Roses through the Year

Belinda's Dream Rose

First rose to be named a Texas Superstar tm and to receive prestigious EarthKind tm designation. Gorgeous shrub rose with large, fragrant and very double pink blossoms. Successive flushes of bloom spring to frost. So disease tolerant that fungicide sprays seldom required. Outstanding performance even in highly alkaline clay soils. A near perfect landscape rose.

Texas Superstar and **EarthKind Roses** are two important programs that were established to help the Texas gardener select plants for their landscape. The three roses (as of 8/2007) that have both tags are Belinda's Dream, Knock Out and Marie Daly.

Marie Daly Rose

Learn more about the Earthkind program at: http://earthkindroses.tamu.edu/
There have been two roses that have received the Earthkind label since this fact sheet was printed. Ducher is an 1869 pure white China rose and Georgetown Tea is a repeat blooming pink blend rose. These were added to the list as of 2007.

January

Hold off on pruning bush roses until February (Valentine's Day is a good marker). Use good shears that will make clean cuts. Remove dead, dying and weak canes. Leave four to eight healthy canes and remove approximately one-half of the top growth and height of the plant.

Climbing roses should be trained but not pruned. Weave long canes through openings in trellises or arbors and tie them with jute twine or plastic/wire plant ties. Securing canes now prevents damage from winter winds and contributes toward a more refined look to the garden when roses are blooming.

Now is an excellent time to select and plant container-grown roses to fill in those bare spots in your rose garden.

February

Plant bare-rooted roses this month. Buy top quality plants and plant them immediately to prevent desiccation.

Prune bush roses by half, always pruning just above buds facing away from the centers of the plants. Miniature bush roses are pruned by the same percentage. This does not mean climbing roses, wait until they have bloomed to prune and shape them.

Fertilize roses, as buds break and new growth begins. Use a fertilizer recommended for roses.

March

Protect roses against black spot and mildew with appropriate fungicide applied weekly.

Fertilize roses with specialty rose fertilizer, monthly or at least every six weeks now until September.

April

Roses can be planted now.

Climbing hybrid tea roses may be pruned as soon as they complete blooming. Prune climbing roses to remove weak branches entirely and cut vigorous canes back by 30% to 40%.

May

Some gardeners feel this is the last month to plant roses from containers because of the coming heat of the summer months and they do not feel roses should be transplanted after

this month. If roses are planted after this month, they **WILL** need extra care to help them through our hot and mostly dry summer months.

Pay attention to training climbers and ramblers to the arbor, trellis, fence or other structures. New growth on these will continue throughout the summer so train them for better results and keep them under control.

June

This begins the most stressful time of the year for roses. Watering is most important for the survival of your plants. Roses planted this year need a deep watering when they go five to seven days without a soaking rain (1 to 1 ½ inches). Maintain a moist but not wet or dry soil during the active growing period of the roses. Avoid watering the foliage if possible. If your system does water the foliage, irrigate during the morning when the foliage will dry quickly and not scorch the leaves.

You can fertilize this month with your favorite rose fertilizer or good quality, slow release 3:1:2 or 4:1:2 ratio fertilizer.

A regular weekly spraying with products that contain a fungus control aid for blackspot and an insect control aid for pests is important. You may also need to use a miticide for control of mites. Use these products only if needed. This is the advantage of disease resistant roses such as Texas Superstars and Earthkind.

This is a good month to prune roses that only bloom one time and have finished their bloom for this year.

July

At this time of year with the extreme temperatures and lack of water, it is difficult to transplant roses and not the best time to plant them. It can be done but to assure success, you will need to be diligent in their care.

Water roses as needed to maintain a moist soil (not soggy or dry). When needed, water thoroughly and moisten to a dept of 4 to 6-inches. Mulching a depth of 3 to 4-inches and maintaining that depth will help stabilize the soil moisture, reduce weeds, and moderates the soil temperatures.

Fertilization during this month is not recommended. If you have followed the recommended fertilization schedule, it is not necessary.

Continue to monitor your roses for blackspot, spider mites, leaf-cutter bees, caterpillars, beetles and weeds. Follow the recommendations found later in this article.

August

Late this month is an important time to fertilize your roses. Use a rose fertilizer (3:1:2 or 4:1:2 ratio). This will provide nutrients for vigorous growth and flowering for the next few months. Fertilize after pruning this month.

You can prune your roses late this month to help them during the fall blooming season. This is another great time to remove all dead wood, diseased canes and twiggy growth. Cut the remaining canes to just above a bud that faces away from the center of the bush. Climbers and ramblers should only be pruned now to correct errant growth, remove dead wood or diseased canes because they bloom on growth they make at this time.

