



THE UNIVERSITY OF GEORGIA

COOPERATIVE EXTENSION

Colleges of Agricultural and Environmental Sciences & Family and Consumer Sciences

Rose Culture for Georgia Gardeners



Contents

- Picking the Planting Site 3
- Preparing the Soil 3
- Buying Plants 4
- Selecting Rose Cultivars 4
- Planting 5
- Mulching 6
- Watering 6
- Fertilizing 10
- Pruning and Grooming 10
- Cutting Roses 11
- Controlling Pests 11
 - Diseases 12
 - Viral Diseases 13
 - Insects and Mites 13
- Rose Societies in Georgia 14

Rose Culture for Georgia Gardeners

Gary L. Wade and James T. Midcap (Retired), Extension Horticulturists

Jean Williams-Woodward, Extension Plant Pathologist

Beverly Sparks, Associate Dean for Extension and Entomologist

Roses are a favorite of Georgia gardeners. Today, thanks to selective breeding programs of specialists and rosarians, we can choose from literally hundreds of rose varieties. Each year new varieties showing superior flower color, fragrance and adaptability are introduced.

Beginners and “old pros” alike can profit from the experience of others when selecting rose varieties. By visiting botanical gardens and talking with local gardeners, nursery producers and garden store operators, you can learn which varieties are best adapted to your area.

Most rose enthusiasts agree that roses require extra-tender loving care, but the rewards are well worth the effort. The following guidelines will make your rose growing experience more successful and enjoyable.

Picking the Planting Site

Many rose failures can be linked directly to poor site location. A site that provides sufficient sunlight, good soil and good air flow is of utmost importance.

Roses require a minimum of six hours of sunlight each day. Where some shade cannot be avoided, a location with morning sun is best. Morning sun will help dry dew from the foliage and reduce leaf diseases.



Figure 1. Roses require a minimum of six hours of full sunlight, good air movement and a well-drained soil.

Next to sunlight, nothing is more important for successful rose culture than the soil. Roses require a well-drained, moderately fertile soil having a pH of 5.5 to 6.5. Air spaces between soil particles are essential for air and water movement into and out of the soil. The fertility and acidity of a well-aerated soil are also easier to correct and maintain than those of a more compact soil. Sandy soils generally have adequate air spaces between particles while heavy clay soils may require sand or organic matter to increase aeration. Failure results if the rose bed is located in a poorly-drained area of the landscape. If you cannot avoid a poorly-drained site, raise the bed with 6 to 8 inches of topsoil.

Preparing the Soil

Thoroughly plow or spade the planting area at least 12 inches deep and remove any rocks or debris. A more desirable practice is to prepare the soil in an entire bed instead of digging individual holes. A 4-inch layer of organic matter such as peat moss, composted pine bark or leaf mold incorporated thoroughly into the bed may be beneficial in certain soils. Some rose growers also incorporate natural organic fertilizers such as cottonseed meal, milorganite or manure into the planting bed.



Figure 2. Soil amended with organic matter such as peat moss, composted pine bark or leaf mold is good for roses.

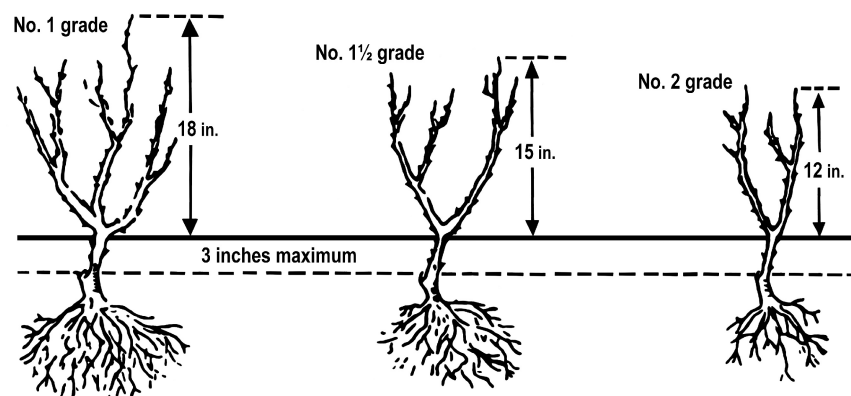


Figure 3. Packaged bare-root roses are available in three grades.

Some soils may also require lime. Determine if your soil needs lime with a soil test available through the University of Georgia. Contact your county extension agent for soil testing containers and instructions for soil sampling.

