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

THE OHIO STATE UNIVERSITY Newsletter Extension

Fruit ICM News

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In This Issue:

Supplemental Label for Strawberry

Source: Richard C. Funt, Extension Small Fruit Specialist, Ohio State University, Columbus

Previously, Prism, which is a post-emergence, selective herbicide for non-bearing strawberry production, was to be applied one year before harvest. Now Select 2EC herbicide (same product as Prism) can be applied within 4 days of harvest. At the rate of 6 to 8 ounces per acre, Select 2EC plus a non-ionic spreader can control such grasses as quackgrass, crabgrass, foxtail, and barnyard grass. Generally, grasses need to be 4 to 6 inches or taller for maximum absorption. Grasses should be actively growing, which indicates good soil moisture and temperatures above 55F. Repeat applications may be necessary. Select can be effective if applied one hour before rainfall.

The supplemental label indicates that the use of crop oil with a 17% emulsifier is to be added to the tank mix. Crop oil can cause some injury to strawberry plants at certain temperatures (below 45F or above 80F). Ohio State specialists generally recommend a non-ionic spreader rather than crop oil. A non-ionic spreader can be just as effective as crop oil, with less risk of leaf damage; however, Valent Corporation indicates that crop oil can be more effective on weed control and will not accept responsibility for the use of a non-ionic spreader, if control is unsatisfactory to the grower.

Surround for Plum Curculio Control

Source: Celeste Welty, OSU Extension Entomologist, & Joe Kovach, OSU Extension IPM Coordinator

Suppression of plum curculio is one of the uses for Surround WP, a crop protectant that was registered last year. Its active ingredient (95%) is kaolin, which is a common food additive. Trees thoroughly and repeatedly sprayed with Surround use what is called "particle film technology" to form a physical barrier between the crop and pests. For more details about the product, see our *Ohio Fruit ICM News*, March 31, 2000.

In a small field trial at Columbus last year, we applied Surround to five single tree replicates of 7-year old Golden Delicious, Liberty, and Jonathan on the schedule recommended for plum curculio control: four sprays at 5-7 day intervals starting at petalfall. Our spray dates were 4/28 (petalfall), 5/3, 5/9, and 5/11 (first cover). We used a backpack sprayer with 0.5 lb product per gallon of water, applied dilute at 0.6 gallon of spray mix per tree. Trees in this treatment were not treated with any insecticides after first cover. Plum curculio pressure was moderate. At harvest, fruit damage by plum curculio was not significantly different between untreated check trees (6.2% damage) and trees treated four times with Surround (6.6% damage).

In apple field trials at other locations in other years, Surround has significantly reduced damage by plum curculio to about 5-10% damage from around 25% if untreated. Apparently the material is most useful under conditions of high pest pressure. It does not seem to do as good a job as conventional organophosphates at reducing damage from curculio at low to moderate pest pressure. The product should be of interest to organic growers who have few alternatives for reducing damage from this pest.

Completely Organic Experience

Source: David Combs, Harvey Reissig and Art Agnello, Entomology, Geneva, NY; Scaffolds #3, 2001

As the concern grows over what materials and how much of them are being used in commercial tree fruit production, so does the tireless effort of manufacturers attempting to find new materials that are "lower risk". The issues brought about by the FQPA, along with resistance problems from various pests, have gotten agricultural chemical companies scrambling to find alternative materials that will not only satisfy the concerns over potential environmental and health problems, but also give acceptable pest control as well. As you are already probably aware, there is an influx of new materials that have flooded the market, and also those that are currently pending registration. Along with this push for safer insecticides, the public and growers alike have shown interest in organically produced fruit. Several growers throughout New York State have already started to plant new blocks with an organic certification in mind.

Trials conducted at the Geneva Experiment Station during the 2000 growing season examined some of these organic materials in a season-long spray program to test whether these materials could have a positive bearing on the fruit industry in New York. This experiment was designed to give somewhat of an overview of what the materials were capable of against the predominant pests of the region. The treatments consisted of weekly sprays from mid-May through late August of Surround WP, a hydrophobic clay film that creates a barrier around the fruit and foliage; the highly refined horticultural mineral oil Orchex 796 (sold in the east as Omni Supreme); and a new botanical material called Aza-

Direct (azadirachtin, a neem product). The standard OP, Imidan 70WP, was applied on a 14-day schedule as well, for comparison.

