

Technical Report TR 18-6



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2018 Colorado Sunflower Variety Performance Trials



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Summary of the 2018 Colorado Sunflower Hybrid Performance Trials

Jerry Johnson, Sally Jones-Diamond, Ed Asfeld, and Ron Meyer

Colorado State University conducts hybrid oil and confection sunflower performance trials to provide unbiased and reliable information to Colorado sunflower producers so they can select the best hybrids for their farms. Hybrid selection is a cornerstone of all crop production systems. Variable climatic conditions, innovations from plant breeding and biotechnology, acquisitions and mergers of seed companies, and rapid development of new hybrids means sunflower performance information is more important than ever to Colorado sunflower producers. The sunflower hybrid performance trial is made possible by funding received from company entry fees, the Colorado Sunflower Administrative Committee, and Colorado State University. CSU Crops Testing is a public service for Colorado producers powered primarily by entry fees by the seed companies. Please join us in thanking the sunflower seed companies that entered the 2018 trials.

Advances in weed control with a broader range of herbicides such as imidazolinone, Express, Clearfield, and Clearfield Plus have benefited sunflower producers. A new herbicide labeled for sunflowers, called Zidua, also has added broadleaf control benefits.

Colorado sunflower producers harvested 53.7 million pounds in 2018, according to the USDA National Ag. Statistics Service.

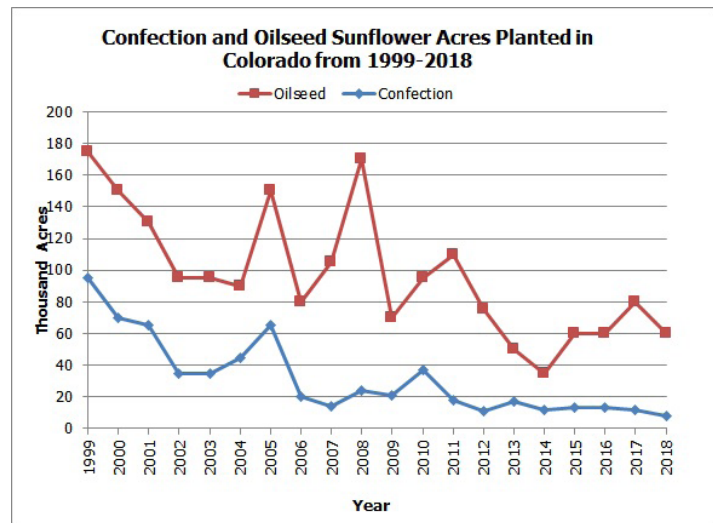


Figure 1. Confection and oilseed sunflower acres planted in Colorado from 1999-2018.

Figure 1 shows the variability of acreage for both oil and confection sunflowers in Colorado – especially for oil type sunflowers.

Sunflower acreage planted to oil type has ranged from 35,000 (2014) up to 175,000 (1999) planted acres. The planted acres of confection sunflowers have generally decreased since 1999 and held steady since 2006.

