



# Kentucky Fruit Facts

Research & Education Center

P.O. Box 469, Princeton, KY 42445

May 1999 (5-99)

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Our web site is: <http://www.uky.edu/Agriculture/HLA/extension.htm>

## Fruit Situation

It looks like we are going to have a bumper crop on all of our fruit plantings in the state this year. Thinning will be a critical factor for grower success with apples, pears, peaches, and plums.

We had two excellent cider treatment equipment demonstrations that answered many questions for growers. Bill Jackson hosted the demonstration of the CiderSure Model 3500 UV treatment equipment on April 28 and Joe Garrett hosted the demonstration of Goodnature's MFP Series Micro Flash Pasteurizer on April 30. Both of these pieces of equipment provide a 5-log kill on *E. coli* and greatly extend cider storage life. The KSHS is proceeding in selecting growers to receive cider equipment grants.

Based on research the USDA has placed the blueberry at the top of the fruit list in cancer-fighting antioxidant activity.

As a rule of thumb, for every inch of rain received after a spray application about 50% of the spray deposit is removed, if the spray has dried on the tree.

## Meetings

**May 19-22 - National Agricultural Plastics Congress**, Ramada Inn Tallahassee, Tallahassee, FL. Contact American Society for

Plasticulture 814/238-7045 e-mail

[peh4@psu.edu](mailto:peh4@psu.edu)

**May 20 - Sustainable Agriculture Workshop**, Kentucky State University Farm, 1525 Mills Lane, Frankfort, KY. Topics: Farm Safety, Crop Cultivation and Irrigation Techniques, Farm Shop Techniques - Welding and repair. Contact 502/564-5871 or 5869. **Jun. 17 -**

**Commercial Apple IPM Workshop**, Kevan Evans Orchard, Georgetown, KY. See article below.

**Jul. 14-16 - Practical Management of Oak and Wine, Forest to Glass - American Society for Enology and Viticulture, Eastern Section**, Airport Marriott, St. Louis, Missouri. Registration \$185. Contact Ellen Harkness, Dept Food Science Purdue University, phone 765/494-6704, e-mail [harkness@foodsci.purdue.edu](mailto:harkness@foodsci.purdue.edu)

**Jul. 17 - Kentucky Vineyard Society's Summer Vineyard meeting**, Bravard Vineyards and Winery, 15000 Overton Rd., Hopkinsville, KY. Contact Jim Bravard 502/269-2583.

**Jul. 22 - UK Robinson Experiment Station & Robinson Forest Field Day**, Quicksand, KY. Contact Terry Jones 606/666-2438, e-mail [tjones@ca.uky.edu](mailto:tjones@ca.uky.edu)

**Oct. 16 - Kentucky Vineyard Society's Annual meeting**, Maker's Mark Conference Center, Loretto, KY. Contact Mitchell Wagner phone: 502/459-6958, Fax: 502/459-2026, Email: [MITCH@KORT.COM](mailto:MITCH@KORT.COM)

**Jan. 3-4, 2000 - KSHS/KVGA Annual Meeting and Trade Show**, Holiday Inn North, Lexington,

Lunch will be available at cost for those that pre-register. The cost will be in the \$6.00 range. (Bessin, Brown, Hartman, Strang)

## Apple IPM Workshop Set for Thursday, June 17

**E**vans' Orchard, Kevin Evans, Georgetown, KY 502/863-4550. Contact Mark Reese, Scott County Extension Agent for Agriculture 502/863-0984.

All apple growers, Extension Agents, and educators are invited. Don't forget to make a reservation for lunch (see below).

