UNIVERSITY OF ILLINOIS EXTENSION
College of Agricultural, Consumer, and Environmental Sciences

Illinois Fruit and Vegetable News

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a newsletter for commercial growers of fruit and vegetable crops

"We are what we repeatedly do. Excellence, then, is not an act, but a habit." Aristotle

Address any questions or comments regarding this newsletter to the individual authors listed after each article or to its editor, Rick Weinzierl, 217-333-6651, weinzier@uiuc.edu. The ***Illinois Fruit and Vegetable News*** is available on the web at: http://www.ipm.uiuc.edu/ifvn/index.html . To receive email notification of new postings of this newsletter, call or write Rick Weinzierl at the number or email address above.

For your calendar … June 16, 2006 – Illinois Summer Horticulture Field Day will be held at Boggio's Little Mountain Orchard near Granville, IL; program information and a registration form were part of the May 24 issue of this newsletter. September 8, 2006 -- Illinois Pumpkin Field Day will be held at the University of Illinois Vegetable Research Farm near Champaign, IL.

In this issue …

Regional Updates

In northern Illinois, we have seen mostly sunny days with high temperatures in the mid 70s to low 90s and night temperatures in the upper 40s to low 60s during the May 22 – June 5 period. The region received about 2 inches of rainfall during the same period, with higher amounts of more than 4 inches in Kankakee County. It has been dry during the past five days, so growers have had opportunities to catch up with field operations and planting.

Apples, pears, and peaches are sizing well, and fruit thinning is ongoing in some orchards. Codling moth monitoring continues, and cover sprays are being applied. Grapes are now in bloom. Growers have planted sweet corn, and early fields are about 5 inches tall. Transplanting of tomatoes, peppers, cucumbers, muskmelons, and watermelons is going on in many farms. Pumpkin and squash planting is going on as well. The warm weather has been very conducive for several vegetable insect pests. I observed cucumber beetles chewing the leaves of squash and cucumber seedlings; flea beetles on leaves of collards and egg plants; imported cabbage worm larvae on the leaves of cabbage and other cole crops; and aphids (both winged and wingless) on leaves of vegetables. Some of the farmers markets in the region are already open; the major produce available now is asparagus, rhubarb, spinach, Chinese cabbage, different types of herbs, strawberries, and vegetable seedlings.

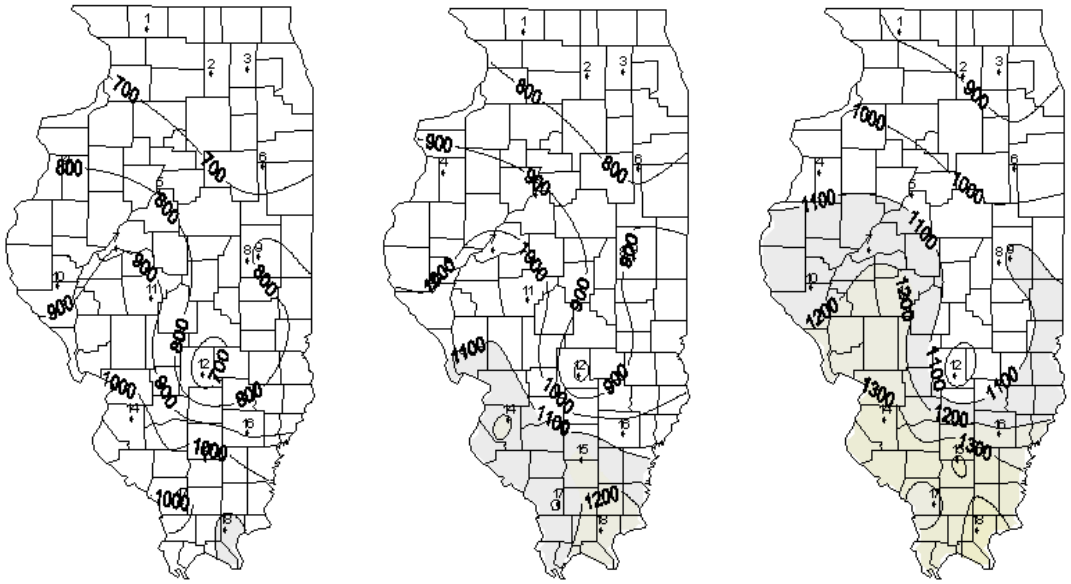
Maurice Ogutu (708-352-0109; ogutu@uiuc.edu)

