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Crop conditions: Many growers are experiencing a good peach season, which is now winding to a close. Early apples are looking good, but earlier frequent rain has resulted in more scab than we normally see.

Correction on HACCP Regulations: I regret there was an error in a recent article in FFF I wrote on HACCP regulations for cider. I incorrectly stated that if you sold your cider at a farmers' market, you could not claim the retail exemption. This is not correct. The retail exemption applies as long as you sell your cider directly to the consumer. This could be at your own market, at a farmers' market or even over the Internet. Useful questions and answers on aspects of the HACCP regulation and who is covered have been prepared by the FDA and is available at their website:

(<http://vm.cfsan.fda.gov/~comm/juiceqa.html>) I have also added a link from the Purdue Fruit and Vegetable Connection webpage: (<http://www.hort.purdue.edu/fruitveg/>) (Hirst)

Using Ozone to reduce pathogens in apple cider: The FDA has recently issued recommendations and guidance regarding the use of ozone for pathogen reduction in apple cider. This is NOT a change in the apple cider regulations, but is intended to advise, and provide recommendations to cider producers. This guidance document from the FDA was prompted by an outbreak of food borne illness

last fall in Ohio, where 148 people became sick. Contaminated apple cider was implicated as the cause of this outbreak. The cider in question had been treated with ozone. "Ozone is approved as a food additive that may be safely used as an antimicrobial agent in the treatment, storage, and processing of certain foods" states the FDA document. Apple cider is one of these foods. This means that it is safe to use, but does not imply that it will achieve the 5-log reduction of pathogens as required by the HACCP regulation. In fact, the FDA goes on to say "However, at this time, FDA is not aware of any published scientific study that establishes conditions for ozonating apple juice to achieve a 5-log pathogen reduction for any pathogen. Therefore, we are advising all processors using (or considering using) ozone for treating apple juice or apple cider to be certain that they comply with the pathogen reduction provisions of the regulation that applies to them, including validation of their process, or implement another means of processing their juice." A link to the FDA document is on the Purdue Fruit and Vegetable Connection webpage, (<http://www.hort.purdue.edu/fruitveg/>) (Hirst)

Timing Retain Sprays: ReTain (AVG) is a plant growth regulator that blocks the production of ethylene. When ReTain is applied to apple, several ripening processes are slowed, including preharvest drop, fruit flesh softening, starch disappearance, and red color formation.

In order for ReTain to be effective it must be applied well in advance of the climacteric rise in ethylene production that signals the onset of fruit maturity. If applied too early the effects may wear off prematurely. If applied too late, a significant portion of the crop may not be responsive to AVG, having already begun to produce autocatalytic ethylene. A second reason for avoiding late applications of ReTain is the 21 day preharvest interval (PHI), which, combined with a late spray date could result in an undesirable delay in harvest.

The label recommends applying ReTain four weeks before anticipated harvest (WBH). This has sometimes caused confusion, as the grower is timing the spray relative to some future, unknown date. A more scientific basis for timing would be to state that ReTain should be applied four weeks before the natural climacteric rise in fruit ethylene, but this is still a future event with an element of uncertainty. The good news is that there is a fairly wide window when ReTain can be applied with optimal results, and a fairly easy way to determine when to apply it.

The best application window for ReTain is about 10 days wide and centered on the 4 WBH date. For early season varieties, such as Gala and McIntosh, start by estimating when you would normally expect to begin harvesting the variety if no ReTain or Ethephon (Ethrel, Ethephon II) were used. Now take into consideration the season. For example, the 2004 bloom date, the ripening pattern of cherries, peaches, and summer apple varieties all suggest that this season is about 10 days earlier than normal in PA. Adjust the anticipated harvest date according to how early or late you estimate the season is, and then count back four weeks on the calendar. Now mark the calendar from that date through the next seven days. This is your application window for that early season variety.

Watch for good spray conditions with at least six hours drying time within that week and apply the material at the first opportunity. Congratulations! Your ReTain is on at the right time.

Now mark your calendar for 21 days after the spray was applied. This is the PHI, as required by the label. You can't legally harvest before this date.

Repeat the same thought process for later varieties, but keep in mind that later varieties are usually less affected by seasonal variation in maturity than stone fruits or early apple varieties. It is usually unnecessary to account for seasonal variation in fruit maturity for Empire and later varieties. See the August issue of Pennsylvania Fruit News for a more in-depth paper on using NAA and ReTain as stop-drops. (from Dr. Jim Schupp in The Fruit Times, Pennsylvania State University)

Disease Management: Wet conditions result in high disease pressure from apple scab, sooty blotch, summer rots, flyspeck, brown rot of peach, plum and cherry, strawberry leaf spot, grape black rot and the list goes on. Under such conditions sprays need to be applied on a tight schedule as long as wet weather prevails. However, as we move into drier summer months the disease pressure lessens and protectant sprays do not need to be applied on such a tight schedule. BUT, this does NOT mean you can stop applying fungicides altogether OR stretch the interval between sprays to 4 or more weeks. Remember that most fungicides are protectant, not curative, and need to be in place before infection occurs, not after. This means applying fungicides before it rains, not after. By all means, if dry conditions persist in your area, use the longest interval between sprays as recommended on the label, but for dependable disease control, maintain a regular fungicide spray program up to the preharvest restriction date. (Pecknold)

