Fungicides Control Cercospora Leaf Spot on Fuchsia Meidiland® Rose

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INTRODUCTION

While black spot is widely recognized as the most widespread and destructive disease of rose, Cercospora leaf spot, which is caused by the fungus *Cercospora rosicola*, may be a relatively common but often overlooked disease on roses in nursery and landscape plantings, particularly in the southeastern United States. Cercospora leaf spot is characterized by the appearance of numerous tiny maroon to purple oval leaf spots that are scattered randomly across the leaf surface *(6).* Later, the center of these spots turn tan to almost gray in color while the margin of the spot remains maroon to dark purple (Figure 1). Heavily spotted leaves turn yellow and are prematurely shed (Figure 2). Typically, leaf loss begins at the base of the canes and gradually spreads upwards through the canopy towards the shoot tips. As is the case with black spot, symptoms first appear in early to mid-April. In South Alabama, leaf spotting and defoliation intensifies through the summer and into early fall, particularly during extended periods of wet, cloudy weather. Growth of shrub roses heavily defoliated by Cercospora leaf spot may be greatly reduced *(9).* Given the rather similar symptoms, this disease can easily be misdiagnosed by rosarians, as well as nursery and landscape management personnel as black spot (Figures 3 and 4).

Counterclockwise from left:
Figure 1. Cercospora leaf spot on rose.
Figure 2. Spotting and yellowing of leaves on 'Happy Trails' shrub rose due to Cercospora leaf spot.
Figure 3. Early symptoms of black spot on rose.
Figure 4. Early leaf shed and stunting of black-spot damaged 'Raven' rose (left) vs a Daconil-sprayed 'Raven' rose (right).

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The risk of significant Cercospora leaf spot damage may be greater on shrub and ground cover roses than on hybrid tea and grandiflora roses. In a recent Alabama study *(8),* moderate levels of Cercospora leaf spot-induced premature defoliation were seen on Polar Ice™, Fire Meidiland®, and Fuchsia Meidiland®. Heavier leaf spotting and defoliation was seen on Happy Trails™, Flower Carpet™, White Flower Carpet™, 'Petite Pink Scotch', 'The Fairy', Carefree Delight™, and 'Therese Bugnet' *(9).* In a North Carolina study *(1),* Cercospora leaf spot was also noted on Fire Meidiland®, Fuchsia Meidiland®, Alba Meidiland®, Scarlet Meidiland®, and Pink Meidiland®, as well as on Red Meidiland® and 'Sea Foam' in Central Alabama *(3).* Previously, this disease was reported on hybrid tea roses in California *(10)* and South Africa *(2),* as well as on 'Christian Dior' hybrid tea rose in Alabama *(4).*

Relatively little information is available concerning the control of Cercospora leaf spot on roses with fungicides. While Clendenen *(3)* saw some reduction in Cercospora leaf spot damage with bimonthly applications of SunSpray Ultra Fine Oil® (paraffinic oil), chlorothalonil applied bimonthly gave the best control of this disease on shrub roses. Depending on cultivar susceptibility to Cercospora leaf spot, bimonthly or monthly applications of Daconil Ultrex® (chlorothalonil) controlled this disease on shrub roses *(9)* and 'Christian Dior' hybrid tea rose *(4).* The objective of this study was to evaluate the effectiveness of several commercial fungicides for the control of Cercospora leaf spot on a shrub rose in a simulated landscape planting.

