FY2013 Annual Report for SARE PDP Project

Agreement No. 2013-41534-21068, Subaward H003044603

Enhancing the Integrated Pest Management Academy to provide professional development opportunities for agricultural educators that increase economically and environmentally sustainable agriculture in Michigan.

SUMMARY

Integrated pest management (IPM) offers agriculture a sustainable approach to deal with evolving pest challenges such as new invasive species, climate change, and pesticide resistance. Following a successful pilot IPM Academy in 2012, we proposed to broaden the reach in 2013 and 2014 to amplify the program's impact by training sustainable agriculture educators and advisors from public and private sectors. Participants can then serve as educators for the broader agricultural community. The target audience included crop consultants, state department of ag personnel, Natural Resource Conservation Service employees, and early-adopters from Michigan and surrounding states. Scholarships were offered to 8 educators through NCR SARE coordinators. The Academy is a two-day professional development program covering fundamentals of pest management and identifying resources and technology for sustainable ag practitioners. Timely topics such as extreme weather effects or newly introduced pests were identified and featured. At least 5 crop-specific bulletins regarding sustainable production are being developed in support of the Academy and for participants use. An advisory group of farmers and representatives of the target audience helped develop the Academy content to ensure a relevant curriculum and well attended program. Academy participants gain a solid foundation in sustainable pest management, knowledge of the resources provided by Michigan State University and its partners, and the ability to share this knowledge with their farm clientele. Our long-term goal is to increase sustainable agriculture through expanded adoption of IPM strategies that improve crop efficiency; minimize pesticide use and enhance environmental quality.

OBJECTIVES

The grant project has two major initiatives to complete before the end date January 1, 2015:

- An annual workshop (FY13 and FY14) to provide educational sessions and resources that prepare sustainable agriculture educators and advisors to assist beginner and advanced producers in adopting or increasing their use of sustainable pest management practices in specific production systems.
- Development of bulletins to support IPM education. The content developed will address a number of cropping systems potentially including, but not limited to ornamentals, vegetables, fruit, conifers, hops, small grains, forages, and field crops. These resources will be available for use by the attending educators for future programming and outreach purposes.

To date the grant has supported 2 IPM Academy workshops (February 2013 and February 2014). This report will focus on the impacts of the 2013 workshop which was evaluated immediately following the event for intended changes in behavior and increase in knowledge and again following the subsequent production season to capture actual impacts.

MATERIALS AND METHODS

The IPM Academy training were 2-day programs during February of 2013 and 2014. It provided educational sessions and resources that prepare sustainable agriculture educators and advisors to assist beginner and advanced producers in adopting or increasing their use of sustainable pest management practices in specific production systems. The first day included preparative discussions covering introductory components for understanding IPM (entomology, scouting, and plant pathology etc.). Each year the Academy also addressed timely obstacles to sustainable agriculture such as global climate change, extreme weather events, pesticide resistance or invasive pests. The final topics were selected by the advisory panel consisting of growers, educators, and governmental agencies.

On the second day of the program, educators had the opportunity to opt into two concurrent sessions that address specific pest and disease issues and identify IPM resources. Sessions were available in the following cropping systems: fruit (strawberries, raspberries, grapes, blueberries, pome fruit, and stone fruit) vegetables (cucurbits, cole crops, onions, peas, beans, sweet corn, asparagus, tomatoes, and peppers), hops, woody ornamentals (conifers, deciduous trees, and shrubs), small grains and forages (wheat, alfalfa, and mixed hay), and field crops (corn and soybeans).

Additionally, the group will publish at least six bulletins to support IPM education. The content developed will address a number of cropping systems potentially including, but not limited to ornamentals, vegetables, fruit, conifers, hops, small grains, forages, and field crops. These resources will be available for use by the attending educators for future programming and outreach purposes.

IMPACTS

2013 IPM Academy Evaluation Highlights-Post program evaluation

This data was collected at the time of the IPM Academy 2013 and reflect changes in knowledge and intended changes to pest management practices. Day 1 evaluation was completed via a Turning Point presentation (n=56) and had a mixed audience of farmers, farm employees, university employees and industry representatives, fertilizer and pesticide retailers, crop consultants, and state and local agency employees. Day 2 evaluation was completed by the primary target audience and those that attended the breakout sessions (n=48). An additional evaluation was completed with students of the CSS 488 MSU class that partially attended Day 1 seminars (n=27).

