

CONTROL OF POWDERY MILDEW IN WHEAT WITH THIOPHANATE-METHYL, BIFORMYLCHLORAZIN AND TRIDEMORPH

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Summary

Three field trials evaluated the use of the systemic fungicides thiophanate-methyl, biformylchlorazin and tridemorph applied as foliar sprays for the control of powdery mildew (*Erysiphe graminis*) in wheat. Control of symptoms lasted for up to four weeks. In the trial giving marked yield responses, biformylchlorazin and tridemorph applied at Feekes stage 9 yielded significantly more than control. Further studies with these fungicides are required to determine the optimum time of application in relation to the stage of crop development and the degree of disease infection.

INTRODUCTION

Powdery mildew (*Erysiphe graminis*) is one of the common fungal diseases infecting wheat and barley in New Zealand. Warm dry weather with cool nights and high humidity lead to a rapid build-up of powdery mildew infection (Brooks 1970). Where disease build-up is extreme before tillering commences, the extent of crop tillering may be severely reduced. Where the crop suffers a heavy infection at the flag-leaf stage, a yield depression due to a reduction in grain size often occurs. A number of recently introduced "systemic" fungicides have given a high degree of control of powdery mildew in cereals, with some products now being marketed in Europe for this purpose. This paper reports on results of three field trials to evaluate three fungicides, thiophanate-methyl, biformylchlorazin and tridemorph, applied as foliar treatments for the control of powdery mildew in wheat (variety Aotea).

EXPERIMENTAL METHODS AND MATERIALS

Overall spray applications were made at identified stages of crop development using a precision sprayer. Trials were laid in a randomized block design with four replications and a plot size of 4 m × 5 m. Spraying Systems Teejet No. 8003 fan jet nozzles were used applying 250 l/ha at 2 atmos. All treatments are expressed in kg/ha. Visual assessments on 100 leaves per treatment were made at intervals indicated in Table 1 by two or more independent observers using the modified Cobb scale described by Smith and Smith (1970) (0 = no infection, 4 = heavy infection). Yields obtained were the total harvest from three 0.66 m² samples per plot. Crop conditions at treatment and at assessment are in Table 1.

RESULTS AND DISCUSSION

Assessments of powdery mildew infection and crop yields for the three trials are presented in Fig. 1.

TABLE 1: SUMMARY OF TRIAL CONDITIONS

Trial	Feekes Stage of Crop at Treatment and Dates	Mean Level of Infection at Treatment (Modified Cobb scale)	Elapsed Time (weeks)	Feekes Stage of Crop when Rated	Leaves on which Ratings made
1. Allanton, Otago	6 10/12/71	2—on lower two leaves and 40% of stems	4 7/1/72	10.5	Flag leaf
	9-10 22/12/71	3—on lower leaves and 50% of stems	2 7/1/72	10.5	Flag leaf
	3 23/11/71	0—none visible	4 22/12/71	9-10	4th leaf from top
2. Outram, Otago	6 10/12/71	2-3—on lower leaves of 90% of plants	5 12/1/72	10.5	Flag leaf
	5, 7 & 10.3 29/10/71	2—on 95% of leaves and tillers	2	7	Lowermost leaf
3. Highbank, mid-Canterbury	9/11/71				
	1/12/71 7 & 10.3 10.3 only	2—on 99% of stems and basal leaves 2—on flag leaves	9/11/71		

