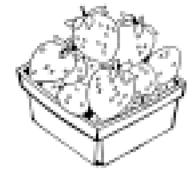
THE OHIO STATE UNIVERSITY EXTENSION

Ohio
Fruit ICM News



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In This Issue

Calendar

June 16: Organic Apple Orchard Tour: MSU and the Organic Apple Team invite you to visit the Clarksville Horticulture Experiment Station Organic Apple Orchard on Thursday, June 16, 2005 from 1:00 to 4:00 p.m. The five acre site, with over 2500 trees, is in its fifth growing season. We will review the ground floor management, soil biology/fertility, and pest management strategies and answer questions about organic certification and marketing. Please RSVP to Sandy Allen by Monday, June 13, 2005. Let us know if you are a first time or a return participant. Phone 517-355-5191 ext. 1339, email: allens@msu.edu, or register online at: http://www.hrt.msu.edu/Registrations/OrganicApple.htm. For additional program information call CHES at 616-693-2193 or email the station at: stewar28@msu.edu.

June 28: Ohio Fruit Growers Society Board Meeting, Burnham Orchards, Berlin Heights, OH, 6:30 to 8:00 p.m. Contact Tom Sachs at 614-246-8290 or e-mail Tsachs@ofbf.org or Kathy Lutz at 614-246-8292 or e-mail growohio@ofbf.org.

June 28: Ohio Apple Marketing Program Board Meeting, Burnham Orchards, Berlin Heights, OH, 8:00 to 9:30 p.m. Contact Tom Sachs at 614-246-8290 or e-mail Tsachs@ofbf.org or Kathy Lutz at 614-246-8292 or e-mail growohio@ofbf.org.

June 29: Ohio Fruit Growers Society Summer Tour, Burnham Orchards, Berlin Heights, OH, 8:00 a.m. to 3:00 p.m. Check out <http://www.ohiofruit.org/ofgs/> (click on 2005 Summer Tour). Burnham's website is <http://www.burnhamorchards.com>.

Getting In Touch With Your Inner Worm

Source: Harvey Reissig, Art Agnello, & Jan Nyrop, Entomology, Geneva, Scaffolds Fruit Journal, Volume 14, No. 11, May 31, 2005

New York apple growers have experienced difficulty in controlling internal Lepidoptera, primarily oriental fruit moth (OFM) since the 2001 growing season. In 2003, most apple growers in western NY who had experienced unacceptable damage in the past began to intensify chemical control programs for control of internal leps and, consequently, fewer loads were rejected, and from a smaller number of growers than the previous year. Even though western NY apple growers achieved temporary success in reducing internal lep damage in 2003, many applied frequent sprays and used materials such as synthetic pyrethroids that are incompatible with IPM programs. Although such intensive control programs may be necessary to achieve acceptable control in orchards with high levels of internal Lepidoptera infestation, more cost-effective, IPM-compatible management programs for this pest complex need to be developed in the future. Studies were conducted in 2004 to evaluate multi-tactic management programs integrating mating disruption and improved timing of IPM-compatible insecticides in large-scale plots in grower orchards.

Three management systems were compared in 10 commercial orchards in western NY. Plots were set up in both "high risk" orchards that had experienced severe damage from OFM in the past and in "low risk" blocks without a history of previous infestation. All research plots were 5-10A, and growers applied their own sprays. Two pheromone traps for OFM, codling moth (CM), and lesser appleworm (LAW) were placed in the center of each plot (4 OFM traps were deployed in the mating disruption plots) and checked weekly. Fruit was sampled on July 19, after the end of the activity of the first brood of OFM, and on Aug. 2 & 17 (1000 apples/plot, 20 apples on each of 50 trees).

