DEPARTMENT OF AGRICULTURE

WESTERN AUSTRALIA

1986 SUMMARY OF EXPERIMENTS

FOLIAR WHEAT DISEASES AND CEREAL SMUTS

A. Chemical control of leaf spots of wheat

B. Semi-natural inoculum for plant breeders' plots

C. Chemical control of soil-borne flag smut

D. Chemical control of barley loose smut

E. Chemical control of loose smut in barley with different levels of seed infection

F. Disease characterisation of cereal variety trial stage 4 sites

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A. Chemical control of leaf spots of wheat

Objectives — To assess effectiveness of seed dressings for control of wheat foliar pathogens.

Experimental — 86BA41 and 86MT49/4492EX

Cultivar:	Millewa (86BA41) Cranbrook (86MT49)	
Design:	Split plot	
Treatments:	Main plots	1. No Tilt Z39
		2. Tilt spray 0.75L (187.5 g propiconazole)/ha at Z39
	Sub plots	1. Nil
		2. 2 sprays Tilt 0.75L/ha, Z30 & Z55
		3. Baytan 200 g/100 kg seed (15 g triadimenol/ha)
		4. Armour 100 g/100 kg seed (5 g flutriafol/ha)
		5. Armour (coated on double superphosphate) 100 g flutriafol/ha
		6. Armour (coated on double superphosphate) 200 g flutriafol/ha
Seeding rate:	50 kg/ha	
Plot size:	1.4 x 20 m	
Replications:	5	
Buffers:	Barley plot between each wheat	
Inoculation:	Infested straw @ 30 g/m^2	
Fertilizers:	80 kg/ha double superphosphate at seeding, Trial BA41 received 50 kg/ha urea topdressed 31/7/86	
Sowing dates and Locations:	Badgingarra R.S. (Paddock 5B), with Robin Randall 4/6/86	Mt Barker R.S. (Paddock S4) with Doug Rowe 28/5/86
Assessments:	Emergence, foliar disease levels, dry weight, hundred grain weight, grain yield	

Comments 86BA41

Fungicide seed treatments did not affect emergence. Figure 1 shows the mean disease levels occurring on this trial. Damage to the youngest (L1) and second youngest (L2) leaves was negligable, however leaves (L3 and L4) sustained considerable damage throughout the trial. Septoria nodorum blotch established after inoculation but was swamped by naturally occurring common leaf spot.

The application of Tilt for the main treatment occurred at Z57, later than scheduled (Z39). The first significant effect of this treatment occurred at Z77. Large reductions in leaf damage of leaves 1 and 2 were recorded at this stage (Table 1). This difference was not reflected in dry weight, grain weight or grain yield. Armour at 100 and 200 g ac/ha produced small but significant reductions to the area affected by disease on leaf 4. The effects were rarely significant when averaged over the top four leaves. At Z77 two applications of Tilt (Z39 and Z63) reduced disease significantly, and the main treatment of Tilt (Z57) reduced disease by the greatest amount when combined with Armour at 100 or 200 g ac/ha. No treatment or treatment combination gave a significant response for dry weight, grain weight or grain yield. The trial experienced a poor start due to a dry seed bed and early nitrogen deficiency. This, and a severe infestation of brome grass contributed to poor yields, reducing the likelihood of observing yield responses to fungicide treatments.

Figures 1 & 2. Average foliar disease levels (as % leaf area affected on leaves 1 to 4) on two trials, at different stages of plant development.

Figure 1. Trial 86BA41.

