Plant Heath, Systems and Production

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V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Heath, Systems and Production

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%		15%	
202	Plant Genetic Resources	5%		10%	
205	Plant Management Systems	25%		10%	
206	Basic Plant Biology	10%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	8%		5%	
212	Pathogens and Nematodes Affecting Plants	6%		10%	
213	Weeds Affecting Plants	6%		10%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	5%		10%	
216	Integrated Pest Management Systems	30%		20%	
	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	42.2	0.0	28.8	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
2056172	0	2052624	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1697209	0	2052624	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
14233088	0	11218123	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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Activities under the sub goal "Maximizing the benefits from specialty crop production systems" include development of a sudangrass cover crop system that provides an important new tool for farmers to suppress Canada thistle; development of elite sweet corn germplasm with enhanced levels of phytochemicals that promote health among the consuming public; demonstrations that high-end salad green vegetables like Arugula, Mizona, picana, and Claytonia can be produced during the winter months in central Illinois under high tunnels for the fresh-cut market; greenhouse experiments to optimize mustard biofumigants; and research designed to identify the critical factors for suppressing pests of cucurbits with mustard or buckwheat.

Activities under the sub goal "Increasing the number of PhD graduates in plant breeding and expanding research in plant breeding" included the development of experimental lines that were evaluated for yield as well as for disease and pest resistance. One of the lines is being licensed to seed companies and seed from it was increased during 2008 and the other line was released as a parent for other breeders to use. Both lines have been widely used as a parent by both private and public sector soybean breeders.

Activities under the sub goal "Conducting cutting edge research that will increase crop production with minimal energy input and minimal negative impact on the environment and translate the results to producers and their advisors" included development of a method to rapidly assay for resistance to a particular group of herbicides [those that inhibit the enzyme protoporphyrinogen oxidase, more generally known as PPO-inhibiting herbicides] in the weed waterhemp [Amaranthus tuberculatus]; insecticide evaluations that provided Midwest growers with specific information on the effectiveness of newly labeled insecticides against key pests of apples and peaches; and apple physical map studies that have allowed us to partner with scientists in New Zealand to pursue the development of new single nucleotide polymorphisms [SNPs] in apple from BAC-end sequences.

Activities under the sub goal "To identify techniques that will obviate crop production factors that result in degradation of the environment" include studies that indicate that an increase of synthesis of the soybean plant chemical weapons such as the anti-microbial compound glyceollin and cell wall fortifying compound lignin could help to improve soybean rust resistance [thus, one way to achieve potentially higher levels of soybean resistance to rust could be genetic manipulation of metabolic events that could lead to production of glyceollin and/or lignin], work to generate quantitative, comparative in vitro mammalian cell toxicity data of emerging disinfection by-products and related compounds [the first systematic cytotoxicity and genotoxicity analysis of its kind], development of new methods to screen for resistance to soybean pathogens, including quantitative PCR [QPCR] methods and a method to screen for resistance to charcoal rot in controlled environments, and continued research into the management of Phytophthora Blight in support of the pumpkin industry, currently the most valuable vegetable industry in Illinois.

Conferences and presentations made by Investigators under this Planned Program in 2008 included the Horseradish Grower’s School, Midwest Organic Production and Specialty Marketing Conference, Illinois Specialty Growers Conference, University of Illinois Agronomy Day, International Sweet Corn Development Association, American Chemical Society, North Central Weed Science Society, the Plant and Animal Genome Conference, the Maize Genetics Conference, North Central Weed Science Society, Weed Science Society of America, American Society of Plant Biologists, University of Illinois Corn and Soybean Classic, National Fusarium Head Blight Forum, Illinois Crop Protection Technology Conference, and the American Phytopathological Society.