Outcome: Increased awareness of IPM resources available from MSU.
Result: 93% of attendees left the IPM Academy with increased awareness

Outcome: Improved ability to identify sustainable agricultural resources of MSU resources.
Result: 86% of attendees left the IPM Academy with improved ability to identify resources.

Outcome: Improved understanding of IPM-based sustainable agricultural practices.

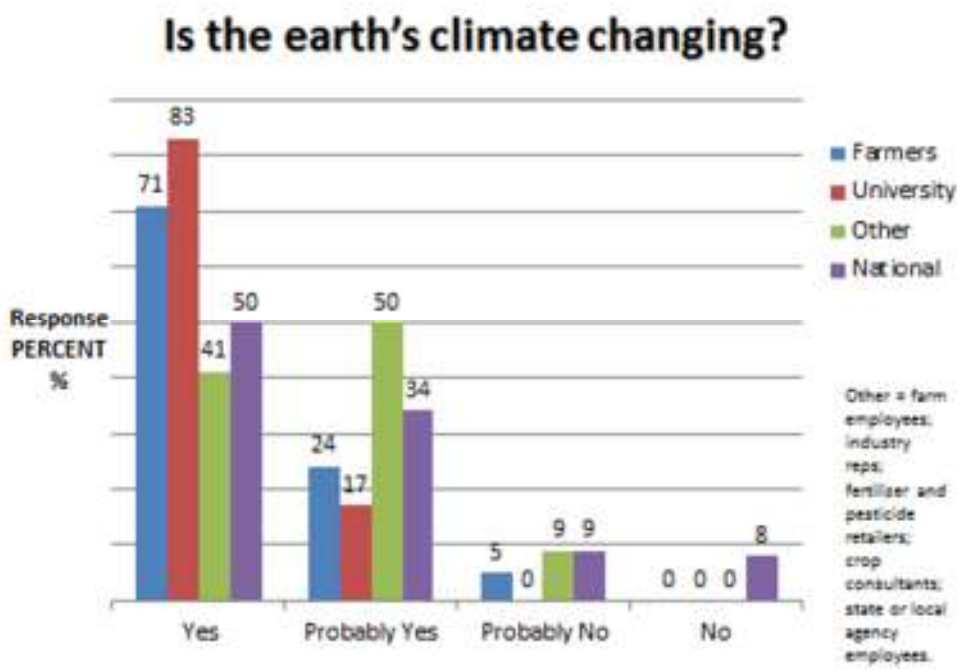
Result: 92% of attendees left the IPM Academy with improved understanding of sustainable Ag practices.

Outcome: Timing of IPM Academy contributed to motivation to implement something new for upcoming growing season.
Result: 67% Yes; 31% Maybe; 12% No.

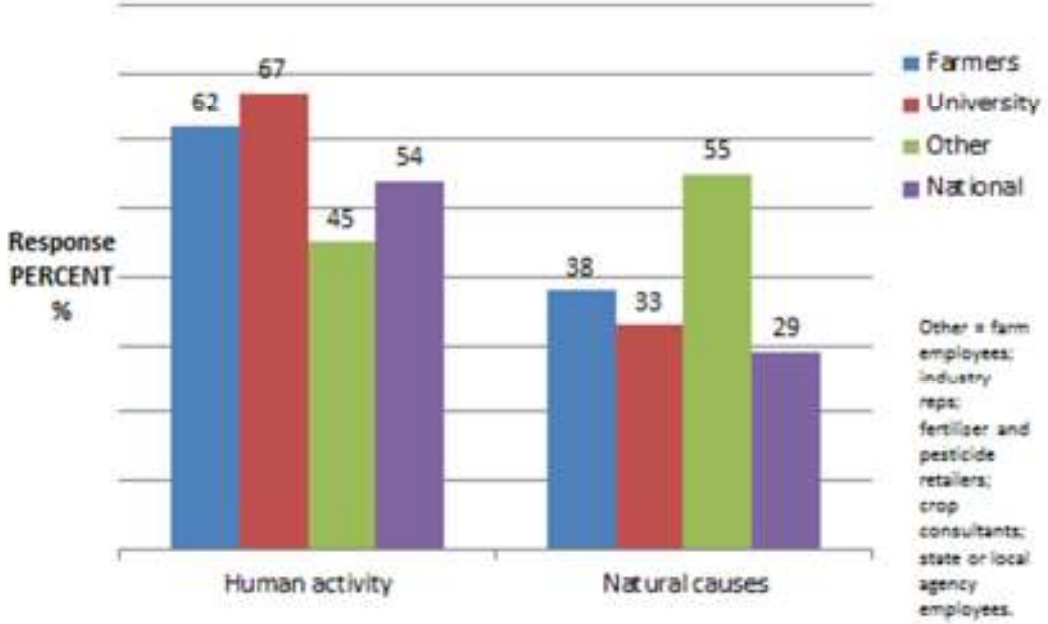
Outcome: Improved understanding of technology that supports sustainable agricultural practices.
Result: 93% of attendees left the IPM Academy with improved understanding of technology.

