

Garden Bad Guys – Mosaic Virus

By Nanette Londeree

Those leaves with the striking green and yellow marbled pattern you spy on the branch of your neighbors apple tree dangling over your fence may look like a cool new designer cultivar, but don't be fooled. More than likely, it's the result of a mosaic virus.

Viruses cause many important plant diseases and are responsible for huge losses in crop production and quality in all parts of the world. There are over 2000 known viruses and about one-fourth cause disease in plants. These submicroscopic, non-cellular particles are among the smallest and simplest entities that can cause disease. They infect living cells and utilize the plant's cellular substances for growth consequently disrupting the normal functioning of the cell and, in most cases, producing visible symptoms. Unlike most infectious disease, mosaic virus is not always the result of infection by a single pathogen; there are many different viruses that give rise to what is called mosaic virus; in some cases there may be multiple viruses that form a complex that produce symptoms.



Mosaic viruses affect a wide range of edible crops – alfalfa, apples, beans, celery, corn, cucumbers, figs, peppers, spinach, tobacco and tomatoes are some of the more common ones. They can also infect ornamental plants like abutilon, delphinium, gladiola, marigold, petunia and one of the most notable, roses.

Symptoms of a mosaic viral infection vary with the type of plant, type of virus and environmental conditions. In California mosaic symptoms develop during cool weather in spring; generally no new symptoms appear after hot weather arrives. Puckered leaflets, mottling or mosaics expressed as variegated patterns of yellow and green on the leaf, fruit or flower, vein clearing or vein banding are common symptoms. Some infected plants lack any obvious symptoms, while others occasionally result in symptoms of ornamental value, such as 'breaking' of tulips or variegation of *Abutilon* and *Nandina*. Infection can reduce plant vigor and crop yields by as much as 25 – 50%.

Plants have robust cell walls that viruses cannot penetrate on their own so that most plant viruses are transmitted by insects feeding on plant sap. Aphids are notorious vectors of plant viruses. The spread of the disease by aphids is often very rapid and local as their ability to transmit a virus lasts for only a very short time (minutes to a few hours). In addition to vectors, viruses can be transmitted mechanically in sap that is spread by hand or grafting tools, in seed, pollen or vegetative parts of plants used for propagation through budding and grafting. The complex of pathogens that produce rose mosaic virus are not transmitted by these mechanisms; transmission of the disease to healthy roses is through grafting, budding or rooting cuttings from infected plants.

Once a plant becomes infected with virus, it usually remains throughout its life. There is no cure or treatment for virus-infected landscape plants and none is generally needed. In addition to proper cultural care to improve plant vigor and control of vector pests through physical or biological control methods, the most effective management option is to purchase plant material that is of high quality and certified virus-free or virus-resistant.

Back to that apple tree. Since all varieties of apple are susceptible to apple mosaic, that may be what you observed, especially if it was after a cool spring and the variety happened to be 'Jonathan', 'Golden Delicious', or 'Granny Smith.' While it shouldn't hurt the tree in the long run, the fruit yields are likely to be reduced.

Photo courtesy of UC IPM website