

Ag Engineering and Agronomy Farm and Central Iowa Research Farms Summary

RFR-A18124

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
Ag Specialist..... Ryan Budnik (resigned 9/30/18)
Farm Equipment Mechanic..... Jeff Erb
Farm Equipment Operator..... Dale Niedermann (retired 2/28/18)

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

Research Farms Coordinator..... 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 280 visitors in 2018. Visitors included 80 students from the West Delaware School District to learn about plant breeding and other research at the farm. The farm also hosted five field days highlighting various research projects. The field days included groups visiting the sustainable ag cropping systems plots, a tour of the bioreactors managed by Michelle Soupir, a tractor maintenance course sponsored by Practical Farmers of Iowa, a plant breeding field day in association with the ISU Department of Agronomy, visitors from Brazil during the Farm Progress Show, and a tour for a group from China.

Developments. Dale Niedermann, farm equipment operator at the farm, retired after 40 years of service to the university, the most recent 23 years at the AEA farm.

Facilities and equipment. A groundbreaking was held in October for a dynamometer test facility to be constructed at the AEA Farm. Construction will begin in 2019 on the new facility that will test power output of tractors, sprayers, and other agricultural equipment.

Work continues in the new Soil Dynamics Lab to make two linear soil bins, donated by Caterpillar Corporation, operational for the ABE department. A circular soil bin, leased from USM Wear Technologies, Eldora, Iowa, also was installed in the same facility. Mehari Tekeste, ABE, is the project leader in charge of managing these units for compaction and tillage tool wear studies.

Work continues to make the Enviratron Facility operational for university experiments. The Enviratron houses eight growth chambers serviced by a robotic rover to obtain data from each chamber. More information can be found at <https://www.news.iastate.edu/news/2014/10/10/enviratron>.

A new water quality study was established at the ISU Finch Farm to evaluate nitrate leaching into tile water under different corn management production scenarios. Sotirios Archontoulis and Mike Castellano, Agronomy; and Matt Helmers, ABE, are the lead professors for this project.

A “soil cube” project headed by Matt Helmers, ABE, commenced in fall 2018 involving transferring one specific soil type in 5-ft square metal boxes to another field location for analyzation of agricultural substances leaching through a specific soil type.

Crop Season Comments

Oat seeding was completed April 25. The oats were harvested late July, with average yields of 75 bushels/acre. Late planting due to cold, wet weather contributed to lower than normal yields.

Corn planting started April 24 and was completed May 29. Harvest began September 30 and was completed November 7. Yields were good, with a whole farm average of 195 bushels/acre.

Soybean planting began April 27 and was completed June 5. Harvest began October 8 and was completed October 28. The whole farm average was 45 bushels/acre.

Weather Comments

Winter. Total snowfall for January, February, and March was 14.8 in. Rainfall equivalent and rainfall events totaled 4.96 in.

Spring. A rainfall total of 16.35 in. was recorded for the months of April, May, and June. A total of 3.5 in. of snow fell in April, with the last snowfall April 18. April was a cold month, with the overall monthly temperature of 8°F below normal. The last killing frost occurred April 19. Temperatures started to warm in May, with six straight days at the end of the month of 90°F or higher. Soil temperatures at the 4-in. depth began to average 50°F April 13. June was a very wet month, with 11.10 in. of rainfall, slowing progress of field work.

Summer. A total of 19.37 in. of rain fell during the summer months of July through September, which was 8.05 in. above normal.

Fall. A total of 9.09 in. of rain was recorded for the months of October through December. The first measurable snowfall of 1.0 in. occurred October 14. The first hard freeze was November 7. Very little tillage was completed in the fall due to wet, and then frozen field conditions.

A total of 49.77 in. of rain was recorded for 2018, which was 17.45 in. above normal (Table 2 indicates growing season totals).

Table 1. Monthly rainfall and average temperatures during the 2018 growing season at the ISU Ag Engineering/Agronomy Research Farm, Boone, IA.

