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THE VOLUNTARY FEED INTAKE OF THREE BREEDS OF SHEEP ON NATURAL PASTURE

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OPSOMMING: DIE VRYWILLIGE VOERINNAME VAN DRIE SKAAPRASSE OP NATUURLIKE WEIDING

Drie skaaprasse naamlik die Merino, S.A.-Vleismerino en Dorper is vergelyk wat voerinname vanaf natuurlike weiding betref gedurende verskillende maande van die jaar. Die selektiewe weigewoontes van die Merino en die Dorper is ook ondersoek. Dit is gevind dat die Merino per metaboliese grootte, met die uitsondering van een maand, konstant meer gevreet het as die Dorper alhoewel die verskille nie altyd statisties betekenisvol was nie. Die innames van die Merino en die van die S.A.-Vleismerino het slegs gedurende een maand betekenisvol verskil. Die verskille in chemiese samestelling en *in vitro* verteerbaarheid van plantmateriaal wat deur die Merino en die Dorper geselekteer is, was nie betekenisvol nie.

SUMMARY:

A comparative study on voluntary feed intake during different months of the year under natural grazing conditions, was conducted with three sheep breeds namely, the Merino, S. Afr. Mutton Merino and Dorper. The selective grazing behaviour of the Merino and Dorper was also investigated. It was found that the feed intake per metabolic size of the Merino, was with the exception of one month, consistently higher than that of the Dorper although the differences were not always statistically significant. The feed intake of the Merino and S. Afr. Mutton Merino differed significantly during one month only. The differences in chemical composition and *in vitro* digestibility of plant material selected by the Merino and the Dorper, were not significant.

Information in the literature on voluntary feed intake of different breeds of sheep is scanty. In comparing the feed intake of six British sheep breeds, Blaxter, Clapperton & Wainman (1966), were unable to draw definite conclusions. Biel (1964) found that Merino wethers consumed significantly more of a chopped lucerne diet than Dorper wethers. Steyn & van der Merwe (1969) reported significant breed differences on roughage diets either in chopped or pelleted form. No information could be found in the literature on the feed intake of different breeds of sheep under grazing conditions. Consequently, a comparative study on voluntary feed intake and selective grazing behaviour under natural grazing conditions, was conducted with three breeds of sheep.

Procedure

The trial was carried out on a mixed type of natural pasture with *Themeda triandra* constituting 60% of the basal plant cover. About 6% of the basal cover consisted of shrubs mainly *Felicia muricatus* with the rest a mixture of annual grasses. Merino, South African Mutton Merino and Dorper wethers, aged 6 to 8 months at the beginning of the trial, were used. The sheep were kept in a continuous grazing system from May 1971 until May 1972 at a stocking rate of 1,2 sheep per ha. A salt/dicalciumphosphate (50:50) lick was always available.

Feed intake of individual sheep in all breeds was measured indirectly during a 5 day period of each month, using the faecal index technique, with faecal nitrogen as indicator, as described by Engels (1972). Daily faeces output was measured directly by means of faeces collection bags. During each five day period of the first six months, samples of the pasture were collected by oesophageally fistulated sheep on the 3 successive days. The sampling procedure was as described by Engels & Hugo (1967). Three Merino and 3 Dorper wethers were available for this purpose. The samples collected by each sheep on different days were pooled. Chemical analyses were carried out according to A.O.A.C. (1960) methods. The two-stage *in vitro* fermentation technique of Tilley & Terry (1963) with slight modifications regarding nitrogen supplementation and filtering procedure as described by Engels & van der Merwe (1967), was used for the determination of digestibility of organic matter.

Results and Discussion

The chemical composition and *in vitro* digestibility of organic matter of fistula collected samples, are presented in Table 1. Both nitrogen and crude fibre content are expressed on ash free basis to compensate for the increase in ash content of oesophageal fistula collected samples due to salivary contamination.