MATERIALS AND METHODS

On June 7, 2000, Fuchsia Meidiland® shrub rose was planted at the Brewton Agricultural Research Unit (USDA Hardiness Zone 8a) in Brewton, Alabama. Prior to planting, soil fertility and pH was adjusted according to the results of a soil fertility assay conducted by the Auburn University Soil Fertility Laboratory. The plants were watered as needed with a drip irrigation system. Beds were mulched with 0.5 to 1 inches of aged pine bark. In February, all of the plants were heavily pruned and the bark mulch was freshened. Approximately four to five times during the growing season, 2.4 ounces or 4 ounces 15-0-15 or 16-4-8 fertilizer was evenly distributed around the base of each plant. When a fertilizer application was made, 4 ounces of Sul-Po-Mag (K-Mag) was also evenly spread around the base of each plant. Annual weeds were controlled with bi-annual applications of the pre-emergent herbicides Gallery™ and Surflan AS™. Escape weeds were pulled by hand or controlled with a directed application of the herbicide MSMA. Fungicide treatments were applied to drip from April 20 to October 4, 2001; March 15 to October 9, 2002; and March 20 to September 25, 2003.

Cercospora leaf spot severity was visually assessed using a rating scale where 1 = no disease, 2 = light spotting in the lower plant canopy, 3 = light spotting in the lower and upper plant canopy, 4 = some spotting with light defoliation (<10%), 5 = noticeable spotting with some defoliation (<25%), 6 = spotting heavy with significant defoliation (<50%), 7 = very heavy leaf spotting with severe defoliation (<75%), 8 = numerous spots on few remaining leaves and very heavy defoliation (<90%), 9 = very few remaining leaves covered with spots and nearly complete defoliation (<95%), and 10 = plants defoliated. Disease ratings displayed in the table were taken on September 26, 2001; October 3, 2002; and September 13, 2003.

RESULTS

When compared with the untreated control, all fungicide treatments greatly reduced the severity of Cercospora leaf spot in 2001. As indicated by a disease rating of 5.8, noticeable leaf spotting along with nearly 50% defoliation was observed for the untreated roses (see table). In comparison, Daconil Ultrex applied weekly, Eagle®, Heritage®, and Compass™, which had similar disease ratings, limited disease development to the spotting of a few scattered leaves in the lower canopy. Daconil Ultrex® proved more effective in controlling Cercospora leaf spot when applied at one- than two-week intervals. Eagle® and Heritage® were equally effective against Cercospora leaf spot when applied at one- and two-week intervals. While none of the fungicide treatments damaged the leaves, buds, or blooms of Fuchsia Meidiland®, the white residue of Daconil Ultrex® was seen, particularly on those roses treated weekly with this fungicide.

Comparison of Fungicides for the Control of Cercospora Leaf Spot on Fuchsia Meidiland® Rose

Fungicide	Application Rate/ 100 gal	Interval wk	Cercospora leaf spot Disease Rating* 2001	2002	2003
Daconil Ultrex ®	1.4 lb	1	1.2 c**	1.2 c	1.7 cd
Daconil Ultrex®	1.4 lb	2	2.8 b	1.7 bc	2.5 b
Eagle®	6.0 oz	1	1.2 c	1.2 c	1.5 d
Eagle®	6.0 oz	2	1.7 c	1.8 b	1.7 cd
Heritage®	4.0 oz	1	1.3 c	1.3 bc	1.2 d
Heritage®	4.0 oz	2	1.7 c	1.2 c	2.3 bc
Compass™	2.0 oz	1	1.2 c	1.6 bc	1.6 d
Untreated Control	---	--	5.8 a	4.2 a	4.7 a

*Disease ratings were recorded on September 26, 2001; October 3, 2002; and September 13, 2003.

**Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's least significant difference test (P=0.05).

Although rainfall totals for June, July, September, and October 2002 were above the historical average for this location, disease development was slow. When compared with the untreated control, reductions in Cercospora leaf spot severity were obtained with all fungicide treatments (see table). Regardless of the fungicide treatment, symptoms on all of the fungicide-treated roses were limited to very light spotting of the leaves with no premature defoliation. Eagle® was more effective in controlling this disease when applied at one- than at two-week intervals, while Daconil Ultrex® and Heritage® proved equally effective in controlling Cercospora leaf spot at both intervals. Compass™ gave similar control of this disease as weekly applications of Daconil Ultrex®, Eagle®, and Heritage®. A distinctive leaf burn was noted on the Bravo Ultrex®-treated roses, particularly those treated weekly with this fungicide (Figure 5).

