

Northeast Research Farm Summary

RFR-A1866

Northeast Iowa Agricultural Experimental Association
2018–2019

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103 Curtiss Hall, 513 Farm House Lane, ISU

Farm and Weather Summary

Ken Pecinovsky, farm superintendent

Farm Comments

Field days and tours. More than 700 people attended 12 field days/farm tours at the ISU Northeast Research Farm (NERF) in 2018. More than 3,000 people visited the Borlaug Learning Center (BLC) and NERF. The BLC hosted 60 events ranging from meetings on nitrogen and water quality research to agronomy, horticulture, and livestock/crops extension trainings. The summer field day included information on current ag weather predictions and research results from long-term tillage and nitrogen management research. A discussion and demonstration of various crop scouting techniques also were included. The fall field day included topics such as crop marketing planning, weed management options, and current research results on soil fertility, liming, and crop disease management recommendations. Tours of field research were held including the home demonstration garden, water quality research plots, and herbicide, fungicide, and nitrogen rate evaluation studies. A soil drainage management workshop was held with a tile drainage installation demonstration on four acres of land.

New projects. Soybean breeding variety trials, D. Singh; Corn planting dates and N rates, M. Castellano; Intensive nitrogen bioreactor sampling, NCSU; Liquid K sidedressing study, A. Mallarino; Winter rye variety yield study, PFI; Corn populations on different N rates and soybean seed treatment on sudden death syndrome, ISU NERF.

Crop Season Comments

Record March and April snow fall (33.7 in.) delayed any chance of early field work. The last snow fell April 18 and nitrogen applications began April 24. On April 25 and

26, oat variety plots were seeded and early manure injection treatments were applied in water quality plots, respectively. Corn and soybean research plot planting began April 30 and May 20, respectively. Corn and soybean planting were completed May 20 and May 26, respectively, due to 14 days of rainfall in May delaying field work. Numerous flooding events caused severe gully erosion in many row crop fields across the northern two tiers of counties in Iowa. A May 3 rain event (2.74 in.), was followed by rain June 8-9 (4.01 in.), June 30 (2.82 in.), August 27-28 (4.11 in.), September 1-4 (8.15 in.), and September 18-21 (5.79 in.).

Corn harvest began September 29 and was completed November 2. Corn yields were average to slightly above average, depending on drainage and soil type, due to excessive rainfall. Corn grain moisture ranged from 17.5-23.0 percent due to above-normal heat unit accumulation for the entire growing season. Corn yields on rotated acres ranged from 200 to 245 bushels/acre and averaged 220 bushels/acre. Continuous corn yields ranged from 180 to 240 bushels/acre and averaged 210 bushels/acre. Soybean yields were average to above average. Minimal sudden death syndrome (SDS) and white mold disease occurred. Soybean aphids did not reach the economic thresholds for control with only 44 and 21/plant recorded August 21 and 27, respectively. Yields ranged from 50 to 70 bushels/acre and averaged 62 bushels/acre.

Weather Comments

Winter 2017–2018. The first measurable snowfall occurred December 11, 2017, and the last snow for the season was April 18, 2018, with a total of 47.4 in. recorded, 11.0 in. more than the previous winter. The average 4-in. soil temperature remained below 50°F after

October 23, 2017, and fall tillage was completed the last day of November.

Spring 2018. The 4-in. average soil temperature remained above 50°F on April 23. April was the coldest month on record, and only the last 7 days were suitable for field work with a record 16.3 in. of snow for the month. The last killing frost was April 20 for sensitive vegetation. May was the warmest on record since 1977, with 19 days suitable for field work and 15 days had precipitation.

Summer 2018. July rainfall was 2.01 in. below the 30-yr average, but all other summer months had excessive rain events. August and September rainfall was 17.43 in. above the 30-yr average. September air temperatures were 2.31°F above normal, which helped reduce the amount of artificial drying of corn at harvest.

Corn pollination occurred primarily the week of July 16. Foliar crop diseases were minimal in corn and soybeans, with a slight increase in corn disease in late August due to excessive moisture and humidity. Summer heat units were slightly above normal, which allowed corn to mature prior to frost. Nineteen days in the growing season had air temperatures at or above 90°F with none in August during corn grain fill, resulting in increased corn yields.

Fall 2018. The first killing freeze occurred October 15 (27°F), the day after a 0.11 in. rain and 1.4 in. snow event. A total of 2,955 heat

units were recorded from May through September of 2018, about 286 more than the previous year. From April through November, 52.29 in. of rain was recorded, which was 21.72 in. above the 30-yr average and the highest amount on record for this location. The northern two tiers of counties in Iowa had more planting delays and lower grain yields, due to summer rainfall totals in excess of 60 in.

