

Coleus and Basil Downy Mildew

*Nora Catlin, Cornell Cooperative Extension of Suffolk County
nora.catlin@cornell.edu*

Impatiens downy mildew isn't the only downy mildew you need to worry about! There are other downy mildews to be concerned about and to watch for in your greenhouse. Quick reviews of two other downy mildews to know, coleus downy mildew and basil downy mildew, are presented below.

Coleus Downy Mildew

Coleus downy mildew is caused by a species of *Peronospora* and was first reported in the United States in 2005. This downy mildew disease causes irregular-shaped discolored or necrotic areas on coleus foliage, which are often (but not always) angular in appearance. Leaves can also curl, twist, and drop. The gray-brown fuzz of the pathogen's sporulation will be found on the undersides of leaves showing symptoms. Careful inspection, a well-lit area, and a hand lens might be necessary to see the sporulation. The sporulation tends to be easiest to see on the non-variegated dark-leaved cultivars and more difficult to see on others.



The greyish fuzz of downy mildew sporulation on the undersurface an infected coleus leaf. Photo: Margery Daughrey.

Both seed and vegetative cultivars of coleus are susceptible as well as agastache. The good news is that there is variation in the susceptibility of coleus cultivars – some are very susceptible and can defoliate while others are less affected. Michigan State



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CONTRIBUTORS

Dr. Nora Catlin
 Floriculture Specialist
 Cornell Cooperative Extension -
 Suffolk County
nora.catlin@cornell.edu

Dan Gilrein
 Entomology Specialist
 Cornell Cooperative Extension -
 Suffolk County
dog1@cornell.edu

Dr. Brian Krug
 Floriculture Ext. Specialist
 Univ. New Hampshire
brian.krug@unh.edu

Dr. Joyce Latimer
 Floriculture Extension & Research
 Virginia Tech University
jlatime@vt.edu

Dr. Roberto Lopez
 Floriculture Extension Specialist &
 Research
 Purdue University
rglopez@purdue.edu

Dr. Paul Thomas
 Floriculture Extension & Research
 University of Georgia
pathomas@uga.edu

Dr. Brian Whipker
 Floriculture Extension & Research
 NC State University
brian_whipker@ncsu.edu

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and Cornell Universities have conducted experiments testing coleus cultivars for downy mildew susceptibility and numerous cultivars were found that are less susceptible. Cultivars with low susceptibility include:

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|---------------------|----------------------|----------------------|
| Beauty | Florida Sun Lava | Pegasus |
| Beckwith's Gem | Florida Sun Rose | Pineapple Beauty |
| Black Ducksfoot | Freckles | Russet |
| Dark Chocolate | Fright Night | Rustic Orange |
| Etna | Giant Palisandra | Saturn |
| Fairway Lemon | Glory of Luxemborg | Smoldering |
| Fairway Orange | Gold Edge | Solar Furnace |
| Fairway Red Velvet | Harlequin | Tapestry |
| Fairway Rose | Kiwi Fern | Trailing Garnet Rose |
| Fairway Salmon Rose | Midway Curly Magenta | Versa Lime |
| Fairway Yellow | Night & Glow | Wild Streak |



Angular leaf spot symptoms of coleus downy mildew. Photo: Margery Daughtrey.



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Leaf spot and leaf twist symptoms of coleus downy mildew. Photo: Margery Daughtrey.

More information can be found at http://msue.anr.msu.edu/news/coleus_downy_mildew, and the complete list of the cultivars tested can be found at <http://msue.anr.msu.edu/uploads/files/6-20%20Coleus%20Table%20MARY.pdf>. Also, stay tuned: additional trials on the susceptibility of various cultivars of coleus are planned for this summer at the Long Island Horticultural Research & Extension Center.



