Dr. Sharon M. Douglas
Department of Plant Pathology and Ecology
The Connecticut Agricultural Experiment Station
123 Huntington Street, P. O. Box 1106
New Haven, CT 06504

Phone: (203) 974-8601
Fax: (203) 974-8502
Email: Sharon.Douglas@po.state.ct.us
Website: www.ct.gov/caes

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ASH LEAF RUST

Ash leaf rust is one of the most spectacular rust diseases of trees in the Northeast. The fungus, *Puccinia sparganoides*, is a heteroecious rust that requires two different species of host plants to complete its life cycle. The two types of hosts are often called primary and secondary (alternate) hosts. The primary hosts (aecial hosts) of ash leaf rust are several species of ash (*Fraxinus* spp.), including white, green, and occasionally, black ash. The secondary hosts (telial hosts) are several species of marsh grass (*Spartina* spp.) and cordgrass (*Distichlis spicata*). Ash leaf rust appears to run in cycles of approximately 5-7 years.

SYMPTOMS AND DISEASE CYCLE:

Ash leaf rust is most severe along the New England coast, locations where the fungus reproduces and overwinters on grasses in salt marshes. In spring, clouds of rust spores are produced on these hosts. They move inland from the marshes and infect newly emerging leaves of ash. Severe rust often develops on ash after periods of foggy, windy weather with onshore airflow. In epidemic years, symptoms of ash leaf rust have been observed as far as 48 km inland.

Infection of ash occurs on leaves, petioles, and green twigs during May and June. Leaflets and leaves are conspicuously distorted and diseased tissues swell by mid to late June. These cause sharp bends in the petioles and elliptic, wart-like galls on green twigs (Figure 1).

Figure 1. Extensive rust symptoms on ash petioles that result in a distortion of the leaves.

Spots on leaflets may enlarge to several millimeters in diameter (Figure 2). Heavily infected trees can look scorched, as petiole infections lead to withering and browning of leaves in early summer.

Defoliation can result when infection is severe. Spores of this rust fungus appear as bright orange or yellow powdery masses that are produced in tiny cup-like structures (Figures 3 and 4). These spores are incapable of reinfecting ash trees, but re-infect the marsh or cord grass hosts in July and August.

Figure 2. Diagnostic rust pustules that distort infected ash leaflets.

Figure 3. Tiny cup-like fruiting structures on ash containing spores that can only infect marsh or cord grass hosts.

Elongate, swollen fruiting structures develop on the grass hosts in July and August. The fungus multiplies and builds up on the grass hosts in late summer. Because rust infections on these hosts are difficult to detect, the disease can reach epidemic levels in one season under favorable conditions. Late in the summer, these fruiting structures change into another type of fruiting body that produces resting spores. The rust fungus then overwinters in the marshes on these grasses. In spring, the cycle begins again as spores produced on the grass hosts move inland to infect the ash hosts. These spores are carried by the wind to newly emerging ash leaves and twigs.

Figure 4. Close-up of powdery spores in cup-like fruiting bodies on ash

CONTROL:

Ash leaf rust is rarely destructive enough to warrant special control measures. Defoliation may be heavy in some years, but it usually occurs in early summer and is thought to do no significant damage to otherwise healthy trees. However, successive years of severe rust infections can weaken trees, make them susceptible to winter damage, and cause dieback. Infections are particularly problematic on landscape trees. This disease has been reported to kill very young trees. In these cases, it is important to maintain the overall vigor of infected trees by following sound cultural practices that include watering during periods of drought, mulching, and fertilizing, as determined by soil or tissue analyses.

A final strategy for disease management involves the proper selection, timing, and application of fungicide sprays. Thorough coverage of all parts of the tree is necessary and the sprays should be applied until run-off. The fungicide label will contain information on dosage rates and safety precautions. Among the fungicides registered for use in Connecticut are chlorothalonil, mancozeb + myclobutanil, myclobutanil, thiophanate methyl, and thiophanate methyl + chlorothalonil. An organic management option is QST 713 strain of *Bacillus subtilis*. Fungicides can be applied at budbreak and repeated 2-3 times as necessary.

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