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

THE OHIO STATE UNIVERSITY Newsletter Extension

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Calendar

July 27: Southern Ohio Vineyard and Winery Tour, starts at 2:00 p.m. at Painter Fork Vineyard, Bethel (Clermont Co.), continues at Kinkead Ridge Vineyard, Ripley (Brown Co.), then on to Moyer's Vineyard, Manchester (Adams Co.). Concludes with dinner at Moyer's Restaurant. Dinner reservations required by July 21. Please call Moyer's Restaurant (937) 549-2957. For more information contact Maurus Brown at OARDC (330) 263-3681.

August 5: Young Grower Tour, northwest Ohio. Designed for, but not limited to, producers and their spouses age 40 and under. The tour will showcase the innovative growing techniques of northwestern Ohio fruit and vegetable growers. Board buses beginning at 8:00 a.m. at the OARDC Vegetable Crops Branch 2 miles south of Fremont. Stops will include the Antesberger Farm, Knipp Farms, Hirzel Canning Company (where barbecue chicken and brat lunch will be served), Northern Ohio Pickle Company, Bench's Greenhouse, Rimelspach Produce Company. Buses return to OARDC-Fremont at approximately 4:30 p.m., where dinner will be served. Cost is only $10 per person. Call OFGS or OVPGA at (614) 249-2424.

Drought Conditions Persist

Sources:

http://www.nws.noaa.gov/oh/hic/current/drought/

http://www.cpc.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif

Conditions in Ohio as of July 17, 1999

Region	Category of Drought
NW Ohio	Severe
WCentral Ohio	Moderate
SW Ohio	Severe
SCentral Ohio	Extreme
Central Ohio	Extreme
NCentral Ohio	Severe
NE Ohio	Extreme
Central Hills	Severe
NE Hills	Extreme
SE Ohio	Extreme

Fruit growers, especially those without irrigation capabilities, have expressed concern about apple sizing under current drought conditions. Unfortunately, we don't have the power to affect the weather. Mike Ellis sends along these comments: "Even with the drought, growers need to maintain a good spray program for summer diseases; however, the spray interval should be extended, but should never exceed 21 days. If wet weather returns the spray interval should not exceed 14 days."

Woolly Apple Aphid

Sources: Ohio State University Extension HYG-2208-94, Celeste Welty, Entomologist, Janet Murphy, Graduate Research Associate

http://ohioline.ag.ohio-state.edu/hyg-fact/2000/2208.html

The woolly apple aphid, *Eriosoma lanigerum*, is one of several species of aphids that can infest apple trees in Ohio. Woolly apple aphid occurs sporadically; it is not usually found in most orchards in most years. Woolly apple aphid is native to eastern North America, and while it feeds mainly on apple, it is also found on elm, pear, quince, hawthorn, mountain ash, and cotoneaster. When elms were common, this insect alternated between elm as a winter host and apple as a summer host. Now that elms are rare, woolly apple aphid usually lives on apple throughout the year.

Damage

Woolly apple aphid is an indirect pest that weakens the tree by its feeding on bark and roots, which reduces tree health, prevents wounds from healing, and transmits perennial apple canker. Woolly apple aphid is also a direct pest when it infests fruit cores of some cultivars. It can also be a nuisance pest during harvest when its waxy covering brushes off the tree and onto clothing of pickers.

Colonies of woolly apple aphid form at wound sites on trunks, limbs, and twigs, where they feed on tender bark. As populations grow, aphids can be found around the axils of leaves on water sprouts or on terminal shoots. Swollen galls form on stems where aphids have fed. Foliage turns yellowish on infested

branches.

Another way woolly apple aphid damages apple is by contributing to the development of black sooty mold. As aphids feed, they excrete excess sap in a form known as honeydew. Honeydew on leaves and fruit provides a medium for growth of black sooty mold. Sooty mold on leaves can affect photosynthesis and may reduce fruit yield, while sooty mold on fruit can lower fruit quality and marketability.

