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Calendar of Events 2004

March 23-27 ISHS- Symposium for Protected Culture in Mild Winter Climates, Kissimmee, Fl. www.conference.ifas.ufl.edu/ishs.

April 12 Pesticide Testing, Hillsborough County Extension Office, Seffner, 9am. 744-5519.

April 22 Wildflower Seed Production Workshop. 9 am. Kendrick Auditorium, Manatee County Extension Service, Palmetto. Registration is limited. To register, please call Frank Melton at 941-722-4524 or FMMelton@ifas.ufl.edu.

June 6-8 Florida State Horticultural Society Annual Meeting, Sheraton World Resort, Orlando. For more information <http://www.fshs.org>.

June 21-24 International Symposium on Tomato Disease and 19th Annual Tomato Disease Workshop. Grosvenor Resort, Walt Disney World, Orlando. For more information visit <http://plantdoctor.ifas.ufl.edu>.

From Your Extension Agent...

The grower meeting held in February at the Hillsborough Extension office on peaches, plums and blueberries had an excellent turnout and I want to thank the speakers for a great program and our sponsors for their support of the meeting. There is a great deal of interest in alternative crops from new growers as well as seasoned growers who are looking to diversify.

Dr. Jeff Williamson of the Horticultural Department at UF spoke on peaches, plums and blueberries with low chill requirements for our area. The peaches and plums recommended for commercial crops in this area are the early season fruit that are smaller than the large fruit we see in the stores in the summer. This area has a marketing window to provide fresh peaches when they are not available from other parts of the US. New blueberry varieties were discussed and Dr. Williamson feels this area still has the marketing window from March through April where we are the only place in the world to have fresh blueberries. Dr. Oscar Liburd from the Entomology Department at UF spoke on scouting methods for thrips in blueberries and

what has given the best control in trials he has conducted. Dr. Barbara Smith of the USDA-ARS Lab in Poplarville, MS spoke on blueberry diseases in the southeast US and the symptoms and control measures for these diseases.

Again thanks to our speakers and to the sponsors- Syngenta, Dow, BASF and Farm Credit Bureau- for a great meeting!

Alicia Whidden

Summary of New Insecticides and Miticides for Florida Strawberries

James F. Price and Curtis A. Nagle

The strawberry industry has struggled through periods when too few insecticides and miticides were available to solve serious production problems. That is not the case now, as in recent years several important new insecticides and miticides have been registered for use, and more are expected.

During 2003, three new active ingredients formulated into four products were approved for insect and mite control in strawberry. Additionally, there are seven other active ingredients that may be registered in 2004 and the next few years. This report discusses the three new products now available to strawberry

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producers and the active ingredients that should become available in the near future.

Products Registered in

2003. *Zeal*[?] (etoxazole) is a miticide registered by Valent USA Corp. in strawberries to control spider mites, lygus bugs, tarnished plant bugs and spittlebugs. It acts primarily as an ovicide and larvicide (in this case, the egg and the first stage after the mite egg hatches). In this regard, it performs as a miticide much like *Savey*[?] hexythiazox, although it is currently believed to possess a unique mode of action and should not confer cross-resistance with hexythiazox in spider mites. Only one application is permitted in a growing season and it can be applied within 1 day of harvest. It carries the signal word "Caution".

Admire[?] (imidacloprid) is registered by Bayer Crop Science in strawberries for control of aphids and whiteflies that affect production in Florida (there is an additional registration for perennial strawberries to control the white grub complex). It is a systemic insecticide that is applied to the soil to be moved through the roots into the leaves. One application is permitted in Florida's annual production system, but it must be applied no later than 2 weeks before harvest. It carries the signal word "Caution".

Provado[?] (imidacloprid) also is registered by Bayer Crop Sciences for the control of aphids, whiteflies, and spittlebugs. This formulation of imidacloprid is for foliar application and should not be used in a season that *Admire*[?] was used. Three applications are permitted but 7 days must elapse between the last application and harvest.

There are strict precautions necessary to protect honeybees. *Provado*[?] carries the signal word "Caution".

Sluggo[?] (iron phosphate) bait is registered by Monterey Chemical in strawberries for control of snails and slugs. It carries the signal word "Caution".

