Ohio
Fruit ICM News

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In This Issue

Calendar

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>.

Ohio Fruit Growers Society Summer Tour 2005

The Ohio Fruit Growers Society (OFGS) is pleased to announce that this year's Summer Tour will be held at Burnham's Orchard, Inc. located in Berlin Heights, Ohio on Wednesday, June 29, 2005. The farmis owned by Joe Burnham III, his wife Martha, and their son Joe Burnham IV. Joe Burnham IV is proud to be the sixth generation to farm this land and recently married Lily, who has joined the family business handling office management, human resources, and marketing.

The farm dedicates approximately 220 acres to the growth of peaches, apples, and, most recently, cherries. Over the years, the Burnhams have experimented with many different training systems for apple growth, such as Y-Trellis, V-Trellis, Vertical Axe, and their current favorite, the Super Spindle. The various systems will be showcased during the orchard tours that begin at 8 a.m. and run every half-hour. The Burnhams will share their vast knowledge of these systems during the tour, and it will be both entertaining and educational.

In addition to their experience with growing fruit, they also plant approximately 550 acres of their property to row crops, such as corn, soybeans, and wheat. In addition, they produce pumpkins, gourds, and squash for use in their retail farm market.

The Burnhams market their fruit through many different avenues. They have an on-site retail farm market that opens with the ripening of the first peach in July and stays open until the very last apple is gone in May.

The Burnhams also market their fruit through direct wholesale to other farm markets and local grocery stores; however, the majority of their apple production is sold through the Fruit Growers Marketing Association, where Joe Burnham III has been a member of the board of directors and served as president for many years.

More recently, they have added an entertainment segment on five weekends during harvest in September and October, where they offer a 5-acre corn maze, a hay bale maze, hay rides, a pedal tractor course, pick your own pumpkins, and lots more!

They also produce apple cider that is flash-pasteurized for product safety and bottled on-site. They market this cider though their retail farm marketand local grocery stores. They also enter their cider in the annual OFGS Cider Contest. Bruce Benedict of the Ohio Department of Agriculture will be on hand to review last year's Cider Contest and give details and entry information for the upcoming November 11, 2005 Cider Contest at The Great Big Food Show in Cleveland, sponsored by The Food Network.

In addition to the orchard tours, we will tour the Burnhams' brand new 14,000 square foot apple packing facility that was built to increase the efficiency of the packing operation and to increase work space around the apple packing line. You will be able to tour the dry refrigerated storage area that includes three loading docks that allow the fruit to be cooled immediately after packing and keeps it cool until the fruit is loaded onto trucks for shipping.

During the tour you will be able to take in an educational food safety audit conducted by Shari Plimpton, with the Center for Innovative Food Technology. Shari serves as food safety educator for the Ohio and Indiana Specialty Crop Food Safety Initiative, presented in partnership with the U.S. Department of Agriculture's Risk Management Agency and Mid American Ag and Hort Services.

The Summer Tour will present more than 30 exhibitors who support the fruit industry. Interaction with these exhibitors will allow participants the unique opportunity to network with industry professionals and discuss and learn about products and technology essential to growing and marketing better fruit.

A delicious chicken barbecue lunch provided by Ag Credit will be served from 11:00 a.m. to 1 p.m. At 1 p.m. Joe Burnham IV will convene the OFGS business meeting and we will hear from him and from members of the Ohio State University Fruit Team.

As an added bonus, the Burnhams have arranged a tour of another sixth generation Berlin Heights business, The Berlin Fruit Box Company. This company has a proud family tradition that began in 1858 with Samuel Patterson. The company has been supplying handmade fruit baskets to local orchards and farm markets for years and also makes handmade maple baskets and accessories for the home.

The Fruit Box tour is an interesting, behind-the-scenes look at yet another aspect of the fruit growing industry. Owner Matt Adelman will graciously open the doors of his facility to Summer Tour participants beginning at 2 p.m. on June 29, 2005. For more information about the company or for driving directions, you may visit its web site at <http://www.samuelpattersonbaskets.com>.

