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EXTENSION

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A Close Call

The freezing temperatures of mid-March were devastating to the blueberry crops in Georgia, South Carolina, and North Carolina. Estimates of loss range from 80% in Georgia to 50% in North Carolina. Florida was spared for the most part, as was much of Mississippi. I have seen some evidence of loss, as well as some minor injury on southern highbush fruit. Overall, however, we fared quite well against the fickle finger of fate. In this issue several topics are covered including info on the upcoming Blueberry Jubilee held annually in Poplarville, a GAPs training in Hattiesburg, the new Chill Hours app, respirator guidelines, and recent research on Exobasidium. So, as I write this the blueberry crop looks very good for Mississippi and hopefully it stays that way throughout the season, because as we all know another close call is always right around the corner.

Blueberry Jubilee 2017

Eric T. Stafne, Fruit Extension Specialist, MSU-ES

The 2017 Blueberry Jubilee in Poplarville will be held on Saturday, June 10. As always it will be a fun-filled day with lots of activities and blueberry products for sale. If you are interested in attending the Jubilee, much more information is available on the official website:

http://www.blueberryjubilee.org/

I will be there Saturday morning assisting with the blueberry products area, making sure things are set up and running smoothly. Come by and say hello, visit the vendors, and buy some locally grown blueberries!

Good Agricultural (GAPs) and Handling Practices Workshop

When: May 5, 2017

Time: 9:00 am-12:00 pm

Where: Forrest County Extension Office, 952 Sullivan Drive

Hattiesburg, MS 39401-2714

The Good Agricultural (GAPs) and Handling (GHPs) Practices Training is a 4 hour workshop designed to teach the basics of GAPs for growing and handling safe foods in Mississippi. The training will be offered on May 5, 2017 from 9:00 am-12:00 pm. The meeting will be held at the Forrest County Extension Office, 952 Sullivan Drive Hattiesburg, MS 39401-2714. This training is a requisite for you to have your farm/packing facility certified by USDA-AMS GAPs. For preregistration and further info/directions contact Dr. Juan Silva, jls46@msstate.edu or call the main office at 662-325-3200.

The Mississippi Department of Agriculture and Commerce is sponsoring this program and is now offering a cost-share program for Mississippi farmers to provide financial assistance to cover the cost of certification. More information on this at: http://www.mdac.state.ms.us/departments/marketing/gap_ghp.htm

Agenda:

9:00 am Registration

9:30 am Introduction- What are GAPs/GHPs/Pre-evaluation

9:45 am Good Agricultural Practices

- Water quality
- Soil amendments (based on research)
- Animal intrusion
- Worker health and hygiene
- Other possible sources

10:45 am Good Handling Practices: Harvest and Post-harvest

- Worker health and hygiene
- Equipment, tools
- Transportation
- Temperature management
- New Food Safety Rule/FSMA- will it affect me and how? Produce Safety Rule

11:15 am Ins and Outs of the USDA GAPs Certification Program

MDAC's Role and Support

11:45 am Developing a Food Safety Plan/Post evaluation

Instructors:

Dr. Juan L. Silva, Professor, Department of Food Science, Nutrition and Health Promotion, Mississippi State University

Fax: 662-325-8728 Email: jls46@msstate.edu

Mr. Kevin Riggin, Mississippi Department of Agriculture & Commerce

GAPs Training Cont.

REGISTRATION FORM

No Registration fee but pre-registration is encouraged (for handouts, count) up to 3 days prior to training (by May 2nd). Walk-ins are welcomed.

