

Thank you for using eradoc, a platform to publish electronic copies of the Rothamsted Documents. Your requested document has been scanned from original documents. If you find this document is not readable, or you suspect there are some problems, please let us know and we will correct that.



ROTHAMSTED
RESEARCH

Yields of the Field Experiments 1979

[Full Table of Content](#)



79/R/WW/3 Factors Limiting Yield - W. Wheat

Rothamsted Research

Rothamsted Research (1980) *79/R/WW/3 Factors Limiting Yield - W. Wheat* ; Yields Of The Field Experiments 1979, pp 254 - 265 - DOI: <https://doi.org/10.23637/ERADOC-1-45>

79/R/WW/3

WINTER WHEAT

FACTORS LIMITING YIELD

Object: To study the effects of a range of factors on the incidence of pests and diseases and on the growth and yield of wheat - West Barnfield I.

Sponsors: C.F. Banfield, A. Dewar, J. Lacey, A. Penny, R.T. Plumb, R.D. Prew, G.N. Thorne, T.D. Williams.

Associate sponsors: P.J. Welbank, F.V. Widdowson.

Design: Half replicate of 2^8 + 6 extra plots.

Whole plot dimensions: 3.25 x 15.2.

Treatments: Combinations of:-

1. DRILL Drills, sowing seed at 380 seeds per m² in rows
 10 cm (4 in) apart:

 NORDSTEN Nordsten drill spacing seed irregularly within the row
 STANHAY Stanhay precision drill
2. SOWDATE Dates of sowing:

 21 SEPT 21 September, 1978
 13 OCT 13 October
3. TOTAL N Total amount of nitrogen fertiliser (kg N) applied:

 160
 250
4. N TIME Times of applying nitrogen fertiliser:

 A All applied on 6 April
 M A M 40 kg of the total applied on 12 March, 30 kg applied on
 17 May, remainder on 6 April
5. AUT PEST Autumn pesticide:

 NONE None
 ALDICARB Aldicarb at 5 kg worked in to seedbed
6. APHCIDE Aphicide:

 NONE None
 PIRIMICA Pirimicarb at 0.14 kg in 340 l applied twice: 26 June and 17 July
7. FUNGCIDE Fungicide:

 NONE None
 CA+MA+TR Carbendazim + maneb + tridemorph (as 'Cosmic' at 4.0 kg)
 in 340 l applied twice: 30 May and 26 June

79/R/WW/3

8. IRRIGATION Irrigation:

NONE None
FULL Full (125 mm) to lessen a deficit of 25 mm to 12.5 mm

plus six extra plots, all sown by Stanhay drill on 21 Sept, all N applied on 6 Apr, given aldicarb, pirimicarb, carbendazim + maneb + tridemorph and full irrigation, testing rates of nitrogen fertiliser (kg N):

EXTRA

N 0
N 100
N 130
N 190
N 220
N 280

NOTE: Irrigation treatments were as follows:-

	mm water
5 July	25
10/12 July	50
19 July	25
25 July	25

Basal applications: Manures: (0:14:28) at 360 kg. Weedkillers: Methabenzthiazuron at 1.6 kg in 340 l. Growth regulator: Chlormequat at 1.4 kg in 340 l.

Seed: Maris Hustler, sown at 174 kg.

Cultivations, etc.:- Harrowed: 13 Sept, 1978. PK applied: 14 Sept. Heavy spring-tine cultivated twice: 15 Sept. Power harrowed all early-sown treatments, and those for STANHAY rolled: 20 Sept. Seed sown on all early-sown plots: 21 Sept. Power harrowed all late-sown plots: 12 Oct. Late-sown STANHAY plots rolled, seed sown on all late-sown plots: 13 Oct. Weedkillers applied: 19 Oct. Growth regulator applied to early-sown plots: 18 Apr, 1979. Growth regulator applied to late-sown plots: 8 May. Combine harvested: 31 Aug. Previous cropping: Fallow, oats, barley, wheat 1977, potatoes 1978.

- NOTES: (1) The growth regulator was applied to both the early and late sown crops at Zadoks Growth Stage 3.0.
- (2) Soil was sampled for nematodes, mineral N and moisture content. Roots were sampled for foot and root rots. The above ground crop was examined for growth stage, aphids, foliar diseases (including BYDV) and general microflora. Plant populations, shoot numbers and sowing depth were measured. Dry weight, leaf area, and N and K content of the above-ground crop and stem nitrate were measured on several occasions.

