

Cover Crops: Widespread Adoption or Niche Conservation Practice?



Jeremy Singer
Research Agronomist



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Survey Goals

- Quantify cover crop use in the Corn Belt.
- Identify impediments to adoption.
- Obtain greater knowledge about management practices.

A Survey of Farming Practices and Cover Crop Use Iowa State University



For each question that follows, please circle the number that best represents your answer.

Background

- 1a. This year, in 2006, are you farming full-time, part-time, or not at all?
- 1 = Farming full-time
 - 2 = Farming part-time
 - 3 = Do not farm at all
- b. If not at all, have you farmed in the last 5 years?
- 1 = Yes (Please continue)
 - 2 = No (Please return the survey in the envelope provided.)
2. About how many years have you been farming (in charge of the operation)? _____ years
- 3a. Are you also currently employed off the farm?
- 1 = Yes
 - 2 = No
- b. If yes, how many hours per week do you work off the farm? _____ hrs/week
4. What county do you live in? _____ County
5. What is your current age? _____ years
6. Are you male or female?
- 1 = Male
 - 2 = Female
7. What is the highest level of education you have completed?
- 1 = Eleventh grade or less
 - 2 = High School (includes GED)
 - 3 = Vocational or technical diploma/certificate
 - 4 = Some college but no Bachelor's Degree
 - 5 = B.A., B.S., or equivalent
 - 6 = Graduate Degree, Master's, Ph.D., M.D., etc.

-We developed a survey tool with 43 questions.

-Cover crops were defined as: grasses, legumes or small grains **grown between regular grain crop production periods** for the purpose of protecting and improving the soil. These crops are usually planted after harvest of the regular grain crop in the fall and killed before planting the next one in the spring.



Cover Crop Survey Results

- 3500 producers in IL, IN, IA, and MN (875 in each state).
- 36% overall response rate (Illinois 33.9%, Indiana 33.6, Iowa 42.1, and Minnesota 35.0).
- 18% had ever used cover crops.
- 11% used cover crops within past 5 years.
- 8% planted cover crops on their farm in the fall of 2005 (only on 6% of land). Only 4.8% (2.4, 7.2) in IA.
- Greater use in IL and IN.
- 80% using conservation practices.
- 43% using conservation practices with cost sharing, 57% w/out.

Survey Results Con't

Reasons for not using cover crops included:

- Too much time involved (34.8%).
- Too costly (27.4%).
- Do not have a runoff problem (28.1%).
- Already use no-till practices (38.6%).
- Do not know enough about them (39.5%).

Survey Results Con't

Table 5. Means and standard errors (SE) for the explanatory variables used in the logistic regression model for Illinois, Indiana, Iowa, and Minnesota.

Variable	Illinois			Indiana			Iowa			Minnesota		
	<i>n</i>	Mean	SE	<i>n</i>	Mean	SE	<i>n</i>	Mean	SE	<i>n</i>	Mean	SE
Years farming	251	33.2	0.8	250	33.5	0.8	309	32.7	0.7	265	31.9	0.8
Percent with more than high school education	257	59.1	3.1	251	59.8	3.1	316	46.4	2.8	268	55.6	3.0
Percent of land owned	252	54.4	6.1	247	62.4	3.4	308	59.1	2.9	261	68.3	3.5
Number of crops	248	2.62	0.06	243	2.65	0.07	299	2.55	0.05	260	2.65	0.06
Percent enrolled in government program	251	49.8	3.2	241	45.2	3.2	313	59.1	2.8	259	52.8	3.1
Percent perceived soil improvement	231	80.1	2.6	234	79.9	2.6	274	70.9	2.7	237	76.8	2.7
Percent perceived yield advantage	231	32.0	3.1	234	35.4	3.1	274	17.9	2.3	237	27.9	2.9
Percent perceived soil water advantage	231	96.5	1.2	234	97.4	1.0	274	99.3	0.5	237	97.0	1.1

Survey Results Con't

Table 6. Descriptive statistics and significance tests for farmers in the study region who used cover crops compared to farmers who never used cover crops.

