

EIGHT SYMPOSIUM

NEMATOLOGICAL SOCIETY OF SOUTHERN AFRICA

7 and 8 April 1987

University of Potchefstroom
Potchefstroom
Republic of South Africa

ABSTRACTS

SEASONAL OCCURRENCE AND CONTROL OF ROOT-KNOT NEMATODES ON GRAPEVINES IN SOUTH AFRICA.
J.T. LOUBSER, Viticultural and Oenological Research Institute P/Bag X5026, 7600 Stellenbosch, Rep. of South Africa.

Seasonal population fluctuations of *Meloidogyne incognita* and *Meloidogyne javanica* on irrigated grape-vines on the same rootstock in two different climatic regions were very similar. *M. incognita* population numbers were, however, much higher than those of *M. javanica*. Fluctuations of both populations appear to be influenced significantly by root growth as well as by soil temperatures. Soil moisture had no apparent effect on nematode numbers or seasonal fluctuations. Single applications of aldicarb 15% gran. (5g/m²) and fenamiphos 10% gran. (20g/m²) resulted in high nematicide residues in the soil for 42 days and 70 days respectively. The importance of adequate irrigation during treatment was also demonstrated. Effective control was achieved in established vineyards by applying these chemicals during the root growth periods.

THE RESPONSE OF WILLIAMS BANANAS TO FENAMIPHOS TREATMENT OVER A 4 YEAR PERIOD.

J Chamberlain, Regional Manager Technical Advisory, Bayer South Africa (Pty) Ltd, Agro-Chem Division, P O Box 326, NELSPRUIT 1200.

Nematicide treatment of bananas on heavy soils has been claimed to be uneconomic. A site in Levubu with 1 year old Williams on Hutton soil with a clay content of 34-44% was treated with fenamiphos 10% granules at 3g a.i./mat. twice annually for a period of 4 years. Bunch mass from each plot was measured after the first year of treatment for the following 36 months. Increase in yield of marketable fruit of up to 4,14 tonnes/ha (20,02%) was obtained despite a relatively low level of infestation of *Pratylenchus* spp. and *Helicotylenchus* spp. Individual bunch mass increased by a mean of 1,71kg (4,69%) whilst the number of bunches per hectare per annum increased by 104,1 (11,1%). The increase in yield resulted in a nett additional profit per hectare of R965 ('83/84), R688 ('84/85) and R462 ('85/86) based on prices from the Banana Board.

INFLUENCE OF SEAWEED CONCENTRATE ON THE REPRODUCTION OF *PRATYLENCHUS ZEAE* ON MAIZE

D de Waele¹, AH Mc Donald¹ and E de Waele²

¹Grain Crops Research Institute, Private Bag X1251, Potchefstroom 2520. ²Department of Zoology, Potchefstroom University of CHE, Potchefstroom 2520.

Seaweed concentrate significantly suppressed the reproduction of *Pratylenchus zeae* on excised maize roots by 47,1 - 63,1 % during an *in vitro* experiment. In a greenhouse experiment, reproduction of *P. zeae* was suppressed by 21,5 - 31,2 % but the differences were not significant. At the highest seaweed concentration, plants were weakened by toxic effects of the seaweed concentrate and became more susceptible to nematode attack. Results indicate that the timing, application method and concentration level of the seaweed concentrate influence its effect on the reproduction of *P. zeae*.

SPECTRORADIOMETRY FOR ASSESSMENT OF NEMATODE DAMAGE TO FIELD CROPS.
Greeff, M.S. Tobacco and Cotton Research Institute, Private Bag X82075, Rustenburg, 0300.

A portable spectroradiometric system is being utilized for identification and monitoring of crop stress induced by biotic and environmental factors. Primary research is directed at the assessment of crop stress induced by nematodes and the interacting effects of nematodes with soil type, and to differentiate between normal water stress and nematode-induced stress. Trials have been initiated in the greenhouse and in microplots using cotton, tobacco and maize as host plants for *Pratylenchus* and *Meloidogyne* species.

DITYLENCHUS DIPSACI ON LUCERNE IN THE OUDTSHOORN DISTRICT.
A.J. Meyer, Entomology and Nematology, University of Stellenbosch, Stellenbosch, 7600.

Symptoms of serious damage to lucerne in different localities in the little Karoo was investigated. Large populations of *Ditylenchus dipsaci* were extracted from infested plants. Experimental plots comprising a number of imported cultivars offered the opportunity to obtain information on differential sensitivity under field conditions.

