

MORLEY RESEARCH CENTRE**Rye varieties, 1995***D H B Dring and D B Stevens***Summary**

Eight varieties of rye were grown on a light land site. Differences in grain yield between varieties were found to be significant, Marlo was highest at 6.21 t/ha and Halo lowest at 5.53 t/ha. Grain was generally small although grain fill was good. Luchs and Marder had relatively low thousand grain weights; all varieties had reasonable specific weights.

Object

To evaluate the relative performance rye varieties grown under "best local practice" on a light soil.

Method

Four replicates of the eight varieties, were sown on 13 October 1994 at a rate of 350 seeds per m², on a loamy sand site at New Found Farm, Colney. The trial received normal farm inputs and was harvested on 8 August 1995. No lodging was recorded.

Brown rust (*Puccinia recondita*) levels were monitored and assessed as necessary throughout the growing season, and assessments of plant establishment, straw height, yield, grain size and specific weight were made, according to Morley standard procedures.

*Not for publication without the Director's consent.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

Rye Varieties

Hybrid	Conventional
Marder	Halo
Luchs	Merkator
Amando	Motto
Marlo	
Gambit	

All seed was supplied treated with Panoctine and New Kotol, with the exception of Luchs, which was provided with a Sibutol treatment.

Results**Establishment**

Emergence was observed to be even, and an overall count performed on 9 November 1994 revealed a population of 221 plants per m².

Grain yield and qualityTable 1. *Grain yield and quality*

Variety	Grain yield (t/ha at 85% dm)	Specific weight (kg/hl)	Thousand grain weight (g)
Marlo	6.21	76.1	34.5
Luchs	6.19	76.0	26.4
Gambit	6.02	74.7	32.6
Merkator	6.02	76.4	29.5
Amando	5.98	75.2	27.4
Motto	5.92	74.8	31.7
Marder	5.82	74.0	25.4
Halo	5.53	75.9	30.2
LSD	0.354	0.84	1.48
SE per plot (df)	0.237 (16)	0.56 (15)	0.98 (14)
CV (%)	4.0	0.7	3.3

Grain yield ranged from 5.53 t/ha to 6.21 t/ha. Marlo and Luchs achieved similar high yields, however Gambit, Merkator, Amando and Motto although lower in yield were not significantly below them. Marder and Halo yielded significantly below Marlo and Luchs.

Specific weights were generally high, although thousand grain weights were relatively low; this being consistent with the observation that the samples were made up of small but well filled grains.

Disease

Table 2. *Brown rust observed on 15 June 1995*

Variety	Leaf 1 (%)	Leaf 2 (%)	Leaf 3 (%)
Marlo	8.8	19.0	49.7
Luchs	16.8	32.0	63.2
Gambit	5.3	14.3	38.7
Merkator	5.4	18.3	39.5
Amando	4.4	12.0	32.0
Motto	0.9	5.0	13.3
Marder	11.5	27.3	53.2
Halo	3.3	10.8	30.0
LSD	3.17	8.21	11.21
SE per plot (21 df)	2.15	5.58	7.63
CV (%)	30.7	32.2	19.1

Active brown rust was observed on all varieties on 2 December 1994, however by 6 March 1995 the rust infected leaves were mostly dead and that remaining appeared inactive. The crop grew away from the disease in the spring and fungicide treatments held it in check until June, although significant differences between varieties were observed, albeit at very low levels, on 24 May. By June 16 the crop was showing clear varietal differences to brown rust infection; these were recorded prior to fungicide application and are presented in Table 2. Motto showed greatest resistance to the disease at this time, Marder and Luchs were more susceptible. Grain yield did not appear to be directly affected by disease occurring at this stage.

Straw height and brackling

Amando had the shortest straw at 87.3 cm and Motto the tallest at 108.5 cm. Straw was relatively short, owing to growth regulator treatment and season, varieties conforming to expectation relative to one another. There was no lodging at harvest, and all varieties were observed to have brackled to a similar level of 30%, allowing plots to be harvested without ear loss.

Discussion

The varietal differences in yield and grain quality were broadly in line with the NIAB's results for rye varieties. The higher yielding varieties Marlo and Luchs are both hybrid ryes. Site variation, always a problem on very light soils, did not seriously influence the results in spite of the period of drought from grain filling through to harvest. Although Luchs had a different seed treatment, all varieties established well and the treatment difference was deemed unlikely to have affected yield.

