Northeast Research Farm Summary

RFR-A1964

Northeast Iowa Agricultural Experimental Association
2019–2020

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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 725 people attended 12 field days/farm tours at the ISU Northeast Research Farm (NERF) in 2019. Almost 3,500 people visited the Borlaug Learning Center (BLC) and NERF. The BLC hosted 75 events including a meeting, tour, and supper with the new Dean Daniel Robison, College of Agriculture and Life Sciences, and meetings on agronomy, horticulture, and livestock/crops extension trainings. The summer field day included information on small grain production, plant diseases, weather predictions, and implications of future legalization of hemp production. The fall field day included topics on crop marketing planning, weed management, corn and soybean insect issues, and current research results on long-term P and K soil fertility studies. Tours of field research were held including the home demonstration garden, water quality research plots, plant protectant products, and fertilizer rate evaluation studies. A 3-day soil drainage management workshop was held with a tile drainage installation demonstration on four acres of land.

New projects. Corn fungicide application timing studies on Tar Spot control, A. Robertson; Japanese beetle defoliation and insecticide study, E. Hodgson; Soybean variety/disease evaluation following fall vs. spring drilled oats, rye and wheat, S. Eggenberger; Cereal winter rye variety yield study, PFI; Soybean seed treatments for sudden death syndrome, S. Navi and NERF.

Crop Season Comments
Frequent precipitation in April (3.77 inches in 15 days) delayed and limited early spring field work. The last snow fell April 28 and nitrogen applications began April 17. On April 9, oat variety plots were seeded. Early manure injection treatments were applied in water quality plots April 15-16. The first chance of planting in dry soils was April 21, although due to frequent rain, the majority of corn and soybean plots were planted starting May 4 and completed May 15 for corn and June 1 for soybean. There were 11 days of rainfall in May delaying field work. Only two heavy rain events occurred in the growing season of 2019: May 18 (1.93 in.) and May 24 (1.52 in.), compared with 2018, when there were eight heavy rain events (over 2 in.) in four months. In 2019, the farm received 22.06 in. less rain compared with 2018.

Corn harvest began October 20 (3 weeks later than 2018) and was completed November 10. Corn yields were above average, due to optimal heat unit accumulation, lower temperatures during grain fill, and optimal, but not excessive rainfall. Corn grain moisture ranged from 18.0-23.0 percent and yields on rotated acres ranged from 210 to 255 bushels/acre and averaged 235 bushels/acre. Continuous corn yields ranged from 180 to 240 bushels/acre and averaged 220 bushels/acre. Soybean harvest began September 23 and was completed October 18. Soybean yields were average to slightly below average with shorter plants that never reached full canopy. Minimal sudden death syndrome (SDS) and white mold disease occurred. Japanese beetle numbers flared up again in 2019, but soybean aphids were almost non-existent. Yields ranged from 50 to 65 bushels/acre and averaged 58 bushels/acre.

Weather Comments
Winter 2018–2019. The first measurable snowfall occurred October 14, 2018, and the last snow for the season was April 28, 2019, with a total of 49.1 in. recorded, 1.7 in. more than the previous winter. The average 4-in. soil
temperature remained below 50°F after October 20, 2018, and fall tillage and manure injection operations were not completed due to frequent rain or snow events and/or frozen soils after November 4.

**Spring 2019.** The 4-in. average soil temperature remained above 50°F on May 4. April had only nine days suitable for field work. The last snowfall and the last killing frost occurred April 28. May had 14 days suitable for field work.

**Summer 2019.** June, July, and August rainfall was 3.1, 1.5, and 2.1 in. below the 30-yr average, respectively, but crop water use requirements were met, since no excessive heat events occurred. GDD accumulation for August was slightly below normal and September above normal, allowing crops to mature slowly, which increased yields. September temperatures were 5.5°F above normal, which helped reduce the amount of artificial drying of corn at harvest.

Corn pollination occurred primarily the week of July 21. Foliar crop diseases were minimal in corn and soybean, with a slight increase in corn disease in late August with some newly found Tar Spot disease symptoms. Summer heat unit accumulation was slightly above normal, which allowed corn to mature prior to frost. Seven days in the growing season had air temperatures at or above 90°F (12 days less than the previous year) with none in August during the corn grain fill period, resulting in increased corn yields.

**Fall 2019.** The first killing freeze occurred October 12 (27°F), the same day as 2018. A total of 2,735 heat units were recorded from May through September 2019, about 220 heat units less than the previous year. From April through November, 30.23 in. of rain was recorded, which was 22.06 in. less than 2018 and 1.46 in. less than the 30-yr average.

Corn grain moisture during harvest stayed in a narrow range of 21-22 percent, due to frequent rain events and below normal solar radiation and heat units to dry the grain down further. Eleven days of rainfall during soybean harvest caused delays since soybean grain moisture levels were difficult to get down to 13 percent. The 4-in. soil temperature remained below 50°F after October 22, 2019, with minimal fall growth of cover crops, drilled after crop harvest. Frozen or wet soils delayed fall manure injection until the first week of December and fall strip tillage was completed December 27. Air temperatures were 6.6°F and 4.2°F above the 30-yr average, for December 2019, and January 2020, respectively.

**Acknowledgements**

Thanks to Northeast Iowa Agricultural Experimental Association, ISU researchers and extension staff, and agribusiness people for their support.

