Northeast Research Farm Summary

Abstract
Includes Farm and Weather Summary, Research Farm Projects, Acknowledgements and Experiments in Previous Annual Reports

Disciplines
Agricultural Science | Agriculture

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Northeast Research Farm Summary

RFR-A12108

Northeast Iowa Agricultural Experimental Association
2012–2013

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Research Farm Technician ........................................... Ralph White
Borlaug Learning Center Administrative Specialist ............. Jeannie Tibbits
Manager, Research and Demonstration Farms .................. Dennis Shannon (retired 12/31/12)
103 Curtiss Hall, ISU
 Coordinate, Research and Demonstration Farms ............... Mark Honeyman
103 Curtiss Hall, ISU
Farm and Weather Summary

Ken Pecinovsky, farm superintendent

Farm Comments

Field days and tours. More than 600 people attended nine field days at the ISU Northeast Research Farm (NERF) in 2012. More than 4,300 people visited the Borlaug Learning Center (BLC). The BLC hosted over 30 events ranging from farm land leasing/insurance meetings to agronomy, horticulture, and livestock extension trainings. The summer field day included management of foliar diseases, planter adjustments, management ideas for increasing soybean yields, and grain marketing. The fall field day included information on the drought, such as alfatoxin and grain quality concerns in corn, research results from spider mites and other harmful crop insects, and tillage effects on soil and grain yield.

New projects. Evaluation of micronutrients in corn and soybeans, A. Mallarino; Nitrogen sensing and N rates, J. Sawyer; corn silage study, ISU NERF; Foliar fungicides in alfalfa, B. Lang. Numerous studies looking at tillage, plant populations, row spacing, and fungicide use (foliar, seed treatment, application timings) in corn and soybeans were also conducted by A. Robertson, X.B. Yang, D. Mueller, and ISU NERF.

Crop Season Comments

Field work began on March 19 with seeding of oat and alfalfa plots. Oats and alfalfa emerged by March 26, due to March air temperatures that were 15°F above normal. The first planting dates of corn and soybeans occurred on March 29 and April 2, respectively. Nitrogen fertilizer was injected the last week of March through the first week of April. The majority of the corn planting occurred from April 17 through April 27, followed by a 12-day rain delay. Corn planting was finished by May 15, which included some re-planting due to hard packing rains that did not allow corn to emerge. The majority of the soybean planting occurred from May 16 through May 22.

Corn harvest began on September 18 and was completed October 12. Corn yields varied significantly due to soil moisture holding capacity, but in general, were below average due to limited summer rainfall and heat stress. Corn yields on rotated acres ranged from 130 to 200 bushels/acre, and averaged 160 bushels/acre. Continuous corn yields ranged from 120 to 200 bushels/acre and averaged 150 bushels/acre. Serious corn lodging occurred on July 25 from 70+ mph winds, which complicated grain fill and harvest.

Soybean harvest began on September 12 and was completed October 6. Soybean yields were respectable due to 4.7 in. of rain from August through mid-September. Soybean yields were also dependent on soil moisture holding capacity, with yields ranging from 40 to 80 bushels/acre and averaged 55 bushels/acre. High yields were also attributed to below economic thresholds of soybean aphids and low disease pressure.

Weather Comments

Winter 2011–2012. The first measurable snowfall occurred November 9, 2011 and the last snow for the season was on March 4, 2012 with a total of 18.75 in. recorded (33.4 in. less than the previous winter). The 4-in. soil temperature remained below 50°F after October 28, 2011 and the topsoil froze on December 5, stopping any further tillage.

Spring 2012. The frost was out of the top 2 ft of soil after March 11 (3 weeks earlier than 2011) and the 4-in. average soil temperature remained above 50°F on May 2. Corn and
soybeans planted on March 29 and April 2, began to emerge on April 15 and April 19 respectively, with the last killing frost on April 12.

