

Midwest Cover Crop Council

Nebraska 2020 Report

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EXTENSION PRODUCTS:

2021 Guide for Weed, Disease, and Insect Management in Nebraska.

- New section on termination of cover crops for corn & soybeans pp.15-23.

On-Farm Research Results 2020 – Cover Crop Studies pp. 115 – 185.

- 24 cover crop on-farm research studies were conducted in 2020 focusing on:

- Rye cover crop seeding rates, irrigated and non-irrigated
- Cover Crops to improve Water Quality & Soil Health on sandy soil
- Effects of Grazing Cover Crops in a 3-year non-irrigated rotation
- Interseeding Cover Crops 6 sites
- NRCS Demo Farms - 10 sites (impacts on soil health & crop yields)

EXTENSION PROGRAMS:

The pandemic significantly impacted Extension Programs in 2020. Fortunately we were able to conduct 3 Cover Crop/Soil Health focused face-to-face programs prior to being shut down.

- The Nebraska Cover Crop & Soil Health Conference was held at ENREC with 231 participants. Abby Wick, NDSU Soil Health Specialist was the Keynote Speaker. A survey following the conference indicated knowledge gained or practice changed from attending this conference was \$11.00/ac for an impact of 18 million dollars.

- 2020 Nebraska Soil Health On-Farm In-person Research Report. There were one hundred and one participants in this program. As a result of this educational opportunity 89% have a better understanding of cover crop management.

- The 2020 Southeast Nebraska Soil Health Conference was held with 145 people in attendance. This program has an added focus of using cover crops as a forage. Excellent speakers included: Dwayne Beck, SDSU, Keynote Speaker, Paul Jasa, University of Nebraska and Mary Drewnoski, University of Nebraska. A survey following the workshop indicated knowledge gained or practice

changes from attending this conference was \$17.75/ac. Changes resulting from this educational effort included 63% are likely or very likely to change how cover crops are used in their operations.

- As part of Nebraska Extension's Crop Diagnostic Clinic Series, A Soil Health Clinic was recorded and included a module on cover crops. This class will be available on eXtension Campus this spring.

- As a part of the Soybean Management Field Days; cover crop research is included at these field day sites to measure impact of cover crops on crop yields and soil health with the cooperating farmers. The field days were recorded, with several presentations about cover crops. These are now available on-line at: <https://extension.unl.edu/statewide/enre/2020-soybean-management-field-days/>.

- Husker Harvest Days, the major farm show in Nebraska, Kansas, and the Dakotas was held virtual in 2020. Nebraska Extension's Cover Crop and Soil Health Team put together a program of videos for this show in 2020. This project can be viewed at: <https://extension.unl.edu/cover-crops-0/>.

UNIVERSITY OF NEBRASKA AND NRCS PARTNERSHIP ON RESEARCH

- The On-Farm Research program with cover crops has previously been mentioned. Many of these sites are a part of the NRCS Soil Health Initiative. The NRCS Soil Health Initiative is a collaboration with University of Nebraska researchers and extension as well as 17 farmer collaborators across Nebraska. Farmers are conducting strip trials of various cover crops, crop rotations and/or management techniques. Experiments were established in both 2016 and 2017 and soil measurements have been taken annually by NRCS field staff and University of Nebraska Extension. NRCS Environmental Quality Incentive Program (EQIP) is funding these demonstration projects, and the funding is for five years per demonstration site. Andrea Basche, faculty member in the Department of Agronomy and Horticulture at the University of Nebraska is leading this effort.

- Andrea Basche – Cover Crop related Projects

- “Developing a decision-support tool for the successful incorporation of cover crops into Nebraska cropping systems”

- Producer panel supporting development of platform with information to evaluate biomass-yield tradeoffs and find Nebraska specific information, co-led with Katja Koehler-Cole.

- Includes modeling work led by postdoc Nilovna Chatterjee, investigating opportunities to extend the cover crop window with varied maturity length corn hybrids, published in Agronomy Journal in 2020

- “Enhancing the Sustainability of US Cropping Systems through Cover Crops and an Innovative Information and Technology Network”

- Nebraska will participate in experiment station and on-farm experiments to answer questions about the impact of planting green on pests/pathogens, nitrogen rates following different cover crop species, and cover crop water impacts.