79/R/WW/3

GRAIN DRY MATTER TONNES/HECTARE

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

SOWDATE	21 SEPT	13 OCT	MEAN
DRILLS			
NORDSTEN	9.64	9.58	9.61
STANHAY	9.81	9.56	9.68
MEAN	9.72	9.57	9.65
TOTAL N			
DRILLS			
NORDSTEN	9.90	9.32	9.61
STANHAY	9.93	9.43	9.68
MEAN	9.91	9.38	9.65
TOTAL N			
SOWDATE			
21 SEPT	10.05	9.39	9.72
13 OCT	9.77	9.36	9.57
MEAN	9.91	9.38	9.65
N TIME			
DRILLS			
NORDSTEN	A	M A M	MEAN
STANHAY	9.46	9.76	9.61
MEAN	9.54	9.83	9.68
MEAN	9.50	9.79	9.65
N TIME			
SOWDATE			
21 SEPT	A	M A M	MEAN
13 OCT	9.47	9.98	9.72
MEAN	9.53	9.61	9.57
MEAN	9.50	9.79	9.65
N TIME			
TOTAL N			
160	A	M A M	MEAN
250	9.81	10.02	9.91
MEAN	9.19	9.57	9.38
MEAN	9.50	9.79	9.65
AUT PEST			
DRILLS			
NORDSTEN	NONE	ALDICARB	MEAN
STANHAY	9.47	9.75	9.61
MEAN	9.57	9.80	9.68
MEAN	9.52	9.77	9.65
AUT PEST			
SOWDATE			
21 SEPT	NONE	ALDICARB	MEAN
13 OCT	9.55	9.90	9.72
MEAN	9.49	9.65	9.57
MEAN	9.52	9.77	9.65

79/R/WW/3

GRAIN DRY MATTER TONNES/HECTARE

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

AUT PEST	NONE	ALDICARB	MEAN
TOTAL N			
160	9.78	10.05	9.91
250	9.26	9.49	9.38
MEAN	9.52	9.77	9.65
AUT PEST	NONE	ALDICARB	MEAN
N TIME			
A	9.35	9.65	9.50
M A M	9.69	9.90	9.79
MEAN	9.52	9.77	9.65
APHICIDE	NONE	PIRIMICA	MEAN
DRILLS			
NORDSTEN	9.00	10.22	9.61
STANHAY	8.97	10.39	9.68
MEAN	8.99	10.30	9.65
APHICIDE	NONE	PIRIMICA	MEAN
SOWDATE			
21 SEPT	9.03	10.41	9.72
13 OCT	8.94	10.19	9.57
MEAN	8.99	10.30	9.65
APHICIDE	NONE	PIRIMICA	MEAN
TOTAL N			
160	9.42	10.41	9.91
250	8.56	10.19	9.38
MEAN	8.99	10.30	9.65
APHICIDE	NONE	PIRIMICA	MEAN
N TIME			
A	8.68	10.31	9.50
M A M	9.29	10.30	9.79
MEAN	8.99	10.30	9.65
APHICIDE	NONE	PIRIMICA	MEAN
AUT PEST			
NONE	8.77	10.27	9.52
ALDICARB	9.21	10.34	9.77
MEAN	8.99	10.30	9.65
FUNGICIDE	NONE	CA+MA+TR	MEAN
DRILLS			
NORDSTEN	9.12	10.10	9.61
STANHAY	9.20	10.16	9.68
MEAN	9.16	10.13	9.65

