*CONFIDENTIAL NAS 930 (1st year)

WINTER OILSEED RAPE

MANAGEMENT OF DOUBLE LOW VARIETIES, 1991

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Summary

In a season which produced relatively low levels of foliar and pod diseases but high levels of stem canker and sclerotinia across all varieties tested, there was a significant yield benefit from the use of an intensive routine fungicide spray programme compared with a low input programme. However, costed at an expected world price of £130/t this yield benefit would not have been worthwhile. Seedrate was not generally important where all varieties produced plant populations above 50/m^2 at the lowest seedrate tested. An experimental plant growth regulator produced a shorter, stiffer crop but adversely affected yields of some varieties, particularly at the lowest seedrate.

Keywords: Oilseed rape varieties, management, agronomy, seedrate, fungicides, growth regulator.

Object

To investigate the responses to fungicide, seedrate and growth regulator of a range of new winter oilseed rape varieties bred to produce seed with a low glucosinolate content.

Introduction

The rapid adoption of new winter oilseed rape varieties conforming to new requirements for low glucosinolate content in seed meal has introduced relatively untried varieties. These show contrasting growth patterns and disease susceptibilities. This trial attempts to quantify some of the differences in order to make useful recommendations concerning the management of the potentially most useful varieties.

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Materials and method

This experiment, sited on a heavy clay loam soil (Ragdale series) at Debenham, Suffolk, was established in the autumn of 1990 on 26 September using an Oyjard plot drill with Suffolk coulters in a seedbed prepared by discing and powerharrow. The treatments comprised all combinations of the following:

Variety

1. Capricorn
2. Falcon
3. Samourai
4. Envol

Seedrate (seeds/m^2)

1. 60
2. 100
3. 140

Details of equivalent weights of seed/ha for each variety appear in Table 1.

Fungicide programme

Two extreme programmes were compared:

1. Managed - treatment in response to disease risk.
2. Intensive - programme of routine sprays.

Details are given in Tables 2 and 3.

In addition, extra plots of each variety were sown at 60 and 140 seeds/m^2 and received the intensive fungicide programme. These plots were treated with an experimental growth regulator, UK 244, applied as a split dose in the spring.

Table 1. Seedrates by variety (kg/ha)

	Seeds/m^2		
Variety	60	100	140
Capricorn	3.5	5.9	8.2
Falcon	3.3	5.5	7.8
Samourai	3.0	5.0	7.0
Envol	2.8	4.6	6.4

Table 2. Fungicide programmes, 1990/91

	Managed	Intensive
30 November (GS 1,4)	-	Sportak Alpha (0.75 l/ha)
13 March (GS 2,0)	Sportak (1.25 l/ha)	Sportak Alpha (1.1 l/ha) + Manzate FL (1.4 l/ha)
9 May (GS 4,3)	-	Compass (3.0 l/ha)
12 June (GS 5,7)	-	Rovral (2.0 l/ha)

Growth stages (Sylvester-Bradley, R., Aspects of Applied Biology, 10, 1985)

1,4 4 true leaves
2,0 Beginning of stem extension
4,3 30 % flowers open
5,7 70% of potential pods set

Table 3. Products used and active ingredients

Product	Active ingredient (g ai/)
Sportak Alpha	prochloraz (266) + carbendazim (100)
Sportak	prochloraz (400)
Manzate FL	maneb (480)
Compass	iprodione (167) + thiophanate-methyl (167)
Rovral	iprodione (250)

Fungicide treatments were applied by hand using a CO_2 powered knapsack sprayer and fan jets with 11003 nozzles for autumn and spring treatments and 8003 nozzles for later sprays. The treatments were laid out in randomised blocks with 3 replicates. The treated plot area was 48.0 m^2 and the area harvested was 20.4 m^2.

Apart from fungicide and growth regulator treatments, all other aspects of management were as normal farm practice. The plots received a total of 85 kg/ha nitrogen in the autumn followed by a further 183 kg/ha in the spring. The whole trial was desiccated with Reglone (3.0 l/ha) on 31 July. The plots were combine harvested direct on 10 August.

Results and discussion

Establishment

Plant counts made on 11 November are summarised in Table 4.

Table 4. Plant populations (plant numbers/m^2)

Variety	Seed/m^2 60	100	140
Capricorn	53	82	113
Falcon	59	73	110
Samourai	53	84	108
Envol	58	87	105

Crop growth

The dry autumn and relatively late drilling resulted in slow autumn growth and a small plant size from all varieties through the winter period. Spring growth was also slower than normal but growth subsequent to the start of stem extension appeared to be normal on all varieties with no unexpected differences. Samourai was the earliest variety to start flowering and Capricorn appeared to be the latest.

The growth regulator treatment was effective in restricting the extension of the lower internodes on all varieties. This resulted in reductions in final crop height averaging approximately 50 cm. There was no severe lodging but Envol was leaning more than the other varieties at crop maturity. All plots treated with growth regulator were stiff and upright.

Disease

Overall assessments at the times of application of the 'intensive' fungicide sprays indicated low levels of foliar disease on all varieties throughout the season. Phoma leaf spot was present and affecting 25% of plants in early winter, but spread to affect more than 50% of plants in the early spring.

