Plant Sciences

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V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Sciences

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	3%		8%	
202	Plant Genetic Resources	2%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	4%		7%	
204	Plant Product Quality and Utility (Preharvest)	3%		5%	
205	Plant Management Systems	25%		25%	
206	Basic Plant Biology	3%		6%	
211	Insects, Mites and Other Arthropods Affecting Plants	3%		9%	
212	Pathogens and Nematodes Affecting Plants	20%		12%	
215	Biological Control of Pests Affecting Plants	3%		3%	
216	Integrated Pest Management Systems	33%		20%	
806	Youth Development	1%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	27.0	0.0	19.0	0.0
Actual	32.0	0.0	22.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1420704	0	1233358	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1420704	0	1237258	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	11962407	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

•Develop improved varieties of dry beans, tart and sweet cherries, potatoes, wheat, rice, soybeans, oats, barley, canola, turfgrass, apples, strawberries, blueberries, floriculture crops, chestnuts, vegetable crops, and conifers for Michigan growers. •Continue to identify genes and genetic pathways that control plant response to environmental stresses and develop techniques to insert these pathways into at-risk plants. •Identify and isolate novel genes, markers and genetic pathways that can benefit crops important to Michigan agriculture through higher yields, improved quality, and better insect and disease resistance. •Identify and isolate novel genes, enzymes and other phytochemicals that may have benefits for human health and determine how these beneficial compounds can be made available to people. •Develop integrated management strategies and provide education programs for producers of fruit, field, vegetable, floriculture, Christmas tree and forestry crops that use the lowest possible inputs of resources and improve yield and quality, while minimizing environmental effects, such as leaching and run-off. •Develop cultural, management and insect and disease control strategies for crops that meet USDA certified organic standards so Michigan growers can take advantage of this growing market, if they choose to do so. •Continue to develop biological controls for pest insects and diseases to minimize effects on the environment. •Continue variety trials for crops important to Michigan, including wheat, corn, soybeans and forages. •Conduct educational programs to help farm producers control weeds and more effectively manage high-cost fertilizer inputs while optimizing crop production. •Develop plant disease prediction models. •Conduct educational programs to help plant producers control disease caused by pathogens and nematodes and teach integrated pest management methods. •Provide green industry professionals and homeowners with scientifically sound information to enable them to safely and effectively manage their turf, landscapes and gardens, improving efficiency of resources and controlling pests, while reducing pesticide and fertilizer use.

2. Brief description of the target audience

Michigan growers, private citizens, agriculture and natural resources industry representatives, biotechnology company representatives, and state agencies.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	7992	15984	1717	0
2007	5632	11264	2662	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	10
2007:	13

Patents listed

U.S. Patents awarded: Nos. 7,195,784; 7,208,182; 7,211,277; 7,264,831; 7,264,832; 7,264,833; 7,270,836; 7,282,593; 7,264,831 - anti-inflammatory and anti-oxidant activities of apple skin.
Korean Patent 10-0679367; 10-0687380; 10-0707051 -- cashew bark tree/stinking toe fruit, may alleviate inflammatory pain)
US Patent No. 7,256,325 -- electro-transformation that allows for modification of dry bean and perhaps other species.
Patent application for methods on conferring aphid resistance to soybeans.

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	66	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

Number of research projects on plant sciences.

Year	Target	Actual
2007	35	70

Output #2

Output Measure

Number of adult participants trained in plant management systems.

Year	Target	Actual
2007	3996	4445

Output #3

Output Measure

Number of youth participants trained in plant management systems.

Year	Target	Actual
2007	1717	2662

Output #4

Output Measure

Number of adult participants trained in pathogens and nematodes affecting plants.

Year	Target	Actual
2007	1332	1350

Output #5

Output Measure

Number of adult participants trained in integrated pest management (IPM).

