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ROTHAMSTED
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Yields of the Field Experiments 1985

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Barley

Rothamsted Research

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85/R/B/1

WINTER BARLEY

FACTORS LIMITING YIELD

Object: To study the importance of factors that may limit the yield of early-sown winter barley - Long Hoos I/II.

Sponsors: F.V. Widdowson, R.J. Darby, R.J. Gutteridge, J.F. Jenkyn, B.R. Kerry, R.T. Plumb, G.J.S. Ross, G.C. Scott, D.W. Wood.

Design: Half replicate of (2 x 2 x 2 x 2 x 2) x 2 (E FUNG) arranged in 2 blocks of 32 plots + 10 extra plots in each block.

Whole plot dimensions: 3.0 x 15.2.

Treatments: Combinations of the following treatments, all variety Panda following a previous barley crop:-

1. SEEDRATE Seed rate (seeds per square metre):
300
450
2. WINTER N Rates of nitrogen fertilizer in winter (kg N) as prilled urea (46% N):
0 None
30+30 30 on 9 Nov, 1984, 30 on 4 Feb, 1985
3. SPRING N Rates of nitrogen fertilizer in spring (kg N) as 'Nitro-Chalk' (26% N) on 2 Apr:
120
180
4. E FUNG Early fungicides:
NONE None
TFSD Triadimenol and fuberidazole seed dressing
5. L FUNG Late fungicides:
NONE None
SPRAYS Prochloraz at 0.40 kg with carbendazim at 0.15 kg in 220 l on 10 Apr, 1985. Carbendazim at 0.15 kg with maneb at 1.6 kg and tridemorph at 0.38 kg in 220 l on 29 Apr. Captafol at 1.3 kg and triadimefon at 0.12 kg in 220 l on 20 May
6. GRTH REG Growth regulator:
NONE None
CHLORMEQ Chlormequat applied at GS 13, 24, 30, at 0.52 kg in 340 l on 23 Oct, 1984, 26 Nov, and in 220 l on 10 Apr, 1985

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7. INSCTCDE Insecticide:
NONE None
CYPERMET Cypermethrin at 0.02 kg in 220 l on 30 Oct, 1984

plus 8 extra treatments with variety Panda sown at 300 seeds per square metre and given cypermethrin, late fungicides, no chlormequat and all combinations of the following:

1. PRECROPX Previous cropping:
OATS
FALLOW

2. N DIVX Division of nitrogen fertilizer (kg N):
30+30+120 30 on 9 Nov, 1984, 30 on 4 Feb, 1985 (both as prilled urea) plus 120 as 'Nitro-Chalk' (26% N) on 2 Apr
180 180 as 'Nitro-Chalk' (26% N) on 2 Apr

3. E FUNGX Early fungicides:
NONE None
TFSD Triadimenol and fuberidazole seed dressing

plus 8 extra treatments with variety Pirate sown at 300 seeds per square metre and given cypermethrin, late fungicides, no chlormequat and all combinations of the following:

1. PRECROPV Previous cropping:
BARLEY
OATS

2. N DIVX Division of nitrogen fertilizer (kg N):
30+30+120 30 on 9 Nov, 1984, 30 on 4 Feb, 1985 (both as prilled urea) plus 120 as 'Nitro-Chalk' (26% N) on 2 Apr
180 180 as 'Nitro-Chalk' (26% N) on 2 Apr

3. E FUNGV, Early fungicides:
NONE None
TFSD Triadimenol and fuberidazole seed dressing

plus 2 extra treatments following previous barley, with variety Panda and given no nitrogen fertilizer or chlormequat but given early fungicides, late fungicides and cypermethrin:

EXTRA NO
SD 300 Seed sown at 300 seeds per square metre (duplicated)
SD 450 Seed sown at 450 seeds per square metre (duplicated)

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Basal applications: Manures: (0:18:36) at 280 kg. Weedkillers: Isoproturon at 2.4 kg with mecoprop at 1.1 kg, bromoxynil at 0.14 kg and ioxynil at 0.14 kg in 250 l. Mecoprop (as 'CMPP' at 3.6 l) with bromoxynil and ioxynil (as 'Deloxil' at 1.5 l) and isoproturon at 2.0 kg in 200 l. Growth regulator: Mepiquat chloride and 2-chloroethylphosphonic acid (as 'Terpal' at 2.0 l) with a wetting agent ('Agral' at 0.05 l) in 500 l.

Cultivations, etc.: - Cultivated by rotary digger: 1 Sept, 2 Sept, 1984. PK applied: 10 Sept. Ploughed, spring-tine cultivated: 11 Sept. Discd three times: 12 Sept. Rotary harrowed, seed sown: 13 Sept. Isoproturon, mecoprop, bromoxynil and ioxynil applied: 7 Dec. 'CMPP', 'Deloxil' and isoproturon applied: 15 Apr, 1985. Growth regulator applied: 3 May. Combine harvested: 15 Aug. Previous crops: W. barley 1983, w. barley, w. oats, fallow 1984.

