

Diseases of Roses and Their Control

ANR-505

Few flowering plants can match the beauty, versatility, and popularity of the rose. Numerous varieties offer a wide range of growth habits and floral colors. With the proper care, some rose varieties will bloom from early spring through late fall.

Disease control is critical for maintaining healthy roses. Of the diseases found on roses, blackspot is by far the most widespread and damaging. Other diseases of concern to rose growers include powdery mildew, Botrytis blight, downy mildew, crown gall, viruses, and plant parasitic nematodes.

Blackspot

SYMPTOMS. Rose leaves and canes often show symptoms of this disease, which is caused by the fungus *Diplocarpon rosae*. Brown to black circular spots ($\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter) are seen on both leaf surfaces (Figure 1). A fringed margin around each leaf spot is characteristic of black spot on rose. Usually, the disease first appears on the leaves at the base of each cane. As symptoms continue to develop, a yellow margin or halo develops around each spot. Several spots may grow together and form large blotches. Large yellow blotches often appear on heavily spotted leaves just before they fall from the plant. Defoliation caused by blackspot is perhaps the most common symptom of this



Figure 1. Blackspot. Note yellowing of diseased leaves.

disease (Figure 2). Typically, leaf shed begins at the base of the canes and gradually spreads upward until all but the youngest leaves are lost. Heavy leaf shed reduces flower production and plant vigor. If severe drought or cold weather conditions further stress blackspot-damaged roses, the plants may die.



Figure 2. 'Sevillana' rose defoliated by blackspot

DISEASE CYCLE. The blackspot fungus survives the winter in the spots on diseased canes and fallen leaves. In early spring, fungal spores are carried by wind-blown rain or irrigation water to the young, expanding leaves. Spots on leaves develop about 10 to 14 days after infection. Frequent spring and summer showers favor further spread, infection, and defoliation. In the absence of effective control measures, roses susceptible to blackspot are often badly defoliated by early June. Once established in a rose planting, blackspot is likely to be an annual problem.

CONTROL PRACTICES. A blackspot control program on cultivated roses starts with regular fungicide applications. For effective season-long disease control, begin fungicide applications shortly after spring bud break and continue at a 7- to no more than 14-day interval right up to the first hard frost. During periods of frequent showers, shorten the time interval between fungicide applications to 5 to 7 days. Spray both the upper and lower leaf surfaces until the fungicide drips from the foliage. Adding a commercial surfactant or liquid detergent ($\frac{1}{2}$ tablespoon per gallon) may improve disease control with wettable powder fungicides. See Table 1 for a list of fungicides registered for blackspot control on roses. The best time to apply a fungicide on roses is early evening. Some fungicides will burn rose foliage if applied on a hot, sunny day.

Cultural practices are also helpful in slowing the spread of blackspot on roses. In the fall, collect and destroy all leaves on the ground. Prune diseased or weakened canes at bud swell and replace the soil mulch in late winter or early spring. Plant roses in full sun and far enough apart to allow some air circulation. Surface irrigate roses to avoid wetting the foliage. If this is not possible, water plants at mid-day to reduce the time the foliage is wet.

Table 1. Fungicides Recommended for Blackspot Control

Fungicide	Rate per Gal. of Water	Interval (Days)*
chlorothalonil		
Daconil Weather Stik 6F**	1.5 t	7 to 14
Garden Fungicide**	2.3 t	7 to 14
myclobutanil		
Immunox	2 T.	7 to 14
propiconazole		
Systemic Fungicide	2 T.	7 to 10
tebuconazole		
Disease Control for Roses, Flowers, and Shrubs	1.5 T.	7 to 14
triforine		
Rose & Shrub Disease Control	1 T.	7 to 10
thiophanate-methyl		
3336 4.5 F	$\frac{1}{2}$ to 1 T.	7 to 10
3336 50W	2.5 t.	7 to 10
Halt	2.5 t.	7 to 10

*Shorten spray interval to 5 to 7 days during rainy weather.