Figure 5. White Daconil deposits and associated dark-colored Daconil-incited burn on rose leaves.

In 2003, disease ratings for the unsprayed control again were higher compared with those of the fungicide treatments. A 4.7 disease rating for the untreated control indicates that moderate spotting of the foliage, as well as almost 20% defoliation was seen. Weekly applications of Daconil Ultrex® and Heritage® gave better control of Cercospora leaf spot than bimonthly treatments of the same fungicides. However, the 2.5 or lower ratings for the bimonthly Daconil Ultrex® and Heritage® treatments indicate that the light and unobtrusive leaf spotting was limited to the base of the plants. Similar disease control was obtained with Eagle® applied at one- and two-week intervals. The level of Cercospora leaf spot control given by weekly Compass™, Daconil Ultrex®, Heritage®, and Eagle® was similar. Again, a Bravo Ultrex®-induced burn was found on the leaves.

SUMMARY

Over a three-year period, Daconil Ultrex®, Eagle®, Heritage®, and Compass™ were highly effective in controlling Cercospora leaf spot on rose. Typically, symptoms were limited to light spotting in the lower plant canopy. Previously, Clendenen *(3)* and Hagan *et al. (8)* also noted that Daconil Ultrex® applied bimonthly significantly reduced Cercospora leaf spot-related leaf spotting and premature defoliation on shrub roses. Daconil Ultrex® and other formulations of chlorothalonil, as well as Eagle® are also among the most effective fungicides for controlling black spot on rose *(4,5,7,8).* When applied weekly, Compass™ at the 4 ounces per 100 gallon rate will also give some control of black spot *(8).* In contrast, Heritage® is much less effective in controlling black spot than Daconil 2787® or Eagle® *(7).*

When applied weekly, Daconil Ultrex® was as effective as the weekly and bimonthly Eagle® and Heritage® programs in controlling this disease on Fuchsia Meidiland® rose. The bimonthly Daconil Ultrex® program was not quite as effective in controlling Cercospora leaf spot as well as Eagle® and to a lesser extent Heritage® applied on the same treatment schedule. In at least two years, a leaf burn was noted on the Daconil Ultrex® (chlorothalonil)-treated roses. Previously, Hagan *et al. (9)* reported significant chlorothalonil-induced leaf burn on the hybrid tea Double Delight™, as well as Knock Out™, First Light™, Flower Carpet®, 'Hansa', Happy Trails™, Magic Carpet™, Mystic Meidiland®, 'Nozomi', and Raven™ shrub roses *(8).*

In residential and commercial landscapes, bimonthly applications of either Daconil Ultrex®, Eagle®, or Heritage® should control of Cercospora leaf spot on most shrub rose selections. In some locations, monthly fungicide applications may be adequate to control Cercospora leaf spot on a partially disease resistant cultivar like Fuchsia Meidiland®, Fire Meidiland®, or Polar Ice™. In a concurrent study at the same location, light defoliation was seen on the above shrub roses treated monthly with Daconil Ultrex®, but the level of leaf spotting was not especially noticeable *(9).* On the more Cercospora leaf spot-susceptible Happy Trails™, Flower Carpet™, White Flower Carpet™, 'Petite Pink Scotch', 'The Fairy', Carefree Delight™, or 'Therese Bugnet' shrub roses, a season-long bimonthly fungicide program probably will be needed to prevent heavy leaf spotting and premature defoliation.

Daconil Ultrex®, which contains the active ingredient chlorothalonil, is sold in garden centers and other retail outlets as Daconil™ (Hi-Yield™) and Garden Fungicide™ (Ortho®). Chlorothalonil is also marketed as a wetable powdery or liquid flowable formulation by other retail pesticide distributors under different trade names. The leaf burn associated with the use of this fungicide may be reduced by making applications when leaf temperatures are cooler in the morning or evening. Adding another pesticide, spray adjuvant, or liquid fertilizer to tank mixes of the above fungicide will greatly increase the risk of a severe leaf burn. Immunox™ (Spectracide™), which has the same active ingredient as Eagle® 40W, is also widely available. Heritage® and Compass™, which are used primarily by the commercial nursery and greenhouse industry, have not been repackaged for the residential landscape market.