In addition to feeding on small branches and wounds, woolly apple aphid may be found year-round on roots where they often go unnoticed. Mature trees usually suffer little damage. Yellowish foliage is a sign that woolly apple aphid may be infesting roots. The root systems of nursery stock can be damaged, nd severe root infestations can stunt or kill young trees. Infested trees often have short, fibrous roots, which predisposes them to being easily uprooted. Swollen galls also form on roots; galls increase in size from year to year and are sites where fungi can attack. Aphid feeding on the root systems also disrupts the nutrient balance of root tissue, which can affect growth of other parts of the tree. The underground form of woolly apple aphid is more damaging than the above-ground form. Trees can have above-ground infestations of woolly apple aphid but no root infestations.

Appearance

Like other aphids, woolly apple aphid is a small, soft-bodied insect with piercing-sucking mouthparts and two cornicles (or "tailpipes") projecting from the back of the abdomen. Woolly apple aphid in the wingless adult stage is dark brown-to-purplish and 1.8 mm long. Its cornicles are very short and look like elevated rings. Woolly apple aphid is so called because of its fuzzy appearance; aphids living above ground produce and surround themselves with long white waxy strings, while the underground form has a bluish-white covering of shorter rod-like wax particles. In the nymph stages, woolly apple aphid is reddish-brown and develops a bluish-white waxy covering as it grows. Nymphs are 0.6 mm when born, and reach 1.3 mm in their last stage. Eggs, which are rarely produced, are oval, 0.3 mm long, brown-to-purplish in color, and covered with a waxy substance.

Life Cycle

Woolly apple aphid usually overwinters in the nymph stages underground on apple tree roots, one to two meters beneath the soil surface. Nymphs and adults may be able to survive above ground in sheltered crevices of the bark during mild winters. In areas with many elm trees, woolly apple aphid overwinters in the egg stage in the cracks and crevices of elm bark.

In the spring, wingless females give birth to live nymphs. The first-stage nymphs are called crawlers because they are the most active of the four nymph stages. Crawlers allow colonies to disperse from roots to above-ground parts of the tree. Crawlers can be carried by the wind, birds, or other insects from tree to tree within an orchard or nursery. Crawlers also move downward to infest the roots. Once aphids complete four nymph stages, they reach the adult stage. Woolly apple aphid reproduces without mating during the spring and summer; female aphids give birth to large numbers of nymphs. Winged adult females are produced when colonies become crowded. There are several generations per year.

In the fall, some nymphs develop into wingless males that mate with wingless females. Each mated female then lays a single egg nearly the size of her body. Sexual reproduction is believed to occur only when elm grows near other hosts; sexual forms of woolly apple aphid and eggs are rarely produced on apple trees. Eggs on elm hatch in the spring into wingless females that, without mating, produce two generations that feed on elm. Such feeding causes clusters of stunted leaves to form at the tips of elm twigs. A winged third generation migrates to secondary hosts including apple, hawthorn, and mountain

ash.

Natural Control

Small parasitic wasps attack aphids; they lay their eggs in aphids by stinging with their ovipositor (egg-laying organ). The wasp egg hatches within the aphid, and the young wasp larva consumes the aphid. Parasitized aphids turn brown or black. In time, the wasp larvae emerge as adults from the aphids, leaving behind empty aphid skins. These skins, called "aphid mummies," can be found attached to leaves. *Aphelinus mali* is a tiny wasp native to North America that frequently parasitizes woolly apple aphid. This wasp is susceptible to insecticides; it can reduce woolly apple aphid populations in abandoned orchards where insecticides are not used, but usually cannot survive in commercial orchards where insecticides are used, particularly pyrethroids or carbamates. Other natural enemies of apple aphids include predators such as hover fly larvae, lacewing larvae, lady beetle larvae, and lady beetle adults. These predators feed on many different aphid species in addition to other insect pests. A cool, wet spring favors aphid development because these conditions are unfavorable for the aphid's natural enemies.

Cultural Control

Resistant varieties must be used to prevent underground infestations, as woolly apple aphid infestations on rootstocks cannot be controlled by insecticides. The Malling-Merton (MM) rootstock series provide resistance to woolly apple aphid attack. Some apple varieties such as Northern Spy are resistant to this pest.

Removal of suckers at the base of trees will create conditions that discourage development of woolly apple aphid populations in early-spring. Summer pruning of water sprouts also contributes to woolly apple aphid suppression.

Monitoring

Pruning cuts and water sprouts should be examined in late-spring and every few weeks throughout the summer for the presence of new colonies of woolly apple aphid. Specific action thresholds have not yet been developed.

