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Winter Oilseed Rape

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90/R/RA/1

WINTER OILSEED RAPE

VARIETIES, SEED RATES, FUNGICIDES AND GROWTH REGULATOR

Object: To study the separate and combined effects of seed rates, fungicides and a growth regulator on the yield of four low-glucosinolate varieties - Bylands/Black Horse I.

Sponsors: C.J. Rawlinson, V.J. Church, D.P. Yeoman.

Design: 2 replicates of 4 x 2 x 2 x 2 arranged in 4 blocks of 16 plots.

Whole plot dimensions: 3.0 x 21.0.

Treatments: All combinations of:-

1. **VARIETY** Varieties:
CAPRCORN Capricorn
COBRA Cobra
LIBRAVO Libravo
TAPIDOR Tapidor
2. **SEEDRATE** Seed rates:
4 KG
8 KG
3. **FUNGICIDE** Fungicides:
NONE None
PRO+IPRO Prochloraz at 0.50 kg in 200 l on 7 Dec, 1989 and
28 Mar, 1990 + iprodione at 0.50 kg in 260 l on
23 May
4. **GROWREG** Growth regulator:
NONE None
TRIAPEN Triapenthanol at 0.70 kg in 300 l on 28 Mar, 1990

Basal applications: Manures: (0:17:34) at 980 kg. 'Nitram' at 140 kg, later at 290 kg and a third time at 290 kg. Weedkillers: Diquat at 0.24 kg ion and paraquat at 0.36 kg ion in 180 l. Metazachlor at 0.75 kg in 200 l. Fluazifop-P-butyl at 0.19 kg with a wetting agent, 'Enhance' at 0.20 l, in 200 l. Benazolin at 0.30 kg and clopyralid at 0.05 kg in 200 l. Insecticides: Deltamethrin at 6.2 g in 200 l on two occasions. Triazophos at 0.42 kg in 260 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent, 'Enhance' at 0.52 l, in 520 l (to two blocks only).

Cultivations, etc.:- PK applied: 18 July, 1989. Rotary cultivated: 19 July. Cultivated by rotary grubber: 2 Aug. Diquat and paraquat applied: 21 Aug. First N applied, rotary harrowed: 30 Aug. Seed sown: 31 Aug. Metazachlor applied: 4 Sept. Fluazifop-P-butyl with wetting agent applied: 17 Oct. First deltamethrin applied: 7 Nov. Second deltamethrin applied: 9 Nov. Second N applied: 16 Feb, 1990. Benazolin and clopyralid applied: 22 Feb. Third N applied: 14 Mar.

90/R/RA/1

Cultivations, etc.:-

Triazophos applied: 23 May. Desiccant with wetting agent applied (FUNGICIDE NONE and GROWREG NONE plots of two blocks only): 12 July, and the remaining plots of these blocks: 17 July. Combine harvested (FUNGICIDE NONE and GROWREG NONE plots in the two blocks given desiccant and wetting agent): 19 July, remaining plots in these blocks: 23 July. Other two blocks (except for VARIETY TAPIDOR) combine harvested: 2 Aug. VARIETY TAPIDOR, on these blocks, combine harvested: 11 Aug. Previous crops: W. wheat 1988, w. barley 1989.

NOTE: Disease assessments were made on seven occasions from November - July. Adult cabbage stem flea beetle damage was assessed in October and April. Establishment counts were made in October and plant populations noted prior to harvest. Crop heights, pollen beetle and frost damage were assessed in May and plant vigour in March and June. Components of yield were measured in June. Glucosinolate and oil content of the seed were measured after harvest.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

SEEDRATE	4 KG	8 KG	Mean
VARIETY			
CAPRCORN	2.50	2.69	2.59
COBRA	2.62	2.31	2.46
LIBRAVO	2.29	2.22	2.25
TAPIDOR	2.14	2.31	2.23
Mean	2.39	2.38	2.38