Registration opens at 7:00 a.m. and the registration fee is $15 individual/$20 family for OFGS members and $20 individual/$25 family for non-members.Orchard tours begin at 8:00 a.m. and continue until noon, and the exhibitor area will also open at 8:00 a.m. and stay open the remainder of the day. Lunch will be served from 11:00 am to 1:00 p.m. OFGS meetings convene at 1:00 p.m. and the tour of The Berlin Fruit Box Company begins at 2:00 p.m.

The Ohio Fruit Growers Society is thrilled to have our Summer Tour hosted by Burnhams Orchard, Inc., located at 8019 state Route 113, Berlin Heights,Ohio 44814. We hope that you will join us for a day filled with education, industry, and fun!

For more information about the OFGS Summer Tour, contact Tom Sachs at 614-246-8290, tsachs@ofbf.org or Kathy Lutz at 614-246-8292, klutz@ofbf.org. For maps, directions, and information visit our web site at <http://www.ohiofruit.com>.

So, Just How Clean is Your Water?

Source: Shari L. Plimpton, Ph.D., Food Safety Educator - Ohio and Indiana Specialty Crop Food Safety Initiative, via John Wargowsky, Executive Director - Mid American Ag and Hort Services, Inc. As we work through another year of helping growers with the application of Good Agricultural Practices (GAPs) to their fresh produce operations, I am repeatedly reminded of just how important, and potentially confusing, is the issue of water quality. First of all, we emphasize in our education programs that water quality is one of the most critical control points for minimizing the risk of foodborne illness. Of course, water contamination of any kind, chemical or microbiological, is to be avoided both out in the field and in the packing house. In the GAPs program we provide recommendations based on good, general science, yet we emphasize that no standards have been established for fresh produce. Ultimately we end up applying the standards for potable water and wait for the research to tell us if we have any other options or considerations.

I have written before about the standards for water testing and treatment of wells and will repeat just a few words about it here. Anyone who has heard me speak has heard about testing wells annually and open water sources quarterly for fecal coliform and E. coli. During farm consultations we provide Standard Operating Procedures (SOPs) that give growers methods for solving a contamination problem, whether it's for water intended for use out in the field or for water used in the packing house. Those SOPs generally rely heavily on the use of chlorine (in its variety of forms) to treat the water, killing bacteria present in the water, and, depending on the level of free chlorine in the water, killing some bacteria on the surface of produce being washed.

And yet the world is a changing place; new problems pop up, and, if we are lucky, new solutions present themselves as well. Some growers are using sanitizers other than chlorine to solve a number of problems inherent to using chlorine (fumes, corrosion, discharge issues, to name a few). Some of the methods I have seen more commonly employed in the Midwest are copper ionization and hydrogen peroxide or hydrogen dioxide.

Copper Ionization is an electrical method that generates electrically charged copper ions into a water system. These ions are reactive and are thereby capable of inactivating bacteria, mold, mildew, and similar microorganisms. The level of copper used by these automatic systems is not toxic and copper has been effectively used to generally control disease in other applications.

The effectiveness of copper ionization on certain spore-forming bacteria and parasites is questionable when it is not monitored or controlled properly. All systems should have a method for being able to monitor the copper ion level in the water. Combination with another sanitizer (i.e. chlorine, hydrogen peroxide, etc.) is a way to cover all of your bases while maintaining lower levels of reactive oxidizing sanitizers.

Using hydrogen peroxide or hydrogen dioxide is another acceptable method for achieving water sanitation. Here we are taking a form of hydrogen and oxygen molecules that are highly reactive, bringing them into contact with organic material (bacteria), and (at a high enough level) effectively killing bacteria and parasites and inactivating viruses. One big plus of using these compounds is that the by-products of their reactions are water and oxygen. There is no need to be concerned about fumes or water discharge; however, these are reactive materials and should be handled carefully. Again, monitoring the level of the reactive components is critical to maintaining control over your sanitizing system.