Black Rot and White Rot: Branches which show bright yellow leaves that eventually turn brown and die are likely candidates for having black rot or white rot cankers. All such yellow "flags" should be pruned out completely several inches below any signs of obvious

cankering or discolored wood as soon as they appear. Removing dead wood, mummies and cankers from the trees is critical in the management of these diseases. Current-season prunings should be removed from the orchard or chopped with a flail mower. Prunings piled on the orchard perimeter (let alone within the orchard!!) can serve as important disease sources...both this year and next! Act now to get rid of such sources. (Pecknold)

Grape Harvest: Grape harvest is getting started in the southern part of the state. Fruit quality is the most important factor determining the quality of wine made from grapes. Fruit quality is comprised of several factors of which the most important are sugars, acids, and pH. Other important factors are phenolics and anthocyanins, volatile terpenes, and other flavor and aroma compounds. Freedom from rots is also an important consideration. Unlike some other fruits, grapes do not continue to ripen after harvest. Consequently, it is extremely important to harvest grapes at the peak of quality and with the desired parameters for the intended use.

With winegrapes, all fruit of a given cultivar is usually harvested from the vineyard or block at a single time to coordinate winery activity and to reduce costs. The fruit is bulked together for processing and eventually all the juice may be blended into a single tank. It is important to carefully plan the harvest date to coincide with the optimum fruit quality from the entire vineyard. Most vineyards have some degree of variability in aspects such as soil type and drainage, sunlight exposure, wind, insect and disease pest, nutritional status, etc. These variations can have a significant effect on fruit ripeness on specific vines. In addition to variations between different parts of the vineyard, fruit from adjacent vines can vary, as well as fruit from different parts of the same vine. These differences are caused by differences in crop load (pounds of fruit/vine size), primary versus secondary clusters, degree of sun exposure, vine vigor, and so on. Much of that variability can be reduced with proper vineyard management.

In order to estimate the juice parameters on the entire crop after harvest and processing, growers must accurately sample the vineyard. On a small, well-managed vineyard block with minimal variability, a sample of 100-200 berries might give a good estimation. However, on a larger vineyard with considerable variability in fruit maturity, it may take a much larger sample to accurately estimate the final juice chemistry. Growers should make every effort to accurately estimate fruit maturity before harvest begins. A workshop is planned for September 16 (see notice below) to discuss this topic. (Bordelon)

Strawberry Fruit Bud Development: Now is the time to fertilize strawberries fields with 20 to 50 pounds of nitrogen. Applications in mid August to September stimulate flower bud initiation during the fall months. Rates depend upon amount of nitrogen supplied at renovation and plant vigor. New fields with high vigor may not need additional nitrogen now, but older fields should benefit. Irrigation during this time is also extremely important, if rainfall has not been sufficient. We suggest about 1 inch per week. (Bordelon)

Fall Herbicide Applications for Strawberries: A number of herbicides can be used on strawberries during late summer and fall to prevent weed germination, kill emerged weeds, and provide residue control until the following spring. The key set of weeds you need to control during this period are fall germinating winter annuals such as chickweed and shepherds purse. You may also need to control wheat, oats, or rye that come from seed in the straw mulch that you apply for winter protection.

Devrinol (napropamide) is a preemergence herbicide. It can inhibit rooting of daughter plants so it should be applied after early forming daughter plants have rooted. Late forming (after late August) daughter plants do not contribute to yield and Devrinol can be applied before these plants root. Devrinol must be applied before winter annuals and small grains emerge. Devrinol provides excellent control of small grains and some winter annuals such as chickweed. Devrinol must be moved into the soil by cultivation or water after application.

Dacthal (DCPA) is a preemergent herbicide that can be used in new plantings or immediately after renovation. It provides good control of many grasses and some broad leaves such as purslane and lambsquarter. Like Devrinol, it must be applied before weeds emerge.

Sinbar (terbacil) is primarily a preemergent herbicide but it has some postemergence activity against small susceptible weeds. Fall applications of Sinbar should only be applied after the strawberries are completely dominant. If Sinbar is applied to actively growing strawberries, injury can occur. Cultivars differ in tolerance to Sinbar. In general, less vigorous cultivars have greater injury. Applications are most effective when applied to the soil and activated by rainfall or irrigation. Sinbar provides excellent control of many winter annual weeds. Fall applications of both Devrinol and Sinbar will persist to the following spring.

Poast (sethoxydim) is a postemergent, grass specific herbicide. The grasses must be actively growing. Thus Poast should be applied in late summer or early fall before plants become dormant. Summer annual grasses, such as foxtails and crabgrass, will be killed by fall frosts, and do not require Poast applications for control. Poast is more effective against annual than perennial grasses. Poast can be used in the fall to suppress perennial grasses such as quackgrass, control early emerging small grains, and kill winter annual grasses such as wild oats and downy brome.

