Introduction

The Ohio IPM program continues to work in cooperation with Ohio Agricultural Research and Development Center scientists, Ohio State University extension personnel and others across the state to address the pest management challenges facing our farmers and urban citizens. Every year new pests, new issues, and new constraints on pest-control options challenge us to develop and demonstrate better pest management methods that are socially and environmentally acceptable. In 2003, for example, the Ohio IPM program worked with the city officials and local livestock producers to help resolve a serious house fly problem in a small town in western Ohio. A member of the IPM team inspected the affected area, identified the species of fly, participated in town meetings, help to bring in a expert, held a training for livestock producers on IPM for fly control and produced fact sheet on integrated fly control for farmers and homeowners. Approximately 30 individuals attended the livestock training. The fact sheets were widely distributed to area farmers and residents living in the affected area. In addition to our normal activities, this year we funded 11 IPM block or mini grants to 5 agricultural and urban extension teams. These block grants helped us to improve pest detection and increase the use of cultural and biological controls.

Benefits achieved through IPM Technologies or Strategies

Agronomic extension personnel, producers and agri-business personnel monitored more than 89 fields in 2003 for first year corn rootworm. Most of the fields were in the northwestern part of Ohio where the problem is thought to more likely appear first. Beetle numbers were low in all surveyed fields in 2003 and none of the fields surveyed was above the economic threshold. Research on transitional organic strawberry production showed that yield and quantity of berries was equivalent to conventional production, but production costs were $0.70 more per quart. It was estimated that organic strawberry producers needed a price at least 24% higher than conventional berries to be cost competitive.

Dissemination of IPM Knowledge

In order to assess IPM adoption in vegetable production in Ohio, a survey was conducted in 2003. Surveys were sent to 253 vegetable growers in the state. Sixty-six or 26% of the growers returned a total of 109 surveys (many of the growers raise more than one of these crops). All of the IPM elements for each crop were given a point value of 5, 10 or 15 indicating the relative importance of the practice. The points were tallied for each survey with 80% being the target score. Only 6.4% of the growers received the target score. Most of the scores were in the 50-70% range. The results revealed the important pest management practices used by Ohio vegetable producers and areas such as biological control that need to be emphasized more.

Four weekly Ohio State newsletters continue to educate our end users on IPM technology. C.O.R.N. (Crop Observation and Recommendation Network), BYGL (Buckeye Yard and Garden Line), Ohio Fruit ICM News and VegNet provide Ohio producers with timely, useful tips on insect, disease and weed management, crop production, weather, control options, research results, and event information. In addition to these newsletters, IPM information was communicated at annual winter meetings (i.e.

Ohio Fruit and Vegetable Congress), in online proceedings, and published research reports on the OSU IPM web site.

Enhanced Stakeholder Collaboration

Frequently at annual winter meetings IPM personnel formally and informally meet with our stakeholders. This year we completed our pepper pest management strategic plan which was the result of meetings with growers, regulatory officials, the Ohio Vegetable and Potato Growers Association and Ohio State scientists over the past two years to discuss the critical issues facing pepper production in Ohio.

Area of Emphasis

School IPM

The School IPM program emphasis for FY 2003 was to continue to provide training for school personnel and work on developing the pilot projects begun the previous years. An active membership was maintained in the Ohio Indoor Air Quality Coalition's School Sub-committee. Presentations were made at coalition meetings regarding the importance of implementing IPM in Schools with an emphasis on new chemistries and least toxic options. In attendance were many registered sanitarians whose job it is to inspect schools twice a year and so are in a position to promote IPM to school administrators. School IPM presentations were made at each of the Ohio Pesticide Education Program's re-certification schools during the winter. These hour-long presentations were made to audiences averaging 150 people. A survey was distributed to members of the audience regarding the implementation of IPM in schools from a pest management professional's perspective. A poster describing the results of the survey was presented at the National IPM Symposium in April.

The manual IPM for Pennsylvania Schools was edited for Ohio. Changes were made to reflect the conditions and legal requirements for Ohio. Enough copies were made of the new manual for all public school districts in the state.

Working with Dr. Marc Lame of Indiana University on an US EPA funded project, a pilot program was established in a suburban Columbus school district using a school IPM model he developed. IPM programs have been established in three targeted school. At each school an initial inspection was conducted, recommendations for changes made, training of custodial and grounds crews conducted and a monitoring program established. Monitoring devices are checked every two weeks and action taken accordingly.

Finally, work was initiated on a prototype of a computer based School IPM training program. It is intended that the program will be made available to school personnel on the Internet thus providing easier access to IPM training for this group. Different tracks of learning will be developed for custodians/maintenance workers, grounds keepers and teacher.

Method of Collecting Information

Evaluation surveys were conducted after each of the three training programs to assess appropriateness of material and effectiveness of presentation. Overall the training programs were rated well. Participants particularly like the hands-on nature of the

trainings. Through an assessment of participants in this and last year's training programs, it was determined that representatives from 30% of Ohio's 611 school districts have received some form of direct instruction about how to implement IPM in schools.