Products Expected in 2004

or later. There are several new insecticides and miticides expected to be registered in 2004 and beyond. These include the miticides: *Kanemite*[?] acequinocyl by Arvesta Corp., *Fujimite*[?] fenpyroximate by Nichino America, *Mesa*[?] milbemectin by Gowan Co., *Nexter*[?] pyridaben by BASF Corp. (is a miticide and insecticide (especially for whiteflies)).

These expected products also include the insecticides: *Knack*[?] pyriproxyfen by Valent USA Corp. (aphids and whiteflies), *Intrepid*[?] methoxyfenozide by Dow Agro-Sciences (lepidopterous larvae "worms") and *Actara*[?] (foliar) and *Platinum*[?] (soil) thiamethoxam by Syngenta Crop Protection (aphids, thrips and whiteflies).

These are the most new insecticides and miticides to be available or expected for strawberries in many years. With the proper use of these products, strawberry growers should possess the chemical tools necessary to develop effective IPM programs for years to come.

(It is the responsibility of the application personnel to ensure that all label directions are understood and followed.)

The Effectiveness of Various Insecticides to Control Blueberry Gall Midge

Oscar Liburd
Entomology and Nematology Department

The blueberry gall midge [Cranberry tipworm] *Dasineura oxycoccana* (Johnson) [Fig.1] is the primary insect pest infesting rabbiteye blueberries, *Vaccinium ashei* Reade, in the southeastern United States. Prior to 1992, floral bud abortion caused by gall midge in rabbiteye

blueberries had not been correctly diagnosed, and therefore chemical control had not been recommended. Since then, blueberry gall midge infestations have increased significantly, destroying up to 80% of floral buds on susceptible rabbiteye cultivars. During 2003, the effectiveness of several insecticides for controlling blueberry gall midge was conducted in a heavily infested rabbiteye planting. The planting was a 4-ha block and contained 'Climax' and 'Tifblue' cultivars.



Fig. 1. Blueberry gall midge.

Seven insecticides treatments were evaluated including Diazinon, at a rate of 1.8 L / ha. Malathion at a rate of 1.8 L / ha, Thiamethoxam at a rate of 0.3 L / ha, Spinosad (SpinTor 2SC) at a rate of 0.4 L / ha (high rate), Azadirachtin (Ecozin 3% EC, Amvac, Los Angeles, CA) at a rate of 0.6 L / ha and Kaolin clay (Surround WP, Engelhard Corporation, Iselin, NJ) at a rate of 28 kg / ha and an untreated control block. Insecticides were applied on 14 and 28 February and 14 March 2003, during stages 2 to 4 of bud development. All insecticides were applied using an airblast sprayer. Insecticide efficacy was evaluated by randomly selecting 200 floral buds per insecticide treatment per cultivar (50 buds per replicate) weekly. Bud

(Continued on page 3)

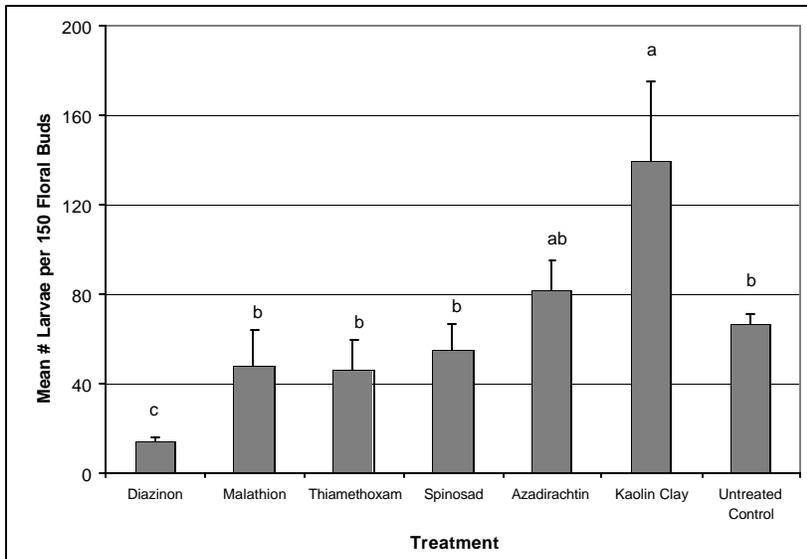


Fig. 2. Effect of selected insecticides on infestation of rabbiteye cv. 'Climax' floral buds by blueberry gall midge (2003). Means followed by the same letter are not significantly different, $P=0.05$, LSD Test.