- NOTES: (1) Soil samples were taken in early October, November and February for amounts of nitrate and ammonium. Crop samples were taken from October to April for measurements of nitrate N concentration.
- (2) Plants were counted in November and samples were taken in March, April and May to measure plant and shoot numbers, leaf areas, dry weights and nitrogen uptakes. After harvest thousand grain weights were measured.
- (3) Leaf diseases, take-all, eyespot and barley yellow dwarf virus were assessed and aphids were counted.
- (4) A cage was erected over the crop from late May to maturity to prevent damage by birds.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

WINTER N	0	30+30	MEAN
SEEDRATE			
300	6.48	6.87	6.67
450	6.21	6.75	6.48
MEAN	6.34	6.81	6.58
E FUNG	NONE	TFSD	MEAN
SEEDRATE			
300	6.53	6.82	6.67
450	6.34	6.62	6.48
MEAN	6.43	6.72	6.58
E FUNG	NONE	TFSD	MEAN
WINTER N			
0	6.04	6.64	6.34
30+30	6.82	6.80	6.81
MEAN	6.43	6.72	6.58

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

L FUNG	NONE	SPRAYS	MEAN
SEEDRATE			
300	6.08	7.27	6.67
450	5.77	7.19	6.48
MEAN	5.92	7.23	6.58
L FUNG	NONE	SPRAYS	MEAN
WINTER N			
0	5.72	6.96	6.34
30+30	6.13	7.49	6.81
MEAN	5.92	7.23	6.58
L FUNG	NONE	SPRAYS	MEAN
E FUNG			
NONE	5.92	6.94	6.43
TFSD	5.92	7.52	6.72
MEAN	5.92	7.23	6.58
SPRING N	120	180	MEAN
SEEDRATE			
300	6.55	6.80	6.67
450	6.33	6.63	6.48
MEAN	6.44	6.71	6.58
SPRING N	120	180	MEAN
WINTER N			
0	6.26	6.43	6.34
30+30	6.62	7.00	6.81
MEAN	6.44	6.71	6.58
SPRING N	120	180	MEAN
E FUNG			
NONE	6.18	6.68	6.43
TFSD	6.69	6.75	6.72
MEAN	6.44	6.71	6.58
SPRING N	120	180	MEAN
L FUNG			
NONE	5.82	6.02	5.92
SPRAYS	7.05	7.41	7.23
MEAN	6.44	6.71	6.58

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSC TCDE	NONE	CYPERMET	MEAN
SEEDRATE			
300	6.62	6.72	6.67
450	6.24	6.72	6.48
MEAN	6.43	6.72	6.58
INSC TCDE	NONE	CYPERMET	MEAN
WINTER N			
0	6.26	6.43	6.34
30+30	6.60	7.02	6.81
MEAN	6.43	6.72	6.58
INSC TCDE	NONE	CYPERMET	MEAN
E FUNG			
NONE	6.20	6.67	6.43
TFSD	6.67	6.77	6.72
MEAN	6.43	6.72	6.58
INSC TCDE	NONE	CYPERMET	MEAN
L FUNG			
NONE	5.81	6.04	5.92
SPRAYS	7.05	7.41	7.23
MEAN	6.43	6.72	6.58
INSC TCDE	NONE	CYPERMET	MEAN
SPRING N			
120	6.34	6.53	6.44
180	6.52	6.91	6.71
MEAN	6.43	6.72	6.58
GRTH REG	NONE	CHLORMEQ	MEAN
SEEDRATE			
300	6.59	6.75	6.67
450	6.47	6.49	6.48
MEAN	6.53	6.62	6.58
GRTH REG	NONE	CHLORMEQ	MEAN
WINTER N			
0	6.39	6.30	6.34
30+30	6.68	6.94	6.81
MEAN	6.53	6.62	6.58

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

GRTH REG	NONE	CHLORMEQ	MEAN
E FUNG			
NONE	6.37	6.49	6.43
TFSD	6.69	6.75	6.72
MEAN	6.53	6.62	6.58
GRTH REG	NONE	CHLORMEQ	MEAN
L FUNG			
NONE	5.85	5.99	5.92
SPRAYS	7.21	7.24	7.23
MEAN	6.53	6.62	6.58
GRTH REG	NONE	CHLORMEQ	MEAN
SPRING N			
120	6.49	6.39	6.44
180	6.58	6.85	6.71
MEAN	6.53	6.62	6.58
GRTH REG	NONE	CHLORMEQ	MEAN
INSCTCDE			
NONE	6.41	6.45	6.43
CYPERMET	6.65	6.79	6.72
MEAN	6.53	6.62	6.58
N DIVX	30+30+120	180	MEAN
PRECROPX			
OATS	8.85	8.36	8.61
FALLOW	7.65	8.67	8.16
MEAN	8.25	8.51	8.38
E FUNGX	NONE	TFSD	MEAN
PRECROPX			
OATS	8.36	8.85	8.61
FALLOW	8.29	8.03	8.16
MEAN	8.32	8.44	8.38
E FUNGX	NONE	TFSD	MEAN
N DIVX			
30+30+120	8.33	8.17	8.25
180	8.32	8.71	8.51
MEAN	8.32	8.44	8.38

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

	E FUNGX N DIVX	NONE	TFSD
PRECROPX OATS	30+30+120	8.66	9.04
	180	8.05	8.67
FALLOW	30+30+120	7.99	7.31
	180	8.59	8.74
N DIVV PRECROPV	30+30+120	180	MEAN
BARLEY	8.39	6.79	7.59
OATS	9.10	9.06	9.08
MEAN	8.74	7.93	8.34
E FUNGV PRECROPV	NONE	TFSD	MEAN
BARLEY	6.63	8.56	7.59
OATS	8.70	9.45	9.08
MEAN	7.66	9.01	8.34
E FUNGV N DIVV	NONE	TFSD	MEAN
30+30+120	8.03	9.46	8.74
180	7.30	8.55	7.93
MEAN	7.66	9.01	8.34
PRECROPV	E FUNGV N DIVV	NONE	TFSD
BARLEY	30+30+120	7.29	9.50
	180	5.97	7.62
OATS	30+30+120	8.77	9.42
	180	8.63	9.48
EXTRA NO	SD 300	SD 450	MEAN
	4.00	3.98	3.99

GRAND MEAN 6.79

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

(NOT INCLUDING EXTRA PLOTS)
 MARGIN OF TWO FACTOR TABLES 0.144
 TWO FACTOR TABLES 0.203

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.575	8.7
GRAIN MEAN DM%	81.9		

