UNIVERSITY OF FLORIDA
EXTENSION
Institute of Food and Agricultural Sciences

Berry/Vegetable Times

June—July 2003

In this issue

Calendar of Events

July 8 and Aug. 12 - Pesticide Testing 7:30 am at Hillsborough Co. Cooperative Extension Office, Seffner. No pre-registration. Call (813) 744-5519 for details.

August 26 and 27—AgriTech Educational Session and Trade Show. Arthur Boring Building—Festival grounds CCA's and CEU's applied for.

September 5—Ag. Pesticide Collection Day, 2002 N. Orient Rd, Tampa; 8 am—2 pm See enclosed flyer.

November 18—Irrigation School. Details to be announced.

March 23-28 2004 ISHS Int'l. Symposium for Protected Culture in Mid-Winter Climate Orlando, FL . Details to be announced.

Evaluation of conventional and reduced-risk insecticides for control of flower thrips in blueberries—

Dr. Oscar Liburd and Erin Finn, Entomology and Nematology Department, University of Florida

During the 2003 blueberry growing season, researchers from the University of Florida Fruit and Vegetable IPM Laboratory in Gainesville conducted field trials to evaluate various conventional and reduced-risk insecticides for control of flower thrips, *Frankliniella* spp., in commercial blueberry plantings. Trials were conducted at two sites: a high-density southern highbush planting in central Florida, and a rabbiteye planting in South Georgia. All insecticides were applied at the recommended rates. In Florida, the following insecticides were evaluated: 1) Imidan 70W, 2) Provado 1.6F, 3) SpinTor 2SC, 4) Ecozin 3% EC, 5) Garlic Extract, and 6) Surround WP. In Georgia, six insecticides were evaluated: 1) Diazinon AG500, 2) Malathion 5 EC, 3) Actara 25 WG, 4) SpinTor 2SC, 5) Ecozin 3% EC, and 6) Surround WP. Insecticides were applied every 10 - 14 days at each site. Insecticide effectiveness for suppressing thrips was evaluated using white sticky traps and by collecting 40 blueberry flower clusters from treated areas (per insecticide). In Florida, Surround was the only insecticide that significantly reduced flower thrips population (Fig. 1). It is uncertain how Surround reduced thrips populations, but one possibility is that it restricted thrips accessibility to blueberry flowers. In Georgia, Malathion and Ecozin were the most promising compounds for suppressing flower thrips population (Fig. 2). Unfortunately, the structure of the blueberry flower allows thrips to feed in a protected environment, and many insecticides only reach the external surface of the flower. It is possible that some of the newer neonicotinoid insecticides (Provado and Actara) with systemic or trans-laminar mode of action may demonstrate more effectiveness against thrips in future studies. The quick movement of thrips within blueberry plantings and from adjacent hosts may hinder the potential to evaluate the

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effectiveness of selected insecticides. Future studies will include laboratory studies to provide additional information regarding thrips behavior as it relates to various classes of insecticides.

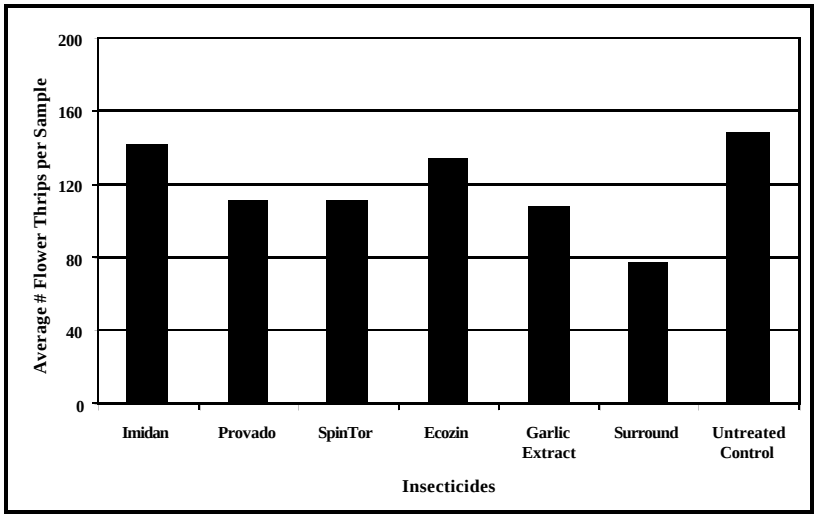


Fig. 1. Effect of selected insecticides on populations of flower thrips in southern highbush blueberries Florida (2003)

