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

THE OHIO STATE UNIVERSITY Newsletter Extension

Fruit ICM News

Volume 4, No. 21
July 13, 2000

In This Issue:

Calendar

July 25: Fruit Production Twilight Farm Meeting, Highwater Orchard, 2010 Lundys Lane, 8 mi. north of Granville, 5 PM till dark. Tom Harrison, ODA & Mike Ellis, OARDC will discuss status & risk management of the Plum Pox Virus in peaches. Bayer Corporation will supply a light supper and will highlight their products for fruit and pumpkin crop protection. From 7-9 PM participants will tour the farm and share ideas with Dr. Mac Reidel, OSU Plant Pathologist (reducing late summer disease pressure in pumpkins), Dr. Dick Funt (minimizing mistakes in small fruit irrigation), and Dr. Mike Ellis (managing disease in fruit crops in late summer and post harvest). Sponsored by OSU Extension, Licking County. Call for more information (740) 349-6900. Note: St. Rte. 661 north of Granville is closed; use an alternate route.

July 27: Apogee Twilight Meeting, in Wooster at OARDC Hort Unit 2, at 6 PM. Apogee is a new growth regulator that not only reduces growth, but also reduces the degree of fire blight infection. See the effect of this material on young Fuji and Golden Delicious trees. BASF will provide a lunch followed by a tour of the plots. In addition, there will be an opportunity to see the relative sensitivity to fire blight of a number of promising new apple cultivars. This will be an excellent opportunity to see first-hand the effects of this new management tool under a severe natural fire blight infection.

July 27-28: Ohio Berry Tour, Central Ohio. Learn more about growing & marketing berries. This drive yourself tour begins on Thursday at 2:30 pm at Rhoads Farm Market on SR 56 east of Circleville. Then head northwest to Circle S Farms located west of Grove City on London-Groveport Road. The tour offers dinner at Circle S Farm on Thursday evening, along with discussions with Dr. Dick Funt and Dr. Mike Ellis of OSU. Friday's tour begins at 9:00 AM at Schacht Farm Market on Shannon Road in Canal Winchester, and also includes stops at Doran's Farm Market on Babbitt Road outside of New Albany and Jacquemine Farms on Hyland-Croy Road near Plain City. Cost of the tour is $15 per person including dinner Thursday evening. For those not participating in the dinner meeting, the cost is $5 per person. Contact Berry Coordinator Sandy Kuhn at (800) 297-2027 or kuhn.37@osu.edu for a registration form (or print it from our website (above).

August 3: OVPGA & Ohio Fruit Growers Society Young Grower Tour, in northeast Ohio, 8:30 a.m. to 7:30 p.m. This bus tour provides a broad variety of fruit and vegetable operations that use different marketing strategies. Tour is designed for growers 40 years of age and younger, and others are welcome if interested. Contact John Wargowsky at (614) 249-2424 or jwargows@ofbf.org for more information.

Ronilan Registration Changes

Source: Dr. Mike Ellis, Dept. Of Plant Pathology, OSU, OARDC, Wooster

Ronilan fungicide loses registration for use on raspberries:

I recently received the following information from BASF Corp. We are losing the registration for Ronilan fungicide on raspberries for control of Botrytis fruit rot. I have not heard anything about Rovral registration on brambles. Hopefully, we will not lose Rovral for use on Brambles. I will try to keep growers informed as I learn more.

Letter from BASF Corp:

As you know, the Food Quality Protection Act (FQPA) created new challenges for the crop protection chemical industry by requiring the U.S. Environmental Protection Agency (EPA) to reassess use patterns and risk for crop protection products currently on the market.

During the re-registration process, EPA has reevaluated data concerning vinclozolin employing newly developed FQPA risk assessment standards. As a result, we can not maintain all current and proposed labeled uses of **Ronilan® fungicide** and still satisfy the conservative standards of FQPA. This factor must be accounted for in order to complete the reregistration of vinclozolin-containing products.

BASF has therefore proposed a phase out of some of the uses of Ronilan. The most immediate of these actions involves the removal of the use on onions and raspberries from the Ronilan label. Our actions are prompted by an effort to comply with the new FQPA safety standard and not by any new data concerning vinclozolin.

