

Northeast Research Farm Summary

RFR-A12108

Northeast Iowa Agricultural Experimental Association
2012–2013

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	103 Curtiss Hall, ISU
Coordinator, 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 up 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.

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

*163 frost-free days

Research Farm Projects

Research Project/Demonstration

Alfalfa nutrient and disease management study
 Asparagus variety trial
 Bt/non-bt corn variety × fungicide study
 Corn variety × starter fertilizer × plant population study
 Cover crop rye harvest re-growth study
 Crop N rate × crop rotation study
 Crop N rate × crop rotation study
 Crop N sensing × N rates study
 Crop rotation × fungicide × tillage × planting population study
 Evaluation of corn nematode control strategies
 Evaluation of corn rootworm insecticides and genetic seed traits
 Evaluation of cover crops and nitrogen rates on corn
 Evaluation of foliar fungicides, application timings, and seed treatments on corn and soybean diseases
 Evaluation of herbicides for equisetum weed control in road ditches
 Evaluation of humic acid and N rates on corn
 Evaluation of multiple resistances to soybean aphids
 Evaluation of soybean aphid and seed treatments
 Evaluation of soybean aphid flight populations from a suction trap monitor
 Evaluation of soybean varieties and soybean disease/insect control
 Evaluation of water tables, tiling methods, and tile spacing distances
 Evaluation of weed management strategies in corn and soybeans
 Home demonstration garden
 Hydrogeology water quality studies in the Devonian Aquifer and near tile drainage
 Insecticide and fungicide interactions in soybeans
 Iowa Crop Improvement Association soybean variety trials
 K rate × Bt rootworm isolate comparison study (2 studies)
 Long-term P-K rate study
 Long-term tillage × crop rotation studies
 Nitrogen rates following fall injected swine manure
 Oat variety study
 Organic corn variety study
 Organic product evaluation for soybean insect control and yield
 Pawpaw tree winter hardiness demonstration
 Phosphorus and potassium placement and rate in different tillages
 Phosphorus rate × P source study
 Rate of lime study

Project Leader

B. Lang
 P. O'Malley
 ISU NERF
 R. Elmore
 B. Lang
 J. Sawyer
 A. Mallarino
 J. Sawyer
 ISU NERF
 G. Tylka
 A. Gassman
 J. Sawyer
 A. Robertson
 X.B Yang
 ISU NERF
 D. Olk
 E. Hodgson
 E. Hodgson
 D. Voegtlin

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 M. Owen
 C. Haynes
 B. Simpkins

 A. Robertson/D. Mueller
 J. Rouse
 A. Mallarino
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 M. Hanna/M. Al-Kaisi
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 B. Lang
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 P. O'Malley
 A. Mallarino
 A. Mallarino
 ISU NERF

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

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.

<p>Agrigold Hybrids Agrilience, LLC Amvac Corporation Asgrow Seed Company BASF Corporation Bayer Crop Science C⁸MP 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</p>	<p>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 Swartzrock Implement Syngenta Crop Protection Syngenta NK Brand Seeds Winterhaven Vineyard Yetter Manufacturing</p>
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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 to Subsurface Drainage Water RFR-A9116.....	ISRF09-13
Corn Breeding.....	ISRF08-13
Organic vs. Conventional Farming Systems.....	ISRF08-13
Corn and Soil Test Responses to By-Product Nitrogen Sources.....	ISRF07-13
Development of Methodologies to Reduce the DCAD of Hay for Transition Dairy Cows.....	ISRF07-13
Sulfur Deficiency in Northeast Iowa Alfalfa Production.....	ISRF06-13
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
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
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