

# Partnership Matters

ISU Research and Extension

PARTNER  
IOWA STATE UNIVERSITY  
CORN AND SOYBEAN  
INITIATIVE

August 2006

## RESEARCH BRIEF—

### Biofuel fuels development

**What's new.** The use of corn-based ethanol is nothing new—Model “T” Fords were powered by ethanol a century ago. But the constant demand for fuels is driving renewed interest in the economically effective production of ethanol. Iowa has taken the national lead in corn-based ethanol production, with new plants springing up rapidly. Energy will remain a constant concern, and the development of additional ethanol production capacity should continue. This expanding industry will provide Iowa agriculture with a growing additional market for corn and provide high protein and mineral concentrates in the form of byproduct distillers grains.

**ISU research.** Biofuel research at Iowa State has ramped up to explore improving the efficiency of production and use of new feedstocks. However, understanding the market demands and community dynamics generated by ethanol production plants also is important. To date,

25 Iowa ethanol plants are in production with approximately 30 more in various stages of planning and construction. Iowa's ethanol plants are expected to produce 1.6 billion gallons of ethanol in 2006.

Connie Hardy of Iowa State University Extension's Value Added Agriculture program is conducting a survey of ethanol plants in Iowa to learn about their needs for corn quality and quantity, and to learn if they plan to acquire most of the corn directly from farmers or from other grain-handling facilities. This information will ultimately help guide the industry about whether to encourage building more on-farm grain storage in certain parts of the state and what grain management education might be needed to help farmers keep the corn in the best processing condition. The survey also asks, in general, how much distillers dried grains (DDG) are produced and what percentage is currently used in Iowa. This could indicate how much additional Iowa livestock production might be encouraged using the available distillers grains. In 2006 nearly 500 million bushels of corn will be used in Iowa to make ethanol, and 4.3 million tons of distillers grains will be produced. By 2008, if the newly announced plants come online, these figures will more than double.

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## RESEARCH BRIEF—

### Stewart's disease

**What's new.** Stewart's disease, also called Stewart's wilt, is a bacterial disease that infects corn in Iowa. The bacterium that causes the disease survives overwinter in the gut of corn flea beetles that then can carry the organism from plant to plant by feeding on corn leaf tissue. Spring damage to corn seedlings can lead to the wilt phase of the disease, sometimes causing stand loss. The disease also shows up as leaf lesions in July and August. Severe infections reduce leaf photosynthetic capacity and can interfere with the vascular system of the plant, reducing yields. Also, infected plants can pass the bacteria to seed, leading to seedborne transmission of Stewart's disease.

Economically significant losses from Stewart's disease are uncommon in hybrid field corn. However, in seed corn, losses can be greater, and also there are international trade restrictions on corn infected with the Stewart's bacterium. Currently, the impact of Stewart's disease in Iowa arises in two major ways: direct yield losses in seed corn, sweet corn and popcorn due to leaf blighting and sometimes plant death, and losses to the corn seed industry due to costs of testing and the potential loss of exports to markets in countries where Stewart's disease is not present.



**ISU research.** Outbreaks of Stewart's disease are nearly always associated with corn flea beetle activity. Recent research at Iowa State University establishes an improved predictive model based on the winter survival potential of corn flea beetle. This model allows for forecasting the potential for Stewart's wilt infection prior to planting, allowing producers to employ better management options.

Warm temperatures in December, January and February (monthly averages above 24 °F) favor increased survival of flea beetles, so by calculating weather conditions for the winter months, the relative risk of flea beetle damage and transmission of Stewart's disease to seedling corn can be predicted. Each month that has an average temperature above 24 °F means increased risk of disease.

Research is continuing at Iowa State University to identify resistant corn lines to improve hybrids. This research centers on developing resistant inbred lines to incorporate into corn breeding programs. Charles Block, ISU plant pathologist at the USDA North Central Plant Introduction Station in Ames, is conducting ongoing field screening

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## Biofuel fuels development, continued—

Plant managers have indicated that there is a need for more on-farm storage as many of the plants depend on farmer deliveries for at least 20 percent of the corn they process. Some offer price incentives for scheduling corn deliveries throughout the year. A significant amount of DDG is shipped out of state for export that could conceivably be used in Iowa to expand livestock production. Individual plants determine how much of the distillers grains to dry depending on their markets, and many are encouraging long-term contracts with livestock producers. Although the main users are beef cattle and dairy producers, some ethanol plants are supplying DDGs to swine and poultry producers. A few are exploring other uses, such as pet food and human food ingredients and reusing it as fuel for the ethanol processing operation.