Keep yellow, fallen leaves picked up from rose beds. These fallen, infected leaves often serve as a source of disease.

September

Roses need good drainage but still need consistent moisture so continue to monitor your roses concerning their needs.

If you did not fertilize in late August, early this month is the time to do so. The late August/early September is the last fertilization required for the year.

Continue to monitor insects and pests on your roses and when necessary, keep up the seven-day spray schedule.

October

Now is a good time to plant container roses and you can continue planting into the winter. If October is still too hot, you may want to wait until November. The best time for planting depends on the temperature levels for that year. (See the instructions for planting container roses that are available in this article).

As flower production increases, remember to begin deadheading again. Keep your pruning to a minimum. Only prune deadwood or damaged canes.

Continue to monitor the moisture in your flowerbeds. This can be a dry month so do not think the beds can be left alone.

No fertilizer is needed for this month.

Watch your roses for disease and pest problems. With the cooler weather, you may be able to reduce the frequency of your protection.

November

With the cooler weather, you may be able to decrease the supplemental watering. Water only as needed to maintain a moist soil. Water directly to the roots with soaker hoses or irrigation systems that spray the water into the soil and not on the leaves.

No fertilizer is required this month.

You should be able to stop your spray schedule this month.

Avoid heavy pruning this month but you may still want to deadhead your roses.

December

This is a great time to transplant roses. (See instructions available in this article).

Do not prune this month. A good time to prune is around Valentine's Day this is a good way to remember the time to prune your roses.

No fertilizer or pest controls are required this month.

Knock Out Rose

Planting a rose from a container

Gently remove the rose from the container.

If needed, use your fingers to pull the rootball slightly apart. This helps the roots grow into the surrounding soil.

Plant your rose in a well-prepared hole (with organic matter added). The top of the rootball should be level with the surrounding soil of the existing bed. Make sure the graft union is approximately two-inches above the ground.

Gently firm the soil around the rose's roots with your hands.
Add a root stimulator (according to the label directions) and then water thoroughly to help settle the soil. Mulch the planting area with 3 to 4-inches of the chosen bark mulch and keep the mulch depth throughout the year.

Transplanting a rose

December and January are the best months to transplant a rosebush. Roses can be transplanted any time after they go dormant through late February.

Dig the rose bush with as much of the root system as possible and then immediately plant it in its new home. Do not let the roots dry out. If the bush cannot be planted immediately, wrap the roots with plastic or you can put it in a pot that can serve as a temporary home. You may want to prune it back some before transplanting to help compensate for moving the plant.

Monitor the moisture of the new transplants and supplement it as needed.

Do prune this month. A good time to prune is around Valentine's Day this is a good way to remember to prune your roses.

Fertilization

Roses have high fertilizer requirements. For most soils, use a complete fertilizer for the first application of the year just as the new growth starts, then use ammonium sulfate or other high nitrogen source, every four to six weeks, usually just as the new growth cycle starts following a flowering cycle. For organic sources use cottonseeds, rotted manures or alfalfa meal.

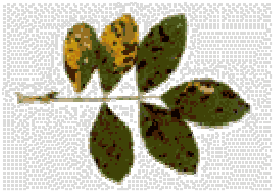
Feed the modern, repeat-bloom rose varieties first in the spring right after pruning. Next, feed when they have developed flower buds, and then again about two months before the first frost in your area. Gardens with fast-draining, sandy soil are usually fed more frequently.

A simple way to remember is fertilize in March, June and lightly in late August. In March and June, use high nitrogen fertilizers in which ½ is in slow release form. In late August, apply fertilizers in which the nitrogen is readily available. Most commercial rose foods and organic fertilizers produce good results. (Taken from *the real dirt* A Gardening Handbook for Parker County.)

Use a commercial rose food or a general-purpose fertilizer like 10-10-10 or 5-10-10 for the first two feedings. A formulation like 0-10-10 is best for the last feeding before frost. Apply the rose food as well as the water-soluble and foliar fertilizers available according to the manufacturer's directions. Dry fertilizers should be scratched into the soil beneath the leaves - but not touching the canes or bud union - and then watered in well.
The older varieties of roses that only bloom once a year should be fertilized one time in early spring.

Diseases and Suggestions for Controls

Spray rose varieties susceptible to black spot, using a spray containing triforine (Funginex). Use every seven to ten days. Black spot causes black-brown spots encircled by bright yellow tissues. Include systemic insecticide to prevent thrips. They cause buds to turn brown and fail to open properly. Many of the Old Garden Roses and some of the newer ones have considerable resistance to black spot.



Blackspot--the most troublesome disease of roses in our area
Blackspot (*Diplocarpons rosae*) is the most devastating and widespread of the rose diseases. This fungus attacks practically all of our modern rose cultivars, but there are numerous wild roses that are left untouched!

