

Short Communications/Kort mededelings

Supplementary winter feeding and reproduction of beef heifers on Dohne sourveld

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Received 17 February 1983

Shorthorn and Bonsmara type beef heifers from two breeding seasons were allocated to a high (H), medium (M) and low (L) level of nutrition after weaning at 7 months of age. The feeding levels were applied for 145 days (1972 heifers) and 118 days (1973 heifers). The H groups produced more calves during the first calving seasons. The L groups maintained higher mean calving percentages during the subsequent production years, mean values being 75,3 (H), 80,7 (M), and 82,7% (L) for the 1972 heifers, and 75 (H), 68 (M), and 83% (L) for the 1973 heifers.

Korthoring- en Bonsmara-vleisrasverse van twee teelseisoene is aan 'n hoë (H), medium (M) en lae (L) peil van voeding onderwerp na speen op 7-maande-ouderdom. Die voedingspeile is vir 145 dae (1972-verse) en 118 dae (1973-verse) gehandhaaf. 'n Hoër kalweraanwas is gedurende die eerste kalfseisoen by die H-groepe waargeneem. Die L-groepe het egter 'n hoër gemiddelde kalfpersentasie getoon gedurende die daaropvolgende produksiejare; gemiddelde kalfpersentasie was 75,3 (H), 80,7 (M) en 82,7% (L) vir die 1972-verse, en 75 (H), 68 (M) en 83% (L) vir die 1973-verse.

Keywords: Supplementary feeding, sourveld, reproduction, beef heifers

Retarded physiological development, late sexual puberty and low annual reproductive rates are some of the major economic problems associated with beef cattle production in the sour grassveld areas. Therefore, Bishop (1966) recommended that beef heifers obtain a minimum bodymass of 340 kg before first mating commences at 2 years of age. Heifers that do not attain this mass, can only be mated during the subsequent seasons. First calving therefore occurs at an age of 4 years.

Inefficient feeding programmes often result in poorly developed heifers and irregular breeding with poor rearing habits. Beef cattle, unlike sheep, do not have a recovery phase during the annual reproductive cycle. Poor feeding conditions accentuate these problems. Early mating, on the other hand, influences the economic fitness of the herd. Heifers calving down at 2 years of age have a higher life time production than heifers calving down at 3 years of age (Donaldson & Takken, 1968). This was confirmed by Young (1974) and Meaker, Coetzee & Lishman (1980) on Natal sourveld (Veld type no. 66; Acocks, 1975).

The heifer is subjected to two stress periods on sourveld. The first winter stress follows shortly after weaning and occurs during an active growth phase. The second winter stress is associated with the eruption of the first teeth. Both stages are important with respect to sexual development and should be kept in mind when economic overwintering programmes are formulated. In this investigation, attention is focused on growth rates during the first winter after weaning, its influence on early calving (2 years) and production performance up to the age of 6 years.

Shorthorn and Bonsmara type beef heifers, born during the 1972 and 1973 breeding seasons (August/September) were allocated to three treatments designed to give different growth rates on spared Dohne sourveld (Veld type No. 44; Acocks, 1975) after weaning at the age of 7 months. The high-level (H) group was fed maize leaf-cob meal, maize meal, maize silage, and/or lucerne hay to obtain a growth rate of 0,68 kg/day. The same feeds were used for the medium-level (M) group, but a growth rate of 0,34 kg/day was aimed at. Heifers in the low-level (L) group received only a protein-energy lick, consisting of maize meal (30%), urea (15%), bone meal (25%), and salt (30%). This lick was also available to the H and M groups. Supplementary feeding commenced during June, and was discontinued during October. The heifers were bulled annually from 1 November to 31 January at a minimum mating mass of 275 kg for the 1972 heifers, and 300 kg for the 1973 heifers. During the spring, summer and autumn periods, the heifers were run on Dohne sourveld. A salt/bone meal lick (1:1) was fed *ad lib*.

Both the H and M groups showed a significant ($P < 0,01$) increase in bodymass over the L groups (Table 1). However, it is evident that a minimum mating mass of 340 kg as recommended by Bishop (1966) is almost unattainable without high-cost supplementary feeding programmes during the first winter after weaning if early mating at 15 months is aimed at. During the subsequent summer seasons, compensatory growth of heifers in the L groups took place. Mass gain over this period was 12, 16 and 27% for the H, M and L groups of the 1972 heifers respectively and 20, 17 and 30% for the 1973 heifers.

