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EC1806 Revised 1955 Cedar Apple Rust

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April 1955

E.C. 1806-5

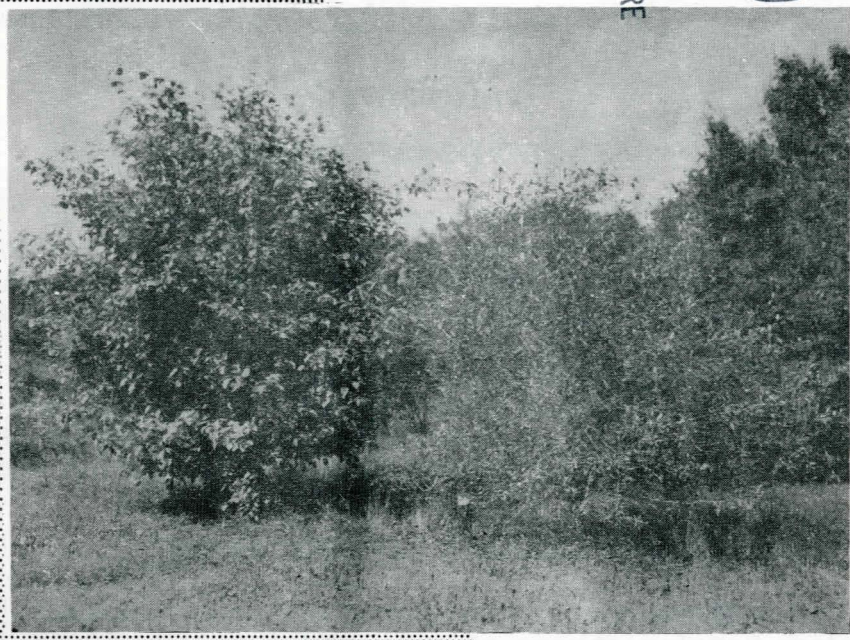
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Cedar Apple Rust

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An example of resistance and susceptibility to cedar apple rust. The tree on the left is a resistant crab apple variety and the one on the right, which is nearly defoliated, is a susceptible hawthorn variety.

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CEDAR APPLE RUST

John L. Weihing and Wayne C. Whitney 1/

Cedar apple rust is one of the most conspicuous tree diseases in Nebraska. Both the cedar and the apple are necessary for the survival of the fungus parasite which causes this disease. Rust also affects species of trees related to apple such as crab apple, hawthorne, red haw, and quince. The symptoms produced on cedars are so different from those on apple that one might never suspect that the same organism caused both.

Symptoms

SYMPTOMS ON CEDARS

In the spring, following a rain, bright orange-colored gelatinous horns come out of galls on the branches of cedar. On some trees hundreds of these galls may be counted, while others may have but a few. The galls vary in size. Some are not larger than a pea, while others may grow to 2 inches in diameter (figures 1 and 2). Usually the rust does not seriously damage the cedar unless the infection is very heavy or is serious for several successive years.

SYMPTOMS ON APPLE TREES

Leaves, fruits and occasionally twigs are attacked. During June and July yellow to orange-colored spots develop on the surfaces of the leaves (figure 3). On the lower surface of the leaf, many small cup-shaped bodies are produced immediately below the colored spots. The cup-shaped bodies are arranged in a ring, giving a crown-like appearance. When the leaves are badly infected they turn yellow and premature defoliation occurs. This weakens the tree, reduces the size of the fruits of the current crop and reduces the number of fruits the following year.

1/ Extension Plant Pathologist and Extension Horticulturist, respectively.

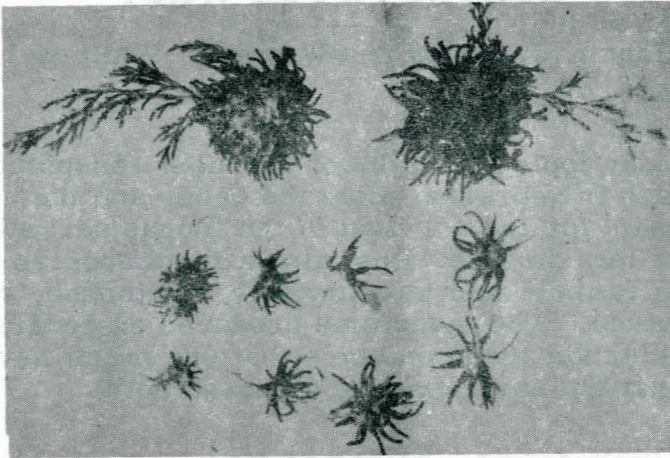


Figure 1. Mature cedar apple galls of various sizes from which have emerged gelatinous, orange tendrils following a spring rain.

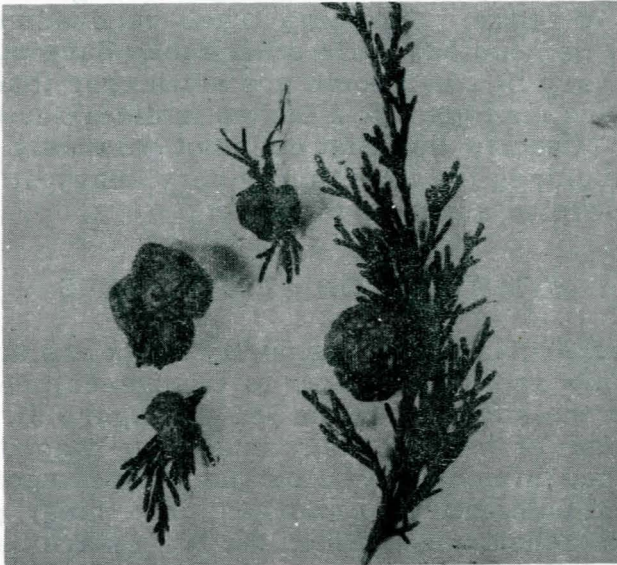


Figure 2. Mature cedar apple rust galls on cedar. Following a spring rain, long, orange, gelatinous tendrils will emerge from the circular indentations on the gall.

