INFLUENCE OF PASTURE ALLOWANCE ANO MASS DURING LATE PREGNANCY ON EWE AND LAMB PERFORMANCE

P. V. RATTRAY*, K. T. JAGUSCH, D. M. DUGANZICH,
K. S. MACLEAN and R. J. LYNCH
Ruakura Agricultural Research Centre, Hamilton

Abstract

For 6 weeks in late pregnancy groups of Coopworth ewes (53-55 kg) were grazed on a range of pasture allowances in each of 2 years (1978: 5 allowances, ranging from I .O to 7.0 kg DM/ewe/day; 1979: 6 allowances, ranging from 0.7 to 4.0 kg DM/ewe/day) on ryegrass-white clover pasture of2 contrasting pre-grazing herbage masses (I 145 and 2895 kg DM/ha in 1978; 1100 and 2700 kg DM/ha in influenced by feeding level. After lambing, ewes grazed a common pasture allowance. There were no consistent carry-over effects of late pregnancy feeding of kg in 1978, and 55-70 kgin 1979. Those on the pasture with higher mass were 1-5 kg heavier at each allowance than those on the lower mass. In spite of the large differences in ewe body weight just prior to lambing there were no effects on ewe or lamb mortality, pregnancy toxaemia or bearings. Birth weights were not consistently influenced by feeding level. After lambing, ewes grazed a common pasture allowance. There were no consistent carry-over effects of late pregnancy feeding on milk production or lamb weaning weights. Fleece weights differed between extreme treatments by 0.3-0.5 kg. After lambing, ewes compensated in terms of live weight, These results demonstrate the great buffering capacity of 52-55 kgewes (6 weeks pre-partum) under the conditions of these trials. The management implications are that under such circumstances strict rationing of pasture can continue right up until lambing, conserving pasture *in situ* for the much more important period immediately post-lambing.

INTRODUCTION

The season variability in both pasture growth and the feed requirements of the breeding ewe leads to a need for matching the feed supply and demand curves by altering lambing date in an attempt to synchronise the increasing feed requirements during late pregnancy with the onset of spring pasture growth (Rattray, 1978). Unfortunately pasture production and feed requirements seldom equate perfectly and periods of feed deficit can occur. before and/or after lambing. Currently there is an emphasis in controlled grazing during winter, when strict rationing allows some accumulation of pasture *in* situ. This leads to problems in the late winter-early spring in allocating these pasture reserves to ewes before or after lambing. On the one hand there is concern that under-feeding before lambing might cause pregnancy toxaemia and low lamb birth weights and vigour; or that over-feeding before lambing could cause an increased incidence of bearings and lambing difficulties and also a pasture shortage after lambing. Farmers who

set-stock their ewes up to 4 weeks before lambing for ease of management (Smith *et al.*, 1976) often find all their saved pasture is consumed as a result, leaving a deficit for a variable period after lambing.

For this reason trials were conducted at Ruakura to examine the influence of a wide range of grazing conditions in late pregnancy on the performance of ewes and lambs.

EXPERIMENTAL

In the spring of 1978 and 1979 at Ruakura groups (n = 32 in 1978; n = 23 in 1979) of mixed-age Coopworth ewes were offered, for 39 or 40 days in late pregnancy, a range of pasture allowances from ryegrass-white clover pasture of two contrasting pre-grazing herbage masses (Tables 1 and 2). First cycle ewes only from synchronised (progestagen sponges) matings were used. In 1978 ewes were randomised on to treatements on a live-weight basis only and litter size ranged from 12 to 1.5, and averaged 1.3 lambs/ ewe. In 1979 ewe live weight and pregnancy status (single or twin as diagnosed by X-ray) were used, and litter size ranged from 1.4 to 1.6, and average 1.5. In 1978 differential feeding started on July 12 and finished on August 21, when pre-lambing ewe weights were taken. Mean lambing date was August 27. The corresponding dates of 1979 for start and finish of treatments and mean lambing were July 16, August 24, and September 6. Ewes were shifted to new breaks every 3 days. Ewes were set-stocked together for lambing, then were rotationally grazed on a common allowance of 4 to 4.5 kg DM/ewe/day until weaning at 10 weeks post-partum.

Pasture measurements were made using techniques similar to those described by Rattray (1977). The following measurements were made: ewe and lamb live weights, ewe 6-month fleece weight and milk production 3 weeks and 6 weeks post-lambing from a sample of ewes (using the oxytocin technique and milking machines similar to that described by Rattray et al. (1975)).

