

# Common Diseases of Juniper in Alabama

**J**unipers are widely used as screens, hedges, ground covers, foundation plants, and occasionally as specimen plants in the majority of residential, recreational, highway, and commercial landscape plantings across Alabama. In addition, junipers rank among Alabama's top container and field-grown nursery crops. These versatile landscape plants, whose many cultivars have a variety of growth habits, range in size from creeping dwarfs to medium-sized trees. Typically, junipers will tolerate a wide range of soil types and landscape settings but tend to perform best in well-drained soils on sunny sites. Diseases not only have a major impact on survival and market value of container and field-grown nursery stock but can also have a detrimental impact on the health and beauty of juniper in landscapes. This publication describes the diseases commonly noted on junipers as well as recommended control procedures.

## Phomopsis Blight

Phomopsis blight is a common and sometimes damaging disease on selected cultivars of juniper, eastern red cedar, Arizona cypress, and related evergreen shrubs and small trees. Although this disease is most damaging on liners, container and field stock, disease-related damage can also be seen in landscape plantings of susceptible juniper and red cedar selections. Frequent shearing coupled with heavy nitrogen fertilization and frequent spring and summer showers will often greatly increase the severity of Phomopsis blight.



**Figure 1.** Phomopsis blight damage on shoots of eastern red cedar

## Symptoms

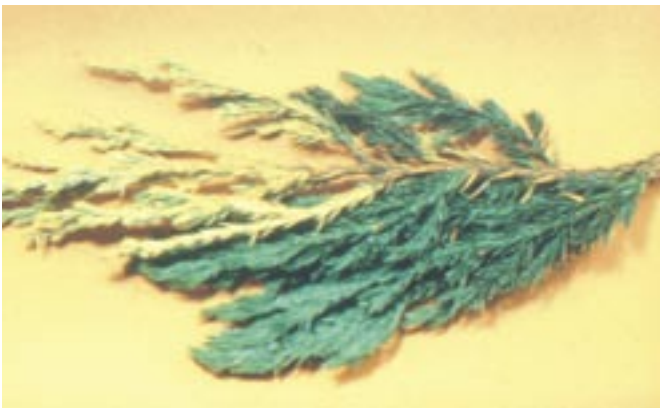
Typically, symptoms of Phomopsis blight first appear in late spring and early summer as a yellowing or chlorosis of the new, succulent shoot tips. Then, these yellowed tips quickly die and turn brown (Figure 1). This browning can extend several inches from the shoot tip. Gray cankers, which mark the site of the first infections, usually girdle the diseased shoots causing the shoots to yellow and die. Girdling cankers can also develop on the main stem of the cuttings of red cedar and other susceptible junipers. Tiny black fruiting bodies of the causal fungus *Phomopsis juniperovora* can be seen with a hand lens in these gray cankers. While seedlings, cuttings, as well as container and field-grown nursery stock can be disfigured or in some cases killed, Phomopsis damage in landscape plantings is unsightly but rarely fatal (Figure 2).



**Figure 2.** Extensive Phomopsis blight damage on Arizona cypress

### ***Persistence and Movement***

The causal fungus overwinters in the cankers on blighted shoots. During periods of wet, humid weather in the spring, masses of fungal spores ooze from the cankers and are spread to new shoots by splashing water from rain and overhead sprinkler systems, or possibly with pruning shears. A film of water on the foliage is needed for an extended period of time for infection of scales or needles to occur. With the right temperatures, the longer the foliage remains wet the heavier the damage.



**Figure 3.** Kabatina twig blight on juniper

Ideal temperatures for infection range from 68 to 74 degrees F while severest symptoms are seen at slightly higher temperatures. Soft, succulent shoots are much more sensitive to attack than hardened, mature foliage. Hot, dry conditions will suppress disease development. Once established in a block of liners, nursery stock plants or landscape planting, Phomopsis blight is impossible to eradicate.

### ***Control***

In a container or field nursery, Phomopsis blight control involves the integration of a number of different strategies such as disease-free liners or stock plants, cultivar resistance, watering practices, and fungicides.

