PUMA® - A NEW POST-EMERGENCE SELECTIVE GRASS HERBICIDE FOR USE IN WHEAT

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Summary. Puma® (fenoxaprop-ethyl) is a new post-emergence grass herbicide, formulated as an oil in water emulsion, for use in wheat. Puma is absorbed through the plant leaves, and stops growth by inhibiting fatty acid synthesis. In Australian trials excellent control of wild oats, *Avena spp.* at 90 g a.i./ha and annual phalaris, *Phalaris paradoxa, Phalaris minor* at 120 g a.i./ha has been achieved.

INTRODUCTION

Puma® is a new post-emergence selective grass herbicide for use in wheat. It was developed in the laboratories of Hoechst AG and will be commercially launched by Hoechst Australia Limited for use in Australia in the 1990 season.

Puma is formulated as an oil in water emulsion containing 60 g per litre fenoxaprop-ethyl (ethyl-2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propanoate)(Hoe033171), with the addition of an external modifier, fenchlorazole-ethyl (proposed) (Hoe070542).

The acute oral LD50 of the formulation for the rat is greater than 5000 mg/kg, with the acute dermal for the female rat being greater than 4000 mg/kg. The formulation has been found to be non-irritating and non-sensitising to mammalian skin, eyes and respiratory systems.

In the plant, the active ingredient is absorbed by the leaves and exhibits limited movement in both the xylem and phloem. The actual site of action is in the meristematic tissue, where fatty acid biosynthesis is inhibited by the free acid fenoxaprop. Good growing conditions favour the effectiveness of Puma, while the speed of action is slowed at low temperatures and low humidity or moisture levels (1).

The first visible symptom appears 2-3 days after application, with cessation of growth. At the same time, formation of new leaves and secondary roots ceases. Young leaves exhibit chlorosis, and then necrosis spreads over leaves and shoots. The plant dies within 2 to 4 weeks depending on the climatic conditions (2).

Puma has given a high level of control of both wild oats, *Avena spp.* and annual phalaris, *Phalaris paradoxa, Phalaris minor* in wheat crops in Australia.

This paper gives general information on fenoxaprop-ethyl and reports on field trials conducted in 1986 and 1987 by Hoechst Australia Limited.

METHODS

All trials were conducted in commercially grown cereal crops for activity against naturally occuring weed populations. The trials were laid out using plots 2x15 m to 20 m, as a randomised complete block design with four replicates. All treatments were applied using propane gas powered sprayers with flat fan nozzles in water volumes of 80 to 100 l/ha. Efficacy was assessed by taking plant counts in each plot and grain yields were assessed using a small plot harvester.

RESULTS AND DISCUSSION

Wild Oats. Nine trials were conducted covering all mainland states over 1986 and 1987 to evaluate the control of wild oats. Treatments were applied between 24 and 63 days after sowing with the wild oats growth stages ranging from (Zadoks Decimal Code) Z11 - Z24. Plant (weed) populations varied from 100 to 474 plants per m^2, with an average infestation level of 227. Results are presented in Table 1.

Table 1. Control of Wild Oats and Yield Response with fenoxaprop-ethyl (average 9 trials).

Rate fenoxaprop-ethyl g a.i./ha	% Weed Control (range)	Yield as % of Untreated Control (range)
0	0	100
60	82.8 (73-100)	156.1 (94.7 - 232.0)
90	95.3 (80-100)	167.0 (100.0 - 246.0)
120	96.0 (85-100)	167.4 (98.9 - 259.5)

Fenoxaprop-ethyl at 60 g a.i./ha did not achieve consistent control while at 90 and 120 g a.i./ha, excellent control of wild oats was obtained with average levels of control above 95%. The higher rate gave a reduced range of control levels, compared to fenoxaprop-ethyl at 90 g a.i./ha.

All rates gave average yield responses of more than a 50% increase over the untreated control, with no difference between the two higher rates.

Phalaris. Eight trials were conducted during 1986 and 1987 to evaluate the control of annual phalaris. Treatments were applied between 24 and 67 days after sowing with the phalaris ranging from Z11 - Z23. Plant (weed) populations varied from 87 to 831 plants per m^2, with an average infestation level of 394. Results are presented in Table 2.

Table 2. Control of annual Phalaris and Yield Response with fenoxaprop-ethyl (ave. 8 trials).

Rate fenoxaprop-ethyl g a.i./ha	% Weed Control (range)	Yield as % of Untreated Control (range)
0	0	100
60	87.0 (67-100)	127.3 (108.3 - 162.9)
90	90.0 (80-100)	130.3 (102.8 - 116.5)
120	95.1 (88-100)	130.0 (99.4 - 192.9)

Rates of fenoxaprop-ethyl below 120 g a.i./ha did not provide acceptable control, although some individual trial results did show high levels of control. To achieve the required consistent high levels neither 60 or 90 g a.i./ha were adequate.

All treatments gave yield increases over the untreated control plots of approximately 30% but no dose response was shown.

CONCLUSION

Field trials with Puma (60 g/l fenoxaprop-ethyl) have given excellent control (>95%) of wild oats in wheat, using rates of 90 to 120 g a.i./ha equivalent to 1.5 to 2.0L of formulated product. This level of control resulted in yield increases in the order of 60%.

Similar levels of control of phalaris was achieved with 120 g a.i./ha (2.0L product) but yield responses were only in the order of 30% suggesting that phalaris does not compete as strongly as wild oats.

No crop damage was encountered.

REFERENCES

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