Name:
Company:
Address:
City:
State:
Zip:
Phone:
Fax:
Email:
Crops:

* Send completed registration form to

Mail: Dr. Juan Silva
FAX: (662) 325-8728
Email to jls46@msstate.edu

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A New Chill Hour App

Eric T. Stafne—MSU Fruit Specialist

From 2000 to 2016, chill hour accumulation was collected by Mississippi State University experiment station employees, USDA-ARS as well as by local growers, and then reported to the Extension fruit specialist (Dr. John Braswell and Dr. Eric Stafne), and then disseminated among all interested growers via various methods (email, telephone, blog, etc.). However, the number of participants fell over time due to equipment failure, loss of interest, retirement, and other issues. By 2016, only one location (Verona) was reporting on a regular basis. Since Mississippi has diverse regions, one location was not representative for all growers. Therefore, I devised a new solution to the problem and enlisted the help of Kelli Alexander, app developer, on campus at Mississippi State University.

The Chill Hours app was written as a mobile-friendly web application instead a native iOS or Android app. This was done because it allowed the app to be accessible from other devices besides mobile phones or tablets. Since databases of climate and weather data are readily available online, it only made sense to utilize existing resources rather than re-create them. The app connects to Weather Underground (https://www.wunderground.com) to access nearby weather stations and to retrieve historical data for a specific weather station. Retrieving the data from Weather Underground is done on a day by day basis and causes the app to take some time to compute the chill hours for the two models over a whole season. To save time, a map of preselected weather stations across the state was added. Every night data is retrieved from Weather Underground for these stations and stored in a database for fast access via the state map. Because the app references Weather Underground data, the app can be used anywhere, not just in Mississippi. The addition of mechanisms to speed up the app and other features are being planned for a future version.

Weather can be different from one field to the next and therefore the most accurate measurement of chill hours is from a dedicated field instrument within a location of interest. Even though the Chill Hours app relies on data from Weather Underground, the results given should be used only as an estimate and not as a definitive measurement. The Chill Hours app is free and available at https://webapps.msucares.com/chill_hours.

Take a look at Page 12 to see the interface homepage of the app. Then, get on the website and take it for a test spin. Let me know if you would like to see more or different features.

Respirator guidelines to meet new Worker Protection Standards

Growers will need a medical evaluation and respirator fit test to handle and apply some pesticides this season.

Posted on April 10, 2017 by Emily Pochubay, and Amy Irish-Brown, Michigan State University Extension

Requirements for a medical evaluation, fit testing and specific training for use of respirators and the associated record keeping became effective Jan. 2, 2017. At this time, most growers are aware of this revision to the Worker Protection Standards (WPS) regulation that requires pesticide handlers and applicators to wear a respirator during mixing/handling, spray applications and potential other uses as outlined on pesticide labels. Additionally, those who use pesticides with respirator requirements must receive documentation from a physician or licensed health care professional (PLHCP) that has "respirator evaluation" as part of their license to ensure the pesticide handler is medically able to use a respirator.

Not all PLHCPs are qualified to provide the respirator evaluation, but primary care physicians should be able to refer patients to appropriate medical personnel. Alternatively, growers can contact local occupation and environmental health professionals who are more likely to have the credentials needed to provide the appropriate respirator medical evaluation and documentation. Please review the following guidelines to help address some of the recent questions received from growers.

Who needs to receive a medical evaluation and how often?

Employees that could be exposed to hazardous airborne contaminants may be required to wear a respirator; respirators and respirator use requirements will be outlined on individual pesticide labels. Some pesticides may require respirators for employees that mix spray material or require applicators to wear a respirator during applications of certain pesticides. Employers are responsible for ensuring employees receive the appropriate equipment, evaluation, respirator fit test, training and record keeping that conforms to Occupational Safety and Health Administration (OSHA) standards.

Who provides the evaluation? What kind of evaluation and documentation are needed?

A PLHCP with respirator evaluation as part of their license will provide the appropriate evaluation using a medical questionnaire or exam that conforms to the OSHA standard. Contact the PLHCP to determine whether a questionnaire or exam will be used and to receive appropriate paperwork.

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Respirator Guidelines, cont.

