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College of Agricultural, Consumer, and Environmental Sciences

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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, 217-244-2126, weinzierl@illinois.edu. The *Illinois Fruit and Vegetable News* is available on the web at: <http://www.ipm.illinois.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.

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University of Illinois Extension Specialists in Fruit & Vegetable Production & Pest Management

Upcoming Programs

- **2009 Sustainable Agriculture Tours that involve fruits and vegetables:**
 - **June 19, Growing Strawberries, Naturally.** Jed's Farm, Thompsonville
 - **August 13, Creative Community Co-op Farming.** Basu Natural Farms, Pembroke
 - **September 22, Fresh Fruits and Vegetables.** River Front Berry Farm, Martinton (<http://www.riverfrontberryfarm.com>)

A fee of \$20 per person will be charged for each tour, which includes lunch. Registration at least one week in advance is required. For more information on these and other tours, see <https://webs.extension.uiuc.edu/registration/default.cfm?RegistrationID=2845>. To register by phone, contact Donna Cray at 217-241-4644. For more information, contact Deborah Cavanaugh-Grant (217-968-5512; cvnghgrn@illinois.edu).

Regional Updates

In northern Illinois, the last two weeks have seen highs in the 60s to low 80s and lows in the 40s and 50s. Soil moisture is adequate to too wet, as the region received 1-2 inches of rainfall during the last two weeks. Apples, pears, and tart cherries are sizing well, and apple thinning continues. I have received reports of peach leaf curl on peach leaves, leafhoppers and leafrollers on apple foliage, and plum curculio damage on apple fruits. June-bearing strawberries are sizing well, and early fruits are starting to color. Raspberries are in full bloom, and the one year-old canes of the fall-bearing types are about 12 inches tall.

Asparagus and rhubarb harvesting is almost done in many farms. The cool weather slowed crop growth, and plants are about one week behind compared to other years. Most vegetables have been transplanted, and the first planting of

sweet corn is more than 1-ft tall in some farms. Tomatoes grown in high tunnels are fruiting, and early cabbage planting is doing great, particularly in the Kankakee area. Transplanting of tomatoes, peppers, cucumbers, muskmelons, and watermelons is almost done in many farms. Pumpkin and winter squash planting is still going on. There are reports of bean leaf beetle feeding on bean leaves, flea beetles feeding on cole crop leaves, and cucumber beetles feeding on cucurbit seedlings.

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

St Charles Horticulture Research Center Update. Activities at the St. Charles Research Center continue to be directed by cool, wet weather. We had lows in the thirties the first week of June and no temps in the 80's until Sunday, June 7. But it's the frequent rains that most hamper our efforts. We've made poor progress establishing planned research, with transplants in the greenhouse getting oversized, despite delaying greenhouse planting dates. We've been able to get two sponsored cover crop studies established and make good progress on Maurice Ogutu's rye cover crop study on pumpkins. We also put in a weed control study on pumpkins week before last. But it seems like our rear ends get wet as we leave the field every time we get work done.

The upside is that as the wet weather hampers our field research efforts, it gives us more opportunity to work in the vineyards and orchards. Weed pressure has been strong with the abundant moisture, and disease pressure seems to be high as well. Some plants needed replacement in the grape trials due to last winter's cold temperatures, so transplants have been set and have taken off beautifully. The grape breeding nursery is looking clean and well-thinned out. Some very nice selections are beginning to show promise as they have more resources to work with since their neighbors were removed.