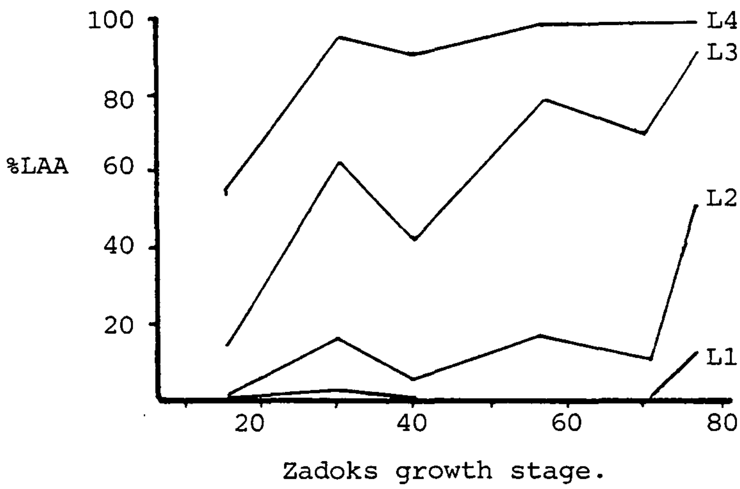

Figure 2. Trial 86MT49

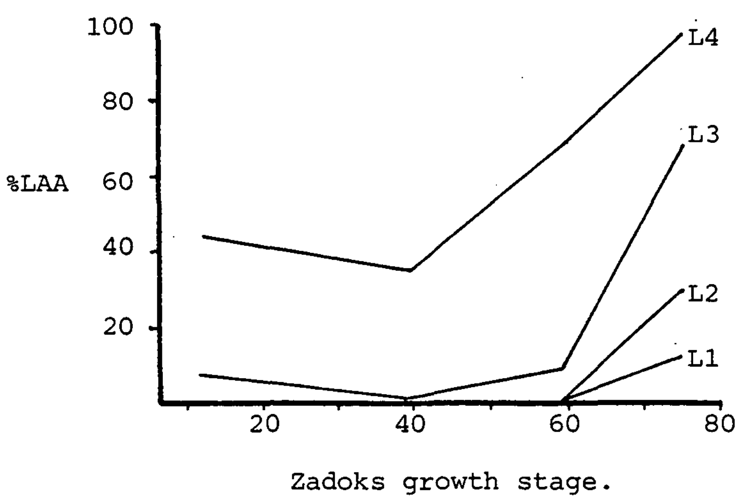

Table 1. Trial 86BA41 emergence, disease and yield data.

	Emergence plants/3m²	Z16/23[a] 15/8 L4	Z16/23 15/8 L1-4	Z31 29/8 L4	Z31 29/8 L1-4	Z40 11/9 L4	Z40 11/9 L1-4	Z57 26/9 L4	Z57 26/9 L1-4	Z71 10/10 L3	Z71 10/10 L1-4	Z77 24/10 L2	Z77 24/10 L1-4	Dry Wt. Z73 g/m²	100 grain weight g	Grain Yield[b] g/m²
Main plots 1. No. Tilt Z57										75.9	47.1	70.5	70.9	171	2.88	72
2. Tilt Z57										61.9	42.8	32.5	56.5	192	3.02	84
lsd ($p < 0.05$)										NS	NS	2.7	2.9	NS	NS	NS
Sub plots																
a. Nil	299	57.1	18.2	97.5	45.9	92.6	35.0	100	51.3	74.9	47.8	57.5	66.5	189	2.92	82
b. Tilt Z39, Z63	245	61.3	19.0	99.3	47.2	94.2	36.9	98.7	47.9	61.1	41.9	34.3	57.4	171	2.98	73
c. Baytan 15 g ac/ha	306	57.5	19.3	93.3	42.9	93.6	35.9	99.8	48.8	75.5	46.6	60.1	67.0	181	2.91	75
d. Armour 5 g ac/ha	301	59.5	18.7	97.9	45.7	92.1	34.9	99.8	47.5	68.4	45.0	60.7	67.8	187	2.92	78
e. Armour 100 g ac/ha	278	42.0	12.9	91.2	41.7	86.3	34.0	99.7	49.7	69.3	45.2	49.3	62.0	182	2.97	80
f. Armour 200 g ac/ha	316	44.1	15.6	92.0	40.5	87.0	33.6	97.5	45.6	64.1	43.3	47.2	61.5	180	2.98	83
lsd ($p < 0.05$)	NS	10.7	3.7	4.5	NS	5.1	NS	NS	NS	9.6	3.5	12.7	5.9	NS	NS	NS

Main x sub	Main − L3	Main + L3	Main − L1-4	Main + L1-4	Main − L2	Main + L2	Main − L1-4	Main + L1-4
a.	82	68	49	47	75	40	73	60
b.	64	58	43	41	34	34	57	58
c.	87	64	51	42	82	39	76	59
d.	82	55	50	40	87	35	77	59
e.	74	64	46	44	78	21	73	51
f.	66	63	44	43	67	27	70	53
lsd ($p < 0.05$)	NS		5.8		18.0		8.4	

