

PHOMOPSIS BLIGHT OF JUNIPER

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OVERVIEW

In the past three decades, junipers have been widely used plant choices for many landscape settings due to their evergreen needed foliage, tolerance of extreme temperature fluctuations and ability to thrive in dry and poor soils conditions. Although junipers are generally free of major pests, they are significantly affected by a fungal plant pathogen commonly referred to as Phomopsis blight, Phomopsis tip blight, and Juniper twig or tip blight. The disease is caused by the fungus *Diaporthe juniperivora* (formerly *Phomopsis juniperivora* or *Phomopsis juniperovora*). This disease spreads rapidly in young landscape plantings and in nursery seed production beds, where plants are often densely planted. Phomopsis blight is most severe in several species and related horticultural varieties of junipers and red cedars. To minimize the incidence and severity of this disease, it is crucial to adopt appropriate cultural practices including maintaining proper sanitation and optimum fertilization. Replace infected plants with blight-resistant cultivars of juniper species.

SYMPTOMS

Phomopsis tip blight occurs during late spring and fall when the weather is cool and wet. New growths of succulent branch tips are most susceptible to this fungal infection. Initial symptoms include yellowing or browning of scales or tips of affected twigs on new and young needled foliage of the lower branches (Figure 1). As the fungus enters young stem tissue, small gray lesions (cankers) form at the junction of healthy and diseased tissue causing the entire branch to die in response to stem girdling (Figure 2). As the disease progresses, the normally dark- to olive-green foliage will change to dull red, brown and finally ash gray. The infected branch will develop pinhead size black spots, which are tiny black fruiting bodies called pycnidia. These spots of pycnidia can be visible with a hand lens (Figure 2). The symptoms of foliar blight and branch dieback also can be confused with the damage caused by abiotic factors including frost damage and drought. However, the damage caused by abiotic factors lacks the formation of cankers, black pycnidia and, therefore, no symptom/damage would progress over time.



Figure 1. Phomopsis tip blight showing shoot tip dieback symptoms and symptoms of light green to brown and ash gray foliar discoloration. The white arrow indicates the point of infection. (Image credit: Alan Windham, University of Tennessee).

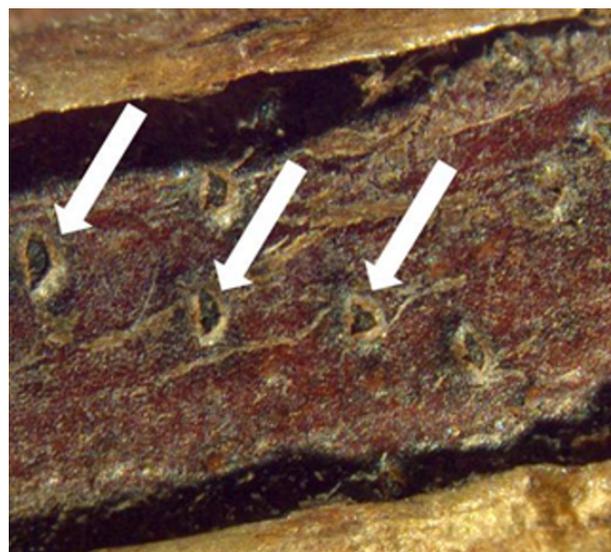


Figure 2. Phomopsis tip blight showing late stage symptoms with dull red, brown, and finally ash gray foliage. (Image credit: Alan Windham, University of Tennessee).

HOST RANGE

Phomopsis blight is a common disease of different members of the cypress family, but it most severely affects juniper species including eastern red cedar (*Juniperus virginiana*), Rocky Mountain juniper (*J. scopulorum*), Chinese juniper (*J. chinensis*), and creeping juniper (*J. horizontalis*) (Pero and Howard, 1969). The disease is also known to effect arborvitae (*Thuja* spp. or *Platycladus* spp.), cypress (*Cupressus* spp.), Douglas fir (*Pseudotsuga* spp.), fir (*Abies* spp.), hemlock (*Tsuga* spp.), larch (*Larix* spp.), redwood (*Sequoia* spp.), white cedar (*Chamaecyparis* spp.) and yew (*Taxus* spp.) (Peterson 1981, Byther 2001, Tisserat and Benson 2001).

