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College of Agricultural, Consumer, and Environmental Sciences

# *Illinois Fruit and Vegetable News*

**Vol. 22, No. 5, April 6, 2016**
**Editors: Nathan Johanning & Bronwyn Aly**

***A newsletter to provide timely, research-based information that commercial fruit & vegetable growers can apply to benefit their farming operations.***

Address any questions or comments regarding this newsletter to the individual authors listed after each article or to its editors, Nathan Johanning, 618-687-1727, njohann@illinois.edu or Bronwyn Aly 618-382-2662, baly@illinois.edu. The ***Illinois Fruit and Vegetable News*** is available on the web at: http://ipm.illinois.edu/ifvn/. To receive email notification of new postings of this newsletter, contact Nathan Johanning at the phone number or email address above.

## *In this issue…*



## *Upcoming Programs*

Check the **Illinois SARE calendar** for a full list of programs and links for registration.
http://illinoissare.org/ and http://illinoissare.org/calendar.php
Also see the **University of Illinois Extension Local Food Systems and Small Farms Team's website** at:
http://web.extension.illinois.edu/smallfarm/ and the calendar of events at
http://web.extension.illinois.edu/units/calendar.cfm?UnitID=629.

- **Spring Cover Crop Field Day, Thursday, April 7, 10:00 a.m.** Ewing Demonstration Center, 16132 N. Ewing Rd; Ewing, IL 62836. Anyone interested in learning more about cover crops is welcome to attend. Certified Crop Advisor CEUs will also be offered (SW – 1.5, CM – 0.5). Lunch will be provided so please call the Franklin County Extension Office at 618-439-3178 for more information and to register by Tuesday, April 5th. http://web.extension.illinois.edu/units/event.cfm?UnitID=629&EventID=71578
- **GAPs online webinar training series, Tuesdays, April 12 through May 3, 6:00 – 8:00 p.m.** Registered participants will be sent webinar instructions, handouts, and a GAPs manual prior to the first webinar. There will be a $25.00 fee per participant, and pre-registration along with pre-payment is required by April 7, 2016. Visit http://web.extension.illinois.edu/units/event.cfm?UnitID=629&EventID=71303 to register, or contact Laurie George at 618-548-1446 or ljgeorge@illinois.edu
- **Southwestern Illinois Commercial Tree Fruit Twilight Meeting, Wednesday, April 20, 2016, 5:30.** Tom Ringhausen Orchard, Batchtown, IL. For more information and to register visit https://web.extension.illinois.edu/registration/?RegistrationID=14272 or contact Ken Johnson at kjohnso@illinois.edu or 217-243-7424.
- **Southern Illinois Summer Twilight Series, 4 Monthly On-Farm Meetings on Mondays, May through August, 6:00 p.m.** For more information or details, contact Bronwyn Aly at 618-382-2662; baly@illinois.edu or Nathan Johanning at 618-687-1727; njohann@illinois.edu Save the dates, more details to follow:
    - **May 16** – All Seasons Farm, Cobden, IL

    - **June 20** – G & C Meyer Farm, near Steeleville, IL
    - **July 18** – Spring Valley Farm, Pulaski, IL
    - **Aug 8** – Grant's Orchard, near Johnston City, IL
- **2016 Illinois Commercial Tree Fruit Twilight Meeting, Thursday, May 19, 2016, 5:30 p.m.** Joe Ringhausen Apple Orchard & Apple House Market, 19770 US Hwy 67, Jerseyville, IL 62052. For more information and to register visit https://web.extension.illinois.edu/registration/?RegistrationID=14319 or contact Andrew Holsinger at 217-532-3941 or aholsing@illinois.edu.
- **ISHS Summer Horticulture Day, Thursday, June 9, 8:00 a.m.** Hosted by Raoul & Jodie Bergersen, Valley Orchard, 811 E State St, Cherry Valley, IL 61016. To register online visit https://www.picatic.com/ilhortday or contact Rachel Graham Coventry at 217-853-6048 or ilsthortsoc@gmail.com
- **Illinois Pumpkin Field Day, Wednesday, August 31.** Ewing Demonstration Center, 16132 N. Ewing Rd; Ewing, IL 62836. For more information, contact Nathan Johanning at 618-687-1727 or njohann@illinois.edu

## *Regional Reports*

From western Illinois … Unbelievable as it may be, our area really needs moisture. According to the Quincy Regional Airport, we've received 1.75" since the first of the year (average for this time is 6.15"). Dry soils are allowing any and all field work to be completed and many have done so. Many corn/soybean producers have ground worked and ready to plant, and some are doing so. Others are awaiting warmer soil temperatures.

