

# **Impatiens Downy Mildew: Guidelines for Growers**

#### **Quick Facts**

**Common Name** Impatiens downy mildew **Scientific Name** *Plasmopara obducens* 

Plants affected Impatiens walleriana

**Primary symptoms:** light-green yellowing or stippling of leaves, leaves curl downward at the margins, white downy-like growth on underside of leaves, stunting, leaf and flower drop

#### **Background**

Impatiens downy mildew is a destructive foliar disease of *Impatiens* walleriana that is capable of causing complete defoliation or plant collapse, especially in landscape plantings under moist conditions and cool nights.

While there have been sporadic reports of impatiens downy mildew in U.S. greenhouses since 2004, it was not until summer 2011 that regional outbreaks of this disease were seen for the first time in landscape beds and container plantings in North America. In early January 2012, outbreaks of impatiens downy mildew were observed in landscape beds and greenhouses in south Florida. It is unclear whether this was a continuation of the 2011 outbreaks or a new cycle of disease for 2012. By the end of the 2012 season, impatiens downy mildew had been confirmed in 33 states. However, the occurrence and timing of when the disease showed up within a geographic region was highly variable. In early November 2012, new outbreaks were being seen in south Florida landscapes signalling the potential start of a new cycle of disease for the 2013 season.

# Young plant and finish growers are at an increased risk for this disease if:

- 1. Located in region where production of *I. walleriana* conincides with plantings of *I. walleriana* growing in the landscape.
- 2. Source of incoming liners and plugs from region where infected impatiens are currently growing or have been reported in landscape
- 3. Growing in region where infected impatiens were confirmed in the landscape in 2011 or 2012.

#### **Hosts**

- ✓ All cultivars of *Impatiens walleriana* (common garden impatiens) and interspecific hybrids with an *I. walleriana* parent are susceptible including Fusion, Fiesta and Patchwork.
- ✓ A few wild species of impatiens are also susceptible; however, there are no other bedding plant species that are known hosts.
- Both vegetative propagated and seed-raised *I. walleriana* are susceptible but there is NO EVIDENCE of seedborne transmission of *P. obducens*.
- ✓ New Guinea impatiens (Impatiens hawkeri) including Fanfare, Divine, Celebration, Celebrette, and Sunpatiens have high resistance to this disease.

#### Spread

Sporangia (sac-like structures filled with zoospores) produced on the underside of infected leaves are easily dislodged and can be spread short distances by water splash, and longer distances by air currents.

# Two main routes for entry into a greenhouse facility:

- 1. infected plant material (plugs, cuttings, liners)
- 2. wind-dispersed, aerial spores from infected plants growing elsewhere (may travel on the order of hundreds of miles).

**CAUTION:** Infected plants not yet showing symptoms may result in the inadvertent movement of the pathogen.

## **Quick Tips**

- Train your staff to recognize early symptoms of downy mildew
- Inspect liners and plugs on delivery
- Apply fungicides preventively
- Scout frequently, turning leaves over to look for white sporulation
- Minimize greenhouse humidity and limit leaf wetness <4-5 hr, especially at night



States with confirmed landscape and/or greenhouse reports of impatiens downy mildew in 2012 are shown in green.

# **Symptoms**

Young plants and immature plant tissues are especially susceptible to infection. Symptoms are often first observed on terminal growth. Seedling cotyledons are highly susceptible to infection.

## Early symptoms include:

 Light-green yellowing or stippling of leaves

✓ Subtle gray markings on upper leaf surface sometimes visible

✓ Downward curling of infected leaves —

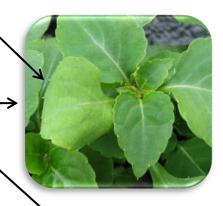
✓ White downy-like fungal growth on the undersides of leaves

# Advanced symptoms include:

 Stunting in both plant height and leaf size when infected at an early stage of development

✓ Leaf and flower drop resulting in bare, leafless stems

✓ Infected stems become soft and plants collapse under continued wet and cool conditions (more likely to see in landscape plantings)







**Example of an Impatiens Downy Mildew Fungicide Rotation** 

Appl No.	FRAC Code	Fungicide	Method	Rate /100 gal
1 Cuttings	43+M3 	Adorn + Protect DF + Capsil	Spray	2 fl oz +2 lb +6 fl oz
Plugs (or as soon as rooted)	43+4	Adorn + Subdue MAXX (or Subdue MAXX alone if Adorn applied to cuttings)	Drench	1 fl oz + 1 fl oz
2	40	Stature SC	Spray	12.25 fl oz
3	М3	Protect DF + Capsil	Spray	2 lb + 6 fl oz
4 (final application)	4+43	Subdue MAXX + Adorn	Drench	1 fl oz + 1 fl oz
(rotation application)	11 11+7	or Pageant	Spray Spray	9 fl oz 12 oz

Rotate among fungicides with a different mode of action (FRAC code)

## **Cultural Control**

- Minimize greenhouse humidity and leaf wetness (< 4-5 hr)
- Frequently scout crop, with particular attention to early leaf symptoms
- Remove symptomatic plants and any fallen leaves immediately
- Bag plant(s) and seal before carrying out of greenhouse; do not
- If sporulation is visible, remove adjacent plants within 3 feet

- Segregate impatiens from different sources
- Grow seed raised and vegetative propagated impatiens in separate greenhouses to minimize risk of contamination

## **Chemical Control**

Preventive application is critical. Control is nearly impossible once sporulation has occurred in a growing facility.

