# PRONAMIDE AND CARBETAMIDE FOR BARLEY GRASS CONTROL

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*Summary*

Trials to determine the optimum time of application of pronamide and carbetamide for barley grass control in pasture were conducted in Waikato, Canterbury and Otago. Good control was obtained from application in June to August (September in Waikato) after which the effect declined rapidly. Ryegrass tolerance also increased with later application. In Waikato and Otago ryegrass showed tolerance earlier than barley grass thus giving a short period of differential selectivity. This was not found in Canterbury where eradication dosage is recommended followed by reseeding. White clover was tolerant of both herbicides at rates adequate to control barley grass.

## INTRODUCTION

TRIALS conducted in different parts of New Zealand to assess the herbicides pronamide and carbetamide for the selective control of barley grass in pasture have suggested regional differences. However, these regional differences have been confounded with variations of application rates and trial techniques (Atkinson, 1970; Meeklah *et al.*, 1970; and unpublished data). In order to obtain more information on the optimum time of application of these herbicides, it was decided to apply pronamide and carbetamide to pasture, as single applications, at monthly intervals in Waikato, Canterbury and Otago using the same rate of application at each centre. In Waikato additional rates of application were also used to determine the optimum dosage.

The results are too extensive to present in full in this paper. Thus typical results are presented showing similarities and differences between sites. Certain trends in herbicidal action were apparent and these will be discussed.

## METHOD

All work was done on plot trials on pasture using a randomized block design with 3 to 4 replicates. Pronamide was applied at two rates (0.6 and 1.2 kg/ha) and carbetamide at 2.5 kg/ha. Because mowing tends to eliminate barley grass, the following techniques were used. In Waikato (Tokanui), barley grass control assessments were made under grazed conditions and dry matter production measurements made on other plots in an adjacent block of the same paddock. In Canterbury (Lincoln and Winchmore), half of each plot was mown and after each mowing the whole area was grazed, barley grass control assessments being made from the grazed portion. In Otago (Palmerston), separate areas were used for barley grass control assessments and pasture tolerance measurements.

## RESULTS

These fall basically into two groups, Waikato and Otago being similar, while Canterbury differs.

### Barley Grass Control

A graph of the percentage cover of barley grass surviving after single treatments to different plots at monthly intervals from May to October in Otago is shown in Fig. 1. Assessments were made by three observers on 14/1/72. The pattern in Waikato was similar except that the most

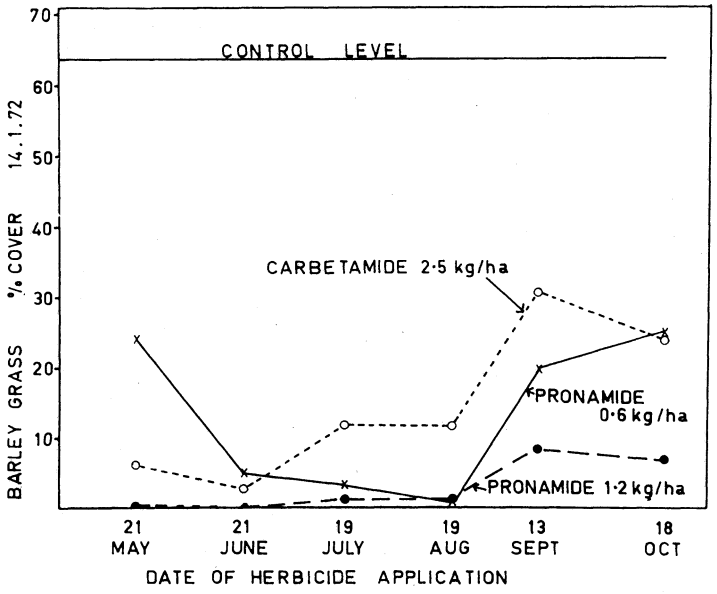


Fig. 1: *Barley grass control, Otago (Palmerston). Similar pattern obtained in Waikato (Tokanui) but with most effective period one month later.*

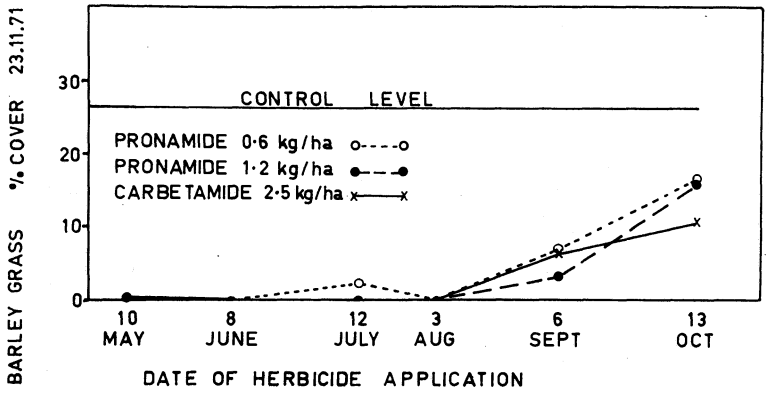


Fig. 2: *Barley grass control, Canterbury (Lincoln).*

effective period was about one month later and the whole graph could be shifted one month to the right. In Canterbury, control was good right through from May to August (Fig. 2) at Lincoln. At Winchmore the pattern was similar but complete control was obtained only at the higher rates.