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STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

WINTER N	0	30+30	MEAN
SEEDRATE			
300	2.84	3.19	3.02
450	2.70	3.17	2.94
MEAN	2.77	3.18	2.98
E FUNG	NONE	TFSD	MEAN
SEEDRATE			
300	3.05	2.98	3.02
450	2.99	2.88	2.94
MEAN	3.02	2.93	2.98
E FUNG	NONE	TFSD	MEAN
WINTER N			
0	2.72	2.83	2.77
30+30	3.33	3.03	3.18
MEAN	3.02	2.93	2.98
L FUNG	NONE	SPRAYS	MEAN
SEEDRATE			
300	2.68	3.35	3.02
450	2.63	3.24	2.94
MEAN	2.66	3.30	2.98
L FUNG	NONE	SPRAYS	MEAN
WINTER N			
0	2.48	3.07	2.77
30+30	2.83	3.52	3.18
MEAN	2.66	3.30	2.98
L FUNG	NONE	SPRAYS	MEAN
E FUNG			
NONE	2.82	3.23	3.02
TFSD	2.50	3.36	2.93
MEAN	2.66	3.30	2.98
SPRING N	120	180	MEAN
SEEDRATE			
300	2.99	3.05	3.02
450	2.84	3.03	2.94
MEAN	2.91	3.04	2.98

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STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

SPRING N	120	180	MEAN
WINTER N			
0	2.79	2.76	2.77
30+30	3.04	3.31	3.18
MEAN	2.91	3.04	2.98
SPRING N	120	180	MEAN
E FUNG			
NONE	2.90	3.14	3.02
TFSD	2.93	2.93	2.93
MEAN	2.91	3.04	2.98
SPRING N	120	180	MEAN
L FUNG			
NONE	2.73	2.58	2.66
SPRAYS	3.10	3.49	3.30
MEAN	2.91	3.04	2.98
INSC TCDE	NONE	CYPERMET	MEAN
SEEDRATE			
300	2.97	3.06	3.02
450	2.78	3.09	2.94
MEAN	2.87	3.08	2.98
INSC TCDE	NONE	CYPERMET	MEAN
WINTER N			
0	2.73	2.81	2.77
30+30	3.02	3.34	3.18
MEAN	2.87	3.08	2.98
INSC TCDE	NONE	CYPERMET	MEAN
E FUNG			
NONE	2.89	3.15	3.02
TFSD	2.86	3.00	2.93
MEAN	2.87	3.08	2.98
INSC TCDE	NONE	CYPERMET	MEAN
L FUNG			
NONE	2.58	2.73	2.66
SPRAYS	3.16	3.43	3.30
MEAN	2.87	3.08	2.98

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STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

INSCDCE	NONE	CYPERMET	MEAN
SPRING N			
120	2.82	3.01	2.91
180	2.93	3.14	3.04
MEAN	2.87	3.08	2.98
GRTH REG	NONE	CHLORMEQ	MEAN
SEEDRATE			
300	2.96	3.07	3.02
450	2.93	2.94	2.94
MEAN	2.94	3.01	2.98
GRTH REG	NONE	CHLORMEQ	MEAN
WINTER N			
0	2.78	2.77	2.77
30+30	3.11	3.24	3.18
MEAN	2.94	3.01	2.98
GRTH REG	NONE	CHLORMEQ	MEAN
E FUNG			
NONE	2.94	3.11	3.02
TFSD	2.95	2.91	2.93
MEAN	2.94	3.01	2.98
GRTH REG	NONE	CHLORMEQ	MEAN
L FUNG			
NONE	2.60	2.72	2.66
SPRAYS	3.29	3.30	3.30
MEAN	2.94	3.01	2.98
GRTH REG	NONE	CHLORMEQ	MEAN
SPRING N			
120	2.93	2.90	2.91
180	2.96	3.12	3.04
MEAN	2.94	3.01	2.98
GRTH REG	NONE	CHLORMEQ	MEAN
INSCDCE			
NONE	2.91	2.84	2.87
CYPERMET	2.98	3.17	3.08
MEAN	2.94	3.01	2.98

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STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

N DIVX	30+30+120	180	MEAN
PRECROPX			
OATS	4.34	3.91	4.12
FALLOW	3.77	4.39	4.08
MEAN	4.06	4.15	4.10
E FUNGX	NONE	TFSD	MEAN
PRECROPX			
OATS	3.81	4.44	4.12
FALLOW	4.46	3.70	4.08
MEAN	4.14	4.07	4.10
E FUNGX	NONE	TFSD	MEAN
N DIVX			
30+30+120	4.10	4.01	4.06
180	4.17	4.12	4.15
MEAN	4.14	4.07	4.10
	E FUNGX	NONE	TFSD
PRECROPX	N DIVX		
OATS	30+30+120	4.03	4.65
	180	3.58	4.23
FALLOW	30+30+120	4.17	3.37
	180	4.76	4.02
N DIVV	30+30+120	180	MEAN
PRECROPV			
BARLEY	3.52	2.74	3.13
OATS	3.90	4.06	3.98
MEAN	3.71	3.40	3.56
E FUNGV	NONE	TFSD	MEAN
PRECROPV			
BARLEY	2.56	3.71	3.13
OATS	3.69	4.27	3.98
MEAN	3.13	3.99	3.56
E FUNGV	NONE	TFSD	MEAN
N DIVV			
30+30+120	3.19	4.23	3.71
180	3.06	3.75	3.40
MEAN	3.13	3.99	3.56

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STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

	E FUNGV N DIVV	NONE	TFSD
PRECROPV BARLEY	30+30+120	2.77	4.26
	180	2.34	3.15
OATS	30+30+120	3.61	4.19
	180	3.77	4.35
EXTRA NO	SD 300	SD 450	MEAN
	1.57	1.37	1.47
GRAND MEAN	3.07		
STRAW MEAN DM%	89.6		
PLOT AREA HARVESTED	0.00249		

85/W/B/1

WINTER BARLEY

AUTUMN DISEASE CONTROL

Object: To examine the effects of autumn disease control, and interactions with growth regulator, in winter barley grown on contrasting soil types - Woburn, White Horse (light land), Broad Mead I (heavy land).

