Impatiens Downy Mildew: Recent History, Identification, and Management

ANGELA ORSHINSKY
ASSISTANT PROFESSOR AND EXTENSION SPECIALIST
DEPARTMENT OF PLANT PATHOLOGY
UNIVERSITY OF MINNESOTA
SEMINAR OUTLINE

- History of impatiens downy mildew
- About the disease
  - The pathogen
  - The host
  - The environment
  - Symptomatology
- Management
  - Cultural strategies
  - Chemical strategies
HISTORY

- 1870s – 2000s Wild impatiens species only

*Impatiens walleriana* – cultivated impatiens

- 2003 - UK – greenhouse and landscape
- 2004 – California – greenhouse production
- 2006 - Australia – greenhouse and landscape
- 2008 - Japan
- 2009 – USA – landscape plants in NY
- 2010 – Norway
- 2011/2012 - Major US outbreak - ongoing
MEDIA PICKS UP THE STORY

Impatiens, a shade garden workhorse, goes lame

Disease threatens impatiens

Surprising scientists and horticulturists, impatiens blooms in 33 states

A puzzling plant disease may dethrone America, the garden impatiens.

A relatively benign condition known as impatiens downy mildew has recently turned ugly, for reasons under debate. For decades, U.S. gardeners rarely noticed downy mildew on their impatiens. But in the last two years, the disease has ravaged flower beds in some of the more humid parts of the country. After rain or fog followed by balmy nights, the disease can turn a lush flower border into a straggly, bare stalks that eventually collapse and die.

Impatiens disease changing American gardens

Fungal disease targets colorful landscape staple, experts recommend trying alternatives

April 22, 2013 | By William Hageman, Chicago Tribune reporter
WHAT HAPPENED?

- Historically, downy mildew only a moderate disease on native Impatiens
  - *I. capensis* = Orange Jewelweed
  - *I. pallida* = Pale Jewelweed
WHAT HAPPENED?

- Genetic evidence suggests hybridization between strains
- Six major genotypes, four of which are “modern”

Impatiens under attack: Genetic variability of the oomycete pathogen *Plasmopara obductens* in the U.S.

Y. RIVERA (1), M. Malapi-Wight (1), A. Ismaiel (2), J. A. Crouch (2)  
(1) Rutgers University / USDA-ARS, Beltsville, MD, U.S.A.; (2) USDA-ARS, Beltsville, MD, U.S.A.  
Phytopathology 104(Suppl. 1):S1.5
CURRENT LOCATIONS - NA

THE PATHOGEN

- There are 2 distinct downy mildew pathogens:
  
  1. *Bremiella sphaerosperma*: on mature leaves, lesions with well defined borders, Eastern NA and Eastern Russia
  
  2. *Perenospora obduscens*: on mature and juvenile tissues, lesions with diffuse borders, throughout the northern hemisphere
THE PATHOGEN

Plasmopara obducens

- Oomycete, water mold
- Not a fungus!
- Likes humidity and cool (60 - 73 F) temperatures

All photos: Tom Creswell, Purdue University, Bugwood.org
THE PATHOGEN

Plasmopara obduscens

- Oospores are resilient spores - overwintering
- Reportedly survives to winterhardiness zone 5
- Formed in stem tissue

Margery Daughtrey
THE PATHOGEN

- Three methods of spread:
  1. Airborne sporangia (storms, normal wind patterns → travel 100s of miles)
  2. Swimming zoospores (from diseased to nearby healthy plants)
  3. Oospores (debris from previously diseased plants)
HOSTS

All cultivars of garden Impatiens *Impatiens walleriana*

Photo: Margery Daughtrey, Cornell
HOSTS

Less susceptible: Balsam impatiens

(*Impatiens balsamina*)
HOSTS

*Impatiens hochstettleri, Impatiens flanaganiae, Impatiens pallida, Impatiens capensis*
HOSTS

Impatiens that are **NOT** hosts:

- *Impatiens hawkeri* – New Guinea Impatiens
- *Impatiens omeiana* – Hardy impatiens
- *Impatiens repens* – Ceylon balsam
- Blue Angel Impatiens
- *Impatiens morsei* ‘Velvetia’
SYMPTOMS AND SIGNS

Remember:

- Can take 5 to 14 days after infection to appear depending on conditions
- Plants that don’t show symptoms are not necessarily pathogen-free
SYMPTOMS AND SIGNS

- Yellowing or stippling of leaves
- Downward curling of infected leaves
- Sporulation can occur on green leaves (flip leaves over when scouting)
SYMPTOMS AND SIGNS