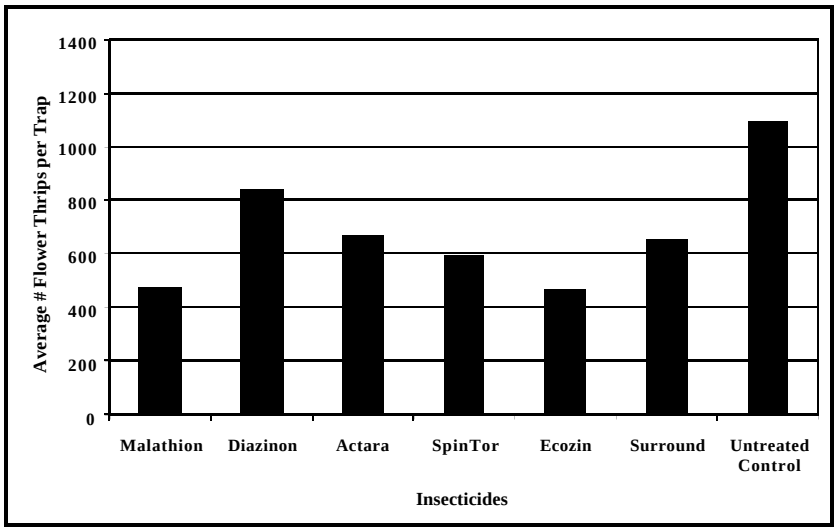


Fig. 2. Effect of selected insecticides on populations of flower thrips in Rabbiteye blueberries, Georgia (2003)

Defining Blueberries

Rabbiteye blueberries, *Vaccinium ashei*, are native to the southeastern United States and were named for their pinkish immature fruits which suggest an albino rabbit's eye. They have soft, blue-green leaves in the summer, followed by orange and crimson foliage in the fall. They have been commercially cultivated for over 100 years. The berries are firmer than highbush, with thicker skin. The seeds tend to be slightly more pronounced than highbush. In the south, growers machine harvest rabbiteyes for both the fresh and process markets.

Highbush blueberries, *Vaccinium corymbosum*, so named because of their height (six feet tall and up.) Most commercial blueberries are grown on highbush variety plants. The highbush blueberry is a deciduous shrub and is cultivated for its flowers, sweet fruit, and bright red autumn foliage. This plant grows well in moist, well-drained, acidic, sandy or peaty soils. Southern highbush blueberries are hybrids derived from crosses between northern highbush blueberries with native southern species, mainly Darrow's evergreen blueberry. Southern highbush cultivars, in addition to lower chilling requirements, also have greater tolerance to high summer temperatures, somewhat greater drought tolerance, and develop superior fruit quality under southern growing conditions.

California Advocates Renew Fight to Limit Hand Weeding

Chemically Speaking, May 2003

Hand weeding would be banned if farm work advocates are successful in their campaign to convince the California Division of Occupational Safety and Health that it's so harmful for workers' backs that it should be eliminated from most fields. California would be the first state in the nation to restrict hand weeding of crops. Growers, including many organic farmers, argue there are no reasonable alternatives to hand weeding because long-handled tools are too imprecise and would damage the crop. They say hand weeding reduces the use of often-criticized herbicides. Vanessa Bogenholm, chairwoman of the board of California Organic Farmers and owner of V.B. Farms in Watsonville, was quoted as saying, "This isn't something we are doing to circumvent the law. It is something we have to do to harvest a marketable crop."

Hand weeding is widely used on several major crops, such as strawberry, lettuce, nursery plants, and broccoli. Nearly all the state's 228,000 acres of lettuce, for example, are hand weeded at some point each growing season, as are the state's 26,000 acres of strawberries. After failed attempts to persuade the legislature to restrict hand weeding in 1995 and 2002, farm worker advocates are pressing the safety board to impose stiff restrictions. Growers say they also fear that hand weeding restrictions are a Trojan horse for a ban on hand harvesting, which requires stooped labor similar to hand weeding. "One of the things that is really disturbing about this whole (proposed rule) is they are banning something that is essentially the same task as hand harvest," said one organic farmer. "If what you are really trying to do is say that this form of motion is damaging to the human body, it seems like a slippery slope." The Farm Bureau and others are pushing hard to prevent the loss of hand weeding as growers prepare for the end of the widely used fumigant methyl bromide, one of the most effective chemical tools against weeds in strawberry and lettuce. (Knight-Ridder Tribune, 4/30/03).