If you are serious about top-notch results from your roses, you may wish to fumigate the bed before planting. Many soil-borne insects, diseases and weeds can be eliminated by soil fumigants. Check with your county extension agent for recommendations.

Buying Plants

Expect to pay higher prices for better quality plants. Buy from reputable sources — a licensed garden center or nursery, an established rose company or a well-known mail-order source. Cheap plants are just that — cheap — and will often produce poor growth and flowers the first year.

Rose plants are usually graded No. 1, 1 1/2 and 2 based on size and number of canes. Grade No. 1 indicates top quality. These plants have three to five canes (3/8 inch diameter or larger) 18 inches long. Grade No. 1 1/2 will have two canes 15 inches long. Grade No. 2 will have two canes 12 inches long (Figure 3).

Dormant rose plants usually become available as packaged bare-root plants in December or January. Buy plants with vigorous looking canes and avoid those that appear shriveled or discolored.

In recent years, roses have also been marketed as container-grown plants. They transplant best during the spring and early summer months. Container-grown plants generally have a better root system than bare-root stock and so suffer less transplanting shock.

Selecting Rose Cultivars

Selecting roses can be a confusing task. There are more than 6,000 rose cultivars (propagated varieties) having a wide variety of flower colors and growth characteristics. Your choice will depend on your personal preference for flower color, growth characteristics, plant performance and availability.

Roses are classified according to their growth habit and flower form. The following are the major classifications of roses.

Hybrid Tea: Hybrid tea roses are the most popular class of rose on the market today. Plants are strong and upright in growth habit and have large flowers borne singly on long stems. Hybrid tea roses make excellent arrangements and are preferred by florists.

Floribunda: As the name implies, floribunda roses flower abundantly throughout the growing season. Flowers are smaller than those of the hybrid tea roses and are borne in bouquet-like clusters. Some cultivars are low growing and are often grown with annuals and perennials in beds or borders.

Grandiflora: Plants of the grandiflora class combine features of the hybrid and floribunda roses. Flowers are borne in clusters like floribunda roses and have the form and long stems of the hybrid tea roses. The flowers are smaller and plants are taller than those of hybrid tea roses.

Climber: Climbers are a large class consisting of many different sub-types. Climbing hybrid teas are mutants of hybrid tea cultivars that are vegetatively propagated for their climbing growth habit. Trailing climbers can be grown on walls or as ground covers on

banks. Ramblers are another type of climber that form dense clusters of small flowers on long, vigorous canes and may grow as much as 20 feet in a single season.

Miniature: Flowers and leaves of miniature roses are smaller than those of other types of roses; however, plants are not always miniature in size. Some miniature rose plants may grow from 4 to 6 feet tall at maturity.

“Old Roses” and Species Roses: Old roses are cultivated garden roses that were in existence before 1867 and have remained genetically pure through the years. These include the European and Chinese ancestors of today’s “modern” roses. Growth habit and flower form of old roses are quite diverse. Species roses are the native or naturalized roses propagated and sold commercially. Two species roses frequently planted in Georgia are the Lady Banks rose and the Cherokee rose, Georgia’s state flower.

An excellent reference on rose cultivars is *Handbook for Selecting Roses*, published annually by the American Rose Society. It lists all the commercially available rose cultivars in the United States. For a small fee, you can get a copy by writing the American Rose Society, P.O. Box 30000, Shreveport, LA 71130.

Another aid in selecting roses is the All-American Rose Selection (AARS) tag you will find on some rose cultivars in garden centers. It is a green-and-white tag containing a picture of a rose and the letters “AARS.” To receive an AARS tag, a rose must be evaluated for two years in test gardens throughout the United States, and it must receive the highest score overall when judged against other roses in its class. AARS judges give each rose cultivar in test gardens an annual score for vigor, growth habit, hardiness, disease resistance, foliage, flower production, bud and flower form, opening and finishing color, fragrance and overall value. Table 1 (page 6) lists All-American Rose Selections from 1980 to 1997.

For several years, scientists at the Georgia Experiment Station at Griffin, Georgia, evaluated rose varieties. They used the rating system of the American Rose Society. Table 2 (page 8) lists highly rated roses from their trials.

Planting

The planting season for roses in Georgia is November through March. Late spring planting of bare-root plants is risky because the new growth forced by warm temperatures will drain an unestablished root system of stored food. Container-grown plants are a better choice for late planting.

Spacing the plants in the rose bed depends on the variety and the growth rate. An average spacing is 3 to 4 feet apart. A 5- to 6-foot spacing is recommended for vigorous growing varieties.

