

Mini data sheet on *Rose rosette virus (Emaravirus)*

Rose rosette virus was added to the EPPO A1 List in 2018. A full datasheet will be prepared, in the meantime you can view here the data which was previously available from the EPPO Alert List (added to the EPPO Alert List in 2016 - deleted in 2018).

Why: Rose rosette is a disease transmitted by an eriophyid mite (*Phyllocoptes fructiphilus*, Acari: Eriophyidae) which has been observed in North America since the 1940s on wild and cultivated roses (*Rosa* spp.). During the last decades, rose rosette disease has become widespread in North-Central, South-Central and Southeastern USA and its incidence has grown exponentially in cultivated roses (e.g. in South-Central USA). The involvement of phytoplasmas or viruses had been suspected but the etiology of rose rosette remained a mystery for many years. However, in 2011, a virus called *Rose rosette virus (Emaravirus, RRV)* could be consistently identified in symptomatic plants. Considering the severity of damage caused by RRV and its current spread in the USA, the EPPO Secretariat considered that this virus should be added to the EPPO Alert List.

Where: symptoms of rose rosette disease were first observed in the 1940s in Canada (Manitoba) and the USA (California and Rocky mountains) on wild roses. It is hypothesized that the spread of this disease began with the introduction and use of the multiflora roses (*Rosa multiflora*) in North America. In the USA, *R. multiflora* was introduced from Japan in 1866 as a rootstock for ornamental roses and was planted for erosion control, cattle fences and as crash protection along highways. Since multiflora roses are highly susceptible to rose rosette, the disease was at some point considered as a potential biological control against the plant which is considered to be invasive in the USA. However, the rose rosette disease started to spread from multiflora roses to other cultivated roses, and significantly expanded its geographical range and incidence. It is supposed that the incidence of rose rosette has grown exponentially in cultivated roses in the Central-South USA because of large areas planted with shrub roses in residential and commercial landscapes.

EPPO region: Absent.

North America: Canada (Manitoba, Ontario), USA (Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Wisconsin, Wyoming)

The eriophyid vector, *P. fructiphilus*, is only known to occur in North America but data is generally lacking on its distribution.

On which plants: RRV has only been reported on *Rosa* spp. *R. multiflora* is particularly susceptible but infections in other cultivated rose types have been observed, including climbers, hybrid teas, floribundas, miniatures, antique or “old-fashioned” roses, knockouts and carpet roses. Observations made in gardens suggest that some rose species might be resistant to RRV (e.g. *R. acicularis*, *R. arkansana*, *R. blanda*, *R. carolina*, *R. palustris*, *R. setigera*, *R. spinosissima*) but this remains to be verified.

Damage: Symptoms caused by RRV may vary according to climatic conditions and type of roses but they can include the development of witches’ brooms, excessive thorn production, excessive lateral shoot growth, rapid stem elongation, thickened, succulent stems, leaf proliferation and malformation, mosaic, bright red pigmentation, deformed buds and flowers, and lack of winter hardiness. Infected plants lose their aesthetic value and gradually display a general decline leading to plant death. It is reported that infected plants usually die within 1 to 5 years. It is also noted that these symptoms may be confused with herbicide damage.

Pictures can be viewed on the Internet:

Disease symptoms: <http://www.invasive.org/browse/subthumb.cfm?sub=4248>

Phyllocoptes fructiphilus: http://entnemdept.ufl.edu/creatures/ORN/ph_fructiphilus.htm

Transmission: RRV is transmitted by *P. fructiphilus* which is a tiny eriophyid mite (140-170 microns in length and 43 microns wide) feeding on many rose species. It is hypothesized that it was originally feeding on native rose species of North America but has then been able to adapt to multiflora and cultivated roses. *P. fructiphilus* can be passively transported by wind, clothing and equipment, and can also crawl from infested plants to adjacent ones. It is also suggested that *P. fructiphilus* might be dispersed through phoresy (attaching itself to insects). *P. fructiphilus* is most prevalent in the apex of the rose shoots where it feeds and reproduces. Females overwinter under bark or on bud scales of living roses. Females move to newly developing shoots where they lay one egg a day for about 30 days. Eggs hatch within 3-4 days, and adulthood is reached within a week depending upon temperatures. Multiple generations occur each year until the autumn when females seek overwintering sites. RRV can also be transmitted by grafting, and possibly by mechanical means (e.g. on contaminated pruning tools).

Pathway: Plants for planting of roses from countries where RRV occurs.

Possible risks: roses are widely planted in the EPPO region and are a valuable nursery product. In the USA, RRV is considered to be a serious threat to rose cultivation, and funds are being allocated to conduct research on rose rosette disease. Once plants are infected by RRV, no curative treatment is available and it is recommended to destroy them (root systems included, as RRV infection is systemic). For the moment, no resistant types of roses have been identified. IPM strategies are being developed to contain the disease and usually include: use of healthy planting material, avoiding dense plantations, use of other plants as barriers within rose gardens (to limit wind dispersal of infectious mites), disinfection of pruning tools, systematic destruction of diseased plants and disposal of potentially infested plant material. Chemical treatments might help in reducing mite populations and limit disease spread, but no experimental results could be found in the literature. In addition, the risk of developing resistance to acaricides cannot be ignored. Considering the serious damage caused by RRV to roses, it is desirable to avoid its introduction into the EPPO region.

Sources

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