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# Yields of the Field Experiments 1987

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## 87/W/CS/245 Minimum Cultivation and Deep P K - W. Wheat, W. Barley, S. Barley

### Rothamsted Research

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87/W/CS/245

MINIMUM CULTIVATION AND DEEP PK

Object: To study the effects of thorough subsoil disturbance and the incorporation of P and K into the subsoil on w. wheat and w. barley either sown conventionally or direct drilled - Woburn Warren Field I and II.

Sponsors: A.E. Johnston, J. McEwen, R.D. Prew, P.H. Nicholls.

The eighth year, w. wheat and w. barley.

For previous years see 80-86/W/CS/245.

Column plot dimensions: 4.27 x 57.6.

Design: 3 series each of 20 x 4 criss cross.

Treatments: All combinations of:-

Series:

1. SER CROP      Series, crops and previous cropping:
  - SER1 SB1      Series I, s. barley in rotation after w. oilseed rape, w. wheat
  - SER2 WW10    Series II, w. wheat, tenth cereal after a break crop
  - SER3 WB10    Series III, w. barley, tenth cereal after a break crop

Column plots: All combinations (duplicated) of:

2. PK SUB      Extra PK and subsoil treatments:
  - None, mouldboard ploughed
  - S           None, subsoiled
  - PKS           PK to subsoil
3. YEAR        Years of applying PK SUB:
  - 1980           In autumn 1979
  - 1980/3/6      In autumn 1979, autumn 1982 and autumn 1985
4. DRILL       Drills and associated cultivations:
  - CNVNTIAL     Mouldboard ploughed, conventionally drilled
  - DIRECT        Direct drilled (duplicated) (conventionally drilled in years when factor 2 involves autumn ploughing)

87/W/CS/245

Row plots:

5. N PATH Nitrogen fertilizer as 'Nitram' in spring, and pathogen control:

W. wheat

75 ENHD	75 kg N enhanced pathogen control
150 ENHD	150 kg N enhanced pathogen control
225 ENHD	225 kg N enhanced pathogen control
150 STND	150 kg N standard pathogen control

S. & W. barley

75 ENHD	75 kg N enhanced pathogen control
150 ENHD	150 kg N enhanced pathogen control
150/225E	150 kg N enhanced pathogen control (225 kg N in previous years)
150 STND	150 kg N standard pathogen control

plus two extra column plot treatments, in all combinations with row plots above:-

EXTRA

TPK 80 D	PK applied to topsoil and mouldboard ploughed in autumn 1979, direct drilled since
TPK 80 C	PK as above, mouldboard ploughed, conventionally drilled each year

- NOTES: (1) Rates of extra P and K were 500 kg P205, as superphosphate, 250 kg K20 as muriate of potash.
- (2) Subsoiling was done with the Wye double-digger which turns a furrow with a conventional plough share, to a depth of 23 cm, and at the same time rotary cultivates the bottom of the adjacent furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.
- (3) The topsoil PK dressing was equally divided before and after ploughing.
- (4) Standard pathogen control in 1987 was conventional seed dressing and, on Series II only, methiocarb pellets at sowing. Enhanced pathogen control had in addition, propiconazole at 0.25 kg in 200 l applied on 29 June, 1987, and, on Series II and III only, prochloraz at 0.40 kg in 200 l applied on 27 May.
- (5) All plots with the combination YEAR 1980/3/6; DRILL DIRECT were mouldboard ploughed and conventionally drilled in error in 1987.

Standard applications:

Series I, s. barley: Manures: (5:14:30) at 340 kg. Weedkillers: Paraquat at 0.40 kg ion in 200 l on two occasions. Clopyralid at 0.05 kg, bromoxynil at 0.34 kg with mecoprop at 2.5 kg in 200 l.

Series II, w. wheat: Manures: (5:14:30) at 340 kg. Weedkillers: Paraquat at 0.40 kg ion in 200 l. Isoproturon at 1.5 kg, clopyralid at 0.05 kg, bromoxynil at 0.34 kg and mecoprop at 2.5 kg in 240 l. Growth regulator: Chlormequat chloride at 1.1 kg in 200 l.

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Series III, w. barley: Manures: (5:14:30) at 340 kg. Weedkillers: Paraquat at 0.40 kg ion in 200 l. Isoproturon at 1.5 kg, clopyralid at 0.05 kg, bromoxynil at 0.34 kg and mecoprop at 2.5 kg in 240 l. Growth regulators: Mepiquat chloride at 0.61 kg, 2-chloroethylphosphonic acid at 0.31 kg applied with a wetting agent ('Citowett' at 0.8 l) in 200 l.

