
THE PROCEEDINGS OF THE
NEW ZEALAND SOCIETY
OF
ANIMAL PRODUCTION
VOLUME 62 2002

CORRELATING STOCK AND PASTURE PRODUCTION IN NORTHLAND

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SUMMARY

The pattern of feed availability and inefficiencies in feed transfer are considered prime causes of poor stock performance in Northland. In separate trials, a normal spring lambing pattern was compared with winter/spring lambing and with autumn/spring lambing. Two pasture types were also compared — mainly ryegrass, and mainly kikuyu/ryegrass.

Spreading the peak of feed demand backward into winter and forward into late spring lessened ewe liveweight losses and increased lamb weight gain during lactation. Increasing the autumn feed demand by 40% for 12 weeks and delaying spring lambing by 2 weeks reduced wool yield but had no significant effects on ewe or lamb liveweight change during spring.

Poor utilization of feed carried forward into spring and relatively slow pasture growth lead to consistent undernutrition of ewes early in lactation. The transfer of some feed demand from spring to winter or autumn will partly alleviate this. On pasture containing kikuyu, it would be better to lamb later than on ryegrass-dominant pasture and to increase utilization in late summer/autumn.

INTRODUCTION

Poor performance of breeding stock is common in Northland. The main cause is probably undernutrition at critical times rather than an inadequate total feed supply. As elsewhere, management systems emphasize spring-summer as the productive season and autumn-winter as the recovery and maintenance period. Improving the fit of demand and supply relies mainly on manipulating the supply of feed by transferring, stimulating or purchasing it. This paper considers whether transferring feed demand may be a more appropriate strategy for Northland.

Previous work at Kaikohe with an intensive sheep system (Rumball and Boyd, 1980) indicated periods when feed demand and supply were sufficiently out of phase to have lasting effects on stock and pasture. The main problem was a lack of feed in spring and a surplus accumulating through autumn which could not be efficiently transferred to meet the spring deficit. Pasture containing a high proportion of kikuyu grass had a significantly different pattern of feed availability from ryegrass-dominant pasture.

TABLE 1: TRIAL TREATMENTS

Lambing Pattern	Pasture Type	Mean Lambing Date	Weaning Date	Drafting Date
Trial 1 (May to March 1976-8)				
(1) Spring 100%	Ryegrass	20 Aug.	29 Oct.	24 Dec.
(2) Winter 50%/spring 50%	Ryegrass	2 Aug.–11 Sep.	11 Oct.–20 Nov.	6 Dec.–15 Jan
(3) Winter 50%/spring 50%	Kikuyu			
Trial 2 (March to February 1978-80)				
(1) Spring 100%	Ryegrass	17 Aug.	11 Nov.	21 Dec.
(2) Autumn* 20%/spring 100%	Ryegrass		15 Mar.–7 Jun.	
(3) Autumn* 20%/spring 100%	Kikuyu	2 Sep.	26 Nov.	8 Jan.

*Autumn lambing simulated.

TABLE 2: TRIAL 1, EWE PRODUCTION SPRING VS. WINTER-SPRING LAMBING
(Mean of 2 years)

Treatment	Liveweight Gain (kg) Year	Liveweight Gain (kg) May-July	Liveweight Gain (kg) Lambing-Weaning	Liveweight Gain (kg) Weaning-Drafting	Liveweight Gain (kg) Drafting-March	Annual Wool Yield (kg)[1]
1. Spring ryegrass	1.6b	2.8a	–1.8b	0.3a	1.3b	3.92a
2. Winter/spring ryegrass	3.7a	2.2a	0.8a	0.6a	1.7b	3.98a
3. Winter/spring kikuyu	4.1a	3.4a	–1.2ab	0.7a	3.6a	4.01a

[1] Greasy fleece without belly and crutchings.

EXPERIMENTAL

Normal spring lambing on ryegrass/poa/white clover pasture was compared in two trials with split-flock winter/spring lambing and autumn/spring lambing on both ryegrass- and kikuyu-dominant pastures. The treatments are set out in Table 1.