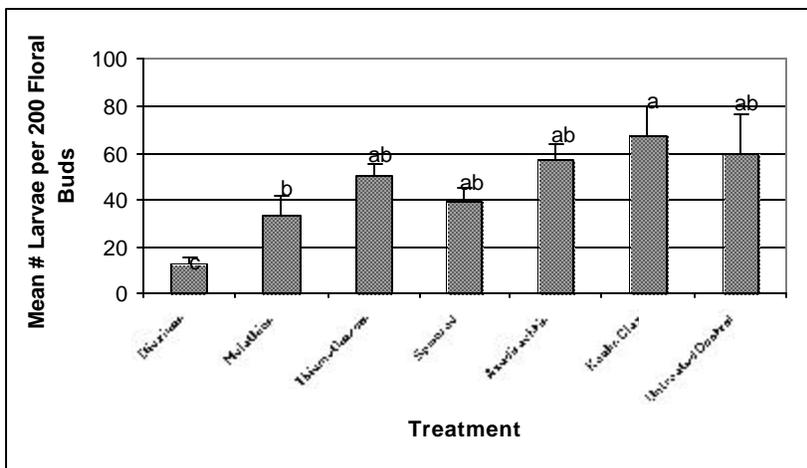


Fig. 3. Effect of selected insecticides on infestation of rabbiteye cv. 'Tifblue' floral buds by *D. oxycoccana* (2003). Means followed by the same letter are not significantly different, $P=0.05$, LSD Test.

samples from the cultivar 'Climax' were collected on 17 and 23 February and 2 March, for a total of 600 floral buds per insecticide treatment. Buds from the cultivar 'Tifblue' developed approximately one week after 'Climax,' therefore, sampling was conducted on the same dates (17 and 23 February and 2 March) as well as 10 March, for a total of 800 floral buds. All bud samples were transferred to 15-cm plastic petri

dishes containing moistened filter paper and held at 27°C under 14L:10 D conditions for 10 days to allow larvae to emerge. The total number of emergent larvae was recorded.

Results & Discussion. Diazinon-treated floral buds had significantly fewer blueberry gall midge larvae compared with buds treated with other compounds (Fig. 2). Furthermore, none of the other insecticides evaluated significantly sup-

pressed larval infestation compared with the control, with the exception of malathion, which was as effective as diazinon on the first sampling date (Table 1 on Page 4). Similar results were recorded for 'Tifblue' floral buds, with diazinon significantly reducing larval infestation compared with all other insecticide treatments (Fig. 3). Spinosad, imidacloprid, and thiamethoxam demonstrated minimal suppression of blueberry gall midge though not at the levels needed for adequate control. Interestingly, kaolin clay appeared to increase infestation of blueberry gall midge. It is uncertain why this phenomenon occurred although the color of the kaolin residues on the buds may have increased their attractiveness to blueberry gall midge. Diazinon was the most effective compound for control of blueberry gall midge, followed by malathion, in both 'Climax' and 'Tifblue' cultivars. Unfortunately, since these compounds are OPs, their future use in blueberry programs may be threatened due to FQPA regulations. Future studies during 2004 will evaluate the efficacy of additional reduced-risk insecticides on gall midge.

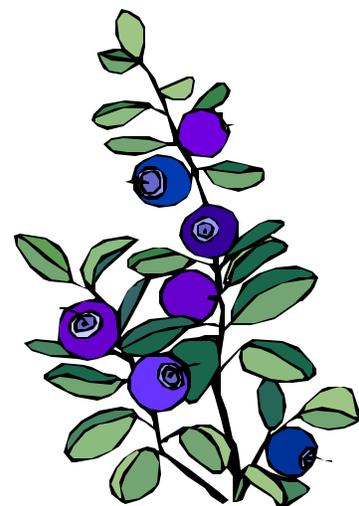


Table 1. Effect of selected insecticides on infestation of rabbiteye floral buds by *D. oxycoccana* (2003).