Degree-Days

Degree-day accumulations listed below for weather stations in the Illinois State Water Survey WARM data base have been summarized by using the Degree-Day Calculator site on the University of Illinois IPM site (http://www.ipm.uiuc.edu/degreedays/index.html). The list below includes only degree-day accumulations and projections based on a 50-degree F developmental threshold and a January 1 starting date, but other options that use different thresholds and specific biofix dates are available on the Degree-Day Calculator. The degree-day calculator is available as a result of a joint effort of extension entomologists (primarily Kelly Cook) and Bob Scott of the Illinois State Water Survey. If you have questions about how to use the site, contact me or Bob Scott (rwscott1@uiuc.edu). Note: An "outlying" data point for Brownstown, coupled with missing data from Olney, is producing an unusual pattern of degree-day totals for south-central Illinois. This pattern seems to be the result of erroneous data; you may want to check the Degree-Day Calculator site in a couple of days and see if the maps have changed. *Rick Weinzierl (217-333-6651; weinzier@uiuc.edu)*

Degree-day accumulations, base 50 degrees F, starting January 1.

Station	County	Base 50F DD Jan 1 – May 23 Historic Average	Base 50F DD Jan 1 – June 6 2006	Base 50F DD Jan 1 – June 13 (Projected)	Base 50F DD Jan 1 – June 20 (Projected)
1. Freeport	Stephenson	634	634	748	891
2. Dekalb	Dekalb	692	630	750	897
3. St. Charles	Kane	627	632	738	873
4. Monmouth	Warren	758	803	927	1076
5. Peoria	Peoria	802	796	924	1077
6. Stelle	Ford	745	642	768	922
7. Kilbourne	Mason	915	900	1029	1183
8. Bondville	Champaign	844	749	880	1036
9. Champaign	Champaign	843	848	982	1142
10. Perry	Pike	869	861	990	1143
11. Springfield	Sangamon	907	945	1084	1249
12. Brownstown	Fayette	993	[621]	[765]	933
13. Olney	Richland	986	Missing	Missing	Missing
14. Belleville	St. Claire	1063	1072	1211	1368
15. Rend Lake	Jefferson	1119	1099	1252	1427
16. Fairfield	Wayne	1068	888	1041	1216
17. Carbondale	Jackson	1091	942	1086	1250
18. Dixon Springs	Pope	1144	1127	1276	1443



Degree days, base 50 degrees F, since January 1, 2006.
Left: January 1 – June 6; center: January 1 – June 13 (projected); and right: January 1 – June 20 (projected).

Notes from Chris Doll

For the record, the first Japanese beetle was trapped on June 5, which was two days earlier than last year. Other phenological happenings such as the first ripe sweet and tart cherries and red and black raspberries are very close to 2005 also. Thornless blackberries are near the end of the bloom period, and strawberry harvest is literally over in this area. Some of us remain dry, with only 4.0 inches of rainfall in the last 64 days, and only 8.1 inches for the year.

Apples are sizing and looking pretty good. Codling moth traps continue to catch moths, which began flying about 6 weeks ago. My degree day accumulation since April 23 is now at 649. Second generation oriental fruit moths are also being caught, but nothing has been seen on peach trees or fruit. Fire blight has not been severe in the area, but again it has been seen in every orchard I've been in. Two growers reported skipping streptomycin in partial blocks with a third spray, and the fire blight strikes were more numerous there. Apogee-sprayed orchards continue to show good fire blight control (coupled with streptomycin) and reduced terminal growth. Only one incidence of apple scab has been found, but two heavy infections of cedar apple rust were found in Missouri.

Peach thinning continues in many orchards, with the final work being targeted to removal of small and damaged fruits and removing high density fruits. Improved fruit size is visible on blocks that were blossom-thinned or thinned early. With the heavy fruit set in the Midwest, good fruit size will be needed to market the crop. Some bacterial spot hot spots have been reported in spite of inclusion of copper materials in the sprays.

