

THE VOLUNTARY FEED INTAKE OF DRY AND LACTATING COWS ON NATURAL PASTURE

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OPSOMMING: VRYWILLIGE VOERINNAME VAN DROË EN LAKTERENDE KOEIE OP NATUURLIKE WEIDING

Die invloed van laktasie op voeriname onder weidingstoestande is ondersoek met twee beersasse naamlik die Simmentaler en die Afrikaner. Die proef het gestrek oor 'n 6 maande periode vanaf November 1971 tot April 1972. Voeriname is maandeliks oor 'n 10 dae periode gemeet. Die veldweiding was in 'n droë stadium met die aanvang van die proef tot die eerste reën in Januarie 1972. By beide rasse het die lakterende koeie betekenisvol meer gevreet as die ooreenstemmende droë koeie. Dit is ook gevind dat die kalwers op 'n ouderdom van 4 tot 5 maande reeds aansienlike hoeveelhede weiding inneem.

SUMMARY:

A comparative study on the voluntary feed intake of lactating and dry cows under natural grazing conditions was undertaken with two breeds the Simmentaler and the Africander. The trial was carried out over a 6 month period from November 1971 until April 1972. Feed intake over a 10 day period was measured at monthly intervals. The pasture was in a dormant stage until the first rain which occurred in January 1972. The feed intake of the lactating cows of both breeds was significantly higher than that of the dry cows. A substantial consumption was found by calves at the early age of 4 to 5 months.

There is general agreement that feed intake of the lactating animal is stimulated by increased energy requirements of lactation and especially by level of production. Where comparisons were made between the voluntary intake of lactating and dry animals it was found that feed consumption was higher in lactating animals. Arnold & Dudzinski (1967) reported that lactating ewes at pasture consumed 42% more grass than their dry counterparts, while Cook, Mattox & Harris (1961) found a stimulating effect of lactation of 26% on intake by ewes. Hadjipieris & Holmes (1966) found that the intake of a cubed dried grass was 80% higher in ewes suckling twins and 60% higher in those with single lambs, than in dry ewes. However, Hadjipieris & Holmes (1966) showed that the increase in intake of medium quality hay, by ewes, due to lactation, was less than 10%. Campling (1966) reported that lactating cows consumed 28% more hay but only 8% more concentrates than their dry twins. Hutton (1963) found that lactating cows at pasture consumed 50% more than their dry twins. Natural pasture in South Africa is and will remain the main food supply of most beef cows. According to the literature, a considerable increase in feed intake of lactating animals may be expected. Therefore it is evident that this increase in feed intake should be kept in mind when estimating carrying capacity. Consequently an investigation was carried out in order to measure the magnitude of the effect of lactation on feed intake of beef cows under free grazing conditions on natural veld.

Procedure

The trial was carried out on a mixed type of natural pasture dominated by *Themeda triandra*, which constituted 70% of the basal plant cover. At the beginning of the trial in November 1971 the pasture was in a dormant stage and remained so until after the first rain fell in January 1972. Three different paddocks were used and stocked at a rate of 8 ha per cow per year. Five lactating and five dry cows from the Simmentaler and Africander herds of this

Institute were used. The pre-experimental feeding program of the two breeds was identical since both had access to the same natural pasture. Prior to calving, the pregnant and dry cows within each breed were grazed together. The calves were from 5 to 21 days old when the trial commenced. During the experimental period from November 1971 to April 1972, the twenty cows were grazed together. A salt/dicalcium phosphate (50-50) lick was always available.

Daily excretion of faeces was measured indirectly, using Cr_2O_3 as an indicator. The cows were dosed twice daily for a period of 10 days each month at 07h00 and at 17h00 with gelatin capsules, each containing 10 g of Cr_2O_3 . During the last five days grab-samples of the faeces of each cow were taken twice daily and dried in a forced draught oven at 100°C. After grinding through a Wiley mill (1.0 mm screen) the samples from each cow collected on different days, were pooled on an even mass basis. The Cr_2O_3 concentration in the pooled samples of the individual cows was determined by atomic absorption spectrophotometry according to the method described by Williams, David & Iismaa (1962). Faecal excretion of dry matter (DM) was calculated as follows:

$$\text{DM excreted per day (g)} = \frac{\text{Mass of indicator fed per day (g)}}{\% \text{ indicator in faeces}}$$

Feed intake was measured indirectly at monthly intervals over the same 10 day periods when faecal excretion was being measured. Organic matter (OM) intake was calculated as follows:

$$\text{OM intake per day (g)} = \frac{100}{\% \text{ indigestibility of OM}} \times \frac{\text{OM excreted (g/day)}}{1}$$

Digestibility of OM was predicted from the *in vitro* digestibility of samples collected by oesophageally fistulated steers. The regression equation of Engels (1972) was used for this purpose. Three steers were used for the collection of

samples representative of the feed ingested by the cows. The steers were grazed together with the cows for the entire experimental period. Collection of samples took place on three different days during each 10 day period. The samples of each steer for the three days were pooled, freeze dried, ground through a Wiley mill and then analysed.