Major Pests
Mice, ant, cockroaches, yellowjacket

Pumpkins

In 2003, the IPM program was involved in both research and demonstration projects addressing pumpkin production. One research project focused on the interaction of three herbicide treatments applied over both bare soil and a killed rye mulch cover crop in pumpkins to reduce weed and disease pressure while conserving moisture, preventing erosion, and building soil structure. Initially weed control in both bare soil and rye mulch plots regardless of herbicide treatment looked excellent, but gave way to late season weed flushes that took their toll on pumpkin development and yields.

The weed spectrum and pressure were very different between the bare soil and rye mulch halves of the field. In the case of the rye mulch, a tremendously thick and competitive carpet of dandelion prevented other weeds or even pumpkins from developing normally. In the bare soil plots, the sheer biomass of Eastern black nightshade overshadowed other weeds and stunted pumpkin development. Strategy herbicide with Roundup wicked on later in the season over either bare soil or rye mulch had the fewest weeds and produced the highest yields of all treatments. Since this technique is very labor intensive and not practical for large scale operations, it is not likely to be widely recommended by Extension specialists or adopted by growers. It does demonstrate the extreme importance of good weed control when producing pumpkins. Based on observations made this year, the other herbicide treatments used in the study were not acceptable for recommendation.

Possibly due to the early harvest, very little soil born disease was detected throughout the treatments, leading to no significant differences between the bare soil or rye mulch half of the field.

There were summary presentations of the herbicide and rye mulch research at the Pumpkin field day at the Western Branch in South Charleston, a vine crops meeting in New Wilmington, PA, and at the annual Fruit and Vegetable Congress in Toledo.

The pumpkin production systems demonstration project between Ohio State University, Cornell University and University of Massachusetts entered its second year in 2003. This project is centered on demonstration of various production systems in cucurbit plantings. One goal of the project is to set up on-farm trials to educate growers, Extension agents, and industry representatives, on the various methods used to raise cucurbits, including Conventional techniques, IPM present and IPM future techniques, and also Organic techniques. In 2003, Ohio recruited 2 Conventional growers, 4 IPM present growers, 1 IPM future grower, and 1 Organic grower. By having growers demonstrate various production systems and specific practices, we are hoping to move them further along the IPM continuum and abandon what are considered more chemically intensive, high input techniques. Most growers who participated in the cucurbit demonstration plots indicated they would like to continue to be cooperators in 2004, with the intent of trying techniques related more advanced production. There was a report

generated at the end of the field season to summarize the data collected in demonstration project.

Delivery of both the research and demonstration work was possible through an August pumpkin field day at the Western Branch research station, where over 65 participants showed up to hear information concerning variety trials, fungicide programs, herbicide and mulch interactions, cover crops, and see the differences in the IPM present and future demonstration production systems. At the annual Ohio Fruit and Vegetable Congress over 50 growers attended a presentation detailing the design and results of the herbicide and mulch interaction study. In addition to this presentation, there was a morning symposium dedicated to various aspects of pumpkins production in which over 100 producers attended. Various sections of this research and their results have been published on the OSU IPM web site, and web based newsletters for vegetable clientele.

Method of Collecting Information

Between the research and demonstration work being done in cucurbits in Ohio, we are working closely with 7 growers, and have made presentations to 250-300 growers through field days and other educational venues. Additionally, this research has been requested and presented to neighboring states at their annual vegetable and winter meetings. Many growers currently access our information on pumpkins via our website http://vegnet.osu.edu/ and VegNet newsletter.

Major Pests
Striped cucumber beetle
Spotted cucumber beetle

Leading Indicators

Indicator 1.2 Transition from high risk to lower risk pesticides

Year	Planned	Actual	Measurement Unit
2000	5.0	5.0	Individuals
2001	10	10.0	Individuals
2002	1010		Individuals
2003	15	10	Individuals
2004	15		Individuals

Indicator 3.4 Producers trained

Year	Planned	Actual	Measurement Unit
2000	300	150	Individuals
2001	400	120	Individuals
2002	500	250	Individuals
2003	600	300	Individuals
2004	700		Individuals

Corn, Field

Program Activities and Outcomes

Extension personnel, producers and agri-business personnel monitored more than 89 fields in 2003 for first year corn rootworm. Most of the fields were in the northwestern part of Ohio where the problem is thought to likely appear first. Additional fields in other parts of the state were not monitored because trap counts from 1998 through 2002 found very few, if any, beetles in these areas. Beetle numbers were low in all areas surveyed in 2003 and none of the fields surveyed was above the economic threshold.

Method of collecting information

Data from the trapping were presented in newsletters, on the web and at many winter meetings. The number of people that were exposed to this information was over 1000 producers. Trapping will continue in 2004 in a limited area to see if this insect is going to move into Ohio and become a pest in the future.

