

Rose Rosette Disease

By: Dr. Raymond A. Cloyd

Rose rosette disease is a well-known infection of roses, including cultivated, native, and introduced wild rose species. The disease was first discovered in North America (e.g., Manitoba, Canada; Wyoming; California; and Nebraska) in 1941 and is now prevalent throughout most of the Midwest. Roses appear to be the only plant type susceptible to this disease. Although multiflora rose (*Rosa multiflora*) is extremely susceptible to rose rosette, different rose types may also be infected including climbers, hybrid teas, floribundas, miniatures, and antique or “old-fashioned” roses. The causal agent associated with rose rosette was initially considered a virus-like organism or double-stranded ribonucleic acid (RNA); however, it has now been determined to be an aster yellows phytoplasma (an organism present in phloem tissue that cannot be grown on artificial media) in the apple proliferation group (16Sr1-B).

Symptoms

Rose rosette disease may cause the following symptoms:

- Rapid stem elongation
- Leaf distortion
- Leaf chlorosis with yellow mosaic patterns
- Leaf reddening
- Abnormal narrow leaflets or smaller leaves than normal
- Thickened stems
- Premature development of lateral buds
- Excessive production of thorns

Multiple stems may also be produced at the ends of branches resulting in a ‘witches’-broom appearance. In addition, lateral growth may be larger than the parent rose canes. Flower buds may abort and opened flowers may be deformed with fewer normal petals. Expression of symptoms varies depending on the rose type or cultivar, plant age, and/or stage of growth (e.g., phenology). Roses exhibiting symptoms of rose rosette may resemble plants that have been exposed to herbicides such as

glyphosate (Roundup) or 2, 4-D, or have a nutritional deficiency. Multiflora roses infected with rose rosette are extremely sensitive to damage by a late frost compared to non-infected plants, thus contributing to severe dieback. In addition, infected roses may be more susceptible to fungal diseases such as powdery mildew. Infected plants, depending on size, may die in 2 to 5 years. Symptoms of rose rosette, in general, are less severe on garden roses.

Causal Agent

Rose rosette is vectored or transmitted by the eriophyid mite, *Phyllocoptes fructiphilus*, which is native to North America. *Phyllocoptes fructiphilus* is robust, spindle-shaped, and yellow to brown in color, 140 to 170 microns in length, and approximately 50 microns in width. The mite has four legs, which differs from other mite species that typically have eight legs. Mites may be observed with the use of 10X hand-lens or high-powered (200X) microscope. The mites are typically located in the angles between leaf petioles and axillary buds. Adult mites overwinter on rose canes between partly opened buds and the angles between rose stems and petioles.

Phyllocoptes fructiphilus needs living, green tissue in order to survive. In early spring, the mites migrate onto developing shoots where females lay eggs. Females may live up to 30 days; laying one egg per day. Young mites develop within the leaf folds of new shoots or under leaf petioles. The mites may move from plant-to-plant via attaching to insects. They may also be dispersed via air currents (wind) from infested rose plants. Mites may start a new infection, by feeding on the succulent, rapidly growing tissues, after landing on an un-infected garden plant or multiflora rose. *Phyllocoptes fructiphilus* most often transmit rose rosette disease to plants from May through July. As such, most symptoms of infection appear in July and August. Mite populations are most abundant from June through July with the peak

occurring in September.

Symptoms on multiflora rose may appear up to 90 days or more after mites have inoculated plants. Adverse conditions such as drought and/or stress may influence transmission of the rose rosette disease to plants. The disease may be spread by infected pruners, so always thoroughly clean pruners with a disinfectant (e.g., Lysol) between pruning each rose plant. Rose rosette may also be spread or transmitted by grafting. In fact, graft transmission tests have shown that the disease may be present or reside in the roots of multiflora roses. Any remaining roots may produce infected shoots in 18 months or later, which can serve as a source of inoculum for non-infected roses.

Management

There is no cure for rose plants that exhibit symptoms of rose rosette disease. Infected or symptomatic plants must be dug-up, including the roots, and disposed of immediately. If possible, eliminate all multiflora rose plants from the vicinity. There are several insecticides/miticides that may be effective against *P. fructiphilus* including abamectin (Avid), bifenthrin (Talstar), carbaryl (Sevin), endosulfan (Thiodan), and/or petroleum-based horticultural oils, if coverage is complete and applications are performed frequently enough (every two weeks from April through September). However, efficacy may vary depending on the extent of the mite infestation. Furthermore, it is not really practical to try to suppress populations of the mite with insecticides/miticides. The most prudent solution in dealing with rose rosette disease is to completely destroy infected rose plants.

Dr. Raymond A. Cloyd is a Professor and Extension Specialist in Ornamental Entomology/Integrated Pest Management Department of Entomology at Kansas State University, 123 Waters Hall, Manhattan, KS 66506 Email: rcloyd@ksu.edu