



Figure 1. Symptoms of rose rosette disease include rapid stem elongation and leaf reddening.

Rose rosette disease is a well-known infection of roses, including cultivated, native, and introduced wild rose species. The disease was first discovered in 1941 in North America — Wyoming, California, Nebraska, and Manitoba, Canada — 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 also may 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, but may 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). However, it has been suggested that the causal agent is a negative-sense RNA virus, Emaravirus.

Symptoms

Plants infected with rose rosette disease may display the following symptoms:

- rapid stem elongation (Figure 1)
- leaf distortion
- leaf reddening (Figure 1)
- leaf chlorosis with yellow mosaic patterns
- abnormal narrow leaflets or smaller leaves than normal
- thickened stems
- premature lateral bud development
- excessive thorn production (Figure 2)

Multiple stems also may be produced at the ends of branches, resulting in a “witches’ broom” appearance (Figure 3). 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 that have a nutritional deficiency. Multiflora roses infected with rose rosette are extremely sensitive to damage by late frost compared to noninfected plants, which may contribute to severe dieback. In addition, infected roses may be more susceptible to fungal diseases such as powdery mildew.



Figure 2. Excessive thorniness.



Figure 3. Witches’ broom.

Infected plants, depending on size, may die in two to five years. In general, symptoms of rose rosette 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. It is 140 to 170 microns long and approximately 50 microns wide (Figure 4).

The mite has four legs, which differs from other mite species that typically have eight. Mites may be observed with the use of a 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.



Figure 4. Eriophyid mite.

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 by attaching to insects. They may also disperse via air currents (wind) from infested rose plants.

Mites may start a new infection by feeding on succulent, rapidly growing tissues after landing on an uninfected garden plant or multiflora rose. *Phyllocoptes fructiphilus*

most often transmits rose rosette disease to plants from May through July. Most infection symptoms 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 90 days or more after mites have inoculated plants. Adverse conditions such as drought or stress may influence transmission of the rose rosette disease to plants. The disease can be spread by infected pruners. To prevent contamination, thoroughly clean pruners with a disinfectant, such as Lysol, between each plant.

Rose rosette also can 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 noninfected 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. It is not 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.

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Figures 1, 2, and 3 courtesy Missouri Botanical Garden.

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