

PROJECT TITLE: Pea Forage Performance Evaluation under No-Till, Dryland, Recrop Conditions near Havre, Montana. (Exp. 10-FR05).

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OBJECTIVES:

To provide pea forage producers in north central Montana with a reliable, unbiased, up-to-date source of information that will permit valid dryland pea forage production comparisons among improved and experimental entries submitted for testing by participating commercial and university entities. This information should help pea forage producers in north central Montana select varieties best suited to this region of the state.

METHODS:

As an initial look at the potential for pea forage in the area, a total of two winter and four spring pea entries were spring seeded under no-till, dryland, recrop conditions near Havre, MT (Table 2). The entries '4010' and 'Arvika' are both forage type peas, while 'Granger' and 'Common AWP' are Austrian type winter peas typically used as a green manure plow down, and 'Majorette' and 'Delta' are a green and a yellow smooth coated spring pea, respectively.

The trial was seeded as randomized complete-block design, in replicated, 4-row, 22-foot plots on a 12-inch row spacing utilizing a three-point-mounted 'Hege 1000' plot drill equipped with 'John Deere Tru-Vee' disk openers. Each plot was seeded at a rate 10 seeds per square foot at a depth of 1 ½ inches. Flowering date was recorded as the date when 50 percent of the plants within a plot had one opened flower. Forage harvest was targeted for pod set, however weather delayed harvest until there were two to four nodes with pods. Plots were cut with an "Almaco Forage Harvester". Following dry matter determination, samples were ground and submitted for quality analyses. Results of these analyses are summarized for the pea forage in Table 2. Trial management information is listed for the trial in Table 3.

RESULTS and SUMMARY:

The pea forage cropping environment in 2010 at the Research Center was categorized as above average with higher than normal precipitation and lower than normal temperatures. At Havre, total annual growing season precipitation (9/1/08 through 8/31/09) was 14.61 inches, 22.5 percent more than the average for all years since 1916 (Table 1). September 2009 through March 2010 precipitation was 91 percent of the long-term average; however, April 1 through July 31 precipitation was 9.69 inches or 144 percent of the 95 year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through October, were 2220, 93 percent of the average for the last 59 years (1951-2010). The last spring frost was one day early with the first fall frost 24 days late, resulting in 154 frost-free days, 25 days longer than the 95 year average. The April through June growing season saw an average daily temperature at 51.5 degrees F, 1.7 degrees below normal. July and August average temperatures were 3.1 percent lower than normal with the high for 2010 recorded on August 27 at 102 degrees F. There were 18 days 90 degrees F or above, and only 1 day with temperatures 100 degrees F or above. Overall, the growing season was cooler than the 95-year average. The minimum winter temperature was -35 degrees F on December 7. Crop outlook was very good with adequate fallow-stored soil moisture and generally favorable growing conditions.

Pea forage dry matter yields averaged 2.2 ton/ac. The two forage type entries (Arvika and 4010), along with the two spring pea seed varieties (Majorette and Delta) significantly out yielded the two winter pea entries. Forage yield, flowering date, canopy height, vine length and forage quality data are located in Table 2.

FUTURE PLANS:

Although there is currently no funding available to support this research, Northern Agricultural Research Center, near Havre, Montana believes that this information is very important for local farmers and ranchers and will continue the pea forage trial in 2011.

Table 1. Summary of climatic data by months for the 2009-2010 crop year (September to August) and averages for the period 1916-2010 at the Northern Agricultural Research Center, Havre, Montana.

Month Year	Sep 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	Mar 2010	Apr 2010	May 2010	Jun 2010	Jul 2010	Aug 2010	Crop Year
<u>Precipitation (inches)</u>													<u>Total</u>
Current Year	0.39	1.25	0.00	0.69	0.72	0.28	0.31	2.39	3.36	2.54	1.40	1.28	14.61
95-Year Average (1916 to 2009-10)	1.14	0.66	0.43	0.45	0.44	0.32	0.54	0.99	1.78	2.55	1.43	1.19	11.92
<u>Mean Temperature (°F)</u>													<u>Average</u>
Current Year	64.1	38.8	38.8	7.0	13.1	12.2	32.7	44.7	49.4	60.3	66.7	66.7	41.2
95-Year Average (1916 to 2009-10)	56.2	45.7	30.2	19.5	15.4	19.9	30.0	43.6	54.0	61.8	69.2	67.3	42.7

Last killing frost in spring*

2010 _____ May 13th (31°)
Ave. 1916-2010 _____ May 14th

First killing frost in fall*

2010 _____ October 14th (31°)
Ave. 1916-2010 _____ September 20th

Frost free period

2010 _____ 154 days
Ave. 1916-2010 _____ 129 days

Growing degree days (base 50)

May 1-Oct 31, 2010 _____ 2219.5
Ave. 1951-2010 _____ 2379.2

Maximum summer temperature _____ 102° August 27th
Minimum winter temperature _____ -35° December 7th

*In this summary 32° is considered a killing frost.

