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

THE OHIO STATE UNIVERSITY Newsletter Extension

Fruit ICM News

Volume 8, No. 10
April 1, 2004

In This Issue:

Calendar

May 6: Cider HACCP Training, Fisher Auditorium, South Exhibit Area, OARDC, Wooster, 10 am to 1 pm. Sponsored by Ohio Department of Agriculture. For more information contact Duane Murray at 614-728-6348.

May 10-12: Ohio Wine Competition, Fisher Auditorium, North Exhibit Area and Conference Room, OARDC, Wooster, 2 pm to 6:30 pm. For more information contact Todd Steiner, 330-263-3881.

June 30: Ohio Fruit Growers Society Summer Tour, OARDC Horticulture Unit 2, Wooster, 8 am to 3 pm. Registration fee. For more information contact Tom Sachs at 614-246-8292 or email at growohio@of f.org.

August 19: Ohio Grape Research Day, OARDC, Wooster, OH.

Supplemental Labels for Assail Insecticide on Pome Fruit and Grapes

Source: Celeste Welty, OSU Extension Entomologist

When Assail 70WP was first registered for pome fruits in 2002, there were 5 target pests on the label. A

supplemental label recently was issued that adds several more pests and modifies the rate used for pear psylla. The following list shows the current roster of target pests and rates:

- spotted tentiform leafminer: 1.1 oz/A
- aphids and white apple leafhopper: 1.1 to 1.7 oz/A
- codling moth, pear psylla, mullein plant bug, and mealybug: 1.7 to 3.4 oz/A
- Oriental fruit moth, European apple sawfly, and Japanese beetle: 2.3 to 3.4 oz/A
- Apple maggot and plum curculio: 3.4 oz/A.
- San José scale (suppression only): 3.4 oz/A.

On grapes, Assail WSB initially had 3 target pests on label, but a supplemental label has added five more pests. All are controlled at the same rate of 1.1 oz/A (=1 packet/A). The pests are: leafhoppers, glassywinged sharpshooter, aphids, mealybug, phylloxera (aerial form), banded grape bug, rose chafer, and Japanese beetle.

Season Premier: Survivor or Insect Fear Factor?

Source: Art Agnello, Dept. of Entomology, Cornell Univ., Geneva, Scaffolds Volume 13, No. 2, March 29, 2004

No doubt most people in our area will recall the winter just past as a fairly harsh and cold one, so it was a little surprising to read recently that the experts who track such things have classified it as only 'average' in terms of temperature and snowfall. Paying too much attention to what the experts say can be distracting to those who just want to get things rolling each season, so we're going to assume that the March-to-April transition this year will play itself out without any unpleasant blizzards or ice storms, and that anything other than a normal, only moderately crummy spring would be ludicrous to consider. That being the case, it will surely include sufficient stretches of non-crummy weather to allow appropriate early season sprays by those who may need them for prebloom arthropod control.

As in the past 100 years or so, this would be an optimal situation to consider using petroleum oil, a traditional option that continues to be a wise tactic, despite the fact that a number of newer and capable contact miticides are available for early season use today. For as many of the blocks as you can find the time and application window to devote to a thorough treatment, oil retains a justifiably preferred position because of its effectiveness, affordability, and relative safety from a biological and pesticide resistance perspective. Exploiting the most acceptable spraying conditions to maximize tree and block coverage can be a challenge in our area, but few pest management efforts have such potentially high returns when everything falls properly into place.

Pear Psylla:
I usually don't manage to get this piece updated and published each spring, but after arriving in my office one morning after a fine warm Sunday, I found a few pear buds placed on my desk. Some anonymous, helpful soul wanted me to be aware that psylla eggs were already present, if I were but to carefully search for them. It's nearly impossible to be sure your pear trees are all protected by the time the very first psylla adults start flying and (presumably) laying eggs during the first warm temperatures of the spring. However, even a few nice warm days in a row don't waken more than a small percentage of the total population, so you'll be more than adequately psylla-ready if you prepare a little ahead of time, provided your orchard floors aren't too soggy from spring snows (or still concealed by them).

