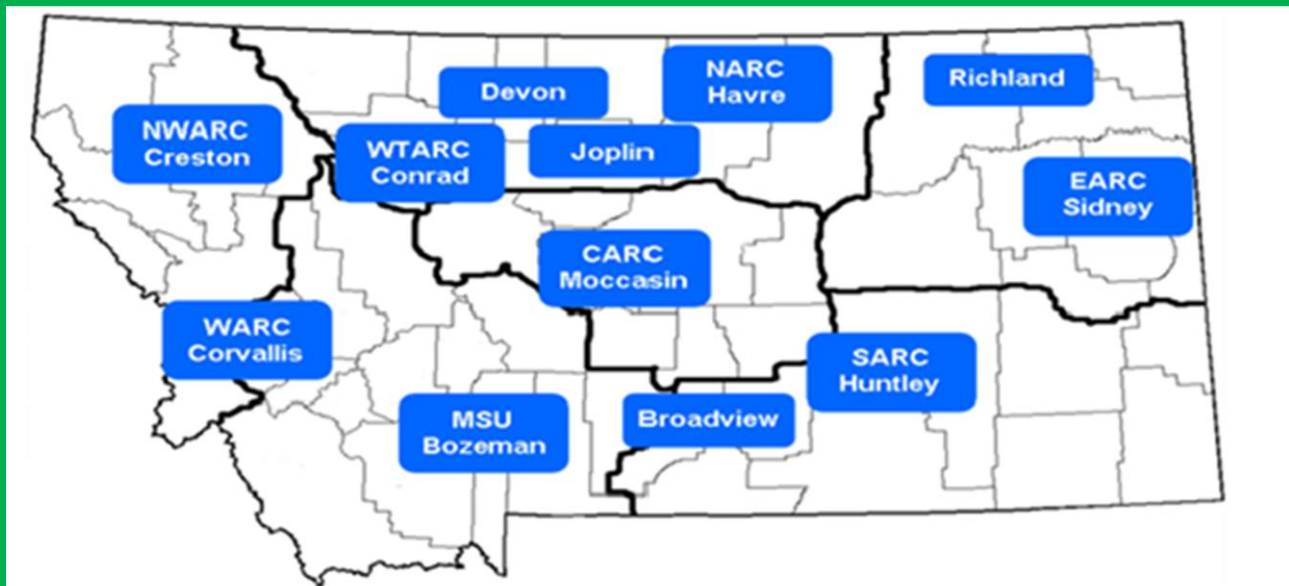


2019 Montana Cool-Season Spring Pulse Variety Evaluation Annual Report

Prepared By:

William Franck, Fatemeh Etemadi and Chengci Chen



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The Montana State University Eastern Agricultural Station in Sidney, MT coordinates an annual variety evaluation for cool season spring pulse crops (dry pea, lentil and chickpea) at multiple locations across the state of Montana. In 2019, funding for this project was obtained from the Montana Agricultural Experiment Station, the USA Dry Pea and Lentil Council, and testing fees from private entities submitting varieties and experimental lines for evaluation. The results provided in this report reflect the efforts of a large team of individuals from the Montana State University Agricultural Experiment Stations, Montana State University Extension, industrial partners from the seed industry and cooperating producers across the state. The following list provides contact information for many of the individuals involved in the 2019 variety evaluation.

Montana State University	
Chengci Chen Superintendent/Professor Eastern Ag. Research Center 1501 North Central Ave, Sidney, MT 59270 (406) 433-2208, cchen@montana.edu	Patrick Carr Superintendent/Associate Professor Central Ag. Research Center 52583 US Hwy 87 Moccasin, MT 59462 (406) 423-5421, Patrick.carr@montana.edu
William Franck Research Scientist Eastern Ag. Research Center 1501 North Central Ave, Sidney, MT 59270 (406) 433-2208, william.franck@montana.edu	Simon Fordyce Research Associate Central Ag. Research Center 52583 US Hwy 87 Moccasin, MT 59462 (406) 423-5421, simon.fordyce@montana.edu
Fatemeh Etemadi Postdoctoral Research Associate Eastern Ag. Research Center 1501 North Central Ave, Sidney, MT 59270 (406) 433-2208, fatemeh.etemadi@montana.edu	Peggy Lamb Research Scientist Northern Ag. Research Center 3710 Assiniboine Road Havre, MT 59501 (406) 265-6115, plamb@montana.edu
Frankie Crutcher Assistant Professor Eastern Ag. Research Center 1501 North Central Ave, Sidney, MT 59270 (406) 433-2208, frankie.crutcher@montana.edu	John Miller Research Scientist Western Triangle Ag. Research Center 9546 Old Shelby Road Conrad, MT 59425 (406) 278-7707, jhmiller@montana.edu
Kent McVay Associate Professor Southern Ag. Research Center 748 Railroad Hwy Huntley, MT 59037 (406) 348-3400, kmcvay@montana.edu	Qasim Khan Research Scientist Southern Ag. Research Center 748 Railroad Hwy Huntley, MT 59037 (406) 348-3400, qkhan@montana.edu
Kevin McPhee Professor, Pulse Breeder Plant Science and Plant Pathology, Bozeman, MT 59717 (406) 994-5156; kevin.mcphee@montana.edu	Derek Lewis Research Associate Plant Science and Plant Pathology, Bozeman, MT 59717 derek.lewis@montana.edu

Shelley Mills
Valley County Extension Agent
501 Court Square
Glasgow, MT 59230
(406) 228-6241, smills@montana.edu

Inga Hawbaker
Daniels County Extension Agent
106 Railroad Ave East
Scobey, MT 59263
(406) 487-2861, inga.hawbaker@montana.edu

University of Saskatchewan

Tom Warkentin and Brent Barlow
Pulse Breeder
(306) 966-4988
Tom.warkentin@usask.ca; brent.barlow@usask.ca

USDA – Agricultural Research Service

George Vandemark
Research Geneticist
USDA-ARS
Pullman, WA 99164
(509) 335-7728, George.vandemark@ars.usda.gov

Rebecca McGee
Research Geneticist
USDA-ARS
Pullman, WA 99164
(509) 335-0300, Rebecca.mcgee@ars.usda.gov

Industries

USA Dry Pea and Lentil Council
2780 W. Pullman Road
Moscow, ID 83843
(208) 882-3023
pulse@pea-lentil.com; www.pea-lentil.com

Northern Pulse Growers Association
1710 Burnt Boat Drive
Bismarck, ND 58503
(701) 222-0128
info@northernpulse.com www.northernpulse.com

Kurt Braunwart, Nancy Powell and Mike Wood
ProGene
860 S. Crestline Othello, WA, 99344
(509) 448-3977; kurt@progenellc.com;
nancy@progenellc.com;mike@progenellc.com

Emily Paul
Pulse USA
1900 Commerce Drive
Bismarck, ND 58501
(701) 530-0734; emily@pulseusa.com

Martin Hochhalter
Meridian Seeds
216553 37th St. SE, Suite 3, Mapleton, ND
(204)988 4681; mhochhalter@meridianseeds.com