TABLE 2. Montana Pea Forage Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions at Northern Agricultural Research Center. Havre, Montana. 2010. (Exp# 10-FR05-FR)

SPECIES	CULTIVAR or SELECTION	2010	2010	FORAGE	FLOWERING DATE		CANOPY	VINE	NODES	PROTEIN	ACID	NEUTRAL	CRUDE
		FORAGE	DRY YIELD	MOISTURE	Julian	Calendar	HEIGHT	LENGTH	w/ PODS		DET FIBER	DET FIBER	FIBER
		Lb/Ac	Ton/Ac	%			in	in	no.	%	%	%	%
Winter Pea	Granger	3548.8	1.8	77.8	181.5	1-Jul	31.4	47.0	2.9	13.7	24.7	24.9	32.0
Spring Pea	4010	4406.0*	2.2	79.2	182.0	1-Jul	25.4	53.7	3.6	14.5	23.4	21.9	26.8
Spring Pea	Arvika	4552.0*	2.3	79.1	183.0	2-Jul	24.6	47.8	2.3	18.8	24.8	23.7	29.1
Winter Pea	Common AWP	4222.6	2.1	81.4	181.0	30-Jun	26.0	47.2	3.6	18.4	24.5	25.5	30.7
Spring Pea	Majorette	4482.0*	2.2	78.5	178.8	28-Jun	26.0	26.6	4.0	12.2	22.2	22.4	27.6
Spring Pea	Delta	4838.1**	2.4	78.5	177.0	26-Jun	27.0	31.4	4.2	14.2	21.2	20.0	25.7
EXPERIMENTAL MEANS		4341.6	2.2	79.1	180.5	30-Jun	26.7	42.3	3.4	15.3	23.5	23.0	28.6
LSD (0.05)		538.0	0.3	1.3	0.5	-	3.2	6.6	0.8	ns	ns	ns	ns
C.V.2: (S of MEAN / MEAN)*100		8.2	8.2	1.1	0.2	-	8.0	10.3	14.6	13.7	13.2	9.0	7.3

1/ No. of Days from January 1 (181 = June 30).

Grain yield is adjusted to 13 percent grain moisture content.

** Indicates highest yielding cultivar within a column.

* Indicates cultivars yielding equal to the highest yielding entry based on Fisher's Protected LSD at the 0.05 probability level.

Table 3. Site Resource & Management Data: (Exp# 10-FR05-FR)

Field	An-2-6	K (ppm) 0-6	327	Init PAW (in.) 0-6"	1.1	Fert. Rate (lbs/ac) P2O5	n/a
Quarter	NW	Ca (ppm)	4864	Init PAW (in.) 6-24"	4.1	Fert. Rate (lbs/ac) K2O	n/a
Section	33	Mg (ppm) 0-6	351	Init PAW (in.) 24-36"	2.3	Herbicide App. Date	n/a
Tow nship	32N	Na (ppm) 0-6	22	Init PAW (in.) 36-48"	1.7	Herbicide Product	n/a
Range	15E	SaltHaz (MMHOS/cm) 0-6	0.33	Init PAW (in.) 0-48"	9.1	Herbicide Rate (/ac)	n/a
Latitude	N48 29.344'	SaltHaz(MMHOS/cm) 6-24	0.34	Cropping System	NT-ChmFlw	Precip (in.) Plnt'g-Harvest	n/a
Longitude	W109 47.789'	S (ppm) 0-24	33	Previous Crop	SB	Precip (>.1) Plnt'g-Harvest	n/a
Soil Series	n/a	Zn (ppm) 0-6	0.89	Planting Date	4/20	Harvest Date	variable
pH 0-6	8.1	Fe (ppm) 0-6	7.3	Planting Depth (in.)	1.50	Rooting Depth (in.)	24"
Org.Matter (%) 0-6	1.6	Mn (ppm) 0-6	3.36	Moist Soil Depth @ Plnt'g	48+	Post PAW (in.) 0-6"	0.92
N (lbs/ac) 0-6	19	Cu (ppm) 0-6	1.2	Dry Surf Soil (in.) @ Plnt'g	0.5	Post PAW (in.) 6-24"	2.44
N (lbs/ac) 6-24	54	CEC 0-6	28.2	2" Soil Temp (°F) @ Plnt'g	68	Post PAW (in.) 24-36"	1.93
N (lbs/ac) 24-36	30	Soil Texture 0-6	n/a	4" Soil Temp (°F) @ Plnt'g	64	Post PAW (in.) 36-48"	4.57
N (lbs/ac) 36-48	12	Soil Texture 6-24	n/a	Fertilizer Formulation	none	Post PAW (in.) 0-48"	9.86
N (lbs/ac) 0-48	29	Soil Texture 24-36	n/a	Fertilizer Placement	n/a	Precip (>.1) Hvst-Post	n/a
P (ppm) Olsen 0-6	14	Soil Texture 36-48	n/a	Fert. Rate (lbs/ac) N	n/a		