Appendix

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

Diary

Seed treatments

Field details

Method

Table A1 Brown rust on 24 May, leaves 2 and 3 and straw height

Experiment diary

- 13 October 1994 Trial drilled to plan, drilling depth 50mm in a ploughed and pressed seedbed which was very soft, with a very fine tilth.
- 9 November Population counts GS 12/13
- 2 December Trial inspected for brown rust infection, low levels present on all plots, assessment not considered necessary, appeared active. GS 21/22
- 6 March 1995 Trial inspected for brown rust development, infected leaves were mostly dead and the disease appeared dormant. All varieties remained prostrate with some signs of growth on odd plants. GS 24/6
- 25 April Crop growing away from disease (treated on 5 April) GS 32
- 24 May Trial inspected, brown rust still appeared to be sporulating 2 weeks after treatment although only occasional leaves were affected. Leaves 2 and 3 were assessed and overall levels were low. GS 59
- 16 June Trial inspected, varietal differences in brown rust obvious, all plots assessed on leaves 1-3 before fungicide application. GS 69
- 8 August Trial harvested.

Seed treatments

- Luchs Sibutol (bitertanol + fuberidazole)
- All other varieties Panoctine (guazatine) + New Kotol (gamma-HCH)

Field details

Trial	NAS 477, Rye varieties		
Site	Newfound Farm, Colney		
Field reference	Block 4 J		
Crop	Winter rye		
Treatments	8 (listed in Table 1 of trial report)		
Previous crop	1994	Spring barley	
	1993	Sugar beet	
	1992	Rye	
	1991	Spring barley	
Soil type (series)	Loamy sand (Burlingham series)		
Drilling date	13 Oct 1994		
Seedrate	350 seeds/m ²		
	Date	Rate/ha	Product
Herbicide	6 Apr	30 g 1.5 l	Ally (metsulfuron-methyl 20% w/w) Duplosan (mecaprop-p 600 g/l)
Fungicide	6 Apr	0.7 l	Alto 100 SL (cyproconazole 100 g/l)
	10 May	1.0 l	Folicur (tebuconazole 250g/l) 26 May
	16 Jun	0.5 l 1.0 l	Corbel (fenpropimorph 750g/l) Folicur
Growth reg.	6 Apr	2.0 l	MSS Chlormequat 70 (chlormequat 700g/l)
	1 May	1.25 l	Terpal (2-chloroethylphosphonic acid + mepiquat chloride 155:305 g/l) + non ionic wetter
Nutrients applied	15 Mar	40 kg 18 kg	Nitrogen as ammonium nitrate/sulphate Sulphur as ammonium sulphate
	11 Apr	95 kg	Nitrogen as ammonium nitrate
	2 May	31 kg	Nitrogen as ammonium nitrate
Total N applied		166 kg	
Harvest date	8 Aug		

Method

These are an abbreviated version of the Standard Operating Procedures used at Morley Research Centre.

Plot layout

Plots were sown at 350 seeds/m² with an Oyjord drill. The drilled plots were 12 m long and 1.56 m wide from outside row to outside row (14 rows at 12.0 cm spacing).

Common treatments such as fertiliser, insecticides, herbicides, fungicides or growth regulators were applied across all plots with farm machinery using wheelings, 12 m apart. For harvest purposes, plot length was reduced to 9.0 or 9.5 m depending on track and tyre size.

Agronomic factors

Plant population was determined by making fifty counts of a 30.5 cm x 30.5 cm square quadrat over the trial area.

Foliar disease, green leaf and ear colour

Foliar disease of a particular leaf or leaf layer was determined by the following method. A standard (based on the appropriate key from the ADAS manual of disease assessment keys, 1976) was agreed between two experienced assessors and plots were assessed by walking along the gap between the harvest area and the buffer, examining the plot from both sides. The crop was examined at intervals and an appropriate disease level was agreed at the end of each plot.

Harvest details

Plots were harvested using a Sampo Rosenlew 2010 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. The fractions of grain that passed over and through a 2mm sieve were separately weighed.

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.

Table A1. *Brown rust 24 May 1995 and straw height*

Variety	Leaf 2 (%) *	Leaf 3 (%)	Straw Height (cm)
Marlo	tr	0.3	94.6
Luchs	tr	0.3	88.1
Gambit	tr	0.1	95.3
Merkator	0.0	0.1	97.0
Amando	tr	0.2	87.3
Motto	tr	0.1	108.5
Marder	0.1	0.2	91.0
Halo	tr	0.1	101.4
LSD	NS	0.10	7.39
SE per plot (21 df)	0.03	0.07	5.03
CV (%)	129.1	39.3	5.3

* tr. indicates trace, disease recorded at less than 0.05% level.