The key points which you need to understand are as follows:

1. BASF will propose cancellation of Ronilan use on onions and raspberries effective July 15, 2000.

2. Use on onions and raspberries will be allowed until January 1, 2001.

3. Commodities legally treated up to January 1, 2001 would be allowed into the channels of trade past January 1, 2001 in accordance with the Federal Food, Drug, and Cosmetic Act (FFDCA) Section 408(1)(5).

4. All new Ronilan products entering the channels of trade after the summer of 2000 will reflect the removal of these crops from the label.

5. There will be no product recalls. The existing stocks provisions will allow for stickering or relabeling of remaining stocks at distributor and retailer sites.

6. In addition BASF will request cancellation of Ronilan® fungicide use in kiwi and Belgian endive (chicory) effective December 31, 2001.

US and Ohio Peaches

Source: Richard C. Funt, Ohio Small Fuit Team, OSU, Columbus

Nationally, retail price for peaches increased 54 percent since 1989. However, prices in July increased more than prices in September. Much of the increase in price has occurred since 1994, however, the 1999 price was the highest since 1990.

In 1999 Ohio produced an average of 9,670 pounds of peaches per acre, up from a 5-year average of nearly 7,400 pounds. The national average for the last five years ranged from 7,590 to 11,600 pounds per acre. Ohio has about 900 acres of peaches and produced 8.7 million pounds in 1999. Growers received an average of 44 cents per pound. Nationally, growers received 32 to 38 cents per pound for fresh market peaches. Growers received 27 to 32 percent of the consumer price. The top five producing states, California, Georgia, New Jersey, Pennsylvania and South Carolina, account for more than 80 percent of the total production in 1999. California's share of fresh market shipments is now over 70 percent of all peaches shipped. However, total national bearing acreage has decreased by 15 percent and per capita consumption has decreased since 1987. Ohio had four percent of the total farms producing peaches in 1997, but California had 18 percent of peach farms and 43 percent of the national acreage. For 2000 Ohio should enjoy another good peach crop despite the drought of 1999. Most growers used irrigation in 1999. Young trees are reaching maturity, which allowed 1999 to be the highest production in 10 years. Overall yields in Ohio may be down slightly due to frost and an early bloom period. However, fruit size should be excellent due to adequate rainfall. Most growers will be heavily hand thinning fruits, particularly most late-ripening cultivars in Ohio such as Red Haven, Reliance, Harcrest and Encore.

Blueberry - Soil Amendment and Mulch

Source: Richard C. Funt, Ohio Small Fuit Team, OSU

Many questions arise about the best soil amendments at planting for blueberries. After planting, questions concern the best type of mulch to use. All of this has to do with the understanding of the roots of blueberries and the plants' need for water.

Blueberry roots grow when the soil temperature is above 43° F, the optimal temperature is 60° F. Soil temperatures in summer exceed 60° F. Summer soil temperatures can be modified with mulching, microirrogation, and shade from tall plants. The greatest root growth is in early spring and late fall. Fruit size is a factor of root growth, shoot diameter, and water. Fruit size can be increased by 35% with water movement into the fruit.

When starting blueberry plants from hardwood cuttings (February to early March) use a 50/50 mixture of sand and peat moss. Be sure to start plants on a structure or in a container above ground to allow water to drain. Maintain mist or sprinkle irrigation.

At planting, use an auger 12 to 18 inches wide and dig 12 to 18 inches deep. Back fill to the upper 6 to 8 inches and then mix in peat moss at 1/4 to 1/2 cubic foot of 'fluffy' material. In general this top soil area should not exceed a 50/50 soil/peat moss mix by volume. Peat moss is acidic and holds 1,000 times its weight in water. Other recommendations are a pound of wet peat moss per plant because dry peat will not wet throughly and can draw moisture from the roots. Incorporating peat into the entire row is expensive but beneficial. Irrigate the planting with one inch of water immediately after planting.

Do not use sawdust or similar material in the planting hole. Green sawdust can damage (burn) roots and rotted sawdust can stunt plant growth because of its ability to use or take nitrogen away from the plant. In other words, sawdust creates a high carbon to nitrogen ratio in the soil. It depresses soil nitrogen. Sawdust mulch is superior to wood chips. Mulch can be applied soon after planting to suppress weed seed germination and preserve moisture around young plant roots. Again, fresh (green) sawdust can heat up (microbial activity) and burn blueberry stems. It is best to 'compost' green sawdust by establishing piles at least 4 to 6 feet high and adding nitrogen to speed up the process. Generally, 6 to 24 months of composting the sawdust may be necessary before applying it to blueberries. If certain sawdust, such as maple, walnut or other high tannin wood, is composted properly (turning, etc) there is no harmful effect to blueberries. It is often recommended that pine, oak, or similar hard wood sawdust be used.