Typically, the source of Phomopsis blight into liner beds or production ranges is diseased cuttings or liners. Cuttings should be taken from blocks of disease-free, preferably disease-resistant, stock



**Figure 4.** Botryosphaeria dieback on the Rocky Mountain juniper cv. 'Wichita Blue'

**Table 1.** Selected Fungicides Registered for the Control of Phomopsis Blight on Juniper

Fungicide	Rate		Comments
	Per gal.	Per 100 gal.	
azoxystrobin Heritage 50W	—	1-4 oz.	Prune-out damaged shoots. Apply at first sign of disease and repeat at 14- to 28-day intervals.
mancozeb Dithane M-45 T/O Fore 80W	1 T. <sup>1</sup> 1 T.	1.5 lb. 1.5 lb.	Spray at 7- to 10-day intervals during humid summer weather. Apply as needed to drip. Use surfactant to improve coverage.
propiconazole Banner Maxx	—	5-8 fl. oz.	Apply as full coverage spray every 14 to 21 days.
propiconazole Ortho Lawn Disease Control	See label.		Sold with ready spray applicator. Apply at 21-day intervals as needed to control disease.
thiophanate-methyl 3336 4.5F 3336 50W	— —	10-20 fl. oz. 12-16 oz.	Spray at 7- to 10-day intervals during humid summer weather. Apply as needed to drip. Use surfactant to improve coverage.
thiophanate-methyl Halt 50W OPH 6672 50W	2½t. —	— 16 oz.	
thiophanate-methyl + mancozeb Zyban 79W	5 t.	3 lb.	
thiophanate-methyl + flutolanil Sys Star 80 WDG	—	4-8 oz.	

<sup>1</sup>T. = Tablespoon, t. = teaspoon.

plants or production material. After each cutting, pruning shears and knives must be cleaned with rubbing alcohol or a similar disinfectant. Symptomatic cuttings should be discarded before being stuck in liner flats or pots. Discard flats of diseased cuttings or liners. Take cuttings from fungicide-protected stock plants or production material. Pruning out blighted shoots can help slow disease spread in nursery and landscape plantings. Again, clean pruning tools and knives with alcohol or similar disinfectant after each cut.

When choosing junipers, inspect plant material for typical shoot blight symptoms of Phomopsis blight and do not install diseased plant material in landscape beds.

Cultivars and selections of juniper vary widely in their resistance to Phomopsis blight. In the landscape, establishment of disease-resistant cultivars is the simplest and most effective means of preventing disease outbreaks. The susceptible junipers such as the sabin juniper *J. sabina* var. *tamaisfolia*; Chinese junipers ‘Sea Green’ and ‘Nicks Compact Pfitzer’ (Pfitzeriana Compacta); creeping junipers ‘Andorra Compacta’, ‘Bar Harbor’, ‘Prince of Wales’, and ‘Blue Rug’; Rocky Mountain juniper

‘Wichita Blue’; single-seed juniper ‘Blue Star’ should not be propagated or planted. A number of juniper cultivars and selections resistant to Phomopsis blight are available. The reaction of juniper cultivars and selections to Phomopsis blight, Kabatina twig blight, and rust diseases is summarized in Table 5.

The length of time free moisture is present on the foliage has a critical impact on infection and subsequent colonization of new shoots by the causal fungus. When using an overhead sprinkler system in the nursery or landscape, water in late morning or early afternoon to insure that the foliage dries before nightfall. In landscape beds, install a drip irrigation system or use a similar surface watering system to minimize the splash dispersal of *P. juniperovora* to adjacent healthy plants. Also, spacing out susceptible junipers in container beds and in new landscape plantings should help slow plant-to-plant spread of the spores. Regardless of the irrigation system used, established junipers should be watered on a 5- to 7-day schedule. Watering junipers every day or two using an overhead sprinkler system will greatly increase disease severity.