A great tour of Bader Farms at Campbell Missouri was attended 10 days ago. Bill Bader has 800+ acres in that area and showed the group many of the 30 varieties that he is growing. Unfortunately we saw some hail damage, but generally good culture and growth. Problems with root rots were being treated with phosphoric acid materials, apparently with some success. He is trying a combination of mustard and crimson clover as a cover crop to overcome the peach-tree replant problems. Tree growth and color were excellent from his management of nitrogen with calcium nitrate applications.

Strawberry renovation should begin as soon as harvest is completed in order to get the plants off to a good recovery for the next crop. With the variable rainfall over southern Illinois, some growers will have to wait for some dry weather, and others will need some irrigation or rainfall to begin.

I hope to see many of the readers of this newsletter at the Illinois Summer Orchard Meeting at Boggio's Orchard, at Granville on Friday, June 16.

Chris Doll

Revised "How to Comply" Manual for Worker Protection Standards

The Worker Protection Standard (WPS) is a regulation issued by the U.S. Environmental Protection Agency. It is designed to limit workers' exposure to pesticides, reduce adverse health effects when exposure occurs, and inform and educate workers about hazards associated with occupational pesticide exposure. If you are involved in the production of agricultural plants on a farm, forest, nursery, or greenhouse, you must comply with all or part of the WPS provisions if you: 1) own or manage such sites where pesticides are used and hire or contract for the services of even one person, 2) operate a business in which you or your employees apply pesticides to such sites, or 3) operate a business in which you or your employees perform tasks as a crop advisor.

Compliance instructions for this law are contained in the U.S. EPA's Worker Protection Standard for Agricultural Pesticides How to Comply (HTC) manual, which was published in 1993. The HTC manual was revised in September 2005 to incorporate the 1995, 1996, and 2004 WPS amendments and administrative exceptions, including the:

- change in the WPS worker training requirement that requires untrained workers be provided basic pesticide information before entering pesticide-treated areas (revised HTC p. 21-22 [1993 version HTC pp. 25-26]);
- reduction in the number of days decontamination supplies must be available to workers after application of low-risk pesticides, and the requirement that the supplies are to be located together (revised pp. 24-25 [previous pp. 29-30]);
- modification in the language requirements for treated-area warning signs (revised p. 34 [previous p. 43]);
- modification in the size requirements for treated-area warning signs (revised p. 35 [previous p. 43]);
- early-entry exception for irrigation tasks and for limited contact tasks (revised pp. 47-48 [previous pp.59-60]);
- optional use of separable glove liners beneath chemical-resistant gloves (revised p. 65 [previous p. 83]);

- optional wearing of gloves by agricultural pilots when entering or leaving aircraft (revised p. 67 [previous p. 87]) and;
- exemption for certified or licensed crop advisors and persons under their direct supervision (revised pp. 74-79 [previous pp. 95-98]).
- finally, the official name of the HTC manual was changed to: "*How to Comply with the Worker Protection Standard for Agricultural Pesticides: What Employers Need to Know"*.

Though your old [1993 version] HTC manual may be marked up and familiar to you, EPA warns that it is obsolete and that its use may lead you to be out of compliance. In late January of 2006, the U.S. EPA distributed a limited number of revised HTC manuals to each state. Your options in obtaining this manual are:

1. Contact Scott Frank (217-785-2427) with the Illinois Department of Agriculture for a free copy of the HTC manual (hard-copy or on CD-ROM [which contains additional compliance assistance resources]). Supplies are limited.

2. Contact your local University of Illinois Extension Unit office. Due to the limited supply made available from EPA, each Extension office received only six hard copies of the HTC manual and one CD-ROM for reproduction, loan, and/or distribution as each office deems appropriate.

3. Visit the EPA's website (http://www.epa.gov/agriculture/htc.html) and print the 141-page HTC Manual (available as a single document and by chapter). In addition, you can print the 2-page "WPS Quick Reference Guide", which summarizes the maximum WPS requirements. To request the HTC manual on CD-ROM from EPA, contact the National Ag Compliance Assistance Center at agcenter@epa.gov or by calling the toll free number (1-888-663-2155). When ordering, please use EPA document number EPA 305-C-05-001.

