HOE 33171 - A NEW SELECTIVE GRASS HERBICIDE FOR USE IN RICE

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Summary. Hoe 33171, proposed common name fenoxaprop-ethyl, is a new post-emergence herbicide discovered by Hoechst AG, for the selective control of barnyard grass, *Echinochloa crus-galli*, and brown bettle grass, *Diplachne fusca*, in rice. In Australian trials, fenoxaprop-ethyl has given excellent control of barnyard grass and brown beetle grass ranging in size from the two leaf to early tillering stages with single applications of 60-180 g ha^{-1}, applied 3 to 12 days prior to permanent flooding. Overseas and local data has indicated some crop phytotoxicity which is influenced by crop growing conditions at application, the number of days between application and permanent flooding, and the depth of water at early permanent flooding.

INTRODUCTION

Hoe 33171 (ethyl 2[4(6-chloro-2-benzoxazolyloxy-)-phenoxy-]-propanoate), proposed common name fenoxaprop-ethyl, was discovered in the laboratories of Hoechst Ag and is currently being tested in field trials in Australia as a post-emergence herbicide for grass control in rice.

Fenoxaprop-ethyl is absorbed through leaves and moves to the shoot meristem, where an accumulation of active ingredient takes place. It has little or no soil activity. Grass kill takes 7 to 14 days, although there is a cessation of growth 2 to 3 days after application. To avoid rice injury, permanent water should not be applied for at least 7 days after application (2).

In most countries barnyard grass is the most important weed of rice (3), and this is also true of both combine and sod sown rice in Australia (Agropraisals Pty. Ltd., pers. comm., 1986). Another grass weed of increasing importance, particularly in the Murrumbidgee Irrigation Area of N.S.W., is brown beetle grass (D. Pollock, pers. comm., 1986). The occurrence of brown beetle grass is particularly important, as existing rice herbicides do not control plants with more than two leaves.

Fenoxaprop-ethyl has given excellent control of both barnyard grass and brown beetle grass, ranging in size from two leaf to early tillering stages. This paper gives general information on fenoxaprop-ethyl and reports the results of trials conducted by Hoechst Australia Limited (Trial 1) and by Agropraisals Pty. Limited for Hoechst Australia Limited (Trials 2, 3 and 4).

METHODS

Four field trials conducted in southern N.S.W. are summarized in Tables 1, 2, and 3. An EC formulation containing 90 g a.i./L was used in all trials, with the exception of Trial 2, where a 120 g/L formulation was also used. All trials were laid out using a randomized block design, with the exception of Trial 3, which used a latin square design. All trials incorporated four replicates of each treatment. Plot sizes ranged from 3x10 m to 2.5x20 m. Treatments in Trial 1 were applied using an AZO gas powered sprayer with flat fan nozzles, in a water volume of 85 L ha^{-1}. All other treatments in other trials were applied with pressurised sprayers using flat fan nozzles, delivering 200 L ha^{-1} of water. Efficacy was assessed by counting plants in each plot. Phytotoxicity was assessed using a visual rating system on a scale of 0 to 9, where 0 represents no damage and 9 represents total crop loss.

Yields were obtained with the use of a small plot harvester.

RESULTS AND DISCUSSIONS

Fenoxaprop-ethyl gave excellent control of barnyard grass and brown beetle grass at rates of 60-180 g ha^{-1}, on weeds ranging in size from 1 leaf to early tillering (Table 1). The interval between application and permanent flooding varied from 3 to 12 days and appears to have little effect on efficacy.

Table 1. Control of seedling barnyard grass and brown beetle grass with fenoxaprop-ethyl

Rate (g/ha^{-1})	Weed control (%)					
	Barnyard grass			Brown beetle grass		
Trial No.	4	2		1	3	
60	75			97		
90	90	99	99	99	100	100
120	97.5			100		
150	97.5			100		
180		100	100		100	100
Days from applic. to flood	7	12	3	7	12	3
Weed stage at application	1-4 leaf	2-5 leaf	Early till.	1-9 leaf	2-5 leaf	Early till.

A long interval of 30 days (Trial 3), between the last irrigation and application, compared with a shorter interval, of 5 days (Trial 2), is associated with less control of barnyard grass and brown beetle grass at 90 and 180 g ha^{-1} of fenoxaprop-ethyl (Table 2). This reduced control is a result of the weeds being moisture stressed.

Increasing the interval between application of fenoxaprop-ethyl and permanent flooding reduces the phytotoxicity on rice (1). An interval of 7 days has been adequate to ensure that only temporary crop phytotoxicity occurs, if at all (American Hoechst Corporation, pers. comm., 1986).

An interval of 12 or 27 days between application and permanent flooding has given acceptance levels of crop phytotoxicity at 90, 180 and 360 g ha^{-1} of fenoxaprop-ethyl. However, when this interval was reduced to 3 days, unacceptable phytotoxicities (scores >3) were recorded (Table 3). Despite these high levels of crop ohytotoxicity grain yields were not reduced. This may be attributed to the ability of rice plants to recover from considerble setbacks early in the growth of the crop.

Table 2. Control of barnyard grass and brown beetle grass with fenoxaprop-ethyl in relation to irrigation

Rate (g ha^{-1})	Weed control (%)			
	Trial 2		Trial 3	
	Barnyard grass	Brown beetle grass	Barnyard grass	Brown beetle grass
90	99	100	60.4	55
180	100	100	98	98
Weed stage at applic.	2-5 leaf	2-4 leaf	4L/3T	3L/4T
Days last flush to application	2		30	
Days applic. to flooding	12		7	

Table 3. Control of barnyard grass and brown beetle grass, phytotoxicity scores, and grain yield of rice from fenoxaprop-ethyl applied at three growth stages, with three different intervals between application and permanent water (Trial 2)

Rate (g ha^{-1})	Days from spray to flood	Crop stage	Weed control (%)[a] Barnyard grass	Weed control (%)[a] Brown beetle grass	Phyto. score (0-9)[b]	Yield (t ha^{-1})
Unsprayed					0	2.7
90		15%	79	91.7	1.0	5.5
180	27	emergence	90.2	96.6	1.0	6.8
360			85	94.9	1.0	8.0
90			99	100	1.3	8.0
180	12	2 leaf	100	100	1.0	8.4
360			99	100	1.0	6.8
90			99	100	2.3	7.3
180	3	3-5 leaf	100	100	3.0	8.9
360			100	100	3.8	8.4

[a] Percentage control 54 days after sowing
[b] Phytotoxicity score 51 days after sowing (0 = no damage, 4 = substantial chlorosis, and 9 = total crop loss)

REFERENCES

1. Thomas, J.M. 1984. Proc. South. Weed Sci. Soc. 37, 41.
2. Todd, L. 1984. Proc. South. Weed Sci. Soc. 37, 40
3. Turner, R.G. 1983. Span, 26, 19-22.