FUNDING OPPORTUNITIES

• **AFRI FOUNDATIONAL PROGRAM**  
  **(Revised Submission Deadline)**  
  The deadline to submit full proposals for the Plant-associated Insects and Nematodes Program Area Priority (A1111) of the Plant Health, Production and Plant Products Program Area in the FY 2014 Agriculture and Food Research Initiative (AFRI) Foundational Program RFA has been extended to May 1st 2014. No other changes have been made to this RFA. As a reminder, applications must be received no later than 5:00 Eastern Time. Applications received after 5:00 pm will not be accepted for review.

  You can access RFA at:  

• **ORGANIC AGRICULTURE RESEARCH AND EXTENSION INITIATIVE**  
  **DATES:** Applications must be received by 5:00 p.m. Eastern Time on May 8, 2014. Applications received after this deadline will normally not be considered for funding (see Part IV, C. of this RFA). Comments regarding this request for applications (RFA) are requested within 6 months from the issuance of this notice. Comments received after that date will be considered to the extent practicable.

  **STAKEHOLDER INPUT:** The National Institute of Food and Agriculture (NIFA) seeks your comments about this RFA. We will consider the comments when we develop the next RFA for the program, if applicable, and we’ll use them to meet the requirements of section 103(c)(2) of the Agricultural Research, Extension, and Education Reform Act of 1998 (7 U.S.C. 7613(c)(2)). Submit written stakeholder comments by the deadline set forth in the DATES portion of this Notice to: Policy and Oversight Division; Office of Grants and Financial Management; National Institute of Food and Agriculture; USDA; STOP 2299; 1400 Independence Avenue, SW; Washington, DC 20250-2299; or via e-mail to: Policy@nifa.usda.gov. (This e-mail address is intended only for receiving comments regarding this RFA and not requesting information or forms.) In your comments, please state that you are responding to the Organic Agriculture Research and Extension Initiative RFA.
EXECUTIVE SUMMARY: NIFA requests applications for the Organic Agriculture Research and Extension Initiative for fiscal year (FY) 2014 to solve critical organic agriculture issues, priorities, or problems through the integration of research, education and extension activities. OREI funds research, education and extension programs that enhance the ability of producers and processors who have already adopted organic standards to grow and market high quality organic agricultural products. NIFA anticipates the amount available for support this program in FY 2014 will be approximately $20 million.

Education activities will be eligible for funding this year. Research, Education and Extension Planning Grants will be offered this year.

You can access RFA at: [http://www.nifa.usda.gov/funding/rfas/pdfs/14_OREI.pdf](http://www.nifa.usda.gov/funding/rfas/pdfs/14_OREI.pdf)

• SPECIALTY CROP RESEARCH INITIATIVE MODIFICATION

DATES:
1. Letters of Intent for Research and Extension Planning Grant applications must be received by 5:00 p.m. Eastern time on April 11, 2014. See Section IV, A. for a description of the requirements for the contents of a letter of intent and submitting instructions. LETTERS OF INTENT ARE MANDATORY FOR RESEARCH AND EXTENSION PLANNING GRANT APPLICATIONS.

2. Complete, error-free Stakeholder Relevance Statements for all other grant types must be received in Grants.gov by 5:00 p.m. Eastern Time on April 11, 2014. See Section IV, C. for a description of the requirements for the contents of a stakeholder relevance statement. STAKEHOLDER RELEVANCE STATEMENTS ARE MANDATORY FOR ALL SPECIALTY CROP RESEARCH INITIATIVE GRANT APPLICATIONS EXCEPT FOR RESEARCH AND EXTENSION PLANNING GRANTS.

3. Invited full applications must be received by 5:00 p.m. Eastern Time on June 20, 2014. See Section IV, D. for a description of the requirements for the contents of a full application.

STAKEHOLDER INPUT: The National Institute of Food and Agriculture (NIFA) seeks your comments about this RFA. We will consider your comments when we develop the next RFA for the program, and to meet the requirements of section 103(c)(2) of the Agricultural Research, Extension, and Education Reform Act of 1998 (7 U.S.C. 7613(c)(2)). Submit written stakeholder comments by the deadline set forth in the DATES portion of this Notice to: Policy and Oversight Division; Office of Grants and Financial Management; National Institute of Food and Agriculture; USDA; STOP 2299; 1400 Independence Avenue, SW; Washington, DC 20250-2299; or via e-mail to: Policy@nifa.usda.gov (this e-mail address is intended only for receiving comments regarding this RFA and not requesting information or forms). In your comments, please state that you are responding to the SCRI RFA.

EXECUTIVE SUMMARY: NIFA requests applications for the Specialty Crop Research Initiative (SCRI) for fiscal year (FY) 2014 to solve critical United States specialty crop issues, priorities, or problems through the integration of research and extension activities that
use systems-based, trans-disciplinary approaches. The intent of the SCRI program is to solve the needs of the various specialty crop industries through the promotion of collaboration, open communication, the exchange of information, and the development of resources that accelerate application of scientific discovery and technology. NIFA anticipates the total amount available for support of the SCRI program in FY 2014 will be approximately $76.8 million. Of this, approximately $24 million will be reserved for the Emergency Citrus Disease Research and Extension Program component of SCRI, in accordance with Section 7306 of P.L, 113-79, the Agricultural Act of 2014. The SCRI program will give priority to projects that are multistate, multi-institutional or trans-disciplinary (see Definitions, Part VIII (E)), and include clearly defined mechanisms to communicate results to producers and the public.

**Please Note:** Beginning in FY 2014, the SCRI program will be competed in two stages. Applicants intending to submit Standard Research and Extension projects, Coordinated Agricultural Projects eXtension projects or Regional Partnerships for Innovation projects will be required to submit Stakeholder Relevance Statements (SRS). The content of the SRS is described in Section IV, C. of this RFA. Applicants whose SRS is scored highly enough will be invited to submit full applications. Invited full applications will undergo a scientific peer review. Review criteria for the SRS and invited full application review can be found in Section V, A. of this RFA. Both the relevance score and the results of the scientific peer review will be considered when recommending applications for award.

The SCRI program offers the following five project types in FY 2014. These project types are described in more detail in Part II, C. Applicants should decide which project type is best suited to the objectives of their research and extension project and develop a budget that fits the objectives. Applicants are discouraged from developing a project (and selecting a project type) based on a budget request target.