Vegetable and fruit growers have been busy with tillage, fertilizer application, laying of plastic, planting of potatoes, onions, cole crops and greens. Transplants are growing for warm season plants for outdoor production, including tomato, pepper, eggplant, etc. Most growers have tomatoes planted in their high tunnels. Several planted a month or more ago, using some heat (wood usually) to protect from cold temperatures. Some growers are using row covers in the tunnel to protect from cool temperatures.

Plasticulture strawberries are at bud stage. The first fertigation has been complete, with beds needing the moisture. New leaves are still emerging on matted row strawberries. Pear trees have large buds, apples up to ½" green, peaches are bud to petal fall, grapes and blueberries have swollen buds. Blackberries are up to 1" green.

We've had some temperatures below freezing (I recorded a low of 26 degrees on March 26 as the first blooms were out) but we've not seen any injury to open blossoms on early peach. The forecast on Friday is for temperatures at 30 or lower, so we hope that we can escape without injury as the early peaches are now at petal fall in Quincy. The few carryover plasticulture strawberry blooms that are emerged have not survived thus far.

Talk is the early field corn that was planted over a month ago in Pike county has emerged. Several producers have been planting field corn for the past two weeks. As they say, you should keep seed in a cool and dry place, and the soil in this area fits that description. Soils are so dry that there are commercial corn fields that have been planted for two weeks but do not have enough soil moisture to allow for germination. A producer who planted his first sweet corn two weeks ago reports that there is a ½" long root that has emerged from the seed. But he also reports that the root is not growing downward, it's growing horizontally. Could this be due to cold?

*Mike Roegge (217-223-8380; roeggem@illinois.edu)*

From southwestern Illinois (St. Louis Metro East)… Stunning fields of purple blooming henbit are rapidly disappearing as field preparations move into high gear. Sweetcorn producers started plantings as early as March 16 and are ongoing, and though slow to germinate, early plantings have successfully germinated. Asparagus producers in the region started harvest around the 1st of April, with one grower reporting soil temperatures at first harvest at 50°F. Buds are swelling with some cultivars at budbreak. Blueberries are at bud break and summer-bearing raspberries and blackberries are well-leaved. Strawberries are vigorously growing, with many plants developing the odd early bloom—some even came out from under covers with blooms already. Apricots and peaches are mostly through bloom and into the stages of shuck split. Apples are anywhere from half-inch green to bloom and pears are at white bud to bloom. Cherries are in full bloom. This has been a very good spring planting season for tree plants and horseradish, and many growers have been quick to take advantage.

*Elizabeth Wahle (618-344-4230; wahle@illinois.edu)*

From southern Illinois ... It has been a typical spring rollercoaster for the weather conditions with some days in the 70s or close to 80 for high followed by cold fronts and temperatures multiple nights dropping in to the 30s. We have had some patchy frost a few nights and the coldest temperature I have seen recently was 33 degrees and that was one morning last week. We did get rain across the area last Wednesday into early Thursday morning; I have heard of totals from ¾" to 2" with the higher amounts to the south. Even with that, the winds have been such that things have dried very quickly. We have had multiple days that you could barely keep your hat on with 20-30+ mph winds. This has made timing spray applications very tricky. Fortunately, we have had a few calm mornings, but overall very windy.

