

Agronomic Performance of Triticale in North Dakota

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Triticale (**Triticale hexaploide** Lart.) is a man-made crop resulting from a cross between wheat and rye. Crosses of wheat and rye have been reported since the 1880's in Europe but intensive investigations of wheat-rye hybrids in North America was not started until the 1950's. Plant breeders have succeeded in producing more than one type of triticale—common wheat X rye crosses and durum wheat X rye crosses. Some current varieties have been developed which are mostly durum X rye crosses but have been crossed to common wheat.

The first intensive breeding program in North America to obtain a possible commercial crop from this new species was started at the University of Manitoba, Canada, about 15 to 20 years ago, working mostly with durum-rye crosses. Other public and private breeding programs have been initiated and variety improvements are being made.

Potential Uses

Triticale may have potential as a feed grain. Some preliminary feeding trials with cattle and swine in the southwestern states have been of particular interest since ergot was not a confounding factor in the triticale performance as a feed grain (4). Average daily gain and feed intake were higher with steers fed on a sorghum grain ration than the triticale ration. Feed utilization was more efficient with triticale. Lower palatability was noted when higher triticale levels were fed. All feeding trials with swine and cattle conducted by the North Dakota Agricultural Experiment Station have been with the Canadian variety 'Rosner' (2, 3). The triticale used in these North Dakota experiments contained different amounts of ergot (2). Cleaning did not remove all the ergot and in some cases .04% ergot by weight caused toxicity symptoms in cattle. Consequently, triticale has not performed as well as barley and corn for average daily gain and feed intake.

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Palatability has been low with triticale used as the only grain, either because it is less palatable or the presence of ergot reduced its acceptability. Adding barley, at 50% or more, has helped rate of gain and feed efficiency.

Triticale varieties are being tested for malting and distilling as well as possible use in breakfast cereals. However, no practical commercial use has been established to date. Triticale varieties available now do not compare favorably with bread wheat for either milling or baking characteristics nor with durum for semolina.

Federal grades have not been established for triticale and no regular cash market outlet is established. A few feed plants have bought or may buy limited amounts for use in commercial feeds and more interest may develop.

Agronomic Performance

Triticale has been tested by the North Dakota Agricultural Experiment Station since 1968 (1). New commercial lines have been tested as they have become available and four Jenkins Research Foundation lines were entered in yield trials in 1969.

Triticale yielded about the same as oats and barley when planted April 14, 1971 at Fargo (Table 1). The triticale varieties were not as competitive at the May 5 planting date, which shows the best yielding triticale variety approximately 900

Table 1. Feed grain trial at Fargo, 1968-1971.

Varieties	Yield in pounds/acre				
	Seeding dates				
	5-17-68	4-27-69	5-6-70	4-14-71	5-5-71
HRS wheat ¹	1753	1989	2005	3796	2787
Barley ²	2115	3437	2076	3498	4280
Oats ³	2963	3754	2220	2922	3100
Rosner triticale	1464	2307	1846	—	2571
6TA203 triticale ⁴	—	2757	2100	3690	3311
6TA204 triticale ⁴	—	2104	1740	4104	2510
6TA208 triticale	—	2112	1814	3084	—
6TA209 triticale	—	2691	2214	3292	2424
Trailblazer triticale ⁵	—	—	—	—	2721

¹Manitou 1968, 1969; Waldron 1970; Era 1971.

²Conquest 1968, 1969; Dickson 1970, 1971.

³Harmon 1968, 1969; Lodi 1970, 1971.

⁴Sold commercially as FasGro 203 and 204.

⁵A reselection of 6TA209.

pounds/acre lower in yield than barley (3). Triticale was competitive with the Lodi oats at the later planting date in 1971.

The average yields of the triticale varieties tested over years are presented in Table 2. These data indicate that barley has yielded best followed by the oats. Yield data presented in Table 3 from western North Dakota indicate results similar to the Fargo data, with oats being best in yield and barley next best.

Table 2. Summary of feed grain trials at Fargo.