- **SUPPLEMENTAL AND ALTERNATIVE CROPS COMPETITIVE GRANTS PROGRAM**

**DATES:** Applications must be received by **5:00 p.m. Eastern Time on May 8, 2014.** Applications received after this deadline will normally not be considered for funding (see Part IV, C. of this RFA). Comments regarding this request for applications (RFA) are requested within six months from the issuance of this notice. Comments received after that date will be considered to the extent practicable.

**STAKEHOLDER INPUT:** The National Institute of Food and Agriculture (NIFA) seeks your comments about this RFA. We will consider the comments when we develop the next RFA for the program, if applicable, and we’ll use them to meet the requirements of section 103(c)(2) of the Agricultural Research, Extension, and Education Reform Act of 1998 (7 U.S.C. 7613(c)(2)). Submit written stakeholder comments by the deadline set forth in the DATES portion of this Notice to: Policy and Oversight Division; Office of Grants and Financial Management; National Institute of Food and Agriculture; USDA; STOP 2299; 1400 Independence Avenue, SW; Washington, DC 20250-2299; or via e-mail to: extension.uga.edu
EXECUTIVE SUMMARY: NIFA requests applications for the Supplemental and Alternative Crops Competitive Grants Program (SACC) for fiscal year (FY) 2014 to significantly increase crop production and/or acreage by developing and testing superior germplasm, improving methods of planting, cultivation, and harvesting, and transferring new knowledge to producers (via Extension) as soon as practicable. Pursuant to H.R. 3547, the Consolidated Appropriations Act, 2014, the amount available to support this program in FY 2014 is approximately $780,000.

This notice identifies the objectives for SACC projects, the eligibility criteria for projects and applicants, and the application forms and associated instructions needed to apply for a SACC grant.

You can access RFA at: [http://www.csrees.usda.gov/funding/rfas/pdfs/14_SACC.pdf](http://www.csrees.usda.gov/funding/rfas/pdfs/14_SACC.pdf)

**SPECIAL RESEARCH GRANTS PROGRAM, POTATO BREEDING RESEARCH**

DATES: Applications must be received by 5:00 p.m. Eastern Time on May 15, 2014. Applications received after this deadline will normally not be considered for funding (see Part IV, C. of this RFA). Comments regarding this request for applications (RFA) are requested within 6 months from the issuance of this notice. Comments received after that date will be considered to the extent practicable.

STAKEHOLDER INPUT: The National Institute of Food and Agriculture (NIFA) seeks your comments about this RFA. We will consider the comments when we develop the next RFA for the program, if applicable, and we’ll use them to meet the requirements of section 103(c)(2) of the Agricultural Research, Extension, and Education Reform Act of 1998 (7 U.S.C. 7613(c)(2)). Submit written stakeholder comments by the deadline set forth in the DATES portion of this Notice to: Policy and Oversight Division; Office of Grants and Financial Management; National Institute of Food and Agriculture; USDA; STOP 2299; 1400 Independence Avenue, SW; Washington, DC 20250-2299; or via e-mail to: Policy@nifa.usda.gov. (This e-mail address is intended only for receiving comments regarding this RFA and not requesting information or forms.) In your comments, please state that you are responding to the Special Research Grants Program, Potato Breeding Research RFA.

EXECUTIVE SUMMARY: NIFA requests applications for the Special Research Grants Program, Potato Breeding Research (Potato Breeding Research) for fiscal year (FY) 2014 to facilitate or expand ongoing state-federal food and agricultural research programs. Pursuant to H.R. 3547, the Consolidated Appropriations Act, 2014, the amount available to support this program in FY 2014 is approximately $1,238,000.
This notice identifies the objectives for Potato Breeding Research projects, the eligibility criteria for projects and applicants, and the application forms and associated instructions needed to apply for a Potato Breeding Research grant.

You can access RFA at: http://www.nifa.usda.gov/funding/rfas/pdfs/14_Potato.pdf

• **THE GEORGIA AGRICULTURAL COMMODITY COMMISSION FOR PECANS (GACCP) HAS ISSUED THEIR CALL FOR PROPOSALS TO BE CONSIDERED FOR FY15 FUNDING (JULY 1, 2014 - JUNE 30, 2015).**

Listed below are the Commission's Guidelines for New Proposals. To meet the Commission's **April 20** deadline, proposals should be forwarded to Debra Rucker for review no later than **Friday, April 11, 2014**. Please include a signed proposal cover sheet (http://ovpr.uga.edu/docs/forms/osp/pdf/Proposal-Cover-Sheet.pdf), and also enter the proposal into UGA's eResearch Portal for Grants and Awards (http://ovpr.uga.edu/osp/proposal/submit-proposal), which will generate the necessary internal transmittal process. The Commission's Research Committee will review and make recommendations at their next meeting.

The Georgia Pecan Commission is pleased to announce the call for proposals for research for the FY 15 period (July 1, 2014 through June 30, 2015). Since limited funds are available, the following priorities have been established. However, all projects will be considered on their individual merit and potential success:

- Scab (High Priority)
- Health benefits of Pecans
- Glomarella/Anthracnose Control
- Agricultural base land value improved by enhancement of horticulture
- More information on chicken litter fertilizer
- Amount of fertilizer to apply to newly planted and young trees
- New spray materials for insects and mites
- Irrigation-drip and solid set amounts in groves and nurseries
- Fertilization-effectiveness as related to production
- Phytophthora-how and when to control
- Insecticides to control black and yellow aphids, stink bugs and nutcase bearer
- Decline in quality in late part of season
- Miticide to control mites
- Effects on herbicides used in strips(round-up)
- Pecan marketing exports; China, India, etc.
- Weevil research directed toward eradication
- Controlling nematodes
- Fertility-minor elements, sulfur
- Problems with Stuart variety opening slowly
- Evaluation of new cultivars
- Hedging of Pecan Trees

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• Application of Fertilizer by Banding
• Fertigation

NOTE: Several research projects are ongoing projects continuing from last year and previous years. The Commission would like to see a continuance of these projects.

Proposals should be limited to three (3) pages and include:

• Title and investigator(s) names
• Need for research in Georgia
• Potential benefit (how do you propose to evaluate cost/benefit?)
• Objectives
• Procedures and location(s) of research
• Budget: Include request of funds for personnel services and operating costs.

Copies of proposals must be received in the commission office by April 20, 2014. Proposals received after the close of business on this day will not be considered. Faxed copies will not be accepted.

