

Kansas Agricultural Experiment Station Research Reports

Volume 8
Issue 4 *Kansas Field Research*

Article 1

2022

Field Station Weather Reports


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Recommended Citation

Adee, E. and Sittel, M. (2022) "Field Station Weather Reports," *Kansas Agricultural Experiment Station Research Reports*: Vol. 8: Iss. 4. <https://doi.org/10.4148/2378-5977.8295>

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Field Station Weather Reports

Abstract

This report includes the annual summary of precipitation from 2021 at the research locations represented in the 2022 field report and further details about the Kansas River Valley locations and the east central Kansas locations.

Keywords

East Central Kansas, Kansas State experiment field, Kaw River Valley, Kansas State Experiment Field, 2020 growing season weather, Kansas weather

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Field Station Weather Reports

East Central Kansas Experiment Field

Introduction

The research program at the Kansas State University East Central Kansas Experiment Field is designed to keep area crop producers abreast of technological advances in agronomic agriculture. Specific objectives are to (1) identify top performing varieties and hybrids of wheat, corn, soybean, and grain sorghum; (2) establish the amount of tillage and crop residue cover needed for optimum crop production; (3) evaluate weed and disease control practices using chemical, no chemical, and combination methods; and (4) test fertilizer rates, timing, and application methods for agronomic proficiency and environmental stewardship.

Soil Description

Soils on the field's 160 acres are Woodson. The terrain is upland and level to gently rolling. The surface soil is a dark gray-brown, somewhat poorly drained silt loam to silty clay loam over slowly permeable clay subsoil. The soil is derived from old alluvium. Water intake is slow, averaging less than 0.1 in./hour when saturated. This makes the soil susceptible to water runoff and sheet erosion.

2021 Weather Information

The 2021 weather was a year of extremes for precipitation and temperature. Precipitation during 2021 was 20% over the average, but only 5 months had rainfall over the average (Table 1). Overall, the 2021 growing season was about average, but hotter in June with 12 days over 90°F. The summer of 2021 had 35 days exceeding 90°F and one exceeding 100°F, which equals an average of 35 days exceeding 90°F, in the last 3 years. There were 14 days with low temperatures in the single digits, compared to an average of 9 days in the previous 3 years. The last freezing temperature in the spring was April 22 (average, April 18), and the first killing frost in the fall was November 3 (average, October 21). There were 195 frost-free days, greater than the long-term average of 185.

Rainfall and cooler temperatures from April through May made planting and field work challenging in the spring. Replanting was required for several corn and grain sorghum studies. There was adequate moisture to maintain corn and grain sorghum through a hot and dry June. The corn and grain sorghum hybrid trials averaged 159 and 148 bu/a, respectively. The early maturing soybean variety trial averaged 60.1 bu/a, and the later maturing variety trial averaged 62 bu/a, both well above the averages of the last year.

Kansas River Valley Experiment Field

Introduction

The Kansas River Valley Experiment Field was established to study management and effective use of irrigation resources for crop production in the Kansas River Valley (KRV). The Paramore Unit consists of 80 acres located 3.5 miles east of Silver Lake on U.S. Highway 24, then 1 mile south of Kiro, and 1.5 miles east on 17th street. The Rossville Unit consists of 80 acres located 1 mile east of Rossville or 4 miles west of Silver Lake on U.S. Highway 24.

Soil Description

Soils on the two fields are predominately in the Eudora series. Small areas of soils in the Sarpy, Kimo, and Wabash series also occur. Except for small areas of Kimo and Wabash soils in low areas, the soils are well drained. Soil texture varies from silt loam to sandy loam, and the soils are subject to wind erosion. Most soils are deep, but texture and surface drainage vary widely.