**Foliar burn may occur during summer, especially on hybrid tea roses.

Roses differ in their susceptibility to blackspot. When buying roses, always choose blackspot resistant cultivars; however, resistance does not mean that this disease will not damage roses. In

Alabama, weather conditions are so favorable for disease development that nearly all blackspot resistant roses, without the protection of weekly fungicide sprays, will suffer severe spotting of the leaves and heavy leaf loss. Breeding truly blackspot resistant Hybrid Tea, Grandiflora, and Florabunda roses is in progress, but no new cultivars have been released.

Table 2. Reaction of Heritage Roses to Blackspot

Highly Resistant to Immune: Felicite Parmentier, Mne. Hardy, The Bishop, Rosa Mundi, Comtesse du Cayla, Old Bush, York and Lancaster, Rose de Meaux, Bolue de Neige, Charles De Mills

Moderately Resistant: Belle de Crecy, Baron Girod de L' Ain, Mme. Isaac Periere, Paul Neyron, Tuscany, Ispahan, Belle Isis, Gloire des Mousseuses, Tour de Malakoff

Moderately Susceptible: Kazanlik, General Kleber, Barrone Prevost, Fantin Letour, William Lobb, Comtesse du Murinais, Rose du Rescht, Konigen von Danemark, General Jaqueminot, La Reine Victoria

Highly Susceptible: Juno, Alfred de Dalmas, Reine Violettes, Crested Moss, Rose du Roi, Autumn Damask, Marie Louise, Cardinal du Richelieu, Hermoas, Leda

Source: Spencer, J.A. and O.W. Wood. 1992. Response of Selected Old Garden Roses to Seven Isolates of Marssonina Rosae in Mississippi. J. Environ. Hort. 10:221-223.

In Mississippi, a number of Heritage (shrub-type) roses have been shown to be highly resistant to nearly immune to rose blackspot and may not require fungicides to maintain plant aesthetics and beauty (see Table 2). Also, the blackspot resistant shrub roses Red Cascade, Knock Out, Ice Meidiland, Mystic Meidiland, Hansa, Pink Grootendorst, Polar Ice, Fuchsia Meidiland, and Fire Meidiland also can be maintained in landscape plantings without fungicide sprays. When sprayed weekly, little or no leaf shed has been reported on the roses Carefree Delight, American Pride, Chrysler Imperial, Gene Boemer, Baby Blanket, Carefree Wonder, and Cherish. On the most blackspot susceptible roses such as Amber Queen, Chicago Peace, Peace, Pleasure, Tiger Tail, Grand Masterpiece, Arkansas, Arizona, and Spellcaster even weekly applications of the most effective fungicides may not prevent severe defoliation.

When buying new roses, select varieties with blackspot resistance. Some blackspot-resistant rose varieties are listed in Table 3. With the favorable conditions for blackspot development that exist in Alabama, a season-long program of foliar fungicide sprays is needed even on the most disease-resistant rose. This will effectively control blackspot.

Table 3. Roses Resistant to Blackspot¹

Hybrid Tea Roses	Grandiflora and Florabunda Roses
Tropicana	Queen Elizabeth
First Prize	Prominent
Miss All-American Beauty	Rose Parase
Mister Lincoln	Razzel dazzel
Tiffany	Gene Boerner
Portrait	Europeana
Pink Peace	Montezuma
Pristine	First Edition
Proud Land	Ivory Fashion
Duet	Sonia
Peace	Carrousel
Electron	Angel Face

¹From Ray, R., and M. MacCaskey. 1985. *Roses: How to Select, Grow, and Enjoy*. HP Books Inc. Tucson, Arizona.

Powdery Mildew

SYMPTOMS. Powdery mildew initially appears as small white patches of superficial dust on the surface of leaves, shoots, buds, and flowers (Figure 3). When the powdery mildew fungus infects young, expanding leaves and shoots, twisting and distortion will often occur in addition to the development of the white, powdery fungal growth. Leaf shed is sometimes seen on severely diseased plants. Diseased buds may fail to open and those that do often produce poor quality flowers. Repeated powdery mildew outbreaks can reduce plant vigor and possibly bud set.

DISEASE CYCLE. The mildew fungus, *Sphaerotheca pannosa*, overwinters primarily in dormant buds, but the fungus may survive on leaves and canes during mild winters. Fungal spores are produced on diseased buds and are spread to expanding leaves by air currents. Infection occurs at temperatures of 70 degrees to 80 degrees F when the relative humidity is 90 to 99 percent.