Pathogens	Z16/23	Z31	Z40	Z57	Z71	Z77
	95% SN[c]	70% DV	80% DV	70% DV	45% DV	30% DV
	5% DT	30% SN	20% SN	30% SN	45% SN	50% SN
		TRACE DT	TRACE DT		10% DT	20% YS
						TRACE ST

a. L2 = % leaf area affected on second youngest leaf
L3 = % leaf area affected on third youngest leaf
L4 = % leaf area affected on fourth youngest leaf
L1-4 = % leaf area affected on averaged over top four leaves

b. 100 g/m² = 1 t/ha

c. SN = *Septoria nodorum*
DV = *Drechslera verticillata*
DT = *Drechslera tritici-repentis*
ST = *Septoria tritici*

Comments 86MT49

Fungicide seed treatments did not affect emergence. Figure 2 shows the low mean disease levels occurring on this trial. Despite being present in plots from the first sampling date, neither septoria nodorum blotch nor septoria tritici blotch reached damaging levels until late in the season.

The application of Tilt for the main treatment occurred at Z49, later than the scheduled Z39. The first significant effect of this treatment occurred at Z75 with reductions in damage to leaves 2 and 3 at this stage. No affects of seed dressing fungicides on disease levels were observed throughout the trial. A single application of Tilt at Z30 reduced disease at Z59 and Z75. This trial showed very vigorous growth and yielded extremely well. However, there were no dryweight, grain weight or yield responses to fungicide treatment, probably as a result of low disease levels for most of the duration of the trial.

Table 2. Trial 86MT49 Emergence, disease and yield data.

	Emergence plants/3m[2]	Z16/26[a] 12/8 L4	Z16/26 12/8 L1-4	Z39 8/9 L4	Z39 8/9 L1-4	Z59 30/9 L4	Z59 30/9 L1-4	Z75 30/10 L3	Z75 30/10 L1-4	Dry Wt. Z73 g/m[2]	100 grain weight g	Grain yield[b] g/m²
Main plots 1. No Tilt Z49						67.3	18.8	81.7	58.8	1697	3.97	534
2. Tilt Z49						69.7	20.2	52.8	43.8	1768	4.11	532
lsd ($p < 0.05$)						NS	NS	15.6	10.4	66	NS	NS
Sub plots												
a. Nil	400	42.6	12.2	34.2	9.0	74.0	21.7	76.3	53.6	1685	4.02	536
b. Tilt Z30 187.5 g ac/ha	459	49.3	15.1	34.7	9.0	27.4	7.2	32.3	37.0	1756	4.17	537
c. Baytan 16 g ac/ha	442	40.2	13.0	31.6	8.2	70.0	20.7	73.3	52.7	1767	4.00	530
d. Armour 5 g ac/ha	435	44.2	13.6	39.1	10.1	80.5	22.4	69.9	52.6	1747	4.08	530
e. Armour 100 g ac/ha	398	45.0	13.0	33.5	8.6	82.0	21.8	76.3	56.4	1799	3.99	540
f. Armour 200 g ac/ha	422	42.2	12.1	36.5	9.5	80.7	23.1	75.0	55.5	1641	4.01	523
lsd ($P < 0.05$)	NS	NS	NS	NS	NS	11.9	3.6	12.4	7.3	NS	NS	NS

Main x Sub	Main L4 −	Main L4 +	Main L1-4 −	Main L1-4 +	Main L3 −	Main L3 +	Main L1-4 −	Main L1-4 +
a.	67	81	18	25	94	59	62	46
b.	24	31	6	8	30	35	38	36
c.	70	73	20	21	91	56	63	43
d.	81	80	23	22	88	52	61	44
e.	82	73	23	21	94	58	65	48
f.	81	81	23	24	93	57	65	47
lsd ($p < 0.05$)	NS		NS		20		NS	

Pathogens	Z16/26	Z39	Z59	Z75
	85% SN[c]	80% SN	80% SN	90% SN
	10% ST	20% ST	20% ST	10% ST
	5% DT			

a. L3 = % leaf area affected on third youngest leaf
L4 = % leaf area affected on fourth youngest leaf.
L1-4 = % leaf area affected averaged over top four leaves.
Z = Zadoks' growth stage

b. 100 g/m² = 1 t/ha

c. SN = *Septoria nodorum*
ST = *Septoria tritici*
DT = *Drechslera tritici-repentis*

B. Semi-natural inoculum for plant breeder's plots

Objectives — To assess the effectiveness of semi-natural inoculum of *Leptosphaeria nodorum* and *Pyrenophora tritici-repentis* in establishing epidemics in small plots of wheat.

