Supplementation of lactating Dorper and Merino ewes on *Themeda cymbopogon* veld. 1. Body mass changes of ewes and their lambs

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Received 14 April 1988; accepted 8 August 1989

Extract from Ph.D (Agric.) thesis submitted by HOdeW to the Department of Animal Science, University of Stellenbosch, 1986

The effects of energy and crude protein (CP) supplementation to lactating ewes on the performance of the ewes and their lambs, while grazing native pasture (veld), were studied during two autumn (1981 and 1982) and two spring (1983 and 1984) lambing seasons. Different levels of energy and / or CP were provided daily via rumen fistulae to the ewes. Body mass loss of lactating Merino and Dorper ewes was not reduced by either supplementary energy or CP during the autumn / winter (1981 and 1982), whilst the growth rate of their lambs was slightly improved. Body mass loss of ewes was reduced by 50% and growth rate of their lambs improved markedly by combined supplementation of energy plus CP. Irrespective of treatment, Dorper ewes lost 100% more body mass during lactation than Merino ewes, but their lambs gained 100% faster than Merino lambs. In contrast, provision of energy and CP supplements (1983), or incremental levels of energy (1984) during the spring / summer to lactating Dorper ewes, had no definite effect on body mass changes of the ewes or growth rate of their lambs. The superior animal performance on veld during the spring / summer, in comparison to the autumn / winter, is discussed and put into perspective.

Die invloed van aanvullende energie en ruproteïen (RP) aan lakterende ooie, op die prestasie van die ooie en hul lammers op veldweiding, is gedurende twee herfs- (1981 en 1982) en twee lentelamseisoene (1983 en 1984) ondersoek. Verskillende peile energie en / of RP is daagliks via rumenfistels aan die ooie verskaf. Afsonderlike aanvulling van energie of RP gedurende die herfs / winter (1981 en 1982) het die liggaamsmassaverliese van lakterende Merino- en Dorperooie min beïnvloed, terwyl die groeitempo van hul lammers ook min verhoog is. Gesamentlike aanvulling van energie en RP het massaverliese van die ooie met 50% verminder en groeitempo van hul lammers aansienlik verhoog. Ongesiens behandeling het die Dorperooie 100% meer massa as die Merino-ooie verloor, maar hul lammers het 100% vinniger gegroei. In teenstelling het RP- en energie-aanvullings (1983) of toenemende peile van aanvullende energie (1984) gedurende die lente / somer aan lakterende Dorperooie, geen definitiewe invloed op massaveranderinge van die ooie en lammers uitgeoefen nie. Die algemene beter diereprestasie gedurende die lente / somer, vergeleke met die herfs / winter, word in perspektief geplaas.

Keywords: Body mass, crude protein, energy, native pasture (veld), reproducing sheep, supplementation

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Introduction

A seasonal trend in the crude protein (CP) and digestible organic matter (DOM) content of the diet selected by sheep on native pasture (veld) in the central Orange Free State is well established (De Waal, Engels & Van der Merwe, 1980; De Waal, Baard & Engels, 1989). Although the CP and DOM content of veld usually declines with the onset of winter, sheep are still able to select herbage with a fairly high quality. However, animal performance is often affected by an insufficient intake of digestible nutrients, both in the case of dry sheep (Engels & Malan, 1978; De Waal, Engels, Van der Merwe & Biel, 1981; De Waal *et al.*, 1989) and ewes and their lambs (Engels & Malan, 1979).

In this area, producers lamb their ewes down in either the autumn and / or spring. Dry land winter cereals, with their higher nutritive value, are utilized as grazing for the ewes and their lambs during the autumn / winter. However, as a result of large variations in the annual precipitation and distribution of rainfall, winter cereals are frequently not available as grazing. Veld is also affected by poor rainfall and the adverse effects of a low and inconsistent precipitation on the availability of herbage are often aggravated by overstocking and overgrazing. Consequently, ewes have to rear their lambs on dry and denuded winter veld. The same situation frequently arises during a spring lambing season, despite a growing number of producers incorporating dry land lucerne as grazing for the ewes and lambs. As a result of low rainfall during the previous summer and autumn, insufficient soil moisture often prevents the emergence of new growth in lucerne early in spring. New growth in the veld is also affected by insufficient soil moisture. In the absence of sound veld management practices, overgrazing exacerbates the nutritional problems, because good quality herbage is usually scarce and sparsely distributed. In these circumstances, a myriad of licks (supplementary feeding) are provided in an effort to prevent a decline in feed intake and the adverse effects on animal performance. However, feedback from practice shows that despite considerable costs incurred, response to supplementation can at best be described as unpredictable and far less than might be expected.

