RESEARCH PAPERS - TRABAJOS DE INVESTIGACION

ABILITY OF SELECTED COMMON WEEDS AND ORNAMENTALS TO HOST *PRATYLENCHUS COFFEAE*.

D.T. Kaplan and J.B. MacGowan
U.S. Department of Agriculture, U.S. Horticultural Research Laboratory, 2120 Camden Road, Orlando, Florida 32803, U.S.A., and Division of Plant Industry, Florida Department of Agriculture and Consumer Services, P.O. Box 1269, Gainesville, Florida 32602, U.S.A.

Accepted:
3.X.1982
Aceptado:

ABSTRACT

Kaplan, D.T., and J.B. MacGowan. 1982. Ability of selected common weeds and ornamentals to host *Pratylenchus coffeae*. Nematropica 12:165-171.

Greenhouse evaluations of weeds and ornamentals commonly found in Florida citrus groves and greenhouses, respectively, indicated that *Pratylenchus coffeae* could be detected in roots of 15 of 27·plant species but most did not support high populations. The weeds *Momordica charantia* and *Schinus terebinthifolius* and the ornamentals *Chamaedorea elegans* and *Codiaeum variegatum* were found to be *P. coffeae* hosts. *P. coffeae* was pathogenic to *C. elegans* and *Brassaia actinophylla* under greenhouse conditions. *C. variegatum* supported large *P. coffeae* populations on large, lesion-free root systems.
Additional key words: lesion nematode, citrus, cultural practices, surveys, weeds.

RESUMEN

Kaplan, D.T., y J.B. MacGowan. 1982. Capacidad de las malezas comunes y de plantas ornamentales para servir de hospederos de *Pratylenchus coffeae*, Nematrópica 12:165-171.

Resultados de evaluaciones efectuadas en invernáculo con hierbas y plantas ornamentales comunmente encontradas en arboledas de citrus e invernáculos de la Florida, respectivamente, indicaron que la mayoría de las especies de plantas estudiadas no son hospederas del *Pratylenchus coffeae*. Las hierbas *Momordica charantia* y *Schinus terebinthifolius* y las ornamentales *Chamaedorea elegans* y *Codiaeum variegatum* sustentaron al *P. coffeae*. *P. coffeae* indicó ser patógeno de *C. elegans* y *Brassaia actinophylla*, bajo condiciones de invernáculo. *C. variegatum* sustentó

grandes poblaciones de *P. coffeae* sobre un extenso sistema de raíces.
Palabras claves adicionales: nematodos lesionadores, cítricos, prácticas culturales, gama de hospederos, malezas.

INTRODUCTION

The coffee lesion nematode, *Pratylenchus coffeae* (Zimmerman) Filipjev & Stekhoven, is widely distributed throughout tropical and subtropical growing regions and is pathogenic to many economically important crops (2). In Florida, *P. coffeae* has been associated with suppressed growth of ornamentals (1,5), and suppressed growth and yield of citrus (3,4). Although O'Bannon and Esser (2) evaluated the relative host suitability of 125 citrus selections to *P. coffeae*, few common ornamentals or weeds have been evaluated as hosts of *P. coffeae*. The purpose of this study was to determine if weeds common to Florida citrus groves and ornamentals commonly grown, imported into or exported from Florida might serve as hosts of *P. coffeae*.

MATERIALS AND METHODS

Weed Study. Seeds of *Amaranthus retroflexus* L., *Bidens pilosa* L., *Chenopodium album* L., *C. amaranticolor* Coste & Reynier, *C. ambrosiodes* L., *Desmodium floridanum* Chapm., *Erigeron canadensis* L., *Gnaphalium purpureum* L., *Lepidium virginicum* L., *Merremia dissecta* (Jaq.) Haller f., *Momordica charantia* L., *Oxalis corniculata* L., *Phytolacca americana* L., *Richardia brasiliensis* (Moq.) Gomez, *Schinus terebinthifolius* Raddi, *Solanum nigrum* L., and *Sporobolus poiretii* (R&S) Hitchock were collected from citrus groves throughout central Florida. Seeds were germinated in randomized 20-cm diam pots, 6 replications/weed species, and filled with Astatula fine sand (hyperthermic, uncoated typic quartzipsamments). *P. coffeae* (adults and larvae) were extracted from citrus roots (6) collected in a central Florida grove. The nematodes were surface sterilized with 5% $HgCl_2$ for 2 h, rinsed with sterile tap water and then added to each pot as an aqueous suspension (20 ml of sterile water). Plants were inoculated with 1300 nematodes 2 mo after germination and grown under glasshouse conditions (26 C $\pm$ 5) for 10 mo. Root systems were washed free of soil, and nematodes were recovered by jar incubation after 7 days at 26 C $\pm$ 1 (6). Roots were dried for 24 h at 76 C, dry root weights determined, and data expressed as nematodes/g dry root weight.