Despite some cold mornings, I have not heard or seen any reports of significant injury to any of our blooming fruit crops. At home at the farm, in southern Monroe county, pears and peaches are done blooming, apples (Jonathan) were at pink, and tart cherries were in full bloom, 'Black Satin' blackberries had about 1 inch green while the 'Dirksen' were just breaking bud with about ¼" green. Of my blueberries, Duke, Earliblue, Blueray, and Bluegold were all on the brink of bloom. The soil worked up very well this past weekend when I planted potatoes and the first sweet corn planting; I know others in the region have pushed sweet corn planting more than a couple of weeks earlier. Overall peaches were loaded with fruit buds and some growers are out now doing additional pruning to help reduce the fruit load on the trees. Back at my office, we have just done the second harvest of asparagus from the variety and so far no signs of asparagus beetles yet. In the high tunnel carrot harvest has been on going with some greens left to harvest, however, aphids are ramped in the leaf lettuce, but very few if any in the spinach. Many growers have tomatoes and other warm season crops started in high tunnels.

*Nathan Johanning (618-687-1727; njohann@illinois.edu)*

## *News and Announcements*

***Best Wishes to Mike Roegge on his Retirement!***

If you have not heard, one of our loyal IFVN contributors, Mike Roegge, will be retiring on April 15th. Mike has been in various roles within Extension throughout his career over the last more than 36 years, going through many reorganizations and changes along the way. We will miss his reports and advice "From western Illinois…" as he has been a dedicated contributor since the time he joined Local Food Systems & Small Farms Educator Team at its creation back in 2011. We still might hear from Mike from time to time in the newsletter but not as much as in the past. We wish you the best and Happy Retirement! Thank you, Mike, for all of your contributions to the Illinois Fruit and Vegetable News and for the grower of the Midwest!

*Nathan & Bronwyn*

***Midwest Vegetable and Fruit Spray Guides Available***

Extra Midwest Fruit and Vegetable Production Guides are still available for purchase for those in need of a hard copy.

For copies of the ***2016 Midwest Fruit Pest Management Guide*** (note this is a combined guide replacing the separate Small Fruit Spray Guide and Tree Fruit Spray Guide from past years.) Contact Laurie George's office (618-242-0780, ljgeorge@illinois.edu) or Elizabeth Wahle's office (618-344-4230, wahle@illinois.edu)

Elizabeth Wahle's office also has copies of the ***2016 Midwest Vegetable Production Guide for Commercial Growers*** available for sale. **Each guide sells for $15.00 delivered within the continental US.**

For those that want to refer to these guides online both can be found as PDFs at the links below:

2016 Midwest Vegetable Production Guide for Commercial Growers
2016 Midwest Fruit Pest Management Guide

*Elizabeth Wahle (618-344-4230; wahle@illinois.edu)*

***Federal Funds Available For Illinois Specialty Crop Projects: Applications due May 13***

The Illinois Department of Agriculture (IDOA) is now accepting proposals for federal specialty crop grants. The agency has been notified Illinois will receive more than $520,000 and instructed to begin the proposal selection process. "This year the United States Department of Agriculture is encouraging projects that benefit underserved communities and veterans, improving producer capacity with the requirements of the Food Safety Modernization Act, developing adaptation and mitigation strategies for farmers in drought-stricken regions, increasing opportunities for new and beginning farmers, developing strong local and regional food systems, protecting pollinator habitats and improving pollinator health, to name a few," said Acting Director Raymond Poe. "These funds may lead to projects that help feed communities, encourage more participation in agriculture, or increase a farmer's profitability and productivity." The funds will come from the Specialty Crop Block Grant Program in the Farm Bill. They are available for projects beginning in calendar year 2017, and are intended to expand the availability of fresh, locally-grown produce and strengthen the competitiveness of our specialty crop industry.

Projects that benefit a particular commercial product or provide a profit to a single organization, institution or individual are ineligible. Farmers' markets, roadside stands and community-sponsored agriculture programs should consider submitting proposals to the USDA's Farmers' Market and Local Food Promotion Program. The USDA's Agricultural Marketing Service defines specialty crops as "fruits, vegetables, tree nuts, dried fruits and horticulture and nursery crops (including floriculture)."

