

FACTS FOR

Fancy Fruit



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Crop conditions

Apples are at early fruit set, with king fruit diameter in West Lafayette approaching 10 mm. Peaches are at fruit set but still in the shuck. Strawberries and blueberries are at bloom in Lafayette. Raspberry and Blackberry have 4-6 inch shoots. Flower buds are appearing. Early variety grapes have 3-4 leaves unfolded and clusters are visible. Overall crops are looking good, despite cool weather during bloom.

Hort. Society Summer Meeting

The summer meeting of the Indiana Hort. Society will be held June 18-19 (Wednesday-Thursday). The locations are still being firmed up, but it will be in the central part of the state. Write the dates on your calendar now and look for full details in the next issue of FFF. (Hirst)

Farm Bill Passes House and Senate

As you have all probably read, the new farm bill has passed both the house and the senate by large majorities. President Bush has threatened to veto it, but a veto over-ride looks likely. For the first time, a farm bill has paid particular attention to specialty crops, and there appears to be quite a lot of support (over \$200 billion) for specialty crop-related programs. (Hirst)

Weather update

After a very late start to the season, we have had unseasonably cool weather that has slowed crop development even further. Unfortunately, for many in

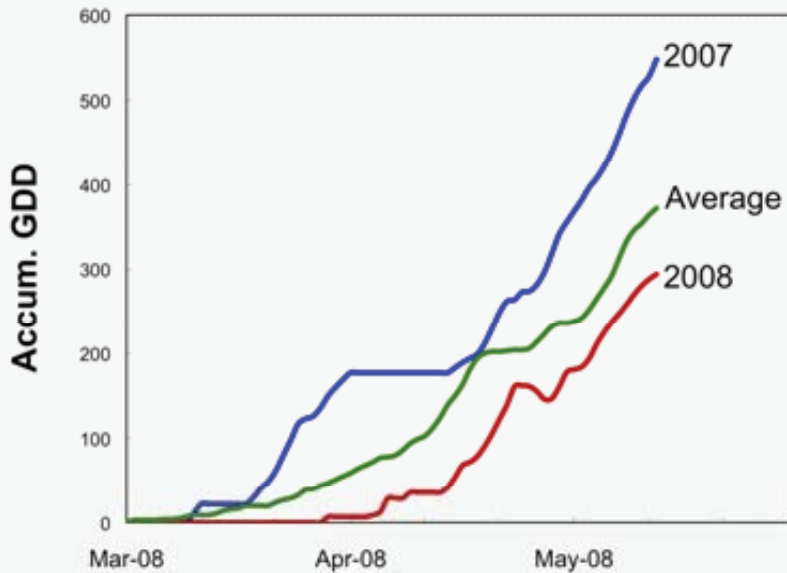
the state the cool, rainy weather came during bloom – not exactly good pollinating weather. However recent research by Ross Byers and Keith Yoder in Virginia has rewritten the textbook in terms of the temperatures required for pollination. It seems less time is needed for the pollen tube to grow down the style to fertilize the ovary than previously thought. So although warm weather during bloom is still important for adequate fruit set, less than ideal temperatures may not be as much of a negative factor as we thought.

As can be seen from the following graph of accumulated growing degree days (GDD) in Lafayette, we are later than average in terms of accumulating growing degree days, and certainly a long way behind this time last year. (Hirst)

Chemical thinning

You've all heard that warm weather is best for chemical thinning. So what is the likely effect of the current cold snap? When thinking of chemical thinning, it's useful to think about what causes fruit drop. Fruit drop is the fruit tree equivalent to the law of the jungle, where there's not enough food to go around and only the strong survive. The food of course refers to the carbohydrates in the tree, coming from stored reserves and photosynthesis. At this time of the year there is very little leaf area on the tree so the supply of carbohydrates is limited. The maximum shortage of carbohydrate usually corresponds to a fruit diameter of around 10-12 mm, which is why we often apply thinners at this stage to gain maximum effect. For example, 5 ppm NAA applied at 12 mm is the thinning equivalent of 8-12 ppm applied at petal





fall. Thinners act to alter the balance between supply and demand of carbohydrate resulting in increased fruit drop. To show how this works, let's think about the 3 most common chemical thinners in Indiana: NAA, Sevin and 6-BA (Accel, Maxcel, Exilis Plus). NAA decreases photosynthesis thereby reducing the supply of carbohydrate. Sevin increases respiration and so increases the usage and demand for carbohydrates, whereas 6-BA reduces the translocation of carbohydrates from leaves to fruit. So all these thinners act to increase demand or reduce supply of carbohydrates. Dull, overcast weather during bloom can have a similar effect. Because there is less light, photosynthesis is reduced so that there are less carbohydrates available to the fruit and therefore more fruit drop.

