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Cedar-Apple Rust

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CEDAR-APPLE RUST

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Cedar-apple rust is a common problem on junipers, apples and crabapples. Other rust diseases cause a similar problem on hawthorns. Cedar-apple rust is notable for the brilliant, red-orange fruiting bodies it produces in early spring on susceptible junipers. It is from such infected junipers that spores are produced which infect "alternate" hosts -- apple, crabapple and hawthorn.

Symptoms (apple and other alternate hosts)

In early summer, small yellow spots appear on the upper leaf surface of infected apples and crabapples. Rapidly the spots enlarge, taking on a brilliant red-orange coloration. At this time, a change occurs on the underside of the leaf where raised pustules are formed which break open into a "cluster-cup" appearance. Defoliation may occur if infection is severe.

Symptoms (junipers)

Chocolate-brown galls, generally the size of a half-dollar, form on infected juniper twigs. In early spring, finger-like projections (spore horns) emerge from the galls. The spore horns are brilliant orange with a gelatinous texture. These "cedar-apple" galls will maintain their brilliant appearance for 2 or 3 weeks but then dry and wither.

Disease Cycle

A unique aspect of cedar-apple rust is that two very different plants are required for the fungus (Gymnosporangium juniperi-virginianae) to complete its life cycle. Junipers are the primary host on which the fungus overwinters, producing the cedar-apple galls in 2 years. During spring, with the emergence of the spore horns, spores are

Cedar Apple Gall with fully expanded orange colored spore horns.
produced which infect the alternate host -- apple or crabapple. (Hawthorns serve as the alternate host for other rust fungi.) In midsummer infected apple leaves produce spores which in turn infect junipers, and the life cycle is completed. This alternating between two different hosts gives the fungus its name, "cedar-apple rust."

The most damaging phase of the disease is on the alternate host -- apples, crabapples, or hawthorns. Severe defoliation often occurs. The disease generally does not cause significant injury to junipers.

**Control**

I. Separation of Hosts and Gall Removal. The rust fungus is dependent upon both the primary (juniper) and alternate (apple) host for survival, removing one or the other will break the life cycle of the fungus, thus preventing disease. A distance of 1/4 mile between junipers and alternate hosts is generally sufficient to prevent infection. Often host separation is not feasible or warranted; however, avoid the extreme situation of having both hosts planted adjacent.

In late winter pick off all cedar-apple galls from junipers. This is a practical control if infection is light and there are not many susceptible junipers in the neighborhood. However, in most cases even if you are successful in removing all galls, spores will be blown in from neighboring junipers.

II. Chemical Control. **APPLES, CRABAPPLES and HAWTHORNS**, which are highly susceptible, should be sprayed with a fungicide during spring. The first application should be at the early pink stage (when first color shows on flower buds). Three to four additional sprays at 7- to 10-day intervals will provide good protection.

Several fungicides are registered for use on apples or crabapples for rust control: zineb, ferbam, thiram, zinmaneb (Manzate D, Dithane M-22 Special); mancozeb (Dithane M-45, Manzate 200, Fore); and chlorothalonil (Daconil 2787 Flowable). Be sure to check the label to determine which plants a particular fungicide can be used on (not all fungicides are registered for use on all crops). For most homeowners, zineb and ferbam are likely to be the most readily available fungicides and are registered for use on both apples and ornamentals.

The primary fungicides in most general purpose fruit sprays is captan. Captan will not control cedar-apple rust; however, it will control apple scab, another serious disease problem on apples and crabapples. Use of zineb or ferbam in conjunction with a general purpose fruit spray containing captan will control cedar-apple rust, apple scab and other fruit disease problems.

**JUNIPERS** are not seriously injured by cedar-apple rust; therefore, fungicide sprays are not generally warranted. To prevent infection of junipers by cedar-apple rust apply ferbam at 14- to 21-day intervals from July to early September. Read label directions for details on proper use of all fungicides.

III. Resistance. The most logical method of avoiding cedar-apple rust is to use resistant plants. However, cedar-apple rust is not the only disease to attack crabapples, apples and hawthorns. Apple scab and fire blight are two other important diseases of crabapples and apples. **Febraea leaf spot** is common to hawthorn. On junipers, **Phomopsis tipe blight** is a recurring problem most every year. Therefore, when choosing a cultivar to plant, consider total disease resistance, not just resistance to one particular problem. These recommended cultivars show good resistance to most major disease problems:

**Apples:** 'Prima,' 'Priscilla,' 'Sir Prize.'

**Crabapples:** 'Robinson,' 'Centurian,' 'David,' 'Donald Wyman,' floribunda, 'Indian Magic,' 'Beverly.'

**Hawthorns:** Washington thorn (Crataegus phaenopyrum), cockspur thorn (C. crus-galli).

**Junipers:** Juniperus chinensis 'Amstrongi,' 'Keteleeri,' 'Pfitzeriana,' 'Pfitzeriana Aurea'; J. communis 'Aureo-spica,' 'Repanda,' 'Suecica'; J. horizontalis 'Depressa,' 'Depressa Aurea'; J. sabina 'Broadmoor,' 'Skandia'; J. squamata var. fargesii.