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

THE OHIO STATE UNIVERSITY Newsletter Extension

Fruit ICM News

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In This Issue:

Calendar

June 9: Plasticulture Strawberry, Blueberry, Blackberry, Raspberry Twilight Meeting; OSU South Centers, 1864 Shyville Road, Piketon, Ohio 45661. Field tours are from 5:00-7:00 p.m.; supper will be served from 7:00-8:00. Contact Brad Bergefurd, at 740-289-3727, 1-800-297-2072 (in Ohio only). E-mail: bergefurd.1@osu.edu. Web site: http://www.southcenters.osu.edu.

June 25: Ohio Fruit Growers Society Summer Tour, Glen Hill Orchard, 17156 Glen Road, Mt. Vernon, OH. See last week's issue for information.

Biofixes Established

Oriental fruit moth:	Columbus, April 22
	North-central Ohio, April 24
Codling moth:	Columbus, April 30
	North-central Ohio, May 1

Ohio Berry Growers Twilight Meeting June 9 at Piketon

Source: Brad Bergefurd, OSU Horticulturalist

The Ohio State University South Centers at Piketon invites anyone interested in growing strawberries, blueberries, blackberries, and/or red and black raspberries to attend a Berry Twilight Meeting at their Research and Extension Centers on Monday, June 9 from 5:00pm to 8:00 pm. "This is an important educational event for anyone that grows or wants to grow a berry crop for farm profit," says Brad Bergefurd, Horticulture Extension Agent at the OSU South Centers in Piketon. "We have been conducting very extensive research and demonstration berry trials at this location for 11 years and have some fascinating results that we would like to share with growers that may help them become more profitable berry growers," says Bergefurd.

Currently there are 18 different berry research and demonstration trials and over 300 different research plots being conducted by the staff of the OSU South Centers. These include over 600 summer and fall red raspberry plants, over 250 thorny blackberry plants, and over 150 thornless blackberry plants. These include some new genetic material imported from China and made available to OSU through Dr. Harry Schwartz from the University of Maryland. "We are looking at these new varieties for yield, hardiness, and disease resistance," says Dr. Shawn Wright, Horticulture Specialist at the OSU South Centers. "As the berry industry grows in Ohio, it is critical to have producers growing those varieties that will perform well and stay in production for a high number of years," says Wright.

Other berry trials being conducted by the Ohio State University South Centers include a black raspberry variety study, a black raspberry alternate year production and pruning study, a blueberry water and nitrogen management study, plasticulture strawberry winter protection study, and a plasticulture strawberry date of planting study to name a few.

In addition to tours and updates of the berry research trials, Dr. Dick Funt, OSU Small Fruits Specialist and Dr. Mike Ellis, OSU Small Fruit Disease Specialist, will provide updates on new herbicides for strawberries, the use of plastic on strawberries for weed control in Eastern cultivars, strawberry renovation procedures, and disease control tactics for small fruit.

Sandy Kuhn, Berry Coordinator at the OSU South Centers, will provide an update on the many exciting opportunities that are occurring in the Ohio Berry Industry. "The OSU South Centers staff is committed to help the berry industry in Ohio to grow and flourish," says Sandy. "Ohio has the potential to grow over 5 to 10 times the current production, therefore as farmers consider alternative crops, berries seem to be a very viable option," says Kuhn.

Several companies from the small fruit industry, including irrigation, fertilizer, and plant suppliers have also been invited to provide updates on what new items are available to berry growers.

The Berry Twilight Meeting is free and open to everyone. The meeting will be held at the OSU South Centers, 1864 Shyville Road in Piketon, Ohio. Tours of the field research trials will be from 5:00 to 7:00 pm with times for questions of industry specialists and supper being served from 7:00 pm to 8:00 pm. For more information on the Berry Twilight meeting or any of the Berry Research trials being conducted at the OSU South Centers, please contact our office at 740-289-2071 or 1-800-297-2072 or visit our web site at http://www.southcenters.osu.edu.

Pheromone-based Management Programs for Codling Moth &

Oriental Fruit Moth

Source: Larry Gut, David Epstein, & Peter McGhee, Entomology, MSUE Fruit CAT, V. 18, # 3, Apr. 29, 2003

Factors to consider when implementing a pheromone-based control program broadly consist of site selection, pheromone application, product performance, and monitoring. The best opportunity for control is achieved where physical characteristics and environmental conditions -- topography, size and shape, canopy structure, and wind -- allow for uniform distribution of pheromone. For example, orchard sites that are even-canopied are better candidates for mating disruption than sites with large numbers of missing trees. Using mating disruption in a large, contiguous area is considered a better strategy than in small, individual orchards. However, mating disruption can be successfully combined with other management strategies for control of moth pests in small orchards and where physical conditions are less than optimum.