Chemical Control

An insecticide can be applied if woolly apple aphid is detected at damaging levels on above-ground parts of trees. Insecticides are most effective if applied when the aphid is in the active crawler stage and is just moving up into the tree. This may occur in late-spring or not until mid-summer. Thorough coverage of the canopy is needed for insecticide to be effective. Because of the aphids' waxy covering, high volume application is needed to get thorough spray coverage. A second application may be needed two weeks after the first if aphids continue to be detected.

Insecticides used to control woolly apple aphid in commercial orchards are methyl parathion (Penncap-M), dimethoate (Cygon), endosulfan (Thiodan), or chlorpyriphos (Lorsban).

E-mailing Tables

For those people having difficulty with the e-mail version of this newsletter (particularly the tables and charts) Tim Murawski, newly appointed Northeast District Extension Associate, Computer Specialist, has related that Eudora is limited on its ability to ensure that the columns and rows will be aligned. An alternative has been provided since early spring by Bruce Eisley, Entomology Research Associate, by posting this newsletter at the site listed in the masthead.

Peachtree Borer Control

Contributed by Dr. Celeste Welty, Extension Entomologist & Associate Professor of Entomology, OSU

http://ohioline.ag.ohio-state.edu/hyg-fact/2000/2032.html

Pheromone traps have shown increasing catches of peachtree borer moths in recent weeks, which means it's a good time of year to think about borer control. Moths lay eggs under bark scales, and eggs hatch in 8-10 days into larvae that bore into the tree. Borers feed on the inner bark and tunnel between the inner bark and the sapwood. The bark eventually peels off of damaged areas. Damage weakens the tree and predisposes it to attack by other pests and diseases. Borers can kill young trees when trunks are girdled by feeding. The peachtree borer attacks healthy bark near the soil line, while the lesser peachtree borer attacks the upper trunk and scaffolds. For more detailed information, see fact sheets HYG-2032-94 on peachtree borer and HYG-2033-94 on lesser peachtree borer (http://ohioline.ag.ohio-state.edu/hyg-fact/2000/2033.html).

Protection from peachtree borer is most critical during the first 3 to 5 years after planting. Chemical control is preventive when insecticide is applied to trees before borer eggs hatch, so that small larvae contact a toxic residue as they crawl into trees. Control may be achieved by fumigant action of insecticide, which can kill larvae already in trees at the time of application.

The best time to treat with insecticide and the number of applications needed depend on whether trees are known to be infested with peachtree borer. The symptoms of infestation are gummy masses mixed with sawdust, usually found on the outer bark. Entries are often found where there are cankers or wounds caused by factors such as winter injury. One insecticide treatment is adequate in orchards where trees show little or no sign of peachtree borer infestation; the best time to treat is at the time of peak adult flight, which is usually in early August. In orchards where borer injury is found on most trees, two treatments should be made: the first about 10 days after adults begin to emerge (usually in late June) and the second at peak emergence about 6 weeks later (usually in early August).

Insecticide should be applied as a bark drench with a high volume, low pressure handgun. The insecticide should run down the trunk and soak the ground at the base of the tree. Any prunings, debris, or weeds at the base of trees should be removed so that they do not block the treatment. An insecticide with long residual action gives the best control of peachtree borer. Chlorpyrifos (Lorsban 4E) or endosulfan (Thiodan 3EC or Thiodan 50WP) may be used. One application of chlorpyrifos is effective for about 12 weeks; one application of endosulfan is effective for about 6 weeks. Lorsban must be applied to the bark and must not be applied to the fruit; it may be applied only once per year on peaches and nectarines or three times per year on cherries, and it may not be used within 14 days of peach or nectarine harvest or within 6 days of cherry harvest. Thiodan may be used two times per year and it may touch the fruit. Thiodan should not be used within 21 days of cherry harvest or 7 days of plum harvest. For peaches, nectarines, and apricots, the pre-harvest restriction for Thiodan is 21 days if used only on the bark, or 30 days if used on the fruit.

