

Ag Engineering and Agronomy Farm and Central Iowa Research Farms Summary

RFR-A1994

Farms Staff

**Ag Engineering/Agronomy Farm (AEA), 1308 U Avenue, Boone, IA
515-296-4081 Ag Engineering office/515-296-4082 Agronomy office**

Superintendent Mike Fiscus
Manager, Ag Engineering Nathan Meyers
Ag Specialist Zachary Koopman
Ag Specialist Ethan Thies (resigned 12/13/19)
Ag Specialist Nick Upah
Farm Equipment Mechanic Jeff Erb

Central Iowa Farms (CIF), ISU Curtiss Farm, 2219 State Avenue, Ames, IA, 515-290-1498

Superintendent Kent Berns
Ag Specialist (½ time CIF, ½ time CAD) Karl Nicolaus
Farm Equipment Operator John Reinhart

College Shop, 52099 260th Street, Ames, IA, 641-751-0280

Farm Equipment Mechanic Dan Crosman

Committee for Agricultural Development (CAD), 103 Curtiss Hall

Seed Plant, 2219 State Avenue, Ames, IA, 515-291-0507

Superintendent Kevin Scholbrock
Ag Specialist (½ time CIF, ½ time CAD) Karl Nicolaus

Compost Facility, 52271 260th Street, Ames, IA, 515-450-0581

Ag Specialist Steve Jonas
Research Associate Arlie Penner

BioCentury Research Farm, 1327 U Avenue, Boone, IA, 515-296-6300

Manager Andrew Suby
Assistant Manager Jordan Funkhouser

Associate Dean for Operations Mark Honeyman
Farms Manager Tim Goode

103 Curtiss Hall, 513 Farm House Lane
Iowa State University

Ag Engineering and Agronomy Farm Farm and Weather Summary

Mike Fiscus, farm superintendent
Nathan Meyers, ag specialist

Farm Comments

Field days and tours. The Ag Engineering and Agronomy (AEA) Farm hosted 330 visitors in 2019. Events included a field day on August 28, focusing on weather trends in Iowa and mitigating soil compaction issues in row crop production. Dennis Todey, USDA, discussed current weather trends. Mark Hanna discussed soil compaction issues with farm equipment and ways to reduce some of those effects through lower tire pressures and new low pressure tire technology. Other visitors included 64 students from the West Delaware School District to learn about plant breeding and other research at the farm. The farm hosted the field tour portion of the Raymond Baker Plant Breeding Tour September 17. Michael Walsh, Australia, was here October 21 to present information on the Weed Destroyer technology currently able to pulverize weed seed coming out the back end of harvest combines. The farm hosted an ISU Extension Tour, an Ames area leadership group, and visitors from Argentina.

Developments. Nick Upah started January 2019 as an ag specialist working with the AEA farm staff. His role is to help with all aspects of the operation of the farm plus assigned research projects, including a water quality project at the Finch Farm.

Facilities and equipment. A groundbreaking was held in October 2018 for a dynamometer test facility to be constructed at the AEA Farm. That facility has been transferred to the BioCentury Research Farm (across the road from the AEA farm), and construction is taking place to start operations in 2020.

The new Soil Dynamics Lab is in full operation following installation of two linear soil bins donated from Caterpillar Corporation, and a round soil bin under lease from USM Technologies. Brian Steward and Mehari Tekeste, Agricultural and Biosystems Engineering (ABE), are the lead professors.

The first year of research was completed in a new water quality study at the Finch Farm sponsored by Bayer Corporation. The study is evaluating nitrate leaching into tile water under varying management approaches, corn plant populations and nitrogen rates. Sotirios Archontoulis and Mike Castellano, Agronomy, and Matt Helmers, ABE, are the lead professors for the project.

A “soil cube” project headed by Matt Helmers, ABE, also completed its first year of research. The project evaluates leaching properties of various soil biological treatments within a 5 in. metal cube box of soil. The cubes are designed to eliminate contamination from one treatment to another.

Crop Season Comments

Oat seeding was completed April 15. The oats were harvested July 25, with average yields of 70 bushels/acre. Late planting and wet weather contributed to lower than normal yields and test weight.

