



# 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, 217-244-2126, [weinzierl@illinois.edu](mailto: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:**
  - **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; [cvnghgrm@illinois.edu](mailto:cvnghgrm@illinois.edu)).

### *Regional Updates*

**At the Dixon Springs Ag Center**, much warmer (excessive) temperatures are contributing to rapid growth on vegetable crops. The high temperatures greatly increase the need for irrigation, especially for tomato and pepper plants which will easily undergo flower abortion if not kept properly irrigated. Some growers have reported uneven ripening in early tomatoes. Ripening in tomatoes is affected by numerous factors, but a couple of the more important include potassium, which growers can augment with potassium nitrate, and weather. We have been capturing corn earworm moths at DSAC since the second week of June when we started monitoring. This will be the second year in a row where the old conventional wisdom that corn finishing before July 1 will naturally be worm free will fail to hold true.

Overall the plasticulture strawberry growers I have visited with report a good crop but some disappointment with total yield. I think fruit size suffered from incessant rainfall causing somewhat diminished pollination. Growers who have renovated weak matted row fields should also remember that with current temperature irrigation may soon be

necessary. The blueberry crop at DSAC has been very good but the heat of this past week has brought us bird depredation problems at levels not seen here since the early 90's. Blackberry harvest has also begun, and the crop appears to be good.

Stay cool or at least stay hydrated!!!

*Jeff Kindhart (618-695-2444 or 618-638-7799; [jkindhar@illinois.edu](mailto:jkindhar@illinois.edu))*

**In northern Illinois**, the last two weeks have brought day temperatures in the upper 80s to low 90s and night temperatures in the upper 50s to low 70s. Precipitation in northern Illinois during the June 9-24 totaled 3-6 inches.

Grapes are sizing, and some bunches will soon need to be thinned. Apples and pears also are sizing, and some fruit thinning is still ongoing. June-bearing strawberry harvest continues, though recent heat is winding the season down faster than anticipated. Orchard cover spray programs need to target apple scab and codling moth, among other disease and insect problems.

In Kankakee area, early-planted sweet corn is tasseling, with some fields silking. Summer squash and early tomatoes also are flowering, and harvest of cabbage and other cool season vegetables is underway. In other parts of northern Illinois, pumpkin, squash, and melon seedlings are starting to vine well, and cucumber beetle control is needed. Diamondback moth, cabbage looper, and imported cabbage worm adults were observed flying in cabbage and broccoli fields; and flea beetles were observed feeding on eggplant leaves. Squash bugs were also observed on summer squash in some parts of the region.

*Maurice Ogutu (708-352-0109; [ogutu@illinois.edu](mailto:ogutu@illinois.edu))*

**St. Charles Horticulture Research Center Update.** I just received an email notice from the National Weather Service that said through June 20, 2009 has been the wettest season on record for the Chicago area. Kind of rubbing it in, isn't it? But we were lucky last weekend. We only had 0.8" of rain. Still, some of it came Sunday night so Monday morning the ground was soggy. I guess it's time to repeat, "When the going gets tough, the tough get going!" I just wish this rainy weather would get going ... right out of here!

Enough of the lament! There are some positives to report. We found a few opportunities to get into the field during the last two weeks. Herbicides were applied and plastic mulch was laid. So we were able to get two funded vegetable projects in the ground. One was an heirloom tomato trial that is a cooperative project with the Great Lakes Vegetable Working Group. Colleagues from other great lakes institutions, such as Purdue, Michigan State and Ohio State are also planting this trial. Jeff and Bronwyn are planting it down south and Loretta Ortiz-Ribbing is helping with this trial at St Charles. We hope to characterize performance of these varieties in a broad manner for our region and identify a few with promise for our industries. Having a late planting may be a blessing, as it will allow us to evaluate during a more pest-intensive segment of the season. We'll report back later.

Another trial we planted is a cooperative project with Rogers Brothers Seed to evaluate summer squash varieties, including several experimental lines from their breeding program. The two types of squash are zucchini and yellow crookneck. 16 varieties are planted by seed in plastic mulch in a randomized, replicated field design. These will be intensively evaluated through the season.

The grapes are growing by leaps and bounds. Promises of support for our grape research are still unfulfilled but I hear the state has funding problems. So we do too. But the frequent rain has made it possible to keep our workers busy by working in the grapes. So we are trying to keep the vineyards in good shape till our funding, and resulting labor, arrive.

