



# **Impatiens Downy Mildew: Description of a Devastating Disease & Hope for the Future**

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IR-4 info and data slides from other researchers removed.



# Impatiens Downy Mildew

The following slides were compiled from presentations provided by Ms. Margery Daughtrey, Dr. Mary Hausbeck, and Dr. Aaron Palmateer.

**Photos by M. Daughtrey**

Before: Sept 15, 2011

After: Oct 11, 2011

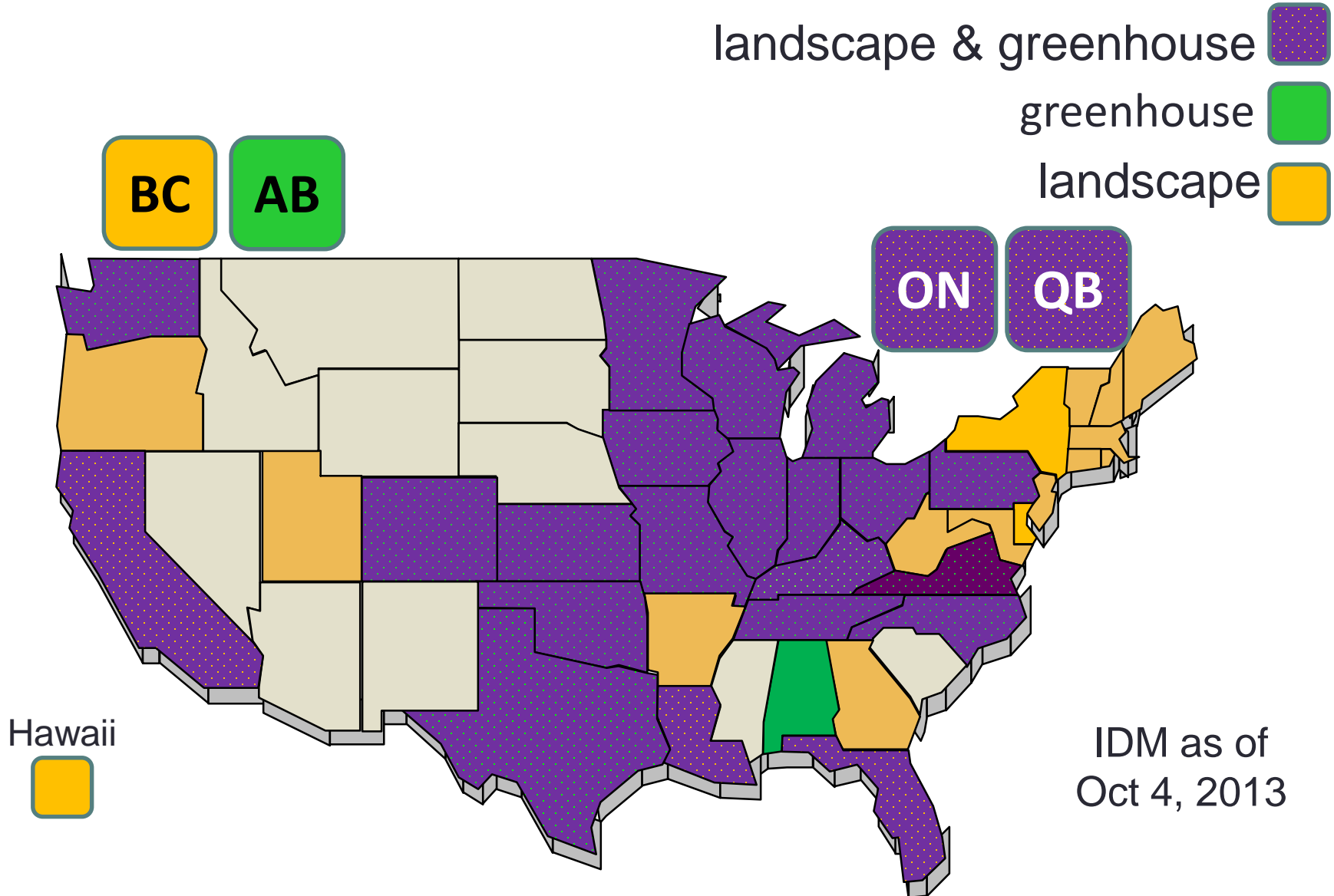
# Recent IDM History

- IDM first seen in 'Busy Lizzies' in 2003 in UK
- 2004 – first seen on greenhouse crops in US, only one reported case in UK
- 2005 – 2007 - sporadic observations
- 2008 – wide spread observations and oospores observed in UK
- 2009 – 2010 – major declines in impatiens in Saratoga Springs, NY
- 2011 – 2012 – widespread reports throughout US





# 2013 Landscape & Greenhouse Reports of Impatiens Downy Mildew



# Symptoms

- Stippling
- Leaves curling down
- Defoliation
- Flower loss
- Collapse of plants