Heat-Related Emergencies

Source: The American Safety and Health Institute

Summer's here, school's out, and the weather is getting hotter and hotter. When the weather is like this, there is always the danger of heat related emergencies. The following are signs and symptoms and first aid response to the three heat related emergencies.

Heat Stroke—call EMS immediately, this is a life-threatening condition.

Signs and Symptoms:

- Skin is hot, red, dry.
- Pupils are constricted.
- Confusion or unconsciousness.
- Little or no sweating.
- Full rapid pulse.

First Aid:

- Move the victim to a cool place.
- Wrap the victim in wet sheets and place in air conditioned room.
- Remove any excess clothing and do not give anything by mouth.

Heat Exhaustion—call EMS immediately, this will progress to heat stroke if left untreated.

Signs and Symptoms:

- Skin is cool, pale, moist.
- Pupils are dilated.
- Heavy sweating.
- Weak pulse, shallow breathing, weakness, and fatigue.
- Nausea and dizziness, or vomiting and headache.

First Aid:

- Move the victim to a cool place.
- Lay the victim on his/her back and elevate fee 10-12 inches.
- Cool the victim by fanning or applying cold packs, wet sheets, or towels.
- If the victim is conscious, give water.
- Monitor.

Heat Cramps—common during outdoor games, a minor heat illness.

Signs and Symptoms:

- Abdominal cramps or muscle spasms.
- Moist, cool skin and heavy sweating.

First Aid:

- Move to a cool place.
- Give water.
- Massage muscle.

The use of trade names in this publication is solely for the purpose of providing specific information. It is not a guarantee or warranty of the products named and does not signify that they are approved to the exclusion of others of suitable composition. Use pesticides safely. Read and follow directions on the manufacturer's label.

Phytotoxicity "Red Flag" Insecticides/ Miticides in Strawberry — Jim Price, Curtis Nagle and Elzie McCord

Strawberry growers should see red flags in their minds any time they plan to apply the seven "red flag" insecticides/ miticides registered on their crop in Florida. Those insecticides/ miticides are:

Carbaryl (Sevin®)
Dicofol (Dicofol 4E®, Kelthane®)
Naled (Dibrom®)
Oils
Propargite (Omite® for nurseries)
Soaps
Sulfurs

Labels for each of these pesticides provide precautions that must be observed to minimize chances of plant damage from their use. These label precautions are summarized below.

- *Carbaryl (Sevin®)*. Labels for most formulations of carbaryl carry precautions for phytotoxicity to "Early Dawn" and "Sunrise" strawberry cultivars. These cultivars are not widely used in Florida, but new cultivars are introduced to production regularly and their sensitivity to carbaryl may not be known. Therefore, precautions should be taken when carbaryl is used on cultivars that experience has not indicated it safe.
- *Dicofol (Dicofol 4E®, Kelthane®)*. The Dicofol 4E® label cautions users not to apply if temperatures exceed 90°F.
- *Naled (Dibrom®)*. Do not apply when temperature is over 90°F
- *Oils*. Labels for various oils express precautions at various degrees of conditions. The most conservative conditions are provided here. DO NOT USE IN COMBINATION WITH OR IMMEDIATELY BEFORE OR AFTER SPRAYING WITH CAPTAN OR ANY PRODUCT CONTAINING SULFUR. DO NOT USE SULFUR WITHIN 4 WEEKS OF AN OIL APPLICATION. DO NOT USE WITH CARBARYL (Sevin®), or PROPARGITE (Omite®). Do not use with any product whose label recommends the use of no oils. Do not use in combination with NPK foliar fertilizer applications. Do not spray when foliage is wet, freezing temperatures are expected within 48 hours of application, or when temperatures 75°F or higher are expected for several days after application. Do not apply when plants are under heat or moisture stress.
- *Propargite (Omite®)*. Propargite can be used only on plants that will not bear fruit for 1 year after application. That largely restricts its use to the strawberry nursery. There are several precautions for propargite: "Leaf damage has been observed when: 1) Applied with other chemicals or spray adjuvants, 2) Temperatures on application date reach 75°F, or within a few days thereafter, 3) rain falls on the application date or within a few days thereafter".
- *Soaps*. Avoid application when leaf temperature exceeds 85°F. Potential for injury increases on plants stressed by heat, humidity, drought, or insect, mite, or disease pressure. Application of excessive water volumes will increase potential for fruit injury by causing collection of spray at bottom of fruit. Do not use on new transplants or plants stressed by drought.
- *Sulfurs*. During periods of high temperatures sulfur may burn foliage and fruit. Do not use during periods of excessively high temperatures. Do not use with oil or within 4 weeks of an oil application. Do not use on sulfur sensitive varieties.