Experience teaches us that orchard borders require extra attention when implementing mating disruption programs. Two processes are thought to contribute to the development of border infestations. First, mated females immigrate from adjacent orchards that are not treated with pheromone. Second, it is suspected that pheromone concentrations are lower on the borders than the interior and so increases the likelihood of males locating females and mating along borders.

Several tactics can be used to protect orchard borders. Additional pheromone can be applied to border trees or extended into adjacent orchards, if possible. This approach appears to be most effective when initial pest densities are low. In orchards that historically have a pest problem, it is best to treat borders with insecticides in addition to applying more pheromone to the borders or extending pheromone treatments into neighboring orchards. An effective border treatment (insecticides or extra pheromone) in most orchards would be an area equivalent to three or four rows around the orchard perimeter or along the problem border. Treating large contiguous areas with mating disruption is the best protection against border damage, as this strategy decreases the amount of border space relative to orchard interior.

Mating disruption, like any other control, is most effective if the application is well timed, the rate is high enough, and coverage is good. Effectiveness of mating disruption is reduced if dispensers are applied late, since this tactic provides no control once mating has taken place. Most moths begin mating immediately upon emergence into the orchard. Dispensers should be in place prior to the predicted start of adult activity for the target pest. Coding moth and oriental fruit moth are currently the principal candidates for control by disruption in fruit orchards. Both pests have more than one period of adult activity, the overwintering generation, and at least one summer generation flight. The best strategy for controlling codling moth in apple and oriental fruit moth in peach is to apply dispensers prior to the start of the first flight period. In contrast, targeting only the late-season activity of oriental fruit moth is a viable approach for using pheromones to manage this pest in apple.

For hand-applied disruption products, the rate of application corresponds to the number of dispensers applied per acre. Dispenser densities that can provide satisfactory control for orchard pests at a reasonable cost range from 100 to 400 dispensers per acre. The recommended application rate for most oriental fruit moth disruption products is about 100 d/a or one per tree. An exception to this is Isomate MRosso, a rope dispenser that has a recommended application rate of 200 units per acre. To successfully disrupt codling moth, the history of pest pressure within an orchard should be considered when determining the number of dispensers to apply per acre. Treat at the high end of the recommended rate if pest pressure is moderate to high. Regardless of pest pressure, experience over the past ten years strongly suggests that a minimum of 200 dispensers per acre is needed to result in worthwhile suppression of codling moth mating. Good coverage for disrupting codling moth or oriental fruit moth entails a more or less uniform distribution of

dispensers throughout the orchard. If two or more dispensers per tree are applied, it is best to spread them out within the canopy.

Proper placement of dispensers within the tree canopy can be a critical component of a pheromone-based control program. Positioning dispensers in the upper portion of the canopy generally provides the best chance of interfering with mate location.

However, good control of oriental fruit moth can be achieved by placing dispensers in the middle of the canopy. In contrast, successful mating disruption of codling moth requires placing dispensers within two feet of the top of the canopy, but near foliage to protect them from UV radiation and high temperatures. In orchards with canopy heights greater than 10 feet, optimum placement of dispensers cannot be achieved from the ground. A very good method for applying dispensers is with the assistance of a pole and clip. Application entails pushing a clip holding a dispenser onto a selected branch and leaving it there when the pole is twisted and pulled away. It takes less than 2 hours to treat an acre of apples with this technique.

Monitoring target pest activity is difficult in orchards treated with mating disruption products. Adult capture in pheromone traps provides some measure of the effectiveness of mating disruption. In pheromone-treated orchards where control is being achieved, moth catch in pheromone-baited traps should be very low or shutdown completely. The rationale behind this measure of effectiveness is that if males are incapable of finding a lure releasing relatively large amounts of pheromone, then they are probably unable to find female moths releasing much lower quantities of natural pheromone.

For oriental fruit moth, trap shutdown appears to be a good indication that a high level of control is being achieved. However, for codling moth, unacceptable levels of fruit injury often occur where moth captures in traps are zero or very low. A pheromone trap baited with a "high load" lure improves the utility of trapping to determine the effectiveness of codling moth disruption. Another option for monitoring disrupted orchards is to use traps baited with a DA lure (Trécé Inc.). The DA lure releases a volatile that is attractive to both female and male codling moth and is not impeded or suppressed by pheromone-based mating disruption.

For all orchard pests, however, monitoring with pheromone traps should not be relied on as a stand-alone method for assessing the effectiveness of mating disruption. Trapping should be used in conjunction with visual inspection of fruit for damage. Concentrating visual examinations of fruit to the upper canopy, orchard borders, and susceptible varieties increases the chance of early detection of fruit damage.