Richard Roland/Cody Roland
Legume Logic
301 3rd St NW Crosby, ND 58730
(701) 965-6058; legumel@nccray.com

Shannah Plehal
Great Northern Ag.
(701) 497-3082; Shannah@greatnorthernag.com

Charlie Cahill
Cahill Seeds
Box 1172, 669 Highway 5, Scobey, MT 59263
(406) 783-5510; cahillseeds@nemontel.net

Producers

Richard Fulton
Richland, MT

Marvin Tarum
Richland, MT

Keith and Karen Schott
Broadview, MT

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PROJECT DESCRIPTION AND OBJECTIVE

Project Description

Cool season spring pulse crop (dry pea, lentil and chickpea) acreage in Montana has increased more than 10 fold this century. In an effort to improve yield and quality of these crops, the Eastern Agricultural Research Center (EARC) of Montana State University (MSU) is currently coordinating a statewide pulse crop variety evaluation project across Montana on an annual basis. For the 2019 growing season, trials were conducted at five MSU Agricultural Research Centers, the MSU-Bozeman Post Farm and two cooperating producers' fields near Broadview and Richland, Montana. The results reported herein are intended to aid producers and seed suppliers in variety selection as well as aiding the research community in variety development. The report is available both in print and electronic formats and can be found at:

(<http://agresearch.montana.edu/earc/annualreports.html>).

Objective

The objective of this project is to evaluate yield and seed quality parameters for dry pea, lentil and chickpea varieties and lines selected by stakeholder input across a broad range of Montana environments.

METHODS

Procedures and Experimental Design

Seed companies and pulse breeders with an interest in Montana pulse production were invited to submit commercial varieties or experimental lines for evaluation in 2019. Locations available for evaluation were indicated in the invitation letter and the selection of locations for each entry to be evaluated was determined by submitting party. In addition, ten (lentil and chickpea) or 11 (dry pea) entries were selected by the EARC to serve as check varieties and were planted at all locations. In 2019 the variety evaluations were performed at seven dryland locations and two irrigated locations.

Seed for all entries were sent to the EARC where each seed lot was tested for germination. All seeds were treated with Obvius Fungicide (BASF Corporation, Research Triangle Park, NC) and Cruiser 5FS Insecticide (Syngenta Crop Protection, Inc., Greensboro, NC) prior to packaging. Seeds were packaged on a per plot basis to obtain live seed rates of 8, 12 and 4 live seeds per ft² for pea, lentil and chickpea, respectively. Seeds were sent to the cooperating research centers with an appropriate rhizobial inoculant to be applied at planting. Research plots were planted in a randomized complete block design with four replicates per entry. Plot size varied amongst locations and was dictated by the equipment available at each location. Management practices varied by location but were consistent with typical practices for the location. In season measurements and harvest data were collected by each cooperating center and sent to the EARC for analysis. Grain yield data was adjusted to 13% moisture content before statistical analysis. Dry pea protein concentrations were determined on an Infratec 1241 Grain Analyzer (Foss, Hilleroed, Denmark). Analysis of variance were done using GLM of the SAS statistical package (SAS 9.4). The LSMEANS (@ $\alpha = 0.05$) procedure was used to differentiate means of different varieties.

List of collaborators and locations

The type of crop (pea, lentil and chickpea) and number of entries for each of these crops evaluated at the different locations varied from location to location depending on the interest of seed suppliers and availability of resources at the respective location. The list of location, collaborators and the type of crops evaluated at each location is shown in Table 1.

Table 1. Collaborators, locations and crops evaluated in 2019.

Location	Collaborator [†]	Irrigation	Crops evaluated at location			Observations
			Pea	Lentil	Chickpea	
Bozeman (Post Farm)	PSPP	No	X	X	X	
Broadview	SARC	No	X			
Conrad	WTARC	No	X	X	X	Chickpea wildlife damage
Havre	NARC	No	X	X	X	Chickpeas lost to wildlife
Huntley (Dryland)	SARC	No	X	X	X	Trials partially lost to hail
Huntley (Irrigated)	SARC	Yes	X	X	X	Trials lost to hail
Moccasin	CARC	No	X	X		
Richland	EARC	No	X	X	X	Chickpea wildlife damage
Sidney (Irrigated)	EARC	Yes	X	X	X	

[†]CARC = Central Agricultural Research Center, EARC = Eastern Agricultural Research Center, PSPP = Plant Sciences and Plant Pathology, NARC = Northern Agricultural Research Center, SARC = Southern Agricultural Research Center, WTARC = Western Triangle Agricultural Research Center. 'X' indicates the collaborator participated for the specific crop variety evaluation in 2019.

List of Varieties

Table 2 includes the list of varieties and experimental lines evaluated in 2019. Additional information for these entries can be obtained by contacting the respective seed suppliers listed in the acknowledgements section. Entries listed in this table include varieties requested by seed suppliers, varieties selected as check varieties by the Montana Agricultural Experiment Station and experimental lines from the Montana State University and North Dakota State University pulse crop breeding programs.

Table 2. Dry pea, lentil and chickpea entries included in 2019 variety evaluation trials.

Crop	Entry	Seed color/size	Maturity
Dry Pea	124-7146	Yellow	
	154-7207	Yellow	
	154-7225	Yellow	
	AAC Asher	Yellow	
	AAC Carver	Yellow	Early
	AAC Chrome	Yellow	Medium
	AAC Comfort	Green	Medium
	AAC Profit	Yellow	Medium/Late
	AC Agassiz	Yellow	Late
	AC Earlystar	Yellow	Early
	Aragorn	Green	Medium
	Astronaute	Yellow	
	Banner	Green	Early
	Bluemoon	Green	Late
	Bridger	Yellow	Medium
	CDC Amarillo	Yellow	Medium
	CDC Dakota	Yellow	Medium
	CDC		
	Greenwater	Green	Medium
	CDC Inca	Yellow	Medium
	CDC Saffron	Yellow	Early/Medium
	CDC Spectrum	Yellow	Medium
	Delta	Yellow	Medium
	DL Apollo	Yellow	Medium
	DS-Admiral	Yellow	Medium
	Durwood	Yellow	Medium
	Ginny	Green	Early
	Greenwood	Green	Medium
	Hampton	Green	
	Hylene	Yellow	
	Jetset	Yellow	Late
	Keystone	Green	
	Korando	Yellow	Late
	LG Amigo	Yellow	Early/Medium
LG Sunrise	Yellow	Medium	
Majestic	Yellow		
Majoret	Green	Medium	