Some of the perilous conditions named above occur frequently in Florida, therefore highest attention should be given to the affected insecticides/miticides when the conditions of interest exist. For instance:

1. Captan and sulfurs are frequently used as fungicides in Florida's strawberry production, therefore precautions should be exercised when considering any use of oils.
2. Fall and late winter temperatures can be high, therefore precautions should be exercised when considering the use of naled (Dibrom®), dicofol (Dicofol 4E®, Kelthane®), propargite (Omite®), soaps, oils or sulfurs.
3. A chance of freezing temperatures exists in winter, therefore precautions should be exercised again when considering any use of oils.

(Continued on page 5)

Each of these precautions is stated on pesticide labels and they underscore the importance of reading and understanding the entire label before applying any pesticide. Devoting attention to the dangers of "red flag" insecticides/miticides during the course of production can reduce chances of phytotoxic damage and can enable a profitable crop.

Strawberry Production in Japan — Takashi Nishizawa Ph.D.

Professor, Faculty of Agriculture, Yamagata University
Tsuruoka Japan

History of Strawberry Production

Strawberry was introduced into Japan in the late 19th century from Holland and called 'Holland strawberry'. Production did not spread widely before World War II. After the war, however, the area planted in strawberry increased almost linearly, along with the utilization of plastic films, peaking at approximately 35,000 acres in 1972. Now, total strawberry production in Japan is approximately 200,000 metric tons per year making it the third largest producer in the world (Fujishige, 1994).

Cultivars and Picking Season

Leading cultivars in the 1980s were 'Donner' and 'Hokowase'. In the 90s, 'Nyoho' and 'Toyonoka' were widely grown. However, many new cultivars have recently been bred, and 'Tochiotome', 'Akihime', 'Sachinoka', 'Nyoho' and 'Toyonoka' are predominant now. All the leading cultivars are short-day types, and ever-bearing and day-neutral cultivars have not been used for winter production. In Japan, summer is often too hot and humid for strawberry production. Therefore, the picking season is usually concentrated from late autumn to spring.

Special Techniques for Strawberry Production during Winter Season

Farmers use some special techniques to produce strawberry fruit during the winter. Virus-free stock plants are grown at regional experimental stations or nurseries. This material is used to produce runner plants that are delivered to growers. Farmers usually pot the runner plants in June and grow them in greenhouses. In July and August, nitrogen fertilizer is often withheld from these plants to stimulate induction of flower buds. In August, potted plants are often transported to a high elevation location (above 3,000 ft) and grown until the primary inflorescence is differentiated. Cooling facilities are also often used for the induction of flower buds. In this system, greenhouses with an air-conditioner are used. Day length is artificially shortened to 8-12 hours by covering the houses with reflective silver plastic (Fig. 1). The houses are cooled to 57-59º F during the night. This treatment is called 'short-day and cooling treatment' and repeated for 2-3 weeks until the primary inflorescence differentiates on the apical stem. The plants are then set in fruiting greenhouses in late August or early September. The plants will continue to flower through the winter if the night temperatures in the greenhouses are maintained between 59 and 68ºF. Thus, fruit can be harvested continuously for 6 months, from November to April. This cultivation method is now used throughout Japan.

Yield and Cost

Strawberry production in Japan is very costly. In northern Japan, for example, growers have to cover the plants with a double or triple layer of plastic film to maintain high temperatures during mid-winter (Fig. 2). They also have to use special equipment, such as CO_2 generators (Fig. 3) to increase photosynthesis, kerosene heaters (Fig. 4), and supplemental lighting systems for increasing leaf and fruit growth (Fig. 5). However, fruit yields for strawberries in Japan are not high compared with those of other countries. Matusda (2000) noted that U.S. farmers plant 16,000-20,000 plants per acre in outdoor, annual hill production systems and these plants can yield an average of 1.9 lb of fruit per plant. On the other hand, Japanese growers plant approximately 32,000 plants per acre but only obtain an average of 0.7 lb per plant. This low productivity is mainly due to higher plant density, lower temperatures, and less sunlight during winter. The fruit from Japanese cultivars are generally sweeter but smaller than those from the U.S. (Fig. 6).