**Directions: From Lexington** take Newtown Pike (Rt. 922) north 8 miles from I-75/I-64. Turn right on Stone road at the Evans Orchard sign. The orchard entrance is at Evans' house about one block on the left. **I-75 from the south** take Georgetown exit 125 and turn right onto Rt. 460. Travel about 3 miles east on 460 and turn right onto Rt. 922. Proceed 0.8 miles to Stone Rd. and turn left at the Evans Orchard sign and proceed as described above. **I-75 from the north** take Georgetown exit 126 and turn right off the exit ramp. Follow signs to Rt. 460 through a commercial area. Turn left onto Rt. 460 at the light (don't get on the bypass), travel about 3 miles east to Rt. 922, turn right and proceed as described above.

### **Agenda - All times CDT**

10:00 am - Welcome and introduction to Scott County

Mark Reese, Scott County Extension Agent

10:10 am - Introduction to orchard and market  
Kevin Evans, grower

10:30 am - Orchard tour and IPM workshop (all events outdoors).

#### The following topics will be covered:

Trickle irrigation for fruit crops (Jerry Brown)

Insect scouting exercise and fruit bagging (Ric Bessin)

Disease scouting and summer disease control (John Hartman)

Fruit marketing (John Strang).

12:30 pm - Lunch (**Please reserve in advance by calling Mary Ann Kelley at the U.K. Experiment Station, Princeton 502/365-7541, ext. 216 between 8:30 and 4:30, before June 15.**)

1:15 pm - The new "Show Me" predictor and computer interface - Evans, Strang, Bessin, Hartman

2:00 pm - Grower round table discussion

## Codling Moth Becoming Active

**C**odling moths have been slow to show up in pheromone traps this spring, but they are now beginning to appear. Now is the critical time to monitor for the moths in commercial orchards. Be sure that traps have fresh pheromone lure (less than one month old) and check traps daily until the biofix is reached. The biofix is the date when the fifth codling moth is trapped. After the biofix has occurred, degree days are calculated on a daily basis and a running total is kept (see Predicting Insect Development Using Degree Days in ENTFACT-201). The codling moth has a 50° F threshold temperature. These degree day accumulations are summed until they reach 250. At 250 DD an insecticide is applied for control which coincides with egg hatch. If codling moth are abundant (more than 10 per trap per week), a second spray may be necessary 7 to 10 days later.

Codling moth trap catch records need to be maintained throughout the summer to monitor additional generations. However, after the initial biofix it is only necessary to examine the traps twice a week. A threshold of five moths per trap per week is used to determine if there are sufficient levels of moths to warrant an insecticide application. (Bessin)

## Chemical Thinning Apples

**C**hemical thinning is one of the most critical activities undertaken by apple growers each year. Fruit thinning allows the remaining fruit to develop a more desirable size and sugar content. It can reduce limb breakage and increase tree longevity. It also improves fruit bud formation for next years crop if done early in the season. It is particularly important on small fruited cultivars and on older trees.

To determine if the fruit need to be thinned, count the fruit that you feel will set on selected limbs. Fruit destined to drop will develop a slight yellowish color, fruitlet stems will remain straight and the sepals will remain folded open. Normally we like to see an average of one fruit every 6 inches along a limb. If the number is 120 to 125 % of the ideal number the block needs thinning.

There are several chemicals that are commonly used for thinning. These are: NAD (Naphthyleaceta-mide) applied from late bloom to petal fall Accel (6BA + GA<sub>4+7</sub>) applied when king fruit are 10 mm in diameter NAA (Naphthalene acetic acid) applied when king fruit are 11-13 mm in diameter Sevin XLR (carbaryl) applied from petal fall to 30 days after bloom. It is most effective when fruit are larger than 13 mm.

It is thought that most thinners work by disrupting the carbohydrate transport in to the developing fruit. Fruit that receive inadequate carbohydrates drop from the tree.

A number of environmental conditions affect fruit set. Low light reduces photosynthesis and carbohydrate production. High temperatures lead to high respiration rates, which reduce fruit carbohydrate levels. The combination of low light (clouds) and high temperatures lead to increased carbohydrate stress and more fruit drop. As you would expect cloudy wet weather leads to the development of thinner cuticles, increased chemical thinner uptake and more thinning. However, sunny days following a cloudy period can negate the effects of the clouds. Frosts and freezes can substantially increase the degree of thinning.