Table 2. Continued

Crop	Entry	Seed color/size	
Dry Pea	MT457	Green	
	Navarro	Yellow	Early
	NDP121587	Yellow	
	Nette 2010	Yellow	Early/Medium
	Pro 093-7410	Yellow	
	Pro 121-7126	Green	
	Pro 131-7123	Green	
	Pro 133-6243	Yellow	
	Pro 141-6258	Green	
	Pro 143-6236	Yellow	
	PS07100925	Yellow	
	PS08101022	Yellow	
	PS0877MT076	Green	
	PS0877MT632	Yellow	
	Salamanca	Yellow	Early
	Spider	Yellow	Early/Medium
	SW Arcadia	Green	Early/Medium
Lentil	Avondale	Medium green	
	CDC Impress	Medium green	
	CDC Invincible	Small green	Early
	CDC Maxim CL	Small red	Early/Medium
	CDC Richlea	Medium green	Early/Medium
	CDC Viceroy	Small Green	
	NDL090185R	Medium green	
	NDL090204R	Medium green	
	NDL090170L	Large Green	
	Sage		
Chickpea	BGC090017	Kabuli type	
	CDC Alma	Kabuli type	Medium
	CDC Frontier	Kabuli type	Late
	CDC Leader	Kabuli type	Medium
	CDC Orion	Kabuli type	Medium/Late
	CDC Palmer	Kabuli type	Medium/Late
	GNC-18011	Kabuli type	
	Myles	Desi type	
	Nash	Kabuli type	
	Royal	Kabuli type	
	Sawyer	Kabuli type	
Sierra	Kabuli type		

Precipitation and Cultural Practices

Precipitation, site information and agronomic management practices for the respective locations are summarized in Tables 3 and 4.

Table 3. Site characteristics for each trial location

	Bozeman	Conrad (WTARC)	Havre (NARC)	Huntley (SARC)	Moccasin (CARC)	Richland	Sidney Irrigated (EARC)
Soil Type	Bozeman Silt Loam		Telstad clay loam & Hillon clay loam		Danvers-Judith Clay loam	Farnuf Loam	Savage Silty Clay Loam
Elevation	4775	3700	2699		4250	2950	2200
Seasonal Precipitation (April - August) (in)		6.8	7.0	11.1	12.1		10.1
Average Precipitation (in)		8.4	8.0	7.9	10.2		9.6
Irrigation (in)							1.8

Table 4. Major agronomic management practices for each location in 2019

Pea Trials						
Location	Tillage	Seeding Date	Harvest Date	Previous Crop	Fertilizer	Pesticide Applications
Bozeman	No-Till	5/7	8/20	Spring Wheat	None	Sharpen @ 1 oz/ac; Prowl @ 1.5 pints/ac; Roundup @ 1 qt/ac
Broadview	No-Till	4/17	8/26	Spring Wheat		
Conrad		4/19			0-20-20 (lbs/ac)	RT3 @ 32 fl oz/ac, Spartan @ 2.5 fl oz/Ac
Havre	No-Till	4/16	7/29	Fallow	None	Mustang Max @ 4 oz/ac
Huntley Dryland		4/24				RT3 @ 24 fl oz/ac, Prowl @ 32 fl oz/Ac & Outlook
Moccasin	Conventional	4/23	8/14	Alfalfa/grass	10-15-10-5 (lbs/ac)	RT3 @ 36 fl oz/ac pre-plant; Raptor + Basagran @ 4 and 13 fl oz/ac; Grizzly Too @ 1.9 fl oz/ac
Richland	No-Till	5/9	8/20	Spring Wheat	None	Valor @ 3 fl oz/ac fall applied; Sharpen @ 0.75 fl oz/ac pre-plant
Sidney Irrigated	Conventional	4/24	8/9	Sugarbeet	None	Durango @ 24 fl oz /ac & Outlook @ 12 fl oz/ac Premergence

Table 4. Continued

Lentil Trials						
Location	Tillage	Seeding Date	Harvest Date	Previous Crop	Fertilizer	Pesticide Applications
Bozeman	No-Till	5/7	9/3	Spring Wheat	None	Sharpen @ 1 oz/ac; Prowl @ 1.5 pints/ac; Roundup @ 1 qt/ac
Conrad		4/23	8/27		0-20-20 (lbs/ac)	
Havre	No-Till	4/16	8/1	Fallow	None	
Huntley Dryland		4/24				RT3 @ 24 fl oz/ac, Prowl @ 32 fl oz/Ac & Outlook
Moccasin	Conventional	4/19	8/15	Alfalfa/grass	10-15-10-5 (lbs/ac)	RT3 @ 36 fl oz/ac pre-plant; Assure II @ 12 fl oz/ac
Richland	No-Till	5/9	8/21	Spring Wheat	None	Valor @ 3 fl oz/ac fall applied; Sharpen @ 0.75 fl oz/ac pre-plant
Sidney Irrigated	Conventional	4/24	8/14	Sugarbeet	None	Durango @ 24 fl oz /ac & Outlook @ 12 fl oz/ac Premergence
Chickpea Trials						
Bozeman	No-Till	5/7	9/23	Spring Wheat	None	Sharpen @ 1 oz/ac; Prowl @ 1.5 pints/ac; Roundup @ 1 qt/ac
Conrad		4/19	9/16		0-20-20 (lbs/ac)	
Richland	No-Till	5/9	9/4	Spring Wheat	None	Valor @ 3 fl oz/ac fall applied; Sharpen @ 0.75 fl oz/ac pre-plant
Sidney Irrigated	Conventional	4/23	9/5	Sugarbeet	None	Durango @ 24 fl oz /ac & Outlook @ 12 fl oz/ac Premergence; Proline @ 5.7 fl oz/ac on 6/27; Priaxor @ 8 fl oz/ac on 7/13; Delaro @ 12 fl oz/ac on 7/30

RESULTS

Dry Pea Variety Evaluation in 2019

A total of 53 dry pea varieties and experimental lines (37 yellow and 16 green) were evaluated in 2019 at 8 locations. A ninth location under irrigation at Huntley was lost to hail just prior to harvest. Planting was slightly delayed at Richland and Bozeman due to weather conditions and subsequently harvest was delayed as well. Eleven entries (six yellow and five green) were advanced breeding lines and check varieties selected by EARC to test at all locations. The remaining 42 entries were tested only at locations requested by the seed supplier. The data collected and presented includes grain yield, thousand kernel weight, test weight, plant height and number of days to flowering consistent with previous years. New to 2019 is the addition of protein content data for all pea entries at each location. As in the past, results are presented in two groups based on cotyledon color (yellow and green).

Yellow dry pea grain yield

Mean grain yield for yellow dry pea for the different locations ranged from 2000 lb/ac at Havre to 5030 lb/ac under irrigation at Sidney (Table 5). Yields were generally normal to above normal with no locations reporting poor yields. Significant differences for entries were found among the locations, and differences within a location were observed for all locations except Bozeman and Conrad.

Yellow dry pea protein content

Protein content is presented in Table 6. The mean protein content by location varied from 20% at Huntley and Conrad to 25% at Moccasin. Protein contents were considerably better at Moccasin and Richland than other locations. Of the six entries tested at all locations, protein contents were always highest at these two locations suggesting that environmental conditions are playing an important role in determining pea protein content.

Yellow dry pea thousand kernel weight (TKW)

TKW's were collected from four locations in 2019 and ranged from 219 to 251 grams per thousand kernels (Table 7). Significant differences for entries within a location were observed for all locations examined.

