CHLORMEQUAT: A GROWTH REGULATOR TO CONTROL LODGING IN WHEAT

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Summary

Chlormequat — a growth regulator — was evaluated as a foliar spray for controlling lodging in wheat caused by eyespot (*Cercospora herpotrichoides*). Three rates, 1, 2 and 3 lb a.i. per acre, were all found to be equally effective in preventing a reduction in yield. When compared with the untreated control, these treatments prevented yield losses of 17.7, 20 and 20.2 bushels per acre, respectively.

INTRODUCTION

In Southland, eyespot (*Cercospora herpotrichoides*) is an important causal organism of lodging in wheat, particularly where two successive crops are grown in the same paddock. The fungus attacks the stems at or slightly above ground level, weakening the straw. Ultimately breakages or bending occur at these points of infection with the result lodging occurs.

Trials in Europe (Caldicott and Lindley, 1964) with the growth regulator chlormequat have shown that lodging caused by *C. herpotrichoides* could be prevented. The purpose of the following trial was a preliminary evaluation of the effectiveness of three different rates of chlormequat in preventing lodging caused primarily by the above fungus.

EXPERIMENTAL

SITE

On the site chosen, a third successive crop of spring-sown wheat, variety Aotea, had been sown. Stubble from the previous crop was still present at the time of treatment, thus providing foci of infection. In Southland it is not common practice to burn off stubble as it is difficult to obtain a satisfactory burn owing to weed growth and adverse autumn weather conditions.

METHOD

Rectangular plots 1/25th of an acre in size were chosen as it was felt that, if small plots (1/160th acre) were used, then lodging pressure from outside untreated areas could ultimately cause the small plots to lodge. This would interfere with the assessment, making it difficult to evaluate the effectiveness of the treatments.

The crop was treated with foliar sprays on November 26, 1967, when the wheat was at stage 5 on the Feekes scale: 40 gal/acre of water was used at 30 lb/sq. in. through fan nozzles. Each treatment was replicated three times. All rates are in lb a.i. per acre.

LODGING

Each plot was examined for the presence of *C. herpotrichoides* prior to harvest. The fungus was found to be present in all samples from every plot. It can, therefore, be concluded that the lodging was due largely to *C. herpotrichoides*.

Two observers evaluated independently the percentage of lodging, first by a ground survey and secondly from an aerial photograph taken on the same day.

As is demonstrated in Table 1, a significant reduction in lodging occurred on all the treated plots when compared with the untreated plots. There were no significant differences between the three rates of chlormequat.

YIELD

The above prevention of lodging was reflected to a large extent in the yield of grain. All the treated areas gave a significant increase in yield compared with the controls, though it would be more correct to state that

RESULTS

TABLE 1: YIELD AND LODGING INDICES

Treatments (lb)	Mean lb per plot	Yield Sign. of Control	Bu/Acre	Lodging Mean	Lodging Sign. of Control
chlormequat 3	116.00	**	63.8	1.3	**
chlormequat 2	115.67	**	63.6	0.9	**
chlormequat 1	111.50	**	61.3	1.1	**
Untreated control	79.67	—	43.6	6.3	—
			Yield	Lodging Index	
Standard error of mean			2.58	0.27	
Least significant differences					
* 5%			8.90	0.90	
** 1%			13.50	1.40	

0 = No lodging.

10 = 100% lodging.

Harvested March 19, 1968.

TABLE 2: ASSESSMENT DATA

Treatment (lb)	Mean (3 reps) Screening (%)	Mean Moisture Content (%)	Sprout Index Mean	Mean Baking Score	Mean % Seed Germination
Control	2.6	17.0	S12 +	30.3	78.6
1	2.0	17.3	S12 +	31.0	84.0
2	2.5	17.5	S12 +	31.6	82.3
3	2.3	17.4	S12 +	30.6	82.3

all sprayed plots prevented a reduction in yield. In this trial reported here, all three rates of chlormequat prevented a reduction in yield of approximately 20 bushels per acre.

The 1968 harvest was exceptionally wet with heavy rain falling prior to harvest. This is illustrated in Table 2 where the sprout index is S12 + for all treatments. This sprouting means that no conclusions can be drawn about the effects of chlormequat on the baking score. However, data from two other unpublished trials have shown it to have no deleterious effects on the baking score. Table 2 also illustrates that chlormequat has no adverse effect on the germination of the grain if saved for seed.

It must be made quite clear that chlormequat is not a fungicide and it has no fungicidal activity against *C. herpotrichoides*. Chlormequat is a growth regulator which reduces the height of the wheat and consequently reduces the mechanical bending moment. For instance, in this trial the average height of 20 stems from the control was 30.6 in. while in the 2 lb treatment it was 24.9 in. This is a height reduction of 18.6%. In addition to the reduction in height, chlormequat is said to increase the strength of the straw. No actual measurements of this factor were carried out.

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REFERENCE

Caldicott, J. J. B.; Lindley, C. D., 1964: *7th Brit. Weed Control Conf.*: 49.