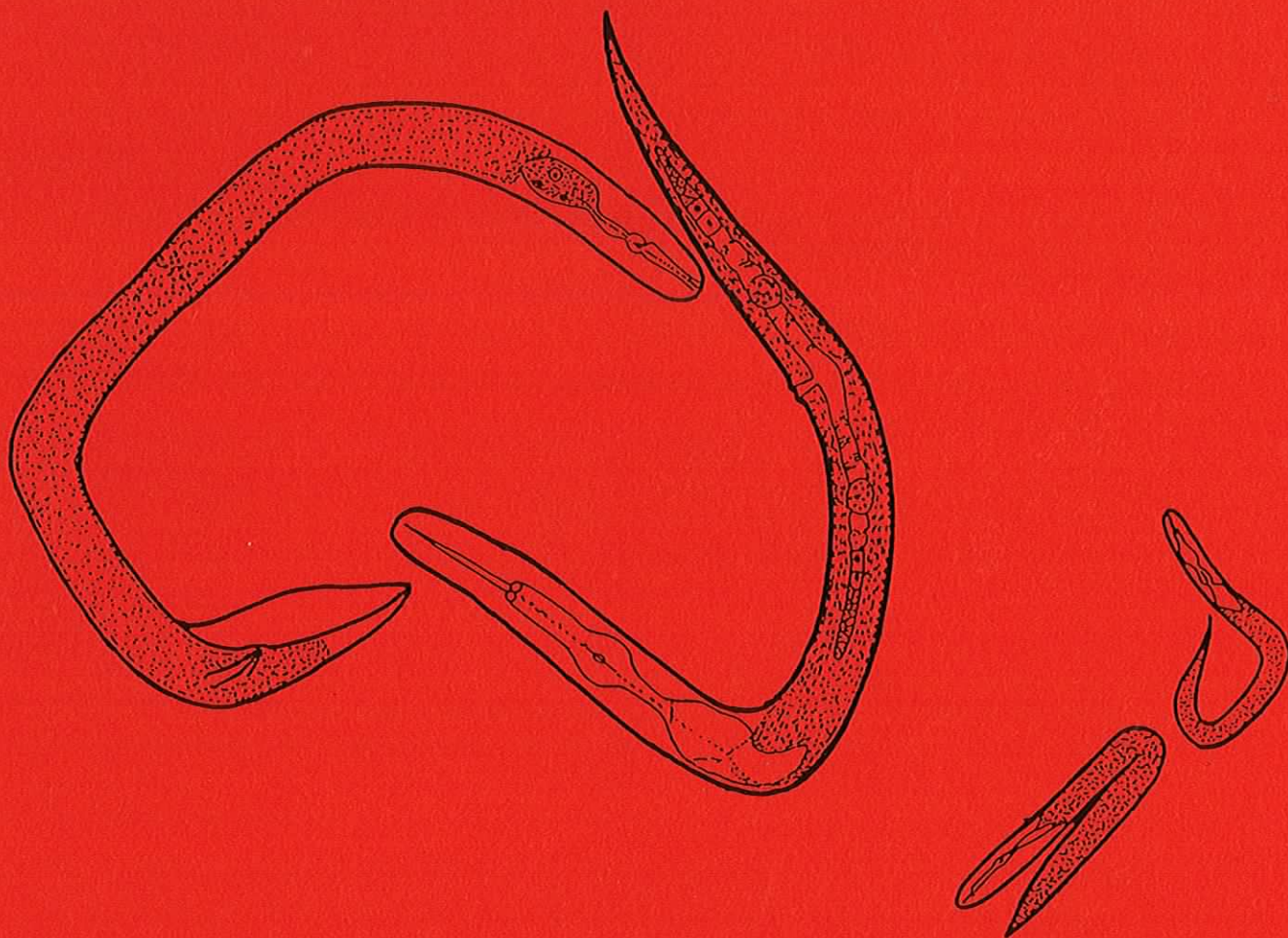


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AUSTRALASIAN NEMATOLOGY NEWSLETTER

IAN T. RILEY
NEMATOLOGY
WAITE CAMPUS
UNIVERSITY OF ADELAIDE



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From the Editor

I have now taken on the task of newsletter editor with many reassurances and much encouragement from the out-going team. I am told that our members need little more than a simple reminder and the flow of contributions duly follows. Although this may be somewhat overstated, I wish to thank those who have sent in material for this issue. The out-going team of Maria Scurrah, Sharyn Taylor and Terry Bertozzi are thanked for their efforts in producing the last four issues.