Powdery Mildew--another widespread disease of roses
Powdery mildew (*Sphaerotheca pannosa*) is another widely distributed and serious disease of roses. Young tissues are the most susceptible and the disease is typically diagnosed when white, powdery patches of fungal growth appear on young leaves. These leaves will often fold inward or become twisted and distorted. New stem growth and flowers can also be attacked.

Follow Proper Pruning Techniques

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Pruning Roses

Rose plants need pruning to tidy up their appearance; control size; and improve their vigor, growing habits and bloom. Pruning methods vary according to the type of rose plant. In South and Central Texas, roses usually are cut back more severely than in North Texas. This is due to the longer growing season, resulting in larger bushes. To keep them in bounds, spring pruning usually is more drastic. Prune about 3 to 4 weeks before the average date of the last killing frost in your area. Roses have a very low chilling requirement to break dormancy. A few weeks of cold weather in December fulfills this requirement and new growth begins the first warm spell in January or February. If pruning is done too early, the new growth begins at the base of the plant. A sudden cold spell in late February or early March can severely damage or kill the plant. If pruning is delayed, the new growth will still be in the top of the unpruned canes and only upper portions of the bush will be damaged in a late freeze. An exception to this rule involves climbing roses that need to be pruned after flowering in early spring.

Probably no other aspect of growing roses has aroused as many questions as has the subject of when and how to prune roses. By following a few simple rules you can improve their appearance and vigor and control the quality and quantity of the flowers. Pruning roses dates back to the nineteenth century when rose growers began to severely prune their plants to produce larger blooms for show. Unfortunately, plant longevity was of secondary importance to these exhibitors. Some fundamental practices of pruning roses correctly in all gardens, regardless of type, are: 1) remove any canes that have been damaged by insects, diseases or storms; 2) remove one of two canes which may be rubbing one another; or 3) remove canes that are spindly or smaller in diameter than the size of a pencil. After pruning, according to these general recommendations, cut hybrid

teas, floribundas, grandifloras and polyanthas back to 12 inches for large flowers and 18 to 24 inches for many smaller sized flowers.

Climbing roses generally are pruned to renew plant vigor by removing the old canes since the most productive and finest blooms on climbers are produced on canes that arise from the bottom of the plant the previous year. These newer canes produce more desirable growth and flowers. Since the canes may become quite long, it is necessary to prune them back so they are maintained in the desirable area.

Old fashion or antique roses require much less pruning than modern roses. Left unpruned old fashion roses will naturally obtain a rounded shrub shape. Pruning of these roses should be confined to some shaping of the plant, removal of damaged branches, and judicious trimming back to encourage growth.

On all roses, consider the cutting of the flowers as a form of pruning. When gathering roses, always leave at least two sets of leaves on the branch from which you cut the flower to insure plant vigor. When removing faded, spent flowers, cut only as far as the first five-leaflet leaf. When making cuts on the ends of branches, cut at 45-degree angles above an outside bud 1/2 inch above the bud with the lowest point on the side opposite the bud, but not below the bud itself. When removing branches, never leave stubs since these die and can cause problems on the plant later. Always remove branches by cutting to a lateral branch or bud, or back to the base of the rose plant.

Texas Agricultural Extension Service
The Texas A&M University System

Managing insects and related pests of roses

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Texas is well known for roses. In the Tyler region, roses are grown commercially in greenhouses and outdoor nurseries, where field-grown cut flowers, potted miniature roses, bare-root roses for use in landscapes, and potted roses for the garden-center trade are produced. Although several species of roses are native to the state, the rose industry is based primarily on the many exotic rose hybrids available, including antique and shrub roses, which have fewer pest problems. One of the largest antique-rose producers in the nation is located near Brenham, Texas.

Because roses are grown and appreciated primarily for their aesthetic value, the plants--and particularly the blossoms--should be relatively free from pest damage. Rose plants in the landscape need not necessarily be blemish-free, but still should be healthy and add to the plantings' overall beauty.

Many species of insects and mites attack and injure roses. Under certain conditions, roses become particularly susceptible to certain pests. For example, greenhouse-grown roses

are more susceptible than field-grown roses to outbreaks of spider mites. Thus, protecting roses from insects and mites requires continual care and substantial knowledge of pests and management alternatives, including pesticides and their use.

Monitoring and identifying pests and their damage

Detecting and identifying pests are the first steps in managing insects attacking roses. Inspect plants regularly for pests and the injury they produce. For example, check the underside of a set number of leaves weekly for such pests as spider mites or aphids. Regular inspections can help growers detect the arrival of new pests or document the abundance of pests over time. In addition, monitoring helps growers time their suppression methods and evaluate their effectiveness better. In greenhouses, yellow sticky cards can be hung over the plant canopy and inspected regularly to indirectly monitor adult populations of many insect pests of roses, such as winged aphids, thrips and whiteflies.