Yellow dry pea test weight

Test weight data was recorded for all locations and location mean test weights ranged from 63.8 lb/bu (Havre) to 64.9 lb/bu (Bozeman). The variation in test weight means amongst locations is considerably smaller

than in previous years. The differences in test weight were significant for entries within a location except at Broadview and Conrad.

Yellow dry pea plant height

The mean plant height ranged from 40 cm to 70 cm (Table 9). The highest mean plant height was observed at Sidney and the lowest at Havre which correspond to the highest and lowest yielding sites. Significant differences for entries within a location were observed for all locations.

Yellow dry pea days to flowering

The number of days to flowering were recorded for all trials located at a research center (Table 10). Consistent with previous years Moccasin had the longest mean time to flowering at 74 days and Sidney the shortest at 55 days (Table 10).

Green dry pea grain yield

The mean grain yield for green pea ranged from 2017 lb/ac at Havre to 4552 lb/ac at Sidney under irrigation (Table 11). As with yellow pea, yields for green pea were average to above average at all locations. Significant differences for entries within a location were observed for all locations except Conrad.

Green dry pea protein content

Green pea protein content is presented in Table 12. The mean protein content by location varied from 19.7% at Conrad to 25.1% at Moccasin. Consistent with yellow pea, protein contents were considerably better at Moccasin and Richland than other locations. Of the five entries tested at all locations, protein contents were always highest at these two locations.

Green dry pea thousand kernel weight (TKW)

TKW's were collected from four locations in 2019 and ranged from 208 to 238 grams per thousand kernels (Table 13). Significant differences for entries within a location were observed for all locations examined.

Green dry pea test weight

Mean test weights for green pea ranged from 63.6 lb/bu to 64.4 lb/bu (Table 14). The differences in test weight among entries were significant within a location for all locations except Conrad.

Green dry pea plant height

Mean plant heights ranged from 37 cm at Havre to 68 cm at Huntley (Table 15).

Green dry pea days to flowering

Mean days to flower ranged from 57 days at Sidney to 74 days at Mocassin (Table 16) consistent with that of the yellow peas.

Summary

A cool summer and timely rainfalls throughout the growing season resulted in average to above average pea yields in the 2019 trials. Pea yield and protein concentration varied greatly from location to location. Mocassin and Richland tended to produce higher protein concentration for all varieties than other locations. Within a location, pea yield and protein concentration also varied among the varieties. There was a negative correlation between the yield and protein concentration within a testing location. Varieties that have higher protein concentrations tended to produce lower yields.

Table 5. Yellow Dry Pea Grain Yield (lb/ac) - 2019 Montana Statewide Variety Evaluation

Yellow Pea Variety/Line	Bozeman (PSP)	Broadview (SARC)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
124-7146							2358	
154-7207							2091	
154-7225							1940	
AAC Asher							3531	
AAC Carver			4088	2012		2704	3175	
AAC Chrome							3597	
AAC Profit			3906	1872		2198	2953	
AC Agassiz			3967	1979		2390	2939	
AC Earlystar			4028	2103		2552	3130	
Astronaute							3448	
Bridger			3739	1927		2340	3084	
CDC Amarillo			3558	2070		2090	2793	
CDC Dakota							3359	
CDC Inca			3960	1975		2296	3207	
CDC Saffron			4148	2205		2231	3516	
CDC Spectrum			3415	1751		1970	3062	
Delta	3308	2194	3795	2223	3307	2305	3287	4994
DL Apollo				2049			3103	
DS-Admiral	3761	2573	4058	1791	3255	2557	3236	5114
Durwood			3830	1904	3099		2823	
Hyline			4035	1875		2360	3114	
Jetset			3800	1590		2411	3640	
Korando			4020	2251	3303		3412	
LG Amigo			3939	2001	3047		3359	
LG Sunrise			3825	2218	3199		2845	
Majestic							3155	
Navarro			3996	2121		2268	3215	
NDP121587	3787	2755	4055	1997	3502	2282	3436	5333
Nette 2010			4091	2161	3402		2946	
Pro 093-7410				2274			3059	
Pro 133-6243				2028			3287	
Pro 143-6236				2128			2538	
PS07100925	3464	2560	3689	2268	3393	2263	3277	5123
PS08101022	3417	2899	3763	1832	3559	2429	3896	5313
PS0877MT632	3407	2035	3911	1806	2825	1904	2567	4305
Salamanca			3783	2094		2283	3132	
Spider			3774	1494		2100	2773	
Mean	3524	2503	3887	2000	3263	2297	3089	5030
P-value	0.51	0.0169	0.657	<.0001	0.0038	0.0006	<.0001	0.0291
LSD	638.4	497.8	538.3	218.4	329.0	312.0	279.4	615.7
CV(%)	12.0	13.2	9.8	7.8	7.0	9.6	6.5	8.1

Table 6. Yellow Dry Pea Protein (%) - 2019 Montana Statewide Variety Evaluation

Yellow Pea Variety/Line	Bozeman (PSPP)	Broadview (SARC)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
124-7146							28.6	
154-7207							25.3	
154-7225							29.3	
AAC Asher							23.5	
AAC Carver			19.6	20		22.7	22.1	
AAC Chrome							24.0	
AAC Profit			20.9	22.0		26.0	25.8	
AC Agassiz			20.7	22.6		25.8	25.2	
AC Earlystar			18.4	20.5		24.0	23.3	
Astronaute							25.0	
Bridger			19.7	21.0		24.9	22.9	
CDC Amarillo			20.2	22.2		26.3	24.5	
CDC Dakota							26.6	
CDC Inca			18.7	23.3		25.8	24.6	
CDC Saffron			18.9	22.2		24.6	24.1	
CDC Spectrum			20.5	22.6		26.8	25.5	
Delta	22.1	21.5	20.7	23.3	20.2	24.8	24.1	20.6
DL Apollo				21.5			25.5	
DS-Admiral	21.0	22.1	18.8	22.0	20.1	24.2	23.5	20.6
Durwood			19.1	20.3	20.0		24.1	
Hyline			19.8	20.9		24.5	24.0	
Jetset			20.7	22.5		24.5	23.8	
Korando			20.2	22.0	21.0		24.2	
LG Amigo			20.1	22.2	21.9		23.5	
LG Sunrise			19.4	19.5	18.0		22.4	
Majestic							23.9	
Navarro			20.6	22.6		25.4	25.2	
NDP121587	20.8	20.0	20.1	20.6	19.0	23.8	22.3	20.1
Nette 2010			18.8	21.1	19.4		23.0	
Pro 093-7410				17.9			21.8	
Pro 133-6243				22.4			24.3	
Pro 143-6236				21.8			22.7	
PS07100925	21.2	23.4	20.3	21.1	19.5	24.1	24.2	20.4
PS08101022	20.3	22.3	20.2	21.2	19.3	23.8	23.3	20.1
PS0877MT632	24.1	25.8	22.5	23.8	21.5	26.8	25.9	22.2
Salamanca			20.5	21.5		25.1	24.8	
Spider			20.6	22.0		26.4	24.9	
Mean	21.6	22.5	20.0	21.6	20.0	25.0	24.4	20.6
P-value	0.0003	<0.0001	0.333	<.0001	<0.0001	<0.0001	<.0001	0.0073
LSD	1.3	1.1	2.4	1.6	0.9	1.2	0.8	1.1
CV(%)	4.1	3.3	8.5	5.3	3.1	3.3	2.2	3.5