79/R/WW/3

GRAIN DRY MATTER TONNES/HECTARE

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

FUNGCIDE	NONE	CA+MA+TR	MEAN
SOWDATE			
21 SEPT	9.16	10.29	9.72
13 OCT	9.15	9.98	9.57
MEAN	9.16	10.13	9.65

FUNGCIDE	NONE	CA+MA+TR	MEAN
TOTAL N			
160	9.52	10.31	9.91
250	8.80	9.95	9.38
MEAN	9.16	10.13	9.65

FUNGCIDE	NONE	CA+MA+TR	MEAN
N TIME			
A	9.01	9.98	9.50
M A M	9.30	10.28	9.79
MEAN	9.16	10.13	9.65

FUNGCIDE	NONE	CA+MA+TR	MEAN
AUT PEST			
NONE	9.01	10.03	9.52
ALDICARB	9.31	10.24	9.77
MEAN	9.16	10.13	9.65

FUNGCIDE	NONE	CA+MA+TR	MEAN
APHICIDE			
NONE	8.61	9.37	8.99
PIRIMICA	9.71	10.90	10.30
MEAN	9.16	10.13	9.65

IRRIGATN	NONE	FULL	MEAN
DRILLS			
NORDSTEN	9.69	9.53	9.61
STANHAY	9.83	9.53	9.68
MEAN	9.76	9.53	9.65

IRRIGATN	NONE	FULL	MEAN
SOWDATE			
21 SEPT	9.84	9.61	9.72
13 OCT	9.68	9.45	9.57
MEAN	9.76	9.53	9.65

IRRIGATN	NONE	FULL	MEAN
TOTAL N			
160	9.99	9.84	9.91
250	9.54	9.22	9.38
MEAN	9.76	9.53	9.65

79/R/WW/3

GRAIN DRY MATTER TONNES/HECTARE

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

IRRIGATN	NONE	FULL	MEAN	
N TIME				
A	9.66	9.34	9.50	
M A M	9.87	9.72	9.79	
MEAN	9.76	9.53	9.65	
IRRIGATN	NONE	FULL	MEAN	
AUT PEST				
NONE	9.56	9.48	9.52	
ALDICARB	9.97	9.58	9.77	
MEAN	9.76	9.53	9.65	
IRRIGATN	NONE	FULL	MEAN	
APHICIDE				
NONE	9.14	8.84	8.99	
PIRIMICA	10.38	10.22	10.30	
MEAN	9.76	9.53	9.65	
IRRIGATN	NONE	FULL	MEAN	
FUNGCIDE				
NONE	9.35	8.97	9.16	
CA+MA+TR	10.17	10.09	10.13	
MEAN	9.76	9.53	9.65	
SOWDATE	21 SEPT		13 OCT	
TOTAL N	160	250	160	250
DRILLS				
NORDSTEN	10.01	9.28	9.79	9.37
STANHAY	10.10	9.51	9.76	9.35
SOWDATE	21 SEPT		13 OCT	
N TIME	A	M A M	A	M A M
DRILLS				
NORDSTEN	9.28	10.00	9.64	9.52
STANHAY	9.65	9.96	9.42	9.70
TOTAL N	160		250	
N TIME	A	M A M	A	M A M
DRILLS				
NORDSTEN	9.78	10.01	9.13	9.51
STANHAY	9.83	10.03	9.24	9.62
TOTAL N	160		250	
N TIME	A	M A M	A	M A M
SOWDATE				
21 SEPT	9.93	10.18	9.00	9.78
13 OCT	9.68	9.87	9.37	9.35
SOWDATE	21 SEPT		13 OCT	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
DRILLS				
NORDSTEN	9.48	9.80	9.46	9.69
STANHAY	9.62	9.99	9.51	9.60

79/R/WW/3

GRAIN RY MATTER TONNES/HECTARE

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

TOTAL N	160		250	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
DRILLS				
NORDSTEN	9.72	10.08	9.22	9.42
STANHAY	9.83	10.03	9.30	9.56
TOTAL N	160		250	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
SOWDATE				
21 SEPT	9.86	10.25	9.24	9.55
13 OCT	9.69	9.86	9.28	9.44
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
DRILLS				
NORDSTEN	9.29	9.62	9.65	9.87
STANHAY	9.40	9.67	9.73	9.92
N TIME	A		M A M	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
SOWDATE				
21 SEPT	9.19	9.74	9.90	10.06
13 OCT	9.50	9.56	9.48	9.74
N TIME	A		M A M	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
TOTAL N				
160	9.65	9.97	9.90	10.14
250	9.04	9.33	9.48	9.65
SOWDATE	21 SEPT		13 OCT	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
DRILLS				
NORDSTEN	9.00	10.29	9.01	10.14
STANHAY	9.07	10.54	8.88	10.24
TOTAL N	160		250	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
DRILLS				
NORDSTEN	9.35	10.44	8.65	9.99
STANHAY	9.48	10.39	8.47	10.39
TOTAL N	160		250	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
SOWDATE				
21 SEPT	9.50	10.60	8.56	10.22
13 OCT	9.33	10.22	8.56	10.16
N TIME	A		M A M	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
DRILLS				
NORDSTEN	8.73	10.19	9.28	10.24
STANHAY	8.64	10.43	9.30	10.35