## Pasture Tolerance

### *Species Composition*

At Lincoln there was no difference in the tolerance of ryegrass and barley grass to the chemicals used as indicated by the total grass/clover ratio. At times of application where the herbicides were effective against barley grass, ryegrass tolerance was as low as that of barley grass and no differential selectivity was obtained (Fig. 3). In Waikato there was approximately one month during the July-August period in which ryegrass had considerably greater tolerance than barley grass. Though barley grass was not present as a competitive factor in the Otago pasture tolerance trial, the data suggest that a similar situation applied, but a month earlier.

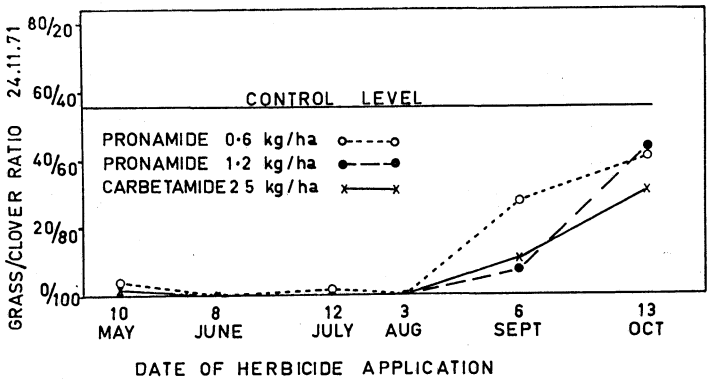


FIG. 3: *Sward composition, grass/clover ratio, Canterbury (Lincoln).*

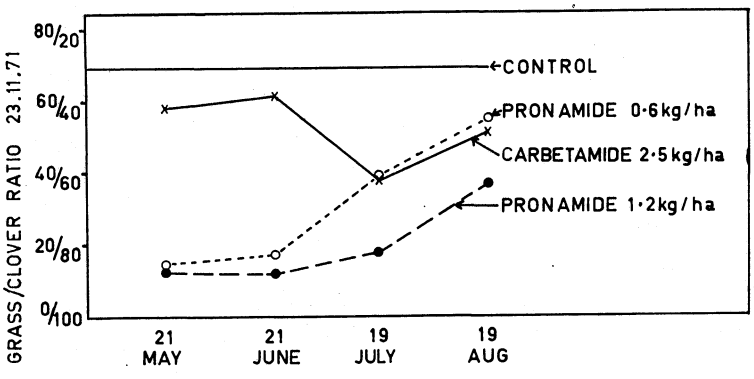


FIG. 4: *Sward composition, grass/clover ratio, Otago (Palmerston).*

Figure 4 shows the effect of time of treatment on the grass/clover ratio in Otago assessed on 23/11/71. In all trials cocksfoot was more tolerant than ryegrass.

### *Dry Matter Production*

Generally speaking, the earlier the herbicide was applied the greater the loss of total dry matter production during the spring and summer. During the effective period for barley grass control, this ranged from 30 to 40% in Canterbury, and 20 to 30% in Waikato and Otago. The increase in the clover component of the sward might compensate to some extent for the loss of grass (Hartley and Atkinson, 1972).

## DISCUSSION

Though limited data for one year are presented, this discussion draws on unpublished data obtained over several years. The conclusions are, therefore, wider than could be justified on presented data alone.

In Waikato and Otago, ryegrass shows some tolerance to the lower rates of pronamide and carbetamide with some prospect of acceptable selective control. However, the period of satisfactory differential selectivity is of limited duration and subject to both geographical and seasonal variations. Trial work in previous years had indicated that the "safe and satisfactory" period may vary from year to year by a few weeks either way.

In the drier areas of Canterbury, ryegrass selectivity cannot be obtained. This also appears to be the case in Hawke's Bay (pers. comm.). Trials under irrigation in Canterbury (Winchmore) show some selectivity, thus tending towards the tolerance shown in Waikato and Otago.

These results suggest two possibe approaches to the use of these chemicals for barley grass control.

Where ryegrass tolerance is likely to be sufficient to re-establish a satisfactory grass/clover balance, low rates, pronamide 0.6 kg/ha and carbetamide 2.5 kg/ha, would be acceptable even if allowing some barley grass to survive, provided barley grass control lasted into succeeding years.

When selectivity is likely to be marginal or absent, then the aim would be to eradicate barley grass by applying higher doses of the order of 1.2 kg/ha of pronamide or 3.5 kg/ha of carbetamide. This would necessitate oversowing with grass seed in the autumn following treatment with the prospect of entering the succeeding year with a barley grass-free sward. In both instances the loss of total dry matter production could be offset by special purpose production from the clover-dominant sward.

## CONCLUSIONS

Both pronamide and carbetamide can give a high level of barley grass control when applied during the winter (June to August).

At the low rates (0.6 kg/ha of pronamide or 2.5 kg/ha carbetamide), some ryegrass tolerance is evident in certain regions over a limited period. However, this period is of short duration and can shift with seasonal variations so that selectivity cannot be guaranteed until the environmental factors affecting the seasonal variations can be determined. White clover is very tolerant of both chemicals and is stimulated by the reduction in grass competition.

## ACKNOWLEDGEMENTS

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