Corn planting started May 16 and was completed June 6. Most of the planting occurred during the first week of June, as May rainfall kept planting equipment out of the fields. Harvest began October 14 and was completed November 26. Yields averaged 189 bushels/acre.

Soybean planting began June 8 and was completed June 14. Harvest began October 9

and was completed October 27. The whole farm average was 50 bushels/acre.

Weather Comments

Winter. Total snowfall for January, February, and March was 36.2 in. with 25 in. of that total occurring in February. Rainfall equivalent and rainfall events totaled 3.74 in.

Spring. A rainfall total of 14.23 in. was recorded for the months of April, May, and June (Table 1). May rainfall was 8.32 inches, limiting field work to only three days for the month. The last killing frost occurred April 13, with some low temps occurring April 28 and May 3. May temperatures were cool, averaging 69.5°F. Soil temperatures at the 4-in. depth began to average 50°F April 5 and cooled again until April 17.

Summer. A total of 10.47 in. of rain fell during the summer months from July through September.

Fall. A total of 7.65 in. of rain was recorded for the months of October through December. October was much wetter than normal (Table 1). The first measurable snowfall of 1.3 in. occurred October 29. The first hard freeze occurred October 12.

A total of 36.09 in. of rain was recorded for 2019, which was 3.71 in. above normal (Table 2 indicates growing season totals). This was the seventh year out of the last 11 years that had above average precipitation (Table 2).

Table 1. Monthly rainfall and average temperatures during the 2019 growing season at the ISU Ag Engineering/Agronomy Research Farm, Boone, IA.

Month	Rainfall (in.)		Avg. temperature (°F)		Days 90°F or above
	2019	Deviation from normal	2019	Deviation from normal	
March	1.50	-0.29	32	-4	0
April	1.94	-1.28	52	3	0
May	8.32	3.87	59	-1	1
June	3.97	-0.86	71	1	2
July	4.61	0.92	76	2	6
August	1.30	-2.70	71	-1	0
September	4.56	0.93	70	6	0
October	<u>5.24</u>	<u>2.79</u>	49	-3	<u>0</u>
Totals	31.44	3.38			9

Table 2. Ag Engineering/Agronomy Research Farm 11-yr summary of monthly precipitation.

Mo.	NR ¹	ANR ²	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Jan	0.79	0.79	0.95	1.17	0.70	0.26	0.41	0.10	0.19	0.60	1.85	1.31	0.54
Feb	0.94	1.73	0.25	0.75	1.06	1.74	0.73	1.15	0.94	0.68	1.20	1.16	1.70
Mar	1.79	3.52	4.07	2.07	0.79	2.49	1.48	1.00	0.21	1.48	3.11	2.49	1.50
Apr	3.23	6.75	4.56	3.66	4.41	4.79	5.81	4.75	3.45	4.09	3.06	1.27	1.94
May	4.41	11.16	3.78	3.64	4.62	2.46	7.09	4.26	4.57	4.28	6.16	3.98	8.32
Jun	4.83	15.99	4.11	11.17	5.05	2.94	3.01	8.86	6.90	0.97	1.73	11.10	3.97
July	3.68	19.67	2.75	6.74	3.90	1.47	1.01	2.88	5.96	5.85	0.99	4.21	4.61
Aug	4.02	23.69	4.84	11.21	3.58	2.98	2.18	5.70	8.26	8.23	3.34	8.41	1.30
Sept	3.62	27.31	0.96	6.57	2.02	1.85	1.19	5.55	5.05	7.90	1.80	6.75	4.56
Oct	2.43	29.74	7.33	0.38	0.86	2.34	2.50	3.75	1.27	0.59	6.07	4.85	5.24
Nov	1.53	31.27	1.38	2.23	2.72	0.90	1.40	0.71	2.75	1.74	0.26	1.62	1.33
Dec	1.05	32.32	1.96	0.80	2.23	1.02	0.32	1.15	5.05	1.17	0.17	2.62	1.08
Tot.	32.32		36.94	50.39	31.94	25.24	27.13	39.86	44.60	37.58	29.74	49.77	36.09
Departure from Normal			4.62	18.07	-0.38	-7.08	-5.19	7.54	12.28	5.26	-2.58	17.45	3.71

¹NR = normal rainfall.²ANR = accumulated normal rainfall.