As you may already have assumed, the Imidan treatment gave the best overall results at harvest. However, there were some results from the organic treatments that were not anticipated. Some of these materials did well against certain pests: Surround on plum curculio; Orchex and Aza-Direct on leafminers; and all treatments on internal worms such as codling moth and oriental fruit moth. After further testing in 2001, we may be able to make recommendations for these chemicals. However, I do not suggest running out and planting an organic block right away. The industry is not financially ready for mass-produced organic crops, especially on the part of the grower.

Some other organic tests were conducted in Niagara County in Jim Bittner's (Singer Farms) orchards in a variety of different arenas. Using an airblast sprayer to apply Surround WP to one treatment and Dipel plus Orchex to another yielded interesting results. Damage from the major pests was not adequately controlled in these programs, although again, the Surround significantly lowered plum curculio damage. In the case of other pests, the damage was actually higher in the treated plots. However, in all fairness to the test and materials, the Surround treatment consisted of only five applications and the Bt and oil program, four. In addition, the applications were not started until after fruit set, because of logistical problems. It is also important to note that no other pesticide was used on these trees.

Mating disruption with the use of pheromones was also conducted in another organic block on Jim's farm. Automated microsprayer dispensers containing a mixture of synthetic pheromones were distributed throughout an orchard. The microsprayers were effective in disrupting the chemical communications of codling moth, obliquebanded leafroller, and oriental fruit moth; however, the target species were not completely controlled. The damage found was less than in an undisrupted check orchard, but other problematic pests caused considerable damage.

As a final experiment, whole-tree exclusion cages were used to try to simply keep pests from getting to the tree. A local tent maker in Geneva, NY manufactured bags from four different netting materials with different mesh sizes. The bags were placed on the trees in late May after the pollination period, and left on until harvest. No further sprays were applied for the remainder of the season. Although this method seemed to produce more clean fruit than the other on-farm trials, the cost and labor intensity limits the practicality of this technique. Some insects (such as leafrollers) were actually trapped inside the bags and were able to damage fruit throughout the season; also, a reduction of light penetration into the tree canopy caused reduced coloring on the fruit.

These trials are only a stepping stone towards the production of organically produced fruit. With some fine-tuning and further testing, seasonal programs that incorporate all or some of these methods applied at specific timings for the niche where they are best suited may be a possibility. Consumers are probably already somewhat accustomed to seeing a less than perfect apple come from organic production, but very few if any are sold on the fresh market. With these materials and techniques, combined with cultural practices, that may change in the future.

It is important to note that this is not yet a recommendation for the planting of organic orchards. The blocks that were used in this study were converted from conventional production in the mid-1990's to fit a niche of juice and dried slices. However, very small changes in the current economic balance would make this system both impractical and unrealistic.

Can Lime Sulfur Be Used to Control Phomopsis in Blueberries?

Source: Annemiek Schilder, MSU Botany and Plant Pathology, Fruit CAT No. 1, March 27, 2001

"Can lime sulfur be used to control Phomopsis in blueberries?" is a question commonly asked. Lime sulfur has gained renewed interest in fruit grower circles because of its use in organic fruit production. Some growers undoubtedly have used lime sulfur and can speak from experience. Unfortunately, it has been difficult to find documented evidence on the efficacy of lime sulfur for control of Phomopsis in blueberries, particularly in Michigan. Add to that the corrosive nature of the product, which might discourage even the most seasoned grower from using it.

Lime sulfur, which has 30 percent calcium polysulfide as its active ingredient, is sold as a liquid spray material. Some people have found Orthorix, a similar product, to be somewhat easier to work with. Lime sulfur is recommended for control of raspberry cane diseases, such as anthracnose and spur blight. Keep in mind that raspberry anthracnose is caused by a completely different organism (Elsinoe veneta) than the one responsible for anthracnose fruit rot in blueberries (Colletotrichum acutatum). In raspberries, lime sulfur is applied as a delayed dormant application to "burn out" or eradicate the fungus from overwintering canes. Timing is important: if lime sulfur is applied too early, the fungus is not yet active, and if applied too late, it can cause burning of the foliage.