The Extension Value Added Agriculture staff will analyze the survey data to measure impacts of growth on the ethanol industry and its input supply chain and will develop analytical tools to track trends within the industry.

Information is constantly changing in this rapidly expanding industry. Currently, key issues for plant managers and investors include:

- Acquiring enough corn at an affordable price to keep plants running at capacity
- Finding markets for the distillers grains
- Maintaining consistent nutrient levels in distillers grains
- Finding technical and managerial staff with engineering skills and life sciences background to operate plants
- Having enough rail service to ship ethanol and distillers grains
- Compliance with evolving environmental regulations

**Learn more.** Survey results will be completed this fall and will be available through the Iowa Grain Quality Initiative website at [www.iowagrains.org](http://www.iowagrains.org). The project is supported by the Iowa Corn Promotion Board. Connie Hardy may be contacted directly at 515-294-8519 or by e-mail at [chardy@iastate.edu](mailto:chardy@iastate.edu).

## Stewart's disease, continued—

of corn seed stocks, mainly inbred lines, held in the National Plant Germplasm System corn collection at Ames. The plants are inoculated with the bacterium that cause Stewart's disease and are rated for disease resistance on a 1–9 scale. In the past five years, more than 1,500 accessions have been screened.

**What's next.** Studies are planned to determine how long corn flea beetles are able to transmit the disease after acquiring the bacteria. Understanding that can help in knowing about the dynamics of the disease, and from that scouting and management practices can be improved. In addition, screening of inbred lines for Stewart's disease resistance will continue.

**Learn more.** The test descriptions and results from inbred line resistance work are available online on the Germplasm Resources Information Network (GRIN) database at [www.ars-grin.gov/cgi-bin/npgs/html/desc.pl?89058](http://www.ars-grin.gov/cgi-bin/npgs/html/desc.pl?89058).

## ISU PROFILE —

### Mark Licht

Extension field crops specialist

#### Origin

- Clare, Iowa (Webster County)

#### Training

- B.S., agronomy and agricultural extension education (double major), Iowa State University, 2000
- M.S., soil science (management and conservation), Iowa State University, 2003



#### At ISU

- Extension field crops specialist, August 2006–present
- Extension program specialist, October 2002–August 2006

#### Notable achievements

- Developed a rainfall simulator to illustrate the value of crop residue and permanent vegetation on protecting soil and water quality.
- Played a key role in beginning the Iowa Learning Farm, a project to promote and increase the awareness of conservation systems to improve water quality in Iowa.
- Established a statewide on-farm network of more than 30 cooperators to demonstrate the use of conservation tillage, cover crops, extended rotations and nutrient timing and placement.

#### Personal

- Enjoy spending free time in the fast-paced activities of my 1-year-old son, William, and with my wife, Melea.
- Hobbies include biking, watching baseball, home improvement projects, gardening and traveling.

#### Quotable quote

“Iowa is the leading corn and soybean state due largely to its highly productive soils. For this reason, I feel it is important to be conscious of how our management practices affect soil quality, allowing the soils to remain highly productive for future generations.”

## ISU BY THE NUMBERS —



### Corn Insect Research Project

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|--|---|
| First year of corn insect research project.....              | 1959  |
| Number of student summer workers.....                        | 10  |
| Iowa miles traveled by workers in field research, 2006 ..... | over 6,000  |
| Insect species studied in 2006 .....                         | 5<br>(northern/western corn rootworms, seedcorn maggot, wireworm, colaspis beetles)                   |
| Corn roots rated in 30 years.....                            | over 200,000  |
| Possible number of corn rootworm eggs laid in 80 acres ..... | 13,500,000,000<br>(35,000 plants per acre, 6 female beetles per plant, 800 eggs per female, 80 acres) |

For more information, contact Jon Tollefson at Iowa State University's Department of Entomology; phone 515-294-1101 or e-mail [tolly@iastate.edu](mailto:tolly@iastate.edu).

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#### ... and justice for all

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