The cover crop studies have suffered from lack of timely management, but the weather has made it difficult to comply with timing protocols. Still, the mustards and buckwheat look very good and are still promising positive results if we can just get a few good windows of opportunity to keep up. Pumpkins and cucumbers will be the beneficiaries of these projects.

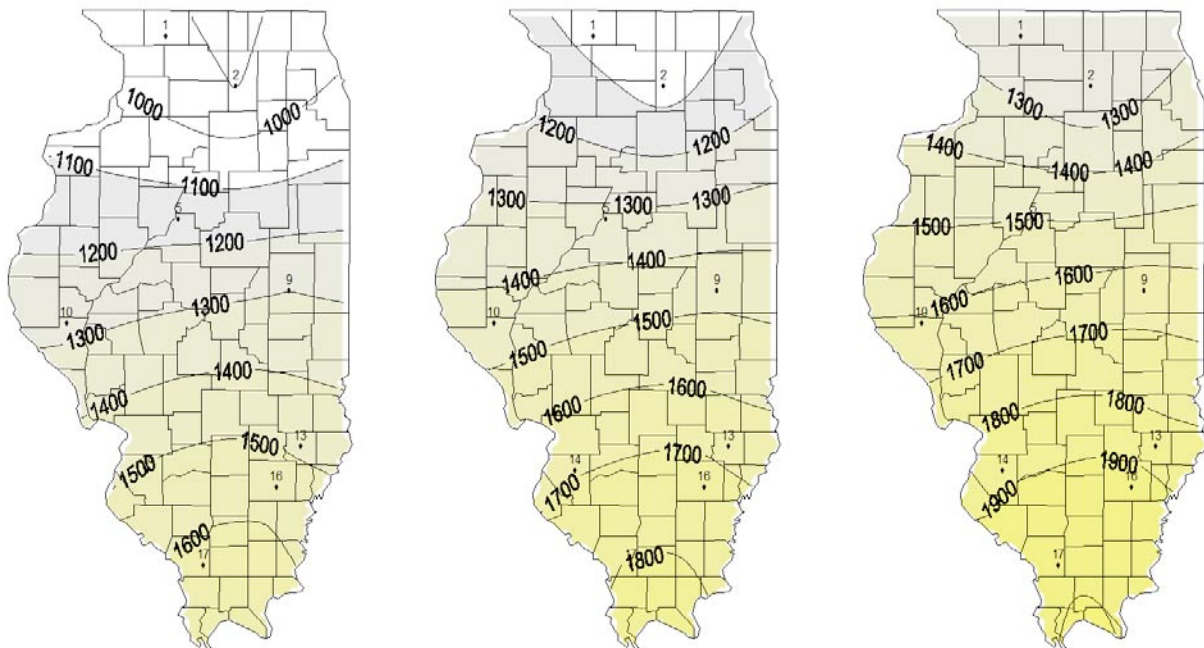
Just a reminder for your calendar. The 2009 Vegetable Growers Twilight Meeting, sponsored by the Illinois Vegetable Growers Association, will be held on July 30 at 6:30 pm. Come join us for an evening of walking tours around the fields to see the vegetable research in progress. I hope you can join us.

Bill Shoemaker (630-584-7254; [wshoemak@illinois.edu](mailto:wshoemak@illinois.edu))

### ***Degree-day Accumulations***

Degree-day accumulations presented in the maps below based on weather stations in the Illinois State Water Survey WARM data base have been taken from the Degree-Day Calculator on the University of Illinois IPM site (<http://www.ipm.uiuc.edu/degreedays/index.html>). I'm presenting only maps this week (and not tables of DD totals) because several sites in the network have displayed "missing data" for the last couple of days. The maps present 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](mailto:rwscott1@uiuc.edu)).

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Degree-day accumulations, base 50 F, January 1- June 25, 2009 (left), and projected through July 2 (center) and July 9 (right).