Dig a hole large enough to accommodate the root system without crowding. Planting depth is critical. Plants set too deeply do poorly and are more susceptible to pests.

To set the plants at the correct depth, construct a cone-like mound of soil in the middle of each hole. The cone should be high enough so when the plant is set on top, the level of the graft union (the swollen area of the main stem) is about 1 inch above the soil level. Separate and spread the roots around the cone (Figure 4). Partially fill the hole with soil, shaking it between the roots. When the roots are covered, fill the hole with water and allow it to soak into the soil. Then finish filling the hole. Use your hands to build a ring of soil about 4 inches high along the perimeter of the planting hole. This directs water to the roots while the plant is getting established. Water thoroughly several times to settle the soil around the roots.

After planting bare-root plants, prune the canes back to 5 to 7 inches in height. Remove any broken or discolored canes. In the colder, mountainous region of Georgia, mound soil up over the canes to protect them from cold damage during the winter. Remove the mounded soil as soon as the danger of frost has passed or as new growth begins.

Plant container-grown roses no deeper than they were in the original container. If the root system is pot-bound, loosen it with your hands before planting.



Figure 4. Dig large holes. Avoid setting plants too deep. Mound soil in the hole and spread roots over the mound.

Plant individual plantings similar to bedded plants. Dig the planting hole two to three times wider than the root system and 12 to 15 inches deep. This loosens the soil in a large area and provides a favorable environment for root system growth. A successful rose grower never places a 10-dollar plant in a 2-dollar hole.

Mulching

Mulched rose plants have several advantages over those grown in bare soil. Mulching prevents soil crusting and erosion, maintains a uniform soil temperature, conserves moisture and reduces weeds.

Mulching materials include fall leaves, pine straw, ground pine bark and hardwood chips. Your choice depends on cost, availability and ease of handling. A 2-

to 3-inch layer of mulching material is adequate. Too much mulch causes soil to retain excessive moisture.

Watering

Adequate soil moisture is essential for rapid, healthy cane growth and flower development. During dry weather, water mulched roses at least once a week. Unmulched plantings require more frequent watering. Three to five gallons of water per plant at each watering should adequately wet the root zone.

Avoid using lawn sprinklers or other overhead irrigation devices that wet the foliage and encourage leaf diseases. A soil-soaker hose placed under the mulch is ideal for watering roses. Drip or trickle irrigation kits are also excellent irrigation systems for rose plantings.

Table 1: All-American Rose Selections

Year	Name	Color	Type
1980	Love	Crimson	Grandiflora
	Cherish	Shell pink	Floribunda
	Honor	White	Hybrid Tea
1981	White Lightnin'	Pure white	Grandiflora
	Marina	Coral orange	Floribunda
	Bing Crosby	Persimmon orange	Hybrid Tea
1982	Brandy	Brandy to apricot	Hybrid Tea
	Mon Cheri	Pink to red	Hybrid Tea
	French Lace	White	Floribunda
	Shreveport	Shades of orange	Grandiflora
1983	Sweet Surrender	Pink	Hybrid Tea
	Sun Flare	Yellow	Floribunda
1984	Impatient	Orange red	Floribunda
	Intrigue	Deep plum	Floribunda
	Olympiad	Crimson	Hybrid Tea
1985	Showbiz	Brilliant scarlet	Floribunda
1986	Voodoo	Yellow-orange to yellow-red	Hybrid Tea
	Touch of Class	Coral pink	Hybrid Tea
	Broadway	Red-pink to yellow	Hybrid Tea
1988	Prima Donna	Deep pink	Grandiflora
	Mikado	Red-yellow	Hybrid Tea
	Amber Queen	Gold-yellow with apricot	Floribunda
1989	Class Act	White	Floribunda
	Tournament of Roses	Coral pink	Grandiflora
	New Beginning	Orange red	Miniature
	Debut	Red blend	Miniature
1990	Pleasure	Coral pink, salmon, red	Floribunda
1991	Perfect Moment	Yellow-red	Hybrid Tea
	Sheer Elegance	Pink with salmon	Hybrid Tea
	Shining Hour	Yellow	Grandiflora
1992	Brigadoon	Deep coral pink	Hybrid Tea
	All That Jazz	Deep coral	Shrub
	Pride 'n' Joy	Salmon	Miniature
1993	Rio Samba	Bright yellow/orange blend	Hybrid Tea
	Solitude	Bright orange/yellow tones	Grandiflora
	Child's Play	White	Miniature
	Sweet Inspiration	Soft pink	Floribunda
1994	Secret	Pink blends	Hybrid Tea
	Caribbean	Orange-yellow blend	Grandiflora
	Midas Touch	Bright yellow	Hybrid Tea

