

## LEAF-BROWNING AND SHEDDING - ARBOR-VITAE AND JUNIPER

During the fall season there may be considerable browning and drop of leaves from juniper and arborvitae resulting in bare branches and grower anxiety! Let us stress that there may be a number of reasons for this leaf drop.

The older, inner leaves may turn brown and drop in the fall. This is usually due to a natural aging phenomenon similar to the dropping of leaves of deciduous trees. If the previous growing season has been favorable for growth, i.e. moderate temperatures, good insect control, and good soil moisture, the shedding will occur over a relatively long period through the fall and not be noticeable. Under adverse cultural conditions, however, this natural drop may occur within a few days or a week. Later, during the winter, winter-browning of leaves may occur, especially in terminal growth, when the high air temperatures and frozen soil result in leaves losing water more rapidly than can be replaced through the roots. Generally, no destructive disease is involved in these cases of leaf browning.

However, there are three fungi that infect foliage and can cause extensive damage: leaf-blight (*Didymascella thujina*), tip-blight (*Coryneum berckmannii*) and juniper blight (*Phomopsis juniperovora*).

**Leaf -Blight:** Arbor-vitae is the primary host and trees and shrubs-of all ages are attacked. This disease is destructive to giant arbor-vitae in the Northwest and occasionally appears on ordinary arbor-vitae. Toward fall the lower foliage becomes reddish-brown and may drop; infected leaves that remain attached will be an ash-gray color. Symptoms of the disease first appeared in the spring when small, elliptical, brown cushions occurred on the small leaves. These spots turned a glossy black in mid-summer. On the ash-gray leaves that do not drop this fall, the black fruiting structures will drop out leaving deep pits. Spore discharge occurs from late spring until fall. Since free moisture on the plant foliage aids the infection process, it is imperative to keep the foliage surface as dry as possible, i.e. method and timing of irrigation, adequate plant spacing and site selection to provide good air drainage.

**Tip-Blight:** This disease resembles leaf-blight, but occurs primarily on varieties of *Thuja orientalis*; occasionally tip-blight may be found on juniper. By fall, most of the infected foliage has changed from a normal green color to a reddish brown and may have dropped resulting in exposed unsightly masses of gray stems. Spring infections began on young, tender foliage with eventual girdling of larger branches. Leaves near the tip then turned brown in late spring or early summer. The fruiting structure of the fungus, appearing as tiny black bodies visible through a magnifying lens, occurs on the lower surface of the infected foliage. Spores, which are produced in the fall, are windborne, water splashed, or insect-borne to new foliage where the infective process continues.

**Juniper-Blight:** This blight, common on red-cedar and other species of *Juniperus*, also affects arborvitae (Figure 1). Damage usually occurs in the fall as scattered browning or blighting of shoot tips of the current season's growth. However, under epidemic conditions, extensive tip blighting, stem dieback, and even death of highly susceptible cultivars can occur. The disease is often severe in the center or heart of the plant where branches join the trunk. Positive diagnosis of juniper blight can be made based on the presence of tiny, black, fruiting bodies of the fungus on the blighted, light tan to grayish area at the base of the blighted portion.



Figure 1. *Phomopsis juniperovora* on Arbor-Vitae.

### **Factors Favoring Development of Juniper Blight:**

The pathogen is active over a wide range of temperatures with maximum infection occurring at 75-83° F and maximum development of disease lesions occurring at 83-90°F. Prolonged wet and cool springs are near optimum weather conditions for the spread of the pathogen in field plantings; likewise, because overhead watering is practiced in most commercial nurseries, and plants are rooted under mist or high relative humidity, conditions are provided that are favorable for disease development in the nursery. In the past, juniper blight was mostly confined to seedling beds; however, recently it has been found to cause extensive damage in established plantings and in nursery stock plants. The light green, juvenile leaves are the most susceptible; however, after initial infection, the fungus spreads from young leaves to older leaves and stem tissue. Also, wounded stems are more susceptible to infection than are nonwounded. Therefore, shearing (which not only produces susceptible wounds, but also promotes new susceptible growth) should be kept to a minimum. Shearing during wet weather should be avoided since spores of the fungus are abundant and readily spread during moist conditions.

Control of *phomopsis* of junipers by application of benomyl sprays (0.5 lb. 50% WP/100 gal.) at two week intervals starting slightly before renewed growth and continuing during the growing season gave better control than several other fungicides tested by Dr. D. L. Gill ("Control of *Phomopsis* Blight of Junipers," D. L. Gill, Plant Disease. Reporter 58(11):1012-1014, November 1974).

The nature of juniper blight is such that control by fungicides is difficult and expensive; possibly, selection and growing of blight-resistant cultivars is the most practical approach to juniper blight control in nursery and landscape plantings. Dr. Donald Schoeneweiss (Plant Pathologist, Illinois Natural History Survey, Urbana, Illinois) reported the relative susceptibility of 188 species, varieties and cultivars of juniper, cypress, false-cypress, and arbor-vitae in the Journal of the American Society for Horticultural Science (J. ASHS 94:609-611, 1969). No blight damage was recorded on five of seven false-cypresses, 27 of 146 junipers, and four of 37 arbor-vitae examined.

Suggestions contained in the Oregon Plant Disease Handbook for control of these three foliar diseases include:

1. Prune out and destroy infected and dead wood.

2. Cultural practices that give an active, growing plant.
3. Irrigation practices that keep foliage surfaces dry.
4. Provide good ventilation between plants.
5. Follow fungicidal spray programs:  
Leaf-Blight - Bordeaux or copper sprays in mid-summer and early autumn.  
Tip-Blight - Tri-basic copper sulfate, 3 tablespoons per gallon in October and November.  
Juniper Blight - Spray at two week intervals in the spring with 8-10-100 Bordeaux.

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