More Marketing Opportunities: Fruit in a Bottle

Dr. Diane Miller, Associate Professor, Department of Horticulture and Crop Science, OARDC, has been working with Paramount Distillers of Cleveland, Ohio to perfect the growing of fruit in a bottle. Paramount fills the bottle with high-proof alcohol after the fruit has reached maturity. The finished product sells at a premium, although Diane is not sure how many bottles are actually consumed. Rather, the attractive bottles are often placed on display in homes as conversation pieces.

The bottles are placed in apple, pear, or peach trees after the fruit has set, but before it has sized beyond the inner diameter of the neck. The bottle is tied to a spur or branch with the neck tilted down to exclude rain. Although the fruit is isolated from spray applications, Diane's success rate has been encouraging, especially with apples.

This year's bottled crop can be observed growing at OARDC, Wooster. Contact Dr. Miller at (330) 263-3824 or miller.87@osu.edu for more details. Her intention is to further perfect the growing of premium fruit before turning the procedure over to commercial growers. She advises that growers should establish a market before considering this enterprise. She believes for the right grower it may be a niche market worth considering.

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:7/14 - 7/21

RBLR: 10 (up from 0)
STLM: 2370 (down from 2755)
SJS: 1299 (up from 816)
CM (mean of 3 traps): 3.7 (down from 9.7)
AM: 0 (unchanged)

TABM: 1 (up from 0)
VLR: 1 (up from 0)
OBLR: 0 (unchanged)

Peaches:

OFM: 4 (down from 6)
LPTB: 0 (down from 4)
PTB: 0 (down from 2)

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

Apple: 7/14 - 7/20

RBLR: 3.8 (down from 10.0)
STLM: 249 (up from 225)
SJS: 25.6 (up from 0.6)
CM: 1.4 (up from 0.6)
OBLR: 8.0 (down from 9.0)
VLR: 1.0 (up from 0.3)
AM: 0.5 (up from 0.4)

Peach:

OFM: 35.0 (down from 38.3)
RBLR: 2.8 (down from 10.0)
LPTB: 32.0 (up from 30.0)
PTB: 6.8 (up from 4.8)

Other pest activity: green apple aphid, wooly apple aphid, potato leafhopper, Japanese beetle, Oriental fruit moth strikes

Beneficials at work: Lacewings everywhere, orange maggot, multitudes of *Stethorus punctum* and other lady beetles

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

Apple: 7/14 - 7/20

RBLR: 2.3 (down from 19.9)
STLM: 231 (down from 217)
SJS: 0.6 (down from 1.6)
CM: 0.7 (unchanged)
OBLR: 1.5 (down from 3.5)
VLR: 5.0 (up from 1.0)
AM: 0 (unchanged)

Peach:

OFM: 7.5 (down from 21.5)
RBLR: 9.0 (down from 42.0)
LPTB: 10.0 (up from 3.5)
PTB: 6.5 (up from 0.5)

Other pest activity: Green apple aphid, Japanese beetle, white apple leafhopper, two-spotted spider mite, potato leafhopper, Oriental fruit moth strikes, apple rust mite

Beneficials at work: Lacewing eggs everywhere, predator mites, orange maggot

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

Apple: 7/15 - 7/21

STLM: 39.2 (down from 49)
CM: 4.93 (up from 2.0)
RBLR: 7.0 (up from 5.5)
OBLR: 9 (1 site) (up from 0)
AM: 0 (unchanged)

Peach:

OFM: 35 (down from 60)
LPTB: 4 (down from 7)
PTB: 4 (down from 15)

ERM over threshold in one orchard. Two spotted spider mite noticeable in several blocks. Rescue treatment recommended in one heavily damaged block for STLM. Little pest activity in peaches. Japanese beetle continues to be a sporadic problem.

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

Central District

Apple Scab:
July 1-3, 6, 7, 10, 19-21 possible infection & damage
July 4, 5, 8, 9, 11-18 active but no infection
Based on Forecasts; July 22-23 possible infection and damage
July 24-28 active but no infection

Fire Blight:
July 1-7, 9, 10, 15 - 21 possible infection and damage; July 8, 12, 14 not active
July 11, 13 active but no infection
Based on Forecasts; July 22, 23, 25 - 28 possible infection and damage
July 24 not active;

Sooty Blotch:

July 1-21 active but no infection
Based on Forecasts; July 22 - 28 active but no infection

