

2008

Cereal Grain Trials



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2008 VERMONT CEREAL GRAIN VARIETY PERFORMANCE TRIALS

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In 2008, the University of Vermont Extension Service conducted a series of cereal grain trials at Borderview Farm in Alburgh, Vermont. The first compared yield and quality of small grain forage crops harvested at two different stages of development, the second compared the grain yields of different cereal crops and the third evaluated the impact of spring wheat seeding rate on grain yield.

TESTING PROCEDURE

Replicated Research Trials:

The experimental design at the Alburgh location was a randomized complete block with either three or four replications depending on the experiment.

Table 1. Small Grain Varieties used for trials.

Seed Source	Species	
		variety
Trial 1: Small Grain Forages		
Lakeview Organic Grain	Barley	Benefit
Albert Lea Seed House	Oats	Rodeo
Lakeview Organic Grain	Spelt	Oberkulmer
Albert Lea Seed House	Spring Wheat	Glenn
Trial 2: Winter Wheat, Spelt and Triticale		
Washington State Univ.	Hard Red Wheat	Bauemeister
Washington State Univ.	Hard Red Wheat	Finely
Lakeview Organic seed	White Wheat	Fredrick
Butterworks Farm	Hard Red Wheat	Maxine
Lakeview Orgnaic Grain	Spelt	Oberkulmer
Butterworks Farm	Hard Red Wheat	Zorro
Agriculver Seed	Triticale	Trical 336
Trial 3: Seeding Rate		
Albert Lea Seed House	Spring Wheat	Glenn

Seasonal precipitation and temperature recorded at a weather station in close proximity to the 2008 site is shown in Table 2. This growing season brought cooler temperatures and higher than normal rainfall patterns across the region.

Table 2. 2008 Temperature and Precipitation Summary

Location*		June		July		August		September		October	
	Temp.	Average	Departure	Average	Departure	Average	Departure	Average	Departure	Average	Departure
	Precip	Total	from normal	Total	Departure	Total	Departure	Total	Departure	Total	Departure
	GDD	Total		Total	Departure	Total	Departure	Total	Departure	Total	Departure
Alburgh	Temp.	54.3	-2.3	67.6	+1.8	71.5	+0.4	68	-0.6	63	+3
	Precip	1.4	-1.6	7.2	+4.0	7.86	+4.5	2.8	-1.1	1.3	-2.2
	GDD	148	----	526	----	621	----	549	----	393	----

Based on National Weather Service data from cooperative observer stations in close proximity to field trials. Historical averages are for 30 years of data (1971-2000). Average GDD was not available for Alburgh location.

The seedbed at each location was prepared by conventional tillage methods. All plots were managed with practices similar to those used by producers in the surrounding areas (Table 3). Winter grain trials were planted in September. Spring grain trials were seeded in early May.

Forage were harvest with a Jeri sickle bar mower at boot and dough stages. The forages were raked onto a canvas tarp and weighed to determine yield. Approximately 1-kg of the fresh forage was subsampled and used to determine moisture and quality.

Grain plots were harvested with an Almaco SP50 plot combine. Yield, moisture, and protein are reported.

Table 3. General plot management of the grain trials in Alburgh, VT.

Trial Information	Trial 1-Spring Grains for Forages	Trial 2-Winter Wheat, Spelt & Triticale	Trial 3-Seeding Rate of Spring Wheat
Location	Alburgh Borderview Farm	Alburgh Borderview Farm	Alburgh Borderview Farm
Soil type	Silt loam	Silt loam	Silt loam
Previous Crop	Small grain	Small grain	Small grain
Row Width (ft.)	5x25	5x25	5x26
Seeding Rate (lbs/acre)	125	140	90, 125, 150 or 175
Replicates	3	4	4
Planting date	5-6-08	9-14-07	5-6-08
Harvest date	Dough: 7-22-08 Boot: 8-14-08	7-27-08	8-15-08
Tillage operations	Spring Plow	Fall Plow	Spring Plow