Month	Rainfall (in.)		Avg. temperature (°F)		Days 90°F or above
	2018	Deviation from normal	2018	Deviation from normal	
March	2.49	0.70	36	0	0
April	1.27	-1.96	42	-8	0
May	3.98	-0.43	69	8	6
June	11.10	6.27	74	4	9
July	4.21	0.53	74	0	7
August	8.41	4.39	73	1	0
September	6.75	3.13	68	4	6
October	<u>4.85</u>	<u>2.42</u>	50	-3	<u>0</u>
Totals	43.06	15.05			28

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

Mo.	NR ¹	ANR ²	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Jan	0.79	0.79	0.24	0.95	1.17	0.70	0.26	0.41	0.10	0.19	0.60	1.85	1.31
Feb	0.94	1.73	0.71	0.25	0.75	1.06	1.74	0.73	1.15	0.94	0.68	1.20	1.16
Mar	1.79	3.52	2.71	4.07	2.07	0.79	2.49	1.48	1.00	0.21	1.48	3.11	2.49
Apr	3.23	6.75	5.22	4.56	3.66	4.41	4.79	5.81	4.75	3.45	4.09	3.06	1.27
May	4.41	11.16	8.49	3.78	3.64	4.62	2.46	7.09	4.26	4.57	4.28	6.16	3.98
Jun	4.83	15.99	10.68	4.11	11.17	5.05	2.94	3.01	8.86	6.90	0.97	1.73	11.10
July	3.68	19.67	9.28	2.75	6.74	3.90	1.47	1.01	2.88	5.96	5.85	0.99	4.21
Aug	4.02	23.69	2.10	4.84	11.21	3.58	2.98	2.18	5.70	8.26	8.23	3.34	8.41
Sept	3.62	27.31	3.09	0.96	6.57	2.02	1.85	1.19	5.55	5.05	7.90	1.80	6.75
Oct	2.43	29.74	3.63	7.33	0.38	0.86	2.34	2.50	3.75	1.27	0.59	6.07	4.85
Nov	1.53	31.27	2.59	1.38	2.23	2.72	0.90	1.40	0.71	2.75	1.74	0.26	1.62
Dec	1.05	32.32	1.20	1.96	0.80	2.23	1.02	0.32	1.15	5.05	1.17	0.17	2.62
Tot.	32.32		49.94	36.94	50.39	31.94	25.24	27.13	39.86	44.60	37.58	29.74	49.77
Departure from Normal			17.62	4.62	18.07	-0.38	-7.08	-5.19	7.54	12.28	5.26	-2.58	17.45

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

Project List

Project-Agronomy Farm

BCRF plant zoo
 Butterfly habitat/milkweed trial
 Canola interseeding and variety trials
 Cereal Rye seeding rate/timing trial
 Corn and soybean climate monitoring
 Corn and soybean date of planting studies
 Corn and soybean hail study
 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
 Corn standability fungicide trial
 Cover crop/strip till trial
 Enviratron Facility project
 FEEL research plots
 Foliar boron application in corn
 Forage and biomass production systems

Department

BCRF
 Entomology
 Agronomy
 Agronomy
 Agronomy
 Agronomy
 Plant Pathology
 ICIA
 Agronomy
 Agronomy
 Entomology/USDA
 Agronomy
 Plant Pathology
 Agronomy
 Agronomy
 Agronomy
 Entomology/USDA
 Seed Science
 Plant Pathology
 Agronomy
 GDCB
 Plant Pathology
 ISU FARM
 Agronomy

Project Leader

A. Suby
 R. Hellmich
 M. Wiedenhoef
 M. Licht
 A. VanLoocke
 M. Licht
 D. Mueller
 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
 A. Robertson
 M. Licht
 S. Howell
 D. Mueller
 Z. Koopman
 K. Moore