According to the 2012 Census of Agriculture, more than 106,000 acres of Illinois farmland are devoted to growing specialty crops on more than 3,200 farms. Illinois is the nation's leading producer of pumpkins and horseradish, and ranks in the top ten in acreage of cantaloupes, green peas, lima beans, and sweet corn. Illinois also is home to a flourishing grape and wine market, with 450 growers utilizing 1,197 acres of Illinois farmland to support the over 100 wineries in the state. Sales of all specialty crops in Illinois, including nursery and greenhouse sales, totaled almost $470 million in 2012.

The IDOA will accept grant proposals until May 13, 2016, at 4 p.m. Request for proposal packets and additional information about the program can be found online at the department's website at www.agr.state.il.us. For more information call (217) 524-9129.

- *Illinois Department of Agriculture*

## *Vegetable Production & Pest Management*

***Early-Season Insect Management***

Seed and root maggots: This is the time of year I usually provide an update on seed and root maggots in vegetable crops … see the March 6, 2014, issue at https://ipm.illinois.edu/ifvn/contents.php?id=39. Last month Rick Foster of Purdue University provided a similar update in the March 14, 2016, issue of Purdue's Vegetable Crops Hotline at https://vegcropshotline.org/article/seed-and-root-maggots-2/. Instead of repeating these articles here, I'll remind you that cabbage maggot, seedcorn maggot, and onion maggot are perennial pests of vegetable crops, and especially during cool, wet springs. Be sure to check the links just listed for background information and updates.

Neonicotinoids in Cucurbits: At several of this winter's conferences I discussed insect control in cucurbits and the use of neonicotinoids (Farmore seed treatment and soil drenches using imidacloprid or thiamethoxam). I stressed that seed treatments "play out" 2 to 3 weeks after seedling emergence, and I recommended against any applications of imidacloprid (Admire Pro and many generics), thiamethoxam (Platinum and Actara), or other systemic neonicotinoids later than as a transplant drench because of risk to pollinators. Rick Foster's article on this topic in the March 14, 2016, issue of Purdue's Vegetable Crops Hotline addresses the same topic. See https://vegcropshotline.org/article/neonicotinoid-seed-treatment-on-cucurbits/.

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

***Managing Soil Fertility in Vegetable Production – Phosphorus & Potassium***

Last fall I wrote an article about soil testing and now as the season gets off to a start here are a few thoughts on how to help put those results to work.

Ideally for vegetable crops I recommend to growers that we want to maintain at least a Phosphorus (P) test of 50 lbs/A and Potassium (K) test of 300 lbs/A. (*Note if your soil lab reports values in parts per million (ppm) ppm x 2 = lbs/A)* Now every soil varies and reacts differently, but these are some good baseline levels that we should try to maintain. If you are below those values research has shown that generally it takes 9 lbs of $P_2O_5$ to raise the P by 1 lb/A; it takes 4 lbs $K_2O$ to raise your K by 1 lb/A. So if you are below the levels listed above, you can figure the difference to "build up" the soil and then multiply by the pounds it takes to change you test value to get an estimation of how much of that given nutrient you will need. Then account for the specific fertilizer source and percent of that nutrient present. Typically, we would divide up any build up applications over 2 or 4 years. See the example below.

*Soil test results P 24 lbs/A – Goal 50 lbs/A*

- *50 - 24 = 26 lbs to Buildup*
- *9 lbs $P_2O_5$/A * 26 lbs = 234 lbs $P_2O_5$/A to achieve the goal*
- *234 lbs $P_2O_5$/A = 509 lbs 0-46-0/A / 4 years = 127 lbs 0-46-0/A/year*

From there we need to consider fertilizing for our annual crop removal to maintain our test values. The best resource I have found to help with this is the University of Kentucky – Vegetable Production Guide http://www2.ca.uky.edu/agc/pubs/id/id36/id36.pdf . This publication has charts and recommendations for P & K applications based off of your soil test values for most all of your vegetable crops, and it is an excellent reference for nutrient recommendations including nitrogen as well.