RESULTS

Pasture measurements are summarised in Tables 1 and 2, and demonstrate the high proportion of green material in the sward at this time of the year (approx. 90%) and the effects of increasing allowance on post-grazing pasture mass, intake and utilization. The higher, in contrast to the low, pre-grazing mass in each year generally resulted in higher intakes and utilization, especially at the low feeding levels.

The influence of treatment on ewe body weights, and lamb and wool production is summarised in Tables 3 and 4. Both allowance and pre-grazing mass had major effects on ewe weights, but minor effects on litter weights. In both years single-bearing ewes were heavier ($P < 0.001$) than twin-bearing ewes on a conceptus-free basis pre-lambing by 4.0 kg and at weaning by 5.0 kg. Also in both years total litter weight was heavier for twins than singles by approximately 3.0 kg, 7.0 kg and 15.0 kg at birth, 4 weeks and weaning,

TABLE 3. INFLUENCE OF PASTURE ALLOWANCE AND MASS IN LATE PREGNANCY ON PRODUCTION PER EWE: 1978'

Pasture mass pre-grazing (kg DM/ha)	2895					1445					Significance		
Pasture allowance (kg DM/ewe/day)	1.1	2.2	3.4	4.7	6.6	1.0	2.4	3.7	4.9	6.9	RSD (±)	Allow-ance	Mass	Inter-action
Ewe live weight (kg)[2]														
Pre-lambing	56	65	68	67	70	55	60	65	66	67	3.3	***	***	**
Pre-conceptus-frees	47	56	58	58	61	46	51	56	57	57	3.1	***	** *	***
Weaning[4]	54	55	58	58	60	53	54	56	56	57	4.5			NS
Litter weight (kg/ewe)[5]														
Birth	6.3	6.4	6.5	6.6	6.6	6.0	6.6	6.4	6.4	6.8	1.08	t	NS	NS
4 weeks	15.5	14.6	15.0	15.1	16.0	14.6	15.2	14.9	14.5	15.3	3.10	NS	NS	NS
IO weeks	27.0	27.0	25.9	28.1	29.5	25.9	26.5	27.1	26.1	28.1	4.04	*	NS	NS
Wool (kg/ewe)[6]	1.81	2.09	2.05	2.22	2.33	1.83	2.06	2.14	2.05	2.16	0.34	***	NS	NS

n ▫ 30/group
2 Initial 24 hour fasted weight 53 kg.
3 Conceptus-free weight ≃ pre-lambing weight minus (total litter weight at birth ▬ 0.70).
4 10 weeks post-partum.
5 Average litter size corrected to 1.5 lambs/ewe.
6 6 months' growth.

TABLE 1. PASTURE MEASUREMENTS 1978

Pasture mass pre-grazing (kg DM/ha)	2895					1445				
Pasture Allowance (kg DM/ewe/day)	1.1	2.2	3.4	4.7	6.6	1.0	2.4	3.7	4.9	6.9
Pasture allowance (kg green DM/ewe/day)	I.0	2.0	3.1	4.3	6.0	0.9	2.2	3.4	4.5	6.3
Pre-grazing mass (kg DM/ha)	380	825	1375	1680	2215	340	600	850	905	1165
Pasture intake (kg DM/ewe/day)	0.93	1.55	1.40	I.96	2.00	0.78	1.48	I.40	I.89	I.70
Utilization/ grazing] (%)	85	69	41	41	30	76	62	38	40	25

[1] Pasture disappearance ÷ pre-grazing mass.

TABLE 2. PASTURE MEASUREMENTS 1979

Pasture mass (kg DM/ha)	2700						1100					
Pasture allowance (kg DM/ewe/day)	0.7	I.0	1.4	2.0	3.0	4.4	0.7	I.0	1.4	1.9	3.0	4.3
Pasture allowance (kg green DM/ewe/ day)	0.6	0.9	1.2	1.8	2.7	3.9	0.6	0.9	1.3	1.8	2.8	4.0
Pre-grazing mass (kg DM/ha)	230	335	610	615	1080	1560	190	245	260	315	510	640
Pasture intake (kg DM/ewe/day)	0.64	0.88	I.08	I.54	I.83	1.94	0.55	0.75	I.02	1.38	I.68	2.20
Utilization/grazing (%)	93	89	77	78	60	44	81	77	72	71	57	51

respectively. In line with the small effects of nutrition on lamb weights, average milk production per ewe did not differ between treatments in either year (2.1 ± 0.48 l/day and 2.4 + 0.66 l/day at 3 weeks; and 1.5 ± 0.43 l/day and 1/7 ± 0.46 l/day at 6 weeks in 1978 and 79, respectively). Ewes sucklingtwins produced more milk ($P < 0.001$) at both stages of lactation in both years (+0.5 to 0.7 1 at 3 weeks and +0.3 1 at 6 weeks), but less wool (by 0.2-0.3 kg, $P < 0.001$).