According to the Environmental Protection Agency (EPA), the medical evaluation is required one time per employee unless another evaluation is required due to one of the following reasons:

- The medical determination is only good for a specified length of time.
- The employee reports medical signs or symptoms related to respirator use.
- The PLHCP, supervisor or program administrator recommends a re-evaluation.
- Fit-test or other program information indicates a need for re-evaluation.
- When changes in the workplace increase respirator stress on an employee.
- The initial medical examination demonstrates the need for a follow-up medical examination.
- Prior to completing the questionnaire or exam, employers must provide employees with:
- The type and weight of the respirator the handler will use.
- How long and how frequently the handler will use the respirator.
- How much physical work the handler will do while using the respirator.
- Other personal protective equipment (PPE) the handler will use.
- The temperature and humidity extremes of the working environment.

Contact a primary care physician to receive a referral for a licensed professional, if necessary. Another low-cost (about $25) and fast alternative for a medical evaluation is OshaMedCert, an online service that involves filling out a form and sending it for approval or denial by a PLHCP; individual's health information remains confidential throughout the process. A respirator fit test (see below) will be needed after receiving the medical determination from OshaMedCert.

A written medical determination of the respirator evaluation for each employee is required before the employee can use the respirator. The employer must keep the medical determination documentation for two years. According to EPA, the required written information to be provided by the PLCHP to the employer must only include:

- Whether or not the employee is medically able to use a respirator.
- Any limitations on respirator use in relation to the medical conditions (if any) of the employee or workplace conditions.
- Need for any follow-up medical evaluations.
- A statement that PLCHP provided the employee with written recommendation; in some cases, this recommendation may simply state that the applicator/person that will use the respirator is capable of wearing a respirator.

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Respirator Guidelines, cont.

Again, the information outlined above is the only information that should be provided in the PLHCP's recommendation to the employer to protect the employee's private medical information and avoid violation of Health Insurance portability and Accountability Act (HIPAA) laws.

What's next? Respirator fit tests.

After receiving a medical evaluation, a fit test is needed to ensure the respirator forms an adequate seal with an employee's face to provide appropriate inhalation exposure protection. A new fit test is required annually or whenever there is a change to the respirator or a physiological change to the employee that could affect the seal between the respirator and the user's face. Furthermore, fit tests are required for each type of respirator that will be used as indicated by pesticide labels. Finally, employees must undergo the fit test using a respirator with the exact specifications of the respirator that will be used on the job.

Fit tests must follow OSHA protocols, and there are two methods for fit testing. The quantitative fit test (QNFT) requires special equipment and a trained person to conduct the testing. Fit test kits are also available to perform qualitative fit tests (QLFT) by a person that can accurately prepare test solutions, calibrate equipment, perform the test properly, recognize invalid tests and ensure test equipment is working properly. Sources for fit tests include pesticide suppliers or companies such as Gempler's or Grainger.

A primary care physician may be able to provide additional options and referrals for fit test providers in the area. Additional information regarding respirator requirements and other WPS revisions can be found in the EPA's "How to Comply with the 2015 Revised Worker Protection Standards for Agricultural Pesticides."

This article was published by Michigan State University Extension. For more information, visit http://www.msue.msu.edu.

Dormant oil and hydrogen cyanamide impact development of Exobasidium leaf and fruit spot of blueberry

Harald Scherm, Renee Allen, and Phillip M. Brannen— University of Georgia

Introduction

Exobasidium leaf and fruit spot, caused by the fungus Exobasidium maculosum, continues to plague the southeastern blueberry industry. The disease can be controlled with well-timed fungicide applications (calcium polysulfide at late dormant, followed by early-season fungicides such as captan as needed), but it has remained difficult to accurately predict disease risk across locations. Environmental and crop management factors that affect disease development are currently not well understood.

