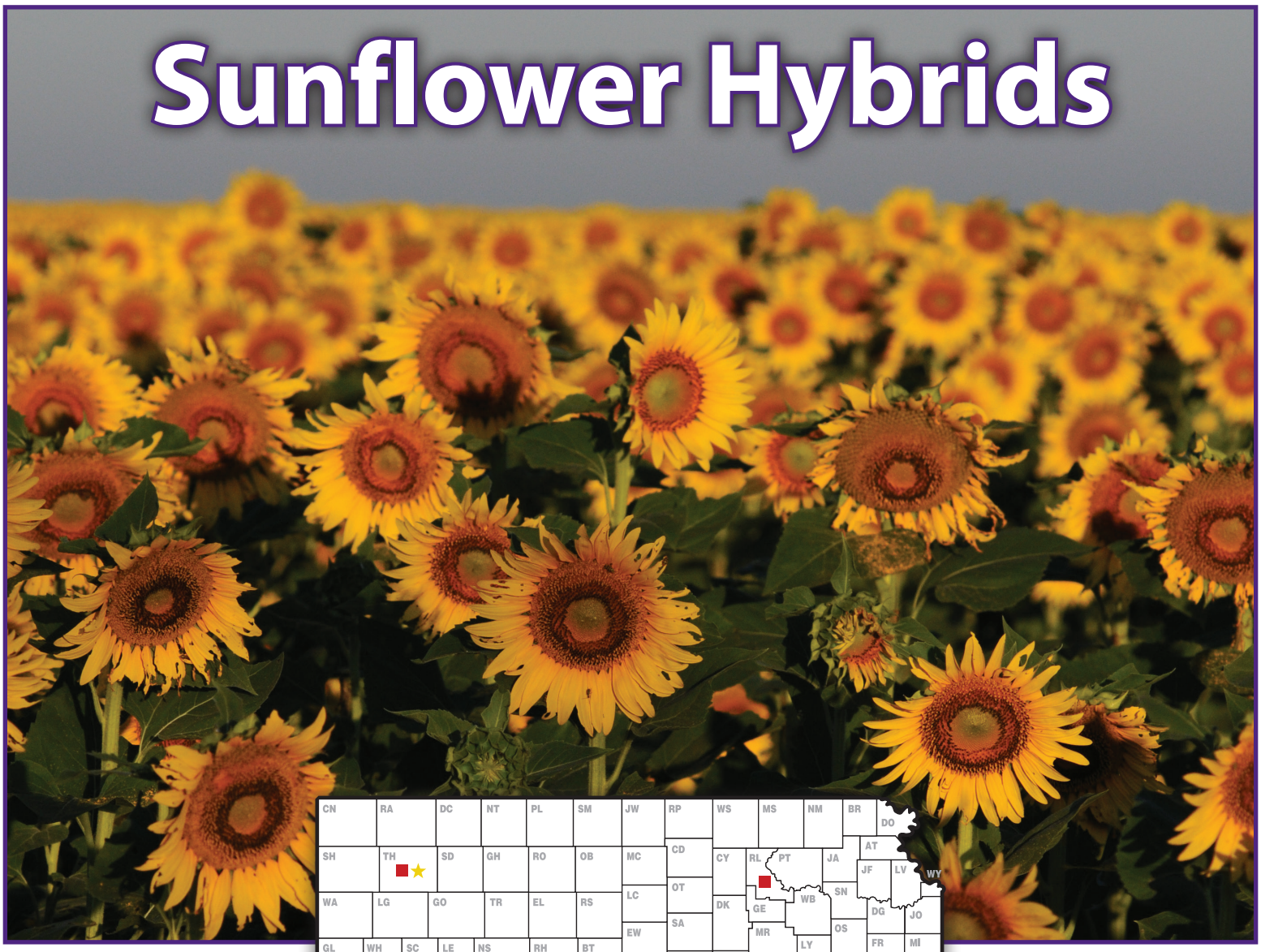
2023 Kansas Performance Tests with

Sunflower Hybrids



Report of Progress 1184

K-STATE Research and Extension

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

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Contribution No. 24-162-S from the Kansas Agricultural Experiment Station.

INTRODUCTION

Statewide Growing Conditions

Starting from the beginning of 2023, Kansas's drought condition has been persistent and there were no improvements at all for the last four months. Water supply shortage affected crop growth and yields as well as livestock conditions.