FUNGICIDE	NONE	PRO+IPRO	Mean
VARIETY			
CAPRCORN	2.52	2.66	2.59
COBRA	2.41	2.52	2.46
LIBRAVO	2.11	2.39	2.25
TAPIDOR	2.30	2.16	2.23
Mean	2.34	2.43	2.38

FUNGICIDE	NONE	PRO+IPRO	Mean
SEEDRATE			
4 KG	2.37	2.41	2.39
8 KG	2.31	2.46	2.38
Mean	2.34	2.43	2.38

GROWREG	NONE	TRIAPEN	Mean
VARIETY			
CAPRCORN	2.70	2.49	2.59
COBRA	2.38	2.55	2.46
LIBRAVO	2.15	2.36	2.25
TAPIDOR	2.15	2.31	2.23
Mean	2.34	2.43	2.38

90/R/RA/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

GROWREG	NONE	TRIAPEN	Mean
SEEDRATE			
4 KG	2.32	2.46	2.39
8 KG	2.37	2.40	2.38
Mean	2.34	2.43	2.38

GROWREG	NONE	TRIAPEN	Mean
FUNGICIDE			
NONE	2.34	2.33	2.34
PRO+IPRO	2.34	2.53	2.43
Mean	2.34	2.43	2.38

VARIETY	SEEDRATE		SEEDRATE	
	4 KG	8 KG	4 KG	8 KG
	FUNGICIDE		FUNGICIDE	
	NONE	PRO+IPRO	NONE	PRO+IPRO
CAPRCORN	2.40	2.59	2.64	2.73
COBRA	2.71	2.53	2.11	2.51
LIBRAVO	2.07	2.50	2.15	2.29
TAPIDOR	2.27	2.01	2.32	2.30

VARIETY	SEEDRATE		SEEDRATE	
	4 KG	8 KG	4 KG	8 KG
	GROWREG		GROWREG	
	NONE	TRIAPEN	NONE	TRIAPEN
CAPRCORN	2.64	2.36	2.75	2.62
COBRA	2.47	2.77	2.29	2.32
LIBRAVO	2.13	2.45	2.17	2.28
TAPIDOR	2.04	2.25	2.26	2.37

VARIETY	FUNGICIDE		FUNGICIDE	
	NONE	PRO+IPRO	NONE	PRO+IPRO
	GROWREG		GROWREG	
	NONE	TRIAPEN	NONE	TRIAPEN
CAPRCORN	2.66	2.38	2.73	2.59
COBRA	2.21	2.61	2.55	2.48
LIBRAVO	2.06	2.16	2.23	2.56
TAPIDOR	2.44	2.15	1.85	2.47

SEEDRATE	FUNGICIDE		FUNGICIDE	
	NONE	PRO+IPRO	NONE	PRO+IPRO
	GROWREG		GROWREG	
	NONE	TRIAPEN	NONE	TRIAPEN
4 KG	2.15	2.58	2.48	2.33
8 KG	2.54	2.08	2.20	2.72

VARIETY	SEEDRATE	FUNGICIDE		FUNGICIDE	
		NONE	PRO+IPRO	NONE	PRO+IPRO
		GROWREG		GROWREG	
		NONE	TRIAPEN	NONE	TRIAPEN
CAPRCORN	4 KG	2.41	2.40	2.87	2.31
	8 KG	2.92	2.37	2.59	2.87
COBRA	4 KG	2.20	3.23	2.75	2.32
	8 KG	2.23	1.99	2.36	2.65
LIBRAVO	4 KG	1.83	2.31	2.42	2.58
	8 KG	2.29	2.01	2.04	2.54
TAPIDOR	4 KG	2.17	2.38	1.90	2.13
	8 KG	2.71	1.93	1.80	2.81