The high costs associated with winter strawberry production inevitably leads to high market prices. In general, 0.66 lb of fruit are packed in a plastic case and sold in Japanese markets at the price of U.S.$ 3-6 (U.S.$ 4.5-9/lb).

Future

Leading cultivars in Japan produce fruit that have good quality and sweetness but these cultivars are not suitable for late spring and summer production because of fruit softness and low tolerance to diseases. Therefore, a lot of strawberries are imported

(Continued on page 6)

during this period, mainly from the U.S. Recently, summer production of strawberries has been tried, especially in northern Japan. Ever-bearing cultivars such as 'Petica', 'Summer-berry', and 'Sweet Charmy', have been used for this production but their fruit quality has not yet reached the level obtained with winter production.

The demand for California and European strawberries has been low because Japanese consumers dislike the sourness and hardness of fruit from these areas. Korea, however, grows mostly Japanese cultivars and some of the Korean-grown fruit is now being exported to Japan. The style and season of strawberry production in Korea is similar to that of Japan, and therefore Korea is likely to become a serious competitor of the Japanese grower in the near future.

Literature Cited

Fujishige N. 1994. Strawberry. p. 78-81. In Konishi K., S. Iwahori, H. Kitagawa and T. Yakuwa eds. Horticulture in Japan. Asakura. Tokyo.

Matsuda T. 2000. Strawberry. p.125-128. Zenkoku Nougyou Kairyou Hukyu Kyokai. Tokyo.

Fig. 1. A facility for 'Short-day and cooling treatment' (for flower bud induction). Roof of greenhouse is opened for 8-12 hours during the day and then plants are cooled under completely dark condition.

Fig. 2. Triple layer of plastic films for mid-winter production.

Fig. 3. System to add supplemental carbon dioxide to the greenhouse.

Fig. 4. A kerosene fueled heating system.

Fig. 5. Incandescent lights used for-long-day treatment.

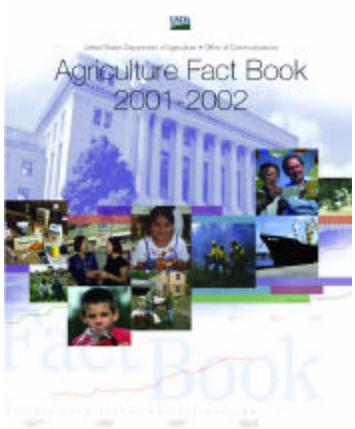
Fig. 6. 'Akihime' strawberry in a hydroponic system. These systems are now very common in Japan.

Ag Fact Book Available

The 2001-2002 Agricultural Fact Book is now available.

The book includes general information and statistical data about American food consumption, the agricultural sector and rural America. The book also describes USDA's programs.

The book can be accessed at www.usda.gov/factbook. Hard copies of the publication are available for sale by the Government Printing Office for $26 and can be ordered by calling 202-720-9035.



A monthly newsletter of the University of Florida Institute of Food and Agricultural Sciences, Gulf Coast Research and Education Center, and Florida Cooperative Extension Service.

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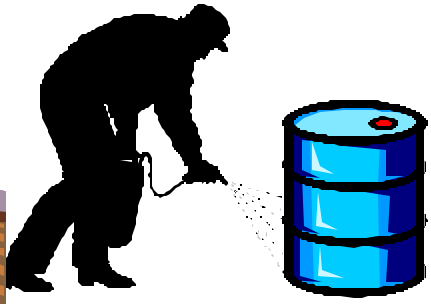

AGRICULTURE PESTICIDE COLLECTION DAY

This agriculture pesticide collection program is a safe way to dispose of cancelled, suspended, and unusable pesticides at no cost to the farmer.

FREE PESTICIDE DISPOSAL

HILLSBOROUGH COUNTY AGRICULTURE OPERATIONS ONLY

Friday, September 5, 2003

8:00 a.m. – 2:00 p.m.

Location: U. S. Liquids
2002 N. Orient Road, Tampa, Florida

Partners and Sponsors

Hillsborough County:
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For more information contact:

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