### ***Notes from Chris Doll***

I'm back in the saddle again, literally, as a back brace is scheduled to be worn for 90 days or more, and most Back-40 activities and bouncing through orchards have been put on hold. I would like to thank those that called or sent me cards, wishing me well. Movement and activities are progressing slowly. Most of the Back-40 activities are being done by others or left undone (like the stoop labor to pick strawberries). Luckily the red and black raspberry crops were reduced by the 2008 water damage, so help was available for that. The birds picked most of my sweet cherry and blueberry crops, and time will tell about the peaches and apples. Spraying is complicated for novices, since the layout of mixed tree types, close planting and the attempt of making 3 gallons of spray cover 50 trees each or apples and peaches is not easy even for me. But 3 cover sprays have been applied and the only problems are some curculio punctures and bacterial spot infections in the stone fruits.

The weather has not been too cooperative this spring. It was generally a cool spring, with 10 inches of rain in May and almost 6 inches in June. Saturated soils lasted for a month, and a few more plants and trees were lost again this year. The heat arrived on the 17th and the degree-days (base 50 F) have averaged 35 per day since that date. My location now has 1176 degree days since a May 1 biofix for codling moth, of which I have trapped only 2 moths. The only trapping success this year has been with lesser peach tree borer, which was sprayed for last week. Other insect abnormalities are near absence of stink bugs (only one seen during strawberry and raspberry harvest), no catfacing of peach, and only 2 Japanese beetles as of today. The data logger has tallied 182 wet hours since the first apple cover spray, so sooty blotch might be a problem for me and others who slack off against this disease.

The calendar says that it's that time of the year for adding 5 ppm of NAA to a few alternating cover sprays of apples to help with the initiation of flower buds for 2010. The need for this depends somewhat on this year's crop load, and should not be needed for lighter set trees. A variety like Fuji might benefit from Ethrel rather than NAA.

Some of my convalescent time was spent reading Illinois Horticulture Society Transactions of the early 1940s. I did not make many notes for this report because I was in a prone position most of the time and writing was impossible, but the content had to do with codling moth control with nicotine, lead arsenate, and the early days of DDT. Fungicides were primarily coppers and sulfur, and the early days of the EDBCs. Maybe it was more simple in those days, but control was not easy. Contributors to those editions included ancestors of a few of our present day growers, with names like Eckert, Ringhausen, Chatten, Boyd, and others, and most of my old college professors. I was most impressed by Professor R. L. McMunn, my favorite, who summarized the "Early History of the Illinois State Horticultural Society and The District Societies" in volume 78 in 1944. It was listed as the topic for the banquet, but the paper covered 95 pages single spaced. Nothing was said about the condition of the audience. The detailing and referencing from old records of our society by Professor McMunn is truly amazing and worthy of browsing by historians.

*Chris Doll*

## ***Fruit Production and Pest Management***

### ***After bloom in northern Illinois: Mid-season grapevine management***

In northern Illinois, grapes are wrapping up bloom and pollination. The crop is set and management from this point will play a large role in determining the size and quality of fruit at harvest. A number of issues need attention at this time, perhaps more than in other seasons because of the unusually wet season we are having.

Nitrogen fertilization may need attention at this time, even if a nitrogen fertilizer application was made early in the season. Why? Nitrogen, unlike other plant nutrients, can be very mobile in the soil. That means when frequent, heavy rainfalls occur in the vineyard, movement of water through the soil matrix may carry off some of the nitrogen, especially in very porous soils. Surface erosion may also move nitrogen, along with other nutrients. High biological activity may tie up or volatilize some of the nitrogen. So nitrogen status may be uncertain if the vineyard has had high moisture and heavy rains. To assess the nitrogen status in the vines, it's still not too late to take petiole samples and have them tested. Look in the Midwest Grape Production Guide for information on the technique. It could help correct a looming nitrogen deficiency.

Another issue which needs attention is disease management. There may not have been a previous season for this young industry with higher potential for disease development. Because of the frequent rainfall and high humidity, fungal disease organisms are extremely active and vines are extremely vulnerable. There may be instances of disease in vines that have not previously been considered susceptible because the environment favors disease so well. This may be exacerbated by failure to achieve timely sprays, or instances where protectant materials were simply washed off. It was just very difficult to get sprays on this season because of frequent rain. If diseases became established earlier, you can bet they are attempting to proliferate, and they are in a good position to do so. The grower must get into the vineyard to look for signs of disease. Questions can be directed to specialists if help is needed. But if risk is high, growers who planned well will be rewarded for their efforts this season. Get the vines protected!