90/R/RA/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

*** Standard errors of differences of means ***

VARIETY	SEEDRATE	FUNGCIDE	GROWREG
0.158	0.112	0.112	0.112
VARIETY	VARIETY	SEEDRATE	VARIETY
SEEDRATE	FUNGCIDE	FUNGCIDE	GROWREG
0.223	0.223	0.158	0.223
SEEDRATE	FUNGCIDE	VARIETY	VARIETY
GROWREG	GROWREG	SEEDRATE	SEEDRATE
		FUNGCIDE	GROWREG
0.158	0.158	0.316	0.316
VARIETY	SEEDRATE	VARIETY	
FUNGCIDE	FUNGCIDE	SEEDRATE	
GROWREG	GROWREG	FUNGCIDE	
		GROWREG	
0.316	0.223	0.447	

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
REP.WP	31	0.447	18.7
GRAIN MEAN DM%	89.2		
PLOT AREA HARVESTED	0.00483		

90/R/RA/2

WINTER OILSEED RAPE

VARIETIES AND FUNGICIDES

Object: To investigate the effects of fungicides on a range of low glucosinolate varieties - Bylands/Black Horse I S.

Sponsors: C.J. Rawlinson, V.J. Church, C.H. Bock.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 3.0 x 21.0.

Treatments: All combinations of:-

1. **VARIETY** Varieties:

CAPRCORN	Capricorn
COBRA	Cobra
LIBRAVO	Libravo
LICTOR	Lictor
SCORE	Score
TAPIDOR	Tapidor

2. **FUNGICIDE** Fungicides:

NONE	None
PRO+IPRO	Prochloraz at 0.50 kg in 200 l on 7 Dec, 1989 and 28 Mar, 1990. Iprodione at 0.50 kg in 260 l on 23 May.

Basal applications: Manures: (0:17:34) at 980 kg. 'Nitram' at 140 kg, later at 290 kg and a third time at 290 kg. Weedkillers: Diquat at 0.24 kg ion and paraquat at 0.36 kg ion in 180 l. Metazachlor at 0.75 kg in 200 l. Fluazifop-P-butyl at 0.19 kg with a wetting agent, 'Enhance' at 0.20 l, in 200 l. Benazolin at 0.30 kg and clopyralid at 0.05 kg in 200 l. Insecticides: Deltamethrin at 6.2 g in 200 l on two occasions. Triazophos at 0.42 kg in 260 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent, 'Enhance' at 0.52 l, in 520 l (to two blocks only).

Seed: Varieties, sown at 8.0 kg.

90/R/RA/2

Cultivations, etc.:- PK applied: 18 July, 1989. Rotary cultivated: 19 July. Cultivated by rotary grubber: 2 Aug. Diquat and paraquat applied: 21 Aug. First N applied, rotary harrowed: 30 Aug. Seed sown: 31 Aug. Metazachlor applied: 4 Sept. Fluazifop-P-butyl with wetting agent applied: 17 Oct. First deltamethrin applied: 7 Nov. Second deltamethrin applied: 9 Nov. Second N applied: 16 Feb, 1990. Benazolin and clopyralid applied: 22 Feb. Third N applied: 14 Mar. Triazophos applied: 23 May. Desiccant with wetting agent applied (**FUNGCIDE NONE** plots of two blocks only): 12 July, and to **FUNGCIDE PRO+IPRO** plots of the same blocks: 17 July. Combine harvested (**FUNGCIDE NONE** plots in the two blocks given desiccant and wetting agent): 19 July, remaining plots in these blocks: 23 July. Other two blocks (except for **VARIETY TAPIDOR**) combine harvested: 2 Aug. **VARIETY TAPIDOR**, on these blocks, combine harvested: 11 Aug. Previous crops: W. wheat 1988, w. barley 1989.

