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#### UGA IPM INFORMATION:

The submission deadline for the April newsletter is April 30, 2018. Please submit all articles prior to the deadline. If you would like an article written about an upcoming event or project, please email [stinafig@uga.edu](mailto:stinafig@uga.edu).

The University of Georgia Integrated Pest Management website is live! Please visit [ipm.uga.edu](http://ipm.uga.edu) to see the new visual design and layout!

Have questions about the newsletter, website, or basic information? Send us an email at [ipm@uga.edu](mailto:ipm@uga.edu)!

Have comments on the newsletter redesign? Be sure to fill out our [survey](#) to let us know your thoughts!

## SPECIALIST SPOTLIGHT

*The IPM program consists of many specialists and faculty throughout the state of Georgia. This section is dedicated to bettering knowledge of your colleagues.*

### Jonathan Oliver



Dr. Jonathan Oliver is an assistant professor in the Department of Plant Pathology at the University of Georgia. Dr. Oliver grew up near Palatka, Florida. He attended the University of Florida for his undergraduate degree in Plant Pathology and Microbiology & Cell Science, and received a Ph.D. in Plant Pathology from Cornell University. After completing his doctorate, Dr. Oliver worked as a postdoctoral researcher at Auburn University for two and a half years and at Kansas State University for three years.

During his dissertation work at Cornell University, Dr. Oliver studied the diversity of viral pathogens of grapevines and cherries, and as a postdoctoral researcher at Auburn University, he characterized the interactions between the emerging bacterial pathogen, *Xylella fastidiosa*, and its blueberry plant hosts. Most recently, as a postdoctoral researcher at Kansas State University, he studied western flower thrips and *Tomato spotted wilt virus* resistance in tomato.

Dr. Oliver started in his current position at the University of Georgia in mid-2017 as a small fruit pathologist at the Coastal Plains Experiment Station in Tifton, Georgia. In this position, he has research and extension responsibilities focused on diseases affecting emerging fruit crops in southern Georgia including blueberries, blackberries, citrus and other fruits. His current projects focus on pathogen biology and disease management of orange cane blotch of blackberry, cane blight of blackberry and bacterial leaf scorch of blueberry, among other disease issues.

One interesting fact about Dr. Oliver is that he has had the opportunity to visit 47 of the 50 states – and still hopes to make it to New Mexico, Nevada, and Alaska someday. His car has been in 31 states (plus Canada and Washington D.C.) with him but probably won't make it to Alaska.


**UPCOMING EVENTS:**

Apr 3 – Master Gardener  
 Extension Volunteer Training |  
 9:00 AM | Albany, GA

Apr 5 – Georgia Forages  
 Conference at GCA Convention  
 | 9:00AM | Perry, GA

Apr 7 – Wild Azalea Festival |  
 11:00AM | Morrow, GA

Apr 23 – Food 4 Thought |  
 6:30 PM | Thomaston, GA

Apr 30 – Getting Started in  
 the Landscape Business |  
 8:30 AM | \$15 | Columbus,  
 GA

**For more events, please visit the  
 UGA Extension Calendar.**

## FROM THE FIELD

*This section includes articles and news stories pertaining to IPM field work  
 written by IPM members.*



**Western Flower Thrips Management in Georgia Blueberry Production**  
 By: Brian Little<sup>1</sup>, Craig Robous<sup>1</sup>, Glen Rains<sup>2</sup>, William Lovett<sup>3</sup>, and Ashfaq Sial<sup>1</sup>

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With the continual acreage expansion in blueberry production in Georgia there are rising concerns of various pests within this system and the best ways to manage these insect pests. Most growers are currently using an Airblast sprayer as the standard to apply pesticides to their fields. However, there are a few limitations with this sprayer type. The grower must make multiple passes through a field, this in turn factors into labor cost and time spent for application. Some growers have started to transition to over the row sprayers, which can operate at higher ground speeds, to cut down on the number of passes through the field and time of application. The Small Fruits IPM Lab has been investigating whether or not over the row sprayers can achieve similar coverage as the standard Airblast sprayer and does that translate to effective control of insect pests within this cropping system.

Western Flower thrips, *Frankliniella occidentalis* are chronic pests of both southern highbush and rabbiteye blueberries in the southeastern United States. Thrips are small (1 to 1.3 mm long) insects and usually yellowish to orange in color. Adults have long thin wings fringed with fine hairs (Figure 3). Females are generally larger than males. Both adults and nymphs have rasping and sucking mouthparts, which are used to extract cell sap from plant tissues.



**Figure 1.** Airblast sprayer



**Figure 2.** Over the row sprayer



**Figure 3.** Adult Western Flower thrips, *Frankliniella occidentalis*. Jack T. Reed, Mississippi State University, Bugwood.org



**Figure 4.** Blueberry flower damage caused by thrips. Jerry A. Payne, USDA Agricultural Research Service, Bugwood.org

Several species of thrips have been reported to infest blueberries. Of those, the eastern flower thrips, *Frankliniella tritici*, Florida flower thrips, *F. bispinosa* (Morgan), and western flower thrips, *F. occidentalis* (Pergrande) have been identified as pests of both rabbiteye and southern highbush blueberries in the southeastern United States. In 2017, chilli thrips, *Scirtothrips dorsalis* (Hood), were found in blueberries late season in South Georgia. These three species of thrips have a wide host range and cause extensive damage to blueberries (Figure 4) and many other crops. Economic damage has often been observed in early-season blueberries.

