

Technical Report TR15-8



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Department of Soil & Crop Sciences

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**2015 Colorado Sunflower
Variety Performance Trials**

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Summary of the 2015 Colorado Sunflower Hybrid Performance Trials

Jerry Johnson, Ron Meyer, Sally Sauer, and Ed Asfeld

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. Variable climatic conditions, innovations from plant breeding and biotechnology, acquisitions and mergers of seed companies, and rapid development of new hybrid lines means crop performance information is increasingly important 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.

Colorado sunflower producers are expected to harvest 52 million pounds of seed in 2015, which is more than double the production of last year, according to the USDA National Ag. Statistics Service. Above average rainfall and new hybrids contributed to the increase. Advances in weed control with a broader range of herbicides such as imidazolinone, Express, Clearfield, and Clearfield Plus have benefited our sunflower producers.

As a result of favorable growing conditions, we harvested record high yields in 2015 in the Prospect Valley irrigated site. Further, improved genetics has raised confection type sunflower yields as well. It is currently common for irrigated sunflower yields to average more than 3000 pounds per acre, with some individual hybrids yielding more than 4000 pounds per acre.

Figure 1 shows the variability of acreage over time for both oil and confection sunflowers in Colorado. This is especially true for oil type sunflowers in the past 20 years. Acreage planted to oil type sunflowers has ranged from 35,000 (2014) planted acres up to 175,000 acres in 1999. The planted acres of confection sunflowers have generally decreased since 1999. The variability of sunflower acreage could be due to several factors, including sunflower commodity prices, the availability of contracts, soil water at the time 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, especially with the new drought tolerant hybrids coming onto the market. On the other hand, herbicide tolerant sunflowers and new oil traits could lead to an increase of sunflower acreage in coming years. Food processors are demanding healthier oils, and sunflower oil meets this demand very well due to the introduction of High Oleic type hybrids. High Oleic oil pressed from sunflower is more stable when used in cooking and has 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

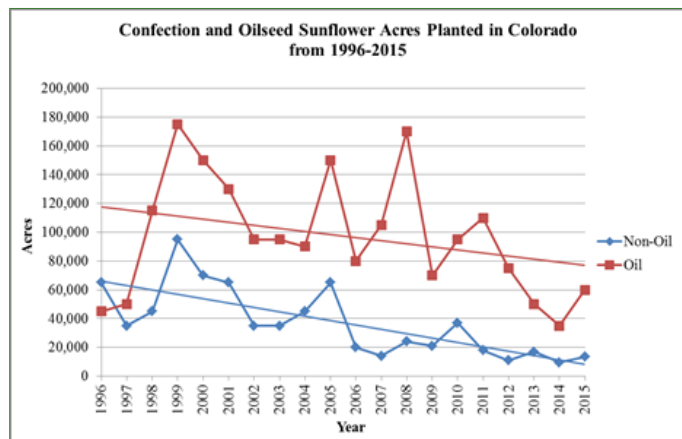


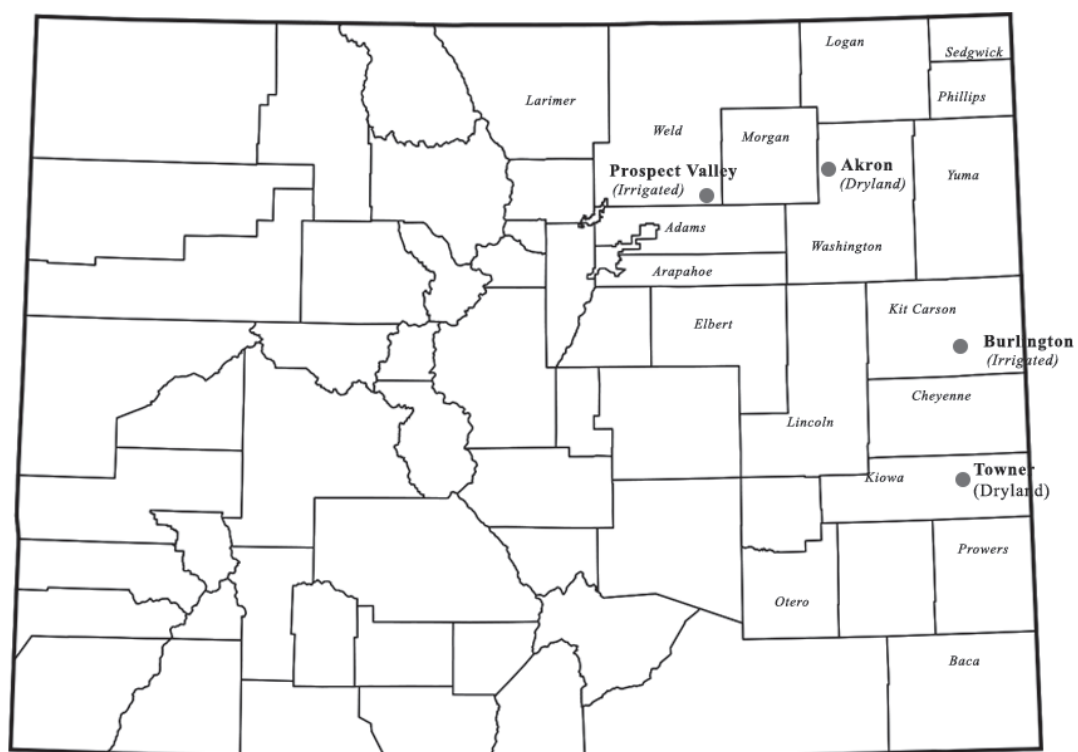
Figure 1: Confection and Oilseed Sunflower Acres Planted in Colorado from 1996-2015