NOTE: Disease assessments were made from November - July. Plant vigour and pollen beetle assessments were made in April and aborted pods were assessed in May. Glucosinolate and oil content of the seed were measured after harvest.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

FUNGCIDE VARIETY	NONE	PRO+IPRO	Mean
CAPRCORN	2.28	2.71	2.49
COBRA	1.88	2.32	2.10
LIBRAVO	1.53	2.14	1.84
LICTOR	1.83	1.86	1.84
SCORE	2.30	2.22	2.26
TAPIDOR	1.61	2.44	2.03
Mean	1.91	2.28	2.09

*** Standard errors of differences of means ***

VARIETY	FUNGCIDE	VARIETY FUNGCIDE
0.231	0.133	0.326

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	33	0.462	22.1

GRAIN MEAN DM% 87.3

PLOT AREA HARVESTED 0.00483

90/R/RA/3

WINTER OILSEED RAPE

EFFECTS OF ISOTHIOCYANATES

Object: To study the effects of two formulations of plant-derived isothiocyanates on insect pests, diseases and yield - Black Horse I S.

Sponsors: L.E. Smart, K. Doughty.

Design: A quasi-complete 5 x 5 Latin square.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

CHEMICAL	Chemicals:
NONE	None
BUTENYL	3,5-bis(3-butenyl)-1,3,5-thiadiazine-2-thione at 350 g a.i.
PHENYL	3,5-bis(2-phenylethyl)-1,3,5-thiadiazine-2-thione at 250 g a.i.
PHEN+ BUT	Phenylethyl + butenyl products as above at 125 g a.i. + 175 g a.i. respectively
STANDARD	Prochloraz at 0.50 kg in 400 l and gamma-HCH at 0.56 kg in 400 l on 6 Nov, 1989 Prochloraz at 0.50 kg in 400 l and gamma-HCH at 0.28 kg in 400 l on 4 Apr, 1990. Iprodione at 0.50 kg applied with triazophos at 0.42 kg in 270 l on 23 May

NOTES: (1) Chemical treatments, except for STANDARD, were applied in tetrahydrofurfuryl alcohol at 4.2 l using a hand-held electrostatic sprayer on 6 Nov, 1989 repeated on 4 Apr, 1990 and 23 May.

(2) STANDARD treatments were applied with a hydraulic sprayer.

Basal applications: Manures: (0:17:34) at 980 kg. 'Nitram' at 140 kg, later at 290 kg and a third time at 290 kg. Weedkillers: Diquat at 0.24 kg ion and paraquat at 0.36 kg ion in 180 l. Metazachlor at 0.75 kg in 200 l. Fluazifop-P-butyl at 0.19 kg with a wetting agent ('Enhance' at 0.20 l) in 200 l. Benazolin at 0.30 kg and clopyralid at 0.05 kg in 200 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent ('Enhance' at 0.52 l) in 520 l.

Seed: Cobra, dressed fenpropimorph, gamma-HCH and thiram, sown at 8.0 kg.

Cultivations, etc.:- PK applied: 18 July, 1989. Rotary cultivated: 19 July. Cultivated by rotary grubber: 2 Aug. Diquat and paraquat applied: 21 Aug. First N applied, rotary harrowed: 30 Aug. Seed sown: 1 Sept. Metazachlor applied: 4 Sept. Fluazifop-P-butyl with wetting agent applied: 17 Oct. Second N applied: 16 Feb, 1990. Benazolin and clopyralid applied: 22 Feb. Third N applied: 14 Feb. Desiccant with wetting agent applied: 17 July. Combine harvested: 23 July. Previous crops: W. wheat 1988, w. barley 1989.

90/R/RA/3

- NOTES: (1) Damage by cabbage stem flea beetle was assessed in autumn and winter.
(2) Pollen beetle adults, eggs and larvae were counted in spring.
(3) Seed weevils and pod midge damage were assessed in late May.
(4) Fungal diseases were assessed during the season.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

CHEMICAL	
NONE	1.52
BUTENYL	1.48
PHENYL	1.47
PHEN+BUT	1.50
STANDARD	2.24
Mean	1.64

*** Standard errors of differences of means ***

CHEMICAL
0.120

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
ROW.COL	12	0.189	11.5
GRAIN MEAN DM%	88.3		
PLOT AREA HARVESTED	0.00230		

90/R/RA/7

WINTER OILSEED RAPE

BACTERIAL INOCULANTS

Object: To study the effects of two bacterial inoculants on the growth and yield of w. oilseed rape - Little Hoos.

