

The Oklahoma Cooperative Extension Service Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.



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Roses continue to be one of the most popular flowers in the garden landscape. Oklahoma roses will produce large quantities of high quality blooms when given proper care. People who like to spend time in the garden will find that rose culture can be a rewarding hobby.

Controlling diseases is an important part of a rose maintenance program. Use of resistant cultivars (varieties) is the best disease control measure. Frequent applications of fungicides to prevent fungal infections of leaves is required on susceptible cultivars. Oklahoma's climate favors foliar disease pathogens. Moist soil conditions in rose gardens provide an excellent environment for nematodes, crown gall bacteria, and soil fungi.

Although some cultivars are less susceptible to diseases, there are none that are resistant to all diseases. Black spot, powdery mildew, crown gall, and nematode damage are the major disease problems in Oklahoma. Of these, black spot and powdery mildew are the most prevalent. However, there are roses that are resistant to both diseases (Table 1). Damage from plant parasitic nematodes seldom kills roses. The nematodes can, however, weaken plants to the extent that plants cannot withstand severe winter conditions, diseases, insects, and drought.

For information on different rose types and species and rose culture, see OSU Extension Fact Sheets F-6400, "Roses in the Landscape," and F-6403, "Rose Culture in Oklahoma."

Fungal Diseases

Black Spot (caused by the fungus

Diplocarpon rosae)

Black spot is a very serious disease of rose plants. It is characterized by nearly circular black spots on leaves. The spots are distinguished from other leaf spot diseases by the fringed margins and consistently black color of the spots (Figure 1).

The spots vary in size from less than 1/16 to 1/2 inch or more in diameter. Spots may merge to produce large irregular lesions. Yellowing often occurs over the entire leaf, but it may develop only around the spots. When plants are badly infected, leaves drop prematurely and canes may become completely defoliated, thereby reducing the quantity of the flowers and eventually killing the plant.

Warm, wet weather favors the spread of pathogens. Spores of the fungus are spread mainly by splashing water or

Diseases of Roses

Oklahoma Cooperative Extension Fact Sheets
are also available on our website at:
<http://www.osuextra.com>

rain. They germinate in water and infection takes place only when water remains on the leaves for periods of six hours or longer.

Control

1. Remove and destroy infected leaves during the season; remove infected twigs when pruning.
2. Avoid overhead watering.
3. Plant roses in an area with good soil drainage and ventilation. Avoid shady spots in dense plantings.
4. Prune out old and diseased canes in the fall or winter.
5. Mulch soil around plants and sprinkle dusting sulfur on the mulch during the spring (see OSU Extension Fact Sheet F-6403, "Rose Culture in Oklahoma").
6. If one wishes to not have to spray for black spot and powdery mildew control, there are some resistant cultivars that can be grown in Oklahoma (Table 1).
7. For chemical control on disease-susceptible cultivars, use fungicides listed in the current OSU Extension Agents' Handbook of Insect, Plant Disease, and Weed Control (E-832). It is important that weekly fungicide applications begin with new growth in the spring and continue until frost in the fall. Sprays may be omitted during hot, dry periods in the summer. Many general purpose rose dusts and sprays are available that contain compatible materials for control not only of black spot and powdery mildew, but also for common insect pests. These materials have been well formulated and, if used properly, will give excellent results. During the dormant season, spray with lime sulfur.

Powdery Mildew (caused by the fungus

Sphaerotheca pannosa var. *rosae*)

Powdery mildew is one of the most widely distributed and common diseases of roses. Unlike many foliar diseases, it may be serious in dry climates as well as in humid regions. It develops over a wide range of temperatures.

Powdery mildew produces a powdery, whitish coating on the leaves and other plant parts (Figure 2). In case of severe attack, plants may become stunted, leaves may curl, become dried, and drop. Unopened buds, young stems, and thorns may be entirely overgrown with the powdery coating. Only in very rare cases does death of the plant result from infection.



Figure 1. Black spot shows up as circular black spots with fringed borders. The spots may merge to produce large irregular lesions. Leaves turn yellow and drop prematurely.



