Root lesion nematode (Pratylenchus neglectus) update, 1995

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In 1995, trials were established to determine yield loss and tolerance of cereal varieties to *P. neglectus*. The resistance and tolerance of medics was also examined in field and glasshouse tests. Management practices including rotations and tillage were investigated.

Cereal yield loss and tolerance trials

Tolerance of varieties was determined on the basis of yield comparison between nematicide treated and untreated plots (Table 1). However, we suspect that yield loss determined in this way is an underestimation, as activity of the nematicide diminishes as the season progresses. Although resistance rankings shown in Table 1 are based on three years field trial data from a total of 18 sites, these data should be used with caution until further information can be obtained.

	1995 yield loss (%)		Ranking	
Variety	Lower North and	Upper Eyre	Tolerance	Resistance
	Lower Murray (3	Peninsula (1 site)		
	sites)			
Echidna	$20 (1.2)^1$	8 (1.1)	Intolerant	S
Machete	17 (1.5)	8 (1.3)		S
Potoroo	16 (1.5)	7 (1.5)	\downarrow	S
Euro	16 (1.1)	0 (1.2)		-
Janz	12 (1.7)	16 (1.4)	Moderately	S
Yallaroi	11 (1.3)	0 (0.8)	intolerant	S
Barunga	10 (1.6)	5 (1.5)	\downarrow	S
Stiletto	9 (1.8)	5 (1.3)		S
Excalibur	9 (2.0)	8 (1.6)	Tolerant	MS
Schooner	8 (1.5)	0 (1.5)		MS
Frame	8 (1.8)	3 (1.3)	\downarrow	S
Chebec	6 (1.7)	5 (1.7)		MR-MS
BT-Schomburgk	6 (1.8)	8 (1.4)		MS-S
Tahara	5 (2.0)	5 (1.4)		MR

 Table 1
 Yield losses on cereals caused by P. neglectus in South Australia.

¹ Values in brackets are yields of untreated plots (t/ha).

S = Susceptible (nematode multiplies); R = Resistant (nematode does not multiply); Tolerant = plant yields well despite nematode infection; Intolerant = plant does not tolerate nematodes and yield is reduced; MR = Moderately resistant; MS = Moderately susceptible.

Yield losses in 1995 occurred at four out of the five sites established, and were similar to those observed in 1994. Although large visual responses were seen initially at the Upper Eyre Peninsula site, yield losses by the end of the season were smaller than those observed at the other sites, probably because the Eyre Peninsula site was affected by *Rhizoctonia* which confounded the nematicide response. Differences between sites in soil type, nutrition, sowing date and rainfall would also have affected the yield losses measured. Although the more tolerant varieties such as Excalibur showed a yield loss, values were smaller compared to the most intolerant varieties. In general the more tolerant varieties also appear to be more resistant.

Medics

A tolerance trial using nematicide was established at Sandilands on Yorke Peninsula. Large responses were observed in dry matter herbage production for most varieties, indicating the intolerance of medics to *P*. *neglectus*. Early visual differences in herbage production appeared even greater than those finally measured, probably as the nematicide effect diminished towards the end of the season. Herald and Santiago had smaller yield losses and the yield in untreated plots of Herald was high, indicating this variety still performed well although being moderately intolerant. Harbinger was the only variety in this trial that appeared tolerant (Table 2), although large losses have been observed in a pot trial using a high nematode density. Resistance rankings shown in Table 2 are based on a glasshouse assay.

Variety	Yield loss (%)	Tolerance	Resistance
SA8460	$28 (1.9)^1$	Intolerant	-
Caliph	28 (4.0)		S
Sava	20 (3.6)		S
Mogul	19 (4.6)	\downarrow	S
Paraggio	18 (4.4)		S
Herald	16 (5.2)		-
Santiago	13 (4.0)		S
Harbinger	0 (5.7)	Tolerant	S

Table 2 Yield losses in medics caused by P. neglectus, 1995.

¹ Values in brackets are herbage yields of untreated plots (t/ha).

James Neal (Honours student, Roseworthy) is studying *P. neglectus* on medics. He has demonstrated the effect of the nematode on growth and nodulation of Parabinga in pots. The addition of only 1 *P. neglectus/g* soil significantly reduced shoot weight by 28% and nodulation by 20%. Addition of 10 nematodes/g decreased shoot weight by 72% (Figure 1).

Figure 1 Effects of increasing *P. neglectus* numbers on Parabinga medic.



Brassicas

Mark Potter (PhD student, Waite) is investigating the potential for canola and related species to control *Pratylenchus* in rotations. He has confirmed our earlier findings that canola and mustard are good hosts for *P. neglectus*, allowing nematodes to multiply. However, nematode populations are significantly reduced when brassicas are green manured and break down to release toxins into the soil.

Rotations

Two rotation trials on Upper Eyre Peninsula were assessed for *P. neglectus* numbers. Wheat grown after peas was infected with 36% fewer nematodes than wheat after medic pasture. These trials will be monitored over the next three years to determine the impact of various rotations on nematode numbers.

Cultivation

In three trials established on Upper Eyre Peninsula, increased cultivation appeared to decrease nematode numbers in soil and roots. However, yield results showed no significant difference between any of the cultivation treatments assessed.

Conclusions

- Medics appear susceptible and very intolerant to *P. neglectus*.
- Of the medics tested, Harbinger is the most tolerant.
- Although moderately intolerant to *P. neglectus*, Herald is a high yielding medic.
- Rotations including medic and wheat result in higher nematode numbers.
- Machete, Potoroo, Echidna and Euro are intolerant.
- Excalibur, BT-Schomburgk and Chebec were the most tolerant varieties tested at several sites over the last two seasons.

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