These are only two out of many alternative sanitation methods for water treatment. Regardless of the one you choose, the most common error I find is that there is no monitoring system for the water sanitation system. With chlorine, people are accustomed to using test strips to measure the free chlorine levels. If they combine this measurement with monitoring the pH of the water, they can be sure to maintain the right balance in the water to achieve inactivation of microorganisms. A pH that is either too high or too low will result in the chlorine moving into a form that will not be effective for killing microorganisms. And if you simply dump and don't measure, you may just be throwing money down the drain.

Using an ORP system to monitor the effectiveness of your water treatment system may be a more useful and easy method to assure that your treatment system is working for you on a consistent basis. ORP stands for oxidation-reduction potential. An ORP system is a system that can measure the oxidation-reduction potential [in terms of milli-volts (mV)] of the treated water. Research has shown that a reading of 650-700 mV will result in the killing of pathogenic bacteria within 30 seconds. (Trevor V. Suslow, Ph.D., UCDavis, Pub. 8149, 2004) Advantages of this system can be automated dosing based on system readings, automatic recording of measurements (helpful for those who face third-party audits), and reduction of the need to test the water for pH.

Maintaining backup methods with which to calibrate your ORP system is strongly recommended. Ultimately you should know as much about your water chemistry (pH, mV, free ion levels) as you probably know about the soil chemistry of your fields. Failing to monitor is a failure to control. Water systems that are out of control are at a much greater risk for being the source of a foodborne outbreak. Minimize your risk and measure.

Ohio and Indiana fruit and vegetable growers can get help with the development of a food safety program by contacting Mid American Ag and Hort Services by phone at 614-246-8286, fax at 614-246-8686, or email at maahs@ofbf.org.

The Initiative is presented in partnership with the United States Department of Agriculture's Risk Management Agency. More information about the Ohio and Indiana Specialty Crop Food Safety Initiative may be found at: <http://www.midamservices.org> by clicking on Projects.

Aphids - Green Apple & Wooly Apple

Source: Art Agnello & Harvey Reissig, Entomology, Geneva, Scaffolds Fruit Journal, June 24, 2002

Green Aphids: Apple aphid, *Aphis pomi* De Geer
Spirea aphid, *Aphis spiraecola* Patch

Although small numbers of these aphids may be present on trees early in the season, populations generally start to increase in mid- to late June.

This trend has been evident once again this year, as the plentiful rains and recurring heat have resulted in a profusion of succulent terminal growth much favored by these insects.

Large numbers of both species may build up on growing terminals on apple trees during summer. Both species are apparently common during the summer in most N.Y. orchards, although no extensive surveys have been done to compare their relative abundance in different production areas throughout the season.

Nymphs and adults of both species suck sap from growing terminals and water sprouts. High populations cause leaves to curl and may stunt shoot growth on young trees. Aphids excrete large amounts of honeydew, which collects on fruit and foliage. Sooty mold fungi that develop on honeydew cause the fruit to turn black, reducing its quality.

Aphids should be sampled several times throughout the season starting in June. Inspect 10 rapidly growing terminals from each of 5 trees throughout the orchard. Record the percentage of infested terminals.

No formal studies have been done to develop an economic threshold for aphids in N.Y. orchards. Currently, treatment is recommended if 30% of the terminals are infested with either species of aphid, or at 50% terminal infestation and less than 20% of the terminals with predators. An alternative threshold is given as 10% of the fruits exhibiting either aphids or honeydew.

The larvae of syrphid (hoverflies) and cecidomyiid flies (midges) prey on aphids throughout the summer. (See "Preys-Worthy," the following article.) These predators complete about three generations during the summer. Most insecticides are somewhat toxic to these two predators, and they usually cannot build up sufficient numbers to control aphids adequately in regularly sprayed orchards. Both aphids are resistant to most organophosphates, but materials in other chemical classes control these pests effectively, including Assail, Calypso, Danitol, Dimethoate, Esteem, and Thiodan (according to the 2005 [Midwest] Commercial Tree Fruit Spray Guide).