Treatment	Mean* number <i>D. oxycoccana</i>			
	Sampling date			
	17 Feb	23 Feb	2 Mar	10 Mar
Climax				
Diazinon	2.3a	6.8	4.8a	—
Malathion	2.0a	25.3	20.5b	—
Thiamethoxam	10.5b	8.3	27.5b	—
Spinosad	11.5b	19.5	24.5b	—
Azadirachtin	16.3b	30.0	35.5bc	—
Kaolin clay	20.0b	47.8	72.0c	—
Untreated control	15.5b	15.5	35.3bc	—
Tifblue				
Diazinon	0.0	2.3	0.8a	10.0
Malathion	0.0	2.0	11.8b	20.0
Thiamethoxam	0.0	2.0	19.8b	29.0
Spinosad	0.3	3.8	18.3b	17.0
Azadirachtin	0.3	5.3	31.3b	20.5
Kaolin clay	0.0	15.8	28.3b	23.3
Untreated control	0.3	13.0	29.3b	17.3

*LS—Means within columns followed by the same letter are not significantly difference, P = 0.05 Analysis was performed on square-root transformed data, but means shown reflect untransformed data. Treatment effectiveness was evaluated by allowing larvae to emerge from infested buds.

Getting the Most Out of 'Festival'

Craig Chandler

My wife does most of the grocery shopping in our family, but sometimes I accompany her, or I'll pick up a few things from the supermarket on my way home from work. I try to make a point of walking

through the produce section to take a look at the strawberries. This season, I've been especially interested in noting the condition of 'Festival' fruit. Generally its appearance has been very good. But I have seen packs containing more than a few light (orange) colored fruit, indicating that these particular fruit were harvested at less than optimum ripeness. These fruit tend to be overly

firm and lack the sweetness that would come with another day or two on the bush. This is unfortunate because I think 'Festival' has the inherent firmness and skin toughness that allows it to be harvested at optimum eating quality and still be resistant to bruising. (Harvesting only fruit that are at optimum ripeness, however, may not be practical when daytime temperatures are in the 80s and nighttime temperatures are in the 60s. Fruit tends to ripen more quickly under these conditions, and light colored fruit left on the bush may be over-ripe by the next picking.)

'Festival' fruit typically turn an orangish-red before mellowing into a deep red. It is this deep red (on all sides of the fruit) that indicates the fruit has reached optimum ripeness. Sometimes the top-side of the fruit will become deep red before the bottom side (or the side touching the plastic). Harvesting only fruit that are at optimum ripeness would require careful observation by the pickers. If they have any doubt as to a fruit's ripeness, they should turn the fruit to inspect its backside -- before removing it from the plant. Careful observation can also spot fruit that have small sap beetle holes in them, or Botrytis infections that are partially or wholly hidden by the calyxes -- fruit that may look perfectly fine to a frenzied picker. This level of observation requires the picker to move more slowly, resulting in fewer trays harvested per picker. This, of course, would increase the cost of harvest, as pickers would have to be compensated for their extra diligence. But it would result in a superior product, and hopefully greater customer satisfaction and demand.



(Continued on page 5)

Important Considerations for Double Cropping

John R. Duval

The time has come once again to turn part of our attention away from the production of strawberry and on to other crops. Interplanting secondary crops (cucurbits and peppers) among existing strawberries is a great means of getting the most out of fumigation, plastic mulch, and drip tubing. Certain management practices must be adopted to allow for the simultaneous growing of these crops in the field. First and foremost is proper pesticide selection for controlling insects and diseases. Pesticides such as **Switch** and **Topsin M** cannot be applied to strawberries when other crops are present in the field due to labeling restriction on the second crop. Labels for all pesticides should be read carefully to ensure that they can be used on both crops. Secondly, fertilization needs to be slightly increased to meet the needs of both crops. Strawberries, since they are well established, will be able to out compete the secondary crop for nutrients. However, an increase in fertilization of 10-15% should supply enough material for established strawberries and young establishing cucurbits and peppers. Lastly, once strawberries are no longer being harvested the bushes should be removed from the top of the bed. Excessive vegetation can reduce the quality of secondary crops (such as when a cantaloupe rests on a rotting strawberry plant), interfere with application of spray materials, and harbor insects and diseases. Making a few simple management decisions can help guarantee a successful late season berry crop and secondary crop and increase monetary returns to the farm.

