Northeast Research Farm Summary

Northeast Iowa Agricultural Experimental Association 2023–2024

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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 1000 people attended 10 extension field day/farm tour events at the ISU Northeast Research Farm (NERF) in 2023. Over 2300 people visited the Borlaug Learning Center (BLC) and NERF. The BLC hosted over 55 events ranging from a 3 day farm coop young agronomist training event, several seed company informational meetings and plot demonstration events and also a 1 day planter workshop with 3 break out sessions on different planter topics. Several livestock and crops extension trainings were also held, along with manure and pesticide applicator license trainings. At our March 15th, NEIAEA Annual Meeting, presentations were made on Monarch butterfly populations and conservation efforts in Iowa, Kelsey Fisher; Heavy equipment soil compaction measurement, modeling and effect on crop yields responses, Mehari Tekeste; along with a review of 2022 research results. The June 21st summer field day included information on ag markets and future trends, Chad Hart; weed management strategies, Bob Hartzler; pollinator habitat esstablishment and management, Randall Cass; and crop diseases update and submitting samples to the ISU plant diagnostics clinic, Ed Zaworski. Several weed and herbicide trait demonstration plots were planted for seed company educational events. The August 31st fall field day included topics on crop modeling and the effects of drought and smoke, Sotirios Archontoulis; corn rootworm research and management update, Erin Hodgson; soil profile and its impact of rooting depth on yield, Casey Luke and Meyer Bohn; and short stature corn update and management, representatives from Bayer and Pioneer. Tours of field research studies were held during these field day events.

New projects. Static water level monitoring of the Devonian Aquifer, Kevin Schilling and Richard Langel, Iowa Geological Survey, Comparison of nitrogen fixing biologicals on varying N rates, ISU NERF, Comparison of nitrogen, sulfur and N biologicals on soybeans, ISU NERF.

Crop Season Comments

In the fall of 2022, 1.78 in. of precipitation fell in September and October, which resulted in a quick harvest, with minimal rain delays, however minimal cover crop emergence occurred due to dry top soils. November and December had 2.65 in. of rainfall and December 2022 and January 2023 had 28.9 inches of snow (1.59 in. water equivalent). This was not enough to get the soil moisture profile replenished for the 2023 growing season. Tile drainage sump pumps were re-installed into our 36 – 1 acre water quality plots on March 7, 2023 with minimal to no flow through October 27, when the pumps were removed, due to only receiving 14.6 in. of rainfall in that time period (less than half of the long term average). In 2021 and 2022, we produced higher than expected corn and soybean yields, with miminal soil moisture reserves until early to mid-August rainfall events, but in 2023, we stayed moisture deficient throughout the entire growing season with less than 2 inches of rain per month from March through August. On September 22nd, we received 2.82 in. of rain, but crops were already physiologically mature. Low relative humdity and 28 days above 90F increased crop stress lowering yields. Corn and soybean yields varied considerably by soil type and slope due to moisture holding capacity. Some farmers in the area with light, sandy ground had dismal yields, but heavy loam soils, held more soil moisture, that increased yields.

Oat and legume seeding occurred on April 4 and nitrogen and manure applications began on April 8 with minimal rain delays. In planting date studies, we planted our 1st timings of corn and soybeans starting on April 10, followed by 15 day planting intervals, ending on June 1. The majority of corn and soybean plots were planted starting on April 26 and completed on May 21 for corn and soybeans. Only 6.2 inches of rain fell from May through August in 30 different rain events. Several areas in northeast Iowa received up to 4.5 inches of rain on July 12, however the research farm only recorded 0.37 inch of rain. The research farm in 2023, received only 13.83 in. of rain from April through November, (16.85 in. below the 47 year average for the research farm and 12.2 inches below 2022).

