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Ag Engineering and Agronomy Farm and Central Iowa Research Farms Summary

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Ag Engineering and Agronomy Farm and Central Iowa Research Farms Summary

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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 568 visitors in 2016. Visitors included groups from China, Brazil, Argentina, and the Czech Republic. Many of these visitors were associated with tours given during the week of the Farm Progress Show in August. Other groups from across the United States and Iowa visited throughout the year. An organic field day was held June 28, and 35 students from the West Delaware school district visited in May to learn about plant breeding and other research at the farm. The farm was the site for the signing of Proclamation of Soil Conservation Week by Governor Terry Branstad.

Developments. Richard VanDePol, long-time manager of the Ag Engineering operations, retired in August. A retirement reception was held in his honor at the farm, with 100 people attending.

Facilities and equipment. A John Deere 4710 high clearance sprayer was converted to a cover crop seeder by removing the liquid tank and replacing it with a Gandy dry box system. The cover crop seed is delivered to a 60-ft boom by an air delivery system, and was used successfully for three different projects in late summer and early fall. It will help meet the needs of future cover crop projects at the farm.

An agreement was reached with Case-IH to donate the use of a self-propelled high clearance sprayer to help the farm complete spring and summer spraying operations. The agreement will be reviewed annually to meet the needs of the farm and Case-IH.

A facilities project with ag engineering faculty involved the relocation of the USDA shop from the USDA Soils Lab to an existing AEA machine shed. The machine shed was renovated to house a new insulated shop in half the building, and storage needs in the other half. This led to the construction of a new machinery storage building at the AEA Farm. The existing USDA Soils Lab building was transferred back to the AEA Farm, and will be converted for use by the ABE soil and water faculty in 2017.

New projects. Sotirios Archontoulis, agronomy, completed the second year of a newly developed crop modeling project, known as the Forecast and Assessment of Cropping sysTemS (FACTS) project. The research involves quantifying soil moisture readings, soil nitrate readings, soil temperature readings, and other various soil and weather components to help predict the actual yield of the current year's corn and soybean crop. Updates for the plot can be found at crops.extension.iastate.edu/facts/news.

Emily Heaton, agronomy, completed the second year of a long-term project involving optimum nitrogen levels and sustainability practices for successful miscanthus production. The title of the project is Long-term Assessment of Miscanthus Productivity and Sustainability (LAMPS).

Mark Licht, agronomy, completed the third year of a corn and soybean date-of-planting trial, evaluating optimum planting dates for each crop.

Crop Season Comments

Oat seeding was completed March 29. The oats were harvested mid-July, with average yields of 84 bushels/acre.

Corn planting started April 15 and was completed June 7. Harvest began September 28 and was completed November 4. Yields were very good, with a whole farm average of 219 bushels/acre.

Soybean planting began May 6 and was completed June 7. Harvest began October 3 and was completed October 20. The whole farm average was 54 bushels/acre.

Weather Comments

Winter. Total snowfall for January, February, and March was 11.7 in. Rainfall equivalent and rainfall events totaled 2.76 in.

Spring. Total rainfall of 9.34 in. was recorded for the months of April, May, and June. The

month of June was very dry with only 0.97 in. recorded (Table 1). The last hard freeze was April 12 with a low temperature of 24°F. Soil temperatures at the 4-in. depth began to average 50°F on April 14.

Summer. A total of 21.98 in. of rain fell during the summer months of July through September. Rainfall for August was 8.23 in., and September recorded a total of 7.9 in.

Fall. A total of 3.5 in. of rain was recorded for the months of October through December, allowing for good harvest conditions. The first measurable snowfall of 1.3 in. fell December 4. The first hard freeze occurred October 13 with a temperature of 29°F.

A total of 37.58 in. of rain was recorded for 2016, 5.33 in. above normal (Table 2).

Table 1. Monthly rainfall and average temperatures during the 2016 growing season at the ISU Ag Engineering/Agronomy Research Farm, Boone, IA.