Ornamentals. Ten young plants of *Brassaia actinophylla* Endl., *Chamaedorea elegans* Mart., *Codiaeum variegatum* (L.) Blume, *Dieffenbachia maculata* (Lodd.) G. Don, *Dracaena marginata* Lam., *Epipremnum aureum* (Linden & Andre) Bunt., *Maranta leuconeura* E. Morr., *Philodendron scandens* C. Koch & H. Sello subsp. *oxycardium* (Schott) Bunt., *Syngonium podophyllum* Schott, and *Yucca elephantipes* Regel were rinsed free of organic potting medium and planted in a loamy-sand (Astatula sand: peat:

vermiculite, 2:1:1) in 8.9 cm diam styrofoam cups. Plants grew well in a glasshouse under shade cloth and soil temperatures (26 C ± 1) were maintained by a water bath. Two mo after planting, eight plants were inoculated as previously described but with 1000 *P. coffeae* each and two plants/species remained noninoculated. Root systems were harvested after 90 days, fresh root weights were determined, and nematodes were recovered by jar incubation at 26 C ± 1 after 7 days (6). Data were expressed as nematodes/g fresh root weight.

RESULTS

Nematode recovery from selected weeds and ornamentals is presented in Tables 1 and 2, respectively. Of the weeds and ornamentals studied, *P. coffeae* was recovered from 15 of 27, however, the majority of weeds and ornamentals did not appear to support multiplication of *P. coffeae*. *P. coffeae* adversely affected *C. elegans* and *B. actinophylla* root growth and was considered to be

Table 1. *Pratylenchus coffeae* populations in weeds common to Florida citrus groves.

Weed	Nematodes/ g root dry weight
Momordica charantia	32.5 a[x]
Schinus terebinthifolius	22.9 ab
Merremia dissecta	6.5 bc
Richardia brasiliensis	5.8 bc
Oxalis corniculata	2.9 bc
Sporobolus poiretii	1.0 bc
Amaranthus retroflexus	0.0 c
Bidens pilosa	0.0 c
Chenopodium album	0.0 c
C. amaranticolor	0.0 c
C. ambrosiodes	0.0 c
Desmodium floridanum	0.0 c
Erigeron canadensis	0.0 c
Gnaphalium purpureum	0.0 c
Lepidium virginicum	0.0 c
Phytolacca americana	0.0 c
Solanum nigrum	0.0 c

[x]Means followed by the same letter are not significantly different according to Duncan's multiple range test (P = 0.5). Data transformed to $\sqrt{X + 0.5}$ prior to analysis.

a primary pathogen of these plant species (Fig. 1A & B). In contrast, *C. variegatum* supported high *P. coffeae* populations on large root systems which remained lesion free.

Table 2. *Pratylenchus coffeae* populations in 10 commonly-grown ornamentals.

Ornamentals	Nematodes/g root fresh weight
Chamaedorea elegans	33.33 a[x]
Codiaeum variegatum	25.04 a
Syngonium podophyllum	4.67 b
Dracaena marginata	1.32 bc
Maranta leuconeura	0.52 bc
Brassaia actinophylla	0.34 bc
Philodendron scandens subsp. *oxycardium*	0.30 bc
Epipremnum aureum	0.24 bc
Dieffenbachia maculata	0.02 c
Yucca elephantipes	0.00 c

[x]Means followed by the same letter are not significantly different according to Duncan's multiple range test (P + 0.05). Data transformed to $\sqrt{X + 0.5}$ prior to analysis.

DISCUSSION

It appears that a program designed to control or limit the spread of *P. coffeae* should i) incorporate herbicides to eliminate weed hosts and ii) require inspection of ornamentals imported from areas where *P. coffeae* is known or suspected to be present. This nematode flourishes in tropical and subtropical regions where year-around weed growth is common. In addition, some weed species which are hosts of *P. coffeae* are perennials and can complicate control procedures. Therefore, control of weeds, especially *Momordica* spp. and *Schinus* spp. should be considered an important aspect of nematode management in *P. coffeae*-infested sites.