Mail 25 copies of the proposals to:

GACCP Pecan Research Committee
19 Martin Luther King Jr. Drive SW Room 324
Atlanta, GA 30334

If you have any questions regarding research proposals please contact Tom Stone, Research Committee Chairman, (229) 226-9228 or John Robison, Jr. (912) 213-2411.

UPDATES FROM EPA

• EPA SOLICITING COMMENTS ON PROPOSED AGRICULTURE WORKER PROTECTION REGULATION FOR PESTICIDES

The Environmental Protection Agency (EPA) has recently proposed reviews to the Worker Protection Standard for Agricultural Pesticides to add new safety measures to protect U.S. farm workers from pesticide exposure. On March 19, EPA announced that it is seeking public comments regarding these proposed revisions.

SUMMARY:
EPA is proposing updates and revisions to the existing worker protection regulation for pesticides. The proposed changes are in response to extensive stakeholder review of the regulation and its implementation since 1992, and reflect current research on how to mitigate occupational pesticide exposure to agricultural workers and pesticide handlers.
EPA is proposing to strengthen the protections provided to agricultural workers and handlers under the worker protection standard by improving elements of the existing regulation, such as training, notification, communication materials, use of personal protective equipment, and decontamination supplies. EPA expects the revisions, once final, to prevent unreasonable adverse effects from exposure to pesticides among agricultural workers and pesticide handlers; vulnerable groups, such as minority and low-income populations, child farmworkers, and farmworker families; and the general public. EPA recognizes the importance and independence of family farms and is proposing to expand the immediate family exemption to the WPS.

Comments are due by June 17, 2014. Additional information on the proposed revisions and directions for submitting comments are available at:


AWARDS AND HONORS

2014 WALTER BARNARD HILL AWARD FOR DISTINGUISHED ACHIEVEMENT IN PUBLIC SERVICE AND OUTREACH

Drs. Stanley Culpepper (Crop and Soil Sciences Department) and Robert C. Kemerait, Jr. (Plant Pathology Department) were recognized with Walter Barnard Hill Award at the 23rd Annual Public Service and Outreach Meeting and Awards Luncheon held at UGA Hotel and Conference Center on Monday, April 7, 2014.

Dr. Stanley Culpepper

As a professor of crop and soil sciences in the College of Agricultural and Environmental Sciences, Stanley Culpepper assists the sustainability of family farms by helping growers control weeds effectively and economically. His background growing up on a North Carolina bicentennial family farm that produced cotton, peanuts, soybeans and wheat helped motivate his current work. His efforts now focus heavily on creating new management tools for vegetable producers and developing tactics to manage resistant weeds currently devastating Georgia cotton and small grains production.

"Dr. Culpepper has demonstrated a unique ability to bring together multiple entities to help find ways to develop data and inform regulatory decisions impacting Georgia growers," says Richard Keigwin, direction of the pesticide re-evaluation division at the U.S. Environmental Protection Agency (EPA). "His research benefits not only Georgia agriculture but also the general public more broadly. Through his work, he has truly embraced the mission of Cooperative Extension."

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Culpepper, who is based at the UGA Tifton campus, has been a speaker at more than 200 functions in 18 states. Across Georgia, he has presented timely information to growers at hundreds of county meetings. In addition to authoring many publications, Culpepper has received numerous awards, the pinnacle of which came in 2010 when he became the first person in Extension to win the EPA's Montreal Protocol Award for the preservation of the ozone layer.

Bill Brim, co-owner of Lewis Farms in Tifton, credits Culpepper with the enthusiasm and innovative spirit needed to tackle emerging weed problems season after season. "He is about being there to help people," said Brim. "He wants to solve problems for the growers in the community, and he's very innovative. I just couldn't say enough about Dr. Culpepper."

Robert C. Kemerait, Jr.

As an associate professor in the Department of Plant Pathology at UGA, Bob Kemerait focuses on disease and nematode management in peanuts, cotton, soybeans and field corn. At the core of Kemerait's Extension program is the belief that education and preparedness of county agents are his utmost responsibility. Based out of the Coastal Plain Experiment Station, Kemerait has redefined disease management in peanut production in the southeastern United States with Peanut Rx and prescription fungicide programs. Through these programs and others, he trains students to work with county agents and to understand the role of Extension in the discipline of plant pathology.

"Dr. Kemerait blends excellence in scholarship with a commitment to growers, county agents, the larger agricultural community and school children throughout Georgia through innovative, creative and prolonged efforts in Extension and outreach," says John Sherwood, professor and head of plant pathology at UGA.

Kemerait has helped growers in other countries as well. Through the Collaborative Research Support Program on Peanuts, he has improved peanut production in the impoverished nations of Guyana and Haiti, and he has spearheaded development of a peanut production guide appropriate for farmers in developing countries.

He was the first person in 50 years to document a leaf spot disease target spot which affects millions of acres of cotton. Kemerait's program also plays a critical role in the national effort to provide early detection of Asian soybean rust.

In addition to authoring dozens of publications, Kemerait has received numerous awards and recognitions. He was the first recipient of the Senior Specialist of the Year, awarded by the Georgia Association of County Agents. In 2012, he received the D.W. Brooks Award for Excellence in Extension from the College of Agricultural and Environmental Sciences.
FROM THE FIELD

CLIMATE OUTLOOK FOR 2014 GROWING SEASON AND WINTER 2014-2015

By Pam Knox, UGA Agricultural Climatologist

Following a very wet 2013, this year has gotten off to a drier than usual start, although generally soil moisture has been very good until recently. In the last few weeks, abnormally dry conditions have started to creep into the mountains in northeast Georgia as well as scattered locations in the west central and southwest parts of the state. However, a major drought is not expected to develop this growing season.

Short-term forecasts out to two weeks indicate that some dryness may continue in southern Georgia but north Georgia is likely to be wetter. In the one to three month period that includes April through June, there are equal chances for below, near, and above normal rainfall, since accurate predictions are very hard in neutral conditions when no El Nino or La Nina are occurring. However, following recent climate trends, temperatures have an increased chance of above normal conditions for the next few months.

NOAA has now issued an El Nino watch for the potential development of an El Nino in the eastern Pacific Ocean by mid to late summer. When an El Nino occurs, we commonly see wet and cool conditions in south Georgia associated with the persistent presence of a subtropical jet stream above the earth’s surface which directs weather systems right across Georgia.

At this time, NOAA is predicting a 50 percent chance of an El Nino developing by mid-summer. If one does occur, then we can expect next winter to be cooler and wetter than normal in 2014-2015. Some scientists believe that this is likely to be a stronger than usual El Nino based on current ocean temperatures. If that happens, the cool and wet conditions will extend throughout Georgia instead of just affecting the southern part of the state.