Woolly apple aphid (WAA), *Eriosoma lanigerum* (Hausmann)

WAA colonizes both aboveground parts of the apple tree and the roots and commonly overwinters on the roots. In the spring, nymphs crawl up on apple trees from the roots to initiate aerial colonies. Most nymphs are born alive to unmated females on apple trees during the summer. Colonies initially build up on the inside of the canopy on sites such as wounds or pruning scars and later become numerous in the outer portion of the tree canopy, usually during late July to early August.

Aerial colonies occur most frequently on succulent tissue, such as the current season's growth, water sprouts, unhealed pruning wounds, or cankers. Heavy infestations cause honeydew and sooty mold on the fruit and galls on the plant parts. Severe root infestations can stunt or kill young trees, but usually do not damage mature trees. Large numbers of colonies on trees may leave sooty mold on the fruit, which annoys pickers because red sticky residues from crushed WAA colonies may accumulate on their hands and clothing.

During late June, water sprouts, pruning wounds, and scars on the inside of the tree canopy should be examined for WAA nymphs. During mid-July, new growth around the outside of the canopy should be examined for WAA colonies. No economic threshold has been determined for treatment of WAA.

Aphelinus mali, a tiny wasp, frequently parasitizes WAA, but is very susceptible to insecticides and thus does not provide adequate control in regularly sprayed commercial orchards. Different rootstocks vary in their susceptibility to WAA. The following resistant rootstocks are the only means of controlling underground infestations of WAA on apple roots: MM.106, MM.111, and Robusta.

WAA is difficult to control with insecticides because of its waxy outer covering and tendency to form dense colonies that are impenetrable to sprays. WAA is resistant to the commonly used organophosphates, but other insecticides are effective against WAA, including Thiodan and Dimethoate (again according to the 2005 [Midwest] Commercial Tree Fruit Spray Guide).

"Preys-Worthy"

Source: Art Agnello, Entomology, Geneva, Scaffolds Fruit Journal, Volume 10, Issue 18, July 16, 2001

There are many insects present in apple orchards that provide a benefit to growers by feeding on pest species. It is important that growers and orchard managers be able to recognize these natural enemies so that they are not mistaken for pests.

The best way to conserve beneficial insects is to spray only when necessary, and to use materials that are less toxic to them. (See Table 12 <http://www.nysaes.cornell.edu/ent/treefruit/html/06imm/06imm_64.php> in the Commercial Tree-Fruit Production 2005 Online Version.

This brief review, taken from IPM Tree-Fruit Beneficial Insects Fact Sheet <http://www.nysipm.cornell.edu/factsheets/treefruit/pests/ben/beneficials.html>, covers the major beneficial insects that are likely to be seen in N.Y. orchards, concentrating on the most commonly seen life stages.

A "Predatory Mites" Factsheet reviews mites that are important predators of leaf-feeding mites: <http://www.nysipm.cornell.edu/factsheets/treefruit/pests/pm/predmites.html>.

Cecidomyiid Larvae (*Aphidoletes aphidimyza*) This fly (Family Cecidomyiidae) is an aphid predator, and overwinters as a larva or pupa in a cocoon. Adults emerge from this cocoon, mate, and females lay eggs among aphid colonies. The adults are delicate, resembling mosquitoes, and are not likely to be seen. The eggs are very small (about 0.3 mm or 1/85 in. long) and orange. They hatch into small, brightly- colored orange larvae that can be found eating aphids on the leaf surface. These predacious larvae are present from mid-June throughout the summer. There are 3-6 generations per year. In addition to aphids, they also feed on soft-bodied scales and mealybugs.

Syrphid Fly Larvae (Family Syrphidae)

The Family Syrphidae contains the "hover flies," so named because of the adults' flying behavior. They are brightly colored with yellow and black stripes, resembling bees. Syrphids overwinter as pupae in the soil. In the spring, the adults emerge, mate, and lay single, long, whitish eggs on foliage or bark, from early spring through mid-summer, usually among aphid colonies. One female lays several eggs. After hatching, the larvae feed on aphids by piercing their bodies and sucking the fluids, leaving shriveled, blackened aphid cadavers. These predacious larvae are shaped cylindrically and taper toward the head. There are 5-7 generations per year. Syrphid larvae feed on aphids and may also feed on scales and caterpillars.

