Virginia Cooperative Extension

Plant Disease Fact Sheets

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Rose Rosette Disease

Chuan Hong, Mary Ann Hansen, and Susan DeBolt*

Rose rosette disease (RRD), a disease believed to be caused by a virus, has been spreading through much of the wild rose population of the midwestern, southern and eastern United States for years, and has now been confirmed in cultivated roses in Virginia. This disease is of great concern to the nursery industry and to many home gardeners because it is known to be lethal to the wild multiflora rose (*Rosa multiflora*) and it is potentially lethal to many ornamental rose species and cultivars.

Symptoms

Symptoms of rose rosette disease are highly variable, depending on the species or cultivar of rose affected. This variability can complicate diagnosis. Some of the more recognizable symptoms include rapid elongation of new shoots (*Fig. 1*), followed by development of witches' brooms or clustering of small branches (*Fig. 2*). Leaves in the witches' broom are small, distorted, and may have a conspicuous red pigmentation (*Fig. 3*), although red pigmentation is not a consistent symptom. Canes on some species or cultivars develop excessive growth of unusually soft and pliable red or green thorns, which may stiffen later (*Fig. 4*). When this symptom is present, it is diagnostic for rose rosette disease. Symptomatic canes may also be noticeably thicker than the parent cane from which they emerged or they may grow in a spiral pattern. Flowers may be distorted with fewer petals than normal (*Fig. 5*), and flower color may be abnormal. For example, flowers that are normally a solid color may be mottled. Buds may abort, be deformed, or be converted to leaf-like tissue. Infected rose plants often die within one to two years.

When all of the above symptoms are present, diagnosis is relatively straightforward. However, a diseased plant may exhibit few of these symptoms, especially in the early stages of the disease. By the time symptoms

Fig. 1. Rapid elongation of shoot with excessive thorniness. (Photo by S. Debolt)

Fig. 2. Witches' broom. (Photo by M. A. Hansen)

Fig. 3. Red pigmentation of stunted leaves. (Photo by M. A. Hansen)

*Extension Plant Pathologist, Hampton Roads AREC; Extension Plant Pathologist, Department of Plant Pathology, Physiology, and Weed Science, Virginia Tech; and Extension Agent of Environmental Horticulture, Virginia Tech, respectively

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Fig. 4. Excessive thorniness on thickened stem.
(Photo by S. Debolt)

Fig. 5. Deformed flowers.
(Photo by S. Debolt)

Fig. 6. Symptoms of glyphosate injury to new growth in spring.
(Photo by M. A. Hansen)

are severe and recognizable, the disease is likely to have already spread to neighboring plants.

Some symptoms, such as leaf coloration, may be subtle. Although some diseased plants develop very obvious red pigmentation, others exhibit a less striking reddish pink color on leaf undersides or along the margins of otherwise green leaves. Since the new leaves of many rose cultivars normally have reddish pigments, it may be difficult to determine whether the reddish color is abnormal or not. Therefore, it is important to continue to monitor symptoms on suspect roses. On RRD-infected plants, the reddish color does not go away, whereas on healthy plants, the reddish color usually disappears as the leaf matures. Witches' brooms on some diseased plants may be an unusual color of green that can be mistaken for symptoms of a nutrient deficiency. However, nutrient deficiency should affect the whole plant. If these symptoms appear only on parts of the plant, they are probably not due to nutrient deficiency, and RRD is more likely.

The witches' broom symptom itself is not necessarily diagnostic for rose rosette disease. This symptom can also occur in response to certain types of herbicide injury. For example, if glyphosate, the active ingredient of the herbicide Roundup, contacts green tissue of rose plants in the fall, it is translocated to the buds, and symptoms do not become evident until those buds emerge the following spring. Witches' brooms with yellow, narrow leaves on clusters of shoots are typical of glyphosate injury (*Fig. 6*). The commonly used broadleaf herbicide 2,4-D can also cause leaf distortion on roses. Unless plants are injured again, symptoms of herbicide injury should disappear by the following year.

Other symptoms of RRD that may be expressed include blackening and death of the canes on some cultivars, short internodal distances, blind shoots (shoots that do not produce a flower) that remain blind, and greater sensitivity of reddish purple tissue to frost. Leaves of diseased plants may have a roughened, "pebbly" texture. Plants with RRD also have increased susceptibility to the fungal disease, powdery mildew. This is especially evident when nearby roses known to be highly susceptible to powdery mildew do not develop signs of this disease.

History of Rose Rosette Disease

Symptoms that were undoubtedly due to rose rosette disease were described in the United States as early as 1941. Spread of the disease in the United States was intimately tied to the history of the multiflora

rose, an exotic plant that was introduced from Japan in 1866 as a rootstock for ornamental roses. During the 1930's through 1960's, planting multiflora rose was recommended for erosion control, as a bird sanctuary and food source, as a living fence for cattle, for strip mine reclamation, and as a crash barrier on highways. This recommendation ultimately backfired. Multiflora rose can produce a million or more seeds per plant and can propagate itself vegetatively as well. It quickly spread and is now declared a noxious weed in several states.