One impact of El Nino on Georgia’s climate is a reduction in the number of hurricanes in the Atlantic Ocean. However, even in a quiet season, a single direct hit by a hurricane or tropical storm can cause significant damage to the area it passes over. Most other effects of El Nino are seen in the winter when the El Nino is strongest.

Other impacts from El Nino include excessive cloudiness, which reduces solar radiation and increases drying times for hay as well as enhancing the development of fungal diseases. Low-lying areas are likely to be soggy and hard to work due to the persistent rain. Cooler temperatures and high humidity may also affect the development of pecans and Vidalia onions, reducing pecan yields as well as the average size of the onions. In

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general, El Nino winters are not associated with unusually late frost dates, however. Runoff may also increase, leading to increased erosion or movement of surface applications of manure into streams.

You can find more information about the impacts of El Nino on climate patterns and crop yields at [www.agroclimate.org](http://www.agroclimate.org).

### 2014 MUMMY BERRY EPIDEMIC IN PROGRESS*

Phil Brannen and Harald Scherm  
*Department of Plant Pathology, University of Georgia, Athens, GA 30602*

As blueberry development is currently in full swing, it is a good time to review some aspects of the mummy berry situation from spring 2014. Where fungicide applications were minimal or absent in 2013 and 2014, mummy berry was back with a vengeance (Fig. 1); this included some organic sites. However, most producers seem to have learned a lesson from 2010, so spray programs were generally initiated much earlier in 2014; also, as much as possible, spray programs were “tight,” although rainfall did cause issues with many timed fungicide applications. Damage in fields with well-timed fungicide applications has been minimal.

Although there is generally a good correlation between shoot blight levels (primary infection) and fruit mummification (secondary infection), it is too early to tell whether fruit mummification in rabbiteyes will be observed this year. The initial apothecium germination warning was issued on 4 March, and the first mummy berry strikes were observed on 17 March. We hope that judicious fungicide applications made after strikes were observed will have been effective in preventing infection of open flowers and subsequent fruit mummification. So far, mummy berry has not been reported either as strikes or mummified fruit in southern highbush varieties in Georgia.

If one examines the temperatures and rainfall patterns that occurred as leaf and bloom tissue emerged, we did have numerous frost/freeze events in our major blueberry production region. If we can extrapolate the temperature information from Dr. Annemiek Schilder’s Michigan fact sheet on mummy berry (Schilder et al., 2008) to rabbiteyes, we do start to see a match again this year:

“Ascospore germination requires free water, and the optimum temperature for infection of susceptible tissue is 57°F. Developing vegetative buds become susceptible to infection when about 1/6th inch of green tissue is exposed. Flower buds become susceptible when the bud scales begin to separate. At 57°C with adequate moisture, germination and infection can occur within 4 hours; at 36°F, at least 10 hours of leaf wetness are required for infection. Blight symptoms appear about two weeks after infection. In lowbush blueberries, developing leaf and flower bud tissues are more susceptible to infection after
exposure to freezing temperatures, and this susceptibility can last for up to 4 days after
the frost event. This also appears to be the case in highbush blueberries.”

We had developing leaf and flower bud tissues exposed to freezing temperatures on
numerous occasions in February/March, possibly making the tissue more susceptible to
infection for 4 days. Immediately after these freezing events, the 57°F optimum infection
temperature was often achieved from middle to south Georgia. Cold temperature
differentials in fields and/or locations might help to explain the differing degrees of
infection (i.e., colder lower portions of fields or lower fields). Since rains were observed
throughout the state on multiple occasions, we likely had ascospore release and
ermination under optimum conditions of moisture and temperature for infection – as
well as having very susceptible (due to freeze damage) bloom and leaf tissue. After
infection occurred, we would have had 2 weeks before symptom expression. As
mentioned, the first report of mummy berry strikes was made on 17 March, so this fits
fairly well.

We have to be diligent in application of green tip and bloom fungicides for mummy berry
control. Either green tip or early bloom provide a good infection court for the initial
mummy berry infections, so whichever one of these events occurs first has to trigger
fungicide applications. In many cases where strikes were significant, fungicide
applications were applied late or insufficient/ineffective fungicides were applied.

It is somewhat difficult to determine a perfect trigger for the first fungicide application,
since flowers and leaves do not open simultaneously. In a "normal" year, early bloom (5
to 10% stage 6) usually occurs before green tip on most rabbiteye cultivars in south
Georgia, Brightwell being one exception. If flowering initiates the first fungicide spray,
we would generally recommend that the first application be made when 5 to 10% of the
flowers are open (stage 6), although earlier applications at stage 4 or 5 (flowers exposed
but corollas not yet open) would be warranted if freeze damage has occurred or is
expected to occur. As stated above, freeze damage can increase the susceptibility of
closed flower buds to ascospore infection, and this may have been an important
contributing factor to widespread flower strike development this year (Fig. 1).

If the leaves (green tip) trigger the initial application, as would have been the case this
spring on most rabbiteye cultivars, then producers really have to make sure they are
applying before emerging leaves are 1/6th inch in length. Leaves do not require cold
damage for infection to occur, and any exposed green tissue can be infected. Once the
initial fungicide is applied, the rest of the bloom should be covered with fungicide
applications, and this usually results in 2 to 3 more applications, depending on how
quickly the bloom progresses. In 2014, up to six application were required in some
locations due to the “stop and go” nature of the bloom as a result of alternating warm and
cold weather, and the fact that cultivars with varying bloom times may have been present
in a field.

In practice, fungicide applications at 7-day intervals have worked well over the years.
For resistance management, we recommend that the first application be Pristine (unless

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Exobasidium leaf and fruit spot has been confirmed for the location), followed by application of DMI fungicides (Indar, Orbit, Tilt, Bumper, Quash, etc.) + Captan (CaptEvate if Botrytis conditions are prevalent, i.e., wet and/or cold damaged tissues are available for infection) for the next two applications. Additional applications, if needed based on bloom progression, should alternate active fungicide classes as much as possible.