Seed: Series I, s. barley: Klaxon, sown at 160 kg.  
Series II, w. wheat: Avalon, with methiocarb pellets, sown at 200 kg.  
Series III: W. barley: Igri, sown at 180 kg.

Cultivations, etc.:-

Series I, s. barley: Straw burnt: 8 Sept, 1986. Heavy spring-tine cultivated: 9 Sept. Ploughed treatment applied: 12 Sept. These plots disced twice: 18 Sept. These plots rolled: 19 Sept. Discd: 27 Sept. Spike harrowed with crumbler attached: 2 Oct. Rolled: 3 Oct. Paraquat applied: 3 Nov, 16 Mar, 1987. Spike harrowed with crumbler attached, seed sown, NPK applied: 16 Mar. N treatments applied: 1 May. Clopyralid, bromoxynil and mecoprop applied: 27 May. Combine harvested: 8 Sept.

Series II, w. wheat: Straw burnt: 8 Sept, 1986. Heavy spring-tine cultivated: 9 Sept. Ploughed treatment applied: 12-15 Sept. These plots disced four times: 18 Sept. These plots rolled: 19 Sept. Discd: 27 Sept. Rotary harrowed: 2 Oct. Rolled: 3 Oct. Paraquat applied: 3 Nov. Seed sown, NPK applied, harrowed: 7 Nov. Isoproturon, clopyralid, bromoxynil and mecoprop applied: 27 Apr. N treatments applied: 1 May. Growth regulator applied: 27 May. Combine harvested: 14 Sept.

Series III, w. barley: Straw burnt: 8 Sept, 1986. Heavy spring-tine cultivated: 9 Sept. Ploughed treatment applied: 15 Sept. These plots disced twice: 18 Sept. These plots rolled: 19 Sept. Discd: 27 Sept. Spike harrowed with crumbler attached: 2 Oct. Rolled: 3 Oct. Paraquat applied: 3 Nov. Seed sown, NPK applied, harrowed: 5 Dec. Isoproturon, clopyralid, bromoxynil and mecoprop applied: 27 Apr, 1987. N treatments applied: 1 May. Growth regulators applied: 27 May. Combine harvested: 10 Sept.

87/W/CS/245 SPRING BARLEY SERIES I

GRAIN TONNES/HECTARE

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

PK SUB	---	--S	PKS	Mean
N PATH				
75 ENHD	5.11	4.67	4.13	4.63
150 ENHD	4.71	4.07	4.48	4.42
150/225E	4.64	4.41	4.33	4.46
150 STND	4.27	4.23	3.56	4.02
Mean	4.68	4.35	4.12	4.38
YEAR	1980	1980/3/6	Mean	
N PATH				
75 ENHD	5.13	4.14	4.63	
150 ENHD	4.49	4.35	4.42	
150/225E	4.70	4.22	4.46	
150 STND	4.05	3.99	4.02	
Mean	4.59	4.18	4.38	
YEAR	1980	1980/3/6	Mean	
PK SUB				
---	4.72	4.64	4.68	
--S	4.81	3.89	4.35	
PKS	4.24	4.01	4.12	
Mean	4.59	4.18	4.38	
DRILL	CNVNTIAL	DIRECT	Mean	
N PATH				
75 ENHD	4.23	4.84	4.63	
150 ENHD	4.23	4.52	4.42	
150/225E	4.03	4.67	4.46	
150 STND	3.86	4.10	4.02	
Mean	4.09	4.53	4.38	
DRILL	CNVNTIAL	DIRECT	Mean	
PK SUB				
---	4.42	4.81	4.68	
--S	3.86	4.59	4.35	
PKS	3.99	4.19	4.12	
Mean	4.09	4.53	4.38	
DRILL	CNVNTIAL	DIRECT	Mean	
YEAR				
1980	4.39	4.69	4.59	
1980/3/6	3.78	4.37	4.18	
Mean	4.09	4.53	4.38	

87/W/CS/245 SPRING BARLEY SERIES I

GRAIN TONNES/HECTARE

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

PK SUB	---	1980/3/6		--S	1980/3/6		PKS	1980/3/6	
YEAR	1980	1980/3/6		1980	1980/3/6		1980	1980/3/6	
N PATH									
75 ENHD	5.05	5.16		5.52	3.83		4.81	3.44	
150 ENHD	4.73	4.69		4.26	3.89		4.47	4.48	
150/225E	4.70	4.57		5.16	3.66		4.24	4.43	
150 STND	4.42	4.13		4.29	4.17		3.45	3.68	