Note also that excessive nutrient levels can also be an issue in some fields that have had many applications of nutrients in excess of what our crop uses and also areas that have been fertilized with manure. If you have P test of above 80-100 lbs/A and K test of above 400 lbs/A you should consider limiting the additions of these nutrients. With excessive levels nutrient imbalance and toxicity can occur and there is no good way to remove the nutrients once applied except by harvest and crop removal. The guide from Kentucky does a good job of helping determine when to make applications when soil tests are high. Overall, every soil is going to react differently and we need to couple these tools with soil sampling every 2-4 years to monitor the changes in our soil test levels and modify our management from there.

*Nathan Johanning (618-687-1727; njohann@illinois.edu)*

## *Fruit Production & Pest Management*

***Post-Bloom Insect Management in Apples and Peaches***

I'm writing this on Sunday, April 3, and at Willard Airport near Champaign this morning the temperature was 24 degrees F for a short period around 5:00 a.m. Although overnight lows at the University of Illinois research orchard at Urbana a few miles away usually are 2-3 degrees warmer than they are at the airport, this morning's official low is definitely a concern. Peaches here are beginning to bloom, with most buds still at pink, and apples are at tight cluster, hovering at pink (not quite there yet). Our standard references estimate that for peaches at pink, a low temperature of 25 F generally results in 10 percent flower bud kill and a low of 18 F results in 90 percent kill. At bloom in peaches, the 10 percent and 90 percent kill temperatures are 27 F and 24 F, respectively. Similarly, for apples at tight cluster, a low temperature of 27 F results in 10 percent flower bud kill and a low of 21 F results in 90 percent kill. Lows near critical temps also are forecast for early in the morning on Tuesday, April 5. Over the next few days we'll see how differences in temperatures at specific locations impact flower bud survival. I suspect that we will see some partial reduction in viable bloom but not total loss, but only time will tell.

Let's move on to protecting the fruit crops that likely will be present in many orchards.

**In peaches**, the insects that usually cause significant damage to fruits shortly after bloom are plum curculio, stink bugs (including the new invasive brown marmorated stink bug), and plant bugs. Adults of all of these insects overwinter in vegetative cover (especially adjacent woods) and move into orchards shortly before, during, and immediately after bloom. Although traps are available for monitoring these insects, the more common method for detecting them is to use limb tapping. For all of you who don't have the special (weird) tools of an entomologist, use the upside-down lid of a medium to large Styrofoam cooler and a 12- to 15-inch length of garden hose (or anything else that's rigid but "soft" enough not to do too much damage to branches when you tap them with it). Hold the lid under a branch, tap the branch enough to jar it with the hose, and look for curculios, stink bugs, and plant bugs that drop onto the lid. Repeat this at least 30-50 times, primarily on trees at or near the edge of each block of trees. Plum curculios will curl up and play dead and look a lot like a bud or a bird dropping, so be careful to look closely at everything on the lid. There are no established thresholds for what constitutes enough of these pests in limb-tap samples to warrant a spray, but if I find them in more than 5 or 10 percent of the samples, I apply an insecticide to avoid excessive fruit damage.

Insecticides labeled for control of these insects in peaches are listed on pages 48 and 50 of the ***2016 Midwest Fruit Pest Management Guide***, and a table that summarizes the effectiveness of common insecticides against key pests of peaches is included on pages 55-56. In general, insecticides that are good to excellent against plum curculio, stink bugs, and plant bugs and can be used at petal fall through shuck split include the neonicotinoid Belay and the many pyrethroids labeled for use on peaches (Asana, Baythroid/Renounce, Danitol, Mustang Maxx, Pounce, Proaxis, and Warrior. Where plum curculio is the only target of petal fall and shuck-split insecticides, Imidan, Assail, Calypso, Avaunt, and Exirel are effective. None of the OMRI-listed insecticides are highly effective against these insects, but the best available choice for organic growers is probably Azera (or a tank-mix of neem and a pyrethrin such as Pyganic).