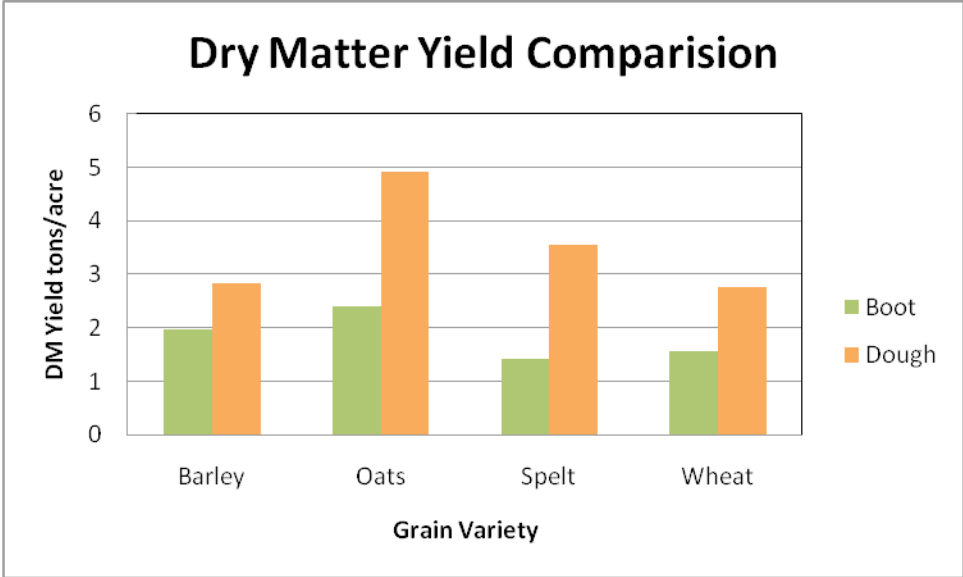
Small Grain Forage Results

Harvesting grains at the Boot stage resulted in higher forage quality especially in terms of protein and digestibility. However, grains harvest in the dough stage resulted in twice the amount of forage. The grains harvested at the Boot stage showed the most variation between each other. In general oats showed the best combination of yield and quality characteristics over the other grains. Grains harvested in the dough stage did not differ significantly in yield, protein or fiber digestibility.

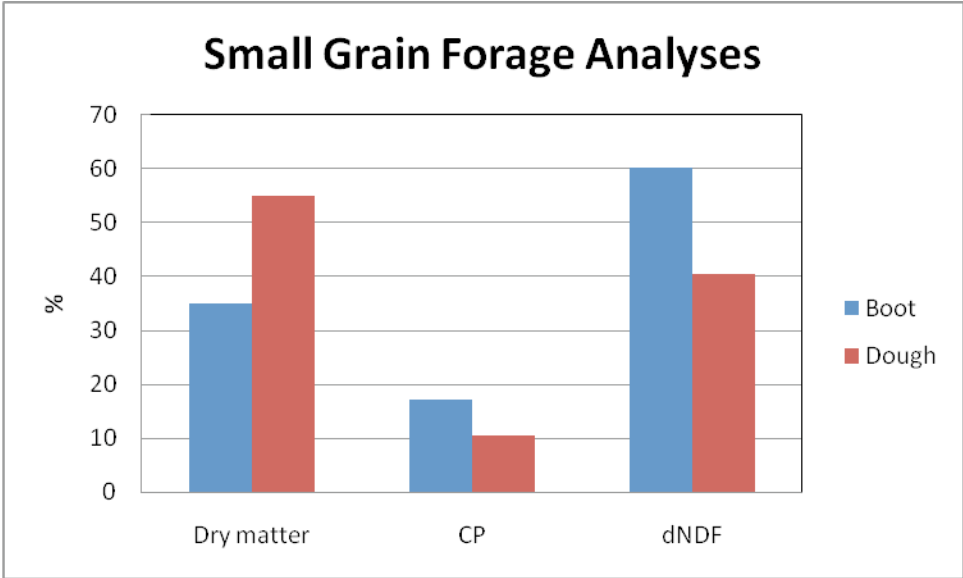
Table 4. Yield and Nutritional analyses of grains harvested at the dough and boot stages.

