Plant Disease Diagnosis Report

Feature	Diagnosis Details
Disease Name	Tomato__Tomato_mosaic_virus
Confidence Level	99.21%
Date	2026-02-21 11:26

AI Expert Recommendations:

Plant Pathologist's Report: Tomato Mosaic Virus (ToMV) in Tomato

Date:October 26, 2023

Diagnosis:Tomato Mosaic Virus (ToMV)Detection Confidence:99.21%

This report provides detailed information regarding the identification, management, and prevention of Tomato mosaic virus (ToMV) on your tomato crop, based on a highly confident diagnosis. Understanding and implementing these strategies is crucial for protecting your current and future yields.

1. Disease Description

Tomato mosaic virus (ToMV) is a highly contagious and persistent viral disease that primarily affects tomato plants, though it can infect other solanaceous crops like peppers and eggplants. It is one of the most common

and economically significant viral diseases of tomatoes worldwide.

Causal Agent:The disease is caused by theTomato mosaic virus, belonging to theTobamovirusgenus. This virus is remarkably stable and can survive for extended periods in plant debris, soil, on tools, and even on clothing.

Symptoms:Symptoms can vary depending on the tomato variety, environmental conditions, and the age of the plant at infection. Common symptoms include:

*Leaf Mosaic and Mottling:The most characteristic symptom is an irregular mosaic pattern of light green (often yellow) and dark green areas on the leaves.

*Leaf Distortion:Leaves may become puckered, blistered, elongated, or exhibit a "fern-leaf" appearance, where leaf margins are deeply lobed and narrow.

*Stunting:Infected plants are often stunted in growth, leading to reduced vigor.

*Fruit Symptoms:Fruits can exhibit various symptoms including:

*Marbling:Irregular yellow or brown areas on the fruit surface.

*Internal Browning:Brown necrotic tissue within the fruit walls, particularly near the stem end.

*Reduced Size and Quality:Fruits may be smaller, ripen unevenly, and have poor flavor, significantly impacting marketability.

*Necrosis (Less Common):In some severe cases or susceptible varieties, brown necrotic streaks may appear on stems, petioles, and even fruit.

Transmission:ToMV is primarily spread throughmechanical transmission. This means the virus is easily spread by:

*Contact:Handling infected plants and then touching healthy plants (e.g., during pruning, staking, harvesting).

*Contaminated Tools:Knives, pruners, stakes, and other equipment used on infected plants and then on healthy ones.

*Clothing and Hands:Workers' hands and clothing can carry virus particles.

*Plant Debris:The virus can persist in infected plant debris in the soil for years.

*Seed Transmission:ToMV can be seed-borne, meaning it can be carried on or within the seed coat, leading to infection of seedlings. However, this is less common than mechanical spread.

*No Insect Vector:Unlike many other plant viruses, ToMV is not spread by insects.

Impact:ToMV can cause significant yield losses, ranging from 20% to 50% or more, depending on the severity of infection and the timing. Fruit quality is severely compromised, reducing salability and profitability.

2. Immediate Treatment

It is crucial to understand thatthere is no cure for viral diseases once a plant is infected.The primary goal of immediate treatment is to prevent further spread of the virus within your crop and to neighboring healthy plants.

Organic Treatment:

- Immediate Removal and Destruction:Identify:Carefully scout your fields and greenhouse for any plants showing ToMV symptoms.Isolate & Remove:As soon as symptoms are detected, immediately and carefully remove the entire infected plant, including its root system. Do not shake or brush against healthy plants during removal.Destroy:Bag the infected plants securely and remove them from the field/greenhouse. The best method of destruction is deep burial or burning, away from cultivated areas, to prevent the virus from persisting in plant debris. Do not compost infected plant material.
- Identify:Carefully scout your fields and greenhouse for any plants showing ToMV symptoms.
- Isolate & Remove:As soon as symptoms are detected, immediately and carefully remove the entire infected

plant, including its root system. Do not shake or brush against healthy plants during removal.
- Destroy:Bag the infected plants securely and remove them from the field/greenhouse. The best method of destruction is deep burial or burning, away from cultivated areas, to prevent the virus from persisting in plant debris. Do not compost infected plant material.
- Strict Sanitation Protocols:Hand Washing:Implement a strict regimen of washing hands thoroughly with soap and water before handling plants, and especially after touching any potentially infected plants or soil.Tool Disinfection:After removing infected plants and before working with healthy ones, disinfect all tools (pruners, knives, stakes, etc.). A 10% solution of household bleach (1 part bleach to 9 parts water) or a 2% solution of trisodium phosphate (TSP) are effective. Soak tools for at least 10 minutes. Rinse tools with clean water after disinfection to prevent corrosion.Avoid Wet Plants:Do not work with plants when they are wet, as this can facilitate virus spread.Protective Gear:Consider wearing disposable gloves and changing outer clothing if you have handled infected plants, especially if moving between different growing areas.
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Chemical Treatment:

