

"Virus" In Roses: What Is It?

-- **Jeri M. Jennings**

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"It's virused."

You hear that phrase in rose circles. Roses may be affected by any of several different sorts of "virus," but the terms, "virus," or "virused," usually refer to **Rose Mosaic Virus Disease**, an ailment that affects a huge proportion of the roses grown and sold in the United States.

Rose Mosaic Virus Disease does not kill a rose. It is said, however, to be cause lack of vigor, distorted blooms, scanty bloom production, or smaller blooms than are typical for their variety. It is thought that the disease causes stems that are thin and weak where they emerge from the bud union, reduces plant survival rates. Virus may impede a plant from establishing itself, after transplanting.

Dr. Malcolm Manners, of Florida Southern College, is an American Rose Society Consulting Rosarian and a recognized expert on Rose Mosaic Virus. **Dr. Manners has written:**

"Rose mosaic is a complex of several viruses which cause similar symptoms in rose plants. The most important of these in the United States is prunus necrotic ringspot virus, a common disease of stone fruit trees. . . "

Stone fruit trees? Yup. This virus isn't even a rose disease! Rose Mosaic Virus appears to have been unknown prior to the 1920's. Once established in roses, however, the disease spread rapidly among American rose nurseries. By 1970, something like 90% of the garden roses grown in the United States were infected with it. We know (have known for a long time) how the disease is transmitted and spread. The problem, however, has reached such vast proportions that an overall remedy seems a remote possibility.

While visible signs of the disease vary from one rose to another, the most recognizable symptom is odd yellowish markings on rose leaves - markings which generally resemble watermark patterns on silk taffeta cloth. Virus is affected by weather, and by growing conditions. You may observe symptoms during a cool spring, only to have them disappear, as the weather grows warmer. Symptoms of Rose Mosaic Virus appear more frequently on some plants, less frequently on others. A plant may appear to be healthy for years, show signs of the disease one spring, and never again demonstrate symptoms. Don't be lulled into thinking the disease is gone. It's not!

Virus may suddenly show itself in a plant that is some years old. The gardener may think the affected plant "caught" the virus from another rose in the garden, but ***THIS IS NOT TRUE!*** Years of study and experimentation have failed to show ANY evidence that one plant can

"catch" it from another in your garden. Researchers have actually TRIED to demonstrate transfer of the virus, using virus, using pruning tools or grafting knives. They have had no success, and the disease is considered to be "**non-contagious in the field.**" A rare exception MAY be the almost-mythical "**natural root graft.**" In theory, this COULD occur in a crowded garden, but I have heard of no confirmed cases where this has happened.

The only known means of transmission of Rose Mosaic Virus is through vegetative propagation: budding/grafting, or cloning through cuttings.

Perhaps you've been advised to buy "own-root" roses, in order to avoid virus? I hate to burst your bubble, but "own-root" doesn't mean "virus free." **Cuttings are only as free of virus as the plants from which they were snipped.**

- **Cuttings taken from infected plants produce infected plants.**
"Clean" budwood grafted onto infected root stock, produces infected plants. Infected budwood, on clean rootstock, produces an infected plant. Cuttings from an infected plant will be infected - no matter what portion of the plant they were taken from. The disease is systemic: The entire plant is infected, whether visible signs of the disease are present, or not. A virused plant remains virused forever.
- **Cuttings taken from virus-free plants produce virus-free plants.**
"Clean" budwood or cuttings produce virus-free plants, whether they are grown on their own roots, or budded onto "clean" rootstock. Such plants remain virus-free for their entire life span.

Where Did It COME From?

Though it occurs naturally in such stone fruits as plums, apples, cherries, and peaches, prunus necrotic ringspot virus was unknown in roses until the advent of '*Dr. Huey*' rootstock in the 1920's. We don't KNOW how the disease was introduced into roses, but we canguess. Sometime, somewhere in the early 1900's, a gardener possessed of more imagination than education probably attempted to graft stone fruit scionwood onto a rose. The idea was doomed to failure - **and worse.**

Inter-species grafts cannot succeed. A Plum or Apple scion, grafted to a rose bush, WILL DIE. The virus, however, proved equal to the interspecies leap. The scion used must have been virused, and it infected the host rose, making it the first victim of Rose Mosaic Virus.

The problem might have gone no further than that one plant, but . . . it, or cuttings from it, must subsequently, have been used as rootstock or as a source of budwood. Once that material reached the commercial world, American rose culture methods set the "virus monster" free.

In most of the world, rootstock plants (usually *R. multiflora*) are grown from seed. "Virus" cannot be spread through seed, so seedling rootstock plants are generally considered to be "clean."

In the United States, rootstock plants (usually '*Dr. Huey*,') are grown from cuttings. Virus IS spread through cuttings from a diseased plant. Here's how it happens:

Cuttings of '*Dr. Huey*' taken in autumn, are field-planted,. They grow up to become rootstock plants. The following spring, scion wood is budded onto them. When autumn comes again, the top of the rootstock plant is cut away, leaving only the scion, which grows into a new budded rose bush. The cut pieces of rootstock, saved and field-planted, become next year's rootstock - and so the cycle is repeated.

Imagine that you start a commercial rose nursery. You start out with a field of "clean" rootstock plants. You acquire scion stock from various sources. You don't know it, but ONE of those scion plants is virused. All rootstock plants budded with that scion wood will be infected with the virus. Cuttings from those rootstock plants become still more virused rootstock plants. Clean scionwood, budded to this rootstock, is in turn infected. Within just a few years, the disease spreads throughout your entire inventory of scion and rootstock plants. Simple economics make it almost impossible for you to halt the cycle of infection. You must grow and sell virused plants, or go out of business.