Sponsor: J.F. Jenkyn.

Design: On each site: 2 replicates of 20 plots, fully randomised.

Whole plot dimensions: 2.75 x 13.0.

Treatments: Duplicates of all combinations of:-

1. AUT FUNG Autumn fungicide:
 - NONE None (organo-Hg to seed)
 - ETHIRIMO Ethirimol to seed (over organo-Hg S.D.)
 - FF 4050 FF 4050 to seed
 - FENPROPI Fenpropimorph spray (organo-Hg to seed) at 0.75 kg in 220 l on 10 Dec, 1984
 - TRIADIME Triadimenol and fuberidazole to seed
2. GR EARLY Growth regulator early:
 - NONE None
 - ME EARLY Mepiquat chloride + 2-Chloroethylphosphonic acid at G.S. 30 (as 'Terpal' at 2.0 l) in 250 l, with a wetting agent ('Citowett' at 0.01 l), on 9 Apr, 1985
3. GR LATE Growth regulator late:
 - NONE None
 - ME LATE Mepiquat chloride + 2-Chloroethylphosphonic acid at G.S. 32 (as 'Terpal' at 2.0 l) in 250 l, with a wetting agent ('Citowett' at 0.01 l), on 24 Apr.

Basal applications: Manures: (5:14:30) at 300 kg. N at 150 kg (White Horse), at 120 kg (Broad Mead I) as 'Nitro-Chalk' (27.5% N).
Magnesian limestone at 7.5 t (Broad Mead I). Weedkillers: Paraquat at 0.30 kg ion in 250 l. Isoproturon at 2.0 kg in 250 l applied with the insecticide; mecoprop at 2.0 kg with cyanazine at 0.30 kg in 250 l applied with the prochloraz. Insecticide: Permethrin at 0.06 kg.
Fungicides: Prochloraz at 0.40 kg. Carbendazim at 0.25 kg in 250 l. Carbendazim at 0.15 kg with tridemorph at 0.38 kg and maneb at 1.6 kg in 250 l. Triadimefon at 0.12 kg and captafol at 1.3 kg in 250 l.
Desiccant: Diquat at 0.56 kg ion in 250 l (Broad Mead I).

Seed: Panda, sown at 300 seeds per square metre (150 kg).

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Cultivations, etc.:-

NPK applied, heavy spring-tine cultivated (White Horse): 4 Sept, 1984. Straw burnt, disced (Broad Mead I): 6 Sept. NPK applied (Broad Mead I): 12 Sept. Paraquat applied: 18 Sept. Magnesian limestone applied, heavy spring-tine cultivated, seed sown (Broad Mead I): 19 Sept. Ploughed (White Horse): 19 Sept. Rotary harrowed, seed sown (White Horse): 26 Sept. Weedkiller with insecticide applied: 1 Nov. N applied: 4 Apr, 1985. Weedkillers with fungicide applied: 10 Apr. Carbendazim applied: 16 Apr. Carbendazim with tridemorph and maneb applied: 3 May. Triadimefon with captafol applied: 30 May. Desiccant applied (Broad Mead I): 31 July. Combine harvested (Broad Mead I): 5 Aug, (White Horse): 13 Aug. Previous crops: (White Horse): W. wheat 1983, s. barley 1984. (Broad Mead I): W. wheat 1983 and 1984.

- NOTES: (1) Seed emergence counts were made in October.
(2) Assessments of leaf and root diseases were made during the season.
(3) Crop samples were taken in May for counts of shoots, ear numbers and assessment of dry weights and in July for grain and ear numbers.

85/W/B/1 WHITE HORSE

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

GR EARLY AUT FUNG	NONE	ME EARLY	MEAN
NONE	6.89	5.99	6.44
ETHIRIMO	6.98	6.65	6.82
FF 4050	7.63	6.32	6.98
FENPROPI	7.09	6.43	6.76
TRIADIME	7.38	6.58	6.98

MEAN 7.20 6.39 6.79

GR LATE AUT FUNG	NONE	ME LATE	MEAN
NONE	7.14	5.74	6.44
ETHIRIMO	7.16	6.47	6.82
FF 4050	7.14	6.82	6.98
FENPROPI	6.87	6.65	6.76
TRIADIME	7.22	6.74	6.98

MEAN 7.11 6.48 6.79

GR LATE GR EARLY	NONE	ME LATE	MEAN
NONE	7.78	6.62	7.20
ME EARLY	6.44	6.35	6.39

MEAN 7.11 6.48 6.79

GR EARLY GR LATE AUT FUNG	NONE	ME LATE	ME EARLY NONE	ME LATE
NONE	7.90	5.89	6.39	5.59
ETHIRIMO	7.77	6.19	6.55	6.75
FF 4050	8.27	6.99	6.00	6.65
FENPROPI	6.98	7.19	6.75	6.12
TRIADIME	7.95	6.82	6.50	6.65

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	AUT FUNG GR EARLY	GR EARLY	GR LATE	AUT FUNG GR EARLY
SED	0.561	0.355	0.355	0.793

