NET BLOTCH OF BARLEY

J. EDMUND SHERIDAN

Plant Doctors Ltd, 2 Cheesman St., Wellington, New Zealand

SUMMARY

Net blotch prevalence and severity in Wairarapa barley crops declined gradually from the epiphytotic in 1976-77 to zero in the 1988-89 season. It reappeared again in 1990-91 in three crops of cv. Regatta. Registered seed treatments containing imazalil and foliar sprays containing propiconazole or prochloraz continued to give good control of net blotch in trials conducted in 1990-91.

Keywords: net blotch, barley, Wairarapa, imazalil, propiconazole

INTRODUCTION

Control of primary net blotch (*Pyrenophora teres*) infection in New Zealand barley crops is currently based on the use of seed treatments containing imazalil (Sheridan and Nendick 1989). Where secondary infection occurs propiconazole is generally applied as a foliar spray. Annual surveys in the Wairarapa district of the North Island, New Zealand, reveal the pattern of net blotch prevalence and severity so that any significant changes can quickly be recognised.

In this paper data are presented from annual surveys conducted since 1974 showing the changes in the net blotch disease pattern and seed treatment fungicide usage. Seed treatment and foliar spray fungicide evaluation trials for disease control in 1990-91, are also reported.

MATERIALS AND METHODS

Disease surveys 1974-1990

The annual surveys were conducted by myself and/or a trained student assistant. As many barley crops as possible were visited between the beginning of November and the end of February each season. Records were kept of location, area, cultivar, seed treatment, foliar spray and yield. Disease was assessed by counting the number of diseased seedlings in four samples of 25 plants taken along a diagonal of the field at early growth stages. Severity was assessed, after the appearance of the flag leaf, as the mean percent of leaf area infected (top three leaves) on 10 main tillers taken at random along the diagonal. Yields were obtained from the farmers immediately after harvest. (For further information see Mycology and Plant Pathology Reports commencing with No. 3, Feb. 1976. Botany Department, Victoria University of Wellington).

Fungicide evaluation trials

Seed treatments (Table 2) and foliar sprays (Table 3) were applied as previously described (Sheridan and Nendick 1988). Seed treatment trials were sown by hand in 5 m long rows, 35 g seed per row, on 30 October 1990 at Dalefield in the Wairarapa with four replicates per treatment. Foliar spray trials were also at the Dalefield site with four replicates. One spray application was made on cv. Zephyr on 24 December 1990 at Feekes GS 10.1. Disease severity on both trials was assessed, at intervals commencing at Feekes GS 1, as the percent of leaf area infected on 10 main tillers taken at random along a diagonal in each plot. Plots were harvested with a Massey-Ferguson header, swath 1.6 m, on 22 February 1991.

RESULTS AND DISCUSSION

Disease surveys 1974-1990

Net blotch prevalence and severity reached 100% and 24.5% respectively in the 1976-77 season and thereafter dropped gradually to reach zero in the 1988-89 season (Table 1). The disease reappeared in 1990-91.

Proc. 44th N.Z. Weed and Pest Control Conf. 1991: 307-309

TABLE 1: Annual surveys 1974-1990 in the Wairarapa. Net blotch, seed treatments and grain yields.

Year	Net blotch		Grain yields		Seed treatment ⁷	
	prevalence %	severity ¹ %	mean kg/ha	highest kg/ha	(% of crops on which used)	
1974-75	83	0.3	—	—	**	
1975-76	96	3.6	—	—	**	
1976-77	100	24.5	4033 (3) ²	4145 Z ⁶	**	
1977-78	93	1.0	4602 (29)	7357 U	76†	19‡
1978-79	47	1.0	4631 (35)	6198 Z	75†	25‡
1979-80	55	1.1	4513 (13)	5292 Z	90†	10‡
1980-81	44	0.5	5160 (25)	6610 Z	95†	5§
1981-82	49	3.5	4343 (30)	6111 Z	95†	5§
1982-83	23	0.1	4875 (30)	6670 G	84†	16§
1983-84 ⁴	9	0.3	5533 (27)	7482 Go	95†	5§
1984-85 ⁵	32	0.1	3910 (110)	5160 T	83†	3* 10i 4m
1985-86	17	0.1	4369 (38)	6830 Go	82†	18*
1986-87	6	trace	4718 (70)	NA	9†	91*
1987-88	16	trace	5619 (58)	7410 F	7†	93*
1988-89	0	0	4827 (78)	7160 F		100*
1989-90	0	0	5475 (24)	6751 F	13 c + t	83*
1990-91	5 ³	trace	5220 (42)	7567 F		86* 14 f + i

¹ mean diseased area of top two leaves² () no. of crops for which yield data collected³ 3 crops of cv. Regatta on one farm. Seed treated with flutriafol + imazalil (Vincit). At Peebles GS 11.1 incidence was 43%, severity was 3% (mean on top three leaves).⁴ a mixture of Georgie and Triumph yielded 7961 kg/ha (not included in the data used to obtain yields for this table).⁵ drought severe this season.⁶ Cultivars: Z = Zephyr, U = Universe, G = Georgie, Go = Goldmarker, T = Triumph, F = Fleet.⁷ Seed treatment products.