Photos by M. Daughtrey



Photo by M. Hausbeck



Photo by M. Daughtrey





2004 NY M. Daughtrey



Photo by A. Windham

**Sporangia on stalk  
growing from infected  
impatiens.**

**Photo by M. Hausbeck**

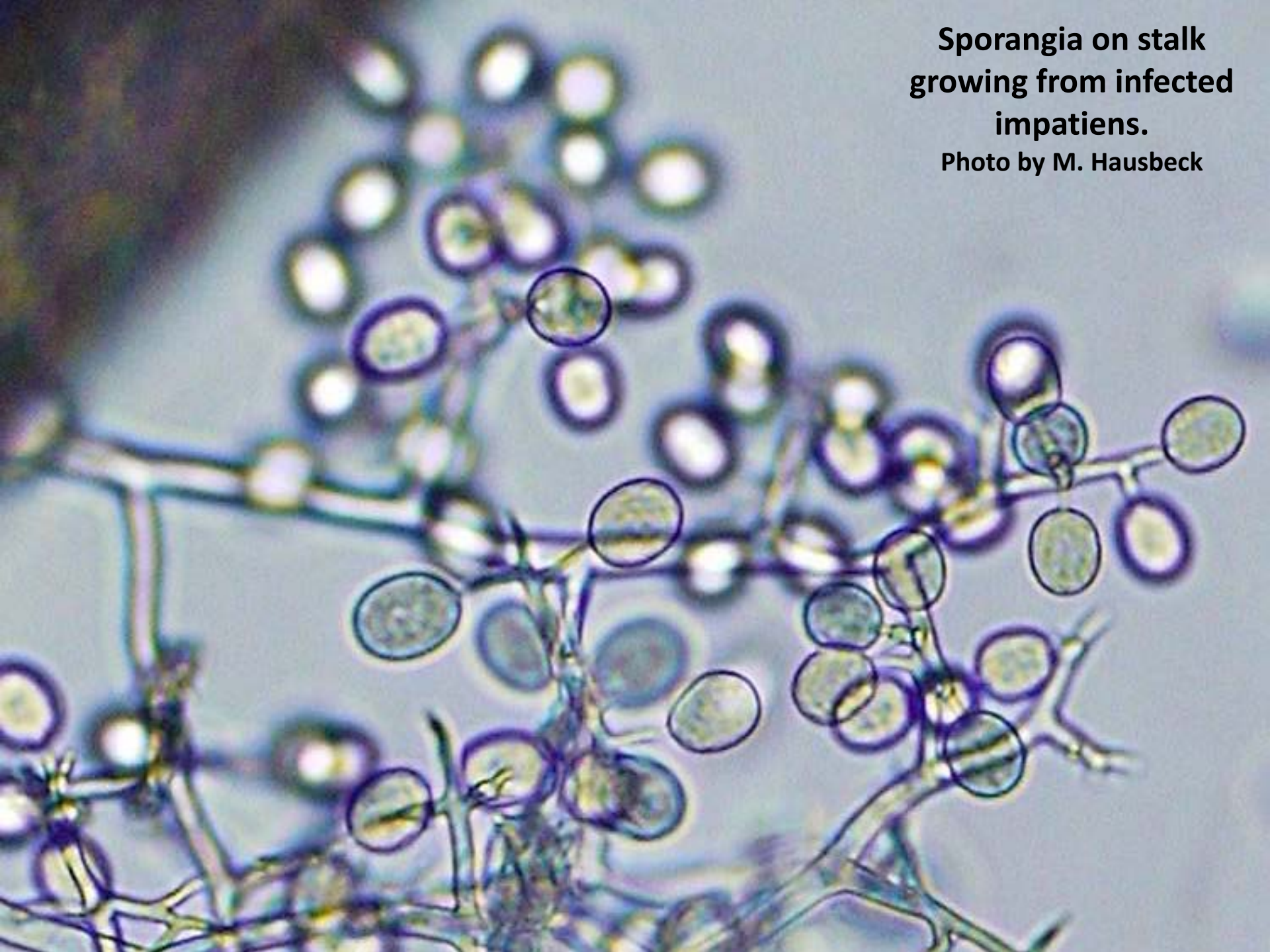




Photo by M. Daughtrey

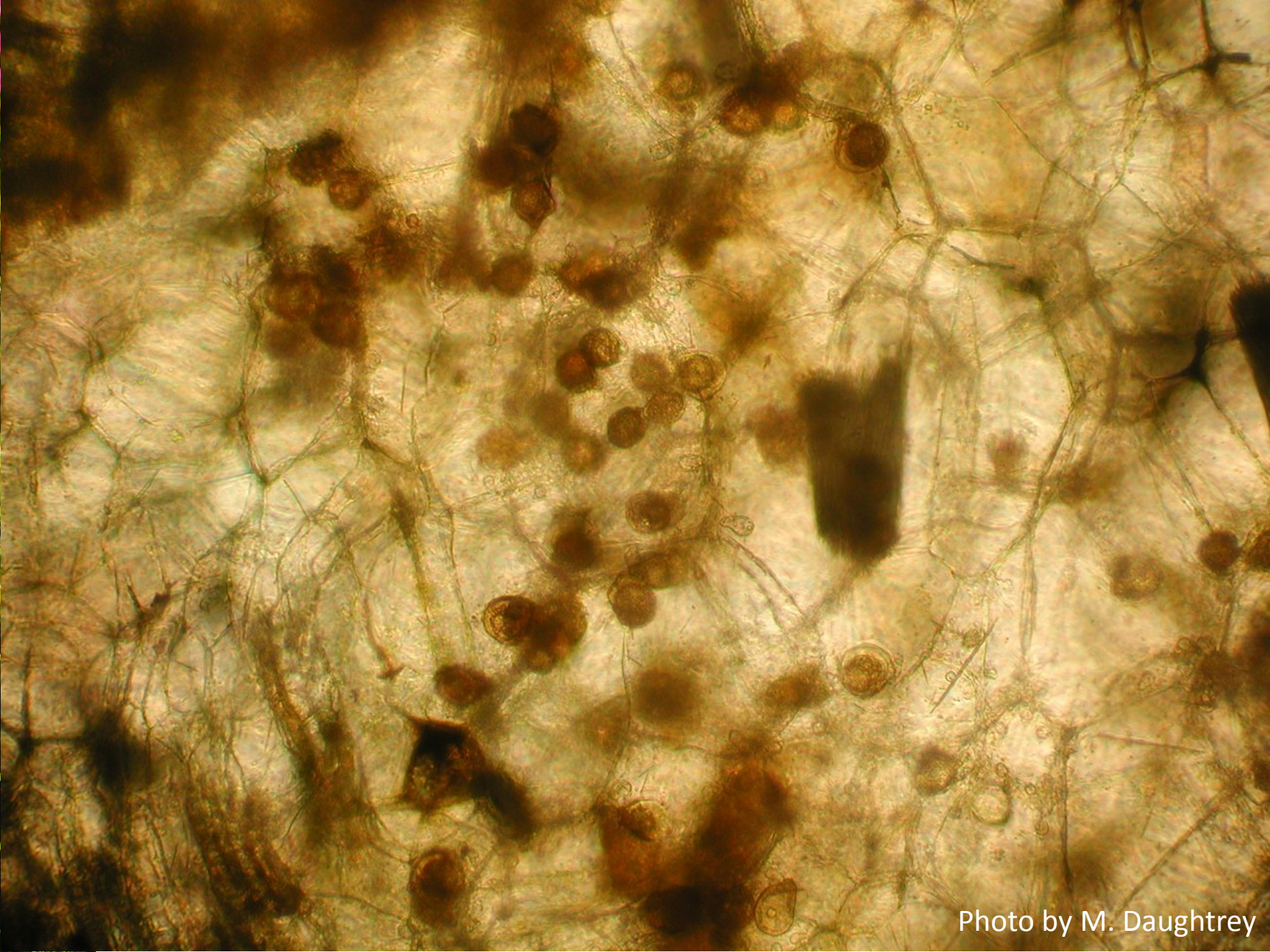


Photo by M. Daughtrey

# Impatiens Downy Mildew is a Challenge!

- Effective management requires:
  - Coordination
    - Suppliers / plug producers
    - Wholesalers
    - Finishers
    - Retailers
  - Knowledge
    - Disease biology
    - Optimal management program(s)


# Impatiens Downy Mildew Research

- Collaborative, coordinated effort
  - Dr. Margery Daughtrey
  - Dr. Mary Hausbeck
  - Dr. Aaron Palmateer
  - Dr. Cristi Palmer
  - Dr. Nina Shishkoff
  - Dr. Lina Quesada
- Green Industry Partners
  - Lin Schmale (SAF)
