

## Statement of Work

### *Need for project:*

USDA estimates suggest that producers may lose as much as 10% of the grain crop from the time of harvest until the grain is fed or processed (1). Much attention has been placed on IPM education for individuals producing field corn, soybeans, wheat and other field/cash crop commodities. Unfortunately, few Integrated Pest Management (IPM) educational opportunities have been available to producers in the northeast for protecting these commodities while stored on-farm. IPM training would help producers minimize or avoid common stored product management problems. A modest potential gain (of 1%) due to improved pest management could have a significant positive economic impact on overall profitability. Enhanced pest management of commodity grains stored on-farm would directly benefit individual growers. These improvements would help ensure a quality product entering the overall grain commodity stream resulting in better grain protection and economic benefits to local and regional grain mills and food processing industries.

### *Background and Justification:*

On-farm storage of harvested field corn, soybean and wheat is an important component of cash crop production and marketing. Depending on contracts and futures market price, producers may hold a stored commodity product for periods of several months to more than 1 year before on-farm use or shipping to commercial mills and brokers. It has been estimated that more than 15 billion bushels of grain are stored in the United States each year. Time spent in storage puts commodities at risk from damage by insects, molds, vertebrate pests, heat sprouting and other factors affecting spoilage. Nationally, these losses have been estimated to be more than \$1 billion annually (2).

In 2007, NY produced 70 M bushels of grain corn, 7.7 M bushels of soybeans and 4.4 M bushels of wheat at a total estimated value of \$4.05 B (3). During the time period 2002 – 2007 wheat, soybean and corn grain. One consequence of grower response to commodity market prices has been a 2.25 fold soybean acreage increase in NY from 1998 – 2008. The increased value of grain commodities along with associated increases in production input costs has increased interest and need for IPM and methods to improve the cost efficiency of crop production and storage.

Direct-feeding damage by insects reduces grain weight, nutritional value, and germination of stored grain. Insect infestations are often associated with conditions that also cause or favor contamination, odor, mold, and heat-damage problems that reduce the quality of the grain and may make it unfit for processing into food for humans or animals. Commercial grain buyers often rely on producers to store their own grain for a time and deliver it to the mill throughout the year. Mills are forced to reject grain that does not meet food quality standards or may pay a reduced price for an inferior product. This is often due to poor on-farm storage IPM (4, 5).

IPM principles and methods can be successfully applied to minimize or avoid many of these pest induced storage risks. Many of these methods are cultural combining sanitation and temperature management, but may also integrate biological control and use of appropriate pesticides to maintain a pest-free grain mass (2).

Proper on-farm storage is the first step to protect and maintain a pest-free grain commodity stream. High-risk grain that enters the grain marketing system at any position will put other grain stored with it at risk. If not detected early, loads of infested grain will contaminate clean grain as it moves throughout the storage facility thereby putting the entire grain mass at risk of reduced quality, profitability, and future marketability. An integrated management approach is clearly necessary to develop economically- and environmentally-sound stored grain programs (2). Stored grain integrated pest management (IPM) methods can be successfully applied to minimize or avoid many of these risks. However, training opportunities on these IPM methods have been limited in the Northeast. Grower interest in stored grain IPM is evidenced by the number of requests for information received by extension personnel and grain mill operators (5).

A train the trainer effort to provide extension educators and other professionals with an overview of on-farm stored grain IPM practices would increase awareness and improve skills to better protect commodities during on-farm storage. This information would then strengthen outreach efforts to grower stakeholders through educational efforts and on-site visits. Improvements to grain protection would reduce risk of losses and enhance net profitability of production.

***Objectives:***

1. Provide train-the-trainer educational opportunity to enhance use, knowledge, understanding and application of IPM principles and practices to on-farm stored grain.
2. Improve dissemination of stored grain IPM principles and practices through grower education by workshop participants.

***What will be done?:***

A workshop will be organized and presented to introduce Stored Grain IPM principles appropriate for use by on-farm storage system operators. To enhance outreach and potential impacts this workshop would be designed as a train-the-trainer program. The program will be advertised to educators and other practitioners via contacts with northeast IPM coordinators, regional certified crop advisors, and others. A combination of lecture and laboratory opportunities would be presented. Where possible, Cornell resources or other local expertise will present information. Several topic areas such as basic grain storage engineering, bin safety, pest control, and pest sampling will require outside speakers. Stored grain specialists in those subject areas will be invited to participate via distance teaching technology such as polycom. The workshop will include an insect identification session. The workshop will conclude with an on-farm visit to enhance the training experience and the practical application of information. An end of program evaluation will be administered. The 1.5 - 2 day workshop agenda would be designed with input from an advisory committee comprised of cooperative extension educators, commercial stored grain operators, private consultants and university pest management specialists. Twenty-five workshop participants are anticipated for this initial workshop. The workshop will be evaluated through an end of program participant survey to assess training effectiveness and opportunities for follow up. Timing and location for the event is to be arranged with sensitivity to availability of speakers and potential participants.

***Anticipated Impact(s) of Project:***

- Twenty-five extension, agriculture industry and other stakeholders will receive training in stored grain Integrated Pest Management (IPM).
- Improved IPM knowledge and skills of cooperative extension, certified crop advisor (CCA) and agriculture industry personnel relative to stored grain protection.
- Improved network of professionals with interest and responsibilities in stored grain protection.
- Training will result in enhanced outreach and timely application of stored grain IPM information and techniques to producers with on-farm grain storage.
- Improved average quality of grain supplied to local grain mills and brokers as the result of improved on-farm grain storage.
- Enhanced communication between field crop producers, cooperative extension and other agricultural industry personnel resulting in improvements to the amount and quality of stored grain IPM information and efforts in the northeast region.
- Field crop producers, grain mills, food processors and consumers stand to benefit through enhanced protection of harvested grain commodities and reduced pest losses and costs of control.

***Literature Cited:***

1. Calvin, D., J. Carson and S. B. Jacobs. 1989. Managing Stored Grain on the Farm. Entomological Notes, Pennsylvania State University, University Park, PA
2. Cuperus, G. and V. Krischnik. 1995. Why Stored Product Integrated Pest Management is Needed. IN: Stored Product Management. *USDA E912*: 199.
3. New York State Agricultural Statistics, 2007-2008 Annual Bulletin, NYS Department of Agriculture and Markets, Albany, NY
4. Mason, L. J. and J. Obermeyer. 2006. (Stored Grain Insect Pest Management, Purdue Entomology Extension Series, E-66-W, West Lafayette, IN
5. Lachance, F. R. 2008. Personal communication (see attached letter of project support)