TABLE	AUT FUNG GR LATE	GR EARLY GR LATE	AUT FUNG GR EARLY GR LATE
SED	0.793	0.501	1.121

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP	20	1.121	16.5

GRAIN MEAN DM% 81.2

85/W/B/1 WHITE HORSE

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

GR EARLY AUT FUNG	NONE	ME	EARLY	MEAN	
NONE	3.63		3.41	3.52	
ETHIRIMO	4.03		3.62	3.82	
FF 4050	4.29		3.52	3.90	
FENPROPI	3.70		3.41	3.55	
TRIADIME	3.63		3.37	3.50	
MEAN	3.85		3.47	3.66	
GR LATE AUT FUNG	NONE	ME	LATE	MEAN	
NONE	3.81		3.23	3.52	
ETHIRIMO	3.51		4.14	3.82	
FF 4050	4.06		3.75	3.90	
FENPROPI	3.69		3.42	3.55	
TRIADIME	3.75		3.24	3.50	
MEAN	3.76		3.56	3.66	
GR LATE GR EARLY	NONE	ME	LATE	MEAN	
NONE	3.89		3.82	3.85	
ME EARLY	3.64		3.29	3.47	
MEAN	3.76		3.56	3.66	
GR EARLY GR LATE AUT FUNG	NONE	ME	EARLY NONE	ME	EARLY LATE
NONE	4.11	3.14	3.50		3.32
ETHIRIMO	3.44	4.62	3.58		3.66
FF 4050	4.65	3.92	3.46		3.59
FENPROPI	3.89	3.50	3.49		3.34
TRIADIME	3.34	3.92	4.17		2.56

STRAW MEAN DM% 80.2

PLOT AREA HARVESTED 0.00248

85/W/B/1 BROAD MEAD I

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

GR EARLY AUT FUNG	NONE	ME EARLY	MEAN
NONE	7.79	8.03	7.91
ETHIRIMO	8.16	8.49	8.33
FF 4050	8.52	7.62	8.07
FENPROPI	8.23	8.27	8.25
TRIADIME	8.20	8.68	8.44

MEAN 8.18 8.22 8.20

GR LATE AUT FUNG	NONE	ME LATE	MEAN
NONE	7.52	8.30	7.91
ETHIRIMO	8.03	8.63	8.33
FF 4050	7.93	8.22	8.07
FENPROPI	7.78	8.71	8.25
TRIADIME	8.30	8.58	8.44

MEAN 7.91 8.49 8.20

GR LATE GR EARLY	NONE	ME LATE	MEAN
NONE	7.83	8.53	8.18
ME EARLY	7.99	8.45	8.22

MEAN 7.91 8.49 8.20

GR EARLY GR LATE AUT FUNG	NONE	ME LATE	ME EARLY NONE	ME LATE
NONE	7.11	8.46	7.92	8.14
ETHIRIMO	7.89	8.43	8.16	8.82
FF 4050	9.07	7.98	6.78	8.46
FENPROPI	7.44	9.01	8.12	8.41
TRIADIME	7.63	8.77	8.96	8.40

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	AUT FUNG	GR EARLY	GR LATE	AUT FUNG GR EARLY
SED	0.262	0.166	0.166	0.371

TABLE	AUT FUNG GR LATE	GR EARLY GR LATE	AUT FUNG GR EARLY GR LATE
SED	0.371	0.234	0.524

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP	20	0.524	6.4

GRAIN MEAN DM% 74.3

85/W/B/1 BROAD MEAD I

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

GR EARLY AUT FUNG	NONE	ME EARLY	MEAN
NONE	4.12	3.87	4.00
ETHIRIMO	3.71	3.93	3.82
FF 4050	4.47	3.95	4.21
FENPROPI	4.00	3.94	3.97
TRIADIME	4.13	4.04	4.08
MEAN	4.09	3.95	4.02

GR LATE AUT FUNG	NONE	ME LATE	MEAN
NONE	3.71	4.28	4.00
ETHIRIMO	3.64	4.00	3.82
FF 4050	4.37	4.05	4.21
FENPROPI	3.64	4.30	3.97
TRIADIME	4.04	4.12	4.08
MEAN	3.88	4.15	4.02

GR LATE GR EARLY	NONE	ME LATE	MEAN
NONE	3.84	4.33	4.09
ME EARLY	3.92	3.97	3.95
MEAN	3.88	4.15	4.02

GR EARLY GR LATE AUT FUNG	NONE	ME LATE	ME EARLY NONE	ME LATE
NONE	3.67	4.57	3.75	3.99
ETHIRIMO	3.43	3.99	3.86	4.01
FF 4050	4.98	3.96	3.76	4.13
FENPROPI	3.42	4.58	3.86	4.02
TRIADIME	3.70	4.56	4.39	3.68

STRAW MEAN DM% 76.7

PLOT AREA HARVESTED 0.00248

85/R/B/2

WINTER BARLEY

CONTROL OF BYDV

Object: To study the effects of insecticides and alarm pheromone derivatives and their interaction with control of autumn volunteers systems on the incidence of BYDV - Scout N.

Sponsors: D.C. Griffiths, G.R. Cayley, J.H. Stevenson, J.A. Pickett, R.T. Plumb.

Design: 2 whole plots divided into 3 replicates of 6 sub-plots.

Whole plot dimensions: 21.0 x 96.0.

