http://ipm.osu.edu/fruit/index.html

THE OHIO STATE UNIVERSITY Newsletter Extension

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Calendar

June 30: 1999 Ohio Fruit Growers Society Annual Summer Tour, Eshleman Fruit Farm, near the intersection of U.S. 20 and St. Rte. 101, Clyde, OH. Tour wagons begin rolling at 8:00 a.m., lunch is at noon, and annual business meeting begins at 1:00 p.m.

July 8: Twilight Summer Fruit School, Lynd's Fruit Farm, western Licking County, 6:30 - 9:00 p.m. Direct marketing, cultivars, & cultural practices. Resource people will be Dick Funt and Mike Ellis. For more information contact Howard Siegrist, (740) 349-6904.

July 21 & 22: Small Fruit Tour, Wooster/Mt. Hope area. Pre-tour gathering begins Wednesday evening at Maurer Farms near Wooster. Thursday morning the group begins its self-guided, self-driven tour at Farmers' Produce Auction in Mt. Hope. Demonstrations at OARDC in Wooster round out the afternoon, and the day ends at Moreland Fruit Farm near Wooster with a walking tour, discussion, and fruit pies. $5.00 registration fee. For more information contact Mike Pullins at (614) 249-24424.

August 5: Young Grower Tour, northwest Ohio. Designed for, but not limited to, producers and their spouses age 40 and under. More information will follow.

Summer Diseases of Apple

Source: Midwest Tree Fruit Pest Management Handbook
http://www.ca.uky.edu/agc/pubs/id/id93/ch_1.htm

Bitter rot, black rot, and white rot (bot rot) are the most common summer rot diseases of apple. Flyspeck and sooty blotch cause superficial blemishes which detract from the appearance of apple and pear fruit.

The summer diseases have the potential to cause serious losses, especially in the more southern regions of the Midwest and on trees not sprayed with fungicides. In the northern regions of the midwest, some fruit rot fungi invade winter-injured tissue and are associated with branch cankers. Any condition that reduces tree vigor will increase susceptibility to branch and trunk infections. Flyspeck and sooty blotch fungi, and some of the fruit rot fungi, survive on a wide range of woody plants. The fruit rot fungi are similar in many respects: they survive in dead or weakened tissue, including fire blight cankers and mummified fruit; they produce enormous numbers of spores which are readily disseminated by rain and wind; and the diseases they cause are favored by warm, humid weather.

Bitter Rot: Symptoms vary slightly, depending on which spore type (ascospore of *Glomerella cingulata* or conidium of *Colletotrichum gloeosporioides* or *C. acutatum*) causes the infection. Lesions incited by conidia are sunken, light brown, and often marked with concentric circles of spore masses that appear creamy and salmon- to pink-colored under humid conditions. Lesions incited by ascospores are usually not sunken and are darker than those caused by conidia. Spore-producing bodies are scattered over the lesion in dark brown to black clusters. Bitter rot decay extends in a cone shape toward the core, which helps distinguish bitter rot from other fruit rots. The rotten spots are soft but firmer than white rot lesions.

Black Rot: In addition to affecting fruit, the black rot fungus, *Botryosphaeria obtusa*, causes leaf spots (frog-eye leaf spot) and branch cankers. The optimal temperature for fruit infection is 68° to 75°F with 9 hours of wetting. Fruit symptoms often start at the blossom end. Dark brown lesions expand and eventually can encompass the entire fruit. Lesions are often marked by concentric alternating brown and black rings. The rotted area is firm, leathery, and dotted with dark, fungal fruiting bodies. Fruit infection can occur throughout the growing season; however, rot symptoms generally appear as fruit reach maturity. The optimal temperature for leaf infection is 80°F with 4 1/2 hours of wetting. Leaf spots first appear about 1 to 3 weeks after petal fall as purple flecks that expand to about 1/4-inch in diameter. The margins of spots remain purple, while the centers turn tan to brown so that the spots resemble a "frog's eye." Spots can enlarge and become irregular in shape as they are invaded by other fungi later in the season. The leaf spot phase is not economically important unless it results in significant defoliation. Branch cankers initially appear as slightly sunken reddish brown areas on the bark. Fire blight cankers and winter-injured tissue are frequent sites for black rot canker initiation. Cankers can expand to several feet in length and can girdle limbs. Branches are weakened and sometimes killed. (Also see following article about Fruit Decay Incidence in 1998).

