

SPRING 2005

Michigan Apple

NEWS



Michigan Apple Committee
www.MichiganApples.com

Getting Michigan Apples Into Schools Growers, Shippers Making a Difference

More Michigan apples are heading off to Michigan schools! Michigan apple growers and shippers are working hard with schools across the state to get homegrown Michigan apples on the lunch tray.

Unfortunately, in the past, schools have served “low-bid Red Delicious,” which means the apples weren’t often from Michigan. But with programs such as “farm-to-school” growing in popularity,

“...we are now getting a substantial quantity of our apples into schools here in Michigan.”

more teachers and their students are becoming aware of the more tasty Michigan apple.

Another promising program for schools and farmers is a grant from the federal government that

provides \$9 million to 25 schools in Michigan (and 25 schools in each of three other states) to purchase fruits and vegetables.

The Michigan Apple Committee recently held a meeting with representatives of Michigan apple shippers, officials from the Michigan Department of Education (MDE) and some school food service directors to strategize about getting Michigan apples into Michigan schools more easily.

Marla Moss, Supervisor of the Food Distribution Program at MDE thinks the local school food service directors can make a big difference.

“The system needs to be director-driven. If school food service directors want Michigan produce in their schools, they should make their wishes known to the commercial distributors who bring their produce every week,” she said. For shippers, people like Moss are providing great help.

“It has been a challenge in the past, to get our apples into Michigan schools,” said **Pat Chase**, of **Jack Brown Produce**, an apple shipper near Sparta. “But Marla Moss has helped the cause. There are still logistical challenges, but we are now getting a substantial quantity of our apples into schools here in Michigan.”

A Unique Situation with Traverse City Schools

Apple grower and MAC board member **Mark Doherty** has made great strides in getting local apples into the Traverse City Schools. Doherty began providing his apples to the district as a part of the farm-to-school program the district’s food service director instituted last fall.

He began with one school, his children’s elementary school. The apples were so popular that the district asked Doherty to deliver his home-grown apples to 14 schools in the district.

“It’s exciting to be involved with a project where everybody benefits,” said Doherty. “The food service people have the opportunity to serve a healthy choice item on the menu, the kids enjoy the apples, and I have a chance to develop the next generation of apple consumers.”

While the logistics of this particular situation can’t be duplicated everywhere, it does illustrate that schools want to serve fruits and vegetables from their home state, and farmers want to provide them. And when kids are provided with a tasty, fresh apple, they demand more!

SPECIAL RESEARCH SECTION INSIDE



L-R First runner-up Emily Westendorp, 2005 Michigan Apple Queen Paula Fisher, Second runner-up Ashley Wright and MAC Chair Bryan Bixby.



Mike Beck of Uncle John's Cider Mill holds the trophy from the cider contest.

Paula Fisher Crowned 2005 Apple Queen

Michigan apples have a new representative in 2005! **Paula Fisher** was crowned the 2005 Michigan Apple Queen at the annual Pageant held at the Great Lakes Fruit, Vegetable and Farm Market Expo.

Fisher, 20, is the granddaughter, daughter, and niece of Berrien Springs apple growers. She is a student at Andrews University in Berrien Springs, where she is pursuing a degree in horticulture.

The first and second runners-up are **Emily Westendorp** of Berrien Springs and **Ashley Wright** of Belding, respectively. Westendorp is a student at Valparaiso University in Indiana, and Wright is a high school senior.

The 2004 Michigan Apple Queen, **Amanda Schweitzer**, ended her reign at the pageant by giving an excellent presentation recapping her eventful year as queen, and crowning Fisher.

The pageant is presented by the Michigan Apple Committee and staged by the Michigan State Horticultural Society Women's Auxiliary.

Candidates for Michigan Apple Queen must be between the ages of 17 and 23, and must have a link to the industry. Contestants are judged on a number of features, including poise, professionalism and knowledge of the apple industry.

The deadline for Michigan Apple Queen 2006 applications is October 1, 2005. For more information, contact **Diane Smith** at the MAC offices at (800) 456-2753.

Uncle John's Cider Mill Wins Cider Contest

The apple cider at **Uncle John's Cider Mill of St. Johns** was deemed the best cider in Michigan at the 8th Annual Cider Contest held at the Great Lakes Fruit, Vegetable and Farm Market Expo in December.

Mike Beck, cider maker and owner of Uncle John's as well as MAC board member, has placed second or third in other years of the contest, and this year marks his first win. Beck's cider mill is located north of Lansing in St. Johns.

Second place in the cider contest went to **Hill Brothers Orchard in Grand Rapids**. **Jim Hill** and his family have racked up several wins in past contests.