  - Dr. Colleen Warfield (Ball Seed Company)
  - Dr. Jane Trollinger (Syngenta Pro Flowers)

# IDM Research Areas

- Fungicides:
  - What works and what doesn't
  - Rotational strategies
  - How long will the last application in the greenhouse maintain good looking impatiens in the landscape?
- Biology:
  - What environmental parameters are conducive for sporangia release?
  - Does *P. obducens* overwinter?
- Genetic Resources:
  - How variable is the genome?
  - Is the current epidemic the same exact fungus as previous reported IDM?





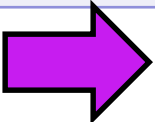
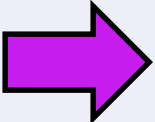
What works to manage IDM in  
the greenhouse?



How long does the final  
greenhouse treatment last when  
impatiens are planted in the  
landscape?

# Efficacy of Several Products on 8/7/2013

Experiment conducted at Cream Ridge Experiment Station, NJ

Treatment	Sporulation Rating (0 – 5)		
	Dark Pink (Dazzler Punch)	Pink (Accent Rose)	White (Accent White)
A14658C 4 pt Weekly Foliar	1.3 ab	0.6 ab	1.7 b
A14658C 8 pt Biweekly Foliar	1.8 b	0.8 ab	1.2 b
Adorn 4 fl oz Monthly Drench 	0.3 a	0.3 ab	0.0 a
Alude 1.25 qt Weekly Foliar	2.1 b	1.4 b	2.0 b
Alude 2.5 qt Biweekly Foliar	3.0 b	1.4 b	3.6 c
Subdue Maxx 2 fl oz Monthly Drench 	0.0 a	0.0 a	0.0 a
Untreated	5.0 c	5.0 c	5.0 d



[Blank white label]

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Alumina  
1.5m  
1.5m

# IDM Management: Chemical Control

- Apply preventive treatments
- Most foliar fungicides have < 7 days residual
- Drench applications of Adorn and Subdue MAXX have 4 – 6 week residual
- Rotate among fungicides with different modes of action (refer to FRAC code)
  - Many choices among 10+ classes