Various hand-applied dispensers are currently the most widely used products for pheromone-based control of fruit pests. At least four products are commercially available in the USA for control of codling moth or oriental fruit moth:

Isomate C Plus and CTT (Pacific Biocontrol, Corp., Ridgefield, WA),
CheckMate (Consep, Inc., Bend, OR),
NoMate (Scentry, Inc., Billings, MT)
Disrupt (Hercon, Inc., Emigsville, PA).

Modifications to these formulations over the past few years have focused on improved longevity and ease of application. A new oriental fruit moth dispenser, Isomate MRosso, provided season-long disruption in trials conducted in Michigan in 2002.

Hand-applied mating disruption formulations employ either a single or multiple application strategy. These strategies are designed to ensure the adequate release of pheromone throughout the mating period

of a target pest. All registered formulations are sensitive to temperature, releasing more pheromone when it is hot and less pheromone during cool periods. This variation in release rates due to temperature difference makes it difficult to determine the effective field life of a dispenser. Control problems have occurred when dispensers have run out of pheromone earlier than expected, leaving gaps when there is no pheromone dispensed.

Dr. Jay Brunner (WSU, Wenatchee, Washington) and other researchers have been evaluating pheromone emission rates for various codling moth disruption products. Among the products registered for use in the US, the two rope dispensers, Isomate C Plus and CTT, had the highest and most consistent release of pheromone. Consistent releases of pheromone were also provided by the Checkmate CM and Disrupt CM dispensers, but at very low rates per day.

The NoMate CM dispenser released pheromone at a very high rate initially, but ran out of pheromone after about 90 days. I encourage you to discuss the expected field life of products to ensure proper use and performance in the field with the dispenser manufacturers or an extension specialist.

Pheromone can be formulated into tiny capsules or beads and then applied through standard spray equipment on an as needed basis. We have been testing microencapsulated formulations manufactured by 3M Corporation or Suterra LLC. Sprayable pheromone offers the opportunity to be readily incorporated into current programs that include a number of sprays for diseases, insects and mites. A sprayable product could be used on an as-needed basis rather than as an expensive preventative control.

The current use pattern for sprayable pheromones is one to two applications per flight at a high rate, generally greater than 10 gm AI/acre. Good control of oriental fruit moth has been achieved using this strategy. However, on-farm trials conducted in Michigan and in other states suggest that high rates are not the most effective or economical way to use sprayable pheromones. Significant rain events (> 0.5 inches) wash off a portion of the microcapsules that contain the pheromone, thus reducing the effectiveness of the treatment. Very low rates (e.g., 2.5 gm AI/acre) appear to be as effective as high rates for up to two weeks post-treatment. Frequent application (every 10 to 14 days) of very low rates of pheromone -- only a few grams per acre -- appears to be the most economical and effective strategy for using sprayable pheromone to manage oriental fruit moth. To date, both high rate and frequent low rate sprayable pheromone strategies have proven to be substantially less effective than hand-applied dispensers for codling moth control.

A Bacterial Resistant Apple

Source: http://www.ncfap.org/40CaseStudies/OnePagers/AppleBROnePager.pdf

Fire blight is the most devastating bacterial disease to affect apples worldwide. Epidemics throughout the 1990s have cost apple producers millions of dollars in lost yields and lost trees across the U. S. The most recent outbreak in Southwest Michigan in 2000 devastated the region's apple industry, with losses estimated to total $42 million, including $10 million in crop losses, $9 million in tree losses, and $23 million in crop losses expected until new plantings become established.

Fire blight can affect all parts of the tree, including blossoms and fruit, twigs and leaves, trunk and rootstock. Infected plant tissue has a scorched appearance, and exudes bacterial ooze. Fire blight bacteria are microscopic and are spread by wind, rain, and insects. An infected tree may die rapidly, or may survive with varying levels of yield loss until it is removed.

Several factors contribute to the increasing severity of fire blight epidemics in the U. S. The 1990s

brought a shift in production practices, away from low-density plantings of varieties such as Red Delicious, which exhibit tolerance to fire blight infections. Market preferences have moved away from Red Delicious, so new plantings use a greater diversity of scion cultivars, such as Gala and Fuji, which are commercially popular but are more susceptible to fire blight.

Modern orchards are also high density, which means trees are smaller and more closely planted, making spread of disease between trees easier. High-density plantings are facilitated by use of dwarf rootstocks, which are highly susceptible to fire blight. Infection of a tree planted on susceptible rootstock, regardless of the scion variety, can be fatal.

Fire blight management includes monitoring trees and pruning out infected wood in order to prevent infections from spreading to the rootstock, combined with carefully timed applications of the antibiotics streptomycin and oxytetracycline to prevent new blossom infections. Increased plantings of cultivars susceptible to fire blight has led to an increase in antibiotic applications for disease protection. Antibiotic-resistant fire blight strains have been detected in several apple-producing regions, including in California, Washington, Oregon, and Michigan, further contributing to outbreaks.