But what can you do now to maintain the 2014 crop and prevent major problems next year? Obviously, it is too late to try to control the disease chemically, given that no new infections can occur past the end of bloom and the pathogen is already firmly established in the developing fruit. The focus for the 2014 crop needs to be on minimizing the number of mummies that end up in the packinghouse and especially in the final product. This requires careful adjustment of the mechanical harvester to separate as many mummies as possible from sound fruit in the field, e.g., through aggressive operation of the blower fans. If possible, the mummies should be collected separately (rather than blown back into the field) and disposed of at a remote site with no blueberry fields nearby. Vigilant adjustment of sorting and separation equipment is also critical in the packinghouse, where the packingline may have to be run slower and/or more inspectors may have to be hired to ensure complete removal of mummies.

Most mummies fall on the ground before or during harvest, where they will substantially increase the soil inoculum levels for 2015. Several sanitation treatments have been suggested to destroy the mummies on the ground or reduce their viability, but none of these methods alone is sufficiently effective. Certain herbicides such as diuron and simazine, when applied at the time of mummy germination in late winter/early spring, can inhibit mummy germination, apothecium formation, and/or ascospore production (Cox & Scherm 2001). However, to what degree these effects translate into reductions in the level of primary infection in the field is currently unknown. Burying mummies to a depth of ~2 inches, for example by applying soil cultivation, has long been suggested to reduce or prevent mummy germination. However, most mummies are located near or within the crowns of the blueberry bushes, where they are difficult to access with tillage implements (Ngugi et al. 2002); tillage can also damage roots, so it is not the best method to utilize under the plants. Raking the mummies to the row centers and tillage of the row centers only would work, but this is an expensive operation.

Covering the beds with mulch to a depth of 2 inches may be an effective, albeit expensive, option to suppress mummy germination. However, as the mulch degrades over time, the long-lived mummies may find favorable conditions for germination, especially considering the high moisture-holding capacity of the mulch. As a warning, covering beds with soil will result in significant issues with root/oxygen relationships, and significant plant stress or even death can occur.

In summary, soil sanitation treatments alone are unlikely to provide sufficient suppression of mummy berry for the 2015 season, and, if environmental conditions are suitable for the disease again, aggressive use of fungicides will be needed to manage both primary and secondary infection next spring. As stated above, the recommendation still
holds that fungicide applications should start at leaf bud break or very early bloom (whichever occurs first) and continue throughout the end of bloom (i.e., until no more flowers at stage 6 or earlier are present). Applications should alternate QoIs and DMIs, and spray intervals should be around 7 days, depending on the rate of bloom progression. It is hoped that a combination of sanitation and judicious fungicide use will prevent a situation similar to that of 2010, despite the substantially increased inoculum levels going into next year.

Literture Cited


*This article was modified and updated from a previous article published in the 2013 Dixie Blueberry News.*
Fig. 1. Extensive leaf and flower blight due to primary infection by the mummy berry fungus on rabbiteye blueberry. Photograph taken on 4/8/2014 (Eddie Beasley; Berrien County Cooperative Extension).

BELL PEPPER UNDER SHADE NETS HAVE INCREASED FRUIT YIELD AND QUALITY, AND REDUCED INCIDENCE OF PHYTOPHTHORA BLIGHT (CAUSED BY PHYTOPHTHORA CAPSICI LEON.)

Juan Carlos Díaz-Pérez

1Professor, Department of Horticulture, University of Georgia, 2360 Rainwater Road, Tifton GA 31793-5766. E-mail: jcdiaz@uga.edu

Shade nets are used to modify the microenvironment with the goal of improving production in horticultural crops. There is currently no commercial vegetable production under shade net in Georgia. The objectives were to evaluate effects of shade level on fruit yield, quality, and incidence of Phytophthora blight (caused by Phytophthora capsici Leon.) in bell pepper. Experiments were conducted in Tifton, GA, in 2008 (with cv. Heritage) and 2009 and 2010 (with cvs. Camelot, Lafayette, Sirius, and Stiletto). Bell pepper plants were grown under shade levels of: 0% (unshaded, as a control), 30%, 47%, 63% and 80%. Total marketable (Fancy and US1) fruit yield augmented with increasing

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shade level to a maximum at 35% shade and then decreased with further increments in shade level. Relative to unshaded plants, marketable yields were improved by 119% (2008) and 43% (2009 and 2010) by 35% shade level. US2 and cull (sunscald) fruit declined with increasing shade level.

Among cultivars, ‘Camelot’ produced among the greatest number and yield of marketable fruit, and ‘Sirius’ the heaviest fruit and greatest number of culls. Fruit soluble solids and percent of fruit dry weight decreased with increasing shade level; fruit water loss rate, and bacterial soft rot incidence were unaffected. Incidences of Phytophthora blight and fruit sunscald decreased with shade level. Shading may be useful in the management of Phytophthora blight in bell pepper.

UPCOMING EVENTS

Apr 16  Bed Bug Monitoring and Control Webinar  
Dr. Susan Jones from the Ohio State University will present her webinar or Bed Bug Monitoring and Control from 8 – 9 AM. To sign up for this webinar or other webinars in this series, please contact Dr. Dan Suiter at dsuiter@uga.edu or 770-233-6114.

Spotted Wing Drosophila Workshop Series: TO TRAIN THE TRAINERS

Apr 18  Spotted Wing Drosophila (SWD) Identification, Monitoring, and Management Workshop (Dr. Ash Sial) – In conjunction with UGA Extension Northeast District Update.

May 13  Spotted Wing Drosophila (SWD) Identification, Monitoring, and Management Workshop (Dr. Ash Sial) – In conjunction with UGA Extension Northwest District Update.
IN THE SPOTLIGHT

SPOTTED WING DROSOPHILA IDENTIFICATION, MONITORING, AND MANAGEMENT IN GEORGIA BLUEBERRIES

Ash Sial and Dan Horton

Department of Entomology, University of Georgia, Athens GA, 30602.

The spotted wing drosophila (SWD), Drosophila suzukii (Matsumura) (Diptera: Drosophilidae) is an invasive and economically important pest of many soft-skinned fruits such as blueberries, blackberries, raspberries, strawberries, cherries, and other. Since its first detection in California in 2008, SWD spread rapidly across the United States. It was first found in Georgia in 2010 and since then this small vinegar fly has impacted the $255 million Georgia blueberry industry with crop losses of up to 20% annually. SWD has been reportedly detected in many counties across the State. However, a statewide survey is underway to confirm reports and develop a SWD distribution map in the State of Georgia.

