

1. The New NYS Wheat Tactical Agriculture Program 2004 in Oneida County and Seneca County

2. Project Leaders:

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Ken Wise: Eastern NYS Area IPM Educator, Livestock and Field Crops, Cornell University

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Mike Dennis: Seneca County Field Crops CCE Educator

3. Cooperators:

Keith Waldron: NYS IPM Coordinator, Livestock and Field Crops, Cornell University

Gary Bergstrom: Professor, Department of Plant Pathology, Cornell University

4. Type of Project:

Training practitioners to use IPM techniques

5. Project Locations:

Oneida County and Seneca County

6. Abstract:

A pilot Tactical Agriculture (TAg) Team project was conducted during the growing season of 2004 to begin to assess the degree of implementation of IPM practices by wheat and small grain producers in New York State. Season-long education programs based on the TAg Team model were implemented in Oneida County and Seneca County. TAg Teams are a proven method for effectively involving extension personnel, agribusiness representatives, and growers in on-farm classroom settings to demonstrate scouting procedures and other IPM tactics. Needs of wheat growers varied, and much basic pest management knowledge was lacking. A test of current knowledge was administered prior to the program, and producers answered on average fewer than half of the questions correctly. At the completion of the program, producers answered close to 85% of the same questions correctly. Results from evaluation materials in Oneida County indicate that IPM will be implemented on close to 2,000 acres of wheat. Interest is strong among county educators and agribusiness professionals for further development of this program. Simple lesson plans and some initial educational materials were developed, and development of curricula that would provide a ready-made package for county educators to use will continue.

7. Background and justification:

A new Tactical Agriculture program was initiated during 2004. Traditionally the Tactical Agriculture (TAg) program has focused on educating field corn and alfalfa producers. There are 120,000 acres of wheat grown in New York State (NYS), yet the NYS IPM program and Cornell Cooperative Extension have not provided comprehensive education on Integrated Pest Management and Integrated Crop Management to wheat growers in several regions in the state. Two sites selected for the development and implementation of a pilot wheat TAg program were in Oneida and Seneca Counties. Ideally a "Wheat TAg team" consists of 3 to 6 growers from a local area. The Wheat TAg groups are small, comprised of farming neighbors who meet at a participant's farm to learn, discuss, demonstrate and practice the Integrated Pest Management (IPM) and Integrated Crop Management (ICM) methods. Wheat TAg Meetings are scheduled approximately once a month to capitalize on the educational and management opportunities of the growing season. This schedule enables participants to observe, assess real field problems as they occur and discuss, select, and employ practical integrated solutions to pest and crop

management problems. TAg participants bring their own experience and expertise, which can enrich discussion and contribute to the groups' overall learning process. TAg participants enroll individual fields of wheat that serve as classrooms for TAg workshops. Growers want to see how an IPM and ICM method or new technology might work on their own farm. The small group educational design promotes learning and effective communication among TAg participants and Extension facilitators. Participants learn from each other what agronomic methods might work on their farm given their unique soils, equipment, management, and other individual farm strengths and constraints. Designing a wheat TAg program to meet local needs has great potential to dramatically increase the rate of adoption of IPM and ICM practices.

8. Objectives:

1. Define, design and implement a pilot Wheat Tactical Agriculture program in two distinct wheat production areas of New York State.
2. Develop new wheat IPM and ICM curriculum to use in TAg meetings.
3. Develop teaching modules to be used as a model to conduct a wheat TAg program.
4. Evaluate the effectiveness (knowledge & adoption of practices) of the wheat TAg program.

9. Procedures:

ENROLLMENT IN WHEAT TAG

We implemented one wheat TAg team consisting of 4 growers in Oneida County. The wheat TAg participants enrolled about 80 acres in the program and managed 800 acres of winter wheat for grain and straw production. We implemented a second wheat TAg team in Seneca County with 6 growers. On the Seneca County team, a wide range of growers was reached, from a field crop producer who manages close to 4,000 acres of crops (600 acres of wheat) to a dairy farmer with approximately 500 acres (120 acres of wheat).