The average temperature for May was 65.8°F, 1.9°F above normal. This ranked as the 29th warmest May out of 129 years of records, dating back to 1895. Average precipitation for May was 3.58 inches, which was 0.63 inches below normal. This ranked as the 65th driest May on record. The three western climate regions all finished the month above normal. Northwest Kansas was the wettest region. When combined with April's precipitation, the growing season to date ranks in the top 20 driest in four regions: north-central, central, south-central, and southeast. Northwest and southwest Kansas were the only two regions above normal since April 1.

Rootzone moisture was very dry in the eastern regions in May, while the south-central and western regions were relatively wet due to rainfall in May. Subsoil moisture supplies rated 29% very short, 31% short, 39% adequate, and 1% surplus on May 28.

The average temperature for June was 73.2°F, 1.0°F below normal. The three eastern Kansas regions were above normal; all other regions were below normal. Average precipitation for June was 4.06 inches, which was 0.01 inches above normal. The three eastern climate regions and north-central had below normal precipitation while the remaining regions were above normal. South-central was the wettest region (6.21 inches) while east central was the driest (2.25 inches). Soil moisture supplies were rated as follows: 44% very short and short, 55% adequate, and 3% surplus.

The average temperature for July was 78.3°F, or 0.7°F below normal. This ranked as the 56th coldest July out of 129 years of records, dating back to 1895. Seven of Kansas' nine climate regions were below normal; only east central and southeast were above normal.

Average precipitation for June was 4.39 inches, or 114% of normal. Southwest (6.09 inches) and south-central (6.01 inches) Kansas were the two wettest regions; their totals ranked as the 6th and 7th wettest Julys on record, respectively. North-central and central Kansas tied for driest region (3.14 inches). When combined with April, May, and June, the past 4-month period is the 5th wettest on record in southwest Kansas. Their total of 16.29 inches is 5.80 inches above normal.

In August, accumulated precipitation showed variations from very dry conditions in the northeast to very wet for the northwest of the state. For soil moisture, the central and west regions were under water-stressed conditions. The root zone moisture indicated drought conditions across the eastern portion of the state.

Impressive heat took hold of the region with absolutely no precipitation statewide (Figures 1 and 2). Like corn fields, dryland sunflower fields experienced significant heat stress. Despite many areas of the state seeing drought improvement over the last month, the duration of record-breaking heat exacerbated in-field moisture stress.

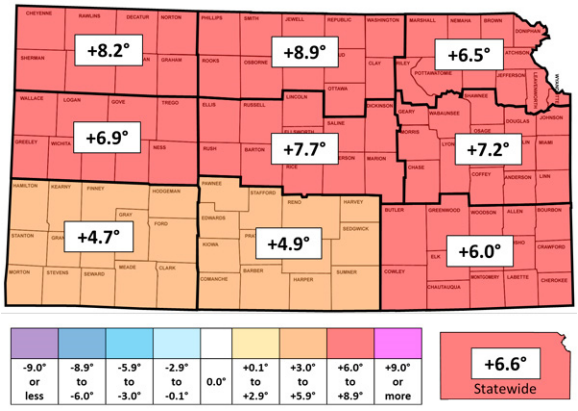

Figure 1. Temperature anomalies (°F) by region for the period August 18-24, 2023. All regions were above normal. Source: Kansas Weather Data Library.

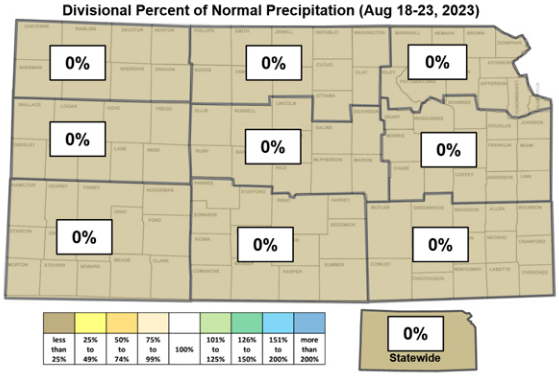

Figure 2. Percent of normal precipitation by region for the time period August 18-23, 2023. All regions recorded negligible precipitation. Source: Kansas Weather Data Library.