**Summer 2012.** The 3.72 in. of rainfall after planting caused emergence issues in conventionally tilled soil due to heavy, quick downpours. No precipitation for 17 days followed. This caused a condition called “rootless corn,” where the soil dried up and pulled away from the emergence zone leaving corn plants to fall over because of no moist soil for root growth. Luckily, 1.59 in. of rain occurred between May 24–26 to swell the soil back to normal and the roots began to grow to anchor the plants. June and July precipitation was 1.71 and 1.77 in., which was 3.4 and 3.0 in. below the 30 year average, respectively. Corn exhibited signs of heat stress (leaf rolling) throughout the month of July, when daily high temperatures averaged 91.8°F for the month. On July 25, a 70+ mph windstorm caused severe lodging of corn planted in May, due to less than optimal corn root formation caused by dry summer soil conditions. From April through November, 22.34 in. of rainfall was recorded, which was 7.5 in. below the 30-yr average. The most beneficial rain of the season, especially for soybeans, was a 1.92 in. rain event on August 8. August and early September temperatures were slightly below normal, which may have relieved some heat stress on the crop to gain some yield. Corn silage was harvested in late August and physiological maturity of corn occurred mid-September, depending on variety. A total of 2,862 heat units were recorded from May through September of 2012 compared with 2,584 in 2011.

**Fall 2012.** September rainfall was 1.46 in. below normal with only four rainfall events delaying harvest operations through mid-October. There were 425 heat units in September of 2012, compared with 330 in 2011, which caused crops to dry down quickly. Harvest was two weeks earlier than 2011. Increased summer heat unit accumulation resulted in dry grain allowing most farmers to use minimal or no propane to dry corn for safe grain storage for the past three years. Soybean grain moisture in the field went quickly from 13 to 7 percent, resulting in harvest losses from shattering ahead of the combine or pods opening prematurely in the field. The first plant-killing freeze occurred September 23 with a recording of 26.5°F, which is about 12 days earlier than the typical frost date for northeast Iowa. The 4-in. soil temperature remained below 50°F after October 26. Topsoil froze on December 8, stopping tillage operations.

**Acknowledgements**
We thank the Northeast Iowa Agricultural Experimental Association, ISU researchers and extension staff, and agribusiness people for their support.
### Table 1. Monthly rainfall and average temperatures during the 2012 growing season.

<table>
<thead>
<tr>
<th>Month</th>
<th>Rainfall (in.)</th>
<th>Departure from normal</th>
<th>No. days of rain</th>
<th>Temperature (°F)*</th>
<th>Departure from normal</th>
<th>Growing degree days</th>
<th>Days 90°F+</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>3.71</td>
<td>+0.16</td>
<td>8</td>
<td>49.7</td>
<td>+2.2</td>
<td>181</td>
<td>0</td>
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<tr>
<td>May</td>
<td>4.97</td>
<td>+0.45</td>
<td>10</td>
<td>64.4</td>
<td>+5.2</td>
<td>487</td>
<td>1</td>
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<tr>
<td>June</td>
<td>1.71</td>
<td>-3.41</td>
<td>5</td>
<td>71.5</td>
<td>+2.9</td>
<td>624</td>
<td>8</td>
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<tr>
<td>July</td>
<td>1.77</td>
<td>-3.02</td>
<td>5</td>
<td>77.2</td>
<td>+5.2</td>
<td>741</td>
<td>19</td>
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<tr>
<td>August</td>
<td>3.19</td>
<td>-1.05</td>
<td>7</td>
<td>69.1</td>
<td>-0.6</td>
<td>585</td>
<td>8</td>
</tr>
<tr>
<td>September</td>
<td>1.67</td>
<td>-1.46</td>
<td>6</td>
<td>60.7</td>
<td>-1.1</td>
<td>425</td>
<td>3</td>
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<tr>
<td>October</td>
<td>4.11</td>
<td>+1.49</td>
<td>10</td>
<td>46.6</td>
<td>-2.9</td>
<td>167</td>
<td>0</td>
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<tr>
<td>November</td>
<td>1.21</td>
<td>-0.66</td>
<td>5</td>
<td>37.5</td>
<td>+2.8</td>
<td>0</td>
<td></td>
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<tr>
<td>Total</td>
<td>22.34</td>
<td>-7.50</td>
<td>56</td>
<td>1st hard freeze: 27°F (9/23/12)</td>
<td>39</td>
<td></td>
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</table>

