The southern U.S. is blessed with an ideal environment for the growth of most ornamentals plants. Unfortunately, the same environment is also ideal for the development of a number of disease agents, especially fungi.

In a short article it is impossible to list all ornamentals grown in this region and the diseases that attack them. Rather, we will list nine of the more common ornamentals grown in the sunbelt and the major disease problems they face.

**Azaleas**

**Azalea Petal Blight:** This disease is largely confined to azaleas grown in the southern coastal states from Maryland to Texas. Indian and Kurume azaleas are especially susceptible.

The disease first appears as small, water-soaked spots on the petal. These spots sometimes give the flower a freckled appearance.

Under favorable conditions the spots enlarge rapidly and cause the flower to become limp and eventually collapse. The entire flower appears to "melt down" and tends to cling to the foliage rather than fall to the ground as spent healthy flowers.

Petal blight often affects the blooms of entire plants within a matter of a few hours, progressing so rapidly that it destroys the beauty of the plant overnight.

The fungus lives from season to season on infected blossoms in the mulch. Therefore, to control flower blight, one must remove all the old mulch from around the plants and replace with new mulch before the plants begin to bloom. Drench the soil with Terraclor in early January using one cup of 75 percent WP in enough water to wet 100 sq. ft.

When the blossoms begin to open, apply either Thylate, Bayleton, or Zyban as a blossom spray. Additional applications may be needed during the blooming period.

**Twig Die-Back:** Several fungi are associated with this disease complex.

These fungi normally enter the plant through either bud or leaf scars. The die-back organism may kill a few inches of the twigs or, if untreated, consume the entire plant.

To control die-back one must prune and destroy all infected branches. Remember that the normal pruning period for these plants is just after blooming. Since the infection period is just after the bloom season, one must continue his spray program for petal blight beyond the blooming period.

**Leaf Gall:** Leaf and flower gall is a common disease on azaleas and camellias in the south. The fungus may infect the developing leaves, stems, and flowers—causing severe distortion, swelling, and thickening of the plant parts.

As the galls form, the infected parts may become white or light green. The
DISEASE CONTROL GUIDE  warm season

disease may be particularly severe
during cool, moist weather.

The best control is to remove the
galls when first noticed, at a time
when only a few galls are present.

There may be situations where re-
moving galls is not practical. In such
cases, a spray program may control
the disease. Spray the plants once be-
fore the new leaves are unfurled using
Maneb, Captan, or Zineb. Apply at 14-
day intervals during the spring or as
long as young leaves are present.

Boxwood

Boxwood Blight (Canker): The term
branch and twig blight, is used to de-
scribe the problem of twigs or entire
branches dying when the remaining
parts of the plant appear healthy.
Leaves may shed prematurely leading
to the death of the twig. The affected
foliage takes on a light, straw color.

Several fungi are associated with
boxwood blight in the south. To en-
sure maintenance of healthy plants
where blight is a problem, one must
utilize an annual program of prun-
ging, sanitation, and spraying. The annual
removal and burning of all dead
leaves and twigs lodged in and around
the plants is important.

Several applications of a broad-
spectrum fungicide — Daconil,
Maneb, or fixed copper — have been
effective in preventing most blighting
problems.

The first application should be
made when the plants are pruned, fol-
lowed by a second application when
new growth is approximately one-
half completed. The remaining appli-
cations can be made at various inter-
vals depending upon further disease
development.

Nematodes: Nematodes are small,
worm-like organisms that attack a
plant’s root system. Boxwoods grown
in the south are susceptible to a num-
ber of nematodes including rootknot,
lesion, spiral, stubby-root, lance, and
ring.

The weak nematode-affected
plants gradually decline. If nematodes
are suspected, a soil nematode anal-
ysis is needed to determine the types
and population of the nematodes
present.

Few chemicals are available for the
homeowner’s use in controlling
nematodes. In some cases it is more
practical to replace infested plants
with a different variety of plant that is
not affected by the disease.

Phytophthora Root Rot: Off-color
foliage followed by sudden wilting

and death of the entire plant is charac-
teristic of this disease. Yews, rhodo-
dendrons, and a large number of other
woody ornamental plants are also
subject to Phytophthora. It is ex-
tremely difficult to rid infected plants
of this disease.

The disease is more severe in
poorly drained soil. Although Subdue
and several other soil fungicides are
labeled, chemical control is difficult.

Camellia

Flower Blight: This blight is confined
to the flowers which turn brown and
drop. Most species and varieties of ca-
mellias appear to be equally suscepti-
bile to this blight.

The control of camellia flower
blight, although caused by a different
fungus, is similar to that for azalea
petal blight.

Die-Back: A canker and die-back of
camellias is widespread and fre-
quently destructive in the southern
states. The fungus normally enters
through wounds or through natural
openings such as scars left by absciss-
ing leaves or petals in the spring.