Corn harvest began September 25 and was completed October 19. Corn yields were below average to average, despite below average rainfall, but moisture holding capacity of the soil, caused the yield differences. Corn yields varied from 135 to 225 bushels/acre and averaged 180 bushels/acre, regardless of crop rotation. Soybean harvest began September 14 and was completed October 5. Due to the dry growing season, minimal to no corn and soybean diseases occurred. No economic thresholds of soybean insect populations occurred, however corn rootworms on continuous corn rotation had areas above economic thresholds. Control of corn rootworms with use of infurrow insecticide was inconsistent, due to such dry soil conditions after planting. Soybean yields ranged from 35 to 60 bushels/acre and averaged 48 bushels/acre. Moisture holding capacity in different soil types caused most of the yield variation, since we had below normal rainfall up until September 22. We received 2920 GDU's from May-September, (104 more than 2022 and 324 GDU's more than the past 30 year average).

Weather Comments

Winter 2022–2023. The first measurable snowfall occurred November 12, 2022, and the last snow for the season was April 21, 2023, with a total of 40.3 in. recorded (21.7 in. more than the previous winter). The average 4-in. soil temperature remained below 50ºF after November 11, 2022. Fall manure injection and tillage operations were completed by November 13 and 29, respectively.

Spring 2023. The 4-in. average soil temperature remained above 50ºF on May 2. Most farmers completed corn and soybean planting from the last week of April through early May) due to no major rain delays. The last killing frost occurred on May 3, although there was some frost injury in parts of northeast Iowa on June 12, due to low dew points, despite air temperatures above freezing. May had 25 days suitable for field work, since only 1.93 in. of rainfall, for the month.

Summer 2023. May, June, July and August rainfall was -2.56, -3.75, -3.31 and -3.34 in. below the 47-yr farm average. May, June, August and September average daily air temperatures was +3.42, +2.23, +3.55, and +5.06 ºF above the 47-yr farm average, respectively. Crop stress was more than previous dry growing seasons, due to 28 days of air temperaturs above 90 ºF from May through October. July air temperature was -0.87 ºF, from the 47-yr farm average, which decreased crop stress during pollination. Corn pollination occurred between July 12-22, when the daily high temperatures averaged 82.6 ºF, while the last 9 days of July averaged 90.8 ºF.

Foliar crop diseases were minimal to non-existent in corn and soybeans, similar to the past few years at the research farm due to dry and low humidity conditions. Total growing degree day heat unit accumulation for April

through October was above normal, which allowed corn to mature prior to frost with minimal to no artificial drying of corn required.

Fall 2023. The first killing freeze occurred October 10 (28.7°F). Grain harvest had very few delays, with only 1.56 and 3.01 in. rainfall during corn and soybean harvest, respectively. The 4-in. soil temperature remained below 50°F on October 28, 2023. On October 6, fall seeded cover crops and cool season forages were notill drilled and emerged October 17, after 1.48 in. rain. Fall manure injection, fall fertilizer applications and tillage operations were completed from October 30 through November 22.

The soil surface never froze in December and only partially froze from January 13 to 21st and remains unfrozen through mid-Febuary. Soil moisture reserves are still deficient, due to only 3.53 in of precipitation from October through December of 2023 and 1.39 in. precipitation in January and February of 2024.

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Table 1. Monthly rainfall and average temperatures during the 2022 growing season.

	Rainfall (in.)			Temperature (°F)*			
Month	NERF	Departure from normal	No. days of rain	NERF	Departure from normal	Growing degree days	Days 90°F+
April	1.85	-1.75	9	48.36	+0.90	187	0
May	1.93	-2.56	9	62.95	+3.42	447	2
June	1.63	-3.75	8	71.37	+2.23	625	4
July	1.17	-3.31	7	71.49	-0.87	642	5
August	1.50	-3.34	6	73.29	+3.55	683	10
September	3.30	-0.16	8	67.65	+5.06	523	5
October	2.16	-0.51	7	52.63	+3.23	255	2
November	0.29	-1.46	2	38.43	+3.37		0
Total	13.83	-16.85	56	1st hard freeze: 28.7°F (10/10/23)			28

*165 frost-free days

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Corteva Agriscience
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