Georgia Extension Vegetable Team

Georgia Extension Vegetable News

The University of Georgia

Cooperative Extension Service

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Downy Mildew on the Move

David Langston
Extension Vegetable Pathologist - UGA

Downy mildew (caused by *Pseudoperonospora cubensis*) is a major disease of cucurbits worldwide and Georgia is no exception. This disease is one of the most troublesome diseases thast cucurbit growers encounter each year and it is not as easily suppressed by fungicides as are other foliar diseases of cucurbits. Recently, many samples have been sent to the Plant Disease Clinic in Tifton that have been diagnosed with downy mildew. Cucumbers in general are the ones at risk this time of year with cantaloupes running a close second. The recent rains are primarily responsible for the sudden increases in this disease as it is favored by wet weather and extended periods of leaf wetness. As long as it keeps raining, this disease will cause problems for us in Georgia.

Diagnosis of this disease can be tricky at times. Usually it appears on foliage as yellow, angular lesions on the top side of the leaf while the corresponding lesion on the bottom of the leaf will be water-soaked and may contain the grayish growth of the organism. This disease is vein-restricted, which means lesion expansion is restricted by veins, giving the angular appearance. If a microscope is handy, examination of the grayish growth will reveal antler-like branches (sporangiophores) that give rise to dark, football-shaped sporangia.

Since resistant varieties are few, many growers rely on fungicide sprays to combat downy mildew. A preventive spray program is a must and fungicides sprayed after disease development have little to no chance of suppressing disease effectively. Previcur Flex tank-mixed with a mancozeb or chlorothalonil product is the foundation fungicide mix for downy and should be rotated with either Tanos or Ranman tank-mixed with mancozeb or chlorothalonil. A 7-day schedule is a must when rains occur once or more a week. Other products that show efficacy against downy mildew are Gavel, Curzate, Reason, Forum, and Cabrio. Since we have observed strobilurin resistance in downy mildew found in Georgia, Reason and Cabrio should be tank-mixed with mancozeb or chlorothalonil if used.

One more thing. Target spot, caused by *Corynespora cassiicola*, may be present as well. This disease causes an angular lesion as well but the lesion quickly turns necrotic and has no yellowness to it. Large, cigar-shaped conidia can be observed with a microscope Since strobilurin use has been reduced due to resistance problems, target spot may now be observed more than in previous years. A strobilurin fungicide used in the mix will help prevent target spot development.

Evito™ Labeled

David Langston
Extension Vegetable Pathologist - UGA

Evito, a new strobilurin fungicide, was recently granted a full Section 3 label by the EPA. This fungicide is being provided by Arysta LifeScience. The active ingredient in Evito is the strobilurin fluoxastrobin, which means it has the same mode of action as Flint, Amistar, Quadris, Headline, and Cabrio. It also has the same mode of action as the non-strobilurin Reason and the famoxadone component of Tanos. The commodites most affected by this new product in Georgia are the fuiting vegetables (tomato, pepper, eggplant) and is labeled to control early blight (*Alternaria solani*), southern blight (*Sclerotium rolfsii*), and target spot (*Corynespora cassiicola*). It has late blight (*Phytophthora infestans*) listed as suppression only. I would predict that this fungicide has similar activity to other strobilurins. A label is provided as a pdf attachment.

Diamondback Moth Update

Stormy Sparks
Extension Vegetable Entomologist - UGA

It appears that the diamondback moth has given use a break. Populations have been very low, and we can only hope they will stay there. The lack of need to control this pest should benefit growers in several ways. Most directly is the ability to produce a relatively clean crop with much less insecticide inputs. Assuming that everyone is minimizing insecticide use at this time, the few diamondback moth that are present are hopefully losing any resistance they may contain. If populations start to build, I encourage everyone to hold off on the 'big guns' until they are truly needed. When these products are used, they should be used only as needed and rotated. We do not want to go right back to where we were last Fall, Winter and Spring.