The third place winner was **Verellen Orchards of Romeo**. **Bill Verellen** is the owner and cider maker.

The cider contest is a blind taste test with nine judges from the apple industry or media. Each judge savors each cider sample not knowing its origin, and then assigns it points based on eight criteria: Appearance and color, aroma and bouquet, acidity and sweetness, sugar/acid balance, body, flavor, finish and overall quality.

A top ranking in each category earns the cider a perfect 20 points. There were 29 entries in this year's contest.

Bob Tritten, Michigan State University Extension's Southeast Michigan District Agent based in Flint, organized the cider contest in 1997. The contest is sponsored by the Michigan Apple Committee.

MAC promotes the cider contest through the web site and newsletter, and provides trophies for the winners. MAC Chairman **Bryan Bixby** announced the winners at the Expo banquet.

Dear Growers,

It's time again for the special research edition of your *Michigan Apple News*!

Every year, MAC funds a very significant amount of research, which is part of our charge under Public Act 232. In 2004, we funded 18 projects for a total of \$267,423. In 2005, we will fund 21 projects with a \$257,034 commitment. MAC also funds IPM coordinator Dave Epstein with \$16,000 annually.

I would like to thank the Michigan Apple Research Committee (MARC) for the hard work and many hours they spend evaluating the research proposals, determining funding for the projects, and presenting the final list to the MAC board for approval. MARC's work is greatly appreciated by the entire apple industry.



This edition of the newsletter presents the 2004 research projects in summary. The complete research reports can be found at www.MichiganApples.com under the "Growers" heading, or by calling the MAC office at (800) 456-2753.

In addition to the great work being done in the field of research for apple growers, great consumer marketing and education is being done as well.

As you can see on the cover page of our newsletter, great strides are being made in getting Michigan apples into our schools. Good things can start in small ways, and we are rapidly putting pieces together on this issue.

We need to get our apples into the hands of the next generation of apple-eaters. Exposing students to the great flavor and wide variety of Michigan Apples is a great way to do that. Kudos to those already making strides in this area!

Sincerely,

A handwritten signature in cursive script, appearing to read "Bryan Bixby".

Bryan Bixby
Chair, Michigan Apple Committee

This edition of the newsletter presents the 2004 research projects in summary. The complete research reports can be found at www.MichiganApples.com under the "Growers" heading (enter username: MichGrower, password: GreatFlavors) or by calling the MAC office at (800) 456-2753.

Research Section

MARKET RESEARCH: FRESH-CUT APPLE SLICES

Dianne K. Novak, RD, MS, of the Michigan State University Product Center for Agriculture and Natural Resources, led a nine month-investigation into the market potential for Michigan fresh-cut apple slices. This project was jointly funded by MAC and the Michigan State Horticulture Society.

Key findings of the market investigation revealed four primary markets and two secondary markets. The prerequisite for this investigation was to explore those markets that could be serviced directly or serviced through a foodservice distribution channel who have access to the ultimate customer, the consumer.

The primary markets showed a strong interest with attractive volumes and margins. These markets included convenience stores, airlines, quick-service restaurants (beyond McDonald's) and vending businesses. The secondary markets are those which could be serviced by regional food service distributors including schools, caterers, contract food providers and privately-operated food service establishments.

The results of the market potential research were presented to interested shippers and processors in mid-December. Additional funds and industry interest showed a desire for conducting a number of "test market trials" with a number of the potential customers identified. Currently, this work is being done by Woods Consulting for MSU with those potential customers.

Sales for the fresh-cut industry continue to show double-digit growth, with the fruit category being identified as the category for greatest growth. Cut fruit sales are expected to reach \$1 billion by 2008. Fresh-cut fruit sales for the last three years, starting in 2001 have been \$175M, \$250M and \$350M respectively. Sales for 2004 are pending, but are anticipated to support similar growth.

Even though these sales growth figures are national in scope, strong regional parallels exist for the Michigan apple industry.

Using Genetics in Fruit Thinning

One of the key factors limiting profitability in the Michigan apple industry is the lack of precise control over flower and fruit thinning, which is essential to optimize fruit size and minimize alternate bearing.

Dr. Steven van Nocker, of the MSU Department of Horticulture, is looking into the genetic make-up of the apple tree to discover what causes abscission in order to make fruit thinning more predictable.

Success of chemical fruit thinning especially is highly variable and depends on cultivar, weather and physiological state of the tree. Commercially available fruit thinning chemicals are based on phytohormones, and their thinning activity is an indirect result of their effects on physiology of the tree.

