PP268

UF UNIVERSITY of FLORIDA
IFAS Extension

Black Spot of Rose[1]

Jozer Mangandi and Natalia A. Peres[2]

Introduction

Black spot, a fungal disease, affects nearly all rose cultivars worldwide. It is a frequent problem for roses grown outdoors and reduces the quality and life span of the plants. However, the poor performance of roses in Florida can also be associated with various factors such as inadequate fertilization and water deficiency during the warm season, as well as the use of root stocks and scions not well-adapted to Florida's conditions.

Causal Agent and Geographical Distribution

The black spot pathogen, *Marssonina rosae* (*Diplocarpon rosae*, sexual stage), is a parasite specific to roses and is considered the most serious disease of roses in Florida. The disease was first reported in Sweden in 1815 and in the United States in 1830. Since then it has been reported in South America, Canada, Australia, China and other countries.

Different genotypes or races of *M. rosae*, i.e. isolates that infect a specific cultivar or group of cultivars, have been identified. Certain species of roses and also cultivars of old garden roses are considered more resistant to the disease than modern cultivars. Modern roses and especially the popular hybrid teas are not only more susceptible to the disease, but also considered high maintenance roses in Florida requiring more attention to disease control, fertilization, and water supply.

Symptoms

M. rosae produces black spots of about two to 12 mm in diameter usually in the upper surface of the leaves (Fig. 1a). Often, those spots may have irregular, radiate, feathery borders (Fig. 1b). In older lesions, black spore-bearing structures, called acervuli, can be observed as well as white, slimy masses of conidia (Fig. 2a). Yellowing around the lesions on infected leaves can occur and severe defoliation occurs in the most susceptible cultivars. While leaves are the most susceptible part of the plant, stipules and pedicels can also be infected. Spots can also be found also in peduncles, fruits and

1. This document is PP268, one of a series of the Plant Pathology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date May 2009. Visit the EDIS Web Site at http://edis.ifas.ufl.edu.

2. Jozer Mangandi, graduate student, Department of Environmental Horticulture; Natalia A. Peres, assistant professor, Department of Plant Pathology, Gulf Coast Research and Education Center (REC)--Balm; Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

sepals. Symptoms of black spot are usually confused with those of Cercospora leaf spot (See EDIS publication *Cercospora Leaf Spot of Rose* at http://edis.ifas.ufl.edu/PP267).

Fig. 1A. Leaves of 'Old Blush' rose infected with *Marsonina rosae*. Credits: J. Mangandi

Fig. 1B. Typical lesion of black spot on a rose leaf. Credits: J. Mangandi

The infection cycle starts when spores are spread by rain or overhead irrigation from leaves or canes infected from the previous season. The conidia must be wet for several hours to infect plant tissues. Symptoms begin to appear in three to 16 days after infection. Mature conidia can be produced 10 to 18 days after infection and initiate a new cycle. Conidia are colorless and two-celled (Fig. 2b). A temperature of 64°F is optimal for black spot development, but conidia germination still occurs from 59 to 81°F. This wide temperature range allows the disease to continue to develop as long as the moisture is adequate during the season.

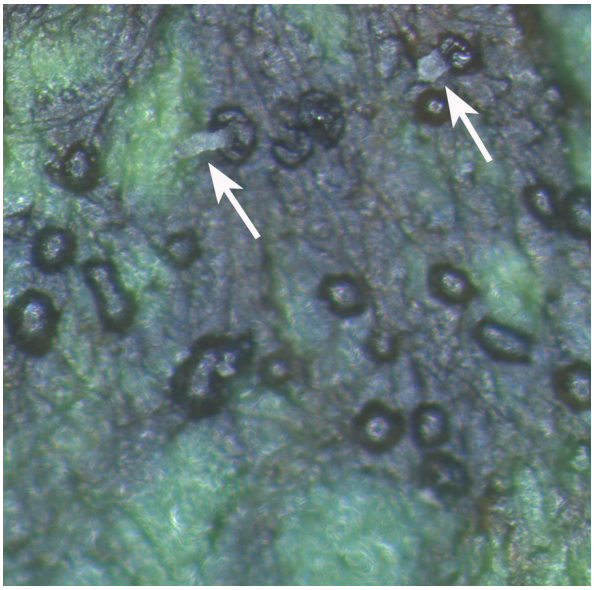

Fig. 2A. Black acervuli on a lesion caused by *Marsonina rosae.* Note the white masses of conidia (arrows), 50x. Credits: J. Mangandi