4. EPA has informed us that some of the major Personal Protection Equipment and Ag/Hort. supply companies (such as Gemplers) are planning to sell the HTC manual.

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Fruit Production and Pest Management

Wetness-Based Warning System for Control of Summer Diseases of Apple

In 2005, trials were conducted in four apple orchards located at Belleville, Dixon Springs, Peoria, and Urbana to evaluate performance of a wetness-based disease-warning system for control of summer diseases (emphasizing sooty blotch/fly speck). A Spectrum Technologies wetness/temperature sensor was placed at a 5-ft height and a 45-degree angle under the canopy of a representative tree within a selected block of trees at each orchard. All trees in the orchards were sprayed according to the standard spray schedule through the first cover spray. After the first cover spray, a 20-tree block of the same apple cultivar was set aside to receive the second cover spray after accumulation of 175 hours of wetness (IPM block). The data from the sensor were downloaded weekly, or more often, and used to determine the accumulated hours of wetness. When the number of hours was close to 175, the grower was asked to apply fungicides to the IPM block, as they would spray the rest of the orchard.

The weather-based system predicted for the second cover spray later than the conventional two-week spray schedule. The disease prediction system saved the growers 5, 1, 4, and 3 prays in Belleville, Dixon Springs, Peoria, and Urbana, respectively, without significant differences in disease severity between IPM trees and the rest of the orchards.

In 2006, trials are being conducted in eight orchards in Belleville, Champaign, Dixon Springs, Granville, Malta, Metamora, Peoria, and Urbana to determine effectiveness of the weather-based warning system for control of summer diseases of apple. The first cover-spray in Belleville, Champaign, Dixon Springs, Granville, Malta, Metamora, Peoria, and Urbana was applied on 5/2, 5/16, 5/11, 5/16, 5/20, 5/16, 5/16, and 5/19, respectively. Accumulated leaf wetness hours on May 31 were 110, 48, 0, 37, 13, 73, 21, and 53 in Belleville, Champaign, Dixon Springs, Granville, Malta, Metamora, Peoria, and Urbana, respectively. The second-cover spray will be applied when 175 leaf wetness hours are accumulated.

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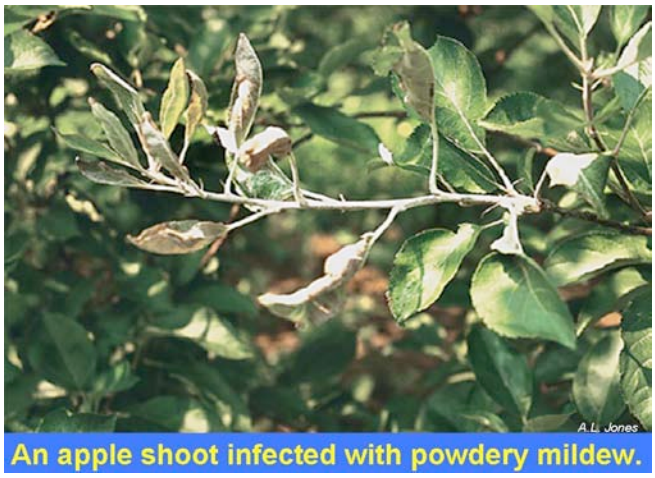
Apple and Peach Powdery Mildew



Apple powdery mildew: Powdery mildew, caused by the fungus *Podosphaera leucotricha*, is a common disease of apple trees. In the past few weeks, widespread incidence of powdery mildew has been observed in orchards in Illinois. The fungus overwinters as mycelium in leaf or fruit buds which were infected the previous season. Infected buds are more sensitive to cold temperatures and will often die if the temperatures drop below -24°F. However, even at lower temperatures some of the mildew survives in infected buds and inoculum is always available. Cultivars such as Jonathan, Idared, Rome, and Gala are susceptible whereas Red and Golden Delicious are resistant. Chemical control with fungicides is necessary when growing susceptible varieties. Early spring applications of a fungicide are necessary to prevent secondary spread of the mildew in apples. Neglecting control early in the year will result in poor control during the season. The fungicides Bayleton, Flint, Nova, Pristine, Procure, Rubigan, Sovran, Sulfur, and Topsin-M are effective against powdery mildew of apples. It is important to alternate materials of a different chemistry to prevent the development of resistance to a fungicide. For information on controlling powdery mildew in apple orchards, consult the "Illinois Commercial Tree Fruit Spray Guide 2006" (http://www.extension.iastate.edu/Publications/PM1282.pdf).

