

College of Food, Agricultural, and Environmental Sciences, Department of Plant Pathology

Orange Rust of Brambles

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In the northeastern quarter of the United States, including Ohio, orange rust of brambles (**Figure 1**) is caused by the fungus *Arthuriomyces peckianus*. Orange rust is the most important of several rust diseases that attack brambles. All varieties of black and purple raspberries, and most varieties of erect blackberries and trailing blackberries are very susceptible. Orange rust does not infect red raspberries.



Figure 1. Early season orange rust symptoms on a black raspberry florican.

Symptoms

Orange rust can be easily identified shortly after new growth appears in the spring (**Figure 2A**). Newly formed shoots are weak and spindly and the canes are stunted.

As the disease develops, the edges and lower surface of infected leaves (**Figure 2B**) are covered with blister-like pustules that are waxy (**Figure 2B-insert**) at first but soon turn powdery and bright orange (**Figure 2C**). This bright orange, rusty appearance is what gives the disease its name. Rusted leaves wither and drop in late spring or early summer. Later in the season, the tips of infected young canes appear to have outgrown the fungus and may appear normal. At this point, infected plants are often difficult to identify. In reality, the plants are systemically infected, and in the following years, infected canes will be bushy and spindly, and will bear little or no fruit. However, the orange rust fungus does not normally kill the plant.

Disease Development

Diseases development of orange rust is complex, however there are two periods of infection (spring and fall) that are important to successful disease development.

Spring infections are favored by cool (43 to 72 degrees F) and persistently wet conditions. On plants previously infected with orange rust, waxy pustules full of brightly colored orange spores (aeciospores) form on newly emerging leaves. In new plantings orange rust can come in on infected canes or from spores blown by the wind from nearby brambles—either other fields or wild brambles. In the early summer, the pustules break open and release thousands of mature spores that cause new leaf infections. The fungus penetrates the leaves and grows internally through the canes, crowns, and roots. However, newly infected plants seldom show symptoms until the following spring. Diseased plants will not recover and unless destroyed, the plants will serve as a source of inoculum (spores), causing disease in surrounding healthy plants.



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Figure 2. A) Orange rust symptoms on thornless blackberry. *Image courtesy of Erik Draper, OSU Extension, Geauga County.* B) Waxy pustules full of brightly colored orange spores (aeciospores) on leaves of thornless blackberry. C) Orange rust spores on the underside of a wild black raspberry leaf. Note the powder-like appearance.

Fall infections begin to occur about 21-40 days after spring infections. The fungus produces a second spore type (basidiospores) that can infect buds of tip rooted canes or buds or the crown of new shoots being formed on healthy plants.

Orange Rust Management

Variety selection

The best way to control orange rust is to plant resistant varieties. **Red raspberries are all resistant.** If you have persistent orange rust problems, red raspberries are a good option. **All purple and black raspberries are susceptible to orange rust.** The level of resistance in blackberries appears to be dependent on the region. For example, 'Triple Crown' is reported as resistant in Kentucky and other southern states but is susceptible in Ohio and other northeastern states. **Table 1** provides a list of susceptible and resistant blackberry varieties.

Cultural practices

Purchase planting material from a reputable source and do not purchase plants with symptoms or signs of the fungus. For new plantings select a sunny location and avoid planting near woodlots or river banks as wild brambles serve as a reservoir for the disease. In the spring, immediately after the last frost, carefully scout for and dig out (including roots) orange rust-infected plants in the field. Plants should be removed and destroyed before pustules form, break open, and discharge the orange masses of spores.

If plants are not removed, these spores will spread the disease to healthy plants. Maintain good air circulation in the planting by pruning out and destroying old fruited canes immediately after harvest, thinning out healthy canes within the row, and keeping the planting free of weeds.

Table 1. Orange rust resistance in blackberry varieties commonly grown in Ohio.

Resistant	Choctaw, Commanche, Cherokee, Cheyenne
Susceptible	Navaho, Ouachita, Chickasaw, Chester, Triple Crown, Darrow, Humble

Chemical control

For commercial plantings, chemical control can compliment plant removal. After removing orange rust infected plants in the spring, fungicides can be applied to prevent any remaining spores from infecting new plants. In fields with a history of orange rust, a fungicide spray program that coincides with the spring and fall infection periods is recommended.

Spring protection: Apply fungicides before blisters appear. Spray the leaves and base of the cane.

Fall protection: If rust was observed in the spring apply fungicides towards the base of the floricanes and primocane to protect developing buds (**Figure 3**). For floricanes varieties also spray the primocane shoots, to protect the buds on next year's floricanes.

For home fruit plantings, fungicide sprays are generally not considered an effective control method for orange rust. Backyard growers can consult the *Controlling Diseases and Insects in Home Fruit Plantings* (Bulletin 780) and commercial growers can consult the *Midwest Fruit Pest Management Guide* (Bulletin 506) for current fungicide recommendations. Both guides can be obtained from your county extension office or the CFAES Publications online bookstore at estore.osu-extension.org.

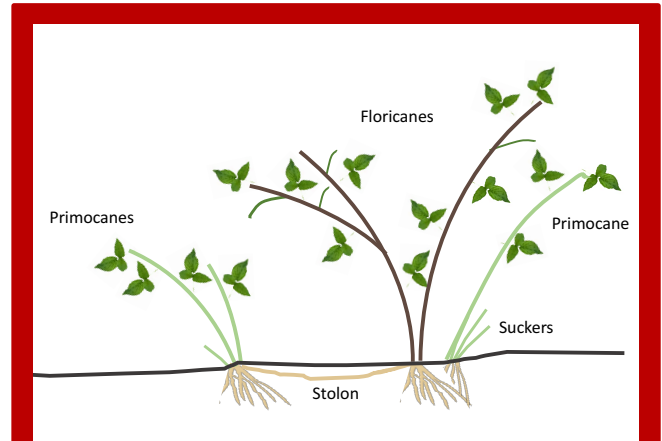


Figure 3. Primocanes are first year growth that are green and fleshy. Floricanes are second year growth and are woody and brown.

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