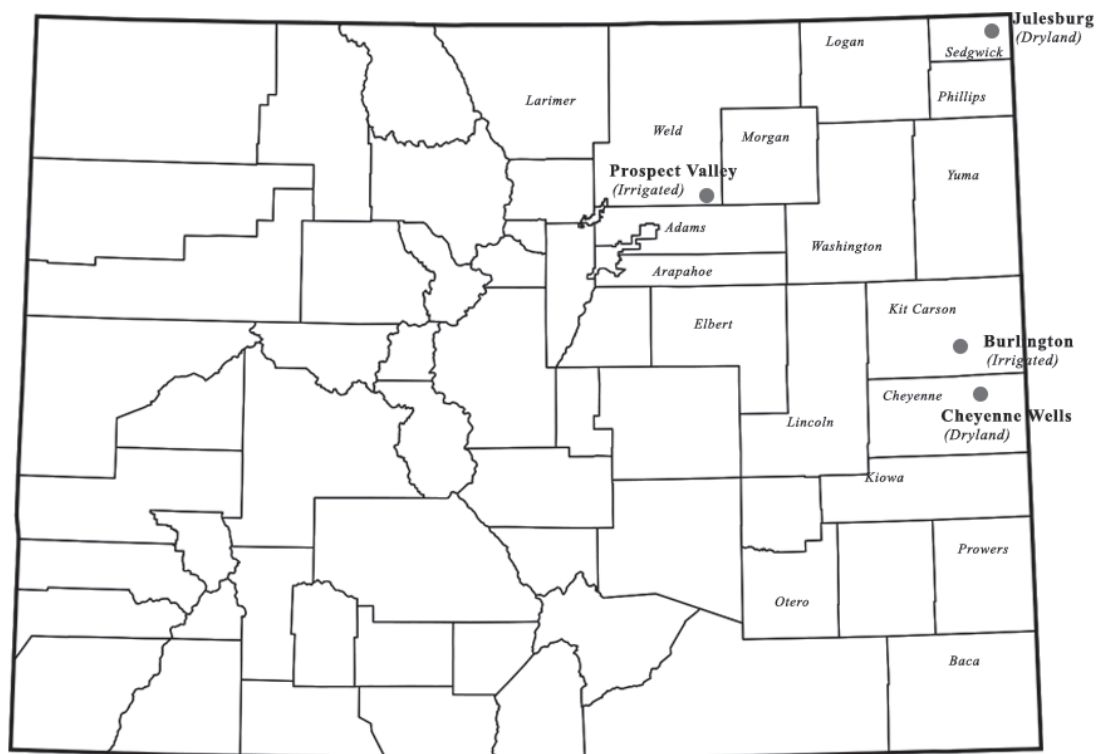
The variability of sunflower acreage could be due to several factors, including sunflower commodity prices, the availability of contracts, soil water at the time of planting, crop insurance requirements, and adoption of cropping rotations that do not include sunflower.

Dryland sunflowers may have fallen out of favor in recent years due to the increasing popularity of dryland corn and grain sorghum. On the other hand, herbicide tolerant sunflowers and new oil traits could lead to an increase of sunflower acreage in coming years. Food processors and consumers are demanding healthier oils, and sunflower oil meets this demand with the introduction of High Oleic type hybrids. High Oleic oil pressed from sunflower is more stable when used in cooking and has exceptional health benefits not found in other oils.

Colorado State University evaluated commercial and experimental oil and confection sunflower hybrids in eastern Colorado at one fully irrigated, one limited-irrigation, and two dryland locations in 2018. The fully irrigated trial at Prospect Valley returned results for oilseed but the confection trial was lost due to weak and highly variable stand establishment. The limited irrigation trial at Burlington returned results for confection and oilseed trials. The two dryland trials were lost due to hail damage at Julesburg and drought conditions with poor stand establishment at Cheyenne Wells.

Results tables for the irrigated trials are presented on the following pages. Thirty-two oil hybrids and eighteen confection hybrids with diverse origins and maturities were tested in the trials. Irrigated plot sizes were approximately 150 ft² at Burlington and Prospect Valley; all varieties in each trial were replicated four times at each trial location. Seed yield for all trial varieties are reported in the tables. Yield and oil content (for oil trials) are adjusted to 10% seed moisture content.

