



GLADIOLUS VIRUSES

Gladiolus plants may be infected by one or more viruses or by strains of a particular virus. Identification of the virus, based on symptoms alone, is difficult because the gladiolus varieties often react differently to the same virus. Plants that are suspected of harboring a virus should be submitted to your nearest Extension office or an extension specialist at the University of Illinois for diagnosis.

The most common virus infections in gladiolus plantings are those caused by the cucumber mosaic virus or the bean yellow mosaic virus, both of which are found worldwide. These viruses can cause extensive losses in the quality and quantity of flowers and corms.

CUCUMBER MOSAIC VIRUS

(White Break Mosaic)

Symptoms

Infection of the gladiolus plant by one or more strains of the cucumber mosaic virus produces conspicuous blotches in the flowers that are white, light gray, or yellowish. Hence, the common name of "white break mosaic" (Figure 1). Flower discoloration may be accompanied by crinkling, shrinking, or flower deformations. Affected flowers open slowly and imperfectly, and fade early. Coarseness, twisting, or a reduction in the size of the florets may also occur. Flower bracts often become severely yellowed and wither early.

Foliar symptoms usually do not appear during the season in which the plants are infected. During the following season, however, conspicuous symptoms appear in the leaves of some gladiolus varieties. Other varieties never show leaf symptoms. The typical foliar symptoms consist of small, chlorotic squares between two leaf veins. The spots may be gray, yellow, brown, or reddish



Figure 1. White, light gray, or yellowish blotches in gladiolus flowers are the first symptoms of white break mosaic.



Figure 2. White break mosaic. Gray, yellow, brown, or reddish spots develop on the leaves, usually the season after the plants become infected. (Il Nat. Hist. Survey)

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(Figure 2). When the symptoms are severe, the plant may have an overall yellow appearance. To detect mild symptoms, a leaf must be held up to the light. Stunted plants are common, and the corms from infected plants of some varieties may be warty when harvested (Figure 3).

Transmission and Distribution

Cucumber mosaic virus has a very wide host range that includes such garden vegetables as bean, carrot, celery, cucumber, melon, onion, pepper, potato, spinach, squash, and tomato. Susceptible garden flowers include calendula, China-aster, columbine, delphinium, geranium, lilies, lobelia, lupines, periwinkle, petunia, primulas, violas, zinnia, and many others. The virus can be transmitted to gladiolus plants by the feeding of aphids, as a result of planting infected corms, and mechanically by contaminated tools.

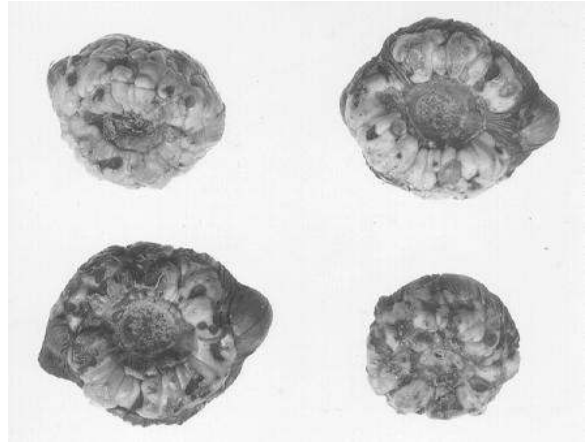


Figure 3. White break mosaic. Warty corms from gladiolus, affecting few varieties. (IL Nat. Hist. Survey)

BEAN YELLOW MOSAIC VIRUS

(Mild Mosaic)

Symptoms

Leaves and flower stems often develop an angular, light and dark green mottling in the early summer when the gladiolus plants are growing rapidly and the temperatures are mild. The symptoms tend to be masked when high temperatures occur. Infected flowers have faint, often inconspicuous, pencil-stripe break patterns that are usually lighter in color than the normal flower. However, some varieties may have conspicuous flower and leaf symptoms that would reduce the sale value of the blooms.

Transmission and Distribution

Bean yellow mosaic virus infects about 80 species of wild and cultivated legumes, including the garden bean and pea, soybean, clover (alsike, crimson, white sweet), lespedeza, and sweet pea, as well as a few species that are not legumes. The virus can be transmitted readily by the feeding of aphids, or mechanically by contaminated tools. Plantings of gladiolus adjacent to bean, pea, or clover fields may be heavily inoculated with the virus as a result of insect migrations.

TOBACCO RINGSPOT VIRUS

(Ringspot)

Symptoms

Leaves on affected plants develop necrotic or chlorotic ringspot patterns (Figure 4). The flowers are not affected. Mild strains of the virus may cause mild chlorotic mottling in gladiolus.