Table 7. Yellow Dry Pea Thousand Kernel Weight (g) - 2019 Montana Statewide Variety Evaluation

Yellow Pea Variety/Line	Bozeman (PSPP)	Havre (NARC)	Moccasin (CARC)	Sidney Irrigated (EARC)
124-7146				
154-7207				
154-7225				
AAC Asher				
AAC Carver		219	218	
AAC Chrome				
AAC Profit		206	209	
AC Agassiz		197	212	
AC Earlystar		191	206	
Astronaute				
Bridger		207	208	
CDC Amarillo		201	200	
CDC Dakota				
CDC Inca		206	212	
CDC Saffron		226	219	
CDC Spectrum		210	213	
Delta	249	221	224	236
DL Apollo		203		
DS-Admiral	242	220	234	235
Durwood		210		
Hyline		220	223	
Jetset		227	225	
Korando		261		
LG Amigo		215		
LG Sunrise		213		
Majestic				
Navarro		256	245	
NDP121587	243	222	223	236
Nette 2010		222		
Pro 093-7410		193		
Pro 133-6243		271		
Pro 143-6236		207		
PS07100925	269	240	245	261
PS08101022	263	234	248	240
PS0877MT632	240	210	206	206
Salamanca		234	242	
Spider		222	235	
Mean	251	219	222	236
P-value	<0.0001	<0.0001	<0.0001	<0.0001
LSD	8.3	8.0	9.3	6.4
CV(%)	2.2	2.6	3.0	1.8

Table 8. Yellow Dry Pea Test Weight (lb/bu) - 2019 Montana Statewide Variety Evaluation

Yellow Pea Variety/Line	Bozeman (PSPP)	Broadview (SARC)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
124-7146							65.8	
154-7207							65.2	
154-7225							65.4	
AAC Asher							64.7	
AAC Carver			65.2	64.0		64.0	64.7	
AAC Chrome							64.2	
AAC Profit			64.6	63.4		65.0	65.0	
AC Agassiz			64.6	62.7		62.7	63.9	
AC Earlystar			65.0	63.7		63.5	64.1	
Astronaute							65.0	
Bridger			65.3	64.6		64.2	64.3	
CDC Amarillo			64.9	63.9		65.2	65.5	
CDC Dakota							65.4	
CDC Inca			65.0	64.0		64.7	65.4	
CDC Saffron			64.7	63.5		64.9	65.2	
CDC Spectrum			64.2	63.6		64.5	64.9	
Delta	65.2	64.6	64.9	64.5	64.4	65.1	64.2	65.7
DL Apollo				64.6			65.4	
DS-Admiral	64.6	64.2	64.5	63.1	64.4	64.1	64.3	64.8
Durwood			64.9	63.3	64.7		64.2	
Hyline			65.1	63.7		64.0	64.4	
Jetset			64.3	62.9		63.6	63.9	
Korando			65.0	64.4	63.8		64.6	
LG Amigo			64.5	63.0	65.3		63.9	
LG Sunrise			65.2	64.3	65.2		64.8	
Majestic							64.8	
Navarro			65.1	64.5		63.9	64.0	
NDP121587	64.5	64.0	64.7	63.2	63.9	62.8	63.7	65.1
Nette 2010			64.9	63.8	65.4		64.7	
Pro 093-7410				63.9			64.7	
Pro 133-6243				64.8			64.8	
Pro 143-6236				64.3			63.9	
PS07100925	64.6	64.3	64.5	63.5	63.8	63.9	64.5	64.7
PS08101022	65.2	64.4	64.3	63.6	64.9	64.9	64.4	64.4
PS0877MT632	65.3	64.2	65.1	63.9	64.3	64.7	64.7	64.0
Salamanca			64.7	63.5		64.3	64.1	
Spider			64.8	64.2		65.8	65.4	
Mean	64.9	64.2	64.8	63.8	64.5	64.3	64.6	64.8
P-value	0.082	0.635	0.616	<.0001	<.0001	<.0001	<.0001	0.005
LSD	0.7	0.8	0.9	0.6	0.7	0.7	0.5	0.8
CV(%)	0.7	0.8	1.0	0.7	0.8	0.7	0.6	0.8

Table 9. Yellow Dry Pea Plant Height (cm) - 2019 Montana Statewide Variety Evaluation

Yellow Pea Variety/Line	Bozeman (PSPP)	Broadview (SARC)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
124-7146							60	
154-7207							57	
154-7225							57	
AAC Asher							65	
AAC Carver			58	44		61	72	
AAC Chrome							69	
AAC Profit			72	46		62	71	
AC Agassiz			57	48		58	69	
AC Earlystar			56	46		60	72	
Astronaute							69	
Bridger			54	37		54	67	
CDC Amarillo			59	50		64	79	
CDC Dakota							74	
CDC Inca			67	49		58	81	
CDC Saffron			57	41		54	70	
CDC Spectrum			65	48		57	80	
Delta	55	49	50	30	63	46	59	64
DL Apollo				38			80	
DS-Admiral	72	58	61	44	67	58	71	78
Durwood			60	46	75		71	
Hyline			60	37		53	70	
Jetset			60	41		55	65	
Korando			58	38	69		67	
LG Amigo			65	41	65		69	
LG Sunrise			64	47	80		67	
Majestic							74	
Navarro			53	38		57	68	
NDP121587	69	54	60	40	66	54	64	77
Nette 2010			64	36	66		62	
Pro 093-7410				36			60	
Pro 133-6243				37			66	
Pro 143-6236				24			57	
PS07100925	52	34	47	27	61	45	62	64
PS08101022	53	38	46	29	63	36	51	65
PS0877MT632	36	36	41	30	65	34	62	71
Salamanca			62	39		60	69	
Spider			64	49		64	72	
Mean	56	45	58	40	67	54	67	70
P-value	<0.0001	0.0004	0.0346	<.0001	0.0003	<0.0001	<.0001	0.0442
LSD	7.6	10.2	14.9	8.9	7.3	5.9	9.4	11.1
CV(%)	8.9	17.1	18.1	15.9	7.5	7.7	9.9	10.5

Table 10. Yellow Dry Pea Days to Flowering - 2019 Montana Statewide Variety Evaluation