Table 1: 2004 Wheat TAg enrollment and acreage

TAg Team County	Acres in Wheat	TAg Field Acres	Total Acres of Farms
Oneida County Participants	800	80	4,900
Seneca County Participants	1,240	120	8,000

EDUCATIONAL DESIGN

We identified key IPM and ICM educational needs, then organized and held timely meetings to address these topics. Meetings were scheduled to capitalize on critical educational moments and to provide relevant pest and crop management training at strategic times during the growing season. The following table is a list of topics taught at wheat TAg meetings over the 2004 growing season and proposed topics for future seasons of the wheat TAg program:

Table 2: Integrated Pest & Crop Management information covered in the TAG meetings

<i>Topics Taught</i>	April Meeting	May Meeting	June Meeting	August Meeting	October Meeting (Proposed)
Wheat Growth Stages	x	x	x	x	x
Wheat Stand Counts	x			x	
Wheat Variety Selection	x		x	x	
Seedling rots and blights					x
Early Season Wheat Diseases and Management	x	x			x
Wheat Scab (Fusarium head blight) Identification and Management			x	x	
Yellow Dwarf Virus and Management	x			x	x
Cereal Leaf Beetle Management		x	x		
Hessian Fly Management				x	x
Aphid Management				x	x
Weed ID and Management	x	x	x	x	x
Soil Fertility	x	x		x	
Stored Grain Pest Management			x	x	
Fall Planting Issues				x	
Tillage Methods				x	

The pests that generated the most discussion were fusarium head blight, cereal leaf beetle, and the foliar fungal diseases including septoria leaf blotch and powdery mildew. Biological control of cereal leaf beetle was a major topic of discussion in Seneca County, where adults and larvae

were abundant during the May meeting. The importance of crop rotation in disease management was emphasized at several meetings.

EVALUATION OF THE WHEAT PROGRAM

Evaluation of impacts is an important aspect of the wheat TAg program. Each participant took a pre-test to document knowledge of IPM/ ICM prior to program participation. The post test-evaluation documented change in the participant's level of understanding at the conclusion of the TAg season. A post-season survey was also conducted to determine how many IPM or ICM practices participants plan to implement in future seasons. Many participants also chose to write comments on what they liked and disliked about wheat TAg. A temporary change in extension staff in Seneca County prevented the completion of the formal evaluation process for the Seneca County TAg team, however an informal survey of participants was conducted.

CURRICULUM DEVELOPMENT

In the process of conducting the wheat TAg meetings, a cooperative effort was formed in producing teaching modules and curricula to use in the program. Julie Stavisky, Ken Wise, Keith Waldron, Jeff Miller, and Gary Bergstrom worked cooperatively in preparing several handouts and pest flash cards to aid in teaching growers wheat integrated pest and crop management. Pest flash cards are simple pocket-sized cards containing descriptions and photographs that can be used in the field to aide in identification and management of pertinent insect and disease pests.

RESEARCH CONDUCTED IN COMBINATION WITH THE EDUCATION PROGRAM

A crucial element for much of agricultural research is obtaining on-farm data and observations. Growers are generally very supportive of these efforts because they understand the possibility of improvements in crop and pest management in the future. During the 2004 wheat season, the wheat TAg program provided opportunities for collection of data for plant pathology and entomology researchers. Data on the incidence of fusarium head blight was collected for Gary Bergstrom, Professor of Plant Pathology, who is working to develop a model for predicting the severity of fusarium head blight based on geographic location and weather conditions. Cereal leaf beetle eggs and larvae were collected for Leslie Allee, research associate in the Department of Entomology, who assessed the cereal leaf beetles for infection by a parasitic natural control agent. We will continue both of these collaborations in future wheat TAg teams. In addition, there are plans in place for collaborating next year with Gary Bergstrom and participating growers to investigate the efficacy of fungicide treatments for eyespot foot rot in the Finger Lakes region of New York State.