79/R/WW/3

GRAIN DRY MATTER TONNES/HECTARE

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

N TIME APHICIDE SOWDATE	A		M A M	
	NONE	PIRIMICA	NONE	PIRIMICA
21 SEPT	8.57	10.36	9.50	10.47
13 OCT	8.80	10.26	9.09	10.13

N TIME APHICIDE TOTAL N	A		M A M	
	NONE	PIRIMICA	NONE	PIRIMICA
160	9.27	10.34	9.56	10.48
250	8.10	10.28	9.03	10.11

AUT PEST APHICIDE DRILLS	NONE		ALDICARB	
	NONE	PIRIMICA	NONE	PIRIMICA
NORDSTEN	8.84	10.10	9.17	10.33
STANHAY	8.70	10.43	9.24	10.35

AUT PEST APHICIDE SOWDATE	NONE		ALDICARB	
	NONE	PIRIMICA	NONE	PIRIMICA
21 SEPT	8.77	10.33	9.29	10.50
13 OCT	8.77	10.21	9.12	10.17

AUT PEST APHICIDE TOTAL N	NONE		ALDICARB	
	NONE	PIRIMICA	NONE	PIRIMICA
160	9.20	10.35	9.63	10.47
250	8.34	10.18	8.78	10.20

AUT PEST APHICIDE N TIME	NONE		ALDICARB	
	NONE	PIRIMICA	NONE	PIRIMICA
A	8.46	10.23	8.91	10.39
M A M	9.08	10.30	9.51	10.29

SOWDATE FUNGICIDE DRILLS	21 SEPT		13 OCT	
	NONE	CA+MA+TR	NONE	CA+MA+TR
NORDSTEN	9.10	10.19	9.14	10.02
STANHAY	9.23	10.39	9.17	9.94

TOTAL N FUNGICIDE DRILLS	160		250	
	NONE	CA+MA+TR	NONE	CA+MA+TR
NORDSTEN	9.49	10.30	8.74	9.90
STANHAY	9.54	10.32	8.86	10.01

TOTAL N FUNGICIDE SOWDATE	160		250	
	NONE	CA+MA+TR	NONE	CA+MA+TR
21 SEPT	9.56	10.55	8.76	10.03
13 OCT	9.47	10.08	8.84	9.88

79/R/WW/3

GRAIN DRY MATTER TONNES/HECTARE

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

N TIME FUNGCIDE DRILLS	A		M A M	
	NONE	CA+MA+TR	NONE	CA+MA+TR
NORDSTEN	8.95	9.97	9.28	10.24
STANHAY	9.07	10.00	9.33	10.33

N TIME FUNGCIDE SOWDATE	A		M A M	
	NONE	CA+MA+TR	NONE	CA+MA+TR
21 SEPT	8.93	10.01	9.39	10.57
13 OCT	9.09	9.96	9.21	10.00

N TIME FUNGCIDE TOTAL N	A		M A M	
	NONE	CA+MA+TR	NONE	CA+MA+TR
160	9.45	10.17	9.58	10.46
250	8.57	9.80	9.03	10.11

AUT PEST FUNGCIDE DRILLS	NONE		ALDICARB	
	NONE	CA+MA+TR	NONE	CA+MA+TR
NORDSTEN	8.94	10.00	9.29	10.21
STANHAY	9.07	10.06	9.33	10.26

AUT PEST FUNGCIDE SOWDATE	NONE		ALDICARB	
	NONE	CA+MA+TR	NONE	CA+MA+TR
21 SEPT	8.93	10.17	9.40	10.40
13 OCT	9.09	9.89	9.22	10.07

AUT PEST FUNGCIDE TOTAL N	NONE		ALDICARB	
	NONE	CA+MA+TR	NONE	CA+MA+TR
160	9.34	10.21	9.69	10.42
250	8.67	9.85	8.93	10.05

AUT PEST FUNGCIDE N TIME	NONE		ALDICARB	
	NONE	CA+MA+TR	NONE	CA+MA+TR
A	8.80	9.89	9.22	10.08
M A M	9.21	10.17	9.40	10.39

APHICIDE FUNGCIDE DRILLS	NONE		PIRIMICA	
	NONE	CA+MA+TR	NONE	CA+MA+TR
NORDSTEN	8.58	9.43	9.65	10.78
STANHAY	8.63	9.32	9.77	11.01

