CONTROL OF BARLEY GRASS AND OTHER PASTURE WEEDS WITH ETHOFUMESATE (NC 8438)

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Summary

Ethofumesate (Fisons NC 8438) was investigated as a potential barley grass (*Hordeum* spp) herbicide during 1973, in two differing climatic areas of New Zealand; mid-Canterbury and the Waikato. Ethofumesate gave greater than 95% control of barley grass in the mid-Canterbury and 90% control in the Waikato trials at a dose rate of 1 to 1.5 kg/ha respectively when applied during early winter (May-July) and assessed six months after application. A number of other broad leaf and grass pasture weeds were controlled.

INTRODUCTION

The biological properties of ethofumesate (Fisons NC 8438) were first described in 1969 (Pfeiffer, 1969). It was reported that this compound was phytotoxic to a number of broadleaved and, in particular, grass weeds. Among the crops tested for selectivity, to ethofumesate, ryegrass (*Lolium* spp) showed a marked tolerance.

In initial studies in New Zealand, ethofumesate was found to give promising control of barley grass (*Hordeum murinum*) when applied as a pre-emergence treatment; it was also reported that ryegrass was unaffected, clover (*Trifolium* spp) was checked but total dry matter production was not depressed (Hartley 1972).

The degree of tolerance of ryegrass and the susceptibility of *Hordeum* spp has been demonstrated in glass house trials simulating field conditions where the LD80 dose rate of ethofumesate was 3.2 kg/ha and 0.4 kg/ha respectively when applied pre-emergence (Pfeiffer, personal communication).

During 1973, field evaluation of ethofumesate was carried out by the writer with a view to establishing a reliable dose rate and degree of barley grass control in two different climatic areas of New Zealand. Observations were made on the effect of ethofumesate on the ryegrass/white clover component of the pasture sward and other pasture weeds.

Details and results of these trials are presented in this paper.

EXPERIMENTAL METHOD

In 1973, 22 mid-Canterbury and 13 Waikato trials were laid down of which 18 and 9 respectively were quantitatively assessed for the presence of barley grass seed heads in late December.

Treatments were applied to 10 m² plots by a modified Oxford Precision CO₂ sprayer, using twin flat fan nozzles (SS2-60 65015), delivering 190 to 320 litres/ha. All treatments were replicated four times and were applied to grazed and/or hay pastures at three timings; May, June, August.

Ethofumesate was applied at dosage rates from 0.5 to 4 kg/ha and a commercial TCA/ 2,2-DPA barley grass herbicide applied at 5.7/1.0

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and 3.4/1.7 kg/ha. Assessment of barley grass control was made in December by taking seed head counts in four 1 m² quadrats per plot, i.e. 16 times per treatment.

Trial sites varied from sheep yards, shelter belts, fence lines, stock camps, to open paddocks, etc; sites typical of barley grass infestations.

RESULTS

Barley Grass

Final assessments of barley grass control showed that application of ethofumesate during May and June gave superior and more reliable control than August applications; both in the Waikato and mid-Canterbury areas, except in two trials where the barley grass was less than 5 cm in length, due to drought and heavy sheep grazing.

May and June applications of ethofumesate at a dose rate of 1 kg/ha, reduced barley grass seed head population by 97% and 89% for the mid-Canterbury and Waikato areas respectively while 2 kg/ha reduced the seed head population by 99% and 96% respectively.

Near perfect control was achieved with the application of ethofumesate at a dose rate of 4 kg/ha where applied.

The TCA/2,2-DPA commercial barley grass herbicide when applied as per the manufacturer's label recommendations, gave 86% and 84% reduction of barley grass seed heads in the mid-Canterbury and Waikato areas respectively.

In two mid-Canterbury heavily grazed trials, ethofumesate treatments were included at a dose rate of 0.5 kg/ha. These gave 94% and 97% reduction in barley grass seed heads.

