

Partnership Matters



RESEARCH BRIEF —

Soybean seeding rates matter

What's new. One goal for soybean growers is to choose planting populations that maximize both yield and profitability. An excessive seeding rate adds extra seed cost without producing corresponding yield increases. In the past, soybean seed was relatively inexpensive, and planting extra seeds not only helped ensure good emergence and stand establishment but also served as a tool for weed management at a relatively low cost. However, with higher cost seed beans of today, using reduced soybean planting rates that maintain yields is a good starting place to lower input costs, therefore enhancing economic yield.

ISU research. Since 2003, ISU soybean extension agronomist Palle Pedersen has conducted 34 experiments funded with checkoff funds from the Iowa Soybean Association to determine the optimum economic soybean seeding rate for Iowa. If a good seedbed can be prepared, soybean planting rates should be able to be lowered. Results of the work consistently indicate that, in general, only 100,000 uniformly distributed plants per acre at harvest are needed to attain maximum yield in Iowa under most conditions. With row spacing of 15, 20, 22, 30, and 36 inches, only 125,000 to 140,000 viable seeds need to be planted per acre if seedbed conditions are good. But growers need to be expert crop managers to achieve the necessary final plant populations for maximum yields using reduced seeding rates. Agronomic management problems to watch for include planting into a poor seedbed, improperly setting planters, planting too deep, or planting poor quality seed. Also, timing of herbicide application will be critical with reduced planting rates.

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Pedersen's research focuses on the optimum economic soybean seeding rate for Iowa.

CURRENT ISSUE —

Using manure on soybean ground

This month, the Environmental Protection Commission (EPC) directed the Iowa Department of Natural Resources (DNR) to develop a proposed rule that would ban using liquid manure on land to be planted to soybean. Iowa State University has provided input on the issue from James Baker, emeritus university professor in agricultural and biosystems engineering, and John Sawyer, associate professor of agronomy and ISU Extension fertility specialist. Below are some key points on the issue provided by ISU to the EPC, based on information compiled by Sawyer.

- The issue of applying manure to grow soybeans should include careful consideration of the amount of nitrogen (N) acquired by the plant both from the soil and from symbiotic fixation. In other words, what is the N source and amount that could be substituted with manure N? Because the soil N supply cannot be changed, it should be related to the N that would not be fixed due to manure application.
- Currently, Iowa DNR manure plans allow a manure N rate based on the removal of 3.8 lb N/bu in harvested soybean grain. With a reasonable soybean crop, this application would approach 200 lb N/acre, an amount that is more than the N typically fixed by soybean. Basing the rate on N in grain assumes that most of the plant N is fixed and ignores N derived from the soil.
- Is 3.8 lb N/bu from the harvested crop the most appropriate value? Recent Iowa State research data indicate 3.1 to 3.4 lb N/bu in soybean grain is more accurate.
- Is the currently allowed manure N application rate excessive? Preliminary results using liquid swine manure at Iowa State's Nashua water quality research site show the effect—more nitrate in the tile flow—from using 200 lb total manure-N/acre for soybean.
- Soybean plants will compensate for any shortage of N supply from the soil, or applied manure, by fixing N. So, using a more moderate manure N rate—one that equals or is less than the total amount of N typically fixed—should not negatively influence soybean production.
- Rather than eliminating the option to apply manure, a reasonable approach would be to consider a manure rate related to compensating for the N that would not be fixed when manure is applied. Depending on the soil and soybean yield, this amount could be in the 100 to 125 lb N/acre range. Recent field trial research with liquid swine manure indicates this N rate will limit residual nitrate in the soil

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Soybean seeding rates matter, *continued*—

What's next. Pedersen will continue conducting the experiments across the state in 2006. Additionally, Pedersen initiated a new research project in 2005 to assess the value of seed treatments used in conjunction with reduced soybean seeding rates since each seed planted is more important with reduced planting rates. Pedersen is also studying soybean growth and development at different plant populations. One of the perceptions about low plant populations is that yields are the same as with higher plant populations because plants that are less crowded can add branches in early July and that the additional branching allows for more pod set that compensates for lower plant populations. Data collected from these experiments will reveal how yield is maintained.