Membership directory

An up-to-date directory of members is included in this issue. Comparing it with the 1995 list, it seems we have seven new names. On behalf of the membership, I am pleased to welcome Ian Kaehne, Valerie Kempster, David Nendick, Kirsty Owen, Janet Patterson, Tony Pattison and Robert Potter to the Association. The contributions of the new members, along with those of the old, will undoubtedly strengthen the network of nematologists in Australasia and beyond.

If your details in the Directory are incorrect or need to be updated please send details to Nora Galway, Plant Science Centre, CSIRO Division of Entomology, GPO Box 1700, CANBERRA ACT 2601 (Tel: 06 246 4296; Fax: 06 346 4000; Email: norag@ento.csiro.au).

July Issue

The deadline for the July issue is June 15. There should be no shortage of material to contribute to the July issue as this issue caught some still recovering from the excesses of the Christmas period. Please send material as it comes to hand and avoid the end-of-financial-year rush.

New publications list

I received a suggestion from Rita Holland that the newsletter could include a list of recent and forthcoming publications of members. Members would need to provide me with references to their papers relevant to Australasian nematology. The papers must be accepted for publication and it would be best if volume and page numbers are known.

For the list to be useful to members it needs to be fairly comprehensive. To gauge interest in the idea, members are asked to forward details of all relevant papers with 1995 or 1996 publication dates for inclusion in the next issue. General comments and suggestions on the proposal are also welcome.

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Association News

FROM THE PRESIDENT

The APPS conference and the AAN workshop is now a memory. What remains, however, is the conviction that meetings of like minded folks are very worthwhile. As a discipline nematology suffers from under representation and I feel that specific groupings such as the AAN help to maintain a feeling of cohesion amongst nematologists.

As the organiser of the workshop I would like to thank everybody that contributed to the success of the meeting and goodwill that was generated during the meeting in Lincoln.

As President I would like to formally thank those who gave presentations and in particular Florian Grundler our key note speaker. His contribution to the workshop was very much appreciated as was his symposium presentation at the APPS conference. To those who gave presentations at the APPS sessions, thank you, you represented nematology well. My pathology friends have commented on the presentations and how they complemented the plant pathology papers.

I would also like to thank the immediate past president John Curran for organising the travel funds to assist Australian nematologists to attend this conference.

The Rural Industries Development Corporation was the primary sponsor and I would like to place on record my appreciation of their support. Rob Brown is a member of the RIDC board and as such we are fortunate to have such a stalwart supporter of nematology.

My first duty as your president was to present a report to the APPS Council meeting, on the evening of 27 August 1995. A summary of the report follows.

Membership

Membership has continued to increase from 64 last year to 72 at the beginning of this year.

Annual General Meeting

The AGM was held at Lincoln University, 5.30 pm, Friday 25 August 1995 following the nematology. The meeting closed 6.30 pm.

Officers elected

- President: John Marshall
- Newsletter editor: Ian Riley
- Secretary: Nora Galway (continuing)
- Treasurer: Diana Hartley (continuing)
- Hon Committee Member: Rob Brown

Agenda items

1. Nematology Workshop - Perth 1997

There will be a nematology workshop at the 1997 APPS conference in Perth. The workshop will be organised by Ian Riley and assisted by Michael Potter and Mike Jones of Murdoch University. The suggested topics for the workshop were: Pasture nematology including *Anguina*, resistance to nematodes, soil health, sustainability, bioindicators, biodiversity. The final content will be determined by the workshop organising committee.

