

THE EVALUATION OF RYE AND TRITICALE VARIETIES AS A SECOND CEREAL, 1992-94

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Summary

Selected varieties of triticale and rye were grown as a second cereal on sandy loam soil at Morley. Yields of the better varieties of both species exceeded that of the surrounding wheat crop. Brown rust was difficult to control in the rye with some of the hybrids worse than the old variety Halo. Rye had smaller grains than triticale. In view of better market prospects, it is concluded that the use of rye in place of wheat as a second cereal is a viable and better alternative than triticale, especially on lighter soils.

Introduction

Winter wheat has tended to provide variable results when grown as a second successive crop in arable rotations on the lighter soils of East Anglia. Problems are particularly severe if these cereals are early sown when both eyespot (*Pseudocercospora herpotrichoides*) and take all (*Gaeumannomyces graminis*) can result in very poor yields.

While the cross of wheat and rye, triticale, has been known for many decades, it is only in the last few years that it has become of commercial interest. Many varieties of triticale have extremely good resistance to the majority of foliar diseases and often also inherit improved resistance to eyespot and take-all from the rye parent. Therefore, triticale has been suggested as a low input, reliable crop for intensive cereal rotations on light land. Since rye already has a small but important position on light land, some varieties of this species were included in the trial as a comparison.

Method

Three to four varieties of rye and four or five varieties of triticale were sown each year in early October as a randomised block experiment with four replicates. Seed was sown at 400 seeds/m² and in each year a satisfactory establishment was achieved. The experiments were all located at Morley on a sandy loam (Ashley series) soil.

Normal inputs of fungicide, fertiliser, insecticides and growth regulator were applied overall (as for the adjoining farm crop) with an additional treatment of growth regulator and fungicide being applied as necessary to combat lodging and brown rust (*Puccinia recondita*).

For the 1992 crop, seed was treated with Rappor (guazatine; 300 g/l) but Luchs was only available with Baytan (fuberidazole + triadimenol; 22.5 + 187.5 g/l). Rappor was used on all varieties for 1993 but in 1994 Amando, Halo, Luchs and Marder were treated with

Baytan and the remainder with Cerevax (carboxin + thiabendazole; 360 + 20 g/l).

Table 1. *Critical dates and husbandry*

	1992	1993	1994
Previous crop	Wheat	Wheat	Wheat
Sowing	10 October 1991	6 October 1992	9 October 1993
Nitrogen	220 kg/ha	221 kg/ha	223 kg/ha
Harvest	23 August	21 August	15 August

Assessments of crop growth were made as appropriate during the year. Lodging was only present in 1992 and was assessed by estimating the proportion of each plot leaning more than 45%. Straw height was recorded at crop maturity each year by measurement of the distance from the soil to the base of the ear. Brown rust was recorded at milky ripe (GS 75; Tottman, 1987) by estimating the infection on each leaf layer for the plot as a whole. The estimates of eyespot infection were made on 25 tillers/plot at GS 69 using the method of Scott & Hollins (1974).

Results

Crop growth and disease

The only significant lodging occurred in 1992 and the results are shown in Table 2. Measurements of straw height are also displayed in this table. While all of the rye varieties showed some tendency to lodge, the growth regulator sequence of chlormequat (700 g/l) and Terpal (2-chloroethylphosphonic acid + mepiquat chloride; 155 + 305 g/l) reduced the lodging to a modest level on all varieties. There were large differences in the triticale varieties with Purdy suffering severe lodging whilst Alamo and Cumulus were free.

Rust was severe on the rye in 1993 with significantly more ($P=0.05$) infection (21.3%) on leaf 2 of Amando in July (GS 85) compared with 9.5% on Marder and 4.0% on Halo.

The rye was generally taller than the triticale, but the newer hybrid rye varieties were significantly shorter than Halo. However, the differences in straw length were not directly linked to standing ability.

Only in 1992 was infection by eyespot sufficient to justify individual assessment and it was found that many of the triticale varieties tested that year carried significantly more eyespot infection than the rye. There were indications in this one year that Purdy was less infected than the other triticale varieties, with an infection index of 36.4 compared with 61.0 on Lasko and 46.0 on Cumulus. On rye, Luchs and Marder (18.3 and 10.3 respectively) were less severely affected than Amando and Halo (30.7 and 53.0 respectively).

