The Iowa Grain Quality Initiative
Overall Project Plan and Final Report
2005-2006

The Iowa Grain Quality Initiative (IGQI), chaired by Dr. Charles R. Hurburgh, Jr. and operated by an interdisciplinary management team representing the Agricultural and Biosystems Engineering, Value-Added Agriculture Agronomy, Economics, Animal Science and Food Science and Human Nutrition Departments, assisted activities in support of its vision, mission, and four objectives.

VISION

Iowa will be the location of choice for commercialization of value-added specialty grains.

MISSION STATEMENT

The mission of the Iowa Grain Quality Initiative (IGQI) is to create knowledge and provide information that will improve the efficiency of traditional commodity grain markets and will assist emerging markets for user-specific grains.

OBJECTIVES

The following four objectives support the mission of IGQI and concentrate its university-private sector efforts in areas most likely to yield economic gains.

1. Address product quality and acceptability issues that could threaten the stability of Iowa grain markets.

2. Facilitate the development/application of technologies that will improve marketing efficiency and value of Iowa’s primary grains as they become products targeted for specific users.

3. Provide educational programs to assist target audiences in capturing opportunities presented by value-added grains.

4. Provide a rapid response to short-term grain quality issues caused by weather conditions, biotechnology, or other external forces.

STRATEGIES

The combination of novel traits and consumer concerns over certain biotechnology events is accelerating the role of the United States as a supplier of differentiated products to higher-value markets rather than as a trader of lowest cost generic bulk commodities. The rapid and continuing growth of the biorenewable energy industry is quickly changing...
the mix of grains being grown and the animal feedstuffs readily available. These trends led the management team to develop six strategy areas that will promote interest and participation from a broad faculty base:

1) Determine how traceability in its various forms might apply in U.S. markets to concurrently solve food safety, consumer preference, security, and product valuation needs.
2) Support environmentally and socially responsible production of differentiated or genetically-enhanced grains.
3) Identify sustainable and equitable marketing structures for differentiated grains or biobased processing co-products.
4) Resolve developing problems related to differentiated grains and biobased processing co-products.
5) Create support and training programs for the application of internationally recognizable quality management systems to grain production.
6) Develop a base of expertise in the agronomic, management and business aspects of differentiated grains and biobased co-products.

**FY06 PROJECTS**

Project Management, Marketing and Information Distribution ............
Charles Hurburgh, Mary Holz Clause, VAAP Staff

Research Assistance and Sample Analysis Program ......................
Glen Rippke and Charles Hurburgh

Physical and Economic Constraints to Isolation of Transgenic Grains ......
Iowa Grain Quality Initiative Management Team
Charles Hurburgh, Principal Investigator

Business Infrastructure Development ....................
Roger Ginder, Darren Jarboe, and Lawrence Johnson

Uniformity in Output-Trait Measurement ................................
Charles Hurburgh

Impacts of Increased Local Processing........................................

Stewardship of Transgenic Products.........................................
Iowa Grain Quality Initiative
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Project Title: Project Management, Marketing and Information Distribution

Project Objectives:
1. Administration of IGQI project operations.
2. Manage internal and external relationships for the project.
3. Assist affiliated scientists with IGQI-related project proposals.
4. Continue expanding the marketing and distribution of grain quality information through media outlets, with an emphasis on web site growth.
5. Expand IGQI’s information and funding base through marketing IGQI outputs.

Summary of Results for 2006:

Administrative work included arranging management team meetings and advisory committee meetings, providing assistance with communications, setting up and taking minutes. Assistance also was provided in updating the existing web site for Iowa Grain Quality, correcting bad links, adding news articles and presentations. Administrative communications assistance was provided on development for professional presentations.

Several media releases focusing on aflatoxins, grain storage and other issues/concerns with the 2005 crop were developed and sent out. From the initial releases there were follow up radio and interview spots. Existing Extension publications on focusing on grain storage and aflatoxins were also updated.

Major emphasis was placed on creating a new web site for the Iowa Grain Quality Initiative. The graphical design of the current site was outdated and it was determined that the content could be reorganized to be more user-friendly. The content was migrated to a branded, ISU-themed content to strengthen the association between ISU and the Iowa Grain Quality Initiative. The site is now organized by projects and resources for grain production, harvesting and handling. Once the web site is fully migrated and live, then additional promotion and marketing of the entire organization will be implemented in fiscal year ’07.