Climate Variability Attitude questions: A series of questions taken from Duke University[1] (Jan. 2013) nationally representative survey and Yale University (Sept. 2012) nationally representative survey[2] were asked of IPM Academy audience on Day 2.

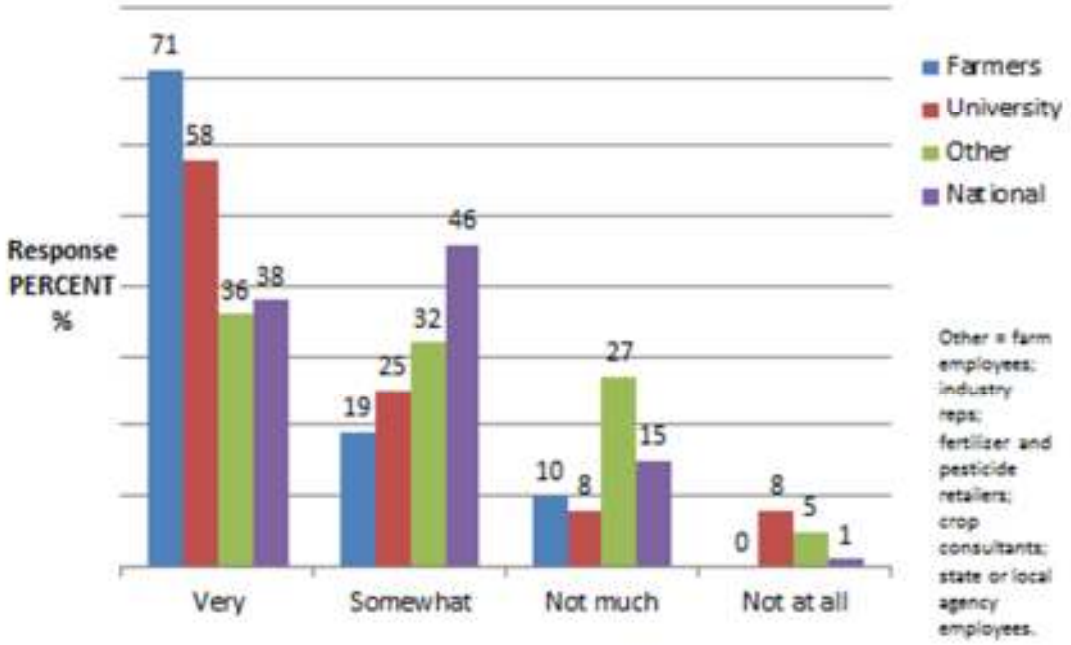
[1] Mayer, Adair, & Pfaff (2013). Americans think climate is changing and support some action. Duke University. Nicholas Institute for Environmental Policy Solutions. Policy brief NIPB 13-10.
[2]Leiserowitz, A., Maibach, E., Roser-Renouf, C., Feinberg, G., & Howe, P. (2012) *Climate change in the American mind: Americans' global warming beliefs and attitudes in September, 2012.* Yale University and George Mason University. New Haven, CT: Yale Project on Climate Change Communication. http://environment.yale.edu/climate/files/Climate-Beliefs-September-2012.pdf