Month	Rainfall (in.)		Avg. temperature (°F)		Days 90°F or above
	2016	Deviation from normal	2016	Deviation from normal	
March	1.48	-.30	45	9	0
April	4.09	0.84	52	2	0
May	4.28	-0.12	61	0	0
June	0.97	-3.84	75	5	9
July	5.85	2.15	74	0	3
August	8.23	4.24	73	1	0
September	7.90	4.30	69	5	4
October	0.59	-1.79	58	5	0
Totals	33.39	5.48			16

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

Mo.	NR ¹	ANR ²	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Jan	0.80	0.80	0.62	0.56	0.24	0.95	1.17	0.70	0.26	0.41	0.10	0.19	0.60
Feb	0.93	1.73	0.41	1.77	0.71	0.25	0.75	1.06	1.74	0.73	1.15	0.94	0.68
Mar	1.78	3.51	2.63	3.09	2.71	4.07	2.07	0.79	2.49	1.48	1.00	0.21	1.48
Apr	3.24	6.75	4.30	5.99	5.22	4.56	3.66	4.41	4.79	5.81	4.75	3.45	4.09
May	4.41	11.16	2.15	6.67	8.49	3.78	3.64	4.62	2.46	7.09	4.26	4.57	4.28
Jun	4.82	15.98	0.81	2.03	10.68	4.11	11.17	5.05	2.94	3.01	8.86	6.90	0.97
July	3.66	19.64	5.56	2.95	9.28	2.75	6.74	3.90	1.47	1.01	2.88	5.96	5.85
Aug	3.92	23.56	6.16	7.89	2.10	4.84	11.21	3.58	2.98	2.18	5.70	8.26	8.23
Sept	3.56	27.12	7.51	1.90	3.09	0.96	6.57	2.02	1.85	1.19	5.55	5.05	7.90
Oct	2.41	29.53	2.53	5.41	3.63	7.33	0.38	0.86	2.34	2.50	3.75	1.27	0.59
Nov	1.54	31.07	1.56	0.14	2.59	1.38	2.23	2.72	0.90	1.40	0.71	2.75	1.74
Dec	1.02	32.09	2.67	1.90	1.20	1.96	0.80	2.23	1.02	0.32	1.15	5.05	1.17
Tot.	32.23		36.91	40.30	49.94	36.94	50.39	31.94	25.24	27.13	39.86	44.60	37.58
Departure from Normal			4.80	8.19	17.83	4.83	18.28	-0.17	-6.84	-4.98	7.77	12.37	5.33

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

Project List

<u>Project-Agronomy Farm</u>	<u>Department</u>	<u>Project Leader</u>
BCRF plant zoo	BCRF	A. Suby
Biochar research trials	Agronomy	D. Laird
CAD soybean grow-out	CAD	L. Henn
Corn and soybean date of planting studies	Agronomy	M. Licht
Corn and soybean yield trials and observation plots	ICIA	J. Rouse
Corn/sorghum breeding	Agronomy	J. Yu
Corn breeding	Agronomy	J. Edwards
Corn breeding	Agronomy	P. Scott
Corn breeding	Agronomy	T. Lubberstedt
Corn breeding	Entomology/USDA	C. Abel
Corn nitrogen stabilization trial	Agronomy	J. Sawyer
Corn residue removal study	Agronomy	M. Al-Kaisi
Corn rootworm research	USDA	A. Gassmann
Corn rootworm/plant pathology trials	Plant Pathology	N. Lauter
Corn starter fertilizer trial	Agronomy	M. Licht
Corn stover biomass removal trial	ABE/USDA	S. Birrell/D. Karlen
Corn nitrogen utilization research	Agronomy	M. Castellano
Corn seedling disease research	Seed Science	G. Munkvold
Corn and soybean climate monitoring	Agronomy	A. VanLoocke
Corn and soybean crop modeling study	Agronomy	S. Archontoulis
Cover crop production research	Agronomy	A. Lenssen
FEEL research plots	Plant Pathology	D. Mueller
Forage and biomass production systems	Agronomy	K. Moore
Global maize crop production study	Agronomy	J. Sawyer
Hail study	Plant Pathology	D. Mueller
Honeybee soybean pollination trial	Entomology	M. O'Neal
Humic acid study	USDA	D. Dinnes
Kernza observation trial	Agronomy	M. Wiedenhoef
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/corn nitrogen trial	Agronomy	E. Heaton
Miscanthus research	Agronomy	E. Heaton
Monarch habitat/milkweed trial	Entomology/USDA	R. Hellmich
Organic corn breeding	Agronomy	J. Edwards
Organic cover crop research	Agronomy	K. Delate
Organic oat/alfalfa trial	Agronomy	M. Wiedenhoef
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