Peach powdery mildew: Powdery mildew of peach, caused by the fungus *Sphaerotheca pannosa*, has been observed as powdery, white spots on fruit in most peach orchards in Illinois. The fungus survives as mycelium in bud scales. Growth of the pathogen is favored by cool, moist nights and warm days. Generally, fruit is susceptible only up to time of pit hardening, but later infections can occur. Management of powdery mildew on peaches focuses on protecting fruit from infections. Apply an effective fungicide from bloom until pit hardening when necessary. Up to three applications may be necessary in seasons when there is cool weather with occasional rain. Fungicides Elite, Indar, Nova, Rubigan, Pristine, and Sulfur are effective against powdery mildew of peaches. It is important to alternate materials of a different chemistry to prevent the development of resistance to a fungicide. For information on controlling powdery mildew in apple orchards, consult the "Illinois Commercial Tree Fruit Spray Guide 2006" (http://www.extension.iastate.edu/Publications/PM1282.pdf).

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June 6 Updates on Codling Moth Phenology

Based on data provided by Bronwyn Aly at Dixon Springs, Gary Grammer near Murphysboro, Sissy Erbacher of Eckert's Orchard at Belleville, Chris Doll at Edwardsville, Kenny Horn from the University of Illinois orchard at Urbana, Curt Christ near Elmwood, and Ken Hall near Poplar Grove, biofix dates for codling moth are listed for six locations in the table below, along with degree-day accumulations and projections for the weather station sites nearest each orchard. (Note that there is no reporting weather station near Edwardsville, so I've used the Springfield station as the best option.)

Orchard Location	Weather Station	Codling Moth Biofix Date	DD_{50} through June 6, 2006	DD_{50} projected through June 13	DD_{50} projected through June 20
Dixon Springs / Murphysboro	Dixon Springs	April 17	741	893	1061
Belleville	Belleville	April 20	692	833	993
Edwardsville	Springfield	April 23	627	770	938
Urbana	Champaign	May 1	511	649	811
Elmwood	Peoria	May 6	456	587	744
Poplar Grove	Freeport	May 10	384	503	649

Developmental events for the codling moth based on degree-day accumulations are presented below. Remember that **"biofix" refers to the date of the first sustained capture of first-generation moths in traps**. An isolated catch of 1 moth in one of several traps followed by a few days of no captures does not constitute a biofix. On the other hand, traps do **not** have to catch lots of moths to mark a biofix. If traps were checked every 2 days, and the average on May 1 was 1 moth per trap, then on May 3 the average was 1.5 moths per trap, then on May 5, 2 moths per trap, consider the biofix date to be May 1 (or April 30).

Codling moth development:

First egg hatch (for first generation larvae)	~220 DD_{50} after biofix
50 percent of first generation moths emerged	~240 DD_{50} after biofix
50 percent of first generation eggs hatched	~500 DD_{50} after biofix
99 percent of first generation eggs hatched	~920 DD_{50} after biofix
First moths of second generation emerge	~900 DD_{50} after biofix
Beginning of second generation egg hatch	~1120 DD_{50} after biofix

(Table based on ***Orchard Pest Management*** by Beers et al., published by Good Fruit Grower, Yakima, WA.)

Rick Weinzierl (217-333-6651; weinzier@uiuc.edu)

Brief Notes on Fruit Insects and Mites

Japanese beetles: Chris Doll noted observing the first Japanese beetle of the season at Edwardsville, so it's time to remind fruit growers of the basics about the control of this insect. There are lots of thorough summaries of its biology and host range available in printed references and on line (including a fact sheet from Ohio State University), so I'll not present the full story in this newsletter. Here are the key points for fruit growers …

- Adults feed voraciously on the leaves of grapes and apples, as well as the fruits of peaches, brambles, and blueberries … they also feed on hundreds of other plants.
- Adults are very mobile. They fly from one area to another to feed, mate, then return to host plants to feed again; this cycle is repeated several times.