2. International Nematology Congress Guadeloupe 1996

John Marshall will represent the AAN and report on the Congress discussions at the 1997 APPS/AAN Conference Perth 1997.

3. Accreditation of nematology identification and facilities

Discussion was led by Graham Stirling and a resolution was passed that the AAN would not be responsible for the accreditation process but would support some form of accreditation process to maintain the integrity of diagnostic nematology.

4. Worldwide nematology web

John Curran proposed the establishment of this facility and offer CSIRO Entomology Web as the home page base. There was general agreement this would be a useful device to improve communications and possibly give rise to an electronic version of the newsletter.

5. Newsletter circulations

It was resolved that copies of the newsletter should be circulated to other nematology Societies and a copy sent to APPS newsletter for abstraction purposes and inclusion in the APPS newsletter.

Nematology Workshop

The recent workshop on the Heteroderidae was attended by 30 nematologists. Details of the programme follow.

Cyst and root knot nematodes - Impact interaction, identification and control

Lincoln University, 8.30 am - 5.30 pm Friday 25 August 1995. Run in conjunction with the APPS conference.

Objective:

To provide an informal forum where all nematologists can meet and exchange information on current research into the "Cyst forming nematodes".

Sessions:

1. Host parasite interactions

Keynote discussion by Dr Florian Grundler on current research into the micro-

manipulation of the giant cells in host plants and progress in understanding the host parasite interaction using the *Heterodera schachtii*/*Arabidopsis* model.

2. Taxonomy of the Heteroderidae

Hands on session with Dr Wim Wouts on the taxonomy and identification of the Heteroderidae. This will cover the full family and those genera and species seldom seen.

3. Detection and identification with molecular methods. (There will be no lab session).

4. Ecology and population biology.

5. Impact and control of nematodes.

6. Resistant plants and Biological control.

John Marshall, AAN President, Crop & Food, Lincoln

FROM THE SECRETARY

I have been receiving material from various institutes from around Australia and other countries. There are several activities coming up soon which may be of interest to some members. If anyone is interested further, contact me for names, addresses and numbers or brochures.

Flower register - Australia

Flower Register - Australia, is being produced by Rural Press Magazines and contains an alphabetical listing of cut-flower growers listed according to flower grown and by state. The register will be launched at the Melbourne International Flower and Garden Show, April 1996. You will be able to order a copy of the register around April.

Australian Turfgrass Research Institute Ltd.

The Australian turf industry is hosting a symposium: *Environmental Issues for Turf*, 4 - 5 March 1996, Panthers Pavilion, Penrith, NSW. Brochures available.

There is also a copy of the 1994-1995 Annual Report available to AAN members and a copy of The Israeli Magazine of Industry, Technology and Subcontracting for those interested.

Parasitic nematodes home page

This site has a wealth of information ranging from images of various nematodes to diagnostics to biological control as well as links to SON and the Journal of Nematology.

<http://ianrwww.unl.edu/ianr/plntpath/nematode/wormhome.htm>

Internet discussion group

There is also a new nematology internet discussion group - "Nema-L" and I encourage all those with access to email to enlist. It is a great opportunity to discuss issues or new ideas with international nematologists. NEMA-L is maintained by Allen Szalanski (aszalans@unlinfo.unl.edu) and Tom Powers. (tpowers@unlinfo.unl.edu).

To join NEMA-L, send an email message to: listserv@unl.edu

In the text of the message type 'subscribe nema-l' followed by your name. You will receive a message from the listserv confirming your subscription.

To post a message to NEMA-L, send the message to: nema-l@unl.edu

It was great to see everyone in Christchurch - and a bonus for membership numbers as well. The AAN is now becoming quite an international body, with members now from Germany. Perhaps we should call it the Australasian-Deutsch Association of Nematologists!