However, events such as flower and fruit drop are regulated naturally using very specific genetic pathways. In order to refine current thinning strategies and develop highly specific and effective thinning compounds, it will be necessary to discover these genetic pathways.

Van Nocker and others are using molecular technology to analyze the genetic regulation of fruit drop. The objective is to utilize the findings to develop a tractable, high-throughput assay to evaluate the efficacy of novel thinning compounds, without the need for extensive initial field trials.

At this stage in the research, van Nocker has implicated numerous novel mechanisms in fruit drop, including the activities of pectinases, reactive oxygen radicals, and small carbohydrate molecules in the abscission layer cells.

Mite-Flaring Potential of New Insecticides on the European Red Mite



European Red Mite adult and egg on an Apple Leaf.

Since the introduction of several new insecticides, there have been reports of serious mite outbreaks. There are two primary factors responsible for "mite-flaring:" One is the elimination of natural enemies like predatory mites; and the second is direct stimulation of egg laying by the pest mite.

The aim of this study, conducted by **Dr. John C. Wise**, was to investigate the mite-flaring potential of new insecticides on the European Red Mite in Michigan apples. The insecticides Assail, Calypso, Diamond, Guthion, Asana, Danitol, Sevin, and Warrior were evaluated in field trials singly and selected compounds in tank mixes with Carbaryl (Sevin), a common fruit thinning agent.

Asana, Danitol and Warrior all showed mite-flaring effects, and all three were highly toxic to the predatory mites needed to promote biological control. Sevin showed moderate toxicity predatory mites.

Treatments of Assail, Calypso, Diamond alone did not show toxicity to predatory mites, nor did they flare mites. When combined with Sevin in tank mix applications, however, they all showed significant levels of mite flaring.

It appears to be the combination of these new insecticides with a predator-toxic material, such as a pyrethroid or Sevin, that triggers the most significant mite-flaring response.

Controlled Annual Cropping Using Carbon-base Model

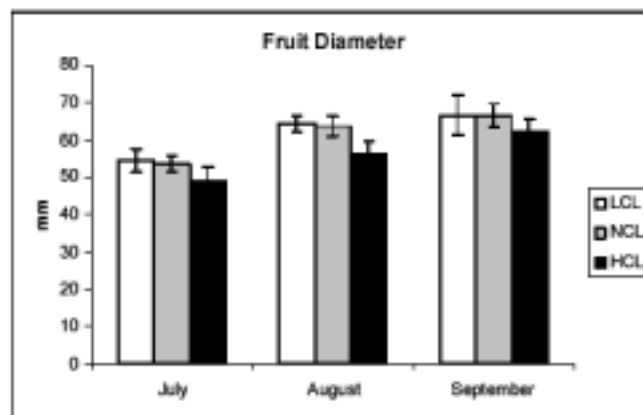
In the second year of a two-year study, researchers **Dr. Jim Flore** and **Dr. John Bukovac** of Michigan State University, examined chemical and crop load manipulation in order to predict and control annual cropping.

The Lakso carbon-base model was tested at the Clarksville Horticultural Research Station under Michigan conditions to develop a situation that had a range of leaf to fruit ratios that affected fruit size and carbohydrate storage.

Three different crop loads (Low, LCL; Normal, NCL; and High, HCL) were studied. HCL had smaller fruit and shorter shoots, while LCL had smaller daily net photosynthesis.

Because of the change in the carbon isotope composition of the fruit, leaves and shoots, it may be possible to predict source limitations, and shortages in starch before bud break the next spring.

This has important management implications for the next growing season.



Flore and Bukovac measured the effect of crop load on fruit growth during the season (7/24, 8/18 and 9/4). Fruit diameter was measured on 20 fruits for each of the four trees in each treatment (20x4x3). Bars represent standard deviation.

Study Focuses on Marketing and Packaging Fresh-cut Apple Slices

Dr. Janice Harte, Professor of Food Science and Human Nutrition at MSU, studied packaging materials for best quality of fresh-cut apple slices.

“The vibration tests simulated the hazards of the truck transportation environment approximately equal to 500 miles of interstate highway shipments.”

The two main objectives of this fresh-cut apple slice project were:

- To determine the best packaging materials to meet consumers’ needs and withstand the processing, storage and

distribution channels for maximum quality and shelf-life. (Phase I)

- To test Smart-Fresh application to extend the storage life of selected varieties for fresh-cut apple slices to assess the capability of having a 12-month supply of fresh-cut slices. (Phase II)

So far, the work on Phase I has been completed using Empire apples.

Three types of packages (5-oz. rigid polystyrene, and 2-oz. and 2-lb. polyethylene bags for individual, school lunch-pack, and food service application, respectively) were subjected to vibration test using apple slices treated with two anti-browning agents (Nature Seal and Ever Fresh).