Sunflower Pests

Historically, by far and away, the number one insect pest of sunflowers in Kansas has been the sunflower head moth. 2023 was no exception as far as producer concern, however the infestation level and thus treatment and associated damage just did not materialize.

There were a few instances of head moth infestations requiring insecticide application. However, overall populations seemed to have declined, not just in 2023, but in the past 4 years as well. There were a few reports of seed weevils and sunflower head clipping weevil but not at treatable levels. (Jeff Whitworth, Kansas State University Department of Entomology)

Objectives and Procedures

Sunflower performance tests were conducted in 2023 by the Kansas Agricultural Experiment Station to provide farmers, extension workers, and private industry with unbiased agronomic information on many of the sunflower hybrids marketed in the state. Tests were financed in part by entry fees from private companies. Companies known to be developing and marketing sunflowers were invited to participate and enter hybrids on a voluntary, fee-entry basis. As a result, not all hybrids grown in the state were included in the tests, and hybrids were not grown uniformly at all locations.

Test locations in 2023 were Thomas County—irrigated and fallow; Riley County—dryland; Reno County—dryland; and Labette County—dryland. Oilseed entries were grown at all locations. Hybrids were planted in four-row, replicated plots at all locations. Due to adverse weather conditions of drought and heat stress (Thomas and Labette counties) and hail later in the season (Thomas County), only the results of Riley and Reno counties are included.

Environmental factors affecting test results and cultural practices are presented for each individual test site. Test results for 2023 and period-of-years average data are included in Tables 1 and 2. Entrants and entries in 2023 tests are listed in Table 3.

Data Interpretation

Yields are reported as pounds of seed per acre adjusted to 10% moisture content.

Days to half bloom is the number of days from date of planting to the date when 50% of plants are in bloom.

Lodging percentage is based on counts of lodged and total plants in harvested areas at all locations.

Statistical analysis: Conducting perfect tests is virtually impossible because soil fertility, moisture, and other environmental factors vary. Therefore, small differences in results might have no real meaning. To help interpret data, we applied a statistical technique, analysis of variance, whenever possible. Such analysis requires repeating whole sets of varieties or treatments several times and placing individual varieties or treatments as they would be placed by chance alone. Results of the analyses are reported in terms of least significant differences (LSD). If two means differ by more than the LSD (.05), such a difference would be due to chance variation only 5% of the time. So, it's 95% probable that the difference was due to treatment. If means do not differ by as much as the LSD, little confidence can be placed in the importance of varietal or treatment differences. The coefficient of variability (CV) represents an estimate of the precision of replicated yield trials. Trials with a CV ranging from 10% to 15% are usually acceptable for performance comparisons. Trials with a CV greater than 15% provide only a rough guide to hybrid performance.

ACKNOWLEDGMENTS

Cooperation of Dustan Ridder, Southwest Seed Research, Keith Thompson, Gretchen Sassenrath, and Garth Blackburn for field operations is sincerely appreciated. Matt Sittel at the Weather Data Library provided climatological data.

Manhattan, Kansas Dryland Sunflower Performance Test, Riley County

Agronomy North Farm, Kansas State University, Manhattan
Planted: 5/24/2023
Harvested: 10/10/2023
180-0-0 lb/ac N, P, K
Herbicide: 8 oz/ac Blanket 4F, 5 oz/ac Zidua, 24 oz/ac glyphosate 53.8%, 16 oz/ac Volunteer