IDENTIFICATION AND LIFE CYCLE

The SWD flies have brownish-yellow thorax, black stripes across the abdomen, and distinct red eyes. Males have dark spots on the wingtips and black combs on the forelegs (Figure 1). Female SWD lack the spots and black combs, but have a very large serrated ovipositor (Figure 2). The adult female punctures the skin of intact fruit using its serrated ovipositor and deposit white eggs just under the fruit skin. Two spiracles (breathing tubes) which are attached to the egg extend out of the fruit through the hole, also known as a sting. Eggs hatch after 1-3 days and the larvae (maggots) continue to feed in the fruit. While in the fruit, the larvae develop through three instars. The respiratory ducts and mouth of the larvae develop with each instar. The third instar (Figure 3) has large hook-like mouthparts and branching anterior spiracles which protrude through its larval exterior. After 5-7 days, the third instar exits the fruit to pupate. The puparium (Figure 4) is initially bright white, but it browns as it ages. The fly remains in its puparium for 3-15 days until the adult emerges. Adult males may not develop the characteristic spot on the wingtips until 10 hours after eclosing, and reproductive maturity will typically be reached after 1-2 days. Mature females are extremely productive, laying 1-3 eggs per oviposition site, in 7-16 sites per day, for 10-59 days. One female can produce 300-600 eggs within a lifetime.
Figure 1. SWD male wing spots and sex combs.
Figure 2. SWD Female and serrated ovipositor
SWD DAMAGE

Blueberries are susceptible to SWD damage as soon as the maturing fruit begin to change color from green to purple up until they are harvested. Typical vinegar flies infest damaged, overripe or rotting fruit for egg-laying, but a female SWD can lay eggs into intact fruit using its serrated ovipositor. Although the fruit receives some damage during egg insertion which increases its vulnerability to fruit pathogens, the majority of the damage is caused by larval feeding. The SWD larvae eat the fruit pulp causing fruit to collapse often within days of egg-laying. Figures 5A-L clearly demonstrate progression of SWD damage from oviposition to complete collapse of a blueberry. Because SWD attacks commercially-viable fruit, SWD poses a significant risk for blueberry growers. If SWD is not managed properly, fruit infested with SWD larvae may be harvested which will result in either downgrading or rejection of the entire shipment. It is therefore extremely important that Georgia blueberry growers implement effective monitoring and management strategies to minimize the impact of this devastating pest blueberry production.

Figure 3. SWD Larva  Figure 4. SWD Pupa (Puparium)
Figures 5 A-L. Progression of SWD Damage in infested blueberry:
MONITORING

The first and the most important step in the effective management of this pest is to determine whether SWD are present in your orchard and when they become active. To determine this, monitoring should be in place from early stages of fruit development until the end of harvest.

There are several trap designs available to detect the presence of SWD, though some are considered better than others. Studies have found that traps with a taller shape and greater bait surface area might attract more SWD. Holes in the traps should be wide enough that the flies can enter, but narrow enough to keep the bait from evaporating too quickly. If the holes are too wide this will also attract unwanted, larger insects.

A suggested trap design would consist of a 32-ounce deli cup with a corresponding lid. To hang the trap use approximately 20” of 14-gauge, insulated copper wire, secured into two of the holes. The deli cup should have 10-12, 3/16-inch holes located just below the rim. The holes should encircle about 2/3 of the way around the cup, leaving an unpunctured section for pouring the bait. The trap should be baited with 150 mL of a yeast-sugar solution. Traps should be placed in shaded areas in or around the fruits, and the traps should be checked weekly. While checking the traps, determine if SWD is present, count the number of male and female SWD, and replace the trap with fresh bait. For detailed instructions on how to make these traps, please visit UGA Blueberry Blog at http://blog.caes.uga.edu/blueberry/. You can also access a video demonstration of how to make monitoring traps for SWD at http://www.youtube.com/watch?v=hVOn5SHqKgL.

SWD baits and lures include synthetic lures, yeast and sugar mixtures, and apple cider vinegar (ACV). Studies have shown that apple cider vinegar is not the most attractive bait, but it is often used because ACV is easy to find at the local stores and the traps are easy to service. The yeast and sugar solution, especially during warmer temperatures, is currently the best alternative. Traps baited with yeast and sugar trapped SWD earlier and in greater numbers than those with the ACV. Although these traps are messier to service, the yeast bait is less expensive than the ACV traps, and of course earlier detection is extremely important and allows for timely implementation of management strategies to protect fruit from infestation. In order to maximize the chances of trapping SWD, we recommend a minimum of one yeast and sugar-baited trap every 5-10 acres. If there is a woodland habitat surrounding the orchard, hang the traps in the orchard close to the woodland habitat. It might help with the earlier detection of the fly activity.

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The traps for SWD should be hung in a shaded area of the bush canopy in the middle of the fruiting zone. Keep the trap clear of vegetation with the holes exposed so that SWD can easily fly in. Check the traps at least once a week and add fresh bait yeast-sugar bait each time traps are checked. Old bait should be poured into a bucket for disposal away from the orchard. The SWD captures should be recorded each week in a log book including number of male and female flies separately, date of the trap change, trap location and if possible GPS coordinates of the trap location.

For flies suspected of being SWD that are trapped in counties where this insect has not yet been reported, we encourage growers, scouts, and consultants to place flies into another container and then send them to your local County Agent for identification. The County Agents should report the first catch of SWD in their respective Counties to us at ashsial@uga.edu to help with a survey currently underway to develop a map of SWD distribution in the State of Georgia.

Here are the recipes for the two most commonly used baits:

1. **Apple cider vinegar**
   - Unscented soap (4 ml/gal)
   - *Use 150 ml of this solution per trap.*

2. **Yeast and sugar**
   - 2 Tbsp yeast (ca. 8 g)
   - 8 Tbsp sugar (ca. 40 g)
   - 24 fl oz water
   - 0.76 ml unscented soap
   - *Use 150 ml of this solution per trap.*
   - *This will make enough bait for just over 4 traps.*

**Supplies**

Traps (see below)
- Apple cider vinegar - 5% "real" ACV
- Sugar - White sugar, brand not important
SAMPLING FRUIT FOR SWD LARVAE

If you suspect has been or may be infested by SWD, then you should sample fruit prior to harvest to determine the level of infestation by extracting larvae from the berries using one of three methods: sugar, salt, or boiling method. Each method require 2-4 cups (about 100) of blueberries.

The sugar method involves adding a cup of sugar solution (1/4 cup of sugar in 4 cups of water) to crushed berries in a seal-top gallon plastic bag. Reseal the bag and inspect the liquid for larvae floating on the surface on the sugar solution. For detailed instructions on how to use sugar solution to sample blueberries for SWD, please visit UGA Blueberry Blog at http://blog.caes.uga.edu/blueberry/. You can also access a video demonstration of how to use sugar solution to sample blueberries for SWD at http://www.youtube.com/watch?v=ZAb24LEFogg.