Figure 3. Powdery mildew in rose leaves

Powdery white fungal growth usually develops on the foliage within a week of infection. Unfolding leaves and tender shoots are more susceptible to this mildew fungus than mature tissues.

Dry, warm days followed by cool, humid nights in the spring and fall favor powdery mildew development. Since a water film inhibits infection, frequent showers or heavy dews usually slow the spread of the disease. Powdery mildew is rarely seen during hot weather.

CONTROL PRACTICES. Effective control of powdery mildew can be maintained with a combination of cultural practices and fungicide sprays. Cultural practices discussed under blackspot also apply to powdery mildew. Resistance is the best defense against powdery mildew. Typically, most available roses have relatively few problems with this disease. The most serious mildew-related damage is most often found on antique roses. In recent landscape trials in Alabama and Louisiana, powdery mildew was not seen on any of the numerous Hybrid Tea, Grandiflora, Floribunda, shrub, and ground cover roses tested. See Table 4 for a list of roses that have good resistance to powdery mildew.

Table 4. Roses Resistant to Powdery Mildew

Tiffany	Queen Elizabeth	Pristine
Europeana	Miss All-American Beauty	Rose Parade
Futura	Charisma	Pascali
Sarabande	Seashell	Saratoga
Pink Peace	Sunspire	Proud Land
Prominent	Mister Lincoln	Razzle Dazzle
Tropicana	First Edition	Chicago Peace
Evening Star		

From Ray, R. and M. MacCaskey. 1985. *Roses: How to Select, Grow, and Enjoy*. HP Books Inc. Tucson, AZ.

To simplify the control of foliar diseases on roses, choose a fungicide that has activity against both blackspot and powdery mildew. Of the fungicides currently recommended for blackspot control, only chlorothalonil (Daconil 2787) will not control powdery mildew. See Table 5 for a list of fungicides labeled for the control of powdery mildew on roses.

Stem Canker and Dieback

SYMPTOMS. Several fungi are capable of causing stem canker and dieback of roses. Cankers begin as spots ranging in color from yellow to purple, depending on the causal fungus. The developing cankers become sunken, forming wrinkled or cracked lesions that are tan to black (Figure 4). Canker margins are brown to reddish purple. Numerous small, black, wart-like specks embedded within the canker area are fruiting bodies of the causal fungus. Cankers often enlarge until the stem

Table 5. Fungicides Recommended for Powdery Mildew Control

Fungicide	Rate per Gal. of Water	Interval (Days)*
myclobutanil Immunox	2 T.	7-14
propiconazole Systemic Fungicide	2 T.	7-10
tebuconazole Disease Control for Roses, Flowers, and Shrubs	1.5 T.	7-14
triflorine Rose & Shrub Disease Control	1 T.	7-10
thiophanate-methyl 3336 4.5 F	½-1 T.	7-10
3336 50W	2.5 t.	7-10
Halt	2.5 t.	7-10

*When severe mildewing of leaves and canes is seen, shorten spray interval.

is girdled. Once the stem is girdled, the foliage above the canker wilts and dies. Cankers that form at the graft union usually result in plant death.

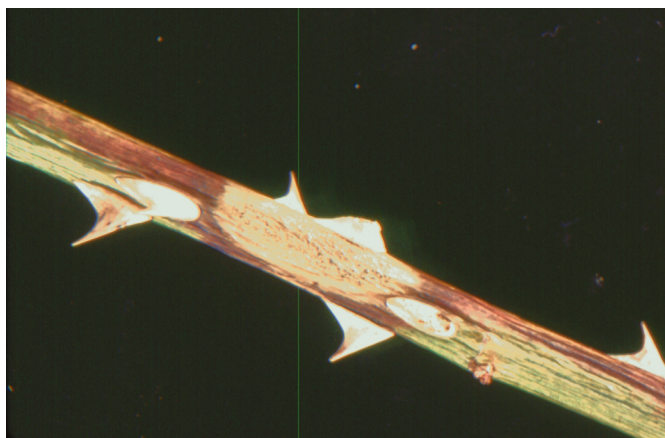


Figure 4. Rose canker

DISEASE CYCLE. The fungi causing stem canker and dieback usually survive the winter on diseased canes or plant debris. Spores of the causal fungi are usually spread by wind-blown rain or irrigation water. Rose canes are infected through wounds during periods of humid, wet weather. The disease may also be spread by fungus-contaminated pruning tools. Cankers often form on the stub of pruned canes, but they may also be seen around leaf or thorn scars, winter injury, or other damage on the canes. Stem canker and dieback are most damaging to weak, slow-growing roses.