This project investigated the ability of a commercial self-propelled “high-boy” boom sprayer to control western flower thrips during early spring. Sprayer coverage within the canopy (Figure 5) and resulting efficacy of sprays were evaluated at 35, 60, and 100 gallons per acre (gpa) utilizing a commercial airblast sprayer and John Deere self-propelled boom sprayer. Delegate® WG (spinetoram) was applied at the rate of 6.0 oz/acre to all plots. Greenleaf Technologies TurboDrop® venturi and Tee Jet nozzles were used for the boom sprayer at the tested rates. Previous research indicated that Low drift, air induced nozzles provided superior coverage to traditional Flat Fan and Flood Jet nozzles. Sticky traps and blueberry flower clusters were used to evaluate the changes in insect populations at different treatments. Red dye and white Kromekote (photographic paper) cards (Figure 6) were placed in the canopy to assess the distribution of spray.

Overall spray coverage was statistically similar in Airblast and overhead TeeJet and GreenLeaf at 100 gpa (Figure 8). Thirty-five flower clusters per replication were collected pre- and post-treatment to evaluate the thrips population in each treatment. Pre-treatment thrips populations ranged from 113 thrips/35 clusters in the 60 gpa TeeJet row to a low of 28 thrips/ 35 clusters in the Greenleaf 60 gpa treatment. The mean thrips/ 35 clusters count across all treatments was 75 thrips/ 35 clusters. All treatments except the untreated control, Greenleaf 35 gpa and Greenleaf 60 gpa had a reduction in thrips populations after treatment. All air blast treatments, the Teejet 100 gpa overhead treatment and the Greenleaf 100

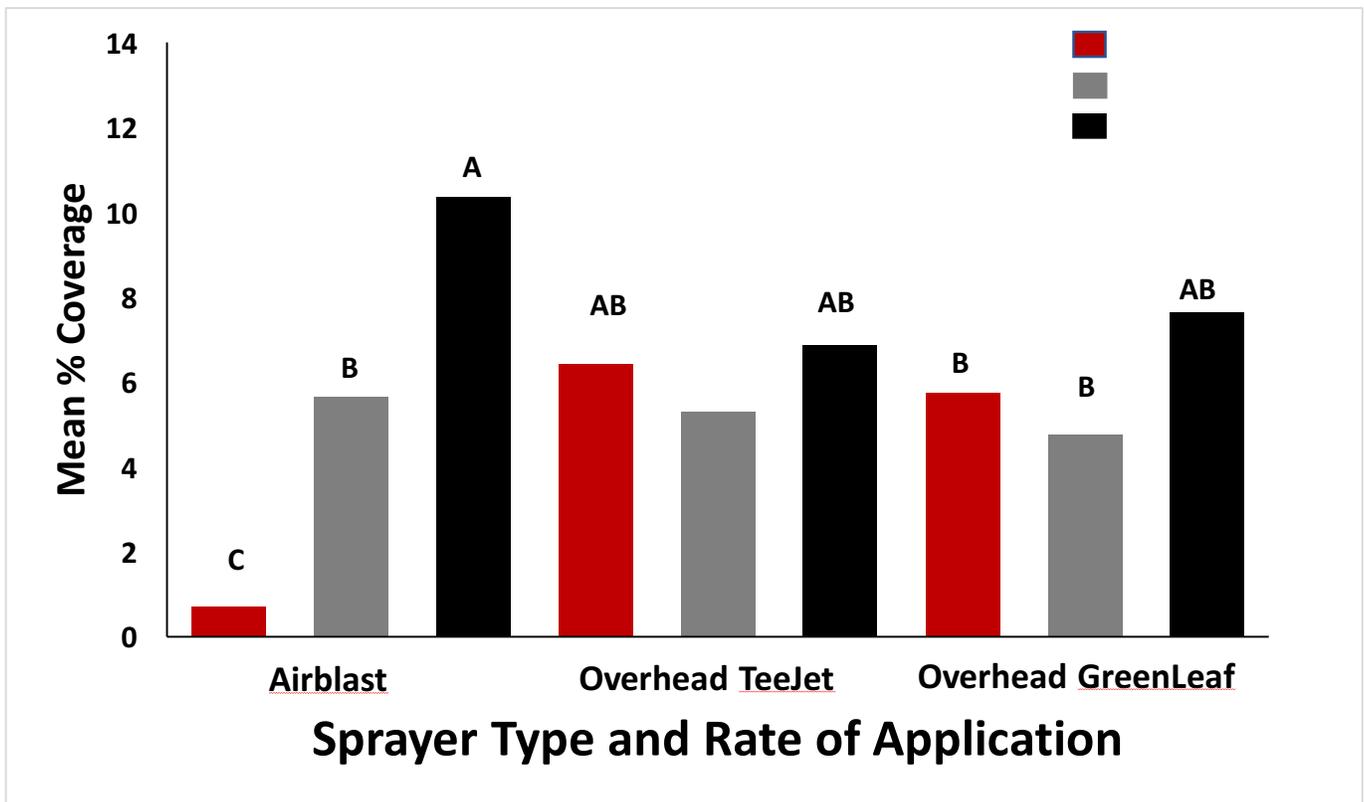


**Figure 5.** Spray coverage poles with Three levels within the canopy; high, mid and low.

gpa overhead treatment showed similar control. These results indicate that boom sprayer can be an effective sprayer option to control Western flower thrips in blueberries (Figure 8). However, proper nozzle selection and water volume rates per acre are critical.



