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STUDIES ON THE BIOLOGICAL ACTIVITY OF
FLUAZIFOP-BUTYL

A THESIS
PRESENTED FOR THE DEGREE OF
PHILOSOPHIAE DOCTOR
IN THE UNIVERSITY OF WALES

by

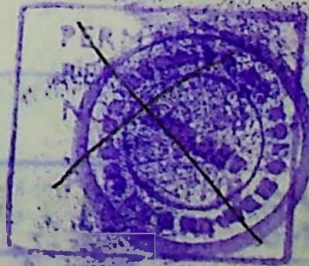
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SUMMARY

Several aspects of the biological activity of fluazifop-butyl, a new selective, post-emergence herbicide for grass-weed control, were investigated with particular reference to its action against couch-grass (Agropyron repens). The herbicide readily kills A.repens, achieving a high degree of rhizome-bud kill at the same time. A dose of 1.0 kg ha^{-1} was sufficient to achieve 100% bud kill under glasshouse conditions in plants up to 16-weeks old, if uptake and translocation occurred undisturbed for 48 h.

Factors affecting the performance of the herbicide were studied using both unlabelled and ^{14}C -labelled fluazifop-butyl. Evidence of typical source-sink dependent phloem mobility was found with the compound accumulating in rhizome apices and other growing points of the plant. High temperature, high humidity and low moisture stress in plants favoured overall activity. Rainfall occurring within 6 h of spraying reduced performance.

A surfactant (Agral) and an oil-additive (Actipron) added to spray solutions either individually or in mixtures, enhanced the activity of fluazifop-butyl. The additives significantly increased foliar uptake and acropetal movement, but clear evidence of enhanced translocation was not found. Uptake and translocation were greater from applications to abaxial than adaxial leaf surfaces; from treatments to basal areas of leaves than to leaf tips and from stem than leaf applications.

Some evidence of early damage to chloroplast function and ultrastructure was found.

Several morphologically different clones of A.repens were adequately controlled by the herbicide, with only minor differences in overall response.