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Summary of Results for 2006: IGQI – Program Coordinator

1. Administration of IGQI project operations.
   • Developed working relationship with team members, through discussion of project objectives and goals for the Iowa Grain Quality Initiative program success. Developed and wrote success stories for projects and success stories were posted on the Extension Web site and the IGQI web site.

2. Manage internal and external relationships for the project.
   • Developed a working relationship with Agribusiness Association of Iowa though IGQI leadership on FDA recordkeeping requirements for commodity grain handlers and animal feed manufactures. This relationship had generated, IGQI participation in the AAI Leadership Conference on Bioterrorism and FDA regulations, linking the IGQI website to the AAI web site, recognition in the AAI newsletter and announcements that the IGQI website is the leader on FDA regulations with training model and quick sheets, developed a FDA regulation quick sheet for the AAI district meetings, creation of a FDA Q&A tab on the AAI website with IGQI leadership answering questions for AAI members.
   • Work with the members of the Iowa Ag Cooperative Safety Director Association to develop a relationship with IGQI on Quality Management and FDA Bioterrorism strategies for grain and food safety. This relationship developed into three opportunities to meet with Cooperative Grain Management Teams and present the FDA Bioterrorism requirements in grain handling.
   • Maintain membership in GEAPS and attend meetings and develop member relations to enhance IGQI position in the grain handling industry.
   • Participated in the ANR Extension Plan of Work planning meeting as IGQI Program Coordinator responsibility and assisted in draft plans.

3. Assist affiliated scientists with IGQI-related project proposals.
   • Coordinated an aflatoxin workshop by assisting in Federal and State agencies, Commodity organizations, growers and agribusiness participants bring to the table meaningful presentations, discussion and recommendations for Dr. Charles Hurburgh and Dr. Alison Robertson to collaborate on proposed research objectives on aflatoxin issues.
   • Coordinated aflatoxin workshop documentation for participants and presenters by
posting aflatoxin papers, presentations, workshop discussion and recommendations on the IGQI website.

4. Continue expanding the marketing and distribution of grain quality information through media outlets, with an emphasis on web site growth.
   • Examined the IGQI web site and developed a strategic plan to define IGQI project objectives, information and results for best management practices for partners at Iowa State University, Federal and State Agencies, Agribusiness, and other clients who use our web site.

5. Expand IGQI’s information and funding base through marketing IGQI outputs.
   • Acted as conduit for IGQI and USDA – RMA to develop a plan for a grant proposal on aflatoxin modeling, and research objectives.
   • Developed a plan for IGQI to partner with Purdue University on distance learning programs presented through GEAPS.

Publications and Other Activities – IGQI Program Coordinator

• ANR – Success Story – FDA Recordkeeping Training Program – Howard Shepherd, Dr. Charles Hurburgh
• ANR – Success Story – National Glyphosate Stewardship Forum – Dr. Mike Owen
• ANR – Success Story – Grain Management Systems – Dr. Charles Hurburgh, Chad Laux, Tom Miller
• ANR – Success Story – Aflatoxin Workshop on 2005 Levels and Responses – Dr. Charles Hurburgh, Dr. Alison Robertson, Howard Shepherd
• IGQI – web site – developed strategic plan to change and define customer needs

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Project Title: Current Issues and Rapid Response

Project Objectives:
1. Provide educational and leadership programming for emerging current issues in grain management.
2. Respond to rapidly-developing immediate problems relating to grain management.

Summary of Results for 2006:

Bio-terror
The Public Health Security and Bioterrorism Preparedness and Response Act of 2002, was signed into law in June 2002. It gives the FDA the responsibility for protecting the nation’s food supply and tracing incidents of adulteration of food by bio-terrorism or natural causes to their source. The Record Maintenance section of the Act, compliance date was 9 June 2006 for the majority of the Iowa grain handling and feed mill businesses.