Generally, 2 oz. of ammonium sulfate per plant are suggested after planting or about 18 pounds of actual N per acre. This can be split in half (1 oz) where half is applied at the first new growth and the second half is applied 4 to 6 weeks later. Sawdust is applied after the second application. At that time there is less of an effect of the sawdust on the nitrogen uptake, and the cooling effect of sawdust is utilized during the hot summer months.

An extensive study on Douglas Fir sawdust in Oregon presents some information about surface and incorporated effects of sawdust on plant growth and soil properties. Clean cultivation, 3 inches of surface mulch, and 3 inches sawdust mixed with soil and then sub-treatments of nitrogen, phosphorus and potassium were used. Soil samples were taken from 0 to 5 inch depths. The findings were:

1. Soil pH decreased as the amount of ammonium sulfate increased. Soil pH decreased from 6.0 to 5.0 with 400 pounds/acre of ammonium sulfate for each year for a total of 4 years.

2. Both sawdust and nitrogen increased total soil nitrogen. Greater soil nitrogen occurred with incorporation of sawdust.

3. Sawdust decreased nitrate content. Under wet and poorly aerated sawdust plots, incorporated sawdust depressed nitrogen due to high carbon.

4. Incorporated sawdust decreased extractable phosphorus.

5. Sawdust increased organic matter.

6. Sawdust increased total carbon in the soil.

7. Neither sawdust nor applied nitrogen affected soil potassium.

Sources: Brown, G.R. and D. Wolfe. 1999 Blueberry Physiology. Northland Berry News 13:3: 1-15.

Kirsch, R.K. 1959. Effects of sawdust mulches. Tech. Bul 49. Oregon State Agric. Expt. Station.

The Truth Is Out There: X-Disease in Peaches and Cherrries

Source: Dave Rosenberger, Plant Pathology, Cornell Univ., Highland, Scaffolds Fruit Journal No. 17

X-disease is causing continued losses in some stone fruit orchards in the Hudson Valley. X-disease often follows a 10-15 year cycle in which extensive losses over a 4 to 6 year period are followed by a gradual decline in disease incidence until the next cycle begins. The reason for this cyclical pattern has never been determined. A significant increase in X-disease was noted in the Hudson Valley in 1997, and losses mounted in 1998 and 1999. The incidence of new X-disease infections may remain high for several more years before the current cycle reaches its zenith.

A general description of X-disease epidemiology and the symptoms that it causes was published in *Scaffolds* Vol. 8, No. 14, 21 June 1999. http://www.nysaes.cornell.edu/ent/scaffolds/1999/6.21_diseases.html Most of that background information will not be repeated here. Instead, this article will include a review of some published literature on X-disease transmission and suggested approaches for reducing the spread of X-disease.

X-disease is caused by a phloem-limited mycoplasma-like organism (XMLO) - a minute pathogenic organism smaller than most bacteria. The XMLO is transmitted by at least eight species of leafhoppers found in New York, but two species predominate. *Scaphytopius acutus* is the most important vector in the Hudson Valley and Connecticut. *Paraphelpsius irroratus* ranks a close second. In Michigan, the relative importance of the two species is reversed. (White-apple leafhopper, rose leafhopper, and potato leafhopper are not vectors.) X-disease vectors acquire the XMLO while feeding on diseased chokecherry bushes, on infected sweet cherry trees, or on wild seedlings of sweet cherry. They may also acquire XMLO from some broad-leaf weeds and grasses, although the importance of weeds in X-disease epidemiology remains unclear. In eastern United States, vectors do NOT acquire the XMLO from diseased peaches, probably because the titer of the disease organism within diseased peach trees is so low that leafhoppers do not encounter the organisms while feeding.

After leafhopper vectors feed on an infected plant, the X-disease organism must grow within the insect for at least 20 days before the insect can transmit X-disease to another plant. Once that 25-day incubation period is completed, however, the leafhoppers with X-disease remain infective for the rest of their lives. In laboratory studies, leafhoppers have often lived for 30-40 days after they become infective. A single infective insect therefore has the potential to infect numerous plants.