In trial 1, treatments 2 and 3 aimed to lamb half the ewes early enough to effectively utilize the accumulated feed surplus and to delay lambing the other half sufficiently to avoid the usual September deficit. In trial 2, treatments 2 and 3 aimed to utilize the autumn feed as produced, and thus carry forward into spring a much reduced reserve. A simulated 20% of the flock were lambed in autumn and the feed requirement for these ewes was estimated at 3× maintenance. Treatments 2 and 3 carried an additional 8.4 ewes/ha for 12 weeks in autumn. No equivalent reduction was made in spring, but lambing was delayed by 2 weeks.

Each trial ran for two consecutive years. Plots were 1.2 ha, replicated three times, and carried 25 mature Perendale ewes on a self-contained basis. Sheep were shorn at the start of the trial, again in November and at the end of the trial year. They were rotationally grazed, with 20 paddocks per plot and provision for further subdivision. Details of site and pasture parameters are given by Lambert *et al.* (1979).

Experimental periods lasted from May to March (trial 1) or March to February (trial 2). In the intervening period pastures were grazed so as to ensure, as far as practicable, uniform availability of feed at the start of the next trial year. For analysis and discussion, trial years were subdivided into four periods:

(1) From the start to July (July to lambing omitted).

(2) From mean lambing date to lamb weaning/ewe shearing 10 weeks later.

(3) From weaning to lamb drafting, 18 weeks after the mean lambing date.

(4) From drafting to the end of the trial year.

Ewe losses were replaced but data from replacements were not included. Lambs were not replaced, but at docking there was some reallocation of ewes within treatments to equalize lamb numbers per plot. Lambs were carried at 116 and 117% in trials 1 and 2, respectively.

TABLE 3: TRIAL 1, LAMB PRODUCTION SPRING VS. WINTER- SPRING LAMBING
(Mean of 2 years)

Treatment	*Birth Weight (kg)*	*Final Liveweight (kg)*	*Liveweight Gain (g/head/day) Lambing-Weaning*	*Weaning-Drafting*
1. Spring ryegrass	3.8a	23.7b	183b	126b
2. Winter/spring ryegrass	3.8a	25.3ab	210a	122b
3. Winter/spring kikuyu	3.9a	25.5a	190ab	149a

TABLE 4: TRIAL 2, EWE PRODUCTION SPRING VS. AUTUMN-SPRING LAMBING
(Mean of 2 years)

Treatment	*Liveweight Gain (kg)* Year	*Mar.-Jul.*	*Lambing-Weaning*	*Weaning-Drafting*	*Drafting-Feb.*	*Annual Wool Yield (kg)*
1. Spring ryegrass	3.2ab	5.4a	–0.9a	1.1a	1.8b	3.56a
2. Autumn/spring ryegrass	1.6b	4.9a	–1.6a	0.6a	1.5b	3.33a
3. Autumn/spring kikuyu	4.2a	4.7a	–1.3a	1.3a	3.3a	3.60a

[1] Greasy fleece without belly and crutchings.

TABLE 5: TRIAL 2, LAMB PRODUCTION SPRING VS. AUTUMN-SPRING LAMBING
(Mean of 2 years)

Treatment	*Birth Weight (kg)*	*Final Liveweight (kg)*	*Liveweight Gain (g/head/day) Lambing-Weaning*	*Weaning-Drafting*
1. Spring ryegrass	3.7a	22.6b	182a	110b
2. Autumn/spring ryegrass	3.9a	22.2b	174a	109b
3. Autumn/spring kikuyu	3.8a	24.3a	180a	142a

RESULTS

SPRING VS. WINTER/SPRING LAMBING

On the ryegrass pastures, the split-lambing treatment had higher ewe liveweight gains than the spring lambing treatment during lactation and over the whole year but not during other periods. Lamb growth rate was also higher in this treatment up until weaning. Final yields of lambs and wool were similar. Ewes on kikuyu pasture had higher weight gains than both groups on ryegrass pasture after drafting and higher lamb growth rates after weaning. The annual liveweight gain of ewes and final lamb production were greater on kikuyu pasture than on the spring ryegrass treatment (Tables 2 and 3).