White Rot (Bot Rot): White rot (*Botryosphaeria dothidea*) lesions begin on fruit as small, circular, tan spots that are sometimes surrounded by a red halo. Duchess, Golden Delicious, Grimes Golden, Gallia Beauty, Rome, and Yellow Transparent varieties are all highly susceptible to white rot. Jonathan and Red Delicious are generally less affected. The rot extends in a cylindrical shape toward and surrounding the core. Eventually the entire fruit becomes soft, watery, and light tan. Under cooler conditions the rot may be darker and closely resemble black rot. Branch infections start out as reddish brown bark lesions that expand and sometimes exude fluid. Cankers are more severe if trees are stressed by drought.

Flyspeck and Sooty Blotch: Flyspeck and sooty blotch are two separate diseases that frequently occur together on the same fruit. Flyspeck appears as clusters of tiny, black dots. Sooty blotch appears as dark, sooty smudges. The fungi that cause flyspeck (*Zygophiala jamaicensis*) and sooty blotch (*Peltaster fructicola, Gastrumia polystigmatis, Leptodontium elatius*, and others) overwinter on the twigs of many woody plants, especially brambles. Spores of sooty blotch fungi are spread during rain. The flyspeck fungus is spread as airborne ascospores which are released during rain or as airborne or waterborne conidia. Fruit infection can occur any time after petal fall, but is most prevalent during mid- to late summer. Both diseases are favored by temperatures between 65° to 80°F and by high relative humidity at the fruit surface (greater than 90 percent for sooty blotch and greater than 95 percent for flyspeck). Conditions such as these are most frequent when nighttime temperatures remain near 65° to 70°F or

during extended warm, rainy periods. The diseases flourish in orchards subject to heavy dews or fog. Under ideal conditions, sooty blotch and flyspeck symptoms can develop within 14 days of infection, but symptom development is arrested by high temperatures and low relative humidity. Thus, the period between infection and symptom development ranges from 25 to more than 60 days in the Northeast and may be similar in the Midwest. Sooty blotch and flyspeck infections not yet visible at harvest can develop during storage.

Control of Summer Diseases: A combination of annual pruning, adequate fruit thinning, orchard sanitation, and protective fungicides is the key to controlling summer diseases.

Pruning and Thinning: Pruning systems that open the tree canopy to light should also improve air movement and thereby reduce relative humidity and the time that leaves and fruit are wet. For example, summer pruning, as opposed to dormant pruning, reduced the incidence of flyspeck on apple fruit by 50 percent in research conducted in Massachusetts. Keeping the orchard mowed should also promote air movement, enhance rapid drying, and in turn, reduce summer diseases. Thinning of fruit is important to improve spray coverage and drying. Clustered fruit often have flyspeck on their inner faces even when an adequate fungicide program has been used.

Sanitation: Dead or weakened wood in or near an orchard can serve as a reservoir for the fungi that cause summer diseases. Therefore, removal and destruction of dead and dying plant material, including the current year's fire blight strikes, is necessary to keep the level of summer disease fungi to a minimum. Removing unwanted vegetation that might be a reservoir for pathogens, particularly wild brambles, should also reduce disease pressure in the orchard.

Fungicides: Different fungicides are recommended for the different summer diseases. In general, protectant fungicides (e.g., captan, ziram) that are permitted later in the season are used alone or mixed with benomyl (Benlate) or thiophanate-methyl (Topsin-M). See the current *Ohio Commercial Tree Fruit Spray Guide* for specific recommendations.

Fruit Decay Incidence in 1998

Source: Ken Hickey and Jim Travis, Dept. of Plant Pathology, Penn State, Fruit Times Newsletter, Vol. 18, No. 9, June 15, 1999

Incidence of fruit decay near harvest in 1998 was higher than normal in a number of commercial orchards in the mid-Atlantic region. The level of fruit infections varied from an occasional lesion to 30% and was attributed to lack of fungicidal protection during above normal rain periods through May and June. Additionally, four or five sporadic rains occurred in July and August, which provided favorable conditions for infection. In a special cooperative project with Dr. Tara Baugher, orchard consultant for Rice Fruit Co., Gardners, PA, Golden Delicious apples from eight commercial producers were observed for decay development. A 50-fruit sample from each of four randomly selected bulk bins was collected from each grower, held at room temperature, and observed for decay development after a 21 day incubation.