The vibration tests simulated the hazards of the truck transportation environment approximately equal to 500 miles of interstate highway shipments.

Product evaluation by a small consumer panel showed that Nature Seal effectively preserved appearance of apple slices and that vibration testing did not produce any detectable adverse changes in the apple slice quality. If bruising occurred as a result of the vibration testing, Nature Seal prevented browning.

Consumer panel results showed that slices treated with Nature Seal had consistently higher scores for color/appearance and overall acceptability than those treated with Ever Fresh, regardless of the vibration treatment.

Antibiotic Resistance Management and Alternative Strategies for Fire Blight Control

Fire blight, caused by the bacterium *Erwinia amylovora* (Ea), is difficult to manage in Michigan and is exacerbated by three major problems:

- Most of the popular apple cultivars selected by growers are susceptible or highly susceptible to fire blight;
- Many popular dwarfing rootstocks are also highly susceptible to fire blight; and
- The few chemical control options available are becoming limited by the development of streptomycin resistance in some areas of Michigan.

Dr. George Sundin, MSU Plant Pathologist, aimed to integrate the various chemical and biological control options available (with streptomycin or substituting for streptomycin) to both optimize disease control and reduce the number of streptomycin sprays required.

His second objective was to survey Michigan apple orchards for the occurrence of streptomycin-resistant Ea to determine if streptomycin-resistant strains are spreading.

Sundin conducted two separate experiments, one in a 32-year-old block of Jonathan and Golden Delicious apple trees and the other in a 25-year-old block of Jonathan.

In Experiment 1, the efficacy of the registered biological control agent BlightBan A506 and a new unregistered biological control strain called C9-1 were tested, along with Serenade, and a streptomycin-oxytetracycline tank-mixed spray.

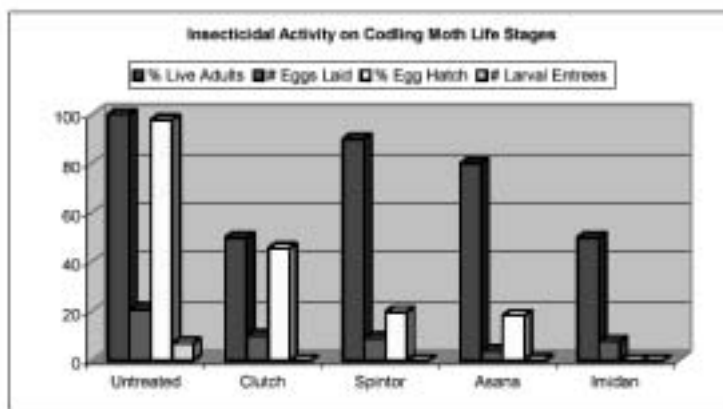
In Experiment 2, several sprays were made of a new antibiotic, gentamicin, which is a promising fire blight control being developed by Gowan Company.

The 2004 growing season was cool and wet without the higher temperatures that favor fire blight. Overall disease pressure was light.

Sundin surveyed six orchards in southwest Michigan and eight orchards in the Fruit Ridge area during bloom in 2004. He isolated streptomycin-resistant Ea from fire blight strikes in all six southwest Michigan orchards and in seven of eight orchards from the “ridge” area.

This is the first finding of widespread streptomycin resistance of the fire blight bacterium in the “ridge.”

Optimizing Performance of New Insecticide Chemistries for Control of Codling Moth



Cumulative Effects of Insecticides on Codling Moth, TNRC, Fennville, MI 2004.

determine how each these new compounds work in terms of residual activity (how long they last), and life stage susceptibility that will lead to optimal performance for control of codling moth.

The study showed that Guthion, Imidan and Asana, and the new neonicotinoids Assail, Clutch and Calypso, have lethal activity on all codling moth life stages (adults, larvae and eggs). The insect growth regulators Intrepid, Esteem, Rimon, and Spintor are the most active when targeting codling moth eggs and larvae. This will have important implications for optimizing spray timing when using these insecticides for codling moth control.

The 2002 growing season proved to be one of most difficult for controlling codling moth in recent history in Michigan.

There are a series of new insecticide chemistries being registered in apples for control of codling moth, which are in many ways different than the conventional materials that preceded them.

The purpose of the study, by **Dr. John C. Wise**, MSU entomologist, was to give Michigan apple growers a more thorough understanding of the strengths and weaknesses of the various groups of insecticides. Wise's research objectives were to

Research Examines Codling Moth Resistance to Controls

Failures to control Codling Moth (CM) are attributed to several different factors including less-than-optimum timing, inadequate coverage, or a reduction in susceptibility to insecticides. Lack of control due to resistance is the most difficult one for growers to address without technical assistance.