A more comprehensive understanding of, and explanation for the interactions between the integrated animal/plant biological system of grazing conditions, is required. In renewed efforts towards some elucidation, De Waal *et al.* (1980) and De Waal *et al.* (1981) found that the differential supplementation of protein and phosphorus (P) to non-reproducing sheep, evinced no consistent trends of response in diet selection, feed intake, or body mass changes of young Merino and Dorper wethers. Extrapolation of these results to widely differing grazing conditions could, however, lead to unrealistic recommendations. Moreover, lactating ewes have higher nutrient requirements than non-reproducing sheep and may respond differently to supplementation. Therefore, more research on supplementary feeding, including various veld types and with sheep differing in physiological status, is needed.

This study was aimed at obtaining more information on the nutritive value of grassveld in the central Orange Free State for reproducing sheep during an autumn and spring lambing season and the response of lactating Merino and Dorper ewes and their lambs to supplementary feeding.

Procedure

The study was conducted on native pasture (veld) at the Agricultural Research Institute, Glen. Acocks (1975) described the pasture as a *Themeda cymbopogon* veld type. The trials were conducted over four years and included two autumn and two spring lambing seasons, namely:

20 April-7 July 1981 (88 days) : Autumn/winter
2 May-27 July 1982 (86 days) : Autumn/winter
6 September-22 November 1983 (77 days) : Spring/summer
14 September-4 December 1984 (81 days) : Spring/summer

Supplements were provided on a daily basis via rumen fistulae to lactating ewes (Langlands, 1969; De Waal *et al.*, 1980; De Waal *et al.*, 1981; De Waal *et al.*, 1989). Thus, the sporadic and inconsistent daily consumption of licks by sheep, which is often suggested as a possible cause for their poor response to supplementation, was eliminated. Ewes and their lambs in the respective treatment groups were run as a single flock in a rotational grazing system, at an annual stocking rate of 1 sheep ha^{-1} (De Waal *et al.*, 1989). Confounding effects, due to possible differences in basal plant cover of the camps and thus the herbage on offer to the sheep, were therefore eliminated.

Mature lactating Merino and Dorper ewes were used as experimental animals in 1981 and 1982, while the trials in 1983 and 1984 were conducted with young lactating Dorper ewes. Prior to lambing, the ewes were fistulated at the rumen (De Waal, Engels & Biel, 1983). The experimental designs and the supplements provided daily via rumen fistulae to the lactating ewes are presented in Tables 1 and 2.

Table 1 Experimental design, composition and levels of supplementary feeding provided daily via rumen fistulae to lactating Merino (1981, 1982) and Dorper (1981, 1982, 1983) ewes

Treatment	Composition and daily levels of supplementary feeding	Digestible organic matter (DOM) g day^{-1}	Crude protein (CP) g day^{-1}	n (Ewes/ breed)
E 0	NaCl*+ Dicalcium phosphate (P)** – control	0	0	5
E 100	NaCl + P + 100 g maize meal	70	9,3	5
E 200	NaCl + P + 200 g maize meal	141	18,7	5
PE 0	NaCl + P + 60 g HPC 60***	23	32,2	5
PE 100	NaCl + P + 60 g HPC 60 + 100 g maize meal	93	41,5	5
PE 200	NaCl + P + 60 g HPC 60 + 200 g maize meal	164	50,9	5

* NaCl – 1981 5 g NaCl ewe^{-1}.
– 1982 and 1983 8 g NaCl ewe^{-1}.
** 15 g DiCaP provided 2,5 g phosphorus (P) ewe^{-1}.
*** HPC 60 – High protein concentrate (61,8% of the N derived from urea).