Multiflora rose is highly susceptible to rose rosette disease, so much so that the disease was initially considered a potential biological control for multiflora rose. Even now, some people suggest introducing infected plants into areas with multiflora rose to control this weed. Most rose growers, however, are very wary of this recommendation because rose rosette disease can spread quickly from multiflora rose to cultivated roses.

Disease Cycle

Rose rosette disease is caused by a virus or virus-like pathogen yet to be characterized. Because the exact causal agent has not yet been identified, there is currently no laboratory test for confirming rose rosette disease. The disease is diagnosed based on a preponderance of characteristic symptoms or by grafting suspect plant material onto known healthy roses and demonstrating transmission of symptoms after a period of weeks to months.

The disease is known to be transmitted by the eriophyid mite *Phyllocoptes fructiphylus* or by grafting. The wild multiflora rose (*Rosa multiflora*) is very susceptible to the disease and is a common source of inoculum. Cultivated roses planted downwind of infected multiflora rose are especially at risk because the mite vector travels on wind currents from infected to healthy plants. Some growers have observed symptoms on previously healthy plants within four weeks of being planted downwind from diseased multiflora rose.

The causal agent of rose rosette disease is not soilborne, so it is possible to successfully plant healthy roses in beds where diseased plants have been removed; however, the pathogen may persist in old root pieces that remain in the soil from previous diseased roses. If plants regrow from these old root pieces, as multiflora rose is apt to do, they can serve as an inoculum source for healthy plants. Therefore, it is important to remove old plants thoroughly and ensure that infected plants are not allowed to regrow from old, infected root pieces.

Control

No effective control is available for rose rosette in existing, diseased rose plants, but the disease may be prevented from spreading to healthy plants by using a combination of the following approaches.

Resistance

R. multiflora is the species that appears to be most susceptible to rose rosette disease. However, many species and selections of cultivated roses are also highly susceptible, and no cultivars have been proven to be resistant. Although the native species *Rosa setigera* is reported to be resistant to the disease, one grower has reported increased susceptibility to powdery mildew on plants of *R. setigera*, which could indicate some level of infection by the RRD pathogen. A species called the McCartney rose, which exists as a weed in Texas, is susceptible to RRD but resistant to feeding by the mites that transmit the disease. It may be possible, through breeding techniques, to incorporate this mite resistance into cultivated roses in the future. In the meantime, it would be wise to assume that all cultivated roses are potentially susceptible to the disease and to be on the lookout for symptoms of rose rosette.

Cultural Control

Early detection of the disease is the key to effective cultural control. Any suspect roses should be removed and destroyed immediately or monitored for continued symptoms and removed as soon as presence of RRD is ascertained. In some areas burning is permitted and can be used to destroy diseased plants. If burning is not allowed in your area, plants should be bagged and removed. Diseased plants that have been uprooted should not be allowed to remain in the vicinity of healthy roses as they can continue to serve as a source of inoculum.

If possible, *R. multiflora* plants, which frequently serve as the source of inoculum, should be eliminated from the immediate vicinity (100-meter radius) of rose nurseries and gardens. Locations where individual multiflora rose plants have been removed should be monitored for regrowth and any regrowth should be removed and destroyed. Multiflora rose over larger areas is, however, difficult to control and complete removal may not be practical. To prevent infection of new transplants, avoid planting cultivated roses on hilltops or downwind of known multiflora rose plantings where the cultivated rose transplants are more susceptible to invasion by the mites. Space plants so that canes and leaves do not touch each other. Eriophyid mites do not have wings and must crawl from plant to

plant. Proper spacing makes it more difficult for the mites to move within a planting.

Chemical Control

Although there is no compound that will control the causal agent of rose rosette directly, effective control of mites with certain miticides can reduce the risk of spread. Be aware that miticides registered for control of spider mites do not control the eriophyid mites that transmit rose rosette disease. Some researchers have obtained reasonable control with Sevin; however, mites are very small and it can be difficult to get complete coverage. Also, use of Sevin to control eriophyid mites can lead to outbreaks of spider mites. The insecticide, Avid, is registered for control of both eriophyid and spider mites on roses.

Use of miticides in the absence of cultural controls is not recommended. One way to use a miticide as an additional tool in a control program is to focus sprays on plants that surround spots where diseased plants have been removed. These are the most likely plants to which mites from within a planting would have moved. Spraying every two weeks from April until September should significantly reduce the mite population and the risk of transmission. Additional sprays may be needed during hot, dry weather when eriophyid mites are most active.

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