

Results and Discussion

Fungicide experiments. Mancozeb, chlorothalonil (regardless of formulation), anilazine, iprodione, and fluazinam sprays applied once just prior to inoculation resulted in excellent disease protection (Table 1). Neither thiophanate-methyl nor basic copper sulfate applied alone gave adequate protection. However, the combination of thiophanate-methyl plus mancozeb resulted in excellent control in both experiments and the combination of chlorothalonil plus copper in Experiment 2 resulted in excellent control. Combinations of iprodione plus mancozeb in both experiments at rates as low as 0.25 lb/100 gal of each resulted in excellent control. Application of mancozeb or chlorothalonil 720 alone at low rates also resulted in superior protection. Combinations of chlorothalonil 720 plus iprodione at low rates of each (0.5 pt+0.5 lb) also gave excellent protection in Experiment 2. It is clear that several fungicides alone or in combination provided excellent protection against *Alternaria* leafspot of periwinkle.

This report presents research results. It does not contain recommendations for their use. It does not imply that the uses evaluated here have been registered. In fact several of the fungicides discussed here are not registered for use on ornamentals. For instance Manzate 200 (mancozeb) is not labeled for use on ornamentals although Dithane T/O (another mancozeb fungicide) is labeled for ornamental use. Bravo 720 (chlorothalonil) also is not labeled for use on ornamentals, whereas Daconil 2787F (another chlorothalonil fungicide) has an ornamental label. Nonetheless, even if ornamental labels exist for certain fungicides, periwinkle may or may not be included on the label. Therefore, it is essential that the labels be read and followed at all times to avoid misuse.

Temperature experiments. Disease severity decreased with increasing temperature in the first three experiments (Table

Table 2. Effect of temperature on development of *Alternaria* leafspot of Madagascar periwinkle.

Temperature		Number of leafspots or H-B' ratings			
F	C	Expt. 1	Expt. 2	Expt. 3	Expt. 4
54	(12)		—	11.75 a	2350 b
61	(16)		256 a	10.75 a	2802 a
68	(20)		151 b	11.00 a	2796 a
74	(23)	800 a'	—	—	—
75	(24)		140 b	11.50 a	2247 b
80	(27)	190 b	—	—	—
82	(28)		1 c	3.0 b	461 c
90	(32)		3 c	—	—

'Horsfall-Barratt rating scale where 1 = 0% of the foliage with symptoms and 12 = 100% of the tissue with symptoms.

^Mean separation (columns), by LSD test, 5% level.

2). It appeared in the last experiment that the optimum temperature for disease development was 61F (16C) and that disease severity slightly moderated at 12F (54C) and also at 68F (20C) and 75F (24C) compared to 61F (16C). Disease severity was greatly diminished at 82 and 90F (28 and 32C). *Alternaria* leafspot of periwinkle is a cool weather disease and a disease that can develop extremely well over a wide temperature range (54-75F or 12-24C). However, it also is a disease that can be easily controlled with the proper fungicide.

Literature Cited

- Chase, A. R. 1993. Common diseases of *Catharanthus* (Vinca). Southern Nursery Digest, pp. 21-22.
 Chase, A. R., G. W. Simone and G. Cashion. 1995. Troubleshooting diseases of flowering plants. Fla. Agr. Expt. Sta. SP 162.
 Horsfall, J. F. and R. W. Barratt. 1945. An improved grading system for measuring plant diseases. *Phytopath.* 35:655 (Abstr.).

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PERIWINKLE TWIG BLIGHT CAUSED BY *COLLETOTRICHUM DEMATIUM* ON *CATHARANTHUS ROSEUS* L.

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Abstract. *Colletotrichum dematium* (Pers.) Grove, which causes twig blight disease on periwinkle (*Catharanthus roseus* (L.) G. Don), was isolated from plants of *C. roseus* 'Pretty in Pink' from a commercial nursery in Dade County, Florida, in the spring of 1991. The species of *Colletotrichum* was identified by

the Commonwealth Mycological Institute, Kew, England. Foliar blight and sporulation of the fungus resulting from inoculation of *C. roseus* plants with a spore suspension were identical in all respects to those resulting from natural infection. Symptoms consisted of wilting of the shoot tips followed by chlorosis and ultimately necrosis of the shoot tips. Necrotic tissues were typically covered with masses of acervuli with setae. The isolated fungus produced falcate conidia as well as abundant sclerotia on the host and in culture, which is typical of *C. dematium*. Cleary's 3336, Dithane M45, Duosan, and Zyban fungicides applied as a protective spray provided significant disease control.

The fungus *Colletotrichum dematium* (Pers.) Grove was first reported in 1918 (Sutton, 1980). However, the synonym *Sphaeria dematium* Pers. was reported in 1801 (Sutton, 1980). Since then it has been observed extensively in temperate re-

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gions, and less so in tropical to subtropical areas (Sutton, 1980). The fungus attacks a wide variety of hosts in different families of both cultivated and wild species (Alfieri et al., 1991; Sutton, 1992; Farr et al., 1989; Lenne, 1992; Waller, 1992).

