Plant Sciences

Plant Sciences

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	5%		13%	
202	Plant Genetic Resources	6%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	7%		7%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
205	Plant Management Systems	30%		20%	
206	Basic Plant Biology	3%		6%	
211	Insects, Mites, and Other Arthropods Affecting Plants	3%		12%	
212	Pathogens and Nematodes Affecting Plants	15%		12%	
215	Biological Control of Pests Affecting Plants	3%		5%	
216	Integrated Pest Management Systems	20%		15%	
806	Youth Development	3%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	27.0	0.0	19.0	0.0
Actual	36.4	0.0	25.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c 1627680	1890 Extension 0	Hatch 2785132	Evans-Allen 0
1862 Matching 1627680	1890 Matching 0	1862 Matching 2341617	1890 Matching 0
1862 All Other 0	1890 All Other 0	1862 All Other 13411944	1890 All Other 0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research and Extension activities undertaken to:

Develop insect and disease control strategies and cultural and management strategies for crops that meet UDSA certified organic standards.

Develop biological controls for pests, insects and diseases to minimize any effects on the environment.

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.

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.

Train native american adults in sustainable agriculture.

2. Brief description of the target audience

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

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
2008	16317	32634	6107	0

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

Patent Applications Submitted

Year	**Target**
Plan:	11
2008:	12

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Patents listed

European Patent App. Filed 3/27/2008, titled 'F-box Protein Targeted Plant Oil Production(TEC2005-0039-01EP).

Indian Patent App. Filed 4/11/2008, titled 'F-box Protein Targeted Plant Oil Production'(TEC2005-0039-01IN).

PCT Patent App. Filed 6/23/2008, titled 'Engineered Plant extracellular Lipids Using Acyltransferases and Fatty Acid Omega-Oxidases'(TEC2007-0095-01PCT).

US Patent Application filed 11/14/2007 titled 'A Method for Producing Biodiesel'(TEC2007-0004-01).

PCT Patent Application filed 11/15/2007 titled 'Method for Producing Biodiesel'(TEC2007-0004-01PCT).

PCT Patent Application filed 2/6/2008,titled 'Composition and Methods for Drought Tolerance'(TEC2003-0035-01PCT).

PCT Patent Application filed 5/12/2008, titled 'Introgression of Festuca Mairei Drought Tolerant Genome into Lolium Perenne Plants'(TEC2003-0035-03PCT).

US Patent Application filed 2/7/2008, titled 'Compositions and Methods for Drought Tolerance(TEC2003-0035-03).

US Patent Application filed 2/6/2008,titled 'Introgression of Festuca Mairie Drought Tolerant Genome into Lolium Perenne Plants'(TEC2003-0035-02).

US Patent Application filed 2/6/2008,titled 'Composition and Methods for Drought Tolerance'(TEC2003-0035-01).

US Provisional Patent App. Filed 2/27/2008, titled 'Biological Synthesis of Poly-3-Hydroxypentanoic Acid'(TEC2006-0146-01Prov).

In addition, 8 patents were issued during this period:

Australian Patent No. 2002-364222 issued 11/1/2007, titled 'Plant Cyclopropane Fatty Acid Synthase Genes and Proteins and Uses Thereof'(TEC2002-0020-02AU).

US Patent No. 7,405,345 issued 7/29/2008, titled 'Novel Gene Sequence(Seed Promoters)'(TEC2000-0006-01DIV1).

Japanese Patent No. 4,068,964 issued 01/18/2008, titled 'Method of Synthesizing Uridine 5'-phosphosulfoquinovose Using a Recombinant Arabidopsis Thaliana Enzyme'(TEC2000-0084-01JP).

US Patent No. 7,241,935 issued 7/10/2007, titled 'Expression of Betaine Lipid Genes in Bacteria and Plants.'

US Patent No. 7,317,098, issued 1/8/2008, titled 'Ryegrass CBF3 Gene: Identification and Isolation'(TEC2004-0055-01).

US Patent No. 7,390,825 issued 6/24/2008, titled 'Process for the Preparation of Oxazolidinones and Method and Use Thereof'(TEC2002-0026-01).

Indian Patent No. 212798 issued 12/17/2007, titled 'Process for the Preparation of an Aldonic-5-Oxime Methyl Ester of a Hexose Sugar'(TEC2000-0060-01IN).

Japanese Patent No. 4060079 issued 12/28/2007, titled 'Process for the Preparation of a 1,5-Dideoxy-1,5-Imino Hexitols from Oximes and Imines'(TEC2000-006-01JP).

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	7	30	
2008	0	75	75

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

Number of research projects on plant sciences.

Year	Target	Actual
2008	35	83

Output #2

Output Measure

Number of adult participants trained in plant management systems.

Year	Target	Actual
2008	3996	12901

Output #3

Output Measure

Number of youth participants trained in plant management systems.

Year	Target	Actual
2008	1717	6107

Output #4

Output Measure

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

Year	Target	Actual
2008	1332	1736

Output #5

Output Measure

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

Year	Target	Actual
2008	2664	1680

Output #6

Output Measure

Number of native american adults trained in small scale sustainable agriculture.

Not reporting on this Output in this Annual Report

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 native american adults with increased knowledge in sustainable agriculture.
15	Number of research programs to develop production protocols and environmental and cultural strategies for the floriculture/nursery industry.
16	Number of research programs to develop weed control methodology, protocols and practices.
17	Number of research programs to identify plant genome, genetics and genetic mechanisms to improve crops economically important to Michigan and the region.
18	Number of research programs to develop controls for pathogens and nematodes affecting plants.
19	Number of research programs to develop more effective post-harvest protocols and practices to minimize loss and enhance 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

We continue to review and refine planned program and outcome measure reporting in this report., hence the significant number of outcomes marked, "Not reporting on this outcome measure." In moving from five planned programs to six, some projects were moved into different planned programs than they were previously reported. In other instances, outcome measures were folded in to broader outcome measure categories to make reporting easier and more consistent. Further, the targets in this report (as they were in the previous year's report) 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

Key Items of Evaluation