2021 Weather Information

The year was generally warmer than last year, with near average rainfall during most of the growing season. The frost-free season was 191 days at both Rossville and Paramore units (average = 173 days). The winter season included 14 and 15 days in the single digits or lower at Rossville and Paramore, respectively, which was fewer than the average of 18 single-digit days in the 2018 and 2019 (4 and 5 days, respectively in 2020). The last spring freeze was April 22 (average = April 21), and the first fall freeze was October 30 (average = October 11). There were 41 and 49 days above 90°F at Paramore and Rossville, respectively, and 1 above 100°F at Paramore. Precipitation was below normal at both fields for the year (Table 2), with 7 months of below average precipitation. May rainfall was about twice of normal for the May 30-year average. Irrigation for corn started in June, much earlier than normal, with an average total of 7 inches for the corn. Soybeans were irrigated an average of 3.4 inches at the end of July and August. The corn performance trials averaged 242 bu/a for the irrigated and 224 for the dryland. The soybean performance trials averaged 77.1 bu/a for the irrigated and 84 bu/a for the dryland. The sudden death syndrome foliar symptoms in soybean were first seen in mid-August in most fields in 2021, causing significant yield loss in susceptible soybeans in the irrigated trial due to the disease.

Table 1. Precipitation at the East Central Kansas Experiment Field, Ottawa

Month	2021		Month	2021	
	35-year avg.			35-year avg.	
	in.			in.	
January	3.26	1.03	July	3.09	3.37
February	0.16	1.32	August	3.00	3.59
March	4.78	2.49	September	2.44	3.83
April	3.24	3.50	October	4.61	3.43
May	12.28	5.23	November	0.63	2.32
June	6.85	5.21	December	0.34	1.45
Annual total				44.68	36.78

Table 2. Precipitation at the Kansas River Valley Experiment Field

Month	Rossville Unit		Paramore Unit	
	2021	30-year avg.	2021	30-year avg.
	in.		in.	
January	2.06	3.18	1.86	3.08
February	0.06	4.88	0.06	4.45
March	4.39	5.46	3.79	5.54
April	2.68	3.67	2.68	3.59
May	7.52	3.44	6.58	3.89
June	2.42	4.64	3.45	3.81
July	2.95	2.97	2.22	3.06
August	2.55	1.90	3.37	1.93
September	2.46	1.24	2.50	1.43
October	3.47	0.95	4.22	0.95
November	1.19	0.89	1.14	1.04
December	0.31	2.42	0.25	2.46
Total	32.06	35.64	32.12	35.23

Table 3. Precipitation at Alexander, Ashland Bottoms, and Belleville

	Alexander		Ashland Bottoms		Belleville	
	Actual	Normal*	Actual	Normal	Actual	Normal
January	0.17	0.71	0.99	0.65	0.56	0.49
February	0.00	0.84	0.09	0.96	0.08	0.77
March	4.55	1.48	3.41	1.83	3.80	1.58
April	1.44	2.26	2.45	3.13	1.47	2.93
May	6.81	3.78	5.39	4.65	3.20	4.55
June	1.99	4.08	1.42	4.83	0.79	4.06
July	2.73	4.18	5.92	4.01	4.54	4.63
August	2.33	3.50	1.54	4.64	5.97	3.24
September	3.06	1.99	3.76	2.69	1.79	2.75
October	3.00	1.78	2.78	2.18	4.23	2.11
November	0.28	0.93	1.40	1.54	0.17	1.20
December	0.00	0.99	0.13	1.06	0.03	1.03
Annual	26.36	26.52	29.28	32.17	26.63	29.34
Last spring freeze	4/23/2021		4/23/2021		4/23/2021	
First fall freeze	10/17/2021		10/31/2021		10/22/2021	
Frost free days	177		191		182	
Number of days > 90°F	55		53		40	
Number of days > 100°F	11		6		3	
Number of days < 10°F	20		15		19	

*Normal = 30-year average, 1981–2010.