CONTROL PRACTICES. When establishing or renovating rose beds, always plant canker-free roses and space the plants to allow for good air

circulation. Promote good plant vigor and minimize canker damage by irrigating and by fertilizing according to soil test recommendations. Avoid any unnecessary damage when pruning or handling plants. Make pruning cuts just above the node, leaving a small stub to speed callus formation. Remove cankers by cutting 5 to 6 inches below the canker margin. After each cut, dip pruning tools in 70-percent alcohol or a dilution of 1 part household bleach and 4 parts water. This will prevent the further spread of the disease. Fungicides applied for blackspot and powdery mildew control will provide some protection from stem dieback.

Botrytis Blight

SYMPTOMS. Buds, flowers, and peduncles are often infected by *Botrytis cinerea*, although cankers and dieback are also reported in the canes. Small, light-colored spots sometimes surrounded by a maroon halo are the first symptoms of Botrytis blight on flower petals. Under favorable conditions, the spots quickly expand into large, brown, irregular blotches covering much of each petal. Infected buds fail to open and often droop. Discolored, slightly sunken lesions often extend down the stem from blighted flower buds. Damaged petals and buds are usually covered with the gray-brown growth of the Botrytis blight fungus (Figure 5). Cankers formed as a result of Botrytis infections are similar in appearance to those produced by other stem canker and dieback fungi. Canes of bare-root roses held in cold storage are often blighted and killed by this disease.

DISEASE CYCLE. Extended periods of cool, humid weather, particularly when roses are in bloom, favor the development of this disease. Spores of the Botrytis blight fungus are dispersed by air currents. Infection and development of symptoms occur rapidly at temperatures of 60 degrees to 72 degrees F under moist, saturated conditions. Botrytis usually develops on older, senescent, or wounded flowers, shoots, or leaves.

CONTROL PRACTICES. Sanitation practices such as the removal of spent blossoms as well as the collection of fallen leaves and petals from around the base of the plant should reduce the risk of Botrytis blight. Spacing out plants will improve air circulation and speed up the evaporation of moisture from the surface of the blooms and leaves. Immediately prune out blighted blooms, canes, and buds. Fungicides such as Daconil, Immunox, and Cleary's 3336, which control black spot, also have activity against Botrytis blight. See Table 1 for application rates and treatment intervals for the above fungicides.



Figure 5. Botrytis Blight on 'Lady Banks' rose

Downy Mildew

SYMPTOMS. Damage caused by the downy mildew fungus *Peronospora sparsa* has been seen on container-grown roses and sometimes on garden roses. Symptoms occur primarily on the leaves, canes, and peduncles. Large red to brown angular spots sometimes surrounded by a yellow halo appear on the leaves (Figure 6). Yellow blotches develop before the diseased leaves are shed. Elongated, discolored blotches ½ to 1 inch in length form on the canes. Under favorable conditions, sparse, gray spore masses are sometimes seen on lesions on the lower leaf surface and on canes.

DISEASE CYCLE. The downy mildew fungus survives as dormant mycelia in lesions on rose canes. Spore production and infection occur during extended periods of cool, humid weather in early to mid spring. A relative humidity below 85 percent and temperatures above 80 degrees F suppress disease development.

CONTROL PRACTICES. In landscapes, removing diseased canes and establishing roses in full sun can minimize the occurrence of downy mildew. On greenhouse-grown roses, vent the house in the late afternoon and maintain the relative humidity below



Figure 6. Leaf symptoms of downy mildew

85 percent overnight. In both the greenhouse and nursery, protective fungicide treatments should be applied from the time the roses begin to leaf-out until the finished plants are shipped. Fungicide treatments are also a control option in established landscape plantings. Application rates and intervals for the fungicides registered for the control of downy mildew on roses are listed in Table 6. When symptoms are seen, apply the highest rate at the shortest interval.