Researchers at Cornell University have successfully transformed apples with the insertion of genetic material from the pupae of the giant silkworm moth. The transformed apples express a lytic protein, which damages and inhibits the functions of bacterial cell membranes. Transgenic lines of Royal Gala were produced and exhibited significant resistance to fire blight. Fruit of the transgenic Gala lines are indistinguishable from fruit of non-transformed lines.

The potential impacts of bacterial resistant transgenic apple are:

- Changes in production: prevent loss of 251 million pounds per year
- Changes in pesticide use: 21,800 pounds per year reduction in antibiotic use
- Changes in production costs/value: $38.4 million per year gain

Evaluating Glyphosate-Containing Products

Source: http://www.ipm.uiuc.edu/ifvn/volume09/frveg0904.html

Glyphosate (i.e. Roundup) is widely used in fruit and vegetable crops as a nonselective herbicide for control of emerged weeds, either in rows of trees or vines or for stale seedbed treatments before planting vegetables. In September 2000, Monsanto's U.S.patent on glyphosate expired, resulting in an increase in the number of glyphosate containing products available. These new products include Acquire, Buccaneer, ClearOut 41, Credit Duo, Gly-Flo, Glyphomax, Glyphosate, Mirage, Rattler, Roundup UltraMax. and Touchdown IQ. This wide array of glyphosate containing products has provided some important price benefits, but also has caused confusion.

James Martin and J. D. Green of the University of Kentucky have written an excellent article comparing these products http://www.uky.edu/Ag/Agronomy/Weeds/. In this article and accompanying tables they sort out how these glyphosate containing products differ. The first way the products differ is in the concentration of the active ingredient (generally expressed as acid equivalents).

Most products contain 3 lbs of acid equivalent per gallon, but there are exceptions. For example, Gly Star 5 contains 4 lbs of acid equivalent per gallon, Roundup UltraMAX contains 3.73 lbs acid equivalent per gallon, and Roundup Weather MAX contains 4.5 lbs acid equivalent per gallon. When determining price, make sure to compare like amounts of the acid form of glyphosate.

Secondly, the type of salt used in the glyphosate formulation can vary. The most common salt is the isopropylamine, but Touchdown Iq uses the diammonium and Roundup Weather MAX uses the potassium salt. The salt used in the formulation can affect performance in such ways as rainfastness and absorption into the plant. It will also impact on the amount of active ingredient in a formulation. This is why it is important to compare acid equivalents of glyphosate when selecting a product.

The use of adjuvants also varies, depending on the glyphosate containing product. Most glyphosate containing products indicate that ammonium sulfate (AMS) can be added as an adjuvant. AMS can improve the activity of glyphosate when it is tank mixed with some soil-residual herbicides, where weeds are not actively growing, where water hardness exceeds 500 ppm calcium or magnesium, or where problem weeds such as velvetleaf are present.

Recommendations on using a surfactant vary, depending on the glyphosate containing product. Some labels allow additional surfactant to be added, other glyphosate containing products require adjuvant, while products with unique surfactant systems (i.e. Roundup Ultra) do not allow additional surfactant.

Several Universities have compared different products. All glyphosate products should provide adequate weed control if applied at the recommended rate to actively growing weeds at the proper size. Any differences in efficacy have generally been small and variable.

Cane Blight on Blackberry

Source: Mike Ellis, OSU Plant Pathologist, A picture is available at: http://ohioline.osu.edu/hyg-fact/3000/3202.html

I did a lot of work on this several years ago and published a paper on it in *Plant Disease*. Cane blight is related to winter injury. We do not see the problem unless the canes are predisposed by winter or some other kind of injury. We generally do not see the problem in years with mild winters. Also, the problem is more prevalent on the thornless types that are less winter hardy than the thorny types in general.

I have seen cane blight kill most of the plants in a planting. There is nothing I can recommend to control it (on thornless blackberries) other than cutting out and removing infected canes. We were not able to control this disease in blackberries with fungicides in our studies. It appears that once the canes are predisposed, the disease develops no matter what you spray them with. At least this was our observation. This is one reason that I have been hesitant to recommend that growers plant large plantings of these less winter-hardy blackberries. In years with very mild winters they are great, but with more severe winters cane blight, along with normal winter injury, is a real problem.

Editor's note: Fungicides are still indicated as being useful in the management of cane blight in raspberries, according to Mike Ellis. If you have questions, contact Mike at 330-363-3849 or e-mail ellis.7@osu.edu

Probability of Scab Infections Resulting from Intermittent Wetting Periods

Source: Bill Turechek & Juliet Carroll, Plant Pathology & IPM, Geneva, Scaffolds Fruit Journal, Vol. 12, Issue 7, April 28, 2003

Growers who rely on the Mills Table to predict apple scab infections often ask, "How should I handle

intermittent wetting periods?" Several studies have been conducted in an attempt to answer this question, but none of the studies provided answers for all of the various combinations of temperatures and wetting and drying intervals. Yet, results from the experiments that have been conducted DO provide us with enough information to derive a good rule of thumb.