PHYTONEMATOLOGY - A PERSONAL VIEW

F.A. van der Vegte - Boshoff str. 200, New Muckleneuk, Pretoria 0181

The author is involved with developments of diverse aspects of phytonematology since 1954. Especially with extraction methods of soil and plant tissue samples and chemical control techniques. In proportion to developments of standard extraction methods interpretations of analytical results became more reliable and thus more satisfactory. Nematode analyses of soil and plant samples became routine performance in laboratories of advisory instances. In many cases these analyses lead up to chemical control measures. Thus phytonematology entered the spheres of commerce and even jurisdiction. In the course of years this kind of service to farmers and nurserymen appeared to be satisfactory for both parties but in some cases conflicts arose related to disastrous results of chemical control measures. From court cases it becomes clear that besides human error unforeseen and/or unknown factors could be involved. The commercial values of certain crops have reached such a level that failures of nematicidal treatments could result in financial disasters. It is the author's opinion that too many unknown factors still exist. It should be kept in mind that nematode analyses of soil and tissue samples are based on extraction and collection of nematodes in watery suspension. Observation in natural environment is seldom possible. Study of ecological aspects of nematode life in soil could be important in view of the possibilities of more accurate forecasts of crop damage than forecasts based on mere numbers of certain nematode species. In practice the author came across several cases of possible interference of plant-parasitic nematode species with other factors. Three examples are discussed: 1. *Ditylenchus destructor* and low temperatures of plant tissue. 2. *Pratylenchus vulnus* and other nematode species on Pea roots. 3. *Itylenchulus semipenetrans* and *Fusarium solani* on Citrus roots. Close co-operation and subsequent team work with other disciplines such as soil sciences, botany, plant pathology, microbiology, etc. would be recommendable for future developments within phytonematology.

OUTSPAN DIAGNOSTIC CENTRE - A COMMERCIAL FACILITY FOR NEMATODE

M. Rea, Laura Huismar and Ruth Janssen

Outspan Citrus Centre, P.O. Box 28, Nelspruit 1200.

With the increasing awareness of profitable cultivation in attaining maximum yields and desired quality, the Citrus Exchange has created a Diagnostic Centre for identifying/quantifying nematodes of various genera.

The modified Baerman tray and Seinhorst mistifier extraction procedures are used to monitor the citrus nematode *Tylenchulus semipenetrans* (Cobb) and *Xiphinema* species (Cobb). Sugar flotation and root homogenization extraction procedures have also been introduced to assist in identifying various different genera from other crops.

Recommendations regarding control measures are then based on results obtained.

HISTOLYTICAL ACTIVITY OF MELOIDOGYNE GELATINOUS MATRIX

D.Orion, G.C. Loots and T. Orion, Dept of Zoology, Potchefstroom University for CHE, Potchefstroom, 2520

The effect of root-knot nematode gelatinous matrix (GM) on the host tissue was studied on monoxenic cultures of *Meloidogyne incognita* reared on excised tomato roots. Fifteen to 30 days following inoculation galled roots were sampled at 3 days intervals, fixed and processed for histological observations utilizing the conventional paraffin method. Twenty-one to twenty-four days after inoculation GM secretion began, forming a small cavity adjacent to the posterior end of the female nematode. At the contact area of the GM and the host cells, fragments of cell walls were observed. At a further distance from the GM front line, the host cell walls were somewhat thicker than other parenchymal cells within the gall, suggesting activity due to diffusants originating from the GM. Twenty-seven to 30 days after inoculation more cell walls were found to have been dissolved by the GM to form a large cavity or canal which reached the surface of the gall. The eggs embedded in the GM were pushed through the canal to the external environment. Observation of fleshy banana roots infested with *M. javanica* also revealed large cavities - sometimes larger than the volume of a swollen female - that were formed in a similar pattern to the above. This study suggests an enzymatic activity of cellulolytic or lignolytic nature exerted by the root-knot nematodes GM.

