

PHYTOPHTHORA PARASITICA WILT OF NEW CULTIVARS OF CATHARANTHUS ROSEUS

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Abstract. An outbreak of a stem and root rot on hybrid periwinkle (*Catharanthus roseus* (L.) G. Don) was observed in a nursery in Dade County, Florida. The *Catharanthus* hybrids infected with *Phytophthora parasitica* showed darkening of the tissues at the soil line followed by wilting of the stem. The lesions on the roots increased rapidly in size and became light to dark brown necrotic areas. A *Phytophthora*-like fungus was isolated from stems and roots on corn meal agar subcultured on potato-dextrose agar and identified as *Phytophthora parasitica*. The disease symptoms appeared as wilting of the leaves, roots were water soaked, turning to a brown to black color and the cortex sloughed easily from the stele. All of the periwinkle hybrids were susceptible to *P. parasitica* while the native white *C. ro-*

seus was resistant. All chemicals applied provided significantly less number of *P. parasitica* infected plants than the untreated check (Table 2). Fosetyl-aluminum at 5 lb and etridiazole + thiophanate-methyl at 12.0 oz and metalaxyl-M at 1.00 fl oz were significantly better than). Fosetyl-aluminum at 1.0 lb, etridiazole + thiophanate-methyl at 6.0 oz, metalaxyl-M at 0.50 oz.

The fungus *Phytophthora parasitica* Butl. Is the most common *Phytophthora* species in bedding and potted plants (Daughtrey et al., 1995). In Florida alone *P. parasitica* attacks some 100 plus different types of plants, including both cultivated ones and weeds, with many more reported host plants world wide. (Alfieri 1970 a, b; Alfieri et al., 1991; Engelhard and Plotz, 1979; Holcomb, 1993; Keim, 1977; Pirone, 1970; Currently south Florida has approximately 400 acres devoted to the production of flowering annual landscape plants. In south Florida *P. parasitica* occurs on crops leaves, stems and pods during the wet warm summer months. Over the past years *P. palmivora* was found on the stems and leaves of commercial nursery potted *Catharanthus roseus* (L.) G. Don., commonly known as rose periwinkle. In Florida, hybrid periwinkle is grown in the winter as a bedding plant. An outbreak of a stem and root disease causing wilt on *C. roseus* was first observed in November of 1998 in a large commercial nursery in Dade County, Fla. *P. parasitica* was positively identified as the cause of stem and root rot with 20% of the grower's crop infected, causing wilt, showing extensive necrotic areas on stems and roots rendering the plants unmarketable. This pathogen presents a serious and continuing problem to growers. The most effective disease management

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practices has been fungicides, fosetyl-aluminum and metalaxyl; Daughtrey and Mackel 1986. The purpose of this study was to reproduce the disease in *C. roseus* hybrids and evaluate fungicide efficacy for the control of *P. parasitica*.

Materials and Methods

A culture of *P. parasitica* originally isolated from naturally infected *C. roseus* hybrid on corn meal agar (CMA) with 100 mg of chloramphenicol per L was transferred periodically on ½ strength potato dextrose agar (PDA) and maintained at 22 °C. This isolate was employed throughout this study. The inoculum suspension for root inoculations was prepared by gently rubbing the fungal growth with a glass rod, in sterile deionized water from 10 PDA plates. The suspension of mycelial fragments and sporangia were then filtered through a layer of cheese cloth and brought up to one liter.

Inoculation of roots. A cut was made in the potting soil 5 cm from the stem and 8 cm deep on opposite side of each pot prior to inoculation. One hundred and fifty mL of inoculum suspension were poured on the soil of each pot. Plants were obtained from a commercial nursery that had not been treated with any fungicide. Four plants were misted with water and treated as described above. Four control plants were misted with water and were cut as above and treated with 150 mL of sterilized distilled water without the inoculum. All plants were placed in a modified humidity chamber (sealed polyethylene bags) for 48 h and then placed in a greenhouse at 27 °C. There were five replications with four treatments with a total of 20 plants. The bags were removed after 6 d at 27 °C and the plants were observed daily for disease symptoms.