1. A training module was developed to address the FDA Recordkeeping requirements for grain handlers and feed mill businesses and placed on the IGQI web site.
2. AAI asked IGQI to present FDA requirements for grain handlers and feed mill businesses at there Leadership conference in January of 2006. The IGQI coordinated presentation by FDA compliance David Miser of Region 7, traceability by Dr. Charles Hurbergh, and recordkeeping requirements by Howard Shepherd.
3. A news release about the FDA requirements and IGQI participation in the AAI leadership conference was developed and placed on the extension.iastate.edu website. Other agribusiness news sites picked up on the extension news release and asked for further information. The River Valley Coop in Easter Iowa interviewed Howard Shepherd and post a release on there sites. The Iowa Farm News today from Ft Dodge, IA interviewed Howard Shepherd and ran an article in the paper and posted on there website.
4. Developed FDA quick sheets for AAI to hand out at there District meetings and posted on the IGQI website.
5. Membership in GEAPS and the Ag Cooperative Safety Director Association of Iowa has allowed IGQI to discuss project goals with these organizations. I have presented discussion points at association meetings and received invitations to three Cooperatives to present the FDA Recordkeeping module to the grain management team.
6. Developed and implemented a FDA Record Keeping Workshop with AAI grain and feed members, IDALS grain and feed managers, and FDA Region 7 Compliance Management on the IGQI recordkeeping training module. The module was reviewed and recommendations were discussed how the module
could better serve the needs of agribusiness in the state of Iowa. Recommendations to separate grain and feed quick sheets and make available on the AAI website. Revise the training module to clarify requirements and best management practices for traceability. Develop a FDA Q&A section on the AAI website where members can view and respond as needed.

7. Scoring Ag Inc. a data management company recommends the IGQI web site and the FDA training module to its customers who need guidance on what is required under the recordkeeping section of the law.

Aflatoxin
The aflatoxin issue in the fall of 2005 pointed out the need for an overall view of grain-based food safety concerns. Improved coordination of the various regulations, risk management programs, and logistical strategies clearly would be a benefit to the entire grain market. A discussion workshop to review the successes and difficulties of the 2005 aflatoxin situation could identify a set of possible action items that would mitigate future impacts of similar situations.

1. A workshop plan was developed and the workshop took place on April 19, 2006 in Bettendorf, IA. Coordinated the workshop logistics and assisted Dr. Hurburgh in developing the agenda and presentation objectives for the workshop. Managed the presenter list and attendant list. Gave guidance to the presenters on their topics, to match the needs of the workshop.

2. The workshop developed excellent discussion and recommendations for projects the IGQI could develop and coordinate. The workshop presentation, participants and agenda were posted on the IGQI website. Presentation highlights, discussion points, and recommendations were include in a document and reviewed by all participants and placed on the IGQI website for reference.

3. One recommendation came from the workshop on developing a plan for modeling aflatoxin occurrence and relating the model to real field aflatoxin levels which could be defined in real risk levels. The Director of USDA – RMA – Heyward Baker contacted the IGQI about a grant opportunity related to aflatoxin and risk assessment. Dr. Hurburgh assembled an aflatoxin team to write and submit a grant proposal directed at modeling and risk assessment. Guidance was given to the proposal through discussions with Director Baker and the aflatoxin team.

Publications and Other Activities

- Bioterrorism Act, FDA Title III, 306 Recordkeeping Maintenance – Training Module – PowerPoint – posted on IGQI website
- Bioterrorism Act, FDA Title III – quick sheet document – posted on IGQI website and handout at AAI District meetings
- News Release – Extension News – 12/22/05 – FDA and ISU Offer Session on the U.S. Bioterrorism Act
- News Release – River Valley Coop – 12/29/05 – FDA Record Maintenance
- News Release – Farm News Today – 1/06/06 – Conference addresses grain handling, bioterrorism
- Document – Aflatoxin Workshop Participants
- Document – Aflatoxin Workshop Agenda
- Document – Aflatoxin Workshop Summary and Recommendations


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Project Title: Research Assistance and Sample Analysis Program

Project Objectives:
1. Provide no-cost grain quality analysis services for locally operated third party variety evaluations.
2. Provide low-cost grain quality analysis services for ISU research projects.
3. Develop a summary report of the use of this service over its 5-year existence.