White rot was the most common decay found, but low incidence of black rot and bitter rot occurred. Statistical correlations of fungicide type, rate, and application timing were made with decay incidence. Decay incidence ranged from 2.5 to 12.0%.

Significant positive correlations were found between decay incidence and the number of fungicide

applications during the summer and the timing of applications in relation to infection (rain) periods. The number of applications ranged from 3 to 10, and the rating for timing ranged from 3 to 9 on a scale of 1 to 10 with 10 being the best timing. The grower with the highest decay level (12.0%) applied four applications of fungicides at full rate at 18 day intervals, and the timing was 2-5 days after each of the summer rain periods (rated 3). The grower which had the least decay (2.5%) applied eight applications at a rate which was 69% of full rate and application timing (rated 8) was before each of the rain periods.

Strawberry Bed Renovation

Source: Bruce Bordelon, Dept. of Horticulture, Purdue University, Facts for Fancy Fruit, June 16, 1999

Strawberry plantings must be renovated after harvest. For best results, renovation should be started immediately after the harvest is completed to promote early runner formation. The earlier a runner gets set, the higher its yield potential. Renovation should be completed by mid-July in normal years. Since harvest was early this year, growers should take advantage of the opportunity to renovate early. The following steps describe renovation of commercial strawberry fields.

1) **Weed control:** Annual broadleaf weeds can be controlled with Formula 40 (2,4-D alkanolamine salts plus 2,4-D Triisopropanolamine salt (4 lbs./gal.) at 2 to 3 pts/acre in 25-50 gallons of water applied immediately after harvest. Formula 40 is the ONLY 2,4-D formulation labeled for use in strawberries. The other amine formulations such as Weedar 64 or Amine 4 have a different formulation and are not labeled specifically for strawberries. Be extremely careful to avoid drift when applying 2,4-D. Even though the amine formulation is not highly volatile, it will volatilize and can cause damage to desirable plants a considerable distance from the site of application under hot, humid conditions. Some damage to strawberries is also possible. Read and understand the label completely before applying Formula 40. If grasses are a problem, sethoxydim (Poast) will control annual and some perennial grasses. However, do not tank mix Poast and 2,4-D. Check the product label for rates and especially for precautions.

2) **Mow** the old leaves off just above the crowns 3-5 days after herbicide application. Do not mow so low as to damage the crowns.

3) **Fertilize** the planting. A soil test will help determine phosphorus and potassium needs, but foliar analysis is a more reliable measure of plant nutrition. Nitrogen should be applied at 25-60 lbs./acre, depending on vigor. It is more efficient to split nitrogen applications into two or three applications at regular intervals, rather than apply it all at once. A good plan is to apply about half at renovation and half again in late August.

4) **Subsoil:** Where picker traffic has been heavy on wet soils, compaction may be severe. Subsoiling between rows will help break up compacted layers and provide better infiltration of water. Subsoiling may be done later in the sequence if crop residue is a problem or if soils are too wet at this time.

5) **Narrow rows:** Reduce width of rows to a manageable width based on your row spacing, the aisle width desired, and the earliness of renovation. A desirable final row width to attain at the end of the season is 12-18 inches. Wider rows lead to low productivity and increased disease pressure. This means that rows can be narrowed to as little as 6 inches during renovation. Use a roto-tiller or cultivator to achieve the reduction. Since more berries are produced at row edges than in the middle, narrow rows are superior to wide rows. Narrow rows will give better sunlight penetration, better disease control, and better fruit quality. Wider is NOT better when it comes to strawberry beds.

6) **Cultivate:** Work in straw between rows and throw a small amount of soil over the row by cultivation. Strawberry crowns continue development at the top, and new roots are initiated above old roots on the crown, so 1/2 - 1 inches of soil should be broadcast to facilitate rooting. This also helps cover straw in the row and provides a good rooting medium for the new runner plants.

7) **Weed control:** Pre-emergence weed control should begin immediately. Sinbar or Devrinol are suggested materials. Check the product labels carefully. Devrinol must be incorporated by irrigation, rainfall, or cultivation to be effective. Rate and timing of Sinbar application is critical. If regrowth has started at all, significant damage may result. Some varieties are more sensitive to Sinbar than others. If unsure, make a test application to a small area before treating the entire planting. Use up to 6 oz/acre/application and no more than 8 oz/acre/year total. Sinbar should not be used on soils with low organic matter, or on sensitive varieties like Guardian, Darrow, Tribute, Tristar and possibly Honeoye. If Sinbar gets onto strawberry leaves, irrigate to wash it off.