Table 1: All-American Rose Selections

Year	Name	Color	Type
1995	Singin' in the Rain	Cinnamon apricot	Floribunda
	Brass Band	Melon orange	Floribunda
1996	St. Patrick	Yellow gold	Hybrid Tea
	Mt. Hood	Ivory white	Grandiflora
	Livin' Easy	Apricot orange	Hybrid Tea
1997	Artistry	Coral orange	Hybrid Tea
	Scentimental	Burgundy-and-cream stripe	Floribunda
	Timeless	Deep rose-pink	Hybrid Tea
1998	Fame!	Deep pink	Grandiflora
	Sunset Celebration	Apricot cream	Hybrid Tea
	First Light	Light pink	Shrub
	Opening Night	Red	Hybrid Tea
1999	Candelabra	Coral orange	Grandiflora
	Kaleidoscope	Tan-lavender/Lavender-pink	Shrub
	Fourth of July	Red-and-white stripe	Climber
	Betty Boop	Ivory-yellow, red edge	Floribunda
2000	Crimson Bouquet	Crimson red	Grandiflora
	Knock Out	Cherry red	Shrub
	Gemini	Coral pink-cream	Hybrid Tea
2001	Marmalade Skies	Tangerine orange	Floribunda
	Sun Sprinkles	Yellow	Miniature
	Glowing Peach	Golden yellow, Cantaloupe	Grandiflora
2002	Starry Night	White	Shrub
	Love & Peace	Golden yellow	Hybrid Tea
2003	Hot Cocoa	Brownish-orange	Floribunda
	Whisper	Creamy white	Hybrid Tea
	Cherry Parfait	White, red edge	Grandiflora
	Eureka	Apricot yellow	Floribunda
2004	Memorial Day	Pink-lavender	Hybrid Tea
	Day Breaker	Apricot pink	Floribunda
	Honey Perfume	Apricot yellow	Floribunda
2005	Daydream	Fuschia pink	Shrub
	Lady Elsie May	Coral pink	Shrub
	About Face	Golden yellow	Grandiflora
	Elle	Shell pink	Hybrid Tea

Table 2: Roses rated highly at the Georgia Experiment Station

Hybrid Tea		
Alabama – pink blend	Granada – red blend	Peach Beauty – pink blend
Cayenne – orange blend	H.G. Hastings – dark red	Perfume Delight – pink
Chicago Peace – pink blend	Kordes Perfecta – pink blend	Portrait – pink blend
Chrysler Imperial – dark red	Matterhorn – white	Pristine – white
Command Performance – pink blend	Mr. Lincoln – dark red	Promise – light pink
Confidence – pink blend	New Day – yellow	Seashell – orange red
Cynthia – dark pink	Oregold – dark yellow	Snowfire – red blend
Double Delight – red blend	Paradise – mauve	Tiffany – pink blend
First Prize – pink blend	Pascali – white	Tropicana – orange red
Futura – orange red	Peace – yellow blend	Yankee Doodle – orange blend
Garden Party – white		
Grandiflora		
Arizona – orange blend	Montezuma – orange red	Queen Elizabeth – pink
Love – red blend	Prominent – orange red	Scarlet King – red
Floribunda		
Angel Face – mauve	First Edition – orange blend	Rose Parade – pink blend
Apricot Nectar – apricot blend	Gene Boerner – pink	Saratoga – white
Bahia – orange blend	Iceberg – white	Sea Pearl – pink blend
Charisma – red blend	Merci – red	Summer Show – white
China Doll – pink	Razzle Dazzle – red blend	Sunsprite – yellow
European – dark red	Roman Holiday – red blend	
Climber		
America – pink blend	Dr. Van Fleet – light pink	Peace – yellow blend
Crimson Glory – dark red	Gladiator – pink	Queen Elizabeth – pink
Don Juan – dark red	New Dawn – light pink	Royal Gold – yellow
Dr. J.H. Nicholas – pink	Paul's Scarlet – red	

Fertilizing

Fertilization varies widely, depending on plant size, soil type, rainfall and the time of growing season. Many rose growers have developed their own recipe for fertilization based on past experience or the experiences of others. This has led to many different approaches to rose fertilization.