Experimental — 86MD24/5226EX

Cultivar:	Millewa
Design:	CRD
Treatments:	Nil
	L. nodorum colonised wheat grain, 30 g/m^2
	" " " " 60 g/m^2
	" " wheaten chaff 30 g/m^2
	" " " " 60 g/m^2
	P. tritici-repentis colonised wheat grain, 30 g/m^2
	" " " " 60 g/m^2
	" " wheaten chaff 30 g/m^2
	" " " " 60 g/m^2
	Stubble naturally infested with *L. nodorum* and *P. tritici-repentis*, 30 g/m^2
Seeding Rate:	50 kg/ha
Plot size:	1 x 5 m
Replications:	3
Buffers:	Experimental plots separated by one plot length and two plot widths of barley.
Location:	Medina Vegetable Research Station, with Robin Wilson (PPD)
Irrigation:	Overhead sprinklers 3 times/week between inoculation and the end of sampling
Assessments:	Foliar disease levels and pathogen proportions at 4 times after inoculation.

Comments

Plots were inoculated on 4/9/86 (Zadoks 15/21). Observations on uninoculated plots on 4/9 indicated a naturally occurring background level of disease comprised entirely of *L. nodorum*. This naturally occurring disease obscured the effects of some treatments. The three most effective treatments were *L. nodorum* chaff (60 g/m^2), *P. tritici-repentis* chaff (60 g/m^2) and natural stubble (30 g/m^2). No treatment caused significantly greater leaf damage than that occurring naturally on untreated plots. *L. nodorum* chaff at 60 g/m^2 was most successful at producing disease beyond levels occurring naturally (Table 3). *P. tritici-repentis* chaff at 60 g/m^2, while not increasing general disease levels beyond natural levels, did succeed in introducing *P. tritici-repentis* into the plots in sufficient quantity to permit dominance over *L. nodorum* by 30/10. Other *P. tritici-repentis* treatments were less effective at introducing this pathogen than chaff at 60 g/m^2. However this treatment was not as effective as natural stubble at introducing *P. tritici-repentis* into the plots.

Table 3 Per cent leaf area diseased on the second youngest leaf for the three most effective treatments and the untreated control

Sampling Date	4/9	18/9	2/10	16/10	30/10
Uninoculated	0.5	4	15	72	91
_L_. _nodorum_ chaff (60 g/m^2)	-	15	40	86	97
_P_. _tritici-repentis_ chaff (60 g/m^2)	-	3	11	72	86
Stubble (30 g/m^2)	-	4	21	84	97

Table 4 Estimated per cent proportion of _L_. _nodorum_ to _P_. _tritici-repentis_ occurring on diseased plants, from all treatments

Sampling Date	4/9	18/9	2/10	16/10	30/10
Uninoculated	100/0	100/0	100/0	100/0	85/15
Ln gr30	-	100/0	99/1	100/0	86/14
Ln gr60	-	100/0	100/0	100/0	92/8
Ln ch30	-	100/0	100/0	83/17	73/27
Ln ch60	-	100/0	100/0	100/0	87/13
Pt gr30	-	100/0	98/2	70/30	95/5
Pt gr60	-	100/0	100/0	95/5	93/7
Pt ch30	-	100/0	97/3	73/27	67/33
Pt ch60	-	100/0	85/15	45/55	38/62
Stubble	-	77/23	38/62	53/47	32/68

Stubble inoculated plots showed disease levels not significantly different from the natural disease level in untreated plots. However, the leaf damage was different from untreated plots as it was caused by a mixture of the two pathogens. P. tritici-repentis was detected earlier in the stubble plots than for any other treatment, indicating early disease establishment. If stubble containing only one pathogen could be naturally produced, it would be the preferred inoculant. At present, disease development under natural conditions cannot guarantee that resulting crop stubbles will contain only a single pathogen.

