CANE DISEASES OF GREENHOUSE ROSES

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Roses are susceptible to many stem canker fungi. Pathogens which cause these stem cankers on greenhouse roses tend to develop and spread during the fall and spring months when humidity is high. Many of these fungi initially enter through pruning cuts or wounds and may then move down into main canes and eventually kill the canes back to the root stock.

Fungi isolated from rose canes obtained from commercial rose growers included: Alternaria sp., Botryodiplodia sp., Botrytis sp., Coniothyrium sp., Pestalotia sp., and Trichothecium sp. Botrytis and Coniothyrium have long been known to be pathogens of roses. Alternaria, Pestalotia and Trichotecium are usually considered to be secondary pathogens or saprophytes. However, Botryodiplodia has not been reported on roses before.

To determine which of these fungi were causing the major damage on roses, inoculation studies were initiated using these fungi on 2 rose cultivars.

Materials & Methods

Mycelial plugs of the fungal isolates Botryodiplodia, Botrytis, Coniothyrium and Pestalotia were used to inoculate 250 ml Erlenmeyer flasks containing autoclaved wheat seed. After inoculation, the flasks were incubated for 2 weeks. Two cultivars, 'Belinda' and 'Golden Fantasy' were used for the inoculation studies. Using disinfected pruning shears, 5 young canes on each plant were pruned back leaving about 50 mm stubs. One kernel of inoculated grain was impaled on a pin and the pin inserted until the inoculum was in contact with the cut cane surfaces. A moistened paper towel was wrapped around the cane just below the cut surface and covered with a plastic bag. One plant of each of the rose cultivars were inoculated with each fungus. Control plants were treated similarly except non-inoculated grain was used. A wet paper towl was wrapped around the inoculated cane and covered with a plastic bag. Inoculated plants were placed on a greenhouse bench, 23°C/18°C day/night temperatures, and 3 weeks after inoculation one of the plastic bags on each plant was removed and developing cankers examined. The 4 remaining plastic bags on each plant were removed after 3 months and the advance of the developing cankers measured.

Mycelial plugs (5 mm) of Alternaria, Botryodiplodia, Botrytis, Coniothyrium, Pestalotia and Trichotecium were placed on potato dextrose agar (PDA) amended with benomyl 50 WP at concentrations of 100, 500 2000 ug/ml to determine the affects on radial growth of these fungi. Petri plates contained approximately 20 ml of amended PDA. Colony diameter of the fungi placed on amended PDA was measured at 2 day intervals. Five plates of each fungicide rate were inoculated with each of the 6 fungi. Controls were unamended PDA plates inoculated with mycelial plugs of the test fungi.

Results

The average advance of disease after 3 months on 4 lateral canes of 'Belinda' and 'Golden Fantasy' which were inoculated with each of the various rose cane pathogens is given in Table 1. No disease areas developed on any of the control canes. Pestalotia moved 3-5 mm into the cane tip but did not develop beyond this initial 3-5 mm on either cultivar. Botryodiplodia, Botrytis and Coniothyrium all advanced into the canes from the original point of inoculation. Botryodiplodia advanced an average of 42 mm in canes of 'Belinda' and 50 mm in canes of 'Golden Fantasy'. Botrytis advanced 21 mm in canes of 'Belinda', but it advanced 51 ml in canes of 'Golden Fantasy'. Coniothyrium advanced 22 mm in canes of 'Belinda' whereas, on 'Golden Fantasy', the pathogen advanced 122 mm. Thus, on most of the 4 canes on 'Golden Fantasy' plants inoculated with Coniothyrium, the pathogen advanced from the point of inoculation on the cut surface through the break into the main stem and down into the root-stock (Table 1).

Table 1. Disease development on the canes of 'Belinda' and 'Golden Fantasy' caused by various rose cane pathogens.

Rose Cultivar	Pathogens	Growth of Pathogen (mm) after 3 months
Belinda	Botryodiplodia	42
	Botrytis	28
	Coniothyrium	22
	Pestalotia	4
	Check	0
Golden Fantasy	Botryodiplodia	50
	Botrytis	51
	Coniothyrium	122
	Pestalotia	4
	Check	0

Average fungal colony diameter in 5 petri plates of each rate of benomyl 50 WP amended PDA inoculated with mycelial plugs of the various rose cane pathogens and incubated at room temperature for 4 days are given in Table 2. Benomyl 50 WP completely inhibited growth of Botryodiplodia, Coniothyrium, Pestalotia and Trichotecium at the rates of 100, 500 and 2000 ug/ml. Alternaria developed 20-22 mm colonies on the 100 ug/ml and 500 ug/ml fungicide amended plates respectively and 7 mm colonies on the 2000 ug/ml plates as compared to 36 mm colonies on control plates. Colony diameters for Botrytis decreased with increasing concentration of benomyl 50 WP and all colony diameters on fungicide amended plates were smaller than on the control plates.

Discussion

From these preliminary inoculation studies it appears that some of the fungi isolated from the rose canes are aggressive pathogens. Botryodiplodia, Botrytis and Coniothyrium all moved down from the sites of inoculation causing discoloration and cankering of the lateral canes. The Pestalodia, however, did not move beyond the initial site of inoculation. There was a difference in the extent of canker formation on the 2 rose cultivars with Botrytis and Coniothyrium. The cankers produced by Botrytis were more extensive on the cultivar 'Golden Fantasy' than on the 'Belinda' cultivar. Coniothyrium developed much more extensively on 'Golden Fantasy' than on 'Belinda' suggesting a difference is susceptible to this pathogen.

We have observed that the canker disease usually develops slowly in the greenhouse and growers frequently fail to detect cankered canes. Effective control of cane diseases can be accomplished by 1) removal of dead or weak plants, 2) avoid stem injury, 3) prune close to the node to allow development of callus over wound tissue and application of fungicides. Removal of diseased stems can be done by pruning back to the node of a vigorously growing shoot.

The fungi used in this study was most commonly found on 'Golden Fantasy'. Further, these fungi were isolated from canes growing in several different commercial greenhouses. Preliminary studies have indicated that benomyl 50 WP applied to the cut surface after pruning has provided control of some of these fungi compared with control plants. Our studies in which benomyl 50 WP was incorporated into PDA varifies this. Additional studies are underway and results will be discussed when the research is completed.

Table 2. Average radial growth of various rose cane pathogens after 4 days growth on benomyl 50 WP.

	Radial growth of pathogen (mm) after 4 days			
	Fungicide Rate			
Pathogen	Control	100 ug/ml	500 ug/ml	2000 ug/ml
Alternaria	36	20	22	7
Botryodiplodia	85	5	5	5
Botrytis	83	64	41	19
Coniothyrium	24	5	5	5
Pestalotia	56	5	5	5
Trichothecium	45	5	5	5

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