In work completed in Connecticut in the late 1970's, McClure (1980a) showed that *S. acutus* prefers to feed and breed on red clover, strawberry, blackberry and multiflora rose rather than on peach or chokecherry. *S. acutus* neither fed nor laid eggs on orchard grass. Adult *S. acutus* apparently move into

peach trees from the ground cover or from border areas rather than completing their full life cycle on peaches. McClure (1980b) also showed that the total numbers of adult X-disease vectors (all species) in peach trees was dependent on the kind of groundcover in the orchard. Vector populations were at least 50% lower in peach orchards that had a pure grass groundcover than in peach orchards that contained herbaceous host plants for the leafhoppers.

In Michigan, Larsen and Whalon (1987) showed that the vector *P. irroratus* moves from ground cover into stone fruit trees at dusk, then returns to the ground cover at dawn. *P. irroratus* breeds on grasses in the ground cover. Nymphs feed on grass stems just above the soil line and therefore often escape exposure to insecticide sprays applied to orchard trees. Both *P. irroratus* and *S. acutus* have two generations per year with adult populations peaking in July and again in September. The role of herbaceous weeds in X-disease epidemiology remains uncertain. Chiykowski and Sinha (1982) conducted greenhouse studies with caged leafhoppers. They showed that *P. irroratus* could transmit XMLO both to and from ragweed, lambs quarter, black mustard, red clover, Ladino clover, birdsfoot trefoil, narrow-leaf plantain, and several other herbaceous plant species. However, the importance of these weed hosts in the field spread of X-disease remains undocumented. McClure (1980b) reported that spread of X-disease was lower in orchards that did not have broadleaf weeds, but that difference may have been attributable reduced vector numbers in orchards that lacked hosts suitable for vector reproduction.

Researchers in California studied the spread of X-disease in sweet cherry orchards from 1986 to 1990 to determine how removal of diseased trees and applications of residual insecticides to control vectors would affect spread of X-disease (VanSteenwyk, 1995). They found that removal of diseased trees as soon as infections were identified was the best way to slow spread of the disease. Removal of diseased cherry trees accounted for 75-84% of the reduction in disease spread, whereas insecticide treatment to kill vectors accounted for only about 7% of the reduction. The strain of XMLO in California is slightly different from that in eastern United States, and vector species and orchard ecology (irrigated versus non-irrigated) also differ between the two areas. However, the California work suggests that vector control alone will not provide good control of X-disease in sweet cherries.

The published literature on X-disease leaves many practical questions unanswered. Again, management decisions must be made based on "educated guesses" derived from published studies. I suggest that stone fruit growers in regions of the eastern US where X-disease is a problem consider the following strategies to minimize losses to X-disease:

1. The most effective protection against X-disease is to isolate peach plantings and new cherry plantings from all of the known woody hosts for X-disease. Woody hosts that can contribute inoculum include older blocks of sweet cherries and tart cherries, as well as chokecherries and volunteer Mazzard seedling trees that may grow in hedgerows. A single infected chokecherry or Mazzard seedling within 500 ft. of a young orchard can contribute enough inoculum to cause major losses.

2. Broad-leaf weeds have been implicated both as host plants for reproduction of vectors and as potential inoculum sources of the XMLO. Importance of the latter in X-disease epidemiology is uncertain, but controlling these weeds is relatively inexpensive. Postharvest applications of 2-4D herbicide to the row middles will eliminate most broad leaf weeds. (In sweet cherries, this application should be made as soon as possible after harvest to eliminate broad leaf weeds before the second generation of vectors matures in September.) Because broad-leaved weeds are the preferred hosts for the *S. acutus* vector, killing weed hosts with 2-4D could possibly stimulate movement of vectors into the trees and thereby contribute to the further spread of X-disease. To avoid that possibility, an insecticide that is effective for controlling leafhoppers should probably be applied at the same time that the 2-4D is applied.

3. Infected cherry trees should be removed as soon as X-disease symptoms are noted. This may be difficult with cultivars of cherry that do not produce distinct symptoms. However, failure to remove infected cherries almost guarantees a continuation of the epidemic.