Figure 2. Powdery mildew is characterized by a white powdery coating on leaves and other plant parts.



Figure 3. Crown gall is characterized by outgrowths (galls) generally at the soil line or on roots.



Figure 4. Rose mosaic virus is characterized by light green to bright yellow mosaic patterns on leaves.

Generally, the most favorable conditions for powdery mildew infection are as follows: daytime temperature near 80°F (27°C) and a relative humidity of 97-100%. These conditions prevail during most of the early part of the growing season, thus control must be made on a regular basis.

Control

During seasons of low rainfall in the spring and very early summer when the daytime temperatures are below 80°F, control may not be needed until later. Thoroughly applied fungicides can effectively control powdery mildew (for suggested fungicides, refer to the current OSU Extension Agents' Handbook of Insect, Plant Disease, and Weed Control, E-832). To avoid having to spray for powdery mildew control, resistant cultivars can be grown (Table 1).

Stem Cankers of Roses

Several fungal stem cankers are found on roses: common canker (caused by *Leptosphaeria coniothyrium*), cane blight canker (caused by *Botryosphaeria ribis*), brand canker

(caused by *Coniothyrium wernsdorffiae*), and brown canker (caused by *Cryptosporella umbrina*). Cankers usually appear as dead areas on canes and vary in color from light tan to a dark purplish brown. The causal fungi enter healthy canes through wounds caused by improper pruning, flower cutting, wind, hail damage, winter injury, and cultivation injury. Once the fungal pathogen has entered the plant, the canker may grow and eventually girdle the stem causing a dieback of the cane and, upon reaching the crown, may destroy other canes or the entire plant.

Control

1. Maintain plants in a vigorous growing condition (refer to OSU Extension Facts F-6403, "Rose Culture in Oklahoma," and F-6404, "Winter Protection for Landscape Plants").
2. Prune out and burn all infected portions of canes. Make cuts well back of the cankered area and about 1/4 inch above an outward facing bud and slanted away from the bud at a 45-degree angle.

Table 1. Black Spot- and Powdery Mildew-Free Roses for Oklahoma^a

Cultivar	Height	Color	Fragrant
<i>Rosa hybrida</i> (except <i>R. rugosa</i>)			
'Amiga Mia'	3.5-4'	Peach pink, semi-double	YES
'Care Free Beauty'	3-4'	Double, rich pink	YES
'Country Dancer'	2-4'	Semi-double, rich pink	YES
'Enchanted Autumn'	3-4'	Coral, double	YES
'Earth Song'	4-5'	Double, soft rose/copper	NO
'Geisha'	2.5-3'	Bright pink, semi-double	NO
'Hawkeye Belle'	3-4'	Ivory white, double	NO
'Ivory Fashion'	2-3'	Semi-double, ivory gold - red stamens	NO
'Malaguena'	3-4'	Soft pink, double	YES
'Prairie Fire'	4-6'	Bright red, single	YES
'Prairie Flower'	4'	Carmine red, single anemone	NO
'Prairie Princess'	5-6'	Clear pink, semi-double	NO
'Prairie Star'	4'	Double, ivory white	NO
'Serena'	5-7'	Single, pink	YES
'Serendipity'	3-4'	Buff/yellow with pink edges	YES
'Servilliana'	4-6'	Light red, yellow petal base, dark red freckles	NO
'Square Dancer'	4'	Vivid rose to light red, semi-double	NO
'William Baffin'	8-10'	Med. red, semi-double	YES
<i>Rugosa roses</i> (<i>R. rugosa</i>): Most form red hips (seed pods) in the fall			
'Agnus'	4-6'	Pale yellow, double	YES
'Alba'	4-6'	Single white	YES
'Belle Poitevine'	4-8'	Double, lilac pink	YES
'Blanc Double de Coubert'	3-5'	Double, white	NO
'Calocarpa' (willmont)	3-4'	Rose pink, semi-double	YES
'Charles Albanel'	1'x3'	Medium red, semi-double	YES
'David Thompson'	4'x4'	Hot pink, semi-double	YES
'Delicata'	3-4'	Semi-double, lilac pink	YES
'Dr. Eckner'	5-6'	Semi-double, soft yellow	YES
'Frau Dagmar Hastrup'	2.5-3'	Single, clear pink	YES
'Gootendorst Supreme'	4-7'	Semi-double cherry red	YES
'Hansa'	4-5'	Double, purple-red	YES
'Henry Hudson'	2.5x3'	White, semi-double	YES
'Jens Monk'	6.5x5'	Soft pink, semi-double	YES
'Magnifica'	4-5'	Double, carmine	YES
'Martin Frobisher'	6.5'x5'	Pale pink, double	YES
'Ruskin'	4-5'	Double, bright red	YES
'Rubra'	4-5'	Magenta-rose, single	YES
'Sir Thomas Lipton'	4-5'	White, double	YES
'Therese Bugnet'	4-6'	Lilac pink, double	YES
'Will Alderman'	3-5'	Double, clear pink	YES