POSSIBLE INVOLVEMENT OF *Meloidogyne* spp. IN THE ONSET AND ETIOLOGY OF FALSE PANAMA DISEASE OF BANANAS

E.C. Snyman

CSFRI, P/Bag X11208, Nelspruit, 1200, South Africa

Because of the similarity in symptoms of False Panama Disease (FPD) and Panama disease, FPD can be confused with Panama disease. As opposed to Panama disease, which is caused by the fungus *Fusarium oxysporum* f. sp. *cubense*, isolates from FPD plants have shown no consistent presence of plant pathogenic fungi. A correlation between FPD and high numbers of rootknot nematode (*Meloidogyne* spp.) has been found, though high numbers of rootknot nematode alone are not an indication of the presence of the disease. The possibility of severe drought stress as another factor in the disease complex has been investigated in a pot trial.

THE INFLUENCE OF TEMPERATURE ON ANHYDROBIOSIS OF PRATYLENCHUS ZEAE.

J.V.S. Swanepoel and G.C. Loots, Department of Zoology, Potchefstroom University for Christian Higher Education, Potchefstroom RSA, 2520.

Anhydrobiosis of *Pratylenchus zeae* was studied at various constant temperatures using water-glycerine solution in relative humidity chambers. The number of nematodes that coiled was determined, as well as the number of nematodes that survived 0% relative humidity (RH) for 24 hours. No nematodes survived temperatures of 15°C and below or of 40°C or higher with the best rate of survival at 25°C.

IMPROVEMENT ON A METHOD OF ASSESSING THE NUMBERS OF FEMALE CITRUS NEMATODES (*TYLENCHULUS SEMIPENETRANS*) IN ROOT SAMPLES. Van der Vegte, F.A., Labuschagne, N. & Kotzé, J.M. 1987. Department of Mikrobiologie and Plant Pathology, University of Pretoria, Pretoria 0002.

An improvement on a previously described technique for assessing the numbers of mature female citrus nematodes on roots is reported. The modification of the technique involves a cold staining procedure which replaces the hot staining. The staining process is the last step in the procedure. After the infested roots have been macerated in the blender and subsequently sieved as previously described, the resulting female nematode suspension is concentrated to a volume of 10ml to which 5ml of a 0.5% acid-fuchsin lactophenol solution is added. After staining for one hour the nematodes can be counted. This modification eliminates the unpleasant and hazardous fumes generated by the hot acid-fuchsin lactophenol staining procedure.

TOBACCO BREEDING-STOCKS WITH RESISTANCE TO MELOIDOGYNE INCOGNITA RACES 2 AND 4 AND TOLERANCE TO M. JAVANICA.

Cornelissen, A.P.F.* and Van Wyk, R.J., Tobacco and Cotton Research Institute, Private Bag X82075, Rustenburg, 0300, R.S.A

By making use of the Sasser Host Range Test it was determined that in South Africa the root knot nematode complex on tobacco consists of *Meloidogyne incognita* Races 2 and 4 as well as *M. javanica*. With this knowledge the selection procedures were made more effective and a family of breeding lines with multiple resistance to root knot nematodes were developed. This was accomplished by recurrent selection of low-rating plants initially in nematode infected seedbeds in glasshouses and followed by selection of plants in naturally occurring field populations. The genetic material used in this breeding project included NC95, R83, Delcrest 202, Hicks, Hicks 76 and TL33 and were planted out in double rows with one row a susceptible variety and a closely planted breeding stock for selection purposes. Only if the susceptible adjacent plant was highly infested was the rating of the breeding-stock used as a reliable rating and seed harvested if a low score was obtained.

EFFECT OF NEMATOCIDES ON THE SUGARCANE PARASITIC NEMATODES COMMUNITY IN BURKINA FASO.

Patrice CADET, ORSTOM, UCB-LYON I, Biométrie, 43, Bd du 11-11-18, 69622 VILLEURBANNE CEDEX, FRANCE.

Up to 20 different plant parasitic nematodes may be present in a same soil sample taken from sugarcane fields in Burkina Faso (West Africa). On sandy soil the use of nematocides increases cane yields, accompanied by strong modifications in the evolution of the populations of the different species. Using the main component analysis the influence of the active ingredients of the nematocides was studied on the equilibrium of the species within the nematodes community. Carbofuran acts on all species from the first month after treatment. Granular oxamyl does not protect the sett roots against endoparasitic nematodes, like the association of aldicarb and cyanamid. However, applied as a foliar spray, oxamyl acts on all species with the exception of *Heterodera sacchari*. The agronomical results confirm the nematocidal activity of the products employed and tend to demonstrate the pathological action of the nematodes community on sugarcane.

