DOWCO 453 - FOR GRASS CONTROL IN LUPINS

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Summary. A new herbicide Dowco 453 selectively controlled young Brome grass (*B. diandrus*) in lupins at 32.25 g ha^{-1}. Higher rates of application were required for satisfactory control of more advanced plants, and of annual rye grass (*Lolium* sp.). Dowco 453 did not control Silver grass (*Vulpia* sp.).

INTRODUCTION

Dowco 453 is a herbicide being developed in Australia by Dow Chemical (Aust) Ltd for post emergence grass control in a number of broadleafed crops. The chemical name for the compound is 2-(4-((3-chloro-5- (trifluoromethyl) -2-pyridinyl) oxy) phenoxy) propionic acid and the proposed common name (ANSI) is haloxyfop.

Mode of action studies have shown that it is rapidly absorbed by foliage, readily absorbed by roots and translocates readily throughout the plant. The main site of activity is the meristematic tissue. No activity has been observed on broadleafed plants or sedges when the herbicide is applied at suggested use rates.

Roy (personal communication 1984) found that 37.5 g ha^{-1} achieved excellent control of annual rye grass (*Lolium* spp.) Phimister (personal communication 1984) found that this rate provided excellent control of wild oats (*Avena* spp.) and a trial at Walpeup showed that 180 g ha^{-1} achieved good control of Brome grass (*B. diandrus*) which had commenced tillering when sprayed (Phimister personal communication 1984).

Brome grass and annual rye grass are problem weeds of lupin crops in Western Australia and two field experiments were conducted in 1983 to study the effect of Dowco 453 on these weeds and lupins. This paper summarises the results of those trials.

METHODS AND MATERIALS

The trials were located at Gillingarra (approx. 100 km north of Perth) on a pale yellow sand, and Kellerberrin (approx. 180 km east of Perth) on a gravelly loamy sand. Dowco 453 EE formulated as a 246g L^{-1} E.C. was sprayed on to emerged Illyarrie lupins and weeds at two times. 0.25% non ionic surfactant was added to the spray mixture.

Table 1. Growth stage of grass weeds and lupins at spraying

Site	Grass weeds	Lupins
Gillingarra		
1st spray	3 to 5 leaves	6 leaves
2nd spray	early-mid tillering	11 leaves to early branching
Kellerberrin		
1st spray	2 to 4 leaves	3 leaves
2nd spray	early tillering	11 leaves to early branching

Treatments were applied in a randomised complete block design with three replications and a minimum plot size of 2.5 m by 20 m. Weed control and crop vigor was assessed by visual rating and plant counts approximately four weeks after the last spray. Crop grain yield was measured at maturity by harvesting a 1.3 m strip from each plot with a self propelled plot harvester.

RESULTS

Excellent Brome grass control was achieved at Gillingarra with 31.25 g Dowco 453 ha^{-1} sprayed when the grass had 3 to 5 leaves (Table 2). When sprayed onto Brome grass that had commenced tillering, 62.5 g Dowco 453 ha^{-1} was required for good visual control and 125 g was needed to reduce plant numbers to a level similar to that achieved with the lowest rate sprayed early. All rates of Dowco 453 were more effective on Brome grass than the standard 125 g Fluazifop ha^{-1}. Neither product controlled silver grass (*Vulpia* spp.).

Lupin data is not shown because no visual symptoms of crop phytotoxicity or reduction in lupin plant numbers due to the herbicides was detected. Grain yield of the sprayed lupins was not significantly different from the unsprayed lupin grain yield.

Table 2. Effect of Dowco 453 on grass weeds

	Treatment g ha^{-1}		Gillingarra		Kellerberrin	
			Visual rating grasses	Brome grass plants m^{-2}	Visual rating grasses	Annual rye grass plants m^{-2}
1	Nil		000	274 a	000	519 a
1st Spray						
2	Fluazifop	125	333	56 c	333	330 b
3	Dowco 453	31.25	444	8 d	445	243 c
4		62.5	444	3 d	435	70 d
5		125	444	6 d	665	30 d
6		250	444	1 d	646	33 d
2nd Spray						
7	Fluazifop	125	322	87 bc	022	NA
8	Dowco 453	31.25	333	117 b	342	"
9		62.5	444	60 c	344	"
10		125	444	19 d	444	"
11		250	544	12 d	465	"

Figures followed by the same letter do not differ significantly (P 0.05) using Duncans Multiple Range Test.

Visual ratings show individual plot ratings for each replication where:

0 = no effect
1 = 0-25% control
2 = 25-50% control
3 = 50-75% control
4 = 75-98% control
5 = 98-100% control
6 = 100% control

At Kellerberrin 31.25 g Dowco 453 achieved good visual control of annual rye grass when sprayed onto grass with 2 to 4 leaves. 62.5 g ha^{-1} was required for a satisfactory reduction in grass plant numbers, and on the basis of the visual ratings, a further response was achieved with 125 g ha^{-1}. Annual rye grass sprayed later when tillering had commenced required at least 125 g ha^{-1} for satisfactory control. Dowco 453 achieved better weed control than Fluazifop at both times of spraying.

No response to any treatment was detected in the lupins at Kellerberrin. The crop had good growing conditions at both sites and the mean grain yield from the unsprayed plots was 1,200 kg.ha^{-1} at Gillingarra and 1,300 kg.ha^{-1} at Kellerberrin.

DISCUSSION AND CONCLUSIONS

Dowco 453 has potential as an excellent herbicide for selective post emergence grass control in grain lupins. This study has shown that 31.25 g ha^{-1} can achieve excellent control of Brome grass providing it is sprayed while the grass is young. Annual rye grass required a higher rate of application for maximum control and even though it displayed some tolerance to the highest rate applied, the control achieved with all rates of Dowco 453 was better than that achieved with Fluazifop.

Both grasses were controlled more readily when the herbicides were applied to young plants with no more than five leaves.

The lupins did not respond to the herbicide and it is concluded that the level of grass infestation at both sites was not high enough to exert any significant competitive pressure on the crop.

Further studies are required to establish whether Dowco 453 can increase lupin grain yield in situations where weed/crop competition favours weed growth. For example, where much higher levels of weed infestation are encountered, or under seasonal conditions where competition with weeds for moisture or sunlight limits crop growth. It is also necessary to study the efficacy of Dowco 453 on other grasses that are pest plants in lupins.

As crop tolerance to this product appears to be high, development studies should continue with the objective of it being developed for commercial use in grain lupins.

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