FACT SHEET

National Clean Plant Network

Start clean, stay clean.

Hop Carlaviruses

American hop latent virus, Hop latent virus, and Hop mosaic virus

There are three distantly related Carlaviruses known to infect hop plants: American hop latent virus, hop latent virus, and hop mosaic virus. They are very common in U.S. hop yards, with incidences of between 40-60%, and frequently occur in mixed infections of two or sometimes all three species.

Symptoms

Of the three viruses, hop mosaic virus is the most likely to cause both symptoms and crop damage. On sensitive varieties, chlorotic mosaic can develop between major leaf veins. Severely affected plants may establish poorly when planted, have weak bine growth and often fail to attach to the string, followed by premature plant decline and death. Cultivars with Golding-type parentage are most susceptible to this virus, although this is suspected to be virus-strain specific. Yield can be reduced by some 15%, but varieties sensitive to this virus can suffer losses up to 62%.

Hop latent virus has been reported to cause chlorotic flecking on Cluster and Hersbrucker Spat, but not on cultivars from the Golding or Wye lineages, or on most of the common U.S.- bred cultivars held in the CPCNW collection. No diagnosable symptoms have been reported for American hop latent virus on any cultivars.

Transmission and Spread

The primary means of spread of these viruses, other than movement of infected planting material, is via aphid transmission. All three viruses are transmitted by the hop aphid (*Phorodon humuli*). Hop mosaic virus and hop latent virus are also transmitted by the potato aphid (*Macrosiphum euphorbiae*) and green peach aphid (*Myzus persicae*). Transmission is non-persistent, which means that the aphid can rapidly acquire and transmit the virus, but as the virus is not retained for long in the aphid's stylet, subsequent transmission to other plants it feeds on is inefficient or does not occur at all, unless it reacquires the virus from another infected plant.

All three viruses are spread from plant to plant by mechanical transfer of virus-containing sap on cutting or pruning tools, through injury and contact between neighboring plants, or by root grafting. There is currently no evidence of seed or pollen transmission for any of these viruses. They all have generally limited host ranges, although incidental infection of weeds, garden plants, and other crops has been observed for hop latent virus due to feeding by virus-carrying aphid vectors and these other hosts are not considered to contribute to the spread of this virus.

Management

Use of virus-tested planting stock is the most practical method of limiting the entry of these viruses into new plantings, although prevention of aphid-transmission in areas of high incidence is difficult. Application of insecticides to control aphids is inefficient for limiting the introduction of virus since it will be transmitted before the viruliferous aphids are killed, and as these aphids have a wide host range, targeted sprays are ineffective. However, reducing local aphid populations using contact or systemic insecticides can reduce the rate of secondary transmission within a hop yard.

Symptomatic bines should be removed, and any cutting tools cleaned between plants. Where possible, bines should be spaced and propagated to prevent plant-to-plant contact. Using contact herbicides rather than mechanical pruning to control basal growth may reduce mechanical transmission of these viruses between adjacent plants.

Yellow mosaic pattern on Chinook due to hop mosaic virus.

At a Glance

- Use only virus-tested planting stock when establishing new yards.
- Remove symptomatic bines.
- Use of contact herbicides rather than mechanical pruning to control basal growth may reduce mechanical transmission of these viruses to adjacent plants.
- Controlled use of contact or systemic insecticides can reduce local spread by aphids in the hop yard.

Reference:

Eastwell, K.C., & Barbara, D.J. (2015). Carlavirus complex: American hop latent virus, Hop latent virus, and Hop mosaic virus. In D.B. Walsh, D.H. Gent, J.D. Barbour, R.A. Boydston, A.E. George, D.G. James, & J.R. Sirrine (Eds.), Field Guide for Integrated Pest Management in Hops (3th ed., p. 38). Hop Growers of America, Yakima, WA.