

## Midwest Cover Crops Council

### Nebraska Report 2018

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#### Research:

• As part of the Nebraska On-Farm Research Network, thirteen On-Farm Research Projects were conducted across Nebraska to evaluate different issues of cover crops in cropping systems. These projects included research that:

- 1) Evaluates the impact of grazing cover crops on subsequent crop yields
- 2) Impact of cover crops on improving soil health and water quality
- 3) Evaluation of corn relative maturity impact on yields and for improving cover crop establishment

• A SARE Research and Education Grant lead by Humberto Blanc and Mary Drewnoski is evaluating the use of no cover crops, cover crops ungrazed and cover crops grazed and the impact on soil health & crop yields. This is the third year of this study. In 2018 the study will conclude with collection of soil health data and crop yields. Data was quite variable in 2017, with inconsistent treatment effects across experimental sites. There was a trend toward an increase in soil compact due to grazing with the impact on soil water infiltration being variable across sites. There were no negative impacts on grain yields from grazing or harvesting cover crops. Observations indicated cereal rye consistently reduced and suppressed marehail in the cover crop plots compared to the no cover crop plots. Cover crop grazing has limited or no effects on soil physical properties after two years.

• A summary of cover crop research in corn and soybeans jointly funded by the Nebraska Corn Board and the Soybean Commodity Boards. An overview indicated a focus on agronomic aspects of cover crops primarily in corn and soybean systems, with ongoing research in three areas with some results included.

- 1) The first project is “Cover Crop Use in Corn-Soybean Systems”. Katja Koehler-Cole and Roger Elmore. This project is being conducted to determine the feasibility of winter cover cropping in corn-soybean rotations (cover crop performance and effects of crop yields). There are 4 locations across the state, 3 cropping systems, 2 seeding dates and 5 cover crop treatments plus a control. Results of this study indicate:
  - a. Rye most productive, above 1 Mg ha<sup>-1</sup> in most cases; Mix was almost as productive, but mostly rye.
  - b. Early planting doubled biomass production compared to late planting.
  - c. Planting before soybean doubled biomass production compared to planting before corn.
  - d. Legume needs to be planted earlier, killed later for higher productivity.

- e. Cover crops reduced soybean yields in 3 out of 7 site-years.
  - f. High-biomass cover crops lowered corn yields at Concord in both years, but not at the other locations.
  - g. What caused yield penalties- Water use by Cover Crops? Nitrogen Immobilization? Pests?
- 2) A second study “Corn Maturity Selection and Rye Productivity”. Angela Bastidas, Roger Elmore and Chris Proctor. The objective of this study is to assess the effects of planting date, plant population and corn maturity on corn yield and cover crop biomass. Study details include: 10 corn maturities (80 to 115 days), corn planting dates mid-May or early June, rye drilling dates, Sept 22 to Oct 27 (about weekly), measurements: Corn yield (at 18% moisture), Fall & Spring rye biomass, Soybean plant population, plant height, and yield. Selecting earlier maturities allowed for earlier planting of cover crops. Earlier planting = more spring biomass. Next crop soybean.
- a. Fall and spring biomass were affected by drilling date.
  - b. There was a positive linear relationship between biomass and temperature.
  - c. Maximization of biomass takes place at 600 (fall) and 975 (Spring) GDDC.
  - d. Rye planting should occur on or before 20 Sept.
  - e. Early corn hybrids planted by mid-May provided more PAR for cover crop growth when interseeded before corn harvest.
  - f. Changing from late to medium corn hybrids with mid-May planting did not impact corn yield but would allow planting the cover crop 15 days earlier in the late summer.
  - g. Early rye planting provided better establishment before frost and resulted in more spring regrowth and greater biomass production.
  - h. Rye did not affect the following soybean plant population, plant height, or grain yield.

- NRCS and Nebraska Extension’s On-Farm Research Program are partnering together to collect data from 12 Soil Health Demonstration Farms across Nebraska agroecological zones. Various cover crop management strategies are being evaluated and will be compared for a 5-year period. A soil health assessment will be conducted from soil data collected from the NRCS Soil Health Demonstration Farms.

- The Nebraska Grazing Lands Coalition is partnering with the University of Nebraska-Lincoln with grazing systems research across Nebraska. Research is being collected at sites that have incorporated cover crops into grazing system to determine the economic viability and sustainability of these systems.

- Evaluation of No-till vs Tillage Systems with and without cover crops under rainfed conditions in eastern Nebraska. – Paul Jasa, Extension Engineer – Nebraska Extension. A long-term study evaluating the effect of cover crops on crop yields and soil health.

**Extension:**

- As part of the Nebraska Extension’s Crop Diagnostic Clinic Series, A Soil Health Clinic evaluated how cover crops can be used to improve soil health with 41 ag professionals participating.

- Cover Crops were a part of the research and programs presented at four Soybean Management Field Days with 441 people participating.

- An Extension Tour was conducted at the SARE On-Farm Field Site in combination with a tour of the NRCS Demonstration Farm and a Nebraska Grazing Land Coalition’s Cover Crop Research Site. Thirty farmers and ag advisors attended this cover crop/soil health tour.

- Mary Lenz, Animal Science Graduate Student received a SARE Graduate Student Grant to evaluate nitrate levels in cover crops and impact on cattle grazing them.
- Opportunities for Cover Crop Grazing - Conference for Crop/Livestock producers drew 150 farmers/ranchers and ag professionals.
- Nebraska Cover Crop Conference – 275 participants learned about Soil Health & use of cover crops in Corn/SB systems.
- Southeast Nebraska Soil Health Conference- recent conference drew 100 farmers interested in diversified crop/livestock systems that use cover crops.
- NRDs, Extension, & NRCS partnered in a local soil health conference to bring in speaker, Ray Archuleta which brought in 120 participants.
- One of the most important activities in Nebraska was the Development of a Cover Crop Selection Tool. NCR SARE provided funding to help develop a Cover Crop Selection Tool for Nebraska. We have held one face-to-face meeting and six Zoom meetings with Dean Baas facilitating and Extension faculty, UNL Researchers, NRCS and the ag industry participating. We completed the process and the Cover Crop Selection Tool will be available to the public soon.