



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

February 20, 2009

It was Cold in January

According to NOAA we were 3 °F below normal for January. Several growers tell me that they chose not to heat their greenhouses in January. Waiting until February, if you can do this, may be a good idea in a cold year such as 2009. Everyone is cranking along at this point and greenhouses are filling up.

Marmorated Stink Bugs

Julie Iferd called about an interesting insect that is showing up in increasing numbers in Washington, Carrroll and Frederick Counties- the marmorated stink bug. Don't worry this will probably not be a problem in greenhouse structures but it may show up in headhouses and people's home. This insect is an invasive species and showed up in Maryland about 6 or 7 years ago. It has been increasing in numbers and populations appear to be especially high this winter. It overwinters as adults in buildings and will migrate outdoors in spring. It will become an increasing problem in orchards and backyard fruit plantings. The stink bug feeds on developing fruit causing distortion and what is called cat-facing on peach, nectarines and plums.



Brown marmorated stink bug adult



Brown marmorated stink bug nymph

Pansy

If you have a soluble salt and pH meter, it is good to run regular soil tests on pansies. The pH level for soilless substrates is 5.4 to 5.8. At pH levels above 5.8, iron deficiency, which causes interveinal chlorosis of lower leaves, is a common problem. With a high pH, it is also important to monitor roots closely for black root rot.



Interveneal chlorosis on pansy with a pH level of 6.3



Close-up shot showing healthy roots on pansy with high pH level

Thielaviopsis Root Rot

Pansy production is in full swing now and many of you are starting fuchsia for Mother's Day sales. Growers should monitor for Thielaviopsis root rot (also called black root rot) in these highly susceptible crops. Symptoms to look for include stunting, yellowing foliage, and in extreme cases, the plants will wilt. Infected roots will have black lesions, due to the dark, thick-walled spores of the fungus. These spores survive well in potting media and plant debris, and can be picked up and moved by insect pests like fungus gnats. The disease can be held in check by keeping the growing medium pH relatively low (below 5.6). Infected plants should be discarded. Soil applications of fungicides such as Banrot, Cleary's 3336, Fungo Flo, Medallion or Terraguard can help protect roots from Thielaviopsis infection, but will not cure infected roots.



Black root rot symptoms on petunia



Infected petunia root system due to black root rot

Alternatives to Plastic Pots

Plastic pots benefited the horticulture business for many years, enabling growers to sell product at just about anytime of the year in an attractive and inexpensive package. Plastic pots are not gone just yet but consumers are interested in products that are environmentally friendly. Plastic is not conceived as environmentally friendly or sustainable material. Limited oil reserves and concern about using anything that is not renewable has changed many of our notions about plastic pots and trays. This is an important enough topic that we decided to have it as subject matter and discussion point at the 2009 Chesapeake Green Conference in February.

Greg Trabka of Ball Horticulture Company laid out several interesting alternatives to plastic pots at the Chesapeake Green Conference. The alternatives vary from pots made from Coir (coconut fiber) and peat moss, wheat based compostable pots, potato flour pots that are biodegradable, and rice hull pots that are biodegradable.

One thing to keep in mind is that the largest pot that can be made so far that has the stiffness or integrity to stand up is a 1 gallon container. None of the alternative pots presently on the market hold up well when growing crops outdoors for several months or longer. It would be great to have mum pots that held up outdoors and pots that perennial growers could use in their multi-month production of plants in outdoor growing conditions.

Alternative pots are still evolving and there are some problems to work out before growers adopt them widely for use in greenhouse floriculture. Grower concerns include how to make these alternative pots last through the production stage and still be an attractive package for the consumer. Another thing to consider is how well the pots will hold up at the garden centers and how the consumer will get the plants home without making a mess. How to keep the rootballs from imploding before making it to the planting site is the main concern. Several growers pointed out that many consumers take plants home and let them sit around for a couple of days before they are planted. They are concerned that customers will let roots growing through pots dry out before getting them into the ground. This last problem can be solved with educational literature to let customers know to get plants into the ground quickly.

What is a little confusing for the public is that there are home compostable pots and industrial compostable pots. Home compostable pots can be thrown on the home compost pile and will break down with little effort. Industrial compostable pots have to be placed in windrow compost piles and turned regularly to get them to break down. The compostable pots appear to be better suited to mechanical planting systems and can be handled in a lot of ways like the familiar plastic pot. Bio-degradable pots break down when planted in the landscape or garden. These biodegradable pots are probably the best system but the trick is have the pots hold up in the production greenhouses with varying length of growing times and growing conditions.

Greg mentioned in his talk that according to the Environmental Protection Agency, 28.9 million tons of plastic containers were generated in 2005. Plastics are a rapidly-growing segment of municipal solid waste that is dumped into overflowing landfills every year. The largest category of plastics is containers and packaging, including the pots and flat trays that hold your plants. The EPA estimates that during the past 45 years, the amount of waste each person creates has doubled from 2.7 to 4.54 pounds a day.