Table 2 Experimental design, composition and levels of supplementary feeding provided daily via rumen fistulae to lactating Dorper ewes during 1984

Treatment	Composition and daily levels of supplementary feeding	Digestible organic matter (DOM) g day^{-1}	Crude protein (CP) g day^{-1}	n
E 0	NaCl*+ Dicalcium phosphate (P)** – control	0	0	7
E 150	NaCl + P + 150 g maize meal	106	10,7	7
E 300	NaCl + P + 300 g maize meal	213	21,4	7
E 450	NaCl + P + 450 g maize meal	319	32,1	7

* NaCl – 8 g NaCl ewe^{-1}.
** 15 g DiCaP provided 2,5 g phosphorus (P) ewe^{-1}.

The body mass of the ewes and lambs was recorded within 24 h from birth. In the case of twins, the smaller of the two lambs was removed and reared by hand. After they had been weighed, the ewes and their lambs were allocated at random to the respective treatment groups and the ewes given the first daily supplement directly into the rumen. Supplementation was continued on an individual and daily basis to each ewe for a period of 63 days. The ewes and their lambs were weighed once a week (Tuesdays) between 07h30 and 09h00, until the lambs were weaned at an age of at least 63 days. Since all the sheep were herded daily into a mobile pen and crush, where the ewes received their supplements via rumen fistulae, they were simply weighed once a week, as an additional operation to the daily routine, before being returned to the veld.

Results

Autumn lambing seasons: 1981 and 1982

During 1981 and 1982, body mass losses were recorded for all treatments (Tables 3 and 4). However, within breeds, only some of the differences between treatments were significant ($P \leq 0,05$; Harvey, 1976). Irrespective of the level of energy supplementation, a combined daily supplement of CP and energy (PE 100 or PE 200) usually resulted in smaller body mass losses by the ewes. Provision of CP (PE 0) or energy supplements (E 100 and E 200) had little effect on body mass losses by the

Table 3 Least-square means for body mass changes of the lactating Merino and Dorper ewes and their lambs in 1981

		Ewes			Lambs	
		Mass at weaning	Change in body mass (63 days)		Weaning mass	Average daily gain (ADG) (63 days)
Breed	Treatment	kg	kg ± *SE*	%	kg	g day^{-1} ± *SE*
Merino	E 0	40,7	$-6,2^{ab}$ ± 1,91	−13,2	10,4	96^{a} ± 29
	E 100	38,7	$-7,6^{a}$ ± 1,33	−16,4	10,3	95^{a} ± 20
	E 200	41,4	$-5,4^{ab}$ ± 1,52	−11,6	11,2	110^{a} ± 23
	PE 0	41,2	$-5,6^{ab}$ ± 1,59	−12,0	11,4	112^{a} ± 24
	PE 100	43,8	$-3,0^{b}$ ± 1,33	− 6,5	12,9	136^{a} ± 20
	PE 200	43,6	$-3,2^{b}$ ± 1,37	− 6,8	13,4	144^{a} ± 21
Dorper	E 0	44,6	$-13,1^{a}$ ± 1,96	−22,7	14,7	163^{a} ± 30
	E 100	45,9	$-12,1^{a}$ ± 1,18	−20,8	17,9	214^{ab} ± 18
	E 200	44,6	$-13,4^{a}$ ± 1,52	−23,2	19,2	234^{ab} ± 23
	PE 0	44,8	$-13,0^{a}$ ± 1,59	−22,5	17,2	204^{ab} ± 24
	PE 100	50,3	$-7,7^{b}$ ± 1,33	−13,3	19,2	234^{ab} ± 20
	PE 200	51,0	$-7,0^{b}$ ± 1,39	−12,1	20,7	259^{b} ± 21

^{a,b} Within breeds, averages in a column without the same superscript differ significantly ($P \leq 0,05$); *t* test (Harvey, 1976).