Treatments: All combinations of:-

Whole plots

- | | |
|-------------|---|
| 1. VOLNTEER | Control of volunteers prior to ploughing shortly before sowing: |
| KILLED | Maximum control of all green plant matter |
| PRESENT | Volunteer germination and survival encouraged |

Sub plots

- | | |
|-------------|---|
| 2. SPRY INS | Sprays of insecticides and pheromone derivatives: |
| NONE | None |
| CYP EL | Cypermethrin applied electrostatically |
| CYP HY | Cypermethrin applied hydraulically |
| PHA O EL | Pheromone 'A' in oil applied electrostatically |
| PHA W EL | Pheromone 'A' in water applied electrostatically |
| PHB W EL | Pheromone 'B' in water applied electrostatically |

- NOTES: (1) Paraquat was applied at 0.60 kg ion in 500 l on 22 Aug, 1984, to VOLNTEER KILLED plots.
- (2) Electrostatic application was by a 'Jumbo' sprayer. This has spinning cone nozzles, spray was charged at 30 kv and applied in 9.2 l.
- (3) Hydraulic application was made in 200 l on 26 Oct.
- (4) Cypermethrin was applied at 0.025 kg on 26 Oct, 1984 and pheromones at 1.0 kg on 2 Oct, 1984 repeated on 12 Oct and 26 Oct.

Basal applications: Manures: (0:18:36) at 340 kg. 'Nitro-Chalk' (26% N) at 620 kg. Weedkillers: Isoproturon at 1.5 kg, clopyralid at 0.05 kg, bromoxynil octanoate at 0.24 kg and mecoprop (as 'CMPP' at 3.0 l) applied with the fungicides in 200 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg. Desiccant: Diquat at 0.80 kg ion with a wetting agent ('Agral' at 0.5 l) in 500 l.

Seed: Panda, sown at 150 kg.

85/R/B/2

Cultivations, etc.: - Heavy spring-tine cultivated: 31 July, 1984.
 Discd: 2 Aug. PK applied: 8 Aug. Ploughed: 12 Sept. Discd:
 14 Sept. Rotary harrowed, seed sown: 18 Sept. N applied,
 weedkillers and fungicides applied: 9 Apr, 1985. Desiccant with
 wetting agent applied: 24 July. Combine harvested: 6 Aug. Previous
 crops: W. barley 1983 and 1984.

NOTE: Aphid and virus counts were taken and beneficial insects assessed.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SPRY INS VOLNTEER	NONE	CYP EL	CYP HY PHA O EL PHA W EL PHB W EL	MEAN					
KILLED	6.97	8.01	7.22	7.19	7.19	7.19	7.41	6.96	7.29
PRESENT	5.97	7.37	7.16	7.27	7.16	7.16	7.16	6.18	6.85
MEAN	6.47	7.69	7.19	7.23	7.28	7.28	7.28	6.57	7.07

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SPRY INS	VOLNTEER* SPRY INS

SED	0.264	0.373

* WITHIN THE SAME LEVEL OF VOLNTEER ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.457	6.5

GRAIN MEAN DM% 80.1

SUB PLOT AREA HARVESTED 0.00163

85/R/B/3

WINTER BARLEY

STUBBLE TREATMENT AND BYDV

Object: To study the effects of herbicides and insecticides applied to stubble at different times before ploughing on the incidence of BYDV - Scout N.

Sponsor: R.T. Plumb.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. SPRAYS Sprays of herbicides and insecticides:

GLYPHOSA	Glyphosate at 1.4 kg
PARAQUAT	Paraquat at 0.60 kg ion

2. TIMES Times of applying sprays (ploughed 12 September):

20 AUG	3 weeks before ploughing
3 SEPT	1 week before ploughing
11 SEPT	1 day before ploughing

Plus four extra treatments:

EXTRA

NONE	No sprays (triplicated)
CY 3 SEP	Cypermethrin applied on 3 September at 0.025 kg
DI 3 SEP	Dimethoate applied on 3 September at 0.34 kg
PI 3 SEP	Pirimicarb applied on 3 September at 0.14 kg

NOTE: Treatment sprays were applied in 500 l except for glyphosate on 20 Aug which was in 200 l.

Basal applications: Manures: (0:18:36) at 340 kg. 'Nitro-Chalk' (26% N) at 620 kg. Weedkillers: Isoproturon at 1.5 kg, clopyralid at 0.05 kg with bromoxynil octanoate at 0.24 kg and mecoprop (as 'CMPP' at 3.0 l) in 200 l with the fungicides. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg. Insecticide: Cypermethrin at 0.025 kg in 250 l. Desiccant: Diquat at 0.80 kg ion with a wetting agent ('Agral' at 0.5 l) in 500 l.

Seed: Panda, sown at 150 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 31 July, 1984. Disced: 2 Aug. PK applied: 8 Aug. Ploughed: 12 Sept. Disced: 14 Sept. Rotary harrowed, seed sown: 18 Sept. Insecticide applied: 31 Oct. N applied, weedkillers and fungicides applied: 9 Apr, 1985. Desiccant with wetting agent applied: 24 July. Combine harvested: 6 Aug. Previous crops: W. barley 1983 and 1984.

85/R/B/3

NOTE: Barley yellow dwarf virus and aphid incidence were recorded on volunteers during August and September, 1984. Emergence counts and aphid counts were made in October. Barley yellow dwarf virus incidence was recorded in May 1985.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SPRAYS TIMES	GLYPHOSA	PARAQUAT	MEAN
20 AUG	7.64	6.97	7.30
3 SEPT	5.89	6.38	6.13
11 SEPT	6.23	6.05	6.14
MEAN	6.59	6.47	6.53

EXTRA	NONE	CY 3 SEP	DI 3 SEP	PI 3 SEP	MEAN
	5.75	5.34	6.68	6.10	5.89

GRAND MEAN 6.21

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SPRAYS	TIMES	SPRAYS TIMES	EXTRA	
SED	0.353	0.432	0.611	0.611	MIN REP
				0.499	MIN-MAX

EXTRA
MIN-MAX NONE V ANY OF THE REMAINDER
MIN REP ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	35	0.864	13.9

GRAIN MEAN DM% 80.0

PLOT AREA HARVESTED 0.00204

85/R/B/5 and 85/W/B/5

SPRING BARLEY

VARIETIES AND N

Object: To study the yields of some of the newer varieties of s. barley at three rates of nitrogen - Rothamsted (R), Summerdells II and Woburn (W), Lansome III.