- Unlike nutritional issues or root rots, affected leaves are scattered throughout the plant (no obvious pattern)
- Diffuse pattern of chlorosis
- When scouting:
  - Look under the leaves (both yellow and green leaves)
  - Carry bags to remove diseased plants immediately
SYMPTOMS AND SIGNS
PREVENTATIVE MANAGEMENT

- Prevent introduction into your greenhouse or landscape
  - Purchase plants from trusted sources
  - No evidence of seed transmission
  - Grow plants from different sources in different houses or separate physically some how
  - Sanitation: disinfectants used properly in addition to keeping growing areas clean
  - Don’t allow for sitting water (drainage, avoid ebb and flood or overhead irrigation)
DISEASE MANAGEMENT

- Rogue diseased plants, and those within 3 feet radius, immediately
  - Bag diseased plants before walking them through the landscape or greenhouse
- Bury or burn diseased plants away from production area / landscape
DISEASE MANAGEMENT

- Manipulate environmental conditions
  - Reduce humidity
  - Space plants to allow for air flow
  - Avoid overhead irrigation (use drip irrigation)
  - Irrigate very early in the morning
ALTERNATIVES?

Shade:
- Begonia
- New Guinea Impatiens
- Coleus
- Vinca
NEW IMPATIENS VARIETIES

- New Bounce™ Impatiens hybrids
- Good for shade and sun
- Resistant to downy mildew
- Color options: cherry, lilac, pink, violet, white
- Reported to be more expensive than other alternatives
CHEMICAL MANAGEMENT

How to read a label

TRADE NAME®

MANUFACTURER NAME

For management of diseases on a broad range of crops.

Active ingredient:
Common name (chemical name*) % active ingredient in formulation
Other ingredients in formulation % other ingredients in formulation

Contains x number of lbs active ingredient per gallon
*IUPAC name

KEEP OUT OF REACH OF CHILDREN
CAUTION (SAFETY SIGNAL WORD)
See additional precautionary statements and directions for use inside. See individual container labels for repackaging instructions.

EPA Registration number
Total amount of fungicide per container.
CHEMICAL MANAGEMENT

- **Warning:**
  - Mefenoxam/metalaxyl-resistance is reported in the downy mildew pathogen from various regions (ie. Florida, Holland)

pesticidestewardship.org
CHEMICAL MANAGEMENT

- Fungicide applications should be preventative
- Once sporulation has occurred, disease suppression is unlikely
### CHEMICAL MANAGEMENT

Preventative applications in landscapes:

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Chemical Name</th>
<th>FRAC Code</th>
<th>Application</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protect DF</td>
<td>Mancozeb</td>
<td>M3</td>
<td>Spray</td>
<td>Contact</td>
</tr>
<tr>
<td>Subdue MAXX</td>
<td>Mefenoxam</td>
<td>4</td>
<td>Spray or Drench</td>
<td>Systemic</td>
</tr>
<tr>
<td>Heritage</td>
<td>Azoxystrobin</td>
<td>11</td>
<td>Spray</td>
<td>Translaminar</td>
</tr>
<tr>
<td>Pageant</td>
<td>Pyraclostrobin + Boscalid</td>
<td>11 + 7</td>
<td>Spray</td>
<td>Translaminar/Systemic</td>
</tr>
<tr>
<td>Segway</td>
<td>Cyazofamid</td>
<td>21</td>
<td>Spray</td>
<td>Contact; limited local mobility</td>
</tr>
<tr>
<td>Allude, Agri-Fos, Vital</td>
<td>Potassium phosphate</td>
<td>33</td>
<td>Spray or Drench</td>
<td>Systemic</td>
</tr>
<tr>
<td>Adorn</td>
<td>Fluopicolide</td>
<td>43</td>
<td>Spray or Drench</td>
<td>Local systemic, translaminar</td>
</tr>
</tbody>
</table>

This list is not inclusive, there may be other chemicals and products that are registered for this purpose. The list does not constitute an endorsement by UMN Extension. Read fungicide labels prior to purchase to ensure registration in your state and ensure that application guidelines are followed. The fungicide label is a legal document.
SUMMARY

- Downy mildew of Impatiens is not new, but has become more severe – possibly due to genetic recombination
- Prevention of downy mildew damage requires vigilant scouting and sanitation measures
- Alternatives to *Impatiens walleriana* should be used where disease has been an issue
- Progress is being made into developing resistant Impatiens with similar flowering habits and shade tolerance
THANK YOU FOR YOUR ATTENTION!
For questions:
Angela Orshinsky
aorshins@umn.edu