Greenhouse TPM/IPM Report  
Central Maryland Research and Education Center  
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SAF Meeting in Florida  
By: Stanton Gill, UME

I just finished up the Society of America Florists’ Conference in Orlando, Florida on Sunday and thought I would share some of the research results from the conference on basil downy mildew and banker plant systems.

**Downy Mildew on Basil**

Basil is a huge moneymaker for many greenhouse operations. One large New Jersey greenhouse operation said their demand for sweet basil exceeds their ability to produce it in New Jersey and they are looking at buying 15 - 20 acres of greenhouse in Florida to produce more basil. In surveying growers at the meeting they said sweet basil is their most in-demand basil.

Margery Daughtrey, Cornell University, spoke about the “Big Gorilla Disease” of basil which is downy mildew. Downy mildew of basil is known to be carried in seed. The trouble is how to find a seed producer who has clean seed. Margery mentioned that they found that if the seed is treated with steam then the downy mildew can be killed without damaging the seed of the basil (hot water treatment does not work because of troublesome seed exudates). She mentioned a Dutch company called Enza Zaden that can supply steam-treated seed. The long-range way to deal with this disease is to use resistant varieties of basil. ‘Eleonora’ is one cultivar that Margery called a good first try, but we still have a ways to go to find a really good downy mildew resistant variety. Some promising new varieties of basil are under development at Rutgers.

Margery suggested that if you plan to use fungicides they have to be applied preventatively. In greenhouses the materials to use would be Revus, Ranman, or phosphorus acid fungicides such as FosPhite or K-Phite. Other

Monitor regularly and destroy infected plants to reduce problems with basil downy mildew  
Photos: David Clement, HGIC
materials registered for use on basil outdoors are not labeled for greenhouse use, but the materials available for the greenhouse will do the job—unless you must grow organically.

One of the physical controls you can do is keep the relatively humidity under 85%, which can be a real challenge later in the spring and early summer when greenhouse humidities tend to rise. Margery mentioned that in Israel they are trying a novel way of dealing with this disease by using incandescent light bulbs suspended over basil and kept on overnight. In the first couple of weeks after germination they are able to protect 96-100% of the basil from downy mildew. In the following weeks this beneficial impact from nighttime lighting drops off gradually because the canopies fill in and much of the leaf area is no longer directly exposed to light. Researchers are continuing this work and looking at using LED lights for the night lighting and its impact on downy mildew.

Margery emphasized the importance of regular monitoring and destroying infected plants immediately. Several people are growing basil as micro-greens for use in salad bars. You really have to stay on top of monitoring with a fast turning crop like this one.

**Banker Plants and Biological Control**

**Whiteflies**
Lance Osborne, IFAS, presented on several banker plant systems for growers. One was new to me – using papaya plants as banker plants. Ashton Dickey, Lance Osborne and Cindy McKenzie published a paper in 2011 on using papaya plants and infesting them with papaya whitefly, *Trialeurodes variabilis*. This whitefly limits its feeding activity to papaya and plants in the same family, which are not generally grown in a greenhouse environment. Lance told me he purchased papaya fruit from the grocery store (easy to do in Florida where he is located) and he would remove the seeds and start the plants in pots. The papaya plants are then infested with whitefly, *Bemisia tabaci*. The parasitic wasp, *Encarsia sophia* (=*E. transvena*), is released on the plants and the female stings the sessile stage of the whitefly and lays an egg inside. The banker plants are then moved out into the greenhouse and the parasitic wasp adults migrate out into the greenhouse to search and sting sessile stages of whiteflies. Biological control supply houses are now investigating what is required to ship out papaya whitefly to states other than Florida where it already exists. Once this hurdle is crossed we will have a potentially very cool banker plant system to deal with whitefly in greenhouses.

**Using Grass Mites for Two-spotted Spider Mite Control**
One of the major mites damaging plants in greenhouses is two-spotted spider mite. Lance Osborne said Florida growers raise field corn plants in pots and infest the foliage with grass mites that just feed on monocots such as corn and grasses. Once the mite population is established they release two predatory mites, *Amblyseius californicus* and *Phytoseilus persimilis*, on the corn plants. The two predatory mites feed on the grass mites, reproduce and when the banker plants are moved into the greenhouse, they migrate off the corn and search for spider mites on plants in the greenhouse. Grass mites are found in many states so shipping them from biological control supply houses should be a smaller hurdle to cross.

**Banker Plants for Aphid Control**
I wrote an article on using banker plants for aphid control. You can find this article at http://extension.umd.edu/ipm/commercial-greenhouse-production/using-banker-plants-control-aphids-greenhouses
**Weird Fungus on Hanging Basket Surfaces**

A grower in Maryland found a fungus growing on the substrate surface of hanging baskets. It is a saprophytic fungus that feeds on the bark in the substrate mix. It is harmless.

**Marengo: An Herbicide for Greenhouse Use**

*By: Chuck Schuster, UME*

Greenhouse weeds can be a problem for many different reasons. These unsightly plants can provide seeds that get into the flats, pots and hanging baskets you intend to sell, causing the need for further labor. There are not many products that are labeled for greenhouse use, but this product may be worth considering.

Marengo is a selective pre-emergent herbicide that is labeled for the nursery and greenhouse industry that can offer up to eight months control of certain weeds. The active ingredient is Indaziflam, a suspension concentrate that has a mode of action that prevents seed germination by inhibiting cellulose biosynthesis. Marengo is found to be stable once applied to the soil and will not volatilize or move in the soil. This herbicide will control weeds that include bittercress, groundsel, oxalis, marestail and spurge when applied and activated with appropriate water prior to seed germination. It has also been found to have limited early post emergent properties with annual bluegrass, crabgrass and oxalis. It is not effective against plants emerging from tubers, rhizomes, bulbs, corms, existing rootstocks, and woody vegetation. It is best applied to a weed free site to prevent new weed growth. Marengo requires activation with ¼ inch of moisture within two days of application. This is a very important step that should not be overlooked.

It is available as a liquid for nursery in-ground and in pot-in-pot container, greenhouse, and Christmas tree production for use as a directed spray. The granular for Marengo G is labeled for over the top application in nursery, hoop and shade houses. The liquid form of this product is not an inexpensive product at $1,100 for a half gallon, it is used at a rate of 7.5 to 18 fluid ounces per acre. This works out to between $3.00 and $6.00 per thousand square feet of covered area. The granular form is not currently labeled for greenhouse use. As always read the label for specific directions to prevent any potential damage to desired plant species.