<u>Project-Agronomy Farm (continued)</u>	<u>Department</u>	<u>Project Leader</u>
Forecast and assessment of cropping systems trial (FACTS plots)	Agronomy	S. Archontoulis
Fungicide application trial	Plant Pathology	D. Mueller/A. Penney
Honeybee soybean pollination trial	Entomology	M. O'Neal
Humic acid study	NLAE	D. Dinnes
Iowa nutrient reduction center trial	Agronomy	M. Castellano
Long-term continuous corn tillage study	Agronomy	M. Al-Kaisi
Long-term nitrogen trial	Agronomy	J. Sawyer
Long-term tillage study	Agronomy	M. Al-Kaisi
Miscanthus research	Agronomy	E. Heaton
Miscanthus/corn nitrogen trial	Agronomy	E. Heaton
Monarch habitat/milkweed trial	Entomology/USDA	R. Hellmich
Mung bean research	Agronomy	Arti Singh
Organic corn breeding	Agronomy	J. Edwards/T. Lubberstedt
Plant pathology corn-soybean tillage trial	Plant Pathology	D. Mueller
Plant pathology soybean disease trials	Plant Pathology	D. Mueller
Prairie forbs establishment trial	Entomology/USDA	R. Hellmich
Rainfall simulation trials	Agronomy	A. Mallarino
Seed corn variability in a bag trial	Agronomy	M. Licht
Sorghum breeding	Agronomy	M. Salas
Soybean and corn disease trials	Plant Pathology	A. Robertson
Soybean aphid suction trap	Entomology	E. Hodgson
Soybean breeding	Agronomy	D. Singh
Soybean cyst nematode trials	Plant Pathology	G. Tylka/S. Cianzio
Soybean defoliation trial	Agronomy	M. Licht
Soybean disease research	Plant Pathology	L. Leandro
Soybean genetic mapping	USDA	J. Hayes
Soybean gypsum fertility trial	Agronomy	A. Mallarino
Soybean potassium trial	Agronomy	A. Mallarino
Soybean SCN trials and research	Plant Pathology	C. Marett/G. Tylka
Sulfur utilization in corn and soybeans	Agronomy	J. Sawyer
Sustainable ag cropping systems	Agronomy	M. Liebman
United Soybean Board soybean trial	Agronomy	S. Archontoulis
Winter wheat/red clover inter seeding trial	Agronomy	M. Liebman
Winter wheat/soybean inter seeding trial	Agronomy	M. Licht

<u>Project-Ag Engineering</u>	<u>Department</u>	<u>Project Leader</u>
Bioreactor evaluation trial	ABE	M. Soupir
COBS project-South Reynoldson Farm	ABE/Agronomy	M. Helmers/M. Thompson/ M. Liebman
Firestone compaction trial	ABE	M. Tekeste
Grain harvest lab	ABE	M. Tekeste
Hermann Farm soil nutrient runoff/cover crop trial	Agronomy/ABE	A. Mallarino/M. Helmers
LEBRC lab facility	ABE	H. Xin/S. Hoff/D. Andersen
Michelin tire test	ABE	M. Tekeste
Organic cropping systems trial	NLAE	C. Camberdella
Poultry manure/water quality plots	ABE	M. Soupir
Soil cube project	ABE	M. Helmers
Soil dynamics lab	ABE	M. Tekeste/S. Birrell
Sprayer droplet test trials	ABE	M. Darr
Tillage equipment draft trial	ABE	S. Birrell
Tunnel hoop cover trial	ABE	B. Steward
USDA organic/water quality plots	NLAE	C. Cambardella
USDA/plant physiology	NLAE	T. Kaspar

Acknowledgements

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AGCO Corporation	Gandy Corporation
AMVAC Chemical	J & M Manufacturing
Calcium Products	John Deere
Case-IH	Monsanto/Bayer Seed
Dupont/Pioneer Seed	Nutrien Ag Solutions
Heartland Ag Supply	
Highway Equipment Company (New Leader Dry Spreader Systems)	

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 2,294 crop acres under Central Farms management in 2018, with 385 acres devoted to intensive small 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.

The ISU Kitchen Farm was tilled into four separate 10-acre blocks in preparation for an atmospheric monitoring study comparing miscanthus, corn, sorghum, and soybeans.

Other tile and waterway repairs and improvements will continue. A 6 series John Deere platform was purchased for the plot cleanup combine. 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 2018 due to wet conditions. A portion of the East Dairy Farm was seeded to grass and will be used for sprayer development and testing.

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

Crop Season Comments

The 2018 season was cold until late April, warm with typical precipitation for May, and extremely wet for June and early July. Precipitation was well above normal for September, delaying harvest until October. Disease and insect pressures were minor.

Bulk corn planting started April 27, however the majority of the acres were planted in May with corn planting complete May 12. Corn silage yields averaged 25 tons/acre at an 8-in. cut height with 68 percent moisture. A total of 231 corn acres were harvested for silage. Those acres were tilled and seeded to a cover crop. Bulk corn grain yields averaged 194 bushels/acre.

Large field soybean planting began May 8 and was completed May 25. Later planted fields had stand issues caused by extremely wet conditions. Yields averaged 55 bushels/acre. Fall harvesting of corn and soybean began late September and was completed November 10.