of

two dryland locations in 2015. The limited irrigation trial was at Burlington and the fully irrigated trial was at Prospect Valley. The two dryland trials were located at Towner (southeast Colorado) and Akron (northeast Colorado). The results from these two dryland trials this year could not be used due to a hailstorm that defoliated plants by 80% on August 1 in Akron and hailstorms combined with vole damage at Towner.

Results tables for the limited and fully irrigated trials are presented in the following pages. Twenty-six hybrids with diverse origins and maturities were tested in the irrigated and dryland trials. Plot sizes were approximately 150 ft² at Burlington and Prospect Valley, and 300 ft² at Akron and Towner. Seed yields for all trial varieties are reported in the tables. Yields and oil content (for oil trials) are adjusted to 10% seed moisture content.

Colorado Sunflower Trial Locations in 2015



2015 Limited-Irrigation Oil Sunflower Hybrid Performance Trial at Burlington

Brand	Hybrid	Oil Type ^a	Technology Traits ^b	2015		2+Year		Test Weight lb/bu	Plant Height in	Population plants/ac	Lodging ^d percent	Oil Content percent
				Yield ^c lb/ac	Avg. Yield	Moisture percent	Avg. Yield					
Croplan	545 CL	NS	Clearfield, DM	2341	2679	7.8	30.4	81	20,255	9.9	39.1	
Nuseed	Camaro II	NS	Clearfield, DM	2125	2494	7.3	32.2	75	21,127	8.6	40.5	
Syngenta	3845 HO	HO	N/A	2088	2402	6.2	32.0	65	16,262	10.2	43.0	
Mycogen Seeds	8H449CLDM	HO	Clearfield, DM	2086	2550	6.6	32.7	71	19,892	10.4	42.5	
Mycogen Seeds	MY8H456CLDM	HO	Clearfield, DM	1953	-	6.4	30.0	73	18,803	11.3	41.0	
Croplan	553 CL HO	HO	Clearfield, DM	1871	-	6.9	31.2	81	20,183	12.7	40.8	
Nuseed	Falcon	NS	ExpressSun	1833	2113	6.4	32.0	70	20,401	12.6	41.0	
Croplan	549 CL HO	HO	Clearfield, DM	1829	-	6.4	32.3	80	21,417	22.9	39.2	
Nuseed	Hornet	HO	Clearfield, DM	1795	2383	6.6	30.5	78	20,038	13.7	40.3	
Croplan	432 E	NS	ExpressSun, DM	1684	2297	6.7	31.2	71	19,675	11.7	37.2	
Syngenta	3732 NS	NS	N/A	1454	2142	6.7	31.5	66	18,440	11.9	40.9	
Nuseed	NHK12M054	HO	Clearfield, DM	1437	-	6.5	32.0	72	19,602	13.2	39.6	
Nuseed	NHK12M055	HO	Clearfield, DM	1374	-	6.4	32.0	69	19,457	10.8	41.1	
Mycogen Seeds	8H570SCL	HO	Clearfield	1206	1336	6.2	32.5	55	20,836	29.8	42.3	
Syngenta	SY7717	HO	Clearfield, DM	896	1540	6.3	31.1	72	20,183	23.0	40.4	
Croplan	458 E HO	HO	ExpressSun, DM	782	-	6.7	30.5	73	20,546	26.7	38.8	
Syngenta	7111 HO/CL/DM	HO	Clearfield, DM	683	-	6.8	31.1	61	18,876	8.2	39.8	
Average				1614	2194	6.6	31.5	71	19,764	14.6	40.4	

^eLSD (P<0.30) 340

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

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

^cYields were corrected to 10% moisture.