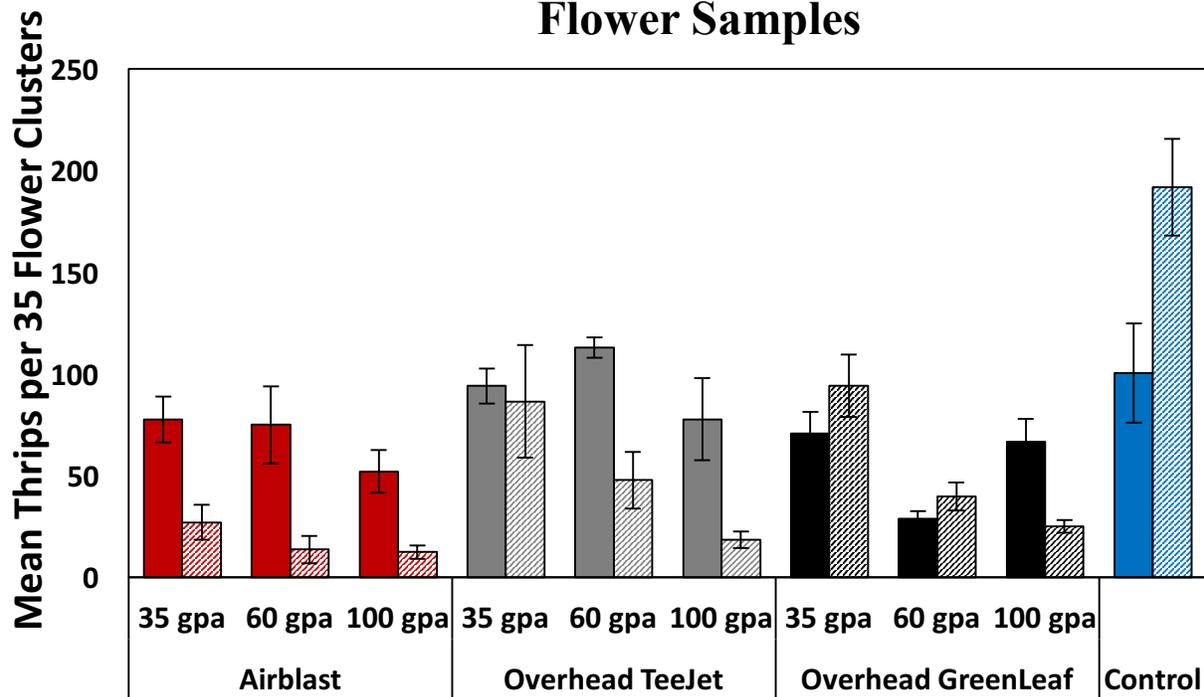
**Figure 6.** L-brackets with Kromekote cards after spray application.



**Figure 7.** Overall spray coverage for all location and layers within the canopy.



## Sprayer Comparison Trial 2017 Flower Samples



### Sprayer Type and Rate of Application

**Figure 8.** Mean number of thrips per 35 flower clusters by sprayer type and application rate. Pre-treatment means are solid bars and post treatment means are striped bars. Pre-Treatment:  $F=2.33$ ,  $P=0.067$  Post Treatment:  $15.80$ ,  $P < 0.0001$

The results from the 2017 boom sprayer trial indicate that boom sprayers can be an effective sprayer option to control Western flower thrips in Rabbiteye blueberries. This work indicates that proper nozzle selection and water volume rate per acre is critical for the successful control of western flower thrips with overhead sprayers. The results of this trial are very positive, but more work is needed to fine-tune spray strategies for utilizing boom sprayers to effectively control pests in blueberries. The second year of this experiment is underway and the data is currently being processed in the lab.

## MEDIA MENTIONS

*This section includes articles and news stories pertaining to IPM field work written by outside sources.*

### UGA Extension study shows impact of herbicides on pecan trees

By Clint Thompson

Published 3/21/18 by **CAES MEDIA NEWSWIRE**

Dicamba and 2,4-D herbicides, sprayed directly on trees at full rates, kill the plant material they touch, but they don't travel through the tree or linger from year to year, according to a newly released University of Georgia Cooperative Extension pecan study. The study also found that drift from the herbicides does not hurt the trees.

UGA Extension pecan specialist Lenny Wells and UGA Extension weed scientist Eric Prostko researched the effects of low and high concentrations of dicamba and 2,4-D herbicides on pecan trees at the university's Ponder Farm in Tifton, Georgia. They studied 5-, 8- and 9-year-old 'Desirable' pecan trees. No data was collected on older trees.

The application of high concentrations of herbicides injured the specific parts of the trees where the herbicides were applied. The team was surprised that the herbicides did not move to other parts of the tree.

"At higher concentrations, whatever tissue the herbicide touched, it killed. But we also expected to see translocation of those materials in the tree, meaning if you spray it on one part of the tree, the material would move to another part of the tree. But we did not see that," Wells said. "There could still be problems, but we feel a little bit better about it than we did initially."

The team also studied the effects of low-concentration applications and whether any of the dicamba or 2,4-D herbicides drifted onto neighboring pecan trees.

Applying lower concentrations of herbicides, particularly given minimal drift, resulted in "very little damage," which also surprised Wells and Prostko.

"I went into this research project thinking, 'If I spray dicamba directly onto a pecan tree, I'm going to kill it.' That didn't happen," Prostko said.

During the simulated drift situations, Wells and Prostko sprayed the herbicides directly onto the pecan trees for approximately 10 seconds. They also sprayed into the wind so the herbicides would drift onto the trees.

"In Georgia, there's a good chance you will have peanuts or cotton next to a pecan orchard, so the chances of off-target movement could be great, depending on what else is going on with the wind and the nozzles and



UGA Extension weed specialist Eric Prostko sprays a pecan tree during a research study with Extension pecan specialist Lenny Wells.



