EFFECT OF RUSHES ON SHEEP CARRYING CAPACITY

M.J. HARTLEY*

Agricultural Research Division, MAF, Palmerston North

SUMMARY

A trial was conducted near Palmerston North to measure the effect of rushes (*Juncus* spp) on stocking rate (sheep). The trial ran for 18 months and showed that control of rushes covering 7-11% of the ground resulted in 16-19% increase in stock carrying capacity.

INTRODUCTION

Rushes of various species are found throughout New Zealand on both hill and easy country. They require damp conditions to establish, and are therefore frequently associated with poor drainage, but once established they can persist through dry periods (Matthews 1975).

They are conspicuous weeds, present the year round, and many species are difficult to control, or had been till the advent of glyphosate (Moore *et al* 1980). The conspicuous nature of rushes leads to much interest in their control but few data are available on their effects on pasture or stock production.

The trial reported here was set up to measure the effect of rushes on sheep production. No attempt was made to change the conditions that had allowed the rush infestation to occur.

METHOD

The trial was conducted on the Hauorongo Research Area near Palmerston North. Two blocks of poorly-drained, rough pasture, with a moderate infestation of rushes were used. The dominant rush species were *Juncus australis* and *J. gregiflorus* with a small amount of *J. sarophorus* and *J. distegus*. Yorkshire fog (*Holcus lanatus*) formed a major component of the sward in the wetter parts of the pasture.

Each block was divided into 6 paddocks of 0.2 ha. The paddocks within each block were paired for rush density from an aerial photograph and one of each pair, chosen at random, treated for rush control.

Rushes were controlled in January 1981 by wiping with glyphosate (Roundup 1:2 in water) using a 2 m wick boom carried between two operators. The rushes were wiped one way only. Three months later the rushes were cut, raked into windrows and burnt. Rush control was not complete but numbers and density greatly reduced. Any rush regrowth was easily controlled by a further treatment. The area affected by burning was negligible. The blocks were grazed as a single unit until winter when the paddocks were divided by electric fencing.

Each block was managed separately and the three treated and three untreated paddocks in each block were grazed by a separate mob of dry sheep on a 3 week rotation. The aim was to keep the sheep weight gains comparable between treated and untreated groups and measure the effect of rushes in terms of number of sheep carried.

Trial stocking commenced on 29.9.81. The paddocks with rushes were stocked with 10 dry ewes per group (16.7 ewes/ha) and treated paddocks with 12 dry ewes per group (20/ha). In November numbers were increased respectively to 13 and 16 on Block 1 and 12 and 14 on Block 2 to utilize feed available and maintain balance between groups. Subsequent adjustments raised the numbers to 14 and 18 (Block 1) and 14 and 15 (Block 2). In March/April a number of animals showed symptoms of facial eczema. All animals were removed and replaced by new young stock on 21.4.82. Because of the unknown effect of facial eczema on the trial groups, data after the 4.3.82 weighing in the first period have not been used.

* Present address Hastings Horticultural Research Station, P.O. Box 85, Hastings.
Proc. 36th N.Z. Weed and Pest Control Conf.

The replacement young stock were initially stocked at 14 and 17 on Block 1 and 13 and 15 on Block 2. The 17 was soon reduced to 16 and apart from some minor adjustment among both untreated groups these numbers were maintained. Unfortunately some time in late July/August an error occurred in rotation sequence in both blocks and groups were switched between paddocks with and without rushes. The error was corrected in September. For this reason data between 22.7.82 and 7.10.82 have been omitted.

Sheep were weighed every 3 weeks and pasture available (between the rushes) measured by capacitance meter about twice a month. Stock numbers were adjusted on the basis of weight gains and feed available. Residual pasture level immediately after grazing was in the range of 500-1000 kg DM/ha.

