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

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

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. The spread of this disease continued throughout the spring, and by mid-July 2012 impatiens downy mildew had been confirmed in landscape beds and/or greenhouses in 25 states and Washington, D.C.

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

1. Located in region where production of *Impatiens 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.

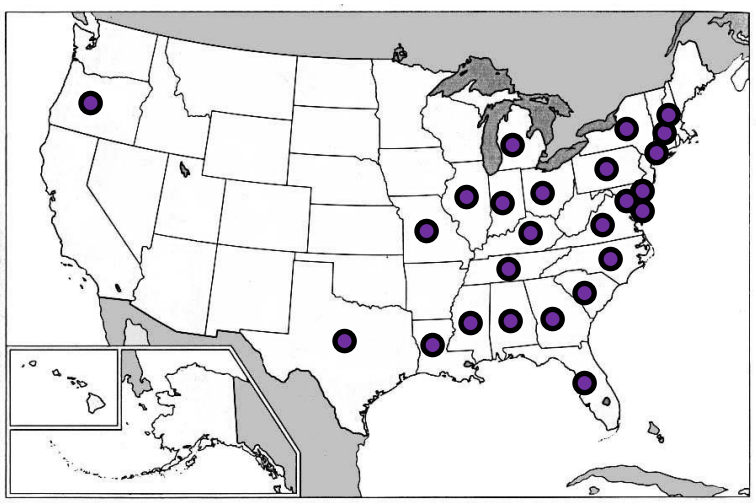
Spread

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.



Confirmed reports of impatiens downy mildew in 2012 (as of July 31) in landscapes and/or greenhouses

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

Example of an Impatiens Downy Mildew Fungicide Rotation

Appl No.	FRAC Code	Fungicide	Method	Rate /100 gal
1	43+M3	Adorn + Protect DF + Capsil	Spray	2 fl oz + 2 lb +6 fl oz
		or		
	43+4	Adorn + Subdue MAXX	Drench	1 fl oz + 1 fl oz
2	40	Stature SC	Spray	12.25 fl oz
3	M3	Protect DF + Capsil	Spray	2 lb + 6 fl oz
4	4+33	Subdue MAXX + Adorn	Drench	1 fl oz + 1 fl oz
		or		
	4+11	Adorn + Alude	Spray	1 fl oz + 2.5 qt
		or Fenstop (not in NY)	Spray	9 fl oz
		or Pageant	Spray	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 compost
- ✓ 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**
  (Adorn+Protect or Adorn+Subdue MAXX tank mix recommended)
  - ➢ **Under low disease pressure or low risk:** Reapply at 7 day intervals
  - ➢ **Under high disease pressure or high risk**: 7-day intervals with foliar applications may not be sufficient due to limited residual activity
- ✓ **Apply final application within 1 week prior to ship**

Drenches of Adorn or Subdue MAXX exhibited the longest residual efficacy of all fungicides in a limited number of research trials. However, each product MUST be tank mixed with another fungicide from a different class (FRAC code) to reduce the risk of fungicide resistance.

Additional Information

http://www.ballpublishing.com/GrowerTalks/ViewArticle.aspx?articleid=18921

http://www.ballpublishing.com/GrowerTalks/ViewArticle.aspx?articleid=18917

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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)	Efficacy
M3	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[C]	azoxystrobin	Translaminar	2 oz	Spray	4 hr	++++
11	Disarm O[C]	fluoxastrobin	Systemic	4 fl oz	Spray	12 hr	++++
11	Fenstop[c] (not registered in NY)	fenamidone	Systemic	7-14 fl oz[A]	Spray	12 hr	+++++
11+7	Pageant	pyraclostrobin+boscalid	Translaminar/Systemic	12 oz	Spray	12 hr	++++
21	Segway[C]	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[V] (Alude/Resyst)[S]	potassium phosphite (K salts of phosphorous acid)	Systemic (Systemic)	4 pt (1.25-2.5 qt)[S]	Spray (Vital) Drench (Vital)	4 hr 4 hr	++++ ++++
40	Stature SC	dimethomorph	Translaminar	12.15 fl oz	Spray	12 hr	++++
40	Micora	mandipropamid	Translaminar	8 fl oz	Spray	4 hr	++++
40+45	Orvego	dimethomorph+ametoctradin	Translaminar	11 fl oz	Spray	12 hr	++++
43	Adorn[C]	fluopicolide	Local systemic Translaminar/Systemic	2-4 fl oz 1 fl oz	Spray Drench	12 hr 12 hr	++++[T] +++++[T]

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

[C] Trials were conducted with the addition of Capsil 6 fl oz/100 gal)

[A] CAUTION: higher rate may cause phytotoxicity on young plants

[T] Fungicide must be tank mixed with another product effective against downy mildew

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

[S] Apply Alude or Resyst as foliar sprays, no trial data available.

[V] Vital no longer sold; suggest using Alude as alternative

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