The salt method consists of combining a salt solution (1 tablespoon of salt and 1 cup of water) and berries in a seal-top gallon plastic bag. Without smashing the berries lightly mix the berries into the solution. Allow the berries and solution to sit in the bag for about 15 minutes. After that time, look for larvae that have emerged from the berries and are crawling on the berry surfaces. For detailed instructions on how to use salt solution to sample blueberries for SWD, please visit UGA Blueberry Blog at http://blog.caes.uga.edu/blueberry/. You can also access a video demonstration of how to use salt solution to sample blueberries for SWD at http://www.youtube.com/watch?v=2u6OeoLVNeo.

The boiling method is most and provides the best estimate of the degree of SWD infestation. The sample of fruit should be placed in a heatproof pan and covered with water. Heat the water and boil the berries for one minute. Next pour the fruit mixture over a shallow, dark-colored pan covered with a mesh screen. Mash the fruit over the mesh screen with a spoon. Finally, lightly wash the berries with cold water to rinse any remaining larvae into the pan. Inspect the pan for larvae floating on the liquid. The fruit processors most commonly use this method. For detailed instructions on how to use the boiling method to sample blueberries for SWD, please visit UGA Blueberry Blog at http://blog.caes.uga.edu/blueberry/. You can also access a video demonstration of how to use the boiling method to sample blueberries for SWD at http://www.youtube.com/watch?v=ak0eMjjndpI.

MANAGEMENT

Measures to control Spotted Wing Drosophila are available, but methods are constantly being refined as new research and information becomes available, so keep informed through your local County Agents, and through our UGA Blueberry Blog. Currently there is no economic threshold for SWD, and the benefits of the treatment significantly outweigh the costs. We are therefore recommending a conservative approach, if SWD is detected at your or at your neighbor’s farm, then control measures must be implemented. SWD control involves cultural control methods and/or chemical control methods.
CULTURAL CONTROL
Cultural control strategies should be part of the overall SWD management program and include sanitation, frequent harvest intervals, and exclusion netting. Sanitation, one of the most important cultural control methods, consists of removing over-ripe or fallen fruit from the field and disposing of them properly. Another sanitation method is the removal of wild plants that can be potential hosts for SWD including wild plants with berries such as grapes, beautyberry, elderberry, pokeweed, pokeberry, honey suckle, nightshade, dogwood, spicebush, and autumn olive, but the exact role of this approach in SWD control programs has yet to be investigated. Furthermore, frequent harvest intervals can keep susceptible fruit off of the bushes. During peak SWD season, harvest can be 1-2 times per week. Lastly, netting with mesh size less than .98mm can also protect the blueberry bushes from SWD. Small-scale growers or organic growers, due to their limited amount of control options, can utilize the mesh netting method to reduce SWD infestation.

If infested berries are found in the field or at the processor, they should be bagged inside plastic bags to prevent fly escape and placed in the sun to kill SWD before they complete development and emerge to continue infesting more fruit. If there is a large pile of fruit, it can be solarized by placing clear plastic sheet over the fruit in a sunny location and sealing well around the edge using soil. The infested fruit may be buried in the soil to prevent emergence, however, it will be effective only if burial depth is at least 30 cm or more otherwise flies can survive in the cool soil and emerge. Freezing berries is another way to kill SWD, and refrigerating them will stop further development of larvae, and may kill them after long periods of refrigeration. Keeping berries cool during the supply chain from processor to market to consumer will also minimize the chance that larvae will develop in berries.

CHEMICAL CONTROL
When implementing chemical control methods, choose from among the insecticides that have been shown to be effective against SWD. Fruits become susceptible to SWD once fruit coloration has started (when blueberries turn from green to purple). Treatment programs should begin as soon as the berries start to change color and continue through the end of harvest. Before administering pesticides growers should make sure their sprayers are calibrated and functioning properly. When administering pesticides, growers should ensure they are providing thorough coverage to the fruit and all areas of the bush. Table 1 includes a list of insecticides registered for use in blueberries that have shown high activity against SWD. Selection of insecticides for SWD control in blueberries, take into account the efficacy, chemical class, harvest date, pre-harvest interval, re-entry restrictions, and your target markets. The level of control achieved will depend on the SWD population, timeliness of application, coverage of fruit, and product effectiveness. If you are exporting fruit, also check carefully on the maximum residue limits (MRL) for the destination country. Make sure to rotate classes of insecticides to delay the development of insecticide resistance. Table 2 includes some suggested insecticide rotational programs to control SWD under different management strategies. This is particularly important for organic growers because there are only two classes of insecticides registered for use against SWD in organically produced blueberries.

When applying insecticides, growers/applicators must follow the label instructions for blueberries because **THE LABEL IS THE LAW.**

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SWD CONTROL OPTIONS FOR ORGANIC BLUEBERRIES
Insecticides registered for organically produced blueberries are less effective against SWD than conventional insecticides and have shorter residual activity. However, SWD can be managed successfully through more intensive monitoring, timely application if flies are detected, and frequent application of the available insecticides. Cultural control strategies described in an earlier section of this update will also be important to help reduce the overall population levels and should be implemented if possible. There are only two organic insecticides effective against SWD which include Entrust and Pyganic. There are some restrictions on how much or how many times Entrust can be applied per season, so please read the label for details. Make sure to rotate Entrust with Pyganic to reduce the risk of resistance development in SWD.

SUMMARY
In summary, SWD is clearly one of the most devastating pests in the history of Georgia blueberry production. It is therefore extremely important for growers to implementing management strategies in a proactive manner in order to minimize the impact of this pest. Following are the key components of effective management of SWD:

1. Monitor fields with traps and check the traps weekly starting from the fruit-set until the end of harvest.

2. Make sure to check the trapped flies and correctly identify SWD to determine presence and number of male and female SWD.

3. Once SWD is detected in the traps while the berries are ripening or ripe, apply effective insecticides registered for blueberries to protect the fruit. For detailed information about insecticides for SWD in blueberries (see Table 1 and Table 2, and also other resources available locally [http://www.ent.uga.edu/labels/BlueberryInsecticide.pdf](http://www.ent.uga.edu/labels/BlueberryInsecticide.pdf) and regionally [http://www.smallfruits.org/SmallFruitsRegGuide/Guides/2014/BlueberrySprayGuide11252013.pdf](http://www.smallfruits.org/SmallFruitsRegGuide/Guides/2014/BlueberrySprayGuide11252013.pdf)).