C. Chemical control of soil-borne flag smut

Objectives — To assess effectiveness of seed dressings for control of soil-borne flag smut (*Urocystis agropyri*).

Experimental 86ME73 and 86MO32/4825EX

Cultivar:	Eradu
Design:	RBD
Treatments:	Nil
	Erex 100 g/100 kg (150 ppm triadimefon)
	Baytan 100 g/100 kg (150 ppm triadimenol)
	Shell 53308 150 ml/ 100 kg (15 ppm diniconazole)
	Pano-Ram 150 g/100 kg (375 ppm fenfuram)
	ICI PP450 100 g/100 kg (25 ppm flutriafol)
	ICI PP450 100 mL/100 kg (25 ppm flutriafol)
Seeding Rate:	50 kg/ha
Plot size:	1.4 x 40 m
Replications:	4
Buffers:	End buffers only
Locations:	86ME73 on Peter White's, Kellerberrin with G. Fosbery, MeDO
	86MO32 on J. Sawyer's, Dalwallinu, with E. Thomason, MoDO
Assessments:	Emergence, smutted plants per plot, yield. Foliar disease at emergence (MO32)

Comments

No significant reductions in emergence were observed (Table 5). Except for Pano-Ram, control with all treatments was excellent. The effectiveness of Pano-Ram in controlling soil-borne flag smut varied with the trial site (Table 6). Compared to untreated plots, yield was significantly improved with Pano-Ram and PP450 powder in trial ME73 (Table 7). At site MO32, the plots were direct drilled over wheat stubbles remaining from the 1984 season. Yellow spot (*Pyrenophora tritici-repentis*) was observed on primary leaves when the plots were being assessed for emergence. Foliar disease levels were assessed on four replicate plots of Nil, Baytan and PP450 powder treatments (Table 8). The chemicals at these rates had minimal effect on yellow spot.

Table 5 Emergence in Eradu wheat treated with seed dressings for soil-borne flag smut control, two trials, 1986

Product	Rate/ 100kg seed	Final active conc.	No. emerged plants/3 m^2 22-31 days after seeding ME73	MO32
Nil	-		220	200
Erex (150 g/kg ai)	100 g	150 ppm	276	165
Baytan (150 g/kg ai)	100 g	150 ppm	234	168
S3308 (10 g/l ai)	150 ml	15 ppm	266	163
Pano-Ram (250 g/kg ai)	150 g	375 ppm	278	186
PP450 (25 g/kg ai)	100 g	25 ppm	270	185
PP450 (25 g/l ai)	100 ml	25 ppm	214	154
significance @ $p < 0.05$			n.s.	n.s.

Table 6 Control of soil-borne flag smut with seed treatments, two trials, 1986

Product	Rate/ 100kg seed	Final active conc.	Number smutted plants/40 m plot ME73	MO32
% smutted plants in nil			6.4	7.3
Nil	-		235.3 a+	199.5 a
Erex (150 g/kg ai)	100 g	150 ppm	0.5 c	0.0 b
Baytan (150 g/kg ai)	100 g	150 ppm	0.0 c	0.0 b
S3308 (10 g/l ai)	150 ml	15 ppm	0.0 c	0.3 b
Pano-Ram (250 g/kg ai)	150 g	375 ppm	29.8 bc	4.3 b
PP450 (25 g/kg ai)	100 g	25 ppm	1.5 c	0.0 b
PP450 (25 g/l ai)	100 ml	25 ppm	0.3 c	0.5 b
		lsd5%	29.3	40.1

\+ Numbers not followed by the same letter within a column are significantly different at $p < 0.05$ using Duncan's Multiple Range Test.