8) **Irrigate:** Water is needed for both activation of herbicides and for plant growth. Don't let the plants go into stress. Ideally the planting should receive 1 to1-1/2 inches of water per week from either rain or irrigation.

9) **Cultivate** to sweep runners into the row until plant stand is sufficient. Thereafter, or in any case after September, any runner plant not yet rooted is not likely to produce fruit next year and is essentially a weed and should be removed. Coulter wheels and/or cultivators will help remove these excess plants in the aisles.

10) **Adequate moisture** and fertility during August and September will increase fruit bud formation and improve fruit yield for the coming year. Continue irrigation through this time period and fertilize if necessary. An additional 20-30 pounds of N per acre is suggested, depending on the vigor.

Correction

Dr. Doug Doohan, Weed Science Extension Specialist, sends along the correct phone number for his office: (330) 202-3593. His address is: Department of Horticulture and Crop Science, OSU/OARDC, 1680 Madison Avenue, Wooster, OH 44691

Fruit Observations

Insect Key

AM: Apple maggot
CM: Codling moth
DWB: Dogwood borer
LPTB: Lesser peachtree borer
OBLR: Oblique banded leafroller
OFM: Oriental fruit moth
PC: Plum curculio
PTB: Peachtree borer
RBLR: Redbanded leafroller
SJS: San Jose scale
STLM: Spotted tentiform leafminer
TABM: Tufted apple budmoth
VLR: Variegated leafroller

Site: Waterman Farm, Columbus
Source: Dr.Celeste Welty, OSU Extension Entomologist

Apple: 6/16 - 6/23

RBLR: 26 (down from 47)
STLM: 1535 (up from 1334)
SJS: 0 (unchanged)
CM (mean of 3 traps): 0.3 (down from 3.0)
TABM: 0 (down from 6)
VLR: 2 (up from 1)
OBLR: 0 (down from 2)

Peaches:

OFM: 10 (up from 5)
LPTB: 0 (down from 2)
PTB: 2 (down from 5)

Site: East District; Erie & Lorain Counties
Source: Jim Mutchler, IPM Scout

Apple: 6/16 - 6/22

RBLR: 6.6 (down from 9.5)
STLM: 713 (up from 400)
SJS: 0 (unchanged)
CM: 0.2 (down from 2.2)
OBLR: 5.0 (up from 4)
VLR: 2.3 (down from 4)

Peach:

OFM: 14.0 (up from 10.8) RBLR: 11.3 (up from 8.3)
LPTB: 22.3 (down from 50)

PTB: 0 (unchanged)

Other pest activity: green apple aphid, white apple leafhopper; occasional fire blight; localized hail damage.

Beneficials at work: Lacewings (both brown & green), and other lady beetles.

Site: West District; Huron, Ottawa, & Sandusky Counties
Source: Gene Horner, IPM Scout

Apple: 6/16 - 6/22

RBLR: 35.7 (down from 36.6)
STLM: 125 (down from 1840)
SJS: 0 (unchanged)
CM: 0.3 (down from 3.8)

Peach:

OFM: 14.0 (up from 9.5)
RBLR: 11.3 (down from 48.5)
LPTB: 22.3 (up from 20)
PTB: 0 (down from 3.5)

Other pest activity: Green apple aphid, white apple leafhopper. OFM and plum curculio strikes.

Beneficials at work: Green and brown lacewings, banded thrips, and orange maggot.

Site: Wayne County
Source: Ron Becker, Program Assistant, Agriculture & IPM, OSU Extension

Apple: 6/17 - 6/23

STLM: 200 (up from 71)
CM: 0.8 (down from 7.3)
OBLR: 0 (down from 4.5)

Peaches:

LPTB: 26 (up from 22)
PTB: 7 (first report)
RBLR: 0 (down from 7)

Other pest activity: ERM, two-spotted spider mite being found in the inner core of a few trees. Sprays have controlled aphids.

Raspberry and blueberry harvests have started. Strawberry harvest has ended. Some of the fruiting raspberry canes showing effect of winter injury, along with present drought.

Ohio Apple Scab, Fire Blight, and Sooty Blotch Activity- SkyBit Products

Because of the addition of the sooty blotch disease product, plus some formatting challenges with the e-mail version of this newsletter, we are trying a new look for this page. Thanks for your understanding and patience.