Once inside the plant the fungus
moves down the twigs causing a grad-
ual die-back. If left untreated the or-
ganism will move back to the main
stem and kill the plant.

To control, prune and destroy all
cankerred twigs. Surgical removal of
diseased portions may be effective
when the cankers occur on a plant’s
main stem. Use tree paint containing a
fungicide to cover all cut areas.

A fungicide application shortly
after the blooming season can protect
the plant from entrance of the fungus
through natural openings. Materials
such as benomyl or daconil have
proven to be effective.

Leaf Gall: The symptoms and con-
trol of leaf gall on camellia are similar
to those that occur on azaleas.

Virus Diseases: The several dis-
eseas appearing on camellias nor-
mally appear as variegation or
yellowing in the leaf or flower. Not all
yellowing of camellia leaves is a result
of a viral infection. They may indicate
a type of nutritional disorder.

Beef suspected of harboring a
virus should be discarded or at least
isolated from healthy plants. Care
should be taken while pruning so that
suspected plants are pruned last to
prevent spreading the virus to healthy
plants.

Six steps for healthy camellias: A
successful camellia disease control
program requires a well-planned, in-
tegrated plan. Here is an example of
such a program that will help reduce
many of the camellia diseases:

1. Buy only disease-free plants. Iso-
late new plants from existing plants
for three to six months to check for
any possible disease development.

2. Take cuttings from current sea-
son’s growth from the top of healthy
plants.

3. Root in a disease-free environ-
ment. If possible, use a sterile root-
ing medium.

4. Prune plants properly. Do the
major pruning just after the flowering
period. Paint the wounds properly
with a pruning paint.

5. Use good cultural practices such
as:
• proper air circulation;
• correct amounts of fertilizer.
Over fertilization causes problems,
especially when plants are most sus-
tceptible to die-back;
• mulching when possible;
• removing and destroying dis-
 eased or spent flowers.

6. Use chemical controls. In areas
where flower blight and die-back are
problems, follow an annual spray pro-
gram along with the previous sug-
gested practices.

Dogwood

Anthracnose: Spot anthracnose is a
serious disease that attacks flowers,
leaves, young shoots, and berries.

The flowers are usually malformed
and covered with small, circular red-
dish to purple spots. The margins of
these spots are normally much darker
in color than the centers.

Leaf infection occurs after the
blooming season is over. Heavily in-
fected young twigs may die back sev-
# Plant Disease Development Calendar

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<tr>
<td>Botrytis</td>
<td></td>
<td>Botrytis cinerea</td>
<td>flowers, stems</td>
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<tr>
<td>Powdery mildew</td>
<td></td>
<td>Sphaerotheca pannosa</td>
<td>leaves</td>
<td></td>
<td></td>
<td></td>
<td></td>
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eral inches from the tips.

The fungus can survive from year to year on these dead twigs. If die-back is severe, the dead twigs should be removed before a spray program is begun.

Anthracnose control requires early application of fungicides prior to blooming. A regular spray program is required for good control. Monthly applications of fungicides such as Benlate, Maneb, Captan, or Zyban can be applied during March, April, May, and September.

Nectria Canker: This fungus attacks dogwoods as well as other hardwoods in the southeast.

The first symptom is usually a dark area on the bark with a water-soaked appearance. These areas will begin to swell, resulting in a great deal of bark splitting. Infected areas may be a few inches to several feet in diameter and can completely gird the trunk.

Cankers are targets for insects and are easily broken during heavy winds. Control is difficult after infection occurs.

If the canker is small, cut the tissue back to healthy wood and paint with a wound dressing. Severely affected trees should be removed. No effective chemical controls are available.

Gardenia Canker: Symptoms of this fungus disease are yellowing, wilting, shriveling, and falling of leaves and buds. The cankers girdle the stems causing die-back. Cankers may enlarge to twice the size of the normal stem.

The fungus gains entrance through mechanical injuries so care should be taken when pruning the plants or mowing to prevent the disease from spreading.

Spraying with a broad-spectrum fungicide—Maneb or Daconil—soon after pruning is recommended.

Sooty Mold: Sooty mold is a frequent problem on leaves of evergreen shrubs such as azaleas, camellias, and gardenias.

The black, powdery coating develops on leaves and twigs during the cool, moist weather of late winter and early spring and fall.

There are several fungi or molds that grow in the sugary dew left on plants by insects such as aphids, scale, white flies, and others that suck sap from plants. This honey dew or sugary substance may occur on low shrubs where insects are not feeding but where the material falls from larger shrubs or overhanging limbs of trees.