Early oil applications can be useful against pear psylla all throughout the swollen bud stage; although it's capable of killing adults and nymphs that are contacted directly, oil is recommended mainly because the

residue has a repellent effect on adult females looking to deposit their eggs, and this lasts for an extended period after treatment. The strategy behind the use of oil is to delay the timing of any needed insecticide spray until as late as possible before (or after) bloom. Oil rates depend on when you start: If your buds are at the dormant stage, one spray of 3% oil, or two of 2% through green cluster are recommended; if you start at swollen bud, one spray at 2% or two at 1% up to white bud should be adequate for this purpose, especially if applied as soon as the psylla become active (50F or above). This will also give some red mite control at the same time.

European Red Mite:
A delayed-dormant spray of petroleum oil from green tip through tight cluster can be a favored approach for early season mite control, both to conserve the efficacy of and to help slow the development of resistance to our contact miticides. Our standard advice has been to try for control of overwintered eggs using 2 gal/100 at the green tip through half-inch green stage, or 1 gal/100 at tight cluster; this assumes ideal spraying conditions and thorough coverage.

Naturally, real life doesn't always measure up, mainly because of weather and coverage challenges, coupled with the difficulty of getting to a number of blocks during this transient window. It is possible for mites to start hatching when the trees are at solid tight cluster, so the suffocating mode of action tends to be compromised if the nymphs are able to wade through or avoid the droplets. Let practicality determine how best to use the following guidelines.

First, to be sure that mites are in the egg stage, start on your blocks as soon as the weather and ground conditions permit, even if this means using a higher rate. Snowfalls have been generally heavy in many locations, so local conditions will be a prime determinant of how easily you can get through the rows early on. Also, tend toward the high end of the dosage range, especially if there's been no frost during the 48-hour period before your intended spray, and no danger of one for 24-48 hours afterwards. For example, use 1.5 gal/100 if the buds linger somewhere between half-inch green and full tight cluster during your chosen spray period.

Naturally, good coverage of the trees is critical if you're to take advantage of oil's potential efficiency; this in turn requires adequate spray volume delivered at an appropriate speed. Experience and research have shown that a 1X concentration (300 gal/A) in larger trees is clearly preferable; however, if all other conditions are optimal (weather, speed, calibration), then 3X, or 100 gal/A, is the highest concentration that should be expected to give acceptable control at any given time. Growers like to concentrate more than this to save time and the hauling of extra water, but reducing coverage too much can wipe out your efforts if you end up getting only a small fraction of the egg population under the residue.

Don't limit this mite-control tactic just to apples and pears. Talks with stone fruit growers recently have reminded us that many cherry, peach, and plum plantings can suffer equally serious European red mite infestations that weren't given the early season attention they might have needed. We don't have hard and fast threshold guidelines for these crops, but stone fruit plantings with a history of past ERM problems should be examined for presence of the red overwintered eggs. If they're numerous enough to see without a hand lens, then a prebloom application of 2% oil would be a prudent measure to help stave off this damage.

San Jose Scale:
It's been a concern that some of the recent insecticide withdrawals and restrictions could induce a return to the pest profiles of the past, with direct fruit pests (internal leps, apple maggot, various bugs) taking precedence over the indirect foliar feeders. San Jose scale is one of those old standbys that already has been responding to some of the regulatory actions of the last few years. The disappearance (or restriction) of products like Penncap-M and Lorsban from our list of spray materials has been at least

partly responsible for the fact that SJS persists or has returned to pest status in a number of orchards. It's therefore worth pointing out that a 2% oil treatment at half-inch green will control the nymphs, and this is a preferred treatment if no other problem insects need to be controlled. Combining the oil with an insecticide has not been shown to be more effective than using the oil (or insecticide) alone, except sometimes in the case of one newer alternative, Esteem, which has shown good efficacy when mixed with 2% oil at the pre-pink timing.