PK SUB	---	1980/3/6		--S	1980/3/6		PKS	1980/3/6	
DRILL	CVNVTIAL	DIRECT		CVNVTIAL	DIRECT		CVNVTIAL	DIRECT	
N PATH									
75 ENHD	4.27	5.52		4.57	4.72		3.86	4.26	
150 ENHD	4.61	4.76		3.62	4.30		4.46	4.49	
150/225E	4.31	4.80		3.66	4.79		4.12	4.44	
150 STND	4.49	4.17		3.58	4.56		3.51	3.59	

YEAR	1980	1980/3/6		1980/3/6	
DRILL	CVNVTIAL	DIRECT		CVNVTIAL	DIRECT
N PATH					
75 ENHD	4.89	5.25		3.58	4.42
150 ENHD	4.26	4.60		4.20	4.43
150/225E	4.55	4.77		3.51	4.58
150 STND	3.87	4.14		3.85	4.07

YEAR	1980	1980/3/6		1980/3/6	
DRILL	CVNVTIAL	DIRECT		CVNVTIAL	DIRECT
PK SUB					
---	4.58	4.80		4.26	4.83
--S	4.45	4.99		3.27	4.20
PKS	4.15	4.29		3.82	4.10

PK SUB	---	1980/3/6		1980/3/6	
YEAR	1980	DIRECT		CVNVTIAL	DIRECT
DRILL					
N PATH					
75 ENHD	4.62	5.27		3.92	5.78
150 ENHD	4.74	4.73		4.49	4.79
150/225E	4.78	4.65		3.84	4.94
150 STND	4.19	4.53		4.79	3.80

PK SUB	--S	1980/3/6		1980/3/6	
YEAR	1980	DIRECT		CVNVTIAL	DIRECT
DRILL					
N PATH					
75 ENHD	5.81	5.37		3.33	4.08
150 ENHD	3.52	4.63		3.73	3.97
150/225E	4.40	5.54		2.92	4.04
150 STND	4.07	4.41		3.09	4.71

87/W/CS/245 SPRING BARLEY SERIES I

GRAIN TONNES/HECTARE

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

PK SUB YEAR DRILL N PATH	PKS 1980 CNVNTIAL	DIRECT	1980/3/6 CNVNTIAL	DIRECT	
75 ENHD	4.24	5.10	3.47	3.42	
150 ENHD	4.54	4.44	4.38	4.53	
150/225E	4.47	4.12	3.77	4.76	
150 STND	3.36	3.49	3.67	3.68	
N PATH EXTRA	75 ENHD	150 ENHD	150/225E	150 STND	Mean
TPK 80 D	5.03	5.47	5.44	3.93	4.97
TPK 80 C	4.48	3.93	4.35	4.82	4.40
Mean	4.75	4.70	4.90	4.38	4.68

N PATH	PK SUB	YEAR DRILL	1980 CNVNTIAL	1980/3/6 DIRECT	1980/3/6 CNVNTIAL	DIRECT
75 ENHD	---		4.62	5.27	3.92	5.78
	--S		5.81	5.37	3.33	4.08
	PKS		4.24	5.10	3.47	3.42
150 ENHD	---		4.74	4.73	4.49	4.79
	--S		3.52	4.63	3.73	3.97
	PKS		4.54	4.44	4.38	4.53
150/225E	---		4.78	4.65	3.84	4.94
	--S		4.40	5.54	2.92	4.04
	PKS		4.47	4.12	3.77	4.76
150 STND	---		4.19	4.53	4.79	3.80
	--S		4.07	4.41	3.09	4.71
	PKS		3.36	3.49	3.67	3.68

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

Table	EXTRA	PK SUB	YEAR	DRILL	
s.e.d.	0.568	0.232	0.189	0.201	
Table	N PATH*	N PATH*	PK SUB	N PATH*	
s.e.d.	PK SUB	YEAR	YEAR	DRILL	
	0.365	0.298	0.328	0.316	
Table	PK SUB	YEAR	N PATH*	N PATH*	
s.e.d.	DRILL	DRILL	EXTRA	PK SUB	
	0.402	0.328		YEAR	min rep
	0.348	0.284	0.894	0.516	max-min
	0.284	0.232			max rep
Table	N PATH*	N PATH*	PK SUB	N PATH*	
s.e.d.	PK SUB	YEAR	YEAR	PK SUB	
	DRILL	DRILL	DRILL	YEAR	
	0.632	0.516	0.568	0.894	min rep
	0.547	0.447	0.492	0.774	max-min
	0.447	0.365	0.402	0.632	max rep

