PennState Extension

Cedar Apple And Related Rusts on Ornamentals

Cedar-apple rust and closely related diseases, cedar-quince, cedar-hawthorn, and Japanese apple rusts are caused by fungi of the genus Gymnosporangium.

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Cedar-quince rust on juniper

These fungi require two different living host plants in order to complete their life cycles. If either host plant is not present, the fungus dies. Juniper, sometimes called cedar, is one host while alternate hosts include apple, hawthorn, quince, and shadbush or serviceberry, depending upon the species of fungus involved. Japanese apple rust (*Gymnosporangium yamadae*) is relatively new to North America, having been introduced from Asia in 2004. With the naked eye, it is almost indistinguishable from cedar-hawthorn rust (*Gymnosporangium globosum*) on *Malus*.

Symptoms

(specific symptoms depend on which species of rust is causing disease)

Juniper (*Juniperus*):

- smooth, round, up to golf-ball size, galls on twigs (cedar-apple rust)
- elongated, slightly swollen areas along the branches (cedar-hawthorn rust)
- prolific branching, called witches' brooming

Apple (*Malus*):

- yellow to bright orange spots on leaves
- spots on fruit

Hawthorn (*Crataegus*):

- yellow spots on leaves
- distorted fruit with horn-like protrusions
- galled twigs

Shadbush or serviceberry (*Amelanchier*):

- brownish-orange spots on leaves
- distorted fruits with horn-like protrusions

Life History

Rust overwinters as mycelium in gall tissue on junipers. During warm, rainy spring weather, gelatinous horn-like protrusions emerge from the gall. Teliospores produced on the horns germinate and give rise to another spore type, basidiospores, which are carried by wind to fruit or leaves of the broadleaf host. Infections occur if moisture is available on the leaves and temperatures are adequate. Later, pycniospores formed on the upper leaf surface of the broadleaf host allow the fungus to mate. Aeciospores that form in the same spots as the pycniospores but on the underside of the leaf of the broadleaf host are carried by the wind back to junipers in the summer. The spring after the juniper is infected, gall tissue begins to form. The second spring after juniper infection, spores are released from the mature gall. Thus, 18 to 20 months are required for the gall to form on junipers, mature, and release spores.

Management

In most cases in the landscape, damage to either host is not severe enough to warrant fungicide applications. However, susceptible varieties of the broadleaf host can be heavily infected and defoliated. Fruits of the broadleaf host can be severely deformed as well. In the nursery, a fungicide can be applied to crabapples in the spring and early summer. To protect hawthorns in the nursery, apply a fungicide beginning as the flowers open and at 10 day intervals. Resistant cultivars of crabapple and apple are available.

Significant damage to junipers may occur if the broadleaf host is close by. Unsightly galls forming on the twigs and branches reduce the value of the plant and twig dieback can occur if the disease is very severe. In many cases, the disease is not noticeable on junipers except in the spring when the galls are producing the bright yellow-orange spore horns. Junipers should be carefully inspected during each dormant season and any gall tissue should be pruned and destroyed before the spore horns develop. In the nursery, apply a fungicide in the summer.

Avoid planting the alternate hosts close together. If possible, remove susceptible non-crop plants from the vicinity. For example if junipers are the desired plants, remove wild apples and hawthorns from the nursery or landscape. If a broadleaf host is the desired plant, remove wild junipers.

Cedar-apple rust hosts: (*Gymnosporangium juniperi-virginiana*)

- Apple, crabapple
- Eastern red cedar, Chinese, and prostrate junipers

Cedar-hawthorn rust hosts: (*Gymnosporangium globosum*)

- Apple, crabapple, hawthorn, quince, pear, and shadbush
- Eastern red cedar, Rocky Mountain juniper, and prostrate junipers

Cedar-quince rust hosts: (*Gymnosporangium clavipes)*

- Apple, crabapple, mountain ash, cotoneaster, hawthorn, quince, pear, photinia, shadbush
- Eastern red cedar, Rocky Mountain juniper, savin, and prostrate junipers

Japanese Apple Rust Hosts: (*Gymnosporangium yamadae*)

- *Malus asiatica, Malus baccata, Malus halliana, Malus micromalus, Malus platycarpa, Malus prunifolia, Malus pumila var. domestica, Malus scheideckeri, Malus spontanea, Malus theifera, Malus toringo, Malus transitoria, Malus yannanensis*.
- *Juniperus chinensis, Juniperus chinensis* var. *procumbens, Juniperus chinensis* var. *sargentii, Juniperus squamata*

Cedar-apple rust on juniper.

Old cedar-hawthorn rust galls on hawthorn

Cedar rust on hawthorn fruit.

Cedar rust on upper leaf surface

Cedar rust on lower leaf surface.

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