In addition to environmental factors, numerous grower management factors, tree characteristics and pollination factors affect the thinning equation. This makes chemical thinning almost an art and challenges even the most astute and accomplished growers.

NAD is used from late bloom to petal fall and is not used much by Kentucky growers because of the higher risk of frost and freeze damage at this stage, which can excessively reduce the crop. This period however, is the best time to thin and affect return bloom the following year.

Accel is the newest compound and next in the developmental stage line for thinning. Consequently we are still learning how to use this material on different varieties. Accel is considered a mild thinning agent and increases fruit size by reducing fruit numbers and stimulating additional fruit growth. It also increases fruit soluble solids. It is recommended for McIntosh, Jonathan, Empire and Fuji. It is recommended that it be used at the 50 ppm rate and works well when combined with Sevin. Accel should NOT be used in combination with NAA or applied after an earlier NAA application, because it can increase the amount of pigmy fruit. It should be applied when the temperature is over 65°F and performs best from 70 to 75°F. Accel is absorbed through the fruit best under slow drying conditions in the evening or morning and should be combined with a surfactant such as Regulade.

NAA is a fairly potent thinning agent and the thinning response is rate dependent. It is

generally applied under fast drying conditions when light levels of thinning are desired. Absorption takes place as the spray dries and the unabsorbed material is rapidly broken down by sunlight, which reduces the potential for additional uptake caused by rewetting. The addition of a surfactant such as Tween 20, Regulade or Amway Wetting agent at 3/4 to 1 pt/100 gal. increases the thinning response and reduces leaf flagging. NAA applied to early summer varieties can lead to foliage injury, fruit cracking and premature ripening. NAA can cause pigmy fruit on spur Red Delicious and consequently Sevin is the preferred material for these strains.

Sevin XLR is a relatively mild thinning agent and the degree of thinning is not rate dependent at concentrations above 3/4 lb/100 gal. The use of high rates can sometimes cause increased thinning if light rain or dew causes rewetting and additional absorption. Sevin is often combined with NAA for hard-to-thin varieties. It can be used from petal fall to 21 days after petal fall, however it is more effective on fruit larger than 13 mm. Sevin can russett Golden Delicious and is not recommended on Rome or Gallia Beauty, because of over thinning.

Additional information on thinning can be found in the Commercial Tree Fruit Spray Guide (ID-92) available through local County Extension offices. Another excellent publication that every grower should have is the "Apple Thinning Guide" by Phillip Schwallier, available through the Great Lakes Publishing Company, 343 South Union Street, Sparta, MI 49345, phone 616/887-9008. (Strang)

## No Quadris for Strawberries in Kentucky

Some of our fruit growers may be aware that strawberry growers in Tennessee may now use the fungicide Quadris (azoxystrobin) for control of anthracnose disease. We were made aware of the situation from an article written by Dr. Steve Bost for the weekly University of Tennessee Entomology and Plant Pathology newsletter "What's Happening?" Strawberry anthracnose disease is favored by warm, wet weather, causing fruit decay as well as attacking vegetative parts of the plant. This disease has been a problem for Tennessee strawberry growers and Dr. Bost has done much field testing of fungicides for anthracnose control.

According to Dr. Bost, the Tennessee Department of Agriculture issued a crisis exemption for use of this fungicide following a request to EPA for a section 18 emergency-use label. Under this crisis exemption, growers would use Quadris to prevent the fruit rot

phase of the disease before harvest and through the season to control the vegetative phase of the disease.

Should Kentucky growers use Quadris to control strawberry anthracnose disease? Should we propose a crisis exemption that would allow emergency use of Quadris in our strawberry fields? While Kentucky growers may wish to have additional chemistry available for disease control, there is an important reason why Quadris will not be cleared for use on Kentucky strawberries this year. There is no emergency here; we receive few inquiries about strawberry anthracnose, we have observed little problem in the field, and we have diagnosed only an occasional specimen with anthracnose on strawberries submitted to our plant disease diagnostic laboratories. We cannot justify to regulatory authorities the issuance of an emergency or crisis exemption unless we can document that an emergency exists and that there has been economic damage to the crop.

