

# Pest Management

Pest Management

## V(A). Planned Program (Summary)

### 1. Name of the Planned Program

Pest Management

## V(B). Program Knowledge Area(s)

### 1. Program Knowledge Areas and Percentage

| KA Code      | Knowledge Area  | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|--------------|---|-----------------|-----------------|----------------|----------------|
| 124          | Urban Forestry  | 5%              |                 | 0%             |                |
| 132          | Weather and Climate                                     | 5%              |                 | 0%             |                |
| 211          | Insects, Mites, and Other Arthropods Affecting Plants   | 15%             |                 | 20%            |                |
| 212          | Pathogens and Nematodes Affecting Plants                | 15%             |                 | 20%            |                |
| 213          | Weeds Affecting Plants                                  | 15%             |                 | 10%            |                |
| 214          | Vertebrates, Mollusks, and Other Pests Affecting Plants | 15%             |                 | 0%             |                |
| 215          | Biological Control of Pests Affecting Plants            | 10%             |                 | 10%            |                |
| 216          | Integrated Pest Management Systems                      | 20%             |                 | 40%            |                |
| <b>Total</b> |   | 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 |
| <b>Plan</b>   | 9.9       | 0.0  | 75.5     | 0.0  |
| <b>Actual</b> | 17.9      | 0.0  | 55.7     | 0.0  |

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

| Extension                                |                            | Research                         |                            |
|--|----------------------------|----------------------------------|----------------------------|
| <b>Smith-Lever 3b &amp; 3c</b><br>599189 | <b>1890 Extension</b><br>0 | <b>Hatch</b><br>1473418          | <b>Evans-Allen</b><br>0    |
| <b>1862 Matching</b><br>1133026          | <b>1890 Matching</b><br>0  | <b>1862 Matching</b><br>3529517  | <b>1890 Matching</b><br>0  |
| <b>1862 All Other</b><br>1097864         | <b>1890 All Other</b><br>0 | <b>1862 All Other</b><br>5025568 | <b>1890 All Other</b><br>0 |

## V(D). Planned Program (Activity)

### 1. Brief description of the Activity

Science-based solutions for pest management require constant research on the biology of pests, the cropping systems, alternative solutions, and consumer attitudes about their food supply. PA AES and CES support a robust portfolio of research and outreach programs to address improved pest management options. Implementation and adoption of an area-wide pheromone mating disruption program as a major control tactic for tree fruit pest management has substantially reduced fruit injury attributable to the codling moth and oriental fruit moth complex. Fruit injury in all orchards in our experimental project was approximately 70 percent lower than injury levels documented in 2006. Based upon grower and pheromone supply companies, in excess of 2,500 ha of tree fruits used pheromone mating disruption technology in 2007 (546 ha are official participants in our experiments; the remaining orchards have been switched to this program voluntarily by growers at their expense). A majority of growers report 50-70 percent reduction in synthetic organic pesticide use in their orchards compared to previous years. This program, where research is conducted directly with cooperation from growers, is an excellent example of the seamless connection between research and extension in the PSU system. Transition of apple orchards, grape vineyards, agronomic crop acreage, and horticultural high tunnels to organic have led faculty and extension educators to examine a variety of alternative pest management strategies. Many of these research and outreach programs have equal value in organic and conventional production systems, sharing the goal of effective pest management while reducing our environmental footprint, increasing worker and consumer safety, and discovering economically sustainable pest management solutions.

Effective implementation of Integrated Pest Management (IPM) systems requires growers to understand pest biology, timing of pest activities, scouting/monitoring procedures, economic thresholds, and selection of appropriate management technologies. Extension programs have been implemented in multiple commodities (i.e. field crops, tree fruits, vegetables, mushrooms, grapes, livestock, etc.) to help growers understand and adopt these technologies and new technologies as they become available. Penn State is unique in its focus on the development of web-based pest prediction models and decision support tools. To support our extension faculty and educators in delivering their programs, numerous insect and weed phenology models and disease forecast models have been developed and implemented. A decision support tool, BET (Bt Economic Analysis model), <http://www.btet.psu.edu/>, is available for growers to assess the economic value of Bt corn on their farm. These models support newsletters and educational programs. In addition, these models can be accessed directly by growers, agricultural input dealers, crop consultants, and personnel in government agencies that assist farmers.

### 2. Brief description of the target audience

The primary target audiences of this Planned Program consist of agricultural producers, crop consultants, state agencies, and policy makers. Extension educators translate information and products developed under this Planned Program to stakeholders.

## 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<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Year | Target                    | Target                      | Target                   | Target                     |
| Plan | 24000                     | 0                           | 0                        | 0                          |
| 2007 | 30936                     | 517493                      | 0                        | 0                          |

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

#### Patent Applications Submitted

| Year  | Target |
|-------|--------|
| Plan: | 0      |
| 2007: | 0      |

#### Patents listed

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

|             | <b>Extension</b> | <b>Research</b> | <b>Total</b> |
|-------------|------------------|-----------------|--------------|
| <b>Plan</b> |                  |                 |              |
| 2007        | 0                | 0               | 245          |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

Number of invention disclosures

| <b>Year</b> | <b>Target</b> | <b>Actual</b> |
|-------------|---------------|---------------|
| 2007        | 0             | 0             |

**Output #2**

**Output Measure**

Number of research projects completed on pest management

| <b>Year</b> | <b>Target</b> | <b>Actual</b> |
|-------------|---------------|---------------|
| 2007        | 16            | 11            |

**Output #3**

**Output Measure**

Number of participants (contacts) in programs related to pest management

| <b>Year</b> | <b>Target</b> | <b>Actual</b> |
|-------------|---------------|---------------|
| 2007        | 21000         | 26672         |

**V(G). State Defined Outcomes**

| <b>O No.</b> | <b>Outcome Name</b>  |
|--------------|--|
| 1            | Number of participants who were evaluated and demonstrated increased knowledge and skills related to managing pests in safer, more effective ways  |
| 2            | Number of decision support tools adopted based upon predictive modeling research   |
| 3            | Number of diagnostic tools implemented or adopted for pest identification  |
| 4            | Number of participants who were evaluated in a follow up and who implement/adopt practices related to managing pests in safer, more effective ways |

**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
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)
- Other (extramural funding)

**Brief Explanation**

A variety of factors influence potential outcomes in Pest Management. Public policy and regulations can influence the research needs and the delivery of research results to stakeholders through Cooperative Extension and technology transfer. Natural disasters (e.g., drought and floods) impact research work and occasionally dictate Cooperative Extension programming priorities. With the changing economics of field crop production, due to world supply and demand and the biofuels industry, the economics of pest management have shifted dramatically in the last year - increasing the demand for pest management extension programs and the research base that supports those programs. Appropriations are a driver of research underlying the development of translational products and could have impact (negative during this year in the case of several key county extension educator positions) on recruiting and retention of AES and CES personnel and ability to maintain current information delivery systems (e.g., websites and other information dissemination tools).

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

**1. Evaluation Studies Planned**

- After Only (post program)
- Before-After (before and after program)
- Other (direct observation)

**Evaluation Results**

The most germane aspects of the evaluation results are shown in the results sections as number of participants increasing knowledge or implementing new practices or methods.

**Key Items of Evaluation**

See results sections.