Chemical Control Treatment

One special OFM spray was timed at the estimated first hatch of OFM eggs for each of the three generations. A pink spray was applied to control egg hatch of the first generation, although subsequent trap catch patterns showed that this flight did not start until bloom. Originally, the Pennsylvania OFM DD model (base temp 45°F) was to be used to time sprays for first hatch of the other generations, but initial, early season observations showed that the model predictions were not accurate. Therefore, sprays for the second and third broods were recommended after the accumulation of 175-200 DD after biofix in pheromone traps. Sprays were recommended during the third week of July to coincide with egg hatch of the second brood, and during the last week in August for control of the third brood. Growers were advised to apply normal control sprays against other insect pests when needed throughout the season.

Seasonal Mating Disruption Treatment

Isomate M-Rosso ties (200/A) were deployed in April prior to the first OFM flight. Growers were advised not to apply special control sprays for OFM unless damaged fruit was observed during the July and August fruit samples, or moths were captured in the pheromone monitoring traps deployed in the blocks. Growers were advised to apply normal control sprays against other insect pests when needed throughout the season.

Monitoring Treatment

A prophylactic control spray was applied at pink to coincide with the initially predicted OFM egg hatch of the first generation. No other special OFM sprays were recommended unless moth catches averaged more than 10/trap/week or fruit damage was found in monitoring bouts during late July and August. Growers were advised to apply control sprays against other insects when needed.

Growers participating in the project used a wide variety of insecticides, including Lorsban at the pink bud stage, Imidan, Guthion, Danitol, Warrior, Avaunt, and Intrepid. Damage in each plot was compared at harvest during the first week of October. One thousand apples were evaluated from each plot, and samples were stratified by examining 100 apples (20/tree) along each of the edges and 400 (100/tree) in the center of each plot.

Results:

OFM Seasonal Phenology

The development of OFM was later than normal, probably because of generally cool, wet conditions throughout the summer. The initial flight began during early bloom on May 13, and peak flight of the first generation was observed during the week of May 18-25. The second flight began on July 13 and peaked around July 26. The third flight did not start until the last week in August, and continued during September and October.

OFM Monitoring Treatments

OFM catches never exceeded recommended treatment threshold levels throughout the season in four of the research orchards. Trap catches exceeding thresholds were most common during the first flight of OFM (5 orchards), and only 2 and 10 of the monitoring plots exceeded the threshold levels, respectively, during the second and third flights.

Seasonal OFM Mating Disruption

The Rosso pheromone ties completely shut down OFM trap catches throughout the season, although codling moth catches were high in two of the orchards in the disrupted plots. A trace of fruit damage was observed in one of the disrupted plots (0.1%), but since codling moth catches were high in that block, this summer fruit damage was attributed to that species. In one of the "high risk" blocks, a low percentage of fruit damage was observed during summer sampling, and chemical sprays were recommended. No fruit damage was observed at harvest in the other mating disruption plots.

Summer Fruit Monitoring in Different Research Treatments

No damaged fruit was observed in any treatments in 8 out of the 10 research orchards in fruit sampled during July and August. Damage was observed in all treatments during each sampling bout in one of the "high risk" orchards (Table 1). A trace of damage (0.1%) was observed in treatments in one of the "low risk" orchards, but since codling moth catches were high in this orchard, this damage was attributed to this species.

Table 1. Comparison of summer fruit damage in OFM plots in one high-risk orchard, 2004.

Treatment	% Damaged Fruit		
	7/19	8/2	8/17
Mating Disruption	0.8	0.8	0.0
Chemical Control	2.3	3.2	1.7
Monitoring	0.5	1.1	0.3

Harvest Fruit Damage

The percentages of damaged fruit observed at harvest in all of the treatments in all orchards was not significantly different among treatments and was very low (0.2-0.3%). The previously noted "high risk" orchard was the only site in which consistent levels of fruit damage were detected at harvest, and overall damage in this orchard was similar among the different treatments (Table 2). Damage in the mating disruption treatment was higher in fruit sampled from the edges of the plot than in the middle, which suggests gravid females may have immigrated into the edges of this relatively small plot from sources outside of the orchard.Table 2. Comparison of summer fruit damage in OFM plots in one high-risk orchard, 2004.