To substantiate the rumors about use of lime sulfur in blueberries, I was able to track down some unpublished data from New Jersey trials done in 1977-78. These data, probably the only ones in existence, were obtained from 35-mm slides from Drs. Al Stretch and Phil Marucci. Lime sulfur was compared to Difolatan (no longer available) and an untreated check for control of Phomopsis twig blight in cultivar Weymouth (Table 1). In this New Jersey study, lime sulfur provided moderate control of Phomopsis twig blight. Depending on the cost of the product, this level of control could still be economically interesting.

Unfortunately, we cannot simply extrapolate these results to Michigan, because cultivars, climatic conditions, and even pathogen populations may differ from those in New Jersey. However, it does suggest that more research is warranted to confirm the efficacy of lime sulfur for control of Phomopsis in blueberries in Michigan, especially if there is grower interest in the material.

Table 1. Control of Phomopis Twig Blight in Blueberry cv. Weymouth in New Jersey (Marucci, 1977-1978)

Fungicide	Rate	Application Time	Infected Twigs per Bush	% Control
Untreated check	----		74	0
Lime sulfur	5 gal/100 gal	Fall	30	59
		Spring	46	38
		Fall + Spring	34	53
Difolatan	4 lb/100 gal	Fall	19	74
		Spring	11	85
		Fall + Spring	9	87

Efficient Use of Nitrogen Fertilizer in Fruit Production

Sources: Eric Hanson, MSU Horticulture; Jim Nugent, MSUE District, Horticulturist, Fruit CAT # 1, and OSU Extension Bulletin 458 "Fertilizing Fruit Crops"

Most fruit plantings require annual applications of nitrogen (N) fertilizer for optimum production. Using appropriate rates and application methods is important from an environmental and economic standpoint. Excessive N rates may reduce fruit quality or yields, and pollute surface water or groundwater resources. Recent natural gas price increases are expected to substantially increase nitrogen fertilizer costs, providing added incentive for farmers to use fertilizers in an efficient and effective manner.

Knowing the symptoms of inadequate and excessive N is important. Deficient plants produce short terminal shoots. As a rough guide, trees supplied with adequate N usually produce the amounts of terminal shoot growth shown in Table 2. Deficient apple, peach, and cherry leaves are pale green to yellow, and pear leaves may exhibit a bronze tint. Color develops uniformly on the leaf with no patterning or mottling and leaf size is small.

Nitrogen is mobile in trees. Deficiency symptoms first appear on older leaves because N moves out of older tissue into actively growing younger leaves. Leaves tend to drop early in the fall. Twig growth is thin. Fruit set may be light, with a heavy June drop. Fruits will be smaller and often color and mature somewhat earlier than usual. Deficiency may also result in the production of weak flower buds, which are more likely to be damaged by cold temperatures during winter and spring. Low N trees are more likely to be damaged by cold winter temperatures than trees with adequate N.

Excess nitrogen can severely reduce fruit quality and tree hardiness. Large, dark green leaves that remain on the plant late into the fall are indicative of too much N. Apples color poorly and lose firmness more readily in storage. Soluble solids are lower in grapes. Growth continues late into summer and fall, and plants are more susceptible to winter injury.

Table 2. Indices for Judging Nitrogen Status of Fruit Trees

Index Point	Low Nitrogen	Normal Nitrogen	Excessive Nitrogen
Terminal Shoot Growth	Bearing: Small diameter, less than 4 in. avg. length	Avg. 4 to 12 in. long	Avg. 12 to 20 in. long
	Non-bearing: less than 10 in. avg. length	Avg. 10 to 24 in. long	Avg. 24 to 40 in. long
Leaf Size	Small, thin	Medium to average	Large, thick, often puckering at tip
Leaf Color	Uniformly pale, yellowish-green	Normal green	Very dark green
Fall Leaf Drop	Early; leaves show some red coloration in veins	Normal time; leaves green to light green	Late; leaves remain dark green until severe frost
Bark Color	Light brown to reddish brown	Gray to dark gray-brown	Greenish gray to gray
Fruit Set	Poor; June drop of young fruit usually heavy	Normal for the cultivar, apples 1 to 3 fruits per	May have little or no effect; or may reduce set somewhat