Colorado Sunflower Trial Locations in 2018



2018 Limited-Irrigation Oil Sunflower Hybrid Variety Performance Trial at Burlington

Brand	Hybrid	Oil Type ^a	Technology Traits ^b	Yield ^c lb/ac	2-Year		Test Weight lb/bu	Plant Height in	Population plants/ac	Oil Content ^c percent
					Avg. Yield lb/ac	Moisture percent				
Croplan	568 CL HO	HO	Clearfield, DM	3507	3455	11.0	28.7	59	18,586	42.1
Nuseed	N4HM521	HO	Clearfield, DM	3466	3288	11.1	27.1	52	21,158	40.8
Dyna-Gro	DG H48HO15 CL	HO	Clearfield, DM	3396	-	10.9	27.8	52	18,295	41.6
Croplan	545 CL	NS	Clearfield, DM	3325	3342	11.6	29.5	48	18,606	41.1
Dyna-Gro	DG H49HO19 CL	HO	Clearfield, DM	3298	-	11.5	29.1	51	20,618	40.9
Allegiant	70H51CL	HO	Clearfield, DM	3264	-	10.7	27.9	55	20,909	42.3
Dyna-Gro	DG H49NS14 CL	NS	Clearfield, DM	3221	-	11.3	30.3	49	17,747	41.0
Croplan	549 CL	NS	Clearfield, DM	3021	2983	10.8	29.8	64	19,332	40.0
Nuseed	Hornet	HO	Clearfield, DM	2939	2949	10.7	29.5	58	17,811	41.2
Croplan	3845 HO	HO	N/A	2887	2797	10.3	28.3	59	18,107	41.4
Nuseed	NHKP53383	HO	Clearfield Plus, DM	2851	-	11.2	28.5	53	22,236	38.9
Dyna-Gro	XH81H50CL	HO	Clearfield	2791	-	11.3	29.1	58	19,747	39.1
Dyna-Gro	XH81N48EX	NS	ExpressSun	2738	-	10.6	30.7	53	21,914	41.2
Nuseed	NHKM34006	HO	Clearfield, DM	2667	-	11.0	28.1	58	22,825	40.2
Croplan	455 E HO	HO	ExpressSun, DM	2650	2528	11.0	29.5	50	20,909	38.5
Croplan	557 CL HO	HO	Clearfield, DM	2645	-	11.6	29.3	59	15,939	40.1
Dyna-Gro	DG H44HO12 CL	HO	Clearfield, DM	2578	-	10.5	28.9	45	20,764	40.4
Croplan	432 E	NS	ExpressSun, DM	2571	2721	10.5	29.9	58	22,942	40.3
Allegiant	65H81CL	HO	Clearfield, DM	2485	-	10.3	29.0	54	21,215	40.7
Dyna-Gro	DG H45NS16 CL	NS	Clearfield, DM	2391	-	10.6	29.8	52	22,942	42.1
Nuseed	N4HP470	HO	Clearfield Plus, DM	2345	-	10.8	30.4	58	19,554	40.7
Nuseed	N4HM354	NS	Clearfield, DM	2110	2544	10.5	30.1	52	20,457	41.4
Croplan	3732	NS	N/A	2088	2557	10.8	29.1	54	17,489	40.6
Nuseed	N4HE302	HO	ExpressSun	2045	-	10.9	27.5	55	19,747	40.0
Dyna-Gro	XH81N46EX	NS	ExpressSun	1590	-	11.2	28.1	55	21,909	40.6
Dyna-Gro	XH81H51EX	HO	ExpressSun	733	-	10.8	25.7	37	20,005	38.7
Average				2677	2916	10.9	28.9	54	20,068	40.6
^d LSD (P<0.30)				258						
^d LSD (P<0.05)				493						
Coefficient of Variation (%)				15.8						

^aOil type designations: HO=High oleic; NS=NuSun/Mid-oleic.

^bTechnology trait designations: Clearfield and Clearfield Plus=tolerant to Beyond herbicide; DM=downy mildew resistance; ExpressSun=tolerant to Express herbicide; N/A=no technology traits.

^cYield and oil content were corrected to 10% moisture at harvest.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance (P<0.30) or 95% chance (P<0.05) the difference is significant.

Site Information

Collaborator: Gerhard Heintges

Planting Date: June 5, 2018

Harvest Date: November 1, 2018

Fertilizer: N at 120 and P at 35 lb/ac

Herbicide: Authority Elite at 19 oz/ac

Insecticide: Prevathon at 20 oz/ac applied 8/7/2018 and Mustang Maxx at 4 oz/ac on 8/23/2018

Irrigation: Center-pivot

Soil Type: Colby loam

This table may be reproduced only in its entirety.