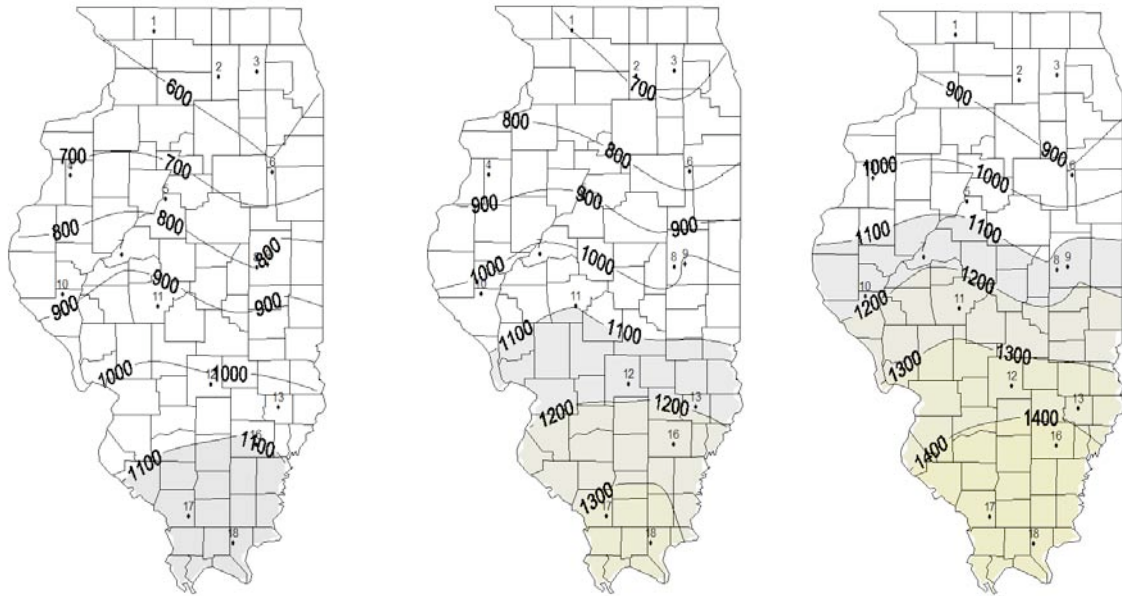
Projects yet to be established include an heirloom tomato trial, a conventional tomato trial and a chile pepper trial. A large summer squash trial will be put in next, when the weather allows us back in the field. Another 1.61" of rain fell earlier this week, and more rain is in the forecast for the middle of this week. I can only take comfort knowing I'm not alone in this dilemma.

Bill Shoemaker (630-584-7254; wshoemak@illinois.edu)

Degree-day Accumulations

Degree-day accumulations, base 50 degrees F, starting January 1, 2009.

Station	County	Base 50F DD Jan 1 – Jun 9, Historic Average	Base 50F DD Jan 1–Jun 9, 2009	Base 50F DD Jan 1–Jun 16, 2009 (Projected)	Base 50F DD Jan 1–Jun 23, 2009 (Projected)
1. Freeport	Stephenson	683	570	699	850
2. Dekalb	Dekalb	743	555	688	843
3. St. Charles	Kane	675	563	683	825
4. Monmouth	Warren	812	711	848	1003
5. Peoria	Peoria	858	770	910	1071
6. Stelle	Ford	798	607	746	908
7. Kilbourne	Mason	973	881	1023	1184
8. Bondville	Champaign	901	797	941	1103
9. Champaign	Champaign	903	883	1030	1196
10. Perry	Pike	924	878	1019	1178
11. Springfield	Sangamon	967	947	1099	1271
12. Brownstown	Fayette	1056	1012	1168	1342
13. Olney	Richland	1048	1035	1190	1362
14. Belleville	St. Claire	1126	Missing	Missing	Missing
15. Rend Lake	Jefferson	1185	Missing	Missing	Missing
16. Fairfield	Wayne	1133	1120	1283	1464
17. Carbondale	Jackson	1153	1172	1325	1494
18. Dixon Springs	Pope	1209	1151	1309	1481



Degree-day accumulations, base 50 F, January 1- June 9, 2009 (left), and projected through June 16 (center) and June 23 (right).

Degree-day accumulations presented above for weather stations in the Illinois State Water Survey WARM data base have been summarized using the Degree-Day Calculator on the University of Illinois IPM site (<http://www.ipm.uiuc.edu/degreedays/index.html>). The list above 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 current and former extension entomologists (primarily Kelly Estes) 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).