4. In regions where X-disease is endemic, cherry growers may need to consider propagating cherry trees with Mahaleb stem pieces or on other rootstocks that will cause trees to die when they become infected. When sweet cherry trees propagated on Mahaleb rootstock become infected with X-disease, the scion variety dies back to the graft union within about a year after they are inoculated. This occurs because the Mahaleb rootstock is hypersensitive to the XMLO. In California, some sweet cherry growers have used high-budded trees on Mahaleb rootstock. A separate scion bud or graft is used to generate each scaffold limb. In these trees, X-disease in a single scaffold causes death of that scaffold without causing infection or loss of the entire tree. The advantage of this approach is that the inoculum source (infected cherry) dies fairly quickly after infection rather than persisting for many years as currently occurs when sweet cherries on Mazzard rootstocks become infected.

Sweet cherry trees on Mahaleb rootstock tend to have small fruit size. However, it might be possible to use a short Mahaleb stem piece or some other rootstock that is hypersensitive to X-disease. This approach would be particularly useful for eliminating X-disease from sweet cherry cultivars that produce indistinct symptoms. Propagating multi-piece trees might be cumbersome, but it deserves further research because growers can ill afford to lose young cherry blocks to X-disease just as these trees are coming into production.

In all probability, no single approach will provide adequate control of X-disease. An integrated approach that combines all or most of the actions suggested above may be the only effective way to reduce losses to X-disease in the Hudson Valley.

Literature cited

Larsen, K. J., and M. E. Whalon. 1987. Crepuscular movement of *Paraphlepsius irroratus* (Say) (HomopteraCicadellidae) between the groundcover and cherry trees. Environmental Entomology 161103-1106.

McClure, M. S. 1980. Role of wild host plants in the feeding, oviposition, and dispersal of *Scaphytopius acutus* (HomopteraCicadellidae), a vector of peach X-disease. Environmental Entomology 9265-274.

McClure, M. S. 1980b. Spatial and seasonal distributions of leafhopper vectors of peach X-disease in Connecticut. Environmental Entomology 9668-672.

Van Steenwyk, R. A., B. C. Kirkpatrick, A. H. Purcell, C. F. Fouche, J. A. Grant, and J. K. Uyemoto. 1995. Evaluation of an abatement program for western X-disease in sweet cherry. Plant Dis. 791025-1028.

Blister Spot *Pseudomonas syringae pv. papulans*

Source: http://www.caf.wvu.edu/Kearneysville/disease_descriptions/omblist.html

Introduction

This bacterial disease is of economic importance mainly on the cultivar Mutsu (Crispin) but can be seen on Golden Delicious when grown adjacent to Mutsu. Even though fruit grow to maturity and no detectable yield loss occurs, severe infection results in ugly fruit and greatly reduces fresh market quality.

Symptoms

Infections of blister spot are first noticeable two to three months after petal fall as small, green, water-soaked, raised blisters that develop at fruit stomata. These spots result in purplish black lesions associated with fruit lenticels. As the fruit increase in size, the lesions expand to about 3/16 inch (5 mm) and become darkened. A mid-vein necrosis of Mutsu apple leaves has been observed prior to fruit lesion development.

Disease Cycle

The bacterium overwinters in a high percentage of apple buds, leaf scars, and diseased fruit on the orchard floor. Throughout the growing season, the bacterium can survive as an epiphyte on foliage and fruit in the orchard. Even though the highest populations of the pathogen have been found on Mutsu, the bacterium has also been detected on foliage and fruit of other apple cultivars. Young Mutsu fruit show an increased susceptibility to infection for about six weeks, beginning about two weeks after petal fall.

Monitoring

Earliest spots can be detected near the calyx end of the fruit that face the sun and are on the periphery of the tree, beginning about mid- to late June in southern fruit-growing areas and mid- to late July in northern areas.

Management

The disease is mainly a problem on the apple cultivar Mutsu. When Mutsu is interplanted with other (normally) resistant apple cultivars (i.e. Red Delicious, Cortland, and others), the pathogen may spread into these, also. Prior to the development of streptomycin-resistant strains of the pathogen, the disease could be controlled with three well-timed antibiotic sprays, the first applied no later than 2 weeks after petal fall, and the others applied weekly thereafter. This strategy is still employed in orchards without resistant strains; however, resistant strains may develop after only a few years of antibiotic use. Once resistance to the antibiotic develops, further use of antibiotic is ineffective.