Ball Horticultural Company and Summit Plastic Company are partnering to make biodegradable, compostable pots for the Ball Circle of Life sustainable horticulture program. Circle of Life pots, made of rice hulls, are available in six sizes: 3.5 in. (9 cm), 4 in. (10 cm), 4.5 in. (11 cm), 5 in. (13 cm), 6 in. (15 cm) and trade gallon. The pots are made from waste rice hulls from China. It would be nice if the pots were made from rice hulls from America but

evidently the Chinese are the ones with the patent on this process. The rice hulls are mixed with glue to stiffen them. The pots look a lot like plastic but some are compostable and others can be planted right into the ground and bio-degrade. Ball has come out with an interesting biodegradable pot with slits in the side of the pot. The whole pot is planted into the ground and the roots grow into the surrounding ground. The pot is supposed to breakdown during the growing season – at least the part of the pot that is placed in the soil.

Rice Hull Pots:



Ball also has a pot called the OP-47 (**photo of pots in yellow tray sent by Greg Trabka**) which is thermoformed and looks like a lot like a standard thin plastic pot (green colored). This OP-47 pot is made from wheat and is rated for industrial composting. This pot is being tried out by a couple of Maryland operations in 2009. It will be interesting to see the public reaction to these compostable pots. Ball has printed compostable on the side of the rim of the pot so the public is aware this pot is different. The tray to hold the pots is yellow and is called PLA and is made from corn based plastic. These trays are industrial compostable.



Greg talked about ITML coir fiber plant-able pots (**photo**) which are biodegradable and sustainable. The coir pots are not stiff by any measurement but they are reported to hold up in greenhouse growing conditions. The coir, a waste product from coconut production, is considered a sustainable product. Once it is planted roots will penetrate through the walls easily. There is also a pot made from potato flour by Dillion Company and this pot is considered biodegradable.



Fertilpots were also mentioned in the presentation and are a biodegradable wood fiber pot composed primarily of spruce fibers. William Evans from Fertilpots was present at the Chesapeake Green conference and sat in on the presentation on alternative pots. Fertilpots are biodegradable and are intended to be planted directly in the

ground. Water, air, and roots penetrate the walls of the fertipot so there is supposedly no need for drainage holes. Fertipots do not require a composting situation to degrade and are planted directly into the ground by the consumer. With rice-hull pots, or starch-based polymers, and 'biodegradable' plastics the pot needs to be composted.

Fertipots has come up with the Dioni tray for handling of biodegradable containers. Developed jointly by Fertel International and Desch Plantpak, the Dioni tray encourages airflow around the pots for better root formation. The design of the Dioni tray provides an air space which promotes air pruning of the root tips emerging from the porous walls of fertipots. I was not real clear on what the material was that is used to create the Desch Plantpak and if it was compostable or re-cycleable.

The one impediment with this downturned economy is that price is king in 2009. Alternative pots definitely run at a higher price than plastic. Several growers I spoke with said price is what will hold them back from adopting this new technology in 2009 and maybe in 2010. Though the alternatives to plastic pots are still rather expensive compared to presently available plastic pots the alternative pots make a lot more sense environmentally since most are made from re-newable sources and are hence sustainable. Some growers have pointed out that it requires fuel energy to form the alternative pots but at least they are not using oil to form the end use product. Using oil based products is starting to be perceived as a “negative”. Once cost comes down we will see a movement toward these bio-degradable and compostable pots. If the economy can get healthy again it will not be long before plastic pots will not be commonplace for bedding plant production.

Fern Scale

We received in samples from two locations, one was a greenhouse and the other was an arboretum that had a heavy infestation of fern scale. Fern scale is usually found on ferns, liriopse and mondo grass. This is an armored scale and they have overlapping generations during the season in greenhouses. The female cover is pear shaped, flat. Light brown. The male cover is what will catch your eye. The male cover is white with three ridges.

Control: Ferns are notoriously sensitive to pesticides. Horticultural oil at a 1 % rate will help suppress a population without causing excess phytotoxicity to ferns. Make sure you treat when the application can dry on the foliage rapidly.



Male and female fern scale



Close-up of female fern scale

Hemispherical Scale

We received samples of hemispherical scale on foliage plants. The hemispherical scale insect is a tropical insect that becomes a common greenhouse pest. In Maryland this scale only lives indoors but in warmer temperate areas, the scale can live outside. Unlike many other scales, the hemispherical scale secretes little wax. Hemispherical scales do produce large quantities of honeydew which allows sooty mold to grow. Males are unknown and reproduction is by parthenogenesis. Each female may deposit up to 1000 eggs. After laying the eggs, the female dies and her body shrinks to form a cup or helmet over the eggs. Development for the egg stage and the three nymphal instars requires at least 40 days and may take as long as 105 days. There may be several generations each year in the greenhouse, with all stages being present at any one time. The nymphs do not move much once they have begun to feed. The hemispherical scale insect has a low rate of parasitism indoors, and it often becomes a serious pest.

Control: Distance applied to the foliage gives good control. Soil applications of imidacloprid (Marathon) or dinotefuran (Safari) give good control of this soft scale.