Dr. Larry Gut, Entomology Professor at MSU, hopes to help growers and consultants identify sites where CM resistance to azinphosmethyl has developed, and to help resistant areas determine the effectiveness of alternative insecticides.

Gut assessed CM populations from 23 orchards during the summer of 2004. High levels of resistance were detected in all assays of CM populations from commercial orchards, and it appears that it is fairly widespread. The only highly susceptible population (100 percent mortality) was from a long-neglected apple orchard in Kalamazoo that had never been exposed to Guthion. The most resistant strains were trapped in orchards in the Lowell, “ridge” and Southwest Michigan areas.

Only a few assays were conducted in other fruit production regions because it was difficult to capture high numbers of moths; however there was some indication that strains in Southeast and West-Central Michigan were more susceptible than those in Lowell, Fruit Ridge and Southwest Michigan.

Gut’s study has identified orchards and production regions in Michigan where Guthion is failing to control CM, and promoted switching to other programs that have proved successful in controlling CM.

Apogee Effects on Apple

A new tool added to the apple grower’s tool box has many positive effects on apple trees, including help to control fireblight.

Research conducted in West-Central Michigan and at the Clarksville Horticulture Experiment Station with Apogee revealed many applications for Michigan apple growers.

Apogee controls the vegetative growth of shoots during the spring growth flush. With limited shoot growth, fireblight canker growth is suppressed and less shoot infections are observed.

Now that Streptomycin-resistant fireblight has been found on Fruit Ridge, the use of Apogee is more important. Shoot growth control can be variable depending on variety, cropland and tree vigor, but Apogee can reduce shoot growth by 30 to 50 percent. In addition to fireblight suppression, this reduces annual pruning costs by 30 to 50 percent.

In 2004 tests at Clarksville, Apogee has significantly increased calcium levels in the fruit just under the skin. This could reduce calcium-related disorders as well, including bitterpit.

Other Apogee affects include increased fruit set and return bloom. These effects are not always easy to measure but Schwallier saw a weak positive tendency in many trials.

Improved Approaches to Codling Moth Mating Disruption

Mating disruption is a novel technique that has been used successfully by some growers for control of Codling Moth (CM), as well as some other pest species.

The cost of mating disruption is often noted as the primary obstacle to greater adoption of this technique for pest control. The high cost of the active ingredient and labor to apply the most widely-used systems, hand-applied devices, contribute to the overall high cost of this strategy compared to control by insecticides.

Dr. Larry Gut aims to develop effective pheromone-based management programs that are both practical and economical for Michigan apple growers.

Two new sprayable pheromones, Scentry fibers and Hercon flakes, showed promise for control of CM. They did not perform as well as hand-applied formulations, but this was largely related to technical problems associated with getting them to readily adhere to the tree.

The approach of deploying high densities of pheromone ropes on the border and dramatically decreasing densities in the interior showed promise as a means of reducing the overall number of units per acre without compromising performance.

Levels of damage at harvest in blocks treated in this manner were similar to those in orchards where ropes were distributed uniformly at a high rate.

Chemical Thinning for Bigger Apples

Bigger, consistently cropped apples may be closer to reality. A new thinner called 6-BA was recently labeled by Valent BioSciences, and Fine Agrochemical and NuFarm.

Dr. Philip Schwallier, District Horticulture Marketing Agent for Michigan State University Extension, has researched chemical apple thinning for MAC.

This thinner has many unique characteristics that are beneficial to apple growers. BA is a gentle thinner; that is, it thins without any harsh tree, leaf or fruit response to the application.

Some thinners will stunt fruit and leaves, but BA does not do that, Schwallier found. This allows growers to choose the level of thinning desired and apply a thinning agent that will achieve it.

When combined with Sevin, BA is an aggressive thinner. On those difficult-to-thin varieties and varieties that tend to not return bloom, aggressive thinning can be quite beneficial.

This year's crop will be improved and next year's will come back with good to excellent return bloom. BA increases cell division boosting fruit size over and above the thinning effect.

When BA is used on a tree, the fruit size is enhanced beyond simple thinning. This year BA thinning affect decreased as the fruitlets aged. NAA applications were able to thin later than the BA.

It appears that the best timing for the use of BA is between 6 mm. and 15 mm. Earlier and later applications are not always effective. BA is not compatible with NAA.

With this new thinner small fruited varieties can benefit from the thinning and fruit size enhancement. Some varieties appear to be quite sensitive to BA, such as Fuji. Overall, the addition of BA to a grower's thinning tools looks hopeful.