If you choose not to use oil against the scale nymphs, or if you have Rosy Apple Aphid or other early season insects to be controlled, an insecticide would be more appropriate. For both of these pests, Lorsban 4EC or Supracide have proven very effective during the green tip to tight cluster stage. The neonicotinoid Actara has a good fit in apple prebloom programs, owing to its activity against Rosy Apple Aphid in addition to leafminers and plum curculio. Check the opening buds for infestations of Rosy Apple Aphid; treatment would be advisable upon finding one colony per 100 clusters.

Fruit Disease Update

Source: Paul Pecknold, Purdue Plant Pathologist, Facts for Fancy Fruit, March 26, 2004

Fire Blight:
Dormant copper sprays are most beneficial in those years following severe fire blight. If you do feel copper sprays are needed, we suggest you apply copper to the entire orchard block, including non-susceptible cultivars. The reason for treating non-susceptible cultivars is that even normally fire blight 'resistant' trees like Red Delicious can be colonized by the bacteria and serve as a source of infection during bloom. If copper sulfate (4 pounds per 100 gallons) is used, be sure to apply it when trees are dormant. If applied late it may burn leaf tissue. Also, do not apply copper sulfate with oil; apply copper sulfate and dormant oil as separate sprays spaced at least 10 days apart.

If copper sulfate is applied under poor drying conditions or later than silver tip, plant injury can result. An alternative to copper sulfate are the fixed coppers such as Kocide and C-O-C- S; most fixed coppers do not have the compatibility problems of copper sulfate and can be tank mixed with early season oil sprays. Remember, however, that even fixed coppers, if applied after half-inch green, can cause fruit russeting in years when there is not enough rain to remove the copper residues before tight cluster. Note: when using copper sprays, growers must read the individual product label to ensure compliance with label restrictions.

Collar Rot of Apple:
Think back to late last summer. Did trees in your orchard show premature leaf reddening, sparse, yellow foliage, and many small, highly colored fruit? Such symptoms, if accompanied by a canker (localized discolored tissue) at or just below ground level, are evidence of possible collar rot, caused by the soil-borne fungus, *Phytophthora*. If collar rot is suspected, we advise the use of Ridomil Gold EC or Aliette 80WDG. We especially recommend these fungicides in those areas having poor drainage and heavy, clay-type soil. Be sure to treat surrounding healthy-appearing trees, not just trees already showing severe symptoms of collar rot. Both these fungicides are best used to prevent collar rot, not cure it. See the *2004 Commercial Tree Fruit Spray Guide* for further information:
http://www.extension.iastate.edu/pubs/PM1282/CTFSPBODY.pdf

Powdery Mildew of Apple:
The *Pathologist's Almanac* states: after a very cold winter, there will be very little powdery mildew on apple; however, after a very mild winter powdery mildew may be severe. The reasoning behind this prediction is that mildew infected apple buds are much more apt to be killed off by severe cold. I'll let

you decide how severe the winter cold was. However, if you do have mildew-prone cultivars, it might be wise to use a fungicide that will also control mildew in your early scab sprays. Nova and Rubigan are excellent for scab, powdery mildew, and rust control.

Peach Leaf Curl:
Peach trees need all the help they can get, and that includes a spray for control of peach leaf curl. If you have not yet sprayed for leaf curl, get on your tractor and spray the first chance you get; however, if peach trees are at or past bud swell, you're too late. If you always seem to be too late, consider applying your leaf curl spray at leaf fall this autumn, then you won't have to worry about spraying in spring.

Raspberry Anthracnose:
The most important spray you will apply this season for control of anthracnose on brambles is the delayed dormant spray of lime sulfur. DON'T FORGET IT! Liquid lime-sulfur at 20 gallons per acre should be applied when new leaves are exposed 1/4 to 3/4 inches; if you are late in your application and don't spray until a few leaves have unfolded, cut the rate to 10 gallons per acre. **Note: There is greater risk of lime-sulfur burn when applied at this later time.**

Start Management Early for Optimal Control of Fruit Tree Bacterial Diseases

Source: George Sundin, MSU Plant Pathology, Fruit Crop Advisory, Volume 19, No. 1, March 30, 2004

Three important bacterial diseases of fruit trees occur yearly in Michigan and have the potential to cause significant losses if disease-favorable weather conditions occur. These diseases are bacterial canker of sweet and tart cherry caused by *Pseudomonas syringae,* bacterial spot of peach caused by *Xanthomonas campestris pv. pruni*, and fire blight of apple and pear caused by *Erwinia amylovora*.

