Junipers grown in South Carolina are relatively low-maintenance plants if planted in the correct location and given proper cultural care. There are several common problems that can cause browning of needles and dieback of entire shoots, especially when junipers are improperly planted or under stress from the environment. Avoid many of these problems by selecting resistant varieties, avoiding overhead watering and selecting a planting site with good drainage. More information is available in HGIC 1068, Juniper.

Diseases

Twig & Tip Blight: Junipers frequently exhibit dieback of shoot tips or entire shoots and browning of needles. Needles may drop from the plant, and dark cankers may form at the junction of live and dead wood. This problem occurs typically during warm, wet weather conditions and is usually caused by one of the fungal organisms described below.

Phomopsis Tip Blight: This disease is caused by the fungus Phomopsis juniperovora and begins by infecting the tips of branches smaller than the diameter of a pencil.

The new, immature growth becomes infected while the darker green, mature foliage remains resistant to infection. Infected twigs first become pale, then turn reddish-brown and finally become brown after death. Scraping away the bark will reveal a sharp line between discolored, dead wood and healthy wood. Watch for disease development during the spring or summer flush of new growth when warm, wet conditions are present.

Cercospora Twig Blight: This disease is caused by the fungus Cercospora sequoiae var. juniperi. It begins by infecting the oldest needles that are located on
the lower branches, inside of the plant. As disease development progresses, the needle browning spreads upward and outward. Branch tips usually remain healthy and green. Needles of spur branches turn brown and die usually in the late summer, leaving a plant with an inner crown devoid of foliage. This disease is sometimes confused with mite damage.

**Prevention & Treatment:** Each of these diseases requires similar methods of control. First, closely inspect the entire plant, since symptoms of tip blight and twig blight can be caused by other problems, such as drought, overwatering or root injury.

Purchase disease-resistant varieties that are healthy with no evidence of dead or dying twigs. Do not stress junipers by planting them in shaded or poorly drained locations. Plant junipers in areas with good air circulation to promote rapid drying of the needles. Do not crowd plants, and avoid using sprinkler irrigation. Promptly prune and remove any diseased or browning branches as they occur. Except on highly susceptible cultivars, pruning will usually control these diseases.

If chemical control is necessary, fungicides are available to provide protection, but they must be applied before infection occurs. Select a fungicide labeled for use on junipers containing one of the following: mancozeb, thiophanate-methyl or copper salts of fatty acids. See Table 1 for examples of products. Apply all chemicals according to directions on the label.

**Kabatina Twig Blight:** This disease is caused by the fungus *Kabatina juniperi*. The symptoms are the same as described for Phomopsis tip blight, except this fungus kills older (usually 1-year-old) twigs in the spring. Damaged or stressed tissues are more susceptible to Kabatina twig blight.

*Cedar-Apple Rust:* This fungal disease...
including Eastern red cedar (Juniperus virginiana) but requires another host plant, apple or crabapple, to complete its life cycle. This disease spreads from junipers to the apple and then back to juniper. It can be a severe problem wherever these two are grown together. Eastern red cedar is the most commonly infected juniper.

On juniper, hard, brown, up to 2-inch diameter galls form near the ends of the branches in the summer. In the spring following a rain, the galls produce large, orange, gelatin-like tendrils, full of spores, which can blow a half-mile to infect nearby apple and crabapple trees.

Symptoms that occur on the apple trees appear as yellow spots on the upper leaf surface. In the late summer, these yellow spots form spores that are spread to the leaves and twigs of nearby junipers (within 2 miles) to infect them.

**Prevention & Treatment:** Select resistant varieties of apple (such as ‘Enterprise’, ‘Pristine’, ‘Liberty’ or ‘Redfree’) or juniper. Prune out all galls on the juniper, if possible. Do not plant apple, crabapple and Eastern red cedar trees in the same area. If disease is severe enough to warrant control, or a particular specimen plant is affected, select a fungicide containing mancozeb or propiconazole. See Table 1 for examples of products. Do not use fruit for food if propiconazole products are used. Apply all chemicals according to directions on the label. More information is available in HGIC 2000, *Apple and Crabapple Diseases*.

The following Juniper varieties are Generally Resistant to Phomopsis Twig Blight & Cedar Rusts:

- *Juniperus chinensis* – Chinese Juniper
  - ‘Foemina’
  - ‘Keteleeri’
  - ‘Mint Julep™’
  - ‘Pfitzeriana’
  - var. *sargentii* (Sargent Juniper)
- *J. communis* – Common Juniper
  - ‘Aureospica’
  - ‘Suecica’
- var. *fargesii*
- *J. sabina* – Savin Juniper
  - ‘Broadmoor’
  - ‘Skandia’
- *J. virginiana* – Eastern Red Cedar
  - ‘Tripartita’
- *J. horizontalis* – Creeping Juniper
  - ‘Tripartita’
  - ‘Wiltoni’ (‘Blue Rug’)

The following Juniper varieties are Generally Resistant to Phomopsis Twig Blight & Cedar Rusts:
Phytophthora Root Rot: This root rot is one of the most serious and difficult-to-control fungal diseases that affects a wide range of plants in South Carolina. It is caused by a soil-borne fungus, *Phytophthora cinnamomi*, and the most common symptom is the slow decline of the plant. Leaves on the plant will become thin or sparse. Some plants may die one branch at a time, until the entire plant dies. The centers of the roots change from white to reddish-brown and the outer layer of the roots separates easily from the core. High soil moisture and warm soil temperatures favor disease development.