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>
Strip tillage	Accola	M. Darr
Corn isolation	Applied Science	U. Frei
Corn isolation	Applied Science	N. Lauter
Corn isolation	Applied Science	F. Engstrom
Forestry breeding	Applied Science	R. Hall
Prairie x rodent	Applied Science	B. Mortensen
Corn isolation	Beach Bottom	U. Frei
Corn isolation 3x	Beef Teaching	P. White
Precision/machinery trial	Been	M. Darr
Soils and water quality	Been	A. Kalieta
Machinery/nutrient placement	Bennett	M. Darr
Bee hive	Century Corn Plot	G. Morgal
Corn isolation	Cross Country Track	T. Paque
Acoustic bat monitoring	Curtiss	J. Blanchong
Corn breeding imagery	Curtiss	L. Coffey
Corn breeding, irrigated	Curtiss	P. Becraft
Corn breeding, irrigated	Curtiss	L. Coffey
Corn breeding, irrigated	Curtiss	M. Hufford
Corn breeding, irrigated	Curtiss	A. Myers
Corn breeding, irrigated	Curtiss	T. Peterson
Corn breeding, irrigated	Curtiss	E. Vollbrecht
Corn breeding, irrigated	Curtiss	D. Little
Corn breeding, non-irrigated	Curtiss	E. Vollbrecht
Soybean breeding	Curtiss	L. Li
Teaching plots	Curtiss	E. Christian
Weed science	Curtiss	D. Franzenburg
Weed science	Curtiss	D. Franzenburg
Milkweed	Dairy Filter Strip	R. Hellmich
IDC screen	Dairy	G. Gebhart
Corn isolation	Dog Track	L. Coffey
Corn growth regulator	East Curtiss	M. Johnson
Milkweed	East Curtiss	R. Hellmich
Corn isolation	Equine	P. Becraft
Teaching plots	Equine	E. Christian
Mesocosm	Hinds	A. Van Der Valk
Miscanthus nursery	Hinds	E. Heaton
SDS	Hinds	L. Leandro
Soybean breeding	Hinds	M. Bhattacharyya
Soybean breeding	Hinds	B. Scott
Soybean charcoal rot	Hinds	S. Navi
Soybean pathology	Hinds	S. Navi
Soybean pathology	Hinds	S. Wiggs
Soybean pathology	Hinds	G. Gebhart

<u>Project-Central IA Farms (continued)</u>	<u>Farm Location</u>	<u>Project Leader</u>
Austrian winter pea	Johnson	M. Johnson
Corn entomology trial	Johnson	G. Vannostrand
Milkweed x Monarch	Johnson	R. Hartzler
No-till soybeans	Johnson	G. Munkvold
Plant Path	Johnson	G. Munkvold
Planter compaction	Johnson	M. Johnson
Rice breeding	Johnson	L. Li
Rice breeding	Johnson	Y. Bing
Rootworm product evaluation	Johnson	P. Weber
Seedcorn maggot	Johnson	P. Weber
Soybean entomology trial	Johnson	G. Vannostrand
Soybean herbicide	Johnson	D. Franzenberg
Volunteer corn control	Johnson	D. Franzenberg
Corn isolate feed value	Kelley	P. Gunn
Corn isolate yield	Kelley	M. Licht
Milkweed establishment	Kelley	R. Hartzler
USDA water quality	Kelley	B. Knutson
Gypsum	Packer	M. Johnson
Harvest performance	Numerous	M. Darr
Precision/modeling	Numerous	M. Darr
Corn isolation	Pony Track	L. Coffey
Corn isolation	South Woodruff	E. Vollbrecht
Corn nursery	South Woodruff	L. Li
SCN	South Woodruff	C. Maret
Soybean future SCN	South Woodruff	G. Gebhart
Switchgrass x N	South Woodruff	E. Heaton
Seed treatment	West Curtiss	C. Arnold
Soybean pathology	West Curtiss	S. Navi
Corn nursery	Woodruff	T. Bierwagen
Corn nursery	Woodruff	N. Lauter
Corn nursery	Woodruff	L. Li
Corn nursery	Woodruff	T. Peterson
Corn nursery	Woodruff	E. Vollbrecht
Corn nursery	Woodruff	P. Becraft