<u>Project-Agronomy Farm (continued)</u>	<u>Department</u>	<u>Project Leader</u>
Soil fertility research	Agronomy	A. Mallarino
Soil nitrate testing trials	Agronomy	D. Laird
Sorghum breeding	Agronomy	M. Salas
Soybean and corn emergence trials	Seed Science	S. Goggi
Soybean and corn plant pathology trials	Plant Pathology	A. Robertson
Soybean aphid suction trap	Entomology	E. Hodgson
Soybean breeding	Agronomy	D. Singh
Soybean chlorosis/disease trial	Plant Pathology	L. Leandro
Soybean cover crop evaluation trial	Plant Pathology	L. Leandro
Soybean cyst nematode trials	Plant Pathology	G. Tylka/S. Cianzio
Soybean defoliation trial	Agronomy	M. Licht
Soybean disease research	Plant Pathology	L. Leandro
Soybean nitrogen study	Agronomy	M. Castellano
Soybean SCN trials and research	Plant Pathology	C. Marett/G. Tylka
Sustainable ag cropping systems	Agronomy	M. Liebman
Weed science glyphosate resistance experiment	Agronomy	M. Owen
Winfield plot accuracy trial	Agronomy	K. Moore
Winter wheat cover crop trial	Agronomy	M. Licht

<u>Projects on site, Ag Engineering</u>	<u>Department</u>	<u>Project Leader</u>
Ag drainage well	ABE	M. Helmers
Biomass harvest systems	ABE	M. Darr
Bioreactors	ABE	M. Soupir
COBS project-South Reynoldson Farm	ABE/Agronomy	M. Helmers/M. Thompson/ M. Liebman
Cover crop/tillage systems and nutrient runoff trial	ABE/Agronomy	M. Helmers/A. Mallarino
Firestone compaction trial	ABE	M. Tekeste
Grain harvest lab	ABE	M. Tekeste
LEBRC Lab	ABE	H. Xin/S. Hoff/D. Andersen
Manure/water quality plots	ABE	M. Soupir
NH3 application trial	ABE	M. Hanna
Soybean/corn rotation cover crop trial	ABE	M. Helmers
Soil nutrient/biomass harvest	ABE/USDA	S. Birrell/D. Karlen
USDA corn plots	USDA	USDA/Syngenta
USDA organic/water quality plots	USDA	C. Cambardella
USDA/plant physiology	USDA	T. Kaspar

Central Iowa Farms Farm and Weather Summary

Kent Berns, superintendent

Farm Comments

The ISU Central Iowa Farms consist of farmland in Story and Boone counties. There were 2,397 crop acres under Central Farms management, with 370 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 200 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 Dakota Access Pipeline was installed across 3 miles of ISU and ISU affiliate-owned land. Central Iowa Farms worked with a tile vendor to locate existing lines and install crossings and headers prior to the pipeline installation. Laterals will be installed after the soil has stabilized. We continued to make numerous tile and waterway repairs and improvements at many farms. A loader was installed on a 150-horsepower tractor. A 170 hp tractor was purchased to use with the 8-row stack fold planter and the grain cart. The 15 coulter nitrogen applicator was replaced with a newer unit equipped with a Raven Hawkeye nozzle system. Sunn Hemp, a tropical legume, was planted into the wheat stubble as a cover crop. A late planting of Austrian Winter peas

also was conducted for observation purposes. Radish and oats were used as a cover crop on acres harvested for corn silage.

Projects. A project list is available in this article.

Crop Season Comments

The 2016 season was fairly normal in the spring, with many days suitable for field work. June was extremely dry. Normal and above normal precipitation resumed in July, August, and September. Disease and insect pressures were minor.

Bulk corn planting began April 15 and was completed May 5. Corn silage yields averaged 32 tons/acre at an 8-in. cut height with 68 percent moisture. A total of 135 corn acres were harvested for silage. Bulk corn grain yields averaged 220 bushels/acre.

Soybean planting began May 6 and was completed May 15. Yields averaged 63 bushels/acre. Fall harvesting of corn and soybeans began late September and was completed November 1.

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 isoline feed value	Kelley	P. Gunn
Corn isoline 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