^aTable adapted from the table presented in Hort 4-2 prepared by Paul Mitchell, Department of Horticulture and Landscape Architecture, OSU, Stillwater, OK 74078-0481. Most rugosa roses are very disease and pest resistant in Oklahoma; however, they are usually very thorny and most are maintained as shrubs with little or no pruning. Older rugosa roses bloom only in spring, but those listed above flower repeatedly during the summer or fall and most set attractive edible hips (seed pods) in fall. Always read the literature about roses for disease resistance. Most roses, even some rugosa hybrids, are disease susceptible.



Figure 5. Iron deficiency (severe). Note the green veins.

3. Disinfect pruning tools after use on a diseased plant.
4. Avoid injury when cultivating and transplanting.
5. A good black spot fungicide spray program will aid in controlling most stem cankers.

Botrytis Blight (caused by the fungus

Botrytis cinerea)

Botrytis blight affects certain hybrid tea roses. The disease prevents blooms from opening as it causes a brown decay. Sometimes partially opened flowers are attacked, and the individual petals turn brown and shrivel. The fungus is always present in rainy seasons when old flowers are not removed. The fungus also lives in winter-killed canes.

Control

Destroy old blooms and dead canes to remove as much fungal inoculum as possible. This fungus will be controlled if a good black spot spray program is followed.

Bacterial Diseases

Crown Gall (caused by the bacterium

Agrobacterium tumefaciens)

Crown gall is characterized by formation of outgrowths (galls) which vary in form and size (Figure 3). At first, the galls are very small with rounded outgrowths on the plant surface. Development continues and the galls may become several inches in diameter. They generally form just below the soil surface on the crown. Galls can also occur on roots and occasionally on aerial parts of rose plants.

Control

1. Transplant only disease-free plants.
2. Avoid wounding during transplanting.
3. Remove infected plants as soon as galls are observed. Where possible, remove and discard all soil in and adjacent to the root system and replace with sterile soil to prevent reintroduction of the bacteria.
4. During cultivation of roses, do not injure roots or crown area.
5. Disinfect pruning and cutting tools frequently. Dipping in a 10% dilution of household bleach (1 part bleach to 9



Figure 6. Nitrogen deficiency. Note the light green appearance (including the veins).

parts water) for several minutes will effectively disinfect cutting tools. This should be done immediately after pruning out a gall or abnormal growth. Cut well below the galled area. Treat cut areas with Gallex or Galltrol. Planting stock may be dipped in a suspension of Galltrol before planting.

Virus and Phytoplasma Diseases

Like all vegetatively propagated plants, roses are subject to infection by virus and virus-like pathogens that are spread during propagation operations. Diseased plants tend to be less vigorous and less likely to survive than healthy plants, and diseases often detract from the aesthetic quality of plants. Two of these diseases are discussed below.

