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MORLEY RESEARCH CENTRE

Rye and triticale

The evaluation of varieties as a second cereal, 1993

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Summary

Three varieties of rye and five varieties of triticale were grown as a second cereal on a sandy loam at Morley. Yields ranged from 7.27-9.39 t/ha which was similar to the adjoining wheat variety trial (8.37-9.59). The rye suffered considerable brown rust infection in spite of an intensive fungicide programme but the triticale remained free of recordable disease. No lodging occurred.

Object

This trial aims to compare rye and triticale and assess varieties, particularly comparing the new hybrid rye varieties with the conventional variety Halo. The comparison was made as a second cereal on sandy loam soil where take-all sometimes limits the performance of wheat crops.

Method

Three varieties of rye and five of triticale, as shown in Table 1, were sown on 6 October 1992 in four randomised blocks. Guazatine treated seed was planted at 400 seeds/m^2.

Normal inputs of fungicide, fertiliser, insecticides and growth regulator were applied overall, as on the adjoining farm crop with an additional treatment of growth regulator and fungicide on 19 May to combat lodging and brown rust. All operations were in accordance with normal Morley procedures.

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*Not for publication without the Director's consent. This report deals primarily with only one year's work, so any conclusions given are provisional.

Table 1. *Rye and triticale varieties in 1993 trial*

Rye	Triticale
Amando	Alamo
Halo	Cumulus
Marder	Lasko
	Purdy
	Trick

Crop establishment was recorded on 25 November and both straw height and brown rust were recorded on 19 July. Periodic observation over the ear emergence period enabled the date of ear emergence to be recorded. The crop was harvested on 21 August and moisture content, grain size and specific weight were subsequently measured.

Results and discussion

Crop growth and disease

Table 2. *Establishment, straw height, ear emergence, and brown rust infection*

Variety	Brown rust, Plants on 25 Nov. (populations/m²)	Straw height (cm)	Date of ear emergence in May	19 July on Leaf 2 (%)
Marder (rye)	141	108	16.0	9.5
Alamo (triticale)	222	93	20.0	0.0
Halo (rye)	199	118	17.0	4.0
Cumulus (triticale)	156	93	23.1	0.0
Amando (rye)	100	93	18.0	21.3
Trick (triticale)	131	94	23.5	0.0
Lasko (triticale)	177	91	28.5	0.0
Purdy (triticale)	199	100	29.3	0.0
LSD	30.5	5.9	1.02	3.0
SE per plot (21 df)	±20.7	±4.0	±0.69	±2.0
or as % GM	12.5%	4.0%	3.2%	46.2%

(LSD = Least significant difference at 95% probability level)

Although all plots were sown at the same seedrate there were significant differences in establishment with the hybrid rye (Amando) appearing to establish plants from only 25% of the seeds sown as shown in Table 2. However, the crops tillered well and by spring had established a dense crop. While all varieties of rye and triticale were at least 30% taller than the surrounding wheat (Beaver) there was no lodging. The conventional rye variety (Halo) was significantly taller than the hybrid ryes and triticale. All varieties of rye reached ear emergence before the triticale. It is interesting to note that within a species, the earlier varieties gave the best yields. Some blind grain sites were noted on the Purdy which emerged at a similar time to surrounding wheat in which blossom midge damage was recorded. Although records are not available it is possible that blossom midge may have preferentially attacked the later triticale varieties.

In spite of a fungicide programme of four sprays, brown rust remained a significant problem on the rye with Amando being significantly worse than the others. All varieties of triticale remained free of disease.

On 17 May some spotting was observed on leaf 2 of the Purdy plots and was attributed to the fungicide + growth regulator treatment that had been applied on 10 May. However the flag leaf emerged normally and no significant depression of growth was apparent.

Yield and quality

The trial was harvested on 21 August with no lodging. Yield and grain quality are shown in Table 3.

Table 3. *Yield and grain quality (at 85% dm)*

Variety	Grain yield (t/ha)	1000 grain weight (g)	Specific weight (kg/hl)
Marder (rye)	9.39	41.4	76.3
Alamo (triticale)	9.32	49.7	75.7
Halo (rye)	9.06	43.9	77.1
Cumulus (triticale)	8.52	52.8	74.3
Amando (rye)	8.31	39.4	75.8
Trick (triticale)	8.14	54.7	75.4
Lasko (triticale)	7.75	47.5	75.5
Purdy (triticale)	7.27	62.4	73.7
LSD	0.44	2.89	0.69
SE per plot (21 df)	±0.30	±1.96	±0.47
or as % GM	3.5%	4.0%	0.6%

As in 1992, Marder (rye) gave the highest yield with Alamo being the highest yielding triticale. The rye produced the smaller grains but generally the higher specific weight values.