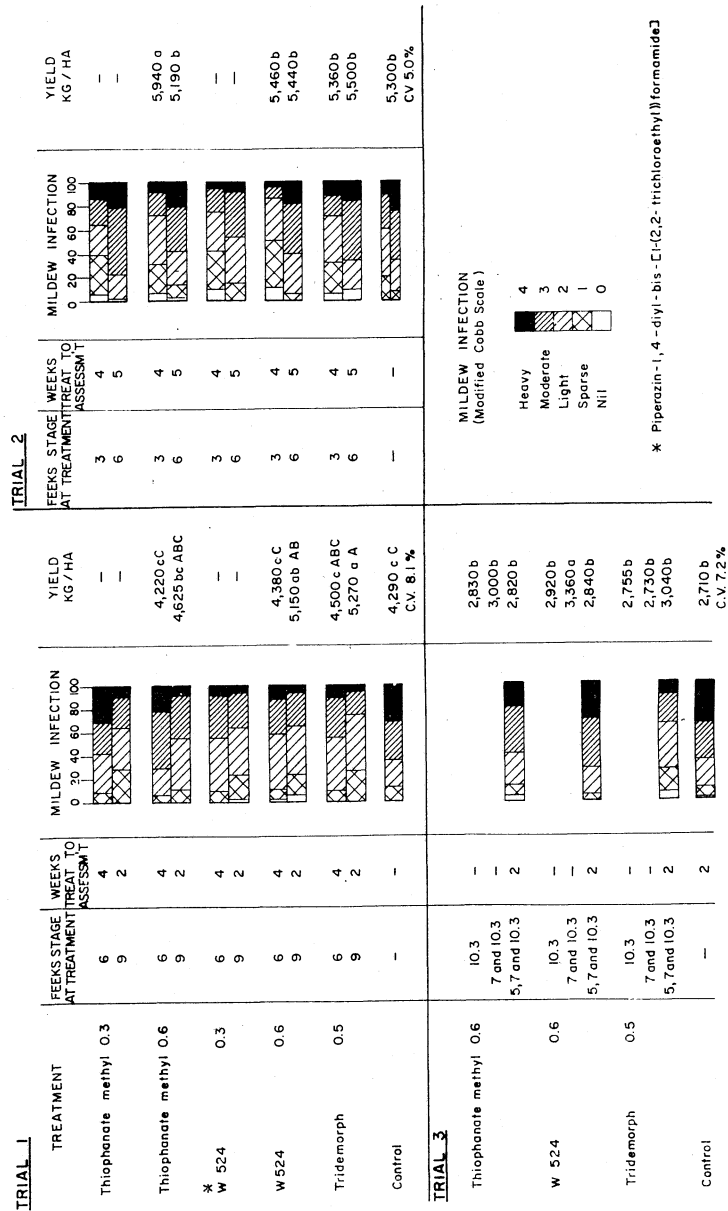


FIG. 1: Powdery mildew control and crop yields.

All three fungicides checked the progression of powdery mildew for short periods (up to 4 weeks) after treatment. There were no obvious differences in disease control between the two rates of thiophanate-methyl or between the two rates of biformylchlorazin. The comparatively short time of suppression of visible infection could be due in part to the small plot size used. Brooks (1970) reported on trials comparing powdery mildew control in small treated plots (2 m × 10 m) with that in larger treated plots (65 m × 65 m) and showed a significant increase in the latter. Larger plots with treated buffers are suggested for future trials.

Biformylchlorazin was also observed to give some control of leaf rust (*Puccinia recondita*) where it occurred in trials not reported in this paper.

In Trial 1 there appears to be a relationship between the degree of mildew control and yield but in Trials 2 and 3 no relationship is evident.

In Trial 1, which produced marked yield responses, biformylchlorazin 0.6 and tridemorph 0.5 applied at Feekes stage 9 were significantly (1% level) higher yielding than control. In Trial 2 thiophanate-methyl 0.6 at Feekes 3 and in Trial 3 biformylchlorazin 0.6 applied twice (Feekes 7 and 10.3) yielded more than control at the 5% level of significance.

In view of the limited period of powdery mildew control by the treatments, the timing of applications could be considered to be of real importance. Further studies are required to clarify the stage of crop development at which disease infection has the greatest effect on yield.

ACKNOWLEDGEMENTS

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COLOUR INFRARED PHOTOGRAPHY
and
WEEDY ST JOHN'S WORTS

CHAIRMAN'S SUMMARY

D. D. McPHAIL

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The paper by G. R. Cochrane gives valuable information on a new and promising technique for the detection of disease and other stress factors in plants. Particularly with pasture pests, where areas involved are extensive, the use of colour infrared photography could also assist in mapping areas of infestation.

Discussion in the session referred mainly to the slides which were shown and there was a feeling that, at least in some cases, the delineation of affected areas was no more effective than with ordinary colour film, with the added complication of having to translate the colours appearing back to reality. However, a real advantage of the technique is in the apparent ability of colour infrared film to detect disease conditions before any colour change is visually apparent.

The paper is valuable in summarizing the situations in which the method has been used and indicating likely fields of use in New Zealand.

A. J. Healy's paper on the weedy species of *Hypericum* in New Zealand is a clear and well-illustrated guide for the identification of the twelve species involved. As well as a formal key for identification, the paper includes descriptions of the entire plant and notes on distribution and common community associations. This paper will undoubtedly stand as the authoritative reference on this subject.