Sponsor: R. Moffitt.

Design: 2 randomised blocks of 3 plots split into 9(R), into 8(W).

Whole plot dimensions: (R) 51 x 10.0. (W) 44 x 10.0.

Treatments: All combinations of:-

Whole plots

1. N Nitrogen fertilizer (kg N) as 'Nitro-Chalk' (27.5% N):

75
113
150

Sub plots

2. VARIETY Varieties:

APEX
ATEM
CASINO
DELTA
DOUBLET
NATASHA
SCRI 8313
TRIUMPH
VISTA

NOTE: SCRI 8313 was omitted at Woburn.

Basal applications:

Summerdells II (R): Weedkillers: Clopyralid at 0.05 kg with bromoxynil octanoate at 0.24 kg and mecoprop at 1.8 kg with the fungicide in 200 l. Fungicide: Tridemorph at 0.52 kg.

Lansome III (W): Weedkillers: Clopyralid at 0.07 kg with bromoxynil octanoate at 0.34 kg and mecoprop at 2.1 kg with the fungicide in 250 l. Fungicide: Tridemorph at 0.52 kg.

Seed: Summerdells II (R), and Lansome III (W): Sown at 160 kg.

Cultivations, etc.:-

Summerdells II (R): Ploughed: 30 Oct, 1984. Spring-tine cultivated: 14 Mar, 1985. Test N applied, rotary harrowed, seed sown: 15 Mar. Weedkillers and fungicide applied: 16 May. Combine harvested: 21 Aug. Previous crops: Potatoes 1983, w. wheat 1984.

85/R/B/5 and 85/W/B/5

Cultivations, etc.:-

Lansome III (W): Discd: 14 Sept, 1984. Ploughed: 30 Nov.
 Spring-tine cultivated with crumbler attached, rotary harrowed,
 seed sown: 19 Mar, 1985. Test N applied: 17 Apr. Weedkillers and
 fungicide applied: 17 May. Combine harvested: 29 Aug. Previous
 crops: W. wheat 1983, s. barley 1984.

85/R/B/5 SUMMERDELLS II (R)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

VARIETY	N	75	113	150	MEAN
APEX		6.56	7.10	7.52	7.06
ATEM		6.72	7.32	7.21	7.08
CASINO		7.18	7.89	7.96	7.68
DELTA		7.16	7.86	7.81	7.61
DOUBLET		6.89	8.16	8.47	7.84
NATASHA		6.32	7.41	8.01	7.25
SCRI 8313		6.79	7.46	7.66	7.30
TRIUMPH		7.17	7.91	8.14	7.74
VISTA		6.97	7.78	7.86	7.53
MEAN		6.86	7.65	7.85	7.45

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	N	VARIETY	N
			VARIETY
-----			-----
SED	0.056	0.087	0.152
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
N			0.150

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	24	0.150	2.0
GRAIN MEAN DM%	83.5		
SUB PLOT AREA HARVESTED	0.00204		

85/W/B/5 LANSOME III (W)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N	75	113	150	MEAN
VARIETY				
APEX	5.95	6.65	6.59	6.40
ATEM	6.24	6.82	7.31	6.79
CASINO	5.90	6.62	6.64	6.39
DELTA	7.33	7.01	6.81	7.05
DOUBLET	5.77	6.85	5.45	6.03
NATASHA	5.84	6.00	6.98	6.27
TRIUMPH	5.70	6.30	6.04	6.01
VISTA	5.97	7.16	7.12	6.75
MEAN	6.09	6.68	6.62	6.46

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	N	VARIETY	N
			VARIETY
-----			-----
SED	0.289	0.286	0.545
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
N			0.495

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	21	0.495	7.7
GRAIN MEAN DM%	85.0		
SUB PLOT AREA HARVESTED	0.00275		

85/R/B/6

SPRING BARLEY

ELECTROSTATIC SPRAYING AND MILDEW

Object: To study the penetration of sprays and control of mildew with a range of sprayers - Bones Close.

Sponsors: G.R. Cayley, D.C. Griffiths, B.J. Pye, P. Etheridge, R.E. Goodchild.

Design: 3 randomised blocks of 26 plots.

Whole plot dimension: 3.0 x 13.0.

Treatments: All combinations of:-

1. SPRAYER Sprayers applying fenpropimorph:
 - EL JUMBO 'Jumbo' electrostatic sprayer
 - EL NEW 'New' electrostatic sprayer
 - HYDRAUL Hydraulic sprayer
 - ROT ATOM Rotary atomiser sprayer
2. RATE Rates of fenpropimorph:
 - THIRD One third standard rate, at 0.25 kg
 - STANDARD Standard rate, at 0.75 kg
3. TIMING Timing of fenpropimorph:
 - EARLY Early, on 23 May, 1985
 - LATE Late, on 17 June
 - EA + LA Early plus late as above

plus one extra treatment

EXTRA

NONE No fenpropimorph (duplicated)

- NOTES: (1) Atem, dressed triadimenol and fuberidazole was sown on the headlands and surrounds at 160 kg.
(2) The 'Jumbo' electrostatic sprayer has spinning cone nozzles, spray was charged at 30 kv, and applied in 8.6 l.
(3) The 'New' electrostatic sprayer has inductively-charged vertically-mounted rotary atomisers and spray was applied in 7.9 l.
(4) Hydraulic application was made in 200 l.
(5) The rotary atomiser sprayer has uncharged vertically mounted rotary atomisers and spray was applied in 7.9 l.