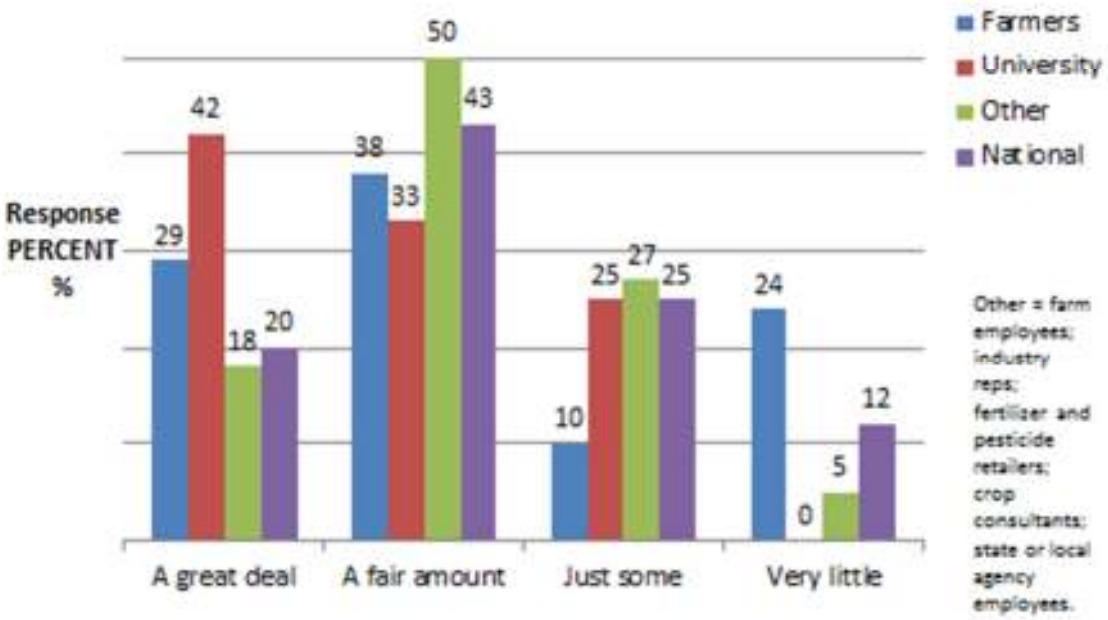
Is climate changing primarily because of...?



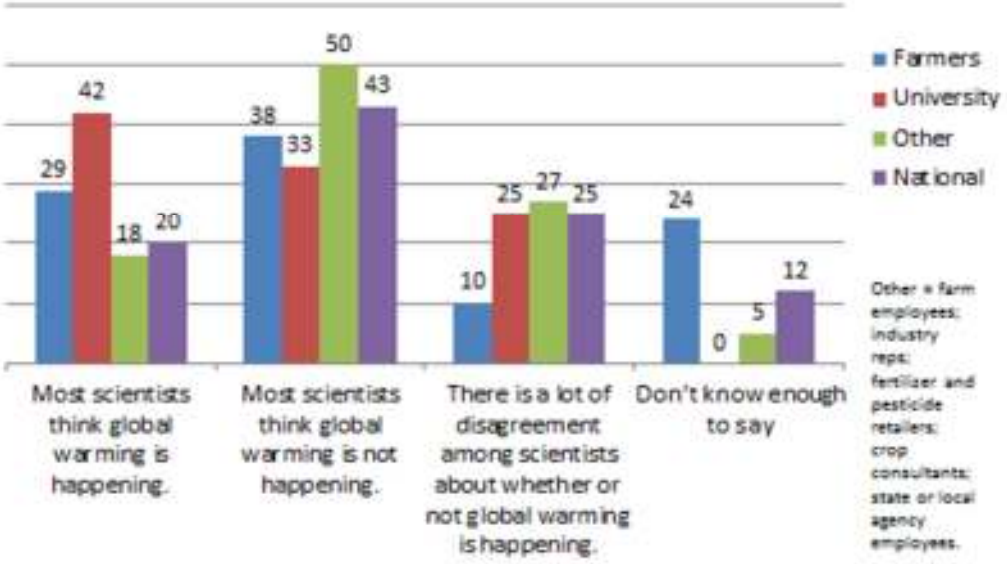
How serious a threat is climate change?