The most detailed study to date was conducted by Chris Becker and Tom Burr in the early 1990's. In their approach, they asked if apple scab conidia could cause disease after exposure to various wet-dry-wet intervals at either 50, 59, 68, or 77F. Three initial wet intervals were tested, either: (1) 15 min, (2) the time at each temperature required for ca. 50% of conidia to germinate, which turned out to be 7, 5, 4, and 5 hours at 50, 59, 68, and 77F, respectively, or (3) the time at each temperature required for ca. 20% of the conidia to also form an appresorium (i.e., 20% of the spores penetrated the host) which was 12, 8, 7, and 8 hours at 50, 59, 68, and 77F, respectively. An appresorium is the structure the fungus produces to penetrate the host plant.

After exposure to the initial wet interval, plants were exposed to 0, 0.25, 6, 12, 24, or 96 hours of drying at either 60% (low) or 90% (high) relative humidity. This was followed by a final wet interval of 24 hours. After exposure to the final wet period, they assessed the proportion of ungerminated conidia and germlings (i.e., germinated conidia) with or without an appresorium that were killed.

Results of this study showed that ungerminated conidia were not killed by exposure to dry intervals until drying exceeded 96 hours within the range of temperatures and relative humidities studied. Germlings with or without an appresorium were more sensitive to drying than ungerminated conidia. Twenty percent of germlings were killed after the first 15 minutes of drying and an additional 10-30% after 96 hours. Germlings with appresoria were killed after 24 and 96 hours, too, but the attrition rate was lower than for germlings without appresoria. Even after 96 hours of drying, over 75% of ungerminated conidia and germlings were still able to penetrate the apple leaf during the second 24-hour-long wet interval.

Becker and Burr proposed the following rule based on their results: "If the interval of drying is less than 48 hours in length, the initial and subsequent intervals of wetting should be summed to calculate Mills infection periods." This rule is more conservative than the "typical" rule of "summing wetting periods separated by less than either 8 hours of sunny weather or 12 hours of cloudy weather." Where did this rule come from? In a review of the scientific literature, MacHardy found NO scientific basis for the establishment of this rule.

In fact, nearly all the research that has been conducted shows that a high proportion of both ascospores and conidia survive drying periods of 24 hours or more whether it is sunny or not. Has this rule worked in the field? Perhaps. If it has, though, it is not because spores have died after only 12 hours of drying.

Several other factors affect the amount of disease that develops after a predicted infection event.

These include:

- the amount of primary inoculum in an orchard, assessed via PAD counts in the fall
- the stage of development of ascosporic inoculum in the spring, assessed via squash mounts, spore traps, and degree day model calculations
- the time of day and season when rain and leaf wetness occurs because ascospore discharge occurs during daylight, whereas conidia can be disseminated anytime by splashing rain
- whether the principal source of inoculum is ascospores or conidia.

MacHardy suggests a less conservative rule than Becker and Burr's to follow for combining successive wetting periods: "Two successive wetting periods, the first started by rain, should be considered a single,

uninterrupted wet period if the intervening dry period is less than 24 hr, regardless of weather conditions (sunshine, temperature, and RH) during the intervening dry period." This rule, in our opinion, should be the rule adopted by NY growers. This rule is easier to apply, slightly more conservative and, most importantly, consistent with the results of research.

Since the Mills Table operates in hourly time steps, a question often asked is: "How do I handle wetting events less than one hour long?" Keeping in mind that ascospores can be detected in spore traps after only 1 hour of wetting (but their numbers increase dramatically after 2 to 3 hours of continuous wetting) and that conidia are instantly dispersed by rain and in films of water or dew, wetting events less than one hour long should be counted as a full hour-long wetting event. When deciding whether to round up or down, the last hour of a wetting event (e.g., after a 4 hour and 20 minute wetting event, do we call it 4 or 5 hours?), use the standard rounding rules. That is, round up if greater than 30 minutes and round down if 29 minutes or less.

Given the intermittent wetting periods that occurred over much of New York State last week, growers who did not apply protectant fungicides before the rains may decide to reconsider the scab infection risk using the 24-hour drying event rule for intermittent wetting periods. Unprotected blocks that were exposed to infections, as determined using the 24-hour rule, should consider the following strategies:

- apply at least two applications of an SI-plus-protectant combination 10 days apart
- where the SI's are no longer working very well, week-old infections may be suppressed using two applications of either a maximum rate of SI-plus-protectant fungicide about 7 days apart instead of 10 days apart, or a combination of dodine plus a protectant. Recall that dodine may work better than the SI's in younger orchards that have seen little to no dodine use. Maximum rates of SI's may work better in orchards where dodine resistance may still be lingering. The objective of back-to-back sprays of SI's or dodine is to suppress any early infections before they can produce conidia.