		cluster	
Fruit Size	Per tree avg. is smaller than normal	Normal for the cultivar	Per tree avg. is larger than normal
Fruit Overcolor	Highly colored often earlier than normal	Avg. color for the cultivar at picking time	Poor color up to and after normal picking period
Fruit Undercolor	Yellow color develops earlier than normal for the cultivar	Yellow-green to yellow color develops normally for the cultivar	Green to greenish-yellow color at normal picking period for the cultivar
Fruit Maturity	Somewhat earlier than normal for the cultivar	Normal picking dates for the cultivar	5 to 10 days later than normal for cultivar

Monitor the N status of the plants. Tissue analysis provides a means of assessing whether current N rates are appropriate, as well as identifying other nutritional problems. Consult OSU Extension Bulletin #458, for detailed sample collection procedures for individual crops. Sample mature orchards, vineyards, and blueberry plantings every two to four years and younger plantings more frequently.

The pH status of the soil may affect the availability of N in the soil. Sample soils every two to four years to aid in the maintenance of desired pH. There are three important considerations for liming when orchards and vineyards are maintained with permanent sod between rows and weed-sprayed strips under plants:

1. Take soil samples from the weed sprayed strip area.
2. With this no-till system, lime should be applied at relatively light rates, but with greater frequency than in tillage systems.
3. If N is band applied, then lime also should generally be band applied.

Adjust N rates to the soil type. Highest rates are generally needed on sandy soils low in organic matter because these soils supply less native N and are most prone to leaching. Lowest rates are generally needed on heavier soils where N is naturally more available. Some fruit plantings on very fertile clay or organic soils may not need annual N applications. Keep these factors in mind and adjust N rates accordingly for different areas of a planting.

Place fertilizer where it is accessible to the plant, but distribute it so the roots are not burned. Most commercial fertilizers are salts; if concentrated, they can injure plant roots. On young trees and vines, spread fertilizer in a circle 3 to 4 feet in diameter around each plant, keeping fertilizer 8 to 10 inches away from the trunk. Fertilize newly planted vines and trees after enough rain has fallen to settle the soil.

If possible, apply fertilizer to mature orchards in a broad band about as wide as the tree canopy. On mature vineyards spread fertilizer in the row in a band 5 to 6 feet wide. Applying N in bands instead of broadcasting will allow the rate per acre of orchard to be reduced without a significant impact on the crop.

Nitrogen use efficiency in orchards can often be increased by injecting N through trickle irrigation systems (fertigation). MSU research in tart cherries found N rates could be reduced by 50 percent without affecting yield or growth if N is applied via trickle irrigation. Successful fertigation requires an irrigation system with relatively uniform application per emitter, a method of injecting the N into the system, and good backflow prevention to assure no N reaches the water source. Nitrogen is applied in

four or more equal applications during the early to mid growing season. This spoon-feeding approach appears to increase N use by the trees and helps minimize the potential of nitrate leaching. To determine the N rate per application, begin by calculating about 50 percent of the normal rate, and then divide that amount by the number of anticipated applications.

Avoid volatilization losses of urea. Be aware that substantial amounts of N in urea can be lost to the atmosphere as ammonia gas if urea remains on the surface of the soil for extended periods during hot weather. This loss can be avoided by applying urea during cool weather or just before predicted rains, or irrigating just after applications, since volatilization does not occur once urea is moved into the soil. Some volatilization losses can also occur from ammonium nitrate or ammonium sulfate, but at much lower rates than urea.

Orchards Rates of N

Although optimum N rates vary considerably from site to site, use rates in accompanying **Table 3** for orchard crops as an initial guide. Be conservative with N rates until you are familiar with the planting. It is much easier to apply additional N than to manage excessive vigor caused by rates that are too high. Excessive vigor is particularly damaging in new, high-density apple plantings.