87/W/CS/245 SPRING BARLEY SERIES I

GRAIN TONNES/HECTARE

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

\* Within the same level of N PATH only

DRILL  
Min-rep CNVNTIAL  
Max rep DIRECT  
Max min DIRECT v CNVNTIAL

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

Stratum	d.f.	s.e.	cv%
WP1	6	0.402	9.1
WP1.WP2	18	0.563	12.8

GRAIN MEAN DM% 80.0

SUB PLOT AREA HARVESTED 0.00341



87/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

PK SUB	---	--S	PKS	Mean
N PATH				
75 ENHD	4.13	3.78	3.94	3.95
150 ENHD	4.66	4.43	4.56	4.55
225 ENHD	5.27	4.94	5.07	5.09
150 STND	3.77	3.62	3.30	3.56
Mean	4.46	4.19	4.22	4.29

YEAR	1980	1980/3/6	Mean
N PATH			
75 ENHD	3.87	4.03	3.95
150 ENHD	4.37	4.73	4.55
225 ENHD	4.85	5.34	5.09
150 STND	3.10	4.02	3.56
Mean	4.05	4.53	4.29

YEAR	1980	1980/3/6	Mean
PK SUB			
---	4.39	4.52	4.46
--S	3.91	4.47	4.19
PKS	3.84	4.60	4.22
Mean	4.05	4.53	4.29

DRILL	CNVNTIAL	DIRECT	Mean
N PATH			
75 ENHD	3.93	3.96	3.95
150 ENHD	4.52	4.56	4.55
225 ENHD	5.18	5.05	5.09
150 STND	4.07	3.31	3.56
Mean	4.43	4.22	4.29

DRILL	CNVNTIAL	DIRECT	Mean
PK SUB			
---	4.38	4.49	4.46
--S	4.42	4.08	4.19
PKS	4.48	4.08	4.22
Mean	4.43	4.22	4.29

DRILL	CNVNTIAL	DIRECT	Mean
YEAR			
1980	4.54	3.80	4.05
1980/3/6	4.32	4.63	4.53
Mean	4.43	4.22	4.29

87/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

PK SUB	---	1980/3/6		--S	1980/3/6		PKS	1980/3/6	
YEAR	1980			1980			1980		
N PATH									
75 ENHD	4.04	4.21		3.69	3.87		3.86	4.02	
150 ENHD	4.71	4.61		4.31	4.55		4.09	5.02	
225 ENHD	5.15	5.39		4.71	5.17		4.70	5.45	
150 STND	3.67	3.86		2.94	4.30		2.69	3.90	

PK SUB	---	1980/3/6		--S	1980/3/6		PKS	1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	
N PATH									
75 ENHD	3.94	4.22		3.83	3.76		4.04	3.89	
150 ENHD	4.42	4.78		4.47	4.41		4.66	4.50	
225 ENHD	5.20	5.30		5.22	4.80		5.13	5.05	
150 STND	3.97	3.67		4.16	3.35		4.09	2.90	

YEAR	1980	1980/3/6		1980/3/6	1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
75 ENHD	4.05	3.77		3.82	4.14	
150 ENHD	4.48	4.32		4.56	4.81	
225 ENHD	5.53	4.51		4.84	5.59	
150 STND	4.09	2.61		4.06	4.00	

YEAR	1980	1980/3/6		1980/3/6	1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB						
---	4.71	4.23		4.05	4.75	
--S	4.47	3.63		4.37	4.53	
PKS	4.42	3.54		4.54	4.63	

PK SUB	---	1980/3/6		1980/3/6	1980/3/6	
YEAR	1980	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
75 ENHD	4.07	4.03		3.80	4.42	
150 ENHD	4.53	4.81		4.32	4.75	
225 ENHD	6.00	4.72		4.40	5.89	
150 STND	4.26	3.38		3.67	3.96	

PK SUB	--S	1980/3/6		1980/3/6	1980/3/6	
YEAR	1980	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
75 ENHD	3.89	3.60		3.77	3.92	
150 ENHD	4.65	4.14		4.30	4.68	
225 ENHD	5.30	4.41		5.14	5.19	
150 STND	4.06	2.38		4.27	4.31	