Seeking Virus-Free Roses . . .

In a recent issue of "*The American Rose*" magazine, it was suggested that the time has come for consumers to demand virus-free roses. Good idea - **but it ain't that easy**. Several nurseries have made and are making sincere efforts to "clean" their stock. Even so, no matter what claims may be made, the probable bottom line is that ***no American rose nursery in business today can honestly claim to be completely virus-free.***

In 1984, the Citrus Institute of Florida Southern College embarked upon a heat therapy program, designed to make virus-free roses available to the Floridians. Similar programs were initiated at Oregon State University, the University of California at Davis, and at Bear Creek Gardens (parent company of Jackson & Perkins Roses). The Southern Florida and Davis programs continue, but so far none of them appear to have significantly impacted the problem. Dr. Manners notes: ***"In recent years, virtually all new cultivars, including the All America Rose Selections (AARS) winners, have been infected with RM, when received by the Florida nurserymen."***

Heat-treating programs have produced a stockpile of "clean" plant material. A grower COULD purchase both "clean" scionwood AND rootstock (if available) OR have it "cleaned," remove all virused plants from the fields, and "start over." Heat Treating, however, is expensive. The cost, and the persistent tales of "relapsed" material, understandably hinder acceptance of the process.

There is also the undeniable fact that not all virused roses are bad roses. In my own garden, I can point to numerous bushes, CLEARLY virused, which grow like a house afire and bloom their fool heads off. I've seen old bushes, thirty years, forty years old, and older, which are healthy and productive despite age and virus. Still, some roses in our garden DO lack vigor, and in some cases I blame Rose Mosaic Virus. I'll accept virused plants where nothing else is available - but I'd really prefer "clean" ones, when and if they are available.

There are no easy answers, but new introductions, at the VERY least, could, and should, be kept and grown virus-free. Perhaps, one day, public demand will force more energetic attempts to eradicate virus. For the present, you can and should ASK.

Do NOT assume that roses imported from England or Europe are "clean." Virused roses have in fact come from those sources, and I have myself purchased virused roses from a grower who claims to offer only "clean," imported stock. ASK whether a rose has been certified virus-free by one of the two heat-treatment facilities in the U.S. That is the ONLY trustworthy basis for a claim of virus-free stock.

What About OLD Roses?

Since Rose Mosaic Virus was unknown prior to the 1920's, one might think "Old Roses" would be free of it, but - *"It ain't necessarily so"*

In the 1960's, and through the 80's, there were few sources for Old Roses. The largest Old Rose Nursery of the day budded their roses onto '**Dr. Huey**' rootstock. Scionwood collected from old plants probably started out clean, but the disease virused rootstock eventually infected their entire inventory. New sources have since emerged, but much of the scionwood used today can be traced directly back to that grower. Thus, many Old Roses now in commerce, whether budded or own-root, are virused. For some cultivars there is currently no known source of "clean" scionwood. There's, of course, hope that clean scionwood may yet be found for some of these. We grow a white Noisette rose, collected from an 1890 grave. We found our '**La Reine**' on Victorice Barbee's 1915 resting place. There's a good chance that these plants are clean (though, again, only testing would guarantee that).

Many old, clean plants have been lost over time. I suspect that more are lost every year, but many yet remain to be found, and Rose Rustlers are still on the hunt. Join in, if you have a sense of adventure . . . Look for plants still hidden in old gardens and cemeteries. If they're old enough, they may be virus-free, and they're waiting for you to find them.

- JMC

**"Only by testing a variety
can there be any basis to claim
that that cultivar is free of virus."**

**- Gregg Lowery,
2000-2001 Vintage Gardens
Availability List**

Fighting The Virus Monster:

Heat Treating: What Is It? How does It Work?

There is only one known way to remove virus from scionwood: HEAT.

Infected scionwood is budded or grafted to rootstock and grown to a 2-gallon size plant. In a controlled-environment chamber, the plant is held at a constant 100°F for twenty-one to thirty-five days. At the end of that period, "clean" axillary buds may be harvested. (The plant itself remains virused. That cannot be altered.)

Presumed-clean axillary buds are grafted to "clean" rootstock. A process called "indexing" is then used to weed out any remaining infected material.

"Indexing: What Is It?"

**There are three commonly-used methods of indexing:
"Mme. Butterfly," "Shirofugen," and ELISA.**

- **'Mme. Butterfly'** -- When first infected with virus, '*Mme. Butterfly*,' a 1918 Hybrid Tea, shows particularly brilliant and unmistakable symptoms. Heat-treated scionwood is budded to established, virus-free '*Mme. Butterfly*.' When the plant produces a new set of leaves, virus, if present should be unmistakable.
- **Shirofugen**: Scionwood to be tested is grafted to clean Shirofugen (Japanese Cherry). The graft dies. (Cherries and roses are not graft-compatible.) If the rose scionwood was clean, the graft area heals cleanly. If it was virused, the area around the graft bleeds a sticky sap, and dies.
- **ELISA - Enzyme-Linked Immunosorbent Assay** - This laboratory test uses rabbit antibodies to quickly detect and identify any virus present.

Though there are doubters, Plant material which has been HEAT TREATED and VIRUS-INDEXED, is generally presumed to be free of virus.

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