Pecan tree shows damage from research study.



everything else we talk about with off-target movement,” Prostko said. “This research alleviated some of the fears we had about dicamba’s or 2,4-D’s impact on pecan trees.”

While the research encouraged Wells and Prostko, they still warn Georgia farmers to be wary of their surroundings when applying these herbicides.

UGA Extension has made a concentrated effort to educate Georgia growers about the dangers of herbicide drift since 2014. One goal is to make sure that producers are aware of the impact certain herbicides may have on neighboring fields, gardens and other plants.

Wells and Prostko collaborated on this project because there was no research data available for UGA Extension agents to distribute to pecan farmers. They wanted to determine how sensitive pecan trees were to these specific herbicides.

The scientists have watched the trees since 2013 and have not observed any long-term effects.

“Probably one of the biggest concerns that pecan producers have relates to the effects of dicamba the year after they get it in their trees,” Prostko said. “We’re doing this work to make sure there are no long-term effects.”

For more information about Georgia pecans, visit Wells’ blog at [site.extension.uga.edu/pecan/](http://site.extension.uga.edu/pecan/).

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## UGA Phenomics and Plant Robotics Center readies researchers for the intersection of big data, robotics and agriculture

By Merrit Melancon

Published 3/19/18 by *CAES MEDIA NEWSWIRE*

Automated data collection and analysis pipelines are changing the way humans generate and use information. At the University of Georgia, researchers harness the power of advanced sensing, robotics and big-data analytics to change agriculture.

From streamlining the development of new crop varieties to improving cultural practices to enhance soil health, advanced sensing and robotics are key to developing more productive, sustainable agricultural systems.

About 50 UGA researchers gathered for the inaugural Phenomics and Plant Robotics Center (PPRC) Symposium on March 9 to discuss how advances in these areas are changing the world of agriculture.

A phenotype is a physical or biochemical trait that is controlled by a single gene or a set of genes inside a plant or animal’s total genetic code, and an animal or plant’s phenome is the collection of all of the animal or plant’s individual physical and biochemical traits. Phenomics is the study of these collections of traits across a population, and it’s the subject of the new PPRC at UGA.



Professor Changying (Charlie) Li works with graduate students (L-R) Yu Jiang and Shangpeng Sun with a robot in a blueberry field. Li is heading a new research initiative at UGA, the Phenomics and Plant Robotics Center. The center will spearhead new research into using robots, sensing and data analysis to help aid the development of new crop varieties.



Housed in the university's Office of Research, the center is led by engineering Professor Charlie Li. It was founded in 2018 and includes 35 UGA faculty members from 17 UGA units and four colleges, including the UGA College of Agricultural and Environmental Sciences.

“Our center will promote convergent research between plant breeding, genomics and biomass characterization; engineering; and computational sciences to propel UGA into a global leadership position in phenomics and plant robotics,” Li said. “The University of Georgia is exceptionally positioned to take the lead in this area because of its burgeoning informatics initiative, the growing strength of our College of Engineering and our world-class plant science research.”

The center's founding members include Li; Harald Scherm, CAES professor and plant pathology department head; Scott Jackson, Georgia Research Alliance Eminent Scholar, CAES crop and soil sciences professor, and director of the UGA Center for Applied Genetic Technologies; Alexander Bucksch, Franklin College of Arts and Sciences assistant professor of plant biology; and Ping Ma, Franklin College professor of statistics specializing in bioinformatics, functional data analysis and geophysics.

The PRCC's goal is to foster the development of high-throughput phenotyping technologies using robotics and big-data analytics to aid in breeding more sustainable, productive crops by identifying individual plants, amongst the thousands in crop field, with traits that breeders want to emphasize in new varieties. For instance, a robot could use computer vision and deep-learning neural networks to find plants with ideal root structures or ideal growth habits.

The center supports research into the development of these types of systems by providing continuing education for faculty through an annual symposium and a series of regular brown-bag seminars on robotics and phenomics. The center will also support partnerships with universities and research centers outside UGA, offer development workshops, help UGA administrators pinpoint specific research needs and recruit faculty to fill those needs.

The inaugural symposium included presentations from Penn State University Distinguished Professor John Lynch, a plant physiologist, and Regents' Professor of Crop and Soil Sciences and Genetics Andrew Paterson, a UGA plant geneticist and breeder.

Lynch, a world-renowned root physiologist, currently uses phenotyping robots to select corn plants with root systems that maximize their uptake of phosphorus from the soil, which could lead farmers to apply less fertilizer to their land but still produce healthy corn crops.

Geneticists often look for one favorable trait — high yield, for instance — and then spend years searching for the genes that control that one trait so that it can be bred into future generations of the crop, Lynch told the crowd gathered at the symposium. He argued that the search for genes that control favorable traits is invaluable, but it sometimes means that researchers can't see the forest for the trees. Assessing all of the traits in a successful adult plant allows breeders to see how multiple traits work together to keep a plant healthy and productive. That's where robotic phenotyping and the study of phenomics is invaluable.

Paterson presented his collaborative work with Li. They use crop-imaging robots at the CAES Iron Horse Farm to identify crops with traits he would like in future varieties of staple crops.

“One of the reasons that breeding proceeds slowly is because phenotyping is laborious,” Paterson said. “In my lab, I've been known to have phenotyping parties where we take the whole lab out to the field, and we measure and count and weigh and harvest. It might go on for days or weeks. We spend a lot of time measuring plants and measuring plant traits.”



Phenotyping robots that can gather and analyze information about plants would greatly speed up the selection process involved in breeding better-adapted plants into new crop varieties.