Year	Target	Actual
2007	2664	691

V(G). State Defined Outcomes

O No.	Outcome Name
1	Number of youth participants with increased knowledge of plant management systems.
2	Number of adult participants with increased knowledge of pathogens and nematodes affecting plants.
3	Number of adult participants with increased knowledge of integrated pest management (IPM).
4	Number of research programs to develop insect and disease control strategies for crops that meet USDA certified organic standards.
5	Number of research programs to develop cultural and management strategies for crops that meet USDA certified organic standards.
6	Number of research programs to develop biological controls for pest insects and diseases to minimize any effects on the environment.
7	Number of research programs to develop integrated management strategies for fruit, field, vegetable, floriculture and forestry crops that use the lowest amounts of nutrients possible and improve yield and quality.
8	Number of research programs to identify and isolate novel genes, enzymes and other phytochemicals that may have benefits for human health.
9	Number of research programs to identify and isolate novel genes, markers and genetic pathways that can benefit crops important to Michigan agriculture through higher yields, improved quality, and better insect and disease resistance.
10	Number of research programs to identify genes and genetic pathways that control plant response to environmental stresses and develop techniques to insert these pathways into at-risk plants.
11	Number of research programs to develop improved varieties of economically important crops for Michigan and the region.
12	Number of variety trials for crops important to Michigan, including wheat, corn, soybeans and forages.
13	Number of adult participants with increased knowledge of plant management systems.
14	Number of research programs to develop production protocols and environmental and cultural strategies for the floriculture/nursery industry.
15	Number of research programs to develop weed control methodology, protocols and practices.
16	The number of research programs to identify plant genome and genetic traits and mechanisms to enhance crops economically important to Michigan and the region.
17	Number of research programs to develop more effective controls for pathogens and nematodes affecting plants.
18	Number of research programs to develop more effective post-harvest protocols and practices to minimize loss and control quality.

Plant Sciences
Outcome #1

1. Outcome Measures

Not reporting on this Outcome for this Annual Report

2. Associated Institution Types

3a. Outcome Type:

3b. Quantitative Outcome

Year	Quantitative Target	Actual

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area

V(H). Planned Program (External Factors)

External factors which affected outcomes

Natural Disasters (drought,weather extremes,etc.)
Economy
Appropriations changes
Public Policy changes
Government Regulations
Competing Public priorities
Competing Programmatic Challenges
Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

The new format and integration of this report has prompted a review and refinement of how we will determine and report outcome measures moving forward. Our goal in this and the 2008 Annual Report is to combine research programs in a more aggregate way to minimize extraneous text and emphasize results reporting. For this reason, some outcome measures have been folded into broader outcome measure categories. Further, the targets in this report (and for 2008 if we're not allowed to modify them) compared to actuals aren't necessarily due to unmet goals, but rather a reconfiguration of goal associations and knowledge areas.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

After Only (post program)
Retrospective (post program)
Before-After (before and after program)
Case Study
Comparisons between program participants (individuals,group,organizations) and non-participants
Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Evaluation of one of Fruit AoE Programming Goal

Goal : Educate & support decision-makers in the fruit industry. This goal is accomplished in many ways by several Fruit AoE team members, but through the 2007 Great Lakes Fruit, Vegetable and Farm Market Expo, so many team members are involved that it fills a huge role as a major objective to accomplishing the goal set forth by the team to educate and support decision-makers. This annual program jointly sponsored by the Michigan Vegetable Council and the Michigan State Horticultural Society was held in Grand Rapids, Michigan December 4-6, 2007. It constitutes a major educational effort for most members of the Fruit Area of Expertise Team. Our team members organize and coordinate all of the fruit education sessions and help plan some of the general education sessions. The sessions that our team organized or had a role in organizing during the 2007 Expo included: Berries, two Blueberry sessions, two apple sessions, an apple variety showcase, a general tree fruit session, sweet cider, cherry, grape, stone fruits, wine grapes, hard cider, and organic tree fruit production. Team member Bob Tritten, also co-organized five farm market sessions, four farm market workshops and the entire Apple Cider Contest.

Our team members also participated in organizing and coordinating these general sessions: alternative energy, pollination, plasticulture, cultivating organic markets, farm labor, two farmers market sessions, preparing for organic production and certification, water use issues session. Because an farm labor session was included in 2007, this program also filled another goal of the Fruit AoE – Ag Labor Issues – recognize and understand local, national and international labor dynamics to better assist producers with ag labor issues.