Treatment	% Damaged Fruit		
	Edge	Middle	Total
Mating Disruption	1.5	0.23	0.7
Chemical Control	0.5	2.3	1.6
Monitoring	0.8	1.3	1.1

The Pennsylvania DD model did not accurately predict seasonal development of OFM in these western NY apple orchards during the 2004 growing season, possibly because the spring and summer were unusually cool and wet. For example, the last flight started considerably earlier than predicted by this model. Because of the abnormalities of the season, it was difficult to determine when to time sprays for OFM in the proposed 3-spray Chemical Control program. For example, the hatch of eggs from the first brood of OFM was originally predicted during bloom, and consequently, the first spray for this brood was recommended at the pink bud stage. However, since pheromone trap catches showed that the first flight did not start until bloom, petal fall would have been a better timing. The spray applied against the second brood based on estimated hatch predicted at 175-200 DD after the pheromone trap biofix, which was recommended during the third week in July, appeared to be timed correctly according to seasonal patterns of flight. However, the third flight did not start until the last week in August, and we estimated that the first hatch of third brood eggs would not occur until about the middle of September. Therefore, we advised growers to apply their last spray for OFM during the last week in August just before the Labor Day holiday in September. The flight of this last generation continued during September and October. However, based on comparisons of damage in the plots during late August and at harvest in October, it did not appear that fruit damage increased in most of the plots as a result of this late third brood activity.

The trap catches were highly variable in the monitoring plots set up in the research orchards and generally correlated with estimated risk. These initial results suggested that trap catch thresholds can be used in commercial orchards to determine when and if sprays for OFM are necessary, although additional work may have to be done to more thoroughly test this concept.

Mating disruption was very effective in preventing OFM damage except in one "high risk" orchard, and observed patterns of damage suggested that injury in this block may have been due to immigration from outside sources into this relatively small plot. Therefore, it appears that mating disruption can eliminate the need for special chemical control sprays against OFM except in extremely "high risk" orchards.

Monitoring fruit on trees during the season can accurately detect low levels of fruit damage in time to apply appropriate control sprays. However, this technology may not be practical for growers or consultants because it requires about 30 minutes to sample 1000 apples in a single orchard block for internal Lepidoptera damage. This technique is being refined this season to require less time to monitor fruit during the summer, by reducing numbers of apples sampled and optimizing sampling sessions so that unacceptable infestations will be detected more quickly.

Codling Moth Control Using *Granulosis* Virus

Source: Larry Gut, MSUE Entomology, Fruit Crop Team Advisory Alert, Volume 20, No. 20, May 31, 2005

Among the new options available for control of codling moth (CM) is a naturally occurring virus that goes by the scientific name of *Cydia pomonella granulovirus* (CpGV). It is commonly referred to as the codling moth *granulosis* virus. CpGV is highly specific to the codling moth. It may infect the larvae of a few very closely related species, but it is noninfectious toward beneficial insects, fish, wildlife, livestock, or humans.

Each CpGV particle is contained within a protein occlusion body (OB). Preparing a concentrated suspension of OB's using mass-reared CM larvae infected with CpGV produces commercial formulations of the virus. Viral OB's are very small. Indeed, over a trillion OB's are present in an ounce of formulated product. These tiny particles must be ingested by the CM larva to be effective, but it only takes a few to cause death. Upon ingestion, OB's are dissolved by the insect's alkaline gut lining, releasing the viral particles. The virus replicates itself within the gut cells and rapidly spreads to other organs. Within a few days the larva stops feeding, becomes discolored and swollen, and melts into a mass of billions of viral OB's.

Products

Two CpGV-based biological insecticides are available for use by Michigan apple growers, Cyd-X®® (Certis USA, L.L.C.) and VirosoftCP4 (BioTEPP Inc.). The label-recommended application rate for Cyd-X is 1 to 6 fluid ounces per acre. The labeled application rate for Virosoft is 3.2 fluid ounces per acre. Both are organically approved products. They can be applied up until harvest and have a re-entry interval of only four hours. Stored material should be kept refrigerated to ensure stability and potency.