It is likely that anthracnose exists in Kentucky. We just have not seen it at high enough levels for growers to be too concerned about it. The last two spring seasons have been relatively cool and wet, with later summers dry. If prolonged, warm wet weather should occur we could see more anthracnose on strawberries in Kentucky. Our current recommendations call for application of captan at 7-day intervals before and through harvest.

Even if we determine that there is a need for Quadris in future years, there is an additional reason for caution in its use. Quadris has the same active ingredient as the fungicide Abound. Since many of our strawberry producers also use the same spray equipment to spray fruit trees, they should be aware that Quadris, like Abound is phytotoxic to certain apple varieties. (Hartman)

## Fire Blight Revisited

**F**ire blight, caused by the bacterium *Erwinia amylovora* is a destructive disease of apples and pears in Kentucky. Shoot infections are probably the most obvious symptoms that growers observe, and branch and limb cankers are often noticed as well. Primary infections of flowers, which kill individual blossoms or tiny fruitlets are frequently un-noticed because the infected organs are small and because often just one fruitlet is infected and blackened within a cluster of otherwise healthy fruitlets. The rest of the fruitlets in the cluster rapidly turn black and the disease can then progress to the branch and limb. It is from these occasional primary infections that high levels of secondary infections of shoots occur. The Maryblyt computer program has been a very useful tool

in Kentucky because it helps growers forecast these primary infections and take appropriate actions.

Many apple orchards in southern and western Kentucky endured a fire blight primary infection period early in the bloom period, around April 10 or 11. Coincidentally, there was considerable wind that weekend, so trauma blight (fire blight infections resulting from bacteria entering the tree through wounds, rather than naturally through floral nectaries) might have increased infections. In contrast, the next week was cool and few new infections would have occurred. As of this writing, more cool weather was in the forecast; if weather remains cool through the rest of the bloom period, growers may escape additional primary infections. Central and Northern Kentucky growers may have missed the first infection period because blooms were not yet open.

Fire blight management. New growing systems and new apple varieties are conducive to increased fire blight. Previous infections are difficult to find and remove and there are few tools available for controlling the pathogen. In addition, *E. amylovora* is widely dispersed, increases its numbers very rapidly, and grows readily on the surface of susceptible and resistant trees alike. When primary infections occur in the flowers, sources of inoculum for secondary shoot infections increase from a few overwintering cankers to thousands of blighted spurs. It is for these reasons that fire blight must be managed diligently. Diligent fire blight management involves the following activities.

- Dormant pruning to remove overwintering infections is essential. Make cuts about four inches below any signs of dead bark.
- Apply a copper spray at 1/4 inch green tip. Apply copper as a dilute spray to all surfaces of all apple trees, even those that are disease resistant. Copper does not reduce bacterial inoculum in cankers appreciably, rather, it is used for preventing healthy tree surfaces from being colonized by the pathogen. It cannot be applied after 1/2 inch green tip because it will injure the fruit.
- In spring, monitor the weather conditions so that the Maryblyt computer program can be used to schedule streptomycin sprays and to advise growers when blossom blight and shoot blight symptoms are about to appear. Streptomycin is best used with the Maryblyt computer program for improved effectiveness and reduced wastage. Using this program, streptomycin is typically used only once

or twice rather than the usual four or five times a season. It is most effective when used the day of or the day before infections occur. It should only be used during bloom; it should neither be used to prevent shoot blight, nor should it be used when symptoms are already present (exception: immediately after hail or high wind initiates trauma blight infections). Efficient use of streptomycin is needed to avoid pathogen resistance to the antibiotic; resistance has already been found in other midwestern and eastern states.