How much do you trust scientists to provide impartial and accurate findings?



Which comes closest to your own view?



Agricultural land managed or directly impacted: *Crops under cultivation (number of participants listing crop in parenthesis):*

Apples (7)	Vegetables (5)	Christmas trees (3)
Corn (7)	Fruit trees (5)	Strawberries (3)
Conifers/ Evergreens/woodlots (6)	Cherries (4)	Wheat (3)
	Pumpkins (3)	Hops (3)

Crops mentioned by two participants: soybeans, tomatoes, grapes, blueberries, peaches, raspberries
Crops mentioned by one participant: Asparagus, Saskatoon berries, snap peas, beans, celery, sugar beets, sugar maples, apricots, blackberries, cranberries, peppers, carrots, cucurbits, forage

Total number of acres represented by audience:

- **Vegetables** 12,951 acres in Leelanau, St Joseph, Ingham, Mason, Grand Traverse, Genesee, and Oceana Counties.
- **Christmas Trees** 10,601 acres in Leelanau, Missaukee, and Livingston Counties.
- **Field Crops & Forage** 6,652 acres in Kent, Ottawa, Manistee, Hillsdale, St Joseph, Saginaw, Clinton and Gratiot Counties.
- **Fruit** 5,553 acres in Leelanau, Ingham, Grand Traverse, Berrien, Kent, Ottawa, Shiawassee, Manistee, Livingston, Hillsdale, and Macomb Counties.
- **Hops** 171 acres in Leelanau, Missaukee, and Livingston Counties.
- **Nurseries** 146 acres in Genesee, Lenawee, Livingston, and Lapeer Counties.

Number of acres committed to change: Acres ***plan to utilize, expand or improve use of the following IPM practices based on the IPM Academy.***

31,306 Acres Access MSU IPM resources online

31,247 Acres Scouting for insects and diseases

14,949 Acres Scouting for beneficial insects

25,639 Acres Referencing weather modeling to make management decisions (e.g. Enviroweather)

8,279 Acres Only treating for pests when the economic threshold is reached, as applicable

5,858 Acres Supporting beneficial insect habitat to promote pest control via natural enemies

10,537 Acres Selection of pest resistant varieties or cultivars

9,858 Acres Sanitation practices (removal of inoculum, sterilizing implements etc.)

12,911 Acres Utilize the least biologically impactful pesticide when management is needed

8,438 Acres Protecting native pollinators (mowing before spraying, spraying at night, etc.)

Skills and Farm Business Outcomes

- 52% (n=25) **20,500 acres** Improve the financial viability of an existing business (reducing management costs, better detecting risks, increasing personal skill, etc.)
- 44% (n=21) **2,765 acres** Improve position at an existing job
- 8% (n=4) **214 acres** Start a business (consulting, farming, etc.)
- 2% (n=1) **52 acres** Apply for a new job

Residence: County, State: *30 Michigan Counties, three out-of-state (2 Missouri & 1 Iowa).*

Attendance at morning and afternoon sessions on Day 2 of the IPM Academy.

Morning Concurrent Crop Specific Sessions

1. 29% (n=14) Apple and Cherry IPM
2. 2% (n=1) Communicating Climate Change
3. 23% (n=11) Conifer IPM
4. 27% (n=13) Scouting Techniques for Field Crops and Forages
5. 19% (n=9) Vegetable IPM

Afternoon Concurrent Crop Specific Sessions

1. 23% (n=11) Deciduous Tree IPM
2. 17% (n=8) Emerging Issues in Field Crop Pesticide Resistance
3. 19% (n=9) IPM in Small Fruit Crops
4. 13% (n=6) MSU Resources for Hops, Saskatoons and Chestnuts
5. 28% (n=13) Vegetable IPM

Plan to utilize, expand or improve use of the following IPM practices based on the IPM Academy:

- 92% (n=44) Access MSU IPM resources online
- 81% (n=39) Scouting for insects and diseases
- 63% (n=30) Scouting for beneficial insects
- 75% (n=36) Referencing weather modeling to make management decisions (e.g. Enviroweather)
- 44% (n=21) Only treating for pests when the economic threshold is reached, as applicable
- 46% (n=22) Supporting beneficial insect habitat to promote pest control via natural enemies
- 44% (n=21) Selection of pest resistant varieties or cultivars
- 38% (n=18) Sanitation practices (removal of inoculum, sterilizing implements etc.)
- 48% (n=23) Utilize the least biologically impactful pesticide when management is needed
- 44% (n=21) Protecting native pollinators (mowing before spraying, spraying at night, etc.)