4. Make sure to rotate classes of insecticides to delay the development of insecticide resistance.

5. Continue monitoring to evaluate your management program, and respond in a timely manner if needed.

6. If possible, harvest frequently and remove leftover fruit from the orchard to reduce fly feeding and breeding resources.

7. Keep yourself updated about this pest to informed decisions to manage it. Find the latest information at our UGA Blueberry Blog ([http://blog.caes.uga.edu/blueberry/](http://blog.caes.uga.edu/blueberry/)) and sign up to receive updates instantly.

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Table 1. Registered Insecticides for Spotted Wing Drosophila Management

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Chemical Name</th>
<th>Class</th>
<th>Application Rate (per acre)</th>
<th>Pre-Harvest Interval (days)</th>
<th>Re-Entry Interval (hours)</th>
<th>MRL* U.S.</th>
<th>MRL* Canada</th>
<th>SWD Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malathion 8F</td>
<td>Malathion</td>
<td>Organophosphates</td>
<td>2.5 pint</td>
<td>1</td>
<td>12</td>
<td>8</td>
<td>8</td>
<td>E</td>
</tr>
<tr>
<td>Imidan 70WP</td>
<td>Phosmet</td>
<td>Organophosphates</td>
<td>1.33 lb</td>
<td>3</td>
<td>24</td>
<td>10</td>
<td>5</td>
<td>E</td>
</tr>
<tr>
<td>Lannate</td>
<td>Methomyl</td>
<td>Carbamate</td>
<td>1 lb</td>
<td>3</td>
<td>48</td>
<td>6</td>
<td>6</td>
<td>E</td>
</tr>
<tr>
<td>Mustang Max 0.8EC</td>
<td>Zeta-cypermethrin</td>
<td>Pyrethroid</td>
<td>4 oz</td>
<td>1</td>
<td>12</td>
<td>0.8</td>
<td>0.1</td>
<td>E</td>
</tr>
<tr>
<td>Danitol 2.4EC</td>
<td>Fenpropathrin</td>
<td>Pyrethroid</td>
<td>16 oz</td>
<td>3</td>
<td>24</td>
<td>3</td>
<td>3</td>
<td>E</td>
</tr>
<tr>
<td>Asana XL</td>
<td>Esfenvalerate</td>
<td>Pyrethroid</td>
<td>9.6 oz</td>
<td>14</td>
<td>12</td>
<td>1</td>
<td>0.1</td>
<td>E</td>
</tr>
<tr>
<td>Brigade 10WSB</td>
<td>Bifenthrin</td>
<td>Pyrethroid</td>
<td>16 oz</td>
<td>1</td>
<td>12</td>
<td>1.8</td>
<td>0.1</td>
<td>E</td>
</tr>
<tr>
<td>Bifenture 10DF</td>
<td>Bifenthrin</td>
<td>Pyrethroid</td>
<td>16 oz</td>
<td>1</td>
<td>12</td>
<td>1.8</td>
<td>0.1</td>
<td>E</td>
</tr>
<tr>
<td>Hero 2.1EC#</td>
<td>Bifenthrin + Zeta-</td>
<td>Pyrethroid</td>
<td>6-10.3 oz</td>
<td>1</td>
<td>12</td>
<td>1.8, 0.8</td>
<td>0.1, 0.1</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td>cypermethrin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyganic 1.4EC</td>
<td>Pyrethrin</td>
<td>Pyrethrin</td>
<td>64 oz</td>
<td>0.5</td>
<td>12</td>
<td>1</td>
<td>1</td>
<td>F</td>
</tr>
<tr>
<td>Entrust 80WP</td>
<td>Spinosad</td>
<td>Spinosyn</td>
<td>2 oz</td>
<td>3</td>
<td>4</td>
<td>0.25</td>
<td>0.5</td>
<td>G</td>
</tr>
<tr>
<td>Delegate 25WG</td>
<td>Spinetoram</td>
<td>Spinosyn</td>
<td>6 oz</td>
<td>3</td>
<td>4</td>
<td>0.25</td>
<td>0.5</td>
<td>E</td>
</tr>
<tr>
<td>Assail 30SG</td>
<td>Acetamiprid</td>
<td>Neonicotinoid</td>
<td>5.3 oz</td>
<td>3</td>
<td>4</td>
<td>1.6</td>
<td>1.6</td>
<td>G</td>
</tr>
<tr>
<td>Exirel</td>
<td>Cyantraniliprole</td>
<td>Anthranilic Diamide</td>
<td>13.5-20.5 oz</td>
<td>3</td>
<td>12</td>
<td>4</td>
<td>4</td>
<td>E</td>
</tr>
</tbody>
</table>

* The maximum residue limit is provided for U.S. and Canada. Check [www.mrldatabase.com](http://www.mrldatabase.com) for MRLs in other countries.

a No MRL set, so default MRL is shown. Check with your marketers on their export policy.

# Hero is a mixture of bifenthrin and zeta-cypermethrin (ingredients in Brigade or Bifenture and Mustang Max). Carefully check the rates used of these products so you do not exceed the total seasonal limit for both active ingredients.

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Table 2. Suggested insecticide rotational programs for Spotted Wing Drosophila Management in Georgia Blueberries

<table>
<thead>
<tr>
<th>Management Strategy</th>
<th>Weekly rotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export-friendly, maximum modes of action</td>
<td>Imidan (phosmet), Malathion 8F, Delegate (spinetoram), and Danitol (fenpropathrin)</td>
</tr>
<tr>
<td>Short pre-harvest interval (PHI)</td>
<td>Mustang Max (zeta-cypermethrin) and Malathion 8F</td>
</tr>
<tr>
<td>Reduced risk</td>
<td>Delegate and Exirel (cyantraniliprole)</td>
</tr>
<tr>
<td>Organic production</td>
<td>Entrust and Pyganic</td>
</tr>
</tbody>
</table>
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Do not regard the information in this newsletter as pest management recommendations. Consult the Georgia Pest Management Handbook and other Extension publications, or appropriate specialists for additional information.

Your input in this newsletter is encouraged. If you wish to be added to the mailing list, just call us at 706-542-1320. Or write us:
Ashfaq Sial Ahmad
IPM Coordinator
Department of Entomology
University of Georgia
Athens, GA 30602
E-mail: ashsial@uga.edu