SEASONAL FLUCTUATIONS OF A MIXED POPULATION OF XIPHINEMA AMERICANUM AND X. BREVICOLLE IN AN APPLE ORCHARD

H.J. Hugo, FFTRI, Private Bag X5013, Stellenbosch, A.J. Meyer, Dept Entomology & Nematology, University of Stellenbosch, Stellenbosch & Elize C. van Zyl, FFTRI, Private Bag X5013, Stellenbosch

Soil around the roots of apple trees on Merton 793 rootstock in the Grabouw district, Western Cape Province, were sampled every month for two years to determine the optimum time for sampling *Xiphinema* populations. Results yielded a mixed population of *X. americanum* and *X. brevicolle* in the ratio 9:1 *X. americanum* to *X. brevicolle*. The results also revealed a seasonal fluctuation of the total numbers (adults and juveniles combined). The *Xiphinema* population reached its lowest level during spring and early summer (October-December) and then built up to a peak in autumn (April-June). Despite the decline in numbers during spring, the populations at individual trees never declined below 100 individuals per 100 cm³ soil. Thus sufficient numbers of *Xiphinema* were always present in the soil for diagnostic purposes. Sampling should however preferably be done during autumn when numbers are at their peak.

EFFECT OF ROOT MASS ON THE EFFICACY OF METHODS FOR EXTRACTING ROOT-LESION NEMATODES FROM MAIZE ROOTS.

E. de Waele¹, D. de Waele² and R Wilken².

¹Department of Zoology, PU for CHE, Potchefstroom 2520.

²Grain Crops Research Institute, Private Bag X1251, Potchefstroom 2520.

Root mass significantly influenced the efficacy of the sugar centrifugal-flotation and mistifier methods for extracting root-lesion nematodes from maize roots. The efficacy of both methods was significantly lower using 5 and 10 grams of roots compared with 1.25 and 2.5 grams of roots. In both methods a highly significant negative correlation existed between the efficacy of the methods and root mass. The efficacy of the sugar centrifugal-flotation method was significantly higher and more consistent compared with the mistifier method. Root mass is a source of error and should therefore be standardized when separating nematodes from roots.

COMPARISON BETWEEN PLANT-PARASITIC NEMATODES ASSOCIATED WITH MAIZE AND SORGHUM IN SOUTH AFRICA

D. de Waele and E. Jordaan

Grain Crops Research Institute, Private Bag X1251, Potchefstroom 2520

In fourteen maize fields and eight sorghum fields, *Paratrichodorus minor* and *Scutellonema brachyurum* were the most predominant plant-parasitic nematode species found in the soil; *Pratylenchus zaei* was the most predominant nematode species in the roots of both maize and sorghum. *Pratylenchus brachyurus* was very common and abundant in maize roots but rare in sorghum roots. *Pratylenchus penetrans* was very common and abundant in sorghum roots but rare in maize roots. The frequency of occurrence of *Meloidogyne* spp was very low in both maize and sorghum fields. The mean number of plant-parasitic nematodes in the roots of sorghum was higher than in the roots of maize.

PLANT-PARASITIC NEMATODES FOUND ON RICE IN SOUTH AFRICA

D. de Waele¹ and E. van den Berg².

¹Grain Crops Research Institute, Private Bag X1251, Potchefstroom 2520.

²Plant Protection Research Institute, Private Bag X134, Pretoria 0001.

Ten plant-parasitic nematode species were found on rice in North Natal, South Africa. *Hemicyclophora* spec., *Hemicyclophora typica*, *Hemicriconemoides brachyurus*, *Criconeema corbatii*, *Criconebella obtusicaudata*, *Rotylenchus gracilidens*, *Rotylenchus unisexuus*, *Brachyodorus tenuis*, *Trichodorus* spec. and *Paratrichodorus lobatus* were found in the soil samples; *Pratylenchus zaei* in the roots. The number of plant-parasitic nematodes varied from 2107 to 3040 (2464) nematodes per liter soil and 60 to 660 (345) nematodes per g roots. The plant-parasitic nematodes represented about 1/3rd of the total nematode population in the soil.