**Prevention & Treatment:** It is important to prevent this disease by cultural methods, since chemical treatment is ineffective once symptoms are noticed. Avoid planting in poorly drained areas where Phytophthora root rot thrives. Heavy clay soils, areas that flood and sites where runoff water is a problem typically create root rot problems. Plant junipers in raised beds, except in deep sandy soils. If you must plant in a site that has heavy clay or does not have good internal drainage, amend the site by thoroughly mixing a porous material, such as ground pine bark (not sawdust or peat), into the bed to a depth of 8 to 12 inches.

Avoid varieties that are the most susceptible to root rot. Some highly susceptible junipers that are likely to be killed by the root rot fungus include: ‘Andorra,’ ‘Bar Harbor,’ ‘Parsoni,’ ‘Sargent,’ ‘Shore’ and *Juniperus procumbens* ‘Nana.’

Fungicides can be effective on a preventative basis only, and repeat applications are required. Fungicides containing mefenoxam (Subdue GR) can be applied in the home landscape to suppress disease, but it will not cure an infected plant. Due to product cost and for accurate application, homeowners may want to hire a licensed landscaper to apply products containing these fungicides. Apply all chemicals according to directions on the label.

**Insects & Other Pests**

Bagworm: Bagworm (*Thyridopteryx ephemeraeformis*) infests many shrubs and trees, but conifers (evergreens) are the preferred hosts. Damage to plants results from feeding by the caterpillar, which causes loss of leaves. Mild infestations of this pest slow the growth of junipers. Heavy infestations can kill a plant.

The adult male is a dark-colored, hairy moth with a 1-inch wingspan and clear
wings. The adult female is yellow and appears almost maggot-like. The larva (immature form or caterpillar) produces a carrot-shaped bag that it carries with it as it feeds. The bag is formed from silk that the larva produces. As it feeds, the larva adds bits of plant material to the bag. The bag is about 2 inches when complete.

In South Carolina, bagworms survive the winter as eggs in a bag. The larvae hatch during May. They spin their cases and carry them along as they feed. After further development, the adult male emerges from its bag in late summer. It locates an adult female in her bag. After mating, the female lays 500 to 1,000 eggs in her bag and dies.

**Prevention & Control:** Several parasites and predators feed on bagworms, generally keeping their numbers under control. Removal of the egg-containing bags during winter and early spring is a very effective method for preventing problems before the next growing season. Once removed, the bags should be destroyed or placed in a deep container, which allows beneficial parasites that may also be present in the bags to escape while retaining the bagworm larvae.

If the infestation is severe or the bags are out of reach, spray with the bacterial insecticide *Bt*. This insecticide contains spores of the bacterium, *Bacillus thuringiensis*, which when eaten kill the caterpillar. Young larvae are much more susceptible to the treatment than are older larvae. As such, apply this pesticide in the spring as soon as bagworms are seen. Control is most effective when spraying is done in late afternoon or early evening. See Table 1 for examples of products containing *Bt*. This insecticide is very safe to use. As with any pesticide, read and follow all label directions and precautions before using.

**Spruce Spider Mite:** Mites are not insects but are more closely related to spiders. Spruce spider mites (*Oligonychus ununguis*) are serious pests of juniper. They are very small and not seen easily with the naked eye. They have piercing mouthparts that they use to suck plant sap. Their feeding results in speckling (formation of tiny yellow spots) on needles. Some needles may turn brown and drop off. With heavy infestations, fine webbing may be seen on the plant. Several seasons of heavy mite feeding may kill a juniper. Although most spider mites increase in numbers during hot, dry weather, spruce spider mites are cool-weather mites. Their population peaks during spring and fall, but drops dramatically during the heat of summer when predators feed on them.

**Control:** Naturally occurring enemies of mites include various predator mites, ladybird beetles (ladybugs) and other insects. These predators will usually suppress mite populations. Since insecticide use kills beneficial predators as well as mites, insecticides should be avoided unless absolutely necessary. Misuse of
insecticides can result in increased problems with mites by causing the death of natural predators of the mite. Miticides, labeled specifically for mite control, are less harmful to beneficial insects. Mites can be removed with a strong spray of water, if applied on a regular basis.

To determine whether insecticide use is needed, it helps to know how many mites are present. Hold a white sheet of paper under a branch and strike the branch. The mites that are knocked off will be seen crawling around on the paper. If dozens of mites are seen per whack, serious damage can result. Continue to check population numbers at seven to ten day intervals. Pesticides labeled for homeowner use against spruce spider mites include insecticidal soaps or horticulture oil sprays. See Table 1 for examples of products. As with any pesticide, read and follow all label directions and precautions before using.