- Cover crop management course approved to be offered in Fall 2021.

COVER CROP RESEARCH FUNDED BY THE NEBRASKA CORN BOARD LOCATED AT THE SOUTH CENTRAL AG LAB

- Katja Koehler-Cole

- Corn Board funded cover crop projects, looking at cereal rye and hairy vetch in corn, soybean, and continuous corn. Measuring nitrate leaching; lysimeters were installed in the cover crop plots at South Central Ag Lab (SCAL) near Clay Center

COVER CROP RESEARCH AT THE UNIVERSITY OF NEBRASKA ROGERS MEMORIAL FARM

- Ten Long-term Cover Crop Experiments are being conducted at the Rogers Memorial (experiments described in 2019 Report).

- Paul Jasa is conducting the majority of these experiments.

- Humberto Blanco and Sabrina Ruis are also conducting a research projects at the Rogers Farm.

COVER CROP ON-FARM RESEARCH MEASURING BIOMASS AND NUTRIENT PRODUCTION

Cover Crop Dry Matter Tons/ac (lbs/ac) Spring 2020

Spring Yld	tons (lbs)	lbs/ac			
		C	N	P	K
Treatment (Rye)	Yield				
Low	.545 (1090)	452	24	8	32
High	2.60 (5200)	2220	97	42	186
Ave. (8 fields)	1.45 (2900)	1212	63	26	110

Cover Crop Biomass Production Fall 2020

Treatment	Tons/Ac	lbs/ac		C/N Ratio	
		C	N		
Nitrogen Fixing Mix	1.94	1735	79	21.96	
Early Grazed Mix	3.73	3325	90	36.94	
Late Grazed Mix	3.53	3099	106	29.24	
Compaction Fighter	3.02	2671	118	22.64	
High Carbon Mix	3.95	3482	100	34.82	3 locations in southeast Nebraska



The photo on the left is an NRCS On-Farm Soil Health Demonstration Site with brassicas/rye on the left and brassicas/oats on the right. The middle photo was a diversified mix of cover crops planted after wheat in mid-July. The photo on the right are the cover crop mixes in October after a hard freeze. Biomasses and nutrients of the cover crops were measured at this time.

COVER CROP PUBLICATIONS

1. Blanco-Canqui, H., and S. Ruis. 2020. Cover crops and soil physical properties: A review. *Soil Sci. Soc. Am. J.* 1527-1576.
2. Blanco-Canqui, H., M. Drewnoski, D. Redfearn, J. Parsons, G. Lesoing, and W. Tyler. 2020. Does cover crop grazing damage soils and reduce crop yields?. *Agrosystems, Geosciences & Environment* 3: e20102.
3. Ruis, S.J., H. Blanco-Canqui, K. Koehler-Cole, P. Jasa, G. Slater, R.W. Elmore, and R.B. Ferguson 2020. Winter cover crop root biomass yield in corn and soybean systems. *Agrosystems, Geosciences & Environment* 3: e20101.
4. Koehler-Cole, K., R.W. Elmore, H. Blanco-Canqui, C.A. Francis, C.A. Shapiro, C.A. Proctor, D.M. Heeren, S. Ruis, S. Irmak, and R.B. Ferguson. 2020. Cover crop productivity and subsequent soybean yield in the western Corn Belt. *Agron. J.* 112:2649-2663.

5. Blanco-Canqui, H., S. Ruis, C. Proctor, C. Creech, M. Drewnoski, and D. Redfearn. 2020. Harvesting cover crops for biofuel and livestock production: Another ecosystem service? A review. *Agron J.* 112:2373-2400.

6. Ruis, S.J., H. Blanco-Canqui, K. R.W. Elmore, C. Proctor, K. Koehler-Cole, C.A. Shapiro, C.A. Francis, and R.B. Ferguson. 2020. Impacts of cover crop planting dates on soils after four years. *Agron. J.* 112:1649-1665.

SOIL HEALTH TASK FORCE – NEBRASKA

A team put together a report and action plan for Soil Health in Nebraska. Hopefully this will lead to more research and cover crop adoption within the state and region.