Summary of Results for 2006:
The ISU Grain Quality Laboratory (GQL) analyzes grain samples for a variety of grain quality factors. The lab has steadily expanded its program offering no-charge analyses for locally operated third party strip-trial evaluations and for ISU-sponsored agronomic research studies. The latter is intended to provide seed data for ongoing projects that would not otherwise have been able to include a grain quality component. In FY06 this service was expanded to cover the corn-soybean initiative (CSI). The CSI component will receive more emphasis in FY 2007 (2006 crop).

For the 2005 crop, the breakdown of samples was:

<table>
<thead>
<tr>
<th></th>
<th>Corn</th>
<th>Soybeans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strip-trials</td>
<td>471</td>
<td>361</td>
</tr>
<tr>
<td>Research projects</td>
<td>517</td>
<td>2363</td>
</tr>
<tr>
<td>CSI</td>
<td>79</td>
<td>127</td>
</tr>
<tr>
<td>Total</td>
<td>1067</td>
<td>2851</td>
</tr>
</tbody>
</table>

In 2007, a five year summary will be done of the data, origins, and publications generated or supported. The impact of plot design on the quality data will also be studied.

Publications and Other Activities

Website publication of public trial data, 16 sources of corn data and 17 sources of soybean data.
Support for research activities, to be summarized in FY2007.


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Project Title: Physical and Economic Constraints to Isolation of Transgenic Grains

Project Objectives:
1. Identify every operation potentially impacting grain quality and purity from seed purchase to end-user delivery, either from accidental or malicious mixing.
2. For each operation, review the available scientific and general information to estimate its potential impact on quality, purity, genetic transfer, the need for standard operating procedures and documentation, and the potential requirements for educational efforts. Identify those operations and situations for which contributions may not be scientifically estimated or controlled. Inventory the available materials and tools from all sources that could meet operational or training needs.
3. Describe research and information gaps which, if filled, would sharpen isolation abilities, reduce risk, identify operating costs, and facilitate necessary quality management systems.
5. Support the international (ISO) standards development, ISO 22001, for agricultural systems and participation in European segregation/traceability standards efforts TRACE and COExtra. (New in 2006)

Summary of Results for 2006:

**Overall**

- System flowcharts, critical control points and numerical quality/cost assessment procedures have been set up for the grain market, to support three grain case study examples, one involving an international market chain (EU).
- An extensive literature review of consumer willingness-to-pay for specific beef and pork attributes related to production practices has been completed.
- Initial discussions have been held to set up case studies demonstrating information technologies related to a national animal identification program.
- Prepared and delivered presentations and publications on age and source verification of the Japanese beef market.
- Several economic advantages of individual animal management have been identified including economic analysis of health management practices, genetics, age, and prior performance.
- The overall benefits of applying documented quality management systems to agriculture are becoming apparent. Practical examples of profitably have been created, and international standards efforts have started to harmonize these systems for world trade.
All of these relate to the goal of providing technical understanding and support for a new, more connected, model for food systems. Recent public health and international regulatory issues have increased the need for change; already the studies are making apparent the competitive advantage the US and US producers could have by taking a positive approach to a less commoditized food system. In both cases, the differentiation (and related operations) created by tracking smaller trade units may create internal efficiencies sufficient to repay the costs of tracking.

**Grain Systems**

The conceptual and flowchart analysis of grain isolation/traceability was expanded, along with an inventory of current providers of quality management system/traceability services. The first case study, nonGMO consumer traits (low linolenic soybeans) was flowcharted, with data collected from two producer groups. There will be two other case studies, a partially approved GM corn event, and a food safety factor, aflatoxin, in corn.

Quality Management Systems (QMS) are internationally recognized in manufacturing as being able to organize efficient responses to safety, tracking, regulatory and product quality needs. QMS have great potential to expand markets and improve efficiency of food production systems. While ISO 9000 is the most clearly recognizable QMS, industry specific systems have been used as effectively as a transition and educational process in the introduction of statistically based process controls. As a result of this project, the largest producer owned grain handling firm in Iowa, Farmers Cooperative Elevator Company, Farnhamville, Iowa has taken the national lead in application of QMS for agricultural marketing. FC now has 5 locations AIB-certified, and one location plus central management ISO certified. Based on analysis of key internal cost parameters, the company is saving $2 for every $1 invested in the QMS. The system is paying for itself without requiring a premium price for grain.