*163 frost-free days
## Research Farm Projects

<table>
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<th>Project Leader</th>
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<td>Alfalfa nutrient and disease management study</td>
<td>B. Lang</td>
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<td>Asparagus variety trial</td>
<td>P. O’Malley</td>
</tr>
<tr>
<td>Bt/non-bt corn variety × fungicide study</td>
<td>ISU NERF</td>
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<tr>
<td>Corn variety × starter fertilizer × plant population study</td>
<td>R. Elmore</td>
</tr>
<tr>
<td>Cover crop rye harvest re-growth study</td>
<td>B. Lang</td>
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<tr>
<td>Crop N rate × crop rotation study</td>
<td>J. Sawyer</td>
</tr>
<tr>
<td>Crop N rate × crop rotation study</td>
<td>A. Mallarino</td>
</tr>
<tr>
<td>Crop N sensing × N rates study</td>
<td>J. Sawyer</td>
</tr>
<tr>
<td>Crop rotation × fungicide × tillage × planting population study</td>
<td>ISU NERF</td>
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<tr>
<td>Evaluation of corn nematode control strategies</td>
<td>G. Tylka</td>
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<tr>
<td>Evaluation of corn rootworm insecticides and genetic seed traits</td>
<td>A. Gassman</td>
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<tr>
<td>Evaluation of cover crops and nitrogen rates on corn</td>
<td>J. Sawyer</td>
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<tr>
<td>Evaluation of foliar fungicides, application timings, and seed treatments on corn and soybean diseases</td>
<td>A. Robertson</td>
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<td>Evaluation of herbicides for equisetum weed control in road ditches</td>
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<td>Evaluation of humic acid and N rates on corn</td>
<td>D. Olk</td>
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<tr>
<td>Evaluation of multiple resistances to soybean aphids</td>
<td>E. Hodgson</td>
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<tr>
<td>Evaluation of soybean aphid and seed treatments</td>
<td>E. Hodgson</td>
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<tr>
<td>Evaluation of soybean aphid flight populations from a suction trap monitor</td>
<td>D. Voegtlin</td>
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<tr>
<td>Evaluation of soybean varieties and soybean disease/insect control</td>
<td>ISU NERF</td>
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<tr>
<td>Evaluation of water tables, tiling methods, and tile spacing distances</td>
<td>ISU NERF</td>
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<tr>
<td>Evaluation of weed management strategies in corn and soybeans</td>
<td>M. Owen</td>
</tr>
<tr>
<td>Home demonstration garden</td>
<td>C. Haynes</td>
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<tr>
<td>Hydrogeology water quality studies in the Devonian Aquifer and near tile drainage</td>
<td>B. Simpkins</td>
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<tr>
<td>Insecticide and fungicide interactions in soybeans</td>
<td>A. Robertson/D. Mueller</td>
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<tr>
<td>Iowa Crop Improvement Association soybean variety trials</td>
<td>J. Rouse</td>
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<tr>
<td>K rate × Bt rootworm isoline comparison study (2 studies)</td>
<td>A. Mallarino</td>
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<tr>
<td>Long-term P-K rate study</td>
<td>A. Mallarino</td>
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<tr>
<td>Long-term tillage × crop rotation studies</td>
<td>M. Hanna/M. Al-Kaisi</td>
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<td>Nitrogen rates following fall injected swine manure</td>
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<tr>
<td>Oat variety study</td>
<td>ISU NERF</td>
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<tr>
<td>Organic corn variety study</td>
<td>B. Lang</td>
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<tr>
<td>Organic product evaluation for soybean insect control and yield</td>
<td>B. Lang</td>
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<tr>
<td>Pawpaw tree winter hardiness demonstration</td>
<td>P. O’Malley</td>
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<tr>
<td>Phosphorus and potassium placement and rate in different tillages</td>
<td>A. Mallarino</td>
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<td>Phosphorus rate × P source study</td>
<td>A. Mallarino</td>
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<tr>
<td>Rate of lime study</td>
<td>ISU NERF</td>
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Research Project/Demonstration (continued)

<table>
<thead>
<tr>
<th>Project Leader</th>
<th>Research Project/Demonstration</th>
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<tr>
<td>ISU NERF</td>
<td>Soil/plant root/soil water observation pit</td>
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<tr>
<td>D. Mueller</td>
<td>Soybean fungicide and aphid resistant soybean evaluation</td>
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<tr>
<td>ISU NERF</td>
<td>Soybean planting date × variety maturity × insecticide/fungicide study</td>
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<tr>
<td>ISU NERF</td>
<td>Soybean population × row spacing study</td>
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<tr>
<td>M. Helmers</td>
<td>Water quality study (cover crops, crop rotation, fertilizer source/application timing)</td>
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<tr>
<td>M. Soupir</td>
<td>Water quality tracing of antibiotics in soils with manure applications</td>
</tr>
<tr>
<td>M. Helmers</td>
<td>Water quality with use of bioreactor</td>
</tr>
</tbody>
</table>

Acknowledgements

The following companies and individuals contributed to research or field day activities at the ISU Northeast Research and Demonstration Farm. Their support is greatly appreciated.