Table 4 Least-square means for body mass changes of the lactating Merino and Dorper ewes and their lambs in 1982

		Ewes			Lambs	
		Mass at weaning	Change in body mass (63 days)		Weaning mass	Average daily gain (ADG) (63 days)
Breed	Treatment	kg	kg ± *SE*	%	kg	g day^{-1} ± *SE*
Merino	E 0	34,8	$-10,0^{a}$ ± 1,66	−22,4	8,5	64^{a} ± 15
	E 100	36,3	$-9,0^{a}$ ± 1,64	−19,9	9,3	78^{a} ± 14
	E 200	35,2	$-9,8^{a}$ ± 1,64	−21,7	11,0	105^{ab} ± 14
	PE 0	40,7	$-4,3^{a}$ ± 1,44	− 9,5	8,9	71^{a} ± 13
	PE 100	36,8	$-8,6^{a}$ ± 1,46	−18,9	10,7	100^{ab} ± 13
	PE 200	37,9	$-7,2^{a}$ ± 1,45	−15,9	11,8	117^{b} ± 13
Dorper	E 0	39,2	$-17,8^{a}$ ± 1,71	−31,3	16,9	193^{ac} ± 15
	E 100	45,0	$-12,0^{b}$ ± 1,65	−21,0	15,7	174^{a} ± 14
	E 200	39,3	$-17,1^{a}$ ± 1,68	−30,3	17,1	198^{ac} ± 15
	PE 0	47,0	$-9,7^{b}$ ± 1,44	−17,2	15,4	170^{a} ± 13
	PE 100	44,4	$-12,0^{b}$ ± 1,53	−21,2	19,1	229^{bc} ± 13
	PE 200	46,2	$-10,9^{b}$ ± 1,50	−19,0	20,4	249^{bc} ± 13

^{a,b,c} Within breeds, averages in a column without the same superscript differ significantly ($P \leq 0,05$); *t* test (Harvey, 1976).

ewes during 1981 (Table 3). In 1982, there was also little response by the ewes (Table 4) to supplementary energy (E 100 and E 200), but CP (PE 0) tended to reduce body mass losses in both breeds. The latter observation should, however, be viewed with reservation, especially in view of the poor performance of their lambs (Table 4).

In 1981 and 1982, the Dorper lambs grew faster than the Merino lambs (Table 3 *vs.* Table 4). Even in the Control groups (E 0), the Dorper lambs grew faster than the highest growth rate of the Merino lambs, notably those in groups PE 200. Furthermore, in 1981 a small, but non-significant ($P \leqslant 0{,}05$) increase in growth rate was observed for those Merino lambs whose dams had been supplemented with CP and energy (PE 100 and PE 200). The Dorpers showed similar increases in growth rates in 1981, with the exception that the increase in growth rate for one group (PE 200) reached significance ($P \leqslant 0{,}05$). More of the differences in growth rate of the Merino lambs between the respective treatments were significant ($P \leqslant 0{,}05$) during 1982 (Table 4), but the lambs performed less well than in 1981 (Table 3). Similar observations were made in 1982 with regard to the Dorper lambs (Table 4 *vs.* Table 3). However, the decline in performance was not as apparent as in the case of the Merino lambs.

Spring lambing seasons: 1983 and 1984

In contrast to the trials in 1981 and 1982, the Dorper ewes in only three of the treatments (E 0, E 200 and PE 100) had a nett loss in body mass during lactation in 1983 (Table 5). The body mass losses during 1983 were substantially less than in 1981 and 1982. Only some of the differences in body mass loss or gain of the ewes between treatments were significant ($P \leqslant 0{,}05$). Supplementation of the Dorper ewes exerted some influence on the growth rate of their lambs (Table 5), but the differences between treatments were not significant ($P \leqslant 0{,}05$).

In 1984 (Table 6), when only maize was supplemented (Table 2), the results were very similar to those in 1983. In the case of the ewes, only one of the treatments (E 300) had a nett gain in body mass during lactation. Again, similar to 1983, the body mass losses during 1984 were substantially less than in 1981 and 1982. The differences in body mass loss or gain of the ewes and the growth rate of their lambs in the respective treatments (Table 6) were not significant ($P \leqslant 0{,}05$).