Controlling Codling Moths Without Using Ops

Source: Rick Foster, Purdue Entomologist, Facts for Fancy Fruit 03-03 for April 28, 2003

A number of apple growers are looking for insecticides other than the organophosphates such as Imidan and Guthion to control codling moths. This desire to change is motivated by restrictions on the use of those products, concern about worker safety or pesticide residues, and probably most commonly, because it appears that codling moths in some locations are resistant to Imidan and Guthion.

There are several possibilities available for codling moth control. I will attempt to share with you what I know about some of the alternatives.

- **Danitol:** This pyrethroid insecticide is different than other pyrethroids in that it gives some control of European red mite without much toxicity to predator mites. However, in my trials it has given disappointing control of codling moth. Some of my colleagues have gotten good results with Danitol.
- **Insect growth regulators:** The three commonly available insect growth regulators are Confirm, Intrepid, and Esteem. I would recommend forgetting about Confirm. Intrepid is manufactured by the same company (Dow AgroSciences) and is a better product. When used twice per generation with another insecticide used between generations, I have seen good results with this product.

Some growers have had less than satisfactory results, however. I have the most hope for Esteem among the insect growth regulators. In my limited experience with it, Esteem has provided reasonably good

control of codling moth, and it also controls several other pests.

- **SpinTor:** Also available as an organic formulation (Entrust), this product has had mixed results. Sometimes the control is quite good and sometimes not so good. Several of my colleagues from neighboring states don't think much of SpinTor at all. If you are trying to grow apples organically, Entrust is the best option you have. If you are a conventional grower, I would only test SpinTor on limited acreages.
- **Avaunt:** This product from DuPont has not been outstanding in any of my trials or those of my colleagues. It does control codling moths, but never seems to be better than mediocre.
- **Assail:** This insecticide is from the neonicotinoid family, meaning it is similar to Provado, but with a broader range of control. My colleague, Bruce Barrett from the University of Missouri, tested Assail last year and got control as good as Imidan and Guthion. Unfortunately, I will test this product for the first time this year. At this point, Assail appears to be the alternative insecticide that has the greatest potential for providing control that is comparable to the organophosphates. If you must use an alternative this year, I strongly recommend that you give Assail a try. If Imidan and Guthion are still working well for you, I encourage you to conduct you own on-farm trial with Assail this year to see how it compares for you.

This season my colleagues from Ohio State University, University of Kentucky, University of Illinois, University of Missouri, and I are all conducting identical trials on all of these products, in addition to a few others so that we can make better decisions about how they work. I will update you as we learn more.

TracApple Record-Keeping and Reporting Software Available

Source: Julie Carroll, IPM, Geneva, Scaffolds Fruit Journal, Vol. 12, Issue 7, April 28, 2003

What is TracApple? TracApple is an easy-to-use software program that apple growers can use to record their yearly spray history and automatically generate required processor spray reporting forms. The program is being offered to apple growers at no charge. TracApple can complete the required spray forms for Motts, AgriLink, Ultimate Juice, Beechnut, and the generic Processor Spray Form.

Why was TracApple developed? Last year, during meetings with growers, one of the repeated themes expressed to the NYS Fruit IPM Coordinator was the need to simplify the spray reporting system to processors. Many growers said they often spent hours re-entering the same information on forms to satisfy the various processors they supplied. From that concern, the idea was born to create a computer program that could generate the processor spray reports from a master form. The end result was TracApple, a spray tracking and reporting program.

How does TracApple work? Those familiar with working on a spreadsheet will find it easy to use TracApple, since it is written in Microsoft Excel, a popular spreadsheet program. Very simply, the user "fills in the blanks." There are two primary data entry "sheets," much like a sheet of paper. One sheet asks for basic grower information, such as name and address. The other sheet allows the user to enter their spray information, such as the spray date and chemical used. From the data entered on these sheets the program is able to complete the required processor forms automatically.

Are there other benefits to using TracApple? We think so! TracApple has "drop down" lists for pesticides and diseases that you can select from. This saves time and prevents typing errors. When you select a pesticide Trade Name from the list, the program automatically fills in the EPA registration number on the form. The software also has Farm and Harvest Data sheets that automatically generate drop-down lists specific to your farm operation.

What hardware and software do I need to run TracApple?

- Microsoft Excel spreadsheet
- Internet service or a CD-ROM Drive
- Printer

Who developed TracApple? New York State Integrated Pest Management Program, Juliet Carroll, Fruit IPM Coordinator, and Judy Nedrow, Programmer

How can I get a copy of TracApple to try with my business?