Nora Galway, AAN Secretary, CSIRO Division of Entomology, Canberra

ACCREDITATION OF NEMATOLOGY LABORATORIES

At the Annual General Meeting in Christchurch, the matter of whether AAN should become involved in accreditation of laboratories was discussed. The general consensus was that we should concentrate on upgrading the standard of nematology laboratories by providing guidelines on how a nematode diagnostic service should be operated.

On my return from New Zealand I prepared a preliminary proposal on behalf of AAN for a project in this area. I have since been asked by RIRDC to prepare a final proposal and so there is a good chance that the project will be funded.

The project is titled 'Guidelines for the operation of advisory services for nematode pests' and involves production of a booklet covering sampling procedures, extraction methods, estimation of extraction efficiencies, nematode identification, nematode counting and interpretation of results.

On the assumption that the project will proceed, I am looking for help from a small number (2 or 3?) of AAN members. If you are interested in helping, particularly during the last half of 1996, please contact me (Phone 07-3896 9392).

Graham Stirling, Queensland

NEMATOLOGY WORKSHOP, PERTH 1997

A nematology workshop will be held in conjunction with the Australasian Plant Pathology Society Conference in Perth, 29 Sept - 3 Oct, 1997. Various topics were discussed at the AGM in Christchurch and a topic within the areas of resistance, biological control and/or management was favoured. As the host/convenor, I propose the tentative title:

Nematode control - genes and microbes

The program could include biological control, transgenic and traditional breeding, ie ways of coping with no or fewer pesticides. I welcome any comments, offers of assistance, titles of papers, suggestions for keynote speakers, etc.

Ian Riley, Agriculture Western Australia, South Perth

Regional News

NEWS FROM THE SOUTH OF THE SOUTH ISLAND OF NEW ZEALAND

I have just completed a study (with Joan Lemmon) on ultrastructural changes during desiccation of *Ditylenchus dipsaci* using freeze substitution techniques. We're now turning our attention back to freezing survival, trying to look at the location of ice crystals and the disposition of cellular components in an Antarctic nematode which can survive intracellular freezing.

I shall be attending the 3rd International Congress of Nematology in Guadeloupe in July where I will be presenting a review on nematode cold tolerance as part of a symposium on nematode survival strategies. I'm then going on to Copenhagen for a symposium on Invertebrate Cold Hardiness.

I have 3 students starting project with me this year (not very nematological though!). Simon MacDonald is working on parasites of Black Stilts (an endangered wader), Brent Sinclair is looking at cold tolerance of NZ alpine insects and Merinda-lee Hassall is starting a PhD on *Anisakis* in seafood processing.

David Wharton, Department of Zoology, University of Otago, Dunedin

HUNTING FOR BANANA NEMATODES IN THAILAND AND VIETNAM

Burrowing nematode (*Radopholus similis*) and banana weevil borer (*Cosmopolites sordidus*) are considered major problems on banana worldwide. At the moment, both are controlled by toxic and expensive chemicals. As with most pest management problems, there is push towards developing non-chemical control strategies. In Australia, we are moving to nematicide application only when the nematode status of the crop suggests potential yield loss. However, for both pests, we are also searching for cultivar resistance and biological control. The best place to look for these is in the crop's and the pests' centre of origin, ie south-east Asia.

In September last year, Neil Treverrow (Entomologist, NSW Agriculture) and I travelled to Thailand and Vietnam with several aims. Firstly, along with Cliff Gold and Paul Speijer from IITA-Uganda, we ran a training course on damage assessment of nematodes and weevil borers in banana with 19 trainees from Thailand, Malaysia, Vietnam, Tonga, China, Philippines and Indonesia. This ensures that we have trained collaborators for future projects. The International Network for Improvement of Banana and Plantain (INIBAP) will publish course notes and relevant bibliography later this year.

A week-long course like this would go relatively unnoticed in Oz, but in Thailand it was heralded with great pomp and ceremony. The lecture room was adorned with rock gardens, plant displays and even a fountain! Thank-you plaques were presented hither and thither. It seemed a little overdone but we certainly felt appreciated.