When junipers are most vulnerable in the spring and early summer to Phomopsis blight, an intensive fungicide spray program will give good disease control. In the nursery, begin fungicide applications after shoot growth has started and before any fresh symptoms are seen. Continue applications at recommended intervals as long as growth flushes continue and the summer weather remains hot and wet. In landscape plantings, make fungicide applications every 10 to 14 days beginning in late spring until the new growth hardens off in early to midsummer. When summer weather patterns are unusually wet and mild for extended time periods, shorten the time interval between fungicide applications and apply the full label rate. Fungicides labeled for the control of Phomopsis blight are listed in Table 1 and in ANR-500B, *Alabama Pest Management Handbook—Volume 2*.

### Kabatina Twig Blight

Kabatina twig blight is easy and often confused with Phomopsis blight. The main difference between the two diseases is the time of year that symptoms first appear. This disease is more common on junipers in landscape plantings than in the nursery. Insect feeding injury or weather-related damage apparently is required for the causal fungus *Kabatina juniperi* to infect juniper shoots. Kabatina twig blight can disfigure but will not kill junipers.

### Symptoms

Symptoms of Kabatina twig blight first appear in late winter or early spring rather than late spring, as is the case for Phomopsis blight. Dull green discoloration of the terminal 2 to 6 inches of last year's shoots is the first symptom of this disease. Later, the damaged shoot tips turn red to yellow in color and quickly die (Figure 3). Ash-gray to silver girdling cankers appear at the base of the blighted shoots. Tiny black fruiting bodies of the causal fungus, which form on the canker face and dead scales, can be seen with a hand lens. The appearance of symptoms is limited to late winter through early spring and does not continue into the summer months. Symptoms of Kabatina, particularly discoloration of the foliage, can easily be confused with those caused by the feeding of the spruce mite.

### Persistence and Movement

As was the case with the causal fungus of Phomopsis blight, *K. juniperi* overseasons as mycelia and fruiting bodies in dead host tissue. Splashing water spread spores to healthy shoots. Infections in the fall and early winter occur at temperatures between 60 and 70 degrees F and when the relative humidity exceeds 95 percent.

**Table 2.** Selected Fungicides Registered for the Control of Cercospora Needle Blight on Juniper

Fungicide	Rate		Comments
	Per gal.	Per 100 gal.	
azoxystrobin Heritage 50W	—	1-4 oz.	Apply to wet the entire canopy. Repeat applications every 14 to 28 days as needed.
propiconazole Banner Maxx	—	8-12 fl. oz.	Apply every 30 days when conditions favor disease.
myclobutanil Immunox	2 T.	—	Apply every 7 to 14 days during the summer as needed to control disease.
thiophanate-methyl 3336 4.5F	—	10-20 fl. oz.	Spray at 7- to 10-day intervals during humid summer weather.
3336 50W	—	12-16 oz.	Apply as needed to drip. Use surfactant to improve coverage.
thiophanate-methyl Halt 50W	2 T.	—	
OPH 6672 50W		16 oz.	
thiophanate-methyl + mancozeb Zyban 79W	5 t.	3 lb.	

<sup>1</sup>T. = Tablespoon, t. = teaspoon.

## **Control**

Since protective insecticide sprays are impractical and not environmentally sound control for insect pests that damage juniper foliage, establishment of twig blight resistant cultivars or selections is the best means of avoiding disease outbreaks. As a group, cultivars of the Rocky Mountain juniper are more susceptible to Kabatina twig blight than those in other juniper species while Chinese junipers appear to be most resistant. Cultivars resistant to Kabatina twig blight are listed in Table 5.

Other control practices include spacing plants in new plantings to allow for good ventilation, not pruning in the fall during periods of wet weather, irrigating beds between midnight and dawn or at midday, and maintaining optimum soil fertility for plant growth. Finally, prune out and discard dead shoots during dry weather in the spring or summer.

No fungicides are currently labeled for the control of Kabatina twig blight on junipers.