A systemic, postemergence broadleaf herbicide, 2,4-D amine can be applied when strawberries are dormant to control some winter annuals. 2,4-D provides good control of many mustards and shepherdspurse, but is not very effective against chickweed. The herbicide should be applied to actively growing weeds. Be careful of 2,4-D drift causing injury to non-target plants. Check the label as only a few formulations are labeled for strawberries.

Gramoxone Extra (paraquat) can be applied as a directed spray between strawberry rows, using shields to prevent contact with strawberry plants. Gramoxone is a nonselective herbicide, so it will kill or severely injure

strawberries it contacts. Gramoxone is a restricted use pesticide and is extremely toxic to animals including humans. It provides excellent control of annual grass and broadleaf weeds. Gramoxone does not extensively translocate in plants so it does not control perennial weeds. Weeds should be actively growing when Gramoxone is applied.

In conclusion there are a number of herbicide options that can be used on strawberries during the fall. Select herbicides that will control problem winter annuals and small grains. Herbicides such as Devrinol and Sinbar can provide residue weed control until spring. (Bordelon)

Perennial Weed Control: Late summer and fall is an excellent time to control troublesome perennial weeds by spot spraying with suitable herbicides. Perennial weeds tend to become established within the rows in fruit plantings because they are not fully controlled by the normal weed management program. Once established, these plants can be difficult to eliminate. Glyphosate (e.g. Roundup) is a particularly good herbicide for controlling perennial weeds in the fall. As perennial plants begin to slow growth and harden off for winter, carbohydrates are translocated to the roots for storage. Fall applied systemic herbicides will be similarly transported to the root system which leads to excellent control. Fall application works equally well on hard to control herbaceous perennial weeds such as thistle, dock, smartweed, and morning glory, as well as woody perennials such as poison ivy, Virginia creeper, multiflora rose, mulberry, blackberry and so on. The plants do not have to be actively growing for good results but should have sufficient active leaf area to take up the herbicide. Check the manufacturer's product label for specific recommendations. NOTE: Desirable crop plants are also translocating carbohydrates to the roots and can be severely injured by fall applied systemic herbicides. Be EXTREMELY CAREFUL when spot treating to avoid any contact with desirable plants. (Bordelon)

2002 Census of Agriculture is available: The National Agricultural Statistics Service (a division of the USDA) has just released the 2002 Census of Agriculture. Since the last census in 1997, the number of farms in Indiana has dropped by 10% to 60,296, although the average size of a farm was up from 233 acres in 1997 to 250 acres in 2002. The total value of production was down 10% at just under \$4.8 B, although the value of production per farm was about the same (\$79,300). Government payments were up 42%, and the average of those receiving payments was \$8300. For more information, the census is available at: (<http://www.nass.usda.gov/census/census02/profiles/in/>) (Hirst)

Twilight meeting at Purdue: Current research on apples, grapes and pumpkins will be demonstrated at a twilight meeting at the Meigs horticulture research farm on September 16. On display will be:

- Twenty new apple varieties. See and taste how they perform under Indiana conditions. Also see dwarf apple tree pruning and training.
- See over 50 grape varieties, training system research, and herbicide injury symptoms.
- See over twenty jack-o-lantern pumpkin varieties. Discuss pumpkin production with Purdue vegetable specialists.



Driving Directions: Take US 231S from Lafayette and turn east (left) onto 800S. Travel one mile then turn south (right) on 100E. Meigs farm is 1/2 mile on the left.

Grape and Wine Fall Workshop: We have scheduled a fall workshop September 16 for grape growers and wine makers that will focus on vineyard sampling and fruit processing. The workshop will be held on the Purdue campus in West Lafayette. For more information visit our web site at <http://www.indianawines.org> and click on Events or call Jill Blume at 765-494-1749. Registration is required and space is limited. (Bordelon)

Upcoming Meetings:

Sept. 16, 2004 Grape and Wine Workshop on Harvest Parameters. Purdue campus. For more information visit our web site at <http://www.indianawines.org> and click on Events or call Jill Blume at 765-494-1749.

Sept. 16, 2004 Commercial fruit and vegetable twilight meeting. Throckmorton Purdue Ag Center, Lafayette. Tours will highlight pumpkin, apple and grape research. Meet at 5 pm, tour plots, and then have dinner. There will be informal presentations by Purdue Specialists. For more information contact Liz Maynard (219-785-5673), Peter Hirst, (765-494-1323), or Bruce Bordelon (765-494-8212).

Sept. 18, 2004 Throckmorton Purdue Ag Center Field Day to showcase research activities to the local farmers, the public, and anyone else interested. Details to be announced. Contact Jay Young, 765-538-3422.

Sept. 27-29, 2004 HACCP training course. West Lafayette, IN. Cost \$300. For more information contact Peter Hirst (765-494-1323) or Richard Linton (765-494-6481).

Jan. 24-26, 2005 Indiana Horticultural Congress, Adams Mark Hotel, airport, Indianapolis.

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