EFFECTS OF INITIAL POPULATION DENSITIES ON THE REPRODUCTION OF PRATYLENCHUS ZAEI AND ITS HISTOPATHOLOGICAL EFFECT ON ROOTS OF ZEA MAYS L. UNDER CONTROLLED CONDITIONS

E. de Waele¹, D. de Waele and G. LOOTS. ¹Department of Zoology, PU for CHE, Potchefstroom, 2520. ²Grain Crops Research Institute, Private Bag X1251, Potchefstroom 2520

Initial population densities (Pi) affected the reproduction rate of *P. zaei* in monoxenic root cultures of *Zea mays* L.: six weeks after inoculation, Pi 50 resulted in the highest reproduction rate (106.3) while the lowest (Pi 5) and the highest (Pi 200) initial population densities resulted in the same reproduction rates (36.3). Initial population densities also affected plant growth. Pi 5 significantly suppressed root fresh weight by 33.2% compared with the uninfested control while Pi 100 and Pi 200 significantly increased root fresh weight by 67.3-78.1% compared with Pi 5. The two highest initial population densities also increased length of primary root.

Since food was not the limiting factor for nematode population growth the results suggest that the reproduction rate of the parasitizing nematodes was suppressed by a biochemical mechanism of the root. Cortical air spaces and destruction of the cortex is caused by two factors, a lack of oxygen and the mechanical breakage of cell walls by the nematodes. Nematodes were rarely observed within the stele of infected roots. Expressions of resistance of the host plant was observed by the formation of phenolic substances in healthy cortical cells and by the development of more lateral roots at Pi 100 and Pi 200.

SOUTH AFRICAN ROOT-KNOT NEMATODES

K.P.N. Kleynhans, Plant Protection Research Institute, Private Bag X134, Pretoria, 0001

Nine root-knot nematode species have been found in South Africa, viz. *Meloidogyne javanica*, *M. incognita*, *M. hapla*, *M. arenaria*, *M. chitwoodi*, *M. kikuyensis*, *M. oryzae*, *M. parvityla*, and an undescribed species. The following morphological characters were used to identify the species: in the female, the shape of the stylet knobs, the degree of dorsal curvature of the stylet cone, the shape of the procorpus lumen lining, the general shape of the perineal pattern, the height and shape of the dorsal arch, size, distinctness and markings of the tail terminus, arrangement of the dorsal and ventral striae in the lateral field areas, degree of flattening and lateral extension of the dorsal wall of the rectal lining at the anal opening, and the presence and arrangement of the subsurface punctations around the rectum in the male, the head shape, presence of transverse striae on the postlabial head region, relative size of the metacorpus lumen lining, shape of stylet knobs, shape of vestibule, and the position of the phasmids in relation to the cloacal opening; in the second stage juvenile, the shape of the tail.

NEW ELAPHONEMA SPECIES

E. van den Berg, P.P.R.I., P/Bag X134, PRETORIA.0001

In 1962 Heyns described the genus *Elaphonema*. The only species, *E. mirabile* displayed such extraordinary characters as a downward directed lip region and fin-like structures on the side of the lip region. During 1984 collections from three different areas, Messina, Fraserburg and Nieuwoudtville provided specimens belonging to three new species viz. *E. messinae*, *E. karoense* and *E. proteae*. The greatest difference between species were found in the reproductive area, such as length of post uterine branch, a depression in the body around the vulva, which stretches over a varying number of annules and one- or multi-branched spermathecae, etc. SEM photos of these specimens showed the structure of the lip region and other structures such as the vulval depression, location of the vulva within this depression, etc., clearly. Recently more specimens were collected from the Karoo as well as the northern Cape and the possibility of more species are not excluded. So far it appears as if these species prefer more arid habitats.

SEM PHOTOGRAPHS OF INTERESTING NEMATODES.

N. Buckley & E. van den Berg, P.P.R.I., P/Bag X134, Pretoria. 0001

Scanning electron microscope photographs of seven nematode genera are presented. Ten known and six unknown species are represented. The external morphology of the head, tail and vulval regions and the lateral field are shown. The differences between the various groups can be clearly seen. Specimens were prepared by killing and fixing live specimens in cold 4% glutaraldehyde, then dehydrated by passing them through increasing concentrations of acetone. Dehydrated specimens were transferred to osmium tetroxide for 16 hours, critical point dried and gold coated. Traditionally the taxonomy of nematodes are based on measurements and observations of internal and external morphological characters. Because of the small size of these organisms and the great inter- and intra-specific variation correct identification is sometimes difficult. Additional "tools" such as the scanning electron microscope is thus used to facilitate more accurate identifications.

