DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

Agriculture and Natural Resources

FSA7579

Rose Rosette Disease

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Introduction

Rose rosette disease (RRD) has long plagued nurseries and rose enthusiasts. RRD was first reported in North America in the 1940s, causing witches'-broom on roses (Figure 1). However, it was not until 2011 that researchers at the University of Arkansas found the causal agent, which was rose rosette virus (RRV), a virus only found in roses with typical RRD symptoms.

Figure 1. Witches'-broom symptoms on rose infected with RRV.

Life Cycle

RRV, like all viruses, requires a living host to survive. Virus movement from infected plants to new rose hosts requires the eriophyid mite, *Phyllocoptes fructiphilus*, as a vector (Figure 2). Mites acquire the virus while feeding and transmit RRV when they move to a new feeding source. The virus is also transmitted through grafting.

Symptoms

Symptoms of RRD depend on environmental conditions but generally appear 1-6 months after RRV-infected mites have transmitted the virus to healthy roses. Mosaic and mottling of leaves are the earliest symptoms of infection (Figure 3), but these symptoms are not solely attributed to RRV as they can also be induced by other viruses infecting rose. Later in infection, newly emerging shoots have an overabundance of thorns, are dark red and tend to bunch together in a so-called witches'-broom. Witches'-broom and excess thorniness are additional symptoms characteristic of RRD (Figure 4). Flowers are malformed, and infected roses lose their aesthetic appeal and experience an overall decline in vigor that leads to plant death.

Although RRD symptoms are very characteristic, the only way to positively diagnose the disease is to send samples to the Arkansas Plant Health Clinic for a virus assay. See

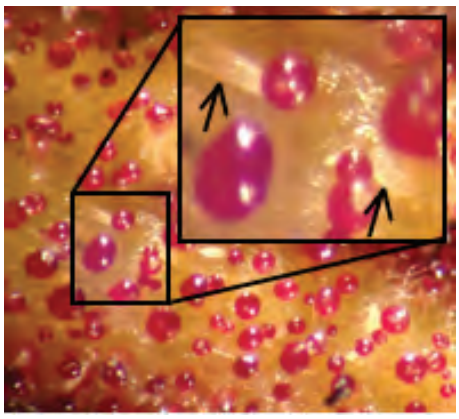

Figure 2. *P. fructiphilus* feeding on rose.

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Figure 3. Mosaic and mottling pattern in an early infection with RRV.

Figure 4. Excessive thorniness and reddening of shoots in a RRV infection.

Extension fact sheet *FSA 6114, Submitting Plant Samples for Disease Diagnosis*, at www.uaex.uada.edu for details on sample submission procedures. If you live outside of Arkansas, contact the Clinic directly at ssmith@uaex.edu to obtain the proper out-of-state permits for submitting samples.

Management

There are three general strategies for virus control: (1) start with good-quality material, (2) remove virus-infected plants from the vicinity and (3) vector control.

To mitigate the impact of RRV, it is important to purchase roses from nurseries with a history of selling high-quality plants prior to introduction into a rose garden as well as material used for propagation, including both scion and rootstocks. Remember, a rose plant may appear symptomless at the time of purchase, but it may already be infected with RRV. Introducing even one infected rose into a landscape or garden provides a source of inoculum for mites to spread the virus throughout the area to healthy roses.

Infected plants provide a source of the virus for the eriophyid mite, so roses that test positive for RRV must be completely removed to slow down the spread of the virus. This includes cultivated roses, wild roses nearby and the roots of infected roses that may remain in a site and push up new shoots later on.

The eriophyid mite, *Phyllocoptes fructiphilius*, is currently the only recognized natural vector of the virus, so by controlling this mite, the spread of RRD can be slowed. The mite can be eliminated with miticides, both organic and non-organic. For non-organic mite control, check the pesticide label for one of the following active ingredients: abamectin, bifenthrin, carbaryl, deltamethrin, imidacloprid, malathion or permethrin. Mites may also be managed using pyrethrum, which may be desirable for organic systems.

Further Reading

Amrine, J. 2002. Multiflora rose. In Biological Control of Invasive Plants in the Eastern United States, pp. 265-292. Edited by Van Driesche, et al. USA: USDA Forest Service.

Laney, A. G., K. E. Keller, R. R. Martin and I. E. Tzanetakis. 2011. A Discovery 70 Years in the Making: Characterization of the Rose Rosette Virus. Journal of General Virology 92: 1727-1732.

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FSA7579-PD-6-2014N