Table 4. Precipitation at Brownell, Buhler, and Colby

	Brownell		Buhler		Colby	
	Actual	Normal*	Actual	Normal	Actual	Normal
January	0.37	0.56	2.48	0.80	0.33	0.41
February	0.09	0.74	0.02	1.25	0.17	0.56
March	4.39	1.40	4.23	2.38	3.73	0.92
April	0.67	1.93	1.04	2.92	0.64	1.97
May	4.39	2.99	7.25	4.89	5.59	2.92
June	2.63	2.83	4.02	5.01	1.26	2.62
July	3.65	3.83	1.61	4.20	2.17	3.81
August	0.56	3.07	4.96	3.89	1.21	3.04
September	1.19	1.84	1.94	2.98	1.66	1.44
October	2.70	1.76	5.89	2.64	0.52	1.56
November	0.38	0.76	0.22	1.65	0.07	0.63
December	0.00	0.88	0.05	1.16	0.06	0.51
Annual	21.02	22.59	33.71	33.77	17.41	20.39
Last spring freeze	4/23/2021		4/23/2021		4/23/2021	
First fall freeze	10/16/2021		10/31/2021		10/15/2021	
Frost free days	176		191		175	
Number of days > 90°F	73		55		55	
Number of days > 100°F	23		4		4	
Number of days < 10°F	22		16		20	

*Normal = 30-year average, 1981–2010.

Table 5. Precipitation at Garden City, Goodland, and Greensburg

	Garden City		Goodland		Greensburg	
	Actual	Normal*	Actual	Normal	Actual	Normal
January	0.29	0.47	0.23	0.32	0.87	0.71
February	0.08	0.59	0.00	0.47	0.06	0.81
March	2.36	1.13	3.07	0.88	4.34	1.92
April	0.51	1.65	0.41	1.69	0.24	2.41
May	5.93	2.79	3.19	2.81	2.88	3.39
June	1.35	3.07	1.52	2.96	2.65	3.87
July	0.69	3.16	1.12	3.08	1.48	3.16
August	0.70	2.80	1.72	3.06	2.23	3.46
September	2.81	1.33	0.27	1.40	5.87	2.04
October	1.02	1.34	0.19	1.41	3.67	2.28
November	0.17	0.49	0.01	0.54	0.27	0.96
December	0.00	0.73	0.05	0.47	0.00	0.96
Annual	15.91	19.55	11.78	19.09	24.56	25.97
Last spring freeze	4/23/2021		5/13/2021		4/22/2021	
First fall freeze	10/16/2021		10/15/2021		11/13/2021	
Frost free days	176		155		205	
Number of days > 90°F	75		72		82	
Number of days > 100°F	18		14		22	
Number of days < 10°F	16		25		11	

*Normal = 30-year average, 1981–2010.

Table 6. Precipitation at Hays, Hutchinson, and Keats

	Hays		Hutchinson		Keats	
	Actual	Normal*	Actual	Normal	Actual	Normal
January	0.47	0.56	1.69	0.58	0.90	0.64
February	0.00	0.81	0.01	1.12	0.10	1.14
March	4.45	1.32	4.54	1.96	3.61	2.17
April	1.07	2.13	0.72	2.34	2.06	3.38
May	7.62	3.6	3.06	4.75	4.68	5.23
June	0.80	3.03	2.90	4.20	2.03	5.47
July	2.39	3.95	3.52	3.33	7.41	4.62
August	3.30	3.47	2.25	3.42	2.52	4.40
September	2.08	2.13	2.08	2.01	2.83	3.41
October	1.58	1.68	3.62	2.32	3.60	2.50
November	0.20	0.90	0.32	1.12	1.14	1.62
December	0.00	0.86	0.00	1.16	0.32	1.19
Annual	23.96	24.44	24.71	28.31	31.20	35.77
Last spring freeze	4/23/2021		4/22/2021		4/23/2021	
First fall freeze	10/17/2021		11/13/2021		11/13/2021	
Frost free days	177		205		204	
Number of days > 90°F	77		62		55	
Number of days > 100°F	23		11		5	
Number of days < 10°F	18		15		13	

*Normal = 30-year average, 1981–2010.