Treatment	DM Yield tons/acre	Dry matter %	CP %	ADF %	NDF %	TDN %	IVTD %	dNDF %
Boot	1.84	35.1	17.2	36.8	59.7	62.3	76.3	60.3
Dough	3.52	54.9	10.4	44.8	68.5	52.8	59.2	40.4
Trial Mean	2.68	45.0	13.8	40.8	64.1	57.6	67.7	50.3
LSD (0.10)	0.46	6.48	1.21	1.82	1.99	1.71	2.62	2.83
Forage Harvested at the Boot Stage								
Barley	1.96	36.5	14.6	39.0	64.1	61.0	73.0	57.5
Oats	2.41	33.6	16.9	37.5	60.0	62.3	76.0	60.3
Spelt	1.42	34.6	19.9	34.5	56.1	63.3	80.3	64.8
Wheat	1.55	35.8	17.6	36.2	58.5	62.8	75.8	58.5
Trial Mean	1.84	35.1	17.2	36.8	59.7	62.3	76.3	60.3
LSD (0.10)	0.36	NS	1.12	1.38	2.90	0.94	1.87	2.13
Forage Harvested at the Dough Stage								
Barley	2.83	59.4	11.4	45.5	71.5	53.8	59.5	43.5
Oats	4.92	52.5	9.0	49.4	72.2	49.0	52.8	34.5
Spelt	3.56	55.1	11.1	43.3	67.5	53.8	61.0	42.3
Wheat	2.77	52.9	10.1	40.9	62.9	54.8	63.5	41.3
Trial Mean	3.52	54.9	10.4	44.8	68.5	52.8	59.2	40.4
LSD (0.10)	NS	NS	NS	4.99	4.76	NS	NS	NS

Graph 1. Comparison of small grain crop yields at the Boot and Dough stages.



Graph 2. Forage quality of small grains harvested in the Boot and Dough stage.



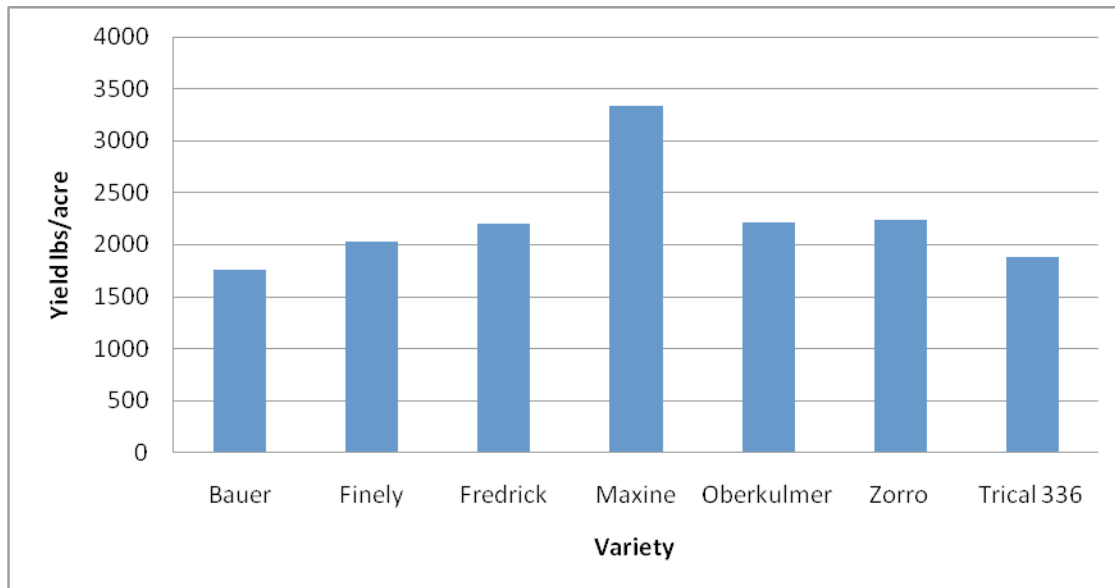
Winter Wheat, Spelt, and Triticale Results

Maxine yielded the highest 3338 lbs/ac while Bauermeister had the lowest yield at 1763 lbs/ac (Graph 3). The average crude protein (CP) of the winter wheat varieties was 14.4%. The spelt variety, Oberkulmer had the highest CP of all the grains, 17%. While the triticale, Trical 336, had the lowest at 12.9% (Graph 4).