Virus in Yellow Squash in Hillsborough County

Alicia Whidden - Hillsborough Co. ext. agent II & Susan Webb - assoc. professor., Entomology. and Nematology. Dept. Vegetarian 01-04

In October 2003 in Hillsborough County, a field of 'Gentry' yellow crookneck squash was severely affected by the watermelon strain of papaya ringspot virus (PRSV-W) (Fig. 1), formerly called WMV-1. PRSV-W infects cucurbits almost exclusively but does not infect papaya. It is the most important of the aphid-transmitted viruses affecting cantaloupe, watermelon, and squash in central and south Florida. The virus is spread in a nonpersistent manner by over 20 species of aphids. Aphids do not retain the virus for very long but can acquire and transmit it in very brief probes of the leaf surface.

Both foliage and fruit symptoms observed in 'Gentry' were severe. The leaves of the plants were distorted and mottled, with the newer leaves reduced in size and very narrow (lacinate or filiform). The squash were knobby instead of smooth with green veining over the fruit. Yield was greatly reduced. In this field, you could see where the virus had first infected squash on the north side where an old abandoned orange grove overgrown with weeds was present. It was easy to tell that the plants next to the grove had been infected at an early age. By the time of harvesting, the plants on this side of the field were severely stunted and were distorted with little to no fruit. The fruits present were small and gnarled with much green veining. The spread of the virus through the field appeared to follow the prevailing winds. As you moved south across the field away from the grove, symptoms were milder. More distant plants had normal lower leaves and fruit with only the upper portion of the plants and youngest fruit dis-

torted, indicating that these plants had been infected later than plants near the grove.

The grower noticed no aphids on the plants but it is unlikely that he would have noticed transient winged aphids without using yellow



Fig. 1. PRSV-W symptoms in squash. Photo credit: Gary Simonne.



Fig. 2. Balsam apple growing on a ditch bank in southwest Florida. Photo credit: Warren Adlerz.

(Continued on page 6)

sticky traps or yellow pan traps to monitor their presence. To transmit the virus, the aphid does not have to be settling down to feed on the squash but can be merely probing the surface of the leaf to determine if the plant is a suitable host. In the process, it can acquire virus from an infected squash plant and move it to another or transmit a virus that it may have already acquired. Most insecticides do not act quickly enough to prevent transmission. Many of the aphid vectors are transients coming from weeds and do not reproduce on cucurbits. Melon aphid, which does reproduce on squash, can transmit the virus but may not be an important vector because it does not move as readily as aphids looking for other host plants. Samples were collected from the field and tested by ELISA for nine viruses known to infect cucurbits. Of 39 samples, 38 were positive for PRSV-W. The sample not infected with PRSV-W had severe viral symptoms. We were able to reproduce the symptoms by rubbing the sap from the ground sample onto squash seedlings in the greenhouse. Further tests are being done to determine what this virus might be. Nine samples of the predominant weed in the abandoned grove, balsam apple, (*Momordica charantia*), were also tested (Fig. 2). The vines of this weed almost covered some of the old trees. All of balsam apple samples were positive for PRSV-W, although no sample had obvious symptoms. This weed and another, creeping cucumber (*Melothria pendula*), have been shown in the past to be important sources of PRSV-W.

The grower also had three varieties of zucchini squash ('Dividend', 'Cash Flow', and 'Payroll') growing just east of the block of yellow squash. The zucchini did very well all season. Only at the very end of the season were mild virus symptoms seen on 'Dividend' and 'Cash Flow'. None was seen on 'Payroll'. According to Rogers

(Syngenta Seeds), 'Payroll' has tolerance to zucchini yellow mosaic virus (ZYMV) and watermelon mosaic virus (WMV-2) (also found in Florida), 'Dividend' has tolerance to these two viruses and cucumber mosaic virus (CMV), and 'Cash Flow' has tolerance to ZYMV. No claim is made for tolerance to PRSV-W, although in this case it appears that these varieties may not develop severe symptoms when infected. However, no samples of the zucchini varieties were tested.