Specific orchards may require more or less N than indicated above. Adjust these rates according to your conditions on the basis of leaf N concentrations and orchard vigor, fruit quality, and productivity. Three factors that have a great effect on N requirements are soil type, orchard floor management and pruning. Orchards on fertile loam soils may require N at only half the recommended rates, whereas those on very sandy soils may require 50 percent more N. Heavily sodded orchards may require 20 percent more N than clean, cultivated plantings. Similarly, orchards heavily infested with weeds may require higher rates. Incorporation of a legume in the sod should reduce the need for N, but research is unclear to what extent. Heavy pruning stimulates vegetative growth and can reduce or replace N requirements. Heavily pruned trees should be fertilized lightly if at all.

Under Midwest conditions, spring and fall applications have been equally effective. Spring applications are advised on sandy soils because fall applications may result in leaching losses during spring snow melt. Many growers split their N applications, applying half to two-thirds in April and the remainder in early June after fruit set is known. The second application can be reduced or skipped if a light crop is set to avoid excessive vigor that year. This strategy of split application is particularly attractive when N prices are high as it allows an opportunity to adjust N rates to reflect crop size.

Another method to apply supplemental N is via foliar application. Orchards and vineyards may benefit from foliar applied N, particularly when relatively low rates of N are applied to the soil in the spring. Foliar N can be applied if deemed desirable based on crop load and other factors. Urea is the most efficient form of N for foliar feeding. Typical rates are up to 5 lbs N per acre per application. Foliar applied N will rarely meet the entire needs of the tree, and should only be considered as a supplement to soil applied N.

Table 3. Nitrogen Rates (lbs N/tree) for Orchard Crops

Orchard Age in Years	**Apples and Pears**			**Stone Fruit**
	Trees per acre			Trees per acre
	80	250	500	130

	Pounds of N per Tree			
1	.05	.05	.04	.07
2	.10	.10	.08	.14
3	.15	.15	.08	.21
4	.20	.20	.08	.28
6	.30	.22	.08	.42
8	.40	.22	.08	.56
10	.50	.22	.08	.62
12	.60	.22	.08	.62
Mature (lb N/tree) >	.75	.22	.08	.62
Lb. N per Acre >	60	55	50	80

Nitrogen for Grapes

Most mature grape juice vineyards require about 50 lbs N per acre annually. Most Michigan vineyards for wine production use less. Young plantings require about 15 to 20 lbs N per acre for each year in the field. Vigorous vineyards on double curtain trellis systems may require 75 to 100 lbs per acre.

Adjust N rates for each vineyard by observing vine growth, fruit soluble solid content and degree of winter injury. Over-fertilized vines are often too vigorous, low in fruit soluble solids, and more prone to winter injury because wood does not harden off in time for winter. Petiole analyses will aid in adjusting N rates.

Application timing can affect efficiency. Vines absorb N relatively slowly between budburst and bloom, most rapidly between bloom and veraison, and somewhat reduced between veraison and harvest. Multiple applications may be needed to maintain sufficient N in the root zone over this extended period, particularly on sandy soils.

Efficiency may also be affected by fertilizer placement and rate. Greatest absorption may be achieved when fertilizer is applied over the areas containing the most grapevine roots (under the trellis). This may be most important in younger vineyards without extensive root systems. As a general rule, the percentage of fertilizer N absorbed by crops decreases as the rate increases. Some growers apply high rates of N in a single application. We suspect they could obtain the same response from moderate rates banded beneath the vines in multiple applications when the vine demand is high.

Nitrogen for Blueberries

Most Midwest blueberries require annual N additions for optimum production. Inadequate N limits bush growth. New shoot growth is reduced and often only one flush of growth occurs. Few new canes are initiated. Leaves are pale green (chlorotic) rather than the lush, dark green of adequately fertilized plants. The chlorosis is uniform across the leaf, with no mottling or pattern. The older, lower leaves usually develop the pale color before younger leaves at the tops of shoots. Leaves of deficient plants often develop fall colors and drop off early. Yield is usually reduced. Excessive N causes abundant vigorous shoots and large, dark green leaves. Bushes may produce several growth flushes, the last of which may be too late to harden off properly before winter. Tips of these shoots are often winter-killed.

Bushes receiving too much N often produce lower yields of small, late-ripening berries.

Blueberries differ from most other fruit crops in that they absorb ammonium (NH_4^+) more readily than nitrate (NO_3^-), so use only fertilizers that contain NH_4^+. Urea is suggested if the soil pH is sufficiently low (below 5.0), and ammonium sulfate (which is more acidic) is recommended if the pH is slightly higher than desired (above 5.0). Nitrogen rates vary depending on the age of the plants (see **Table 4**). Mature plantings generally require about 60-70 lbs N/ acre.

