MORLEY RESEARCH CENTRE

Comparison of rye varieties on light land, 1997

D H B Dring and D B Stevens

Summary

Seven varieties of rye were grown on a light land site. Yields ranged from 4.94 t/ha (Amando) to 6.56 t/ha (Motto) and differences were statistically significant. Grain size was generally small although grain fill was good. Amando had the lowest thousand grain weight; 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 seven varieties, were sown on 10 October 1996 at a rate of 350 seeds/ m^2, on a loamy sand site at New Found Farm, Colney. The trial received normal farm inputs and was harvested on 6 August 1997. Lodging and brackling were recorded.

Disease levels were observed throughout the growing season, and assessments of plant establishment, 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*Not for publication without the Director's consent.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
Esperit	Motto
Amando	
Marlo	
Rapid	

All seed was supplied treated with Panoctine and New Kotol seed dressing.

Results

The trial received an intensive programme of fungicides as used on the adjoining commercial crop but all varieties suffered from infection of brown rust (*Puccinia recondita*) towards the end of the season.

Establishment and crop development

Emergence was observed to be even, however plant population counts performed on 5 November 1996 revealed variation between varieties (Table. 1), from 201 to 341 plants/m^2 for Amando and Halo respectively.

Crop colour and vigour were scored on 3 February 1997 (Table.1), Amando was significantly less green than the other varieties. Amando and Marder were significantly less vigorous than the others.

Table 1. *Plant population, colour and vigour scores, and brackling at harvest*

Variety	Plant population counts, 5 Nov 96 (plants /m^2)	Colour score, 3 Feb 1997 (0 = yellow or dead, 10 = verdant)	Vigour score, 3 Feb 1997 (0 = dead, 10 = very vigorous)	Brackling at harvest (%)
Motto	306	7.5	7.3	3
Espirit	255	6.8	7.3	41
Halo	341	7.8	7.8	20
Rapid	230	6.5	6.5	51
Marder	244	5.8	4.8	68
Marlo	231	6.3	6.5	30
Amando	201	4.0	5.0	48
LSD	36.0	0.56	0.96	24.2
SE per plot (18 df)	24.2	0.38	0.65	16.3
CV (%)	9.4	5.9	10.1	43.8

LSD = least significant difference at 95% probability level

Brown rust was active on all varieties when the crop was inspected on 3 February although Motto appeared to have considerably less infection than other varieties. A further inspection on 18 March showed the crop growing away from infection, brown rust being confined to the lowest leaves. Fungicide treatments held diseases in check through the growing season although brown rust developed on all varieties and was present on the flag leaf by 17 June.

All varieties exhibited some brackling at harvest (Table 1.), although Motto had significantly less than most of the others. Lodging occurred in Amando (40%) and Marder (5%)

Grain yield and quality

Table 2. *Grain yield and quality*

Variety	Grain yield (t/ha at 85% dm)	Specific weight (kg/hl)	1000 grain weight (g)
Motto	6.56	72.8	35.1
Espirit	6.25	73.2	31.1
Halo	5.82	74.4	33.3
Rapid	5.61	72.8	28.8
Marder	5.51	72.1	26.2
Marlo	5.32	70.3	30.5
Amando	4.94	72.7	24.3
LSD	0.506	0.95	1.81
SE per plot (18 df)	0.340	0.64	1.22
CV (%)	6.0	0.9	4.1

Grain yield ranged from 4.94 t/ha to 6.56 t/ha (Table 2), with significant differences between varieties. Motto had the highest yield with Espirit not significantly lower. Amando, the only variety with significant lodging, had the lowest yield.

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 typically small but well filled grains. Amando had a significantly lower thousand grain weight than the rest.

Discussion

Crop establishment was generally acceptable and early season disease control was good. Disease control later in the season was adequate although adjacent plots of Amando treated with Amistar showed better disease control and green leaf retention when observed on 17 June. The best yield of 6.56 t/ha given by Motto is good for this site. Espirit, with a yield not significantly different from that of Motto, has been consistently high yielding in the last two very different seasons.

While Amando established fewer plants than the other varieties, 201 plants/m^2 is considered to be adequate for hybrid rye and low population is not thought to be responsible for its low yield. The late surge of brown rust may have affected this variety which is particularly susceptible and lodging was also a contributing factor.

Acknowledgments

The experiment was funded by Morley Research Centre. Appreciation is expressed for the contribution of Morley staff to the field work and grain analysis.

Appendix

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

Diary
Field details
Method
Table A1. (lodging at harvest)

Experiment diary

10 October 1996	Trial drilled to plan, drilling depth 50 mm in a ploughed and pressed seedbed with a very fine tilth.
5 November	Population counts GS 12
3 February 1997	Trial inspected for brown rust infection, low levels present on all plots, assessment not considered necessary. GS 23-25
14 March	Trial inspected for brown rust development, varieties are starting to grow away from infection. GS 23-27
3 May	Crop growing well; brown rust detectable at low levels on lowest leaves of all varieties in trial. GS 45-49
25 May	Crop growing well and generally disease free. GS 59
17 June	Trial inspected, brown rust developing. GS 69-71
6 August	Trial harvested, lodging and brackling recorded.

Field details

Site	New Found Farm, Colney
Field reference	Block III
Crop	Rye
Varieties	7 (See variety list in main trial report)
Previous crop	1996 linseed 1995 sugar beet 1994 rye 1993 spring barley 1992 rye
Soil type	Loamy sand (Burlingham series)

Soil analysis	pH	P	K	Mg
26 January 1994	8.4	2.0	0.0	0.0

Drilling date	10 October 1996
Seed treatment	Panoctine (guazatine) + New Kotol (gamma-HCH)
Seedrate	350 seeds/m^2

Nutrients applied (kg/ha)	**N**	**P**	**K**
27 February		60	60
2 March	40		
17 April	112		
Total N	152		

Applications to crop

Date	GS	Item (g ai/l)	Dose/ha
10 March 1996	25	Stefes CCC 720 (chlormequat, 720)	2.0 l
		+ Ally (metsulfuron-methyl, 20%)	20 g
		+ Duplosan (mecaprop-p, 600)	2.0 l
31 Mar	31	Alto 100 SL (cyproconazole 100)	0.8 l
1 May	45	Terpal (2-chloroethylphosphosphonic acid, 155	
		+ mepiquat chloride, 305)	0.5 l
		+ non ionic wetter	40 ml
15 May	59	Folicur (tebuconazole 250)	1.0 l
6 June	69	Folicur (tebuconazole 250)	0.5 l
		+ Aura (fenpropimorph 750)	0.3 l

Method

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

Plot layout

Plots were sown at 350 seeds/m^2 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, 24 m apart. For harvest purposes, plot length was reduced to 9.0 m.

Agronomic factors

Plant population was determined by making 6 counts of a 30.5 cm x 30.5 cm square quadrat per plot.

Foliar disease, green leaf and ear colour

Foliar disease of a particular leaf or leaf layer(s) 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 2010 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.

Results

Table A1. *Lodging at Harvest*

Variety	Lodging at harvest (%)
Motto	0
Espirit	0
Halo	0
Rapid	0
Marder	5
Marlo	0
Amando	40
LSD	22.0
SE per plot (18 df)	14.8
CV (%)	232.5