GROWERTALKS

Features

3/31/2016

War on the Roses

Helen Margaret Griffiths

The rose (genus *Rosa*) is one of the most-loved flowers in the world for cut flowers, home gardens and public gardens. In North America, rose production is a $400 million annual business and, therefore, it's no surprise that when a deadly disease like rose rosette disease (RRD) strikes there's much alarm.

Even though the disease has been known since the 1940s, it wasn't until 2011 that researchers in Arkansas identified the causal agent—a negative-sense RNA virus and a new member of the genus Emaravirus.

According to Jennifer Olson, assistant extension specialist at the plant disease and insect diagnostic laboratory at Oklahoma State University, RRD is now considered to be established throughout much of the country. It has, however, caused different degrees of devastation to roses in different parts of the country. Mark Windham from the University of Tennessee said that there were widespread losses of roses due to RRD in Arkansas, North Carolina, Oklahoma, South Carolina and Tennessee.

Over the last 10 years in Tennessee, Mark's conservative estimate for loss of roses to RRD is in the tens of thousands; at one location there was a loss of more than 2,000 roses to RRD. However, in Georgia, Alabama and Mississippi, where there have been some significant outbreaks of RRD, there are also large portions of those states where there have been no or very few reports of RRD. Louisiana in 2015 reported some limited outbreaks of the disease, as did Florida a few years earlier; in both states. the outbreaks were found to be due to infected material being brought in from out of state.

The virus, plant and the mite

This is a disease complex and there are three components to the disease: rose rosette virus (RRV), the large expanse of naturalized Rosa multiflora and the airborne eriophyid mite (*Phyllocoptes fructiphilus*).

RRV is specific to Rosa species and multiflora rose plays an important part in the epidemic because it's highly susceptible and is present in much of the Central and Eastern U.S. It's therefore a major reservoir of RRV and vector, although commercially grown cultivars are also involved as currently there are no known commercial cultivars with identified resistance. Significant progress is being made to change this situation and David Byrne, Texas A & M, is optimistic that they'll find a few commercial roses that have some resistance. David is the leader of a $3.3 million USDA research grant—"Combating Rose Rosette: Short Term and Long Term Approaches." The 26-member research group includes plant breeders and geneticists,

molecular geneticists, an entomologist, agricultural economists, marketing experts and extension personnel. The researchers are from state, federal and private organizations from multiple states.

Breeding roses for resistance to RRD is an integral part of the project. David along with Mark Windham, University of Tennessee, and Tom Evans, University of Delaware, and their research teams working with six private rose breeders have so far identified over 200 rose genotypes to test and will be adding an additional 100 cultivars this year. David emphasized that this is a grower- and industry-driven project that developed from a Rose Rosette Conference organized by Star Roses & Plants and the Garden Rose Council in April of 2013. David said that they receive quite a bit of support with donations of plants, chemicals, publication space, time, materials and meeting sponsorship for the project from the rose industry.

Nurseries need to be sure that they're starting with plant material that's been tested for RRV. They can have this assurance by obtaining plants or propagation material through the Foundation Plant Services in Davis, California, which has a large collection of roses certified as virus tested. This collection will be expanding to include common old roses.

Choice should soon be increased, as in April 2015 members of the rose industry, academia and State government held an organizational meeting to establish the National Clean Plant Network for Roses as part of the National Clean Plant Network. This is a federal-industry effort with the goal to establish and maintain a certified clean rose
collection.

The virus can be transmitted through grafts and by plant propagation, but the eriophyid mite is thought to be the main vector for RRV. The biology of the eriophyid mite is complex and work is underway to try to understand more about virus uptake and transmission by the mite. Results from many surveys and studies conducted by Jim Amrine, emeritus professor from West Virginia University, have provided much of the current information on the mite. Mites are not insects, but are related to ticks—though unlike ticks cannot be seen by the naked eye, as they're only 140 to 170 microns. They feed on tender plant tissue and overwinter on the rose and have a very short life cycle (eight days), which means that mite populations can become high very quickly.

When roses are infected by viruliferous mites, symptoms of RRD may occur as soon as 30 days after infection. As the mite is wingless, air currents play a major role in its movement. It's thought that aided by air currents, mites can move up to 100 meters per year. In addition to wind, humans—whether it be on clothing or garden tools—can also be responsible for mite movement. This means that good sanitation protocols are a very important part of RRD management practices. Using leaf blowers around roses is another way to assist mite movement and should therefore be avoided.

Producers and homeowners are both anxious to have an effective miticide, something that Mark Windham is working on as part of the USDA project. Mark's research is progressing well and he's identified some products that look very promising for the producer, but they don't have labels for homeowner use, so that need still has to be filled.

Who needs to be on the look out for RRD?

Even though in urban areas the prevalence of multiflora rose may be low, with the introduction of “disease-resistant” roses—such as the Knock Out Series (not resistant to RRV)—the number of cultivated roses planted by homeowners during the last 10 to 15 years has been significant. This means that even in these urban areas there’s now abundant host material for mites that may be infected and hence greater likelihood for RRV spread.

As the disease is thought to be indigenous to the U.S., APHIS is unlikely to use quarantine measures. It’s therefore imperative that all growers of Rosa, whether they are home gardeners, public garden managers, nurseries or landscapers, be aware of RRD and be willing to remove infected plants and thus assist in eradicating the disease. When RRD is found in specific areas, it’s important that there’s cooperation within the community to eradicate it. Only with this approach is there going to be success in slowing and reducing spread of this disease that’s so deadly to roses.

