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## **New Solutions for Floriculture Disease Problems (OH 6D, 0.5 hrs)**

**Moderator:** Jeremy Jubenville, Michigan State University Extension

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# New Solutions for Floriculture Disease Problems

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**Botrytis Blight (Gray Mold).** The fungus *Botrytis cinerea* infects many greenhouse ornamental and vegetable crops. Disease symptoms include leaf spots, blighting, stem cankers, and damping-off. *Botrytis* blight is also called gray mold due to the large masses of gray conidia or spores ('seeds' of the *Botrytis* pathogen) that are produced (Figure 1A). Spores are carried on air currents to healthy plants where new infections can become established. *Botrytis* typically becomes established and produces conidia on older lower leaves that are near the moist soil surface and under the plant canopy of bedding and stock plants. *Botrytis* can also infect dead plant tissue in the pot or on the greenhouse bench or floor, which can be a source of future infections. Water allows the *Botrytis* conidia to germinate and penetrate the plant. Cuttings propagated under mist should be scouted daily for signs of *Botrytis* infection. Minimize *Botrytis* by watering in the morning so that the foliage can dry rapidly. Space plants further apart and provide good air circulation to reduce relative humidity. Reduce the relative humidity for a minimum of 24 hours immediately following the harvesting of cuttings to help 'dry' the wounded stems and thereby limit stem blight. Sanitation is an important first step to reduce *Botrytis* in your greenhouse. Remove dead plant tissue from greenhouse benches.



**Figure 1.** (A) *Botrytis* blight sporulating on a geranium leaf. (B) Downy mildew sporulating on the underside of an impatiens leaf. (C) Powdery mildew sporulating on verbena leaves. (D) *Pythium* crown and root rot on geranium.

**Impatiens Downy Mildew.** Downy mildew, caused by *Plasmopara obducens*, is an important disease of impatiens in Michigan. Downy mildew diseases are caused by specific pathogens that differ based on the host, meaning that the downy mildew infecting impatiens will not spread to other nearby, unrelated crops in greenhouses or in the landscape. Infection symptoms include chlorotic mottling of the leaves, downward curling of the foliage and plant stunting. The downy mildew pathogen reproduces rapidly, producing a vast quantity of sporangia on diseased tissue, easily observed on the underside of infected leaves (Figure 1B). When the infection becomes severe, leaves may drop from the plant, leaving the plant nearly devoid of foliage and stopping the disease becomes difficult. The pathogen can infect a plant and lay quiet in tissue without noticeable blighting; it is possible to receive plants that appear healthy only to have symptoms develop later. Another spore type, oospores, can form inside infected stems, leaves, and plant debris and enter the soil as plants decay where they can survive and cause infections in subsequent growing seasons. Wetness, high relative humidity, and overcast conditions are triggers to downy mildew disease. In outdoor growing facilities, fog provides nearly the perfect weather for an outbreak. Sporangia develop and ripen during the night as long as there is darkness and at least 6 hours of continuous moisture. When the environment begins to dry in the early to mid-morning hours, air currents or splashing water pluck the sporangia from their spore stalks and carry them to nearby healthy foliage. Downy mildew is most favored at temperatures around 68°F. Temperatures that are too warm (77°F and above) or too cold (59°F and below) may slow the disease. Extended leaf wetness periods of 6

or more hours favors downy mildew. If the weather becomes hot and dry, the pathogen will be halted at least for a while, but it is possible for it to lay quiet in infected tissue and wait for cooler weather.

**Powdery Mildew.** The white talcum-like colonies of powdery mildew start small but can rapidly blight the leaves (Figure 1C), stems, and flowers of susceptible crops. Some powdery mildews can infect many different annual and perennial flowers and vegetables while others can be specific to one plant type. The abundant conidia (spores) give a white, powdery or fluffy appearance. Sometimes the disease only causes yellowing and withering of leaves and stunted plant growth and the characteristic white powdery spores are not produced, making identification of the disease difficult. High relative humidity can prompt epidemics. Gerbera daisy, calibrachoa, zinnia, asters, and verbena (Figure 1C) are very susceptible and may need to be protected with frequent applications of effective fungicides. Other crops may not need frequent fungicide treatments but should be scouted regularly for signs of powdery mildew. Research has found that certain cultivars of a plant crop may be more susceptible than others.

**Pythium Crown and Root Rot.** A common and persistent disease in the greenhouse industry is crown and root rot caused by the water mold *Pythium*. This pathogen can “nibble” the feeding roots of plants, resulting in stunted growth. *Pythium* also causes severe symptoms, such as crown rot, that can result in plant death. Saturated, overwatered growing media favors the *Pythium* pathogen. *Pythium* can persist in the greenhouse and ‘hibernate’ on dirty plant containers, benches, hoses, and greenhouse walkways, ready to become activated by the right crop and weather conditions. Almost any greenhouse crop can be infected by *Pythium*, but the disease is most often found on geraniums (Figure 1D), poinsettias, and snapdragons. Sanitation is especially important in limiting root rot. Minimizing stress on the crop by promoting good growth makes the plant less vulnerable to attack by a root rot. Use a pressure washer with soap and water when cleaning walkways, benches, etc. Follow with a disinfectant to remove any remaining *Pythium*. Choosing the right fungicide tools can help to minimize plant losses. If *Pythium* crown and root rot is a recurring problem, growing cultivars that are less susceptible to the pathogen may be an option. Scouting is an important first step in controlling *Pythium* root rot. If *Pythium* has a significant head start, the root system of some plants will be too rotted and the fungicides will not be able to rescue them. If *Pythium* continues to be an issue in your greenhouse and Subdue MAXX has been the only or primary fungicide used over years, it is possible that the *Pythium* has become resistant and is no longer affected by this fungicide. Testing the *Pythium* present in your greenhouse by a diagnostic lab is the only way to know for sure if the pathogen is resistant.

**Fungicides.** Fungicides are assigned FRAC codes by the Fungicide Resistance Action Committee which are based on the mode of action of the active ingredients. Check product labels and rotate among FRAC codes when applying fungicides.

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