Plum Pox Found in Canada

Source: Healthy Fruit, Volume 8, Number 16, University of Massachusetts Tree Fruit Team

According to a report by the Canadian Food Inspection Agency (CIFA), plum pox virus (PPV) has been found in a block of Fantasia nectarines in Niagara, Ontario, Canada. The origin of the infected trees is Adams County Nursery in Pennsylvania, where PPV was first detected in North America last fall. As you are probably aware, a comprehensive survey of stone fruit throughout North America for PPV is being coordinated by USDA and CIFA this growing season, with the goal of confirming or denying the spread of PPV outside of Adams County Pennsylvania. PPV is a serious viral disease (with no cure) of commercially important peaches, nectarines, and plums. Hence, the ambitious effort to determine the

extent of its existence in North America is underway. Umass Extension IPM Specialist Craig Hollingsworth reports that the PPV survey in Massachusetts was complete as of July 6. UMass, Massachusetts Department of Food and Agriculture, USDA, and Polaris Orchard Management combined forces to sample peaches at 31 locations in ten Massachusetts counties for a total of 322 samples. Craig says all samples have been analyzed for PPV and all were negative for the virus. This is good news; however, we await results from the rest of the country to establish PPV's presence or absence elsewhere. (See http://www.umass.edu/umext/programs/agro/tree_fruit/Team_members/clements/plumpoxsurvey.html for more details on the PPV survey in Massachusetts, or the official PPV web site).

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, and 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.

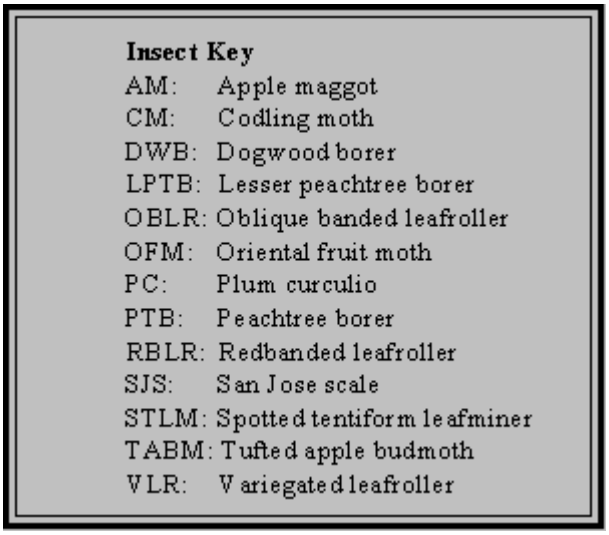
In the fall, some nymphs develop into wingless males that mate with wingless females. Each mated female then lays a single egg nearly the size of her body. Sexual reproduction is believed to occur only when elm grows near other hosts; sexual forms of woolly apple aphid and eggs are rarely produced on 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.

To be continued . . .

Fruit Observations



Site: Waterman Lab, Columbus (7/6-7/12)
Source: Dr. Celeste Welty, OSU Extension Entomologist
Traps used: STLM=wing traps, SJS=Pherocom-V, Others=Multipher-1® traps

Apple	**Peach**
RBLR: 0 (down from 1)	OFM: 27 (up from 13)
STLM: 459 (up from 189)	LPTB: 1.5 (up from 0)
DWB: 1.0 (down from 1.5)	PTB: 6.5 (down from 7.0)
SJS: 0 (unchanged)	
CM: 5.7 (up from 4.0)	
OBLR: 0 (unchanged)	
TABM: 0 (unchanged)	
VLR: 0 (unchanged)	
AM: 0 (down from 0.3)	

Site: East District; Erie & Lorain Counties
Source: Jim Mutchler, IPM Scout
Traps Used: STLM=wing traps, SJS=Pherocon-V, Others=Multipher® traps

Apple	**Peach**
RBLR: 4.4 (down from 6.4)	OFM: 8.3 (up from 6.0)
CM: 0.8 (down from 2.3)	RBLR: 4.3 (up from 4.0)
SJS: 62.5 (up from 0)	LPTB: 19.3 (down from 29.0)

AM: 0.8 PTB: 7.3 (up from 6.0)

Other pests: blister spot, green apple aphid, Japanese beetle, fire blight, scab, white apple leafhopper