Table 5 Least-square means for body mass changes of the lactating Dorper ewes and their lambs in 1983

	Dorper ewes			Dorper lambs	
	Mass at weaning	Change in body mass (63 days)		Weaning mass	Average daily gain (ADG) (63 days)
Treatment	kg	kg ± *SE*	%	kg	g day^{-1} ± *SE*
E 0	39,8	– 3,4^{a} ± 1,68	– 7,8	18,6	233^{a} ± 10
E 100	43,8	0,5^{ab} ± 1,65	1,2	19,8	252^{a} ± 9
E 200	42,9	– 0,3^{ab} ± 1,68	– 0,8	19,6	249^{a} ± 10
PE 0	46,2	2,9^{b} ± 1,63	6,7	19,3	245^{a} ± 9
PE 100	43,2	– 0,1^{ab} ± 2,01	– 0,2	20,9	269^{a} ± 11
PE 200	46,8	3,6^{b} ± 1,75	8,3	20,1	258^{a} ± 10

[a,b] Within breeds, averages in a column without the same superscript differ significantly ($P \leqslant 0{,}05$); *t* test (Harvey, 1976).

Table 6 Least-square means for body mass changes of the lactating Dorper ewes and their lambs in 1984

	Dorper ewes			Dorper lambs	
	Mass at weaning	Change in body mass (63 days)		Weaning mass	Average daily gain (ADG) (63 days)
Treatment	kg	kg ± *SE*	%	kg	g day^{-1} ± *SE*
E 0	50,3	– 1,0^{a} ± 1,42	– 2,0	23,6	307^{a} ± 8
E 150	47,4	– 4,0^{a} ± 2,06	– 7,7	24,8	326^{a} ± 12
E 300	53,5	2,1^{a} ± 1,52	4,1	24,0	314^{a} ± 9
E 450	49,7	– 1,6^{a} ± 1,64	– 3,1	22,7	293^{a} ± 9

[a,b] Within breeds, averages in a column without the same superscript differ significantly ($P \leqslant 0{,}05$); *t* test (Harvey, 1976).

Discussion

Changes in body mass of the lactating ewes and their lambs served as the main parameters of animal performance and response to supplementation. The results show that neither energy nor CP supplementation reduced body mass losses of lactating Merino and Dorper ewes during autumn / winter, while the growth rate of their lambs was only slightly improved. Combined supplementation of energy and CP reduced body mass losses of the ewes by 50% and improved the growth rate of their lambs. Despite the latter response to supplementation, animal performance was still inferior to that achieved during spring/summer. However, body mass of lactating ewes is not necessarily a reflection of body composition (Cowan, Robinson, Greenhalgh & McHattie, 1979; Cowan, Robinson, McDonald & Smart, 1980a; Cowan, Robinson, McHattie & Fraser, 1980b; Cowan, Robinson & McDonald, 1982). Mobilization of body tissue, mainly fat, in early lactation may be regarded as a normal and highly desirable phenomenon (Cowan *et al.*, 1979; Cowan *et al.*, 1980a; 1980b; Gibb & Treacher, 1980; Gibb, Treacher & Shanmugalingham, 1981; Cowan *et al.*, 1982; Orr & Newton, 1984a; 1984b). The contribution made by body fat to milk synthesis is influenced by changes in diet composition, level of feed intake and body condition of the ewe (Cowan *et al.*, 1980a). Changes in the body mass of lactating ewes are therefore the result of at least two factors. Firstly, they reflect the rate and extent of body tissue mobilization. Secondly, the level of digestible nutrient intake can either increase or decrease the rate and extent of body tissue mobilization (Oldham, 1984). Furthermore, differences in alimentary tract fill, especially in grazing ruminants, may also have pronounced complicating effects on the body mass of lactating ewes (Peart, 1968; Bass & Duganzich, 1980).

Considering the body mass changes of the lactating Merino and Dorper ewes in 1981 and 1982 (Tables 3 and 4), breed differences are apparent. At the start of lactation in 1981 (De Waal, 1986), the Dorper ewes were on average 24% heavier than Merino ewes (57,9 *vs.* 46,7 kg) and, 63 days post partum, the difference had decreased to 13% (46,9 *vs.* 41,6 kg). By subtracting the wool production of the Merino ewes, it was calculated that the difference between breeds at the end of the 63-day lactation period was 14,5% (46,9 *vs.* 40,9 kg) (De Waal, 1986). Owing to increased body mass losses by the Merino ewes in 1982, the situation differed slightly from 1981. At the start of lactation in 1982 (De Waal, 1986), the Dorper ewes were on average 26% heavier than the Merinos (56,8 *vs.* 45,1 kg) and, 63 days post partum, the difference had decreased to 18% (43,5 *vs.* 37,0 kg). After subtraction of the wool production of the Merino ewes, the difference between breeds was 20% (43,5 *vs.* 36,3 kg) (De Waal, 1986). Both breeds were subjected to the same environmental and experimental conditions and, although body mass does not necessarily reflect body composition (Cowan *et al.*, 1979; Cowan *et al.*, 1980a; 1980b; Cowan *et al.*, 1982), the lactating Dorper ewes apparently mobilized more body reserves than the Merinos, especially in 1981.