This project has led to the organization of an ISO work item proposal (ISO 22006, Production Agriculture) for Ag Quality Systems standards. This work item was accepted by international vote in 2006. The actual development process began in March 2006 with the first international meeting. Funding from this project will provide US technical input through to the completion of the ISO 22006 process, estimated to be in 2009. In preparation for ISO22006, one of the project graduate students has assembled a comprehensive review of world food marketing and traceability Standards. There is large divergence among nations. The need for harmonization is quite clear. Through this project, the US is in position to encourage this harmonization in ways that may relatively advantage US producers.

A list of performance criteria was established to evaluate the success of quality management systems. Most measures are numeric with historical data available against which to benchmark. The outline for application of ISO 9000 to the agronomy/agricultural input business of Farmers Coop in 2007 was developed. The information gained from the producers of low linolenic soybeans is being used to create similar benchmarking metrics against which benefits of quality management systems for production (with associated traceability) can be measured.
Dr. Hurburgh is the US participant in the European Union work program 6 projects TRACE, (which will define the operational requirements to support the 2004 food traceability regulations) and CoExtra (which will define requirements for future EU importation and public policy relative to foods from biotechnology-based raw materials (GMOs). The cereal grains marketing chain study for TRACE and CoExtra will also be a case study in this project.

The US grain industry is adapting to food safety, biosecurity, consumer right to know and other market pressures by instituting systems that will not only meet the needs but improve efficiency as well. Iowa State has developed materials to assist grain handlers in implementing the FDA biosecurity regulations. Opportunities for market improvement and cost efficiency have been created in the compliance process.

Two doctoral students and one masters student are now working on the grains component of Food Chain Economic Analysis, each with a specific area of study

**Publications and Other Activities**


The Ag9000 proposed quality management system standard for agriculture was approved as a new work item by ISO Technical Committee 34, Food and Agriculture, Working Group 12. The United States is the lead country, and Iowa State (Dr. Hurburgh and the Grain Quality Initiative) were the national leaders in developing consensus for creation of this international standard. The first International meeting was March 20-22, 2006 in Dallas. Dr. Hurburgh serves as a US representative on the expert group.

Dr. Hurburgh attended the second meeting of TRACE, EU 6th Framework project for food traceability systems, in Prague, CK April 24-26. ISU will be organizing the cereal grains case study of this project, and a similar effort for the EU project CoExtra (GMO)
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Project Title: Business Infrastructure Development
Analytical Tools for Production of Non-Food Protein Corn

Project Objectives:
1. Identify the marketable products from a non-food protein corn product located in the germ and estimate a range of potential returns for the products in the value chain.
2. Identify and evaluate the economic benefits of degerming kernels for non-food protein extraction prior to the dry grind ethanol process at various corn and ethanol price levels.
3. Evaluate feasible premium levels for the non-food protein corn product value chains identified in objective 1.
4. Evaluate the economic benefit to producers of the non-food grade protein corn products at feasible premium and yield levels.
5. Develop and distribute a corn channeling informational poster to all grain collection facilities in nine states. This is a continuation of a project that has been conducted the past three years with funding from a consortium of seed companies.

Summary of Results for 2006:

The analytical tools for non-food protein corn continued in the discovery phase with the corn model and a white paper under development. Collection of relevant data for fractionation prior to the ethanol production process has been difficult. Roger Ginder met with Big River Resources, LLC in Burlington. The company decided against fractionation in favor of building a new plant near Grinnell. Ginder and Corinne Langinier met with CORN LP in Eagle Grove. CORN LP decided to use a post ethanol production oil recovery system and invest in a new ethanol production facility near Wesley. Both had fractionation engineering studies completed. Darren Jarboe met with Quality Technology International, Inc., of Chicago, Illinois, regarding their efforts in partnering with ethanol facilities. The corn analytical tool project will continue in FY2007 as planned.

