ADDITIONAL LIST OF ORNAMENTAL FOLIAGE PLANTS HOST OF THE LESION NEMATODE *PRATYLENCHUS COFFEAE*

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ABSTRACT

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In a host range study carried out several years ago in Honduras, Central America, 44 species and cultivars of foliage plants were tested for reaction to the lesion nematode, *Pratylenchus coffeae,* under greenhouse conditions. Honduran rubber plant, *Ficus elastica* 'Honduras'; Indian rubber plant, *Ficus elastica* 'decora'; amaryllis, *Hippeastrum vittatum;* variegated pepper face, *Peperomia obtusifolia* 'variegata'; and wandering jew, *Zebrina pendula* were found to be good hosts. Ten species were found to be poor hosts and the remaining 29, non-hosts. The effects of Hurricane Fifi on nematode dissemination are discussed.
Additional key words: lesion nematode, ornamentals, host-range, dissemination by flooding.

RESUMEN

Pinochet, J. y O. Duarte. 1986. Lista adicional de plantas ornamentales hospederas del nemátodo de las lesiones *Pratylenchus coffeae.* Nematropica 16:11-19.

En un estudio de rango de hospederos llevado a cabo hace varios años en Honduras, Centro América, un total de 44 especies y cultivares de plantas ornamentales fueron evaluados bajo condiciones de invernaderos para conocer su reacción al nemátodo de las lesiones, *Pratylenchus coffeae.* Se determinó que las siguientes especies fueron buenos hospederos: gomero hondureño, *Ficus elastica* 'decora'; amarilo, *Hippeastrum vittatum;* peperomia, *Peperomia obtusifolia* 'variegata'; y judío errante, *Zebrina pendula.* Diez especies resultaron ser hospederos pobres y 29 no hospederos. Se comenta acerca de la diseminación de nemátodos causados por el Huracán Fifi.
Palabras claves adicionales: nemátodo lesionador, ornamentales, rango hospedero, diseminación por inundación.

INTRODUCTION

The foliage plant industry is an important enterprise in Central America and the Caribbean where large nurseries export propagation material to the United States and Europe. One of these nurseries was a

private operation located near Progreso, off the northwest coast of Honduras, which grew more than 80 different species and cultivars of foliage plants in an area equivalent to 77 ha. Most of the plant material was grown in ground beds, another part on raised benches. The nursery had been established in 1970 in an area adjacent to banana farms and also in an area where bananas had been growing previously. In October 1974, Hurricane Fifi flooded the entire nursery for several days. After the initial labor of re-establishing the nursery, newly planted material became infested in 1977 with *Radopholus similis* (Cobb, 1893) Thorne, 1949 and *Pratylenchus coffeae* (Zimmerman, 1898) Filipjev & Schuurmans-Stekhoven, 1941. The latter had not been previously recorded in any of the ornamental species grown in the nursery. Therefore host range information was necessary, followed by drastic control measures to eradicate both nematodes.

Information on the host range of the banana and citrus biotypes of *R. similis* and *P. coffeae* on ornamental species is available (1,2,5,7,9,12,20). The most important host list of *P. coffeae,* published by Esser (6), included 128 plant species and varieties, of which approximately 30 were ornamentals. Due to the importance of *P. coffeae* to many crops throughout Central and North America and the Caribbean (3,11,14,15,16,17,18,19,21), and its potential threat to the foliage plant industry, the results of the host range study on commercial ornamentals is presented.

MATERIALS AND METHODS

A total of 44 species and cultivars of ornamental foliage plants were grown in autoclaved sand flats. Nematode-free plants were selected as air layers, aerial cuttings, or seeds. After two weeks to one month, plants with uniform growth were transplanted to 30-cm-diam clay pots containing autoclaved sandy-loam soil. Each species or cultivar was replicated 5 times. Ten days after transplanting, plants were inoculated with a suspension of 1000 *P. coffeae,* using 5 inoculation sites per pot. The original source of *P. coffeae* was isolated from its banana host near La Lima, Honduras, and had been maintained on carrot disks for several generations (13). The plants were grown under greenhouse conditions from February to June 1977 and were irrigated with distilled water as needed. In addition, half-strength Hoagland's nutrient solution was added once every 15 days. Four months after inoculation, plants were harvested. Nematodes in soil were obtained by removing soil from pots and placing it in a large pan. Roots were washed free of remaining soil particles in a second pan with a known volume of water. Contents of both pans were mixed and stirred. A volume of 250 cm^3 of slurry was used as a sample. Nematode extractions were made by a screening and

Table 1. Good hosts of *Pratylenchus coffeae*[y]

Scientific name	Common name	Family	Final nematode population[z]
Ficus elastica 'Honduras'	Honduran rubber plant	Moraceae	17,020 ± 7555
Ficus elastica 'Decora'	Indian rubber plant	Moraceae	6975 ± 1084
Hippeastrum vittatum	Amaryllis	Amarylliaceae	6637 ± 2905
Peperomia obtusifolia 'Variegata'	Variegated pepper face	Piperaceae	2628 ± 416
Zebrina pendula	Wandering jew	Commelinaceae	1794 ± 690

[y]Inoculation level of 1000 nematodes per pot.
[z]Total amount of nematodes in roots and soil. Mean of 5 replicates, plus standard error.