Light fertilizer application at monthly intervals are recommended from March until early September in north Georgia and until mid-September in south Georgia. A 12 to 16 percent nitrogen source such as 16-4-8 or 12-4-8 fertilizer is advisable. Three tablespoons per plant per application is usually adequate. If the plant is shorter than 1 foot, reduce the rate to 1 tablespoon. Large bushes, 6 feet tall, respond to 5 tablespoons per application. Beginning 6 inches from the main stem, spread the fertilizer evenly in a circle around the shrub. Use a rake to mix it lightly into the soil and water soon after application. Avoid getting fertilizer on the foliage, canes or flowers and too close to the main trunk.

Pruning and Grooming

Roses respond to pruning and grooming (removal of old flowers) by producing specimen flowers in greater quantity. Larger, more attractive flowers are the result of well-groomed, correctly pruned plants. Major pruning is done in early spring (before growth begins) while grooming is done throughout the growing season.

All plants are not pruned alike because of differences in flowering and growth habits. Generally, weak-

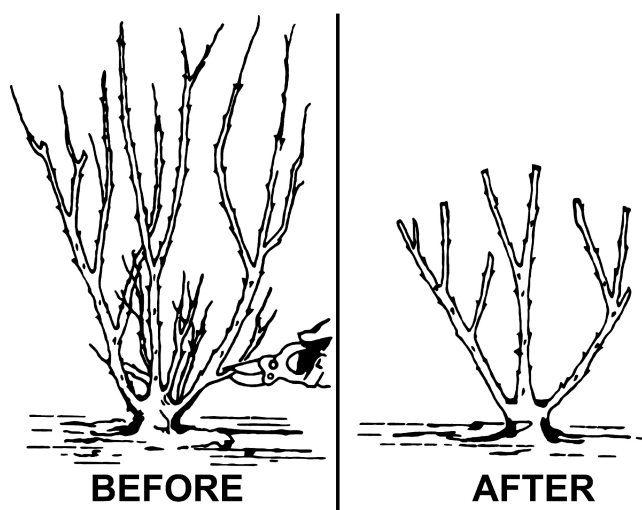


Figure 5. Keep all spindly growth removed. When spring growth begins, remove all but four or six of the healthiest canes. Cut the remaining canes one-half their length.



Figure 6. For larger, quality blooms for exhibition or show purposes, always remove all but one bud per stem. Pinch or prune the extra buds while they are young and soft.

growing varieties are pruned lightly while vigorous growing varieties are pruned more heavily and more frequently. In either case, wounded or weak canes or those showing evidence of bark splitting should be removed first.

Here are specific instructions for pruning the various types of roses:

Hybrid Teas — Hybrid teas (garden type or cut-flower roses) should be pruned in early spring just before new growth starts. Leave at least four to six of the most vigorous canes. Prune these canes back to within 24 to 30 inches of ground level. Make the cuts about $\frac{1}{4}$ inch above a bud. Always use clean, sharp pruning shears (Figure 5).

Vigorous shoots (suckers) originating below the graft union will be different in foliage and flower from the desired grafted variety and should be removed. If allowed to develop, they will compete heavily with the grafted variety.

Groom the plants by removing old flowers as soon as they have passed their peak. If allowed to remain on the plant, the flower heads will develop seed pods (also called *hips*) that draw heavily on the plant's food supply. Also, remove any spindly shoots or sucker originating from below the graft union or any stems showing disease symptoms during the growing season.

To produce specimen flowers on hybrid tea or garden roses, remove the flower buds that develop on shoots other than the main one. Allow only one flower bud to develop and mature on each main shoot (Figure 6).

Climbing Roses — Climbing roses require special pruning for profuse flowering. Many varieties in this group produce most of their flowers in the spring. During flowering, they will develop new canes on which next year's flowers will be borne. Prune to remove the oldest canes near ground level immediately after flowering to promote vigorous new shoot development.

Prune climbers to keep them trained to their support (fence, trellis, wires). Climbers generally require much less pruning than do other types.

Some climbers bloom off and on during the spring and summer. However, they usually have a peak flowering period quite early in the season. Prune these climbers following their first flush of flowering (Figure 7).

Canes of most climbers are good flower producers for two years. In some cases, new canes develop only on the older canes rather than from ground level. In such cases, remove the oldest canes in early spring, leaving five or six of the healthy, vigorous ones. Also, keep all faded flowers cut from the plants.

You can now get climbing forms of many hybrid tea varieties, which are generally more vigorous than their corresponding bush varieties. Prune them in early spring to remove weak, spindly growth and dead or diseased branches.