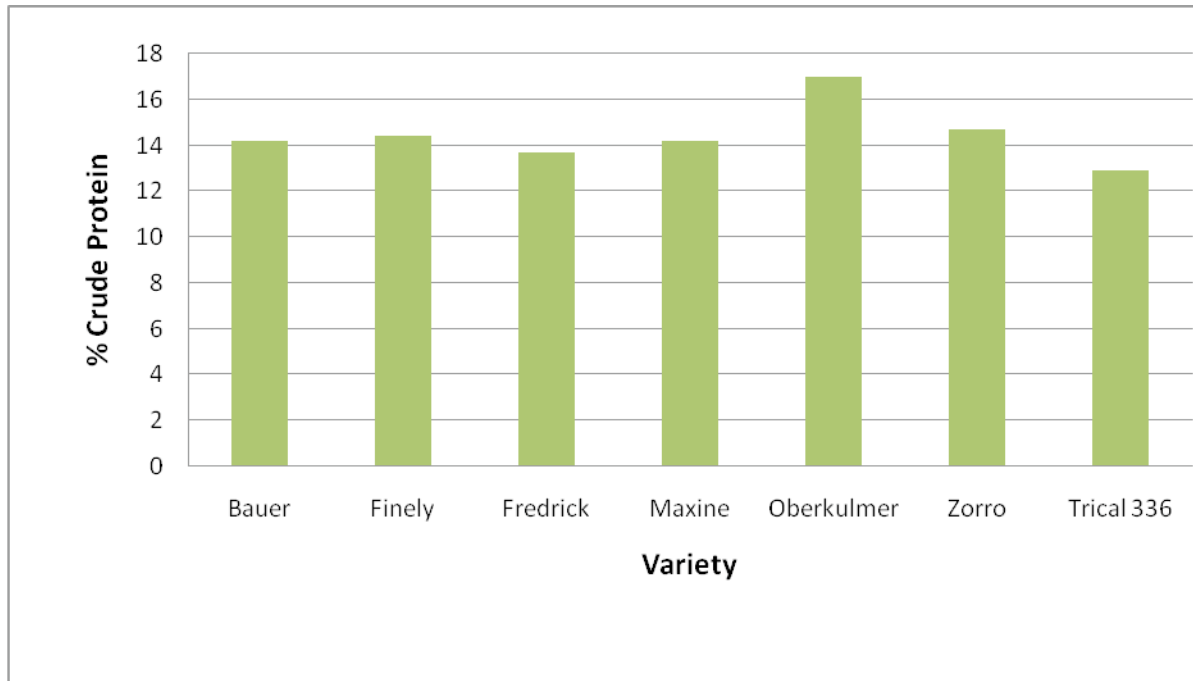
Table 5. Yield and nutritional comparisons of Winter Wheat, Spelt, and Triticale.

Species	Variety	Yield lbs/acre	Crude protein %	NDF %	Starch %	NeL %
Hard Red Wheat	Bauer	1763	14.2	9.9	60.9	0.90
Hard Red Wheat	Finely	2025	14.4	9.4	63.1	0.90
White Winter Wheat	Fredrick	2200	13.7	10.1	60.5	0.90
Hard Red Wheat	Maxine	3338	14.2	11.1	60.5	0.90
Spelt	Oberkulmer	2213	17.0	23.8	42.2	0.86
Hard Red Wheat	Zorro	2238	14.7	10.6	59.1	0.90
Triticale	Trical 336	1888	12.9	12.8	57.1	0.89
Trial mean		2238	14.4	12.5	57.6	0.89
LSD (0.10)		834	NS	NS	NS	NS

Graph 3. Comparison of the yields of winter grain species.



Graph 4. Crude Protein (%) of winter grains in Vermont.



Spring Wheat Seeding Rate Results

A spring wheat seeding rate study was conducted in 2008. There are varying seeding rate recommendations available from Washington, New York, and Quebec. The recommended seeding rates range from 90 lbs up to 175 lbs/acre. Four seeding rates (90, 125, 150, 175 lbs/acre) were evaluated to determine what rate would produce the highest yields. The 90lb/acre was significantly lower in yield than the 125, 150, and 175 lbs/acre seeding rates (Table 6). Interestingly, there was no difference in yield between the higher seeding rates.

Table 6. Seeding rate compared to yield

Seeding rate lbs/ acre	Yield lbs/ acre
90	709b
125	2397a
150	1864a
175	1960a

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