Botrytis and sclerotinia became evident after prolonged wet weather in June affecting the 'managed' disease control plots more severely than the 'intensive' fungicide treated plots. These was no evidence of variety differences. No alternaria was seen.

Yields

Full yield data are shown in Table 5. Yields for the additional treatments are shown in Table 6.

Table 5. Seed yields (t/ha at 91% dm)

Variety and seed rate (seeds/m^2)		Fungicide programmes Managed	Intensive	Means
Capricorn	60	4.32	4.61	4.46
	100	4.38	4.70	4.54
	140	4.36	4.76	4.56
Means		4.35	4.69	4.52
Falcon	60	4.43	4.87	4.65
	100	4.28	4.91	4.60
	140	4.45	4.76	4.61
Means		4.39	4.84	4.62
Samourai	60	4.53	4.95	4.74
	100	4.69	5.09	4.89
	140	4.62	5.01	4.81
Means		4.61	5.02	4.81
Envol	60	4.63	4.89	4.76
	100	4.57	4.81	4.69
	140	4.56	5.01	4.79
Means		4.59	4.91	4.76
Fungicide means		4.49	4.86	
Seedrate means				
	60			4.65
	100			4.68
	140			4.68

LSD between variety means = 0.111
LSD between fungicide means = 0.078
Differences between seedrate means and interactions were not significant

SE per plot (46 df) = ±0.165 or 3.5% of GM

There was no yield effect resulting from varying seedrates from approximately 3 kg/ha (60 seeds/m^2) to 8 kg/ha (140 seeds/m^2). These seedrates resulted in plant populations ranging from 50 to 100/m^2.

Samourai and Envol were significantly higher yielding than Capricorn and Falcon in this trial. All varieties reacted to the better disease control afforded by the intensive fungicide programme by giving improved yields in a season which saw above average levels of both stem canker and sclerotinia.

At current list prices the intensive fungicide programme cost £98.9/ha compared with the managed programme which cost £25.4/ha. Under the new payments for oilseed rape which forecast a price of £130/t, the intensive fungicide programme used in this experiment would not have been profitable.

Table 6. Seed yields - additional treatments (t/ha at 91%)

Variety and seed rate (seeds/m^2)		Growth regulator -	+	Means
Capricorn	60	4.61	4.67	4.64
	140	4.76	4.52	4.64
Means		4.68	4.60	4.64
Falcon	60	4.87	4.67	4.77
	140	4.76	4.93	4.85
Means		4.81	4.80	4.81
Samourai	60	4.95	4.61	4.78
	140	5.01	4.64	4.82
Means		4.98	4.62	4.80
Envol	60	4.89	4.56	4.73
	140	5.01	5.14	5.08
Means		4.95	4.85	4.90
Growth reg means		4.86	4.76	
Seedrate means				
	60	4.83	4.63	4.73
	140	4.88	4.81	4.85

LSD between variety means = 0.119
LSD between growth regulator means = 0.084
LSD between seedrate means = 0.084
LSD for variety x seedrate x growth regulator interactions = 0.237

SE per plot (30 df) = $\pm$0.143 or 3.0% of GM

When the yields from the additional growth regulator plots are compared with similar untreated plots there are significant differences affecting Samourai, Falcon and Envol. Samourai gave poorer yields at both seedrates where the growth regulator was used, while Falcon and Envol only showed this effect at the lower seedrate.

Diary details are set out in an Appendix which is available on request.

Acknowledgements

The authors are grateful to Messrs Knowland for providing the site and crop management.

APPENDIX - NAS 930 MA 91

WINTER OILSEED RAPE - MANAGEMENT OF DOUBLE LOW VARIETIES

Site details

Site:	Crows Hall Farm, Debenham, Suffolk
Soil type:	Clay loam over chalky boulder clay (Ragdale series)
Previous crop:	Winter wheat (previous oilseed rape crop 1984)

Diary

26 September 1990	Trial drill using Oyjard plot drill.
15 October	Farm applied 22 kg/ha nitrogen overall
16 October	Farm spray tank mix overall containing: 0.75 l/ha Fusilade (fluazifop-P-butyl, 125 g ai/l) 1.5 l/ha Butisan S (metazachlor, 500 g ai/l) for weed control and 0.2 l/ha Cyper (cypermethrin, 100 g ai/l) for control of cabbage stem flea beetle.
27 October	Farm applied 63 kg/ha nitrogen overall.
30 November	Applied autumn fungicide sprays.
30 November	Plant counts.
25 February 1991	Farm applied 64 kg/ha nitrogen overall.
13 March	Applied early spring fungicide sprays, GS 1,10/2,0
14 March	First growth regulator spray applied, GS 2,0
25 March	Farm applied 119 kg/ha nitrogen overall.
11 April	Second growth regulator spray applied, GS 2,2
9 May	Applied early flowering fungicide sprays, GS 4,3
22 May	Farm sprayed 0.15 l/ha Fastac (alphacypermethrin, 100 g ai/l) overall for control of pollen beetle/seed weevil.
12 June	Applied late flowering fungicide sprays GS 5,8
18 June	Farm sprayed 0.15 l/ha Fastac overall for control of seed weevil.
31 July	Farm sprayed 3 l/ha Reglone (diquat, 200 g ai/l) overall for crop desiccation.
9 August	Trial direct combined.