For each of these diseases, effective management practices should include efforts to reduce the primary disease inoculum. Primary inoculum refers to the bacteria that cause the initial infections in a growing season. After primary infection, bacterial populations in orchards can skyrocket, and significant losses can occur. Therefore, limiting primary infection by starting control practices early is a critical first step in a season-long control program. The predominant location of overwintering bacterial inoculum for these diseases can be found in the accompanying table.

Bacterial Canker	Dormant buds, cankers
Bacterial Spot	Twig cankers, terminal buds
Fire Blight	Cankers

On sweet cherry, bacterial canker infections are initiated during bloom and are associated with frost injury or extended periods of cool, wet weather. The critical factor for disease incidence is the occurrence of large surface populations of *Pseudomonas syringae* on individual blossoms. These bacteria grow on blossoms without causing symptoms, so it is impossible to determine their presence without processing blossoms in a laboratory.

We sampled 46 sweet cherry orchards in Michigan in 2003 and found high numbers of *P. syringae* on blossoms in every orchard sampled. These results indicate that orchards are at risk for bacterial canker infection if a frost event occurs during bloom, as happened in much of Michigan in 2002.

Fire blight infections leading to blossom blight are also initiated during bloom. Bacterial colonization and infection of open flowers lowers yield and initiates systemic infections of trees that can lead to rootstock blight and death of younger trees planted on susceptible rootstocks. The occurrence of shoot blight (wilting and dieback of actively growing shoots) is also typically higher in orchards where blossom infections have occurred.

Bacterial spot infections occur after petal fall; however, bacterial inoculum begins to build up in orchards during bloom. Leaves become susceptible to bacterial spot infection after they have elongated. Fruit are most susceptible to infection between shuck split and pit hardening.

The best method for lowering initial populations of plant pathogenic bacteria in orchards is to use an early application of copper to cover trees with a 'blanket' of copper. Entire trees should be sprayed, not just alternate rows. High rates of copper can be used (~ 2.0 to 2.5 lbs metallic copper per acre), with timings immediately prior to the trees breaking dormancy. Be sure that the correct rate of copper is used and that sprayers are properly calibrated. Any formulation of copper should be effective in disease control (copper sulfate, cupric hydroxide, copper oxychloride, etc.). The goal of this management practice is to have copper available to protect the plant tissue from bacterial colonization as the tissue develops, thus lowering initial inoculum levels.

Beware of phytotoxicity! Between bud break and bloom on sweet cherry, copper can be used at about 25 percent rate. On peaches, cut the rate in half after bud break. Both sweet cherry and peach are highly susceptible to leaf injury caused by copper. Copper phytotoxicity can also occur on apple, with the predominant copper problem on apple being increased fruit russeting. Although phytotoxicity is a potential problem, if used wisely, copper bactericides applied early will effectively begin the 2004 disease management season and lower primary bacterial disease inoculum.

Pear Psylla Control

Source: Dr. Celeste Welty, OSU Extension Entomologist

We have few acres of pears in Ohio, but where pears are grown, pear psylla is always a challenging pest to control. Recommendations for pear psylla control vary greatly in different places. Basically there are two approaches to managing this pest with insecticides: one approach is highly effective in the short term but risky for long term resistance management, while the other is more IPM-oriented, thus more sustainable for long-term management. For either approach, cultural controls are important.

During the dormant stages, heavy pruning should be minimized. In late June and early July, it is very important to prune water sprouts because these become the preferred habitat for late-season generations of psylla. One approach with insecticides is to use four sprays in the early season.

