Partnership Matters

PARTNER
IOWA STATE UNIVERSITY
CORN AND SOYBEAN
INITIATIVE

March 2006

RESEARCH BRIEF—

Tillage system research

What's new. Although tillage is integral to crop production, continuing questions arise about the effects of tillage practices in corn and soybean production as other elements of the cropping systems change. The tillage systems most common in Iowa include:

- "conventional" tillage that includes chisel plowing in either fall or spring before planting,
- moldboard plow,
- strip tillage, where tillage is done in strips associated with the row, effectively leaving the bulk field area untilled,
- fall subsoiling (ripping), and
- no-till.

ISU research. Mark Hanna, extension agricultural and biosystems engineer, and Mahdi Al-Kaisi, assistant professor of agronomy, have collaborated in establishing field research sites primarily at ISU outlying research and demonstration farms examining crop responses in side-by-side tillage system plots for the five types mentioned above. The first site began in 1997 at the ISU Agronomy and Agricultural Engineering Farm east of Boone. Since then, research followed at the Northern Research and Demonstration Farm in Kanawha in 2000, and was expanded in 2003 to the McNay (Chariton), Western (Castana), Northeast (Nashua), and Southeast (Crawfordsville) Research and Demonstration Farm sites, geographically covering most of Iowa. Although most trials were in a corn-soybean rotation, there are a few examining second-year corn in a corn-corn-soybean rotation.

Fall subsoiler in action.

What's next. Research will continue with annual data adding to our understanding of crop responses under different tillage systems.

Learn more. Results of the research are presented in the annual reports of participating outlying research and demonstration farms.

—*continued*

RESEARCH BRIEF—

Phytophthora root and stem rot

What's new. Phytophthora root rot, caused by *Phytophthora sojae,* is a common problem on soybean in Iowa. Resistant varieties are the most economical and effective management tool available to growers. Surveys done from 1991 to 1994 and 2001 to 2002 by researchers at Iowa State University showed that numerous races of *P. sojae* exist within the state. In addition, a population shift of the fungus in Iowa was detected in the 2001 to 2002 survey, which showed races that are virulent on varieties containing the Rps1k gene were becoming increasingly common.

ISU research. In the previous surveys, only a few samples were collected from each field for isolation of *P. sojae* and a single race identified. It is possible that a number of races could exist within a single field. This within-field diversity of *P. sojae* has not been assessed in Iowa. Alison Robertson and Sarah Cerra in the Department of Plant Pathology, and Silvia Cianzio in the Department of Agronomy, with funding from the North Central Soybean Research Program, are intensively surveying individual soybean fields with a history of Phytophthora root and stem rot across the state. *P. sojae* is isolated from soil samples and the race profile of the isolates determined. This information is important for plant breeders. If the within-field population of *P. sojae* in Iowa is highly diverse, it will justify the use of varieties that have a major gene for resistance and genes for partial resistance.

—*continued*

Soybean fields in Iowa are commonly affected by Phytophthora root rot.

Tillage system research, *continued—*

McNay
http://www.ag.iastate.edu/farms/04reports/mcnay/LongtermTillage.pdf
Northeast
http://www.ag.iastate.edu/farms/04reports/ne/EffectsofLongtermTillage.pdf
Southeast
http://www.ag.iastate.edu/farms/04reports/se/EffectsofLongtermTillage.pdf
Western
http://www.ag.iastate.edu/farms/04reports/w/LongtermTillage.pdf

Information about the effects of long-term tillage systems on carbon sequestration and other factors is also available at the Iowa Learning Farms research reports site, **http://www.extension.iastate.edu/Publications/PM1871.pdf.** Results are available on an as-needed basis for programming by contacting Mark Hanna (**hmhanna@iastate.edu**) or Mahdi Al-Kaisi (**malkaisi@iastate.edu**).

ISU PROFILE—

Clarke McGrath

Extension field crops specialist,
ISU Armstrong Research and
Demonstration Farm, Lewis

Origin

Raised on two farms in southwest Iowa and then family moved to a farm in northeast Nebraska

Training

- B.S., agribusiness/agronomy, Iowa State University
- Facility manager/technical agronomist, Agriland FS for 8 years
- Growmark FS system PRO-TRACK agronomy and sales training throughout Agriland career
- Completing master's in agriculture, spring 2006

At ISU

- Provide technical assistance to SW Iowa clients (producers, ag retailers, industry representatives and agronomists)
- Involved with many applied research and demonstration projects

Notable achievements

- Certified crop adviser, 1994–present
- Growmark certified crop specialist, 1993–2000
- Won 17 Gromark agronomy sales awards
- Past president/current vice president, Pottawattamie Co. Iowa Corn Growers Association

Personal

- Wife Meg, science teacher for Harlan Community High School, daughters Bailey (12) and Maggie (7)
- Certified Iowa High School Athletics Association football official, 1999–present
- Enjoy coaching daughters in several youth league sports, playing basketball, strength/conditioning training, jeeping and hiking in the Colorado Rockies

Quotable quote

"Timeliness, accuracy, and applicability of agronomic information are what today's input suppliers and crop producers want from service and information providers such as ISU. Working to meet and exceed these expectations helped to make my retail career so successful, and the same objectives have translated well in serving the clients of ISU."

Phytophthora root and stem rot, *continued—*

What's next. Since the *P. sojae* populations appear to be continuously changing, it is imperative that novel and effective resistance genes are discovered. A selection of *Phytophthora* isolates collected during this study will be used to inoculate 32 soybean breeding lines that have shown promise as new sources of resistance and partial resistance to *P. sojae*. Accessions that have potential for Phytophthora resistance for Iowa soybean producers will then be incorporated into soybean breeding programs.

Learn more. A website highlighting the research is being designed and will be in place in spring 2006.

ISU BY THE NUMBERS—

Diagnostician Laura Jesse at the Iowa Insect Diagnostic Clinic, 104 Insectary.

Iowa Insect Diagnostic Clinic

Number of insect diagnostic contacts in 2005	3,811
Number of samples delivered to the clinic	925
Number of diagnosticians	4
First report of Asian multicolored lady beetles in Iowa (Boone and Story Co.)	1995
Number of lady beetles reported in the Oklahoma City *Daily Oklahoman* as attending the ISU-OU football game in 2003	5,000,000,000
First report of western corn rootworm in Iowa (Montgomery and Mills Co.)	1953
First formal entomology program at ISU	1880

To contact the Iowa Insect Diagnostic Clinic call 1-515-294-BUGS (2847) or e-mail **insects@iastate.edu**.

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