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**Table 1. Monthly rainfall and average temperatures during the 2019 growing season.**

<table>
<thead>
<tr>
<th>Month</th>
<th>Rainfall (in.)</th>
<th>Departure from normal</th>
<th>No. of days</th>
<th>Temperature (°F)*</th>
<th>Growing degree days</th>
<th>Days 90°F+</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>3.77</td>
<td>-0.13</td>
<td>14</td>
<td>48.8</td>
<td>+1.4</td>
<td>173</td>
</tr>
<tr>
<td>May</td>
<td>6.32</td>
<td>+1.68</td>
<td>11</td>
<td>57.0</td>
<td>-2.4</td>
<td>299</td>
</tr>
<tr>
<td>June</td>
<td>2.89</td>
<td>-3.10</td>
<td>14</td>
<td>69.3</td>
<td>+0.2</td>
<td>575</td>
</tr>
<tr>
<td>July</td>
<td>3.46</td>
<td>-1.45</td>
<td>14</td>
<td>74.4</td>
<td>+2.6</td>
<td>738</td>
</tr>
<tr>
<td>August</td>
<td>2.50</td>
<td>-2.06</td>
<td>8</td>
<td>68.5</td>
<td>-1.1</td>
<td>582</td>
</tr>
<tr>
<td>September</td>
<td>3.94</td>
<td>+0.54</td>
<td>16</td>
<td>67.9</td>
<td>+5.5</td>
<td>541</td>
</tr>
<tr>
<td>October</td>
<td>5.20</td>
<td>+2.56</td>
<td>10</td>
<td>46.5</td>
<td>-3.4</td>
<td>132</td>
</tr>
<tr>
<td>November</td>
<td>2.15</td>
<td>+0.50</td>
<td>15</td>
<td>31.3</td>
<td>-4.3</td>
<td>0</td>
</tr>
</tbody>
</table>

Total 30.23 -1.46 102 1st hard freeze: 27°F (10/12/19) 7

*167 frost-free days
# Research Farm Projects

<table>
<thead>
<tr>
<th>Research Project/Demonstration</th>
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<td>B. Lang</td>
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<td>E. Taylor</td>
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<td>Bt trait/corn variety x fungicide study</td>
<td>ISU NERF</td>
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<tr>
<td>Corn fungicide epidemiology study</td>
<td>A. Robertson</td>
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<tr>
<td>Corn fungicide product and application timing evaluation study</td>
<td>A. Robertson</td>
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<tr>
<td>Corn fungicide product evaluation for disease management</td>
<td>ISU NERF</td>
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<tr>
<td>Corn planting date x relative maturity study</td>
<td>ISU NERF</td>
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<tr>
<td>Corn row spacings, populations, and fungicide products and timings</td>
<td>E. (Juchems) Ripley</td>
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<td>Cover crop mixture studies in corn and soybean</td>
<td>S. Eggenberger</td>
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<td>Cover crop species x fall vs. spring seeding on soybean diseases</td>
<td>S. Archontoulis</td>
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<tr>
<td>Crop modeling–FACTS–Forecast &amp; assessment of cropping systems</td>
<td>A. Mallarino</td>
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<td>Crop N rate x crop rotation studies</td>
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<tr>
<td>Crop N rate x crop rotation studies</td>
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<tr>
<td>Evaluation of fungicide and application timings on soybean diseases</td>
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<td>Evaluation of gypsum rates on corn and soybean yields</td>
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<td>Evaluation of liquid K applications in corn and soybean</td>
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<td>Evaluation of soybean aphid flight population monitoring</td>
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<td>Evaluation of soybean Japanese beetle defoliation apps</td>
<td>E. Hodgson</td>
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<tr>
<td>Evaluation of soybean Japanese beetle foliar insecticides</td>
<td>E. Hodgson</td>
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<td>Evaluation of water tables, tiling methods, and tile spacing distances</td>
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<td>Evaluation of weed management strategies in corn and soybean</td>
<td>P. Jha</td>
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<td>Home demonstration garden</td>
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<td>Hydrogeology water quality studies in the Devonian Aquifer</td>
<td>B. Simpkins</td>
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<td>Milkweed and pollinator species x Monarch butterfly evaluation</td>
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<td>Pawpaw tree winter hardiness demonstration</td>
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<td>Soybean planting date x relative maturity study</td>
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<td>PFI</td>
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Acknowledgements

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

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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

Long-Term Tillage and Crop Rotation Effects on Soil Carbon and Soil Productivity in Northeast Iowa RFR-A1869 ................................................ ISRF18-13

Iowa Conservation Reserve & Enhancement Program-Wetlands in Floyd County RFR-A1898 ................................................ ISRF18-13

Antibiotic Resistant Bacteria in Subsurface Tile Drainage From Manure Amended Fields RFR-A1889 ................................................ ISRF18-13

Effect of Foliar Fungicide Applications on Standability of Hybrid Corn RFR-A1873 .... ISRF18-13

Corn and Soybean Grain Yield Response to Different Phosphorus Fertilization Rates and Soil-Test Phosphorus Levels RFR-A1774 ................................................ ISRF17-13

Foliar Fungicides for Alfalfa Production: A Six-year Summary RFR-A1710 ........ 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

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

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

NO3-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