^dLodging was a result of mid-season weed competition and light hail.

^eIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Trial note: Lodged plants were unable to be harvested.

Plot size: 5' x 30'

Site Information

Collaborator: Gerhard Heintges
 Planting Date: June 9, 2015
 Harvest Date: October 27, 2015
 Fertilizer: Nitrogen at 110 lb/ac and phosphorus at 30 lb/ac
 Herbicide: Pre-plant: Spartan at 4 oz/ac and Roundup at 32 oz/ac
 Insecticide: Warrior at 2.56 oz/ac and Lorsban at 1 pt/ac applied during early-bloom stage
 Irrigation: Limited-irrigation (total amount of water applied was between 4 and 9 inches via center pivot)
 Soil Type: Norka silt loam

2015 Limited-Irrigation Confection Sunflower Hybrid Performance Trial at Burlington

Brand	Hybrid	Technology Traits ^a	2015 Yield ^b lb/ac	3-Year Avg. Yield lb/ac	Moisture percent	Test Weight lb/bu	Plant Height in	Population plants/ac	Lodging percent	Seed Retained Over Screen			
										Over 24/64	Over 22/64	Over 20/64	Over 16/64
Royal Hybrid	RH609CLP	Clearfield	3119	-	9.0	20.2	82	16,625	5.1	20.4	48.8	72.6	91.4
Red River Commodities, Inc.	2215CL	Clearfield	2939	2807	9.2	18.6	81	14,956	8.1	11.2	37.4	72.0	97.0
Red River Commodities, Inc.	8015	N/A	2916	2556	9.3	17.8	73	15,827	9.6	15.6	46.8	81.8	98.4
Nuseed	NDK12M147	N/A	2820	-	9.7	19.3	78	14,375	9.2	18.8	44.8	71.4	96.2
Red River Commodities, Inc.	2217CP	Clearfield Plus	2805	2453	8.9	18.8	77	15,754	9.2	20.8	48.6	79.6	98.2
Red River Commodities, Inc.	2215	N/A	2397	2632	9.1	19.9	76	14,012	7.1	11.2	39.0	82.6	98.4
Royal Hybrid	RH1130EX	ExpressSun	2051	-	9.4	18.6	78	16,117	4.5	18.8	53.2	85.2	98.2
Average			2721	2612	9.2	19.0	78	15,381	7.6	16.7	45.5	77.9	96.8

^aLSD (P<0.30)

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

^bYields were corrected to 10% moisture.

^cIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Trial note: Lodged plants were unable to be harvested.

Plot size: 5' x 30'

Site Information

Collaborator: Gerhard Heintges
 Planting Date: June 9, 2015
 Harvest Date: October 27, 2015
 Fertilizer: Nitrogen at 110 lb/ac and phosphorus at 30 lb/ac
 Herbicide: Pre-plant: Spartan at 4 oz/ac and Roundup at 32 oz/ac
 Insecticide: Warrior at 2.56 oz/ac and Lorsban at 1 pt/ac applied during early-bloom stage
 Irrigation: Limited-irrigation (total amount of water applied was between 4 and 9 inches via center pivot)
 Soil Type: Norika silt loam