Basal applications: Manures: (0:18:36) at 690 kg. 'Nitro-Chalk' (27.5% N) at 450 kg. Weedkillers: Mecoprop at 1.6 kg and cyanazine at 0.24 kg in 500 l.

Seed: Georgie, sown at 160 kg.

85/R/B/6

Cultivations, etc.: - PK applied: 25 Sept, 1984. Ploughed: 31 Oct.
 Spring-tine cultivated: 13 Mar, 1985. Rotary harrowed, seed sown:
 14 Mar. N applied: 19 Apr. Weedkillers applied: 10 May. Combine
 harvested: 21 Aug. Previous crops: Winter oilseed rape 1983,
 w. wheat 1984.

NOTE: Chemical deposits were observed after spraying and mildew
 assessments were made on two occasions.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

RATE	THIRD	STANDARD	MEAN	
SPRAYER				
EL JUMBO	7.78	7.86	7.82	
EL NEW	7.29	7.56	7.42	
HYDRAUL	7.71	7.66	7.68	
ROT ATOM	7.49	7.78	7.64	
MEAN	7.57	7.72	7.64	
TIMING	EARLY	LATE	EA + LA	MEAN
SPRAYER				
EL JUMBO	7.96	7.26	8.24	7.82
EL NEW	7.38	7.15	7.73	7.42
HYDRAUL	7.80	7.15	8.11	7.68
ROT ATOM	7.54	7.30	8.07	7.64
MEAN	7.67	7.21	8.04	7.64
TIMING	EARLY	LATE	EA + LA	MEAN
RATE				
THIRD	7.61	7.14	7.95	7.57
STANDARD	7.73	7.28	8.13	7.72
MEAN	7.67	7.21	8.04	7.64
SPRAYER	TIMING	EARLY	LATE	EA + LA
EL JUMBO	RATE			
	THIRD	7.87	7.35	8.13
	STANDARD	8.05	7.16	8.36
EL NEW	THIRD	7.20	6.93	7.73
	STANDARD	7.56	7.37	7.74
HYDRAUL	THIRD	7.93	7.12	8.07
	STANDARD	7.67	7.17	8.15
ROT ATOM	THIRD	7.44	7.16	7.87
	STANDARD	7.65	7.43	8.27
NONE	6.10			
GRAND MEAN	7.52			

85/R/B/6

GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SPRAYER	RATE	TIMING	SPRAYER RATE
SED	0.085	0.060	0.073	0.120
TABLE	SPRAYER TIMING	RATE TIMING	SPRAYER RATE TIMING	
SED	0.146	0.104	0.207	

SED FOR COMPARING NONE WITH ANY ITEM IN
SPRAYER.RATE.TIMING TABLE IS 0.179

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	51	0.254	3.4

GRAIN MEAN DM% 77.1

PLOT AREA HARVESTED 0.00265

85/R/B/8

SPRING BARLEY

NITROPHOSPHATES

Object: To study the effect of different amounts of water-soluble phosphate in nitrophosphate fertilizers on the growth and P uptake of spring barley - Highfield V.

Sponsor: K.G. Copestake.

Design: 3 randomised blocks of 13 plots.

Whole plot dimensions: 3.0 x 21.0.

Treatments: All combinations of:-

1. P SOL Phosphate water solubility (%):
 - 59 Compound fertilizer 16.4 : 14.2 : 17.5 with 59% of the P2O5 water soluble
 - 73 Compound fertilizer 15.9 : 16.2 : 15.3 with 73% of the P2O5 water soluble
 - 95 Compound fertilizer 15.0 : 15.0 : 15.0 with 95% of the P2O5 water soluble
2. P RATE Rate of phosphate (kg P2O5):
 - 20
 - 40
 - 60

plus one extra treatment:

EXTRA

NONE No phosphate fertilizer (quadruplicated)

NOTE: The compound fertilizers used to apply the phosphate treatments supplied differing amounts of the total 120 kg N and 72.5 kg K2O required on all plots. Additional amounts of N (as 'Nitrotop' 33.5% N) and K2O (as muriate of potash 60% K2O) were applied as needed to achieve this total. Combinations with P SOL 59 received 74.0 kg K2O in error.

Basal applications: Manures: Chalk at 5.0 t, on two occasions.
Weedkillers: Clopyralid at 0.05 kg and bromoxynil at 0.24 kg with mecoprop (as 'CMPP' at 3.0 l) applied with the fungicide in 200 l.
Fungicide: Tridemorph at 0.52 kg.

Seed: Klaxon, sown at 160 kg.

Cultivations, etc.: - Discd: 14 Aug, 1984. First chalk applied: 23 Aug. Ploughed: 11 Sept. Second chalk applied: 2 Oct. Fertilizer treatments applied, spring-tine cultivated, rotary harrowed, seed sown: 21 Mar, 1985. Weedkillers and fungicide applied: 16 May. Combine harvested: 23 Aug. Previous crops: S. barley 1983, w. oats 1984.

85/R/B/8

NOTE: Soil was sampled for nutrient analysis before fertilizer application and again after harvest. Emergence and stem counts were made. Samples were taken for fresh and dry weight crop components throughout the season.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

P RATE	20	40	60	MEAN
P SOL				
59	7.92	7.76	7.94	7.87
73	7.75	7.91	8.00	7.88
95	8.01	7.56	8.22	7.93
MEAN	7.89	7.74	8.05	7.90

NONE 7.02

GRAND MEAN 7.63

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	P SOL	P RATE	P SOL P RATE

SED	0.188	0.188	0.326

SED FOR COMPARING NONE WITH ANY ITEM
IN P SOL.P RATE TABLE IS 0.258

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	27	0.400	5.2

GRAIN MEAN DM% 80.4

PLOT AREA HARVESTED 0.00224