Some of these technologies are already used to spot diseased plants or plants under drought or heat stress. Farmers use this information to pinpoint where irrigation, pesticide and fertilizer applications are necessary in an effort to minimize the impact on water and soil resources and to reduce costs.

As the center produces new technologies to breed more sustainable, resilient crops and to help farmers practice more precise agriculture, robotics will become a key part of meeting the world's growing demand for food while protecting the natural environment.

For more information about the center and its work, visit [pprc.uga.edu](http://pprc.uga.edu).

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### UGA Extension researchers dual-use system to boost Georgia's wheat crop

By Julie Jernigan

Published 3/14/18 by **CAES MEDIA NEWSWIRE**

Wheat prices are down, and wheat acreage in Georgia is dropping.

To boost the state's wheat industry and help producers get more out of their crop, University of Georgia Cooperative Extension small-grains specialist Reagan Noland is researching a dual-use system that would enable growers to use their wheat crop for grain and forage production.

The dual-use system is common in Texas and Oklahoma and allows growers to use their wheat crop as a winter forage for grazing and for a grain harvest. The UGA study compares different seeding rates of winter wheat and measures forage yield and subsequent grain yield. Seeding rate guidelines for grain and forage production are available, but not for the dual-use system.



This year's cold weather has been a boon for Georgia's wheat producers. In recent years, poor vernalization, or flowering, has been one of Georgia wheat producers' biggest problems. Wheat needs a period of cold temperatures for optimum reproductive growth and grain production in the spring.

"Supplemental forages are often needed in the winter. This wheat management approach enables farmers to provide their cattle with good, quality forage," Noland said. "Economically, it's a challenge to grow wheat right now. Hopefully, this method can help farmers gain the most out of their crop."

According to the 2017-18 Extension Wheat Production Guide, Georgia farmers planted 160,000 acres in the 2016-2017 season, which marked the third year the state's wheat acreage declined. Growers only harvested 70,000 acres, or 43 percent of the planted area, due to disease pressure and poor environmental conditions. The average yield was only 47 bushels per acre.

An underwhelming 2016 financial market didn't help farmers. In the production guide, prices were recorded as low as \$4.05 a bushel. This marked the fifth year prices have declined. The price per bushel was \$4.60 in 2015 and \$5.35 in 2014.

Adam Rabinowitz, UGA Extension economist, said prices are improving for the 2017 crop and will be closer to 2015 prices, mainly due to drought conditions in the Southern Plains.



This year's cold weather has been a boon for Georgia's wheat producers. In recent years, poor vernalization, or flowering, has been one of Georgia wheat producers' biggest problems. Wheat needs a period of cold temperatures for optimum reproductive growth and grain production in the spring.

The past two winters have been extremely mild, and temperatures rarely dropped below freezing. That has not been the case this year.

"With the extensive cold periods we experienced this winter, I am confident that the crop has had adequate vernalization, which sets us up for good yield potential this spring," Noland said.

Farmers should be prepared to manage diseases such as Fusarium head blight (FHB), or head scab, this spring, he said. Head scab causes yield loss, low test weights, low seed germination and mycotoxins that contaminate grain.

For more information on FHB, read UGA Extension Circular 1066, "Identification and Control of Fusarium Head Blight (Scab) of Wheat in Georgia," at [extension.uga.edu/publications](http://extension.uga.edu/publications) or visit the U.S. Wheat and Barley Scab Initiative website at [www.scabusa.org](http://www.scabusa.org).

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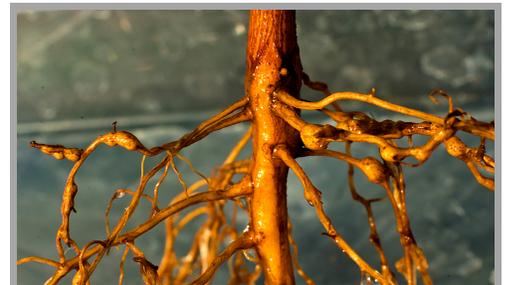
### Spring's warm temperatures could spark nematode activity

By Clint Thompson

Published 3/13/18 by *CAES MEDIA NEWSWIRE*

Mother Nature's freezing January temperatures reduced nematode buildup in southern Georgia fields. But warmer temperatures this spring could spark nematode activity, according to University of Georgia Cooperative Extension plant pathologist Bob Kemerait.

"The great thing about this cold weather was that the soil temperature fell below 60 degrees (Fahrenheit) and even approached 40 degrees during much of January. As the soil temperature decreased, nematode activity started to drop to the point that they were not active anymore," Kemerait said. "Now, as we enter spring and as soil temperature climbs above 60 and 65 degrees, the nematodes are happy, they're feeding and reproducing. That's what growers need to be concerned about."



Cotton roots infected with root-knot nematodes swell in response to the infection. These knots serve as feeding sites where nematodes (microscopic worms) grow, produce more eggs and stunt the plant's growth.

Root-knot nematodes cause the most problems for cotton farmers. They feed on cotton roots and cause swelling, or "galls," to develop. The galls disrupt the function of the roots, which stunts the plant's growth. Further, female nematodes feed and lay eggs at the galls.

Georgia farmers welcome the cooler start to 2018. Through the final days of last year, unseasonably warm temperatures enabled the growth of volunteer, or unintentionally planted, peanuts and regrowth in some corn and cotton fields. Nematodes feed at these sites in the winter if temperatures are warm enough.

"The bottom line is, if the nematodes have something to eat, whether it's a susceptible winter crop or a suitable weed, and the soils get warm earlier than we want them to, the nematodes may be waiting when we plant seed in April and May," Kemerait said.