The percentage of 1972 heifers that obtained the minimum

Table 1 Bodymass changes in heifers during the winter feeding period

Treatments	1972 Heifers				1973 Heifers			
	Commencement	Termination	Gain		Commencement	Termination	Gain	
	73.06.06	73.10.29	kg	%	74.06.13	74.10.09	kg	%
High level (H)	201	280	79 ^a	39	217	282	65 ^a	30
Medium level (M)	199	257	58 ^a	29	210	268	58 ^a	28
Low level (L)	202	215	13	6	212	209	-3	-1

^a $P < 0,01$

Table 2 Influence of supplementary feeding during the first winter after weaning on the reproduction of heifers during the first breeding season.

Measurement	1972 Heifers ^a			1973 Heifers ^a			Mean		
	H	M	L	H	M	L	H	M	L
<i>n</i>	19	19	19	14	14	14	16,5	16,5	16,5
Minimum mating mass (kg)	275	275	275	300	300	300	287,5	287,5	287,5
Heifers mated of total (%)	100	95	58	79	71	36	89,5	83	47
Heifers calved of heifers mated (%)	63	56	91	82	80	40	72,5	68	65,5
Heifers calved of total (%)	63	53	53	64	57	14	63,5	55	33,5

^aFirst breeding seasons, 1974 and 1975 for the 1972 and 1973 heifers respectively.

Table 3 Production performance of heifers from the second to fifth calving seasons.

Detail	Second calving season		Third calving season		Fourth calving season		Fifth calving season		Mean	
	Weaning mass cow (kg)	Calving percentage (%)	Weaning mass cow (kg)	Calving percentage (%)	Weaning mass cow (kg)	Calving percentage (%)	Weaning mass cow (kg)	Calving percentage (%)	Weaning mass cow (kg)	Calving percentage (%)
1972 Heifers										
H	363	53	^a —	—	438	82	420	91	380	75,3
M	424	63	—	—	431	93	437	86	400	80,7
L	345	72	—	—	441	93	449	83	390	82,7
1973 Heifers										
H	^a —	—	446	90	490	60	—	—	436	75
M	—	—	419	62	450	75	—	—	405	68
L	—	—	414	85	443	82	—	—	428	83
Mean										
H	363	53	446	90	464	71	420	91	408	75,2
M	424	63	419	62	440	84	437	86	402	74,4
L	345	72	414	85	442	87,5	449	83	409	82,9

^a1976 data omitted on account of an obvious bull effect.

mating mass at the end of the mating period was 100, 95 and 58 for the H, M and L groups respectively. With a higher minimum limit of 300 kg, the percentages were 79, 71 and 36 respectively for the 1973 heifers. Morgan (1979) was of the opinion that the limit for a minimum mating mass is more variable, and that between 250 and 319 kg, a calving percentage of 71 could be attained. At a lower limit, a calving percentage of 51 may be expected. Smith (1979) indicated few problems when British beef breeds or their crosses are mated at 300 kg.

The advantage of the high feeding level was obvious during the first calving season, regardless of the fact that only heifers that attained minimum mating mass, were mated (Table 2). The L groups maintained higher mean calving percentages during the subsequent production years (Table 3). Pinney, Stephens and Pope (1972) observed high calving percentages in cows overwintered on a low feeding level. Other workers found no differences in calving percentages between groups fed high and low planes of nutrition (Holloway & Totusek, 1973; Hughes, Stephens, Lusby, Pope, Whiteman, Smithson & Totusek, 1978). Ellis (1974) and Sparke & Lamond (1968) found increased calving percentages with an increase in mating mass.

Heifers calving down at 24 months of age realize only 69% of mature body size (6 years) at first calving. It is evident that even if mass gains of 25–40% may be achieved during the first winter after weaning, it would not ensure that an exceptional percentage (> 80%) of heifers attain the minimum mass at an early stage. To calve down at 24 months, an additional

feeding programme (e.g. cultivated pastures) would have to be incorporated during the summer season. The poor reproductive performance of the H groups in the present study, may be due to three of the most important causes of poor breeding, viz. physiological immaturity, failure of fertilization, and early death of the embryo (Hammond, Mason & Robinson, 1971). A single supplementary feeding programme for heifers in an active growth phase during the winter after weaning is inadequate to achieve sustained growth and reproductive performance during the first five breeding seasons.

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