Following the course, we surveyed Thai banana crops for nematodes and weevil borers. The most common nematode, which occurred in high populations, was *Pratylenchus coffeae*. Its

distribution and populations suggest that it is causing significant damage and yield loss. *Meloidogyne* and *Helicotylenchus* were also common and the latter may also be contributing to yield loss. *Radopholus similis* was only found in the south of the country. It has a history of association with black pepper, where it causes yield loss, in the Chantha Buri province east of Bangkok. It was also found much further south at Nakhon Si Thammarat and Surat Thani.

The lack of *Radopholus similis* in the central part of Thailand could be attributed to lack of introduction, waterlogging, use of resistant cultivars or biological control. It is unlikely that the nematode has not been introduced with planting material as few precautions are used and other damaging nematodes are widespread. Waterlogging may affect nematode populations and plant growth in some regions although, once the nematode is inside the root, it would be largely protected from the soil environment. There is widespread use of cv. Pisang awak which, according to Paul Speijer, is moderately resistant to *R. similis* and other nematodes in Africa but was even less damaged in Thailand. Biological control may be involved. This appears to be an ideal situation to search for natural suppression or biological control of this nematode.

We also surveyed north Vietnamese banana crops for nematodes and weevil borers and a much wider survey was done by a World Bank team in October. Surprisingly, there appeared to be no nematode problems on banana and no *R. similis* has been found. There was very little root damage and any lesions present were probably caused by low populations of *Helicotylenchus* or *Pratylenchus*. *Meloidogyne* spp. is very common but it is not known to be damaging on bananas. Vietnamese nematologists were concerned by its high incidence but we advised them that it would be better to invest scarce resources on other severe nematode problems such as root-knot nematode on many crops.

There was a strong contrast between the entomological and nematological facilities and expertise in Thailand and Vietnam. We were pleasantly surprised by what we found in Thailand (and very impressed by the food!). There are relatively well-equipped laboratories even in regional centres and many enthusiastic scientists, some trained internationally. However, the scope of research seems very narrow. We didn't see very much effort being made toward developing nematode control strategies, with most work being done on surveys and taxonomy.

However, there seems to be little nematological expertise in Vietnam. The nematologist who was appointed to accompany us asked me to identify a nematode to solve a baffling problem that he had. It was obviously a Rhabditid and it had come from a rotten orange. This suggests that huge advances could be made by teaching even the basics of nematology. It was very sad to see enthusiastic young scientists without any research directions or equipment to use. I tried to fix some nematodes in the 'lab' and needed a pipette. The best they could scrape up was an ancient eye dropper with a rotten bulb. It would be very rewarding to teach nematology in Vietnam even on a short-term basis - and a box of pipettes would be treated like gold! A huge difference could be made with very little effort.

Julie Stanton, Department of Primary Industries, Indooroopilly, Queensland.

NEWS FROM WESTERN AUSTRALIA

Christine Tonkin has been appointed as technical officer in the IWS/GRDC funded project on biological control of annual ryegrass toxicity (ARGT). Chris has a strong background in mycology and given that the project is mainly focused on developing the fungus *Dilophospora alopecuri* for biocontrol, her skills are greatly appreciated. She will have to learn her nematology on the run, as is the lot for many of us.

Donna Shedley has successfully completed her forth year project on aspects of the biology of *Anguina australis*. Prof. Sivasithamparam (UWA) and I supervised the project. *A. australis* forms leaf-galls in annual veldt grass in WA, is of no economic significance but has a life cycle unique among the seed- and leaf-gall nematodes. The adults over-summer in an anhydrobiotic state; the few eggs or juveniles found in mature galls do not survive desiccation. Egg laying, which is quite temperature specific, occurs in response to autumn rains. Rainfall in the warmer months would not stimulate egg laying.