THE BEET CYST NEMATODE, *HETERODERA SCHACHTII*, SCHMIDT, ON SOME VEGETABLE FARMS NEAR JOHANNESBURG

K.C. Daiber, Vegetable and Ornamental Plant Research Institute, Private Bag X293, Pretoria, 0001.

High numbers of cysts of *H. schachtii* were found in fields of a vegetable farm at Rondebult near Johannesburg during the course of a 1½ year observation period. On these fields either beetroot, cabbage or cauliflower, i.e. crops susceptible to the nematode were grown at least once a year. In a screening trial several nematicides were tested for the control of the nematode on beetroot sown in summer, when the nematode is most active. In this experiment, harvested in January, the yield on the treated plots was good, but poor on the untreated plot. So far the occurrence of the nematode is limited to a few farms. The problem has become serious on these farms because susceptible crops follow too often after each other and so far no efforts have been made to reduce the nematode population in the soil.

OBSERVATIONS OF THE EFFECT OF MAIZE ROOTS ON THE HATCHING OF
PRATYLENCHUS ZEA AND P. BRACHYURUS

Elsie de Waele and C.G. Loots. Department of Zoology, PU for
CHE, Potchefstroom, 2520

Experiments under greenhouse conditions indicated that maize roots had a marked effect on the hatching of Pratylenchus eggs, making bio-assaying more reliable than preplant sampling in determining field population densities. Significant differences were observed among the number of Pratylenchus specimens present in control pots and the respective pots with maize plants for the three evaluations on day 21 following planting. This phenomenon was also found after bio-assaying five maize fields in different districts. The three experiments under greenhouse conditions indicated that preplant bio-assaying is much more reliable than mid-season and end-season bio-assaying.

THE EFFECT OF SOIL TYPE AND CROP HISTORY ON THE OCCURRENCE OF PLANT-PARASITIC NEMATODES ON SUNFLOWER IN SOUTH AFRICA.

C. Bolton¹, D. de Waele¹ and G.C. Loots²

¹Grain Crops Research Institute, Private Bag X1251, Potchefstroom 2520. ²Department of Zoology, PU for CHE, Potchefstroom 2520.

Samples were taken through the 1984/85 season from fourteen farms in the main sunflower producing areas of South Africa. Twelve plant-parasitic species were found, including: Pratylenchus zaei; Scutellonema brachyurum; Paratrichodorus minor and Rotylenchulus parvus. In general, there were more nematode species and higher numbers of nematodes in the clay soils than in the sandy soils. Meloidogyne spp., however, were found in the sandy soils only. Farms which had sorghum the previous year had a greater variety of species, and a particularly high number of nematodes at the beginning of the following season.

A METHOD FOR EXPOSING THE INTERNAL ANATOMY OF NEMATODE INFESTED ROOTS FOR SEM STUDIES USING POLYETHYLENE GLYCOL EMBEDDING.

VL Hamilton-Attwell, Tamar Orion and D. Orion
Department of Zoology, Potchefstroom University
for Christian Higher Education, Potchefstroom 2520

A new method for the studying of the internal structures of nematode-infested roots is described. This method involves the embedding of the tissue in polyethylene glycol (PEG) before sectioning and afterwards the removal of the water soluble wax before studying the material in the scanning electron microscope. The advantages of this method when compared to freeze-fracturing are the following: The precise way in which a section can be obtained through a definite plane to a definite depth; very small specimens, such as maize roots (less than 1 mm diameter) can easily be sectioned longitudinally and all cut edges are clean and sharp.

POPULATION STUDIES OF MELOIDOGYNE INCOGNITA AND M. JAVANICA IN YOUNG AND OLDER TOMATO ROOTS.

K.C. Daiber, Vegetable and Ornamental Plant Research Institute, Private Bag X293, Pretoria, 0001

Infective L2-stages of root-knot nematodes penetrated tomato roots at transplanting and in the weeks after transplanting. The larvae became females and produced eggs from 29 to 37 days after penetrating the roots. Large numbers of second generation infective L2-stages penetrated the roots 38 to 44 days after first generation individuals had penetrated the roots. From that time onwards the root-knot nematode population was always large and mainly consisting of infective L2-stages. The tomato plants reacted to root-knot nematode attack with reduced vigour and yield when the nematodes penetrated the roots at transplanting. When the nematodes penetrated the roots several weeks after transplanting, the plants reacted with reduced vigour only at the end of the growth period with practically no yield loss.

