

Partnership Matters

ISU Research and Extension

April 2007



RESEARCH BRIEF —

Foliar application techniques on soybean

What's new. Iowa pesticide applicators are very experienced with applying herbicides to row crops. With the discovery of Asian soybean rust in the southern United States in fall 2004, fungicide application to soybean became a distinct possibility for many growers. Spray techniques commonly used for herbicides (e.g., low application volumes, coarse droplet size) may be inappropriate for fungicide applications to control a disease that first develops low in the soybean canopy.

Fungicide application techniques designed to increase deposition on lower parts of the plant canopy have been studied on other crops. For example, in broadleaf vegetable and horticultural crops, smaller droplet sizes and nozzles with multiple orifices are used to deliver fungicide deep in the canopy. Insecticide application work on cotton suggested smaller droplet sizes and the use of an air-assisted sprayer aid in delivering pesticide into lower parts of the plant canopy.



Drop cards in the canopy measure droplet size (top). An air-assisted sprayer places pesticide in the lower parts of the plant canopy (bottom).

ISU research. ISU Extension personnel Mark Hanna (agricultural and biosystems engineer), Alison Robertson (plant pathologist), and Mark Carlton (field specialist—crops) conducted research in collaboration with Bob Wolf (Kansas State University agricultural engineer) to compare five different foliar pesticide application techniques at Boone (30" rows) and Chariton, Iowa (15" rows) in 2005 and 2006.

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RESEARCH BRIEF —

New tool: Rotation Profitability Calculator

What's new. The recent upswing in ethanol production and the planned expansion in corn acres could significantly shift the demand for corn. So it is April in Iowa, and yet some producers are still deciding how much acreage should be planted to corn versus soybean. The total acres planted to the principal crops in Iowa have been relatively constant over the past 70 years, and corn acreage has stayed quite consistent, accounting for about half of the row-crop acres planted in the state. Corn has never accounted for more than 55 percent (in 1976) of Iowa's row-crop acres in the past 75 years, and in recent years, the numbers of acres devoted to corn and soybean in Iowa have been converging. However, on March 30, 2007, the U.S. Department of Agriculture issued a survey of crop planting intentions for 2007 and the report forecast a 10 percent increase in Iowa corn acreage over last year, to 13.9 million acres, with a 9 percent reduction in soybean acreage.



The debate among growers: Corn or soybean?

ISU research. ISU economists Mike Duffy and David Correll have developed a tool to help producers and agribusiness personnel examine profitability of three cropping rotations: corn-soybean, corn-corn-soybean and continuous corn. The Rotation Profitability Calculator allows a producer to plug in reasonably expected crop yields and the anticipated per-bushel prices at harvest, along with crop nutrient, labor and land charges, to forecast potential profitability from different crop patterns. Although planting is underway or imminent now, the tool is a handy way to consider management options as the growing season unfolds and also can help for planning in future years.

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Foliar application techniques on soybean, *continued*—

Application techniques included “high-rate” (20 gal/acre, fine droplet); “low-rate” (12 gal/acre, fine droplet); “herbicide-style” (18 gal/acre, coarse droplet); “air-assist” (with 20 gal/acre, fine droplet); and “turbo duo” (20 gal/acre, medium droplet). Measurements included droplet size, droplet coverage and foliar disease severity in the top, middle and lower parts of the plant canopy and soybean yield. Application was delayed until early August to observe penetration into a full plant canopy. Droplet size for application treatments generally followed manufacturer specifications. Deposition differences among treatments (percentage area covered and drops/cm² of leaf area) were sometimes present but were not as great as expected. As expected, there was greater droplet coverage at the top of the canopy than at the middle or bottom. Foliar disease pressure was light in 2005 and moderate in 2006, and disease severity was generally unaffected by application method and no different than an area that did not receive fungicide application. Yield was unaffected by application technique with an early August application.

