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Juniper Blight Diseases

Recognition and control of several needle and twig blight pathogens which attack junipers.

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Junipers are widely used throughout Nebraska in both ornamental landscape plantings and windbreaks. Eastern redcedar (*Juniperus virginiana*), Rocky Mountain juniper (*J. scopulorum*), and other common juniper species are subject to attack by several needle and twig blight pathogens. It is important to properly identify and separate the diseases involved, as each may require a different procedure for effective control.

Phomopsis Twig Blight

This disease is caused by the fungus *Phomopsis juniperovora* and is common throughout the Great Plains. Losses due to seedling death can be extensive both in nursery beds and in young transplants. Established older plantings may also be damaged, but are rarely killed. Landscape plantings often are unsightly due to numerous dead branch tips.



The fungus infects new foliage. Newly developing needles are especially susceptible while they are in the yellowish-green stage. Once the needles turn to the normal deep green color, they are no longer susceptible to infection.

Figure 1. Typical reddish-brown coloration of juniper twig infected with *Phomopsis juniperovora*.

Small, yellowish spots appear on the needles shortly after infection. The fungus grows rapidly and invades the stem tissue, often girdling small stems. Infected tissues turn light green, then reddish-brown, and finally ashen-gray (*Figure 1*). Within three to four weeks after infection, fungal fruiting bodies (pycnidia) develop on needles and stems that have

turned ashen-gray. The pycnidia are initially embedded in the host tissue; however, they later erupt through the epidermis, where they can be easily seen as small, black, pimple-like structures within the ashen-gray host tissue (Figure 2).

Figure 2. Ash-gray coloration of host tissue and pycnidia of *Phomopsis juniperovora*.

Spores produced within the pycnidia can infect susceptible tissue. The spores are spread primarily by rain splash, but also by wind, insects or mechanical means. Infection is optimum at temperatures of 70-80° F during periods of high humidity when the foliage is wet. Under these conditions, *Phomopsis* spores need only seven hours to germinate, penetrate the epidermis, and initiate infection. The fungus can produce spores for as long as two years in diseased plants.

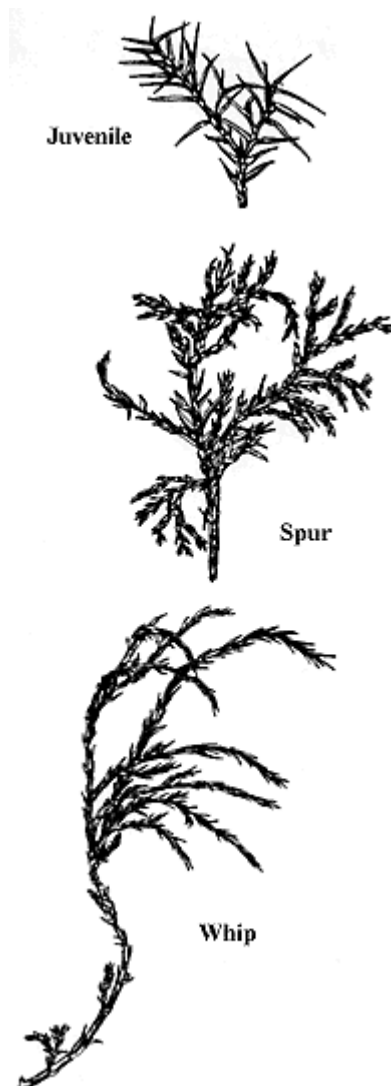


Figure 3. The three juniper foliage types.

The main objective in controlling *Phomopsis* twig blight is to protect the susceptible new growth from infection. For seedlings and young transplants which continually produce new growth, a protective fungicide needs to be applied regularly. Benomyl (Benlate 50WP, Tersan 1991) and Mancozeb (Dithane M-45, FORE) are currently registered for use in the control of *Phomopsis* twig blight. Applications should be made to seedlings at seven- to ten-day intervals throughout the growing season. Fungicide applications, coupled with roguing of infected seedlings, provides excellent control of *Phomopsis* twig blight in nursery beds.

