DISEASES

Juniper-Hawthorn Rust no. 2.904

by L.P. Pottorff and W.M. Brown Jr.[1]

Juniper-hawthorn rust, or cedar-apple rust, is caused by the fungus *Gymnosporangium*. It requires two different hosts to complete its life cycle. Symptoms on the primary host, juniper (*Juniperus scopulorm, J. virginana*) or cedar, look very different from symptoms on the alternate host, hawthorn, mountain ash, apple and crabapple.

Infections typically are more harmful to the alternate host than to juniper. Repeated infections over several years can cause reduced fruit size on apple and premature defoliation of hawthorn, apple, crabapple or mountain ash. Defoliated trees may suffer winter injury and often fail to set fruit the following season.

Quick Facts...

Infected juniper or cedar trees develop chocolate-colored, kidney-shaped galls on the upper or inner leaf surface.

When mature, the galls may range from 1/16 inch to more than 2 inches and are covered with small, circular depressions.

Symptoms on alternate hosts appear on the upper surface of leaves as small, greenish-yellow spots that gradually enlarge and change to orange-yellow surrounded at the border by concentric, red bands.

The fungus that causes juniper-hawthorn rust spends 18 to 20 months of its life on the juniper.

Symptoms

Juniper or cedar trees infected with rust develop chocolate-colored, kidney-shaped galls on the upper or inner foliage surface. When mature, the galls may range from 1/16 inch to more than 2 inches and are covered with small, circular depressions. The rust galls become active following rainy spring weather, when an orange gelatinous material exudes out of the pocket-like depressions on the galls. These gelatinous structures are referred to as “telial horns” or spore horns. The telial horns eject billions of spores that are carried by the wind to the alternate host.

Symptoms on alternate hosts appear on the upper surface of leaves as small, greenish-yellow spots that gradually enlarge, changing to orange-yellow surrounded at the border by concentric, red bands. On the lower side of the leaf, cup-like lesions (called aecia) are formed in which hair-like projections are produced. These cup-like lesions also can appear on immature apple fruit and cause dwarfing and malformation. The spores formed in the aecia are carried to susceptible juniper trees.

About the Disease

The fungus that causes juniper-hawthorn rust spends 18 to 20 months of its life on the juniper. Juniper leaves are infected between June and September by spores blown from leaf spots on the alternate hosts. The juniper galls that result from the initial infection do not mature until the following spring. After rainy weather, the gelatinous orange spore horns extrude from the galls. In Colorado, these usually are produced sometime in May.

Spores produced by the juniper galls can be carried in the wind for considerable distances. Eventually some spores settle on the leaves or fruit of alternate hosts. The spore stage on juniper cannot reinfect juniper but must go to an alternate host. Likewise, the spore stage on the alternate host cannot reinfect that host but must go to juniper in order to complete the life cycle. All in all, the entire life cycle of this disease takes two years, 18 to 20 months on juniper and four to six months on the alternate host (Figure 1).

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Control

Cultural

The rust depends on two hosts to complete its life cycle. It cannot survive in the absence of one of the hosts. Design landscapes so that susceptible junipers are separated as far as possible from alternate hosts. Where practical, locate the house or a dense hedge between junipers and alternate hosts.

Remove juniper galls in late winter or early spring by pruning them out. To break the disease cycle, remove galls before the gelatinous spore horns emerge.

Chemical

Protective sprays for rust control on alternate hosts can begin in the spring, when the gelatinous spore horns emerge from the juniper galls. Spray alternate hosts (hawthorn, apple, crabapple and mountain ash) at seven- to 10-day intervals beginning at blossom time. Blossoms and emergence of spore horns often occur at the same time.

Chemical control usually is not necessary on juniper. However, if fungicide control is desired, application to juniper would occur from July through September at two-week intervals.

Table 1: Sprays for juniper and alternate hosts.

Chemical	Notes
Bayleton (Triadimefon)	For control of rust on apple (50WP), juniper (25DF).

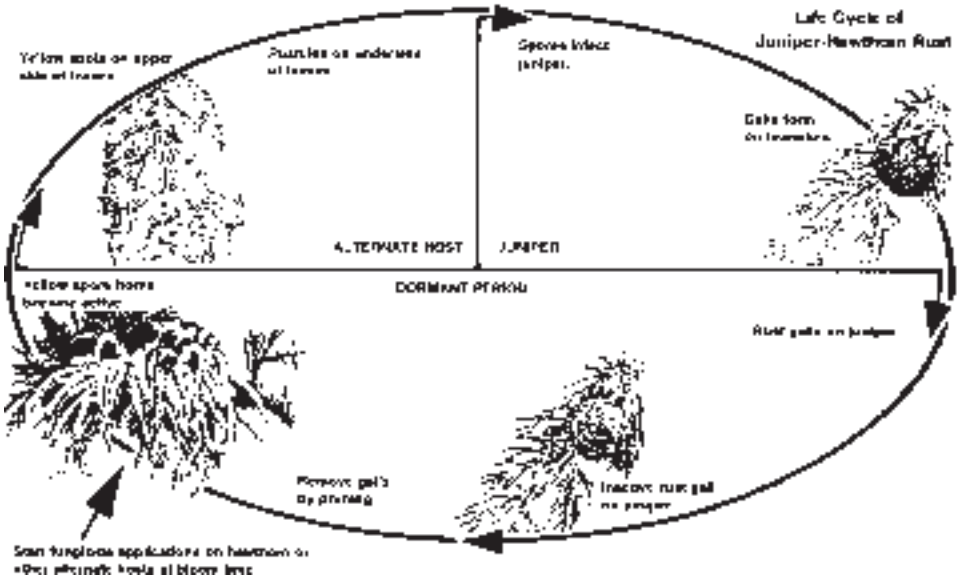

Figure 1: *Gymnosporangium* life cycle.

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