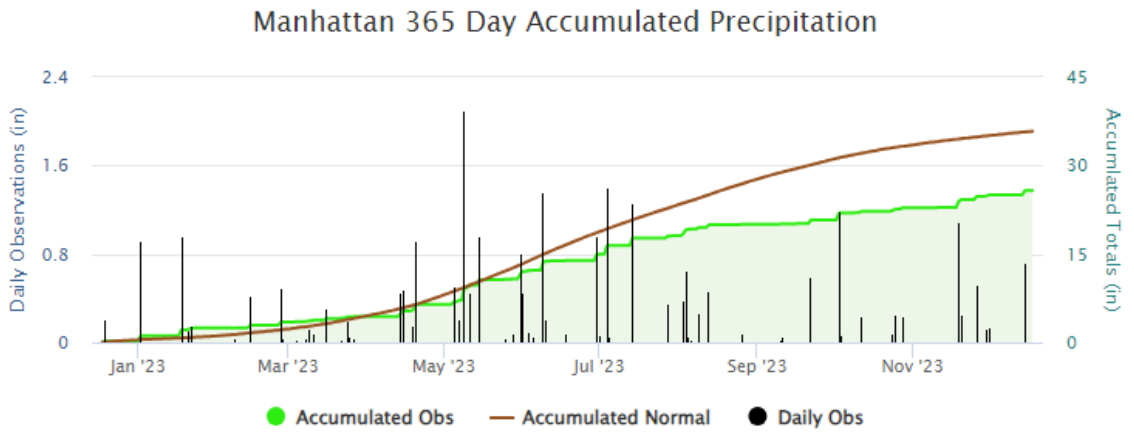

Table 1. Manhattan, Riley County Dryland Sunflower Performance Test, 2021-2023

		ACRE YIELD, POUNDS					YIELD AS % OF TEST AVERAGE		
Brand	Name	2023	2022	2021	2-Yr. AVG.	3-Yr. AVG.	2023	2022	2021
CROPLAN	CP 455E	1326	1641	618	1484	1195	92	85	53
CROPLAN	CP 7919CL	1380	2710	1347	2045	1812	96	140	115
DYNA GRO	H42HO18CL	1270	1916	--	--	--	88	99	--
DYNA GRO	H45HO10EX	1159	2243	--	--	--	81	116	--
DYNA GRO	H47HO11EX	1378	1789	--	--	--	96	92	--
DYNA GRO	H49HO19CL	1506	1466	1189	1486	1387	105	76	101
DYNA GRO	H50HO20CP	1507	2248	--	--	--	105	116	--
DYNAGRO	H45NS16CL	1396	--	--	--	--	97	--	--
NUSEED	HORNET	1527	--	1205	--	1366	106	--	103
NUSEED	N4H422 CL	1739	2017	1586	1878	1781	121	104	135
NUSEED	N4H470 CL+	1350	1676	795	1513	1274	94	87	68
NUSEED	N4H490 E	1492	--	--	--	--	104	--	--
NUSEED	N4H521 CL	1355	1460	1372	1408	1396	94	75	117
PIONEER	P64ME01	1774	--	--	--	--	123	--	--
	AVERAGE	1440	1934	1174	1687	1516	100	100	100
	CV (%)	15	24	13	--	--	15	24	13
	LSD (0.05)	162	363	230	--	--	11	19	13

Yields must differ by more than the LSD value to be considered statistically different.

Hutchinson, Kansas Dryland Sunflower Performance Test, Reno County, 2023

Private Field, 37.92140417, -97.91588529, Hutchinson
Planted: 7/11/2023
Previous crop: Wheat