Although animal numbers are rather minimal there were no obvious trends in the incidence of ewe or lamb mortality, pregnancy toxaemia, bearing problems, or lambing difficulties.

DISCUSSION

The trends in intake and ewe weight gains are similar to those obtained at similar and other times of the year (Clark, 1978; Rattray & Jagusch, 1978; Rattray et al., 1980a). The latter study also showed the beneficial effects of greater pasture mass at a given allowance, presumably because of increase ease of prehension. The lack of effect on birth weight, especially of twins, is in contrast to other findings (Clark, 1978; Rattray & Jagusch, 1978).

Several studies have shown that large differences in feeding in mid-pregnancy have had little effect on subsequent lamb production (Monteath, 1971; Rattray & Jagusch, 1978). This present study showed, in contrast to pen-feeding experiments (Rattray *et al.*, 1980b), that in the grazing situation, in spite of large differences in ewe body weight being induced by feeding levels in late pregnancy, the effects on problems at lambing, ewe birth weights and carry-over effects on ewe milk production and lamb weaning weights were minimal. Davis et al. (1981) found that placental weight rather than level of feeding in late pregnancy was a major determinant of lamb birth weight, while Clark (1978) showed that lamb weaning weight was quite difficult to manipulate by large differences in ewe feeding level and live weight. Under grazing conditions similar to those encountered in these trials, level of feeding during late pregnancy does not appear to be critical in influencing overall productivity, especially of lamb meat per ewe. In contrast, in other Ruakura grazing trials extreme feeding levels after lambing have resulted in differences in lamb weaning weight of over 10 kg (Rattray & Jagusch, 1981), demonstrating that this is a much more critical period for feeding the ewe and her offspring.

In the trials described in this paper feeding levels were 'steady state'and did not fluctuate at all during the 6 weeks pre-partum. In addition with initial weights of 53 and 55kg the ewes were in quite good condition and had considerable reserves that can buffer under-feeding by being mobilised to support foetal growth. Such may have not been the case if the ewes were in poor condition (Rattray *et al.*, 1980b).

If pasture shortages are liable to occur around lambing, for ewes in average to good conditions, strict rationing of pasture can continue right up until lambing. Such pasture conserved *in situ* can then be used for the much more important period immediately after lambing. There would appear, in most

TABLE 4. INFLUENCE OF PASTURE ALLOWANCE AND MASS IN LATE PREGNANCY ON PRODUCTION PER EWE: 1979[1]

Pasture mass pre-grazing (kg DM/ha)	2700						1100						Significance			
Pasture allowance (kg DM/ewe/day)	0.7	1.0	1.4	2.0	3.0	4.4	0.7	1.0	1.4	1.9	3.0	4.3	RSD (±)	Allowance	Mass	Interaction
Ewe live weight (kg)[2]																
Pre-lambing	56	57	60	65	68	70	53	53	57	64	67	69	2.4	***	***	**
Pre-conceptus-free[3]	46	48	50	55	57	59	43	44	47	54	57	59	2.9	***	***	**
Weaning[4]	52	55	56	57	48	56	52	53	55	59	58	60	4.4	***	NS	*
Litter weight (kg/ewe)[5]																
Birth	6.6	6.7	7.1	7.0	7.2	7.6	6.7	6.6	6.8	6.7	7.0	6.9	1.19	NS	†	NS
4 weeks	13.6	14.1	13.7	14.1	14.4	14.7	13.7	13.1	13.7	13.7	13.8	14.6	2.96	NS	NS	NS
10 weeks	28.4	28.2	28.6	28.6	29.5	28.5	28.1	27.5	28.1	26.6	28.1	30.0	3.36	NS	NS	NS
Wool (kg/ewe)[6]	1.58	1.85	1.97	1.83	2.02	1.91	1.64	1.68	1.75	2.00	1.91	2.11	0.31	***	NS	**

[1] n = 22/group.
[2] Initial 24-hour fasted weight 55 kg.
[3] Conceptus-free weight = pre-lambing weight minus (total litter weight at birth ÷ 0.70).
[4] 10 weeks post-partum.
[5] Average litter size 1.5 lambs/ewe.
[6] 6 months' growth.

highly stocked situations, to be advantages in identifying early lambing or twin lambing ewes to utilize this scarce feed resource. Short periods of feed shortage post-lambing affect twins more than singles (Coop et al., 1972) and the onset of spring growth should meet the feed requirements of later lambing ewes.

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