Table 7 Yield of Eradu wheat treated with seed dressings for control of soil-borne flag smut, two trials, 1986

Product	Rate/ 100kg seed	Final active conc.	Grain yield (g/m^2) ME73	Grain yield (g/m^2) MO32
Site mean			115 *	58 #
Nil	-		105 c+	56
Erex (150 g/kg ai)	100 g	150 ppm	111 c	59
Baytan (150 g/kg ai)	100 g	150 ppm	110 c	59
S3308 (10 g/l ai)	150 ml	15 ppm	114 bc	60
Pano-Ram (250 g/kg ai)	150 g	375 ppm	129 a	61
PP450 (25 g/kg ai)	100 g	25 ppm	124 ab	58
PP450 (25 g/l ai)	100 ml	25 ppm	114 bc	52
		lsd5%	10	n.s.

\+ Numbers not followed by the same letter within a column are significantly different at $p < 0.05$ using Duncan's Multiple Range Test.

* $100 g/m^2 = 1 t/ha$.

\# Copper deficiency reduced yields at this site.

Table 8 Effect of Baytan (150 ppm ac) and PP450 (25 ppm ac) on yellow spot, trial 86MO32

	% leaf area diseased (primary leaves)	Average lesion length (mm) on primary leaves
Nil	6.7	1.15 b+
Baytan (150 ppm ac)	2.9	0.97 a
PP450 (25 ppm ac)	5.2	1.05 ab
$p < 0.05$	n.s.	*

\+ numbers not followed by the same letter are significantly different at $p < 0.05$ using lsd of ln transformed data.

D. Chemical control of barley loose smut

Objectives — To assess effectiveness of seed dressings for control of barley loose smut (*Ustilago segetum* var *tritici*).

Experimental 86AL50, 86KA59, 86MT47, 86NA41/3003EX.

Cultivar: Stirling barley with 10% infection (embryo test)
Design: RBD
Treatments: Nil
Baytan 100 g/100 kg (150 ppm triadimenol)
Baytan 150 g/100 kg (225 ppm triadimenol)
Shell 53308 150 ml/ 100 kg (75 ppm diniconazole)
Pano-Ram 150 g/100 kg (375 ppm fenfuram)
ICI PP450 100 g/100 kg (25 ppm flutriafol)
ICI PP450 150 g/100 kg (37.5 ppm flutriafol)
ICI PP450 100 mL/100 kg (25 ppm flutriafol)
ICI PP450 150 ml/100 kg (37.5 ppm flutriafol
Seeding Rate: 50 kg/ha
Plot size: 1.4 x 40 m
Replications: 4
Buffers: End buffers only
Locations: 86AL50 on M. Trotter's, S. Perillup with D. Highman, AlDO
86KA59 on J. Guise's, Kojonup with I. Pritchard, KaDO
86MT47 on MBRS with D. Rowe
86NA41 on K. Lange's, W. Pingelly with B. McDonald, NaDO
Assessments: Emergence, smutted plants per 10 m of plot, yield.
Numbers of diseased and health tillers per diseased plant (AL50 and NA41 only)

Comments

No significant reductions in emergence were observed (Table 9). Averaged across the four sites, untreated plots had 8% of heads smutted. Treatment with Baytan @ 150 g/100 kg gave the best control (89 to 99% control) followed by the experimental Vincit formulation of PP450 @ 150 ml/100 kg (88 to 94% control) and S3308 @ 150 ml/100 kg (83 to 93% control). Pano-Ram 150 g/100 kg was the least effective treatment (30 to 72% control). Average smut counts are given in Table 10. Significant yield increases occurred with several treatments (Table 11). Practically all heads of untreated diseased plants were affected. In contrast, treated diseased plants had only 50 to 90% of heads per plant affected, indicating that seed treatments were only partially controlling disease in some plants.

Table 9 Emergence in Stirling barley treated with seed dressings for loose smut control, four trials, 1986

Product	Rate/ 100kg seed	Final active conc.	No. emerged plants/3m^2 19-24 days after seeding AL50	KA59	MT47	NA41
Nil	-		345	315	288	239
Baytan (150 g/kg ai)	100 g	150 ppm	355	320	383	264
"	150 g	225 ppm	326	323	343	264
S3308 (50 g/l ai)	150 ml	75 ppm	303	296	310	244
Pano-Ram (250 g/kg ai)	150 g	375 ppm	333	323	341	247
PP450 (25 g/kg ai)	100 g	25 ppm	317	321	342	262
"	150 g	37.5 ppm	353	310	341	241
PP450 (25 g/l ai)	100 ml	25 ppm	334	313	367	249
"	150 ml	37.5 ppm	335	333	272	268
		lsd5%	-	-	57	-
significance @ p < 0.05			n.s.	n.s.	*	n.s.