Write:
NYS Integrated Pest Management Program
Cornell University, NYS Agric Expt Station
630 West North Street
Geneva, NY 14456-0462

Phone, Fax, E-mail or Web site:
PH: (315) 787-2430
Fax: (315) 787-2360
E-mail: jec3@cornell.edu
Web site: http://www.nysipm.cornell.edu

Sevin Conference Call for Revised REIs

Source: Celeste Welty, OSU Entomologist

The USDA conference call to discuss the revised risk assessment for Carbaryl is scheduled for May 7 at 1:00 PM to 3:00 PM. Both EPA and the Registrant will be participating. The Call-in Numbers are 800-867-6144 or 202-554-1742, Access Code: 5746

Since the public comment period for the revised risk assessment closes June 2nd, and the list of registered crops are extensive, we would like to identify the critical uses for carbaryl before the call. For these crops, we would like to look at the use assumptions considered in the risk assessment and the resulting changes to the REIs.

The first question: Is carbaryl important and valuable for your crop? If the answer is yes, we need to make sure the labeled application rates and maximum number of applications per season reflect your actual use. The application rates and proposed REIs can be found in the following table.

These REIs are derived without the benefit of the most recent transfer coefficients from the Agricultural Re-Entry Task Force (ARTF) data submitted to the Agency in November 2001.

Are these REIs acceptable for your crop? If you have any questions, contact:

Dhol Herzi
Office of Pest Management, USDA
dherzi@usda.gov
202-720-2664

Also, the Chemical Review Manager at EPA, Tony Britten, is available to answer any of your specific questions:

britten.anthony@epa.gov
703-308-8179

How the proposed new REIs would affect fruit management is shown in the following table:

Carbaryl: Proposed ReEntry Intervals (and application rates)
(present REIs equal 12 hours for all fruit crops listed below)

Crop	Application Rate Lbs ai/Acre	ReEntry Interval (days)	Activity (exposure) driving the REI
Blueberries (highbush)	2	2, 11	Hand harvest, leaf pulling, thinning, pruning REI = 11 REI for grape girdling, cane turning = 14
Blackberries & Raspberries	2	2, 11	Hand harvest, leaf pulling, thinning, pruning REI = 11 REI for grape girdling, cane turning = 14
Strawberry	2	4	Harvesting, hand pruning, pinching, training
Apples	3	1	Harvesting, pruning, training, tying (thinning REI = 8)
Apricots	3	1	Harvesting, pruning, training, tying (thinning REI = 8)
Cherries	3	1	Harvesting, pruning, training, tying (thinning REI = 8)
Nectarines	3	1	Harvesting, pruning, training, tying (thinning REI = 8)
Peaches	3	1	Harvesting, pruning, training, tying (thinning REI = 8)
Pears	3	1	Harvesting, pruning, training, tying (thinning REI = 8)
Plums/Prunes	3	1	Harvesting, pruning, training, tying (thinning REI = 8)
Grapes	2	2, 11	Hand harvest, leaf pulling, thinning, pruning REI = 11 REI for grape girdling, cane turning = 14

Timing Sprays for Oriental Fruit Moth

Source: PennState Fruit Production Guide http://tfpg.cas.psu.edu/part2/part22bv.htm

Spray timing for Oriental fruit moth can be aided by using pheromone traps to establish a biofix (i.e., first sustained capture of two or more moths per trap) and then calculating and recording degree days (DD base 45) to determine the percent egg hatch for each generation. Having placed sex pheromone traps in

stone fruit and/or orchards in early April, and having now captured moths to establish biofix, you need to calculate DD (base 45). Timing of insecticide sprays for the first and second generations are as follows:

- First generation - 150 to 200 DD (base 45) plus 350 to 400 DD following biofix
- Second generation - 1,100 to 1,150 DD (base 45 plus 1,450 to 1,500 DD following biofix
- Insecticide timings for third (and fourth) generations are still being evaluated

Recommended control products for Ohio growers at petal fall and later include Ambush, Asana, Pounce, Guthion, Imidan, Lannate, or SpinTor*. However, the use of pyrethroids (Ambush, Asana, Pounce) can cause mite outbreaks because they kill mite predators and persist a long time. Lannate will also control catfacing insects but not plum curculio.

* PennState has not found SpinTor to be effective in controlling OFM.

Degree Day Accumulations for Ohio Sites April 30, 2003

Note change of Base Degrees to reflect values used for management of Oriental fruit moth (45) and codling moth (50).