Figure 1. Rose injury caused by thrips.

Correct identification enables growers to choose the best methods to control pests while helping preserve beneficial insects. Not all insects that frequent roses are damaging. Many are incidental; some are pollinators; and others are beneficial natural enemies that feed on harmful species. Insects that attack roses can be divided into two groups according to the way they feed on plants and the damage they cause:

- Sucking insects, which insert their mouth-parts into plant tissue and suck out the juices, sometimes transmitting diseases to roses in the process; and
- Chewing insects, which chew on plant tissue and may damage all or parts of the plant, including roots, stems, leaves, buds and open flowers.

Although spider mites are not insects, the symptoms they produce (stippling, bronzing of leaves) are similar to those of sucking insects. Like spider mites, thrips rupture plant cells and suck out the cell contents. Thrips also often injure expanding flower petals, producing discolored, malformed blooms.

Sucking pests, such as aphids, leafhoppers, scale insects and whiteflies, produce these symptoms:

- Discoloration (yellow or brown) and necrotic (dead) spots on leaves or petals;
- Wilted appearance of plant or plant parts;

- Curled, malformed leaves and petals; and
- Shiny, sticky “honeydew” or black-colored coating of sooty mold.

Chewing pests, such as caterpillars, beetles, grasshoppers and leaf-cutter bees, produce these symptoms:

- Holes in foliage or stems;
- Discolored areas on the surface or margins of leaves or petals;
- Severed stems, leaves or buds or wilting of stem or cane (limb girdling);
- Wilting of plant (root damage by white grubs or other root feeders); and
- Semicircular holes in leaf margins (leaf-cutting bees).

Figure 2. Aphids on a rose.

Common insect and mite pests of roses

Aphids: Many species of aphids or plant lice, including the rose aphid, attack roses. Aphids are small, soft-bodied winged or wingless insects about 1/25 to 1/8 inch long with relatively long legs and antennae. Species vary in color from black, green, yellow to even pinkish. Some aphids lay eggs; others give birth to live young that mature in 7 to 8 days. Because aphids breed continuously, populations grow quickly, especially in cool weather.

Aphids usually live together on buds, the underside of leaves or in the plants’ growing tips. They suck out plant sap and excrete a sweet, sticky substance called “honeydew” that collects on leaves and stems. A black fungus called sooty mold grows on honeydew, making it look ugly and reducing photosynthesis. Plants heavily infested with aphids appear wilted. Some aphid species cause leaves to yellow or drop from the plant; other species stunt and curl young leaves. Heavily infested buds may fail to open, be deformed or produce small blossoms (also see Extension publication B-6047, *Aphids in Texas Landscapes*).

Leafhoppers: Leafhopper species are about four times longer than wide. When full grown, they range from 1/4 to 1/2 inch long. Adults vary in color from gray to yellow and green; some species have patterned markings. The immature forms (nymphs) resemble adults but are lighter in color and lack wings. Both adults and nymphs can injure roses. Some species feed on tender stems and leaf petioles; others, such as rose leafhoppers, feed on the underside of leaves, causing whitish stippling. In Texas, leafhoppers attack roses from early spring until late fall.

Scale insects: Several scale insects occasionally attack roses, but the most damaging is rose scale. Small and soft-bodied, scale insects secrete a material that forms a shell or "scale" over the insect itself. Female rose scales are round and dirty white. Males are elongate and snow white. When mature, these insects insert their mouth-parts into the plant tissue and remain there, protected under their scale covering, for their entire life span. Females deposit eggs beneath the old scale covering.

When the eggs hatch, the young, six-legged scale insect "crawlers" disperse throughout the new tissue and attach themselves to the plant. Heavily infested canes may become encrusted in the scales. Scales become most abundant under high humidity and reduced sunlight. They not only spoil the plant's appearance, but also great-ly reduce plant vigor (also see Extension publication L-1827, *Scale Insects on Ornamental Plants*).

Whiteflies: Adult whiteflies are small, white, soft-bodied insects. Weak fliers, they resemble tiny snowflakes fluttering about a plant. Immature whiteflies attach to the underside of leaves and resemble scale insects. Both immature and adult forms feed on roses, leaving yellow spots on the leaves. Heavy infestations can cause defoliation. Much like aphids, whiteflies secrete honeydew, causing plants to be covered with a black sooty mold (also see Extension publication L-1299, *Whiteflies*).