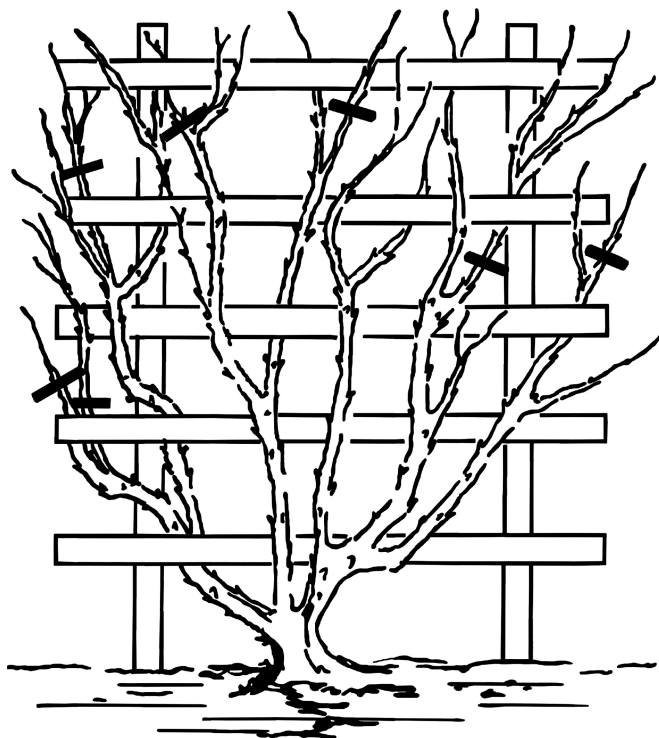


Figure 7. Prune climbers after the first flush of flowers. Keep weak, diseased or dead stems removed. Leave five or six healthy, vigorous canes. Thick, dense growth of climbers leads to problems.

Floribundas and Grandifloras — Floribundas and Grandifloras are grouped together for practical purposes. Both produce flowers in profusion. Floribundas have a shrub growth habit and are low- to medium-growing. Consequently, pruning is generally confined to maintaining plant shape and vigor. Grandifloras have a growth habit similar to that of hybrid teas and are pruned in the same manner.

Cutting Roses

Cut roses in early morning or late afternoon when there is more stored food in the stems and flowers. Stored food lengthens the life of the cut flower. Make cuts about $\frac{1}{4}$ inch above a node and cut only the length of stem needed for the flower arrangement.

Put the cut stems in water as soon as possible. Have a bucket or container with you in which to place each stem as it is cut. Put the bucket of cut roses in a cool, dark place for several hours. If room permits, place them in the lower part of your refrigerator. Unopened flower buds can be stored in the refrigerator for several days until blooms are desired for special occasions.

Controlling Pests

Roses will not be productive during the flowering periods unless they are kept free of insects and diseases. It is important to understand the characteristics and the types of damage caused by insects and diseases.

Before applying any pesticide, always read and follow the instructions on the label. Play it safe! Do not expose yourself or your plants to unnecessary hazards such as improper measuring, mixing and application of insecticides and fungicides.

Careful observation of your plants throughout the year is of utmost importance. This allows early detection of problems that may arise and leads to better control, better plants and greater personal satisfaction.

Successful rose growers prevent problems more often than they control them. Here are a few tips that will help keep your plants beautiful, vigorous and productive:

1. Buy healthy plants. Avoid those with any abnormal swellings or discoloration on canes or roots. Do not, however, confuse the enlarged graft union with a disease.
2. When applying fungicides, always spray the area underneath the plant where leaves have fallen. This will help in your disease control program.

3. Cut out any canes showing cankers, discolorations or sunken areas. Make cuts 4 to 6 inches below the infected area. Before making each cut, dip shears in a solution of rubbing alcohol or a solution of 9 parts water and 1 part bleach. Destroy all infected stems, leaves and faded blooms.
4. Remove and destroy any plant infected with crown gall or root-knot nematodes. Do not replant on such sites if at all possible.
5. Successful rose growers follow a regular spray program. Generally, each application contains a fungicide for disease control and an insecticide for insect and mite control. Applications are usually made at weekly intervals or as indicated on the pesticide label. Preventive spraying is the most effective approach to controlling pests.

Leaf diseases are extremely difficult to control once they have become established. When applying fungicides, cover the surfaces of stems, leaves, flower buds and canes thoroughly to adequately control pests. Do not delay spraying even if rain is forecast. Most disease-causing organisms require this wet environment to infect; this is the time fungicides are needed the most.

Diseases

Black spot is the most prevalent rose disease in Georgia. It is characterized by circular black spots with irregular margins on leaves. Control with fungicides is difficult. Mulching around plants can reduce disease occurrence. The leaf spots may increase in size and number with time. Infection will cause leaves to turn yellow and drop. (Figure 8) Severely infected plants may be completely defoliated by midsummer.