2018 Limited-Irrigation Confection Sunflower Hybrid Variety Performance Trial at Burlington

Brand	Hybrid	Technology Traits ^a	Yield ^b lb/ac	2-Year Avg. Yield lb/ac	Moisture percent	Test Weight lb/bu	Plant Height in	Population plants/ac	Seed Retained Over Screen			
									Over 24/64	Over 22/64	Over 20/64	Over 16/64
Red River Commodities, Inc	RRC 2414	N/A	3922	-	13.2	17.5	72	15,329	60.6	82.5	93.1	99.0
SunOpta	9590	N/A	3517	-	11.8	17.0	62	16,501	17.7	39.6	71.9	98.1
Nuseed	5009	N/A	3287	3261	11.4	19.5	45	12,569	10.4	32.9	71.2	97.7
Nuseed	4334	Clearfield	3220	3419	12.0	17.6	60	15,811	44.4	76.1	94.7	99.2
Red River Commodities, Inc	RRC 2310	N/A	3210	-	13.0	18.4	70	16,511	53.3	75.9	91.4	98.8
SunOpta	9521	N/A	3042	-	11.9	18.7	52	13,636	43.6	70.1	90.0	98.7
Red River Commodities, Inc	RRC 2319	N/A	2897	-	11.3	16.1	60	14,743	54.0	72.4	90.3	99.0
SunOpta	9569	N/A	2850	-	12.0	18.2	41	15,043	20.0	50.1	80.3	97.8
Valia Genetics	Valia 41	N/A	2697	2928	11.9	18.8	55	16,802	23.7	48.7	80.9	98.9
Valia Genetics	H9811 EXP	N/A	2626	-	11.1	18.4	46	16,262	38.3	68.5	87.1	98.3
Red River Commodities, Inc	EXP 05	Clearfield Plus	2623	-	12.7	15.3	47	14,839	21.2	52.7	85.6	98.4
SunOpta	9579	N/A	2619	-	11.1	18.4	50	16,030	25.5	64.6	88.6	99.2
Nuseed	NSKM65891	N/A	2563	-	13.0	18.2	56	14,738	31.0	60.1	84.5	98.5
Nuseed	Panther DMR	DM	2488	2467	11.4	19.9	42	17,134	32.9	50.8	77.9	97.7
Nuseed	NSKM65802	N/A	2424	-	13.2	16.2	38	15,898	33.1	58.6	84.9	98.6
Valia Genetics	Valia 73	N/A	2360	-	11.3	17.6	52	14,256	25.9	53.2	77.7	97.1
Red River Commodities, Inc	RRC 2215	N/A	2333	2947	11.6	18.2	45	14,995	22.0	58.6	85.7	97.5
SunOpta	9549	N/A	2318	-	10.7	16.8	41	17,714	12.3	31.8	65.8	96.8
Average			2833	3005	11.9	17.8	52	15,489	31.7	58.2	83.4	98.3
°LSD (P<0.30)			376									
°LSD (P<0.05)			722									
Coefficient of Variation (%)			18.2									

°LSD (P<0.30)

°LSD (P<0.05)

Coefficient of Variation (%)

^aTechnology trait designations: Clearfield and Clearfield Plus=tolerant to Beyond herbicide; DM=downy mildew resistance; ExpressSun=tolerant to Express herbicide; N/A=no technology traits.

^bYield and oil content were corrected to 10% moisture at harvest.

°If the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance (P<0.30) or 95% chance (P<0.05) the difference is significant.