The 2005 corn stewardship poster project created informational posters and distributed them to over 4,300 grain handling facilities and 700 Extension offices in nine Midwestern states. The poster encouraged producers to segregate Market Choices® corn at delivery. A press release was also developed and the www.marketchoices.info Web site was maintained. The project was supported by the cooperative councils, grain and feed associations, corn grower organizations, and Extension programs in the nine states. Dow AgroSciences LLC, Monsanto Company, and Pioneer Hi-Bred International, Inc. provided financial support ($30,000).

Mark Hanna and Jarboe completed the third year of the combine sanitation research project funded by the Leopold Center. Data was collected for CaseIH 1460 and John
Deere 9650 combines. Limited results were presented at the 2005 Integrated Crop Management Conference and 2006 Corn Utilization and Technology Conference. A paper has been submitted to the American Society of Agricultural and Biological Engineers (ASABE) for presentation at the 2006 ASABE Annual Meeting.

USDA-APHIS Biotechnology Regulatory Services (BRS) provided $69,462 for development of inspector training modules for cleanout of grain storage, grain transport equipment, and grain processing equipment. The grain storage module is finished and the transport and processing modules are under BRS review. BRS has used the modules and videos previously developed under this cooperative effort to train 60 to 100 inspectors annually.

The machinery sanitation project received 2005 educational materials awards from the ASABE and American Society of Agronomy for the video Plot Harvester Clean-Out Procedures.

**Publications and Other Activities**

**Abstracts**


**Presentation**


**Proceedings**


**Extension Publications**


Awards


Grants


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Project Title: Uniformity in Output-Trait Measurement

Project Objectives:
1. Receive and confirm ability of release and near-release genetic material to be accurately analyzed in NIRS measuring systems. Expand organized NIRS calibration databases as new material becomes available.
2. Create and maintain calibration databases for seven or more NIRS brands.
3. Develop protocols for the combination of either calibration equations or spectral databases across similar models of NIRS produced by different manufacturers.

Summary of Results for 2006:
1. Continued soybean database update for 13 models of Near-infrared analyzers (whole grain)
   a. Protein, oil, fiber,
   b. Amino acid profile, fatty acid profile - selected more capable instruments
   c. Added sugar profile (one set of 135 samples).
   d. Infratec (3), Bruins Omega (3), Zeiss Corona, ASD LabSpec, Zeltex (2), NIRSystems 6500, Perten DA7200, Perten 9100, Dickey-john Instalab
   e. Added approx 850 samples.
2. NIR calibrations for linolenic acid, total saturates, were tested on site at a processor, using a new NIR unit. Results were superior to previous unit tested, especially for linolenic acid.
3. Calibrations for amino acids depend on correlation with protein content. A robust set of protein equations is available, but unusual germplasm will be needed to break the correlative effect.
4. Refined new mathematical procedures (percent by weight rather than % oil, support vector machine calibration algorithm) to improve the measurement of subunit factors (fatty acids, sugar profile) by NIR.
5. New doctoral student began January 2006. Short term visiting scientist will be at Iowa State from July 1 – September 30, 2006, to work on the spectral combination problem.
6. Initial study of spectral database combination (across models) was started. There will be a report by September 30, 2006 on what direction to take on this problem. Solving the problem of different readings from different NIRS on the same sample is the most crucial need for wider usage of rapid tests, and therefore wider acceptance of improved soybeans.

Publications and Other Activities

Hurburgh, C. R., Jr. 2006. Measurement of amino acid content with near infrared spectroscopy. 97th AOCS Annual Meeting, American Oil Chemists Society, Champaign, IL. May 2-6, 2006, St. Louis, Mo. (abstr)


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Project Title: Impacts of Increased Local Processing of Grains
Survey and Analysis of Ethanol Producers Sourcing Corn in Iowa

Project Objectives:
1. Create an objective data set to define the scope and variation involved in the current industry activities surrounding grain origination methods, impact on grain storage and co-product handling/marketing.
2. Develop analytical tools that can track trends within the industry.
3. Analyze the data to measure impacts of growth on the ethanol industry and its input supply chain.

