

Cedar Rust Diseases of Ornamental Plants

Jim Chatfield
Ohio State University Extension

Stephen Nameth and C. Wayne Ellett
Department of Plant Pathology

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** (pathogen: *Gymnosporangium juniperi-virginianae*). The fungus alternates between Eastern red cedar (*Juniperus virginiana*) and mostly apple and crabapple.
2. **Cedar hawthorn rust** (pathogen: *Gymnosporangium globosum*). The fungus alternates between junipers and hawthorn, crabapple, and apple in addition to several other rosaceous hosts.
3. **Cedar quince rust** (pathogen: *Gymnosporangium clavipes*). 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

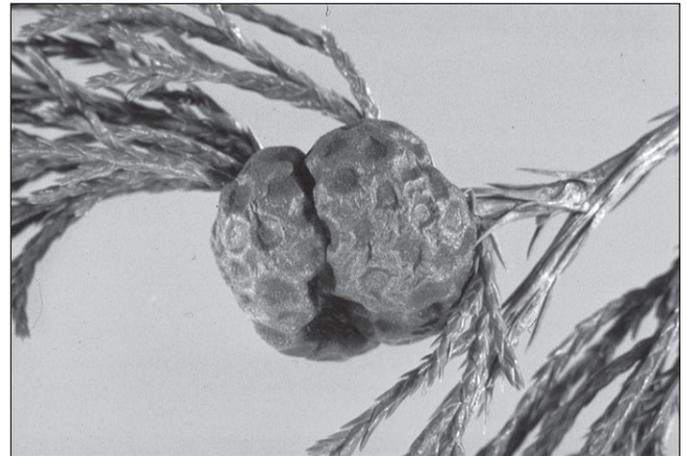


Figure 2. Cedar apple rust gall on juniper.

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, 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



Figure 1. Close up of cedar apple rust on crabapple leaf.



Figure 3. Cedar apple rust gall with gelatinous spore horns on juniper.



Figure 4. Cedar hawthorn rust on upper surface of hawthorn leaf.

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 Conditions 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 reinfect hawthorns or other rosaceous plants—they will only reinfect junipers later in the season. Spores produced on juniper will not reinfect 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.



Figure 5. Cedar hawthorn rust on lower surface of hawthorn leaf.

Control Hints

1. **Application of fungicides.** Protective fungicides can be applied several times starting with prebloom 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. Commonly recommended fungicides include: Mancozeb (Fore, Dithane, Mancozeb); Chlorothalonil (Daconil*); Triadimefon (Bayleton, Strike) and propiconazole (Banner). It is the user's responsibility to follow all label instructions.

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.

2. **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



Figure 6. Cedar quince rust on juniper.

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.

3. **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 and where disease pressures are historically high these plants should be used. Review local Extension literature and experienced horticulturists for recommendations on the best-adapted plant material for your area, and see Table 1 below.



Figure 7. Cedar quince rust on hawthorn fruit.

Table 1. Selected species and varieties of Crabapple, Juniper and Hawthorn with resistance to rust diseases.

<i>Juniperus</i>			<i>Crataegus (Hawthorn)</i>	<i>Malus (Crab Apple)</i>
Cedar Apple and Hawthorn Rust:	Aureo-spica	<i>J. rigida</i>	Cedar Hawthorn Rust:	Cedar Hawthorn Rust:
Resistant:	Cracovia	<i>J. sabina:</i>	Resistant:	Resistant:
<i>J. ashei</i>	Depressa	Broadmoor	<i>C. crus-galli</i>	Adams
Resistant:	Hibernica	Fastigiata	<i>C. intricata</i>	Beverly
<i>J. chinensis:</i>	Oblonga pendula	Knap Hill var.	<i>C. laevigata</i>	Candied Apple
<i>Fermina</i>	Pyramidalis	tamariscifolia	Autumn Glory	Dolgo
Fortunei	Saxatilis	Skandia	<i>C. phaenopyrum</i>	Donald Wyman
Hetzii	Saxatilis pallas	<i>J. squamata:</i>	<i>C. pruinosa</i>	Eleyi
Japonica	Suecia	Albo-variegata	<i>C. viridis</i>	Inglis
Keteleeri	Suecia nana	Fargesii	Winter King	Indian Summer
Leeana	<i>J. conferta</i>	Mereri		Liset
Mas	<i>J. formosana</i> ‘Hyata’	Wilsonii		Mt. Arbor
Oblonga	<i>J. horizontalis:</i>	<i>J. virginiana:</i>		Narangasett
Pedula	Admirabilis	Aurea		Periscifolia
Pfitzeriana	Adpressa	Berg’s Rust Resistant		Red Jewel
Pfitzeriana compacta	Argenteus	Burkii		Robinson
Pfitzeriana glauca	Douglasii	Globosa		Robusta
Plumosa aurea	Eximius	Kosteri		Royalty
Pyramidalis	Filicinus	Pseudocupressus		Sargent cv. Tina
Sargentii	Glomerata	Pyramidalis		Snowdrift
Sargentii variegata	Lividus	Skyrocket		Special Radiant
Sargentii watereri	Petraea	Tripartita		Zumi
<i>J. communis:</i>	Plumosa	Venusta		
Aurea	<i>J. procumbens</i>			
	(=J.chinensis var. procumbens)			

* Commonly available for homeowner use.

Taken from Pest Resistant Ornamental Plants by Deborah C. Smith-Fiola. Rutgers Cooperative Extension.

This publication contains pesticide recommendations that are subject to change at any time. These recommendations are provided only as a guide. It is always the pesticide applicator’s responsibility, by law, to read and follow all current label directions for the specific pesticide being used. Due to constantly changing labels and product registration, some of the recommendations given in this writing may no longer be legal by the time you read them. If any information in these recommendations disagrees with the label, the recommendation must be disregarded. No endorsement is intended for products mentioned, nor is criticism meant for products not mentioned. The author, The Ohio State University and Ohio State University Extension assume no liability resulting from the use of these recommendations.

Visit Ohio State University Extension’s web site “Ohioline” at:
ohioline.osu.edu

All educational programs conducted by Ohio State University Extension are available to clientele on a nondiscriminatory basis without regard to race, color, creed, religion, sexual orientation, national origin, gender, age, disability or Vietnam-era veteran status.

Keith L. Smith, Associate Vice President for Ag. Adm. and Director, OSU Extension

TDD No. 800-589-8292 (Ohio only) or 614-292-1868