
EFFECT AND CONTROL OF CALIFORNIAN THISTLE IN DAIRY PASTURE

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A hstract

Pasture infested with Californian thistle (*Cirsium arvense*) was treated in a large scale paddock trial for thistle control using MCPA, MCPB and mechanical topping, and the effect on cattle production measured. All treatments gave significant control of Californian thistle with little difference between MCPB and MCPA but MCPA depressed clover and cattle liveweight gains significantly. Topping while successful in controlling Californian thistle on this trial may not be as effective under a dairy rotation.

INTRODUCTION

Californian thistle is a widespread weed but little work has been done on its effects on pasture production as measured via grazing animals. A previous study (Hartley & James, 1979), showed that control of a 30% cover of Californian thistle in pasture increased sheep liveweight gains by 50% and that Californian thistles were a greater problem in sheep grazed than cattle grazed pastures. However, as Californian thistle is also a common weed of dairy pastures a trial was set up on the Taranaki Agricultural Research Station, Normanby, to assess the effect of Californian thistles on dairy cattle and to compare methods of thistle control. Results of the first year are reported.

METHODS

An area heavily infested by Californian thistles, was divided into 16 paddocks each of 0.35 ha. In December 1979 the distribution of thistles was mapped on each paddock using an arbitrary thistle density scale of nil, scattered, medium and dense. The paddocks were then ranked according to thistle density and divided into four groups of four paddocks in such a way as to ensure that equal densities of thistles were present in each group. The four groups were then allocated at random to the following treatments:

1. Untreated control
2. MCPB (1.5 kg a.i./ha)
3. MCPA (1.0 kg a.i./ha)
4. Topping

411 treatments were applied by farm machinery, the herbicides by boom spraying in 200 litres/ha post-grazing in December 1979 and again in February 1980, and the topping by rotary slasher during grazing in January

1980 and February-March 1980.

Treatments were repeated the following season except that only two paddocks of each spray treatment needed a second application.

Each treatment was grazed by a separate group of young dairy replacement cattle on a 4 week rotation (1 week/paddock) from September to May, and on an 8 week rotation (2 weeks/paddock), with supplementary feeding, from May to September. The cattle were set pre-determined liveweight gains and stock numbers were adjusted seasonally, according to feed available, to keep within their target limits. Numbers were always equal on all treatments with a minimum number of seven, and supplementary feed was given equally, as necessary, to maintain this number. The cattle were weighed weekly. Each April the yearling cattle were replaced by weaner calves.

The distribution of Californian thistles was re-mapped in December 1980 as in the previous year, and pasture composition was assessed in February 1981 by points analysis.

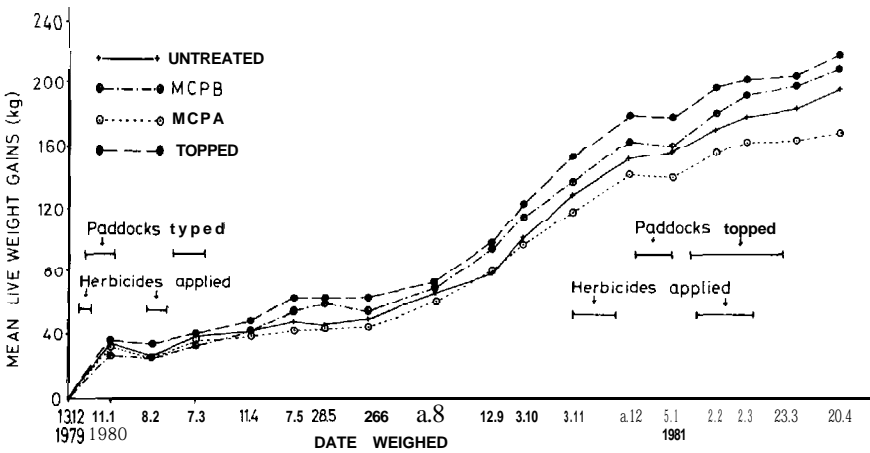


FIG. 1: Mean accumulative liveweight gain of all cattle on the trial from December 1979 to April 1981.

RESULTS

CATTLE LIVEWEIGHTS

Because of the changes in stock numbers the data are expressed as an accumulation of liveweight gains over approximately monthly periods (Fig. 1). All animals common to any two consecutive dates were included in the weight gain for that period. Because of the changes in stock numbers, the data could not be analysed meaningfully. However, Fig. 1 indicates that topping, and to a lesser degree MCPB, increase liveweight gains throughout, whereas MCPA reduced productivity relative to the untreated control. An examination of the liveweight gain of the few animals on the trial for one full year shows MCPA depressed liveweight gains significantly (Table 1). MCPB

showed a slight though non-significant advantage over untreated but there was no response to topping.

