ROTHAMSTED RESEARCH

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

Rothamsted Research (1988) *87/W/CS/245 Minimum Cultivation and Deep P K - W. Wheat, W. Barley, S. Barley ;* Yields Of The Field Experiments 1987, pp 97 - 111 **- DOI: https://doi.org/10.23637/ERADOC-1-37**

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)

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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 P2O5, as superphosphate, 250 kg K2O 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. Disced: 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. Disced: 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. Disced: 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.

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87/W/CS/245 SPRING BARLEY SERIES I

GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	Mean
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 N PATH	1980	1980/3/6	Mean
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 PK SUB	1980	1980/3/6	Mean
---	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 N PATH	CNVNTIAL	DIRECT	Mean
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 PK SUB	CNVNTIAL	DIRECT	Mean
---	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 YEAR	CNVNTIAL	DIRECT	Mean
1980	4.39	4.69	4.59
1980/3/6	3.78	4.37	4.18
Mean	4.09	4.53	4.38

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87/W/CS/245 SPRING BARLEY SERIES I

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	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	---		--S		PKS	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	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	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	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	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	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	---			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
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			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
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

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87/W/CS/245 SPRING BARLEY SERIES I

GRAIN TONNES/HECTARE

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

PK SUB	PKS			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
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	75 ENHD	150 ENHD	150/225E	150 STND	Mean
EXTRA					
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

		YEAR	1980		1980/3/6	
N PATH	PK SUB	DRILL	CNVNTIAL	DIRECT	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* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL	
s.e.d.	0.365	0.298	0.328	0.316	
Table	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR	
s.e.d.	0.402	0.328			min rep
	0.348	0.284	0.894	0.516	max-min
	0.284	0.232			max rep
Table	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL	
s.e.d.	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

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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

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GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	Mean
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 N PATH	1980	1980/3/6	Mean
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 PK SUB	1980	1980/3/6	Mean
---	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 N PATH	CNVNTIAL	DIRECT	Mean
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 PK SUB	CNVNTIAL	DIRECT	Mean
---	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 YEAR	CNVNTIAL	DIRECT	Mean
1980	4.54	3.80	4.05
1980/3/6	4.32	4.63	4.53
Mean	4.43	4.22	4.29

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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	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	---		--S		PKS	
DRILL	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	
DRILL	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	
DRILL	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	---			
YEAR	1980		1980/3/6	
DRILL	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			
YEAR	1980		1980/3/6	
DRILL	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

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GRAIN TONNES/HECTARE

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

PK SUB YEAR DRILL N PATH	PKS 1980 CNVNTIAL	DIRECT	1980/3/6 CNVNTIAL	DIRECT
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 EXTRA	75 ENHD	150 ENHD	225 ENHD	150 STND	Mean
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 DRILL	1980 CNVNTIAL	DIRECT	1980/3/6 CNVNTIAL	DIRECT
75 ENHD	---		4.07	4.03	3.80	4.42
	--S		3.89	3.60	3.77	3.92
	PKS		4.20	3.69	3.88	4.09
150 ENHD	---		4.53	4.81	4.32	4.75
	--S		4.65	4.14	4.30	4.68
	PKS		4.25	4.02	5.07	4.99
225 ENHD	---		6.00	4.72	4.40	5.89
	--S		5.30	4.41	5.14	5.19
	PKS		5.29	4.40	4.96	5.69
150 STND	---		4.26	3.38	3.67	3.96
	--S		4.06	2.38	4.27	4.31
	PKS		3.93	2.07	4.25	3.73

*** 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* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL	
s.e.d.	0.408	0.333	0.496	0.354	
Table	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR	
s.e.d.	0.608	0.496			min rep
	0.527	0.430	1.000	0.578	max-min
	0.430	0.351			max rep
Table	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL	
s.e.d.	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

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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	CNVNTIAL
Max rep	DIRECT
Max min	DIRECT v CNVNTIAL

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

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

GRAIN MEAN DM% 80.0

SUB PLOT AREA HARVESTED 0.00341

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	Mean
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 N PATH	1980	1980/3/6	Mean
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 PK SUB	1980	1980/3/6	Mean
---	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 N PATH	CNVNTIAL	DIRECT	Mean
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 PK SUB	CNVNTIAL	DIRECT	Mean
---	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 YEAR	CNVNTIAL	DIRECT	Mean
1980	4.62	5.22	5.02
1980/3/6	4.74	4.90	4.84
Mean	4.68	5.06	4.93

https://doi.org/10.23637/ERADOC-1-37

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	---			
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			
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	PKS			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	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	75 ENHD	150 ENHD	150/225E	150 STND	Mean
EXTRA					
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

		YEAR	1980		1980/3/6	
N PATH	PK SUB	DRILL	CNVNTIAL	DIRECT	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	EXTRA	PK SUB	YEAR	DRILL	
s.e.d.	0.438	0.179	0.146	0.155	
Table	N PATH* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL	
s.e.d.	0.250	0.204	0.253	0.216	
Table	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR	
s.e.d.	0.310	0.253			min rep
	0.268	0.219	0.611	0.353	max-min
	0.219	0.179			max rep
Table	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL	
s.e.d.	0.432	0.354	0.438	0.611	min rep
	0.374	0.306	0.379	0.529	max-min
	0.306	0.250	0.310	0.432	max rep

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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	0.310	6.3
WP1.WP2	18	0.348	7.0

GRAIN MEAN DM% 83.1

SUB PLOT AREA HARVESTED 0.00341

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