10. Results and discussion:

GENERAL PERCEPTION OF THE TAG PROGRAM BY PRODUCERS

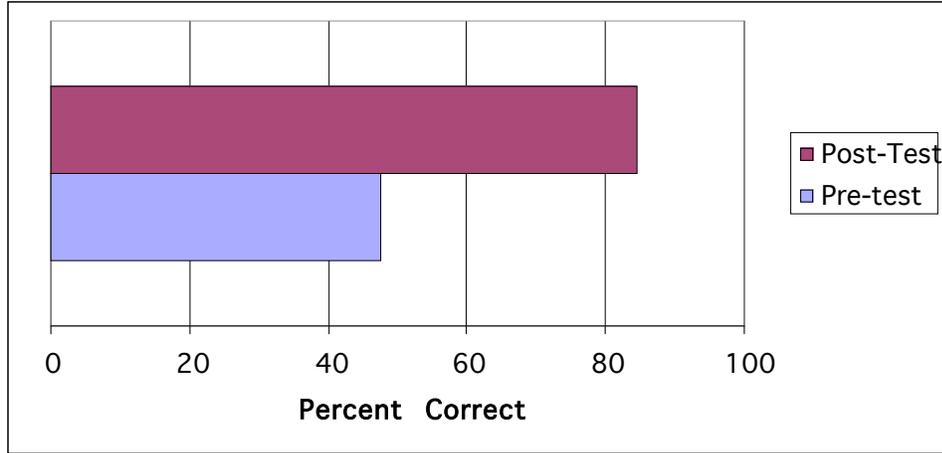
Participants provided very positive feedback regarding their TAg training experience. Growers all indicated that they would recommend the program to other farmers in their area.

KNOWLEDGE OF IPM AND ICM

Prior to wheat TAg participation, growers were asked to complete a pre-season assessment of their general IPM and ICM knowledge and activities, and to help educators identify areas of strength or need. Using the same instrument, TAg participants are given a post season "test" to identify changes in knowledge. Pre- and post-test comparisons indicate this year's participants dramatically increased their knowledge of IPM and ICM. The TAg team scored an average of 48 % on the pre-test and an average of 85% correct on the post-test. Overall test scores increased 37% percent from the pre-test to the post-test (Figure 1). Seneca county grower participants scored an average of 64% on the pre-test. Informal surveys with participants of the Seneca County TAg team indicate an increased interest in scouting and a commitment to conducting

regular scouting in the future as a result of the TAg program. Growers indicate that the program was very valuable, and suggestions were made on several topics for types of additional detailed information that would be useful for future participants.

Figure 1: Evaluation of Oneida County Participants' Knowledge of IPM and ICM



By conducting a pre-test we were able to identify topics that certain growers need to know more about. In this case growers knew a lot about weed management but needed more instruction in areas of wheat disease and insect pest management.

ADOPTION OF IPM AND ICM

Measuring knowledge is important to determine what a grower learned over the course of the program. It is equally imperative to know how a grower will implement their newly acquired knowledge into their farming operation. The following is the percent of growers indicating whether they “will do”, “will try” or “will not do” certain practices they learned in the wheat TAg program. The growers also indicated the number of acres on which they would be willing to implement IPM and ICM practices. In all cases (with the expectation of conducting stand count) 100 percent of next year’s acreage in wheat will receive the practices they learned in the wheat TAg program.

Table 3: Percent of Growers Responses of the Adoption of General Integrated Pest Management Concepts

Will Do	Will Try	Will Not Do	
0	100	0	Keep Scouting Records and Management Action Reports
25	75	0	Use threshold tables and guidelines
0	100	0	Prepare IPM scouting plan before the growing season begins
25	75	0	Collect reference material to help plan your IPM program
100	0	0	Consult you extension educator or IPM educator for new information

Table 4: Percent of Growers Responses of the Adoption of Wheat Integrated Pest Management Practices

Will Do	Will Try	Will Not Do
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ACRES

25	50	25	Perform stand counts	270
75	25	0	Conduct spring and fall weed identification and surveys	670
75	25	0	Scout for diseases	670
50	50	0	Scout for cereal leaf beetle	670
50	50	0	Monitor for beneficial insects	670
75	25	0	Time herbicide treatments carefully based on plant growth stage	670
75	25	0	Plant disease resistant varieties	670
100	0	0	Use economic thresholds to guide insect and disease management decisions	670
0	100	0	Consider alternative solutions to using herbicides	670
75	100	0	Will use NYS guidelines for wheat fungicide decisions	670