Rick Weinzierl (217-244-2126; weinzier@uiuc.edu)

Fruit Production and Pest Management

Bloom time in northern Illinois vineyards

Grape growers in northern Illinois are entering a critical time in the management of their crop for this season. Though late, the grapes are beginning to blossom and many activities will be taking place. This is the time when phylloxera move up into the canopy to establish galls on the leaves. If your vineyard has a history of developing severe galling on certain varieties, you need to consider a preventive spray of an effective insecticide. Also, grape berry moth adults will begin to fly into vineyards from neighboring woods and will lay eggs on vines near clusters. The larvae which hatch out will feed in the clusters, boring into berries. These wounds are perfect sites for rot organisms to establish, leading to high potential for berry rots at harvest time. Pheromone traps will help growers determine risk. Sprays for phylloxera will often control this pest, but only in vines that are sprayed. If you're not spraying for phylloxera, you need to consider how you'll control grape berry moth. Pheromone disruption is a possibility.

This is a good time to evaluate the performance of weed control strategies. If you used herbicides, are they working? The frequent, heavy rains may lead to early decline in performance of the herbicides. If you did not use herbicides, how is your strategy working? What is your labor bill? In-row rotary weeders can be useful, but are you hitting the base of the trunk? Wounding of this tissue can lead to crown gall developing later. It's never easy, is it?

Canopy management is entering a critical phase. Have you thinned out shoots? Is your crop load estimate consistent with the health of the vineyard? Have you cluster thinned? This could be a good time to cluster thin open-clustered varieties as they will size up more after thinning. Wait until after bloom to cluster-thin tight clustered varieties. Any shoots with more than two clusters leads to potential for a crop that lacks uniformity. Leave the first two clusters but

remove the third, and if necessary, the fourth. Just make sure your remaining cluster counts are high enough to reach the yield you want. Shoots can be combed down but tendrils are probably already grabbing neighboring shoots. This is where it gets difficult, but the quicker it's done, the easier it will be. It just gets harder later on. In VSP systems the first catch wire should be in place now and the second should go in place soon. Practice using the catch wire to position shoots as you place the wire. Brush the shoots up with the wire before putting the wire in the clip.

Disease pressure should be high right now due to the abundant moisture. And flowering time is critical for protecting fruit, and vines, from fungal organisms. Do you know the disease susceptibility of your varieties? Each variety is unique. Knowing their weaknesses allow you to be prepared to protect them when conditions are good for disease development. This is a season where your disease management plan will be tested. Check out the 2009 Midwest Commercial Small Fruit and Grape Spray Guide. If you don't have it, it's available as a download on the home page of this newsletter's website. It's a great tool for fine tuning your pest management strategy.

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Potato leafhopper

Potato leafhoppers are abundant on lots of different plants, apparently from the far south all the way through northern counties. This insect migrates into the region on weather systems from the south each spring, and its arrival in late May and June is very common. In Illinois fruit crops, potato leafhopper commonly damages apples, grapes, strawberries, and brambles. In apples it is most common in blocks that are either unsprayed (with an insecticide) because they are not bearing or that are treated with an insecticide that is specific to Lepidopteran target pests. For example, blocks treated with Rimon, Altacor, or Delegate may be infested because while these products are very effective against codling moth and oriental fruit moth, they are not effective against leafhoppers. Apple growers might consider using Assail, Imidan, or Guthion against potato leafhoppers where they are abundant. Grape growers might use Assail or Danitol. Symptoms of "hopper burn" on apples on apples and grapes include a downward cupping of leaves, often accompanied by browning and death of leaf margins, along with reduced shoot growth. See the [2009 Midwest Small Fruit and Grape Spray Guide](#) and the [2009 Midwest Tree Fruit Spray Guide](#) for a comprehensive list of registered insecticides.



Potato leafhopper injury on apple. (Photo from Michigan State University.)

Oriental fruit moth and codling moth updates

Oriental fruit moth traps near Murphysboro began catching moths in late March, then 2 to 3 weeks passed without further activity. I've listed two possible biofix dates for OFM phenology models for the far south as well as biofix dates and degree-day accumulations for Calhoun County and Urbana. Degree-day accumulations and projections, base 45 F, from nearest Illinois State Water Survey weather stations are:

Oriental fruit moth biofix dates and degree-day (base 45F) accumulations:

	Biofix Date	DD Base 45 F, through June 9	DD Base 45 F, projected through June 16	DD Base 45 F, projected through June 23
Murphysboro (Carbondale weather data)	<i>March 25</i> <i>OR</i>	1281	1472	1678
	<i>April 17</i>	1131	1322	1528
Hardin (Brownstown weather data)	April 15	1066	1260	1471
Urbana (Champaign weather data)	April 18	966	1151	1374

Approximately 950 degree-days after biofix roughly marks the beginning of second generation flight, and 1900 degree-days after biofix marks the beginning of third generation flight. Generations overlap and blur together as second and third (and subsequent generations) develop, so this will be the last time I'll summarize degree-days for this insect for the 2009 season. Growers are reminded to check issue 6 of this year's newsletter (dated May 29, 2009) for OFM management guidelines.

Codling moth biofix dates and degree-day (base 50F) accumulations:

	Biofix Date	DD Base 50 F, through June 9	DD Base 50 F, projected through June 16	DD Base 50 F, projected through June 23
Murphysboro (Carbondale weather data)	April 24	810	966	1136
Centralia (Fairfield weather data)	April 28	714	881	1063
Hardin (Brownstown weather data)	April 30	624	783	959
Urbana (Champaign weather data)	May 10	479	630	798
Rockford (DeKalb weather data)	May 19	287	424	581

Developmental events for the codling moth based on degree-day accumulations are presented below. Within the next week or so, the first moths of the second generation will begin to emerge in far southern Illinois. The most intense period of first generation egg hatch is about to begin in far northern Illinois.

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
90 percent of first generation moths emerged	~500 DD ₅₀ after biofix
90 percent of first generation eggs hatched	~730 DD ₅₀ after biofix
First moths of second generation emerge	~860-900 DD ₅₀ after biofix
First eggs hatch for second generation larvae	~1100-1120 DD ₅₀ after biofix
50 percent of second generation moths emerged	~ 1340 DD ₅₀ after biofix

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

Grape Phylloxera

I mentioned 2 weeks ago that it was early to see much phylloxera damage in northern Illinois, but by now it's not too early to see phylloxera galls on foliage anywhere in the state.



Leaf galls caused by grape phylloxera (photo from University of Minnesota).

Phylloxera crawlers move up from roots to foliage around bloom, and for a couple weeks a relatively high percentage of the above-ground stage may be exposed on plant surfaces (versus inside galls). That's why insecticides applied during this time are more effective than later in the season when at any application date a large portion of the population is inside galls and not vulnerable to contact insecticides. Danitol and Endosulfan are among the insecticides rated most effective against the foliar phase of phylloxera; other more recently registered products that also appear to be highly effective include Assail and Movento. The pyrethroids Baythroid/Renounce and Brigade/Capture also are labeled against foliar stage phylloxera, as is the neonicotinoid Provado.

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Vegetable Production and Pest Management

Colorado potato beetle

Last week I received a report from far southern Illinois about failures of Sevin, Endosulfan, and one or more pyrethroids to control Colorado potato beetle larvae in potatoes. These failures almost certainly resulted from insecticide resistance in the treated population.

Newer alternatives to which this insect has had less time to develop resistance include (for foliar application) Agri-Mek, Assail, SpinTor, Entrust, Provado, and Rimon. Novodor is effective against small larvae only. Soil-applied drenches of Admire or Platinum also are labeled, as is seed-piece treatment with Cruiser. Soil and seed-piece treatments rely on the systemic uptake of these insecticides and their translocation to foliage.

Thresholds for Colorado potato beetle control are based on the level of defoliation that plants withstand at different growth stages before significant yield losses occur. Treat if defoliation (loss of leaf area) exceeds the following levels at specified stages: preflowering – 30 percent; flowering – 5-10 percent; tuber formation – 30 percent.

Potato leafhopper

As noted above under the fruit heading, potato leafhoppers are abundant now in many areas. Vegetable crops that are particularly susceptible to potato leafhopper injury include potatoes and snap beans. Check the [2009 Midwest Vegetable Production Guide for Commercial Growers](#) for a listing of products and rates for the control of potato leafhoppers in potatoes and beans.