Table 10 Control of loose smut in Stirling barley with seed treatments, four trials, 1986

Product	Rate/ 100kg seed	Final active conc.	Number smutted heads/10 m plot AL50	KA59	MT47	NA41
% smutted heads in nil			7.1	6.8	9.4	8.5
Nil	-		429 a+	528 a	665 a	342 a
Baytan (150 g/kg ai)	100 g	150 ppm	153 cd	111 c	140 cd	34 ef
"	150 g	225 ppm	47 e	44 de	28 e	11 f
S3308(50 g/l ai)	150 ml	75 ppm	69 e	18 e	28 e	23 f
Pano-Ram (250 g/kg ai)	150 g	375 ppm	300 b	293 b	409 b	95 cd
PP450 (25 g/kg ai)	100 g	25 ppm	213 c	122 c	177 c	70 de
"	150 g	37.5 ppm	107 de	94 cd	89 de	37 ef
PP450 (25 g/l ai)	100 ml	25 ppm	218 c	146 c	204 c	131 bc
"	150 ml	37.5 ppm	49 e	44 de	34 e	20 f
		lsd5%	62	53	71	43

\+ Numbers not followed by the same letter within a column are significantly different at $p < 0.05$ using Duncan's Multiple Range Test.

Table 11 Grain yield in Stirling barley treated with seed dressings, four trials, 1986

Product	Rate/ 100kg seed	Final active conc.	Grain yield (g/m^2) AL50	KA59	MT47	NA41
Site mean			316 *	247	397	169
Nil	-		255 d+	228	353 c	153 c
Baytan (150 g/kg ai)	100 g	150 ppm	333 ab	263	434 a	186 a
"	150 g	225 ppm	352 a	269	425 ab	187 a
S3308 (50 g/l ai)	150 ml	75 ppm	323 ab	239	371 bc	164 bc
Pano-Ram (250 g/kg ai)	150 g	375 ppm	311 bc	239	390 abc	153 c
PP450 (25 g/kg ai)	100 g	25 ppm	291 c	230	405 abc	169 abc
"	150 g	37.5 ppm	322 ab	264	379 abc	166 abc
PP450 (25 g/l ai)	100 ml	25 ppm	318 bc	265	390 abc	166 abc
"	150 ml	37.5 ppm	336 ab	230	427 ab	175 ab
		lsd5%	33	n.s.	59	16

\+ Numbers not followed by the same letter within a column are significantly different at $p < 0.05$ using Duncan's Multiple Range Test.

* $100 g/m^2 = 1$ t/ha.

E. Chemical control of loose smut in barley with different levels of seed infections

Objectives: To determine how increasing amounts of seed infection influence effectiveness of chemical seed treatment for control of loose smut (Ustilago segetum var tritici).

Experimental 86MT48/3003EX

Cultivar:	Forrest barley with 21% infection (embryo test) mixed with Forrest barley (0.6% infection) to give different levels of seed infection		
Design:	Split Plot		
Treatments:	Main Plots	1.	Seed with high infection (21%)
		2.	Seed with medium infection (7%)
		3.	Seed with low infection (2%)
	Sub Plots	1.	Untreated seed
		2.	Pano-Ram 150 g/100 kg (375 ppm fenfuram)
Seeding Rate:	50 kg/ha		
Plot size:	1.4 x 40 m		
Replications:	5		
Buffers:	End buffers only		
Locations:	MBRS with D. Rowe		
Assessments:	Emergence, smutted plants per 20 m of plot, yield.		