87/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

PK SUB	PKS	1980		1980/3/6		
YEAR	1980	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	
N PATH	75 ENHD	150 ENHD	225 ENHD	150 STND	Mean	
75 ENHD	4.20	3.69	3.88	4.09		
150 ENHD	4.25	4.02	5.07	4.99		
225 ENHD	5.29	4.40	4.96	5.69		
150 STND	3.93	2.07	4.25	3.73		
N PATH	75 ENHD	150 ENHD	225 ENHD	150 STND	Mean	
EXTRA						
TPK 80 D	4.37	4.80	4.93	3.53	4.41	
TPK 80 C	4.02	4.16	5.10	4.36	4.41	
Mean	4.19	4.48	5.01	3.95	4.41	

N PATH	PK SUB	YEAR	1980	1980/3/6	DIRECT
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL
75 ENHD	---	---	4.07	4.03	3.80
	--S	---	3.89	3.60	3.77
	PKS	---	4.20	3.69	3.88
150 ENHD	---	---	4.53	4.81	4.32
	--S	---	4.65	4.14	4.30
	PKS	---	4.25	4.02	5.07
225 ENHD	---	---	6.00	4.72	4.40
	--S	---	5.30	4.41	5.14
	PKS	---	5.29	4.40	4.96
150 STND	---	---	4.26	3.38	3.67
	--S	---	4.06	2.38	4.27
	PKS	---	3.93	2.07	4.25

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

Table	EXTRA	PK SUB	YEAR	DRILL	
s.e.d.	0.860	0.351	0.287	0.304	
Table	N PATH*	N PATH*	PK SUB	N PATH*	
s.e.d.	PK SUB	YEAR	YEAR	DRILL	
	0.408	0.333	0.496	0.354	
Table	PK SUB	YEAR	N PATH*	N PATH*	
s.e.d.	DRILL	DRILL	EXTRA	PK SUB	
	0.608	0.496		YEAR	
	0.527	0.430	1.000	0.578	min rep
	0.430	0.351			max-min
					max rep
Table	N PATH*	N PATH*	PK SUB	N PATH*	
s.e.d.	PK SUB	YEAR	YEAR	PK SUB	
	DRILL	DRILL	DRILL	YEAR	
	0.707	0.576	0.860	1.000	min rep
	0.613	0.500	0.745	0.866	max-min
	0.500	0.408	0.608	0.707	max rep

87/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

\* Within the same level of N PATH only

DRILL  
Min-rep CNVTIAL  
Max rep DIRECT  
Max min DIRECT v CNVTIAL

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

Stratum	d.f.	s.e.	cv%
WP1	6	0.608	14.1
WP1.WP2	18	0.418	9.7

GRAIN MEAN DM% 80.0

SUB PLOT AREA HARVESTED 0.00341

87/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

PK SUB	---	--S	PKS	Mean
N PATH				
75 ENHD	4.13	4.47	4.78	4.46
150 ENHD	5.35	5.41	5.48	5.41
150/225E	5.34	5.31	5.40	5.35
150 STND	4.52	4.53	4.46	4.51
Mean	4.83	4.93	5.03	4.93
YEAR	1980	1980/3/6	Mean	
N PATH				
75 ENHD	4.41	4.50	4.46	
150 ENHD	5.50	5.32	5.41	
150/225E	5.59	5.11	5.35	
150 STND	4.57	4.44	4.51	
Mean	5.02	4.84	4.93	
YEAR	1980	1980/3/6	Mean	
PK SUB				
---	5.02	4.65	4.83	
--S	5.05	4.81	4.93	
PKS	4.98	5.07	5.03	
Mean	5.02	4.84	4.93	
DRILL	CNVNTIAL	DIRECT	Mean	
N PATH				
75 ENHD	4.46	4.46	4.46	
150 ENHD	5.18	5.53	5.41	
150/225E	4.96	5.55	5.35	
150 STND	4.14	4.69	4.51	
Mean	4.68	5.06	4.93	
DRILL	CNVNTIAL	DIRECT	Mean	
PK SUB				
---	4.52	4.99	4.83	
--S	4.75	5.02	4.93	
PKS	4.77	5.16	5.03	
Mean	4.68	5.06	4.93	
DRILL	CNVNTIAL	DIRECT	Mean	
YEAR				
1980	4.62	5.22	5.02	
1980/3/6	4.74	4.90	4.84	
Mean	4.68	5.06	4.93	