- No Direct Viral Control:There areno chemical sprays or treatments that can cure a plant infected with ToMVor prevent the virus from replicating within the plant. Pesticides are ineffective as there is no insect vector for this virus.
- Chemical Disinfectants for Tools and Surfaces:Bleach (Sodium Hypochlorite):As mentioned above, a 10% bleach solution is effective for disinfecting tools and non-porous surfaces.Trisodium Phosphate (TSP):A 2% solution (e.g., 20g per liter of water) is also highly effective for disinfecting tools, greenhouse structures, and hard surfaces. TSP has the added benefit of being less corrosive than bleach.Commercial Disinfectants:Several commercial agricultural disinfectants (e.g., Virkon S) are available and can be highly effective against plant viruses. Follow product label instructions carefully for concentration and application.Greenhouse Structures:In a greenhouse setting, thoroughly disinfect benches, supports, and flooring after removing infected plants.
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Critical Note:The focus for immediate treatment is entirely on sanitation and containment. Swift action is

paramount to limit spread.

3. Prevention

Long-term prevention is the most effective strategy for managing ToMV and should be integrated into your regular farming practices.

- Use Resistant Varieties:Selection:Whenever possible, plant tomato varieties that are genetically resistant to ToMV. Look for designations like 'TMV-resistant' or 'ToMV-resistant' in seed catalogs. These varieties carry specific resistance genes that prevent or minimize infection.Consult Local Extension:Check with your local agricultural extension service for recommended resistant varieties suitable for your region and growing conditions.
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- Certified Virus-Free Seeds/Transplants:Source:Purchase seeds and transplants from reputable suppliers who guarantee their stock is virus-free.Seed Treatment:For saved seeds or seeds from unknown sources, consider commercial seed treatments such as acid treatment (e.g., hydrochloric acid) or hot water treatment. These methods aim to eliminate surface-borne virus particles.Warning:Improper treatment can reduce seed viability, so consult an expert or your seed supplier for precise protocols if considering this.
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- Strict Sanitation Program (Ongoing):Tool Disinfection:Routinely disinfect all tools (pruners, knives, ties, stakes, planting equipment) between plants, rows, or at least daily. This is the single most important preventative measure against mechanical transmission.Hand Hygiene:Implement strict handwashing protocols for all personnel before and during work with tomatoes.Clothing:Consider dedicated clothing for working in tomato fields/greenhouses, or at least ensure outer garments are clean.Weed Control:While ToMV has a narrow host range, good weed control generally contributes to overall plant health and reduces potential alternative hosts for other diseases.Tobacco Products:Advise workers who use tobacco products (cigarettes, cigars, chewing tobacco) not to handle tomato plants without thoroughly washing their hands beforehand. Tobacco mosaic virus (TMV), a closely related virus, can be present in tobacco and transfer to tomatoes.
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- Crop Rotation and Field Hygiene:Remove Debris:After harvest, thoroughly remove all tomato plant debris from the field or greenhouse. The virus can persist in residual plant material.Soil Sanitation (Greenhouse):In greenhouse operations, consider soil sterilization (e.g., steam pasteurization) or solarization (for field) after a severe outbreak, especially if the virus is known to persist in soil-borne debris.Crop Rotation:While ToMV can be persistent, practicing crop rotation with non-solanaceous crops for at least 2-3 years can help reduce inoculum levels in the soil from previous crop debris.
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- Monitoring and Early Detection:Regular Scouting:Routinely scout your crops for any signs of mosaic patterns, leaf distortion, or stunted growth.Prompt Action:If suspicious symptoms appear, isolate the plant immediately and have it diagnosed. Early detection allows for prompt removal and significantly reduces the risk of widespread infection.
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By diligently implementing these comprehensive prevention and management strategies, you can significantly reduce the incidence and impact of Tomato mosaic virus on your tomato production.