<table>
<thead>
<tr>
<th>Junipers resistant to phomopsis and twig blight</th>
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</thead>
<tbody>
<tr>
<td><strong>Juniperus chinensis</strong></td>
</tr>
<tr>
<td>cv. Femina*</td>
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<tr>
<td>Iowa</td>
</tr>
<tr>
<td>Keteleeri*</td>
</tr>
<tr>
<td>Pfitziriana Aurea</td>
</tr>
<tr>
<td>Robusta</td>
</tr>
<tr>
<td>var. sargentii</td>
</tr>
<tr>
<td>sargentii, cv. Glauca</td>
</tr>
<tr>
<td>cv. Shoosmith</td>
</tr>
<tr>
<td><strong>Juniper horizontalis</strong></td>
</tr>
<tr>
<td>cv. Depressa</td>
</tr>
<tr>
<td>cv. Depressa Aurea</td>
</tr>
<tr>
<td>Procumbens</td>
</tr>
<tr>
<td><strong>Juniper scopulorum</strong></td>
</tr>
<tr>
<td>cv. Silver King</td>
</tr>
<tr>
<td><strong>Juniper virginiana</strong></td>
</tr>
<tr>
<td>cv. Tripartita*</td>
</tr>
<tr>
<td><strong>Juniperus communis</strong></td>
</tr>
<tr>
<td>cv. Ashfordi</td>
</tr>
<tr>
<td>Aureo-spica*</td>
</tr>
<tr>
<td>var. depressa*</td>
</tr>
<tr>
<td>cv. Hulkaerhus</td>
</tr>
<tr>
<td>Prostrara Aurea</td>
</tr>
<tr>
<td>Repanda</td>
</tr>
<tr>
<td>var. saxatilis</td>
</tr>
<tr>
<td>cv. Suecia*</td>
</tr>
<tr>
<td><strong>Juniper sabina</strong></td>
</tr>
<tr>
<td>cv. Broadmoor</td>
</tr>
<tr>
<td>Knap Hill</td>
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<tr>
<td>Skandia</td>
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<tr>
<td><strong>Juniper squamata</strong></td>
</tr>
<tr>
<td>cv. Campbellii</td>
</tr>
<tr>
<td>cv. Fargesii*</td>
</tr>
<tr>
<td>cv. Prostrata</td>
</tr>
<tr>
<td>Pumila</td>
</tr>
</tbody>
</table>

*Also reported resistant to cedar-apple rust.

The fungi that cause sooty mold do not attack the plants directly but derive their nutrients directly from the honey dew itself. These fungi will also grow on honey dew on walls, sidewalks, fences, automobiles, or anything where honey dew is present.

Control of sooty mold is indirectly achieved by controlling the insects that produce this sugary material. Once sooty mold has been established, it is not easy to remove.

The best method is to soak affected plants in a water and detergent mixture by using one tablespoon of household liquid detergent per gallon of water and spraying on these plants. Wait for a few minutes and then wash the material off with a strong stream of water.

You may have to repeat the procedure several times. However, once completed, control of the insects should begin.

**Holly**

In the South, holly is subject to attack by only a few disease-causing organisms. Many times poor appearance of plants is often caused by improper planting, dry weather, cold weather, and planting varieties that are not adapted to the area.

The amount of damage from disease on hollies can be minimized by giving plants ample growing space and pruning out all diseased twigs and branches as they appear.

**Tar Spot:** Yellow spots appear on the leaves of American and English hollies late in the spring. These later turn reddish-brown and finally, by fall, a dark black color.

If at all possible, all diseased leaves should be burned. Make several applications of a broad-spectrum fungicide such as Maneb, Ferbam, or a copper fungicide.

**Die-Back and Canker:** There are several fungi that cause die-back and canker of holly. These are usually noted as sunken areas on the twigs and stems that cause varying degrees of die-back of young twigs.

Prune and destroy all diseased twigs and begin a spray program with a broad-spectrum fungicide such as Maneb or copper fungicide. Repeat at weekly intervals until all new growth is established.

**Junipers**

**Twig Blight:** Juniper twig blight, also known as Phomopsis blight, infects several species of juniper and arborvitae growing in the southeast.

Early disease symptoms consist of yellowing and dying of the scale leaves, especially the tips. This is followed by a progressive die back of the new growth. Small black lesions are formed on the stems, and cankers may form on the woody stems especially near a side branch.

In the southeast, twig blight spreads rapidly during periods of rainy, humid weather in the spring and fall. During dry weather, prune as much of the infected branches as possible and destroy.

Research has shown some varieties are more tolerant to twig blight than others.

Protective fungicides should be used frequently to protect new foliage. In most cases applications can be limited to periods in which flushes of new growth occur.

Fungicides shown to be effective in controlling twig blight are copper fungicides (such as copper sulphate), benomyl (Benlate), or Zyban. A spreader sticker should be added to
the spray for best results.