Recommended N rates are averages across most conditions and need to be adjusted for specific plantings based primarily on soil type. Plantings on very sandy soil with little organic matter will require higher rates because there is greater leaching potential and less native N reserves. Plants on organic soils may require much less N because considerable N is supplied naturally through mineralization.

Time fertilizer applications for efficient use. Fertilizer should be applied to maintain adequate soil N levels during the period of peak demand, which lasts from about petalfall to the end of harvest, a period of two to three months. Because fertilizer N does not persist in the root zone this long, split applications are recommended; applying half of N prior to bloom and half at petalfall. Split applications may be most effective on sandier soils.

Efficiency of fertilizer use can sometimes be enhanced by proper placement. The root systems of young blueberries are generally confined to the area beneath the canopy. Placement of fertilizer in a three foot wide band beneath plants may optimize recovery by young bushes, whereas N applied outside this area may not be used. As plants mature, the roots colonize a greater area. In old plantings, roots may reach across rows. Consider the location of the roots and spread your fertilizer evenly over this area.

Table 4. Nitrogen Recommendations for Michigan Blueberries (lbs/acre)

Age (yrs)	Nitrogen	Urea	Ammonium Sulfate
2	15	35	75
4	30	70	150
6	45	100	215
8	65	150	300

Nitrogen for Raspberries

Most plantings need annual nitrogen (N) applications. Urea (46% N), ammonium nitrate (33% N) and calcium nitrate (15.5% N) are suitable N sources. Nitrogen can also be supplied as a complete fertilizer containing P and K, such as (12-12-12), or manure, though these sources are often more expensive than those supplying only N. Use complete fertilizers with a 1:1:1 or similar ratio if the soil has not been sampled to determine fertility levels.

Fertilize newly set plants two to three weeks after planting by sprinkling the equivalent of 15 to 20 lbs N per acre (½ lb N/100 feet of row) around individual plants, keeping the fertilizer 3 to 4 inches away from the base of the plants. Repeat this application in mid-summer. Apply 25 to 30 lbs N per acre (3/4 lbs N/100 feet of row) in April or May of the second year in a 4-foot-wide band over the row. Plantings 3 years old and older generally require 50 to 60 lbs N per acre (1 ½ lbs N/100 feet row) each year banded over the row.

The variety and soil type determine the exact amount of N required. Vigorous varieties (Brandywine, Royalty) and primocane-fruiting types usually require 50 to 100 lbs more N. Plantings on light, sandy soils require higher rates than those on heavier soils. Generally, red raspberries should be fertilized to produce canes 5 feet tall, and canes of purple raspberries should be taller than 5 feet. New black raspberry canes should reach a height of 2.5 to 3 feet by harvest time.

Nitrogen for Strawberries

Strawberries are a shallow rooted crop, often grown on sandy soils. This combination can make efficient N fertilizer use a challenge, since N readily leaches out of the reach of roots. The general recommendation for the planting year is to incorporate 30 lbs N per acre prior to planting, apply an additional 20-30 lbs N per acre in June if growth is weak or the soil is very sandy, and a third application in early-mid August.

Recommendations during harvest years call for no N fertilizer in the spring, although light rates (10-15 lbs N per acre) may be used on very sandy soils. Fertilize with 50-70 lbs N per acre at renovation (early-mid July) and an additional 20-30 lbs N per acre in August on sandier soils or during very wet summers.

Here again, the primary ways to maximize efficiency are to apply smaller rates more frequently, avoid over-irrigating which leaches N from the root zone, and use appropriate rates for your soil type. Nitrogen can also be applied as a supplement through the overhead irrigation at about 5-10 lbs/a, usually in the form of urea.

The Apple as the National Tree

Source: Patrick O'Connor, Michigan Apple Committee via John Wargowsky, Ohio Fruit Growers Society

The National Arbor Day Foundation is taking votes for "America's National Tree". You can vote through their web site as follows: http://www.arborday.org/votealt.cfm

"No better tree could be chosen. Apple trees were planted by our early settlers long before we became a nation. Thomas Jefferson and George Washington traded apple bud wood for grafting. No other type of tree has fed more Americans. I am sure that you can think of many other reasons why the apple tree is worth honoring. The voting period will end April 26, 2001. On National Arbor Day, April 27th, our National Tree will be announced."