Black spot disease is unsightly. More importantly, the disease reduces leaf function, which weakens the



Figure 8. Black spot disease causes discoloration and leaf drop.



Figure 9. Mildew is severe on stems, buds and leaves during damp, cool weather.

entire plant. The result is a plant that grows very slowly and is more susceptible to other diseases and winter injury.

Powdery mildew is a rose disease that stunts and distorts young, tender growth of buds, leaves and canes (Figure 9). Older leaves may also be diseased, but damage is not as severe. The fungus is a prolific spore producer. These spores form on the surface of the tissue, which gives it a “powdered” appearance — hence, its name. Fungicide application to new growth can reduce disease incidence and spread. Disease development requires damp, cool nights, which can occur any time during the growing season. Some varieties of climbing roses and small-flowering ramblers are most susceptible to this disease.

Botrytis blossom blight is severe on some varieties of hybrid teas, particularly the whites and pinks. This disease affects the buds and partially opened flowers. It is recognized by its grayish-brown fungus growth on the buds and petals under humid, wet conditions. The fungus overwinters on infected plant parts, especially winter-killed stems. Pick off and destroy faded and infected blooms. Fungicides are effective in controlling the disease.

Crown gall, caused by a soil-borne bacterium, severely damages roses (Figure 10, page 13). The bacterium usually gains entry into the plant via wounds or natural openings. This disease causes large, corky growths or galls to form on the crown or roots. Sometimes galls develop on above-ground portions of the plant. These galls first appear as small swellings that slowly increase in size. Diseased plants show a loss in vigor and produce smaller blossoms and leaves. This effect on the plant becomes evident only when the galls have reached a diameter of several inches. Do not confuse crown gall with normal enlargement of the graft



Figure 10. The large, dark- to flesh-colored gall shown above is characteristic of Crown Gall disease. Galls can also occur on shallow roots.

union of plants (Figure 10). Infection may occur during grafting; therefore, inspect nursery stock before buying. Burn or destroy all infected plants. Chemical control of this disease is not effective.

Stem cankers. The three most common stem canker diseases are caused by fungi that invade the plant through wounds caused by pruning, cultivation or winter injury. Hybrid tea varieties are more susceptible than others. Failure to control leaf diseases with fungicides increases susceptibility to stem cankers.

The fungi overwinter in cankers and continue to spread during the season. If left untreated, the infection can girdle the cane, causing death or poor growth above these infected areas. (Figure 11)

To control stem canker infections, prune and discard all infected tissues. Be sure to make cuts well below the blighted areas. Disinfect pruning shears between cuts with a surface disinfectant such as isopropyl rubbing alcohol.

Viral Diseases

There are several viral diseases of roses. Most of these maladies are transmitted to non-infected plants through vegetative propagation processes used by commercial rose producers or through pruning. There is some evidence that at least two of these viral diseases are transmitted to other plants by insects or spider mites. Viral infected roses tend to be less vigorous, are more susceptible to other diseases, and are less likely to tolerate environmental stresses as healthy plants do.

There are at least six known viral diseases of roses. Yellow and green mosaic patterns, leaf distortion and ring spots are possible symptoms of virus infections.



Figure 11. Symptoms of stem canker. Notice the difference between the dark, infected tissue and the lighter, healthy tissue.

(Figure 12) Others that exhibit viral-like symptoms have not been linked to a particular virus. It is not unusual to encounter plants infected with more than one virus. Also, such occurrences usually cause problems in positive identification.

Some chemical toxicities and nutrient deficiencies express symptoms similar to those caused by viral diseases. Removing severely infected plants may be the only solution. Preventive measures to prohibit the spread of viruses include disinfecting pruning shears when moving from one plant to another, and a good insect control program is a must. Also, buy plants that are apparently healthy and exhibit no peculiar foliar symptoms (Figure 13, page 14).

Insects and Mites

Aphids. Several species of aphids damage roses by removing large quantities of plant juices and by secreting a sticky substance over the surface of infested plant parts. Heavy infestation can cause abnormal growth of plants.

Aphids are small, approximately 1/8 inch long, and vary in color from yellow to green to black. Their life cycle is completed in as few as four days under favor-



Figure 12. Typical viral symptom on rose.