The summertime is when some of our most serious insect pests begin to impact the vines. Pollination is finishing. If a grower has a history of problems with leaf-phase phylloxera, it's time to get that first spray on. Do it right away. Plan on another spray in two to three weeks. Consult the Midwest Small Fruit and Grape Spray Guide for more information. Japanese beetles are about to emerge. Remember them?!! They were a beast last year. Will they be as bad this year? No one knows for sure, but it's best to be ready. Be aware of limits on total quantity of pesticides used. Have several choices available. Do traps help? Probably not, unless the population of the beetle is low. Then you may even be able to tolerate a little defoliation. But don't let it exceed 15% of the leaf material. Grape berry moth is active this time of year, but if you're using pesticides to control phylloxera and Japanese beetle, you may be controlling them too. Just be aware of any gaps in your spray program they can sneak through.

Weeds never cease, do they? This season that may be more true than ever. Why? Because any herbicides which were used earlier may be losing efficacy because of the heavy rains and resulting soil biological activity. Plus, weeds love rain too. They are growing fast. If mechanical control was the primary strategy, it's been difficult getting the job done. Is your management being tested? Mine too. But that's the nature of nature. We must compete with the ecosystem to produce a bountiful, high quality crop. If you decide to use mechanical equipment to get the weeds under control (string trimmers, mowers, rotary tilling), be careful not to injure the trunks. That is one way crown gall gets itself started. If you use Round-up or a burn-down herbicide, such as Rely or 20% vinegar, be careful what you spray. Suckers from the trunk may lie under the weeds and can be at risk, particularly from Round-Up, which will move into the plant systemically. Any green tissue is susceptible to Round-Up. If you accidentally spray green tissue, cut it off immediately to prevent uptake and damage.

On top of all this, canopy management will need attention right now as well. Leaf pulling should occur soon after fruit set. Shoots still need to be combed down. If the fruit set was too good and crop potential too high for your vines, now is the time to remove fruit clusters. Take off the later clusters, the ones further down the shoot, to improve uniformity of ripening in the crop. Young vines are enjoying the moisture, but they probably need trimming about once every week. Remove any shoot that won't become permanent or productive wood. Remove clusters if the vines are too young to bear a crop. Spending time with your 2 or 3 yr-old vines right now will have a big impact on how ready they are for next season. Now is the time to show them you love them! “;,>)

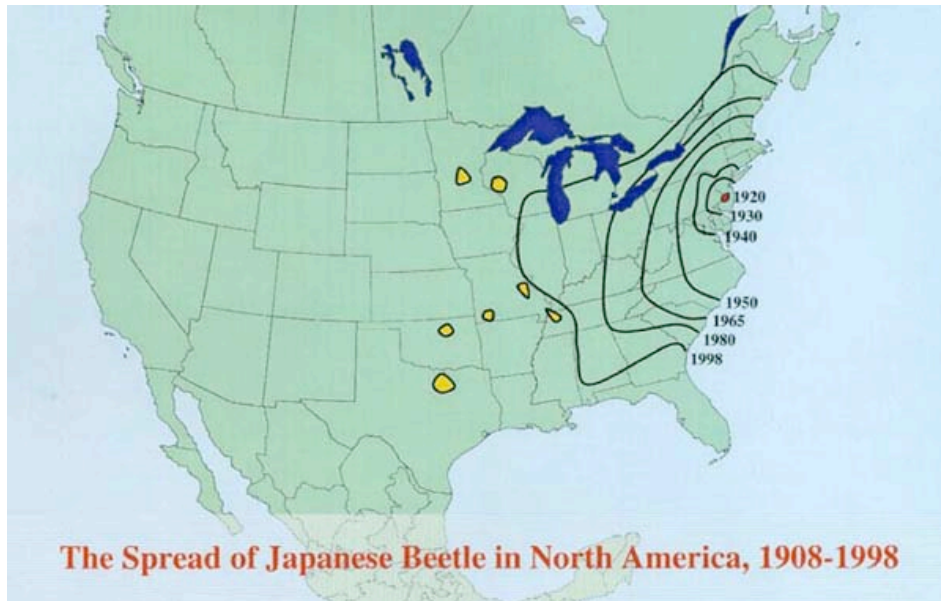
The season isn't over. It's been tough so far, but things could turn around beautifully. It's amazing how quickly grapes respond when the weather favors them.

