

utilize nitrogen from the decaying nodules of the legume, and only 18 lb per acre (20 kg per hectare) of nitrogen, as a top dressing, was applied.

Quadrat yields of about 3,000 kg per hectare paddy rice were obtained.

If this system can be made practicable on a large scale it represents a very cheap method of growing rice.

THE EFFECTS OF RATE AND TIME OF APPLICATION OF MOLINATE
ON THE CONTROL OF *ECHINOCHLOA* SPP. IN RICE

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Molinate has been widely used for the control of *Echinochloa* spp. in rice in both the U.S.A. and Australia. In America it is recommended for pre-sowing applications for rice sown into water or post-emergence applications to drill-sown rice. Crop damage has been reported when molinate has been applied before sowing to drill-sown rice.

To investigate optimal application rates and times for rice under drill-sown conditions in New South Wales rice-growing areas, a series of trials were carried out in the Murrumbidgee Irrigation Area. These trials included molinate at rates ranging from 2 to 6 lb a.i. per acre (2.25 to 6.74 kg per hectare), applied at times ranging from before sowing to immediately prior to permanent flooding, up to 37 days after sowing. Herbicide volatilization was minimized by shallow cultivation, in the case of pre-sowing treatment, or by flooding within 24 hours of application.

Observations on *Echinochloa* population and growth indicated that molinate at rates of 3 lb a.i. per acre (3.37 kg per hectare) and above gave effective control. There was little difference between times of application. In one trial pre-sowing, pre-emergence, and early post-emergence applications (up to 16 days after sowing) were superior to late post-emergence applications (36 days after sowing). In other trials post-emergence applications up to 37 days after sowing were superior to pre-emergence applications. It appeared in these latter trials that 5 lb a.i. per acre (5.62 kg per hectare) applied before emergence gave a similar degree of weed control to

3 lb a.i. per acre after emergence.

No treatment, whether prior to sowing, before emergence or after emergence, caused any reductions in rice plant numbers. Variations in crop tiller numbers, dry matter production, and yield reflected weed control efficiency.

The results of these trials indicate that molinate is a versatile herbicide which can be used safely and effectively over a wide range of application times. Its safety as a pre-sowing or pre-emergence application contradicts some overseas reports and local glasshouse results. Safety in the current experiments was exhibited at rates twice those normally used.

Molinate is generally considered to have a soil life of at least 3 weeks. In a cool spring, rice grows slowly and 5-6 weeks may elapse before the crop is far enough advanced to tolerate permanent flooding. Under these conditions the residual effect of molinate applied before emergence may dissipate before anaerobic conditions prevent further *Echinochloa* germination. This may account for the slight superiority of post-emergence applications.

Distribution of *Echinochloa* in rice bays is often far from uniform, varying from dense stands to practically weed-free conditions within a few yards. If spraying can be delayed until the extent of the infestation can be seen, it is often possible to restrict treatment to part of the crop only.

For this reason, and from the results outlined above, there would seem to be no reason for altering current recommendations to apply 3 lb a.i. per acre at the early post-emergence stage. If, however, earlier or later application becomes necessary for some reason, the time of application can be varied without any great reduction in weed control efficiency.

THE ROLE OF POST-EMERGENCE HERBICIDES FOR WEED CONTROL IN COTTON IN QUEENSLAND

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INTRODUCTION

The present use of herbicides in cotton in Queensland is almost entirely limited to pre-emergence materials. An estimated 75% of the irrigated cotton acreage is treated annually. Post-emergence herbicides are not widely used.