PROJECT TITLE: Evaluation of spring emmer germplasm for yield and quality under dryland cropping in Montana.

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OBJECTIVES: To evaluate seed lots of common emmer grown in Montana and the Dakotas, and selections from the world collection, for yield, quality and resistance to lodging.

RESULTS: Sixteen emmer entries were compared to spring barley, oats and hard red wheat, at both the central and southern research centers in 1996 (Tables 1, 2).

During the past 5 years we have evaluated 4 white chaffed emmers originating from common seed sources in Montana and North Dakota. Three of the seed lots appeared similar in plant height, yield, and straw characteristics. One seed source consistently produced lower yields. The emmers which yielded well were obtained from Cenex in Minot North Dakota and Bowman Seed in Billings, while the source of the lower-yielding selection is unknown. A selection from the world collection identified as PI (plant introduction) 148 has also produced consistently high yields, with an exception one year due to use of a selected seed source of PI 148. In 1995 and 1996, several seed lots of PI 148 were evaluated.

PI 148 emmer is characterized by predominantly black chaff, black stems, and also characterized by mottled white and black chaff. The PI 148 seed lot was separated into dark and light chaff and into sources produced in different years. No significant differences in yield were observed among the PI 148 seed lots or when separated into dark and light colored chaff. The PI 148 selection is characterized by high yield, early maturity and short straw height. A second PI selection, PI 306535, is a tall white chaffed selection with good yield and straw strength which will be evaluated for possible release potential. PI 306535 has demonstrated good yield under low moisture environments.

SUMMARY: Three emmer selections have exhibited yield and agronomic traits suitable for consideration as variety releases in Montana. The three emmer selections include a landrace selection of unknown origin obtained from Bowman seed (possibly identical to the emmer obtained from Cenex, Minot, N.D.) and two selections from the world germplasm obtained from Idaho, PI 254148 and PI 306535.

FUTURE PLANS: Spring emmers are grown in small acreages throughout Montana and the Dakotas in regions where winter spelt does not survive, and are erroneously referred to as spring spelt. We have identified several selections which have consistently produced high yields in the trials.

Three high-yielding emmer selections will be evaluated in yield trials at the 7 research centers in Montana and selected centers in North Dakota. Yield and agronomic data will be compiled and used for support data to releases of the emmer selections as identifiable varieties.

Table 1 1996 Spring Emmer Trial
Exp.96EM07 Central Agricultural Research Center, Moccasin, MT.

ID#	Variety	Head Date	Plant Ht.	Grain Yield
		day	"	lbs/a
1	Lewis	181.67	25.00	2170.23
4	WA 11045-	184.00	25.33	1988.60
3	Otana	184.67	27.00	1887.00
5	PI 148 em	179.00	22.67	1813.13
19	PI 148 da	179.33	23.00	1813.13
6	PI 148 1i	178.00	21.00	1776.17
7	PI 148 da	178.00	23.00	1714.63
18	PI 148 1i	178.67	21.33	1674.63
14	PI 254162	184.00	24.00	1560.70
12	PI 355478	183.67	26.00	1526.83
17	PI 148 wh	178.67	20.33	1523.77
2	Newana	184.00	23.33	1480.67
15	PI 148 or	178.33	22.00	1474.53
8	Cenex emm	189.67	26.33	1437.57
16	PI 306535	189.67	25.00	1412.97
20	Bowman em	189.33	26.67	1379.10
11	Cenex emm	190.00	23.33	1342.13
9	Bowman em	189.33	23.67	1329.87
10	Common em	190.33	21.67	1268.27
21	PI 352-335	189.00	27.67	1182.07
22	CI 5473	189.67	28.67	1123.57
13	PI 101971	177.00	21.67	1003.53
EXPERIMENTAL MEANS		183.91	24.03	1540.14
TOTAL OBSERVATIONS		66.00	66.00	66.00
NO. OF REPLICATIONS		3.00	3.00	3.00
NO. OF VARIETIES		22.00	22.00	22.00
REP. MEAN SQUARE		2.36	18.56	*******
VAR. MEAN SQUARE		73.85	16.25	*******
ERROR MEAN SQUARE		.57	9.08	*******
ERROR DEGREES OF FREEDOM		42.00	42.00	42.00
F TEST FOR REPS.		4.15	2.04	3.06
F TEST FOR VAR.		129.56	1.79	1.99
STANDARD ERROR		.75	3.01	357.66
STANDARD ERROR OF THE MEAN		.44	1.74	206.49
C.V. 1: (S/MEAN)*100		.41	12.54	23.22
C.V. 2: (S OF MEAN/MEAN)*100		.24	7.24	13.41
LSD (0.05)		1.24	4.97	589.34

Table 2 1996 Spring Emmer Trial
Exp.96EM08 Southern Agricultural Research Center, Huntley, MT.

ID#	Variety	Plant Ht.	Grain Yield
		"	lbs/a
1	Lewis	29	2976.90
14	PI 254162	28	2932.13
16	PI 306535	36	2871.30
21	PI 352-335	33	2621.63
12	PI 355478	34	2429.57
9	Bowman em	30	2400.77
7	PI 148 da	26	2320.73
15	PI 148 or	26	2259.90
13	PI 101971	29	2243.90
18	PI 148 1i	26	2227.90
6	PI 148 1i	25	2160.63
5	PI 148 em	26	2157.47
8	Cenex emm	33	2115.87
11	Cenex emm	31	2083.87
20	Bowman em	33	2080.63
17	PI 148 wh	27	2032.67
22	CI 5473	33	2010.20
2	Newana	27	2003.83
19	PI 148 da	25	1763.77
3	Otana	24	1750.93
10	Common em	30	1629.30
4	WA 11045-	25	1619.70

EXPERIMENTAL MEANS	2213.35
TOTAL OBSERVATIONS	66.00
NO. OF REPLICATIONS	3.00
NO. OF VARIETIES	22.00
REP. MEAN SQUARE	*******
VAR. MEAN SQUARE	*******
ERROR MEAN SQUARE	*******
ERROR DEGREES OF FREEDOM	42.00
F TEST FOR REPS.	.38
F TEST FOR VAR.	7.77
STANDARD ERROR	237.73
STANDARD ERROR OF THE MEAN	137.25
C.V. 1: (S/MEAN)*100	10.74
C.V. 2: (S OF MEAN/MEAN)*100	6.20
LSD (0.05)	391.72