On-farm Evaluation of New Insecticides for Control of Codling Moth

In the final year of this project, **Dr. Larry Gut's** focus is to determine the effectiveness, best timing and most economical uses of new insecticides for control of codling moth (CM), apple maggot (AM) and other key apple pests.

This was the first year that Calypso was commercially available and much of the effort focused on evaluating its effectiveness. Very good CM control was achieved in orchards at 11 locations that were treated with pheromone and companion insecticide sprays, primarily Calypso, but also Assail and Intrepid.

CM virus products from two manufacturers were directly compared at three sites. Either virus applied at a low rate and on an alternating basis with a Calypso treatment was a very effective CM management program.

Fruit injury at harvest was about 0.5 percent in plots treated with virus and Calypso and 2.0 percent in plots treated with older, standard control options. Excellent AM control was achieved using newer insecticides only, primarily, Provado, Calypso and Assail.

This research provides a foundation for MSU's winter educational programs and helps set published guidelines (Michigan Fruit Management Guide). Results from this project were presented at the Michigan Fruit and Vegetable Expo in Grand Rapids, and have been incorporated into Fruit CAT Alert articles in the past (e.g., Gut and Wise, 2004, "Incorporating newer insecticides into Michigan apple IPM programs." Gut, 2004, "Codling moth control using granulosis virus," Fruit CAT Alert 19(8): 2-3).

Calcium Treatments to Reduce Disorders of Honeycrisp

Post harvest concerns with Honeycrisp and the large numbers of Honeycrisp recently planted has led **Dr. Philip Schwallier**, MSUE, to study treatments for bitterpit and other problems.

Honeycrisp trees with low and moderate croploads were used for this trial. The low cropload trees were likely to produce bitterpit damaged fruit both before harvest and after harvest.

Summer calcium sprays were applied to half of each block to measure the differences. The fruit is now in storage and has developed some post harvest disorders.

Firmness was not significantly different between the treated versus the untreated Honeycrisp at 40 days after harvest.

Insect Growth Regulators for Control of Plum Curculio

As familiar pesticides are being restricted, a new class of insecticides is emerging. **Dr. Mark Whalon**, MSU Professor of Entomology, has studied a number of strategies for controlling plum curculio. Insect growth regulators (IGRs) look to play an important role in the future control of plum curculio and other pests.

IGRs interfere with the development of certain insect pests, causing both lethal and sublethal effects.

Whalon's aim is to identify IGRs that control plum curculio (PC), a primary weevil pest in Michigan tree fruit. In his research, IGRs have not had significant success at killing PC, but have shown an ability to break the curculios' life cycle, which could prove just as effective.

During summer, there are two generations of PC. The first emerges from overwintering sites in early spring and lays eggs in fruit. These eggs result in a second generation that emerges during the latter half of summer.

This second PC generation uses stored fat to survive winter and become the egg-producing first generation of the next season.

One of the IGRs Whalon tested, Esteem, demonstrated an ability to trigger ovary development in second generation curculios, using up fat reserves and leaving them unable to survive the winter. This effect is well documented in the lab and initial field tests have also been very encouraging.

If Esteem performs on a large scale as it has in small tests, it will be a powerful tool against a very destructive insect pest.

Border Row Attract-and-Kill for Control of Plum Curculio

In a second plum curculio project, **Dr. Mark Whalon** looked at several alternative controls for this pest.

Using a push/pull border row attract-and-kill strategy, Whalon was able to isolate plum curculio damage to the outside three rows of the orchards.

Beetles were pushed out of the orchard interior with Surround and pulled to the border with plant volatile chemistries known to attract plum curculio.

Border rows were then sprayed with Pyganic to kill the gathered beetles.

Whalon's damage assessments showed that this approach significantly reduced plum curculio damage in the interior of the orchard.

Damage in the outside three rows of the treatment blocks was higher than the outer rows of the controls, but the amount of damage in the interior was significantly lower than blocks receiving no treatment as well as blocks treated with the grower's standard spray program.

Growth Regulators for Honeycrisp

Most growers know that while Honeycrisp is profitable new variety, it has some serious problems. It has the tendency to set a too heavy crop in some years. Trees with crops that are moderate to heavy have minimal return bloom the next year. To keep each year's Honeycrisp crop more consistent, **Dr. Philip Schwallier** of MSUE's Clarksville station has studied growth regulators. To reduce the impact of the cyclic cropping, no cropping and cropping rhythm, Schwallier selected two growth regulators for use on Honeycrisp.