Project List

Project-Agronomy Farm

BCRF plant zoo
 Agrocete corn and soybean project trial
 Bioreactor evaluation trial
 Butterfly habitat/milkweed trial
 Canola interseeding and variety trials
 Cereal rye seeding rate/timing trial
 COBS project-South Reynoldson Farm

 Comparison of biofuel systems (COBS)
 Corn and soybean climate monitoring
 Corn and soybean fungicide trials
 Corn and soybean hail study
 Corn and soybean of cytozyme trials
 Corn and soybean yield trials
 Corn breeding
 Corn breeding
 Corn breeding
 Corn breeding/double haploid research
 Corn breeding/plant pathology trials
 Corn breeding/sorghum breeding
 Corn growth evaluation/camera trial
 Corn hybrid calibration trial
 Corn nitrogen utilization research
 Corn production systems/water quality
 Corn rootworm research
 Corn seedling disease research

Department

BCRF
 Agronomy
 ABE
 Entomology
 Agronomy
 Agronomy
 ABE/Agronomy

 Agronomy
 Agronomy
 Plant Pathology
 Plant Pathology
 Agronomy
 ICIA
 Agronomy
 Agronomy
 Entomology/USDA
 Agronomy
 Plant Pathology
 Agronomy
 Agronomy
 Agronomy
 Agronomy
 Entomology/USDA
 Seed Science

Project Leader

A. Suby
 S. Archontoulis
 M. Soupir
 R. Hellmich
 M. Wiedenhoef
 M. Licht
 M. Helmers/M. Thompson/
 M. Liebman
 M. Liebman
 A. VanLoocke
 A. Robertson
 D. Mueller
 M. Licht
 J. Rouse
 J. Edwards
 P. Scott
 C. Abel
 T. Lubberstedt
 N. Lauter
 J. Yu
 P. Schnable
 J. Edwards/S. Archontoulis
 M. Castellano
 S. Archontoulis/M. Castellano
 A. Gassmann
 G. Munkvold

<u>Project-Agronomy Farm (continued)</u>	<u>Department</u>	<u>Project Leader</u>
Corn standability fungicide trial	Plant Pathology	A. Robertson
Cover crop/strip till trial	Agronomy	M. Licht
DOP soybean relative maturity trial	ISU FARM	Z. Koopman/M. Witt
Enviratron Facility project	GDCB	S. Howell/S. Whitham
FEEL research plots	Plant Pathology	D. Mueller
Forage and biomass production systems	Agronomy	K. Moore
Forecast and assessment of cropping systems trial (FACTS plots)	Agronomy	S. Archontoulis
Glycerin product corn trial	Agronomy	M. McDaniel
Hermann Farm soil nutrient runoff/cover crop trial	Agronomy/ABE	A. Mallarino/M. Helmers
Humic acid study	NLAE	D. Dinnes
LEBRC lab facility	ABE	B. Ramirez
Long-term continuous corn tillage study	Agronomy	M. Al-Kaisi
Long-term nitrogen trial	Agronomy	S. Archontoulis
Long-term tillage study	Agronomy	M. Al-Kaisi
Miscanthus research	Agronomy	E. Heaton
Miscanthus/corn nitrogen trial	Agronomy	E. Heaton
Mung bean research	Agronomy	Arti Singh
Oat variety trial	Practical Farmers	M. Schnable
Organic corn breeding	Agronomy	J. Edwards/T. Lubberstedt
Organic cropping systems trial	NLAE	C. Camberdella
Oxbow and bioreactor installation	NREM	E. Thies
Pivot Bio corn trial	Agronomy	M. Castellano
Plant pathology corn-soybean tillage trial	Plant Pathology	D. Mueller
Plant pathology soybean disease trials	Plant Pathology	D. Mueller
Poultry manure/water quality plots	ABE	M. Soupir
Prairie forbs establishment trial	Entomology/USDA	R. Hellmich
Rye nitrogen utilization trial	Agronomy	J. Sawyer
Saturated buffer installation	NREM	T. Isenhardt
Soil compaction tire trial	ABE	S. Birrell
Soil cube project	ABE	M. Helmers
Soil dynamics lab	ABE	M. Tekeste/B. Steward
Sorghum breeding	Agronomy	M. Salas
Soybean aphid suction trap	Entomology	E. Hodgson
Soybean breeding	Agronomy	D. Singh
Soybean cyst nematode trials	Plant Pathology	G. Tylka
Soybean disease research	Plant Pathology	L. Leandro
Soybean genetic mapping	USDA	J. Hayes
Soybean gypsum fertility trial	Agronomy	A. Mallarino
Soybean inoculation trial	Agronomy	S. Archontoulis
Soybean SCN trials and research	Plant Pathology	C. Marett/G. Tylka
Sustainable ag cropping systems	Agronomy	M. Liebman
Switchgrass variety trial	Agronomy	E. Heaton
USB Soybean project trial	Agronomy	S. Archontoulis