Georgia growers also face a restricted supply of the nematicide Telone II, a soil fumigant, this year.

“My advice is, if you want to use Telone, make sure you know your source. Make sure you can get the supply you need,” Kemeraït said.

He suggests that growers reduce Telone use through “site-specific applications,” or by applying Telone only in parts of the field that really need it. Other nematicides can be used on the remainder of the field, he said.

Where southern root-knot nematodes are a problem, cotton growers should consider planting resistant varieties that don’t need nematicides. Resistant varieties sustain minimal damage from the nematodes, and they minimize the buildup of nematodes.

“Growers sometimes balk at planting the resistant varieties because, when they look at UGA Extension variety trials, they see that the susceptible varieties yield more than the nematode-resistant varieties. I tell growers that our highest-yielding cotton varieties are probably not the nematode-resistant ones, but we’ve got great yield potential in our resistant varieties if you plant them in fields where they belong,” Kemeraït said. “With cotton, if you plant resistant varieties in a heavily infested root-knot-nematode-infested field, they will outshine the susceptible variety. When you look at resistant varieties, where they shine is where the grower is struggling to make yields because of nematodes.”

For more information about growing cotton in Georgia, go to [www.ugacotton.com](http://www.ugacotton.com).

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### **The poblano pepper, a spicier complement to the bell pepper**

By Julie Jernigan

Published 3/6/18 by **CAES MEDIA NEWSWIRE**

Juan Carlos Díaz-Perez, University of Georgia vegetable horticulturist, encourages Georgia vegetable producers to consider planting poblano peppers. Compared to bell peppers, poblano peppers have a greater yield per acre, comparable market price and more disease resistance.

Poblano pepper plants produce an average marketable yield of 71,000 pounds per acre, according to Díaz-Perez, who researched poblano peppers at the UGA Tifton campus. This average poblano pepper yield is 237 percent higher than the comparable state average yield for bell peppers, which came to 30,000 pounds per acre in 2016.

“The market price for the poblano pepper is similar, if not higher, when compared to bell peppers,” said Díaz-Perez. “Poblano peppers should be a consideration for those farmers looking for an alternative to bell peppers. It’s always important to have diverse crops. (Poblano peppers are part of) a niche market right now, but they are already in such high demand that I expect it to grow.”

The poblano pepper, which is spicier than the bell pepper, is also an attractive option because it seems to be less susceptible to diseases, according to Díaz-Perez. Southern blight disease does affect poblano peppers, but Díaz-Perez’s research shows that disease impacts poblano peppers less than it does bell peppers.



Juan Carlos Díaz-Perez, University of Georgia vegetable horticulturist, suggests that farmers add poblano peppers to their fields one to two weeks before planting bell peppers.



In recent years, demand for the green poblano pepper has increased. Diaz-Perez thinks that Georgia growers could meet consumer demand, which means the U.S. would no longer have to import poblano peppers from countries like Mexico.

“There’s always an interest in finding an alternative or complementary crop to maintain diversity among crops,” Diaz-Perez said. “You have more options to invest in that way.”

More restaurants and culinary enthusiasts crave the rich, spicy flavor of the poblano pepper, Diaz-Perez said.

“One common dish in Mexican cuisine is chile relleno, which consists of a poblano pepper stuffed with meat and cheese,” he said. “I don’t want to say which pepper is better, but the poblano adds a distinct, smoky flavor than can liven up any dish. It’s definitely a vegetable crop that farmers should add to their production list.”

Diaz-Perez suggests that farmers add the plant to their fields one to two weeks before installing bell pepper plants.

“They’re not exactly like bell peppers, and they prefer a cooler environment in order to grow,” he said. “While planting in the spring will produce a solid bounty, planting in early fall will produce a higher volume of peppers. They only take about 65 days to produce mature green fruit.”

For information on growing peppers in a home garden, refer to UGA Cooperative Extension Circular 1005, “Home Garden Peppers,” at [extension.uga.edu/publications](http://extension.uga.edu/publications).

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### **Cottontail rabbits: cute, cuddly, destructive**

By Michael Anthony Foster

Published 3/5/18 by **CAES MEDIA NEWSWIRE**

Rabbits are often welcomed additions to lawns because many homeowners find them adorable. They love to see rabbits at the edges of their lawns early in the morning or in the evening. However, if the population is left unchecked, rabbits can cost homeowners hundreds, even thousands, of dollars a year in damages.

In the Southeast, rabbits feed on backyard plants year-round. They consume flowers, soft stems, fruits and vegetables during the spring and summer months. Very few home-garden crops, like tomatoes, cucumbers, potatoes, corn and spicy peppers, are immune to rabbit damage. Rabbits can kill older, mature trees by stripping bark from the trees’ bases.

Damage caused by rabbits is often mistaken for damage by whitetail deer and squirrels. Many of their foraging habits overlap.

Rabbit damage is identifiable by gnaw marks on woody vegetation. Bark gnawing usually occurs in patches and doesn’t occur higher than 2.5 feet above ground level.

Other signs of rabbit damage are young, clean-cut stems sheared at an angle. This damage looks as if the stem was cut with scissors. The presence of round, pea-sized droppings around damaged areas may also be chalked up to rabbits.



One of the easiest ways to mitigate damage caused by rabbits is to modify their habitat. Remove brush piles and weed patches, fill holes and remove any debris that could be used as a den site. Habitat modification is extremely effective in residential areas because there are very few suitable habitats available.

When habitat modification doesn't work, use a physical barrier to prevent rabbits' access. Exclusion is the most effective means of control, but it can be the most expensive in terms of labor and money.