First he applied Ethrel at six weeks after bloom on trees with heavy crops (the "on" year). Ethrel enhances return bloom even though the tree is cropping.

What level of cropping will the Ethrel sprays overcome? This year's data indicate that normal rates and timings may not be enough to overcome heavy cropping, but may be adequate when the Honeycrisp are chemically thinned to moderate croploads.

Second, Provide (GA4+7) was applied to trees with little or no bloom and/or crop (the "off" year). Provide reduces return bloom, hopefully enough to reduce the cropload next year, and thus evening out the annual bloom and cropping. The 2004 trial indicated that normal timing and normal Provide rates only slightly reduce return bloom on low cropload Honeycrisp.

Continued work may discover rates and timing that will be helpful to stabilizing bloom and cropping of Honeycrisp.

This data is especially significant since the experiment was intentionally biased, placing the treatment blocks in areas known to have the highest PC pressure. Whalon presented this data at the November 2004 Entomology Society of America's national meeting.

Assessment Reminder

The current Michigan Apple Committee assessment rates are:

Fresh	52 cents/hundredweight
Process	28 cents/hundredweight
Juice	12 cents/hundredweight

These rates represent money for research, U.S. Apple assessments, and Michigan Apple Committee programs.

Apple Scab Diagnostic Test Development

Andrew Jarosz, Plant Biology Professor at MSU, is developing a rapid assay to test populations of *Venturia inaequalis*—the causal agent of apple scab—for resistance to strobilurin fungicides.

Jarosz harvests spores directly from infected lesions and uses them in a germination test. Spores collected from a single orchard are bathed overnight in droplets containing 3.0, 1.0 0.1 or 0.01 mg./ml. strobilurin.

The test could be offered as a fee-based service by MSU's Plant Diagnostic Services.

A part of Jarosz's work in 2004 evaluated the best way to send samples to the MSU lab. He found that samples sent by either the US mail or overnight express delivery yielded an abundance of pathogen spores that could be assayed.

Jarosz also evaluated whether lesions remained active over the whole growing season. The data indicates that it is possible to harvest viable spores from samples collected from early May to late August. However, the summer of 2004 was abnormally cool and wet, so it is unclear whether the 2004 data is indicative of a "normal" growing season.

Work in 2005 will concentrate on evaluating the commercial aspects of the assay in preparation for offering the assay through the Plant Diagnostic Services lab in 2006.

Part II: Neglected Orchards Regulation on the Move

In our winter issue, we published an article on neglected orchards and referenced a case brought against the Michigan Department of Agriculture. Subsequent to publishing that article, MAC was contacted by Olson, Bzdok & Howard (www.envlaw.com), representing Adam and Naomi VandenBosch.

Olson, Bzdok & Howard asked that we clarify that the VandenBosches own 80 acres of land, 15 of which are woods containing old apple trees. According to the VandenBosches, MDA records show that the previous owner stopped tending the old apple tress on the VandenBosch property more than 30 years ago.

According to court records, the MDA inspected the VandenBosches' property on September 19, 2002, and discovered apple maggots and codling moths. MDA informed the VandenBosches that the property was a public nuisance because it harbored insects that adversely affected other orchards. The MDA informed the VandenBosches to remedy the nuisance by implementing effective pest management measures or remove the nuisance orchard in a manner approved by the MDA. The MDA also informed VandenBosches that the only viable method to remedy the nuisance was to clear their trees.

The matter culminated in the VandenBosches filing a complaint in Kent County Circuit Court, appealing the MDA's decision that the property constituted a nuisance, alleging that the MDA violated their due process rights, and requesting a court order enjoining MDA from clearing their property or employing chemical pesticides.

The Court ruled, in part, that the MDA policies that set forth the criteria for a nuisance must be promulgated as a rule pursuant to state law.

As previously reported, the MDA is drafting new laws, as well as rules which will enable effective enforcement of the existing laws. MAC will keep you updated on the status of any legislative actions in this regard.

Elimination of Post-Harvest Drenches

Scald is a condition apple growers work hard to prevent. Growers also want to reduce pesticide and chemical usage on their crop. **Randy Beaudry**, Horticulture Professor at MSU, is studying a way growers can prevent superficial scald without using pesticides.

MCP is a gaseous plant growth regulator that can reduce or prevent development of superficial scald, because of its effect on ripening. When applied prior to the onset of the ethylene climacteric, MPC effectively prevents or slows the ripening process and can control superficial scald.

Beaudry's data for the first season of testing (2003 apple crop) suggests that 1-MCP suppresses scald development and improves the retention of fruit firmness. If subsequent experiences prove similarly successful, 1-MCP has the potential to completely eliminate residues and disposal issues associated with DPA use on Red Delicious.