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### ***Japanese beetle***

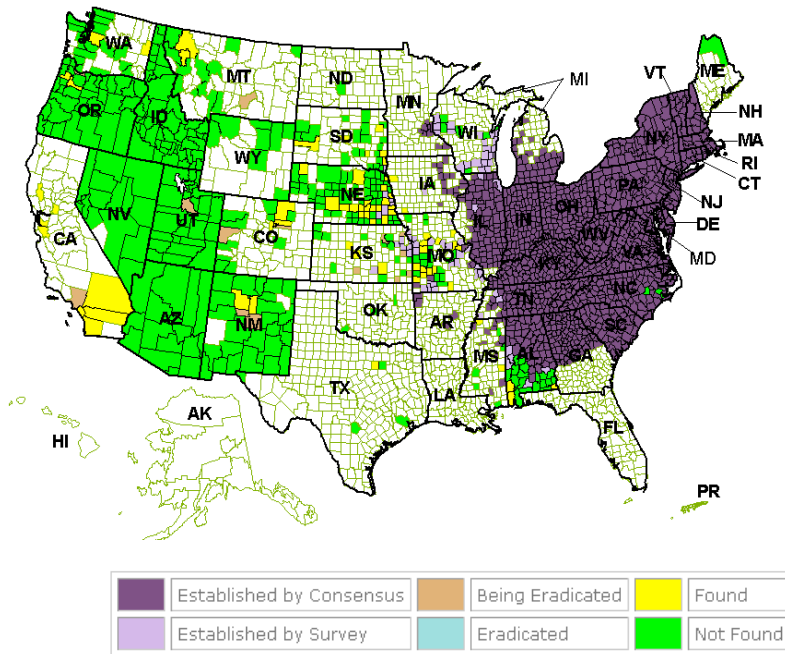
Japanese beetles have started to emerge at least as far north as Champaign, and numbers, as usual, are quite variable. Here's an updated summary on the biology and management of this insect in fruit crops.

The Japanese beetle is an "introduced" pest in North America. It was brought to the United States accidentally in the early 1900s with plant materials from Japan. It has since spread across much of the eastern United States to the Mississippi River, and local populations are established in Texas, Oklahoma, Missouri, and Minnesota. The map below illustrates its spread through 1998.



The spread of the Japanese beetle in North America. (Ohio State University, [http://www.oardc.ohio-state.edu/biocontrol/images/jb\\_map.jpg](http://www.oardc.ohio-state.edu/biocontrol/images/jb_map.jpg))

The current NAPIS map (<http://pest.ceris.purdue.edu/searchmap.php?selectName=INBPAZA>) of Japanese beetle distribution (below) shows some areas of Illinois where Japanese beetle has not been found, but in fact I think this insect has been observed in all Illinois counties.



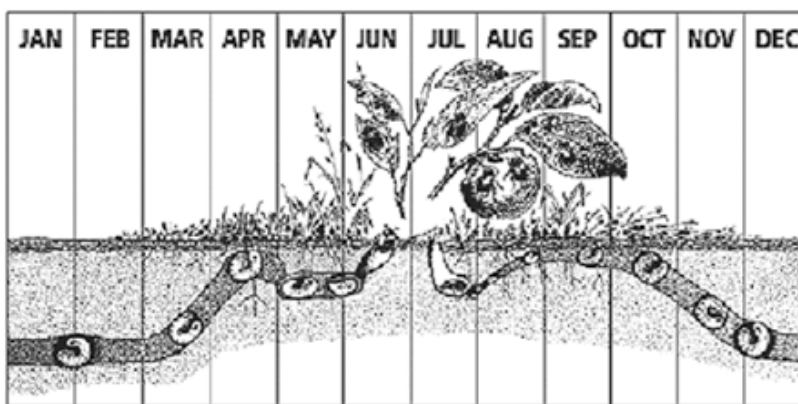
Japanese beetle larvae - grubs - feed on the roots of a wide range of grasses and can be serious pests of turf. In most of Illinois, the common grub that has damaged lawns and golf courses has been the annual white grub or masked chafer, *Cyclocephala* spp. It remains unclear whether or not larvae of the Japanese beetle will become as damaging to turf here as populations build, but it is a damaging species in at least some lawns and golf courses around the state. Adult Japanese beetles feed on the fruits and foliage of over 275 different plant species. Among the host plants that they prefer the most are roses, grapes, American linden, cherry, plum, peach, apple, flowering crab apples, Norway maple, and Japanese maple. In small fruit production in Illinois, adult Japanese beetles feed on the foliage of grapes and the foliage and fruits of blueberries and brambles. They also aggregate in mass to feed on fruits of peaches.