Spider mites: Although several species of spider mites attack roses, the most common is the two-spotted spider mite. Mites are tiny, scarcely visible without magnification. Their color varies in shades of yellow, red and green marked with two darker spots on their backs. All develop-mental stages of spider mites usually live on the underside of the leaves, but may be found elsewhere on heavily infested plants, which they may cover with a fine web. Female mites lay clear, spherical eggs on the underside of leaves. Eggs develop into adults in 5 to 20 days, so populations grow quickly, especially in hot, dry weather.

Spider mites rupture plant cells with their mouthparts and suck the juices, producing feeding punctures that look like tiny light-colored spots, giving leaves a stippled appearance. Leaves of heavily infested plants turn yellow, then brown and eventually fall from the plant (also see Extension publication L-1244, *Destructive Mites in the Home Garden*).

Thrips: Common species on roses include flower thrips, onion thrips and tobacco thrips. Thrips are extremely small, soft-bodied insects less than 1/16-inch long. Some are yellow to golden; others almost black. Females lay eggs in plant tissue. After hatching, immature stages (larvae) develop through several stages, completing their life cycle in about 3 weeks.

Migrating adult populations, particularly in late spring, damage roses most. Thrips feed predominately on pollen, but also attack tender plant tissue, rasping the surface tissue from leaves, buds and petals. Recently injured tissue looks silvery. Heavy infestations result in discolored, deformed growth and blemished, deformed flower petals.

Leaf-feeding beetles: Several species occasionally feed on rose plants, chewing plant tissue from leaves, buds and petals. Rose chafers and June beetles are brown; rose leaf beetles are small and metallic green; and twelve-spotted cucumber beetles are 3/8 inch long and greenish-yellow with black spots.

Caterpillars: Many species of caterpillars, the immature stages of moths, can be incidental pests of roses. Although most feed on leaves voraciously, only a few damage or defoliate plants extensively. Leafrollers are small, pale-green black-headed caterpillars that produce leaf mines when small and later feed inside leaves they have rolled up and tied with silk. Leaf tiers also draw several leaves or parts of leaves together with silk.

Grasshoppers: Several species of grasshoppers feed on rose leaves, buds, flowers and stems. Winged adult grasshoppers are difficult to control in the times of year they migrate to rose plantings from surrounding vegetation where they developed.

Leaf-cutter bees: These solitary bees nest in burrows and hollowed twigs and stems. Adult females cut circular to elongate pieces of leaves from roses to build walls and partitions of nesting cells where their young develop. Cells are provided with nectar and pollen collected from flowers as food for the larvae.

Indirect pests of roses: Many insects in and around rose plantings should be controlled when they become numerous enough to be a nuisance. These pests rarely injure established rose plants in the landscape and are treated in other Extension publications:

- Red imported fire ants (see B-6043, *Managing Red Imported Fire Ants in Urban Areas* or L-5070, *The Two-Step Method Do-It-Yourself Fire Ant Control*);
- White grubs (see L-1131, *White Grubs in Texas Turfgrass*);
- Snails and slugs (see L-1737, *Snails and Slugs*);
- Centipedes and millipedes (see L-1747, *Centipedes and Millipedes*);
- Crickets (see L-1809, *Crickets*);
- Fungus gnats (see L-2041, *Fungus Gnats*); and
- Springtails (see L-2109, *Springtails*).

Figure 4. A thrips.

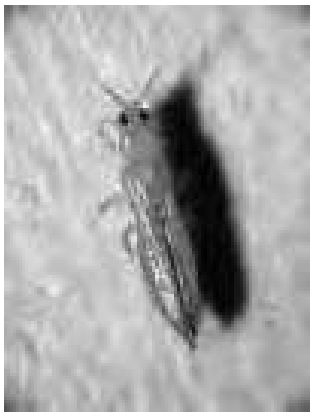
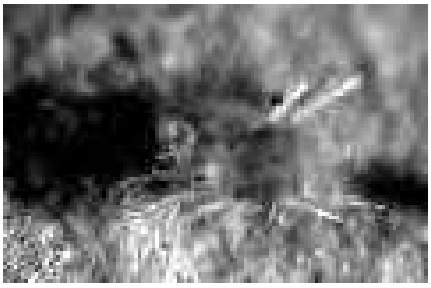


Figure 3. A spider mite.



Cultural, non-chemical and biological control

Cultural practices can greatly reduce or eliminate the incidence of insect problems and the need for insecticides. Selecting proper varieties and keeping plants healthy by proper planting and care (watering, fertilization and disease control) can help prevent and reduce pest damage. In addition, the following cultural practices aid in managing pests (also see Extension publications L-866 *Roses: How to Plant* and L-878 *Roses: Summer Care*):

- Maintain clean, closely mowed areas next to the rose garden to help deter grasshoppers, beetles and caterpillars from migrating into the planting.
- Dispose of dead leaves, trash or debris and periodically disrupt landscape timbers or rocks serving as harborage areas to reduce "trash pests" such as pillbugs, sowbugs, centipedes and millipedes, around plantings.
- Prune properly to remove dead canes that can become harborage or nesting sites for insects such as leaf-cutter bees.