Comments

Emergence for seed with high infection was significantly less than emergence for medium or low infected seed (Table 13). In a pre-trial germination test of the two Forrest samples both had 96% germination. However the highly infected barley sample was of unknown seed age whereas the clean sample was produced the previous season. Therefore it is not known if the effect on emergence was due to seed age or loose smut infection. Treatment with Pano-Ram did not significantly effect emergence and there was no infection x seed treatment interaction. The percent smutted heads in untreated plots was about one third of that expected from embryo test results, suggesting that many of the loose smut infections were non viable (Table 12). The amount of smutted heads from highly infected treated seed was significantly higher than for medium or low infected treated seed. The percent disease control provided by the treatment was not significantly different at different seed infections, indicating that the relative effectiveness of seed treatment was not influenced by percentage of seed infection. However because disease control was not complete, significantly greater numbers of smutted heads occurred with the high level of seed infection. This is likely to result in greater levels of seed infection perpetuating from season to season in high infection seed lines compared to low infection seed lines, despite seed treatment.

Table 12 Disease control of loose smut in Forrest barley with Pano-Ram, at three levels of seed infection, 1986 (trial MT48)

Seed Infection	Seed Treatment	% smutted heads	No. smutted heads/20 m plot	% disease control
High	Nil	7.2	705.2	
	Pano-Ram 25*		73.8	90
Medium	Nil	2.1	201.6	
	Pano-Ram 25		9.6	95
Low	Nil	0.6	58.4	
	Pano-Ram 25		2.2	96
lsd 5%	within levels of seed infection		46.9	n.s.
	between levels of seed infection		55.1	

* Pano-Ram 25 @ 150 g/100kg (375ppm Fenfuram)

Table 13 Emergence and grain yield in Forrest barley treated with Pano-Ram seed dressing for loose smut control, 1986 (trial MT48)

Seed infection Factor 1	Seed Treatment Factor 2	Emerged plants/3 m^2 20 days after seeding[a]	Grain yield (g/m^2)[b]
High	Nil	128	285[c]
	Pano-Ram 25*	130	296
Medium	Nil	180	326
	Pano-Ram 25	134	315
Low	Nil	194	345
	Pano-Ram 25	163	337

* Pano-Ram 25 @ 150 g/100kg (375ppm fenfuram)

a Factor 1 significant @ $p < 0.001$
Factor 2 not significant @ $p < 0.1$
Interaction not significant

b Factors 1 and 2 not significant, interaction not significant

c 100 g/m^2 = 1 t/ha

F. Disease characterisation of cereal variety trial stage 4 sites

Objectives

To estimate the importance of foliar wheat diseases as a means of improving understanding of site yield data for cereal variety trials.

Experimental

Co-operating district officers were invited to submit plant samples from 4 replicate Gamenya plots of stage 4 wheat trials, 100 days after seeding. Assessments of leaf disease and pathogen proportions were made from the samples. Where disease caused less than 25% LAA (leaf area affected) on the third youngest leaves (L3) of all four replicates, disease was assessed to be low (L). Where greater than 80% LAA occurred on L3 in all four replicates, disease was assessed as high (H). Disease levels intermediate between these two classes were moderate (M). Plant growth stage was noted for each sample. The work was undertaken in co-operation with Robin Wilson and Rod Hunter, Plant Production Division.

Comments

Samples from 21 trial locations were rated. Several samples arrived in poor condition and could not be rated. Data are presented in figure 3. Despite a request that sampling occur at a uniform stage the growth stage for the different samples varied widely. Because of this, estimates of disease levels at early growth stages will not indicate how important disease may have been later in the season. Disease levels at Walkaway, Ajana, Gibson and Mt Barker were high at late growth stages. Pathogen proportions indicate that *Septoria nodorum* occurred throughout the cereal belt, *Septoria tritici* was observed in southern and central areas. The yellow spot pathogen, *Pyrenophora tritici-repentis*, was observed at low proportions at some southern and central sites but was more prevalent at some northern sites. The common leaf spot pathogen, *Drechslera verticillata* was observed throughout the cereal belt reaching high relative proportions at some sites.

Figure 3. LEAF DISEASES OCCURRING AT WHEAT VARIETY TRIAL STAGE 4 SITES, 1986.

HISTOGRAMS GIVE ESTIMATED DISEASE PROPORTIONS.
H,M,L GIVE DISEASE LEVELS (SEE TEXT)
Z=ZADOKS GROWTH STAGE WHEN SAMPLED
N=SEPTORIA NODORUM BLOTCH
T=SEPTORIA TRITICI BLOTCH
Y=YELLOW SPOT
C=COMMON LEAF SPOT