Variable	Used Cover Crops			Never Used Cover Crops			Z-statistic	p-value
	<i>n</i>	Mean	SE	<i>n</i>	Mean	SE		
Acres farmed	200	883	73	870	742	28	1.79	0.07
Number of crops	192	3.12	0.08	843	2.51	0.03	7.26	< 0.001
Percent who implemented conservation practices	167	86.0	2.5	674	79.2	1.4	2.37	0.02
Percent receiving incentives who would adopt conservation practices without incentives	43	60.8	5.9	150	56.3	3.1	0.68	0.50
Percent only growing crops	95	47.1	3.6	533	61.3	1.7	-3.57	< 0.001
Percent growing crops and raising livestock	100	51.6	3.6	326	37.9	1.7	3.44	0.001

Survey Results Con't

- Respondents replied minimum payment \$23/acre to plant cover crops.
- 56% said they would use cover crops with cost-sharing.

Singer et al. (2007), J. Soil and Water Conserv.

Survey Results Con't

- 46% of respondents said they need more information about cover crops to make decisions about selection, use, and management.
- Source of information: Coop (13%), other farmers (27%), agribusiness (15%), extension (28%), NRCS (19%), SWCD (28%), ARS (4%).

Percent \pm standard error for cover crops used during the period 2001-2005.

Species	Indiana	Illinois	Iowa	Minnesota
	<hr style="width: 100%; border: 0; border-top: 1px solid black; margin: 0;"/> %			
Cereal Rye	43.8 \pm 6.2	49.9 \pm 7.1	53.3 \pm 9.2	18.4 \pm 6.3
Winter wheat	49.9 \pm 6.3	40.0 \pm 6.9	13.3 \pm 6.3	26.3 \pm 7.2
Winter triticale	3.1 \pm 2.2	0	0	0
Annual ryegrass	9.3 \pm 3.6	15.6 \pm 5.1	16.6 \pm 6.9	15.7 \pm 5.9
Oat	14.0 \pm 4.3	19.9 \pm 5.7	43.3 \pm 9.2	52.6 \pm 8.2
Red Clover	28.0 \pm 5.6	35.9 \pm 6.8	13.3 \pm 6.3	18.4 \pm 6.3
Hairy vetch	4.6 \pm 2.6	11.9 \pm 4.6	3.3 \pm 3.3	2.6 \pm 2.6
Other	11.0 \pm 3.9	7.8 \pm 3.8	6.6 \pm 4.6	21.0 \pm 6.7

Cover crop management

Question	n	——%——
Do you use CC on rented land	22	14.1 ± 2.8
Do you use CC on owned land	75	45.1 ± 3.9
Do you use CC on both	69	40.7 ± 3.9
Establish CC using a drill	119	67.5 ± 3.6
Establish CC using broadcast spreader	39	21.0 ± 1.8
Establish CC by aerial seeding	14	7.8 ± 2.0
Do you use tillage to kill overwintering CC	39	32.9 ± 4.3
Do you use chemicals to kill overwintering CC	65	53.9 ± 4.5
Do you use both to kill overwintering CC	16	13.1 ± 3.1
Do you harvest CC for feed	49	27.2 ± 3.3
Do you harvest CC for other uses	19	10.3 ± 2.3
Do not harvest CC	117	62.3 ± 3.6
Prefer CC that does not winterkill	577	68.4 ± 1.6
Prefer CC that fixes nitrogen	539	64.3 ± 1.6

What did we learn?

- Develop additional educational materials. We need to make using cover crops easy (management, seed sources, etc.).
- Diversified farming operations are more likely to use cover crops.
- Focus on multiple cover crop functions.
- Find management systems that add value.

Iowa Cover Crop Acreage in 2006

Our survey estimated 12,500 acres of cover crops planted in the fall of 2005 in Iowa, which represents 0.0543% of the roughly 23 million acres planted in row crops in 2006.

Ongoing Research

- Compare cover crop nutrient uptake in low vs. high disturbance manure injection systems.



- Quantify fate of manure N and the cumulative effect of coupling manure and cover crops on nutrient cycling.