Grain moisture during corn harvest started at 21.3 percent September 29 and was 18.3 percent November 2. Eleven days of rainfall in October delayed soybean harvest with soybean grain moisture levels finally averaging 13 percent or lower October 19. The 4-in. soil temperature remained below 50°F after October 10, 2018, with later planted cover crops not able to germinate. November and December air temperatures were 6.6°F below and 6.6°F above the 30-yr average, respectively, followed by warmer-than-normal weather into mid January, before colder-than-normal air temperatures arrived for the latter third of January. Frozen top soils reduced the amount of fall nitrogen and manure injection applications and tillage in fall/winter of 2018.

Acknowledgements

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Table 1. Monthly rainfall and average temperatures during the 2018 growing season.

Month	Rainfall (in.)			Temperature (°F)*			
	NERF	Departure from normal	No. days of rain	NERF	Departure from normal	Growing degree days	Days 90°F+
April	2.81	-1.08	7	38.5	-9.1	84	0
May	6.26	+1.79	15	66.7	+7.4	501	6
June	9.73	+4.00	12	72.9	+3.8	669	7
July	2.90	-2.01	7	72.1	+0.3	676	3
August	10.20	+5.87	15	71.0	+1.2	645	0
September	14.58	+11.56	14	64.7	+2.3	464	3
October	3.78	+1.24	11	48.1	-1.7	143	0
November	2.03	+0.34	11	29.2	-6.6		0
Total	52.29	+21.72	78	1 st hard freeze: 28°F (10/12/18)			19

*174 frost-free days

Research Farm Projects

<u>Research Project/Demonstration</u>	<u>Project Leader</u>
Automated weather station (ISU Mesonet)	E. Taylor
Alfalfa nutrient and management studies	B. Lang
Asparagus variety trial	P. O'Malley
Bt trait/corn variety x fungicide study	ISU NERF
Cover crop species x fall vs. spring seeding on soybean diseases	S. Eggenberger
Corn planting date x relative maturity study	M. Licht
Corn nitrogen rates and tillage in a corn-soybean crop rotation	J. Sawyer
Corn head comparison of knife rolls vs. OEM stalk rolls	ISU NERF
Cover crop mixture studies in corn and soybeans	E. Juchems
Crop N rate x crop rotation studies	J. Sawyer/A. Mallarino
Crop rotation x corn variety x tillage x fungicide study	ISU NERF
Crop modeling–FACTS–Forecast and assessment of cropping systems	S. Archontoulis
Corn and soybean planting date x nitrogen rates on corn study	M. Castellano
Corn row spacing, populations, and effects of fungicide timing study	ISU NERF
Corn varieties and fungicides in 2 crop rotations and 4 tillage systems	ISU NERF
Evaluation of gypsum rates on corn and soybean yields	A. Mallarino
Evaluation of fungicide application timings and placement	D. Mueller
Evaluation of bio-fungicides and crop growth hormones	ISU NERF
Evaluation of seed mixes/mowing on prairie establishment	L. Jackson/J. Meissen
Evaluation of soybean aphid flight population monitoring	D. Lagos-Kutz
Evaluation of soybean aphid foliar and seed treatment insecticides	E. Hodgson
Evaluation of water tables, tiling methods, and tile spacing distances	ISU NERF
Evaluation of weed management strategies in corn and soybeans	M. Owen
Evaluation of liquid K applications in corn and soybeans	A. Mallarino
Home demonstration garden	C. Haynes
Hydrogeology water quality studies in the Devonian Aquifer	B. Simpkins
Iowa Crop Improvement Association corn and soybean variety trials	J. Rouse
K rate x residual soil K studies on corn and soybeans	A. Mallarino
Long-term P-K rate study	A. Mallarino
Long-term tillage x crop rotation studies	M. Al-Kaisi/M. Hanna
Milkweed and pollinator species x Monarch butterfly evaluation	R. Hellmich
Nitrogen rates following fall injected swine manure	ISU NERF
Oat variety study	PFI
Pawpaw tree winter hardiness demonstration	P. O'Malley
Phosphorus and potassium placement and rate in different tillages	A. Mallarino
Phosphorus rate x P source study	A. Mallarino
Rate of lime study	ISU NERF
Soybean planting date x relative maturity study	M. Licht
Soybean seed treatment x disease control studies	ISU NERF
Soybean breeding variety evaluation studies	D. Singh
Water quality tracing of antibiotics in soils with manure applications	M. Soupir
Water quality with use of bioreactor	M. Helmers/NCSU
Winter rye variety study	PFI

