PROJECT TITLE:

2019 STATEWIDE DURUM VARIETY TRIALS

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OBJECTIVE:

To test advanced experimental durum lines for agronomic and quality traits relative to currently grown cultivars under Montana growing conditions.

METHODS:

In 2019, ten experimental durum lines developed at MSU and fourteen elite durum varieties were tested at six Montana Agricultural Experiment Stations and six off-station locations. Experimental lines developed at MSU carry genetic markers associated with reduced cadmium accumulation and/or a licensed gene that increases pasta firmness (Table 1). Durum varieties tested include releases from North Dakota State University, University of Saskatchewan-Canadian Crop Development Center, and Westbred (Table 1). Dryland experiments were grown on-station in Bozeman, MT (MSU-Post Agronomy Farm), Havre, MT (MSU-NARC), Sidney, MT (MSU-EARC), Conrad, MT (MSU-WTARC), Huntley, MT (MSU-SARC), and Moccasin, MT (MSU-CARC). Irrigated trials were grown on-station in Bozeman, MT (MSU-Post Agronomy Farm) and Sidney, MT (MSU-EARC). At the Bozeman locations two additional MSU experimental lines, MT112219 and MTD16003, were grown to maintain experimental design. There were three off-station experiments planted in Eastern Montana by EARC staff and three off-station experiments planted in North Central Montana by NARC staff. The trial at SARC this year was destroyed before harvest by hail and the Wibaux off-station site in Eastern Montana was sprayed out by the cooperator. There were three replicates of each line/variety grown at each location in either a randomized complete block design or an alpha-lattice design to determine statistical differences. Seed was treated with CruiserMaxx Vibrance for Cereals® (Syngenta) (5 fl oz/100 lb). MAES research cooperators provided agronomic data such as plant height, heading date, pest pressure, grain protein content, grain test weight, and grain yield. On-station grain sub-samples from the three replicates per line per location were bulked and submitted to Dr. Linda Dykes (USDA-ARS, Fargo, ND) for analysis of seed traits, milling and semolina quality, and mixing strength.

Overall statewide agronomic performance from 2019 can be found in Table 1. Statewide yield and protein evaluation over three years (2017-19) are presented in Table 2. Statewide agronomic performance for 2019 separated by environment (irrigated or dryland) is presented in Tables 3 and 4. Agronomic data for each individual location is found in Tables 5-12 with overall quality data summarized in Tables 13 and 14. Individual location quality data can be found in Tables 15-28. Agronomic data for off-station variety trails grown in the North Central and North Eastern Montana can be found in Tables 29-33. Fusarium head blight evaluations conducted by Dr. Crutcher at EARC are found in Table 34.

Table 12. Agronomic means from 2019 dryland intrastate durum trial at Western Triangle Agricultural Research Center in Conrad, MT.

Cultivar	Yield bu/ac[1]	Test weight lb/bu	Moisture %	Protein %[2]	Sawfly damage %[3]	Plant height inch
Mountrail	46.6	58.4	10.7	15.8	9.3	35.3
Divide	37.3	59.4	10.9	15.4	6.5	33.8
Alkabo	37.4	60.7	11.0	14.8	6.7	33.0
Grenora	51.4	61.2	11.1	15.1	5.0	30.0
Tioga	41.1	59.4	10.9	16.6	9.3	34.0
Carpio	40.6	58.5	10.9	15.3	3.9	32.2
Joppa	44.6	60.0	11.0	15.6	8.7	35.0
ND-Riveland	45.7	59.4	10.9	16.0	9.3	35.0
ND-Grano	40.1	59.8	10.8	15.2	10.0	32.5
Alzada	50.6	61.1	11.0	15.0	6.5	29.7
CDC-Dynamic	46.8	59.6	10.9	16.3	6.5	33.0
CDC-Fortitude	38.4	59.9	10.8	16.3	6.5	30.7
CDC-Precision	51.3	60.4	10.8	15.9	7.5	35.0
CDC-Vivid	51.8	60.6	11.0	15.9	7.5	35.7
MTD16001	49.7	59.0	10.8	14.8	6.5	34.2
MTD16002	51.8	58.6	10.9	15.1	9.3	36.0
MTD16004	49.7	60.8	10.8	14.6	6.5	33.5
MTD16005	54.1	59.4	10.8	15.4	9.3	35.3
MTD16006	44.3	60.4	10.9	15.1	7.5	35.7
MTD16007	50.9	60.6	10.8	15.8	7.5	33.8
MTD16008	42.1	58.0	10.7	15.6	10.0	33.2
MTD16009	31.6	54.9	10.6	16.2	9.3	34.3
MTD16010	46.7	60.3	10.8	15.8	9.3	34.2
MTD16011	44.2	59.5	10.8	15.0	9.3	34.7
Average	45.4	59.6	10.8	15.5	8.2	33.7
LSD (0.05)	14.4	1.8	0.2	0.7	2.8	3.0
Prob > F	0.200	<0.001	<0.001	<0.001	0.147	0.002
CV (%)	19.3	1.9	1.1	2.8	29.6	5.4

[1]Grain yield reported on a 13% moisture basis.
[2]Grain protein reported on a 12% moisture basis.
[3]Sawfly damage reported on percent cut stems.