First generation oriental fruit moth (OFM) flight has been underway for a few days in southern Illinois and probably is just starting in most of central Illinois. Although OFM is a serious pest later in the season, we rarely target first generation OFM with insecticides in peaches here because first-generation larval feeding is limited to shoots, not fruit. See the table on pages 55-56 of the ***2016 Midwest Fruit Pest Management Guide*** to compare the effectiveness of various insecticides against OFM.

**In apples**, the same pests listed above are the ones that damage fruits immediately after petal fall, with plum curculio usually (but not always) more damaging than stink bugs or plant bugs. Use the same sampling methods listed above, beginning at petal fall. Wait to apply any insecticides until honey bee hives have been removed from the orchard and wild bees are no longer present on late blooms. (In other words, don't apply petal-fall insecticides until risk of bee kill has passed.) Insecticides labeled for plum curculio, stink bug, and plant bug control in apples are listed on pages 17 and 19 of the ***2016 Midwest Fruit Pest Management Guide***, and a summary of the effectiveness of labeled insecticides against major pests of apples is presented on page 32. I recommend against using pyrethroids in apples because they trigger outbreaks of European red mite, so the insecticides of choice for plum curculio control in apples are Imidan, Avaunt, Assail, Calypso, and Exirel. Two neonicotinoids – Actara and Belay – are effective against plum curculio and stink bugs and plant bugs, but they are extremely toxic to bees and should not be used if late bloom is still bringing bees to apples or if blooming weeds are present in the orchard.

Codling moth flight has not yet started in central Illinois, and with the current medium-range forecast, I doubt we will catch moths until about 2 weeks from now or a little later. The key to controlling this insect is to base sprays on captures of moths in pheromone traps and the accumulation of degree-days after catches begin. In the February 17, 2016, issue of this newsletter, I described where to get traps for this and other key insects, how many to use, where to place them, etc. Traps should be in place by the time apples bloom, and you should check them twice weekly and keep a record of your counts (including zeroes). The first date that traps consistently capture moths is termed the "biofix" (it will be the day you first start counting degree-days to determine when to spray.) So what does "consistently capture moths" mean? If you use 3 traps and only one trap catches one codling moth on April 15, and then none of the traps catch another moth until April 25 (even though you checked them on April 18, April 22, and April 25), ignore the first capture. On April 25 the counts in the three traps are 3, 4, and 0; then on April 29 the counts are 4, 0, and 5 … so the biofix date is April 25 – the date when captures started and then continued. (Some might be a bit more conservative and set the biofix date as April 23 or 24 since traps were not checked on those dates but moths were present by the 25th … this is probably more nuanced than necessary.) If you start counting degree-days on the biofix date, use the table on page 29 of the ***2016 Midwest Fruit Pest Management Guide*** to determine when a specific insecticide should be used. Of the products listed on page 29, Rimon, Altacor, Assail, Calypso, Delegate, and Exirel are the best choices for Illinois growers targeting codling moth control in apples.

For degree-day data for a location near you (not as good as weather data from your own site, but still useful), use the Degree-Day Calculator (http://www.isws.illinois.edu/warm/pestdata/sqlchoose1.asp?plc=) on the Illinois State Water Survey website. Select the nearest location to you on the map and "codling moth" from the list on the left, then click "Calculate." On the next page (http://www.isws.illinois.edu/warm/pestdata/sqlcalc1.asp?plc= for Champaign), enter the biofix date and click "Submit." The resulting webpage will provide current codling moth degree-day accumulations since the biofix and projections for 1 and 2 weeks into the future. I'll provide updates on CM degree-day accumulations and what those degree-day totals mean in terms of codling moth development over the next several weeks.

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

***Notes on Elderberry Production***

For those interested in Elderberry production, you may find research coming out of University of Missouri Extension to be of interest: http://extension.missouri.edu/greene/ElderberryDevelopmentProject.aspx. One thing this author found of particular interest was their work on the response of American elderberries to various pruning methods. Specifically, researchers found that if American elderberries were annually pruned to the ground, shoots will readily arise from the crown or root system. These shoots are typically unbranched and produce a single large cyme at the tip, which results in cyme production at a uniform height. Researchers also found that harvest is concentrated over a 2-3 week period rather than the 3-4 week diffuse harvest associated with selective annual pruning.