<u>Project-Agronomy Farm (continued)</u>	<u>Department</u>	<u>Project Leader</u>
USDA organic/water quality plots	NLAE	C. Cambardella
USDA/plant physiology	NLAE	T. Kaspar
Weed Science cover crop trial	Agronomy	P. Jha
Winter wheat/red clover inter seeding trial	Agronomy	M. Liebman
Winter wheat/soybean inter seeding trial	Agronomy	M. Licht

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Case-IH
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Heartland Ag Supply

Gandy Corporation
J & M Manufacturing
John Deere
Monsanto/Bayer Seed
Nutrien Ag Solutions

Central Iowa Farms Farm and Weather Summary

Kent Berns, farms superintendent

Farm Comments

The ISU Central Iowa Farms consist of farmland in Story and Boone counties. There were 2,376 crop acres under Central Farms management in 2019, with 445 acres devoted to intensive plot research. The additional acres were used for large-scale research, equipment testing, silage production, and manure application. The student-managed Ag 450 Farm rented approximately 185 acres and sharecropped another 52 acres. The Ag 450 Farm also was hired to perform custom farm work on a portion of the Central Iowa Farms.

New projects. An atmospheric monitoring study comparing miscanthus, corn, sorghum, and soybeans was initiated at the Kitchen Farm.

Miscanthus grass was planted in three potholes on Section 19. A saturated buffer was installed on the West Dairy Farm. A pump and spillway structure was installed at South Woodruff to facilitate a tile zone water quality improvement project.

Other tile and waterway repairs and improvements will continue. An oat/radish blend was aerially seeded on the ISU Sundberg Farm in early September. A similar blend was used as a cover crop on acres harvested for corn silage. The irrigator at the ISU Curtiss Farm was not operated in 2019 due to wet conditions. The east field at the Bilsland Farm was used for sprayer development.

Bill Fjelland, retired from Iowa Crop Improvement Association, began working part-time for the Central Iowa Farms.

Crop Season Comments

The 2019 season was cold and wet until mid to late April. Only a few days were fit for fieldwork in May. The summer was cool and heat units seemed to be under normal pace. Precipitation was well above normal for September and October delaying harvest. Disease pressures were minor. Insect pressure seemed more than recent years.

Bulk corn planting started April 24 and finished June 4. Corn silage yields averaged 25 tons/acre at an 8-in. cut height with 67 percent moisture. A total of 298 corn acres were harvested for silage. Those acres were tilled and seeded to a cover crop. Bulk corn grain yields averaged 196 bushels/acre and harvest was completed mid-November.

Large field soybean planting began June 3 and was completed June 8. E3 soybeans were planted in one bulk field and yield was excellent, averaging 59 bushels/acre. Fall harvesting of corn and soybean began mid-October and was completed in late October.

Fall tillage was limited due to late harvest dates and wet soil conditions in November.

Weather Comments

The Ag Engineering/Agronomy Farm weather summary (Table 1, page 3) represents the weather data for all of the farms in central Iowa covered by this report.