Rate and timing of application

There are many options for incorporating virus into your CM management program. Deciding how much, when, and how often to apply product can be quite confusing. Keep in mind the following factors when trying to sort things out:

- CpGV must be ingested by the CM larva and may not kill it immediately,
- the virus breaks down in the environment, thus a spray may only be effective for a week or so, and
- the virus is highly lethal to CM; a few OB's are all that are required to cause death.

Optimal use of the virus is against young larvae before they penetrate the fruit. The best way to target young larvae is to have the virus present on the surface of the eggs when they begin to hatch. Hatching CM larvae will ingest the virus as they consume their eggshells. If the virus is intended as a primary CM control, the first application should be made at about 250 GDD50 after biofix.

At least four applications will be required to cover the egg hatch period. Weekly applications at a low rate are a better approach than high dose sprays applied at wider intervals. In orchards with high CM pressure, this sequence of sprays will need to be repeated beginning at about 1250 GDD post-biofix or 250 GDD after the start of the second-generation flight.

Growers can opt to use the virus as part of a multi-tactic CM control program. Rotating it with chemical insecticides is a good means of combating resistance. We suggest the following approaches to incorporating CM virus into a management program. If you want to restrict your use to a single generation, target the first generation. Some virus-infected larvae
will not die immediately, allowing them to cause fruit damage and even complete larval development.

Fortunately, stings or deeper entries in small fruits attacked by first generation larvae often fall off the tree or are removed by thinning. Additionally, research conducted in 2003 revealed that less than 4 percent of the individuals that managed to complete larval development survived to pupate and emerge as summer generation adults. Thus, applications against the first generation can greatly reduce the size of the summer generation that will need to be controlled.

Regardless of the generation targeted, it is best to make at least two applications. If you want to rotate a CpGV product with other controls, I favor applying a chemical insecticide as the first spray at the start of egg hatch (250 GDD) and the virus as the second spray. This is because more eggs will be present and covered by the virus spray at the later timing. The insecticide and virus could then be rotated again, or the virus could be applied weekly at a low rate for the remainder of the egg hatch period.

Tank mixing

Codling moth granulosis virus products are compatible with most fungicides and insecticides sprayed in apple orchards. However, they should not be mixed with lime sulfur, Bt products, or copper fungicides. Use of a buffer to neutralize the spray mix is recommended if the pH is above 9 or below 5. Also, I am concerned about tank mixing them with the neonicotinoids, Assail and Calypso. This is because bioassays conducted at the MSU Trevor Nichols Research Complex have indicated that the compounds have anti-feeding properties.

Use of spray adjuvants

A number of adjuvants have been recommended and tried as a means of increasing the longevity or improving the effectiveness of CpGV products. The virus is sensitive to the UV rays in sunlight, thus powdered milk and other adjuvants have been added to limit this effect.

Since the virus must be ingested to be effective, feeding stimulants such as molasses are often used in an attempt to increase larval feeding on the spray droplets. Although these options may prove useful, my experience is that applying more virus, rather than adding a spray adjuvant, is the best means of increasing efficacy.

Disease Control in Grapes

During and After Bloom

Source: Annemiek Schilder, MSUE Plant Pathology, Fruit Crop Team Advisory Alert, Volume 20, No. 20, May 31, 2005

Black rot

Temperatures in the high 70's and low 80's, as predicted for the coming week, are perfect for black rot. At these temperatures, only 6-7 hours of wetness are needed for infection. Black rot is a tricky disease, in that infections can remain latent (dormant) for a long period of time, so you won't know that you have the disease until is it too late to do anything about it. Infections can take place anytime from bloom onwards, but only become apparent at or shortly before veraison.

Grape berries are highly susceptible to black rot infection for the first 2-3 weeks after bloom. However, they become progressively less susceptible as they continue to develop, finally becoming highly resistant about 4-8 weeks after bloom, depending on the variety and year.

In general, 'Concord' berries become resistant to infection about 5 weeks after bloom, while some *V. vinifera* cultivars don't become fully resistant until 8 weeks after bloom. Thus, the period from immediate pre-bloom through early fruit development is crucial to protect grapes against black rot infection.