*Elizabeth Wahle (618-344-4230; wahle@illinois.edu)*

## ***Critical Temperatures for Various Fruits***

The temperature at which fruit buds are injured depends primarily on their stage of development. As flowers begin to swell and expand into blossoms, they become less resistant to freeze injury.

Examples of stages of fruit bud development: top left - apple tight cluster; top right - apple pre-bloom; lower left - sweet cherry first white; lower right - peach pink.

Not all blossoms on a tree are equally tender. Resistance to freeze injury varies within trees as it does between orchards, cultivars, and crops. Buds that develop slowly tend to be more resistant. As a result, some buds are usually killed at higher temperatures, while others are resistant at much lower temperatures.

The table below shows the average temperatures required to kill 10 percent and 90 percent of buds if they are exposed for 30 minutes. Consideration should also be given to weather conditions preceding cold nights. Prolonged cool weather tends to increase bud hardiness during the early stages of bud development.

| Stage of Development | 10% kill (°F) | 90% kill (°F) |
|---|---|---|
| **Apples**[a] | | |
| Silver tip | 15 | 2 |
| Green tip | 18 | 10 |
| ½-inch green | 23 | 15 |
| Tight cluster | 27 | 21 |
| First pink | 28 | 24 |
| Full pink | 28 | 25 |
| First bloom | 28 | 25 |
| Full bloom | 28 | 25 |
| Post bloom | 28 | 25 |
| **Peaches** | | |
| First swelling | 18 | 1 |
| Calyx green | 21 | 5 |
| Calyx red | 23 | 9 |
| First pink | 25 | 15 |
| First bloom | 26 | 21 |
| Full bloom | 27 | 24 |
| Post bloom | 28 | 25 |
| **Pears**[b] | | |
| Scales separating | 15 | 0 |
| Blossom buds exposed | 20 | 6 |
| Tight cluster | 24 | 15 |
| First white | 25 | 19 |
| Full white | 26 | 22 |
| First bloom | 27 | 23 |
| Full bloom | 28 | 24 |
| Post bloom | 28 | 24 |

| Stage of Development | 10% kill (°F) | 90% kill (°F) |
|---|---|---|
| **Sweet cherries** | | |
| First swelling | 17 | 5 |
| Side green | 22 | 9 |
| Green tip | 25 | 14 |
| Tight cluster | 26 | 17 |
| Open cluster | 27 | 21 |
| First white | 27 | 24 |
| First bloom | 28 | 25 |
| Full bloom | 28 | 25 |
| Post bloom | 28 | 25 |
| **Apricots** | | |
| First swelling | 15 | - |
| Tip separates | 20 | 0 |
| Red calyx | 22 | 9 |
| First white | 24 | 14 |
| First bloom | 25 | 19 |
| Full bloom | 27 | 22 |
| In the shuck | 27 | 24 |
| Green fruit | 28 | 25 |

*Adapted from 1989 Spray Guide for Tree Fruits in Eastern Washington. Bulletin EBO419. E. H. Beers, coordinator.*

[a] For Red Delicious. Golden Delicious and Winesap are approximately 1 degree hardier. Rome Beauty is 2 degrees hardier, except after petal fall when all cultivars are equally tender.
[b] For Bartlett. D'Anjou is similar but may bloom earlier and therefore may be more tender than Bartlett at the same date.

Source: Penn State Tree Fruit Production Guide. (Updated January 2016).

(*Robert Crassweller, Professor of Tree Fruit, Penn State, (814-863-6163; rmc7@psu.edu )*

## *Food Safety Updates*

**Produce Safety Rule: BIOLOGICAL SOIL AMENDMENTS – article 5 of 7**
The FDA definition of soil amendment is:

*"A material, including manure, which is intentionally added to the soil to improve its chemical or physical condition for growing plants or to improve its capacity to hold water"*

**RAW MANURE:** A biological soil amendment of animal origin is considered **untreated** if it has become contaminated after treatment, has been recombined with an untreated biological soil amendment of animal origin, is or contains a component of untreated waste that you have reason to believe is contaminated, or is an agricultural tea that contains an agricultural tea additive.