Work with Terry Reardon (SA Museum) and Terry Bertozzi (SARDI) on genetic variation of *Dilophospora*, indicated limited variation in WA but much variation in eastern Australia. In response, I undertook a collection of the fungus in SA, Vic and NSW in December, 1995 - 10 days, 6500 km, 150 sites, 45 accessions, 1 warning and 1 ticket - glad to be back in the West. Although the fungus was found to be common in some ARGV areas of SA, it is not easily found in all areas, providing potential for its use for biocontrol in SA as well as WA. The fungus is widespread and easily found on ryegrass in the Wimmera district of Victoria, indicating that its vector, *Anguina funesta*, is common but probably kept at low population levels. I also collected the fungus on Yorkshire fog (*Holcus lanatus*) in SA, Vic and NSW, and on my return, near Denmark, WA. I found galls in the samples from NSW and WA, constituting new records for both the *Anguina* sp. and the fungus in these States.

Ian Riley, Agriculture Western Australia, South Perth, WA

NEMATOTOLOGY AT CROP & FOOD LINCOLN

As we reported at the AAN workshop we have been working on a PCR based detection system for potato cyst nematode (PCN) *Globodera rostochiensis* and *G. pallida*. I am pleased to say that the problems discussed at the meeting have been resolved and we now have a set of primers that will differentiate the two species with a single reaction.

We are still working on virulence in PCN populations and have detected virulence in at least two New Zealand populations of *G. pallida*.

In addition to nematodes we are looking for better sources of resistance in the tuber forming Solanaceae. This work is based on Sue Turner's approach but we are also looking at species with a diploid background. If we locate superior genes for resistance we will have the interesting task of transferring this to the tetraploid configuration of commercial cultivars.

At present there is a strong upsurge in the demand for traditional nematology and we are currently looking at the distribution of nematodes (free living) in peat bogs, carrot crops (root knot) and potatoes (root knot).

John Marshall and Simon Bulman, Crop & Food, Lincoln

Research

ROOT LESION NEMATODE (*PRATYLENCHUS NEGLECTUS*) UPDATE, 1995

*Vivien Vanstone, University of Adelaide, Waite Campus and
Sharyn Taylor, SARDI, Waite Campus*

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.

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

Variety	1995 yield loss (%)		Ranking	
	Lower North and Lower Murray (3 sites)	Upper Eyre Peninsula (1 site)	Tolerance	Resistance
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)	↓	S
Euro	16 (1.1)	0 (1.2)		-
Janz	12 (1.7)	16 (1.4)	Moderately intolerant	S
Yallaroi	11 (1.3)	0 (0.8)		S
Barunga	10 (1.6)	5 (1.5)	↓	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)	↓	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

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.

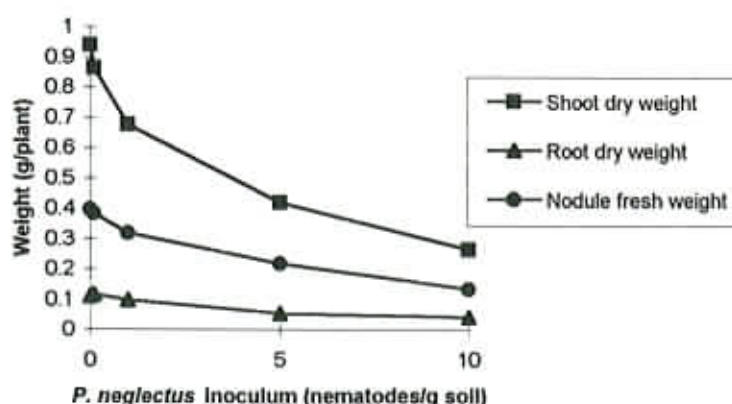
Table 2 Yield losses in medics caused by *P. neglectus*, 1995.

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)		S
Paraggio	18 (4.4)		S
Herald	16 (5.2)	Tolerant	-
Santiago	13 (4.0)		S
Harbinger	0 (5.7)		S

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.

Acknowledgments

The majority of this work is supported financially by the Grains Research and Development Corporation. We would like to thank Andrew Ware, John Solly and the other staff at Minnipa Research Centre for locating, establishing and maintaining trials on Eyre Peninsula. The medic trial was established with the cooperation of Jake Howie and staff of the Medic Breeding Program. The Waite Wheat Breeding Program assisted with cereal trials in the Adelaide region. We would also like to thank the many farmers who make land available for field trials.