Disease control. ‘Atropurpurea’, ‘Double Blue’, ‘Double Purple’ and ‘Florida Native White’ periwinkle plants growing one per 100 cm plastic pot applied Aliette (fosetyl-aluminum) at a foliar sprays using a pressurized hand sprayer at 60 GPA and 30 psi, at a rate equivalent to 100 gal/acre and Banrot (etridiazole + thiophanate-methyl) and Subdue Maxx (metalaxyl-M) applied as a drench where each chemical treatment was replicated five times. Forty-eight hours after the chemical drench, a cut was made in the potting soil 5 cm from the stem and 8 cm deep on opposite sides of each plant. One hundred and fifty ml of inoculum suspension were poured on the soil of each pot. The inoculum suspension for root inoculations was prepared by gently rubbing the fungal growth with a glass rod, in sterile deionized water from 10 PDA plates. The suspension of mycelial fragments and sporangia were then filtered through a layer of cheese cloth and brought up to one liter. The untreated and uninoculated control plants were handled in the same manner except sterile PDA was used in place of the cultures of *P. parasitica*. The plants were evaluated for Phytophthora stem and root rot on 15 Aug. 2003.

Results and Discussion

The disease symptoms appeared as wilting of the leaves, roots were water soaked, turning to a brown to black color

Table 1. Disease reaction of periwinkle plants inoculated with *Phytophthora parasitica*.

Cultivar	Reaction
Atropurpurea Hybrid	+
Double Blue Hybrid	+
Double Purple Hybrid	+
Florida Native White Species	—

Table 2. Fungicide efficacy for Phytophthora stem and root rot caused by *Phytophthora parasitica* on periwinkle (*Catharanthus roseus*).

Product	Rate/A ^w	% Web blight ^{xyz}
Untreated Control		93.9 d
Aliette (Fosetyl-aluminum)	1.0 lb	2.5 c
Aliette (Fosetyl-aluminum)	5.0 lb	0.2 a
Banrot (Etridiazole + thiophanate-methyl)	6.0 oz	3.2 c
Banrot (Etridiazole + thiophanate-methyl)	12.0 oz	2.8 c
Subdue Maxx (Metalaxyl-M)	0.50 fl. oz	1.3 b
Subdue Maxx (Metalaxyl-M)	1.00 fl. oz	0.1 a

^wAliette was applied foliar and Banrot and Subdue Maxx were applied as a drench.

^xMeans with the same letter are not significantly different at the DWMRT, 5% level.

^yDisease severity evaluation was made after the final harvest on an index of 0 to 10 where 0 = no disease and 10 = 100% disease.

^zPercent stem and root rot was made on mean number of plants infected out of 20 plants per treatment.

and the cortex sloughed easily from the stele. All of the periwinkle hybrids were susceptible to *P. parasitica* while the native white *C. roseus* was resistant (Table 1).

Commercial production of the periwinkle hybrids where the crop is grown on gravel or ground cover on the soil is a serious problem since the pathogen is in close proximity to the plant at all times. Bench production of the plants to remove them from immediate exposure would be cost prohibited.

All chemicals applied resulted in significantly less number of *P. parasitica* infected plants than the untreated check (Table 2). Fosetyl-aluminum at 5 lb and etridiazole + thiophanate-methyl at 12.0 oz and metalaxyl-M at 1.00 fl oz were significantly better than). Fosetyl-aluminum at 1.0 lb, etridiazole + thiophanate-methyl at 6.0 oz, metalaxyl-M at 0.50 oz. Even though metalaxyl was effective in this trial it may be short lived since it was reported in 1992 that *P. parasitica* in an in vivo study there was an expression of resistance (Ferrin and Rohde, 1992).

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