- ✓ Make first fungicide application at transplant (plugs) \*Adorn + Subdue MAXX drench recommended
- ✓ Make first fungicide application within 7 days of receipt (unrooted cuttings)
  - \* Protect DF + Adorn foliar tank mix recommended
  - Under low disease pressure or low risk: Reapply foliar applications at 7 day intervals with different FRAC code product
  - Under high disease pressure or high risk: 7-day intervals with foliar applications may not be sufficient due to limited residual
- ✓ Apply a final drench application within 1 week prior to ship

Drenches of Adorn and/or Subdue MAXX exhibited the longest residual efficacy (21-28 days) of all fungicides tested in a limited number of research trials. Tank mix to reduce the risk of fungicide resistance.

#### Additional Information

http://www.ballpublishing.com/GrowerTalks/ViewArticle.aspx?articleid=18

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Dr. Colleen Warfield: cwarfield@ballhort.com Corporate Plant Pathologist, Ball Horticultural Co.

These products are labeled for greenhouse use. Double check labels before using in the landscape, as not all products are labeled for landscape use.

FRAC Code (MOA)	Fungicide	Active ingredient(s)	Activity	Rate/100 gal	Application	REI (re-entry interval)	Preventive efficacy
М3	Protect DF	mancozeb	Contact	2 lb	Spray	24 hr	+++++
4	Subdue MAXX	mefenoxam	Systemic	1 fl oz	Spray Drench	48 hr 0 hr (drench)	+++++RT +++++RT
11	Heritage <sup>C</sup>	azoxystrobin	Translaminar	2 oz	Spray	4 hr	++++
11	Disarm O <sup>C</sup>	fluoxastrobin	Systemic	4 fl oz	Spray	12 hr	++++
11	FenStop <sup>c</sup> (not registered in NY)	fenamidone	Systemic	7-14 fl oz <sup>A</sup>	Spray	12 hr	+++++
11+7	Pageant	pyraclostrobin+boscalid	Translaminar/Systemic	12 oz	Spray	12 hr	++++
21	Segway <sup>C</sup>	cyazofamid	Contact; limited systemic	3.5 fl oz	Spray	12 hr	++++
33	Aliette	fosetyl-AL	Systemic	12.8 oz	Spray	12 hr	++
33	Vital 4.2L <sup>V</sup> (Alude/Resyst) <sup>S</sup>	potassium phosphite (K salts of phosphorous acid)	Systemic (Systemic)	4 pt (1.25-2.5 qt) <sup>S</sup>	Spray (Vital) Drench (Vital)	4 hr 4 hr	++++
40	Stature SC	dimethomorph	Translaminar	12.15 fl oz	Spray	12 hr	++++
40	Micora (not registered in NY, CA)	mandipropamid	Translaminar	8 fl oz	Spray	4 hr	++++
40+45	Orvego (not registered in NY, CA)	dimethomorph+ametoctradin	Translaminar	11 fl oz	Spray	12 hr	++++
43	Adorn <sup>C</sup>	fluopicolide	Local systemic Translaminar/Systemic	2-4 fl oz 1 fl oz	Spray Drench	12 hr 12 hr	++++ <sup>T</sup> +++++ <sup>T</sup>

Efficacy ratings based on research trials conducted at Ball: + = poor (not recommended), ++ = fair, +++ = good, ++++ = very good, +++++ = excellent

<sup>&</sup>lt;sup>c</sup> Trials were conducted with the addition of Capsil 6 fl oz/100 gal)

<sup>&</sup>lt;sup>T</sup> Fungicide must be tank mixed with another product effective against downy mildew

<sup>&</sup>lt;sup>S</sup> Apply Alude or Resyst as foliar sprays, no trial data available.

A CAUTION: higher rate may cause phytotoxicity on young plants

R CAUTION: Populations resistant to mefenoxam have been observed in Europe

V Vital no longer on market

<sup>(</sup>Not all commercially available products may be listed. The use of brand names or commercial products listed does not imply endorsement by Ball Horticultural Co. or discrimination against similar products not mentioned. This table is not intended as a substitute for the product label. Obtain current information about usage regulations before purchasing or applying any chemical.)