Eastern Highlands

Apple Scab:
July 1, 4, 5, 8, 11 - 19, 21 active but no infection
July 2, 3, 6, 7, 9, 10, 20 possible infection & damage
Based on Forecasts; July 22 possible infection and damage
July 23 - 28 active but no infection

Fire Blight:
July 1- 4, 6, 7, 9, 10, 14, 18 - 20 possible infection and damage
July 5, 8, 11 - 13 not active, July 21 active but no infection
Based on Forecasts; July 22, 23, 25-28 possible infection and damage
July 24 not active;

Sooty Blotch:
July 1-21 active but no infection
Based on Forecasts; July 22 - 28 active but no infection

Northeast District

Apple Scab:
July 1, 2, 6, 7, 9, 10, 19, 20 possible infection & damage
July 3 - 5, 8, 11-18, 21 active but no infection
Based on Forecasts; July 22, 23 possible infection and damage
July 24 - 28 active but no infection

Fire Blight:
July 1, 2, 6, 7 , 9, 10, 18 - 21 possible infection and damage
July 3 - 5, 8, 11 - 17 not active
Based on Forecasts; July 22, 23, 25 - 28 possible infection and damage
July 24 not active

Sooty Blotch:
July 1-21 active but no infection
Based on Forecasts; July 22 - 28 active but no infection

North Central District

Apple Scab:
July 1, 2, 6, 7, 10, 19 - 21 possible infection & damage
July 3 - 5, 8, 9, 11-18 active but no infection
Based on Forecasts; July 22 - 28 active but no infection

Fire Blight:
July 1, 2, 6, 7, 9, 10, 19 - 21 possible infection and damage;
July 3 - 5, 8, 11 - 18 not active
Based on Forecasts; July 22, 23, 25 - 28 possible infection and damage

July 24 not active

Sooty Blotch:
July 1-21 active but no infection
Based on Forecasts; July 22 - 28 active but no infection

West District

Apple Scab:
July 1, 2, 18, 20, 21 possible infection & damage
July 3 - 117, 19 active but no infection
Based on Forecasts; July 22, 24 - 28 active but no infection
July 23 possible infection and damage

Fire Blight:
July 1-3, 6, 9, 16 - 21 possible infection and damage
July 4, 5, 7, 8, 10 - 15 not active
Based on Forecasts; July 22, 23, 25 - 28 possible infection and damage
July 24 not active

Sooty Blotch:
July 1-21 active but no infection
Based on Forecasts; July 22 - 28 active but no infection

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

	Actual DD Accumulations July 21, 1999		Forecasted Degree Day Accumulations July 28, 1999			
Location	**Base 43° F**	**Base 50° F**	**Base 43° F**	**Normal**	**Base 50° F**	**Normal**
Akron - Canton	2363	1588	2606	2379	1782	1586
Cincinnati	2774	1902	3033	3033	2112	2111
Cleveland	2367	1603	2609	2323	1796	1547
Columbus	2828	1986	3086	2646	2195	1801
Dayton	2651	1834	2907	2710	2041	1865
Elyria	2494	1731	2739	2451	1876	1657
Fremont	2268	1540	2535	2377	1758	1611

Mansfield	2304	1535	2556	2356	1737	1569
Norwalk	2378	1623	2623	2316	1819	1551
Toledo	2425	1668	2678	2313	1872	1551
Wooster	2411	1629	2654	2252	1823	1474
Youngstown	2182	1439	2411	2195	1619	1432

Phenology

	Range of Degree Day Accumulations	
Coming Events	**Base 43° F**	**Base 50° F**
Codling moth 2nd flight peak	1587-3103	1061-2212
San Jose scale 2nd flight peak	1934-2591	1271-1874
Apple maggot flight peak	2033-2688	1387-1804
Obliquebanded leafroller 2nd flight begins	2124-3040	1412-2076
Oriental fruit moth 3rd flight begins	2172-2956	1553-2013
Peachtree borer flight subsiding	2230-3255	1497-2309
Redbanded leafroller 3rd flight begins	2389-3113	1722-2209
Spotted tentiform leafminer 3rd flight peak	2415-3142	1728-2231
San Jose scale 2nd flight subsides	2494-3257	1662-2303
Redbanded leafroller 3rd flight peak	2514-3225	1818-2625

Thanks to Scaffolds Fruit Journal (Art Agnello)

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