Rush cover on the untreated paddocks was estimated by placing a transparent grid 10 times over an aerial photograph and counting the percent of intersection points occupied by rushes. The technique was reasonably accurate for any one operator but operator variability could be appreciable. A detailed ground measure in one area indicated that the aerial photograph estimate measured an area about 2.5-times greater (for the operator quoted) than actual ground cover due to the spreading nature of rush clumps.

RESULTS

The results in terms of total grazing days are presented in Table 1 with corresponding live weight gains (LWG) shown in Table 2. The data are presented in three periods.

TABLE 1: Total of and percent increase in sheep grazing days on each treatment for three periods between 29.9.81 and 17.3.83.

Period	Block 1			Block 2		
	Rushes	No rushes	Increase	Rushes	No rushes	Increase
29.9.81-4.3.82	1850	2280	23%	1760	2040	16%
21.4.82-22.7.82	1230	1430	16%	1140	1320	16%
7.10.82-17.3.83	2310	2690	16%	2180	2520	15%
TOTAL	5390	6400	19%	5080	5880	16%

During the 5 months October-February inclusive the removal of rushes resulted in 23% and 16% increase in stock numbers on Blocks 1 and 2 respectively (Table 1). The LWGs were well matched (Table 2) with slightly higher LWG on treated paddocks of Block 1 so that, if anything, these paddocks could have carried more sheep.

TABLE 2: Mean live weight gains of each group of sheep during three periods between 29.9.81 and 17.3.83.

Period	Mean live weight gain (kg)			
	Block 1		Block 2	
	Rushes	No rushes	Rushes	No rushes
29.9.81-4.3.82	12.0	12.8	15.1	15.0
21.4.82-22.7.82	-1.5	-1.6	-0.7	-1.9
7.10.82-17.3.83	14.2	14.8	15.6	14.8
TOTAL	25.7	26.0	30.0	27.9

Over the two later periods the paddocks without rushes supported about 16% more grazing days than paddocks with rushes (Table 1). On Block 1 the LWGs were about equal but on Block 2 the sheep on rushes gained more than those on treated paddocks suggesting that the paddocks with rushes could have carried more stock.

Mean rush cover as measured from aerial photograph was 27% and 17% on Blocks 1 and 2 respectively. This is estimated as equivalent to about 11% and 7% actual ground cover.

DISCUSSION

The data obtained from this trial indicate that rushes have an effect on stock production greater than actual ground area occupied, since the removal of an 11% and 7% cover of rushes resulted in stocking rate increases of 23% and 16% respectively (first period). Over the second and third periods the LWGs on Block 1 were comparable between groups and removal of an 11% cover of rushes gave 16% increase in stocking rate.

Over the first period the mean stocking rates on paddocks without rushes were 25.1/ha (Block 1) and 22.7/ha (Block 2). The corresponding reductions in stock numbers due to rushes were 4.8/ha and 2.7/ha respectively. Divided by the estimated mean ground area occupied by rushes (11% and 7% respectively) each 1% ground cover of rushes was equivalent to 0.44 and 0.38 sheep/ha. A similar calculation for Block 1 for second and third periods gave 1% ground cover of rushes equivalent to 0.3 sheep/ha. For Block 2 over these periods the ratio was 0.47 but this is considered too high because rush paddocks were understocked. Thus, depending on carrying capacity and stocking rate each 1% ground cover of rushes may be equivalent to about 0.35 sheep/ha or 3% rushes equals one sheep. This figure should give an indication of the likely return to be gained from money spent on rush control and the level of rush infestation at which rush control will be economic.

ACKNOWLEDGEMENTS

The author would like to thank D.P. Meade for setting up the trial and management during the first season and D. Patterson for management in the latter stages. The assistance of other staff in the Weed Research Group, MAF, Palmerston North is also acknowledged.

REFERENCES

- Matthews, L.J., 1975. Weed Control by Chemical Methods. Government Printer, Wellington, p 173.
- Moore, R.W., Yortt, M.L. and Atkinson, G.C., 1980. Rush and Australian sedge control with glyphosate. *Proc. 33rd N.Z. Weed and Pest Control Conf.*: 63-66