- Emergence of new adults spans a period of 6 weeks or longer, and individual adults live for a few weeks, so adults may be present for as long as about 3 months in any given area.
- Adults aggregate -- they group together in response to plant chemicals and pheromones produced by males and females.
- The only effective means of controlling adult Japanese beetles in commercial fruit production is by application of insecticides. Traps sold by a variety of garden supply companies are ineffective unless many, many traps are used. (How many? Too many to be practical, and even then a lot of beetles come to the area of the traps but are not captured.) Microbial insecticides (and conventional insecticides as well) used to control the larval stage in the soil can prevent damage to the roots of turf and other grasses, but no area-wide control of adults has ever been achieved by such uses. Because adults are large insects that move from treated to untreated areas, insecticide applications often kill the beetles present at the time of treatment, but residual control lasts only for a few days (unlike the 2 weeks or more of codling moth or oriental fruit moth control we expect from cover sprays in apples or peaches). The key is to choose an effective insecticide, treat when adults are too numerous to tolerate, then begin scouting again as soon as 3 days after application to determine if another spray is needed. Check the 2006 Midwest Commercial Small Fruit and Grape Spray Guide or the 2006 Commercial Tree Fruit Spray Guide for listings of registered insecticides and rates for specific fruit crops. Sevin and the pyrethroids (such as Pounce, Warrior, Capture, Asana, Danitol, etc.) are effective where the preharvest interval is great enough to allow their use; pyrethrins (such as Pyganic) or malathion provide immediate knockdown, and the required interval between treatment and harvest is shorter, allowing their use even as harvest is ongoing.

Japanese beetle (Clemson University)

European red mite: Extended dry weather (where it's occurring) may trigger population increases in European red mites in apples and other perennial fruit crops, including grapes and peaches. This is especially likely where insecticides used in cover sprays are toxic to predaceous mites that otherwise help to hold European red mite populations in check; such insecticides include the pyrethroids and, to a lesser extent, Assail and Calypso as well. Growers are advised to scout regularly (at least weekly), and the threshold during June and July is 5 mites per leaf. The Midwest Tree Fruit Pest Management Handbook includes a graph that summarizes "presence-absence" sampling for European red mites on apples so that scouts simply keep track of the portion of leaves infested with one or more live mites; this process is easier than counting the number of mites on each leaf. Miticides that are best suited for use through about first or maybe second cover include Apollo, Savey, and Agri-Mek. Later in the crop's development, Nexter, Fujimite, Acramite, Zeal, Envidor, and Kanemite are better choices. Data from Illinois and elsewhere in the lower Midwest indicate that Nexter, Acramite, and Zeal are very effective.

Potato leafhopper: Fruit growers should be sure to read the brief note below about potato leafhopper under the heading on Vegetable Insects.

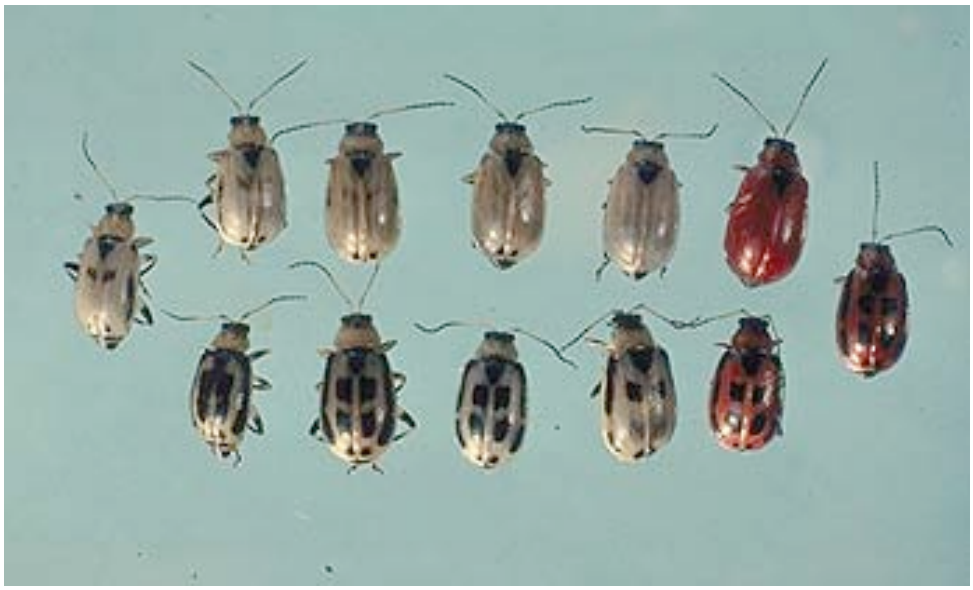
Rick Weinzierl (217-333-6651; weinzier@uiuc.edu)