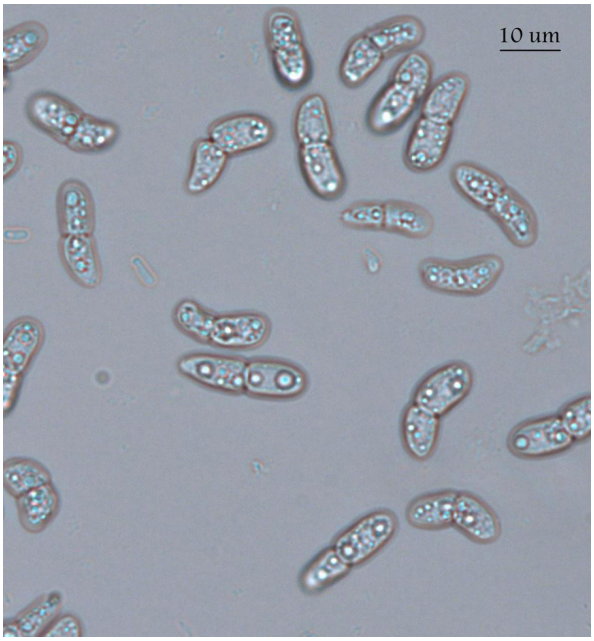

Fig. 2B. Microscopic view of two-celled conidia of *Marsonina rosae*, 400x. Credits: J. Mangandi

Control

Black spot can be controlled using cultural practices such as planting cultivars with resistance to the disease. Sanitation practices include removal and burning of fallen leaves and pruning of canes late in the winter before new shoots are produced. Plants should not be allowed to remain wet for long periods of time and overhead irrigation should be avoided or minimized. If this is not possible, plants should be irrigated early in the morning to allow leaves to dry.

For chemical control, an initial application of a protectant fungicide should be made at bud break, followed by bimonthly applications until leaves are completely expanded. During the summer, applications every 7-14 days may be necessary to successfully manage the disease. Fungicides labeled for the control of black spot of roses in Florida are listed in Tables 1 and 2. For managing fungicide resistance, the best strategy is to rotate among products with different modes of action. All fungicides within the same group (with the same number or letter) have the same active ingredient or a similar mode of action. Fungicide resistance is usually low with multi-site inhibitor fungicides (M).

Table 1. Fungicide products marketed for use by professional pesticide applicators for control of black spot on roses.

Trade name	Active ingredient	Fungicide group
Heritage®	Azoxystrobin	11
Captan® 50 WP, Captan® 50 W, Captec® 4L	Captan	M4
Spectro® 90 WDG	Chlorotalonil + thiophanate-methyl	M5+1
Daconil® Ultrex	Chlorothalonil	M5
Echo® 720 T&O, Echo® ZN T&O		
Esign® 720		
Prokoz® Mainsail 6.0 F, Prokoz® Mainsail WDG		
Sporan® EC	Clove oil+ Rosemary Oil+ Thyme oil	NC
Copper Count® N	Copper ammonium complex	M1
Champ® DP, Dry Prill	Copper hydroxide	M1
Champ® Formula 2 Flowable		
Badge® SC	Copper hydroxide + Copper oxychloride	M1
C-O-C-S® WDG	Copper oxychloride sulfate	M1
Ferbam® Granuflo	Ferbam	M3
Dithane® -75 DF Rainshield	Mancozeb	M3
Fore® 80WP Rainshield		
Penncozeb® 75 DF T&O		
Prokoz® Clevis	Mancozeb + Myclobutanil	M3 + 3
Maneb® 75 DF, Maneb® 80 WP	Maneb	M3

Table 1. Fungicide products marketed for use by professional pesticide applicators for control of black spot on roses.

