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Plant Disease
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Tomato Yellow Leaf Curl

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Tomato yellow leaf curl is a destructive viral disease of tomato caused by *Tomato yellow leaf curl virus* (TYLCV). In tropical and subtropical regions, total losses of tomato crops have been reported. TYLCV is widespread and can be found in most places where tomato is grown. In Hawai'i, TYLCV was first discovered in Wailuku, Maui, and Poamoho, O'ahu, in November of 2009. It is not known how TYLCV entered Hawai'i.

Symptoms of tomato yellow leaf curl

The new growth of plants with tomato yellow leaf curl has reduced internodes, giving the plant a stunted appearance. The new leaves are also greatly reduced in size and wrinkled, are yellowed between the veins, and have margins that curl upward, giving them a cup-like appearance. Flowers may appear but usually will drop before fruit is set.

Spread of TYLCV

TYLCV is primarily transmitted by the sweetpotato whitefly (*Bemisia tabaci*) and the biotype B (or silverleaf) whitefly (*Bemisia argentifolii*). These whiteflies can acquire the virus in as little as 5 minutes by feeding on infected plants, and they remain infective for life; the virus, however, is not passed on to their progeny. TYLCV is not spread by other whitefly species such as the

Left: typical foliar symptoms of tomato yellow leaf curl. Upper right: new leaflets with symptoms of yellowing between veins and an upward curling of their margins. Lower right: adult and nymph of bemisia whitefly, a vector of TYLCV.

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greenhouse whitefly, *Trialeurodes vaporariorum*, which is also common in Hawai'i. TYLCV cannot be spread by seed and is not mechanically transmitted (e.g., by pruning equipment or by touch). Long-distance spread of TYLCV occurs primarily by movement of infected plant material or by wind dispersal of whiteflies harboring the virus.

Other hosts of TYLCV

TYLCV infects a wide range of plant crops and weeds, but it usually does not cause symptoms in these hosts. Most solanaceous plants such as tomato, eggplant, potato, tobacco, and pepper can be infected with TYLCV but remain healthy in appearance. Common bean is also a host and will sometimes display leaf curl symptoms when infected. Many common weeds are also host to the virus and may or may not develop symptoms when infected.

Management of tomato yellow leaf curl

Symptomatic plants should immediately be carefully removed, bagged, and discarded to prevent the spread of whiteflies on them that may be carrying the virus. Remove weeds and avoid growing other solanaceous crops near tomato plants whenever possible, as these plants may serve as a reservoir of the virus. UV-reflective mulch can also be effective at deterring whiteflies from landing on crops. Insect exclusion screens rated for whitefly can be used for individual plants and are now being used for screenhouse construction in regions where TYLCV is prevalent.

It is important to visually monitor the crop for whitefly infestations and apply insecticides to suppress whitefly populations and reduce the spread of TYLCV. Imidacloprid-based systemic insecticides (e.g., Admire® Pro, Provado®) are effective for both adult and nymph stages but should not be used in soil-free media as a drench. Pyrethrins and pyrethroid-based insecticides effectively control adult whiteflies. Spirotetramat (Movento™), with methylated seed oil plus silicone surfactant, and insecticidal oils, soaps, and other extracts are effective at suppressing all stages. It is important to alternate insecticide chemical types to prevent the build-up of pesticide-resistant insect populations. Always read and follow the label instructions of any insecticide before its application.

Many TYLCV-resistant tomato varieties are available for both field and greenhouse production systems. These varieties come in many fruit shapes (globe, Roma, cherry, etc.) and as both determinate and indeterminate plant types. Under stress, however, these resistant varieties can lose their protection and develop symptoms of tomato yellow leaf curl. As such, it is important to keep plants healthy by proper irrigation and fertilizer regimes and to keep them free of other pests and diseases.

For further information on tomato yellow leaf curl disease, or if you have any of these symptoms in your tomato crop, contact your local Cooperative Extension Service office or the CTAHR Agricultural Diagnostic Service Center (956-6706).

Reference

Czosnek, H. 2007. Tomato yellow leafcurl disease. Springer, Netherlands.

Some sources* of commercially available TYLCV-resistant or -tolerant tomato varieties

Source	*Contact*	*Website*
BHNSeed	239-352-1100; fax 239-352-1981 tomato@bhnseed.com	www.bhnseed.com
Golden Valley Seed	760-337-3100; fax 760-337-3135 info@goldenvalleyseed.com	www.goldenvalleyseed.com
Hazera Seed	561-988-1315; fax 561-988-1319 office@hazerainc.com	www.hazera.com
Sakata Seed	408-778-7758; fax 408-778-7768	www.sakata.com
Seminis Seed	866-334-1056 garden@seminis.com	us.seminis.com
Zeraim Gedera	979 200-1876; fax 979-272-9504	www.zeraim.com

*Not all of these companies will distribute seeds directly to the public. However, their websites can provide valuable information about the characteristics of different varieties and may provide information about local distributors. Not all tomato varieties produced by these seed companies are TYLCV-resistant. TYLCV resistance is often referred to as "TY-resistant." Mention of company names does not imply endorsement by UH CTAHR.