Notes on Vegetable Insects

Potato leafhopper: I've noticed potato leafhopper nymphs and adults on apples in untreated plots at the University of Illinois orchard near Urbana. Although the insect's common name might suggest that it's primarily a problem on potatoes, it is a serious pest of snap beans, alfalfa, grapes, apples, and a number of woody ornamental landscape plants. Potato leafhoppers feed on foliage by inserting their needle-like stylet into tissue and sucking out plant sap. Unfortunately, they also inject a salivary toxin into tissue, and that toxin causes damage to leaf tissue (called hopper burn) and reduced growth of new shoots. Vegetable growers are advised to scout potatoes and green beans for potato leafhoppers on a weekly basis throughout the season, beginning now. The same is true for apples and grapes. Young, nonbearing blocks of trees or vines are particularly susceptible to injury because they usually are sprayed less often (no fruit to protect for harvest), yet these are the blocks or plantings where vigorous growth of new shoots is most important. Check the 2006 Midwest Commercial Small Fruit and Grape Spray Guide, the 2006 Commercial Tree Fruit Spray Guide, or the 2006 Midwest Vegetable Production Guide for Commercial Growers for notes on thresholds and specific insecticide recommendations.

Potato leafhopper adult and nymph. (Pennsylvania state Univ.)

Bean leaf beetle: Continued scouting is necessary for bean leaf beetle in snap beans (and also cucurbits, on which it will feed but NOT transmit the bacterial wilt pathogen carried by striped and spotted cucumber beetles). This insect exhibits different patterns of markings on the elytra (the forewings that form the shell-like covering of the body in beetles) but always bears a black triangular mark just behind the prothorax at the center of the base of the forewings.


Bean leaf beetle adults (Univ. of Illinois)

Updates on European corn borer, southwestern corn borer, and corn earworm: Ron Hines of the University of Illinois Dixon Springs Agricultural Center in far southern Illinois has reported the following on his web site, The Hines Report:

- Southwestern corn borer flight is underway in far southern Illinois, with counts exceeding 40 moths per trap per night in Massac County and over 10 moths per trap per night in Pulaski county for the 7-day period ending June 6.
- Corn earworm traps captured approximately 7 moths per trap per night and 4 moths per trap per night for the 7-day periods ending May 30 and June 6 at the SIU Belleville Research Center in St. Clair county. Ron also caught a trickle of earworm moths in a trap in Pulaski County over the last few weeks. We have not received reports of consistent catches anywhere else yet.
- There have been a couple of European corn borer moths in pheromone or light traps as far north as Urbana, but there's not much action yet to report on this insect in Illinois.

"Leps" in cabbage: In response to Maurice Ogutu's note about imported cabbage worm larvae on cabbage transplants in northern Illinois … I'll present a more complete summary on the status of insecticides for controlling the "Leps" (Lepidoptera – imported cabbage worm, cabbage looper, and diamondback moth) that feed on crucifers in the next issue of this newsletter, but for now it's worth the effort to make this annual reminder. Early in the development of cabbage, broccoli, Brussels sprouts, and cauliflower, where controlling the "worms" (Lepidoptera larvae) of these crops is the goal, relying as much as possible on *Bacillus thuringiensis* (Bt) products is always wise. Bt kills only caterpillars, leaving natural enemies alive to attack the ones not controlled by sprays. Additionally, saving the pyrethroids and other insecticides that are highly effective against susceptible populations of loopers or diamondback moth larvae makes it less likely that resistant populations will develop and make late-season control very difficult.

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Words of Wisdom

2,000 words here …

Left: "Brave kid." Right: "Left and right." (From: http://www.jokesgallery.com)

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