



Cedar Rust Diseases of Ornamental Plants

There are a number of "cedar rust" diseases in which the fungus completes its life cycle on two plant hosts; one in the cypress family and one in the rose family (the rosaceous host). Discussed here are three common cedar rust diseases in the northeast U.S.

1. Cedar apple rust – The fungus alternates between Eastern red cedar and mostly apple and crabapple.
2. Cedar hawthorn rust – The fungus alternates between junipers and hawthorn, crabapple, and apple in addition to several other rosaceous hosts.
3. Cedar quince rust – The fungus alternates between junipers and a wide range of rosaceous hosts. The most noticeable in the landscape is hawthorn.

In some cases these diseases are minor problems, but cedar quince rust and cedar hawthorn rust can be a major problem on hawthorns and cedar apple rust is a major economic consideration in commercial apple production.

Diagnostic Symptoms

Cedar apple rust: On junipers, tan to brownish round to kidney-shaped fungal galls are present in winter and early spring (Figure 2). With moist weather, gaudy bright orange masses of gelatinous spores develop from these galls, and galls swell to several times their original size (Figure 3). Spore masses are several inches in diameter, with a central core and radiating hornlike tendrils, and are highly visible during moist weather in mid-spring.

On apple and crabapple, bright orange-yellow leaf spots develop on upper surfaces of leaves in late spring (Figure 1), followed by light colored, and fringed cup-shaped structures: on lower leaf surfaces several weeks later. Damage on junipers is generally minor and involves presence of the galls and twig dieback. On apples and crabapples, fruit infections and leaf drop also can occur.

Cedar hawthorn rust: On junipers, galls are somewhat smaller than with cedar apple rust disease. Galls continue to produce spores on junipers for more than one year, compared to only one season of spore production with cedar apple rust. On hawthorn, leaf spots are similar to above and occasionally green twigs are deformed by the fungus (Figures 4 and 5). Cedar quince rust: Infected areas on juniper are much less spectacular than with cedar apple rust, with a cushion-like mat of orangish fungal growth developing on spherical galls in spring (Figure 6). Cedar quince rust causes the greatest damage of the three rusts to ornamental rosaceous hosts, especially to hawthorns, because of extensive, unsightly fruit infestations, stunting and death of fruits and swelling and distortion of twigs. Infected leaves brown and die. Fruits become covered with orangish-pink spore horns (Figure 7). Unsightly spherical cankers developing on stems can last more than one year.

Disease Cycle and Condition Favoring Disease

Rust fungi have complicated disease cycles with a number of different spore types that will not be detailed here. A crucial factor relative to control on these cedar rusts, however, is that there is no repeating spore cycle on the rosaceous hosts. In other words, spores produced on hawthorn will not re-infect hawthorns or other rosaceous plants; they will



Close-up of cedar apple rust on crabapple leaf.



Cedar apple rust gall on juniper.



Cedar apple rust gall with gelatinous spore horns on juniper.

only re-infect junipers later in the season. Spores produced on juniper will not re-infect junipers; they will only infect the rosaceous host. The alternating host plant is necessary for survival of the fungus.

Spores produced on the juniper host are blown during moist weather to the rosaceous hosts in mid-spring at a time when new growth has emerged. The fungus then causes leaf spots on upper leaf surfaces and while growing in the leaf two strains of the fungus mate and emerge as a new spore form on the lower leaf surface. These spores are then blown back to junipers in mid-summer to fall, develop galled areas on the junipers over a one and a half year period and the cycle begins again. Windborne spread of spores between the hosts of several hundred yards is not unusual and spread can be a matter of miles.

Control Hints

1. Application of fungicides. Protective fungicides can be applied several times starting with pre-bloom on hawthorn and bud break on crabapples if the disease is chronically a problem at a given site. These applications are to protect the plant from spores being disseminated from the juniper host in mid-spring. Since there is no repeating cycle of this disease on the rosaceous host, further applications after this springtime spread from juniper are unnecessary.
2. When you diagnose cedar rust disease from infected hawthorn or crabapple fruits and leaves it is far too late to spray for that year. Sprays are rarely recommended to protect the juniper host from spores being disseminated from the rosaceous host in late summer and fall.
3. Eradication of the other host plant. One approach sometimes suggested is to eliminate junipers from around plantings of rosaceous hosts, and vice versa. Concerted efforts to eradicate junipers were historically tried in concentrated apple growing regions. This practice is limited to some extent by practicality in terms of the widespread occurrence of junipers, long distance spread of the fungi involved, the rights of juniper lovers, and the fact that in most situations cedar diseases are not so serious that such extreme measures are needed. Nevertheless, it is prudent to separate highly susceptible junipers and rosaceous hosts to the extent possible in nursery and landscape situations. One simple practice where only a few plants are involved is to remove galls from junipers. This is easier to do with cedar apple rust and cedar hawthorn rust, since galled areas are more inconspicuous with cedar quince rust.
4. Use plants with genetic resistance. A number of juniper species and cultivars and a number of rosaceous plant species and cultivars have varying levels of resistance and susceptibility to these three diseases.



Cedar hawthorn rust on upper surface of hawthorn leaf.



Cedar hawthorn rust on lower surface of hawthorn leaf.



Cedar quince rust on juniper.



Cedar quince rust on hawthorn fruit.

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