

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.

Regional outbreaks of this disease were seen for the first time in landscape beds and container plantings in North America in summer 2011. In early January 2012, outbreaks of impatiens downy mildew were observed in landscape beds and greenhouses in south Florida. It was 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 34 states. However, the occurrence and timing of when the disease showed up within a geographic region was highly variable. In early November 2012, outbreaks were again seen in south Florida landscapes signaling the start of a new cycle of disease for the 2013 season. In 2013, the distribution of the disease was similar to the previous two years, with the addition of infected landscape beds in regions of Colorado, Kansas and Utah. In most regions of the country the occurrence of the disease in 2013 was late in the season, similar to what was observed in 2011.

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

1. Located in region where production of *I. walleriana* coincides with plantings of *I. walleriana* growing in the landscape.
2. Source of incoming liners and plugs from region where infected impatiens currently growing or have been reported in landscape.
3. Growing in region where infected impatiens were confirmed in the landscape in 2011, 2012 or 2013.

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.

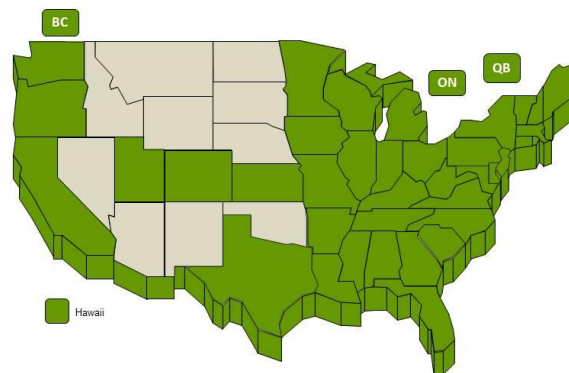
Spread

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.



States where impatiens downy mildew has been confirmed in the landscape and/or greenhouse are shown in green (2011-2013)

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
- ✓ 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	43+M3	Adorn + Protect DF + Capsil	Spray	2 fl oz +2 lb + 6 fl oz
		or		
Plugs (or cuttings 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 or Micora	Spray	12.25 fl oz
	40		Spray	8 fl oz
3	M3	Protect DF + Capsil	Spray	2 lb + 6 fl oz
4	4+43	Subdue MAXX + Adorn (6 wk after last drench)	Drench	1 fl oz + 1 fl oz
(final application)				
(rotation application)	11	or FenStop (not in NY)	Spray	9 fl oz
	11+7	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

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)	Residual efficacy (>7 day)
M3	Protect DF	mancozeb	Contact	2 lb	Spray	24 hr	++++
M3	Dithane 75DF	mancozeb	Contact	2 lb	Spray	24 hr	++++
4	Subdue MAXX	mefenoxam	Systemic	1 fl oz 0.5-1.0 fl oz	Spray Drench	48 hr 0 hr (drench)	++ ^{RT} ++++ ^R
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 4.2LV	potassium phosphite	Systemic	4 pt 1.25 pt	Spray Drench	4 hr 4 hr	+++ ++++ ^V
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 (not registered in NY)	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

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

^V Vital no longer on market (Alude/Resist/AgriFos potential spray alternatives; trials using label rates of AgriFos had <7 day residual activity). In Canada: drench with 1.5L/1000L PHOSTROL.

(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.)

LISTED PRODUCTS MAY NOT BE REGISTERED IN ALL STATES.

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Chemical Control

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

- ✓ **Plugs: make first fungicide application at transplant**
*Adorn + Subdue MAXX drench recommended
- ✓ **Unrooted cuttings: make first fungicide application within 7 days of receipt and then drench as soon as rooted**
* Protect DF + Adorn foliar tank mix recommended
- **Under low disease pressure or low risk (and if you have drenched):** Reapply foliar applications at 14-day intervals with different FRAC code product
- **Under high disease pressure or high risk (or if you have not drenched):** 7-day intervals with foliar applications may not be sufficient due to limited residual activity
- ✓ **Drench again 6 weeks after first drench application if plants still onsite (or 4 wk if using 0.5 fl oz/100 gal Subdue MAXX)**

** Drenches of Adorn (1 fl oz/100 gal) + Subdue MAXX (1 fl oz/100 gal) exhibited the longest residual efficacy (35 days) of all fungicides tested

** Foliar applications of mancozeb (Protect DF or Dithane 75 DF) exhibited the longest residual efficacy of all foliar-applied fungicides

Additional Information

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

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

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