In five years of trials in New York, good black rot control was achieved with one immediate pre-bloom and 1 to 2 post-bloom fungicide sprays. The second post-bloom application is strongly advised if black rot has been a problem in the vineyard the previous year, and should be considered prudent if wet weather is anticipated. Only in one vineyard with a history of severe black rot did a spray two weeks before the immediate pre-bloom application improve disease control.

During three years of fungicide trials in a 'Concord' vineyard in Fennville, Michigan, just two post-bloom applications of SI fungicides have provided very good control under high black rot pressure. However, an immediate pre-bloom application is advised so as not to miss potential infection periods.

Sterol-inhibitor fungicides (e.g., Nova and Elite) provide outstanding control of black rot, and provide about 3-4 days of post-infection activity. When using SI fungicides on a post-infection schedule, use the highest label rates, because post-infection activity is strongly rate-dependent, particularly when extended "kickback" activity is required.

The strobilurin fungicides (Abound, Flint, Sovran, Pristine) are excellent protectants but provide only limited post-infection activity (about 24 hours). Flint should not be used on Concord grapes because of potential phytotoxicity. Pristine should not be used on Labrusca-type grapes.

Phomopsis

Cane and leaf lesions have been showing up in vineyards despite the relatively dry early spring. More regular precipitation in the last few weeks has been conducive to infection. Phomopsis spores were also plentiful in a Niagara vineyard in rainwater collected in the second and third week of May, so the potential for infection is certainly there. Each rainfall event will lead to spore dispersal and can also lead to infection if the tissue remain wet for a sufficient amount of time.

The optimum temperature for infection is 59-68°F, at which time about 7-10 hours of wetness are needed for infection. The longer the tissue stays wet, the more severe the symptoms will be. Since rachis and flower clusters are now fully exposed, we should be concerned with preventing Phomopsis infection of the rachis and fruit, especially in mechanically pruned vineyards and vineyards with a history of the disease. Rachis infections can eventually lead to fruit infections, because the fungus moves from the rachis into the berry. Rachis infections are most closely correlated with yield loss.

EBDC fungicides can still be used as long as the grapes are not in bloom. If at this time there are a lot of lesions on the leaves and canes, infection pressure will be high for the fruit also. Best fungicide options for control of Phomopsis during and after bloom will be Abound or Sovran. Pristine is also a good option for wine (non-Labrusca-type) grapes, but should not be used in Concord or Niagara grapes. ProPhyt also appears to be a good alternative. In trials done in Michigan, ProPhyt provided very good control of Phomopsis when sprayed on a 14-day schedule. Tighten the schedule and increase the rate if disease pressure is high. EBDC fungicides are good protectants but cannot be applied after bloom has started in grapes grown for the National Grape Cooperative. EBDC's have a 66-day pre-harvest interval.

Downy mildew

Some reports of yellow spots on grape leaves have come in. I have not been able to find spores on Niagara leaves with these spots, so could not confirm downy mildew. However, in wine grapes they appeared to be downy mildew. If so, this would be one of the earliest sightings of downy mildew in Michigan in years. So keep an eye out for it. Downy mildew lesions can be confused with low-concentration Gramoxone injury, which also causes yellow spots on leaves. However, if no Gramoxone was used and no Gramoxone spots are present on lower leaves, the spots are unlikely to be Gramoxone injury. A spray for downy mildew at this time is recommended for susceptible varieties, such as Niagara, especially in vineyards with a history of disease. The downy mildew fungus can cause infection if rains occur (at least 0.4 inch) and temperatures are above 50°F. It takes 7 to 12 days for the lesions to form after infection has taken place. Severe downy mildew infection can result in premature defoliation of the vine.