Table 5: Percent of Growers Responses of the Adoption of General Wheat Crop Management Practices

Will Do	Will Try	Will Not Do		ACRES
100	0	0	Conduct soil testing to determine proper fertilization needs	670
100	0	0	Use crop rotation to control weeds and diseases	670
25	75	0	Review the soil test results with your CCE educator	670
75	25	0	Time fertilizer applications carefully based on plant growth stage	670

CURRICULUM DEVELOPMENT

Lesson plans were developed for 5 meetings, and efforts are underway to expand each lesson plan into a teaching module that will include descriptions of activities to conduct and questions to ask to stimulate conversation on IPM topics during TAG team meetings.

In addition to preparing lesson plans, several handouts and pest flash cards to aid in teaching growers wheat integrated pest and crop management are being developed. The following is a list of educational materials prepared for wheat TAG programs in NYS.

Lesson Plans

- 🕒 IPM in wheat from green-up through early tillering
- 🕒 Wheat IPM in May: Protecting the flag leaf
- 🕒 Wheat IPM at flowering and grain filling
- 🕒 Preparation for planting wheat the IPM way
- 🕒 IPM in seedling wheat

Flash Cards

- 🕒 Stagonospora nodorum blotch on Wheat: IPM Guide.
- 🕒 Common Bunt or Stinking Smut on Wheat: IPM Guide.
- 🕒 Eyespot Foot Rot (Straw Breaker) on Wheat: IPM Guide
- 🕒 Powdery Mildew on Wheat: IPM Guide.
- 🕒 Wheat Spindle Streak Mosaic-virus on Wheat: IPM Guide
- 🕒 Yellow Dwarf-Virus on Wheat on Wheat: IPM Guide
- 🕒 Stored Grain: IPM Guide
- 🕒 Leaf Rust on Wheat: IPM Guide
- 🕒 Hessian Fly on Wheat: IPM Guide
- 🕒 Aphids on Wheat: IPM Guide
- 🕒 Seedling Rots and Blights: IPM Guide

- 🕒 Fusarium head blight on Wheat: IPM Guide
- 🕒 Armyworm on Wheat: IPM Guide
- 🕒 Cereal Leaf Beetle on Wheat: IPM Guide
- 🕒 Winter Wheat Growth Stages
- 🕒 Small Grains Planting Guide

IPM Wheat Scouting Cards

- 🕒 Weed Assessments
- 🕒 Disease Assessments
- 🕒 Insect Pest Assessments
- 🕒 Plant Populations

SUMMARY

The wheat TAg program teaches growers to better manage their wheat production. The wheat program has proven to increase the grower’s knowledge of IPM and ICM. Learning is enhanced when sound pertinent and appropriate information is individualized to a producer’s specific needs and presented in a positive, interactive and participatory setting. Overwhelmingly, growers involved in the 2004 wheat TAg program indicated receptiveness to the TAg approach and have shown a willingness to implement many of the IPM and ICM practices highlighted in the course. When growers were asked if they would recommend the TAg program to other produces they all indicated they would recommend TAg. They also suggest that TAg has helped them understand the importance of pest and crop management issues (table 6).

Table 6: *Grower’s perception of the wheat TAg program.*

Would you recommend TAg to other farmers in your area?					
Highly recommend	Recommend	Not sure	Not Recommend	Highly Not Recommend	
50	50	0	0	0	<input type="checkbox"/>

Has TAg helped you understand the importance of pest and crop management issues					
Highly agree	Agree	Not Sure	Not Agree	Highly Not Agree	
50	50	0	0	0	<input type="checkbox"/>

12. Samples of materials:

TAg participants made the following comments on the post-season survey:

“Wheat TAg was very beneficial to me!”

“I learned a lot from the wheat TAg program”

“Cornell Cooperative Extension’s willingness to make the meetings fit the framers’ busy days was greatly appreciated”

“Nice to have a variety of farms and tillage practices to compare with”

“More farmers should take advantage of TAg”

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