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SHADE TREES & ORNAMENTALS & FRUIT CROPS

Cedar Rust Diseases are Active Now
By John Hartman

Rust-infected *Juniperus* species (cedars and junipers) are revealing bright orange evidence of the rust fungi infecting them during moist periods this spring. In Kentucky, we commonly see three different rust fungi on cedars and junipers, often on the same tree. These rust diseases are cedar-apple rust, cedar-hawthorn rust, and cedar-quince rust. All three rusts are caused by different species of the fungus *Gymnosporangium,* each of which must spend a phase of its life cycle as a parasite on *Juniperus* species such as native red cedars or ornamental junipers. The other phase of the life of these rust fungi is spent on susceptible alternate hosts such as apple, crabapple, hawthorn, mountain ash, pear, and serviceberry.

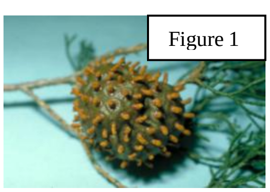

Figure 1

Cedar apple rust. The cedar-apple rust fungus (*G. juniperi-virginianae*) forms light brown to reddish or chocolate brown galls in the leaf axils of infected *Juniperus* species. These galls are usually rounded and range from pea-sized to 2 inches in diameter. As galls mature, the flesh becomes corky and the surface becomes pitted with circular depressions. In spring, following rainy periods, slimy, yellow-orange tendrils, or "spore horns," up to 2 inches long swell and protrude from these depressions (Figure 1, Figure 2). A gall may produce many spore horns, which cause it to resemble orange-colored blossoms from a distance. Severely rusted *Juniperus* can be very conspicuous.

Figure 2

Cedar-hawthorn rust. Galls produced by cedar-hawthorn rust (*G. globosum*) are similar in appearance but are smaller and more irregular in shape and do not develop the regular arrangement of circular depressions. Spore horns, too, are shorter, generally fewer in number, and wedge- or club-shaped (Figure 3). Because of its smaller size, cedar-hawthorn rust is less conspicuous than cedar-apple rust.

Figure 3

Cedar-quince rust. Cedar-quince rust (*G. clavipes*) does not form rounded galls but instead forms perennial, spindle-shaped swellings on the twigs, on


Figure 4

which a gelatinous, orange-brown mass of spores is borne in the spring (Figure 2 and Figure 4).

Disease cycle. All three fungi have similar life cycles. From dormant galls and swellings, orange spore "horns" or spore masses begin to appear in spring about the time that flowering crabapples are in bloom and apple buds are in the pink to early bloom stage. These spore horns or spore masses are actually columns of fungal spores (teliospores), each of which can germinate under moist conditions to form four new spores (basidiospores). Basidiospores are then carried to apple, crabapple, hawthorn and other susceptible trees by wind currents where they can germinate and cause infection during relatively short periods of wetness (about six or seven hours for moderate levels of infection when temperatures are in the 50s and 60s). The springtime period of infection usually ends about 30 days after apples bloom when the fungus no longer produces basidiospores on cedars and the majority of alternate host leaf, shoot or fruit tissues have aged to the point where they are no longer susceptible. Depending on the alternate host, spots may begin forming on the upper leaf surface or on shoot or fruit surfaces about 10 to 14 days after infection and spores (aeciospores) are produced in tiny "cups" called aecia on the infected tissues several weeks later. Aeciospores produced in summer in the tubular aecia on diseased apple, crabapple, or hawthorn tissue are blown to cedar during the summer where they germinate during moist weather, infect, and cause small pea-sized galls to form on the twigs. The fungus over-winters in these galls which continue to grow and enlarge during the following year. The fungus survives a second winter within the gall, then begins producing its long, orange spore horns the next spring, completing the disease cycle that began two years earlier.

Although cedar rusts can cause unsightly growths on *Juniperus,* they do not usually cause serious damage to these plants. However rust diseases can cause serious fruit losses on apples and weaken and kill shoots of crabapples and hawthorns. Infected fruits can drop prematurely or have a reduced commercial value if they remain on the tree through harvest. Leaf infections often result in premature leaf loss, reducing the size and quality of the fruit crop, weakening the tree, and reducing bloom the following year. Hawthorn and crabapple twigs infected by the cedar-quince fungus can become swollen and die.

Cedar rust disease management efforts are usually aimed at reducing damage to apples, crabapples, and hawthorns.

- In the landscape and nursery, keep cedars and alternate hosts such as apple, crabapple, and hawthorn separate. The closer these hosts grow to one another, the greater the risk of cedar rust diseases on both.

- Grow resistant apples (crabapples, hawthorn, mountain ash) or junipers. Resistant apple varieties were listed in Kentucky Pest News issue 999 (August 18, 2003). Resistance may vary among localities, however, depending on the specific races of the rust species present in the area.

- Destroy nearby wild, abandoned, or worthless apples, crabapples, hawthorns, cedars, or junipers. When practical, prune out and destroy cedar galls found on ornamental junipers and cedars. Although apples may occasionally become infected by spores produced up to several miles away, most infections result from spores produced on infected *Juniperus* within a few hundred feet of the apple or hawthorn tree.

- Follow a recommended fungicide control program. Early protection of apples, crabapples, and hawthorns (beginning at the pink-bud stage) is especially important for control, as most infections occur within the first 30 days after bloom. For specific spray recommendations, commercial apple growers should consult UK Extension publication ID-92, "Commercial Fruit Spray Schedule." Homeowners should consult publication ID-21, "Disease and Insect Control Program for Home Grown

Fruit in Kentucky." Landscape managers need to consult UK Extension publication ID-88, "Woody Plant Disease Control Guide for Kentucky." All three are available through local county Extension offices.