Yellow Pea Variety/Line	Bozeman (PSPP)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Sidney Irrigated (EARC)
124-7146						
154-7207						
154-7225						
AAC Asher						
AAC Carver		68	67		73	
AAC Chrome						
AAC Profit		68	69		76	
AC Agassiz		69	67		75	
AC Earlystar		68	65		73	
Astronoute						
Bridger		68	63		72	
CDC Amarillo		69	68		77	
CDC Dakota						
CDC Inca		70	69		75	
CDC Saffron		70	68		75	
CDC Spectrum		69	69		76	
Delta	61	65	63	62	71	56
DL Apollo			67			
DS-Admiral	62	68	67	63	74	56
Durwood		70	64	63		
Hyline		69	69		74	
Jetset		69	65		75	
Korando		67	62	61		
LG Amigo		71	66	63		
LG Sunrise		66	63	61		
Majestic						
Navarro		65	62		70	
NDP121587	66	70	68	63	74	54
Nette 2010		66	63	62		
Pro 093-7410			65			
Pro 133-6243			62			
Pro 143-6236			62			
PS07100925	64	67	64	64	72	58
PS08101022	61	66	62	61	71	54
PS0877MT632	62	68	64	64	74	54
Salamanca		68	66		75	
Spider		70	67		75	
Mean	63	68	65	62	74	55
P-value	<0.0001	0.384	<.0001	<0.0001	<0.0001	<0.0001
LSD	1.2	4.3	1.7	1.2	0.9	0.0
CV(%)	1.3	4.5	1.8	1.3	0.8	0.0

Table 11. Green Dry Pea Grain Yield (lb/ac) - 2019 Montana Statewide Variety Evaluation

Green Pea Variety/Line	Bozeman (PSPP)	Broadview (SARC)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
AAC Comfort			3799	2116		1949	2696	
Aragorn	2779	2725	3765	1620	3113	2269	2858	4874
Banner				1733				
Bluemoon							3153	
CDC Greenwater			3735	2014		1982	2938	
Ginny				2057			2941	
Greenwood				2044				
Hampton	3488	1946	3823	2239	3313	2080	2441	4731
Keystone							2105	
Majoret	3248	2069	3698	1788	2881	2025	2764	5050
MT457	3332	2338	3713	2360	3267	2174	2757	4691
Pro 121-7126				1746			2651	
Pro 131-7123			4008	2017				
Pro 141-6258			4230	2084			2671	
PS0877MT076	2872	1983	3822	2407	3154	2116	2133	3414
SW Arcadia							2930	
Mean	3144	2212	3844	2017	3146	2085	2695	4552
P-value	0.0381	0.0412	0.8	<.0001	0.0108	0.0117	<.0001	0.0002
LSD	496.1	536.1	646.1	248.6	226.2	169.0	227.4	544.5
CV(%)	10.2	15.7	11.5	8.6	4.7	5.5	5.9	7.8

Table 12. Green Dry Pea Protein (%) - 2019 Montana Statewide Variety Evaluation

Green Pea Variety/Line	Bozeman (PSPP)	Broadview (SARC)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
AAC Comfort			20.3	23.0		24.8	24.6	
Aragorn	20.9	22.4	18.4	20.7	20.5	24.0	23.1	21.5
Banner				18.0				
Bluemoon							22.9	
CDC Greenwater			19.8	22.9		24.4	23.4	
Ginny				21.0			23.3	
Greenwood				19.9				
Hampton	24.4	23.4	21.2	24.2	21.3	26.4	26.2	21.5
Keystone							25.2	
Majoret	21.7	22.5	20.8	21.6	21.3	25.2	24.7	21.1
MT457	23.0	23.3	20.4	23.9	21.9	26.1	25.4	25.0
Pro 121-7126				22.3			23.7	
Pro 131-7123			19.7	20.9				
Pro 141-6258			17.4	21.4			21.2	
PS0877MT076	20.6	21.1	19.1	22.5	20.0	25.1	25.8	21.9
SW Arcadia							23.7	
Mean	22.1	22.5	19.7	21.7	21.0	25.1	24.1	22.2
P-value	<0.0001	0.1683	0.0086	<.0001	<0.0001	0.0011	<.0001	<0.0001
LSD	0.9	2.0	1.9	1.4	0.6	1.0	0.7	0.8
CV(%)	2.6	5.9	6.6	4.5	1.8	2.7	1.9	2.3

Table 13. Green Dry Pea Thousand Kernel Weight (g) - 2019 Montana Statewide Variety Evaluation

Green Pea Variety/Line	Bozeman (PSPP)	Havre (NARC)	Moccasin (CARC)	Sidney (EARC)
AAC Comfort		239	246	
Aragorn	230	209	209	205
Banner		203		
Bluemoon				
CDC Greenwater		210	206	
Ginny		195		
Greenwood		195		
Hampton	247	216	200	214
Keystone				
Majoret	243	223	224	235
MT457	249	236	220	233
Pro 121-7126		204		
Pro 131-7123		168		
Pro 141-6258		212		
PS0877MT076	219	195	181	176
SW Arcadia				
Mean	238	208	212	212
P-value	0.0075	<0.0001	<0.0001	<0.0001
LSD	16.5	6.9	6.6	8.3
CV(%)	4.5	2.3	2.1	2.5

Table 14. Green Dry Pea Test Weight (lb/bu) - 2019 Montana Statewide Variety Evaluation

Green Pea Variety/Line	Bozeman (PSPP)	Broadview (SARC)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
AAC Comfort			65.1	63.1		65.5	64.7	
Aragorn	63.2	63.7	64.0	63.1	63.7	63.2	62.5	63.4
Banner				64.9				
Bluemoon							64.4	
CDC Greenwater			64.9	64.2		65.1	65.6	
Ginny				63.3			64.0	
Greenwood				64.2				
Hampton	64.4	64.4	64.8	63.7	63.9	64.3	64.4	64.8
Keystone							65.6	
Majoret	65.1	64.3	64.3	64.1	64.4	65.2	64.8	65.3
MT457	64.0	64.1	64.3	63.3	62.9	64.2	64.6	64.1
Pro 121-7126				63.2			63.9	
Pro 131-7123			64.2	62.8				
Pro 141-6258			64.9	64.5			63.8	
PS0877MT076	64.8	63.4	65.0	63.2	63.4	63.7	63.8	63.9
SW Arcadia							63.9	
Mean	64.3	64.0	64.6	63.6	63.6	64.4	64.3	64.3
P-value	0.0009	0.0017	0.1133	<.0001	0.001	<0.0001	<.0001	<0.0001
LSD	0.7	0.5	0.9	0.5	0.6	0.5	0.6	0.5
CV(%)	0.7	0.5	0.9	0.6	0.6	0.6	0.6	0.6

Table 15. Green Dry Pea Plant Height (cm) - 2019 Montana Statewide Variety Evaluation

