

VEGETABLE CROPS

DISEASES OF SWEET CORN Virus Diseases

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Virus Diseases of Sweet Corn

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Only two virus diseases are currently recognized as infecting sweet corn in New York. They are maize dwarf mosaic virus (MDMV) and maize white line mosaic virus (MWLMV). MDMV has been present in the state since the late 1960s; MWLMV was first recognized in the United States in Tompkins County, New York, in 1979. These two diseases differ greatly in their method of transmission and their locations within the state.

Maize dwarf mosaic virus (MDMV) was first reported in the state in 1967 and, at that time, was a serious problem for both field and sweet corn. Today, most field corn hybrids are resistant or tolerant to MDMV, and the genes responsible for resistance in field corn have been transferred into sweet corn progenies. Because dent corn is the source of resistance for MDMV, the release of high-quality sweet corn varieties has been delayed. In addition to infecting all corn types, MDMV also infects many grass species (annual, winter annual, and perennial). Although many strains of MDMV have been identified, the two most common strains are called A and B. MDMV-A can infect perennial johnsongrass (*Sorghum halepense*), which is its principal weed source, whereas MDMV-B and the other strains can-

not infect johnsongrass. However, other grass species can serve as virus reservoirs for strain B.

Both strains of MDMV are transmitted by several aphid species in a nonpersistent manner, with the corn leaf aphid (*Rhopalosiphum maidis*) being the predominant vector. MDMV remains an important virus disease of sweet corn in key fresh-market producing areas of the state, such as the Hudson Valley and selected upstate locations, and for processing sweet corn in several upstate counties.

MDMV symptoms on sweet corn foliage consist of a mosaic pattern of light and darker green streaks along the veinal and interveinal tissues (fig. 1). Symptoms usually persist, but are most striking at the whorl stages. Mosaic symptoms are also evident on the flag



and husk leaves (fig. 2). Inside, the ears will show poor cob and tip fill (fig. 3). Infected susceptible plants are stunted and have reduced yields when compared with resistant plants inoculated at the same time (fig. 4).

Several sources of MDMV inoculum are recognized, but opinions differ as to the importance of these sources. MDMV may be seedborne in corn, but this occurrence is rare and the percentage of infestation is low. A second source of virus is the movement of viruliferous aphids (virus ready for transmission) for long distances on low-level winds often associated with storm fronts. This source was substantiated in several midwestern states and, therefore, cannot be ruled out. A third virus source is perennial and winter annual grasses that can maintain the virus from one season until the next; the aphids acquire the virus from these sources and transmit it to the susceptible corn crop. This source would appear to be the most plausible and important, but proof is difficult.

Several methods for controlling MDMV are available. Although MDMV-resistant sweet corn varieties are being developed, they currently lack good eating quality, are not suitable for processors, and are not presently available in all maturity groups or colors to span the entire planting season. Previous work in the Hudson Valley indicated that in most years growers who planted susceptible varieties after June 15 ran

the risk of reduced yields from virus infection for corn harvested in September. Thus, planting early to avoid peak aphid flights should be done whenever it is practical. Herbicides should be used to eliminate johnsongrass and other perennial grass hosts bordering fields. Although insecticides are effective in controlling aphid populations, they cannot prevent the introduction of virus by migrant aphids. Mineral oil sprays have been used successfully in other states to control viruses, including MDMV, transmitted nonpersistently by aphids. However, this technique depends upon special spraying apparatus plus thorough and timely application of oils to a fast growing crop and may not be practical for most growers.

Maize white line mosaic virus (MWLMV) is a relatively new virus disease of corn, first identified in the United States at Ithaca, Tompkins County, New York. Since then the virus has been reported from seven additional states located in New England and the north central region (Ohio, Michigan, and Wisconsin). Since 1979, the virus has been found in 21 counties in New York, where it is more extensively distributed than in any of the other states.

MWLMV is not transmitted mechanically or by aphids or leafhoppers. It is, however, soilborne and appears to be transmitted by a soilborne fungus. Several fungi known to parasitize corn roots act as vectors for plant viruses; the

fungi require ample soil moisture to allow zoospores to move in the root zone and make contact with roots of germinating seedlings.

Symptoms of MWLMV in corn seedlings appear approximately 1 month after planting into infested soil. A strong mosaic pattern with short chlorotic white lines 1/16 inch wide and up to 3/4 inch long appear in and along the veinal tissue (fig. 5). Some particularly susceptible sweet corn varieties display "goose-necking" of the entire plant (fig. 6). Severely infected plants will fail to produce ears, whereas ears on other plants are poorly developed and unmarketable. The disease is usually associated with lower, wetter areas of fields, but as fungus/virus-infested soil and debris are redistributed, infected plants may appear in level areas of the field. Not all plants express symptoms even though virus can be recovered from roots and stems. This suggests that the virus may be more extensively distributed than is now recognized.

Because the virus is soilborne and depends upon soil moisture for infection, avoid planting in low, wet areas. Select varieties that are less susceptible; contact your Cooperative Extension agent for an up-to-date list. Because the virus can infect all corn types (sweet, dent, Indian) as well as grasses, infested fields should be rotated out of corn for several years.

Quantity discount available.