2015 Irrigated Oil Sunflower Hybrid Performance Trial at Prospect Valley

Brand	Hybrid	Oil Type ^a	Technology Traits ^b	2015 Yield ^c lb/ac	2-Year Avg. Yield	Moisture percent	Test Weight lb/bu	Plant Height in	Population plants/ac	Lodging percent	Oil Content percent
Mycogen Seeds	8H449CLDM	HO	Clearfield, DM	4032	3092	7.7	33.4	65	21,780	0.0	42.3
Mycogen Seeds	MY8H456CLDM	HO	Clearfield, DM	3739	-	7.9	30.7	66	20,637	3.4	41.3
Syngenta	3732 NS	NS	N/A	3410	2550	7.8	31.2	60	20,255	5.0	41.4
Nuseed	Hornet	HO	Clearfield, DM	3376	2691	8.0	30.6	69	21,635	7.1	40.8
Syngenta	3845 HO	HO	N/A	3290	2431	7.4	31.7	61	17,144	0.8	43.7
Nuseed	Falcon	NS	ExpressSun	3258	2477	7.3	31.8	65	19,962	1.3	39.8
Nuseed	Camaro II	NS	Clearfield, DM	2883	2431	7.6	31.9	68	20,145	4.1	40.1
Mycogen Seeds	8H570SCL	HO	Clearfield	2804	2330	7.4	31.5	45	20,836	8.1	41.4
Nuseed	NHK12M054	HO	Clearfield, DM	2701	-	7.5	32.3	62	20,691	2.2	40.5
Nuseed	NHK12M055	HO	Clearfield, DM	2567	-	7.8	31.1	60	18,731	5.4	39.5
Syngenta	SY7717	HO	Clearfield, DM	1920	1786	7.8	31.5	59	21,853	27.8	39.4
Syngenta	7111 HO/CL/DM	HO	Clearfield, DM	1559	-	7.4	30.6	56	18,634	13.0	39.4
Average				2962	2473	7.6	31.5	61	20,192	6.5	40.8
				LSD (P<0.30)						384	

^dLSD (P<0.30)

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

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

^cYields were corrected to 10% moisture.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Trial note: Lodged plants were unable to be harvested.

Plot size: 5' x 30'

Site Information

Collaborator: David Ruppel
 Planting Date: June 3, 2015
 Harvest Date: October 29, 2015
 Fertilizer: Poultry manure applied at 4 tons/ac
 Herbicide: Sonalan at 40 oz/ac
 Insecticide: Lorsban at 1 pt/ac and Warrior at 2.6 oz/ac applied during early-bloom stage
 Fungicide: Follicur at 4 oz/ac applied during early-bloom stage
 Irrigation: Full irrigation (total amount of water applied was greater than 13 inches via furrow irrigation)
 Soil Type: Colby loam

2015 Irrigated Confection Sunflower Hybrid Performance Trial at Prospect Valley

Brand	Hybrid	Technology Traits ^a	2015 Yield ^b lb/ac	Moisture percent	Test Weight lb/bu	Plant Height in	Population plants/ac	Lodging percent	Seed Retained Over Screen			
									Over 24/64	Over 22/64	Over 16/64	
Royal Hybrid	RH609CLP	Clearfield	4767	11.1	20.1	67	18,451	0.4	19.8	54.0	87.0	99.2
Red River Commodities, Inc.	2215CL	Clearfield	3783	11.7	19.6	69	15,827	0.5	20.8	57.0	90.6	99.2
Nuseed	NDK12M147	N/A	3653	11.6	19.6	62	13,205	1.2	16.0	44.2	74.8	96.4
Red River Commodities, Inc.	2217CP	Clearfield Plus	3577	11.5	19.1	67	16,625	1.3	27.2	62.0	89.0	98.8
Royal Hybrid	RH1130EX	ExpressSun	3326	13.1	18.5	72	16,916	0.9	38.4	71.0	90.0	97.2
Red River Commodities, Inc.	2215	N/A	3221	11.5	20.2	62	13,822	3.1	28.4	66.8	89.6	98.6
Red River Commodities, Inc.	8015	N/A	3105	11.2	17.6	60	15,827	0.8	17.2	52.0	81.4	98.0
Average			3633	11.7	19.2	65	15,810	1.2	24.0	58.1	86.1	98.2

^cLSD (P<0.30)
210

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

^bYields were corrected to 10% moisture.

^cIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Trial note: Lodged plants were unable to be harvested.

Plot size: 5' x 30'

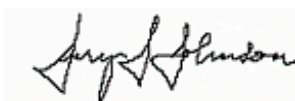
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Collaborator: David Ruppel
 Planting Date: June 3, 2015
 Harvest Date: October 29, 2015
 Fertilizer: Poultry manure applied at 4 tons/ac
 Herbicide: Sonalan at 40 oz/ac
 Insecticide: Lorsban at 1 pt/ac and Warrior at 2.6 oz/ac applied during early-bloom stage
 Fungicide: Folicur at 4 oz/ac applied during early-bloom stage
 Irrigation: Full irrigation (total amount of water applied was greater than 13 inches via furrow irrigation)
 Soil Type: Colby loam

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