Beaudry's tests of MCP in commercial conditions will conclude in Fall 2005.

BREAKING NEWS! Research Funded for 2005!

At a February 2005 meeting, the Michigan Apple Research Committee (MARC) reviewed dozens of proposals to determine its solid recommendations for 2005 funding. The list was recently approved by MAC, and researchers are being notified that their projects are a “go.” MARC and MAC intend to fund \$257,034 of research on 21 different projects listed in the chart below. Final reports will be provided to MARC at its December 2005 meeting, just ahead of the Expo. This meeting is open to the public—please save the date and put it on your calendar.

	Preproposal Title	MARC Funded
Wise, J.	Curative Activity of Insecticides to Control the Plum Curculio Post-Infestation	\$9,886
Wise, J.	Impact of Spray Water Alkalinity on the Stability and Performance of Pesticides	\$5,000
Wise, J.	Optimizing Performance of New Insecticide Chemistries for Control of Codling Moth	\$14,098
Flore, J.	Regulation of Flowering and Fruiting in Apple Trees to Promote Fruit Size and Annual Cropping, with Emphasis on Carbon Storage and Chemical Regulation	\$22,500
Sundin, G. Epstein, D.	Assessment of Strategies for Reducing Overwintering Apple Scab Inoculum	\$7,494
Sundin, G.	Antibiotic Resistance Management and Alternative Strategies for Fireblight Control	\$20,000
Jarosz, A.	Apple Scab Diagnostic Test Development	\$9,571
Schwaller, P.	Apogee Evaluation on Apple 2005	\$8,000
Schwaller, P.	Gala Fruit Size Enhancement 2005	\$11,500
Schwaller, P.	Chemical Apple Thinning 2005	\$10,000
Schwaller, P.	Sprayable MCP Evaluation 2005	\$10,000
Schwaller, P.	Honeycrisp and Growth Regulators 2005	\$7,000
Schwaller, P.	Calcium Treatments to Reduce Disorders of Honeycrisp 2005	\$10,000
Whalon, M.	Border Row Attract-and-Kill for Control of Plum Curculio in Apples	\$8,000
Whalon, M.	Developing New Insecticides for Plum Curculio Control in Apple IPM	\$11,000
Shane, W.	Evaluation of Apple Germplasm for the Fresh and Processing Industries	\$10,000
Beaudry, R.	Elimination of Postharvest Drenches for Apple - Research, Extension and Impact Assessment	\$2,075
Gut, L.	Improved Approaches to Codling Moth Mating Disruption	\$11,300
Gut, L.	Field Survey of Codling Moth Resistance to Guthion and Impact on Alternative Controls	\$22,380
Gut, L.	Impact of Abandoned Apple Orchards on Pest Abundance in Commercial Orchards	\$22,170
Gut, L.	On-farm Evaluation of Newly Registered Pesticides for Use in Apples	\$25,060
GRAND TOTAL		\$257,034

Dates to Remember

May 1-3

FMI & UFFV Show: MAC represents fresh, processed apples

June

Potential Cuban Trade Delegation

June 21-22

US Apple Export Council Meeting, Grand Rapids

June 28

Michigan Apple Task Force Meeting, Clarksville

August 18-21

US Apple Outlook Conference, Chicago, IL

Michigan Apple Committee Board Members and Staff

Board Members

Bryan Bixby, Chair	Alvin Dietrich
Julia Hersey, Vice Chair	Mark Doherty
Mike Beck	Scott Lewis
Robert Colgren	

Staff

Denise Yockey, *Executive Director*
Diane Smith, *Manager of Administration & Finance*
Ken Meyer, *Southern Merchandiser*
Scott Hoerman, *Northern Merchandiser*
Gretchen Mensing, *Communications Specialist*
Karen Blink, *Administrative Assistant*

Michigan Apple Research Available Online!

The Michigan Apple Committee is proud to announce that all 2003 and 2004 research reports are available online at www.MichiganApples.com/growers.

The Grower page is password protected, and can be accessed using the following:

User I.D.: MichGrower
Password: GreatFlavors

In addition to the research summaries provided in this newsletter, growers can find the complete reports on the web site.

The Michigan Apple Committee Moves to DeWitt

The Michigan Apple Committee has moved to DeWitt. Please note the committee's new address:

13105 Schavey Road	<i>Phone numbers:</i>
Suite 2	(800) 456-2753
DeWitt, MI 48820	(517) 669-8353

The committee has signed a five-year lease to remain in this location.



Michigan Apple Committee
13105 Schavey Road, Suite 2
DeWitt, MI 48820
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