



Sporulating Leaf. (Photos courtesy of M.K. Hausbeck)

# IT'S BACK

Downy mildew on impatiens in the United Kingdom...  
a problem for the United States?

By M.K. Hausbeck

**D**owny mildew on impatiens has been recently diagnosed in Michigan. Growers visiting from the United Kingdom last November mentioned that they had experienced a severe outbreak of downy mildew on hybrid impatiens earlier in the year. The disease had taken the growers by surprise, as they were not familiar with downy mildew on impatiens. Snapdragon, rose, alyssum, pansy, and salvia are susceptible to downy mildew and often suffer from the disease. Other crops such as cineraria, gerbera, lisianthus, ranunculus, larkspur, anemone, garden balsam and impatiens may also become infected by a downy mildew pathogen, although the disease problems are less frequent.

The downy mildew that affects *Impatiens* spp. is caused by a fungal-like microscopic organism called *Plasmopara obducens*. Although downy mildew diseases look the same, they are quite different microscopically with each preferring a particular plant. Snapdragons, roses and impatiens each have a unique downy mildew pathogen. The

downy mildew on snapdragons cannot blight roses, nor can the downy mildew on impatiens spread to any plant outside of the impatiens group. Plants in the impatiens group include bedding plant impatiens, New Guinea impatiens, vegetatively-propagated impatiens and garden balsam.

Downy mildew is a pathogen of *Impatiens* spp. throughout the world and has been reported in the United States, Canada, Asia, Europe and India. This disease has not been a persistent problem for the United States and has been reported at only sporadic intervals (i.e., 1942, 1953, 1955, 1959, 1960, 1973 and 1982) in various locations, including Montana, Minnesota, Wisconsin, Mississippi, Missouri, Indiana, West Virginia, the Northeast and now Michigan.

The disease spores may be spread within a greenhouse by air currents and/or splashing water. Spread from one greenhouse to another may occur via movement of infected plants. U.S. growers must be vigilant and be prepared to take quick action. Given these recent problems and the confirmation of the disease in Michigan, growers in the

## Downy Mildew Symptoms

- Yellowish or pale green foliage
- Downward curling of the leaves
- Distortion of the leaves
- White to light gray fuzz on the undersides of the leaves
- Emerging leaves that are small and/or discolored (yellow or pale green)
- Flower buds may fail to form
- Plants may be stunted

## pests & diseases



The top leaf is healthy, while the bottom one is infected.

United States should review the downy mildew basics because this can be an explosive, destructive and costly pest if it is not managed.

Apparently, it can be eradicated given the gaps in the disease reports. However, given the widespread losses growers in the United Kingdom suffered just a few months ago — their plant losses mounted before they could halt the disease — we should assume that losses from this disease have the potential to be large. Early detection and a rapid response can avert the devastation that some U.K. growers experienced as a result of this downy mildew.

### WHAT TO DO

**Know the symptoms.** Downy mildew distorts plants, blights the foliage and can be very destructive if not detected early. Disease symptoms may be localized within the plant without causing severe injury. Leaf spots are “local infections” and are mild symptoms because the downy mildew is limited within the plant. If downy mildew advances and invades the internal

or vascular system of the plant, the disease becomes “systemic” and is more destructive. When the infection is systemic, the internal mechanism (vascular system) of the plant is affected. Plants become stunted and yellowed with distorted leaves. When young plants and seedlings are infected, they generally do not survive.

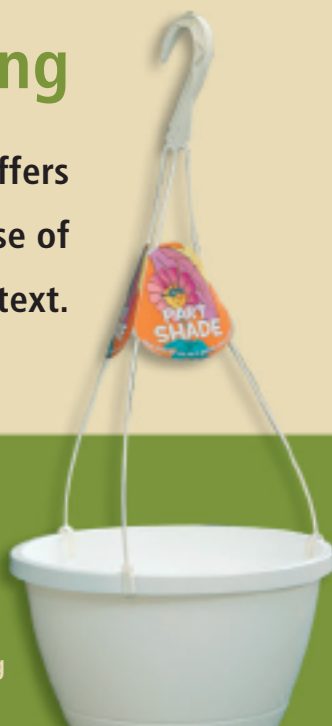
The most obvious sign of downy mildew is the white, grayish fuzz that develops on the underside of the leaves. This can go unnoticed because growers are not accustomed to turning over leaves to look for plant problems. Perhaps other than an especially severe case of Botrytis, no other disease causes such obvious gray fuzz especially on the underside of the leaf. This disease should not be confused with powdery mildew, which affects some floriculture crops and has white fuzzy growth.