Green Pea Variety/Line	Bozeman (PSPP)	Broadview (SARC)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
AAC Comfort			58	44		52	67	
Aragorn	60	58	49	35	70	48	65	67
Banner				38				
Bluemoon							64	
CDC Greenwater			58	52		61	77	
Ginny				41			60	
Greenwood				31				
Hampton	56	42	56	34	61	39	62	66
Keystone							62	
Majoret	65	61	60	37	72	54	65	70
MT457	62	57	49	34	72	54	65	72
Pro 121-7126				37			56	
Pro 131-7123			65	43				
Pro 141-6258			56	28			56	
PS0877MT076	48	41	49	32	65	40	57	62
SW Arcadia							63	
Mean	58	52	56	37	68	50	63	67
P-value	0.0191	0.1112	0.1355	<.0001	0.0509	<0.0001	0.0003	0.0845
LSD	9.5	19.0	12.7	6.5	8.2	7.3	7.6	7.2
CV(%)	10.6	23.8	15.7	12.2	7.8	9.9	8.4	7.0

Table 16. Green Dry Pea Days to Flowering - 2019 Montana Statewide Variety Evaluation

Green Pea Variety/Line	Bozeman (PSPP)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Sidney Irrigated (EARC)
AAC Comfort		69	72		77	
Aragorn	61	64	62	60	70	56
Banner			61			
Bluemoon						
CDC Greenwater		70	69		74	
Ginny			63			
Greenwood			63			
Hampton	67	70	69	65	75	59
Keystone						
Majoret	65	71	68	64	74	56
MT457	60	64	62	60	71	56
Pro 121-7126			65			
Pro 131-7123		70	68			
Pro 141-6258		66	62			
PS0877MT076	66	66	69	65	75	59
SW Arcadia						
Mean	64	68	66	63	74	57
P-value	0.0018	0.0656	<.0001	<0.0001	<0.0001	<0.0001
LSD	3.24	5.26	1.06	0.67	0.80	0.00
CV(%)	3.31	5.32	1.13	0.70	0.73	0.00

Lentil Variety Evaluation in 2018

A total of 10 lentil entries were evaluated at seven locations. The lentil trial under irrigation at Huntley was lost to hail just prior to harvest. Seeding was delayed due to weather related field conditions in Bozeman and Richland. Harvest was also slightly delayed in Bozeman. No other issues were reported for the trials.

Lentil grain yield

The mean grain yield varied from 1204 lb/ac to 3043 lb/ac (Table 17). The differences in grain yield among entries within a location was significant for five of the seven locations. The Bozeman and Richland locations had mean grain yields greater than any year dating back to 2011. The varieties Avondale and CDC Richlea have been trialed continuously at Bozeman and Richland dating back to 2011 and both produced their highest observed yields at these two locations in 2019.

Lentil TKW

Thousand kernel weights (TKW) were obtained for all entries at all locations (Table 18). The mean TKW ranged from 38.4 g per 1000 seeds at Huntley to 47.1 g per 1000 seeds recorded at Bozeman. These values are generally higher than previous years. TKWs were significantly different for different classes of lentils within a location for all locations.

Lentil test weight

The mean test weight ranged from 61.4 lb/bu at Sidney to 64.5 lb/bu at Conrad, a spread smaller than in previous years (Table 19). The test weight differences among entries within a location were significant for all locations.

Lentil plant height

The mean plant height ranged from 20 cm at Havre to 41 cm at Moccasin and Bozeman (Table 20). Across all locations, variety Avondale had the tallest average plants at 37.4 cm. Plant height differences among entries within a location were significant for all locations.

Lentil number of days to flowering

The mean number of days to flowering ranging from 56 days at Sidney to 76 days recorded at Moccasin which are considerably shorter or longer than the other locations respectively (Table 21). However, neither the early flowering at Sidney nor late flowering at Moccasin is unusual with respect to previous years. The differences in mean number of days to flowering were significant for the different entries at each location.

Table 17. Lentil Grain Yield (lb/ac) - 2019 Montana Statewide Variety Evaluation

Lentil Variety/Line	Bozeman (PSPP)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
Avondale	3246	1641	1716	1452	1731	2299	2751
CDC Impress	3105	1447	1691	1272	1502	2332	2371
CDC Invincible	2846	1524	1383	1075	1708	2076	2753
CDC Maxim	2930	1433	1562	1688	1513	2366	2864
CDC Richlea	3119	1421	1587	980	1309	2355	2488
CDC Viceroy	2749	1283	1466	1027	1592	2371	2729
NDL090185R	3367	1450	1552	1076	1394	2536	2531
NDL090204R	3070	1526	1571	1028	1376	2271	2273
NDL090170L	3008	1355	1668	1049	1532	2283	2110
Sage	2987	1295	1318	1395	1031	1943	2758
Mean	3043	1437	1551	1204	1469	2283	2563
P-value	0.028	0.1967	<0.0001	<0.0001	0	<0.0001	0.4
LSD	330.3	259.3	142.3	241.9	273.0	167.0	692.0
CV(%)	7.5	12.4	6.3	13.8	12.8	5.0	18.6

Table 18. Lentil Thousand Kernel Weight (g) - 2019 Montana Statewide Variety Evaluation

Lentil Variety/Line	Bozeman (PSPP)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
Avondale	48.3	46.6	44.5	41.3	46.5	49.0	44.9
CDC Impress	51.8	49.5	47.1	43.5	49.8	50.4	51.8
CDC Invincible	32.8	29.1	26.3	26.6	27.5	30.0	33.8
CDC Maxim	38.8	36.6	35.6	34.1	37.5	38.4	37.5
CDC Richlea	52.5	48.8	47.4	42.4	51.5	53.5	47.6
CDCViceroy	32.0	30.3	27.6	26.6	28.5	30.8	33.3
NDL090185R	49.5	44.3	43.3	39.9	44.8	37.4	46.6
NDL090204R	52.3	49.1	49.4	42.3	50.8	40.6	50.9
NDL090170L	71.3	66.8	62.3	55.8	62.8	67.8	60.0
Sage	42.3	36.8	34.3	31.1	32.0	37.0	35.8
Mean	47.1	43.8	41.8	38.4	43.2	43.5	44.2
P-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.003	<0.0001
LSD	5.7	1.5	1.5	1.6	2.1	17.3	2.6
CV(%)	8.4	2.3	2.5	2.8	3.3	27.3	4.0

Table 19. Lentil Test Weight (lb/bu) - 2019 Montana Statewide Variety Evaluation

Lentil Variety/Line	Bozeman (PSPP)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
Avondale	64.1	64.2	62.4	61.7	62.6	62.5	61.1
CDC Impress	64.0	63.7	61.9	61.2	62.1	62.2	59.7
CDC Invincible	65.6	65.9	64.3	63.8	65.0	64.9	63.0
CDC Maxim	65.2	65.6	63.9	63.6	64.6	64.4	63.4
CDC Richlea	63.2	63.1	61.0	59.9	61.6	61.8	59.6
CDC Viceroy	65.6	65.9	64.6	64.1	65.5	65.0	63.5
NDL090185R	63.9	63.9	62.0	61.0	62.7	62.8	60.1
NDL090204R	64.2	64.4	62.7	62.0	63.7	63.9	61.7
NDL090170L	61.8	62.1	60.3	59.1	60.5	61.1	59.0
Sage	65.8	65.8	64.1	64.0	64.0	64.6	63.2
Mean	64.3	64.5	62.7	62.0	63.2	63.3	61.4
P-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD	0.4	0.3	0.4	0.5	0.3	0.3	0.6
CV(%)	0.4	0.3	0.4	0.6	0.3	0.3	0.7