Many of the ornamentals evaluated for their ability to support *P. coffeae* can be grown as outdoor plantings in tropical and subtropical areas. If previously infected, these plants would serve as inoculum sources or as alternate hosts in *P. coffeae*-infested areas. Although *P. coffeae* did not dramatically affect ornamental plant growth in the glasshouse, *P. coffeae*-

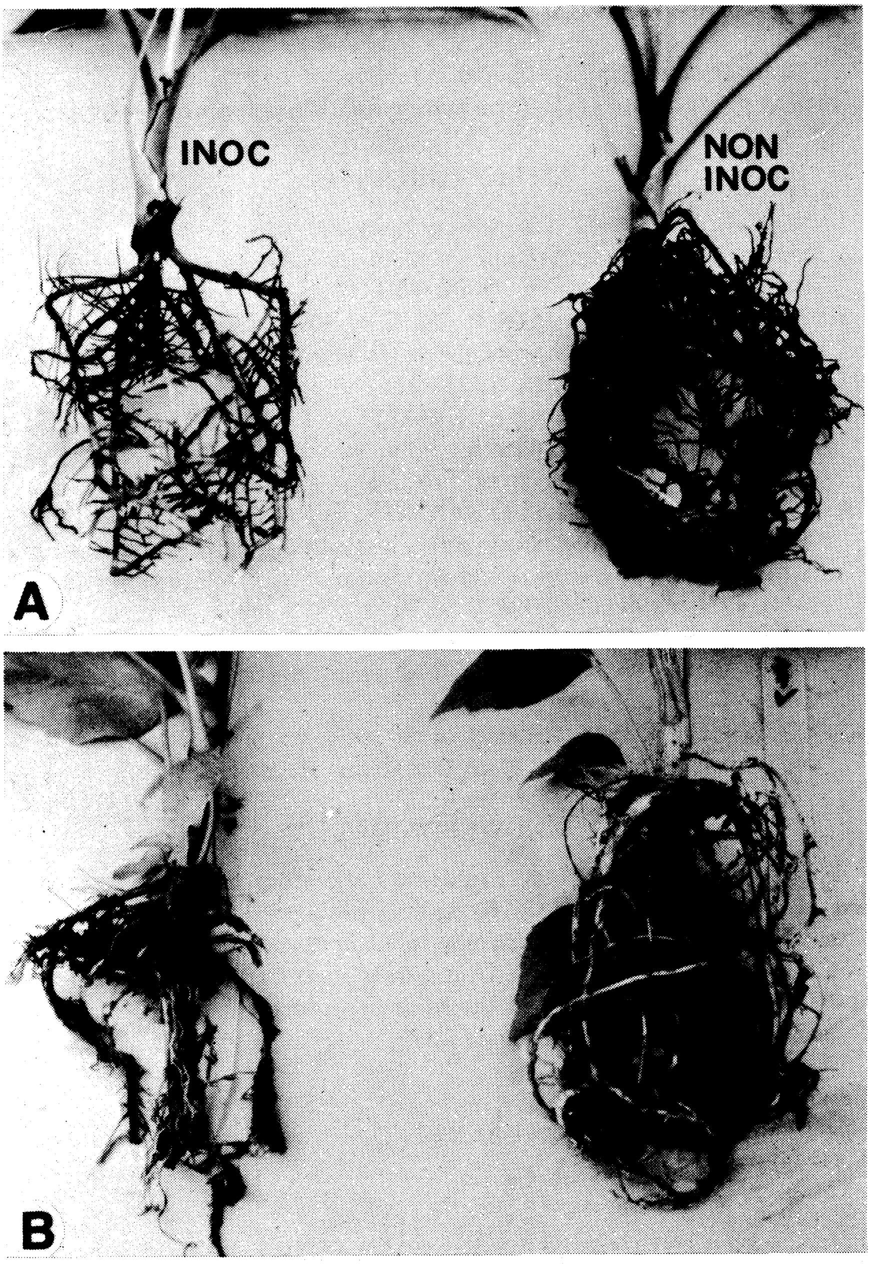

Fig. 1. Appearance of A) *Chamaedorea elegans* and B) *Brassaia actinophylla* root systems which were infected with *Pratylenchus coffeae* (left) and noninfected healthy root systems (right).

