

Viruses and Insects – An intricate relationship

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While some of the recent virus articles in the Bulletin dealt with virus incidence, not much was written about the role of insects in virus spread. The majority of dahlia-infecting viruses are spread by two major means: through vegetative/propagating materials (cuttings, tubers, bulbs), and by insects. The major insect groups that are known to transmit dahlia-infecting viruses include aphids and thrips. It is important to note that a given virus is spread by only one group of insects. For example, cucumber mosaic virus (CMV) and dahlia mosaic virus (DMV) are spread only by aphids. Similarly, other dahlia-infecting viruses such as impatiens necrotic spot virus (INSV), tobacco streak virus, (TSV), and tomato spotted wilt virus (TSWV) are spread by thrips. Insects that specifically spread these viruses are called 'vectors.' In commercial crop production systems such as potato, tomato, pepper, peanut, and cucurbits, virus outbreaks are largely due to these vector populations spreading the viruses between fields and within fields.



The role of insect vectors in spreading viruses within and between dahlia gardens is not well understood. From the recent results of testing plants from G1 tubers (see the accompanying article), it appears that we need to give more attention to reducing the vector populations, especially those of thrips, since the three most prevalent viruses turned out to be spread by thrips during the production season. The word 'thrips' is both singular and plural: one thrips, ten thrips, hundred thrips. There is no one 'thrip'.

Thrips have a wide host range: they feed on hundreds of different plants that include the crops we grow and many weeds. Some of these plants are hosts for viruses as well. Thrips act as a 'bridge' for some viruses between crops and weeds. Breaking this cycle continues to be a challenge as complete eradication of alternate hosts of thrips is neither practical nor economical.

Thrips are tiny insects that feed preferably on flowers. One common thrips species is popularly known as 'western flower thrips' as these are primarily flower (pollen) feeders. Adult western flower thrips are approximately 1-2 mm in length and generally yellowish-brown in color. (See picture, above.) Western flower thrips are the most abundant of several different thrips species and they are efficient vectors of some of the dahlia viruses. Thrips are first of all considered as plant pests since they feed by piercing the plant surface with their mouthparts and sucking the contents of plant cells, thus weakening the plants. Besides causing direct damage, they spread viruses from plant to plant during the process of feeding. Thrips primarily reproduce through eggs, which develop into larva, pupa and into adults. The life cycle (egg to adult) could take up to 30 days but this is influenced by temperature and could be as short as

14 to 20 days. Because of this relatively short time period, thrips populations could build up rapidly under optimal conditions.

The incidence of some of the dahlia viruses could be reduced by managing thrips populations in our gardens. A non-chemical option is the use of blue and yellow sticky cards. It has been



shown that thrips get attracted to these two colors. Having these sticky cards at the plant canopy would help reduce the numbers to some extent. If the cards become ‘filled’ with insects, it is advisable to replace them with fresh cards.

Another option to reduce the thrips numbers in our gardens includes a chemical option. Spinosad is available in formulations for garden applications and is sold as ‘Monterey Garden Insect Spray’. Organic in nature, Spinosad is effective against thrips. One important thing to keep in mind when it comes to using Spinosad is not to over-do it. Excessive use could result in developing resistance in thrips to this chemical. Count the thrips on the sticky cards on a weekly basis. One guideline is to apply Spinosad if the thrips numbers exceed, on an average, 20 on the sticky cards, with no more than 3 or 4 applications during the season.

There are several retailers that sell Spinosad and couple of sources are listed below:

<https://www.arbico-organics.com/product/monterey-garden-insect-spray-spinosad-concentrate/pest-solver-guide-ants>

<https://www.planetnatural.com/product/monterey-garden-insect-spray-spinosad/>