

Virus in Dahlias

Virus is a hot topic in the dahlia community and tends to generate some very strong opinions.

The strength of these discussions can at times make dahlias seem scary and difficult. For the home gardener who wants to enjoy a few plants in the garden and to pick a few flowers they do not need to be.

The importance of virus to you the grower, and how you choose to manage it, may well be different depending on your circumstance - but understanding a few basic “facts” might help.

Virus in Context

Most of the “facts” about virus that we have been told over many years are not the result of extensive research but rather have become accepted wisdom. What little specific research has been done has not fully supported these general beliefs so it is worth at least trying to summarise the current understandings.

1. While there are a range of viruses that can infect dahlias there are 4 main ones found in extensive testing in the United States. These are:
 - a. Tobacco Streak Virus (TSV) is an RNA virus which has a very wide range of host plants including sunflowers, cotton and peanuts as well as lots of weeds. One of the symptoms of TSV is black streaks on the stem and yellow blotches on the leaves. There are very few reported cases of TSV in epidemic proportions in commercial crops with sunflowers in Queensland an exception. Thrips are the primary natural vector.
 - b. Tomato Spotted Wilt Virus (TSWV) is an RNA virus which can affect over 1000 plant species and is particularly an issue in commercial production of tomatoes, capsicum and, to a lesser extent, potatoes. Symptoms can include yellow spots on the leaves and spots on the stems of the leaves. Again, thrips are the principle natural vector.
 - c. Impatiens necrotic spot virus (INSV) is an RNA virus which can affect a wide range of plants and is particularly an issue for production of ornamentals such as impatiens, begonias, cyclamen etc as well as vegetable crops such as tomatoes. It also affects weeds such as oxalis. Again thrips are the principle natural vector and INSV can spread very rapidly.
 - d. Dahlia Mosaic - a dahlia specific DNA virus the main vector of which appears to be humans. Symptoms can include yellowing of the veins, short inter nodes and poor plant performance.

2. Virus is not always symptomatic. Sometimes dahlias react to a virus by growing very poorly, becoming stunted and not performing well. Such plants may also have twisted leaves and/ or leaves showing yellowing along the veins. However, often dahlias will be asymptomatic to a virus or even more than one virus, with the plant growing and flowering well and no sign of any issue.
3. The plants that have some yellowing in the leaves - what does this mean? Trying to diagnose from looking at a leaf is not a great method if. Perhaps it is worth remembering there is a degree of uncertainty inherent in any such observational analysis. With that in mind a few rules of thumb might be useful
 - a. A single leaf does not tell you much - it is important to look at the whole plant.
 - b. Early leaves can get damaged emerging from the ground - don't over read that
 - c. The bottom leaves often "go off" as the season progresses and pick up all sorts of things from the soil - the newer growth higher up the plant probably tells you more about the plant.
 - d. Dahlias take time to make a root system - they live off the tuber early on so can sometimes look a bit funny until they get some roots to take up various micro nutrients - this is particularly true of those big tubers.
4. How much virus is out there? Simply put, there is a lot. Unless you are growing in complete isolation then you will be exposed to thrips with virus from surrounding plants of various kinds. Testing in the US suggests that even without looking at dahlia mosaic, on average, over half the plants that growers thought were "clean" had at least one of the 3 RNA virus listed above.
5. It is expensive to test for virus. Each RNA virus test costs just under \$16.
6. Questions have also been raised on virus persistence. Ron Miner reported in the January 2023 Bulletin of the American Dahlia Society,

"Perhaps the most interesting differences in behaviour we've observed is the tendency of the various viruses to persist through digging, dividing, and storing for a winter. Tobacco Streak Virus (TSV) is the most persistent. It will almost always carry over in stock from one season to the next. Tomato Spotted Wilt Virus (TSWV) usually, but not always, persist through the off season. Impatiens Necrotic Spot Virus (INSV) almost always disappears from one season to the next."

This should not really surprise us given the earlier research on potatoes suggesting virus does not always pass from infected plant to tuber or from tuber to new shoots, though very little work has been done on this question for dahlias.

So where does this leave us in Australia?

There are a few things we can all do

1. Assume all plants have virus! That means clean between every cut in the garden and when dividing. While thrips may be a natural vector the primary vector may well be us humans! To clean your snips you can use things like a 10% bleach solution or simply soap and water.
2. Remove and dispose of clearly unhealthy plants that are not performing well. All plants that are stunted, with shortened internodes and are obviously sickly are not ones we want to be sharing around.
3. From there it is really a choice for you. At one extreme you might choose to simply grow and enjoy your dahlias and not worry about virus at all. This is a reasonable choice to make for a home gardener, particularly if you are not intending to sell any stock but understand your plants, just like other types of plants in your garden, may be acting as a host plant for a virus that may impact other plants. This would still mean removing sickly, stunted and poorly growing plants as they are of no value - if you are going to give a plant space it might as well be one that grows well.
4. In the middle perhaps is those who remove plants when they feel they can diagnose a virus from some symptoms. The first plants to go, might be those which are stunted, poor growth, black patches on the stem and/ or leaf stem, lighter coloured leaves than normal, or extensive leaf mottling through the whole plant. This is your choice but do not think this is leading to a virus free garden. It might, however, lead to a garden with a lesser viral load. This would be supported by annual digging and dividing, careful stock selection for replanting, the taking of cuttings, and planting out only the healthiest of those plants.
5. At the final extreme we might find operations who can test propagating material and grow in controlled conditions to develop and maintain a virus free stock. This virus free stock would avoid infecting other product lines in the business as much as improving the health of the plants. All in all this is an expensive process.

Obviously there is a spectrum of choices. It is up to the individual grower to decide where they fit on that spectrum depending on their own individual circumstances where they sit on that continuum.

As with all dahlia issues - Don't Panic- take a considered approach to managing the problem.

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