Learn more. For more information on agronomic issues related to soybean production go to www.soybeanmanagement.info.

Using manure on soybean ground, *continued*—

profile after harvest. With consideration of this N rate, manure application also could be P-based.

- This moderate-rate approach would allow soybean growers to continue to use valuable manure applications, minimize the potential for nitrate reaching surface water systems and gain desired agronomic benefits—increased yield, supply of nutrients such as phosphorus and potassium and less impact on soil erosion when injected into cornstalks.
- If manure is restricted to corn ground, the adverse environmental effect of increased nitrate in water may not change because the same amount of manure will be applied. Application may go on second-year or continuous corn, which, at the rates applied for those rotations, could have the same effect on nitrate in surface water systems.
- Further research would better document soybean production enhancement from manure application and the impact on nitrate in the soil and in water leaving fields.

ISU BY THE NUMBERS —

North Central Region Plant Introduction Station (NCRPIS)

United States Department of Agriculture, Iowa State University cooperating

NCRPIS is one of four USDA facilities in the nation to preserve genetic material for future plant breeding efforts. Genetics are preserved for crops like corn and amaranth, among others.

Year the PI Station system was founded	1948
Full-time staff at the NCRPIS.....	35
Seed packets distributed by NCRPIS to researchers yearly (approximate).....	20,000
Guinness world record currently held at NCRPIS (tallest amaranth, 15.12 ft.).....	1
U.S. sites holding the corn repository.....	1
Number of corn and corn "kin" strains at the NCRPIS (2004)	18,327
Total number of plant strains, all species, preserved in the NCRPIS	47,925
Percent of the NCRPIS collection that is corn and close corn relatives	38.2

For more information, visit

www.ars.usda.gov/main/site_main.htm?modecode=36-25-12-00/.

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To learn more about the Corn and Soybean Initiative contact

Greg Tylka	gtlylka@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
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ISU PROFILE —

Virgil Schmitt

Extension field crops specialist, southeast Iowa

Origin

Born and raised on a small beef, swine and crops farm in Muscatine County

Training

B.S. and M.S., agricultural education (emphasis in agronomy), Iowa State University



At ISU

- Extension crops specialist (Cedar, Clinton, Des Moines, Henry, Jackson, Louisa, Muscatine and Scott counties), 1992–present
- Conduct applied research at the Andrew Jackson Demonstration Farm and several ISU research and demonstration farms
- Extension agriculturalist, Linn County, 1988–1992
- 4-H and youth leader, Butler and Grundy counties, 1973–1976

Notable achievements

- National Association of County Agricultural Agents Distinguished Service Award, 2006
- ISU Extension Excellence in Agricultural Extension Programs—Crops Award, 2004
- FFA Distinguished Service Award, 1987

Personal

- Enjoy my job and also working on and spending time at my own farm
- Experiment with new technologies to help clients or me do more or better
- Like to travel

Quotable quote

“The major advantage corporate farms have over family farms is that corporate farms are better information managers. To quote Gregg Carlson at South Dakota State University, ‘The future of information management will be to use yield data, soil and plant analysis data, remotely sensed data, and field scout data combined with good analytical reasoning to make decisions maximizing farm profitability.’”

ANNOUNCEMENT —

Soybean Rust First Detector training

The Iowa Soybean Rust Team would like to enlist the help of Iowa Certified Crop Advisers, Certified Professional Agronomists and other crop production professionals in detection of soybean rust. A training for new First Detectors is being offered on Tuesday, June 20, 2006, at the Field Extension Education Laboratory (FEEL), 5 miles west of Ames. There is a \$20 registration fee for this program. No preregistration is required. Cash, checks and credit card payments will be taken at the door. For questions about this program, call 515-432-9548 or e-mail aep@iastate.edu. Additional information is available at www.aep.iastate.edu.

... and justice for all

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