NOTES ON NEMATODES AND PHYTOPHTHORA BOLL ROT

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Nematodes

Nematodes comprise a group of animals which include roundworms, threadworms and eel worms. Some are free living while others are plant or animal parasites. Nematodes that injure plants are microscopic, transparent animals which feed on plant roots by puncturing cell walls and extracting cell contents via a hollow stylet or spear shaped structure. Some species remain wormlike and migratory throughout the life cycle and in other species the female becomes sedentary upon entering the adult stage with the posterior section swelling to an oval or pear shape. Nematode injury to plants usually takes the form of stunting and/or galling (root knot) depending on the nematode species.

Nematodes are regarded as a major pest of cotton in many parts of the world. It has been claimed that "nematodes cause economic losses to cotton everywhere it is grown" (Watkins, 1981). Apart from yield reductions resulting from nematode activity alone, nematodes are often involved in interactions with other plant pathogens. The interaction between fusarium wilt and the root knot nematode is well documented. Nematodes usually are favoured by well drained light-textured soils. In recent years plant parasitic nematodes have been found in wheat growing on the heavy textured soils of north-west NSW.

Samples of soil from cotton fields in the Macquarie, Namoi, Gwydir and McIntyre valleys of New South Wales were collected in March, 1988 for nematode extraction and identification. It has previously been shown that nematode populations under cotton reach a maximum towards the end of the season. Composite soil samples were taken by collecting ten sub-samples (approx 100 grams each) from sites throughout the field. Samples were refrigerated and transported to the Biological & Chemical Research Institute at Rydalmere where the nematologist Mr R.W. McLeod extracted, counted and identified the nematodes present.

Table 1. A survey of nematodes present in irrigated cotton fields throughout New South Wales in March 1988*.

		nematodes/500 g soil			
		non-parasitic nematodes including *Aphelenchus avenae*	non-parasitic nematodes *Rhabditis* spp.	stunt nematode	root lesion nematode
Alcheringa	Boggabilla	-	30	-	-
Telleraga	W.of Moree	1400	-	-	-
Benwerrin	Croppa Creek	1700	-	-	-
Colly Farms	Collarenebri	-	780	-	-
Nbri ARS	Narrabri	3000	-	3	-
Drayton	Breeza	-	70	-	-
Auscott	Warren	660	-	-	-
Byron	Narromine	700	-	-	-
Letoka	Bourke	1400	-	-	1

* Extraction, counting and identification by Mr R W McLeod, BCRI.

The results (Table 1) indicate that plant parasitic nematodes are not a factor in the heavy textured, furrow irrigated, cotton growing areas of New South Wales. *Aphelenchus avenae* was the most common nematode found in the samples. This species is one of the most common nematodes found in soil and may be of some

significance as a destroyer of plant parasitic fungi. *Rhabditis* spp are another common group of nematodes in soil which feed on bacteria. The stunt nematode and the root lesion nematode are parasitic on plants, however numbers need to exceed 500 per 500 grams soil before they are able to affect root growth. Populations of the root lesion nematode in wheat crops usually vary from 300 to 4000 per 500 gram soil. The numbers of stunt and root lesion nematodes observed in this survey was therefore insignificant.

Phytophthora Boll Rot

Phytophthora boll rot of cotton has been observed during recent seasons when heavy rainfall has occurred in late February or early March. The fungus which causes the disease is a soil-inhabiting water mould which requires water for the production of motile spores. These spores are initially produced in wet soil beneath plants and are splashed up on to lower leaves and fruiting structures during heavy rain. The pathogen has a wide host range which includes a large number of ornamental plants derived from the Australian native flora.

Symptoms on Cotton. Infected bolls become blackened, open prematurely and the enclosed lint is discoloured and remains compact. These discoloured compact locks are easily dislodged and fall to the ground. The disease is most severe when bolls are close to the ground either as a result of low fruiting branches or lodging of older plants. A low plant population which exposes the soil surface to splashing rain also favours the disease.

1988 Disease Surveys. During the March, 1988 disease survey (Tables 2 & 3) phytophthora boll rot was observed in 49% of fields inspected and the mean incidence of the disease where present, was

1.7% (range 0.1 to 10%). The disease was most severe in two fields of Sicala and one field of Siokra in the Gwydir valley where the plant stand was 4.1, 3.1 and 3.6 plants/metre respectively. The mean incidence of phytophthora boll rot in these three fields was 8.3%.

Table 2. The incidence of phytophthora boll rot in commercial cotton crops in NSW during March 1988.*

	Macquarie	Namoi	Gwydir	McIntyre	Bourke
No of fields inspected	19	24	19	14	9
No of fields where disease was present	12(63%)	9(37%)	8(42%)	11(79%)	0(0%)
mean incidence when present (range)	1.0% (0-2.5%)	1.8% (0-3%)	1.1% (0-5%)	1.2% (0-2.5%)	0% -

* Fields with a plant stand < 5 plants/metre were omitted.

Table 3. The incidence of phytophthora boll rot on Deltapine 90, Siokra & Sicala in commercial crops and in CSD cultivar trials.

	Phytophthora boll rot (%)	
	from March 1988 disease survey of commercial crops.	from CSD cultivar trials*
Deltapine 90	0.9	0.3
Siokra	1.4	0.3
Sicala	1.1	1.3

* CSD cultivar trials at Boggabilla, Breeza & Auscott Midkin, Narrabri & Warren.