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TRITICALE COMPARED WITH OATS AND WEAL BARLEY AS A FORAGE AT PT. MACKENZIE

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INTRODUCTION

Trials conducted with entries of oats, barley, and triticale on the university tract in 1987 and 1988 provided the first research information on triticale for forage use at Pt. MacKenzie. Triticale is a hybrid resulting from a cross between wheat and rye. The rye ancestry would confer greater acid tolerance than is possessed by wheat alone. In previous trials with cereals on the moderately to strongly acidic soils of Pt. MacKenzie, the better yielding oat varieties have out produced barley (Mitchell 1983 and unpublished data).

METHODS

The cereals were drill-seeded in rows spaced 8 inches apart in plots measuring 4 x 15 ft. The plots were replicated four times in a randomized block design. Three rows, 12 ft long, were harvested from the interior portion of each plot to obtain yield data. Samples were retained for dry matter determination and laboratory analyses for forage quality. Yields are reported on an oven-dry basis (dried at 60° C). One ton of oven-dry matter equals about 1.14 tons of hay (assuming 12% moisture content for the hay).

The plots were fertilized to provide about 90-90-70 lbs/acre of N-P_2O_5-K_2O. The fertilizer was broadcast and raked 1 to 2 inches into the soil surface. The plots were seeded on 26 May and harvested 5 August in 1987, and on 2 June and 25 August, respectively, in 1988.

RESULTS AND DISCUSSION

The 1987 and 1988 growing seasons differed substantially in growth characteristics. This probably accounted for differences in relative yields between triticale and the other entries over the two seasons. The 1987 season was wetter than 1988 through the early to mid part of the growing season (Table 1). The 1988 season was particularly droughty during the period from June 6 to July

Table 1. Weather data for 1987 and 1988 growing seasons at Pt. MacKenzie (monthly averages given in inches precipitation and degrees Fahrenheit).

	May		June		July		August	
	Prec.	Temp.	Prec.	Temp.	Prec.	Temp.	Prec.	Temp.
1987	l.09	47.1	1.35	52.0	2.33	57.6	0.59	57.7
1988	0.42	48.5	1.29	55.5	0.66	59.0	3.67	55.5

21. Concomitantly, with lower precipitation, temperatures during this period were warmer in 1988 than in 1987.

In 1987 the plots were harvested when the oats were in the early heading stage, 71 days after seeding. The better yielding oats provided from 2.50 to almost 3 tons of dry matter per acre at this stage (Table 2). Crude protein content (C.P.) was generally over 10%, and digestible dry matter (DDM—as determined by the in vitro method) about 60%. The oat varieties, in general, surpassed Weal barely in crude protein, digestibility, and phosphorus (P) content while providing more yield. The relatively low C.P. content of Ceal oats may be attributed to its greater maturity, being the earliest maturing oat variety. This also is true of the barley.

Both triticale entries were the lowest producers in 1987 but were substantially higher than the oats in C.P. content, digestibility, and phosphorus content. This is related, in part at least, to their relatively low yields. The higher yields of the oats resulted in a dilution of those quality factors. Both entries of triticale tended to lodge under the growing conditions of 1987.

In 1988 the plots were harvested when the oats were in the late milk to early soft dough stage, 90 days after seeding. The highest producers in 1988 were the two entries of triticale (Table 3). This can be attributed to warmer, drier conditions than in 1987, when triticale was the lowest producer. Although barley is reputed to be more drought tolerant than oats, two of the oat varieties exceeded Weal barley in yield. The longer growing period of 1988 contributed to lower forage quality measurements in 1988 than in 1987. Furthermore, the drier soil probably rendered nutrients less available to the plants. The high yielding triticales about equalled oats in digestible dry matter, but were somewhat lower in crude protein and generally lower in the other quality measures.