Disease control in established landscape and windbreak situations is slightly different. Established trees generally have only two flushes of new growth, the first in the spring and the second in late summer or early fall. Frequent applications of fungicide are impractical in established outplantings, but applying fungicide to coincide with growth flushes is practical and adequate in most years.

Other actions can be taken to augment fungicide application and reduce disease presence and resulting damage. Careful pruning to remove infected branches will improve the overall appearance and reduce the amount of inoculum. Restrict pruning and shearing operations to periods when the resulting flush of new growth will occur during the drier part of the growing season. Remove and destroy clippings from the area after pruning and shearing to reduce potential inoculum sources. Avoid overhead irrigation that will leave foliage wet for an extended time. Timing irrigation so that foliage dries quickly and thinning overgrown plants or plantings to allow for better air and light penetration also help in disease control.

A number of junipers are reported to be resistant to *Phomopsis* twig blight. Their use may be desirable in some situations. Those available in Nebraska are listed below:

Juniperus chinensis cv. Iowa

Juniperus chinensis cv. Keteleeri
Juniperus chinensis cv. Pfitzeriana Aurea
Juniperus chinensis var. sargentii
Juniperus chinensis var. sargentii cv. Glauca
Juniperus horizontalis cv. Plumosa
Juniperus horizontalis cv. Procumbens
Juniperus sabina cv. Broadmoor
Juniperus sabina cv. Skandia

Cercospora Needle Blight

Cercospora sequoiae var. *juniperi* is the fungus which causes Cercospora needle blight on eastern redcedar and Rocky Mountain juniper throughout the Great Plains. This disease can severely damage older windbreak and landscape plantings. Successive seasons of infection can eventually kill trees.



Figure 4. View of windbreak showing damage characteristic of *Cercospora* needle blight.

Juniper foliage is composed of three types (*Figure 3*): (1) juvenile needles, which are pointed and commonly found on seedlings, (2) spur needles, which are the flattened, blunt, clasping needles characteristic of short (spur) branches, and (3) whip foliage, characterized by long shoot growth on the ends of branches. Initial infection can occur on any juvenile needles and on previous years' spur needles in the inner crown of the tree during late June and July. Generally all of the needles on a spur shoot become infected, turn bronze-colored, become necrotic and die by late September. These dead shoots drop from the tree in the fall, resulting in the characteristic appearance of infected trees -- the interior of the tree is bare of foliage while the branch ends have healthy, green foliage (*Figure 4*). Whip foliage appears to be resistant to infection. Cercospora needle blight tends to start in the lower, inner branches and spread upward and outward.



Figure 5. Fruiting bodies of *Cercospora sequoiae* var. *juniperi*.

The black fruiting bodies (sporodochia) of the Cercospora fungus are found on the needles and have a fuzzy appearance (*Figure 5*). The spores are released from the fruiting bodies from late April through October only during wet weather. There is very little long-distance spread of the spores. Moisture is necessary for dispersal, germination and penetration.

Cercospora needle blight can be successfully controlled by applying a fungicide to protect the susceptible foliage during the infection period. Standard strength Bordeaux mixture (8-8-100) or a liquid copper fungicide are recommended. An initial application in mid-June, followed by a second application in late July is usually adequate. Additional applications may be necessary if frequent rains occur in August and September. Slightly earlier applications may be necessary further south.

Kabatina Tip Blight

Kabatina juniperi causes early season damage to the branch tips of eastern redcedars and Rocky Mountain junipers in Nebraska. The damage is very similar to that caused by *Phomopsis juniperovora*. The time of symptom development, however, is helpful in distinguishing these two blights. Kabatina tip blight symptoms develop before new growth begins in the spring; Phomopsis twig blight symptoms

develop during the growing season.