The first spray should be applied during the dormant stage as soon as adults are ready to start laying eggs. Adults become active when temperatures are above 40F, and eggs are laid on buds and twigs when temperatures are above 50F. The first spray should be oil (2-3 gal/A), which inhibits egg laying, plus an adulticide such as a pyrethroid (Ambush, Asana, Danitol, Pounce, Warrior). Esteem can also be used at this time.

The second spray is the same as the first, oil plus an adulticide, and should be applied during the bud burst stage, which is the time of peak egg laying and a time when adults can be moving in from outside areas.

The third spray should be at the white bud stage, which is when nymphs begin emerging from eggs; pyrethroids are most effective, but should be avoided for resistance management reasons because other alternatives such as Thiodan, Nexter (Pyramite), and Esteem can be used at this time.

The fourth spray should be at petalfall, when Agri-Mek (plus oil) or Actara is best, but other options are Thiodan, Provado, Nexter (Pyramite), and Esteem. After these four sprays, no action is needed until the second generation young nymphs appear, which is usually in mid-July. These nymphs are best controlled by two sprays 10-12 days apart using Actara, Assail, Calypso, Provado, Nexter (Pyramite), or Mitac.

The other approach to psylla management is to avoid using the pyrethroids due to the great potential for development of resistance. The two critical management tools are using oil twice in the prebloom period, for prevention of egg laying. The first oil spray should be 2-3 gal/A, and the second should be about 1 week later at 1-2 gal/A. At petalfall to first cover, a preventive spray of either Agri-Mek or Actara can be used, or control can be delayed until the psylla population can be evaluated and a rescue treatment made if needed by Actara, Assail, Calypso, Provado, Nexter (Pyramite), or Mitac.

Using the New Neonicotinoid Insecticides in Apples

Source: Dr. Celeste Welty, OSU Extension Entomologist

This year we have four insecticides available in the neonicotinoid class: Provado, Actara, Assail, and Calypso. In Ohio we had Actara for apples in 2001and 2002, then it was canceled on apples for Ohio and some other states in 2003, but it is now back for use on apples east of the Mississippi River.

Questions are coming up about how best to use these insecticides. In general, the major advantage of the neonicotinoids is that they are not as disruptive of predators as the pyrethroids, but their disadvantage is that they are expensive. Although each product can control several pests, the best timing for each pest differs. Given that these products are expensive, their best use and timing should be for control of the pest that is historically the most troublesome pest at a particular orchard. Efficacy information mentioned below is based on publications from Pennsylvania, Michigan, and New York.

Rosy apple aphid and green apple aphid: these four products are equally excellent and provide better control than other insecticides. Rosies are best controlled at the pink bud stage, but some control is possible post-bloom.

White apple leafhopper: these four products are equally excellent, although excellent control is also possible from Sevin, Warrior, and Lannate. If Assail or Calypso are used for leafhopper control, timing might be delayed until first cover so that they can also be used for codling moth control.

Spotted tentiform leafminer: Provado, Assail, and Calypso are excellent, whereas Actara is good, but other excellent alternatives are Agri-Mek and the pyrethroids (Asana, Danitol, Warrior). For best leafminer control, these products should be applied as early in the petal-fall stage as possible.

Plum curculio: Calypso is excellent, whereas Assail and Actara are good. Other excellent alternatives are Guthion and Avaunt. Timing is best at petal-fall.

Codling moth: In most Ohio orchards where codling moth is the key pest that attacks fruit, Assail and Calypso are good. Efficacy of alternative products depends on the site's history of insecticide resistance, but at most sites, Guthion, Imidan, and the pyrethroids (Asana, Danitol, Warrior) are excellent

alternatives. For codling moth control, the labeled rate of Assail is 1.7 to 3.4 oz/A, but at most orchards it is being effectively used at 2.5 oz/A if applied with 0.5 to 1% oil.

Oriental fruit moth: In orchards where Oriental fruit moth is a key pest in apple fruit (which is not typical of most Ohio orchards) Assail is excellent, whereas Calypso is good. Other alternatives that are excellent are the pyrethroids (Asana, Danitol, Warrior).

Apple maggot: Assail, Calypso, and Actara are equally good. Alternative products that are excellent for maggot control are Guthion and Imidan.