Adult Japanese beetles are about 3/8-inch long, with metallic green bodies and coppery-brown front wings ("wing covers"). Five tufts of white hairs (white spots) are visible along each side of the abdomen, and a sixth pair of white tufts are visible at the tip of the abdomen. Larvae are typical C-shaped grubs, with three pairs of legs on the thorax and no legs or prolegs on the abdomen. Newly hatched larvae are about 1/16 inch long; mature larvae are about 1 1/4 inch long. Larvae of the Japanese beetle can be distinguished from larvae of other grub species by the V-shaped pattern of spines (the raster) at the tip of the abdomen.



Adult Japanese beetle ([University of Minnesota](#))

Mature larvae of the Japanese beetle pupate in the soil in late spring, and adults emerge from June through August; adult emergence begins earlier in the southern portion of the region, and damage to grapes was reported from southern Illinois during the week of June 15. Females emit a sex pheromone to attract males, and mating occurs in the turf or other grasses where the female emerges; additional matings occur later on the plants on which adults feed. Adults find a suitable host plant, begin feeding, and both sexes emit an aggregation pheromone to attract other beetles to the same plant. Females, feed, lay eggs in grassy areas, and return to host plants to mate and feed again, completing several cycles of this behavior. Each female lays 40 to 60 eggs. Because adult beetles can live for several weeks and emergence from pupae spans a period of several weeks as well, Japanese beetle adults may be present from June through October in at least some areas. Larvae hatch from eggs in July, August, and September, and they feed on the roots of grasses until cold temperatures trigger their movement downward in the soil to depths of 4 to 8 inches; they survive prolonged exposure to temperatures of 25 degrees F at that depth with little or no mortality. In the spring, partially grown larvae move upwards in the soil and resume feeding on roots. They pupate in May and June.



Japanese beetle life cycle. ([Ohio State University](#))

**Management:** Biological control agents are available for reducing numbers of Japanese beetle larvae in soil. They include the "milky disease" bacteria *Bacillus lentimorbis* and *Bacillus popilliae* and the insect-parasitic nematodes *Steinernema carpocapsae* and *Heterorhabditis* spp. However, if the goal is to reduce adult damage to fruit or vegetable crops or ornamental plants, the great mobility of adult beetles limits or negates the value of larval control unless it is practiced on an area-wide basis. Most fruit and vegetable growers must focus on adult control to limit crop losses.

Although traps that attract and kill great numbers of Japanese beetles are marketed widely, studies have shown repeatedly that these traps do not reduce beetle populations enough to protect nearby plants, and in some instances damage is greater on plants near traps than on those in areas where traps are not used at all. Exclusion (by use of plant covers) and the use of insecticides are the only effective options for protecting small fruit crops from Japanese beetle adults. Plant covers (with textures similar to floating row covers) can be practical for protecting small numbers of blueberry plants or a few small peach or apple trees when fruit is ripening, but covers rarely are feasible for protecting grapes (because sprays for fungal diseases are needed at the same time as protection from Japanese beetles) or brambles (bees are still visiting and pollinating some flowers while ripening fruit is vulnerable to Japanese beetles).

Insecticides labeled for use on blueberries, grapes, and brambles for Japanese beetle control are listed in the [2009 Midwest Small Fruit and Grape Spray Guide](#). In grapes, effective insecticides for Japanese beetle control include Assail, Brigade/Capture, Danitol, Imidan, and Sevin. Organic growers can use neem products (which act as repellents) or Pyganic. In blueberries, if control is needed it is usually during harvest or very shortly before harvest. Insecticides that may be used near harvest in blueberries and control Japanese beetle include Assail (1-day PHI), Malathion (1-day PHI), Danitol (3-day PHI), Imidan (3-day PHI), and Provado (3-day PHI). The required waiting period between application and harvest – the preharvest interval or PHI – for Sevin in blueberries is 7 days, so it cannot be used for Japanese beetle control during harvest cycles. In brambles, Assail (1-day PHI), Brigade/Capture (3-day PHI), malathion (1-day PHI), and pyrethrins (0-day PHI) provide fair to adequate control.