Trade name	Active ingredient	Fungicide group
Eagle® 20EW, Eagle® 40WP	Myclobutanil	3
Prokoz® Hoist		
JMS® Stylet-oil, Organic JMS® Stylet oil	Parafinic Oil	NC
Saf-t-side®	Petroleum Oil	NC
Banner Maxx®	Propiconazole	3
Procon Z		
Prokoz®Fathom 14.3 MEC		
Propensity® 1.3 ME		
Kumulus® DF Fungicide/Acaricide	Sulfur	M2
Sulfur® 6L, Sulfur 90 W, THAT® flowable Sulfur, Thiolux® Jet		
3336 F	Thiophanate-methyl	1
Ziram® 76 DF, Ziram® Granuflo	Ziram	M3
Fungicide Group (FRAC Code): Numbers (1-37) and letters (M) are used to distinguish the fungicidal mode of action groups. All fungicides within the same group (with same number or letter) indicate same active ingredient or similar mode of action. This information must be considered in making decisions about how to manage fungicide resistance. M=Multi-site inhibitors, fungicide resistance is low; NC= not classified. Source: http://www.frac.info/ (Fungicide Resistance Action Committee, FRAC). Be sure to read a current product label before applying any chemicals.		

Table 2. Fungicide products marketed toward homeowners for control of black spot on roses.

Trade name	Active ingredient	Fungicide group
Hi-Yield® Captan Fungicide, Bonide®Captan Fruit and Ornamental	Captan	M4
Ferti-lome® Liquid fungicide, Bonide® Fungonil Multipurpose Fungicide, Monterey® Bravado Fungicide,Ortho Garden Disease Control	Chlorothalonil	M5
Monterey® Liqui-Cop	Copper ammonium compex	M1
Ferti-lome® Blackspot Powdery Mildew Control, Hi-Yield® Copper Fungicide	Copper hydroxide	M1
Bonide® Copper Dust or Spray, Dexol® Bordeaux Powder	Copper Sulfate	M1
Bonide® Mancozeb Flowable	Mancozeb	M3
Spectracide® Immunox Multipurpose Fungicide	Myclobutanil	3
Bonide® Rose Rx 3-in-1, Ferti-lome® Triple Action Plus, Monterey® 70% Neem oil	Neem Oil	NC
Bonide® Remedy	Potassium Bicarbonate	NC
Ferti-lome® Systematic Fungicide, Bonide® Infuse	Propiconazole	3
Bonide® Sulfur Plant Fungicide, Ferti-lome® Dusting Sulfur, Green Light® Wettable Dusting Sulfur, Hi-Yield® Dusting Wettable Sulfur, Safer Garden® Fungicide	Sulfur	M2
Bayer® Advanced Garden Disease Control for Roses, Flowers & Shrubs	Tebuconazole	3
Ferti-lome® Halt Systemic Fungicide, Green Light® Systemic Fungicide.	Thiophanate-methyl	1
Ortho® Rose Pride Rose & Shrub Disease Control	Triforine	3
Ziram® 76 DF, Ziram® Granuflo	Ziram	M3

Table 2. Fungicide products marketed toward homeowners for control of black spot on roses.

Trade name	Active ingredient	Fungicide group
Fungicide Group (FRAC Code): Numbers (1-37) and letters (M) are used to distinguish the fungicidal mode of action groups. All fungicides within the same group (with same number or letter) indicate same active ingredient or similar mode of action. This information must be considered in making decisions about how to manage fungicide resistance. M=Multi-site inhibitors, fungicide resistance is low; NC= not classified. Source: http://www.frac.info/ (Fungicide Resistance Action Committee, FRAC). Be sure to read a current product label before applying any chemicals.		