Understanding Plant Viruses in the Greenhouse

Viruses are very stripped-down pathogens: they are composed merely of **DNA or RNA with a protein coat**. They are so very tiny, one needs an electron microscope to see their shape.

Viruses that cause plant disease can be roundish, sausage-shaped, filament-like or rods. Once in a cell they take over structures and resources to make many more copies of themselves.

Viruses are easily **spread if we propagate a plant vegetatively**: a virus infected plant gives you virus-infected cuttings. Some viruses show **latency** at certain time of year or when the plant isn't suffering from any stress—viruses are present but they are not in high enough numbers for symptoms to show. Some viruses are spread through seed – the percentage varies.

Some (not all) viruses are **spread by handling** a plant. When you break off fine leaf hairs, plant sap gets onto your hands that can be brought to the next plants you handle. Usually this is no problem, but if the first plant happens to have Tobacco Mosaic Virus in it, e.g., the virus particles may be spread to the second plant without your knowledge. The ability to be spread by handling is a characteristic of the Tobamovirus group, which includes Tobacco Mosaic Virus (TMV), Tomato Mosaic Virus (ToMV) and Chili Pepper Mild Mottle Mosaic Virus (CPMMoV).

Many viruses have a **vector** (sort of like an entomological limousine service ☺) that can move it from plant to plant. Sometimes the virus lives inside the salivary glands of the insect and can be shared with the plants the insect feeds on for the rest of its life. In other cases, the insect can only spread the virus for a short time. Aphids are another common vector, especially outdoors.

The most common plant virus vector in the greenhouses is the Western flower thrips (WFT), which carries Tomato Spotted Wilt Virus (TSWV) and Impatiens Necrotic Spot Virus (INSV). If the thrips population gets out of hand and there is a plant in the greenhouse with TSWV or INSV, an epidemic of the virus disease can build up very quickly. Only the young WFT larvae can pick up the virus as they feed on an infected plant, and only the resulting adults can fly around the greenhouse to spread the virus to other plants as they feed. Fun fact: plants that have a lot of virus inside them are actually more attractive to the thrips!

Some Symptoms of Viruses (not every virus can do every one of these tricks):
Stunting - (the whole plant or just new growth)
Mosaics & mottle – remember, some plants have a natural genetic variegation
Ringspots – concentric rings of brown or yellow on plant tissue
Strapped leaves or other distortions of plant parts
Vein clearing, vein banding – vein is yellow or vein is darker green
Black, brown, yellow or white spots
Black or brown stem cankers
Symptoms are often confused with spray injury, herbicide effects, fungal/bacterial spots, etc

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