Table 20. Lentil Plant Height (cm) - 2019 Montana Statewide Variety Evaluation

Lentil Variety/Line	Bozeman (PSPP)	Conrad (WTARC)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Richland (EARC)	Sidney Irrigated (EARC)
Avondale	44	34	32	37	44	33	38
CDC Impress	38	36	32	35	43	32	35
CDC Invincible	41	34	29	38	40	30	35
CDC Maxim	40	33	30	37	39	30	29
CDC Richlea	41	36	26	34	42	31	32
CDC Viceroy	42	32	29	37	41	33	34
NDL090185R	44	37	31	36	44	35	35
NDL090204R	39	31	27	34	36	32	31
NDL090170L	36	36	26	27	42	33	33
Sage	40	29	26	33	38	27	29
Mean	41	34	29	35	41	32	33
P-value	0.0022	0.001	<0.0001	0	<0.0001	0.0002	0.0086
LSD	3.4	3.7	2.3	6.0	2.3	2.9	4.7
CV(%)	5.7	7.5	5.6	11.9	4.0	6.3	9.9

Table 21. Lentil Days to Flowering - 2019 Montana Statewide Variety Evaluation

Lentil Variety/Line	Bozeman (PSPP)	Havre (NARC)	Huntley Dryland (SARC)	Moccasin (CARC)	Sidney Irrigated (EARC)
Avondale	62	62	65	75	54
CDC Impress	64	65	66	75	56
CDC Invincible	68	70	68	78	58
CDC Maxim	62	64	65	75	54
CDC Richlea	64	66	65	76	58
CDC Viceroy	66	69	68	78	57
NDL090185R	63	66	66	76	56
NDL090204R	68	70	67	77	54
NDL090170L	61	62	65	75	54
Sage	60	63	64	74	54
Mean	64	66	66	76	56
P-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD	2.2	1.0	1.4	0.7	0.0
CV(%)	2.4	1.1	1.5	0.7	0.0

Chickpea Variety Evaluation in 2019

The 2019 statewide chickpea variety evaluation included twelve varieties (eleven Kabuli type and one Desi type). Results are reported for four locations. Trials were planted late in Bozeman and Richland due to weather related field conditions and harvest was slightly delayed in Bozeman. Trials were lost at Huntley due to hail, Havre due to wildlife damage and Moccasin due to planter issues. The trials at Conrad and Richland also suffered wildlife damage due to late maturity. Mean grain yields ranged from 361 to 4371 lb/ac with location averages of 2611 lb/ac at Bozeman, 1605 lb/ac at Conrad, 1568 lb/ac at Richland, 2112 lb/ac at Sidney and a total average of 1939 lb/ac for all entries across all locations (Table 22). Differences in mean grain yield were significant for all locations except Conrad.

Seed size was evaluated for all locations using a sieve with an 8.73 mm (22/64 in) diameter round openings (Table 23). The Desi type entry Myles had essentially no seeds larger than 8.73 mm diameter at all locations. Entries Sierra, Nash and Royal had the highest percentage of seeds larger than 8.73 mm diameter with averages across all four locations of 83%, 82% and 77% respectively. Bozeman had the highest percentage of seeds larger than 8.73 mm in diameter with a site average of 70% and Sidney the lowest 39%.

The hot and humid conditions in Sidney were favorable for development of *Ascochyta* blight during the 2019 growing season. Three fungicide applications were made on 6/27/2019, 7/13/2019 and 7/30/2019 (Table 4) in an effort to limit disease impact on the trials. An assessment of *Ascochyta* incidence and severity was performed on 07/30/2019 and the results are presented in Table 24. Disease severity was high for cultivars Nash, Sierra and Royal resulting in significant yield reductions (Table 22). Resistant varieties CDC Leader, BGC090017, and Myles had less disease severity and therefore produced the highest yields even though disease incidence remained high for all three entries. Seed sizes for all entries at Sidney were reduced relative to other locations irrespective of the *Ascochyta* severity.

Table 22. Chickpea Grain yield (lb/ac) - 2019 Montana Statewide Variety Evaluation

Chickpea Variety/Line	Bozeman (PSPP)	Conrad (WTARC)	Richland (EARC)	Sidney Irrigated (EARC)
BGC090017			1713	3965
CDC Alma	2476	1728	2245	1249
CDC Frontier	2686	1829	2391	2605
CDC Leader	3146	1669	2193	4371
CDC Orion	2850	1731	1705	2830
CDC Palmer		1702	1811	
GNC-18011			1011	
Myles	2028	1417	1168	2573
Nash	2396	1275	802	361
Royal	3024	1484	924	662
Sawyer	2751	1694	1854	1585
Sierra	2143	1523	996	922
Mean	2611	1605	1568	2112
P-value	0.038	0.104	<0.0001	<0.0001
LSD	701.6	368.1	142.8	532.8
CV(%)	18.4	15.8	6.3	17.4

Table 23. Chickpea Seed Size (% greater than 8.73 mm) - 2019 Montana Statewide Variety Evaluation

Chickpea Variety/Line	Bozeman (PSPP)	Conrad (WTARC)	Richland (EARC)	Sidney Irrigated (EARC)
BGC090017			82.0	57.9
CDC Alma	54.6	33.4	48.8	33.5
CDC Frontier	39.3	26.8	62.4	24.0
CDC Leader	78.5	36.2	66.3	49.4
CDC Orion	86.6	64.7	70.7	47.7
CDC Palmer	0.0	44.7	67.0	
GNC-18011			4.3	
Myles	0.0	0.0	0.0	0.0
Nash	98.7	88.9	88.9	51.9
Royal	97.3	85.8	77.5	46.1
Sawyer	79.4	56.0	63.9	21.7
Sierra	96.7	88.3	87.8	59.2
Mean	70.1	53.1	60.0	39.1
P-value	<0.0001	<0.0001	<0.0001	<0.0001
LSD	0.04	0.15	0.127	0.086
CV(%)	4.29	19.89	14.69	15.75

Table 24. Chickpea Ascochyta Assesment at Sidney- 2019 Montana Statewide Variety Evaluation

Chickpea Variety/Line	% Incidence	% Severity
BGC090017	80	5
CDC Alma	100	32
CDC Frontier	100	28
CDC Leader	63	3
CDC Orion	100	15
Myles	95	17
Nash	100	39
Royal	100	30
Sawyer	100	21
Sierra	100	32
Mean	94	22
P-value	0.0001	<0.0001
LSD	14.8	12.8
CV(%)	10.9	39.6

FUTURE PLANS

The EARC will continue to lead the statewide variety evaluations in the coming years as long as there is a need from pulse growers, seed industries, and breeders.

Note: The data and summaries presented in this report are for **informational purposes only**. Inclusion and or exclusion of any commercial variety in this summary does not constitute a recommendation by Montana State University Agricultural Experiment Station or EARC.

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