Ridomil Gold MZ and Ridomil Copper have excellent curative and protectant activity against downy mildew. Under moderate infection pressure, they will
provide 3 to 4 weeks of protection. Of the strobilurins, Pristine, Abound, and Sovran are good choices. Again, don't apply Pristine on Labrusca-type grapes. Other effective fungicides are mancozeb, ziram, and fixed coppers. ProPhyt is also a good alternative; it provides curative action and about 14 days protective activity. Phostrol and Agri-Fos are similar products, but have not been tested sufficiently in Michigan to make a recommendation at this point.

Powdery mildew

No powdery mildew has been sighted in vineyards yet. However, sprays may be warranted during and after bloom on susceptible varieties. For those Concord vineyards that have had powdery mildew on the berries in the past, it might be prudent to apply an immediate pre-bloom spray against powdery mildew, followed by a post-bloom spray.

In general, sprays applied for black rot or Phomopsis will also be effective against powdery mildew. The most effective fungicides are the SI's (Nova, Elite, etc.). Sterol inhibitors are also effective, particularly Pristine and Flint, both of which should not be applied to Concord grapes. Sovran and Abound would be alternatives in that case. Luckily, we do not have any reports of fungicide resistance to strobilurins in powdery mildew in Michigan yet. Sulfur is an old but effective and inexpensive fungicide option for non-sulfur-sensitive varieties. New excellent fungicide options are Quintec and Endura. Unfortunately, ProPhyt does not work well against powdery mildew.

Label Changes in Captan 50WP (Wettable Powder) and Captec 4L (Flowable)

Source: Mike Ellis, OARDC & OSUE Plant Pathologist

Fruit growers who use Captan fungicide are aware that several years ago the REI (reentry interval) for all formulations of Captan was set at 4 days. This created a problem for growers who needed to send workers into the planting within the 4-day REI. In addition, brambles (raspberries and blackberries) were removed from the label.

A few years ago, the REI on strawberry was reduced from 4 days to 24 hours, but remained at 4 days for all other crops. About a year ago, the 80WDG formulation of Captan from the company Mico-Flow obtained a reduced REI for several fruit crops, and brambles were added to the label. The REI was reduced from 4 days to 24 hours for strawberries, almonds, apples, apricots, cherries, plums (fresh and prune), and peaches. The REI was reduced from 4 to 3 days (72 hours) for blueberries, grapes, raspberries, blackberries, and dewberries. These changes were not made for the Captan 50WP, Captan 80WP, or Captec 4L formulations.

I have just learned that the Drexel company has a new label (reduced REI and brambles on the label) for Captan 50WP, Captan 80WP, Captan 80WDG, and Captan 4L. The Micro-Flow labels for Captan 50WP, Captan 80WP, and Captec 4l have not been changed as of yet.

The bottom line is that if you want the reduced REI and brambles on the label, and you want to use a formulation other than the 80WDG, you need to make sure the material you buy is produced by Drexel. You also need to check the label before you buy it to make sure it has the new label. Old material may still have the old label. ALWAYS READ THE LABEL!

Another short note on Captan: I have heard from several growers that the Captan 80WDG formulation foams badly. To prevent problems when filling, you should try putting in the water, then adding the Captan 80WDG. It will disperse into the water and the agitator will mix it well. You can also use an anti foaming agent.

Contact Mike Ellis if you have questions. E-mail is ellis.7@osu.edu and phone is 330-263-3849.

Garlic Mustard

Source: Leslie Huffman, Weed Management Specialist Horticultural Crops/OMAF Hort Matters, Ontario Ministry of Agriculture and Food (OMFA) Vol. 5, Issue 10, 5/25/05

Garlic mustard, an herb introduced by pioneers, is now an invasive plant. It is also known as *Alliaria petiolata*, hedge garlic, sauce-alone, jack-by-the-hedge, poor man's mustard, jack-in-the-bush, garlic root, garlicwort, and mustard root.

The growth habit of garlic mustard is that of an annual, winter annual, or biennial, and is most commonly found in moist woodlands, ditches, and fencerows. Seeds are shed in June, and remain dormant for up to 20 months. Rosettes of green leaves grow close to the ground in their first year, remain green all winter, and develop into mature flowering plants the following spring.