Fruit Observations

Insect Key
OFM: Oriental fruit moth
RBLR: Redbanded leafroller
STLM: Spotted tentiform leafminer

Site: Waterman Lab, Columbus

3/28 (silver tip) to 4/4 (green tip). Reported by Celeste Welty

Apple: STLM - 0, sticky trap, RBLR - 0, Multipher
Peach: OFM - 0, Multipher trap

Sources for Information on Tree Fruit and Berries

Source: Fruit Times, Vol 20, No. 4 April 3, 200, and Ted Gastier's resources

One of the nice things about the information age is that, if you have access to the web at home or a local library, you can obtain information from around the world. See ICM News Volume 4, Issue 14 for other sites.

Ohio Sites

Brambles, Production, Management, and Marketing http://ohioline.ag.ohio-state.edu/b782/index.html

Controlling Diseases and Insects in Home Fruit Plantings http://ohioline.ag.ohio-state.edu/b780/index.html

Ohio Commercial Small Fruit & Grape Spray Guide http://www.hort.purdue.edu/hort/ext/sfg/

Ohio Extension Internet Resources for Tree Fruit http://www.ag.ohio-state.edu/~nedoanr/sfnf/crops/fruit.html

Ohio Extension Internet Resources for Berries http://www.ag.ohio-state.edu/~nedoanr/sfnf/crops/berries.html

Ohio Fruit ICM News http://www.ag.ohio-state.edu/~ipm/fruit/index.html

Pennsylvania Sites

Pennsylvania Tree Fruit Production Guide http://tfpg.cas.psu.edu.

Penn State Plum Pox Virus symptom booklet http://ppvbooklet.cas.psu.edu/

Penn State Plum Pox Virus information site http://sharka.cas.psu.edu

Regional Sites

PA Dept. of Agriculture Plum Pox Site
http://sites.state.pa.us/PA_Exec/Agriculture/plum_pox/index.html

Mid-Atlantic Regional Fruit Loop http://www.caf.wvu.edu/kearneysville/fruitloop.html

Midwest Small Fruit Pest Management Handbook http://ohioline.ag.ohio-state.edu/b861/index.html

USDA-ARS Appalachian Fruit Research Station http://afrsweb.usda.gov/

WVU Tree Fruit Research and Extension Center http://www.caf.wvu.edu/kearneysville/wvufarm1.html

New Jersey Fruit Focus http://www.virtualorchard.net/rce/default.html

Rutgers Cooperative Extension Tree Fruit Production Guide
http://www.rce.rutgers.edu/pubs/treefruitguide/index.html

Virginia Fruit Page http://www.ento.vt.edu/Fruitfiles/VAFS.html

NY State Ag. Experiment Station - Geneva Apple Rootstock Breeding and Evaluation Program
http://www.nysaes.cornell.edu/hort/breeders/appleroots/applerootstocks.html

Cornell University Scaffolds Fruit Newsletter http://www.nysaes.cornell.edu/ent/scafolds/

Other State Fruit Sites

Purdue Facts for Fancy Fruit Newsletter http://www.hort.purdue.edu/fff/fff.html

Iowa Strawberry IPM Update Newsletter http://www.exnet.iastate.edu/Pages/plantpath/strawber.html

North Carolina State Univ. Apple Production Newsletter
http://henderson.ces.state.nc.us/newsletters/apple/

Michigan State University Fruit CAT (Crop Alert Team) Newsletter
http://www.msue.msu.edu/ipm/fruitCAT.htm

Michigan State Fruit Information http://www.msue.msu.edu/fruit/

Northwest Michigan Horticultural Research Station http://www.maes.msu.edu/nwmihort/

The University of Massachusetts Fruit Advisor http://www.umass.edu/fruitadvisor/

University of California Fruit and Nut Research and Information Center http://fruitsandnuts.ucdavis.edu/