## **Cercospora Needle Blight**

*Cercospora* needle blight is a common disease but not nearly as damaging as *Phomopsis* blight on selected junipers, primarily cultivars of the Rocky Mountain juniper. In Alabama, the primary targets of this disease are eastern red cedar as well as Leyland, bald and Arizona cypress, particularly those grown as Christmas trees. Most other cypress species are also susceptible to this disease. *Cercospora* needle blight tends to be most damaging to stressed or poorly managed trees. Damaged Christmas trees are unsalable.

## **Symptoms**

A browning or blighting of the needles, which typically begins on the lowest, innermost branches near the base of the tree, progresses upward and outward towards the shoot tips until only the current season's growth remains on the shoot tips. In some cases, selected trees can succumb to this disease. Symptoms usually appear during the summer months.

## **Persistence and Movement**

Native eastern red cedar and bald cypress are a likely source of the causal fungus *Cercospora sequoia*. The causal fungus can also be introduced into landscape plantings on diseased balled and

burlapped (B&B) or container-grown junipers or cypress. The fungus overwinters in needles and other host tissues. Spores of this fungus, which are produced during periods of wet weather in the spring and summer, are dispersed to the foliage of healthy trees by air currents and wind-driven rain. Free water is required for spore germination and infection of the needles.

## **Control**

The occurrence of *Cercospora* needle blight in Alabama landscapes can be largely avoided by planting cultivars or selections of juniper other than the susceptible Rocky Mountain juniper and eastern red cedar. Reaction of juniper cultivars to *Cercospora* leaf spot is summarized in Table 5. Removal of established eastern red cedar in the immediate vicinity of newly planted junipers or cypresses, particularly on Christmas tree plantations, is also suggested. Before buying needle blight-susceptible junipers or cypresses for landscapes or tree plantations, inspect the foliage for typical symptoms of this disease. Practices such as maintaining soil fertility and pH according to the results of a soil test, as well as watering during periods of severe heat and drought stress, should reduce the risk of a disease outbreak and minimize plant injury.

Fungicides can provide good protection from *Cercospora* needle blight, but such treatments are rarely practical and are quite costly, particularly on trees and shrubs in residential and commercial landscapes. For effective control, preventative sprays must be started in mid to late spring before infection occurs and be repeated every 10 to 14 days throughout the summer until the weather cools in early fall. When applying fungicides to control this disease, particular attention must be paid to getting good coverage of all the foliage, particularly the inner canopy near the base of the tree. Many of the fungicides cleared for the control of *Cercospora* needle blight is also used to control *Phomopsis* blight. See Table 2 for a list of registered fungicides and their application rates. Refer to ANR-500B, *Alabama Pest Management Handbook—Volume 2*, for the latest fungicide recommendations.

## **Botryosphaeria Canker**

*Botryosphaeria* canker is typically considered a disease of trees weakened by weather-related

stress or poor management. In Alabama, canker and dieback disease outbreaks often follow periods of severe drought as well as a sudden early or late hard freeze and transplant shock. The causal fungus *Botryosphaeria stevensii* and related species have a host range that includes a wide range of shrubs and trees.

### **Symptoms**

The sudden yellowing or browning of the foliage on one or more branches is usually the first symptom seen (Figure 4). Elongated, slightly sunken cankers usually can be found at the base of the dead shoots. Typically, the surface of the canker is cracked and darker in color than the surrounding healthy bark.

### **Persistence and Movement**

Due to the wide host range, *B. stevensii* probably is a resident of most plant communities surrounding most residential and commercial landscapes or is introduced on diseased plant material. Spores from fruiting bodies embedded in cankers on the stem and trunk are spread by splashing water and possibly by pruning tools. The fungus invades plants through pruning wounds or natural openings in the bark such as frost cracks or lenticels. The causal fungus more readily invades tissues damaged by cold or drought than those of a healthy tree. Cankers are typically much larger on a stressed than on a vigorous tree or shrub.