Coleus plant showing symptoms of downy mildew. Photo: Margery Daughtrey

Cultural management practices to help manage this disease include providing conditions of good air movement, limiting leaf wetness, and keeping humidity low. Products labeled for downy mildew management on ornamentals include: Adorn (flupicolide), cyazofamid (Segway), dimethomorph (Stature), strobilurin-containing materials (Heritage, Insignia, Compass, FenStop, Pageant), mefenoxam (SubdueMAXX), phosphites (e.g., Aliette, Alude, Flanker, Fosphite, KPhite, Rampart, Vital), mancozeb materials (e.g., Protect, Dithane), polyoxin D zinc salt (Affirm, Veranda O), *Streptomyces lydicus* (Actinovate SP), and copper materials. As always, make sure to follow all label recommendations and restrictions. State or local restrictions may apply; some of these materials are not registered for use on coleus for downy mildew in all states.

Basil Downy Mildew

Basil downy mildew was first reported in the United States in 2007 and is caused by a different species of *Peronospora* than the *Peronospora* causing downy mildew on coleus. Watch your basil for leaves showing subtle chlorosis or yellowing between leaf veins; sometimes these symptoms of downy mildew are mistaken for a nitrogen deficiency. If these symptoms are seen, check the leaf undersides for the diagnostic dusty dark gray sporulation.

Basil species and cultivars vary in their susceptibility to basil downy mildew. Unfortunately, the commonly used culinary sweet basil (*Ocimum basilicum*) cultivars are most susceptible. Exotic and ornamental basil species are less susceptible. Research trials conducted at Rutgers have shown that the worst downy mildew symptoms were seen on *O. basilicum* 'Aroma 2', 'Genovese', 'Martina', 'Italian Large Leaf', 'Magical Michael', 'Nufar', 'Opal Purple Variegated', 'Poppy Joe's', 'Queenette' and 'Superbo'. Fewer symptoms were found on 'Red Leaf', 'Red Rubin', lemon and lime basil species ('Lemon', 'Lemon Mrs. Burns', 'Sweet Dani Lemon Basil', and 'Lime'). No symptoms were found on leaves of 'Spice', 'Blue Spice', and 'Blue Spice Fil'. A trial conducted on Long Island showed that 'Cinnamon', 'Queenette', and 'Red Rubin' were less severely affected than 'Superbo'.

A basil downy mildew monitoring program was started in 2009. Visit <http://vegetablemdonline.ppath.cornell.edu/NewsArticles/BasilDowny.html>



Symptoms of downy mildew on basil. Photo: M. McGrath



Dark sporulation of downy mildew on leaf undersides of basil. Photo: M. McGrath

for more information or to report an occurrence or to see where basil downy mildew is present. You can also help researchers by sending samples of basil downy mildew; see the website listed above for more information.

Starting with clean plant material is critical to prevent this disease. Basil downy mildew can be spread via infected plants and can also be seed borne, so every effort should be made to use clean seed and clean plant material.

Spores can be spread from infected plants on air currents and by splashing water. Providing conditions of good air movement and reduced humidity will help avoid new infections. When the downy mildew pathogen is present and the environmental factors are favorable for disease (conditions creating long periods of leaf wetness—high humid-

ity, wet weather), fungicides should be used to protect plants from infection. Some products that are labeled for management of downy mildew on herbs and are not prohibited from greenhouse use include: Actinovate AG (*Streptomyces lydicus*), Armicarb O and Milstop (*potassium bicarbonate*), Double Nickel 55 (*Bacillus amyloliquefaciens*), Ranman (cyazofamid), Regalia (extract of *Reynoutria sachalinensis*), Trilogy and Triact 70 (neem oil), and OxiDate (hydrogen dioxide) and several phosphite fungicides (including Fungi-Phite, Fosphite, ProPhyt, K-Phite, and Rampart). Actinovate AG, Armicarb O, Double Nickel 55, MilStop, Regalia, Trilogy, Triact 70, and OxiDate are OMRI-listed.

For more information on basil downy mildew, visit: <<http://vegetablemdonline.ppath.cornell.edu/NewsArticles/BasilDowny.html>>