Notes on corn earworm and European corn borer

Mike Roegge, University of Illinois Crop Systems Extension Educator in western Illinois, has reported moderate to severe infestation of European corn borer in Adams and Brown counties. In addition, his corn earworm trap captured 38 moths on the night of June 9. So, time for the second round of reminders on the control of these two pests of sweet corn (see issue number 6, dated May 29, 2009, for the first round of comments)...

Corn earworm moths lay their eggs singly on silks, and larvae move down the silk channel immediately after they hatch from the eggs. On corn, larvae do not feed on any exposed parts of the plant (leaves, husks, etc.), so the only way to kill them (short of having planted BT sweet corn) is with a contact insecticide applied to the silks. Larvae crawl across the residues on the silks, and the insecticide is taken up through the cuticle.

Although this insect overwinters with at least some success in some areas of the state in some years, it also migrates in on weather fronts every year. Moths are almost always active in the Collinsville area by late May and early June, but in much of the state the period of first activity (and the first need to control them) can vary from June through August. Although control may be necessary in one portion of the state at a particular time, it may be unnecessary in many other locations. Consequently, it really is essential to operate an earworm trap and determine spray needs based on moth captures.

The correct trap to use is a wire Hartstack trap; these are available from Bob Poppe, Route 1, Box 33, Lexington, IL, 61753 (309-723-3201). Bait the trap with Hercon "zealures," and replace the lure with a new one every 2 weeks. These lures are available from Great Lakes IPM (<http://www.greatlakesipm.com> or 800-235-0285) or Gempler's (<http://www.gemplers.com/> or 800-272-7672). Earworm control is necessary in fresh-market sweet corn when moth flight is ongoing and fresh silks are present. If traps are catching more than a few moths (3 to 5 per trap per night) when silking begins, sprays should be applied within 2 days after first silk -- insecticide residues must be on the silks to kill larvae immediately after they hatch from eggs and before they enter the silk channel.

Historically the pyrethroid insecticides – especially Warrior, Capture/Brigade, Baythroid, and Mustang Max – have been the most effective against earworms. These are restricted-use pesticides (users must be licensed). Pounce and Ambush also have been effective, but not as effective as the four products listed above. In recent years variable levels of pyrethroid resistance in corn earworm populations have resulted in occasional control failures where pyrethroids have been used. Alternatives to pyrethroids include Belt and Radiant, and both have effective in small-plot trials in recent years. Coragen – available for use in sweet corn last year under a Section 18 Emergency Use exemption – is NOT labeled for use in Illinois on sweet corn in 2009. Growers who are not licensed to apply restricted-use insecticides can reduce earworm damage by applying SpinTor, Entrust (same active ingredient as SpinTor, but formulated to allow use in certified organic production), or Sevin. None of the botanical insecticides is effective for earworm control, nor are spray or dust applications of BT products.

Caveats and comments ...

- For the last few years, organic growers have had an option for earworm control other than planting early so that at least a portion of the season's crop comes to harvest when earworm numbers are low. Entrust, an OMRI-listed insecticide containing spinosads (derived from soil microorganisms), is labeled and sold as an 80-percent wettable powder, and although it is not as effective as the top pyrethroids have been in small-plot trials, it is better for corn earworm control than anything that organic growers have been able to use in the past.
- On the whole issue of pyrethroid resistance in earworm populations ... this problem is real and it is serious, but throughout the state and the region the occurrence of control failures in the field is still uncommon. Many growers obtained successful control of corn earworms with pyrethroids in 2009. Results in any given field depend in large part on something we do not control at all – the specific origin and the resistance level of the moths that migrate to us from Louisiana and Texas. Given the uncertainties, growers might plan to use the economical pyrethroids as their primary insecticides but also have alternative products on hand in case those pyrethroids fail to control resistant populations.
- Spray intervals: When moth flight is heavy (greater than 50-100 moths per trap per night) and temperatures are high (upper 60s at night, 90 and above during the day), the spray interval for high levels of control in fresh-market sweet corn for Warrior, Brigade/Capture, Baythroid, or Mustang Max should be no longer than 3 days and as short as 2 days (with a max of 2 days for Pounce, Ambush, SpinTor, or Entrust). When moth counts are lower (5-25 per night) and the daily average temperatures (max + min divided by 2) are in the low 70s or

lower, the interval for Warrior, Brigade/Capture, Baythroid, or Mustang Max might be increased to 4 days, and for Pounce, Ambush, SpinTor, or Entrust to 3 days. The demands and expectations of your customers may influence these guidelines ... if you need 95 percent worm-free corn, keep the spray intervals on the short end of the ranges listed above. It is NOT useful to apply insecticides for earworm control until silking begins because significant egg-laying in corn begins only after silks are present.