First-year rosettes with kidney-shaped green leaves with scalloped edges grow close to the ground. The flower stalks grow 2 to 3-1/2 feet tall with clusters of small white flowers, with four petals in the shape of a cross. Seeds are produced in erect, slender, four-sided pods, called siliques, beginning in May.

Siliques become tan and papery as they mature and contain shiny black seeds in a row. By late June, most of the leaves have faded away and garlic mustard plants can be recognized only by the dead stalks with pale brown seedpods that may remain and hold viable seed through the summer. Garlic mustard spreads only by seed, which can remain viable in the soil for up to 5 years. Each plant will produce between 150 and 850 seeds.

Garlic mustard is the "purple loosestrife" of woodlands and fencerows. It competes with native wildflowers that also flower in the spring, like spring beauty, wild ginger, bloodroot, Dutchman's breeches, hepatica, toothworts, and trilliums, stealing light, moisture, nutrients, soil, and space. Wildlife and insects that depend on these early plants for food soon disappear. Cows that graze on this weed produce milk with a garlic flavor.

Garlic mustard can be confused with several white-flowered native plants, including toothworts (Dentaria), sweet cicely (Osmorhiza claytonii), and early saxifrage (Saxifraga virginica).

Cultural control:

- The first step is to prevent garlic mustard. Watch for your first invader, and seek and destroy it immediately. Scout field edges now, and pull or hoe out invaders.
- Once garlic mustard is established, the goal is to prevent seed shed for several years until all viable seed is exhausted.
- Plants can be pulled out easily, especially if soil is moist, but new sprouts will grow if the plant breaks off. Remove pulled plants to prevent seed shed after the siliques are formed.
- Plants can be cut off to prevent further spread, but watch for sprouts below the cut.
- Prescribed burns can be used in large areas, although other desirable vegetation may be damaged.
- Directed flamers can be very effective in small locations.
- Chemical control: Applications of glyphosate, 2,4-D/mecoprop/dicamba, or triclopyr are effective.
- Care must be taken with either burning or spraying to avoid damaging desired plants. Wick wipers could be used to minimize damage.

Additional information on Garlic Mustard: More than meets the eye! *Source: Jan Schooley, Ginseng and Medicinal Herb Specialist, Ontario Ministry of Ag & Food*

Members of the country gentry in 1699 would be familiar with "alliaria", also known as "Jack-by-the-hedge" and "sauce-alone." Even in those days, garlic mustard was invasive and could be found abundantly under hedges and along banks. Leaves of garlic mustard were added to salads to impart a mild garlic flavor. But garlic mustard was more than a pungent salad herb. It was considered to possess many valuable medicinal properties and was used to clear infections and "encourage healing." Garlic mustard has been used internally for bronchitis, asthma, and eczema and externally for minor injuries, skin problems that are slow to heal, rheumatism, and gout. It's another weed with a little more to it than meets the eye!

Degree Day Accumulations for Ohio Sites

June 1, 2005

Ohio Location	Degree Day Accumulations Base 50°	
	Actual	Normal
Akron-Canton	320	451
Cincinnati	619	723
Cleveland	301	424
Columbus	500	558
Dayton	442	576
Fremont	294	426
Kingsville	220	362
Mansfield	310	439
Norwalk	323	418
Piketon	544	737
Toledo	339	411
Wooster	347	405
Youngstown	261	393

Pest Phenology

Coming Events	Degree Day Accum. Base 50°F
Lesser appleworm 1st flight peak	181 - 483
Plum curculio oviposition scars	232 - 348
European red mite summer egg present	235 - 320
Redbanded leafroller 1st flight subsides	255 - 716
Obliquebanded leafroller pupae present	330 - 509
Codling moth 1st flight peak	332 - 586
Obliquebanded leafroller 1st catch	392 - 681
Peachtree borer 1st catch	445 - 829
Spotted tentiform leafminer 2nd flight begins	449 - 880

Revised thanks to *Scaffolds Fruit Journal*
(Art Agnello)

Fruit Observations and Trap Reports

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

Apple: 5/25 to 6/1/05	
Redbanded leafroller	0 same as last wk.
Spotted tentiform leafminer	117 up from 0
San José scale	0 same as last wk.
Codling moth (3 trap mean)	12.7 up from 10.7
Lesser appleworm	15 up from 5
Tufted apple budmoth	8 up from 6
Variegated leafroller	3 up from 0
Obliquebanded leafroller	0 same as last wk.