Figure 6. Discolored branch tips of a tree infected with *Kabatina* tip blight.

Kabatina juniperi is thought to enter the plant through wounds caused by insects, pruning or mechanical injury. Symptoms are most apparent in early spring just before new growth begins and as the junipers lose winter coloration. Infected branch tips turn yellowish-brown instead of deep green. The discolored portions of the infected branch tips are usually about five inches long (Figure 6). At the base of the discolored branch tip there will be a sunken grayish area with small, black fruiting bodies (acervuli) (Figure 7). These fruiting bodies are numerous in April and May but decline in number throughout the summer.

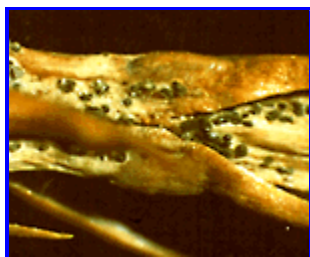


Figure 7. Fruiting bodies in gray host tissue of *Kabatina juniperi*.

Procedures for the control of *Kabatina* tip blight are not well defined. Information is needed on when the infection period occurs in Nebraska and what fungicides provide effective control. Prevention of insect wounds may reduce the amount of infection. Pruning infected branches may reduce the inoculum level but also may result in more wounds where fungus could penetrate. The unsightly appearance of infected trees usually improves as new growth develops and dead branch tips drop.

Blight diseases of junipers can be difficult to identify. *Table I* highlights the important differences between blight diseases. Blight diseases may even be confused with other non-pathogenic problems. Drought, winter desiccation and cold temperature injury often produce dead branch tips similar to *Phomopsis* and *Kabatina* blights. However, the line of demarcation between dead and healthy tissue is sharp if diseased and gradual if environmental factors are involved.

Occasionally a weak, parasitic fungus resembling *Lophodermium* may colonize dead or dying tissue. Black fruiting bodies which are flat, small and oval develop on dead plant tissue. This fungus is not the principle agent responsible for tissue death; other factors should be investigated.

Note

Fungicides listed represent the best information available. No criticism is intended of products not listed, nor is endorsement by the University of Nebraska given to those listed. Always read and follow all label directions.

Acknowledgement

Sincere appreciation and credit are extended to Dr. Glenn Peterson, USDA Forest Service, for the use of his photographs and his dedicated research on juniper diseases.

Table I. Comparison Chart for Junior Blight Diseases			
Disease:	Phomopsis Twig Blight	Cercospora Needle Blight	Kabatina Tip Blight
<i>Pathogen:</i>	<i>Phomopsis juniperovora juniperi</i>	<i>Cercospora sequoiae</i> var.	<i>Kabatina juniperi</i>
<i>Symptoms:</i>	Terminals that turn light green to red-brown and finally ash-gray. Disease advances inward.	Infected needles turn bronze, then necrotic and die. Dead shoots drop from the tree in the fall. Disease starts in the lower, inner branches and works upward and outward.	Branch tips are yellow-brown instead of dark green in early spring. Sunken gray area at base of branch.
<i>Fruiting Structures:</i>	Small, black pimple-like structures in ash-gray host tissue (pycnidia).	Small, fuzzy, gray structures on needles of infected tissue (sporodochia).	Small, black, rough fruiting structures (acervuli).
<i>Infection Period:</i>	Anytime there is susceptible new growth and high humidity.	Starting in June and continuing during wet weather. All juvenile and previous years' spur needles are susceptible.	Unknown, but suspect infection occurs through wounds during the previous growing season.
<i>Control Recommendations</i>	Protect new growth during humid weather with benomyl or mancozeb applied at 7- to 10-day intervals.	Protect susceptible foliage with Bordeaux mixture or a liquid copper fungicide applied in mid-June and again in late July.	Effective fungicide program unknown. May be beneficial to control wound agents. Pruning may improve appearance.

File G858 under: PLANT DISEASES

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