Beneficials at work: lacewing eggs, larvae, & adults, orange maggots, lady beetles, *Stethorus punctum,*

Site: West District; Huron, Ottawa, & Sandusky
Source: Gene Horner, IPM Scout
Traps Used: STLM=wing traps, SJS=Pherocon-V, Others=Multipher® traps

Apple	**Peach**
RBLR: 10.5 (down from 18)	OFM: 7.8 (up from 5.25)
SJS: 0.0 (unchanged)	RBLR: 12.5 (down from 20.8)
CM: 0.4 (down from 1.6)	LPTB: 18 (up from 15.5)
	PTB: 4.8 (up from 2.8)

Other pests: green apple aphid, lilac borer, potato leafhopper, Japanese beetle, leafroller & fruit moth damage

Beneficials at work: Lacewing eggs & adults, banded thrips, lady beetles *Stethorus punctum*, black hunter thrips

---

Site: Wayne County (7/7-7/13)
Source: Ron Becker, Extension Program Assistant
Traps used: STLM=Wing traps, PC=Circle trunk trap, Others=Multipher® traps

	Apple			
	North	South	East	West
RBLR:	3	8	12	3.5
STLM:	220	60	3	52.5
CM:	1.3	1.2	3	1.2
PC:	0			0

	Peach		
	North	South	West
OFM:	2	32	15.5
LPTB:	0	1	0
PTB:	1	6	3

Orchard observations: Light red mite infestations, light aphids, leaf miners, white apple leafhopper and two-spotted spider mites. Japanese beetles causing moderate to heavy fruit and foliage damage in perimeter rows. Beneficials present include lady bugs, lacewings, minute pirate bugs, banded thrips.

Northern Ohio Apple Scab Activity - SkyBit Product

SkyBit based on observations: July 3, 4 10, 11; possible infection & damage

Based on Forecasts: July 14-16; possible infection & damage

North Central Ohio Spectrum Technologies Orchard Monitors for Apple Scab
Spectrum Technologies Monitors and Software* Observations**:** July 4, 11; Medium Infection
(Software* based on Modified Mills Chart)

Northern Ohio Fire Blight Activity - SkyBit Product

SkyBit based observations: July 3, 4, 9-11; possible infection and damage

Based on Forecasts: July 14-22; possible infection & damage

Northern Ohio Sooty Blotch - SkyBit Product

SkyBit based observations: July 4-12; possible infection and damage

Based on Forecasts: July 13-22; possible infection & damage

Degree Day Accumulations for Selected Ohio Sites January 1, 2000 to date indicated

	Actual DD Accumulations July 12, 2000		**Forecasted Degree Day Accumulations July 19, 2000**			
Location	**Base 43° F**	**Base 50° F**	**Base 43° F**	**Normal**	**Base 50° F**	**Normal**
Akron - Canton	1996	1242	2203	2119	1399	1388
Cincinnati	2483	1644	2721	2733	1832	1874
Cleveland	2004	1265	2210	2064	1421	1351
Columbus	2431	1607	2650	2370	1777	1588
Dayton	2367	1546	2592	2427	1721	1645
Mansfield	2003	1258	2209	2096	1414	1372
Norwalk	2086	1338	2291	2057	1493	1355
Toledo	2066	1299	2273	2052	1456	1353

Wooster	2097	1323	2294	2003	1470	1288
Youngstown	1925	1175	2119	1949	1319	1250

Phenology

	Range of Degree Day Accumulations	
Coming Events	**Base 43° F**	**Base 50° F**
Codling moth 2nd flight peak	1587-3103	1061-2212
Oriental fruit moth 2nd flight subsides	1806-2783	1164-1963
Redbanded leafroller 2nd flight subsides	1927-3045	1291-2160
San Jose scale 2nd flight peak	1934-2591	1271-1874
Spotted tentiform leafminer 3rd flight begins	2215-2783	1558-2123

Thanks to Scaffolds Fruit Journal (Art Agnello)

The Ohio Fruit ICM News is edited by:

Ted W. Gastier
Extension Agent, Agriculture
Tree Fruit Team Coordinator
Ohio State University Extension Huron County
180 Milan Avenue
Norwalk, OH 44857
Phone: (419)668-8210
FAX: (419)663-4233
E-mail: gastier.1@osu.edu