Other events at the Expo that are covered by Fruit AoE team members are the Educational Posters and the Education Credits for Pesticide Applicators and Certified Crop Advisors

In total, there were 45 educational sessions offered at the 2007 Great Lakes Fruit, Vegetable and Farm Market Expo. Of those 45, 14 were related to fruit topics, 11 focused on farm marketing aspics and 7 were general sessions that both fruit or vegetable producers would be likely to attend.

While some of the Fruit AoE team members organize sessions, other serve as speakers in educational programs, more than half of the talks presented at the sessions are given by Team members, especially campus based staff. The in-depth survey designed by Dr. Murari Suvedi for the 2005 Expo demonstrated the effectiveness and impact of the Great Lakes Expos programs in educating participants. Current plans are to repeat that survey every five years. Also, surveys were handed out at each and every session during the 2007 Expo.

What need did the program address?:

The Great Lakes Expo addresses ALL of the goals set forth by the Fruit AoE –

- Develop leadership of our membership and the fruit industry.
- Enhance profitability and sustainability of the MI fruit industry
- Promote IPM practices for fruit production.
- Ag Labor Issues – recognize and understand local, national and international labor dymanics to better assist producers with ag labor issues.
- Maintain the safety of MI fruit products to consumers through educational training.
- Educate & support decision-makers in the fruit industry.

At the same time, this program addresses some of the state-wide initiatives Developing entrepreneurs by teaching new skills to fruit producers who are just starting in the fruit business; Promoting healthy lifestyles by education to help producers stay ahead of emerging diseases and pests that threaten the health of ecosystems, plant industries, or environmental health and quality of life; Building leaders for today and tomorrow through programs to help people acquire leadership skills and learn about public policy issues and processes.

What stakeholder input and involvement did you have?:

Session coordinators seek the input of producers of the various fruit crops as well as industry leaders and commodity organizations, such as the Michigan Apple Committee, the Michigan Cherry Committee, The Michigan Wine and Grape Industry Council, Michigan Blueberry Growers, Michigan Peach Sponsors, and the Michigan Farm Marketing & Agri-Tourism Association, among others.

What were the key program components? What were the resources used for this activity?

(i.e., staff, materials, curriculum, research-based information) How did campus and field staff collaborate?

How long was the training or initiative? What was the intensity?:

The educational sessions at the Great Lakes Expo are mostly two hour time slots over three days time. During the session time, many varied topics can be covered by a number of speakers or the time can focus on one general topic with only one presenter.

Resources used to pull this program together come from many sources, but the main resource is people and many of those people are MSU Extension Educators and MSU campus personal, working together to create full and well-rounded educational sessions based on the current needs of the fruit industries.

What was the evaluation framework? What methodology did you use?:

Paper surveys were handed out at every session and not mandatory. Questions were generally the same for each session, but coordinators have the possibility to tailor a survey if they wish. A general survey included the following:

- How helpful was this session?
- Home State
- Type of Operation, i.e. Grower, Shipper, FarmMarket , Packer, Processor, Other
- Do you have specific comments for any of the presenters? (from Growers)
- Do you have specific comments for any of the presenters? (from Farm Marketers)
- Do you have specific comments for any of the presenters? (from Others)
- List at least one thing you learned during this session that you can use in your business:
- What topic(s) do you suggest for future meetings?

Who was the target audience? Is this an underserved audience?

How many people were reached?:

The target audience is fruit growers and farm marketers from Michigan and the general Midwestern states. In 2006, attendees were from 31 states and 5Canadian provinces.

The 2007 Expo set yet another new attendance record of over 3500 attendees, which was about 300 more than the 2006 numbers.

What were the documented outcomes and impacts?:

Since there are so many different sessions, it is imprudent to include them in this format. They are available on-line at: http://www.glexpo.com/evaluation/index.php From this site, you can access individual sessions by topic or see all 59 pages of the evaluation summary with comments in a PDF file.

Key Items of Evaluation