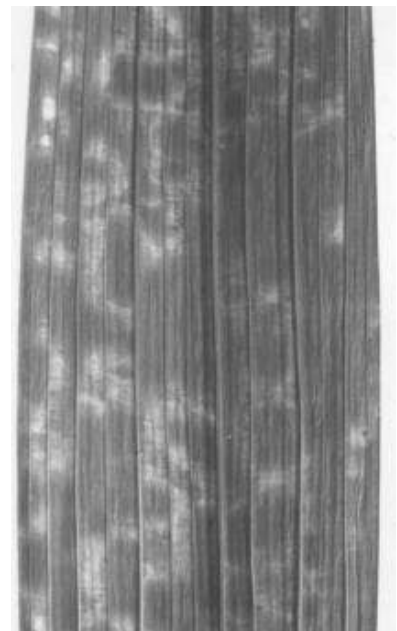


Figure 4. Necrotic or chlorotic ringspot patterns on gladiolus leaves infected with tobacco ringspot virus. (IL Nat. Hist. Survey).

Transmission and Distribution

The tobacco ringspot virus has a wide range of host plants—over 250 species in 54 plant families. This virus infects many herbaceous and woody plants. The tobacco ringspot virus can be transmitted by a dagger nematode (*Xiphinema americanum*), although other vectors such as thrips, mites, grasshoppers, and the tobacco flea beetle have been reported as transmitting agents to other hosts. A low rate of mechanical transmission (3 percent) by cutting tools has been shown for gladiolus plants.

TOBACCO RATTLE VIRUS

(Notched leaf)

Symptoms

Gladiolus plants infected with the tobacco rattle virus show severely distorted growth. Such plants usually have notches along the margin or along the veins of one or more of the leaves. These markings are often combined with chlorotic or brown, dead (necrotic) stripes and spots or a crumpling of the tissue between the veins. The stems and buds of the flowers may stop growing and may also show deformities and necrosis.

Transmission and Distribution

Tobacco rattle virus has a host range of over 350 plant species and is transmitted by soil-inhabiting nematodes of the genus *Trichodorus*. Stubby-root nematodes prefer light and sandy or peaty soils and can transmit the virus either in the adult or the larval stages. After the nematodes are capable of transmitting the virus when they feed, they retain this ability for many weeks. Transmission by contaminated tools is also possible with some virus strains.

TOMATO RINGSPOT VIRUS

(Stunt)

Symptoms

Gladiolus plants infected with this virus are stunted and have short flower spikes that often contain only 4 or 5 florets. Leaves on affected plants are usually smaller, stiffer, and more erect than those on normal plants.

Transmission and Distribution

The tobacco ringspot virus is transmitted by the same dagger nematode that vectors the tobacco ringspot virus. The adult stage and all three larval stages are capable of transmission. Tomato ringspot virus has a wide range of woody as well as herbaceous hosts and can be found where the nematode is prevalent in the soil. The mechanical transmission of the virus to other host plants has been reported, although this has not been successful with gladiolus plants.

CONTROL OF VIRUS DISEASES

1. Plant only certified, disease-free corms, preferably CVI (culture-virus-indexed) corms (incorrectly called bulbs) from a reputable nursery.

2. Remove and destroy (burn or compost) all infected plants when symptoms first become evident. Some diseased plants may not show symptoms until the season after infection has occurred. Since the viruses overseason in the corms, plants known to be infected should be dug up and all parts destroyed.
3. Eradicate all nearby weeds (for example, groundcherry, milkweed, pokeweed, pigweed, clover, henbane, Jimsonweed, wild cucumber, bryony, shepherd's-purse, goosefoot, thistle, chickweed, nettle, deadnettle, and sowthistle) that may serve as virus reservoirs or may harbor insects that move onto gladiolus plants later in the season.
4. Avoid transferring viruses from infected to healthy plants during the harvesting of flowers and corms by disinfecting tools and other utensils in a 70-percent solution of denatured alcohol between cuts.
5. Where feasible, place aluminum strips between the rows of gladiolus plants to repel aphids. This should help reduce the prevalence of the viruses transmitted by these insects. The aluminum strips also help to keep down weeds.
6. Avoid growing gladiolus near bean, clover, cucumber, melon, or tomato.
7. Apply a nematicide, such as EDB or ethylene dibromide, or mixed dichloropropenes (according to label directions) to nematode-infested soil, where treatment would be economically feasible. Soil treatment with a nematicide cannot completely prevent the transmission of the tobacco rattle virus to gladiolus when viruliferous nematodes occur at great depths, as in many sandy soils with a low water table.