These products vary in their toxicity to beneficial arthropods. Actara is more harsh to bees than the other products. Assail is more toxic to predatory mites than the other products. As a final note to growers who have peaches as well as apples, be aware that Actara is registered for use on peaches, whereas Assail and Calypso are not.

Organic Food and Farming Education and Research Program (OFFER)

Source: Sean Wright, OSU Horticulturalist http://www.oardc.ohio-state.edu/offer/default.htm

A team of Ohio State University researchers and Ohio farmers form the core of OFFER. This interdisciplinary team works together to develop research initiatives to better characterize how organic agriculture works, particularly in terms of underlying crop-soil relationships, pest control, economics, and system management. Successful organic farmers know organic farming works, but they want scientific understanding of why and how it works. Researchers are designing long-term transition experiments for both vegetables and field crops to address these questions.

The Ohio Agriculture Research and Development Center (OARDC) has allocated funds to support research which is conducted at either OARDC, branch experiment stations around Ohio, or on private organic and transitional farms. In the latter case, the practice of on-farm research provides a real world context for research questions raised by both farmers and scientists. On-station research provides a lower-risk forum, and therefore the freedom for researchers to experiment with new ideas in management, which may be considered high-risk. The team's mission is to provide educational resources and research expertise to Ohio's agricultural community to stimulate interest in and adoption of organic agricultural management systems.

Team members include: Peter Bierman, John Cardina, Doug Doohan, Serita Fry, Parwinder Grewal, Matt Kleinhenz, Joe Kovach, Ken McClure, Fred Michel, David Munn, Richard Moore, Larry Phelan, Phil Rzwenicki, Ben Stinner, Robin Taylor, Dave McCartney, John Cardina, and Deb Stinner.

Farmer advisors include: Perry Clutz and Asa Chester, Keith Dix, Charlie Eselgroth, Harold Hartzler (who is serving as field crop operations advisor this season), Joe Hartzler, John Hirzel, Art Rigenbach, Harv Roehling and Rex Spray. Others, including Sean McGovern, Jeff Dickinson, and Louise Warner are making significant contributions to the program's development.

Methyl Bromide Phase-out Extended

Source: http://www.fruitgrowersnews.com

Eleven developed nations agreed to delay the implementation of a deal to stop using methyl bromide during a conference held in late March. Methyl bromide was due to be phased out in developed nations by January 1, 2005 under the 1987 Montreal Protocol. But under the new deal, the 11 developed nations, including the United States, would be given exemptions allowing them to use the fumigant at least until the end of 2005. Developing nations have until 2015 to phase out methyl bromide.

Under the agreement, the 11 developed countries received exemptions totaling 14,813 tons for 2005. The 2001 consumption figure for all 34 developed countries in 2001 was 25,891 tons. The 11 countries were: Australia (160 tons), Belgium (52), Canada (62), France (449), Greece (205), Italy (2,351), Japan (313), Portugal (55), Spain (1,167), Britain (142) and the United States (9,857). In addition, the United States has agreed to limit its 2005 production levels for methyl bromide to 7,659 tons (equal to 30 percent of its baseline, as compared with 35 percent for its exemption). This means that it will supply some of its exemptions from existing stockpiles.

The deal was reached after the developed nations testified during a United Nations-sponsored meeting held March 24-26 in Montreal. The nations testified that there is no viable alternative for methyl bromide. The exemptions were allowed to give farmers and others who use methyl bromide additional time to examine cost-effective substitutes for the pesticide, which is used to eliminate pests in such crops as tomatoes, strawberries, melons, peppers, cucumbers, and flowers.

More than 350 participants, representing 114 governments, attended the Extraordinary Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer (ExMOP) conference. They discussed a series of issues relating to methyl bromide that had been left unresolved at the 15th Meeting of the Parties in November 2003.

According to the Earth Negotiations Bulletin, compromise was reached by adopting a double-cap concept distinguishing between use and production for critical-use exemptions and by establishing an ad hoc working group to review the working procedures and terms of reference of the Methyl Bromide Technical Options Committee. Delegates to the ExMOP also adopted decisions relating to further specific interim reductions of methyl bromide for the period beyond 2005 and conditions for granting and reporting critical-use exemptions for methyl bromide.