Major Pests
corn rootworm

Indicator 3.3 People participating

Year	Planned	Actual	Measurement Unit
2000	10	10.0	Individuals
2001	20	25.0	Individuals
2002	25	30.0	Individuals
2003	25	30.0	Individuals
2004	30		Individuals

Apples

Thirty-one apple and peach growers in fourteen Ohio counties, including five of the top ten apple producing counties, plus five Extension Agents and two industry reps received apple disease prediction products by e-mail. These products were supplemented with weekly orchard visits to thirty-five production blocks.

Codling moth management continues to challenge apple growers and researchers throughout the Midwest. Timing of spray application will become more important as newer, more environmentally friendly materials supplement and/or replace organophosphates. Dependable timing is provided by establishing Biofixes with pheromone traps. Newer materials will help lower the Environmental Impact Quotients. A combination of factors contributed to control failures in two blocks: inadequate coverage in older, standard trees; storage of apple bins in or near orchard perimeter; high resident populations; nearby woods; and inattention to late-season control during the peach harvest. Codling moth mating disruption is not “ready for the big-time” in the Midwest.

Apple scab pressures were heavy this season due to a cooler and wetter than normal growing season. Our growers had good control using a combination of standard and newer, softer materials. Continued movement away from the standards will lower future EIQs. Fire blight severity was lessened with the wide-spread use of a twig growth inhibitor except where later applications of foliar nutrients were added in cover spray applications.

For the most part, the peach crop was abundant with good quality. However, bacterial spot was diagnosed in two orchards by Dr. Mike Ellis. Oriental fruit moth damage was considered excessive in later varieties in one block due to several factor. The block has a history of damage, we have no way to monitor mated-females with mating disruption, and extremely high populations were present in the early season. Heavy disease pressures lead to heavier usage of control materials compared to 1999.

The SkyBit scab prediction product has been used for several years to assist growers with apple scab. Because of the low predictability (25% accuracy) of precipitation for any given point, the product errors on the safe side as shown for the 4 to 10 day prediction in the table above which could lead to over-application. The SpecWare monitoring and analysis is subject to equipment failure and depends on downloading by growers on a timely basis.

Nursery Crops

Biweekly Nursery/Landscape IPM programs were conducted by extension personnel with growers and other green industry professionals, to discuss phenology, pest management, monitoring, pesticide application technology, and diagnostic topics.This program linked to the USDA-ARS Pesticide Application Technology Research Unit which is involved in finding the most efficient ways to apply pesticides by improving coverage and reducing non-target application. This project also involves linking IPM strategies to improved environmental monitoring. See the following websites developed for such monitoring. http://lake.osu.edu/hort/pg1.htm..

Other IPM projects included IPM perspectives on the Emerald Ash Borer throughout the season in the BYGL, in the special December 2003 Emerald Ash Borer special edition of the BYGL, and numerous programs including EAB information for arborists, landscapers, diagnosticians, and the general public. Dan Herms also led several ENLTT-sponsored EAB tours for team members, for the green industry and for public officials and is heavily involved in statewide, regional, and national EAB research and management initiatives. Disease surveys of *Phytophthora ramorum* (none found) and pathogenicity studies of honeylocust knot disease were conducted in 2003 by Enrico Bonello. A Riker mount project for insects and diseases of ornamental plants for Extension programming was started in 2003 by the OSU C.Wayne Ellett Plant and Pest Diagnostic Clinic as part of the IPM Project.

Methods of Collecting Information

Last year the impacts of these activities were evaluated by a post-season newsletter survey. A total of 155 surveys were returned, 76 from commercial or for-profit companies, 61 from non-profit organizations, and 18 from non-professional readers. Survey question/statement samples: In response to the statement: I (we) changed some pest management practices based on information in the newsletter, 101 responded that they agreed or strongly agreed with the statement. In response to the question: What have you learned from the newsletter this season, the responses were, number of new insects learned, 410; number of new diseases learned, 373; number of new cultural (non-insect/non-disease problems learned), 353; and number of times pesticide use was improved, 424. In response to the question: Has the information in the newsletter saved

your company money or increased your profit, 74 responders said "Yes.". Estimated total savings for respondents was $200,750.

Major Pests
clearwing moth borer, mites, Gypsy moth, Japanese beetle, bagworm, scale insects

Success Story
Compost Shown to Fight Turf Disease

Incorporating compost into soils when lawns are seeded reduce the severity of leaf rust, a fungal disease that attacks perennial ryegrass.

Ohio State plant pathologists found that the amount of leaf rust on perennial ryegrass fell by 50 percent when the turfgrass was seeded into soils with at least a one-inch laye of composted sewage sludge. The stud is the first of its kind to document the suppression of a foliar turf disease through the incorporation of compost into the soil. Mil Boehm, one of the scientists on the project, says the compost adds nitrogen that helps ward off the disease: " We know that some fungi, like leaf rust, like to attack turf that is growing under nutrient-stressed conditions. The perennial ryegrass grew so well with the additional nitrogen that the pathogens were not able to attack it."

For more information: http://fusion.ag.ohio-state.edu/news/story.asp?storyid=355