**Juniper Scale:** Symptoms of juniper scale (*Carulaspis juniperi*) infestation are very similar to symptoms of spruce spider mite infestation. Initially, the juniper appears off-color and infested branches show little growth. The needles eventually turn yellow or brown. Branches may die back. If ignored, juniper scale infestation may kill the plant in two to three growing seasons. Signs of the pest include clusters of tiny bumps or scales about 1/8-inch in diameter, especially on the undersides of needles. Adult females are white at first but turn gray or black later. Adult females are mostly flat with a slight volcano appearance, if viewed through a magnifying lens. In addition, a shiny, sticky material (honeydew) is often seen on needles of junipers infested with juniper scale.

Adult females survive the winter on the plant. In early spring, they lay eggs under their shell. The immature forms, called crawlers, hatch and crawl around before settling on the needles to feed. They feed by sucking plant sap. As they mature, they form a crusty shell over their bodies. Their legs become useless and they remain in one location. As they feed, excess sap is excreted as a sugary material, called honeydew. The sooty mold fungus can grow on the honeydew, forming dark splotches on needles.

**Control:** The presence of adults or crawlers determines which treatment will be most effective. Use a 2 or 3% horticultural oil mix as a dormant spray in late
**Winter or very early spring** before new growth occurs to control adult females by suffocation. A 2% solution is made with 5 tablespoons of horticultural oil per gallon of water. See Table 1 for examples of products.

Most insecticides are effective only against the crawlers. Monitor the crawler emergence with sticky cards, double-faced tape wrapped around a branch, or by putting an infested shoot into a baggie and watching for crawler movement. Crawler activity often coincides with the flush of new plant growth in the spring. However, some scale species may have overlapping generations with an extended crawler emergence period, such as along the coast. Insecticides recommended for use against crawlers include acephate, malathion, and cyfluthrin. See Table 1 for examples of products. Read and follow all label directions and precautions before using.

### Other Problems

**Needle Browning:** These symptoms appear as needles that initially turn yellow, then brown and dry, before finally dropping from the plant. The plant may die if the condition is severe enough. There are many conditions that will cause needles to turn brown, including many diseases already discussed. A few reasons needles may turn brown are described below.

- **Drought & Overwatering:** These two problems cause similar symptoms on junipers. Check to see if the ground is dry or frozen. Overwatering causes the plant's root to rot, therefore rendering it unable to take up water. Rinse the foliage if you suspect this is a problem.

- **Dog Urine:** Salts in the urine burn the foliage causing it to appear scorched. Rinse the foliage if you suspect this is a problem.

Note: Control of diseases and insects on large trees is usually not feasible, since adequate coverage of the foliage with a pesticide cannot be achieved.

### Table 1. Insecticides & Fungicides to Control Juniper Insect Pests & Diseases

<table>
<thead>
<tr>
<th>Insecticides &amp; Fungicides</th>
<th>Examples of Brand Names &amp; Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acephate</td>
<td>Bonide Systemic Insect Control Concentrate</td>
</tr>
<tr>
<td>Bacillus thuringiensis (Bt)</td>
<td>Bonide Thuricide Concentrate</td>
</tr>
<tr>
<td>Garden Safe Wrm &amp; Caterpillar Killer</td>
<td>Garden Safe Bt Worm &amp; Caterpillar Killer</td>
</tr>
</tbody>
</table>

[For more details, see Table 1 for examples of products. Read and follow all label directions and precautions before using.]
### Copper Fungicides
- Bonide Copper Fungicide Spray or Dust
- Bonide Liquid Copper Concentrate
- Camelot O Fungicide/ Bactericide Concentrate
- Monterey Liqui-cop Fungicide Concentrate
- Natural Guard Copper Soap Liquid Fungicide Conc.
- Southern Ag Liquid Copper Fungicide

### Cyfluthrin
- Bayer Advanced Vegetable & Garden Insect Spray Conc.

### Horticultural Oil
- Bonide All Seasons Spray Oil Concentrate
- Ferti-lome Horticultural Oil Spray Concentrate
- Southern Ag ParaFine Horticultural Oil Concentrate
- Monterey Horticultural Oil Concentrate
- Summit Year Round Spray Oil Concentrate

### Insecticidal Soap
- Bonide Insecticidal Soap Concentrate
- Safer Brand Insect Killing Soap Concentrate
- Natural Guard Insecticidal Soap Concentrate
- Garden Safe Insecticidal Soap Insect Killer Concentrate
- Espoma Earth-tone Insecticidal Soap Concentrate

### Malathion
- Bonide Malathion 50% Insect Control
- Gordon’s Malathion 50% Spray
- Hi-Yield 55% Malathion Insect Spray
- Martin’s Malathion 57% Concentrate
- Ortho Max Malathion Insect Spray Concentrate
- Spectracide Malathion Insect Spray Concentrate
- Southern Ag Malathion 50% EC
- Tiger Brand 55% Malathion

### Mancozeb
- Bonide Mancozeb Flowable with Zinc Concentrate
- Southern Ag Dithane M-45

### Propiconazole
- Banner Maxx Fungicide
- Bonide Infuse Systemic Disease Control