Table 6. Fungicides Recommended for the Control of Downy Mildew on Roses

Fungicide	Rate per gallon	per 100 gallons	Interval (Days)
azoxystrobin Heritage 50W		2-4 oz	7-21
fosetyl-Al Aliette T/O Prodigy T/O	2-4 T. 2-4 T.	2.5 lb 2.5 lb	7-14 7-14

Cercospora Leaf Spot

SYMPTOMS. *Cercospora* leaf spot is characterized by the appearance of numerous tiny maroon to purple oval spots scattered randomly across the leaf surface (Figure 7). Later, the center of the spot turns tan to almost gray in color while the margin of the spot remains maroon to dark purple. Heavily spotted leaves will turn yellow and prematurely shed. Because *Cercospora*-damaged roses typically lose most of their leaves, this disease can easily be confused with blackspot.

DISEASE CYCLE. Very little specific information is available concerning the development of *Cercospora* leaf spot on roses. However, the same warm, wet weather patterns which favor the spread and development of blackspot will also start outbreaks of this disease. Beginning in early spring, spores of the causal fungus *C.* are spread by air currents to the newly expanded leaves. Free water on leaf surfaces triggers spore germination



Figure 7. Cercospora leaf spot on a shrub rose

and infection of the leaves. Frequent rain showers or possibly overhead watering favors continued disease spread until the first hard frost in the fall.

CONTROL PRACTICES. Currently, shrub and ground cover roses appear to be the main targets of Cercospora leaf spot. The reaction of these roses to Cercospora leaf spot is summarized in Table 7. Many of the roses resistant to Cercospora leaf spot are susceptible to blackspot. Fungicides such as Daconil Weather Stik, Immunox, and Halt, which are recommended as weekly treatments for blackspot control, should also provide good protection from Cercospora leaf spot when applied on the same schedule. See Table 1 for recommended application rates and treatment intervals for the above fungicides.

Crown Gall

SYMPTOMS. Rounded galls or swelling is usually found on stems or roots at or just below the soil surface. Galls have a rough, irregular surface and a diameter of ¼ to several inches (Figure 8). Young, developing galls are soft and white to light green, but they darken and harden with age. The surface of large woody galls often rots and sloughs off while the internal tissues are white. Roses with large, well-developed galls are stunted, have small yellow leaves, and produce few blooms.

DISEASE CYCLE. The crown gall bacterium, *Agrobacterium tumefaciens*, is usually introduced into the landscape on diseased nursery stock. As the galls rot, bacteria are released into the soil where they survive for 2 to 3 years. Bacteria enter the plants through wounds or natural openings in the roots. Once inside the plant, the bacteria stimulate rapid cell division as well as an increase in cell size. Galls usually become visible several months after infection and may continue to grow depending on the vigor of the host plant and environmental conditions. Gall decay usually starts when there is no longer enough water and nutrients available for growth.

Table 7. Reaction of Selected Shrub and Ground Cover Roses to Cercospora Leaf Spot

Susceptible: Petite Pink Scotch, The Fairy, Fushia Meidiland, Carefree Delight, White Flower Carpet, Happy Trails, Flower Carpet, Polar Ice, and Fire Meidiland

Highly Resistant to Immune: Jeepers Creeper, Ralph's Creeper, Royal Bonica, Nearly Wild, Betty Prior, Sevillana, Magic Carpet, Easy Livin', Cherry Meidiland, Pearl Meidiland, Rosa mutabulis, Rosa wichuraiana, First Light, Bonica, Carefree Wonder, Sea Foam, Pink Grootendorst, Nozomi, Red Cascade, Mystic Meidiland, Hansa, Double Delight

Source: Hagan, A. K., R. Akridge, and J. Olive. 1999. A rose is not just a rose. Al. Exp. Sta. Auburn University Highlights of Agriculture 46(3):18-20.

CONTROL PRACTICES. Inspect the roots and crown of roses for galls before planting. When planting or cultivating roses, avoid wounding the roots or crown of the plants. The root system of bare-root roses may be protected from crown gall with a pre-lant root-dip of the biological control agents Galltrol-A or Norbac 84-C. Fumigation of new or renovated rose beds is suggested before planting. Directions for the use of fumigants are discussed in Extension publication ANR-30, "Nematode Control in the Home Garden." Dip pruning tools in 70-percent alcohol or wash shovels or other digging equipment before working in another bed to prevent the spread of bacteria-infested soil. Destroy diseased roses and fumigate the area where the plants were removed. Where crown gall is a serious problem, consider replanting the area with woody ornamentals resistant to crown gall such as azalea, boxwood, crape myrtle, photinia, or wax myrtle.