Exobasidium is an early-season disease, with leaf and fruit infections occurring in the spring. After fruit are harvested and leaf spots become necrotic and develop into shot-holes in early summer, the disease is no longer visible in the planting. Based on recent epidemiological evidence, it appears likely that E. maculosum oversummers and overwinters superficially on plant tissues in the form of yeast cells. While this mode of epiphytic survival may be an effective ecological adaptation, it also presents an Achilles heel for the pathogen in that these superficial yeast cells may be destroyed relatively easily with a surface-active contact fungicide during the dormant season. This is likely the main reasons for the high disease control efficacy observed with dormant applications of calcium polysulfide against Exobasidium leaf and fruit spot.

But if E. maculosum survives epiphytically for such a long time during summer, fall, and winter, there are likely other agrichemicals or horticultural practices that affect this plant surface resident. For example, fungicide sprays during the fall (applied to control leaf spot or leaf rust diseases) might also knock down E. maculosum yeast populations, thereby reducing disease the following year. Similarly, insecticidal oil applications during the summer or dormant season could suffocate pathogen cells on the plant surface. Dormant applications of the plant growth regulator hydrogen cyanamide, a caustic compound, could kill pathogen yeast cells upon contact, thereby reducing subsequent disease risk. Based on these considerations, the objective of this study was to evaluate potential added benefits of select horticultural and pest management applications made between late summer and the dormant season on the development of Exobasidium leaf and fruit spot in the field.

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Exobasidium, cont.

Materials and Methods

Field trials were carried out in two commercial blueberry plantings (referred to as sites 1 and 2 henceforth) on mature 'Premier' rabbiteye plants in Bacon County in 2014/15 (site 1) and 2015/16 (sites 1 and 2). Experimental treatments focused on agrichemicals applied for certain horticultural or pest management purposes between late summer and the dormant season, with the goal of identifying practices with added benefits against Exobasidium. Application timings, products, and rates for these treatments are summarized in Table 1. The target indication for the summer/ fall oil application was blueberry bud mite control. Fall applications of captan and calcium polysulfide were timed to coincide with control of fungal leaf spots and rust. The dormant application of hydrogen cyanamide was timed according to the commercial use of this practice to enhance and synchronize blueberry bud break. Application of dormant oil was targeted toward control of scale insects. A dormant treatment of calcium polysulfide was included as the current standard for Exobasidium leaf and fruit spot control.

Treatments were applied to field plots (7 to 8 blueberry bushes long) in a randomized complete block design with four replications. Plots were separated by at least one untreated plant row. Applications were made with a commercial airblast sprayer set to deliver ~50 gal/acre, with the exception of the oil sprays which were made in ~100 gal/acre.

Leaf disease severity (average number of spots per leaf) and fruit disease incidence (percentage of symptomatic fruit) were assessed in early/mid-May and late May/early June each year, respectively. Samples for assessment consisted of at least 20 current-season shoots (each typically having 5 to 12 leaves) and between 100 and 250 fruit per plot; the outermost plants in each plot were not used for disease assessment. Data were subjected to mixed-model analysis of variance and means separation for a randomized complete block design ($P = 0.05$).

Results and Discussion

Disease levels, especially on the fruit, were higher at site 1 than at site 2 (Table 2). At site 2, average fruit spot incidence was only 7.0% in the untreated check, and no significant treatment effects were observed, including the dormant calcium polysulfide standard. Hence, only data from site 1 are discussed in detail below. Numerically, however, trends were similar for the two sites.

As expected, a single dormant application of calcium polysulfide, the current standard for Exobasidium control, reduced leaf spot severity and fruit spot incidence considerably and significantly in both years at site 1 (Table 2). Interestingly, a statistically equivalent level of control was achieved with a single dormant application of hydrogen cyanamide or with two fall applications of calcium polysulfide; however, numerical disease levels were somewhat higher in the latter two treatments compared with dormant calcium polysulfide. Unexpectedly, the dormant oil application increased both leaf spot severity and fruit spot incidence considerably (by almost 50%) and significantly compared with the untreated check in both years. The other treatments (summer application of paraffinic oil and fall application of captan) had no effect on the disease (Table 2).