Acknowledgements

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Albert Lea Seed House	John Fox
AMVAC Corporation	Kruger Seed Company
Asgrow Seed Company	Kuhn North America, Inc.
BASF Corporation	MBS Farms/Farmers Feed and Grain
Bayer Crop Science	Mike Shaw
Brian Lang, ISU Extension	Monsanto Company
C ⁸ MP Crop Consulting	Mitas North America, Inc.
Calcium Products, Inc.	Nutrien Ag Solutions
Calmer Corn Heads	Potash Corp
Case IH Corporation	Pioneer Hi-Bred International
CDS-John Blue Company	Raven Industries
Corteva Agriscience	Renk Seed Company
Cropwise Consulting	Smidt Crop Management, Inc.
Dairyland Seed Company	Sukup Manufacturing
Dekalb Genetics	Swartzrock Implement
Dennis Carney	Syngenta Crop Protection
Dennis Weibke	Timewell Drainage Products
Gandy Company	USDA National Lab for Ag and Environment
Glen Zubrod	Wallaces Farmer
Iowa Farm Bureau	Winfield Solutions, LLC
ISU Weed Science Program	Yetter Manufacturing Company
Johnson Drainage Plows	
Jim Johnson	

The mention of firm names or trade products does not imply they are endorsed over other firms or similar products not mentioned.

Northeast Research and Demonstration Farm
3321 290th Street
Nashua, IA 50658

Take the Nashua exit off Highway 27 (218), go 1.2 miles west on Highway B60, then one mile south on gravel (Windfall Ave.), and 0.2 mile east on 290th Street.
To schedule a tour, call 641-435-4864.

Experiments in Previous Annual Reports

Corn and Soybean Grain Yield Response to Different Phosphorus Fertilization Rates and Soil-Test Phosphorus Levels RFR-A1774	ISRF17-13
Demonstrating Cover Crop Mixtures on Iowa Farmland:	
Management, Soil Health, and Water Quality Benefits RFR-A1759	ISRF17-13
Forecast and Assessment of Cropping Systems in Northeast Iowa RFR-A1763	ISRF17-13
Monitoring Bioreactors Using Improved Techniques RFR-A1762	ISRF17-13
Foliar Fungicides for Alfalfa Production: A Six-year Summary RFR-A1710	ISRF17-13
Forecast and Assessment of Cropping Systems in Northeast Iowa RFR-A1763	ISRF17-13
Monarch Oviposition and Larval Survival on Nine Milkweed Species RFR-A1727	ISRF17-13
Field Test for Effects of Cross-Resistance on Root Injury to Bt Corn by Western Corn Rootworm RFR-A1694	ISRF16-13
Denitrification Bioreactor in Northeast Iowa RFR-A1696	ISRF16-13
Corn Yield Response to Nitrogen Fertilizer Application Timing RFR-A1691	ISRF16-13
Enhancing Corn Yield in a Winter Cereal Rye Cover Crop System RFR-A1683	ISRF16-13
Best Management Production Input Approach to High Yield Alfalfa RFR-A1583	ISRF15-13
Corn and Soybean Yield Responses to Micronutrients in NE Iowa RFR-A14106	ISRF14-13
Crop and Soil Responses to Rates of Lime RFR-A14101	ISRF14-13
Long-term Phosphorus and Potassium Fertilization Effects on Yields of Corn and Soybean Grown in Rotation RFR-A14104	ISRF14-13
Evaluation of Soybean Aphid-resistant Soybean Lines RFR-A13111	ISRF13-13
Corn and Soybean Potassium Uptake, Removal with Harvest and Recycling to the Soil RFR-A12109	ISRF12-13
Effects of Seed Treatments and a Soil-applied Nematicide on Corn Yields and Nematode Population Densities RFR-A12114	ISRF12-13
Fertilizer and Swine Manure Management Systems Impact Phosphorus in Soil and Subsurface Tile Drainage RFR-A11115	ISRF11-13
Role of Directly Connected Macropores on Pathogen Transport to Subsurface Drainage Water RFR-A9116	ISRF09-13
Corn Breeding	ISRF08-13
Organic vs. Conventional Farming Systems	ISRF08-13
Development of Methodologies to Reduce the DCAD of Hay for Transition Dairy Cows	ISRF07-13
Sulfur Deficiency in Northeast Iowa Alfalfa Production	ISRF06-13
NO ₃ -N Concentrations in Shallow and Deep Groundwater Wells from 1991–2003	ISRF04-13
Runoff Phosphorus Loss as Affected by Tillage, Fertilizer, and Swine Manure Phosphorus Management in Corn-Soybean Production Systems	ISRF04-13
Legume Identity and Timing of Incorporation Effect on Soil Responses to Green Manure	ISRF03-13
Corn Row Spacing, Plant Density, and Maturity Effects	ISRF02-13
Excerpts from Keynote Address: ISU NE Research Farm Silver Anniversary Field Day	ISRF01-13
Emergence Characteristics of Several Annual Weeds	ISRF00-13
Transport of Chemicals through Fractures in Pre-Illinoian Till	ISRF99-13
Conversion of CRP to Corn and Soybeans	ISRF96-13
Hydrogeology and Water Quality Studies in the Devonian Aquifer	ISRF94-13