While cabbage growers still have a fairly good arsenal of products for this pest, our greens growers may be severely restricted in product choice when control is needed. Cabbage growers can still use most of the older chemistries plus, SpinTor, Avaunt, Proclaim, and Rimon. I would also use Intrepid in the rotation for caterpillar control where diamondback moth is not the primary pest. Avaunt and Rimon are not labeled for use on greens, and SpinTor is in the process of being removed from the greens as well. SpinTor can still be used on greens ONLY if the label on the product still contains greens. A final thought on rotation. For growers with cabbage and greens, I would try and minimize use of Proclaim on cabbage and save those applications for the greens.

If anyone runs into diamondback moth populations, I am still looking to collect several colonies for resistance testing. If you get some moderate to heavy populations, please give me a call.

David Riley and I have completed a pamphlet on management of resistance in the diamondback moth. We have plenty of copies. If you would like some copies, let me know and I will get them to you.

Whiteflies and Neonicotinoid Insecticides

Stormy Sparks
Extension Vegetable Entomologist - UGA

Sweetpotato whiteflies (SWF; aka silverleaf whitefly) have been extremely high in some areas of south Georgia this fall. Populations have appeared to decline some in the last week or two, but they are still relatively high and will bounce back rapidly if we go back to hot, dry weather. The neonicotinoid insecticides remain one of our key tools for controlling this pest and we need to take precautions to protect this

chemistry from resistance. We may already be experiencing some decline in activity, as general observations have indicated less residual control than normal (although this could also be a simple case of overwhelming populations).

The recent registration of several new foliar neonicotinoid insecticides has added to the potential for resistance problems. Current neonicotinoid insecticides registered for use on vegetables include Admire, Platinum and Venom for soil applications (transplant drench, drip irrigations, etc.) and Provado, Actara, Assail and Venom for foliar applications. The primary caution to growers is to NOT use a foliar neonicotinoid insecticide on a crop where a soil application was previously made. While there are alternative chemistries for whitefly control, I would not want to try and battle this pest without the neonicotinoid insecticides in the system. There are crops where we do not use the neonicotinoids, but even these crops are benefitting from reduced populations arising from crops where the neonicotinoids are used.

Alternative chemistries that have provided good control of SWF in my tests include endosulfan (control of adults only), bifenthrin, pyrethroids tank mixed with OPs, and Knack. Other products that have good activity on SWF and could be used in a rotation include Courier, Rimon and Oberon. The exact approach for managing SWF will vary with the specific crop involved, pest pressure, and costs.

Fruit and Vegetable Waste for Alternative Energy Production?

Gary L. Hawkins
Biological and Agricultural Engineering

As the interest in alternative energies increases it may be a good idea to look at the fruit and vegetable industry as a potential source. Through the process of anaerobic digestion the sugars, starches and carbohydrates forming the fruit or vegetable can be converted into a useful by-product, methane. Researchers on the University of Georgia – Tifton Campus are in the infant stages of measuring the amount of energy available from culled and unharvested fruits and vegetables. Methane production in a digestion process is related to the amount of total solids and volatile solids comprising a fruit or vegetable. The table at the end of the newsletter provides data collected from initial sampling of waste fruits and vegetables on the Tifton Campus or local farms.

From this data the potential volumes of methane can be estimated based on research indicating that 0.37 cubic meters of methane can be produced from a kilogram of volatile solids put into an anaerobic digester. This produced methane can then be used for heating and/or electricity production. Even though it is possible to use anaerobic digestion for the production of methane, different parameters have to be determined for optimization of the production rate.

We know that fruit and vegetable waste can be converted into methane through the anaerobic digestion process, but there are optimum loading rates and retention times within a reactor. Therefore, the researchers within the Biological and Agricultural Engineering, Horticultural and Plant Pathology Departments are beginning research projects to determine potential amounts of methane possible, reactor sizes to handle a given volume of waste products and the economics of such a system. Currently there is no data available, but as it becomes available it will be passed on to those interested.