Intend to use skills gained at the IPM Academy to do the following:

- 52% (n=25) Improve the financial viability of an existing business (reducing management costs, better detecting risks, increasing personal skill, etc.)
- 44% (n=21) Improve your position at an existing job
- 8% (n=4) Start a business (consulting, farming, etc.)
- 2% (n=1) Apply for a new job

Comments:

- This was very well done- I have taken a lot from today (day 2) where I felt yesterday was not as helpful. Keep up the good work!
- Attended last 2 years, Day 1 was much better for audience as a whole this year (2013) than last year (2012). Good job!
- Thanks for the info. I'm fortunate to be able to take the time to participate.
- Deal a lot with the public on a volunteer basis. Will be able to share better information.
- Great sessions. Enjoyed. Keep pushing diversity and provenance.
- Great program and speakers
- Lina Rodriguez is a fantastic educator and presenter. She does a great job at judging amount of technicality of information to present.
- Was already aware of these practices, and utilizing
- We keep bees. Very useful presentations and well-qualified speakers. Want to improve farming. Try to bring cost of conference down!
- Would like to see more emphasis on actual IPM rather than emphasizing chemistries, resistance management, and have more on cultural and physical controls.
- Great conference! I work with producers so this conference was very beneficial as I talk with producers about IPM.
- Very good meeting. All speakers have been very helpful.
- Very informative and beneficial. This has proved to be valuable to me as the great lakes expo in a couple days.
- The information on the spotted wing drosophila was very useful. Thank you.

CSS 488 MSU class that partially attended Day 1 seminars (n=27)

100% were obviously university students, but they also served in other roles: 30% of the students were farmers or farm employees and 16% were industry representatives or worked for local/state agencies in addition to being MSU students.

- 67% of students were raised on a farm
- 74% indicated that they intend to own, rent, or lease farmland someday.

- 96% agreed they will be going into a career that involves farming or agricultural production.
- 89% said they will have a future career that involves consulting on agriculture.
- 61% plan to start my own business or professional service related to agriculture in the future.

- 85% consider agricultural careers 'green industry' careers.

Something learned during the presentations that reinforced or changed your viewpoint?

- Rainfall will change. Michigan will see less frequent, but more intense rainfalls in the future. Also, winters will see more precipitation.
- I learned more about climate patterns and the fact that even though it is warming where it will change is purely speculation.
- I learned how exactly the changing weather patterns will be able to effect agriculture in the state of Michigan and more specifically, how the weather will play an effect on row crops.
- I learned a great deal about the body of research that is occurring regarding the effect of climate change on farming. Many of the predicted weather changes for Michigan, I didn't expect, such as the belief that the summers will not be much hotter, but the winters will be much warmer.

- The fact the humans are having such an impact on the future climate makes me want to learn more about what I can do to help prevent it.
- Variable impacts of climate change on Michigan agriculture. Understood more about variability of temperature and moisture at important times during the season.
- I was surprised to see that there will be an increase in moisture, but it makes sense if the lakes do not freeze over as often as they have in the past.
- I listened to the talk on climate change and I thought it was interesting and really reinforced the idea that we need to change management strategies to fit this changing growing conditions. I have never really fully believed in global warming until last summer and looking at the graphs and history of the weather over the past few years has really changed my mind.
- The changing climates in the U.S. and how it will change positions of the cornbelt and the fruit and vegetables crop locations.
- There may end up being the same amount of precipitation, but the frequency will be less and the intensity will be greater.
- It was helpful hearing a rather straightforward explanation of anticipated climate changes for the State of Michigan over the next several decades.
- Temperatures will not get much warmer in the summer but more in the winter.
- Warmer and wetter weather for Michigan
- The new direction of weather patterns across the U.S. and more importantly in Michigan, and how I should plan considering the new weather patterns.
- I learned how much the climate is expected to change. I did not know how quickly the temperature was projected to increase.
- How quickly the climate is changing and how we will have Ohio's climate in the near future.