Control of Fruit Rots in Blueberries After Bloom

Source: Annemiek Schilder, MSUE Plant Pathology, Fruit CAT Alert, Vol. 20, No. 10, June 14, 2005

As blueberries are now in various stages of development and ripening, the main diseases of concern are fruit rots such as anthracnose (orange spore masses) and Alternaria fruit rot (green velvety mold). Botrytis fruit rot (gray mold) is not as common in Michigan.

Anthracnose tends to be a problem in cultivars such as Bluecrop, Jersey, Blueray and Rubel, while Alternaria fruit rot may be visible before harvest in Bluecrop. Cultivars Duke and Elliott are moderately resistant to anthracnose.

Fruit rots are generally separated into two types: field rot and post-harvest rot. The former can be seen on berries in the field before harvest and is especially common when berries are left on the bushes too long. So timely harvesting is an important control measure.

Post-harvest rot can develop on sound-looking berries, as spores from infected berries can infect them before or during harvest or during processing. Often, these berries look healthy at harvest but start to rot soon after in the lugs while awaiting processing. Rot may be slowed down by refrigerated storage, but will resume on the supermarket shelves, lowering fruit quality.

These infections can also contribute to high microbial counts in frozen berries, leading to rejection of fruit lots by some buyers. Rapid cooling of harvested fruit is important in reducing post-harvest fruit rot incidence, particularly at the later harvests when disease pressure is generally high.

While fruit rot is often not visible until the berries ripen or even after harvest, it is prudent to assume that you will have a fruit rot problem if you had problems in past years. The warm, wet conditions of the past week are particularly conducive to anthracnose fruit rot.

If the first blueberries are starting to show rot, fungicide sprays can still limit new infections of neighboring healthy berries. Applications within one to two weeks of the first harvest can still be beneficial in preventing these late infections. In fact, an additional fungicide application between the first and second harvest may be beneficial under high disease pressure.

Following are examples of fungicides that can be used during fruit development and ripening:

The strobilurins (Abound, Cabrio, Pristine) are all highly effective against anthracnose, with Pristine having the most broad-spectrum activity since it contains two different active ingredients. (However, it is also the most expensive of the three.)

Pristine will also have excellent activity against Phomopsis, while Cabrio has good and Abound fair activity against this disease. All are supposed to have

moderate to good activity against Alternaria fruit rot and become quickly rainfast since they are locally systemic.

Switch (cyprodinil and fludioxonil) also has some systemic properties and provides simultaneous control of anthracnose, Alternaria and Botrytis fruit rots. Thus, it may be a good choice if several fruit rots are a concern.

Captevate (captan and fenhexamid) at the high rate will provide good control of anthracnose as well as Botrytis fruit rot, but this disease tends to be less common in Michigan. Captevate is also fairly expensive.

Aliette (fosetyl-Al) is a highly systemic fungicide that provides good control of anthracnose, Alternaria fruit rot, and Phomopsis.

Of course Topsin M + Captan can still be used, provided the 7-day PHI of Topsin M is taken into consideration. While Topsin M is a systemic material and is more active against Phomopsis, Captan as a protectant will do much of the work against anthracnose. Therefore, if anthracnose is the disease you wish to control and the weather is relatively dry, a Captan or Captec spray alone may suffice.

Do take note of the pre-harvest intervals for the various fungicides.