87/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

PK SUB	---		--S		PKS	
YEAR	1980	1980/3/6	1980	1980/3/6	1980	1980/3/6
N PATH						
75 ENHD	3.89	4.36	4.61	4.32	4.73	4.83
150 ENHD	5.42	5.28	5.57	5.25	5.52	5.43
150/225E	5.87	4.82	5.50	5.13	5.40	5.39
150 STND	4.92	4.12	4.51	4.56	4.28	4.64

PK SUB	---		--S		PKS	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
75 ENHD	4.29	4.04	4.49	4.45	4.59	4.88
150 ENHD	4.83	5.60	5.39	5.43	5.31	5.56
150/225E	4.92	5.56	4.87	5.53	5.09	5.55
150 STND	4.05	4.76	4.25	4.67	4.10	4.64

YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.42	4.41	4.49	4.51
150 ENHD	5.11	5.70	5.25	5.36
150/225E	4.95	5.91	4.97	5.18
150 STND	4.02	4.84	4.25	4.54

YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB				
---	4.77	5.15	4.28	4.83
--S	4.52	5.31	4.99	4.73
PKS	4.59	5.18	4.95	5.13

PK SUB	---		1980/3/6	
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.43	3.63	4.15	4.46
150 ENHD	5.06	5.60	4.60	5.61
150/225E	5.24	6.18	4.60	4.93
150 STND	4.34	5.21	3.76	4.31

PK SUB	--S		1980/3/6	
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.46	4.69	4.53	4.22
150 ENHD	4.99	5.86	5.79	4.99
150/225E	4.75	5.87	4.99	5.19
150 STND	3.86	4.83	4.64	4.52

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GRAIN TONNES/HECTARE

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

PK SUB YEAR DRILL	PKS 1980 CNVNTIAL	DIRECT	1980/3/6 CNVNTIAL	DIRECT	
N PATH 75 ENHD	4.39	4.90	4.79	4.85	
150 ENHD	5.28	5.64	5.34	5.48	
150/225E	4.85	5.68	5.32	5.42	
150 STND	3.84	4.49	4.36	4.79	
N PATH EXTRA					Mean
TPK 80 D	4.87	5.89	6.34	5.01	5.53
TPK 80 C	4.16	4.72	4.77	4.37	4.50
Mean	4.51	5.30	5.56	4.69	5.02

N PATH	PK SUB	YEAR DRILL	1980 CNVNTIAL	DIRECT	1980/3/6 CNVNTIAL	DIRECT
75 ENHD	---		4.43	3.63	4.15	4.46
	--S		4.46	4.69	4.53	4.22
	PKS		4.39	4.90	4.79	4.85
150 ENHD	---		5.06	5.60	4.60	5.61
	--S		4.99	5.86	5.79	4.99
	PKS		5.28	5.64	5.34	5.48
150/225E	---		5.24	6.18	4.60	4.93
	--S		4.75	5.87	4.99	5.19
	PKS		4.85	5.68	5.32	5.42
150 STND	---		4.34	5.21	3.76	4.31
	--S		3.86	4.83	4.64	4.52
	PKS		3.84	4.49	4.36	4.79

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

Table s.e.d.	EXTRA 0.438	PK SUB 0.179	YEAR 0.146	DRILL 0.155	
Table s.e.d.	N PATH* PK SUB 0.250	N PATH* YEAR 0.204	PK SUB YEAR 0.253	N PATH* DRILL 0.216	
Table s.e.d.	PK SUB DRILL 0.310 0.268 0.219	YEAR DRILL 0.253 0.219 0.179	N PATH* EXTRA 0.611	N PATH* PK SUB YEAR 0.353	min rep max-min max rep
Table s.e.d.	N PATH* PK SUB DRILL 0.432 0.374 0.306	N PATH* YEAR DRILL 0.354 0.306 0.250	PK SUB YEAR DRILL 0.438 0.379 0.310	N PATH* PK SUB YEAR DRILL 0.611 0.529 0.432	min rep max-min max rep

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

\* Within the same level of N PATH only

DRILL  
Min-rep CNVTIAL  
Max rep DIRECT  
Max min DIRECT v CNVTIAL

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

Stratum	d.f.	s.e.	cv%
WP1	6	0.310	6.3
WP1.WP2	18	0.348	7.0

GRAIN MEAN DM% 83.1

SUB PLOT AREA HARVESTED 0.00341