Using a Rye Cover Crop to Help Manage Beef Feedlot N

- Large feedlots are required to collect runoff water in lagoons
- Field was center pivot irrigated to empty lagoon
- Stockpiled manure was also applied
- Rye was harvested the end of May as silage
- Corn planted for silage

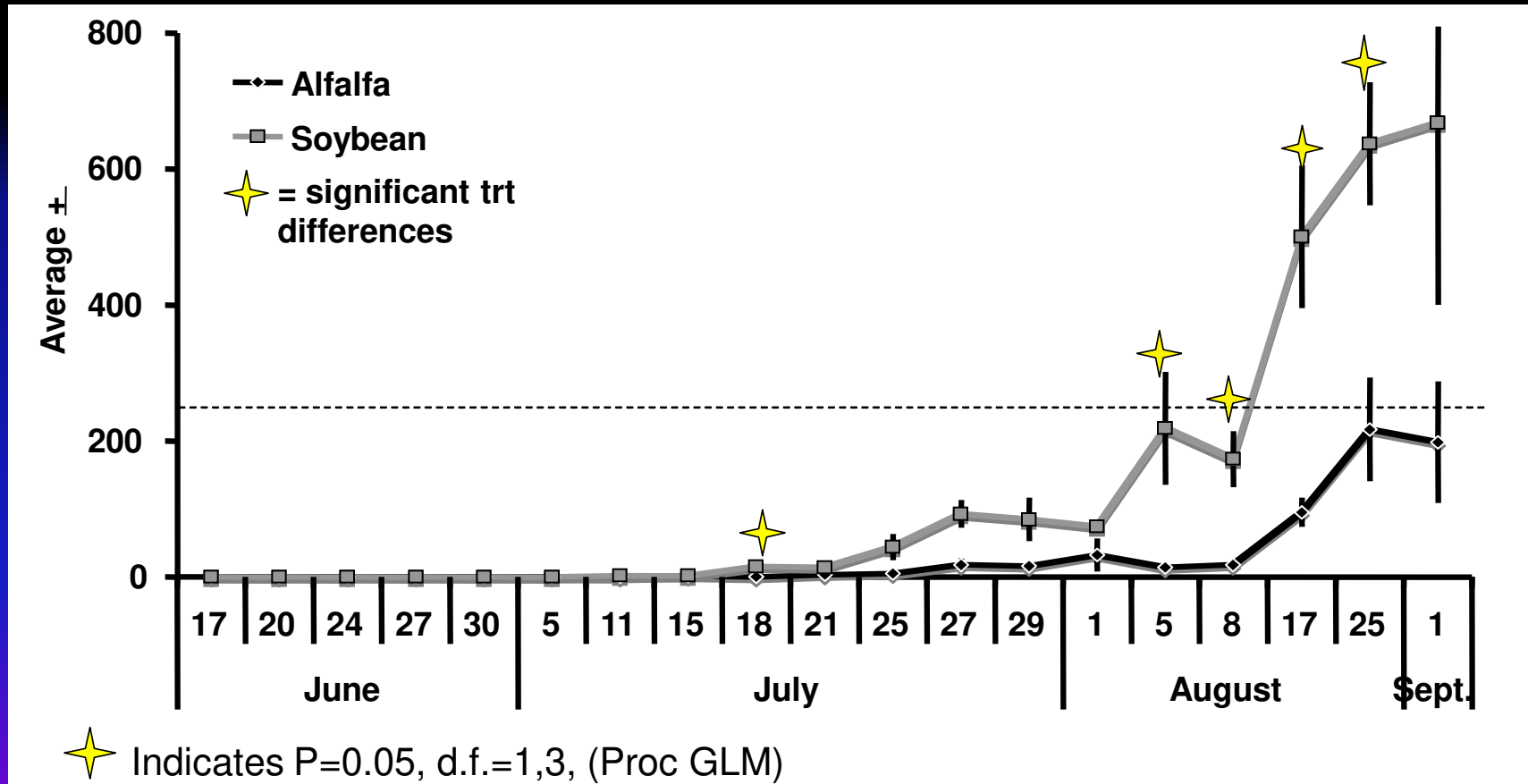


Cover Crop

- Reduced spring soil nitrate from 146 lb N/acre to 33 lb/acre
- Produced 2.9 tons DM/acre containing 200 lb N/acre
- Offers protection from soil erosion after corn silage
- Potentially increases net seasonal silage production