LITERATURE CITED

1. Bir, R. E., T. G. Ranney, and R. K. Jones. 1996. Pest resistant shrub roses, the rest of the story. Proc. SNA Res. Conf. 41: 278-279.

2. Boelema, B. H. 1973. A Cercospora leaf spot and stem necrosis on Rosa sp. In the Transvaal. Phytophylactica 5(1):7-12.

3. Clendenen, B., B. Behe, K. L. Bowen, and D. Weaver. 1997. Evaluation of disease resistant rose varieties for southern landscapes. Proc. SNA Res. Conf. 42:78-80.

4. Hagan, A. K. and J. R. Akridge. 2005. Comparison of fungicide drenches for the control of black spot and Cercospora leaf spot on rose, 2004. Fungicide and Nematicide Tests 60:(in press).

5. Hagan, A. K., C. H. Gilliam, D. C. Fare, and K. L. Bowen. 1991. Application rates and spray schedules of ergosterol-biosynthesis inhibitor fungicides for control of black spot of rose. Plant Dis. 75:1143-1146.

6. Hagan, A. K. and J. M. Mullen. 2000. Diseases of roses and their control. AL. Coop. Ext. Sys. ANR-505.

7. Hagan, A. K., J. W. Olive, and F. C. Parrott, Jr. 2000. Evaluation of Heritage at several application rates and treatment intervals for the control of black spot on rose, 1999. Fungicide and Nematicide Tests 55:560.

8. Hagan, A. K. J. W. Olive, and J. Stephenson. 2004. Effect of application rate on control of rose black spot with Compass 50W, 2003. Fungicide and Nematicide Tests 59:OT041.

9. Hagan, A. K., M. E. Rivas-Davila, J. R. Akridge, and J. W. Olive. 2005. Disease resistance and response of shrub and ground cover roses to fungicides. Alabama Agric. Exp. Stn. Bull. 656.

10. McCain, A. H. and D. S. Farnham. 1974. Cercospora leaf spot - an unusual occurrence. Flower and Nursery Report. May:4-5.

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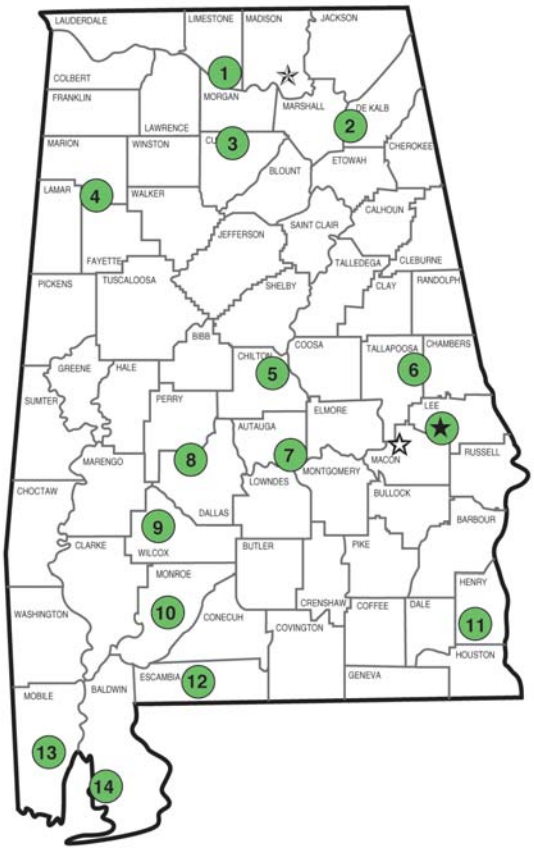

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