### **Control**

Outbreaks of stress-induced diseases such as *Botryosphaeria* canker can often be avoided by following recommended establishment, management, and sanitation practices. Proper site preparation, adjusting soil fertility and pH according to the results of a soil test, choosing quality plant material, planting at the proper depth, and mulching with aged bark or pine straw will greatly reduce the risk of disease. In addition, new and established plants should be fertilized and watered as needed to maintain plant vigor. Avoid heavy fertilization, particularly in late winter and the fall. Prune out dead branches below the dead wood. Also, clean pruning tools with alcohol or similar disinfectant after each cut.

No fungicides are cleared for the control of *Botryosphaeria* canker.

## **Cedar Rust Diseases**

Cedar rust diseases occur statewide on members of the juniper and apple family. The most common of these diseases on junipers is cedar-apple rust, which is caused by the fungus *Gymnosporangium juniperæ-virginianæ*. Other cedar rust diseases which are also found in Alabama include cedar hawthorn rust (*G. globosum*) and cedar-quince rust (*G. clavipes*). Among the junipers commonly found in Alabama landscapes, the native eastern red cedar is the most common host of all the above cedar rust diseases. Typically, cedar rust disease damage on eastern red cedar and other junipers is largely cosmetic. However, the above diseases can cause sizable reductions in fruit yield and quality as well as severe spotting of the leaves and heavy leaf shed in the late spring and early summer on apple, crabapple, and hawthorn. Refer to ANR-468, "Controlling Cedar Rust Diseases," for more information on the identification and control of these diseases on crabapples and junipers.

### **Symptoms**

Small green-brown swellings on juniper twigs appear in late spring to early summer. By winter, green to brown, round to kidney-shaped galls up to 2 inches in diameter are found on the twigs (Figure 5). The surface of these galls is covered with numerous, small round pits or depressions. During wet weather in the following March and April, bright yellow-orange, jellylike tendrils or horns emerge from the pits covering the surface of each gall (Figure 6). After several weeks, the horns disintegrate into a slimy mass and the galls die. The galls of cedar hawthorn rust are similar to those of cedar-apple rust but are smaller. Perennial spindle-shaped swellings or cankers of cedar quince rust form on the twigs, branches, and trunks of juniper and eastern red cedar. During the late winter and early spring, an orange, jellylike material oozes from the surfaces of these cankers (Figure 7).

### **Persistence and Movement**

The causal fungi overwinter in the swellings and galls on junipers and eastern red cedars. Spores are spread from the jellylike ooze by wind to the young leaves of apple, crabapple, native

**Table 3.** Fungicide Registered for the Control of Cedar-Apple Rust on Juniper

Fungicide	Rate		Comments
	Per gal.	Per 100 gal.	
myclobutanil Eagle WSP	—	6 oz.	Apply May through September at 10- to 14-day intervals. Add a non-ionic surfactant to improve coverage of the foliage.
myclobutanil Immunox	2 T.	—	
Systhane WSP	—	6 oz.	Apply every 7 to 14 days during the summer as needed to control disease. No surfactant needed.
thiophanate-methyl + mancozeb Zyban 79W	2.5 t. <sup>1</sup>	1.5 lb.	
triadimefon Bayleton T/O	—	1-4 oz.	

<sup>1</sup>T. = Tablespoon, t. = teaspoon.

hawthorn, and quince. Infection of leaves and fruit occurs during periods of warm, wet weather and spots appear a week or two later. Several weeks later, cuplike structures appear on the underside of the leaves. Spores released from these cups during wet weather then infect young shoots of juniper. Galls appear several months later.

### Control

Cedar rust diseases are best controlled by the use of resistant cultivars, sanitation practices, protective fungicide treatments, or some combination of several of these procedures.

With the notable exception of native eastern red cedar, cedar rust diseases are not common in landscape plantings of juniper. Hand removal of the galls and twig cankers in the fall and winter is an effective method of minimizing damage to juniper. However, planting disease resistant junipers is recommended in those areas of the state where one or more cedar rust diseases are common. Juniper cultivars resistant to cedar rust diseases are listed in Table 5.