# Preventative Control Options

## Caveats:

- Curative applications are not effective. ***Must apply preventatively!!!***
- Residual efficacy is 7 days or less for foliar applications
  - Adorn & Subdue can be applied preventatively 6-7 days prior to inoculation and still be effective; others are not quite as good under heavy inoculations.
- Must rotate among different classes to reduce potential for resistance
- Must get excellent coverage for best efficacy including bottom of leaves, even for systemic products

# Downy Mildew Fungicides

FRAC	Product	A.I.
M3	Protect DF	mancozeb
4	Subdue MAXX	mefenoxam
11	Heritage	azoxystrobin
11	Disarm O	fluoxastrobin
11	FenStop	fenamidone
11+7	Pageant	pyraclostrobin+boscalid
40	Micora	mandipropamid
21	Segway	cyazofamid
33	Vital	potassium phosphate
33	Alude	K salts of phosphorous acid
40	Stature	dimethomorph
43	Adorn	fluopicolide
45+40	Orvego	ametoctradin+dimethomorph

# Downy Mildew Greenhouse\* Fungicides

Product	Rate/100 gal	REI (hrs)
Protect DF	2 lb foliar	24
Subdue MAXX	0.5-1 fl oz foliar, drench	48 fol, 0 dr
Heritage	1-4 oz foliar	4
Disarm O	1-4 fl oz foliar	12
FenStop	14 fl oz foliar	12
Pageant	12-18 oz foliar	12
Segway	2.1-3.5 fl oz foliar	12
Vital	0.65-1.25 pt drench**	4
Alude	6.25-12.75 fl oz drench**	4
Micora	4-8 fl oz drench	4
Stature	3.2-6.4 fl oz foliar	12
Adorn	2-4 fl oz foliar, 1-4 fl oz drench	12 fol/dr
Orvego	11-14 fl oz foliar	12

\* May not be labeled for landscape use

\*\* Drench labeled for *Phytophthora* and *Pythium* spp.



# Downy Mildew Landscape\* Fungicides

Product	Rate/100 gal	REI (hrs)
Protect DF	2 lb foliar	24
Subdue MAXX	0.5-1 fl oz foliar, drench	48 fol, 0 dr
Subdue GR	6-30 oz/1000 sq ft 1.6-8 oz/cu yd in containers	48
Heritage	1-4 oz foliar	4
Pageant	12-18 oz foliar	12
Segway	2.1-3.5 fl oz foliar	12
Vital	4 pt foliar	4
Alude	6.25-12.75 fl oz drench	4
Adorn	2-4 fl oz foliar, 1-4 fl oz drench	12 fol/dr

\* Has the word "Landscape" in label use directions

# Shade alternatives to *Impatiens walleriana*

- Alternanthera
- Begonia
- Browalia
- Caladium
- Coleus
- Fuschia
- Hypoestes (polka dot plant)
- NG Impatiens
- Oxalis
- Perilla
- Torenia
- Scutellaria



# Partial Shade alternatives to *Impatiens walleriana*

- Cyclamen
- Diascia
- Dichondra
- Euphorbia hypericifolia
- Ivy Geranium
- Heliotrope
- Ipomoea
- Iresine
- Lobelia
- Lobularia
- Nemesia
- Nicotiana
- Plectranthus
- Salvia splendens
- Sanvitalia



# Additional Resources

- American Floral Endowment
  - <http://www.endowment.org>
- Cornell Cooperative Extension
  - <http://ccesuffolk.org/floriculture-program/>

# Thank you !



## **Funding for IR-4 Research:**

USDA-NIFA

USDA-ARS

USDA-APHIS

Land Grant Institutions



The Chemical Company



## **Researchers:**

All the fine researchers throughout the US and in cooperating countries



## **Growers:**

Who donate time to complete the biennial survey and all those plant materials!



## **IR-4 Personnel:**

Michelle Foo

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Edith Lurvey

Becky Sisco

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Ely Vea



Thank you