High-pressure water sprays via hose-end devices can dislodge mites and other pests from their host plants. These devices produce a fine, hard spray to the underside of leaves and plant terminals. Begin treatments when pests are first detected and repeat regularly to maintain clean plants. Other mechanical methods of insect control, such as hand destruction or removing insects with a cotton swab, may be used for house plant roses.

Natural enemies may be released into greenhouses, interiorscapes and landscapes to help control insect and mite pests. Releasing natural enemies (predators, parasites and pathogens) to control pests is a type of biological control called augmentation. In this approach, commercially available species are applied in a timely manner to suppress or prevent pest population increases. To make augmentation cost-effective, growers must understand the pests and their natural enemies as well as the operation's economic goals and environment. Although researchers and Extension faculty at The Texas A&M University System are evaluating some of these products, suggestions for their most effective use are still being developed.

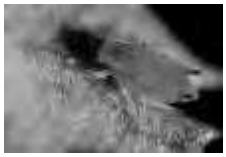
Some commercially available biological control agents include:

- LACEWINGS: *Chrysoperla carnea* and *C. rufilabris*--predators of aphids, mealybugs, scales, spider mites, thrips and small caterpillars and many other pest insects.

- TRUE BUGS: *Orius* spp.--predator of larval and adult thrips, mites, aphids and whitefly pupae.
- MITES: *Metaseiulus occidentalis, Phytoseiulus persimilis, Mesoseiulus longipes* (=Phytoseiulus *longipes*) and *Neoseiulus californicus* (*Amblyseius californicus*)--predatory mites of spider mites; *Amblyseius cucumeris, Neoseiulus cucumeris* and *Neoseiulus barkeri* --predatory mites of thrips; *Galendromus occidentalis* (=Metaseiulus *occidentalis*)-- predatory mite of spider mites; and *Hypoaspis miles*--predaceous mite of shore-fly larvae and thrips pupae in the soil.
- WASPS: *Aphelinus abdominalis*, *Aphidius colemani* and *Aphidius matricariae*--parasitic wasps of aphids (such as green peach aphids); *Encarsia formosa* and *Eretmocerus* sp. nr. *californicus*--parasitic wasps of whiteflies; and *Trichogramma* spp.--several species of parasitic wasps for caterpillar eggs.
- NEMATODES: *Heterorhabditis* spp.--predaceous nematodes for black vine weevil; *Steinernema carpocapsae*--parasitic nematode of fungus gnats, grubs, black vine weevils and wood borers; and *Steinernema feltiae*--predaceous nematodes on sciarid flies (Sciaridae, dark-winged fungus gnats, root gnats).

Those who use these natural enemies should follow instructions provided by the insectaries or their distributors. The Environmental Protection Agency has exempted these products from the regulations applying to insecticides and microbial insecticide (bacteria, viruses, fungi) products.

Figure 5. Cotton aphid.



Chemical selection and safety

When choosing a pesticide to control insects or mites on roses, look for products with "roses" on the product label. Many products are available; examples are provided in Table 1. However, other products with labels that cover roses in general categories such as "shrubs," "ornamental plants" or "flowering plants" also may be used.

For interiorscape and greenhouse-grown plants, use only products registered for roses located in those usage sites. Otherwise, move plants outdoors to spray. Whenever possible, choose the least toxic, most target-specific products available. Pesticide labels contain the signal words "Danger" (most toxic), "Warning" (less toxic) or "Caution" (least toxic) to indicate the toxicity of the formulated insecticide in the container.

Certain products affect only a small group of pests. For instance, *Bacillus thuringiensis* var. *kurstaki* affects only leaf-feeding caterpillars. Similarly, miticides are generally specific pesticides for mite control.