Exobasidium, cont.

The finding of decreased Exdobasidium levels following a dormant hydrogen cyanamide application, and of increased disease levels following a dormant oil application, is novel. These results may help explain the variability in Exobasidium risk observed among blueberry plantings that otherwise receive similar disease management programs. The beneficial effect of hydrogen cyanamide against Exobasidium leaf and fruit spot is likely due to the compound's caustic activity, which may kill overwintering surface inoculum of E. maculosum upon contact. Additional experiments are currently underway to test this hypothesis. Despite the beneficial activity of hydrogen cyanamide, forgoing conventional fungicide applications against the disease and relying on hydrogen cyanamide alone would seem too risky at this time.

The significantly increased levels of leaf and fruit spot following dormant oil application are of concern. Further research is needed to determine whether this effect is formulation-specific to Damoil, or whether it applies to other dormant oils as well. The oil may act by protecting overwintering surface inoculum of E. maculosum from desiccation, and this hypothesis is currently being tested experimentally in the field. In general, dormant oil is an important component of integrated pest management, and we are not suggesting based on these new findings that growers discontinue this practice. However, it seems critical that dormant oil be followed by an effective fungicide program against Exobasidium leaf and fruit spot, in line with what is currently recommended in the Southeast Regional Blueberry Integrated Management Guide. Currently we do not know the optimum time interval between a dormant oil application and a subsequent dormant spray of calcium polysulfide.

Two fall applications of captan were not effective against Exobasidium, but when calcium polysulfide was used for these applications, both leaf spot severity and fruit spot incidence were reduced to a level equivalent to the dormant calcium polysulfide standard. Fall applications of fungicides in blueberry are commonly used to manage leaf spots and leaf rust; if it can be shown through additional research that calcium polysulfide applied during this application window controls leaf spots and/or rust, then the added benefit of reducing Exobasidium levels for the following year would be of considerable practical interest.

Acknowledgments

We thank the participating blueberry growers and Mr. Will Lovett for their collaboration. Funded by the Georgia Agricultural Commodity Commission for Blueberries and USDA-NIFA award no. 2015-67028-23541.

Exobasidium, cont.

Table 1. Experimental treatments to determine the effects of certain horticultural and pest management applications between late summer and the dormant season on Exobasidium leaf and fruit spot in three field trials on 'Premier' rabbit-eye blueberry in Bacon County, GA.

Seasonal			Specific application dates		
application timing	Product and rate	Active ingredient	Site 1 (2014/15)	Site 1 (2015/16)	Site 2 (2015/16)
----	Untreated check	----	----	----	----
Late summer or fall (1x)	JMS Stylet Oil, 6 qt/ 100 gal	Paraffinic oil	9 Oct. 2014	27 Aug. 2015	25 Aug. 2015
Fall (2x)	Captan 4L, 2.5 qt/A	Captan	9 Oct. 2014 7 Nov. 2014	25 Sept. 2015 23 Oct. 2015	25 Sept. 2015 23 Oct. 2015
Fall (2x)	Lime sulfur, 5 gal/A	Calcium polysul-fide	9 Oct. 2014 10 Nov. 2014	25 Sept. 2015 23 Oct. 2015	25 Sept. 2015 23 Oct. 2015
Dormant (1x)	Damoil, 3 gal/100 gal	Dormant oil	20 Jan. 2015	25 Jan. 2016	25 Jan. 2016
Dormant (1x)	Dormex, 0.75 gal/A	Hydrogen cyana-mide	20 Jan. 2015	25 Jan. 2016	25 Jan. 2016
Dormant (1x)	Lime sulfur, 5 gal/A	Calcium polysul-fide	20 Jan. 2015	25 Jan. 2016	25 Jan. 2016

Table 2. Exobasidium leaf spot severity (average number of spots per leaf) and fruit spot incidence (percent affected fruit) in three field trials on 'Premier' rabbiteye blueberry in Bacon County, GA‡.