Average Natural Aphid Infestation

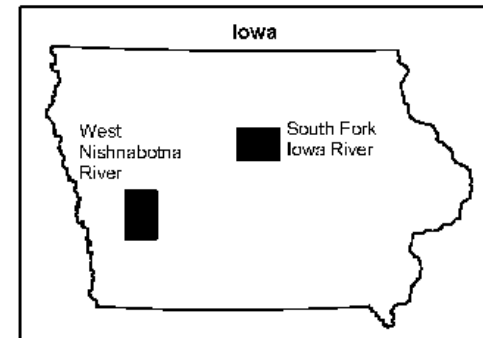


Schmidt et al. (2007), Environmental Entomology



Targeting Cover Crops on the Landscape

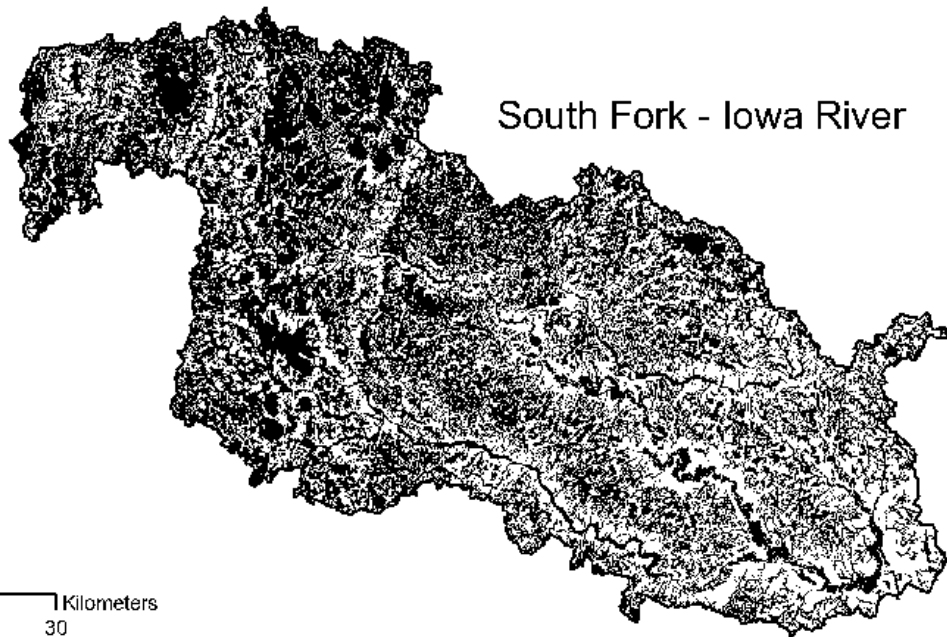
West Nishnabotna River



Highly erodible land

Hydric soils

South Fork - Iowa River



0 5 10 20 30 Kilometers

Figure credit: Mark Tomer, NLAE

Additional Sources of Cover Crop Survey Information

2010
Iowa
Farm
Poll

IOWA COVER CROP ACREAGE INVENTORY

****Fill in info about fall-planted **COVER CROPS** in your area

What county do you farm in? _____

Have you heard of cover crops? _____

Have you ever planted cover crops? _____

*****Help us assess # of **COVER CROP** acres in Iowa*****

How many cover crop acres
did you plant in:

Fall 2006 _____

Fall 2007 _____

Fall 2008 _____

Which species did you plant?

Winter rye _____

Winter wheat _____

Winter canola _____

Winter triticale _____

Winter oat _____

Hairy vetch _____

Red clover _____

Alfalfa _____

Other _____

Please contact Sarah
Carlson, 515-232-5661
x 105, or e-mail sarah@
practicalfarmers.org, if you
have cover crop stories to
share or projects you want
to conduct.

Your name (optional):

How do we Increase Adoption?

- Work with NRCS on cost-sharing and writing standards.
- Quantify benefits at multiple scales.
- Identify early adopters in your communities.
- Work with producers that could adopt w/out significant changes.
- Keep talking and writing.