Because cedar rust diseases rarely cause severe damage on junipers, protective fungicide treatments are rarely needed except where sanitation and establishment of a resistant cultivar has proven ineffective. On junipers, fungicide sprays should be applied to runoff beginning in early June and should be continued through September every 10 to 14 days. See Table 3 for a list of fungicides labeled for cedar rust control on juniper and eastern red cedar. Refer to ANR-500B, *Alabama Pest Management Handbook—Volume 2*, for the latest fungicide recommendations.

### Phytophthora Root Rot

Phytophthora root rot is a destructive disease, particularly on rooted cuttings, liners, and container-grown junipers. Devastating disease outbreaks can occur at almost anytime during the production cycle. Junipers planted on landscape sites prone to flooding or growing on wet natured, poorly drained soils are also quite susceptible to this disease. In both the nursery and landscape, heavy rains or overwatering often trigger outbreaks of Phytophthora root rot. Planting too deep or over-mulching will also increase the risk of disease.

### Symptoms

Yellowed or off-color foliage, as well as slow and uneven shoot growth, across a block of container stock or landscape planting of junipers is the most noticeable symptom of Phytophthora root rot (Figure 8). Later, one or more limbs on symptomatic plants can wilt and die. Often, symptoms often appear in blocks of container stock and landscape plantings on a few, scattered junipers and then on a number of surrounding plants.

The fine feeder roots on root rot-damaged plants are brittle and brown to reddish brown in color. Sometimes the rotted feeder roots are confined to one area of the root ball or can encompass the entire root system. Often, the epidermis or outer surface sloughs off the surface of the larger rotted roots. In some cases, the discoloration of roots can extend up to the root collar at or just above the soil line.

**Table 4.** Selected Fungicides Registered for Control of Phytophthora Root Rot on Juniper

Fungicide	Rate		Comments
	Per gal.	Per 100 gal.	
etr Diazazole Truban 30W Terrazole 35W	0.75-1.5 t. <sup>1</sup>	3-10 oz. 1.5-3 oz./cu. yd.	<i>Soil Drench:</i> Covers 400 square feet. Water immediately. Repeat every 1 to 3 months. <i>Dry Soil Mix:</i> Add to media before planting or transplanting. Apply soil drench 1 to 3 months later as needed.
Truban 5G	—	10 oz./cu. yd.	<i>Dry Soil Mix:</i> See above.
etr Diazazole + thiophanate-methyl Banrot 40W	0.5-1.25 t.	6-12 oz. 16 oz./cu. yd.	<i>Soil Drench:</i> Covers 400 square feet. Water immediately. Repeat every 1 to 3 months. <i>Dry Soil Mix:</i> Add to media before planting or transplanting. Apply soil drench 1 to 3 months later as needed.
Banrot 8G	—	8-12 lb./1000 sq. ft.	<i>Broadcast on Field Stock:</i> Apply as needed. See label for spreader settings.
fosetyl-Al Aliette T/O	—	8-12.8 oz./cu. yd.	<i>Dry Soil Mix:</i> Incorporate thoroughly at potting. Repeat with soil drench as needed.
	—	0.4-0.8 lb.	<i>Soil Drench:</i> Covers 1000 sq. ft. Repeat monthly.
	—	2.5-5.0 lb.	<i>Foliar Spray:</i> Begin sprays at potting and repeat at monthly intervals. <b>DO NOT MIX</b> with sticker, extender, or wetting agent.
mefonoxam Subdue Maxx	—	1-2 fl. oz.	<i>Soil Drench:</i> Covers 400 to 800 square feet of area. For media depth greater than 4 inches, apply 1.5 to 2 pints per square foot. Repeat at 2- to 3-month intervals. See label for additional application instructions and restrictions.
Subdue GR	—	26-125 oz. 1.6-12.5 oz./cu. yd.	<i>Broadcast:</i> Covers 1000 square feet. Irrigate to wet soil. Repeat at 2- to 4-month intervals. <i>Dry Soil Mix:</i> Thoroughly mix in media or soil. After transplanting, thoroughly wet root zone. Retreat as needed after 2 to 4 months.