Agrigold Hybrids
Agriliance, LLC
Amvac Corporation
Asgrow Seed Company
BASF Corporation
Bayer Crop Science
C™MP Crop Consulting
CDS-John Blue Company
Dekalb Genetics
Demco-Dethmers Mfg. Company
Dennis Weibke
Don Vetter
Duane Lines
Floyd County ISU Extension
Floyd County SWCD
Gandy Company
Glen Zubrod
Great Plains Manufacturing Co.
Indiana Berry and Plant Company
ISU Entomology Department
ISU Weed Science Department
John Fox
Kinze Manufacturing
Kuhn-Krause Corporation
Kruger Seed Company
LG Seed Company
MBS Farms
Monsanto Company
National Lab for Ag & Environment
PCS Fertilizer
Pioneer Hi-Bred International
Plainfield Welding and Repair
Schneider Milling Inc.
Spraying Systems Company
Stutzman’s Incorporated
Sukup Manufacturing
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Syngenta Crop Protection
Syngenta NK Brand Seeds
Winterhaven Vineyard
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The mention of firm names or trade products does not imply that 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

Regional Corn Re-plant Recommendations RFR-A11120..........................ISRF11-13
Soybean Planting Dates in Northeast Iowa RFR-A11127..........................ISRF11-13
Fertilizer and Swine Manure Management Systems Impact Phosphorus in Soil and
Subsurface Tile Drainage RFR-A11115..................................................ISRF11-13
Hydraulic Performance of the Denitrification RFR-A11116........................ISRF11-13
Effect of Sulfur and Boron Fertilization on Alfalfa RFR-A11113..................ISRF11-13
Impact of Liquid Swine Manure Application and Cover Crops on
Ground Water Quality RFR-A11117....................................................ISRF11-13
Effects of Seed Treatments and a Soil-applied Nematicide on Corn Yields and
Nematode Population Densities RFR-A11108......................................ISRF11-13
Corn Population Research RFR-A10112..............................................ISRF10-13
The Suction Trap Network Documents Soybean Aphid Migrations RFR-A10105.....ISRF10-13
Phosphorus and Potassium Placement Methods and Tillage Effects
on Yield of Corn and Soybean RFR-A10110........................................ISRF10-13
Seasonal and Rotational Influences on Corn Nitrogen Requirements RFR-A9119.....ISRF09-13
Crop and Soil Responses to Rates of Lime RFR-A9096............................ISRF09-13
Phosphorus and Potassium Fertilization for Corn and Soybean Grown
in Rotation for 30 years RFR-A9122..................................................ISRF09-13
Role of Directly Connected Macropores on Pathogen Transport
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Organic vs. Conventional Farming Systems........................................ISRF08-13
Corn and Soil Test Responses to By-Product Nitrogen Sources..................ISRF07-13
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of Hay for Transition Dairy Cows.......................................................ISRF07-13
Sulfur Deficiency in Northeast Iowa Alfalfa Production...............................ISRF06-13
Soybean Yield Influenced by Planting Date and Plant Population................ISRF05-13
Effect of Four Tillage Systems and Two Crop Rotations on Placement of P and K.....ISRF05-13
Evaluation of Hybrid Vigor between Different Alfalfa Varieties ..................ISRF05-13
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
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Corn Row Spacing, Plant Density, and Maturity Effects..............................ISRF02-13
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Silver Anniversary Field Day ................................................................ISRF01-13
Emergence Characteristics of Several Annual Weeds.................................ISRF00-13
Stalk and Ear Diseases in Bt and Non-Bt Corn Hybrids in Northeast Iowa........ISRF00-13
Stand Reduction Effects on Corn Grown at High Population Densities............ISRF99-13
Row Width and Variety Effects on Soybean Yield .....................................ISRF99-13
Transport of Chemicals through Fractures in Pre-Illinoian Till .......................ISRF99-13
Conversion of CRP to Corn and Soybeans.............................................ISRF96-13