Methyl bromide is being phased out because of its damage to the ozone layer and to possible dangers to those who come in contact with the pesticide. The Montreal Protocol allows governments to apply for exemptions when there are no technically or economically feasible alternatives, or for health or safety reasons. For more information, visit http://www.unep.org and search for "methyl bromide."

Fruit Observations & Trap Reports

Insect Key
AM: apple maggot
CM: codling moth
ESBM: eye-spotted budmoth
LAW: lesser apple worm
LPTB: lesser peachtree borer
OBLR: obliquebanded leafroller
OFM: oriental fruit moth
PTB: peachtree borer
RBLR: redbanded leafroller
SJS: San Jose scale
STLM: spotted tentiform leafminer
TABM: tufted apple budmoth
VLR: variegated leafroller

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

Apple:3/23 to 3/31/04
RBLR: 7
OFM: 1
STLM: 8

Half-inch green stage on 3/31/04

Pest Phenology

Coming Events	**Degree Day Accum. Base 50F**
Pear psylla adults active	0 - 49
Pear psylla 1st oviposition	1 - 72
Redbanded leaf roller 1st catch	5 - 251
Green fruitworm 1st catch	9 - 101
Spotted tentiform leafminer 1st catch	17 - 251
Tarnished plant bug active	34 - 299

Thanks to *Scaffolds Fruit Journal* (Art Agnello)

Degree Day Accumulations for Ohio Sites March 31, 2004

Ohio Location	**Degree Day Accumulations Base 50**	
	Actual	**Normal***

Akron-Canton	44	38
Cincinnati	97	80
Cleveland	41	38
Columbus	69	58
Dayton	74	66
Fremont	29	25
Kingsville	33	21
Mansfield	40	38
Norwalk	42	28
Piketon	99	65
Toledo	28	27
Wooster	54	34
Youngstown	31	34

*Normal - Revised to reflect change in base period from 1961-1990 to 1971-2000 by Midwestern Regional Climate Center http://mcc.sws.uiuc.edu/.

Preliminary Monthly Climatological Data for Selected Ohio Locations, March, 2004

Weather Station Location	Monthly Precip	Normal Monthly Precip	Year-to-Date Precip	Normal Year-to-Date Precip	Avg High	Normal High	Avg Low	Normal Low	Mean Temp.	Normal Mean
Akron-Canton	3.68	3.15	7.97	7.92	47.7	47.5	31.6	27.9	39.7	37.7
Cincinnati	2.97	3.90	8.77	9.57	54.4	53.9	36.4	33.8	45.4	43.8
Cleveland	4.82	2.94	8.27	7.71	47.3	46.1	33.5	28.9	40.4	37.5
Columbus	3.27	2.89	10.37	7.62	51.9	51.6	35.0	32.2	43.5	41.9
Dayton	2.48	3.29	8.41	8.18	51.4	49.3	34.5	31.2	42.9	40.2
Fremont	2.93	2.69	4.96	6.14	50.1	45.3	29.2	27.0	39.6	36.2
Kingsville	4.15	2.40	7.18	6.20	46.9	43.6	31.6	27.0	39.3	35.3
Mansfield	4.26	3.36	8.87	8.16	47.4	46.6	32.0	26.8	39.7	36.7
Norwalk	3.85	2.77	7.24	6.40	47.5	45.7	32.5	27.5	40.0	36.6
Piketon	3.38	4.20	8.37	10.60	56.5	52.3	34.6	31.8	45.5	42.0
Toledo	2.36	2.62	4.09	6.43	48.6	46.5	32.6	27.9	40.6	37.2
Wooster	4.39	2.92	8.97	6.84	50.3	47.7	32.3	27.7	41.3	37.7
Youngstown	3.75	3.05	8.36	7.42	47.2	46.3	31.3	27.4	39.2	36.8

Temperatures in degrees F, Precipitation in inches

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

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