PLANT PARASITIC NEMATODES ASSOCIATED WITH ALFALFA IN THE SULTANATE OF OMAN

A. Mani, Agricultural Research Center, Ministry of Agriculture and Fisheries,
PO Box 467, Muscat, Sultanate of Oman

A survey of nematodes associated with alfalfa has been carried out in all the regions of North and South Oman during 1991-95. The survey was carried out by Nematology Section at the Directorate of Agricultural Research, Ministry of Agriculture & Fisheries, Muscat. Preliminary observations made earlier revealed the association of parasitic nematodes like *Meloidogyne* spp., *Pratylenchus* spp., *Tylenchorhynchus* spp. and *Xiphinema* sp. (Waller and Bridge, 1978). Alfalfa is grown under irrigated conditions as a perennial crop in Oman. The crop is maintained for a period of 7-10 years under optimum conditions. However, it was observed recently that the crop declined after a period of about 4-5 years due to many reasons. The present survey was carried out to study the occurrence and distribution of plant parasitic nematodes in alfalfa fields.

A total of 160 each of soil and root samples were collected from five regions of agricultural importance. Nematodes were extracted from 250 cm³ soil by Cobb's sieving and decanting method followed by modified Baermann funnel technique. One gram of root samples were macerated in a blender for 60 seconds and incubated in modified Baermann funnel filled with water for 24-36 h. Finally, nematodes were concentrated in 38 µm sieves and observed under a microscope.

Thirteen genera of plant parasitic nematodes were identified in all the samples collected from various parts of Oman. *Pratylenchus* spp. was the most predominant nematode genus which was observed in 52.0 per cent of the samples. *P. jordanensis* was the frequently encountered species with high population density both in soil and root samples. Besides, *P. brachyurus*, *P. delattrei* and *P. pseudopratensis* were also observed at low frequency levels. *Tylenchorhynchus* spp., *Meloidogyne* spp., *Helicotylenchus* spp., and *Rotylenchulus reniformis* were the major parasitic nematodes recorded with a frequency of occurrence of 27.5, 21.5, 21.0 and 13.8 per cent respectively. *Aphlenchoides*, *Ditylenchus*, *Hemicriconemoides*, *Hoplolaimus*, *Longidorus*, *Mulcorhynchus*, *Telotylenchus* and *Xiphinema* were the other nematode genera observed. It appeared from the results that *Pratylenchus* species were the widespread and economically important nematodes encountered in alfalfa production in Oman. Similarly, *Pratylenchus* spp. was recorded as a major parasite of alfalfa in Australia (Georgaras *et al.*, 1992) and USA (Griffin, 1984). Currently work is being carried out to study the economic importance and management of the nematode under Oman conditions.

Georgaras, P. A., Kaehne, I. D., Fisher, J. M., Lowe, K. F. and Smith, R. S. (1992). Preliminary results of a survey on the distribution of plant-parasitic nematodes in Australian alfalfa fields. Report of the 33rd North American Alfalfa Improvement Conference, Atlanta, Georgia, USA p.71.

Griffin, G. D. (1984). Nematode parasites of alfalfa, cereals and grasses. In: Plant and Insect Nematodes (W. R. Nickle, ed.) Marcel Dekker, New York. pp.243-321.

Waller, J. M. and Bridge, J. (1978). Plant diseases and nematodes in the Sultanate of Oman. PANS. 24:313-326.

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Meloidogyne sp.
Pratylenchus penetrans
Paratrichodorus sp.