Extension activities focus on both horticulture and agricultural crops. The Ask Extension—Hort Corner is a website that allows visitors to ask a question of a University of Illinois Extension Educator or review the questions asked and answers received by previous visitors via an online web form. A series of 12 horticulture distance education programs titled 4-Seasons are offered annually at Extension offices throughout the state during the fall and winter months. Extension Master Gardeners give countless hours in providing horticulture information to the public. There are currently 3,355 active Master Gardeners in Illinois. This past year, 600 new Master Gardeners completed training at various locations in the state and through an online course. Other horticulture plant health Extension programs are targeted at commercial growers of vegetables, tree fruits, small fruits, grapes, turf grass, and grounds maintenance through regional or statewide workshops.

The plant clinic and Digital Diagnostic System provided extensive outreach to homeowners and commercial producers in diagnosing and providing solutions for invasive and exotic species pest management and application of integrated pest management. The system connects 95 local University of Extension field offices with over 50 University campus and field-based experts. The system utilizes a unique combination of hand-held digital cameras, microscopes, and adapters that will allow the cameras to take pictures through a microscope. Pesticide safety education was conducted using Power Point presentations at numerous locations for 7,936 commercial and 2,100 private pesticide applicators. Topics included understanding pesticide basics, integrated pest management, protecting the environment from pesticides, understanding pesticide labels, application equipment and calibrations, and protecting humans from pesticide poisoning. Operation S.A.F.E. fly-in was conducted in four locations [including one in Colorado] to ensure aerial applications of fungicides to corn are accurately and safely made. Extension worked with the Illinois Agricultural Aviation Association to check the spray pattern and droplet size of 41 aircraft and adjustments were made to the aircraft setup if needed.

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State and regional conferences/clinics and field days reach large numbers of corn and soybean producers with information on fertility and pest management. Extension of research to the public also includes the Varietal Information Program for Soybeans, a website [123,000 visits annually] and publication [5,000 distributed] that provides information on the yield, protein and oil, and disease and pest susceptibility.

Two-day Regional Crop Management Conferences were held in four locations in 2008. Topics included current biofuel and tile drainage research, environmental implications of corn ethanol production, and water quality and gulf hypoxia update along with 18 breakout sessions that addressed soil fertility and management and pest management issues from both economic and environmental perspectives. The primary audience of 370 was certified crop advisers [92%].

New initiatives receiving attention focused on organic production, small tract farming, and local food systems through workshops, conferences, and demonstrations.

2. Brief description of the target audience

Farmers growing cucurbit vegetables, processed pickle and pumpkin industries, Extension agents, crops consultants, the soybean breeding research community, soybean growers, weed management professionals, scientists in the Rosaceae community, commodity associations, farm bureaus, crop producers and processors, water scientists and regulators, environmental protection agencies, vegetable growers, agribusiness personnel, home owners, and Extension Master Gardeners.

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	52750	2549000	4000	228000
2008	168981	174719	60601	0

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

Patent Applications Submitted

Year	**Target**
Plan:	0
2008:	2

Patents listed
Two patents were submitted in 2008, numbers 12/040,857 and 61/028,459.

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	**Research**	**Total**
Plan	0	92	
2008	4	102	102

V(F). State Defined Outputs

Output Target
Output #1

Output Measure
Number of completed research projects

Year	**Target**	**Actual**
2008	27	6

V(G). State Defined Outcomes

O No.	Outcome Name
1	Number of participants demonstrating changes in KASA
2	Number of participants exhibiting or reporting changes in practice including improved decision-making.
3	Educating Weed Management Clientele On The Management Of Waterhemp
4	Providing Management Information To Farmers With Regard To Managing Soybean Cyst Nematode Heteroda, Glycines
5	Educating Grower-Cooperators On The Use Of Bt-Hybrids to Manage Western Corn Rootworm While Minimizing Chemical Exposure And Simplifying Planting Operations
6	Percent Of Nitrogen Utilization By Wheat
7	Using Genetic Resistance To Control Aflatoxin And Fumonisin In Corn Grain
8	More Informed Users Of Pesticides
9	Increased Knowledge Of New Crop Management Techniques

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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

Brief Explanation

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

1. Evaluation Studies Planned

Before-After (before and after program)
During (during program)
Other (post then pre retrospective stud)

Evaluation Results

Key Items of Evaluation