APHICIDE FUNGCIDE SOWDATE	NONE		PIRIMICA	
	NONE	CA+MA+TR	NONE	CA+MA+TR
21 SEPT	8.59	9.48	9.73	11.10
13 OCT	8.62	9.27	9.69	10.70

79/R/WW/3

GRAIN DRY MATTER TONNES/HECTARE

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

APHICIDE	NONE		PIRIMICA	
FUNGICIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
TOTAL N				
160	9.08	9.75	9.95	10.88
250	8.13	9.00	9.47	10.91
APHICIDE	NONE		PIRIMICA	
FUNGICIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
N TIME				
A	8.24	9.13	9.78	10.84
M A M	8.97	9.62	9.64	10.95
APHICIDE	NONE		PIRIMICA	
FUNGICIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
AUT PEST				
NONE	8.32	9.22	9.69	10.84
ALDICARB	8.89	9.52	9.73	10.95
SOWDATE	21 SEPT		13 OCT	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.76	9.53	9.62	9.53
STANHAY	9.92	9.69	9.75	9.37
TOTAL N	160		250	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.98	9.82	9.40	9.24
STANHAY	10.00	9.86	9.67	9.19
TOTAL N	160		250	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
21 SEPT	10.13	9.98	9.55	9.24
13 OCT	9.84	9.70	9.52	9.20
N TIME	A		M A M	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.57	9.34	9.80	9.72
STANHAY	9.74	9.33	9.93	9.73
N TIME	A		M A M	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
21 SEPT	9.64	9.30	10.04	9.92
13 OCT	9.67	9.38	9.69	9.52
N TIME	A		M A M	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
160	9.87	9.75	10.11	9.93
250	9.44	8.93	9.63	9.51

79/R/WW/3

GRAIN DRY MATTER TONNES/HECTARE

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

AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.46	9.48	9.91	9.58
STANHAY	9.65	9.48	10.02	9.58
AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
21 SEPT	9.62	9.48	10.06	9.73
13 OCT	9.50	9.48	9.87	9.43
AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
160	9.84	9.72	10.14	9.97
250	9.28	9.24	9.79	9.19
AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
N TIME				
A	9.42	9.27	9.89	9.41
M A M	9.69	9.69	10.04	9.75
APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.10	8.91	10.28	10.15
STANHAY	9.18	8.77	10.49	10.29
APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
21 SEPT	9.16	8.90	10.52	10.31
13 OCT	9.11	8.78	10.25	10.13
APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
160	9.46	9.37	10.51	10.31
250	8.81	8.31	10.26	10.13
APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
N TIME				
A	8.93	8.44	10.38	10.24
M A M	9.35	9.24	10.39	10.20
APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
AUT PEST				
NONE	8.87	8.67	10.25	10.29
ALDICARB	9.41	9.01	10.52	10.15

79/R/WW/3

GRAIN DRY MATTER TONNES/HECTARE

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

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.33	8.90	10.05	10.16
STANHAY	9.37	9.03	10.30	10.03

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
21 SEPT	9.38	8.94	10.30	10.27
13 OCT	9.32	8.99	10.05	9.91

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
160	9.62	9.41	10.36	10.27
250	9.08	8.52	9.99	9.92

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
N TIME				
A	9.31	8.71	10.00	9.97
M A M	9.38	9.23	10.35	10.22

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
AUT PEST				
NONE	9.13	8.89	9.99	10.07
ALDICARB	9.57	9.04	10.36	10.12

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
APHICIDE				
NONE	8.91	8.30	9.36	9.38
PIRIMICA	9.78	9.63	10.99	10.81

EXTRA	N 0	N 100	N 130	N 190	N 220	N 280	MEAN
	8.01	10.27	11.90	10.79	11.06	10.64	10.45

GRAND MEAN 9.68

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

SED FOR ALL TABLES EXCEPT EXTRA

ONE FACTOR TABLE	0.096
TWO FACTOR TABLES	0.135
THREE FACTOR TABLES	0.191

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

STRATUM	DF	SE	CV%
WP	35	0.541	5.6

GRAIN MEAN DM% 85.1 PLOT AREA HARVESTED 0.00204