E. coli Outbreak Underscores Need for Good Agricultural Practices

William Terry Kelley
Extension Horticulturist

The recent outbreak of *E. coli* in spinach is a stark reminder that the Georgia vegetable industry is only one mistake away from being in the midst of a similar crisis. The spinach outbreak has spread to 21 states, killed one person and is responsible for

another 113 reported illnesses. The result has been a massive recall of fresh spinach products by a company called Natural Selection.

These types of cases can happen despite the use of the best practices. However, when they happen, they can still leave a commodity, or an entire state's industry, with a black eye for an extended period of time. The most prudent approach therefore is prevention. The Georgia Good Agricultural Practices Program is probably the best tool to ensure a safe food supply in the vegetable industry.

Currently, there are only a handful of farms that have been certified under the GAPs Program. The Georgia Fruit and Vegetable Association, The Georgia Crop Improvement Association, The Georgia Department of Agriculture and The University of Georgia Departments of Food Science and Horticulture have all collaborated to put the GAPs program in place and make it available to all Georgia produce growers.

The inspection/auditing program was established by the Georgia fresh produce industry to verify that Good Agricultural Practices are followed during production, packing and shipping of fresh produce. The Georgia GAPs Program follows the U.S. Department of Health and Human Services Food and Drug Administration Services *"Guide To Minimize Microbial Food Safety Hazards For Fresh Fruits And Vegetables*." The goal is to protect consumers of Georgia produced fruits and vegetables.

Among other things the program requires the use of sanitary handling and packaging practices and promotes the use of food security precautions. While the third-party certification for GAPs is issued by the Georgia Crop Improvement Association, the Georgia Fruit and Vegetable Growers Association has a program to prepare growers for the audit process.

When the applicant has successfully completed the inspection/audit process, the GCIA director will issue a GAP "Certificate". The certificate may be copied by the GAP program producer and presented as proof of approval. Upon receipt of the GAP "certificate" a producer may use the GAP seal on shipping containers, invoices, letterhead, promotional items and advertising.

The GAP seal will only be used on products grown under the GAP Program rules. For the GAP seal to be used on produce both the production farm and packing facility must be approved. The inspection of a GAP program producer is the verification of a process. The GAP approved producer is responsible for complying with the standards and is responsible for product quality and safety.

While current technologies cannot eliminate all food safety hazards associated with fresh produce that will be eaten raw, the program does go a long way in ensuring that the likelihood of contamination is minimized. Given the current situation in the California spinach industry, such precautions could only be considered an asset to the Georgia industry. The FDA's Robert Brackett reportedly warned California growers almost a year ago that more needed to be done to increase food safety in their fresh leafy vegetable industry. Being proactive in advance of such warnings can only benefit the Georgia industry.

For more information on the Georgia Good Agricultural Practices program, contact Beth Bland with GFVGA at bbland@asginfo.net of call 1-877-99GFVGA.

Portions of this article were courtesy of the GFVGA GAPs program website.

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Editor . . . . . David B. Langston, Jr.
Production Asst. & Webmaster . . . Paul Sumner

This newsletter is also available on the World Wide Web at http://www.tifton.uga.edu/veg/

Your local county extension agent is a source of information on all information contained in the above newsletter articles.

County Extension Agent _____

Table 1. Potential energy derived from vegetable culls.

	Volume (mL)	Weigh t (g)	% Moisture	% Volatile Solids	COD concentration (ppm)	Potential energy (m^3 of Methane per kg
Bell pepper	303	151	94	92		0.05
Eggplant	516	360	94	99		0.13
Squash	307	370	93	90		0.12
Tomato	100	275	94	99	48500	0.10
Watermelon					153000	0.08
Onion	530	493	92	86		0.16