

Rose Rosette Disease

Andrew L. Loyd, PhD, Plant Pathologist

Rose rosette is a highly destructive and lethal viral disease affecting all roses. Rose rosette disease (RRD), first observed and described in 1941 in the western United States, has spread across the country. The disease range expansion over the last 70-80 years is, in part, due to the planting and spread of the invasive multiflora rose (*Rosa multiflora*). Once mistakenly attributed to a phytoplasma, RRD is now known to be caused by a virus in the genus *Emaravirus* that is transmitted by the eriophyid mite *Phyllocoptes fructiphilus* [1].

Symptoms

Typical symptoms of RRD include reddening of the foliage, long, slender leaves, flattening of the stem, witches' brooms, proliferation of thorns, and progressive dieback. While reddening of the foliage may be observed in numerous cultivars of roses in new growth or fall color, with RRD, the reddening symptom can be seen throughout the growing season (Figure 1). Slender leaves may be observed in some cultivars of infected roses. Flattening of stems (Figure 1) occurs prior to the proliferation of growth from a single growing point, referred to as a witches' broom (Figure 2). Witches' brooms may consist of leaves, stems and flowers, and persist for extended periods of time. In some rose cultivars, an abundance of thorns is

Figure 1: Multiflora rose with RRD showing red, slender, strappy foliage and flattened stems (arrows)



Figure 2: Knockout rose displaying a typical witches' broom symptom of RRD



produced in response to the infection (Figure 3). Some of the symptoms of RRD, such as proliferation of thorns, may be confused with herbicide damage caused by glyphosate, so accurate diagnosis should be made before intervening. Infected plants are more susceptible to winter injury and produce less starch to overwinter, resulting in reduced growth and vigor in the spring [2]. Once infected with the rose rosette virus (RRV), the plants begin to decline, and may die within 3-4 years.

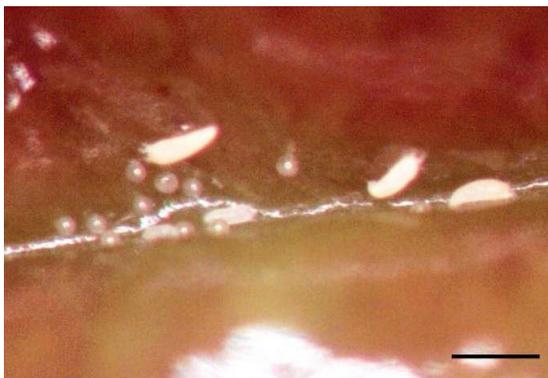
Figure 3: Rose with RRD showing a proliferation of thorns



Life Cycle

RRV is a RNA virus that is transmitted by the microscopic, wind-blown eriophyid mite *Phyllocoptes fructiphilus* (Figure 4). This mite is the only known vector of RRV. While it does not have wings, the mite can travel in the wind to a healthy rose through a process called ballooning [3]. These mites feed on sheltered places near petioles, flower buds, and in leaf folds. Once they feed on a rose infected with RRV they can balloon to a healthy plant, feed on it, and transmit RRV. Root grafts between healthy and infected roses is another means of transmission over shorter distances. Infected plants may remain asymptomatic for a period of time before expressing symptoms, and this period can vary depending on environment and species/cultivar of rose.

Figure 4: Microscopic photo showing *Phyllocoptes fructiphilus* adults and eggs on a rose leaf. Scale bar is 200 μ m



Management

There is no cure for RRD, and diseased plants should be removed immediately. Knockout® roses, known for tolerance of many devastating diseases, are also susceptible to RRD. Invasive multiflora rose on adjacent, wooded areas should be eradicated with herbicide to reduce the RRV inoculum and eriophyid mite population. Barrier plantings, such as large hedges or tall ornamental grasses between beds with roses, may reduce movement of infected mites to healthy rose plants [2]. Routine, preventive applications of products that are effective against eriophyid mites may help with managing the vector. These are not 100% effective because an individual infected mite could feed and spread the virus before dying from the treatment. The best management strategy is to plant disease-free plants and vigilantly remove infected plants, including the roots, as soon as symptoms appear or disease is confirmed. Breeding programs are underway to help develop resistant/tolerant rose selections. Contact your Bartlett Arborist Representative if you suspect RRD to develop a management strategy for your landscape.



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References

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