- Ground versus aerial sprays? To repeat the argument I've offered in previous years ... usually ground applications are best for all but large fields. For small scale, fresh-market sweet corn growers, the first reason for ground sprays is simple ... in most cases relatively few rows of sweet corn that are in the stage that needs to be sprayed are surrounded by earlier corn and by a range of other vegetable crops. Drift or overspray onto these crops is very likely to be greater in aerial applications than in ground sprays, at least if all the rows at the edges of the target sweet corn are sprayed. If the insecticide used on corn results in any spray deposit on adjacent vegetable or fruit crops and it is not registered on those crops, it becomes an illegal residue. End of discussion.

But not quite the end of the discussion ... what about larger acreages? After all, sweet corn processors routinely rely on aerial applications of insecticides for earworm control in their contracted acreage. Although they may "get by" with this because a little bit of infestation and damage can be cleaned out in processing, there is another reason why aerial sprays have greater merit in these situations. The pyrethroids are generally thought to be much more effective at killing adult moths than were the older insecticides that preceded them (though PennCap-M also provides some adult control). In large fields, the influx of new earworm moths into the field after resident moths have been killed by an insecticide is relatively slow during at least some periods. Although aerial applications do not provide as thorough coverage of silks as ground applications do, they do kill adult moths in the field at the time of spraying. Brian Flood of Del Monte has suggested that in fields of 30 acres or larger, adult control provided by aerial sprays persists for a few days because it takes a while for new female earworm moths to re-enter the field. (This is NOT true for corn borer moths, but aerial sprays are effective at killing corn borer larvae anyway, as they feed on leaves and other exposed plant surfaces before tunneling into the plant.)

In smaller plantings, however, moths move back into the bulk of a field faster, simply because most of the field is close to an edge and to untreated surroundings. As a result, thorough coverage of silks and repeat applications of insecticides that put a residue on new silk growth are necessary. Where ground applications can be made in a timely manner, better coverage of silks is possible with ground sprayers equipped with drop nozzles. If heavy rains prevent the use of ground rigs for a few days, however, then a timely aerial application is FAR more effective than a ground spray applied 1 or 2 days late, after earworms have entered the ear.

So ... ground applications are more effective for most fresh-market sweet corn growers. Aerial applications have their place in larger acreages typical of contract fields grown for processors and when rains prevent timely sprays from ground equipment.

European corn borer control is generally much easier because (1) larvae feed externally on leaves before entering stalks or ears, and during this period of foliage feeding they are exposed to insecticide residues, and (2) there is no evidence of pyrethroid resistance (or other insecticide resistance) in corn borer populations. The best monitoring tool for corn borer moth flights is a black light trap, but unfortunately, relatively few such traps are operated in Illinois, so we do not always have a convenient record of the status of corn borer flight in various parts of the state. One resource for info on corn borer flights is the *Illinois Pest Management and Crop Development Bulletin* (<http://ipm.illinois.edu/bulletin/>), the weekly newsletter on field crop topics. Monitoring plants for egg masses and foliar feeding also provides information to base spray decisions on infestation levels. Treat for corn borer control during late whorl stage if 20 percent or more of plants show leaf feeding. Repeat applications at 5- to 6-day intervals until 7 days before harvest. See the [2009 Midwest Vegetable Production Guide for Commercial Growers](#) for listings of registered products and application rates.

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Less seriously

Passwords and underwear ... information you can use.

With all the issues about computer security, identity theft, etc., passwords for everything take on great importance. On a recent NPR program a contributor summarized the advice given by Brown University's Technology Coordinator to incoming freshmen when advising them about computer security and their passwords. He told them ...

"Passwords are like underwear. They should be private. They should not be shared with anyone, and they should be changed often."

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