Several insecticides are labeled for application to apples and peaches for Japanese beetle control. In general, the organophosphates (Imidan and Guthion), carbamates (primarily Sevin), pyrethroids (several), and some neonicotinoids (Provado, Actara, and Assail) used in cover sprays aimed at codling moth and other fruit-damaging pests are effective against Japanese beetles as well. (Labels for Altacor, Delegate, and Rimon do NOT list Japanese beetle as a pest that they control.) See the [2009 Midwest Tree Fruit Spray Guide](#) and specific insecticide labels for rates and restrictions.

For all crop and insecticide combinations, the key to adequate control of Japanese beetle is to scout regularly (once or twice weekly) and treat when damaging numbers of beetles occur on foliage or fruit. Just as important is to scout again beginning a couple of days after treatment to detect reinfestation (something that usually happens with Japanese beetles) and treat again if necessary.

### ***Codling moth updates***

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

	Biofix Date	DD Base 50 F, through June 24	DD Base 50 F, projected through July 1	DD Base 50 F, projected through July 8
Murphysboro (Carbondale weather data)	April 24	1236	1412	1597
Centralia (Fairfield weather data)	April 28	1138	1325	1518
Hardin (Brownstown weather data)	April 30	989	1172	1361
Urbana (Champaign weather data)	May 10	862	1034	1210
Rockford (DeKalb weather data)	May 19	597	756	911

Developmental events for the codling moth based on degree-day accumulations are presented below. Second-generation moth flight should be well underway in the far south and will begin soon as far north as Urbana. First generation egg hatch should be a little more than 50 percent complete in far northern Illinois.



Codling moth development:

50 percent of first generation eggs hatched	~500 DD <sub>50</sub> after biofix
90 percent of first generation moths emerged	~500 DD <sub>50</sub> after biofix
90 percent of first generation eggs hatched	~730 DD <sub>50</sub> after biofix
First moths of second generation emerge	~860-900 DD <sub>50</sub> after biofix
First eggs hatch for second generation larvae	~1100-1120 DD <sub>50</sub> after biofix
50 percent of second generation moths emerged	~ 1340 DD <sub>50</sub> after biofix
50 percent of eggs have hatched for second generation larvae	~ 1580 DD <sub>50</sub> after biofix
90 percent of second generation moths emerged	~ 1660 DD <sub>50</sub> after biofix

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

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## ***Vegetable Production and Pest Management***

### ***Notes on corn earworm***

Just as Jeff Kindhart pointed out that corn earworm moths are active in far southern Illinois, I'll note that earworm moth counts from pheromone traps have been fairly high near Collinsville (nearly 150 per night earlier this week), in Adams County (Mike Roegge reported as high as 50 moths per night), and here in Urbana (over 50 per night on more than one night). With recent extremely high temps, if a grower's market does not tolerate tip damage and worms in ears, these counts should trigger insecticide applications on 2-day intervals beginning within 2 days after silks first emerge. A less aggressive spray program (3-day intervals) can be adequate where counts and temps are lower.

### ***Other quick notes on vegetable insects***

- Squash bug in pumpkins and summer squash: threshold for control is 1 egg mass per plant ... treat as soon as nymphs begin to hatch from eggs. Brigade/Capture and other pyrethroids are the most effective.
- Striped cucumber beetle: Overwintered adults are still active in central and northern Illinois. This insect transmits the pathogen that causes bacterial wilt of cucumbers and muskmelons. The threshold for cucurbits that are susceptible to wilt is 1 beetle per plant (or less). Cruiser-treated seed or in-furrow at-plant applications of Admire are likely to provide systemic control for about 1-2 weeks after seedling emergence, but be sure to scout for later immigration of adults into fields.
- European corn borer in peppers: Pyrethroids such as Mustang-Max, Pounce, and Warrior are effective but can trigger aphid outbreaks. Orthene (acephate) remains registered on peppers and is effective for corn borer control and aphid control. Orthene is not highly effective against corn earworm.

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