Agronomic Spotlight

Seminis grow forward

Identifying and Managing Diseases in Melons

- Disease identification usually starts with an evaluation of the symptoms that develop on infected plants.
- The time and pattern of symptom expression are often important in making an accurate diagnosis.
- Management strategies are chosen based on where pathogens overwinter, how they spread and infect, and the availability of resistant varieties and effective pesticides.

Powdery Mildew

Powdery mildew of melons is caused by two different species of fungi, *Podosphaera xanthii* and *Golovinomyces cichoracearum*.[1] Up to 28 races of *P. xanthii* have been identified, with races 1 and 2 being the most common in the U. S. These fungi overwinter mostly on living plants in southern regions of the U. S. and are spread northward as windblown spores during the season.[2] In more northern areas, the disease is typically first detected in mid- to late-summer. The disease first appears as a white, powdery growth on upper and lower leaf surfaces, as well as on petioles and stems (Figure 1). This growth develops first on older and shaded leaves. Pale-yellow spots may accompany the fungal growth. Infected leaves gradually turn yellow and may become brown and papery. Fewer and smaller fruit are produced, and the loss of leaves can result in sunscalding of the fruit.[1]

Figure 1. Powdery mildew growth on a leaf. Gerald Holmes, California Polytechnic State University at San Luis Obispo, Bugwood.org

Crop rotation is not usually effective for controlling powdery mildew on melons.[1] However, some production guides indicate that crop rotation and fall tillage can help delay the onset of epidemics in some areas.[2,3,4] Host resistance to both powdery mildew species is available in melon varieties.[1] Seminis® uses the designation Px to indicate resistance to *Podosphaera xanthii* and Gc to indicate resistance to *Golovinomyces cichoracearum*. Px resistance can be race-specific, and a designation of Px-1 indicates a variety with resistance to *P. xanthii* race 1.

Fungicides may be needed even with varieties that have some resistance to powdery mildew. Initiate treatments when the disease is first detected in the region. Fungicides need to reach the undersides of leaves and leaves in the lower canopy. Adjust sprayers to provide maximum coverage and use mobile (systemic, translaminar, or volatile) fungicides.[1,4] A number of protectant and mobile fungicides are available for powdery mildew on melons. However, resistance has developed to some fungicide groups. When using a fungicide that has a higher risk for resistance to develop, apply the fungicide with a protectant fungicide and alternate applications of fungicides in different MOA groups.[1,2,4]

Monosporascus Root Rot

Monosporascus root rot is also called **vine decline** and **sudden wilt**. Plants can be infected early in the season, but symptoms usually develop late in the season, 1 to 3 weeks before harvest.[1,2] Symptoms appear first on older crown leaves, which become chlorotic and then rapidly collapse and die. The symptoms progress toward the tips of vines, and total plant collapse can occur within 5 to 10 days. Lesions develop on the primary and secondary roots of affected plants. The lesions are distinct, reddish-brown, and often dry. Black, spherical fungal fruiting bodies may develop on infected roots very late in the season, sometimes after harvest (Figure 2).[1,2]

Figure 2. Fruiting structures of *Monosporascus* on roots. Gerald Holmes, California Polytechnic State University at San Luis Obispo, Bugwood.org

Avoid planting in areas known to be infested with the pathogen and avoid excessive irrigation. Direct-seeded plants often develop root systems that can better tolerate the disease. Preplant soil fumigation is sometimes used on fields with a history of vine decline, but this may only be minimally effective.[1,2] The application of fungicides (such as fludioxonil) through a drip irrigation system early in the season has been shown to provide some control.[1] To prevent the buildup of inoculum for future plantings, cultivate the field after harvest to destroy and dry the infected roots.[1]

Root-Knot Nematodes

Several species of root-knot nematodes can infect and

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Figure 3. Root-knot symptoms on melon roots. Gerald Holmes, California Polytechnic State University at San Luis Obispo, Bugwood.org

damage melon roots. Patches of stunted, chlorotic plants develop in the field. Infected plants can wilt during the heat of the day.[1] Root symptoms include the formation of wart-like galls, singly or in clumps, giving the roots a knobby appearance with few feeder roots (Figure 3).

Root-knot nematodes have a wide host range (infecting over 2,000 different plants). Therefore, crop rotation is not an effective management strategy.[1] Pre-plant soil fumigation with nematicidal fumigants, such as 1,3-dichloropropene (Telone® II) and metam sodium (Vapam® HL™ Soil Fumigant), can effectively reduce populations of root-knot nematodes and control the disease. Applications of oxamyl (DuPont™ Vydate® L Insecticide/Nematicide) at planting followed by foliar application during the season can also effectively manage the disease.[3]

Figure 4. Foliar symptoms of Cucurbit yellow stunting disorder.

Cucurbit yellow stunting disorder

Cucurbit yellow stunting disorder (CYSD), caused by the *Cucurbit yellow stunting disorder virus* (CYSDV), is transmitted primarily by the silverleaf whitefly.[1] Following infection, it can take up to three weeks for symptoms to develop. Initial symptoms include mottling of leaves followed by interveinal chlorosis and foliar yellowing (Figure 4). These symptoms are most prominent on older leaves.[1] With time, the leaves may start to roll upward and become brittle. Infected plants show reduced vigor, and the fruit on these plants have reduced sugar content making them unmarketable.

Management of CYSD is focused mostly on controlling the whitefly vector. If possible, time plantings to avoid periods with large whitefly populations. Whiteflies can be excluded in protected culture systems with the use of 50-52 mesh (297 micron) screens and in field planting with the use of early-season mesh tunnels. The tunnels need to be removed prior to flowering. Preventative applications of insecticides during transplant production can reduce the incidence of CYSD, but field applications of insecticides are usually not effective for managing virus spread.[1]

Cucumber green mottle mosaic

(CGMM) is caused by the *Cucumber green mottle mosaic virus* (CGMMV). This virus is very stable and can survive in infested crop debris. It is easily transmitted by workers and on equipment. It has also been shown to be transmitted by honey bees in net-house culture systems, and this virus can be seedborne.[1,5]

Figure 5. Foliar symptoms of Cucumber green mottle mosaic. Tera Pitman, UC Davis.

The symptoms of CGMM are similar to those of other mosaic virus diseases of melons.[6] Initial symptoms appear on leaves one to two weeks after infection. A dark-green mottling develops on leaves, and young leaves may show vein clearing and crumpling deformation (Figure 5). Infected plants are stunted.[1,6] Fruit on infected plants may show some spotting or streaking and be distorted, especially at high temperatures.

Plant only seed or transplants obtained from reputable sources. During transplant production, inspect seedlings regularly for disease symptoms. Verify suspected infections with lab tests or test kits. Remove and destroy all seedlings within 3 to 5 feet of infected plants. Sanitize trays, benches, and tools with 10% bleach or other disinfectants. In field and greenhouse systems, workers should wash their hands before and after working with plants. Minimize the handling of seedlings for the first few weeks after transplanting.[1,6]

Sources:

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