Project List

<u>Project-Central IA Farms</u>	<u>Farm Location</u>	<u>Project Leader</u>
Continuous corn plot 100+yrs	Animal Science	K. Berns
Continuous corn rootworm evaluation	Johnson 16, 17	A. Gassman
Corn aphid	Johnson 2	G. Vannostrand
Corn genetics nursery	Curtiss	S. Anderson
Corn genetics nursery	Ames area	S. Anderson
Corn isolation	Bennett	L. Coffey
Corn isolation	Packer Iso	C. Gardner
Corn isolation	East Curtiss	T. Peterson
Corn isolation 3x	Beef teaching	J. Yu
Corn modeling vs. maturity	South Woodruff	B. Hornbuckle
Corn nursery	Curtiss 16	M. Hufford
Corn nursery	Curtiss	D. Wright
Corn nursery	Woodruff	P. Scott
Corn trial	Johnson	U. Frei
Dicamba-Bayer	Main Dairy	D. Franzenburg
Eddy covariance corn	Kitchen	A. Vanlooche
Eddy covariance miscanthus	Kitchen	A. Vanlooche
Eddy covariance sorghum	Kitchen	A. Vanlooche
Eddy covariance soybeans	Kitchen	A. Vanlooche
Fertilizer placement in furrow	Bilsland	M. Darr
First year corn insect	South Woodruff	A. Gassman
First year corn insect	Johnson 18	A. Gassman
Genetics irrigated	Curtiss	L. Coffey
Genetics irrigated	Curtiss	T. Peterson
Genetics irrigated	Curtiss 16, 18	E. Vollbrecht
Genetics non irrigated	Curtiss 19	E. Vollbrecht
Genetics nursery	Ames area	P. Becraft
Genetics nursery	Ames area	T. Bierwagen
Genetics nursery	Ames area	U. Frei
Genetics nursery	Curtiss	A. Myers
Genetics nursery	Ames area	E. Vollbrecht
Teaching plot	Hansen	B. Hornbuckle
Herbicide evaluation	Curtiss	D. Franzenburg
IDC screen	Beef Teaching	G. Gebhart
IDC x cover crop	Johnson	L. Leandro
Imaging	Curtiss	L. Coffey
Inbred x insect	Johnson 17	C. Abel
Japanese beetles	Johnson	G. Vannostrand
Milkweed	Johnson 23	R. Hartzler

<u>Project-Central IA Farms (continued)</u>	<u>Farm Location</u>	<u>Project Leader</u>
Miscanthus in potholes	Woodruff	E. Heaton
Monarch	College Creek	R. Helmich
Monarch	East Curtiss	R. Helmich
Nitrogen rate imaging	East Kelley	L. Coffey
Oat fallow	Bilsland	M. Darr
Off year	West Curtiss Farm	D. Franzenburg
Pipeline recovery	North Woodruff	M. Tekeste
Pollinator seeding evaluation	East Curtiss	R. Helmich
Poplar tree propagation	Applied Science	D. Buchman
PPO resistance	Pony track iso	D. Franzenburg
Prairie seeding ratios	South Woodruff	B. Wilsey
Remote sensing yields	Main Dairy	N. Upah
Rootworm trait trial	Johnson 7 c-c	A. Gassman
Rootworm trait trial	Kelley c-c	A. Gassman
Saturated buffer	West Dairy	T. Isenhardt
SCN off-year planting	Johnson	G. Gebhart
SCN off-year planting	South Woodruff	C. Maret
SDS x cover crop	Hinds 9S	L. Leandro
Soil gas flux sampling	Been and Woodruff	S. Hall
Soil sample nutrient response	West Curtiss 1	Landus Cooperative
Sorghum breeding	Curtiss 5	M. Salas
Sorghum cold vigor evaluation	Curtiss 5	M. Salas
Sorghum isolation	North Woodruff	M. Salas
Soybean cages/growout	Johnson 8	J. Hohenstein
Soybean disease	West Curtiss 2	S. Navi
Soybean disease	East Curtiss	S. Wiggs
Soybean foliar feeding	Johnson, Dairy	A. Dean
Soybean pathology	Hinds 2, 3	L. Leandro
Soybean pathology	Hinds 2, 3	S. Navi
Soybean pathology	Johnson 8	S. Wiggs
Soybean pathology	Johnson 14	S. Wiggs
Sprayer development	Bilsland	M. Darr
Sprayer test track	East Dairy	M. Darr
Swan tracking	Kelley	S. Dinsmore
Tile zone wetland	South Woodruff	W. Crumpton
Weed phenotype	Moore	R. Hartzler
Weeds field day, August	Curtiss	M. Anderson
Weeds field day, late June	Curtiss	M. Anderson
Wildlife population sampling	Kelley	A. Janke
Yield trial	Johnson	J. Edwards