Ryegrass/White Clover

No visible phytotoxic effects were noted on ryegrass in the ethofumesate treatments in any trial; however, in the TCA/2,2-DPA treatments, damage occurred to the ryegrass component of the pasture, especially in the mid-Canterbury area. In the ethofumesate treatments, ryegrass growth appeared to be stimulated and to have a darker green appearance but no fully quantitative data was collected. It is planned that this aspect will be studied in field trials during 1974.

White clover suffered an initial check in all ethofumesate treatments, the severest being in the drier Canterbury trials. Observations in December showed that clover was actively growing in all trials in the 1 and 2 kg/ha treatments, both in mid-Canterbury and Waikato.

Other Pasture Weeds

At dose rates of from 0.5 to 2 kg/ha, ethofumesate removed or reduced the population of a number of other pasture weeds. Field scale trials to quantify this activity are currently in progress.

Those weeds, other than barley grass, which appear to be susceptible to ethofumesate are:—

poa trivialis (<i>Poa trivialis</i>)	chickweed (<i>Stellaria media</i>)
poa annua (<i>Poa annua</i>)	shepherd's purse (<i>Capsella bursa-pastoris</i>)
bromus mollis (<i>Bromus mollis</i>)	field chickweed (<i>Cerastium arvense</i>)
prairie grass (<i>Bromus unioloides</i>)	vulpia hair grass (<i>Vulpia</i> spp.)

Senecio spp and other members of the compositae family appear to be resistant to quite high dose rates of ethofumesate.

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BARLEY GRASS CONTROL — 1973 % Control of Barley Grass Seed Heads

Barley grass height Location	Date	Ethofumesate kg/ha					TCA/2,2-DPA Commercial rate	control seedhead per m ²
		0.5	1.0	1.5	2.0	4.0		
Short (<5 cm) mid-Canterbury	May June							
Mean		95.7	97.0	98.2	98.9	99.5	86.5	448
M.D.		—*	3.4	2.0	1.4	0.7	9.6	220
Short (<5 cm) Waikato	June July							
Mean			88.1	89.4	96.4	100	84.5	98.0
M.D.			1.5	8.6	2.6	—**	0.4	21.2
mid-Canterbury								
Long (>5 cm) + Waikato	Aug							
Mean			65.9	79.4	87.5		80.8	240
M.D.			15.1	10.9	9.5		10.0	162

* Two trials only included the dose rate 0.5 kg/ha

** One trial only included the dose rate 4.0 kg/ha

M.D. = mean deviation from the mean

DISCUSSION

Though only limited data from one season's trials programme is presented, indications can be drawn as to the activity of ethofumesate for the control of barley grass in Canterbury and Waikato pastures.

Control of barley grass by the application of ethofumesate at from 1 to 2 kg/ha was superior to commercial TCA/2,2-DPA treatments.

A dose rate of 0.5 kg/ha on closely grazed pastures in the drier Canterbury area when applied in winter may give commercially acceptable barley grass control.

Under the higher rainfall, more equitable climatic and high organic soil conditions of the Waikato, an increase in the dosage rate of ethofumesate appears necessary to achieve the same degree of control of barley grass as that achieved in mid-Canterbury.

In the ethofumesate treatments, ryegrass growth appeared to be stimulated, possibly due to the lack of competition of barley grass and thus greater availability of soil moisture and nutrients to the remaining ryegrass plants.

Indications are that ethofumesate will not only control barley grass but will also control a number of important annual pasture weeds.

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REFERENCES

- Hartley, M. J., 1972. NC 8438 for control of seedling barley grass. *Proc. 25th Weed and Pest Control Conf.*: 62-63.
- Pfeiffer, R. K., 1969. The biological properties of 2-ethoxy-2, 3-dihydro-3, 3-dimethyl-5-benzofuranyl methanesulphonate (NC 8438) (a new experimental herbicide). *3rd Symposium on new Herbicides*, Versailles, 1-8.
- Proc. 27th N.Z. Weed and Pest Control Conf.*