CONTROL OF ROOT-KNOT NEMATODE SPECIES (Meloidogyne) IN GINGER PLANTINGS

P. Willers
Citrus and Subtropical Fruit Research Institute, Private Bag X11208, Nelspruit
1200, South Africa

Key words: Meloidogyne javanica, M. incognita, Zingiber officinale, fenamiphos, nematode control

Fenamiphos 10% granules was evaluated as a post-plant nematicide for ginger plantings. A double application using 1 g ai fenamiphos/m of the planting furrow at plant and 4 months later gave good control of both root-knot nematode species infesting ginger for a complete growing cycle. A single application at the above rate (1 g ai/m) provided control only during initial growth, and nematode populations reached high levels before harvest. The single application resulted in non-detectable residue levels at harvest while fenamiphos residues exceeding 0,25 mg/kg resulted from the double application. Yield increases due to nematode control were 60% and 52% for the double and single applications respectively when compared to the untreated control plots. Leaf analyses provided evidence that high root-knot nematode levels could affect the uptake of macro-nutrients adversely. Leaf K content indices of infested ginger plants were well below the accepted norm of 3% leaf potash for ginger production despite high soil K levels.

NEW INFORMATION ON THE INTERNAL MORPHOLOGY OF EUTOBRILIUS HEPTAPAPILLATUS (JOUBERT & HEYNS, 1979) TSALOLIKHIN, 1981
Antoinette Swart and J. Heyns, Department of Zoology,
Rand Afrikaans University.

While preparing a redescription of E. heptapapillatus, the authors were struck by the exceptionally well developed "glandular"-system in the region of the nerve ring and at the base of the oesophagus. The indoxyl acetate method for non-specific esterases was used to determine the nature of this system, the details of which are shown on the poster. The esterase enzymes in whole mounts of an unknown Tobrilus sp. from the Hennops River, were found in the intestine, around and inside the stoma and in the ganglia of the nervous system. After subsection to 34 C, the intestine was the only region to show esterase activity. Important is the fact that the "glands" remained light blue after heating and did not stain as blue as the ganglia before heating. The indoxyl acetate method, the results and speculations on the "glandular"-system are given on the poster, as well as a scanning electron micrograph of the excretory pore of Neotobrilus diversipapillatus.

GNOTOBIOTIC MASS CULTURE OF THE ROOT-LESION NEMATODE PRATYLENCHUS SCRIBNERI STEINER, 1943, ON CARROT DISCS.
A.P. van Miegheem & W. Pieterse, Plant and Seed Control,
Private Bag X5015, Stellenbosch, 7600

Pratylenchus scribneri, obtained from vine roots in the field, were surface sterilized using 0,1% Hibitane for 3 min, followed by two rinses with sterile distilled water. Surface sterilized carrots were cut into discs and placed separately on water agar in petri dishes. Each petri dish was inoculated with five surface sterilized nematodes placed individually on the agar and incubated at 25°C. Three months later only the discs with larvae and eggs visible on the agar were cut into sections and used to inoculate fresh carrot discs. After a further month the nematodes were extracted by slicing the discs into small sections and placed on a modified Baermann funnel for two days. Discs yielded an average of 8 500 active nematodes. The culture-reared nematodes were successfully used as inoculum on vines in a glasshouse experiment.

EFFECTS OF WEEDS ON THE INFESTATION OF PRATYLENCHUS ZEA ON MAIZE.

Elizabeth M. Jordaan and D. de Waele, Grain Crops Research Institute, Private Bag X1251, Potchefstroom 2520.

Greenhouse trials were conducted to evaluate the status of five common weed species as hosts of Pratylenchus zaei and to determine the effects of their root diffusates on the infestation of P. zaei on maize. The five weed species were Elymus indica, Crotalaria sphaerocarpa, Amaranthus hybridus, Datura stramonium and Tagetes minuta. None of the weed species were as good hosts as maize. Among the weed species E. indica supported the highest nematode population and T. minuta the lowest. Reproduction of P. zaei on maize in soil previously infested with E. indica, C. sphaerocarpa, A. hybridus and D. stramonium, was comparable with the reproduction of P. zaei on maize in soil previously grown with Z. mays. Soil which has been infested with T. minuta significantly suppressed infestation of P. zaei on maize.