Table 7. Precipitation at Kiro, Leoti, and Manhattan

	Kiro		Leoti		Manhattan	
	Actual	Normal*	Actual	Normal	Actual	Normal
January	1.86	0.89	0.04	0.38	0.90	0.64
February	0.06	1.31	0.01	0.51	0.10	1.14
March	3.79	2.25	0.51	1.27	3.61	2.17
April	2.68	3.81	0.53	1.95	2.06	3.38
May	5.93	5.17	7.83	2.31	4.68	5.23
June	3.26	4.92	0.22	2.58	2.03	5.47
July	2.99	3.99	1.79	2.87	7.41	4.62
August	3.06	4.55	1.30	3.11	2.52	4.40
September	2.73	3.52	2.90	1.40	2.83	3.41
October	4.37	2.85	1.34	1.66	3.60	2.50
November	1.14	1.78	0.10	0.64	1.14	1.62
December	0.25	1.49	0.01	0.60	0.32	1.19
Annual	32.12	36.53	16.58	19.28	31.20	35.77
Last spring freeze	4/23/2021		4/24/2021		4/23/2021	
First fall freeze	10/31/2021		10/17/2021		11/13/2021	
Frost free days	191		176		204	
Number of days > 90°F	48		58		55	
Number of days > 100°F	1		9		5	
Number of days < 10°F	15		18		13	

*Normal = 30-year average, 1981–2010.

Table 8. Precipitation at Marquette, Mitchell, and Norcatur

	Marquette		Mitchell		Norcatur	
	Actual	Normal*	Actual	Normal	Actual	Normal
January	2.03	0.90	0.69	0.68	0.07	0.44
February	0.04	1.22	0.09	0.82	0.40	0.52
March	3.72	2.35	3.98	1.45	4.94	1.20
April	0.96	2.98	1.78	2.60	0.67	2.71
May	8.42	5.42	3.54	4.39	5.78	4.26
June	2.15	4.75	1.09	3.77	1.89	3.19
July	1.54	4.19	1.59	4.84	0.96	4.23
August	4.05	3.51	2.11	3.58	0.79	3.63
September	3.79	2.97	1.70	2.72	2.22	2.10
October	2.18	2.44	2.98	1.98	1.69	2.27
November	0.03	1.56	0.03	1.21	0.04	0.91
December	0.11	1.29	0.00	1.04	0.04	0.76
Annual	29.02	33.58	19.58	29.08	19.49	26.22
Last spring freeze	4/23/2021		4/23/2021		5/13/2021	
First fall freeze	11/13/2021		11/5/2021		10/15/2021	
Frost free days	204		196		155	
Number of days > 90°F	58		62		70	
Number of days > 100°F	5		15		16	
Number of days < 10°F	13		17		21	

*Normal = 30-year average, 1981–2010.

Table 9. Precipitation at Ottawa, Rossville, and Scandia

	Ottawa, ECK		Rossville, KRV		Scandia	
	Actual	Normal*	Actual	Normal	Actual	Normal
January	3.26	1.22	2.06	0.74	0.48	0.49
February	0.16	1.57	0.06	1.18	0.03	0.77
March	4.78	2.29	4.39	2.08	4.35	1.58
April	3.24	3.79	2.68	3.48	1.40	2.93
May	12.07	5.82	6.77	5.06	2.89	4.55
June	5.49	5.55	2.81	5.11	0.97	4.06
July	4.66	3.75	3.29	4.32	1.60	4.63
August	2.74	4.63	2.21	4.60	3.46	3.24
September	2.70	4.05	2.68	3.75	1.02	2.75
October	4.61	3.08	3.61	2.71	2.84	2.11
November	0.63	2.39	1.19	1.67	0.16	1.20
December	0.34	1.71	0.31	1.37	0.06	1.03
Annual	44.68	39.85	32.06	36.07	19.26	29.34
Last spring freeze	4/23/2021		4/23/2021		5/14/2021	
First fall freeze	11/4/2021		10/31/2021		10/15/2021	
Frost free days	195		191		154	
Number of days > 90°F	36		38		33	
Number of days > 100°F	1		0		0	
Number of days < 10°F	14		14		21	

*Normal = 30-year average, 1981–2010.