The majority of the cut flower rose production is currently outside the U.S. and to date the disease hasn’t been detected. These producers are anxious to keep it out and Jennifer said that some have contacted her about testing protocols for RRV. Greenhouse rose producers have not as yet reported having RRV.

There have been no reports of RRD in any roses growing in any location outside of North America.

What are the symptoms?

Symptoms observed with RRD can mimic other problems, such as damage from herbicides like glyphosate, which can result in proliferation of lateral shoots causing something often called a witch’s broom appearance. This is common with RRD (Figure 1).

The response to RRV can vary between cultivars. It’s therefore important to know the characteristics of the healthy cultivar and thus to be able to identify unusual features. RRV-infected roses often have an unusual degree of thorniness (Figure 2) and the new growth is often elongated and bright pink/red (Figure 1). The stems are often thickened with buds and flowers are often distorted (Figure 3). Eventually, stunting of plant growth is observed, followed by defoliation and death of the plant (Figure 4). All of this usually occurs in just a few years.

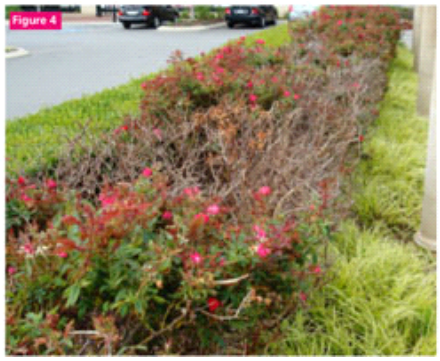
To obtain confirmation, you may consult with your local extension office or send a sample for diagnosis to a laboratory, such as the Plant Disease and Insect Diagnostic laboratory at Oklahoma State University, where a fee of $35 is charged per sample.



Figure 1. A rose bush with pink/red elongated stems and witch’s brooms from rose rosette virus.

Photo: Alan Windham
Figure 2. Rose showing excessive thorns, characteristic of rose rosette disease. Photo: Mark Windham
Figure 3. Thick and distorted stems due to rose rosette virus. Photo: Mark Windham
Figure 4. Roses with advanced stage of rose rosette disease. Photo: Alan Windham





What management approaches need to be taken?

”Even where RRD is rampant, it is still possible to grow good roses if you are vigilant,” said Mark. How can this be accomplished? It requires scouting and monitoring of roses for RRD symptoms on a weekly basis and removing the entire plant (including roots, as they may produce suckers) as soon as symptoms are seen. Preventing the spread of mites is critical and, hence, the plant should be bagged and discarded and not composted. Care should be taken to work at these sites so as not to spread mites on clothing and not to reuse tools before cleaning. As the mite is thought to only survive about eight hours without the host, scheduling work at sites with RRD for the end of the day is ideal.

Pruning is suggested by some as a way of managing RRD, but Mark says that they’ve had very mixed success with pruning and this year will conduct studies to address their inconsistent findings.

Observations in Oklahoma indicate that under their conditions heavy dormant pruning along with dormant oil and monthly summer oil applications can reduce the eriophyid mite populations.

Replanting of roses is acceptable, provided all parts of infected roses have been removed. As mites can crawl from plant to plant, it’s suggested that wider spacing be used. As Rosa is the only known host for RRV, the grower may wish to consider mixed-species plantings. If there are multiflora or roses that have become “wild” within 100 meters of the planting, they should, if possible, be removed.

As new findings come from the USDA studies, management may change to include miticides and the possibility of growing cultivars with resistance to RRV. The new rose cultivars are more likely to have resistance rather than immunity to RRV and as mites have a known history of fairly quickly becoming resistant to pesticides, even with these new tools available, using an integrated pest management approach will continue to be important; i.e., removing the inoculum source (RRD plants) and using good sanitary practices.

What information will be generated from the USDA project for growers?

Kevin Ong from Texas A & M is developing a Rose Rosette Monitoring network and an app. If growers find they have RRD and are in an area that the disease hasn’t previously been identified, or they have it on an unusual rose cultivar, Kevin would be interested in hearing. He can be contacted at the Texas A & M diagnostic laboratory at plantclinic@ag.tamu.edu.

Kevin and Jennifer are working on diagnostic tools to allow disease detection to occur prior to symptom occurrence. They'll evaluate a number of different types of tests over the next few seasons to identify the ones that will be the most feasible for use in the field. The factors they'll be considering in their choice include accuracy, ease of use, cost effectiveness and the amount of training or equipment required. **GT**

> Several of the participants of the USDA project will be making presentations during the year ahead at grower-specific meetings. Jennifer Olson will be making a number of YouTube presentations on various aspects of RRD, including diagnosis and manage-ment. Some will be more for growers and others for homeowners. They'll be available for viewing this summer. Links for the YouTube videos will be posted on the Combatting Rose Rosette Facebook page at www.facebook.com/CombatingRoseRosette.

Additional information on this disease is available at a number of websites, including AmericanHort (http://americanhort.theknowledgecenter.com) and updates related to the USDA project are often available on the Facebook page from the Texas A & M rose breeding project (www.facebook.com/tamuroses). Photographs that may be helpful in assisting with disease diagnosis are available at www.forestryimages.org/browse/subthumb.cfm?sub=4248.

Helen Margaret Griffiths is a freelance writer in the Finger Lakes area of Central New York.