LIFE CYCLE AND SPREAD

Diaporthe juniperivora overwinters as spores in infected plant tissue, whether attached or beneath infected plants. During presence of adequate moisture, spores ooze out of the black pycnidia. These spores may be spread via wind, insects, rain-splashing or following irrigation that transfers spores onto healthy tissues. Phomopsis blight also can be mechanically transferred on the blades of contaminated pruning tools. New and succulent growth is more susceptible to disease than mature needles. Foliage must be wet or dewy for infection to occur. Optimal conditions require as little as seven hours of high humidity, temperatures between 70 F and 80 F and wet foliage. Juniper blight becomes prevalent in the spring and fall during wet conditions. As the fungus colonizes tissues, cankers begin to form, leading to girdling on smaller branches. Larger stems and branches may take several years to die. Once stem tips die, black pycnidia are produced and may continue to be produced for up to two years that commonly infect new, succulent young tissues (Tisserat and Benson 2001).

INTEGRATED DISEASE MANAGEMENT

Cultural methods

- The following cultural practices help to manage the disease:
- Seek available cultivars of Phomopsis-resistant *Juniperus* species (Table 1).
- Do not buy or transplant plants with dead or dying branches and stem tips.
- Prune infected and dead branches to prevent disease spread. Prune approximately 2 inches into live wood and remove and destroy the pruned cut tissues.
- Spores are produced for up to two years in the dead tissue of infected plants.
- The best time to prune is late summer when weather conditions are dry.
- Avoid pruning when foliage is wet.
- When pruning, sanitize pruners or other cutting tools by immersing or spraying blades with 70 percent alcohol solution or 10 percent bleach solution. Sanitize equipment between pruning of stems, branches or at minimum between plants.
- Plant and space plants in blocks with good airflow and proper drainage. Air circulation can be improved by controlling weeds between and around plants.
- Weed removal also reduces humidity, which helps to reduce fungal growth and disease spread.
- Avoid planting junipers in shaded areas.
- Water juniper plantings in the morning to allow foliage to dry during the day.
- Remove and discard/destroy severely infected plants. Remember, infected plants can be replaced with resistant cultivars.

Table 1. Selected List of cultivars of juniper species with resistance to Phomopsis blight.

Species	Cultivar	Resistance status*
<i>Juniperus chinensis</i>	'Robusta Green'	Highly resistant
	'Ames'	Resistant
	'Aureo-globosa'	Resistant
	'Femina'	Resistant
	'Globosa'	Resistant
	'Hetzii'	Resistant
	'Keteleeri'	Resistant
	'Pyramidalis'	Resistant
	'Mas'	Resistant
	'Mountbatten'	Resistant
	'Pfitzeriana Compacta'	Resistant

Table 1. Selected List of cultivars of juniper species with resistance to Phomopsis blight (CONTINUED)

Species	Cultivar	Resistance status*
<i>J. communis</i>	'Depressa'	Highly resistant
	'Oblonga-pendula'	Highly resistant
<i>J. conferta</i>		Highly resistant
<i>J. horizontalis</i>	'Douglasii'	Resistant
	'Procumbens'	Resistant
<i>J. sabina</i>	'Fastigiata'	Resistant
<i>J. scopulorum</i>	'Moffettii'	Resistant
<i>J. squamata</i>	'Meyeri'	Resistant
<i>J. virginiana</i>	'Cinerascens'	Resistant
	'Globosa'	Resistant
	'Reptans'	Resistant
	'Tripartita'	Highly resistant

*Highly resistant and resistant cultivars are determined by having no disease or very low disease rating screened during seasons favorable for disease development (Hartman et. al. 1994 and Schoeneweiss 1969).

Chemical Control

Table 2. Fungicide products and active ingredients recommended for (P) prevention, (C) curative management or (both P, C) protection against Phomopsis tip blight.

Name of Fungicide	FRAC Code	Active Ingredients	Homeowner Rate (per gal)	Commerical Rate (per 100 gal)	Application Interval (days)	Activity
Dithane M-45	M 3	Mancozeb	-	1.5lb	7-10	P
Topsin 4.5FL	1	Thiophanate-methyl	-	15-20 fl. oz	7-14	C
Mancozeb DG	M3	Mancozeb	-	1-2 lbs	10-14	P
MilStop	NC	Postassium bicarbonate	1-2 tbsp	2.5lbs	7	C
TwoSome	1+2	Thiophanate-methyl + iprodione	-	33-84 fl.oz	7 -14	P, C

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PRECAUTIONARY STATEMENT

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, products must be used only as directed by the label.



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