



Greenhouse TPM/IPM Bi-Weekly Report
University of Maryland Cooperative Extension
Central Maryland Research and Education Center

From: Stanton Gill, Extension Specialist – IPM for Greenhouse and Nurseries, CMREC, University of Maryland Cooperative Extension
Karen Rane, Extension Specialist, Director of the Plant Diagnostic Clinic, University of Maryland Cooperative Extension
Suzanne Klick, Technician, CMREC, University of Maryland Cooperative Extension

May 1, 2009

Basil Diseases, Karen Rane, UMD Plant Diagnostic Laboratory

There are several diseases growers need to watch for in basil, grown as bedding transplants or for herb production.

At this time of year when we are in the rainy season growers need to monitor for Botrytis stem canker. This disease causes darkened stem lesions and collapse of the plants. Under conditions of high humidity, you may see the gray-brown, fuzzy growth of the fungus on the cankered stems. Do not water plants in the evening and try to keep watering to a minimum during extended cloudy periods to reduce humidity around the plants. Keep the growing area clean of plant debris, which can be colonized by Botrytis and serve as a source of infection for your crop.

Basil is also susceptible to Impatiens Necrotic Spot Virus. This thrips-vectored virus causes chlorotic mottling and necrotic ringspots on the leaves of infected basil plants. If you have INSV in other crops in the greenhouse, check your basil for infection as well. Strict control of thrips, and discarding all infected plants, are the only effective management strategies for this disease.



Lemon basil infected with Impatiens Necrotic Spot Virus (note mottling of youngest leaves) – photo by K. Rane

Fusarium wilt of basil is caused by *Fusarium oxysporum f. sp. basilicum*. This disease was first reported in the United State back in the early 1990s. Symptoms include wilting, yellowing, and stunting. Infected plants may develop brown streaks on the stem as well as brown discoloration in the vascular system. Infected plants will eventually die. The fungus can be spread through contaminated seed or soil.

The best thing growers can do to avoid Fusarium wilt is purchase seed that is from clean, reliable sources. Some selections of basil are more resistant to Fusarium. Resistant selections include 'Nufar', 'Nufresh', 'Aroma 2', and 'Green Gate'.

Last, but certainly not least - downy mildew is a newly emerging disease of basil. The first US detection of this disease was in Florida in 2007, and last year there were numerous reports throughout the eastern US in both greenhouse and field-grown basil. Because of the sudden outbreak and quick spread of this disease, scientists will be monitoring basil sentinel plots this year to trace pathogen movement. Dr. Meg McGrath, vegetable pathologist at Cornell University, has posted a very informative article, with several nice photos, on her website: <http://vegetablemdonline.ppath.cornell.edu/NewsArticles/BasilDowny.html#Report> Symptoms of downy mildew on basil can be quite subtle, starting as a blotchy chlorosis on the upper leaf surface. Gray, fuzzy growth consisting of the spore structures of the pathogen can be seen on the underside of chlorotic leaves. As the disease progresses, the chlorotic areas on infected leaves become brown. Symptoms and signs of the pathogen are very similar to downy mildew of coleus. In fact, the basil strain was once thought to be the same as coleus downy mildew. New research has found that the two strains are different – basil downy mildew is known to affect only basil. Dr. McGrath reports that two phosphorous acid fungicides, ProPhyt and K-Phite, were effective in managing the disease, and both have downy mildew listed under herbs on the current label. In addition, Actinovate AG is also labeled for suppression of foliar diseases, such as downy mildew, on herbs.

Maryland will be participating in the sentinel plot survey for basil downy mildew, so we are very interested in seeing suspect samples of this disease. If you have basil plants showing symptoms of downy mildew, please contact me (Karen Rane) at the UMD Plant Diagnostic Laboratory (phone # 301-405-1611, email: rane@umd.edu).



Downy Mildew of Basil

Photo by Dr. M. McGrath, Cornell University Long Island Research and Extension Center
<http://vegetablemdonline.ppath.cornell.edu/NewsArticles/BasilDowny.html#Report>

Use of herbicides in flowers grown using plastic mulch

Jeffrey Derr, Professor of Weed Science, Virginia Tech

There are limited preemergence herbicide options in annual and perennial flowers and those that are available generally have a narrow spectrum of weed species controlled. One option for improved weed control is the use of plastic mulch, such as solid black plastic (polyethylene). Solid black



plastic controls annual weeds and will suppress perennials, although weeds like yellow nutsedge could still punch through the material in places. Holes must be cut through the plastic to allow for transplanting, providing an opening for weed germination. Also, alternative weed control measures are needed in the alleys between rows of plastic. Some growers will utilize preemergence and postemergence herbicides to improve weed control over plastic mulch alone.

Unless the herbicide label allows it, do not broadcast apply preemergence herbicides under black plastic. Certain herbicides could volatilize under the plastic, with the trapped vapors causing crop injury. Use caution if spraying herbicides to row middles after laying plastic. Do not overspray the plastic with a preemergence herbicide since subsequent rain or irrigation could wash the chemical towards the planting hole, resulting in a high herbicide concentration that could injure the crop. Do not apply unregistered herbicides to the rows' middles since desired plants could potentially absorb the chemical through their root system.