Hemispherical scale on palm

Thrips

Thrips are starting to be reported in low numbers in Maryland this month. As we start to have warmer weather and plants begin to flower, thrips populations can increase quickly. Monitor plants closely. Conduct tap tests on flowers and look at sticky cards to determine if the population is increasing. At the Chesapeake Green program, Ron Valentin, Biobest Canada Ltd., noted that thrips, on average, lay 3 – 5 eggs per day when plants are vegetative and 15 eggs per day when plants are in flower.

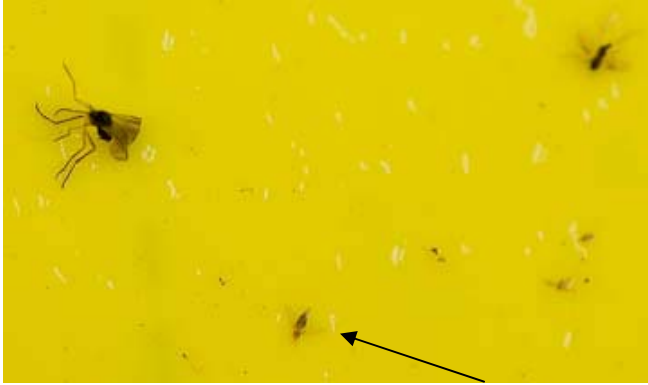
Chemical Control: Early in the season when populations are low, consider using one of the neem insecticides such as Azatin, Neemix, or Aza-Direct mixed with BotaniGard or neem insecticide mixed with Naturalis-O. As populations increase, control materials available include Abamectin, Acephate (Orthene), Bifenthrin (Talstar), Chlorfenapyr (Pylon) (5 oz/100 gallons for low populations. For high populations use 10 -15 oz/100 gallons), Fluvalinate (Mavrik), Kinoprene (Enstar II), Methiocarb (Mesurol), Novaluron (Pedestal), and Spinosad (Conserve – Dow Agro Science); Pyridalyl (Overture 35 WP) can be used to control both thrips and caterpillars in the greenhouse.

Biological Control: *Amblyseius cucumeris* and *A. swirskii* are two predatory mites that can be used for thrips control. They only feed on the larval stages of thrips. *A. swirskii* are better in

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warmer temperatures and also feed on whitefly eggs. In the October 10, 2008 report, we mentioned the potential use of pepper plants as banker plants for the predator, *Orius* spp. (minute pirate bug).

A few thrips were found this week on sticky cards among heliotrope trees so tap tests were done on the flowers. One thrips each came from three of twelve flowers.



Look closely at sticky cards for thrips among fungus gnats and shoreflies



Do tap tests on flowers as they open to see if any thrips fall onto the paper.

Botrytis

As greenhouses start to fill up at this time of year, keep an eye out for Botrytis on plants. So far, sites visits this week have shown very little signs of it. The *Botrytis* fungus requires a film of water on plant surfaces to germinate and infect the plant. This film of water must remain on the plant surface for several hours. Proper spacing and sanitation, periodic venting, horizontal airflow fans, and watering early in the day help prevent continuous periods of water on plants which reduces the spread of Botrytis.



Some controls include: Decree (fenhexamid), Zeritol (hydrogen peroxide), Spectro (chlorothalonil), Protect T/O (mancozeb)

Easter Lilies

Lilies should be 7 to 8" tall and buds can be felt at this time.

NEW BOOK SHEDS LIGHT ON LANDSCAPE PROBLEMS

Special Pre-printing Offers Available Now! Ends March 1st

Broadleaved Shrubs and Shade Trees: Problems, Picture Clues, and Management Options (NRAES–183) — an invaluable resource for novice and experienced home gardeners, master gardeners, students, extension and college educators, landscape professionals, and horticultural consultants — is set for publication by NRAES this spring. This easy-to-use, photo-based guide illustrates over 125 problems that affect broadleaved shrubs and shade trees, allowing users to diagnose and remedy problems before it's too late.

For a limited time, NRAES is offering a substantial pre-printing discount to those who order the book in advance. The anticipated list price is \$35 per copy, but the pre-printing price is just \$24.50 (plus S&H) for a single copy or \$21 per copy for orders for 25 or more.

The book will be over 210 pages, with 430 color photos. Included are descriptions of 30 abiotic problems, over 30 diseases, over 55 insect pests, seven wildlife pests, and four miscellaneous organisms. The introductory chapter covers diagnostics and nonchemical management strategies. The book was authored by Mary Kay Malinoski and David L. Clement, seasoned experts who have fielded questions on landscape problems for 20 years at the University of Maryland's Home and Garden Information Center.

For detailed information on the book and pre-printing opportunities, to download a two-page flier, and to place a secure order, visit WWW.NRAES.ORG. For more information, call NRAES at (607) 255-7654.

NRAES, housed at Cornell University, is an extension program sponsored by 11 Land Grant Universities. For more than 30 years, NRAES has published practical, science- and experience-based, peer-reviewed books on a variety of subjects, including fruit and vegetable production; livestock and dairy; waste management; natural resources; landscaping; personal finance; and more.