<sup>1</sup>T. = Tablespoon, t. = teaspoon.

### ***Persistence and Movement***

Several fungi in the genus *Phytophthora* cause Phytophthora root rot. In Alabama, *P. parasitica* is the most common of the *Phytophthora* species isolated from junipers and other woody ornamentals. This fungus is often introduced into blocks of liners and container stock in diseased rooted cuttings, in contaminated potting media, or moved along with soil and crop debris in water flowing through production beds. Although several *Phytophthora* fungi are native to Alabama soils, they are often introduced into landscape plantings in root rot-damaged junipers and other woody ornamentals.

### ***Control***

Good sanitation is a critical factor in reducing the risk of root rot outbreaks in liner and container production nurseries and landscapes. The foliage and roots of incoming root cuttings and container

stock should be inspected for typical symptoms of *Phytophthora* root rot. Take a few minutes to check the root system of several plants selected at random from a block of container stock. If they are diseased, do not install them in landscape beds. Take cuttings for propagation from healthy field or container stock and root them in fresh soilless potting media in new flats or containers. Do not root cuttings in native soil or in ground beds and place flats of cuttings on raised benches. Discard poor quality cuttings, liners, and diseased container stock.

Liner and container production beds must be graded to allow for rapid movement of water into drainage ditches and covered with a coarse material such as oyster shell or gravel. In the nursery, block plant material by container size and water needs. Never allow container stock to sit in standing or flowing water. Ponds fed by runoff water should not be used to irrigate liners and con-

tainer stock unless the water has been filtered and chlorinated.

To minimize the risk of contamination, store aged bark on asphalt or concrete pads and dedicate a front-end loader to handling potting media. Keep all media-handling equipment clean. Never add native soil to potting media. Aged bark, particularly composted red oak bark, will suppress the activity of *Phytophthora* fungi. Potting media must have 20

to 30 percent air space and maintain a high percolation rate throughout the production cycle.

On poorly drained sites, planting junipers on raised beds is strongly suggested. Also, amending the soil with aged bark will improve drainage and help suppress disease. Planting too deeply is an open invitation to root rot. Before planting, adjust soil fertility and pH according to the results of a soil assay. Later, fertilize and water established

**Table 5.** Reaction of Selected Cultivars of Juniper to Common Blight and Rust Diseases

Juniper Species Cultivar	Disease				
	Cedar-Apple Rust	Cedar Hawthorn Rust	Cercospora Needle Blight	Kabatina Twig Blight	Phomopsis Blight
<b>Savin Juniper (<i>J. sabina</i>)</b>					
Arcadia	R <sup>1</sup>	R	-	-	-
Broadmoor	R	R	-	S	R
Skandia	R	R	-	-	R
var. <i>tamariscifolia</i>	R	R	-	-	HS
Variiegata	R	R	-	-	-
<b>Rocky Mountain Juniper (<i>J. scopulorum</i>)</b>					
Gray Gleam	-	-	R	-	-
Medora	R	-	-	-	-
Moffettii	-	R	-	-	-
Moonglow	R	-	-	-	-
Silver Globe	R	-	R	R	-
Sparkling Skyrocket	R	R	-	-	-
Table Top	R	-	-	-	-
Welchii	R	-	-	-	-
Wichita Blue	R	-	-	-	-
<b>Red Cedar (<i>J. virginiana</i>)</b>					
Burkii	-	-	R	R	-
Canaertii	HS	-	-	-	-
Emerald Sentinel	-	-	R	R	-
Globosa	R	R	-	-	-
Hillii	-	-	R	R	-
Hillspire	R	R	R	R	-
Kosteri	R	R	-	-	-
Manhattan Blue	-	-	R	R	-
Pseudocupressus	R	R	-	-	-
Pyramidalis	R	R	-	-	-
Tripartita	R	R	-	-	R
<b>Common Juniper (<i>J. communis</i>)</b>					
var. <i>depressa</i>	R	R	-	-	R
var. <i>depressa aurea</i>	-	-	-	-	R
Hibernica	R	R	-	R	R
Seucica	R	R	-	-	R
<b>Shore Juniper (<i>J. conferta</i>)</b>					
Blue Pacific	R	R	-	S	S
Emerald Sea	-	-	-	S	S