Insect parasitic and entomopathogenic
nematodes

A. guina spp.

Nematode structure and physiology

Nematodes as pests of sugarcane and
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Curator in charge of nematode collection -
a taxonomic repository with many type
specimens

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Nematodes on sugarcane

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Cereal cyst nematode

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Anhydrobiotic survival of nematodes
Biological control

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Entomopathogenic nematodes
Molecular taxonomy

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Growth and Development of nematodes
Entomophilic nematodes
Biocontrol of snails

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Chemical and biocontrol of parasitic
nematodes of deciduous fruit and
vegetables

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Cereal cyst nematode

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Biological control
Fungal molecular biology

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Diagnostic nematology in horticultural
crops
Entomophagus nematodes

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Plant interactions (pastoral)
Endophyte relation

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Molecular taxonomy of plant-parasitic
nematodes (*Pratylenchus* spp)

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Root gall nematodes
Leaf-parasitic nematodes
Ecology of plant parasitic nematodes

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Nematode pathogens of lucerne

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General

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Host-Parasite interactions
Sedentary nematodes
Plant physiology and molecular biology

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Nematode problems on turf

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Pratylenchus thornei - effects of fallow
management strategies

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Entomopathogenic nematodes

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PCN
Pasture nematodes
Horticulture

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Systematics and ecology of free-living
nematodes
Taxonomy

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Development of products for nematode control
International update-particularly on control methods

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Breeding for cereal cyst nematode resistance and tolerance in wheat
Root lesion nematode tolerance breeding
Pratylenchus sp.

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Meloidogyne javanica and *Heterodera avenae* interactions with *Paecilomyces lilacinus*

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Host parasite relations of endoparasites (root-knot and cyst-nematodes);
Molecular approaches to understanding and control -emphasis on plant response

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Entomopathogenic nematodes
Plant-parasitic nematodes

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Cereal cyst nematode - control and Resistance

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Entomophilic nematodes

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Advice/sales and application of
nematicides

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General plant nematology
Biocontrol

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Biology and management of nematodes in
temperate crops
Molecular biology of nematodes

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Nematode counting and diagnosis for
research trials

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Annual ryegrass toxicity

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Diagnosis, information systems, control
strategies

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Resistance in white clover to *M. hapla*
and *H. trifolii*
Resistance in clover hybrids
Effect of grass endophytes on nematodes

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PCN
Nematodes of horticultural crops

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PhD Research
Hoplolaimus columbus on cotton-USA
Pasture Nematology in New Zealand
Quarantine issues

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Significance of *P. thornei* on wheat
productivity in South Australia

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Interaction of grapevines and
Meloidogyne spp

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General interest in nematology and
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Pratylenchus thornei in wheat
Nematodes of bananas and tropical fruits

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Root Knot and cyst Nematodes
Giant cell gene expression
Engineered resistance

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Taxonomy of plant parasitic nematodes
nematode distribution in native vegetation
Taxonomy of Dorylaimidia

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Anguina and associated microbes
Biological control of annual ryegrass
toxicity

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Chemical control, taxonomy, biological
control, host ranges and nematode disease
complexes

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Pratylenchus neglectus - does it damage
wheat?
Ditylenchus dipsaci - resistance in oats,
beans, peas, lucerne
Ex-interest: PCN - races and breeding

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Molecular diagnosis of *Meloidogyne*
Non chemical control of *Meloidogyne*
and *Radopholus similis*

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General plant nematology
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Pratylenchus spp.
Meloidogyne spp.
CCN

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Pratylenchus spp.
Cereals
Grain legumes
Annual legumes

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Pratylenchus thornei and *Merlinius breviden*
Identification of nematodes
Control methods, especially through resistance breeding

Biological, chemical and cultural control of nematodes

Pratylenchus neglectus, biology control, crop rotations
Cereals and legumes

Nematode problems in horticultural crops
Biocontrol - root knot
Chemical control

Plant nematology, especially in horticulture
Control
Interactions
Diagnostic services and extension
Ecology
Pasture Pathology

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Pasture nematology; biocontrol;
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Biological control
Rotation crops resistant to root knot
nematode
organic matter to control root knot
nematode

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Environmental physiology of cold
tolerance and anhydrobiosis
Nematode ultrastructure

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Development and production of
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Ecology
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