IPM Academy 2013, Postseason impact survey results

The 2013 Integrated Pest Management Academy was held February 18-19 in Okemos Michigan and drew 83 participants. Intended changes and knowledge gained were measured at the end of each day of programming. In order to capture actual changes and impacts, a follow-up survey was sent to attendees via email in November 2013, the following are the results of this postseason survey.

There were 20 respondents to the follow-up survey. Forty-two percent identified as growers, 11% scout/consultants, 11% farmhands/techs, 26% agricultural educators, 5% government employees, 5% recreational gardeners. Three participants identified themselves as a utility arborist, public gardener and apple cider stand operator, respectively. Respondents reported the following as their home counties: Eaton (1), Genesee (2), Grand Traverse (1), Gratiot (1), Ingham (3), Ionia (1), Isabella (1), Kalamazoo (1), Lenawee (1), Livingston (1), Monroe (2), Presque Isle (1), Saginaw (1) and St. Joseph (1). Three out of state respondents reported Gibson County, IN, Morgan County, MO and Cole County, MO as their home counties.

Respondents reported actively farming, managing or directly impacting 171,227 acres of agricultural land and 15,344 square feet of greenhouse production during the 2013 season including:

- Vegetable acreage (n=9) 2,387 acres
- Tree fruit acreage (n=8) 90 acres
- Small fruit acreage (n=7) 25 acres
- Field crop acreage (n=7) 168,710 acres
- Christmas tree acreage (n=2) 1 acre

- Nursery acreage (n=2) 4 acres
- Hops acreage (n=2) 10 acres
- Greenhouse (n=6) 15,344 square feet

Over the last 6 months, the following percentages of participants indicated that had adopted or expanded their use of the following IPM strategies or resources based on their experiences at the IPM Academy:

- Scouted for insects and/or diseases (n=14) 74%
- Scouted for beneficial insects (n=10) 53%
- Increased their ability to identify pests, disease and/or beneficial insects (n=15) 79%
- Referenced weather modeling to make management decisions (n=4) 21%
- Only treated for pests when the economic threshold was reached (n=8) 42%
- Supported beneficial insect habitat to promote pest control via natural enemies (n=6) 32%
- Selected pest resistant plant varieties or cultivars (n=2) 11%
- Eliminated or reduced pesticide applications (n=10) 53%
- Improved sanitation practices (n=8) 42%
- Utilized of the least biologically disruptive pesticides when treatment was needed (n=4) 21%
- Actively protected native pollinators (n=9) 47%
- Subscribed to an MSUE News Digest or visited the MSUE webpage (n=12) 63%
- Purchased or reference MSUE publications (n=11) 58%
- One respondent also reported that they increased the number if insect traps deployed and decreased their pesticide applications. 4 Acres

These following percentages represent the adoption of new tools or practices on 171,227 acres of agricultural land and 15,344 SQFT of greenhouse production and 4 new Enviro-weather users.

Additionally, 15% applied for a new job (n=2), 46% improved their position at an existing job (n=6), 15% started a business (n=2), and 46% improved the financial viability of an existing business (n=6) based on the resources presented at the IPMA13.

One respondent indicated that information regarding tank mixing, order guidelines nozzle selection, performance analysis (crop and product specific, wind conditions, deposition aids, size, spacing, pressures) example weed management programs, number and timing would be helpful.

Bulletin generation

We are currently working to develop and complete five bulletins related to integrated pest management and sustainable agriculture. Each will be posted online as a pdf, some will be printed as funds allow) to be shared at meetings and events. The bulletin “Integrated Pest Management: A guide to resources from Michigan State University” is complete and is being distributed and posted online. The other bulletins are on the following topics and would be applicable for use in other states with similar growing conditions:

- Cole crops integrated pest management
- Asparagus integrated pest management
- IPM for raspberries under high tunnels

- IPM for tree fruit under high tunnels