Fences to deter rabbits should be at least 2 feet tall, buried 8 to 12 inches below the ground, and constructed out of chicken wire or hardware cloth.

Tree guards may keep rabbits from tearing the bark from young trees. Construct box cages around small, raised gardens and individual plants to protect them. Be sure to use hinges on these box cages so the homeowner has an access point.

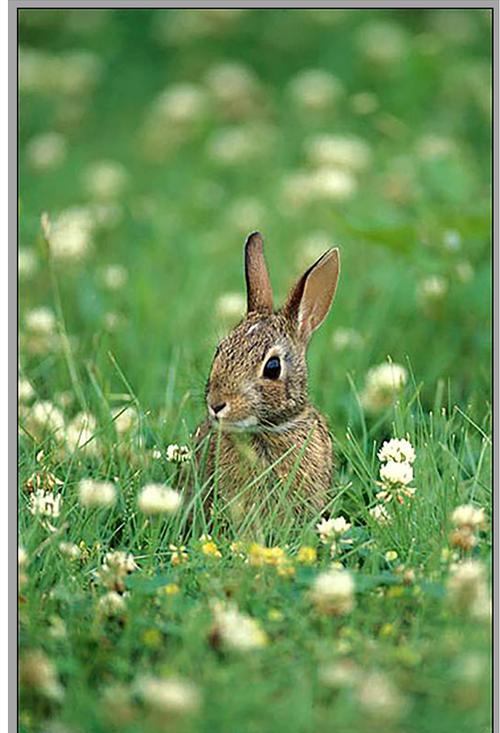
Repellents are the most common form of pest control. A variety of chemical repellents, designed to discourage rabbits from browsing, are on the market today. Remember to vary the products you use. If you use the same repellent over and over again, the rabbits will become accustomed to that product, rendering it ineffective.

Most repellents can be sprayed or brushed on like paint, and most are contact-, taste- or odor-based repellents. Taste-based repellents should be applied before damage occurs. Homeowners who experienced previous damage to their vegetable gardens should apply repellent shortly after this year's crop begins to emerge. This teaches the offending animals that these plants are unpalatable.

The final option is lethal control. Rabbits are classified as a game species in Georgia, so game laws must be followed. When rabbits are in season, live box traps can be baited with apples, lettuce, carrots or Brussels sprouts. While shooting is a quick, easy method of control, most municipal firearm ordinances prohibit the discharge of firearms within city limits.

While rabbits may be adorable, they can also be the source of significant damage to backyard gardens and landscape plants. Fortunately, there are a variety of available control techniques that can help mitigate and even prevent rabbit damage.

For more information on controlling nuisance wildlife, see the University of Georgia Cooperative Extension Circular 1021, "Repellents and Wildlife Damage," at [extension.uga.edu/publications](https://extension.uga.edu/publications).



The fictional Peter Rabbit isn't the only rabbit that enjoys munching in vegetable gardens. To keep rabbits out of home gardens, the University of Georgia Extension specialists recommend building a fence around precious plants. The fence must be at least 2 feet high and must be buried 8 to 12 inches deep.



## Bell peppers a popular choice for home gardeners

By Clint Thompson

Published 3/5/18 by *CAES MEDIA NEWSWIRE*

While commercial bell pepper producers grow this popular vegetable on fumigated plastic mulch beginning in early March, home gardeners in south and central Georgia should plant them in early to mid-April, according to University of Georgia Cooperative Extension vegetable horticulturist Tim Coolong.

He advises north Georgia residents, particularly those who are located at high elevations, to wait until early May before planting.

Bell peppers self-pollinate and grow best in warm-to-hot conditions in full sunlight. They don't tolerate cool or wet soil.

The plastic that commercial growers use helps keep soil temperatures up if cool weather occurs in March and early April. Gardeners who plant the crop in bare ground should wait until the middle of spring.

"Bell peppers are not difficult to grow in the spring, but commercially, there are a lot of inputs involved in their production," Coolong said. "Our climate here in the South is conducive to the successful growth of bell peppers."

If they are planted in early spring, bell peppers are typically ready for first harvest between 75 and 84 days. The cooler weather slows the growing process. In the fall, bell peppers can be harvested about 65 days after they are planted.

A good-yielding pepper plant may produce up to seven or eight, 8-ounce jumbo peppers. Bell peppers need well-drained soil that receives between eight and 10 hours of sunlight per day, according to the UGA Extension Circular 1005, "Home Garden Peppers." Peppers should be planted between 12 and 24 inches apart in a row, and rows should be about 3 feet apart.

Peppers' root zone is fairly shallow. Most roots are in the top 6 to 10 inches of soil. This shallow root zone means that consistent watering is critical for proper fruit set and development, Coolong said.

Bell peppers are typically harvested when they're green. Cut the stems to avoid breaking the branches. Peppers left on the plant after reaching full size become red as they mature. These peppers are sweeter than green peppers.

Gardeners should look for diseases and disorders commonly associated with bell peppers, namely blossom-end rot, a disorder characterized by a brown rot at the blossom end of the fruit. Bacterial leaf spot is another problem disease in peppers, although leaf-spot-resistant peppers are currently available.

"We also have problems with phytophthora, a disease we still have in watermelons. It's the same disease, it just attacks the bell pepper plant and fruit instead of just the fruit, as is the case with melons," Coolong said.

Store bell peppers in the refrigerator for two to three weeks. To freeze bell peppers, wash them thoroughly, cut them into strips, spread them out on a tray, then freeze them. Once the peppers are fully frozen, transfer them into plastic bags and store the bags in the freezer.



Bell peppers are typically harvested when they're green. Cut the stems to avoid breaking the branches.