Sponsors: J. Tann, J.M. Day, P.H. Williams, I.J. Webster.

Design: 4 randomised blocks of 10 plots.

Whole plot dimensions: 4.0 x 10.0.

Treatments: All combinations of:-

- | | |
|---------------------|-----------------------------------|
| 1. INOCULANT | Bacterial inoculants: |
| B SUBT 1 | Bacillus subtilis, strain 1 |
| B SUBT 2 | " " " 2 |
| 2. FORMULAT | Formulations: |
| BROTH | Liquid broth to seed |
| SLURRY | Slurry, pre-coated to seed |
| 3. SEEDRESS | Seed dressings: |
| NONE | None |
| FE+LI+TH | Fenpropimorph, lindane and thiram |

plus two extra treatments:

EXTRA

- | | |
|---------|--|
| BO SO | No bacterial inoculant, no seed dressing |
| BO SFLT | No bacterial inoculant, seed dressed fenpropimorph, lindane and thiram |

- NOTES:** (1) Irrigation was applied at 17 mm on 10 Oct, 1989.
(2) The FORMULAT - BROTH treatment was applied as a bacterial culture in standard nutrient broth dripped into the seed furrow at planting.

Basal applications: Manures: 'Nitram' at 290 kg on two occasions.
Weedkillers: Paraquat at 0.60 kg ion in 200 l. Fluazifop-P-butyl at 0.12 kg with metazachlor at 1.2 kg and a wetting agent, 'Enhance' at 0.40 l, in 400 l.

Seed: Cobra, sown at 7.0 kg.

Cultivations, etc.:- Cultivated by rotary grubber: 27 July, 1989.
Paraquat applied: 18 Aug. Rotary harrowed: 22 Aug and 18 Sept. Seed sown: 19 Sept. Remaining weedkillers with wetting agent applied: 25 Oct. First N applied: 16 Feb, 1990. Second N applied: 14 Mar. Combine harvested: 25 July. Previous crops: S. wheat 1988, w. barley 1989.

90/R/RA/7

NOTE: Seedling emergence counts were made and vigour was assessed during the season. Dates of flowering were noted.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

FORMULAT INOCLANT	BROTH	SLURRY	Mean
B SUBT 1	2.50	2.78	2.64
B SUBT 2	2.61	2.76	2.68
Mean	2.56	2.77	2.66

SEEDRESS INOCLANT	NONE	FE+LI+TH	Mean
B SUBT 1	2.75	2.53	2.64
B SUBT 2	2.77	2.60	2.68
Mean	2.76	2.56	2.66

SEEDRESS FORMULAT	NONE	FE+LI+TH	Mean
BROTH	2.61	2.50	2.56
SLURRY	2.91	2.63	2.77
Mean	2.76	2.56	2.66

INOCLANT	SEEDRESS FORMULAT	NONE	FE+LI+TH
B SUBT 1	BROTH	2.59	2.40
	SLURRY	2.91	2.65
B SUBT 2	BROTH	2.63	2.59
	SLURRY	2.91	2.60

EXTRA	BO SO	BO SFLT	Mean
	2.41	2.83	2.62

GRAND MEAN 2.65

*** Standard errors of differences of means ***

INOCLANT	FORMULAT	SEEDRESS	INOCLANT FORMULAT
0.090	0.090	0.090	0.127
INOCLANT SEEDRESS	FORMULAT SEEDRESS	INOCLANT FORMULAT SEEDRESS	EXTRA
0.127	0.127	0.180	0.180

90/R/RA/7

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	27	0.255	9.6
MEAN DM%	87.0		
PLOT AREA HARVESTED	0.00230		