TABLE 1: MEAN LIVEWEIGHT GAINS (kg) OF CATTLE CONSTANTLY ON THE TRIAL (Number animals in parenthesis).

Treatment	Period
	11.4.80-20.4.81
Untreated	161 (7)
MCPB	173 (6)
MCPA	132 (5)
Topped	162 (5)
LSD 5%	25

THISTLE CONTROL

Changes in thistle density after one year are shown in Fig. 2. The untreated area changed little except for a shift from medium density to scattered following more intensive grazing. The other three treatments resulted in a significant increase in the area free of thistles and significantly decreased the medium and high density areas relative to untreated. MCPB and MCPA also reduced the area of scattered infestation.

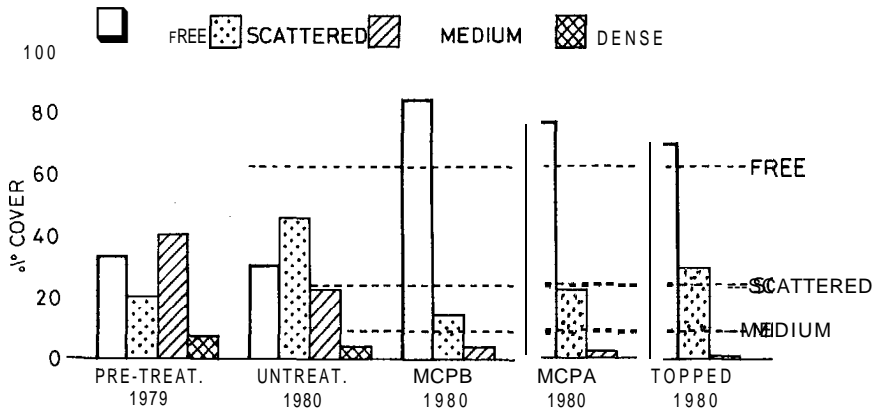


FIG. 2: Percentage area covered by four Californian thistle density categories, before treatment in December 1979 and in December 1980 after one season of treatment. The dotted lines indicate the 5% significant levels of treatments above or below the corresponding densities of untreated 1980.

In December 1980 there was an obvious shortage of clover on the MCPA paddocks. White clover flower head counts taken from equal areas of identically taken photographs show untreated 20, MCPB 127, MCPA 9 and topped 92. By the time the area was point analysed in February the clover differences were less marked but clover was still significantly reduced by MCPA (Table 2).

TABLE 2: PASTURE COMPOSITION BY POINT ANALYSIS 17th FEBRUARY 1981
(200 points] paddock)

Treatment	% ground cover					Litter/
	Ryegrass	Other Grass	Clover	Weeds		
			35	bare	ground	
Untreated	39	11	37	5		10
MCPB	45	8		3		7
MCPA	53	10	22	2		13
Topped	48	10	29	4		9
LSD 5%	7	8	10	5		10

DISCUSSION

Results so far indicate that Californian thistles affect cattle rather less than they do sheep. Cattle are more prepared to move into the thistle areas, hence renovate the pasture by grazing and thin the thistle clumps by trampling many new shoots.

The reduction in cattle liveweight gains following the use of MCPA demonstrates the danger of using a clover toxic herbicide on pasture, especially when applied during the growing season. However, since MCPB gave a similar control of Californian thistles without the clover damage there is no advantage in using MCPA. The topping treatment proved very successful in this trial for thistle control and initially cattle performance. However, on the rest of the research farm where milking cows were grazing paddocks for only 2 days per 24 day rotation topping failed to give thistle control. Mean stocking rate for the milking cows was 3.7/ ha compared to 8.5 young cattle/ ha on the trial area, indicating there may be an interaction between intensity and duration of grazing and thistle control by topping. The improved production from the topping treatment was associated initially with an improvement in pasture quality through removal of rank growth, but the persistence of the effect into the spring, in spite of hard winter grazing, is hard to explain. The treatment however, showed no advantage in the second year under more intensive grazing.

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REFERENCE

Hartley, M. J.; James, T. K., 1979: *Proc. 32nd N. Z. Weed and Pest Contr. Conf.*: 245-249.