Central District

Apple Scab:
June 14 possible infection & damage; June 15-23 active but no infection
Based on Forecasts; June 30 active but no infection
June 24-29 possible infection and damage

Fire Blight:
June 14 possible infection and damage; June 15-17, 19 - 23 not active
June 18 active but no infection
Based on Forecasts; June 24-30, possible infection and damage

Sooty Blotch:
June 14 - 23, active but no infection
Based on Forecasts; June 24-30, active but no infection

Eastern Highlands

Apple Scab:
June 14-15 possible infection & damage; June 16-23 active but no infection
Based on Forecasts; June 24, 26, 30 active but no infection
June 25, 27-29 possible infection and damage

Fire Blight:
June 14-15 possible infection and damage; June 16, 19 - 23 not active
June 17-18 active but no infection
Based on Forecasts; June 25, 27-30 possible infection and damage
June 24, 26 not active

Sooty Blotch:
June 14 - 23, active but no infection
Based on Forecasts; June 24-30, active but no infection

Northeast District

Apple Scab:
June 14 possible infection & damage; June 15-23 active but no infection
Based on Forecasts; June 26, 30 active but no infection
June 24, 25, 27-29 possible infection and damage

Fire Blight:
June 14, 17 possible infection and damage**;** June 15, 16, 18 - 23 not active
Based on Forecasts; June 24, 25, 27-30 possible infection and damage
June 26 not active

Sooty Blotch:
June 14 - 23, active but no infection
Based on Forecasts; June 24-30, active but no infection

North Central District

Apple Scab:
June 14, 17 possible infection & damage; June 15, 16, 18-23 active but no infection
Based on Forecasts; June 26, 30 active but no infection
June 24, 25, 27-29 possible infection and damage

Fire Blight:
June 14 & 17 possible infection and damage; June 15, 16, 18 - 23, not active
Based on Forecasts; June 24, 25, 27-30 possible infection and damage
June 26 not active

Sooty Blotch:
June 14 - 23, active but no infection
Based on Forecasts; June 24-30, active but no infection

West District

Apple Scab:
June 14, 17 possible infection & damage; June 15, 16, 18-23, active but no infection
Based on Forecasts; June 26, 29, 30 active but no infection
June 24, 25, 27, 28 possible infection and damage

Fire Blight:
June 14 possible infection and damage**;** June 15, 18 - 23, not active
June 16, 17 active but no infection
Based on Forecasts; June 24, 25, 27-30 possible infection and damage
June 26 not active

Sooty Blotch:
June 14 - 23 active but no infection
Based on Forecasts; June 24-30, active but no infection

Degree Day Accumulations for Selected Ohio Sites January 1, 1999 to date indicated

	Actual DD Accumulations June 23, 1999		Forecasted Degree Day Accumulations June 30, 1999			
Location	**Base 43° F**	**Base 50° F**	**Base 43° F**	**Normal**	**Base 50° F**	**Normal**

Akron - Canton	1473	893	1698	1571	1070	973
Cincinnati	1832	1156	2065	2102	1340	1375
Cleveland	1463	895	1691	1519	1073	938
Columbus	1852	1206	2084	1788	1389	1138
Dayton	1715	1095	1950	1831	1281	1181
Elyria	1577	1010	1807	1618	1191	1019
Fremont	1363	831	1608	1548	1027	977
Mansfield	1464	891	1691	1549	1068	957
Norwalk	1474	915	1704	1513	1096	943
Toledo	1509	948	1733	1503	1123	936
Wooster	1516	930	1740	1479	1105	897
Youngstown	1333	786	1550	1434	954	867

Phenology

	Range of Degree Day Accumulations	
Coming Events	**Base 43° F**	**Base 50° F**
Lesser peachtree borer flight peak	733-2330	392-1526
Spotted tentiform leafminer (STLM) 2nd flight begins	795-1379	449-880
Obliquebanded leafroller 1st flight peak catch	869-1548	506-987
Apple maggot 1st catch	1045-1671	629-1078
Redbanded leafroller 2nd flight begins	1096-2029	656-1381
Codling moth 1st flight subsides	1112-2118	673-1395

Codling moth 2nd flight begins	1355-2302	864-1549
San Jose scale 2nd flight begins	1449-1995	893-1407
STLM 2nd generation tissue feeders present	1504-2086	952-1201

Thanks to Scaffolds Fruit Journal (Art Agnello)

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