Degree Day Accumulations for Ohio Sites

June 15, 2005

Ohio Location	Degree Day Accumulations Base 50°	
	Actual	Normal
Akron-Canton	656	695
Cincinnati	974	1025
Cleveland	671	664
Columbus	860	828
Dayton	788	858
Kingsville	580	590
Mansfield	646	681
Norwalk	710	664
Piketon	894	1020
Toledo	708	657
Wooster	696	635
Youngstown	580	615

Pest Phenology

Coming Events	Degree Day Accum. Base 50°F
Obliquebanded leafroller 1st catch	392 - 681
Peachtree borer 1st catch	445 - 829
Spotted tentiform leafminer 2nd flight begins	449 - 880
Oriental fruit moth 1st flight subsides	493 - 823
Pear psyllia 2nd brood hatches	584 - 750
San Jose scale 1st generation crawlers present	619 - 757
Apple maggot 1st catch	749 - 1033
Redbanded leafroller 2nd flight begins	772 - 1080
Oriental fruit moth 2nd flight begins	784 - 1022

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

Better Than Sex

Source: Art Agnello, Entomology, Geneva, Scaffolds Fruit Journal, Volume 14, No. 13, June 13, 2005

Last year I conducted some field trials to assess new technology in hand-applied pheromone dispensers for mating disruption of oriental fruit moth in apples. This trial was conducted in mixed plantings of fresh and processing apples on six commercial farms in Wayne and Ontario Counties. A low-density pheromone "bag" dispenser was compared against two types of "twist-tie" dispensers for efficacy in suppressing pheromone trap catches of oriental fruit moth (OFM), when applied against the 2nd and 3rd generations of this pest. Apple varieties included Gala, R.I. Greening, Golden Delicious, Red Delicious, Monroe, Ida Red, Empire, and McIntosh.

Methods

The pheromone bag treatment, termed "MSTRS" technology (Metered Semiochemical Timed Release System, AgBio Inc., Westminster, CO) consisted of food-grade plastic enclosing a 6.4 x 6.4 cm natural fiber pad containing 65.8 g of OFM pheromone (85.4 : 5.5 : 0.9% of Z:E8-12 acetate : Z8-12 alcohol), which was deployed in a grid pattern at a spacing of 75 ft between dispensers, resulting in densities between 5.2-8.0 per acre. A pole+hoop applicator was used to position the dispensers in the top one-third of the tree canopy; deployment took place from July 9-13.

The MSTRS dispensers were compared against the following treatments in single-plot replicates ranging in size from 3-5.0 acres:

- Isomate M Rosso ties (CBC America Corp., Commack, NY), applied April 16-22 at a rate of 200/acre at four of the sites (1-4).
- Isomate M-100 ties (CBC America), applied June 16-18 at a rate of 100/acre at two of the sites (5 and 6).

Grower standard blocks were used as check plots at each site, and had no pheromone treatments, but received pesticide sprays according to conventional practice. Treatment efficacy in depressing adult male trap catch was monitored by using 3-4 Pherocon IIB traps per plot, each baited with a standard Scentry oriental fruit moth lure, and checked weekly from July 9 to September 16.

Results

As ease of use and labor requirements are considerations in deciding the type of pheromone dispenser to be used in a particular situation, data were taken on the time and number of people required to deploy the MSTRS dispensers in each plot. This product is used at a certain inter-dispenser spacing rather than a specific per-acre rate, so plot geometry as well as area dictate the total number of dispensers needed per block; density decreases as area increases.

The following specifics pertain to the six sites where the MSTRS were deployed in this trial:

Site	Area, acres	Dimensions, ft.	Number of Dispensers Applied		Time Required, worker-minutes	
			Total	Per Acre	Total	Per Acre
1	5.0	360 x 450	26	5.2	40	8.0
2	5.0	216 x 920	33	6.6	60	12.0
3	3.5	294 x 504	28	8.0	30	8.6
4	3.5	273 x 425	24	6.9	25	7.1
5	5.0	312 x 1512	36	7.2	40	8.0
6	3.0	180 x 760	22	7.3	25	8.3

Time measurements for hand-applied deployment of the twist-tie OFM dispensers taken in parallel studies have averaged approximately 240 ties/hr/person, or 25 min per A for the Isomate M-100 dispenser, and 50 min per A for Isomate Rosso. The MSTRS time requirements correspond to a ca. 50-70% reduction over the M-100 ties, and ca. 75-85% over the Rosso ties.