Table 2. *Lodging and straw height*

Variety	% Lodging		Straw height (cm)	
	1992	1992	1993	1994
Triticale				
Alamo	0.0	88	93	-
Cumulus	0.0	91	93	107
Lasko	90.0	88	91	106
Olympus	-	-	-	111
Purdy	11.3	100	100	118
Trick	-	-	94	107
Rye				
Amando	6.2	104	93	125
Halo	3.7	117	118	134
Luchs	3.7	103	-	125
Marder	1.3	107	108	128
LSD	12.19	4.7	5.9	3.7

LSD = least significant difference at 95% probability level

Table 3. *Date of ear emergence*

Variety	Date of ear emergence (in May)		
	1992	1993	1994
Triticale			
Alamo	19	20	-
Cumulus	21	23	29
Lasko	24	29	30
Olympus	-	-	2 June
Purdy	26	29	1 June
Trick	-	24	30
Rye			
Amando	13	18	20
Halo	13	17	20
Luchs	12	-	19
Marder	11	16	19
LSD	1.2	1.0	5.9

Ear emergence

The date at which the majority of ears reached 50% emergence was recorded and is shown in Table 3. All rye varieties were significantly earlier at ear emergence than the triticale. Although detailed records of ripening were not kept, it was apparent that all varieties of both species were fit for harvest within a period of a few days, so that by this time the triticale had caught up.

Grain yield and quality

Over the period of the trial, yields of triticale ranged from 6.67 to 9.32 t/ha while yields of rye were from 6.65 to 9.39 t/ha (Table 4). The best varieties of both species produced better yields than the second wheat crops which were in the range 7.50 to 8.50 t/ha over this period.

Of the triticale varieties, the performance of Alamo was particularly good in the two years that it was included. The hybrid rye varieties consistently outyielded the older Halo but it was our experience that brown rust was even more of a problem on the new hybrids and, overall, the triticale would have been the cheaper crop to grow.

Table 4. *Grain yield (t/ha at 85% dm)*

Variety	1992	1993	1994
Triticale			
Alamo	9.03	9.32	-
Cumulus	8.87	8.52	6.89
Lasko	8.09	7.75	7.73
Olympus	-	-	6.67
Purdy	8.75	7.27	7.25
Trick	-	8.14	6.88
Rye			
Amando	8.46	8.31	6.96
Halo	8.21	9.06	6.65
Luchs	9.08	-	7.39
Marder	9.12	9.39	7.48
LSD	0.731	0.439	0.387

Tables 5 and 6 show the specific weight and grain size of samples taken at harvest. The rye consistently produced smaller grains, but this had a higher specific weight than the triticale.

Annex C
Evaluation of rye and triticale

Table 5. *Specific weight (kg/hl)*

Variety	1992	1993	1994
Triticale			
Alamo	69.2	75.7	-
Cumulus	68.3	74.3	70.8
Lasko	67.8	75.5	75.1
Olympus	-	-	74.9
Purdy	69.7	73.7	73.5
Trick	-	75.4	72.9
Rye			
Amando	71.7	75.8	74.6
Halo	72.0	77.1	76.0
Luchs	72.0	-	75.6
Marder	71.1	76.3	75.7
LSD	1.19	0.69	0.69

Table 6. *1000 grain weight (g)*

Variety	1992	1993	1994
Triticale			
Alamo	47.5	49.7	-
Cumulus	46.3	52.8	44.8
Lasko	42.6	47.5	44.0
Olympus	-	-	53.3
Purdy	52.1	62.4	56.5
Trick	-	54.7	52.5
Rye			
Amando	38.3	39.4	34.1
Halo	41.5	43.9	41.5
Luchs	45.3	-	36.3
Marder	44.4	41.4	37.5
LSD	4.89	2.89	1.32

Discussion

These trials demonstrated that both triticale and rye offer the possibility of a non wheat crop that will match or exceed the yield of a second wheat on sandy loam soils. Severe take-all was not encountered during this trial series, but it is likely that the advantage to triticale and rye would increase in such a situation. Since rye has a specific market and triticale is generally only used as a substitute for feed wheat, rye is likely to command the better price if it meets the required market standards. Therefore, in spite of the poor resistance to brown rust, it is concluded that rye is an attractive alternative to wheat and the benefits of rye are likely to increase on the lighter soils where the specific weight of triticale could become very low.

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References

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