- Alternative chemical and biological control treatments may not be good substitutes for streptomycin. Aliette, used for collar rot control, is sometimes helpful for fire blight control, but its effectiveness is too inconsistent to be relied upon. Blight Ban, which uses a strain of *Pseudomonas fluorescens* to suppress fire blight, must be present in the flowers before *E. amylovora* to be effective. This and other experimental biocontrols have been moderately active for disease control, but have not surpassed streptomycin. Systemic acquired resistance chemicals such as Actigard or Harpin are only just beginning to be tested for effectiveness against fire blight. More effective biological control agents will be needed before their use is to become widespread.
- If infections have occurred, monitor for strikes and promptly remove infected branches. If fire blight strikes are discovered early, before leaves have turned completely brown, timely removal of infected shoots can help slow the spread of the disease. If there are too many and it will take more than two days to remove them, it might be best to just leave most of them and cut out only those associated with the main stem. Give early strikes on young trees the highest priority because they can provide secondary inoculum for key scaffold branches.
- When blighted branches are removed, leave an obvious 4 or 5-inch stub of two-years or older wood; if needed, paint it with bright paint to make it more obvious. Remove these highly visible stubs in winter.
- Control insects such as leafhoppers, plant bugs, and psyllids that may spread the bacterial.
- Monitor blocks of trees with susceptible

rootstocks closely and remove dying diseased trees. M.9 and M.26 rootstocks are highly susceptible to fire blight. Rootstocks can become infected and killed by internal movement of the bacteria, even though the scion may have little disease.

- Be aware that fire blight-susceptible apples such as 'Braeburn', 'Empire', 'Fuji', 'Gala', 'Gingergold', 'Granny Smith', 'Idared', 'Jonagold', 'Jonathan', 'Liberty', 'Lodi', 'Rome', 'Tydeman's Red', and 'York' will require more diligent management and should be avoided, if possible. Cultivars of 'Golden Delicious' and 'Stayman' are moderately resistant, and all strains of 'Delicious' are highly resistant except when damaged by frost, hail, or high winds.
- Use fertility, pruning, and water management systems that promote early completion of tree growth. When tree growth continues past mid-summer, overwintering of the fire blight bacteria is more likely. Avoid planting sites that are poorly drained and frost-prone, fertilize only enough to meet the needs of the trees. Be aware that when tree densities increase, damage from fire blight can also increase.
- Long range plans for establishing new orchards with fire blight susceptible cultivars should include contingency plans for controlling the disease without streptomycin.

## Getting the Most Out of Roundup and Other Sprays:

**G**lyphosate (Roundup) is a systemic herbicide that is widely used by fruit growers. In order for glyphosate to be effective, it needs to be absorbed into the plant. In soft water glyphosate has no problems in being absorbed. However in hard water glyphosate will be tied up and not absorbed as readily. Hard water, contains high concentrations of soluble salts, calcium and magnesium. When these cations are present they react with the negatively charged glyphosate to form compounds that are not readily absorbed by plants. This results in poor uptake and poor weed control.

The solution to the hard water problem is to add ammonium sulfate to the spray water

before mixing with glyphosate. Ammonium sulfate ions tie up the calcium and magnesium ions forming conjugate salts. Additionally, some of the glyphosate reacts with ammonium to form a compound that some weeds preferentially absorb. Follow the Roundup label recommendations on the amount of ammonium sulfate to add.

Another problem associated with spray water quality is that many fungicides and insecticides break down quickly in high pH water. Captan, Cygon, Imidan, Kelthane, malathion, and Omite are examples of compounds that are especially vulnerable to alkaline hydrolysis. Both the Commercial Tree Fruit and Small Fruit and Grape Spray Guides have a discussion of spray tank pH. Refer to those publications for specifics on adjusting pH. (Adapted from an article by Gary Thornton in the Michigan State University Fruit Crop Advisory Team Alert, Vol. 14 No. 1 by Bruce Bordelon, Purdue University)

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