The FDA is conducting a risk assessment and extensive research on the number of days needed between the applications of raw manure as a soil amendment, and harvesting to minimize the risk of contamination. They anticipate that these efforts will take 5 – 10 years to complete.

At this time, the FDA does not object to farmers complying with the USDA's National Organic Program Standards, which state there:

- Must be a 120-day interval between the application of raw manure for crops that come in contact with the soil
- Must be a 90-day interval between the application of raw manure for crops that do not come in contact with the soil.

The final rule requires that untreated biological soil amendments of animal origin, such as raw manure, must be applied in a manner that does not contact covered produce during the application process, and minimizes the potential for contact with covered produce after application (ie: incorporation into the soil).

**STABILIZED COMPOST:** A biological soil amendment of animal origin is considered **treated** if it has been processed to completion, adequately reducing microorganisms of public health significance. The rule includes two examples of scientifically valid composting methods that meet those standards. Stabilized compost prepared using either of these methods must be applied in a manner that minimizes the potential for contact with produce during and after application. The processes include:

- A scientifically valid controlled physical process (e.g. thermal - heat), chemical process (e.g. high alkaline pH), or combination of scientifically valid controlled physical and chemical processes that has been demonstrated to satisfy the microbial standard for *Listeria monocytogenes* (ie: not detected using a method that can detect one colony forming unit (CFU) per 5 gram portion), *Salmonella* species (ie: less than three post probable numbers (MPN) per 4 grams of total solids (dry weight basis), and *E. coli* O157:H7 (ie: less than 0.3 MPN per 1 gram analytical portion).
- A scientifically valid controlled physical process, chemical process, or combination of scientifically valid controlled physical and chemical processes, that has been demonstrated to satisfy the microbial standard for *Salmonella* and fecal coliforms (less than three MPN Salmonella species per four grams of total solids (dry weight basis), and less than 1,000 MPN fecal coliforms per gram of total solids (dry weight basis)).

Scientifically valid controlled composting processes include:

1) Static composting that maintains aerobic (i.e., oxygenated) conditions at a minimum of 131°F (55 °C) for 3 days and is followed by adequate curing, which includes proper insulation;
2) Turned composting that maintains aerobic conditions at a minimum of 131°F (55 °C) for 15 days, with a minimum of five turnings, and is followed by adequate curing, which includes proper insulation; or
3) You may establish alternatives to the requirements provided you satisfy the set requirements listed above, including that the alternative process has been demonstrated to satisfy the established microbial standards.

**QUESTIONS/COMMENTS:**
The Food and Drug Administration has established a Food Safety Technical Assistance Network to provide a central source of information to support industry understanding and implementation:

**http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm459719.htm**

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## *Less seriously…*

Taken from the Top 100: Funny Quotes and One-Liners

"Knowledge is knowing a tomato is a fruit; Wisdom is not putting it in a fruit salad." – *Brian Gerald O'Driscoll*

"When I was a boy of fourteen, my father was so ignorant I could hardly stand to have the old man around. But when I got to be twenty-one, I was astonished at how much he had learned in seven years." – *Mark Twain*

"The quickest way to double your money is to fold it over and put it back in your pocket." – *Will Rogers*

"Politicians and diapers have one thing in common. They should both be changed regularly, and for the same reason." – *José Maria de Eça de Queiroz*

"By working faithfully eight hours a day you may eventually get to be boss and work twelve hours a day." – *Robert Frost*

"Hospitality: making your guests feel like they're at home, even if you wish they were." – *Unknown*

"Why didn't Noah swat those two mosquitoes?" – *Unknown*

"America is a country where half of the money is spent buying food, and the other half is spent trying to lose weight." – *Unknown*

"Duct tape is like the force. It has a light side, a dark side, and it holds the universe together." – *Oprah Winfrey*

"Life's disappointments are harder to take when you don't know any swear words." – *Unknown*

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