Used as recommended on the label, pesticides are safe and effective. However, all pesticides are poisonous and, if misused, may harm humans, animals or plants and contribute to environmental pollution. Before using any pesticide, read the label

completely. Note any special precautions, such as the necessity of wearing special protective clothing while applying. Follow all safety precautions indicated on the label. Growers wanting to adopt safe practices should:

- Become familiar with a pesticide *before using it*. Know its registered uses, toxicity and the necessary precautions for safe use.
- Select appropriate application equipment for the task at hand. Pesticides sold in hand pump and aerosol containers are useful for house plants or small plantings.
- Keep application equipment clean and assure it is in working condition before mixing and loading any pesticide. Spray soon after mixing the pesticide in water, or use a buffer to neutralize alkaline water. Use other tank additives or mix with other products, e.g., fertilizer, fungicide, spreaders, stickers, only when necessary. Promptly drain and clean equipment after each use.
- Keep all safety equipment, such as face masks, respirators and protective clothing, clean and in *good working order*. Wear all protective clothing specified on the product label and wash contaminated clothing separately.
- Mix pesticides outdoors or in a well-ventilated area. Avoid contact with skin and do not breathe vapors. Diluting the pesticide in water can be the most hazardous part of using a pesticide.
- Apply the correct dosage of pesticide. Using less than the recommended amount may not control the pest. Using more may damage plants or leave excessive residue. Observe the specified times between treatments, lest residue be excessive or plants damaged.
- When applying foliar sprays or dusts, be sure to cover the underside of leaves and other plant parts where target pests live.
- When using a pesticide for the first time, or treating a new variety, cultivar or growth stage such as flowering roses, apply the material to a few plants and observe for plant damage before treating the entire planting. Some rose varieties may be burned by certain chemicals or combinations of chemicals, or by their use under certain conditions such as temperature extremes. Take particular care when using acephate, carbofenthion, chlorpyrifos, dichlorvos, dicofol, dimethoate, endosulfan, kinoprene, lindane, malathion, fluvalinate, naled, nicotine, oxthioquinox, propargite, resmethrin or sulfatepp, which have been reported to injure certain cultivars. Refer to the label for reference to susceptible plants.
- In commercial greenhouse and nurseries, heed restricted reentry intervals after applying pesticides.
- Store all pesticides in a secure place away from pets and children. Never store pesticides in unmarked containers. Do not save used pesticide containers. Dispose of the containers as instructed by label directions.

Figure 6. Green peach aphid.

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Insecticides and Miticides for Rose Pests

Table 1. Examples of insecticides and miticides registered for use on insect and mite pests of roses, 1997.*

Generic or Active Ingredient	Trade Name(s)	Pest(s)	Remarks
acephate	Orthene Turf, Tree &	aphids, fungus gnats, spider	Do not use on roses
	Ornamental Spray, WSP,	mites, scale insects, thrips,	with open flowers.
	PT 1300 TR	whiteflies	
	Orthene Systemic Insect	aphids, armyworm, grass-	
	Control	hoppers, leafhoppers, mealybugs,	
		scale insects (crawlers), spider	
		mites (twospotted), thrips,	
		whiteflies	
azadirachtin	Azatin XL, Turplex	aphids, fungus gnats, thrips,	
	BioInsecticide	whiteflies	
	Safer Brand BioNEEM	aphids, beetles, caterpillars, leaf-	for trees, shrubs,
	Multipurpose Concentrate	hoppers, thrips, whiteflies	ornamentals and flowers
	Insecticide & Repellent		
Bacillus	Greenlight Dipel Dust	armyworms	for use on flowers and
thuringiensis var.			ornamental
Kurstaki			
Bacillus	Gnatrol	fungus gnats	media treatment
thuringiensis var.			
Israelensis			
Beauveria bassiana	Naturalis-O	aphids, beetles (cucumber, flea),	for use on flowering
JW-1		leaf-feeding caterpillars, leaf-	woody ornamentals
carbaryl	Chipco Sevin Brand 80WSP,	aphids (rose), armyworms,	for control of nuisance
	Sevin SL	eriophyid mites, grasshoppers,	bees; can be applied to
		June and flea beetles, plant bugs,	buildings and perime-
		scale insect (crawlers), sowbugs,	ters; in and around
		springtails, thrips	flower beds and ornamental plantings
	Sevin Brand Insecticide	ants, aphids (rose), caterpillars	
	Liquid (21.3%)	(cutworm, saddled prominent),	
		flea beetles, grasshoppers, June	
		beetles, leafhoppers, mealybug,	
		plant bugs, sowbugs, springtail,	
		thrips, tree hoppers	
	Hi-Yield 10% Sevin Dust	aphids (rose), mealybugs, June	
		beetles, scale insects (crawlers)	
chlorpyrifos		aphids (rose), beetles (leaf-	
	PT 1325 ME DuraGuard	feeding) caterpillars (armyworms),	
		grasshoppers, fungus gnats,	
		leaf-hoppers, plant bugs, rose chafer,	
		scale insects (crawlers) sowbugs,	

		spider mites, thornbugs, thrips,	
		whiteflies	
	Ford’s Dursban Insecticide		Do not use on rose
	Concentrate, Greenlight White-		bushes.
	fly & Mealybug Spray		