Table 2. Poor hosts of *Pratylenchus coffeae*[y]

Scientific name	Common name	Family	Final nematode population[z]
Dracaena marginata	Madagascar dragon tree	Liliaceae	995 ± 100
Codiaeum punctatum aureum	Gold spot croton	Euphorbiaceae	982 ± 768
Chrysalidocarpus lutescens	Areca palm	Palmae	899 ± 222
Philodendron panduraeforme	Fiddle leaf philodendron	Araceae	892 ± 202
Codiaeum x 'Aucubaefolium'	Gold dust croton	Euphorbiaceae	882 ± 244
Cordyline terminalis 'Baby doll'	Baby doll tea plant	Liliaceae	855 ± 301
Philodendron hastatum	Elephant ear philodendron	Araceae	779 ± 158
Peperomia scandens	Philodendron pepperomia	Piperaceae	527 ± 112
Polyscias fruticosa	Ming aralia	Araliaceae	509 ± 74
Philodendron x 'Red emerald'	Red emerald philodendron	Araceae	504 ± 227

[y]Inoculation level of 1000 nematodes per pot.
[z]Total amount of nematodes in roots and soil. Mean of 5 replicates, plus standard error.

Table 3. Non-hosts of *Pratylenchus coffeae*[y]

Scientific name	Common name	Family	Final nematode population[z]
Dracaena godseffiana 'Florida beauty'	Florida beauty dracaena	Liliaceae	492 ± 69
Scindapsus aureus 'Marble queen'	Marble queen pothos	Araceae	374 ± 74
Dracaena draco	Dragon tree dracaena	Liliaceae	363 ± 71
Pilea cadierei	Aluminum plant	Urticaceae	322 ± 107
Aglaonema x 'Silver queen'	Silver queen evergreen	Araceae	322 ± 148
Stromanthe amabilis	Red calathea	Marantaceae	318 ± 55
Dieffenbachia x 'Exotica'	Exotic dumbcane	Araceae	312 ± 69
Saintpaulia ionantha	African violet	Gesneriaceae	296 ± 39
Spathiphillum x 'Mauna Loa'	Mauna Loa peace lily	Araceae	241 ± 51
Pleomelea angustifolia honoriae	Honoriae pleomele	Liliaceae	223 ± 38
Philodendron pertusum	Ceriman	Araceae	216 ± 49
Dracaena deremensis 'Janet Craig'	Janet Craig dracaena	Liliaceae	189 ± 37
Crypthanthus x 'It'	Earth star	Bromeliaceae	203 ± 61

Table 3. Non-hosts of *Pratylenchus coffeae*[y] (continued)

Scientific name	Common name	Family	Final nematode population[z]
Peperomia obtusifolia	Pepper face	Piperaceae	201 ± 60
Codiaeum variegatum 'Bravo'	Bravo croton	Euphorbiaceae	164 ± 40
Pellionia pulcra	Satin pellionia	Urticaceae	156 ± 48
Dracaena sanderiana	Sander's dracaena	Liliaceae	133 ± 78
Dieffenbachia oertedii variegata	Oerstedi dumbcane	Araceae	98 ± 42
Pleomelea thalioides	Lance dracaena	Liliaceae	78 ± 24
Polyscias fruticosa 'elegans'	Bonsai aralia	Araliaceae	72 ± 67
Dracaena sanderiana 'Borinquensis'	Borinquensis dracaena	Liliaceae	39 ± 13
Aglaonema x 'Francher'	Francher evergreen	Araceae	38 ± 25
Yuca elephantipes	Spineless yucca	Liliaceae	36 ± 24
Dracaena deremensis 'Warneckei'	Warneckei dracaena	Liliaceae	39 ± 14
Pellionia lanceolata	Pellionia	Urticaceae	21 ± 3
Scindapsus aureus	Golden pothos	Araceae	14 ± 11

[y]Inoculation level of 1000 nematodes per pot.
[z]Total amount of nematodes in roots and soil. Mean of 5 replicates, plus standard error.