Conclusions

Both rye and triticale produced good yields which were similar to the adjoining wheat crop. However, the wheat did not suffer significantly from take-all. It is apparent that a very intensive fungicide programme is required in order to control brown rust in the current varieties of rye and although four fungicide sprays were applied to the crop an earlier start date may have been advantageous.

The following information is presented as an appendix which is available on request.

1. Field details
2. Method
3. Experiment diary

Field details

Site	Morley Research Centre				
Field reference	13 M, Skippers				
Crop	Winter wheat, surrounding rye/triticale trial				
Previous crop	1992 Winter wheat 1991 Sugar beet 1990 Winter barley 1989 Winter barley				
Soil type and series	Sandy loam over chalky boulder clay (Ashley series)				
Soil analysis 19 September 1990	pH 8.0	P 3.0	K 1.0	Mg 2.0	
Seed	C1 direct from agents except Amando which was from Morley bulk supply			**Seedrate**	400 seeds/m²
Date sown	6 October 1992				

Nutrients applied			Rate (kg/ha)
8 March 1993		N	41
20 April		N	100
10 May		N	80
	Total	N	221

Cultivations	9 September 1992, ploughed and pressed 6 October, power harrowed and drilled

Applications to crop

	GS	Item	Rate/ha
6 November 1992	10	Ambush C (cypermethrin, 100 g)	250 ml
		Flexidor (isoxaben, 500 g)	150 ml
		Stomp (pendimethalin, 400 g)	2.5 l
16 February 1993	21	Avadex BW granules (tri-allate, 10% w/w)	22 kg
8 March	23-24	Urea (46% N)	90kg
15 April	30	New 5C Cycocel (chlormequat, 645 g + choline chloride, 32 g)	1.8 l
20 April	30-31	Urea (46% N)	218 kg
23 April	30-31	Ally (metsulfuron-methyl, 20% w/w)	30 g
		Duplosan (mecoprop-P, 600 g)	1.0 l
24 April	30-31	New 5C Cycocel	0.8 l
5 May	32	Impact Excel (chlorothalonil, 300 g + flutriafol, 47 g)	1.25 l
10 May	33	Urea (46% N)	174 kg
		Terpal (mepiquat chloride, 305 g + 2-chloroethylphosphonic acid, 155 g)	1.0 l
		+ citowett	80 ml
		Folicur (tebuconazole, 250 g)	0.5 l
18 May	37	Terpal	0.75 l
		Citowett	80 ml
24 May	39	Folicur	0.6 l
		Bravo (chlorothalonil, 500 g)	1.0 l
15 June	59	Folicur	0.5 l
		Aphox (pirimicarb, 50% w/w)	280 g

Method

Plot layout

Plots were sown at 400 seeds/m^2 with an Oyjord drill. The drilled plots were 12 m long and 1.66 m wide from outside row to outside row (14 rows at 12.8 cm spacing). Plots were drilled 46 cm apart giving an effective plot width of 2.12 m which was used for harvest yield calculations.

Agronomic factors

Straw length was determined by measuring the average height to the base of the ear of a group of plants at 10 sites per plot.

Plants numbers were determined by counting the number of plants within a 30 cm square quadrat when thrown at random six times in each plot.

Foliar disease

Foliar disease was assessed using the whole plot method, where the top four leaves were examined. Disease levels were determined by walking along the gap between plots and examining the plot from both sides. The leaf canopy was compared with standard NIAB assessment keys for the relevant disease.

Harvest details

Plots were harvested using a Claas Compact combine which was modified for plot work and used electronic weighing (Novatech M864 Loadmeter). Trials were harvested by replicate.

Post harvest determinations

Moisture content was determined using a Burrows digital moisture computer. A minimum of two samples were tested from each plot, with a tolerance of 0.2% required between samples.

The grain samples were pre cleaned using a Rational sample cleaner to remove any chaff or straw before further assessments (specific weight or 1000 grain weight) were carried out.

Specific weight was determined using a Farm-Tec Easi-Lab chondrometer and electronic balance. A minimum of two samples were tested from each plot, with a tolerance of 2.0 g required between samples.

1000 grain weight was determined by counting 200 grains from a well mixed sample and weighing on an electronic balance. A minimum of two samples were counted from each plot with a tolerance of 0.2 g required between samples.

Experiment diary

Date	Treatment applied
6 October 1992	Plots drilled into ploughed and pressed land after one pass with a power harrow. Seedrate 400 seeds/m^2.
25 November	Plant counts.
16-30 May 1993	Ear emergence recorded.
19 July	Brown rust scored. Straw height recorded.
21 August	Crop harvested with no lodging present.

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