Ontario - Tree Fruit http://www.gov.on.ca/OMAFRA/english/crops/hort/tree_fruit.html

Washington State - Chelan, Okanagan & Douglas Counties http://www.ncw.wsu.edu/treefruit/

Washington State Tree Fruit Research and Extension Center http://www.tfrec.wsu.eduTFREC.html

USDA-ARS Tree Fruit Research Laboratory - Wenatchee, WA http://www.tfrl.ars.usda.gov/

Washington State Tree Fruit Production Guide (pdf format)
http://cru.cahe.wsu.edu/CEPublications/eb0419/eb0419.pdf

Fruit Reserach in Japan http://ss.fruit.affrc.go.jp/activities.html (Rob Crassweller)

Preliminary Monthly Climatological Data for Selected Ohio Locations March, 2001

Weather Station Location	Monthly Precip	Normal Monthly Precip	Year-to-Date Precip	Normal Year-to-Date Precip	Average High	Normal High	Average Low	Normal Low	Mean Temp.	Normal Mean
Akron-Canton	1.70	3.33	4.73	7.72	41.4	47.3	25.9	28.6	33.6	38.0
Cincinnati	1.42	4.24	4.56	9.52	48.8	53.0	30.6	33.1	39.7	43.0
Cleveland	2.41	2.91	5.63	7.14	40.5	46.3	27.5	28.2	34.0	37.2
Columbus	1.03	3.27	3.71	7.69	46.5	50.5	29.6	31.2	38.0	40.8
Dayton	1.35	3.42	3.88	7.72	45.8	50.0	28.5	31.0	37.1	40.5
Fremont	1.01	2.69	3.35	6.14	42.6	45.3	26.0	27.0	34.3	36.2
Mansfield	1.72	3.30	4.56	7.30	41.0	46.6	25.6	28.6	33.3	37.6
Norwalk	1.42	2.77	3.73	6.40	42.3	45.4	26.8	26.9	34.6	36.1
Piketon	1.69	4.2	3.54	10.6	49.3	52.8	29.3	31.2	39.3	42.0
Toledo	0.82	2.66	3.90	6.14	43.6	45.5	26.7	26.8	35.1	36.1
Wooster	.99	2.92	2.89	6.84	43.3	47.7	27.1	27.7	35.2	37.7
Youngstown	2.09	3.11	4.81	7.27	40.1	45.3	25.5	27.3	32.8	36.3

Temperatures in degrees F, Precipitation in inches

Record low temperatures set: 26th; Akron-Canton 10, Cleveland 14, Columbus 13, Dayton 10, Mansfield 6, Wooster 10, Youngstown 12

Table Created by Ted W. Gastier, OSU Extension from National Weather Service, OARDC & Local Data

Degree Day Accumulations for Selected Ohio Sites January 1, 2001 to date indicated

	Actual DD Accumulations April 4, 2001				**Normal Degree Day Accumulations for April 11, 2001**	
Location	**Base 43° F**	**Base 43° F normal accumulations**	**Base 50° F**	**Base 50° F normal accumulations**	**Base 43° F**	**Base 50° F**

Akron - Canton	16	118	1	40	159	59
Cincinnati	118	237	13	88	301	122
Cleveland	17	114	1	40	151	57
Columbus	73	162	2	59	211	84
Dayton	47	159	0	58	210	83
Fremont	9	85	0	28	122	45
Mansfield	10	113	0	40	153	59
Norwalk	12	97	0	33	133	49
Piketon	128	255	24	101	320	137
Toledo	9	85	0	29	120	45
Wooster	24	107	2	35	144	52
Youngstown	20	100	6	34	136	50

Phenology

	Range of Degree Day Accumulations	
Coming Events	**Base 43° F**	**Base 50° F**
Pear psylla adults active	2-121	0-49
Pear psylla 1st oviposition	25-147	1-72
Redbanded leafroller 1st catch	32-480	5-251
Tarnished plant bug active	71-536	34-299
Spotted tentiform leafminer 1st adult catch	73-433	17-251
Rosy apple aphid nymphs present - 1st egg hatch	91-291	45-148

Thanks to Scaffolds Fruit Journal (Art Agnello)

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Keith L. Smith, Associate Vice President for Ag. Adm. and Director, OSU Extension.

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