Ok what does all this mean for chemical thinning this year? Even though the cool, overcast weather has not been good for the action of chemical thinners, the weather itself is likely to result in increased drop. Of course this is yet another factor to take into account when deciding whether to put on another thinner application (as if chemical thinning wasn't risky and complicated enough already!). One last point – remember to wait 10-14 days to assess the action of a thinner application before making the decision about another application.(Hirst)

Thinning with ethephon

Ethephon is an aggressive thinner which often has unpredictable results. It can easily

overthin when the temperature is over 80 F. In studies in Ohio, ethephon applied alone at 200-300 ppm with 4-6 applications was not an effective thinner. However when applied in combination with Sevin at petal fall and again at 12 mm, it resulted in more thinning (overthinning). Ethephon may be a useful addition if you need to increase the effect of thinner applications. Once fruit size is beyond 15 mm, ethephon is probably your only effective choice of thinner.(Hirst)

NAA and ethephon for return bloom

For a number of years growers have talked about and have been experimenting with summer applications of NAA and ethephon for return bloom. The most comprehensive study of this has recently been published by Dr. Steve McCartney and his coworkers at North Carolina State University. His paper described 8 years of experiments. Below I'll summarize his findings, but if you'd like to read the paper for yourself, contact me and I'll be happy to send you a copy.

Both NAA and ethephon were found to be effective in increasing return bloom, but not consistently. NAA increased return bloom in 6 of 10 experiments and ethephon was effective in 4 of 7 experiments. Four biweekly applications of 5 ppm NAA was the most effective way of applying this material, but the timing was not critical. These applications worked about the same whether applied in June and July as they were if applied leading up to






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<i>Current bud stages West Lafayette, IN</i>		
Apple	Blueberry	Grape
		
<i>Apple king fruit 8 mm diameter</i>		
Peach		Strawberry
		
<i>Peaches almost out of shuck</i>		

harvest. A single application of ethephon was as effective as the 4 applications of NAA. Combining NAA and ethephon was no more effective than applying either material alone. Ethephon was applied at rates of 400-1200ppm, but there was not much difference in effect with these different rates. Both NAA and ethephon applied in the on-year of a biennial bearing cycle can promote return bloom, but have little effect if the initial crop load was high. So these applications are not a substitute for effective chemical thinning, but may help out with varieties with a tendency for biennial bearing. (Hirst)

Three Big Foliar Diseases of Strawberry

1. **Fungal leaf spot** is caused by *Mycosphaerella fragariae*. This fungus infects leaves, petioles, runners, and even fruit stalks (pedicels), berry caps or calyxes. Small, dark purple to reddish-purple, round spots, 1/8 to 1/4 inch in diameter develop on the upper leaf surfaces (See Fig. 1). As the lesion

develops, the center of the spots becomes tan, eventually turning gray or even white, while the margins remain dark purple. Later in the season, dark pepper-like specks appear in older lesions. These black specks are either sclerotia, tiny fungus balls that allow the fungus to survive inclement condition, or perithecia, th at contain the sexual spores of the fungus.

Long wet periods (several days) and warm temperatures (over 50°F) favors disease development in the spring and in summer after renovation. During conditions such as these, the fungus can also infect fruit, causing what is called "black seed disease." Berries usually have one or two spots but may more can develop. Fruit does not rot but discolors under the spot; however, there is no decay of an infected berry.