Table 10. Precipitation at Selkirk, Tipton, and Topeka

	Selkirk		Tipton		Topeka, KRV	
	Actual	Normal*	Actual	Normal	Actual	Normal
January	0.24	0.28	0.69	0.68	1.86	0.89
February	0.03	0.48	0.09	0.82	0.06	1.31
March	2.98	0.83	3.98	1.45	3.79	2.25
April	0.59	1.56	1.78	2.60	2.68	3.81
May	6.35	2.36	3.54	4.39	5.93	5.17
June	0.74	2.78	1.09	3.77	3.26	4.92
July	1.58	3.04	1.59	4.84	2.99	3.99
August	0.76	2.78	2.11	3.58	3.06	4.55
September	1.14	1.20	1.70	2.72	2.73	3.52
October	1.66	1.44	2.98	1.98	4.37	2.85
November	0.09	0.38	0.03	1.21	1.14	1.78
December	0.00	0.48	0.00	1.04	0.25	1.49
Annual	16.16	17.61	19.58	29.08	32.12	36.53
Last spring freeze	5/13/2021		4/23/2021		4/23/2021	
First fall freeze	10/16/2021		11/5/2021		10/31/2021	
Frost free days	156		196		191	
Number of days > 90°F	53		62		48	
Number of days > 100°F	8		15		1	
Number of days < 10°F	24		17		15	

*Normal = 30-year average, 1981–2010.

Table 11. Precipitation at Wamego

	Wamego	
	Actual*	Normal
January	0.90	0.69
February	0.10	1.16
March	3.61	2.09
April	2.06	3.50
May	4.68	5.11
June	2.03	5.19
July	7.41	4.66
August	2.52	4.11
September	2.83	2.86
October	3.60	2.41
November	1.14	1.67
December	0.32	1.28
Annual	31.20	34.73
Last spring freeze		4/23/2021
First fall freeze		11/13/2021
Frost free days		204
Number of days > 90°F		55
Number of days > 100°F		5
Number of days < 10°F		13

*Normal = 30-year average, 1981–2010.

Table 12. Location references per field locations

Field location	Mesonet site	Normals site*
	(Actual precipitation, temperatures)	(Normal precipitation)
Alexander	La Crosse	Bison 3NW (BSNK1)
Ashland Bottoms	Ashland Bottoms	Manhattan ASOS (MHK)
Belleville	Belleville 2W	Scandia (SCDK1)
Brownell	Ness City	Ness City (NESK1)
Buhler	Flickner Innovation Farm	Newton (NWTK1)
Colby	Colby	Colby 1SW (CBKK1)
Garden City	Garden City	Garden City (GESK1)
Goodland	Sherman	Goodland Renner Field (GLD)
Greensburg	Lake City	Greensburg (GEEK1)
Hays	Hays	Hays 1 S (HASK1)
Hutchinson	Hutchinson 10SW	Hutchinson 10SW (HINK1)
Keats	Manhattan	Manhattan (MHTK1)
Kiro	Silver Lake 4E	Topeka ASOS (TOP)
Leoti	Leoti	Leoti (LEOK1)
Manhattan	Manhattan	Manhattan (MHTK1)
Marquette	McPherson 1S	McPherson (MCPK1)
Mitchell	Mitchell	Beloit (BELK1)
Norcatour	Norton 4SW	Norton Dam (NTDK1)
Ottawa, ECK	Ottawa 2SE	Ottawa (OTTK1)
Rossville, KRV	Rossville 2SE	Rossville (RVEK1)
Scandia	Scandia	Scandia (SCDK1)
Selkirk	Tribune 6NE	Tribune 13NNE (GRWK1)
Tipton	Mitchell	Beloit (BELK1)
Topeka, KRV	Silver Lake 4E	Topeka ASOS (TOP)
Wamego	Manhattan	Wamego 4W (WAMK1)

*Normal = 30-year average, 1981–2010.