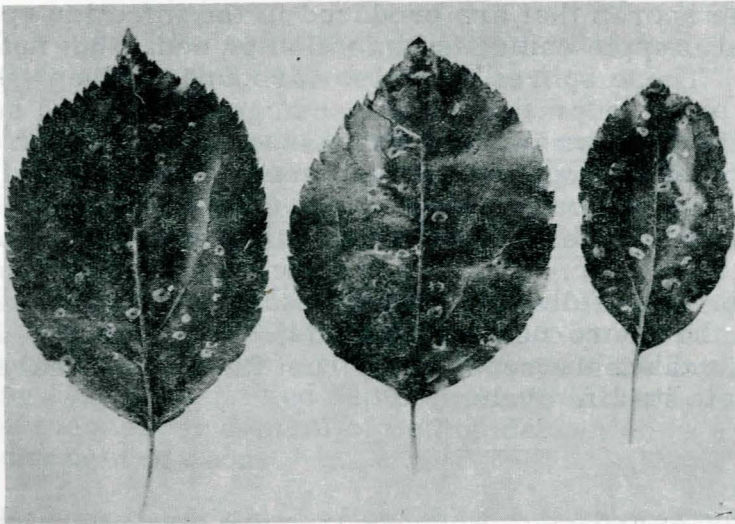


Figure 3. Cedar apple rust on apple leaves. The spots are bright yellow to orange in color.

The crown-like ring of cup-shaped structures may also occur on the fruits and mar their shape and appearance. While rust itself does not cause a rot in storage, the injuries on the fruit may serve as entrance-ways for rot-producing organisms.

On twigs of the very susceptible varieties, rust occasionally forms elongated, swollen cankers which may girdle the twigs.

Life History of the Fungus

The fungus Gymnosporangium juniperi-virginianae is responsible for the cedar apple rust disease. Infection causes the formation of galls on cedar. Spores (fungus seed) develop within these galls. The spores are carried to the outside by the long, gelatinous orange tendrils that emerge following a spring rain. They germinate and produce another kind of spore which is shot into the air to be carried away. These airborne spores from cedar can cause infection only on apple and do so when they by chance lodge upon an apple tree.

The spores that are produced in the infection spots formed on apple can cause infection on cedar but not on apple. These spores are also airborne. When they lodge on a cedar needle they can germinate and send germ tubes down into the leaf tissue, setting up an infection. This occurs in the summer. The first visible signs of infection on cedar do not show up until July of the following year at which time tiny, soft woody galls begin to appear. These galls increase in size until October. The following spring, after the galls have produced the spore-bearing tendrils, they usually die. Thus, it takes the cedar apple rust fungus two years to complete its life cycle.

In cities and towns where cedars are commonly used as ornamentals and the apple is grown extensively as a home fruit, infection may become so severe as to kill one or the other. Cedar and apple trees growing 1 mile apart seldom, if ever, show reciprocal infection, but under favorable circumstances the airborne spores may sometimes be carried for several miles.

Control

The best way to control cedar apple rust is to avoid planting susceptible cedar and apple near each other. If cedars are desired near susceptible varieties of apples, then a resistant or immune type such as varieties of the Chinese juniper should be planted. If apples are wanted near the susceptible cedar planting, only the most highly resistant varieties should be selected.

Fungicidal sprays are also used for protection against the disease as well as for eradication of cedar apple rust.

CONTROL ON CEDAR

1. Plant the resistant varieties. Chinese juniper (Juniper chinensis) is immune to the disease.

Avoid the susceptible red cedar (Juniperus virginiana) and most of its varieties; Rocky Mountain or Colorado cedar (Juniperus scopulorum) and its varieties and the Bermuda juniper (Juniperus barbadensis).

2. Use of fungicidal sprays. As a protection against infection, spray the cedars with wettable sulfur (1 pound to 10 gallons of water) at three- to four-week intervals during July, August and September. This spray is also recommended for control of red spider which is a very serious pest of cedar.

For eradicant types of sprays the following two are suggested: (a) Bordeaux "180" which consists of:

Copper sulfate	- - - - -	12 lbs.
Spray lime	- - - - -	12 lbs.
Monocalcium arsenite	- -	2 lbs.
Zinc arsenite	- - - - -	8 lbs.
Soybean flour	- - - - -	1 lb.
Water	- - - - -	-100 gals.

or (b) Elgetol at the rate of 1 gallon per 100 gallons of water. Either of these two sprays should be applied in April. They will reduce gall production and at the same time inhibit spore production on the large galls.

CONTROL ON APPLE

1. Plant the resistant varieties.

Very resistant are;

Delicious (Red type)	Northwestern Greening
Early McIntosh	Sharon

Resistant:

Cortland	Turley
Duchess	Winesap
Golden Delicious	Yellow Transparent
Haralson	York
King David	

Avoid the susceptible:

Grimes	Secor
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and very susceptible:

Beacon	Minjon
Jonathan	Wealthy

2. Use of fungicidal sprays. Spray the apple trees with ferbam (2 lbs. per 100 gals. of water or 5 tablespoons per 3 gals. of water) or wettable sulfur (4 lbs. per 100 gals. of water or 4 tablespoons per 3 gals. of water) three to five times in the spring before and during the period when the tendrils have emerged on the cedar galls.

Since many other pests attack apple trees it is desirable to carry out a complete spray schedule. Therefore, it is suggested that E. C. 1277, Pest control in the Home Fruit Planting, be consulted.