

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

**Program # 7**

**1. Name of the Planned Program**

Climate Change - Insect 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
211	Insects, Mites, and Other Arthropods Affecting Plants	55%		55%	
216	Integrated Pest Management Systems	40%		40%	
721	Insects and Other Pests Affecting Humans	5%		5%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	4.0	0.0
Actual	2.0	0.0	5.0	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
64000	0	188500	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
96000	0	282500	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

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

1. Brief description of the Activity

- Assess emerging pest issues

- Provide insect diagnostics
- Provide bio-based pest management systems
- Meet social and regulatory needs
- Evaluate activity effectiveness

**2. Brief description of the target audience**

- Crop and animal agricultural producers
- Home owners
- Agribusiness
- Government and NGO agency personnel
- Medical professionals
- Crop Consultants
- General public

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	5000	100000	8000	0
<b>Actual</b>	5000	100000	8000	0

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 0  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Plan</b>	75	12	
<b>Actual</b>	75	12	87

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

**Output Target**

**Output #1**

**Output Measure**

- {No Data Entered}

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

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Pest alerts disseminated through various channels
2	Improved pest management practices based on currently available research knowledge
3	Relevant research and extension programs in entomology initiated
4	Conduct diagnostic insect identification review session with Plant Diagnostics Lab
5	Output materials made available to users
6	Accurate insect diagnostics and reporting integrated with Plant Diagnostics Lab, National Plant Diagnostic Network and others
7	Pest management technologies that meet social and regulatory constraints
8	Estimation of adoption rate of best pest management practices
9	Insect diagnostic capacity meeting national needs
10	Number of extension professionals, producers, agribusiness professionals, crop consultants, researchers, state or federal agency workers, etc. receiving education on improved pest management practices for wheat stem sawfly.

**Outcome #1**

**1. Outcome Measures**

Pest alerts disseminated through various channels

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Improved pest management practices based on currently available research knowledge

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Relevant research and extension programs in entomology initiated

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Conduct diagnostic insect identification review session with Plant Diagnostics Lab

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Output materials made available to users

Not Reporting on this Outcome Measure

### **Outcome #6**

#### **1. Outcome Measures**

Accurate insect diagnostics and reporting integrated with Plant Diagnostics Lab, National Plant Diagnostic Network and others

Not Reporting on this Outcome Measure

### **Outcome #7**

#### **1. Outcome Measures**

Pest management technologies that meet social and regulatory constraints

Not Reporting on this Outcome Measure

### **Outcome #8**

#### **1. Outcome Measures**

Estimation of adoption rate of best pest management practices

Not Reporting on this Outcome Measure

### **Outcome #9**

#### **1. Outcome Measures**

Insect diagnostic capacity meeting national needs

Not Reporting on this Outcome Measure

### **Outcome #10**

#### **1. Outcome Measures**

Number of extension professionals, producers, agribusiness professionals, crop consultants, researchers, state or federal agency workers, etc. receiving education on improved pest management practices for wheat stem sawfly.

#### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	10000

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Wheat stem sawfly is a major insect pest of spring wheat, winter wheat and durum in North Dakota. Sawfly larvae feed inside the stem, which impairs grain development and may reduce grain protein. Mature larvae girdle the bases of plants, which results in lodging and further yield loss because it is difficult or impossible to harvest sawfly-lodged plants. North Dakota wheat growers lose an estimated \$28-\$70 million annually to wheat stem sawfly. Because of its long flight period, insecticides are ineffective at controlling wheat stem sawfly. Other effective Integrated Pest Management (IPM) strategies are needed.

**What has been done**

NDSU Extension Entomology, in collaboration with NDSU Research Extension Center extension personnel, Montana State University researchers, USDA-ARS researchers, North Dakota and Montana wheat commodity groups and wheat growers organized and held a Focus Group meeting in January 2010 to address current problems and summarize current research on wheat stem sawfly. We used this information to identify extension and research priorities and needs. Research and Extension presentations addressed IPM strategies for management of wheat stem sawfly, including use of solid-stemmed cultivars, insecticide efficacy, crop rotation, trap crops, cultivation, and conservation of native biological control agents. These recommendations were communicated through a new extension bulletin and video.

**Results**

The focus group was effective in identifying priorities and communicating the current knowledge about sawfly management. The presentations were effective in increasing wheat producer knowledge and changes in sawfly management practices are anticipated. Based on a pre-post survey, 95% of growers are more likely to manage for sawfly; 0% of growers will use insecticides for sawfly compared with 8% before the meeting; 55% of growers will use solid-stemmed varieties compared with 12% before the meeting; growers will continue to use crop rotation as a management strategy; and 100% of growers will scout for sawfly compared with 56% before the meeting. NDSU research and extension efforts will result in: better prediction and identification of sawfly problem areas; less economic loss due to wheat stem sawfly; improved wheat cultivars with sawfly resistance; increased wheat yields; savings in pesticide applications that are not effective; and implementation of the best sawfly management strategies.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

721      Insects and Other Pests Affecting Humans

### **V(H). Planned Program (External Factors)**

#### **External factors which affected outcomes**

- Economy

#### **Brief Explanation**

The wheat region affected by sawfly is lower yielding because of lower annual precipitation. Consequently, economic losses caused by this insect are more important to producer profitability.

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

#### **1. Evaluation Studies Planned**

- Before-After (before and after program)

#### **Evaluation Results**

See specific outcomes (above).

#### **Key Items of Evaluation**