Summary of Results for 2006:

The goals of the ethanol project were to determine how corn distribution and storage patterns were changing as a result of the growth in ethanol production in Iowa and to estimate potential for increasing livestock numbers in Iowa with the availability of feedstock co-products (distillers grains.) Creation of an objective data set (Objective 1.) required interviews with management personnel at each of Iowa’s ethanol processing plants to gather operational data about processing and ethanol storage capacities, expansion plans, corn acquisition and storage, co-product descriptions, and co-product distribution. The interview questions were designed to reveal general concepts about the operations of ethanol processing and marketing, but not to pry into specific marketing or corn acquisition strategies.

Interviews began in late April 2006. As of June 30, 2006, interviews with management personnel from sixteen of Iowa’s operating dry grind ethanol plants were completed. These plants represent 825 million gallons of ethanol production capacity, requiring approximately 300 million bushels of corn. With recent new plant announcements and others under construction in Iowa, data from at least fourteen more dry-grind plants should be included in the data set, as well as information from six wet-mill plants that produce ethanol.

Corn acquisition arrangements differ among the ethanol plants depending on the existing grain handling facilities and truck access to the plant. Most of the plants buy corn both directly from farmers and from one or more elevators. Where there has been an economic reason for a plant make a formal agreement with a local elevator for grain storage and co-product marketing, those arrangements exist. In some cases, there is common ownership in the elevator and ethanol plant. More recently, investor groups from remote locations have announced plans to build ethanol plants in Iowa or have purchased an existing plant.

Marketing of ethanol and the co-products differs among the plants. Most often, ethanol producers work with independent brokers to market both ethanol and the co-products. Some, however, have merchandisers within the local operation. Some plants have developed a name brand for the feed co-products and they guarantee consistent nutritional quality in the distillers grains. Generally, more ethanol is moved from the
plants by train to locations out-of-state. Modified distillers grains (high moisture) are usually sold within 50 miles of the plant and are shipped by truck or fed at adjacent feedlots. Dry distillers grains can be sold locally or are shipped by rail to dairies in California and Arizona, to feedlots in Texas, Kansas, Oklahoma, and Mexico, and for export.

In the interviews, plant managers shared concerns they had for the ethanol industry in Iowa. The most often mentioned concern was the ability to access enough corn at the right price to keep the processing plants viable, followed closely by the struggle to find enough skilled people to work in the plants (engineers for management positions and technicians with life sciences background.) Also mentioned was the ability to comply with continually increasing environmental regulations and the availability of enough 100-car trains to move ethanol and co-products.

Data for this part of the project will be gathered through August and a written report submitted by September 30, 2006.

Publications and Other Activities:

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Project Title:  Stewardship of Transgenic Products and Management of Pests in Specialty Grains

Project Objectives:
1. Evaluate the potential for suspect weeds to evolve resistance to glyphosate
2. Determine which weeds are becoming new economic problems in response to the adoption of transgenic cropping systems
3. Develop management tactics to manage changes in the weed community in transgenic crop production systems
4. Establish the risk of traditional weed management programs in specialty grains
5. Develop effective, safe weed management programs for specialty grains

Summary of Results for 2006:  Three field experiments have been established, including nine low linolenic acid soybean varieties and five specialty corn hybrids, to investigate the potential for crop phytotoxicity and overall weed control from a number of herbicides applied PE and POST. Data collection is underway and information will be tabulated at harvest. In 2005, three experiments included 15 popcorn varieties which were evaluated for sensitivity to herbicides.

Experiments are established to investigate management tactics on several weeds which are becoming increasingly difficult to manage with glyphosate in glyphosate resistant crops. These experiments were also conducted in 2005.

A number of field-scale evaluations of weed management programs were established throughout Iowa and differences in weed populations will be determined.

Publications and Other Activities:  The final report of the National Glyphosate Stewardship Forum was submitted. The report can be viewed at [http://www.weeds.iastate.edu/weednews/2006/NGSF.htm](http://www.weeds.iastate.edu/weednews/2006/NGSF.htm). Also, a series of regional publications that address several issues in weed management for glyphosate resistant crops was initiated. Two of these are now available and can be found at [http://www.weeds.iastate.edu/mgmt/2006/NCWSSglystewardship.htm](http://www.weeds.iastate.edu/mgmt/2006/NCWSSglystewardship.htm). Finally, a report to the Popcorn Board on the effects of herbicides on popcorn hybrids was submitted.

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