<b>Juniper Species Cultivar</b>	Cedar- Apple Rust	Cedar Hawthorn Rust	Disease Cercospora Needle Blight	Kabatina Twig Blight	Phomopsis Blight
<b>Creeping Juniper (<i>J. horizontalis</i>)</b>					
Admirabilis	R	R	-	R	-
Adpressa	R	R	-	-	-
Alpina	-	R	-	-	HS
Argenteus	R	R	-	-	-
Bar Harbor	R	-	-	R	HS
Blue Chip	R	-	-	S	R
Douglasii	R	R	-	-	-
Emerald Isle	R	-	-	R	R
Filcina	R	R	-	-	-
Glenmore	R	-	-	-	-
Glomerata	R	R	-	-	-
Grey Carpet	R	-	-	-	-
Livida	R	R	-	-	-
Petraea	R	R	-	-	-
Plumosa (Andorra)	R	R	-	R	S
Prince of Wales	R	-	-	R	S
Procumbens	R	R	-	-	R
Wiltonii (Blue Rug)	R	R	-	R	S
<b>Chinese juniper (<i>J. chinensis</i>)</b>					
Ames	R	R	R	R	-
Blue Point	R	-	R	R	-
Columnaris	R	-	R	R	-
Iowa	-	-	-	-	R
Keteleeri	R	R	R	R	R
Maney	R	-	R	R	-
Mint Julep	R	-	-	R	R
Mountbatten	R	-	R	R	-
Pfitzeriana Compacta	R	R	-	-	HS
Robusta Green	R	-	R	R	R
Saybrook Gold	R	-	-	R	R
Sea Green	-	-	-	-	HS
Spartan	R	-	R	S	R
Wintergreen	R	-	R	R	-

<sup>1</sup>R = Resistant, S = Susceptible, HS = Highly Susceptible, - = no information.

junipers as needed to maintain plant vigor. Refer to ANR-571, "Phytophthora Root Rot on Woody Ornamentals," for more information concerning the control of root rot diseases.

Juniper cultivars differ considerably in their susceptibility to Phytophthora root rot. The Rocky Mountain juniper 'Wichita Blue', savin juniper var. *tamariscifolia*, Chinese juniper 'Gold Coast', shore

juniper 'Blue Pacific' are susceptible to Phytophthora root rot. Junipers that have demonstrated some resistance to this disease include cultivars of eastern red cedar, Chinese juniper 'Prostrata', creeping juniper 'Bar Harbor', and 'Prince of Wales'. Information concerning the reaction of most other junipers to Phytophthora root rot is not available.



**Figure 5.** Cedar-apple rust gall on a twig of eastern red cedar in late winter before the orange horn appears



**Figure 6.** Cedar-apple rust gall seen in late winter to early spring with orange horns



**Figure 7.** Cedar quince rust gall with jellylike spore mass oozing from gall



**Figure 8.** Phytophthora root rot on the Rocky Mountain juniper cv. 'Wichita Blue'

Preventative fungicide treatments can protect juniper from root rot but are recommended for use only on liners and container-grown plants. Fungicides act as a protective barrier around the roots but will not kill *Phytophthora* fungi that have already invaded the root system. For best results, fungicides should be applied according to instructions on the product labels from the time rooted cuttings are stuck in liner pots or containers until the finished plants are shipped. Depending on the product chosen, fungicides can be incorporated into potting media or soil before planting, applied as a soil drench or foliar spray, or broadcast over established juniper plantings. Recommended fungicide treatments and application instructions are listed in the Table 4. Refer to ANR-500B, *Alabama Pest Management Handbook—Volume 2*, and ANR-571, “Control of *Phytophthora* Root Rot on Woody Ornamentals,” for the latest fungicide recommendations.

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

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

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

**For more information**, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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