Rose mosaic is found virtually everywhere roses are grown and can be recognized by light green to bright yellow mosaic patterns on leaves of infected plants (Figure 4). Symptoms of rose rosette (caused by a phytoplasma, a virus-like pathogen) include leaflet deformation and wrinkling, bright red leaf pigmentation, witches brooming, and phyllody (conversion of flower parts to a leaf-like appearance).

Control

There is no known practical cure for diseases caused by viruses or phytoplasmas once infection has occurred. Infection with rose mosaic usually does not sufficiently damage plants to necessitate their removal. However, all plants severely infected by viruses should be removed from the nursery or landscape and destroyed. The best control for virus and virus-like diseases is to use only pathogen-free buds and rootstocks during propagation.

Accidental herbicide damage sometimes resembles symptoms of virus or phytoplasma infection. To avoid possible herbicide injury, it is better to apply herbicides during fall rather than in the spring.

Nematode Diseases

Many rose growers have observed rose plants that have failed to respond to good cultural practices and exhibit chlorosis, dwarfing, and reduced vitality. These symptoms may be caused by plant-parasitic, microscopic worms called nematodes. Above-ground symptoms are an indirect result of root

damage. Below-ground symptoms include root galls (root-knot nematodes), root lesions (root-lesion and ring nematodes), and injured root tips (stubby-root and other nematodes).

Control

1. Plant nematode-free plants. Commercial propagators usually subject roots of understocks to a hot water treatment (122°F for 10 minutes) to destroy any nematodes present.
2. Reduce nematode populations in gardens with heat using a technique called solarization. See OSU Extension Facts F-7640, "Solar Heating (Solarization) of Soil in Garden Plots for Control of Soilborne Plant Diseases." This procedure must be done prior to planting.

Nutritional Disorders

Iron deficiency. Iron deficiency is characterized by chlorosis (yellowing) of non-veinal tissue of young leaves (Figure 5). **Manganese deficiency** exhibits similar symptoms. If the deficiency is allowed to continue, newly formed leaves may remain very small and may eventually become almost white. Pink or white flowered cultivars exhibit this symptom more than red flowered cultivars.

Some cases of iron or other micronutrient deficiency are caused by some factor that interferes with the availability or uptake from soil, rather than by an actual deficiency in the soil. These influences include high soil pH, poor soil aeration, overwatering, root-knot nematodes, extremes in temperatures, high soluble salt concentrations, and over-fertilization. For long-term correction of iron or micronutrient deficiency, the appropriate soil problem needs to be identified and corrected. For short-term correction of iron deficiency, foliar applications

of chelated iron products can be made. A soil analysis should be done to determine soil pH and the amount of lime or sulphur needed to change the pH to a suitable value. Refer to OSU Extension Facts F-6412, "Fertilizing Shade and Ornamental Trees and Shrubs."

Herbicide Injury. Root-absorbed herbicides can cause a similar interveinal chlorosis to iron deficiency on all rose types and cultivars, but they will destroy all the green tissues between veins, leaving sharply defined, dark green major and secondary veins contrasting with the light yellow leaves. Damaged plants do not respond to fertilizer applications, but disease and insect control and proper watering are very important for helping them to recover. In many cases, it would be wise to remove the plant and the contaminated soil. Before replanting the damaged plant or planting a new plant in new soil, line the hole with sheet metal or fiberglass to prevent roots from growing into the herbicide contaminated soil. Some herbicides persist in soil for several years.

Nitrogen deficiency. Nitrogen deficient leaves have an overall light green or yellow color with no distinct green veins (Figure 6). Deficient leaves may fall off. Affected leaves are generally small; internode length and stem diameters are smaller than normal. Flowers may have lighter shades of color than normal.

Apply a readily available nitrogenous fertilizer to planting soil or potting medium. Numerous specialty rose fertilizers are available.

Potassium, phosphorus, zinc, copper, magnesium, sulfur, boron, molybdenum, and sulfur deficiencies can occur under unusual situations, particularly under greenhouse hydroponic culture conditions. Roses grown in soil rarely show symptoms of deficiency of these elements.