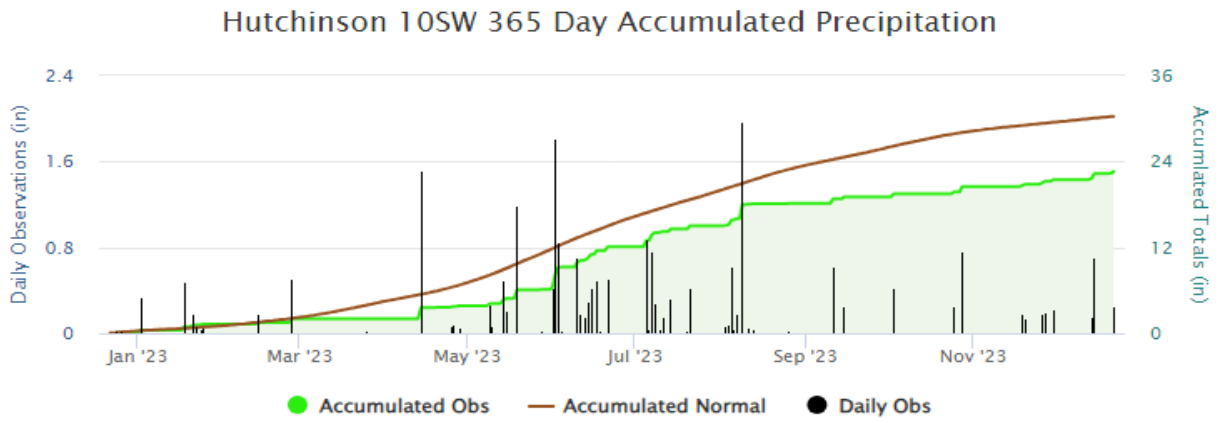

Table 2. Hutchinson, Reno County Dryland Sunflower Performance Test, 2021-2023

		ACRE YIELD, POUNDS				YIELD AS % OF TEST AVERAGE			TW (lb/bu)
Brand	Name	2023	2022	2021	2-Yr. AVG.	2023	2022	2021	2023
CROPLAN	CP 455E	1819	--	1396	1608	100	--	114	32
CROPLAN	CP 7919CL	1898	--	1417	1658	104	--	115	32
DYNA GRO	H42HO18CL	1660	--	--	--	91	--	--	32
DYNA GRO	H45HO10EX	1370	--	--	--	75	--	--	32
DYNA GRO	H47HO11EX	1365	--	--	--	75	--	--	34
DYNA GRO	H49HO19CL	2099	--	988	1544	115	--	81	30
DYNA GRO	H50HO20CP	1709	--	--	--	94	--	--	32
DYNAGRO	H45NS16CL	1726	--	--	--	95	--	--	32
NUSEED	HORNET	2199	--	1250	1725	120	--	102	30
NUSEED	N4H422 CL	1625	--	1211	1418	89	--	99	33
NUSEED	N4H470 CL+	1560	--	1336	1448	85	--	109	32
NUSEED	N4H490 E	1756	--	--	--	96	--	--	33
NUSEED	N4H521 CL	2090	--	1193	1642	114	--	97	32
PIONEER	P64ME01	2685	--	--	--	147	--	--	33
	AVERAGE	1826	--	1227	1527	100	--	100	32
	CV (%)	18	--	11	--	18	--	11	1
	LSD (0.05)	340	--	205	--	19	--	10	1

Yields must differ by more than the LSD value to be considered statistically different.

Table 3. Entrants and Entries in the 2023 Sunflower Performance Tests

Croplan by Winfield
Vincent, IA
515-356-4521

- CP 455E
- CP 7919CL

NuSeed
Breckenridge, MN
701-630-8122

- HORNET
- N4H422 CL
- N4H470 CL+
- N4H490 E
- N4H521 CL

Dyna-Gro
Ralls, TX
806-402-0463

- H42HO18CL
- H45HO10EX
- H47HO11EX
- H49HO19CL
- H50HO20CP
- H45NS16CL

Pioneer Hi Bred International
Johnston, IA
800-233-7333

- P64ME01
- *check hybrid

To access crop performance testing information electronically, visit our website. The information contained in this publication, plus more, is available for viewing or downloading at:

www.agronomy.k-state.edu/services/crop-performance-tests/index.html

Excerpts from the University Research Policy Agreement with Cooperating Seed Companies

Permission is hereby given to Kansas State University (KSU) to test varieties and/or hybrids designated on the attached entry forms in the manner indicated in the test announcements. I certify that seed submitted for testing is a true sample of the seed being offered for sale.

I understand that all results from Kansas Crop Performance Tests belong to the University and the public and shall be controlled by the University so as to produce the greatest benefit to the public. Performance data may be used in the following ways: 1) Tables may be reproduced in their entirety provided the source is referenced and data are not manipulated or reinterpreted; 2) Advertising statements by an individual company about the performance of its entries may be made as long as they are accurate statements about the data as published, with no reference to other companies' names or cultivars. In both cases, the following must be included with the reprint or ad citing the appropriate publication number and title: "See the official Kansas State University Agricultural Experiment Station and Cooperative Extension Service Report of Progress 1184, '2023 Kansas Performance Tests with Sunflower Hybrids,' or the Kansas Crop Performance Test website, *www.agronomy.k-state.edu/services/crop-performance-tests/index.html*, for details. Endorsement or recommendation by Kansas State University is not implied."

Contributors

Jane Lingenfelser, Manhattan
Dustan Ridder, Manhattan
Matt Sittel, Manhattan
R. Jeff Whitworth, Manhattan
Garth Blackburn, Parsons
Gretchen Sassenrath, Parsons
Keith Thompson, Hutchinson
Southwest Seed Research, Hutchinson

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