What’s next. Analysis of deposition data for the second year is ongoing. Detailed results and conclusions will be presented when available at ISU Extension field days and meetings.

Learn more. Visit the Extension Agricultural and Biosystems Engineering field machinery website at www.abe.iastate.edu/machinery for more information on application and other field equipment issues. For specific questions on application techniques, contact Mark Hanna at hmhanna@iastate.edu or (515) 294-0468.

BY THE NUMBERS —

Crop production and protection support

Agribusiness Education Program.....	(515) 294-6429
summers.....	(515) 432-9548
Agricultural and Biosystems Engineering Extension	(515) 294-1434
Agronomy Extension	(515) 294-1923
Entomology Extension.....	(515) 294-1101
Herbicide injury questions.....	(515) 294-1923
Insect Diagnostic Laboratory	(515) 294-BUGS (2847)
Pesticide certification training programs.....	(515) 294-1101
Pesticide licensing issues (Iowa Department of Agriculture and Land Stewardship).....	(515) 281-8591
Plant Disease Clinic.....	(515) 294-0581
Plant Pathology Extension.....	(515) 294-1160
Seed Science Center	(515) 294-6821
Soil and Plant Analysis Laboratory.....	(515) 294-3076

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To learn more about the Corn and Soybean Initiative contact:

Greg Tylka gtylka@iastate.edu (515) 294-3021
Rich Pope ropope@iastate.edu (515) 294-5899

For questions or comments about the newsletter, contact:

Keven Arrowsmith karrows@iastate.edu (515) 294-2405

... and justice for all

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New tool: Rotation Profitability Calculator, *continued*—

The calculator, part of the Ag Decision Maker program at ISU, is in an easy-to-use spreadsheet format that can be downloaded at www.extension.iastate.edu/agdm/crops/xls/a1-80rotationprofitabilitycalculator.xls. In the tool, producer’s own input values are used to calculate the return to management under each rotation and results are shown graphically. The break-even prices calculated are the corn prices that would be necessary to make the return to management equal between the corn-soybean rotation and the other rotations. Input costs in the program are determined and published annually in ISU Extension publication FM 1712, *Estimated Costs of Crop Production in Iowa*, available online at www.extension.iastate.edu/Publications/FM1712.pdf.

What’s next. Changes over the next few years will dramatically influence Iowa’s cropping pattern. Using tools such as the Rotation Profitability Calculator, growers and those advising growers should carefully evaluate the options when assessing new cropping opportunities.

Learn more. For more information on this topic, contact Mike Duffy at (515) 294-6160 or visit the Ag Decision Maker webpage at www.extension.iastate.edu/agdm.

ISU PROFILE —

Elwynn Taylor

Extension climatologist



Origin

- Native of Utah
- Strong interest from childhood in weather and its impacts on crops, animals and people

Training

- Ph.D., biology, Washington University, 1970
- B.S., botany, Utah State University, 1966

At ISU

- Professor of agronomy/extension climatologist, 1979–present

Notable achievements

- Governor’s Crop Condition Task Force, 1988–present
- Iowa Farm Bureau Distinguished Service to Agriculture award, 2003
- Outstanding Extension National Contribution, American Agricultural Economics Association (co-recipient), 2000
- ISU Extension Meritorious Service Award, 1989
- Recognized in *Who’s Who in Science* and *Who’s Who in the Midwest*
- Co-developed predictive models on black cutworm migration
- Designed and directed implementation of the “Iowa Crop Advisory Network,” which has evolved into several commercial services, including Data Transmission Network (DTN)
- Regular broadcaster of time-sensitive weather and crop production information with Iowa Public Radio station WOI-AM
- Popular speaker; deliver 140+ invited presentations each year (to more than 17,000 people)

Personal

- Enjoy baking homemade whole wheat bread, Dutch oven cooking, hiking, biking and jogging

Quotable quote

“Farming is the foundation of civilization: Without agriculture, we would have no culture at all.”