2. Leaf scorch, caused by the fungus, *Diplo-carpon earliana*, attacks the above ground portions, including the leaves, petioles, runners, pedicels, and calyxes of strawberry plants. The fungus most frequently

infects strawberry leaves at any stage of development. The symptoms of leaf scorch are very similar to the early stages of leaf spot in that small, dark purple spots develop on upper leaf surfaces. Unlike leaf spot, the leaf spots of leaf scorch remain dark purple, and never develop a dying or dead center. Spots have an irregular outline and may run together, causing the entire leaf to develop a reddish or light purple color. In severe cases, foliage is reduced considerably, and plants may be stunted. Round to angular dark-purple spots, up to about 1/4 inch in diameter, are scattered over the upper leaf surface. As the spots gradually enlarge, they resemble small drops of tar due to the production of large numbers of minute, black, fungal fruiting bodies called acervuli.

Fruit may become infected, as well. Infected fruit has elongated, slightly sunken, reddish areas or streaks; these lesions usually disappear as the fruit ripens.

3. Leaf blight, or Phomopsis leaf blight is caused by the fungus *Phomopsis obscurans*. Although infections are occurring now, symptoms often do not become visible until after harvest. The disease can weaken strawberry plants through the destruction of older foliage. Weakened plants can result in reduced yields the following year. Phomopsis leaf blight symptoms begin as circular spots that also appear similar to leaf spot disease of strawberry. However, as the disease progresses, irregular, zoned lesions may form. In later stages of disease development, lesions, especially ones along veins, may become V-shaped, with the widest part of the V toward the margin of the leaflet. These V-shaped lesions are characteristic of the disease.

Managing Leaf Spot, Leaf Scorch and Leaf Blight

Begin planting by choosing disease resistant cultivars. [Cornell University Tree Fruit and Berry Pathology web site](http://www.nysaes.cornell.edu/pp/extension/fabp/factshts/smallfr/stbapx.html) provides a comprehensive list of commonly used strawberry cultivars, and their known disease susceptibility and resistances. This table can be found at:

<http://www.nysaes.cornell.edu/pp/extension/fabp/factshts/smallfr/stbapx.html>

It is important to note that due to the presence of different races of the pathogens, strawberry cultivars rated as resistant in one location may be susceptible in another.

After choosing your cultivars, purchase certified, disease-free plants from a reputable nursery. Plants should be planted in full sun in well-drained soil with good air circulation. Reduce competition and increase air circulation by properly spacing plants and preventing weed growth by cultural or chemical methods.

Limit nitrogen fertilizer applications to renovation time after harvest. Nitrogen fertilizer increases tender, susceptible leaf growth, encouraging disease.

Problem	Material	Rate/Acre	Comments
Leaf spot, Leaf blight, Leaf scorch,	Nova 40WP	2.5-5oz	Nova is very effective for control of Phomopsis leaf blight. Leaf spot is also listed on the label.
	Abound 2.08F	6.2-15.4 fl oz	A strobilurin fungicide with good to excellent broad-spectrum activity against leaf spots and fruit rots.
	Cabrio 20EG	14 oz	This strobilurin fungicide is a very broad-spectrum and has excellent activity against leaf spots and fruit rots.
	Pristine 38WG	18.5-23 oz	This fungicide is very broad-spectrum and has excellent activity against leaf spots and fruit rots.

Follow a fungicide spray schedule recommended for the control of leaf diseases and fruit rots. See the Midwest Commercial Small Fruit and Grape Spray Guide at <http://www.hort.purdue.edu/hort/ext/sfg/>

The above chemicals should be rotated with either:

Captan 80 WDG at 1.9 to 3.75 lb/A. May be applied up to the day of harvest.

OR

Fixed copper. Monitor plants and discontinue if signs of phytotoxicity appear.

Champ Formula 2 at 1.3 to 2 pints/A. 24-hr reentry.

Cuprofix Dispers at 2.5 to 5 lb/A. 24-hr reentry.

Kocide DF at 2 to 3 lb/A. 24-hr reentry.

Nu-Cop 50 DF at 2 to 3 lb/A. 24-hr reentry.

Remember, fungicides are a tool to prevent serious disease from occurring in the first place. In plantings with severe disease incidence, destroy (mow, rake, and burn) all diseased strawberry debris at renovation time immediately after harvest.



Upcoming meetings

June 3. Eastern Indiana Horticultural Society twilight meeting. For details contact Dave Clamme, dclamme@purdue.edu, (765) 747-7732.

June 18-19. Indiana Horticultural Society summer meeting. Location to be announced.



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