Note: Biofix for codling moth on 5/10/05

Site: East District; Erie and Lorain Counties
Jim Mutchler, IPM Scout/Technician

Apple: 5/24to 6/1	
Codling moth (3 trap mean)	2.8 up from 1.0
Oriental fruit moth	6.9 down from 12.4
Redbanded leafroller	0.7 down from 3.5
San Jose scale	3.1 up from 0.0
Spotted tentiform leafminer	26.8 down from 288
Lesser appleworm	5.7 first report

Beneficials found: brown lacewings, native lady beetles
Note: Biofix for Oriental fruit moth on 5/8/05

Peach: 5/14 to 6/1	
Redbanded leafroller	1.5 down from 9.8
Oriental fruit moth	0.5 up from 0.2
Lesser peachtree borer	13.4 up from 3.6
Peachtree borer	0.0 first report

Site: West District: Huron, Ottawa, Richland, and Sandusky Counties
Lowell Kreager, IPM Scout/Technician

Apple: 5/23 to 5/30	
Codling moth	0.7 up from 0.3
Oriental fruit moth	0.0 down 1.4
Redbanded leafroller	0.8 down from 3.8
San Jose scale	0.0 same as last week
Spotted tentiform leafminer	44.8 down from 72
Lesser appleworm	2.5 up from 1.0

Beneficials found: brown lacewing, native lady beetles
Note: Biofix for codling moth on 5/10/05

Peach: 5/23 to 5/30	
Redbanded leafroller	1.0 down from 12.5
Oriental fruit moth	0.4 down from 14.5
Lesser peachtree borer	10.1 up from 0.0
Peachtree borer	0 same as last wk.

Preliminary Monthly Climatological Data for Selected Ohio Locations
May 2005

Weather Station Location	Monthly Precipitation	Normal Monthly Precipitation	Year-to-Date Precipitation	Normal Year-to-Date Precipitation	Average High	Normal High	Average Low	Normal Low	Mean Temp.	Normal Mean
Akron-Canton	2.38	3.96	16.56	15.27	66.4	69.8	43.9	47.8	55.1	58.8
Cincinnati	1.88	4.59	18.29	18.12	71.6	74.4	49.0	52.9	60.3	63.6
Cleveland	1.43	3.50	16.62	14.58	65.3	68.5	45.1	48.3	55.2	58.4
Columbus	3.36	3.88	21.47	14.75	69.5	73.3	47.0	51.8	58.2	62.5
Dayton	2.31	4.17	19.44	16.38	68.1	71.2	46.5	51.1	57.3	61.1
Fremont	1.27	3.61	13.11	12.78	67.8	70.4	40.3	48.2	54.0	59.3
Kingsville	1.69	3.32	13.60	12.70	63.5	67.0	42.2	47.1	52.9	57.1
Mansfield	2.07	4.42	17.37	16.75	65.8	69.3	43.9	46.7	54.8	58.0
Norwalk	1.84	3.55	17.04	13.08	68.9	69.3	43.4	47.9	56.1	58.6
Piketon	0.99	4.20	12.71	18.60	71.7	73.8	45.5	49.5	58.6	61.7
Toledo	2.08	3.14	12.84	12.81	68.2	70.6	44.6	48.5	56.4	59.6
Wooster	2.28	4.01	15.18	13.91	68.6	70.6	43.1	46.5	55.8	58.5
Youngstown	3.16	3.45	18.84	14.20	65.2	69.0	42.1	46.2	53.6	57.6

Temperatures in degrees F, Precipitation in inches

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