Do not transplant after a nonselective herbicide such as Reward (diquat), Finale (glufosinate), or glyphosate ((Roundup ProMax, Touchdown Pro, GlyphoMate 41, etc). has been applied until rain or irrigation has washed the nonselective chemical off the plastic. Plants could absorb an herbicide like glyphosate off the plastic if leaves touch sections of treated plastic before a rain or irrigation event.

A hole will need to be cut or burned into the black plastic for transplanting. Some individuals will apply a preemergence herbicide after transplanting to control weeds that germinate in the opening of the plastic. Calibration is very important to avoid any overapplication.

One herbicide that can be safely applied to a wide range of transplanted flowers is trifluralin, sold under a variety of trade names, including Treflan 5G and Preen Garden Weed Preventer, among others. Check the label to determine the application rate since the formulations differ in concentration. For example, Treflan 5G contains 5% trifluralin, while Preen Garden Weed Preventer contains 1.47% trifluralin.

The container I had on hand recommended that Preen Garden Weed Preventer be applied at 6 pounds product per 960 square feet. Assume one is creating a 2 inch diameter hole in the plastic through burning. This equals 0.0217 square feet. Based on my calculations, a 2 inch diameter area should receive 0.00014 lb Preen Garden Weed Preventer per hole or 0.062 g per hole. For the chemical I had on hand, a 1/8 level teaspoon of Preen Garden Weed Preventer weighed 0.42 grams. So a 1/8 teaspoon sample of Preen Garden Weed Preventer would be enough herbicide to treat about 7 planting holes. If one used a formulation with a higher

concentration of trifluralin, a 1/8 teaspoon sample would treat even more planting holes. It would be difficult and time-consuming to do this. One could mix the herbicide with sand to make it easier to apply but one would have to use a particle size similar to that of the herbicide granule plus ensure that the herbicide was mixed uniformly with the sand. Mixing 1 part Garden Weed Preventer with 6 parts sand by volume would result in an application rate of 1/8 teaspoon per planting hole. One would need to do these calculations with your formulation in case the density or concentration differed from the form I weighed.

Perhaps another option would be to treat the liners prior to transplanting while they were in flats. One would want to do this on a small scale prior to widespread to ensure that no injury occurred from this application. Trifluralin, like certain other preemergence herbicides, is a root inhibitor so monitor root development after transplanting. The transplanting process could disturb the herbicide layer, resulting in somewhat uneven weed control. One would need to use gloves during the transplanting process and one would have to follow all label requirements when making such an application.

A nonchemical option may be to apply a shredded mulch after transplanting, thus avoiding chemical application. This avoids the herbicide calibration issue. Solid black plastic, though, does not hold mulch well so rain may wash the mulch off the bed.

***Osteospermum* problems**

We observed an interesting problem at a greenhouse operation this week. They were growing *Osteospermum* plants that were showing a spotting of the foliage that they thought was a disease. The spotting is necrotic tissue with a slightly reddish color in the center. They had been applying an acidifying fertilizer that was high in iron to the crop. *Osteospermum* is best grown at a pH level of 6.0 - 6.2. It is also susceptible to iron toxicity. The problem was being induced by lowering the pH and applying a high iron fertilizer. This same sort of symptom is often seen on geraniums when the pH is low and iron becomes readily available to the plant.



Odema on Geranium

With the heavy cloud cover last week and the early part of this week we are seeing a fair amount of odema on geranium foliage. During the cloud cover periods the plants continue to draw up water into the plant cells but with the low transpiration rate the foliage does not evaporate the water through the foliage as efficiently as it does on sunny, low humidity days. The cells load up on water like tiny water balloons and if they get enough water they burst. The ruptured plant cells look discolored and can be mistaken for a pathological disease. When we have extended cloud cover keep the plants on the dry side. Water once the sunny weather returns.



Daylily Leaf Streak

I, Karen Rane, Plant Diagnostic Lab, received two samples of daylily leaf streak from nurseries this week. One of the samples also had aphids. The brown rectangular spots and yellow streaking on the leaves are symptoms of daylily leaf streak, caused by the fungus *Aureobasidium microstictum*. Cultivars vary in susceptibility to this disease- in extreme cases on highly susceptible cultivars, virtually all of the foliage can be affected. The pathogen overwinters on infected leaves, and is spread by splashing water from overhead irrigation or rainfall. Infection is limited when temperatures reach 90 °F or above.

Control: Fungicides effective in protecting uninfected leaves from this disease include thiophanate methyl (Cleary's 3336 and others), chlorothalonil (Daconil), and azoxystrobin (Heritage). For maximum effectiveness, fungicides should be applied starting when new growth is emerging.



Photos of daylily streak and aphids on daylily by Selin Balci

IPM Reports:

Aphids

Brian Clark, Extension Educator in Prince George's County, received 4" pots of sedum with a melon aphid infestation. He noted that the leaves and foliage were twisted and curling.

Control: Imidacloprid (Marathon), dinotefuran (Safari), Acetamiprid (TriStar), Endeavor, Aria, insecticidal soaps.

Aphid photo by Brian Clark



Thrips

While visiting greenhouses during the high temperatures earlier in the week, we were seeing increasing thrips populations.

Some controls include: Conserve (spinosad), Mesurol (methiocarb), Pedestal (novaluron)