Results and discussion

The chemical composition and the *in vitro* digestibility of the natural pasture, as selected by the oesophageally fistulated steers, are presented in Table 1. Crude protein and crude fibre concentrations are expressed on an ash free basis in order to compensate for the increase in ash

content due to salivary contamination. A substantial fluctuation in both crude protein and crude fibre content is evident. However, during the study the changes in the *in vitro* digestibility were relative small, but did reach an unexpectedly high value of 67,2% during February when crude fibre content was also at its peak. The pasture samples collected by the oesophageally fistulated steers predominantly consisted of grass. Some green material was present in most of the samples indicating that selective grazing took place as the pasture was predominantly dry during the first two months.

The estimated voluntary OM intake of lactating and dry cows of both breeds is presented in Table 2. The results indicate that the lactating cows of both breeds consumed significantly more feed than the dry cows. The

Table 1

The chemical composition and in vitro digestibility of organic matter (OM) of the natural pasture collected by oesophageally fistulated steers during different months of the experimental period

Month	Crude protein	Crude Fibre	OM	<i>In vitro</i> digestibility of OM
	%	%	%	%
Nov. 1971	5,4	32,4	84,0	62,0
Dec. 1971	8,4	36,0	79,7	61,5
Jan. 1972	10,6	37,2	78,2	64,6
Feb. 1972	8,8	41,8	84,1	67,2
March 1972	11,6	37,4	80,6	65,0
April 1972	11,2	31,3	79,3	63,2

Table 2

The estimated mean daily voluntary organic matter (OM) intake of lactating and dry Simmenthaler and Africander cows on natural pasture

	Daily OM intake/W ^{0,75} kg					
	Simmenthalers			Africanders		
	Lactating	Dry	Difference	Lactating	Dry	Difference
	g	g	%	g	g	%
Nov. 1971	165,8 ^a	108,1 ^b	53,4	132,8 ^c	86,6 ^d	53,3
Dec. 1971	171,9 ^a	122,6 ^b	40,2	138,1 ^c	90,2 ^d	53,1
Jan. 1972	157,4 ^a	102,7 ^b	53,3	143,5 ^a	91,3 ^b	57,2
Feb. 1972	187,5 ^a	126,5 ^b	48,2	185,0 ^a	123,5 ^b	49,8
March 1972	146,2 ^a	105,7 ^b	38,3	147,5 ^a	100,3 ^b	47,1
April 1972	135,1 ^a	100,8 ^b	34,0	—	—	—

a, b, c, d: Means in the same line bearing the same superscript do not differ significantly ($P \leq 0,05$).

effect of lactation on feed intake was larger in the Africander than in the Simmenthaler. This is noteworthy since the Simmenthaler is known to have a higher milk production potential than the Africander.

During March and April the feed intake of the Simmenthaler calves was also measured. For this purpose it

was assumed that the milk ingested by the calves was completely digestible and that all faeces produced came from plant material. The daily feed consumption of lactating Simmenthaler cows and their calves, and that of the dry cows is presented in Table 3.

Table 3

The estimated mean daily voluntary organic matter (OM) intake (g) of lactating Simmenthaler cows and their calves in comparison with that of dry cows

			Daily OM intake			
	Lactating cow	Calf	Cow plus calf	Total of cow plus calf per W ^{0,75} of cow	Dry cow per W ^{0,75} kg	Difference
	g	g	g	g	g	g
March	16292	3299	19591	175,6	105,7	66,1
April	14944	3505	18449	169,2	100,8	67,9

The data in Table 3 indicate that the calves were consuming substantial quantities of plant material at an age of about 4 to 5 months. The mean feed intake of the calves expressed as a percentage of that of their mothers was 20,2 and 23,4% for March and April, respectively. When the feed intake of the calves is added to that of the cows and expressed per metabolic size of the cow, the differences between the lactating and dry Simmenthaler cows increased from 38,3% to 66,1% and from 34,0% to 67,9% for March and April, respectively.

The data in Tables 2 and 3 show that feed consumption is higher during lactation. This should be borne in mind when estimating carrying capacity for these purposes. On a basis of equal live mass, it can be calculated from data in Table 2 that a lactating cow is equivalent to 1,5 dry cows. Similarly the feed intake of a lactating cow plus that of her calf (Table 3) may be calculated to be equivalent to 1,7 dry cows.

The result of this study show that lactation was accompanied by an increase in feed intake in both breeds. The greater nutritional requirements for lactation is probably responsible for this increase. However, under practical grazing systems the condition of the pasture would

have a pronounced effect on the observed increase in feed intake. When grass is scarce it is doubtful whether the lactating animal will still be able to consume significantly more material than the dry animal. Any bias in the indirect estimation of intake may be ruled out since the error in prediction was the same for all groups.

Particular attention should be given to the differences in feed intake between the two breeds during the first three months of the experiment (Table 2). Both lactating and dry Simmenthaler cows consumed significantly more of the pasture in the dormant period than the Africander cows. However, as the small numbers of animals do not warrant definite conclusions, further investigation under various grazing conditions should be carried out. The economic importance of this possibility could have far-reaching consequences, since breeds are often compared in terms of the quantity of meat produced per unit area of land.

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