Figure legends:

Figure 1. Telial "horns" emerging from a cedar-apple rust gall.

Figure 2. Cedar-apple rust with telial "horns" (left) and cedar-quince rust (right).

Figure 3. Several cedar-hawthorn rust infections on juniper.

Figure 4. Cedar-quince rust on juniper twig.

TOBACCO

Sclerotinia Collar Rot Reported in Central Kentucky
By Kenny Seebold

Cool, wet weather has prevailed across much of Kentucky over the past week or so, increasing the risk to diseases on tobacco transplants. The current conditions are particularly favorable for collar rot and target spot. We have confirmed a case of collar rot from a greenhouse in central Kentucky within the past few days, so the focus of this week's article will be on recognition and management of this disease.

Collar rot shows up in float beds in the spring, when sclerotia located outside the float system germinate produce cup-shaped fruiting bodies called apothecia. Apothecia then produce spores (ascospores) that are dispersed on wind currents. When ascospores land on susceptible tissue, they germinate if sufficient moisture is present. Long periods of leaf wetness (greater than 16 hours) are required for this process. Germinated ascospores produce hyphae (fungal "threads") that penetrate tissue and begin the infection process.

The first symptoms of collar rot are small, dark green, water-soaked lesions that appear at the bases of stems. In most cases, this disease becomes apparent when clusters of infected transplants collapse, leaving open holes in the plant canopy (Fig. 1). These clusters, or "foci", are usually grapefruit-sized (4-6" in diameter). Stems of affected seedlings generally show a wet necrosis that is amber-to-brown in color, beginning at the base of the plant and extending upward (Fig. 2). Signs of the causal agent, *Sclerotinia sclerotiorum*, may be present on symptomatic plants or on debris in float trays. These signs include a white, cottony mycelium (fungal mass), present if humidity is high, and irregularly shaped, black sclerotia (Fig. 3). Sclerotia resemble seeds or rodent droppings and are the primary survival structure of *S. sclerotiorum* and are the primary source of inoculum for outbreaks in subsequent years.

Plants that are 5-7 weeks old are most susceptible to collar rot. We often see the first cases shortly after plants are first clipped following a period of disease-favorable weather. Cool temperatures (60 to 75 ºF), high humidity, and overcast conditions, like those that have been common in Kentucky for the past week, are ideal for development of this disease. It's also important to note that *S. sclerotiorum* is an efficient colonizer of dead plant matter and weakened or injured tissue, and these are usually the first to be attacked. The fungus will then move from these areas to nearby healthy plants as long as cool temperatures and high humidity prevail. This is one of the ways that secondary spread of the collar rot pathogen takes place, since

S. sclerotiorum does not produce airborne spores on infected tissue. The other way in which secondary spread can occur is through dispersal of infected tissue – a possible event when infected plants are clipped.

There are no fungicides labeled for control of Sclerotinia collar rot on tobacco transplants, making this a difficult disease to manage. Sound management practices are the only options that a grower can use to fight collar rot. Adequate ventilation and air circulation are a primary concern, since these limit the duration of leaf and stem wetness. Growers should manage temperatures to promote healthy plants and minimize injury. The latter is important because injured tissues are more susceptible to *S. sclerotiorum*. Fertility should be kept at around 100 ppm (N); excessive levels of N can lead to a lush, dense canopy that will take longer to dry and will be more susceptible to attack by the collar rot pathogen. Plant debris should not be allowed to build up in transplant trays or remain in contact with seedlings. Clip seedlings at a low blade speed with a well-sharpened, high-vacuum mower to ensure complete removal of leaf pieces in the least injurious way possible. Frequent clippings will reduce the amount of tissue that must be removed by the mower and will cause less plant injury and lead to less leaf material left on the transplants. Clippings and diseased plants should be discarded a minimum of 100 yards from the transplant facility, or buried. Home gardens should not be planted near transplant facilities, and keep a weed-free zone around float beds. Over 300 species of plants, including many weeds, are hosts to *S. sclerotiorum*, making many weeds potential hosts for this pathogen.

DIAGNOSTIC LAB HIGHLIGHTS

By Julie Beale and Paul Bachi

The first case this year of Sclerotinia collar rot on tobacco transplants was diagnosed. See Dr. Seebold's article in this issue of Kentucky Pest News for information on this disease and its management. We have also seen Botrytis blight on petunia and tomato transplants.

In the landscape, more cases of Rhizosphaera needle cast have been seen on spruce. Landscape evergreens such as holly, boxwood and magnolia are showing symptoms of winter drying.

INSECT TRAP COUNT
April 3-10

By Patricia Lucas

Graphs of insect trap counts for the 2008 season are available on the IPM web site at -

Location	Princeton, KY	Lexington, KY
Black cutworm	12	4
Armyworm	239	68
Corn earworm	0	0
European corn borer	0	0
Southwestern corn borer	0	0
Fall armyworm	0	0

http://www.uky.edu/Ag/IPM/ipm.htm.
View trap counts for Fulton County, Kentucky at - http://ces2.ca.uky.edu/fulton/InsectTraps
For information on trap counts in southern Illinois visit the Hines Report at – http://www.ipm.uiuc.edu/pubs/hines_report/index.html

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