PROJECT TITLE: Advanced evaluations of spring emmer plant introduction (PI) accessions for consideration of cultivar release.

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OBJECTIVES: Limited acreage of spring emmer are grown throughout eastern Montana and North Dakota for use as a high energy high roughage feed. The objective of this study was to evaluate a portion of the (PI) accessions from the world germplasm center, Aberdeen, Idaho for comparison to the common North Dakota emmer presently available to growers. The objective is to select emmer cultivars which have higher yield and quality characteristics than the North Dakota common emmer.

RESULTS: Three hundred (PI) accession lines were selected out of 1100 lines available from the U.S. world collection, and planted in 1988. Seven emmer (PI) accessions have been selected for increase during the past five years, with one PI accession identified as PI 148 showing particular merit for release considerations.

Table 1 describes the yield data of PI 148 in comparison to: Lewis barley, Otana oats, and North Dakota common emmer grown under dryland cropping for the years of 1988 through 1992. The results show that PI 148 far out yielded the North Dakota emmer in each of the years tested. Also, quite importantly, PI 148 out yielded Otana oats in all years tested.

In low moisture years, 1988, 1989, PI 148 emmer did out yield Lewis barley. However, during high moisture years, Lewis barley did out yield PI 148. It should be noted, however that growing season moisture levels were above average for 1990, 91, and 92 as seen by the above average dryland barley yields for the 1990, 91, and 92 seasons. Normal SARC dryland barley yields vary between 50-55 bushels/acre.

Table 2 describes percent protein, neutral detergent fiber (NDF) and acid detergent fiber (ADF) value comparisons for PI 148, Otana oats, and Lewis barley as analyzed in 1992. PI 148 emmer had protein content equal to oats, and significantly higher than barley.

ADF values indicate digestibility of a feed product, the lower the ADF value the higher the digestibility. The ADF data shows that PI 148 is more digestible than oats, 13 vs 17 percent ADF, while Lewis barley is significantly more digestible (5 percent ADF).

NDF values indicate intake of a feed product, the lower the NDF values, the higher the intake value of the feedstuff. Again, the NDF data suggest that PI 148 would be a better feedstuff than oats, since PI 148 has a lower NDF value, 22 compared to 37 for oats. Barley grain, which has less hull than emmer, has the lowest NDF value 15 percent, which reflects the lower fiber content of the grain.

Our 1992 quality data suggest that the higher feed value of emmer as compared to oats is due to the higher feed value of the emmer kernel. NDF and ADF values of the dehulled emmer is given at the bottom of Table 2. The data shows that the NDF value for the emmer kernel is 6 as compared to 15 for barley, and the ADF value is 2 compared to 5 for barley. Thus it appears that emmer is a very competitive crop when compared to oats for both yield potential and feed value.

When comparing agronomic data, PI 148 has an average test wt. of 31.9 lb/bu compared to 30.3 for Otana oats. While the test weights are comparable, it should be noted that a certain percentage of the emmer kernels do thresh free from the hulls. The PI 148 emmer will head from 5to 10 days earlier than Otana oats, and from 2 to 8 days earlier than Lewis barley. PI 148 averages from 2 to 18 inches shorter in height than Otana oats, and equal to or several inches shorter than Lewis barley. PI 148 does not respond to higher available growing season moisture by increasing in height as do Otana oats, or Lewis barley. PI 148 has good straw strength and is much more resistant to lodging when compared to the North Dakota emmer.

SUMMARY: Based on five years of data at the Southern Ag. Research Center, our data would indicate that PI 148 emmer will nearly yield double that of the common North Dakota emmer, will out yield Otana oats, and has test weight and protein values equal to or greater than Otana oats. PI 148 is unique in that it has black glumes while most emmers have light tan glumes.

FUTURE PLANS: PI 148 will be grown in replicated yield trials throughout Montana and North Dakota in 1993.

Table 1. Comparison of 5 year yield data (Lbs/Ac) for Emmer, Oats and Barley. SARC Huntley, 1992.

Cultivar /Year	1988	1989	1990	1991	1992
Lewis Barley	480(10)*	1600(34)*	3300(70)*	3100(65)*	4300(90)*
PI 148	560	1900	2600	2700	3400
ND Emmer	--	932	1400	1600	2000
Otana Oats	460	1200	2300	2200	2800
LSD 0.05	143	75	323	385	463
* denotes bushels/ac based on 48 lb. bushel test weight					

Table 2. Quality characteristics of PI 148 Emmer in comparison to Oats, and Barley. SARC, Huntley 1992.

Variety/ Quality Factor	PI 148	Otana Oats	Lewis Barley
% Whole kernel protein	17.0	16.8	15.2
Percent Grain protein	18.0	--	--
NDF	22	37	15
ADF	13	19	5
DeHulled Emmer	(Emmer Grain)		
NDF	6		
ADF	2		