Site Information

Collaborator: Gerhard Heintges
 Planting Date: June 5, 2018
 Harvest Date: November 1, 2018
 Fertilizer: N at 120 and P at 35 lb/ac
 Herbicide: Authority Elite at 19 oz/ac
 Insecticide: Prevathon at 20 oz/ac applied 8/7/2018 and Mustang Maxx at 4 oz/ac on 8/23/2018
 Irrigation: Center-pivot
 Soil Type: Colby loam

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2018 Irrigated Oil Sunflower Hybrid Variety Performance Trial at Prospect Valley

Brand	Hybrid	Oil Type ^a	Technology Traits ^b	Yield ^c		Moisture	Test Weight	Plant Height	Population	Oil Content ^c
				lb/ac	lb/ac					
Croplan	549 CL	NS	Clearfield, DM	2928	2936	10.8	32.1	60	17,134	39.9
Nuseed	NHKP53383	HO	Clearfield Plus, DM	2747	-	12.0	30.1	36	17,134	39.2
Croplan	545 CL	NS	Clearfield, DM	2667	3013	11.8	31.4	46	13,358	39.4
Dyna-Gro	XH81N48EX	NS	ExpressSun	2571	-	10.6	32.4	44	19,747	40.0
Dyna-Gro	XH82N62EX	NS	ExpressSun	2568	-	11.1	32.0	47	18,295	39.8
Nuseed	Hornet	HO	Clearfield, DM	2470	2715	11.0	31.2	48	17,424	40.9
Dyna-Gro	DG H49NS14 CL	NS	Clearfield, DM	2358	-	11.2	31.2	48	13,068	40.5
Dyna-Gro	XH82H65EX	HO	ExpressSun	2287	-	11.1	31.5	54	19,166	39.9
Croplan	455 E HO	HO	ExpressSun, DM	2273	2340	11.0	31.3	52	17,424	39.4
Croplan	568 CL HO	HO	Clearfield, DM	2210	2807	11.3	30.5	43	15,972	42.8
Dyna-Gro	DG H48HO15 CL	HO	Clearfield, DM	2146	-	11.1	31.2	50	13,358	42.1
Dyna-Gro	DG H49HO19 CL	HO	Clearfield, DM	2123	-	10.9	31.0	44	14,520	41.2
Allegiant	70H51CL	HO	Clearfield, DM	2109	-	11.4	31.4	51	17,714	43.5
Dyna-Gro	XH81H53EX	HO	ExpressSun	2081	-	10.8	30.3	49	16,262	41.8
Dyna-Gro	XH81H52CP	HO	Clearfield Plus	2077	-	11.7	32.0	49	16,843	42.7
Nuseed	N4HP470	HO	Clearfield Plus, DM	2071	-	11.5	32.6	48	14,810	42.3
Dyna-Gro	XH82H63EX	HO	ExpressSun	2033	-	11.4	32.0	50	14,810	38.9
Croplan	3845 HO	HO	N/A	2017	2362	10.8	32.0	48	14,810	43.0
Nuseed	N4HM521	HO	Clearfield, DM	1942	2525	10.8	30.4	44	15,682	42.9
Nuseed	NHKM34006	HO	Clearfield, DM	1895	-	10.7	31.5	44	18,295	40.9
Croplan	432 E	NS	ExpressSun, DM	1842	2357	10.6	31.0	55	19,166	37.6
Dyna-Gro	XH82N64EX	NS	ExpressSun	1772	-	10.5	31.7	54	19,457	-
Croplan	3732	NS	N/A	1732	2378	11.4	31.3	47	13,649	41.9
Nuseed	N4HE302	HO	ExpressSun	1719	-	10.8	30.1	47	17,424	39.4
Nuseed	N4HM354	NS	Clearfield, DM	1700	2338	11.1	31.9	46	18,295	42.0
Dyna-Gro	XH81H50CL	HO	Clearfield	1676	-	11.1	31.2	48	18,876	40.4
Allegiant	65H81CL	HO	Clearfield, DM	1626	-	10.7	31.4	40	19,747	41.7
Dyna-Gro	DG H45NS16 CL	NS	Clearfield, DM	1617	-	11.1	31.7	42	16,843	40.5
Croplan	557 CL HO	HO	Clearfield, DM	1604	-	12.1	30.9	45	14,053	39.7
Dyna-Gro	DG H44HO12 CL	HO	Clearfield, DM	1529	-	10.9	31.1	54	19,747	41.9
Dyna-Gro	XH81N46EX	NS	ExpressSun	1485	-	11.4	30.0	52	18,586	39.6
Dyna-Gro	XH81H51EX	HO	ExpressSun	514	-	8.4	30.9	32	17,134	39.2
Average				2012	2577	11.0	31.3	47	16,838	40.9
^d LSD (P<0.30)				229						
^d LSD (P<0.05)				436						
Coefficient of Variation (%)				15.8						