SPRING VS. AUTUMN/SPRING LAMBING

All treatments had similar ewe liveweight gains between March and July, despite a 40% increase in stocking rate on treatments 2 and 3. This reflects the accumulation of a larger feed reserve on treatment 1. Mean liveweight changes of ewes on the ryegrass treatments were also similar during the rest of the year, although wool yield from the treatment 1 flock was greater at spring shearing. Lamb growth rates were similar. As in trial 1, kikuyu pasture produced higher lamb weight gains after weaning and higher final liveweight. Ewe weight gains on kikuyu over summer were also better, giving a higher annual liveweight gain than the autumn-spring ryegrass treatment (Tables 4 and 5).

DISCUSSION

Ewes on ryegrass pasture with a normal lambing pattern made adequate weight gains through autumn/winter, and prior to lambing were in good condition and had a substantial feed reserve. However, during lactation they lost weight and wool break was common. The normal lambing pattern allows limited management flexibility. Earlier lambing increases the severity of the spring deficit, while delaying it penalizes lamb performance later in the season. The split-flock lambing pattern spread the peak of feed demand back into July and forward into late October, alleviating the stress period in September. In these flocks differential feeding of early- and late-lambing ewes began in early July and pasture grazed during this month recovered relatively well. Trial 2 demonstrated that a large increase in autumn utilization reduced wool growth but had no significant effect on ewe liveweight or lamb production the following spring. The apparent inefficient use of the feed reserve on the spring ryegrass treatment was attributed to low pasture utilization on the often saturated soil (despite daily stock shifts), poor recovery of the excessively long pasture, and treading damage associated with concentrated stocking.

Pasture containing vigorous kikuyu gave greater ewe and lamb production than ryegrass from late spring. In a previous trial (Rumball and Boyd, 1980) in which a common lambing date was used, lamb yields from ryegrass and kikuyu pastures were similar, but ewes on kikuyu suffered greater weight loss in spring and produced less wool. The extra autumn grazing pressure in trial 2 controlled kikuyu and much improved the vigour of associated temperate grasses and clover.

The ewe/lamb system is not a sensitive measure of management variation and the stocking rates needed to detect significant differences tend to be unrealistically high. An attempt has been made on this site to characterize the pattern of potential stock production in a way that was unrelated to the type of stock enterprise or affected by arbitrary management decisions (Rumball and Boyd, 1980). Estimates were made of the intake of metabolizable energy (ME) of hoggets over a 3-year period in which pasture utilization closely matched its growth. Proportion of annual ME intake by season was: spring (Sep.-Nov.) 38.6% (kikuyu pasture 31.7%), summer 20.3% (28.2%), autumn 20.1% (25.1%), winter 21.0% (15.0%). The combined spring/summer total of 59% (60%) compares with the 65 to 70% calculated from the data of Jagusch and Coop (1971) needed for a ewe-lamb system.

The costs of transferring feed supply are high. They include wastage, direct costs of conservation, and the need to make up shortfalls or suffer reduced production. On this site the pattern of pasture growth, the problem of utilizing saved pasture in early spring, and the consequences of concentrating ewes on saturated soil during lambing justify placing more emphasis on transferring demand. Practical alternatives are to use expensive nitrogen fertilizer in early spring, or to reduce the stocking rate below that which can be carried on an annual basis.

How general this pattern of feed availability is in Northland can only be guessed. Variability of feed supply is high and this encourages conservative stocking rates. Any improvement in management options or flexibility is very desirable. Transferring feed demand implies a less seasonal flow of farm produce, and there could be advantages in this to transport and processing industries.

Autumn lambing requires the use either of hormones or of sheep breds with appropriate breeding seasons. Current work at Kaikohe with Polled Dorsets has resulted in a reasonable proportion of ewes being bred in late spring and very good first-year growth of autumn-born lambs. The development of the trait for an extended breeding season in the common breeds appears to be a worthwhile crossbreeding objective. As a means of raising stock performance in Northland it could be a low-cost alternative to manipulating feed supply.

ACKNOWLEDGEMENTS

To A. F. Boyd, M. W. McClintock and others for assistance with field work.

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