sugar flotation method (8). The total number of nematodes in the soil per pot was determined by calculations based on 250 cm^3 aliquots. Complete root systems were carefully checked for damage under a stereoscope, then macerated in a blender for 15 seconds and placed on Baermann funnels for 48 h. Nematodes extracted from the roots and soil were counted separately and added. To determine host susceptibility, three arbitrary categories were established: A) Good host: more than 1000 nematodes recovered from the roots at the end of the experiment and root damage visible in the majority of cases; B) Poor host: more than 50 nematodes recovered from the roots and not more than 1000 from roots and soil together, with little or no visible damage; C) Non host: less than 50 nematodes extracted from the roots and not more than 500 from the roots and soil together, with no visible damage.

RESULTS

Five cultivars were found to be good hosts of *P. coffeae: Ficus elastica* 'Honduras' (Honduran rubber plant), *Ficus elastic* 'Decora' (Indian rubber plant), *Hippeastrum vittatum* (amaryllis), *Peperomia obtusifolia* (variegated pepper face), and *Zebrina pendula* (wandering jew) (Table 1). The ten species recorded as poor hosts were: *Dracaena marginata* (Madagascar dragon tree), *Codiaeum punctatum aureum* (gold spot croton), *Chrysalidocarpus lutescens* (Areca palm), *Philodendron panduraeforme* (fiddle leaf philodendron), *Codiaeum* x 'Aucubaefolium' (gold dust croton), *Cordyline terminalis* (baby doll tea plant), *Philodendron hastatum* (elephant ear philodendron), *Peperomia scandens* (philodendron pepperomia), *Polyscias fructicosa* (Ming aralia), and *Philodendron* x 'Red emerald' (Red emerald philodendron) (Table 2). The remaining 29 species were found to be non-hosts (Table 3).

DISCUSSION

In comparison with *R. similis,* 16 of the 44 species tested in this study have been reported as hosts of the burrowing nematode (7,12), thus indicating a wider host range over *P. coffeae.* This also suggests that *R. similis* is of greater economic importance than *P. coffeae* to foliage plants for export market. The banana biotype of *R. similis* from Honduras was not tested in this study.

The best hosts for *P. coffeae* were two cultivars of rubber plant, *Ficus elastica.* The final population per plant were 17,200 nematodes for Honduran rubber plant and 6975 for Indian rubber plant (Table 1). In both cases the soil population was approximately three times higher than in the roots, suggesting that the root system was destroyed by the nematodes in a brief period of time and that the high soil population

was a result of nematodes migrating out of the roots into the surrounding environment. This situation was not observed in the other ornamental species and cultivars found to be good or poor hosts. A non-host designation of less than 50 nematodes in the roots was arbitrarily chosen in view of the inability of the nematodes to establish parasitic life and reproduce in the host. However, the final population in the soil of many non-host plants varied from a few specimens to several hundreds. These differences could be explained by the ability of *P. coffeae* to feed itself ectoparasitically in some cases. In other situations with final low root and soil populations, the nematode possibly was unable to approach the roots because exudates failed to attract or possibly repelled them, or simply because they were not able to penetrate the cell walls of the roots, a truly non-host situation (4).

A very important occurrence relative to this study was the establishment of burrowing and coffee root nematodes following flooding engendered by Hurricane Fifi. Previously, four plant species were recorded infested in the field with high populations of *P. coffeae* after Hurricane Fifi. In this study, two of them, variegated pepper face, *Peperomia obtusifolia* 'Variegata', and wandering jew, *Zebrina pendula,* were found to be good hosts and the other, Areca palm, *Chrysalidocarpus lutescens,* a poor host. A fourth species, Francher evergreen, *Aglaonema* x 'Francher', was found to be a non-host. The experimental conditions under which the host-range study was conducted might have accounted for such differences. Also, the possibility of a different biotype of *P. coffeae* being present should not be discounted (10).

As a result of this host-range study, an improvement in the layout of plants in the nursery was conducted with the formation of buffer zones of non-host species. This permitted better chemical control in localized areas of infestation and better management of labor and use of tools that could easily spread the nematode to susceptible hosts. Other improvements in relation to weed control practices, distribution of running water, and use of raised benches were also made. Unfortunately, the success of permanently eradicating *P. coffeae* from this nursery was never known.

For practical purposes, both good and poor hosts can be potentially dangerous if they are to be transferred to areas where they are not present, especially to other nursery operations that propagate plant material. In a recent host range study conducted on weeds and ornamental hosts, Kaplan and MacGowan (9) pointed out the concern of spreading this nematode through propagating material imported and exported from Florida.

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