Milk yield of the ewes and feed intake of their lambs were not determined in this study. However, during the first few weeks of life the lamb is totally dependent on its milk intake. As the lamb gets older its intake of solid feed increases progressively, while at the same time the milk yield of the ewe declines. Milk production of ewes reaches a maximum during the second to the third and fourth weeks of lactation (Gardner & Hogue, 1964; Hadjipieris & Holmes, 1966; Peart, 1967; 1968; Forbes, 1969; Gibb & Treacher, 1978). Thereafter, milk production declines while the nutrient requirements of the lamb are rapidly increasing (Agricultural Research Council, 1980). Within breeds, feed and milk intake of lambs are also negatively correlated (Joyce & Rattray, 1970; Penning & Gibb, 1979; Doney, Smith, Sim & Zygoyannis, 1984). However, an increase in feed intake by the lamb, in response to the decreasing milk production of its dam, does not always compensate for the lower milk intake (Penning & Gibb, 1979; Doney *et al.*, 1984). The quality and availability of the herbage on offer, as well as competition between the ewe and lamb, also have a pronounced effect on the level of feed intake by the young lamb (Peart, 1967; 1968; Orr & Newton, 1984b; Warner & Sharrow, 1984). Considering the quality of the veld during 1981 and especially 1982 (De Waal, 1986), the lambs apparently had great difficulty in compensating for the decline in milk intake by an increase in herbage intake. The combined effects of a lower milk yield by the ewes and an inadequate herbage intake by the lambs were therefore responsible for the lower weaning mass in 1982 (Table 4), especially in the case of the Merinos.

The effect of milk yield and especially persistence of yield on the growth of lambs is indirectly borne out by the results in Table 7. The body mass of a lamb at the age of five weeks, reflects to a great extent the milk yield by its dam (Gardner & Hogue, 1964; Forbes, 1969; Gibb & Treacher, 1978; Penning & Gibb, 1979). The results (Table 7) indicate that, especially, the Merino ewes apparently yielded less milk in 1982. According to De Waal (1986), the average body mass of the Merino

Table 7 Average daily gain (ADG) from birth to five weeks of age for the Merino and Dorper lambs in 1981 and 1982

	Merino lambs		Dorper lambs	
Treatment	1981 g day^{-1}	1982 g day^{-1}	1981 g day^{-1}	1982 g day^{-1}
E 0	161	87	221	233
E 100	178	109	287	208
E 200	179	143	322	249
PE 0	198	103	268	195
PE 100	207	143	284	261
PE 200	221	154	338	278

and Dorper lambs at the age of five weeks was respectively 11,0 and 14,4 kg in 1981 and 8,8 and 13,0 kg in 1982. At the age of nine weeks, the average body mass of the two breeds had increased respectively to 11,6 and 18,1 kg in 1981 and 10,1 and 17,4 kg in 1982. Obviously the body mass which had been attained by the lambs at the age of five weeks, especially in the case of the Merinos, increased only slightly during the next four weeks. The quality and the availability of herbage on offer to young suckling lambs during 1981 and 1982 (De Waal, 1986), apparently impaired their feed intake. Since competition between the ewes and their lambs probably also favoured the ewes, herbage intake by the lambs would have been low. Furthermore, the largest relative differences in growth rate between the Merino lambs, in the respective treatment groups, occurred at this stage in 1982 (Table 7). Although the growth rates of the Dorper lambs were also lower in 1982 (Table 7), the differences between trials and treatments were relatively smaller compared to the Merino lambs. Herbage intake of the Merino and Dorper ewes was comparable between and within the trials in 1981 and 1982 (De Waal, 1986). Therefore, the Dorper ewes utilized more mobilized body tissue for milk synthesis, thus sustaining higher growth rates in their lambs. Although the Merino and Dorper ewes lost more body mass in 1982 than in 1981, the larger losses in body reserves by the Merino ewes in 1982 were apparently utilized to a much lesser extent for milk synthesis. Dual demands for and partitioning of nutrients between wool and milk synthesis by the Merino ewes may have played a big role in this regard.