The UGA Extension guide to growing peppers is available online at <http://bit.ly/2GOKBwr>.

## Identify pests before applying pesticides

By Amanda Tedrow

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Pesticides, which include insecticides, fungicides, herbicides and more, can contain organic or conventional ingredients. People use them in homes and workplaces, on farms and in gardens, and in other places where they want to control pests like weeds, insects, fungi, rodents and plant viruses.

University of Georgia Cooperative Extension urges all Georgians to learn more about the safe use, storage and disposal of pesticides. The UGA Extension Pesticide Safety Education Program promotes the safe, responsible use of pesticides by individuals and commercial groups by providing training programs, materials and educational resources that cover pest identification, personal safety, safe storage and safe disposal of pesticides.

UGA Extension experts educate homeowners, landscape professionals, farmers and other individuals who commonly use pesticides about how to protect the environment, reduce pesticide drift and runoff, protect threatened and endangered species, protect water quality, and keep food safe.

To reduce the unnecessary use of pesticides, remember that not every bug is a pest. Integrated pest management (IPM) is a science-based decision-making process focused on controlling insects through biological, mechanical, cultural and chemical methods. IPM reduces the economic, environmental and public health risks associated with pests and pest management practices.

The first step in the IPM process is pest identification. If an insect, weed or suspected plant disease causes trouble in your landscape or garden, bring a sample of the pest or email a photograph to your local UGA Extension office. Place the insect in a plastic container or glass bottle, or bring in a freshly cut leaf sample.

UGA Extension agents can identify the suspected pest and recommend the low-risk treatment options, if treatment is needed. Some insects may actually be beneficial to your plants.

Agents use their knowledge and experience, and the home and garden edition of the 2018 Georgia Pest Management Handbook, to give control recommendations. The home and garden edition of the handbook, along with the commercial edition, provides current information on selection, application and safe use of pest control chemicals.

To purchase a print copy of either edition of the 2018 Georgia Pest Management Handbook, visit [UGAExtensionStore.com](http://UGAExtensionStore.com). The Commercial Edition is \$50, which includes both volumes. The Home and Garden Edition is \$20.



UGA Agents use the home and garden edition of the 2018 Georgia Pest Management Handbook to give control recommendations. Both the home and garden and commercial editions of the handbook provide current information on selection, application and safe use of pest control chemicals.



## FUNDING OPPORTUNITIES

*This section provides IPM grant information.*

### **NIFA Crop Protection and Pest Management Program**

The purpose of the Crop Protection and Pest Management program is to address high priority issues related to pests and their management using IPM approaches at the state, regional and national levels. The CPPM program supports projects that will ensure food security and respond effectively to other major societal pest management challenges with comprehensive IPM approaches that are economically viable, ecologically prudent, and safe for human health. The CPPM program addresses IPM challenges for emerging issues and existing priority pest concerns that can be addressed more effectively with new and emerging technologies. The outcomes of the CPPM program are effective, affordable, and environmentally sound IPM practices and strategies needed to maintain agricultural productivity and healthy communities. The closing date for the grant application is May 8, 2018. For more information, please visit their [website](#).

### **Agriculture and Food Research Initiative Foundational – Exploratory Research**

This program area encourages continuous development of innovative ideas that will position U.S. Agriculture at the global forefront. These ideas will lead to quantum leaps in our knowledge and capabilities in agriculture and food production. They will address the challenges that have never been addressed before or challenges that have been addressed, but where new and risky ideas could promise high potential impact. This program area supports research projects that need to develop proof of concept for untested ideas that will lead to creative and positive disruption of the agricultural norm. The closing date for the grant application is May 22, 2018. For more information, please visit their [website](#).

### **Agriculture and Food Research Initiative – Foundational Program**

The AFRI Foundational Program supports grants in the six AFRI priority areas to continue building a foundation of knowledge critical for solving current and future societal challenges. The six priority areas are: Plant Health and Production and Plant Products; Animal Health and Production and Animal Products; Food Safety, Nutrition, and Health; Bioenergy, Natural Resources, and Environment; Agriculture Systems and Technology; and Agriculture Economics and Rural Communities. Single-function Research Projects, multi-function Integrated Projects, and Food and Agricultural Science Enhancement (FASE) Grants are expected to address one of the Program Area Priorities (see Foundational Program RFA for details). The closing date for the grant application is September 30, 2018. For more information, please visit their [website](#).

### **Scale Management to Promote Sustainable Southeastern Peach Production**

Scale insects can damage peach orchards, both acutely and over the long-term, but for decades growers have been able to control San Jose scale with highly effective, but potentially dangerous insecticides. Thus, with the loss of these effective pesticides and increased regulations on other insecticide use, growers have to seek a more integrated pest management approach. Peach growers need a management strategy that more effectively utilizes environmentally friendly insecticides, such as horticultural oils, and support the beneficial insects to help naturally control scale. Thus, by working directly with key peach growers in Georgia, we will demonstrate the effectiveness of horticultural oil coverage and timing for San Jose scale



management and identify the impact of management on natural enemies. This project has been extended due to crop loss last year. For more information, please visit their [website](#).

The UGA Integrated Pest Management Newsletter is a monthly journal for researchers, extension agents, extension specialists, and others interested in pest management. It provides the most updated information on legislation, regulations, and other issues concerning pest management in Georgia.

Do not regard the information in this newsletter as pest management recommendations. Consult the Georgia Pest Management Handbook, extension publications or appropriate specialists for additional information.

We value your feedback.  
Please complete our [survey](#).

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or email us at [ipm@uga.edu](mailto:ipm@uga.edu).