Ohio Location	Degree Day Accumulations			
	Base 45 F		Base 50 F	
	Actual	Normal	Actual	Normal
Akron-Canton	319	255	174	138
Cincinnati	489	458	306	264
Cleveland	279	238	156	130
Columbus	465	329	290	184
Dayton	428	335	264	189
Fremont	234	214	132	115
Kingsville Grape Branch	199	190	105	101
Mansfield	298	247	159	135
Norwalk	266	221	143	119
Piketon	533	483	317	285
Toledo	257	208	133	112
Wooster	362	228	206	119
Youngstown	273	223	146	120

Pest Phenology

Coming Event	Degree Day Accum. Base 43 F

Redbanded leafroller 1st flight peak	65 - 221
Apple grain aphids present	67 - 251
San Jose scale 1st catch	69 - 385
European red mite egg hatch	74 - 208
Lesser peachtree borer 1st catch	110 - 553
Spotted tentiform leafminer sap-feeders present	130 - 325
First codling moth catch	141 -491

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: 4/23/03 to 4/30/03 (petalfall on 4/30)
CM: 1.7 (up form 0)
RBLR: 0 (down from 5)
SJS: 107 (up from 0)
STLM: 15 (down from 21)
TABM: 0 (same as last week)

Biofix established April 30 for codling moth

Peach: 4/23 to 4/30/03
OFM: 2 (down from 3)
LPTB: 0 (same as last week)

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

Apple: 4/16 to 4/23/03 (full bloom to blossom drop)

STLM: Holmes: 200 (down from 960)
Medina: 1186 (up from 560)
Wayne: 147 (down from 1688)

RBLR: Holmes: 88 (down from 118)
Medina: 41 (down from 43)
Wayne: 24 (down from 65)

CM: Holmes: 0 (first report)
Medina: 0 (first report)
Wayne: 0 (first report)

OFM: Holmes: 4 (first report)
Wayne: 4 (first report)

Orange rust is being found in blackberries and black raspberries. In sweeping strawberries for TPB, the most found in any one field was 1 per 100 sweeps. Frost damage was light in most apple and peaches. Grapes show light to moderate damage.

Site: East District: Erie & Lorain Counties
Source: Jim Mutchler, IPM Scout

Apple: 4/23 to 4/29/03 (Pink to bloom)
STLM: 465 (down from 692)
OFM: 0.5 (down from 1)
RBLR: 31 (same as last week)

Peach: 4/23 to 4/29/03 (Bloom to petal fall)
RBLR: 28 (down from 76)
OFM: 0 (down from 1

Site: West District: Huron, Ottawa, Richland, & Sandusky Counties
Gene Horner, IPM Scout

Apple: 4/23 to 4/29/03 (Pink to bloom)
STLM: 105 (first report)
OFM: 0 (first report)

Peach: 4/23 to 4/29/03 (Bloom to petal fall)
RBLR: 125 (first report)
OFM: 85 (up from 1)

Biofix established April 24, 2003 for oriental fruit moth

Biofix established May 1, 2003 for codling moth

Preliminary Monthly Climatological Data for Selected Ohio Locations, April, 2003

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	2.28	3.39	8.75	11.31	62.3	59.0	39.5	37.1	50.8	48.1
Cincinnati	1.91	3.96	9.70	13.53	65.9	64.7	45.5	42.7	55.7	53.7
Cleveland	2.47	3.37	9.52	11.08	59.0	57.3	38.7	37.9	48.8	47.6
Columbus	2.54	3.25	9.37	10.87	66.0	62.9	43.8	41.2	54.9	52.0
Dayton	1.49	4.03	7.44	12.21	64.3	60.7	43.0	40.4	53.7	50.6
Fremont	3.42	3.03	7.76	9.17	59.3	58.9	34.9	37.8	47.1	48.4
Kingsville	3.33	3.15	9.82	9.40	56.4	55.2	35.6	36.8	46.0	46.0
Mansfield	2.10	4.17	8.05	12.33	61.7	58.4	37.9	36.1	49.8	47.3
Norwalk	2.47	3.13	8.90	9.53	59.3	57.7	38.5	36.9	48.9	47.3
Piketon*	3.63	3.81	12.27	14.34	69.2	63.4	44.4	41.4	56.8	52.4
Toledo	2.57	3.24	7.85	9.67	59.8	58.9	37.7	37.7	48.8	48.3
Wooster	2.76	3.06	9.92	9.90	64.4	59.6	39.7	36.7	52.0	48.1
Youngstown	1.82	3.33	8.13	10.75	61.2	58.2	37.5	36.5	49.4	47.3

Temperatures in degrees F, Precipitation in inches

* Piketon precipitation unavailable due to equipment failure, Jackson Station reports substituted.

Record Highs Set: 15th ; Akron-Canton 81, Cleveland 82, Mansfield 80, Wooster 82 , Youngstown 82

Records Tied: 14th ; Youngstown 75, 15th Columbus 82

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

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