The differences between breeds with regard to chemical composition and *in vitro* digestibility, were statistically not significant. Engels (1972) as well as Van Dyne & Heady (1965) found that sheep are more selective in their grazing habits than cattle. A possible explanation may be the difference in the anatomy of the mouth of the two species. According to the results in Table 1, the selective grazing behaviour of the Merino and the Dorper appear to be similar on a mixed type of natural pasture of the Central Orange Free State. However, this aspect should be investigated on natural pastures varying widely in botanical composition. The results in Table 1 indicate that the pasture was relatively high in nutritive value. *In vitro* digestibility varied from 44,8 to 67,8% with the lowest nitrogen concentration of 1,20% during September.

Table 1

The chemical composition and in vitro *digestibility of organic matter (OM) of grazing samples collected by Merino and Dorper wethers*

Month	Breed	OM	Nitrogen	Crude fibre	*In vitro* digestibility of OM
		%	%	%	%
June '71	Merino	85,4	1,91	28,4	55,5
	Dorper	84,2	1,95	27,7	53,7
July "	Merino	84,1	1,50	28,5	47,2
	Dorper	81,0	1,76	29,7	44,8
Aug. "	Merino	84,4	1,58	28,1	49,1
	Dorper	84,1	1,68	28,9	51,4
Sept. "	Merino	80,0	1,34	31,1	54,5
	Dorper	80,4	1,20	31,4	58,9
Oct. "	Merino	84,1	2,44	27,5	66,0
	Dorper	83,7	2,82	29,5	67,8
Nov. "	Merino	84,8	1,91	31,6	65,7
	Dorper	85,7	1,68	33,0	64,2

Table 2

The voluntary organic matter (OM) intake on natural pasture, by Merino, S. Afr. Mutton Merino and Dorper wethers during different months of the year

Month	Daily OM intake per $W^{0,75}_{kg}$		
	Merino	S. Afr. Mutton Merino	Dorper
	g	g	g
June '71	102,1[a]	96,8[a]	71,4[b]
July "	82,9[a]	91,1[a]	64,0[b]
Aug. "	77,0[a]	79,0[a]	63,7[b]
Sept. "	64,5	65,3	57,3
Oct. "	64,8[a]	65,5[a]	54,0[b]
Nov. "	74,7[a]	63,0[b]	62,8[b]
Dec. "	70,3	63,3	65,7
Jan. '72	49,1	52,0	51,0
Feb. & March '72	50,1	49,2	45,8
April "	52,3	47,7	44,2
May "	51,8	53,8	48,8

a,b: Means in the same line bearing the same superscript do not differ significantly (P = 0,05)

The average voluntary organic matter intakes by the three breeds on the pasture, are presented in Table 2. The results indicate that the organic matter intake per metabolic body size of the Merino was, with the exception of January 1972, consistently higher than that of the Dorper. The differences in intake between the two breeds were statistically significant during 5 months. The dif ferences in feed consumption between the Merino and the S. Afr. Mutton Merino were significant during one month only.

Due to its lower feed intake per metabolic size, the Dorper seems to require a smaller area of natural pasture than the Merino. However, the adult Dorper is about 50% heavier than the adult Merino which will consequently cancel the advantage of a lower feed intake. The feed intake of the Merino and the S. Afr. Mutton Merino per metabolic size, was very similar. In practice the latter breed is on average also about 1,5 times the mass of the Merino and it is therefore evident that less S. Afr. Mutton Merinos should be kept on the same area of pasture in comparison with the Merino. However, research should be extended to veld types varying widely in botanical composition and basal plant cover, especially under extensive grazing conditions where walking ability could influence feed intake. Information on feed intake by different breeds of sheep under various grazing conditions is of pertinent importance in the estimation of the stocking rate of a farm.

The use of the faecal nitrogen method for estimating digestibility and consequently intake, is criticised by many workers. The main objection regarding the use of regression equations for prediction of the digestibility of organic matter from faecal nitrogen concentration, is the bias pertinent to some of these equations. However, such objection does not apply in the case of the present study. The possible error of the regression equation was similar for all breeds. According to the results in Table 1, the composition of the diets consumed by the different breeds was probably very similar. The nitrogen concentration in the faecal organic matter of the three breeds was almost identical and therefore supports the conclusion that the degree of selection of the different breeds, with regard to diet composition, may be ignored.

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