Generic or Active Ingredient	Trade Name(s)	Pest(s)	Remarks
disulfoton	Hi-Yield Di-Syston	aphids, flea beetles, leafhoppers,	soil treatment
	Granules (2%)	scale insects, spider mites, thrips,	
		whiteflies	
	Ortho RosePride Systemic	aphids, leafhoppers, spider mites,	soil treatment
	Rose & Flower Care (1%)	whiteflies	
	Ross Systemic Insecticide		soil treatment
	Root Feeder Refills		
dormant oil	Greenlight Plus Dormant	scale insects (rose), spider mites	
	Spray and Summer Insect	(red)	
	Spray		
horticultural oil	SunSpray Ultrafine Year-	aphids, bugs (immature),	
	Round Pesticidal Oil	caterpillars (certain), eriophyid	
		mites, mealybugs, scale insects	
		(immature), spider mites,	
		whiteflies (immature)	
	Marathon 1G	aphids, mealybugs, thrips,	for use on flowering and
		whiteflies	foliage plants
insecticidal soap	Concern Insect Killing Soap	aphids, flea beetles, leafhoppers,	
(19.9% potassium	Concentrate	mealybugs, spider mites, scale	
salt of fatty acids)		insects (crawlers), thrips,	
		whiteflies	
lindane	Protech Lindane Flea, Tick &	aphids, thrips	
	Chigger Concentrate		
malathion	50% Malathion	aphids, leafhoppers, mealybugs,	
		tarnished plant bugs, scale insects,	
		spider mites, thrips, whiteflies	
neem oil (clarified	Greenlight Rose Defense	aphids, spider mites, whiteflies	
hydrophobic extract			
of neem oil)(90%)			
permethrin	Ford’s InterCept Insect	aphids, armyworms, mealybugs,	apply before blossom
	Control Vegetable, Lawn &	scale insects, spider mites, thrips	formation
	Garden Spray Concentrate	(exposed), whiteflies	
pyrethrins (1%)	Concern Multipurpose Insect	aphids, blister beetles, flea beetles,	

plus piperonyl	Concentrate	leafhoppers, whiteflies	

Generic or Active Ingredient	Trade Name(s)	Pest(s)	Remarks
	Greenlight Rose & Flower	aphids, flea beetles, leafhoppers,	
	Spray	whiteflies	
rotenone	Greenlight Plus Rotenone	aphids	
	Insect Dust		
sulfur	HiYield Dusting Wettable	mites, thrips	Do not apply oil within
	Sulfur		two weeks.
Combination			
Ingredients			
acephate (4%),	Ortho RosePride Orthenex	aphids, mites, leafhoppers	foliar spray
triforine(0.75%),	Insecticide & Disease Control		
hexakis (0.75%)			
acephate (0.25%),	Ortho RosePride Orthenex	aphids, mealybugs, saltmarsh	aerosol
resmethrin (0.1%),	Insect & Disease Control	caterpillars, scale insects	
triforine (0.1%)		(crawlers), twospotted spider	
		mites, whiteflies, thrips	
acephate (8%),	Ortho Isotox Insect Killer	aphids, mealybugs, mites, scale	
hexakis (0.5%)	Formula IV	insects, thrips, whiteflies	
carbaryl (5%),	Greenlight Bug & Snail Bait	armyworms, crickets, earwigs,	for use in lawns,
metaldehyde (1%)		grasshoppers, sowbugs, pillbugs,	flowerbeds, ornamental
		snails, slugs	and home vegetable
			gardens
chlorothalonil (6%)	Insecticide-Miticide	thrips	
malathion (4%),	Greenlight Rose & Flower	aphids, beetles (flea, blister),	
methoxychlor (5%),	Dust	leafhoppers, plant bugs, spider	
captan (6.8%)		mites, thrips, whiteflies	
resmethrin (0.8%),	Ford’s InterCept Insect	aphids, fungus gnats, leafhoppers,	avoid wetting blossoms
pyrethrins (0.2%)	Control Rose, Flower &	plant bugs, red spider mites,	
and piperonyl	Ornamental Spray	thrips, whiteflies	
butoxide (0.2%)			
rotenone (1.1%),	Greenlight Organospray	aphids, flea beetles, fleahopper	
pyrethrins (0.8%)		(garden), leafhoppers, spider	
		mites, thrips, whiteflies	
		(greenhouse)	
tetramethrin (0.2%),	Ortho Home Defense Home &	aphids, caterpillars, leafrollers,	
sumithrin (0.191%)	Garden Insect Killer	mealybugs, spider mites, whiteflies	

*Note: Some of the products listed are Restricted Use or for commercial use only and cannot be purchased without a pesticide applicator license. For any insecticide, always refer to the product’s label for instructions, registered use sites (outdoor, greenhouse, interiorscape), species controlled and plant species or types on which the material can be safely applied.

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