Pheromone trap catches of OFM adult males in the test sites were lower than they might normally have been, owing to unfavorable cool and rainy weather during July and August. Nevertheless, sufficient numbers of moths were caught in the non-disrupted check plots to indicate the degree of effectiveness of the pheromone treatments in the adjacent plantings.

Both the Isomate M-100 and Rosso treatments completely suppressed OFM trap catches in their respective plots for the duration of the study; in 4 of the 6 sites, traps in the MSTRS plots caught 1-2 moths on one or two occasions.

Because of time constraints resulting from a shipping error at the production facility, the MSTRS dispensers were received without the proper tree-attaching clips, so an arrangement was improvised using rubber bands. Unfortunately, these degraded with the prolonged exposure to sunlight.

Therefore, a certain proportion (10-20%) of the bags ended up on the ground in most plots by late August or early September, possibly detracting from the degree of pheromone saturation attained in the tree canopy space. Nonetheless, overall treatment efficacy and efficiency of this type of dispenser appears to be high enough to encourage further investigation of opportunities to integrate this type of product into future demonstration-research plots involving OFM mating disruption as one management component.

The principle of using a low-density, high-yield dispenser to disrupt chemical communication between the sexes incorporates elements of both mechanisms of mating disruption as currently proposed -- false trail following by the males as they are attracted up the plumes from the bags, coupled with sex pheromone habituation from exposure to the strong doses -- which would serve to arrest them in mid-flight.

While this approach may be suitable for a species such as OFM, which is relatively easy to disrupt, other studies have shown that species such as codling moth tend to respond better to higher numbers of pheromone point sources, with perhaps greater concentrations on the block edges. Therefore, the utility of the MSTRS design may be best realized against a selected smaller number of pest species.

Fruit Observations and Trap Reports

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

Apple: 6/8 to 6/15/05		
Redbanded leafroller	21	up from 0
Spotted tentiform leafminer	556	down from 1023
San José scale	0	same as last wk.
Codling moth (3 trap mean)	18.3	down from 18.7
Lesser appleworm	17	down from 37
Tufted apple budmoth	10	up from 6
Variegated leafroller	6	up from 5
Obliquebanded leafroller	11	up from 9

Site: Holmes, Medina, and Wayne Counties
Ron Becker, IPM Program Assistant

We have been finding light infestations of aphids, white apple leafhopper, potato leafhopper and European red mite (one tree in one block with mites). Scab is starting to show on fruit, and there is very scattered fire blight starting to appear. Codling moth trap catches have gone down the past week.

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

Apple: 6/7 to 6/14/05		
Codling moth (3 trap mean)	4.8	up from 3.5
Oriental fruit moth	4.7	up from 4.0
Redbanded leafroller	0.0	down from 0.2
San Jose scale	0.0	same as last wk.
Spotted tentiform leafminer	23.3	up from 8.7
Lesser appleworm	23.3	down from 27.5

Beneficials found: lacewings, native lady beetles, orange maggots

Peach: 6/7 to 6/14/05		
Redbanded leafroller	0.0	same as last wk.
Oriental fruit moth	1.0	up from 0.1
Lesser peachtree borer	21	up from 3.4
Peachtree borer	0.7	up from 0.0

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

Apple: 6/6 to 6/13/05		
Codling moth	0.3	down from 1.2
Oriental fruit moth	2.7	up from 1.0
Redbanded leafroller	0.2	down from 0.3
San Jose scale	0.0	down from 0.2
Spotted tentiform leafminer	0.0	down from 13.0
Lesser appleworm	15.8	up from 7.0

Beneficials found: brown lacewing, native lady beetles

Peach: 6/6 to 6/13/05		
Redbanded leafroller	0.0	same as last wk.
Oriental fruit moth	0.0	same as last wk.
Lesser peachtree borer	2.5	up from 1.0
Peachtree borer	0.0	same as last wk.