The triticales yielded more in 1988 than in 1987, whereas the reverse was true for the other cereals. The cereals were allowed to grow into late August in 1988, compared with an early August harvest in 1987, thus taking advantage of the much increased precipitation that occurred in August 1988. However, the oats headed by late July and did not benefit as much from the August rains in 1988 as they did from the earlier rains in 1987. Yields for the three oat varieties averaged 2.07 tons/acre in 1988 compared with the 2.71 tons/acre with a 19 day shorter growing season in 1987.

These trials suggest that triticale can out yield oats and barley under relatively warm, dry conditions while giving up little in

Table 2. Forage yield and quality data for cereals tested at Pt. MacKenzie in 1987.

Forage Entry	Ton/Acre Yield	% C.P.	% DDM	% P	% K	% Ca	% Mg
Oats							
Nip	2.84	10.5	59.3	0.21	3.31	0.44	0.22
Toral	2.79	11.5	61.0	0.24	3.74	0.36	0.21
Ceal	2.63	9.8	59.9	0.21	3.46	0.34	0.20
Rodney	2.60	10.2	56.5	0.21	3.45	0.25	0.18
Athabasca	2.52	11.2	59.6	0.21	3.50	0.30	0.19
Park	2.50	11.0	59.9	0.22	3.57	0.41	0.20
Foothill	2.49	10.7	64.2	0.21	3.55	0.38	0.19
Otana	2.44	13.2	62.3	0.24	3.60	0.46	0.22
Swedish	2.33	11.6	62.4	0.23	3.73	0.30	0.20
Barley							
Weal	2.47	8.6	56.3	0.17	2.66	0.36	0.19
Triticale							
Winter*	2.15	14.8	68.8	0.32	4.15	0.44	0.24
Spring	1.98	14.1	68.0	0.32	3.67	0.40	0.23

*The winter triticale was seeded in the spring along with other cereals.

crude protein and digestible dry matter. In more moist years, oats may be expected to out yield triticale, but the triticale will be higher in crude protein and digestible dry matter. It appears that at comparable yields and length of growing period, triticale definitely exceeds Weal barely in crude protein and digestible dry matter.

These results suggest a possible hedge for some of the cereal forage acreage at Pt. MacKenzie. Oats and triticale could be planted in alternate strips, and in the event of a dry year, the triticale may contribute to higher productivity; in the event of a moist year, it may contribute to higher crude protein and digestibility values. This cultural practice is employed in the Matanuska Valley using barley and oats. Under the soil conditions of the Matanuska Valley barley exceeds oats in yield, but the later-maturing oats are inserted in the planting to upgrade crude protein and digestible dry matter of the feed (Brundage et al., 1981).

Triticale is an awned cereal so should be managed as silage rather than dried hay. My presumption that the relative yields of oats and triticale differed in the two years because of weather differences is based on the evidence of only two years of trials. Further trials are needed for confirming evidence.

Table 3. Forage yield and quality data for cereals tested at Pt. MacKenzie in 1988.

Forage Entry	Tons/Acre Yield	% C.P.	% DDM	% P	% K	% Ca	% Mg
Oats							
Foothill	2.31	9.4	58.1	0.16	1.44	0.35	0.15
Toral	2.10	9.4	55.4	0.16	1.61	0.35	0.13
Nip	1.80	9.9	56.3	0.18	1.30	0.30	0.19
Barley							
Weal	1.88	8.6	47.2	0.13	l.83	0.50	0.19
Triticale							
Spring	2.62	8.3	54.4	0.24	1.08	0.21	0.09
Winter*	2.61	8.7	56.8	0.14	1.15	0.21	00.9

* Winter triticale was seeded in the spring along with other cereals.

REFERENCES CITED

Brundage, A. L., Taylor, R. L., and Burton, V. L. 1981. A changing pattern in small-grain silage mixtures. *Agroborealis* 13:4-5.

Mitchell, W. W., 1983 *Forage yield and quality of cereals at Pt. MacKenzie*. University of Alaska Fairbanks Agricultural and Forestry Experiment Station Bulletin 61.

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