The Plant Doctor
Tobacco Mosaic Virus

Tobacco mosaic virus is the oldest identified plant virus. It was first recognized because of how easily it infects plants, its noticeable symptoms, and its persistence. It is not as common in Mississippi as other plant viruses, such as tomato spotted wilt virus that causes blackening and ring spots on many plants, or the mosaic viruses that mottle the leaves of cucurbit and blackeyed pea crops.

The tobacco mosaic virus attacks plants in the families that include tomato, pepper, eggplant, tobacco, spinach, petunia, and marigold. Many modern vegetable varieties have been developed to resist this virus. Resistance to TMV is usually stated as "TMV" or sometimes just "T." You must refer directly to the grower's catalog to determine if TMV resistance is present because it is often not labeled on the packaging.

Symptoms vary somewhat with the strain of the virus. Infected plants are usually mottled, stunted, and sometimes distorted. On tomatoes, the virus frequently causes light and dark green mottled areas on the leaves. The dark green areas tend to be thicker than the lighter portions of the leaf. Young growth is usually stunted, with distorted leaves curling down. Some strains produce mottling and streaking, and death of the fruits.

The virus moves to new plants by grafting, in seed coats from the infected mother plant, and by contact with infected plants or plant sap. These facts are very important for a grower to understand, so examples will be used to demonstrate how easily this virus spreads.

Cultivation, pinching, or picking of plant parts spreads virus-infested plant sap from infected to healthy plants. A controlled study showed that a razor blade used to make a single cut in a TMV-infected petunia plant passed the virus to 20 healthy petunia plants before the virus was exhausted on the razor blade.

Slight contact may also transmit the virus. It has been shown that watering nozzles that touch infected plants and are then allowed to touch uninfected plants will transmit the virus. The author was taking weekly pictures of uninfected plants and plants infected with a close relative of TMV. Occasionally, the tripod would LIGHTLY brush a leaf. By the end of 10 weeks, almost all plants were infected with the virus.

Seeds from infected plants may also carry the virus. The earlier the age by which the mother plant is infected, the more likely the seed coat will be contaminated by the virus. When the seed germinates, the virus may enter the seedling by small cuts caused by transplanting, handling, or in the germination/emergence process. Tobacco seeds and tomato seeds are routinely disinfested with either trisodium phosphate or calcium hypochlorite, respectively, to prevent spread. Saving your own seeds is not cost effective when cleaning up an infection.

Tobacco products commonly contain the virus. This means that people who use tobacco products, especially those who roll their own cigarettes, should wash their hands thoroughly with detergent soap before handling plant material. Whole milk or 20 percent (weight to volume) powdered non-fat skim milk with a surfactant such as 0.1 percent Tween 20 is slightly more effective than detergent soap.

The virus is very persistent on bench tops and other materials. It can be infective as long as 8 years on bench tops and 50 years in dried plant material. Cleaning a growing operation after infection with this virus or its relative, tomato mosaic virus, requires patience and attention to detail.

You should carefully clean and disinfest benches, equipment, and disposal areas. First remove soil that has been used to grow infected plants, then remove leaves or other plant debris, whether living or dead. The soil probably holds infected pieces of roots. Dead leaves, even if they have dried and crumbled into a powder, may spread the virus later. It is a good idea to vacuum any remaining plant parts and contaminated soil after you take the trash off site.

Everything should be disinfested. A solution of 10 percent household bleach in contact with the surface for 1 minute has been shown to be the least expensive and an effective means of killing the virus on contaminated tools. Even a little bit of dirt will inactivate the bleach, so make sure all surfaces are clean before disinfesting. Remember to clean and disinfest any tools such as hoses, nozzles, pruners, and plant stakes.

As with all viruses, you cannot save the plant once it is infected. Bag infected plants, then remove them from the operation and destroy them. Control perennial weeds such as horsenettle and jimsonweed, which may act as hosts.

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