75% captan: Orthocide, Bayer Seed Treater.

20% carboxin + 20% thiram (c + t): Vitaflo 200.

15% carbendazim + 60% mancozeb (c + m): Granosan 200

15% triadimenol + 2% fuberidazole: Baytan F17

15% triadimenol + 5% imazalil: Baytan IM.

80% mancozeb (m): Dithane M45.

6.25 g/litre imazalil (i): Fungazil.

5% flutriafol + 5% imazalil (f + i): Vincit.

NB: Under 'seed treatment' where figures do not add up to 100% the difference is due to untreated crops.

** = captan, † = carboxin + thiram, ‡ = carbendazim + mancozeb, § = triadimenol + fuberidazole, * = triadimenol + imazalil

Seed treatments were based on captan up to, and including, 1976-77 (Table 1). Carboxin + thiram was introduced in 1977-78 and used on over 75% of crops for 9 years. Triadimenol + fuberidazole was first used in 1980-81 but disappeared after the 1983-84 season due to failure to control triadimenol-resistant strains of the pathogen. Imazalil was first used in 1984-85 and the mixture of triadimenol + imazalil soon became popular, being used on all crops in 1988-89. 'Fungazil', containing imazalil only, was used for one season on 10% of crops; it did not control scald or smuts and was therefore not widely used. Other fungicides used as seed treatments to a lesser extent are listed in Table 1. The occurrence of net blotch after 2 year's absence is viewed with concern because the seed was treated with an imazalil containing seed treatment

(flutriafol + imazalil). Trials and tests are underway to determine whether strains of the pathogen with reduced sensitivity to imazalil are present in this seed line.

Fungicide evaluation trials

The imazalil containing seed treatments gave excellent control of net blotch on all three cultivars (Table 2). Good transmission of disease was obtained with cvs. Zephyr and Kym in both seasons. The cv. Triumph had a lower natural infection but was included because the seed originated outside the Wairarapa. Carboxin + thiram gave poor control.

In the foliar spray trial one application of propiconazole or prochloraz at Feekes GS 10.1 gave good control of net blotch on cv. Zephyr and worthwhile yield increases (Table 3). Further trials should be conducted on other cultivars from other barley growing districts of New Zealand to determine whether these fungicides remain effective on all net blotch pathogen populations.

TABLE 2: Effect of seed treatments on control of primary net blotch: Spring 1989 and 1990.

Treatment	Rate g ai/100 kg seed	% control				
		Zephyr		Kym		Triumph
		1989*	1990	1989*	1990	1990
triadimenol + imazalil ¹	15 + 5	100	98	99	100	100
flutriafol + imazalil ²	5 + 5	100	98	99	97	100
carboxin + thiram ³	50 + 50	77	78	75	71	40
disease in untreated**		18.3%	9.3%	7.6%	5.7%	0.6%

* The 1989 trial site was at Gladstone: sown 21 October 1989.

** percent plants diseased

¹ Baytan IM ² Vincit ³ Vitaflo 200

TABLE 3: Effect of foliar sprays on control of secondary net blotch and grain yields: Spring 1990.

Treatment	Trade name and formulation	Rate g ai/ha	% control 15 DAT GS 10.5.4	% yield increase
propiconazole	Tilt 250 EC	125	88	21
prochloraz	Sportak 45 EC	450	85	14
disease severity in unsprayed*			19%	

*mean percent leaf area diseased: top two leaves, cv. Zephyr.

ACKNOWLEDGEMENTS

The assistance and co-operation of barley growers and seed and chemical firms is much appreciated. Special thanks are due to Robert and Jan Baird for use of land and machinery for the field trials, and to the students who assisted with the surveys.

REFERENCES

- Sheridan, J.E. and Nendick, D.K., 1988. Control of *Rhynchosporium* scald of barley by seed and foliar fungicides. *Proc. 41st N.Z. Weed and Pest Control Conf.*: 30-33.
- Sheridan, J.E. and Nendick, D.K., 1989. Control of scald and net blotch of barley with DMI fungicides. *Proc. 42nd N.Z. Weed and Pest Control Conf.*: 221-224.