Cedar-Apple Rust: In areas where apples and red cedar grow together, the cedars may become covered with hundreds of galls an inch or more in diameter.

Infection occurs on the leaves which stimulates the development of the gall. The second spring after infection, the galls form numerous, long, yellow, tongue-like outgrowths during warm, rainy weather.

The spores from these galls are spread by wind to leaves of nearby apples which may become seriously diseased and fall prematurely. The damage to red cedar is usually not serious.

Photinia

Photinia Leaf Spot: The major problem on photinia (red top) grown in the south is Entomosporium leaf spot. The fungus attacks old growth as well as new succulent tissue. The spots occur on both lower and upper surfaces of the leaf and are usually surrounded by a purple to red margin. As they mature these lesions will have a gray center.

Once the disease is well established, it is sometimes very difficult to control. For successful control, a good spray spray program, along with sanitation and pruning, must be carried out.

Diseased plants should be pruned in the spring just before they put on new growth. Prune out as much of the diseased areas as possible. Remove and burn any fallen leaves beneath the plant that may contain disease.

As the leaves begin to unfold, start the spray program and continue on a 10- to 14-day schedule throughout the early part of the growing season.

Effective fungicides against this disease include Maneb, Funginex, Zineb, or copper fungicides.

Roses

Many different disease agents affect roses in the southeast. To adequately control these diseases the landscaper or grower must recognize these diseases and be able to control either by variety selection, sanitation, or chemical control.

Black Spot: As the name implies, the disease's most prominent symptoms are black spots on either side of the leaves. A number of other diseases cause dark spots on the leaves but you can distinguish black spot by the darker color and the fringed borders of the spots.

There is usually a great deal of yellowing and chlorosis associated with the disease. Black spot causes premature leaf drop and may result in severe defoliation. The black spot fungus may weaken plants and make them more susceptible to other disorders.

Although rose varieties may vary in their susceptibility to the fungus, no variety is completely immune. Hybrid teas are generally more susceptible than other varieties.

The first step toward controlling black spot is sanitation. If only a few leaves show symptoms these should be removed and destroyed. Since the fungus overwinters in leaves and canes, remove all diseased leaves from around the plants at the end of the growing season.

If severe pruning does not eradicate the virus, it is best to remove the plant. The virus may be transmitted either by pruning instruments or by insects.

Before new leaves appear in the spring remove and burn old mulch and replace with fresh mulch.

A regular spray program throughout the growing season is usually necessary for control. You may want to use one of several fungicides including Maneb, Moncozeb, benomyl, chlorothalonil, funginex, or Zyban.

All give acceptable control of black spot if applied on weekly intervals during the spring and at two-week intervals during the dry part of the summer.

Once plants become severely infected, the fungicides are of little value other than keeping the disease from spreading. Therefore, regular spraying and thorough coverage are important.

Die-Back and Stem Canker: Die-back and stem canker are really a complex of diseases since they are caused by several different types of fungi. However, identifying these diseases is not of great importance since the control is very much the same for all.

The die-back phase of the disease appears as a black sunken lesion that causes death of the terminals of the cane. Die-back normally gets established through wounds.

When pruning be sure to dip all pruning tools in a 70 percent solution of denatured alcohol or household liquid bleach diluted one part bleach to four parts water.

The fungicides effective in controlling black spot will also control die-back and canker.

Powdery Mildew: A white powdery fungus growth on the surface of leaves, buds, or stems or roses usually indicates powdery mildew. Infection on young leaves may cause curling and sometimes a purple discoloration.

Badly infected flower buds do not open properly. Most sanitation procedures for the control of other rose diseases are also valuable in controlling powdery mildew.

When the disease is a problem, spray dormant plants with commercial lime sulfur (1:15).

During the growing season you can hold powdery mildew in check by spraying with benomyl, cycloheximide (Acti-dione), or wettable sulfur. Be sure to add a spreader sticker and follow label directions closely.

Viruses: There are several virus diseases that attack roses in the south. The symptom expressed will depend on the type of virus present.

Some of the mosaic viruses will cause pale to bright yellow spots on the leaves. Occasionally, ring spots will occur or some type of light yellow zig-zag pattern across the leaf. Also, the mosaics will result in a puckering of the younger leaves.

Some of the streak viruses will produce a brown to reddish ring pattern in the leaves. Brown or green rings may also occur on some of the canes.

Generally speaking, the viruses cause little loss of plant vigor. Nor does it affect flower production. The major problem is with discoloration and deformity of the foliage.

Occasionally symptoms may be masked during hot weather. Infected roses should not be used for budding or grafting. Propagators can use heat treatment of root stock to rid the plants of most viruses.

If virus symptoms do occur on established plants, severe pruning may eradicate the virus. If this is not successful, it is best to remove the plant since the virus may be transmitted to healthy plants either by pruning instruments or by insects.