Varieties	Yield in pounds/acre					68-71 average
	1969-71 average					
	1971 average	With early ⁵ '71 seeding	With late ⁵ '71 seeding	Both '71 seeding dates	With late '71 seeding	
HRS wheat ¹	3292	2594	2258	2644	2134	
Barley ²	3889	3000	3261	3323	2977	
Oats ³	3011	2962	3022	2999	3009	
Rosner triticale	—	—	2240	—	2047	
6TA203 triticale ⁴	3501	2846	2720	2965	—	
6TA204 triticale ⁴	3307	2647	2116	2615	—	
6TA208 triticale	—	2334	—	—	—	
6TA209 triticale	2858	2730	2441	2655	—	

¹Manitou 1968, 1969; Waldron 1970; Era 1971.
²Conquest 1968, 1969; Dickson 1970, 1971.
³Harmon 1968, 1969; Lodi 1970, 1971.
⁴Sold commercially as FasGro 203 and 204.
⁵Early seeding was 4-14-71, and late 5-7-71.

Table 3. Feed grain trials in western North Dakota.

Varieties	Yield in pounds/acre					
	1969-70			1968-70		
	Williston	Minot	aver-	aver-	age	age
HRS wheat ¹	1623	1821	1200	2874	1963	1880
Barley ²	2021	2742	1453	2625	2271	2210
Oats ³	1703	3033	1234	3484	2581	2364
Rosner triticale	1311	1908	758	2878	1846	1714
6TA203 triticale ⁴	—	2154	909	3118	2058	—
6TA204 triticale ⁴	—	2322	1032	3399	2249	—
6TA208 triticale	—	1915	1226	2586	1907	—
6TA209 triticale	—	2180	1050	2953	2059	—

¹Manitou 1968, 1969; Waldron 1970.
²Conquest 1968, 1969; Larker 1970.
³Harmon 1968, 1969; Kelsey 1970.
⁴Sold commercially as FasGro 203 and 204.

The 1971 Carrington data (Table 4) indicate that the triticale varieties again perform more competitively with oats and barley when planted earlier (3), but barley and oats yielded higher than triticale in both trials.

A major problem of triticale is susceptibility to ergot, as shown in Table 5. Ergot infection is quite variable due to the environmental effects,

Table 4. Feed grain trials at Carrington, 1971.

Varieties	Seeding date		Average yield of 2 trials	Average test weight, 2 trials
	4-23-71	5-7-71		
HRS wheat ¹	3648	2114	3381	59
Dickson barley	3978	3316	3647	48
Oats ²	3510	3837	3674	38
Rosner triticale	2868	2522	2695	49
6TA203 triticale	3378	2243	2811	48
6TA204 triticale	3474	2401	2938	48
6TA209 triticale	2370	2161	2266	47
Trailblazer triticale	3114	—	—	—

¹Era in 4-23 trial, Waldron in 5-7 trial.
²Lodi in 4-23 trial, Kelsey in 5-7 trial.
³and⁴Late maturing varieties were not used in the late seeded trial.

available inoculum, and the time of triticale flowering. Sterility is a contributing factor to ergot infection since the triticale florets remain open longer and give the ergot a better opportunity to attack the floret.

Table 5. Per cent protein and ergot of feed grains.

Varieties	% feed protein		% ergot (weight)		
	Fargo		Fargo 1971		Carrington 4-23-71
	1970	1971	4-14	5-7	
Era wheat ¹	—	15.0 (13.8)	.00	.01	.01
Waldron wheat ¹	18.8 (17.3)	16.8 (15.5)	.03	.25	.13
Dickson barley	61.0	12.4	.04	.18	.04
Lodi oats	17.2	—	.01	.01	.00
Rosner triticale	18.2	15.3	—	.53	.06
6TA203 triticale ²	17.9	15.2	.21	.39	.18
6TA204 triticale ²	18.6	15.3	.37	.92	.25
6TA209 triticale	19.7	15.1	.20	.86	.47
Trailblazer triticale ³	—	15.8	—	.62	.22

¹The protein content of wheat was adjusted to feed protein (%N X 6.25). Wheat protein (%N X 5.75) for milling is given in ().
²Sold commercially as FasGro 203 and 204.
³A reselection of 6TA209.

Conclusions

New improved varieties of triticale may provide alternatives to farmers as a source of feed grain in the future. The present varieties are not recommended for commercial production in North Dakota because of their susceptibility to ergot and present level of yield when compared to oats and barley.

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