NASGA Tours GCREC Dover

Christine Cooley

Gulf Coast Research and Education Center hosted a tour for the North American Strawberry Growers Association on what had to be one of the most beautiful days of this past February. Nearly 200 participants came to the center to learn about strawberry production and the research taking place at GCREC. Each of the center's faculty as well as faculty from Gainesville, Bradenton and Lake Alfred participated in the event. Brief program presentations, an exhibit area and bedding demonstration gave the NASGA group insight on Florida strawberry production. For lunch, the group was treated to a wild game cookout including swamp cabbage, wild boar, turkey, and alligator, and entertainment was provided by Billy and the Boys, a local bluegrass band. However, the highlight for most of the visitors was the alligator wrestling demonstration from Gatorland. Thanks to everyone who participated and to NASGA for the opportunity to showcase the center and the research provided to the local strawberry industry.



A beautiful, warm Florida day provided the perfect backdrop for the NASGA tour at GCREC Dover.



The bedding equipment and demonstration was organized by BBI Produce, Inc.



Gatorland wrestlers entertained and educated the NASGA group, most of whom had never seen a live alligator.



Even UF employees, like Joanie Souder, were able to interact with some of Florida's wildlife.

SPECIAL ALERT

New Strawberry Pest Found

James Price

On 5 March 2004, staff at GCREC Dover discovered a few locations on the farm where about a half dozen mature strawberry plants were wilting and dying. Their investigations revealed a $\frac{3}{4}$ inch white grub weevil larva on or in the root crown. All white roots had been severed. The preliminary identification is *Diaprepes* root weevil, known in the area for problems in citrus and ornamental nurseries. Please report any discoveries of this new problem in area strawberry to Hillsborough Co. vegetables/strawberry extension agent Alicia Whidden (813) 744-5519 ext. 134 or strawberry entomologist Jim Price (941) 751-7636 ext. 246.

GCREC Balm Update

Christine Cooley

Work continues at the new research center that will house both Dover and Bradenton faculty and staff in early 2005. Now that the property has been cleared of hundreds of citrus trees, the infrastructure and building foundations are being constructed. The photos below show the progress taking place. The center is slated to be a state-of-the-art research center and the pride



Building foundations are being completed.

of UF/IFAS. Updates on the construction can be found on the GCREC website <http://gcrec.ifas.ufl.edu>.



Heavy equipment is a sure sign of construction in Balm.

Chemically Speaking

February 2004

Based on a request by IR-4, time-limited tolerances have been established for residues of the fungicide cyprodinil in strawberry and onion (dry bulb or green). The tolerances expire on 12/31/04. (*Federal Register*, 12/31/03.)

UF Biotech Affiliated Company to Produce Biological Nematicide. Pasteuria Bioscience, located at UF's Biotechnology Development Institute in Alachua is beginning to gear up for commercial production of the bacterium *Pasteuris penetrans*, a known nematode control agent. Two venture capital companies have recently invested \$750,000 into the company, which has developed a method to mass rear the organism and make it affordable on a farm scale.

With the imminent loss of materials such as methyl bromide and fenamiphos (Nemacur®), the market for new nematicides is large, as these pest annually cause an estimated \$100 billion in damage. The investors believe the market may well be worth hundreds of millions of dollars each year. The company plans to begin field testing of the produce this spring, beginning with

micro-plot trials on crops such as tomato, peanut, and cucumber. (*The High Springs Herald*, 1/1/04.)

Health and Nutrition Related Links

To learn more about health and nutrition, including the nutritional benefits of berries, visit the following sites:

American Dietetic Association
www.eatright.org/Public

Produce For Better Health Foundation
www.5aday.org

Sports, Cardiovascular and Wellness Nutritionists
www.scandpg.org

United States Department of Food and Agriculture
www.usda.gov/cnpp

United States National Agricultural Library
www.nalusda.gov

Vegetarian Diets
www.vegetarian.about.com

State of Michigan Dept. of Agriculture
www.michigan.gov/mda/0%2C1607%2C7-125--38099--%2C00.html

US Highbush Blueberry Council
www.ushbc.org/health.htm

Driscoll's
www.driscolls.com/health/benefits.html

GNC
www.gnc.com/health_notes/Food_Hbc/Berries_Hbc.htm