Figure 13. Symptoms of the rosette virus. Note the increased numbers of thorns; clusters of deformed, crinkled leaves; and the many small leaves originating from one point (a condition called "witches' broom"). Symptoms sometimes mimic those associated with herbicide injury.

able environmental conditions. Remove and destroy heavily infested plant parts. Then treat plants with an insecticide registered for aphid control on roses. Inspect roses for aphids two to three days after application. Due to their short life cycle, aphids can rapidly build back up in number; therefore, several applications of insecticide may be necessary to bring the population under control.

Thrips. Thrips are another troublesome pest on roses. Thrips enter developing flower buds to feed and cause petals to become flecked and discolored. Heavy infestations cause deformities in new growth and can be responsible for buds not opening properly. Adult thrips are tiny, slender, brown to yellow insects with feather-like wings. They are most easily seen by shaking new growth or flower buds over a white cloth.

Thrips have repeated generations during spring through fall. In hot, dry weather they complete a life cycle in less than two weeks. Cutting off and disposing of old blooms lessens infestation. Do not leave old blooms on the ground or thrips will quickly leave them and reinfest plants. Treat infested plants with an insecticide registered for thrips control on roses. Complete coverage of infested plants with the insecticide is important to your control program.

Spider Mites. Mites are such small pests that they often cause damage before they are noticed. Mites are found on the underside of leaves, there they feed by sucking plant juices. Infested leaves will have many tiny chlorotic spots. Heavy infestations cause leaves to turn brown and die.

Mites have a very rapid life cycle and can complete development in less than a week under hot, dry condi-

tions. A control program for mites begins with the removal of weeds and other plants serving as alternate hosts for mites. Frequently inspect roses for the presence of mites. A magnifying glass is useful for seeing mites. When mites are found, treat plants with a registered miticide and reinspect plants for mites three to four days later.

Other Insect Pests. Rose chafers, scale insects and Japanese beetles are occasionally found damaging roses. Rose chafers are buff-colored beetles $\frac{1}{2}$ inch long with long, spiny legs. They feed on the rose blossoms. Japanese beetles are bright green, about $\frac{3}{8}$ inch long; they feed on the foliage (Figure 14). Scale insects are small, stationary insects found on the stems and leaves of roses. They damage roses by removing plant juices with their sucking mouth parts.

Nematodes. Nematodes are microscopic worms that feed on plant roots. They may stunt young rose plants and can cause a slow decline in older ones. If you suspect nematodes have entered your rose bed, take a soil sample from the root zone of the plants involved. Place a pint of this soil in a plastic bag. Be sure the soil is moist. Take this sample to your county extension agent, who will have the soil examined for nematodes.



For more information on insect and disease identification and control, contact your local county extension agent.

Rose Societies in Georgia

One of the best ways to learn about roses is to join a rose society. There are several in Georgia. Most meet regularly, provide educational lectures and conduct rose shows. The list on the following page was provided by the American Rose Society, P.O. Box 30000, Shreveport, LA 71130.



Figure 14. Japanese beetle feeding injury on rose petals.

Society	Contact	Address	Phone
South Metro Rose Society	Blair Walker	Fayetteville, Georgia	770-304-0454
Greater Gwinnett Rose Society	Susan Clingenpeel	Lawrenceville, Georgia	770-868-4476
Greater Atlanta Rose Society	Victoria Fleming	Atlanta, Georgia	770-939-9114
Millen Rose Society	Seth Benson	Millen, Georgia	478-982-4079
NE Georgia Rose Society	Reb. Herb Owen	Athens, Georgia	706-549-6471
Thomson Rose Society	Vernon Johnson	P.O. Box 397, Mesena, GA 30819	706-595-4215
Augusta Rose Society	Marcia Faglier	Augusta, Georgia	706-595-7964
Middle Georgia Rose Society	Lee Hale	Jackson, Georgia	770-775-6381
Golden Isles Rose Society	Betty White	St. Simons Island, Georgia	912-638-6217
Savannah Rose Society	Kathryn Waller	Savannah, Georgia	912-352-9422
Thomasville Rose Society	Rick Thomas	110 Chukkars Dr., Thomasville, GA 31792	912-226-8310
Columbus Rose Society	Vernon Moon	Columbus, Georgia	334-756-3251

Appreciation to Mr. Will Corley, Extension Horticulturist (ret.), for contributions to the original publication.



The University of Georgia and Ft. Valley State University, the U.S. Department of Agriculture and counties of the state cooperating. The Cooperative Extension Service, the University of Georgia College of Agricultural and Environmental Sciences offers educational programs, assistance and materials to all people without regard to race, color, national origin, age, gender or disability.

An Equal Opportunity Employer/Affirmative Action Organization Committed to a Diverse Work Force