The performance of the ewes and their lambs during 1983 and 1984 (spring / summer) was in sharp contrast to that in 1981 and 1982 (autumn / winter), though the former was conducted with one breed only. The Merino and Dorper ewes continuously lost body mass over nine weeks of lactation in 1981 and 1982 (Tables 3 and 4). Furthermore, despite different types of supplements being provided to Dorper ewes in 1983 and 1984 respectively (Table 1 *vs.* Table 2), certain trends in animal performance were evident. According to De Waal (1986), the Dorper ewes lost body mass until about the sixth week of lactation in 1983, whereafter they started regaining body mass, while in 1984 the ewes started regaining body mass after the third week of lactation. These differences in ewe performance between the two trials can be attributed to differences in distribution of rainfall, with the resultant effect on quality and availability of the herbage on offer (De Waal, 1986). Both trials coincided with a relatively dry spring and early summer. However, the first good spells of rain occurred during the last phase of lactation in November 1983, while a good spell of rain only occurred during the early phase of lactation in October 1984. The greater availability of high quality herbage also improved the opportunity for a higher digestible nutrient intake by the ewes and lambs. The higher growth rate of the Dorper lambs in 1984 (Table 6), in comparison to 1983 (Table 5), can thus be ascribed partially to the higher quality and availability of the herbage in 1984. Through a higher herbage intake (De Waal, 1986), this would have had a positive effect on milk yield by the ewes. The higher quality and availability of herbage would have encouraged intake by lambs early in life. Furthermore, in 1983 the Dorper ewes were nursing their first offspring, while in 1984 they were more mature. The post partum mass of the ewes differed on average by about 8 kg (43,3 *vs.* 51,4 kg) in 1983 and 1984 (De Waal, 1986). This meant that in 1984, the ewes had more body reserves which could be mobilized for milk synthesis. It is significant to note that the average post partum mass of the mature Dorper ewes (4 to 8 years) in 1981 and 1982 (De Waal, 1986) was 57,9 and 56,8 kg, respectively. Yet, animal performance by the less mature and lighter ewes and their lambs in spring / summer (1983 and 1984) was superior.

The growth rates of Merino and Dorper lambs should be seen in perspective. According to De Waal (1986), Dorper lambs which were born in spring and reared on veld at Glen, had an ADG of 268 g day^{-1} (birth to 63 days of age), while Merino lambs which were born in autumn and reared on dry land oats pasture, had an ADG of 288 g day^{-1}. Although the two dietary regimes (veld *vs.* oats pasture) are not comparable, the data provide a valuable indication of the growth potential of the two breeds under local conditions. Despite the Dorper ewes not being fully mature during the trials in 1983 and 1984, the performance of their lambs (Tables 5 and 6) was quite satisfactory. In contrast, in 1981 and 1982 (Tables 3 and 4) the Dorper lambs in most treatments failed to achieve growth rates commensurate with their potential, while their mothers suffered severe losses in body mass. The only exceptions were the performance by the ewes and lambs in the treatments which received a combination of energy and CP (PE 100 and PE 200). Furthermore, despite similar trends of response by both breeds in 1981 and 1982 to the respective supplements, the Merino lambs achieved at best only about 50% of their potential growth rate (Tables 3 and 4).

De Waal *et al.* (1981) concluded that their results were rather disappointing, since supplementation at the levels applied were not reflected in animal performance. Most levels of supplementation which were provided to the ewes (Tables 1 and 2) were substantially higher than those applied by producers. Many of the supplementary feeding strategies presently employed by producers in the grassveld of the central Orange Free State can therefore be questioned, especially from an economic point of view. Moreover, by applying realistic stocking rates commensurate with the long term grazing capacity of veld, satisfactory levels of animal performance can be achieved with a spring lambing season.

Acknowledgements

The authors are indebted to Dr E.A.N. Engels, Mrs Heila Terblanche, Dr Marion Read, Miss Maksie Baard and the late Dr Daan Els for valuable assistance rendered during the course of the trials.

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