In south Florida *C. dematium* occurs on crop leaves and stems during the wet warm summer months. Recently, *C. dematium* was found on the stems of commercial nursery potted *Catharanthus roseus* (commonly known as periwinkle) 'Pretty in Pink' (McMillan and Graves, 1994). The disease occurred as a severe twig blight affecting over 80% of 10,000 potted nursery plants in the spring of 1991. Crop grade and standard reduction resulted from the severe twig blight.

The purpose of this research was to reproduce the disease and to determine effective methods of control.

Materials and Methods

A culture of *C. dematium* originally isolated from naturally infected *C. roseus* was transferred periodically on potato-dextrose agar and maintained at 22C. This isolate was employed throughout this study. A subculture of the *Colletotrichum* was sent to the Commonwealth Mycological Institute, Kew, England for speciation and was verified as *C. dematium*.

All inoculations were accomplished by inoculating six-month-old plants of *C. roseus* with 3-day-old conidia suspensions, 1×10^6 spores/ml and observed for symptoms after 6 to 10 days.

Four fungicides were evaluated for disease control in a commercial nursery. The compounds and their concentrations per 380 liters of water were as follows: Cleary's 3336 (methyl thiophanate), Dithane M45 (ethylene bis dithiocarbamate with zinc and manganese), Duosan [(methyl thiophanate) (ethylene bis dithiocarbamate with zinc and manganese)], and Zyban [methyl thiophanate) (ethylene bis dithiocarbamate with zinc and manganese)]. The control treatments were sprayed with water. The field trial consisted of 10 six-month-old plants per treatment which were sprayed five times with the candidate fungicides at 7-day intervals. Plants were inoculated as described for greenhouse studies, 2 days after the first spray application.

Results and Discussion

The twig blight which resulted from inoculation of *C. dematium* in the greenhouse and in the field were identical in all respect to those resulting from natural infection. *Colletotrichum dematium* was reisolated consistently from the diseased tissue. Colonies were variable, with colony color being white to pale grey or pale gray vinaceous salmon; sclerotia abundant, black, conical; setae abundant; conidia falcate, fusi-

Table 1. Efficacy of four fungicides: Duosan, Zyban, Cleary's 3336 and Dithane M45, applied as a protectant spray to control *Colletotrichum dematium* on *Catharanthus roseus*.

Treatment	Rate/380 liters	Percent disease ^a
Duosan	681 g	2.2c
Zyban	681 g	2.5c
Cleary's 3336	681 g	2.1c
Dithane M45	681 g	5.3b
Untreated Control		8.0a

^aAverage of 10 replications. Data taken 10 days after last application.

^aMeans followed by the same letters are not significantly different at the 1% level according to the Duncan-Waller Multiple Range Test.

form, apices acute, 19.5-24 μ long \times 2-2.5 μ wide; appressoria abundant, medium brown, clavate to circular, edge usually entire, 8-11.5 \times 6.5-8, often complex and forming long, closely branched chains.

Disease symptoms, wilt and chlorosis were first noted in the leaves 6 to 10 days after inoculation. The leaves on the inoculated stems wilted and died. The spots on the petioles began as oval, soft, watery lesions. These rapidly increased in number and size until the whole stalk was included. After the tissue was completely invaded the fungus produced small dark fruiting bodies in great abundance. All of the fungicides applied as a protective spray were significantly better than the control (Table 1). Duosan, Zyban and Cleary's 3336 resulted in consistently better disease control than did Dithane M45, which was significantly better than the inoculated control. All of the fungicides reported must be applied as per the manufacturers labels.

Literature Cited

- Alfieri, S. A., Jr., K. R. Langdo, J. W. Kimbrough, N. E. El-Gholl and C. Wehlburg. 1991. Diseases and disorders of plants in Florida. Bulletin No. 14. Fla. Dept. of Agr. & Consumer Serv., Div. of Plant Industry.
- Farr, D. F., G. F. Bills, G. P. Chamuris and A. Y. Rossman. 1989. Fungi on plants and plant products in the United States. The American Phytopathological Society. St. Paul, Minnesota. USA.
- Lenne, J. M. 1992. *Colletotrichum* diseases of legumes. J. A. Bailey and M. J. Jeger (eds.). In: *Colletotrichum: Biology, pathology and control*. CAB International.
- McMillan, R. T., Jr. and W. R. Graves. 1994. First report of periwinkle twig blight caused by *Colletotrichum dematium* in Florida. Plant Dis. 77:428.
- Sutton, B. C. 1992. The genus *Glomerella* and its anamorph *Colletotrichum*. J. A. Bailey and M. J. Jeger, (eds.) In: *Colletotrichum: Biology, pathology and control*. CAB International.
- Sutton, B. C. 1980. The coelomycetes fungi imperfecti with pycnidia acervuli and stromata. Robert MacLehose and Co. Ltd. UK.
- Waller, J. M. 1992. *Colletotrichum* diseases of perennial and other cash crops. J. A. Bailey and M. J. Jeger, (eds.). In: *Colletotrichum: Biology, pathology and control*. CAB International.