**Scout for the disease.** Unlike other diseases that are readily seen from the top of the leaf, downy mildew is most obvious on the undersides of leaves. Growers may not become aware of downy mildew infection until the disease is well established and dif-

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difficult to control. A small amount of downy mildew can become established over several days or weeks on the undersides of leaves and remain unnoticed until the environment is favorable for rapid production of spores. Once spores are produced in great

quantities, the disease spreads rapidly and becomes evident to growers. Growers experiencing losses due to downy mildew on susceptible crops often report that the disease seemed to appear overnight. Once downy mildew is established at a low level,

wet weather can prompt an explosion of disease. Fungicide sprays are best started prior to a disease outbreak.

When receiving impatiens, scout them immediately by examining fully-expanded leaves, paying special attention to the undersides of leaves. Scout a minimum of one out of every 30 plants. Since plants may be infected with downy mildew but not show white or grayish fuzz immediately, they should be scouted weekly. If diseased plants are discovered, they should be discarded immediately.

**Dispose of diseased plants.** Downy mildew has a unique, thick-walled survival structure that allows it to persist in soil, growing media or diseased plants for years. When disposing of diseased plants, place the entire plant, including the growing media and pot, in a bag and promptly seal it. Do not carry diseased plants through the greenhouse for disposal because spores on the infected plants will be released and may infect nearby healthy plants of the same plant type. Disposing of diseased plants removes a source of spores that would otherwise

## Keeping the Fungicides Working: A Sample Program

Downy mildew has the bad habit of changing and becoming resistant to systemic fungicides. Since Subdue MAXX is used so often and is therefore especially at risk, it should only be used once in a production program and must only be applied as a drench.

An example of a fungicide program for downy mildew:

- Subdue MAXX drench at planting only.

- Weekly foliar sprays could include the following:

Spray 1. Mancozeb

Spray 2. Stature DM 50WP+ Mancozeb

Spray 3. Mancozeb

Spray 4. Aliette + Mancozeb

Spray 5. Mancozeb

Spray 6. Strobilurin (examples: Compass 50WDG or Heritage 50WG) + Mancozeb

Spray 7. Repeat the program beginning with Spray 1

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allow the downy mildew to spread. Do not place diseased plants in a cull or compost pile. They should be removed from the greenhouse vicinity and destroyed or disposed of in a landfill.

Healthy-appearing plants that are adjacent to the diseased plants should also be discarded.

All remaining impatiens anywhere on the premises should be treated with fungicides.

### PREVENTION

*Maintain a dry environment.*

Downy mildew can be explosive when the weather is wet and humid. A film of water on the

plant's surface for more than six hours allows the downy mildew pathogen to germinate and infect. Keep the relative humidity below 85 percent to prevent condensation from forming. Water plants when they can dry quickly.

*Apply effective fungicides preventively.* Fungicides should be applied preventively before disease develops. Protectant fungicides act as a barrier to the downy mildew pathogen. Mancozeb (Protect T/O, Cleary Chemical) is the preferred protectant fungicide for downy mildew. Mancozeb is not absorbed by the plant so the spray program must begin before downy mildew becomes established. At Michigan State University, downy mildew studies with snapdragons and vegetable crops have shown that weekly sprays of mancozeb effectively suppress downy mildew if applications are made early and repeated frequently.

Systemic fungicides can be especially helpful in managing downy mildew because these products are absorbed by the plant and can help fight newly-

established infections. Systemic fungicides include mefenoxam (Subdue Maxx, Syngenta) as a soil drench and dimethomorph (Stature DM 50WP, SePRO) as a foliar spray. Aliette 80WDG (Bayer Environmental Science) is applied as a foliar spray and is a unique fungicide because it helps prompt the plant to defend itself. In research trials on snapdragon, mefenoxam applied to the soil performed well against downy mildew. Stature WP, a relatively new product, was also effective. For research, other non-registered and registered fungicides were used, as some provided good control and others did not. <sup>[GPN]</sup>

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Figure 1. Partial Listing of chemicals available for control of downy mildew.

Aliette WDG	Bayer Environmental Science
Alude Systemic Fungicide	Cleary Chemical Corp.
Camelot	Whitmire Micro-Gen
Cygnus	The Scotts Co.
Compass 0	Olympic Horticultural Products
Dithane	Valent USA
Fore	Valent USA
Heritage Fungicide	Syngenta Professional Products
Manzate 75WD	Griffin
Milstop	BioWorks
Pentathlon	Griffin
Plantshield HC	BioWorks
Protect T/O	Cleary Chemical Corp.
Quell Sipcam	Agro
Stature	SePRO Corp.
Subdue MAXX	Syngenta Professional Products
Triact 70	Olympic Horticultural Products
ZeroTol	BioSafe Systems
Zyban	The Scotts Co.