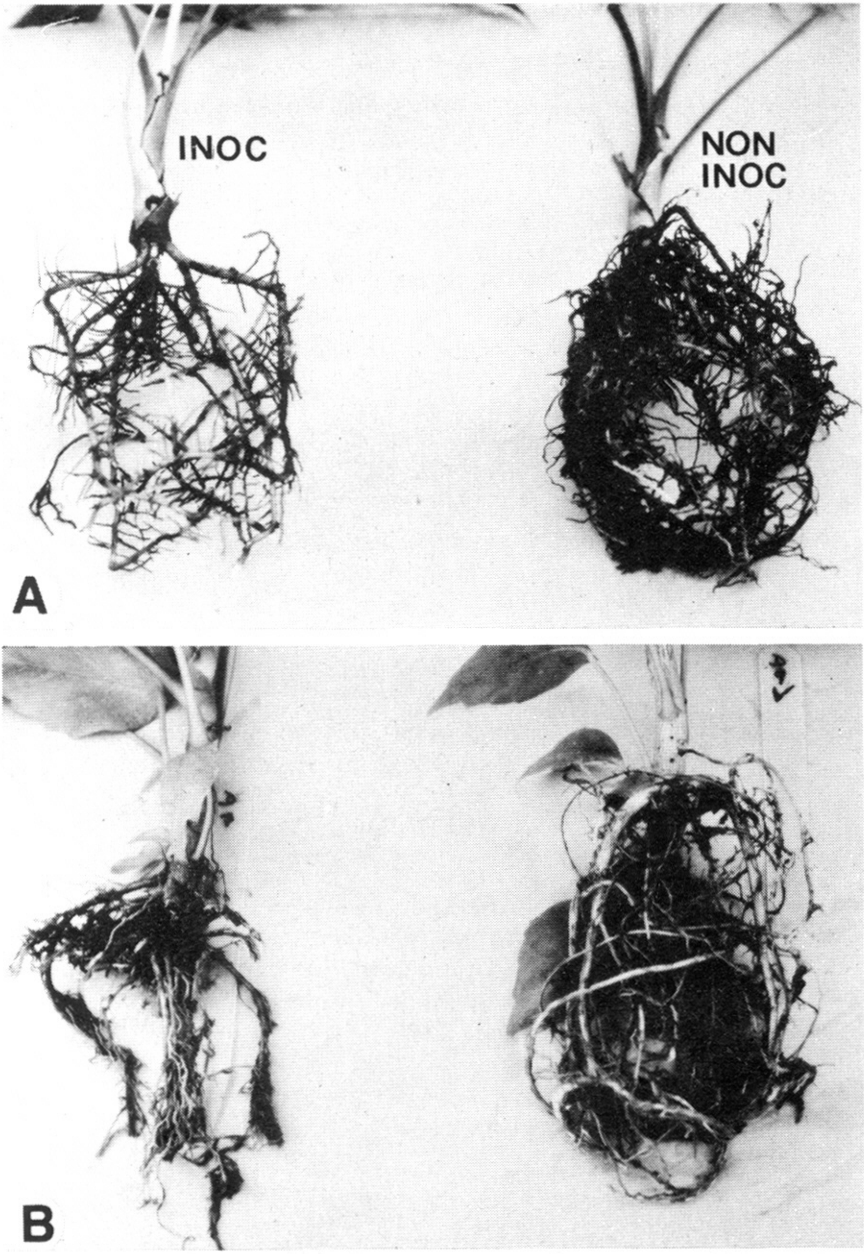

Fig. 1. Appearance of A) *Chamaedorea elegans* and B) *Brassaia actinophylla* root systems which were infected with *Pratylenchus coffeae* (left) and noninfected healthy root systems (right).

infected ornamentals might not grow well under less than favorable conditions such as the home environment. *C. variegatum* was found to be a good host as reported previously (5), and should prove to be an excellent plant on which to produce large *P. coffeae* populations for experimental purposes.

LITERATURE CITED

1. NOEGEL, K.A. 1972. The pathogenicity and interrelationship of *Pratylenchus coffeae* and *Pythium splendens* on Chinese evergreens. Ph.D. Dissertation, Univ. of Fla., Gainesville. 49 pp.
2. O'BANNON, J.H., and R.P. ESSER. 1975. Evaluation of citrus, hybrids, and relatives as hosts of *Pratylenchus coffeae* with comments on their hosts. Nematol. Med. 3:113-122.
3. O'BANNON, J.H., J.D. RADEWALD, A.T. TOMERLIN, and R.N. INSERRA. 1976. Comparative influence of *Radopholus similis* and *Pratylenchus coffeae* on citrus. J. Nematol. 8:58-63.
4. RADEWALD, J.D., J.H. O'BANNON, and A.T. TOMERLIN. 1971. Temperature effects on reproduction and pathogenicity of *Pratylenchus coffeae* and *P. brachyurus* and survival of *P. coffeae* in rough lemon roots. J. Nematol. 3:390-394.
5. STOKES, D.E. 1979. *Pratylenchus coffeae:* A lesion nematode affecting foliage plants. Nema. Circ. 58, Fla. Dept. Agric. & Consum. Svcs., Gainesville, 2 pp.
6. YOUNG, T.W. 1954. An incubation method for collecting migratory endoparasitic nematodes. Plant Dis. Reptr. 38:794-795.

ACKNOWLEDGEMENTS:

The assistance of D. Gaffney, Biological Laboratory Technician as well as K.R. Langdon, Botanist, and C.R. Artand, Biologist, in making identifications and providing correct terminology of plant names used in this investigation is gratefully acknowledged. Gratitude is also extended to C.R. Artand and L. Llana for translation of the summary and to A. Van Donnan for contributing ornamental plant material.

Received for publication:

25.VIII.1982

Recibido para publicar: