks but poor growth symptoms appear soon after permanent water is applied. Affected plants are stunted and chlorotic, with short, discoloured roots and necrotic root tips. Since diseased plants lack vigor, the stand declines until relatively few plants remain. Sedges (*Cyperus* spp.) become dominant and water birds tend to congregate in diseased patches, adding to crop losses. Badly affected areas yield little or no grain.

Initial studies by local agronomists and extension officers failed to identify the cause of the poor growth. Poor management, inadequate nutrition, salinity of irrigation water and root feeding insects were not consistently associated with the disease. Subsequently, large numbers of needle nematodes were found in soil around diseased plants and the results of a pathogenicity test showed that the nematode was the primary cause of the poor growth syndrome. Rice seedlings grown in vials containing 10 g sterile soil and inoculated with 250 or 900 needle nematodes were significantly smaller than uninoculated seedlings (Table 1). The stunted roots and necrotic root tips observed on inoculated seedlings were similar to the symptoms observed on plants growing poorly in the field.

The nematode is an undescribed species of *Paralongidorus* and is probably endemic to north Queensland. It is a relatively large nematode, larval stages varying in length from 2.5 to 7 mm and adults being 7-10 mm long. Observations in the field suggest that needle nematodes are susceptible to desiccation and to mechanical disturbance from cultivation and that they survive in soil during periods between rice crops at depths below 10 cm. Because of their size, needle nematodes cannot move readily in moist clay soils, but they become active when these soils are flooded. Roots of newly sown rice initially grow into top-soil relatively free of nematodes, but after permanent water is applied, nematodes migrate upwards to feed on root tips. Populations of 400-1000 needle nematodes per 200 ml soil have been found in the root zone of diseased rice plants.

**Table 1. Effect of *Paralongidorus* sp. on the growth of rice (cv. Starbonnet)**

No. nematodes inoculated	Total leaf length (cm)	Average root length (cm)	Dry weight (g)		No. nematodes recovered
			Tops	Roots	
0	100.8 a*	8.2 a	0.279 a	0.221 a	0 a
250	83.6 b	5.4 b	0.211 ab	0.174 ab	59 b
900	73.6 b	2.8 c	0.176 b	0.061 b	135 b

\* Means of five replicates. In each column, numbers followed by the same letter are not significantly different ( $P = 0.05$ ).