Figure 8. Crown gall on rose



Figure 9. Rose mosaic. Note mosaic pattern.

Rose Mosaic

SYMPTOMS. Yellow ring spots, erratic white to yellow line patterns, and yellow-green mottle of rose foliage are the common symptoms of rose mosaic (Figure 9). Water marks, oak leaf patterns, vein-clearing, general yellowing of the leaves, and leaf distortion are also associated with rose mosaic. Symptoms are most noticeable during periods of rapid growth in the spring and fall. Some reduction in flower bud formation and shoot elongation has been seen on certain virus-infected rose varieties. Virus infections may reduce plant vigor and thereby increase plant sensitivity to damage caused by extreme drought or low temperatures. Other virus diseases of roses include rose rosette, rose leaf curl, and rose spring dwarf.

DISEASE CYCLE. Rose viruses are transmitted when virus-infected buds, scions, or rootstock are grafted to healthy plants. Unlike most plant viruses, rose viruses are not spread by insects. Pollen transmission of one virus, PNRSV (prunus necrotic ringspot virus), is suspected due to the slow spread of the disease within roses.

CONTROL PRACTICES. No practical cure for rose mosaic is known. When establishing new rose plantings, buy only plants that are free of virus disease symptoms. In landscape plantings, this disease does not cause enough damage to warrant immediate removal of virus-infected roses. However, replacement of virus-infected roses may be more frequent than healthy plants due

to a decline in plant vigor. Growers interested in breeding or propagating roses should destroy plants as disease symptoms appear. Heat treatments have been used to produce virus-free buds for propagation.

Nematodes

SYMPTOMS. Low plant vigor, small yellow leaves, early leaf shed, stunting, and reduced bud formation are the foliar symptoms of nematode damage on roses. These symptoms are easily confused with those of low soil fertility and crown gall. Plant decline usually occurs gradually over a period of several years until poor flower and foliage quality is easily visible. Discoloration and a reduction in the number of fibrous roots are often associated with nematode damage on roses. The root-knot nematode produces distinctive small swellings or galls on the fine fibrous roots. If a nematode problem is suspected, a nematode analysis of a soil sample is recommended. See Extension publication ANR-450, "The Plant Diagnostic Lab," for directions on collecting and handling soil samples for nematode analysis.

DISEASE CYCLE. Parasitic nematodes are often introduced in landscape beds in the roots or in soil clinging to the roots of field-grown roses. Nematode problems often develop when roses are planted in old vegetable gardens. Nematodes are usually spread by water runoff, soil, or tillage equipment. Free-living nematode larvae or adults also migrate slowly (3 inches to 2 feet per year) through the soil surface. Nematodes feed on cells on the root surface or inside the root. Under favorable soil conditions, nematodes reproduce rapidly (life cycle of 3 to 4 weeks), and several generations may be produced each year.

CONTROL PRACTICES. Prevention is the best control measure for nematode pests of roses. Before planting bare-root or container-grown roses, inspect their roots for signs of nematode injury. Collect a soil sample for nematode analysis, particularly if nematode damage was suspected on the previous crop. Pre-plant fumigation with Vapam on new or renovated beds will provide protection from nematode pests for one to two years. **Note: Vapam is a restricted use pesticide and may be purchased and applied by only a certified applicator.** Directions for the application of fumigant nematicides is discussed in Extension publication ANR-30, "Nematode Control in the Home Garden." Once established in an area, nematodes cannot be controlled unless the plants are destroyed. No post-plant nematicides are cleared for homeowner use.



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Austin Hagan, *Extension Plant Pathologist*, Professor, and **Jackie Mullen**, *Extension Plant Pathologist and Diagnostician*, both in Entomology and Plant Pathology at Auburn University

Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency and the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply any pesticide, check with your county Extension agent for the latest information.

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6M, Revised August 2007, ANR-505