^aOil type designations: HO=High oleic; NS=NuSun/Mid-oleic.

^bTechnology trait designations: Clearfield and Clearfield Plus=tolerant to Beyond herbicide; DM=downy mildew resistance; ExpressSun=tolerant to Express herbicide; N/A=no technology traits.

^cYield and oil content were corrected to 10% moisture at harvest.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance (P<0.30) or 95% chance (P<0.05) the difference is significant.

Site Information

Collaborator: Leon Zimbelman

Planting Date: June 2, 2018

Harvest Date: November 3, 2018

Fertilizer: N at 120 lb/ac

Herbicide: Sonolan at 3 pt/ac

Insecticide: Warrior at 1.9 oz/ac and Lorsban at 0.67 pt/ac

Irrigation: Furrow irrigation

Soil Type: Colby loam

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Sunflower Markets

RF Meyer

Golden Plains Area Agronomist

Sunflower producers have unique marketing opportunities when compared to other commodities. Marketing choices include NuSun oil, high oleic oil, confection, bird seed, and salad bar markets. Each one of these markets are unique and have specific quality requirements. Many of these markets pay premiums when delivering high quality sunflower but also have discounts for lower quality sunflower. Therefore, it is essential to know what you have in terms of sunflower quality to obtain the best price for the product you produced.

Oil-type sunflower has strong markets. Sunflower oil is considered a premium oil when compared to most other plant-based oils. Sunflower oil is a healthy oil that has low saturated fat contents, low trans-fat amounts and contains high levels of vitamin E. Sunflower oil contains high levels of unsaturated fats and Omega 3 which research has shown to lower “LDL” or bad cholesterol that makes this oil considered “heart healthy” by medical professionals. Currently, high oleic sunflower hybrids are the healthiest oil being marketed with this type offering a marketing premium over the NuSun hybrids. Plant breeders are now working on even healthier sunflower oil types and new releases are expected in the future. A market premium is paid for sunflower that contains more than 40% total oil with discounts applied for less than 40% oil.

A second sunflower market is the confection market. The growing season found within the High Plains Region enables extra-large sized confection seed production. International markets look for this characteristic and request sunflower seeds grown from the High Plains. In addition, confection sunflower as a food offers anti-oxidant, anti-carcinogenic, and heart healthy benefits. As a result, markets are strong for confections and premiums are paid to producers who deliver large seed sizes. This market is best managed with grower contracts. Other food markets for sunflower include the salad bar market. This is a small, specialized market and is mostly grown by contract.

Bird seed markets offer another marketing opportunity for this crop. Bird seed markets normally don't concern themselves with oil content or seed size. As a result, seeds that may get discounted from other sunflower markets may be suitable for the bird seed market without discounts. The best bird seed marketing opportunities occur when the East Coast experiences severe winter weather, as more than 50 million people feed birds as a hobby in the U.S.

Sunflower markets do not have a Board of Trade like many of the other commodities. As a result, sunflower marketing opportunities are unique. Many of these markets have an “Act of God” marketing contract available. Simply put, if you don't produce a sunflower crop due to an act of nature, you don't have to deliver the crop. Multiple marketing opportunities exist for this crop which can allow producers to take advantages of premiums offered.



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