		Site 1 (2014/15)		Site 1 (2015/16)		Site 2 (2015/16)	
Timing and num-ber of sprays	Treatment	Leaf spot severity	Fruit spot incidence	Leaf spot severity	Fruit spot incidence	Leaf spot severity	Fruit spot incidence
----	Untreated check	0.344	20.7	0.363	11.4	0.469	7.0
Summer/ fall (1x)	Paraffinic oil	0.385	18.4	0.298	6.83	0.521	8.0
Fall (2x)	Captan	0.540 *	21.5	0.393	14.3	0.497	9.0
Fall (2x)	Calcium polysulfide	0.149 *	5.47 *	0.036 *	2.65 *	0.156	4.0
Dormant (1x)	Dormant oil	0.605 *	37.4 *	0.639 *	20.3 *	0.331	5.3
Dormant (1x)	Hydrogen cyanamide	0.169 *	6.8 *	0.036 *	1.32 *	0.256	3.5
Dormant (1x)	Calcium polysulfide	0.094 *	1.45 *	0.034 *	0.86 *	0.236	6.3
Prob > *F*		<0.0001	<0.0001	<0.0001	<0.0001	0.0858	0.2618

‡Disease intensity values in each column are presented as a heat-map where the highest values are shaded in red and the lowest in green. Values with an asterisk (*) are significantly higher or lower than the corresponding untreated control.

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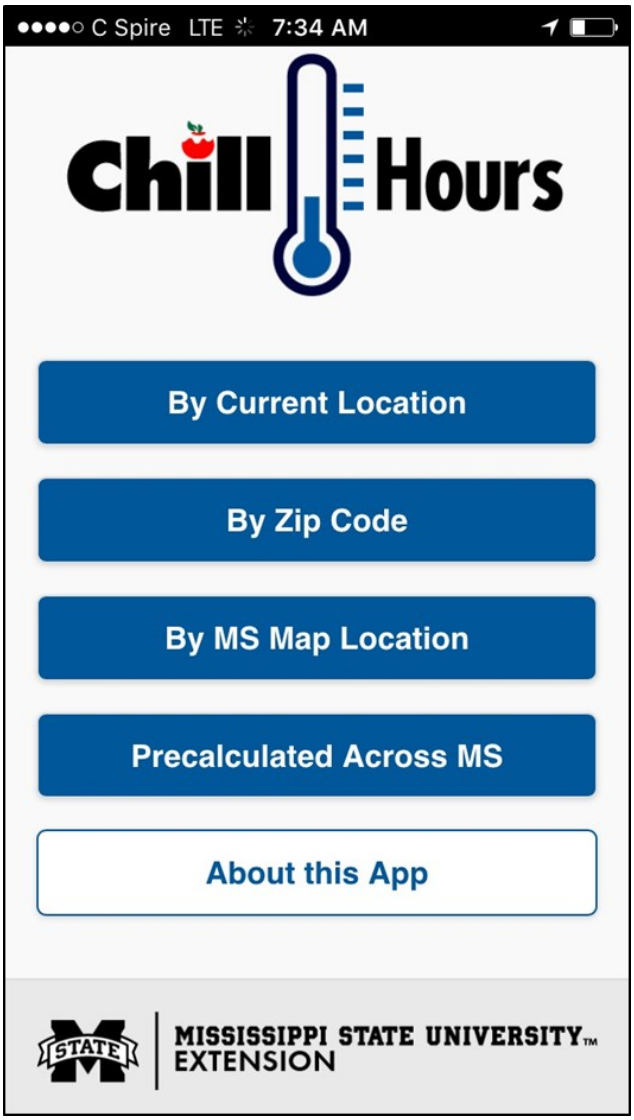
Chill Hours App!

Eric T. Stafne, Fruit Extension Specialist MSU-ES



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