CONTROL OF POWDERY MILDEW (*ERYSIPHE PISI*) WITH PENCONAZOLE

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Powdery mildew (*Erysiphe pisi*) which has a worldwide distribution and is a major disease problem of pea crops in many countries, has in the last few years become of major concern in New Zealand. Sheridan and Nendick (1988) reported that 7 out of 52 crops inspected in the Wairarapa were found infected in 1986/87 and 23 crops out of 35 in the following season, with a similar situation in the Hawkes Bay and Manawatu.

The disease appears in the crop during hot dry summers. Warm days that are followed by cool nights allow heavy dew formation giving rise to rapid infection. It occurs mainly in later sown crops near flowering. Infected plants are covered in a fine white film of mycelium, starting as discrete colonies that rapidly cover the entire leaf, stem and pods. Effects of the disease range from a failure to fill pods and a delay in the maturation of the crop to foliage shrivelling and plant death. As there is currently no systemic fungicide registered for the control of this disease in New Zealand, a series of trials in the 1987/1988 and 1988/1989 seasons were carried out with penconazole (Topas 100 EC).

Apart from one seed crop (cv. Bolero) in the Manawatu (Trial 1), all other crops were process peas — using cultivars Puget in Trials 2 (Canterbury), 4 and 5 (Hastings), Patea in Trial 3 (Hastings), and Pania in Trial 6 (Canterbury).

The trial designs were randomised complete blocks with plots measuring 2.5-3 x 8-10 m and replicated 4-6 times. Penconazole was applied at the rates shown in Tables 1 and 2 with the addition of a wetting agent. Treatments were applied using a precision plot sprayer, fitted with hollow cone nozzles (D5-25 or D4-25), with a water rate of 300-400 litres/ha and a pressure of 240-306 kPa. All treatments were applied at pod filling with some disease present in 1987/88 (Trials 1 and 2) and before the onset of disease at early flowering in 1988/89 (Trials 3, 4, 5 and 6). Only one application was made, with the exception of Trial 2 (Canterbury) in 1987/88. Assessments of disease were made 14-18 days post-application using a severity scale or by assessing the percent leaf area diseased (Table 1). Yields were estimated in Trials 2 and 3 by harvesting 1 m² of peas per plot (Table 2).

TABLE 1: Incidence of powdery mildew on peas, treated with penconazole, in Trials 1 and 2 (1987/88) and in Trials 3-6 (1988/89). Incidence measured 14-18 days after treatment.

Treatment	Rate g ai/ha	Mean % pod area infected	*Disease level			Mean % leaf area diseased		
			1	2	3	4	5	6
penconazole	15	70B	4	3	—	—	—	—
penconazole	20	38C	3	2	8.6bB**	20.0B	32.5B	1.0B
penconazole	25	36C	2.5	2	4.3bcB	21.3B	15.0C	0.8B
penconazole	35	—	—	—	3.1cB	16.3B	13.8C	0.3B
penconazole	50	—	—	—	2.9cB	10.0B	8.8C	0.3B
untreated	—	91A	4.7	5	15.9aA	76.3A	57.5A	45.0A
	C.V.	19.9%	16.5%			15.4%	21.9%	12.8%

* 0 = no disease, 1 = 1-10%, 2 = 11-25%, 3 = 26-50%, 4 = 51-75%, 5 = 76-100%.

** Means not followed by a letter in common are significantly different. Lower case letters indicate $P < 0.05$; capitals that $P < 0.01$.

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TABLE 2: Yields of seed peas (Trial 2 — 1987/88) and process peas (Trial 3 — 1988/89) after treatment with penconazole.

Treatment	Rate g ai/ha	Trial 2 (seed)		Trial 3 (process) t/ha
		t/ha	1000 seed wgt (g)	
penconazole	15	3.45 A*	184.5 A	—
penconazole	20	3.46 A	184.0 A	2.07 abA
penconazole	25	3.48 A	186.5 A	2.14 abA
penconazole	35	—	—	2.33 aA
penconazole	50	—	—	2.34 aA
untreated	—	2.74 B	162.8 B	1.93 bA
C.V.	—	5.0%	3.5%	11.1%

* Means not followed by a letter in common are significantly different. Lower case letters indicate $P < 0.05$; capitals that $P < 0.01$.

Penconazole at 15 and 20 g/ha gave a highly significant reduction in the level of disease. Higher rates further decreased the level of disease recorded (Table 1). There were no phytotoxic effects on the crop. In Trial 2 seed yields were significantly greater than untreated following the application of penconazole at all rates (Table 2). For process peas in Trial 3 only the 35 and 50 g/ha rates of penconazole gave significant increases in yield ($P < 0.05$).

Concurrent with the 1988/89 season's trials were grower applications of penconazole at 25 g/ha under an EUP(LS). Monitoring of these treated crops confirmed the results reported in this paper. It was observed, in addition, that crops treated only when the disease was present showed a lower level of control.

In summary, the optimum rate of penconazole for the control of powdery mildew in peas was found to be between 25 and 35 g/ha, with one application being sufficient. The timing of this application should be before the disease is present or at the onset of flowering.

REFERENCE

- Sheridan, J.E. and Nendick, D.K., 1988. In Cereal Diseases 1987-1988. *Mycology & Plant Pathology Report No. 25*. Botany Department, Victoria University of Wellington.