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THE INFLUENCE OF DIFFERENT PLANES OF NUTRITION DURING WINTER ON THE CONCEPTION RATE OF HEIFERS

H.J. Meaker
Agricultural Research Station, Dundee, Natal

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Dietary supplementation of growing heifers which graze veld during winter has been studied in South Africa but with varying results. This variation has been due to diferences in the severity of the winters and the planes of supplementation (Joubert, 1954; Bishop, 1966; Lyle, 1973). It is generally accepted that young growing heifers require good management during the first two years of life to ensure satisfactory overall performance and fertility. However, obesity of heifers must be avoided since this is detrimental to fertility (Arnett, Holland & Totusek, 1971). The economy of the wintering operation is of utmost importance especially in the sour grassveld areas since winter feed is the greatest single factor in the cost of beef production.

The objective of this study was to determine the optimal nutritional levels for beef heifers from weaning to mating (at approximately 26 m of age) in the Sandy Sourveld areas of Natal.

Fifty two Africander x Sussex weaner heifers were randomly allocated to two planes of nutrition at the start of the winter (May 1971) viz.

1. High (H) – Maize silage (DM = ± 35%) *ad lib.* plus *Eragrostis curvula* hay *ad lib.*

2. Low (L) – Veld only (Dry Tall Grassveld, Phillips, 1970).

All the heifers in both treatments had free access to a lick consisting of 25% yellow maize meal, 25% biuret, 25% dicalcium phosphate, 15% salt and 10% sunflower oilcake meal during the winter feeding period. From October 7 the two groups were pooled and had free access to veld and a lick consisting of 50% dicalcium phosphate and 50% salt.

At the start of the following winter (June, 1972) each group of heifers was randomly subdivided and allocated to a High (H) and Low (L) plane of nutrition. There were thus four treatments; High-High (H–H), High-Low (H–L), Low-High (L–H) and Low-Low (L–L). The heifers in Groups H–H and L–H were grouped together and were fed to produce gains of 0,3 kg–0,4 kg per day on maize silage and *E. curvula* hay while the heifers in groups H–L and L–L were pooled and had access to rested winter veld only. All the heifers had free access to a lick consisting of 34% yellow maize meal, 31% salt, 20% bone meal and 15% urea.

The breeding season began in mid-October when a fertile bull was introduced to each of the two groups. From the end of October the heifers in the H–H and L–H groups had access to summer grazing. The mating season terminated in mid-January. The experiment had to be terminated at first conception as a number of heifers aborted due to *Brucellosis.*

The average daily gain (ADG) over the two years, percentage conception and feed intakes of the heifers are summarised in Tables 1 and 2. The results indicated that over both summer periods compensatory gains of between 26% (L–L compared to L–H) and 83% (H–L compared to H–H) were recorded when winter restricted heifers were put to summer grazing. These findings are in accordance with those of Scales & Lewes, (1971) and Reyneke, (1973) who recorded compensatory gains of between 65% and 70%. Notwithstanding the compensatory growth of the L, H–L and L–L groups of heifers, the mass of these groups was 25 kg (L–H) to 71 kg (L–L) less than the H–H group at the start of the breeding season (Table 1).

Although satisfactory conception rates were achieved with the H–L and L–L groups of heifers, these practices cannot be recommended for the area concerned for various reasons. It is common to mate heifers up to 2 months before the mating of the main herd. This allows heifers a longer intercalving period which will enable them to resume normal oestrous cycles before mating commences. Invariably nutritional conditions are poor in Spring due to late rains which will retard growth of the heifers and suppress oestrus. This will result in a delayed first conception. According to Wiltbank, (1968) Lesmeister, Burfening & Blackwell, (1973) heifers should be managed and bred so they will calve early in the calving season because thereafter they will tend to maintain early calving throughout their productive lives. It is therefore clear that heifers must be managed in such a way that they are in condition at the onset of the breeding season for mating.

The results in this study therefore indicate that the heifers in the L–H group maintained the best production, since these heifers recorded the same conception as the H–H group but required only one winter's supplementary feeding. Provided growth is not stunted, a considerable saving can be made by utilising low-cost rested winter veld during the first winter. Compensatory growth will occur in the ensuing summer which will reduce the winter livemass deficit and the heifers must then be fed to body requirements as laid down by nutritional standards the following winter. This will ensure that the heifers will reach the appropriate mass for mating at the onset of the breeding season.

Table 1

Average daily gain of the heifers over two years and percentage conception

First year:	H	L
Number of animals per group	26	26
Average mass per heifer at start of winter (kg)	213[a]	214[a]
Average mass per heifer at end of winter (kg)	247[a]	197[b]
Difference in mass per heifer during winter (kg)	34[a]	−17[b]
A.D.G. per heifer during winter (kg/day)	0,243[a]	−0,121[b]
Average mass per heifer at end of summer (kg)	310[a]	291[b]
Difference in mass per heifer during summer (kg)	63[a]	94[b]
A.D.G.per heifer during summer (kg/day)	0,279[a]	0,416[b]

Second year:	HH	HL	LH	LL
Number of heifers per group	13	13	13	13
Average mass per heifer at start of winter (kg)	310[a]	310[a]	292[b]	290[b]
Average mass per heifer at end of winter (kg)	361[a]	305[b]	337[c]	291[d]
Difference in mass per heifer during winter (kg)	51[a]	−5[b]	45[a]	1[b]
A.D.G. per heifer during winter (kg/day)	0,331[a]	0,032[b]	0,292[a]	0,006[b]
Average mass per heifer at start of breeding season (kg)	357[a]	300[b]	332[c]	286[d]
Average mass per heifer at end of breeding season (kg)	381[a]	344[b]	367[c]	330[d]
Difference in mass per heifer during breeding season (kg)	24[a]	44[b]	35[c]	44[b]
A.D.G. per heifer during breeding season (kg/day)	0,261[a]	0,478[b]	0,380[c]	0,478[b]
Conception (%)	100	92,3	100	84,6

a, b, c, d : Within each set of observations, means having the same superscript are not significantly different from each other.

Table 2

Feed intakes of the heifers over the two winters

First year:	H	L
Average intake of silage (kg/heifer/day)	14,3	–
Average intake of *E. curvula* hay (kg/heifer/day)	1,7	–
Average intake of lick (g/heifer/day)	179	219

Second year:	HH	HL	LH	LL
Average intake of silage (kg/heifer/day)	9	–	9	–
Average intake of *E. curvula* hay (kg/heifer/day)	2,3	–	2,3	–
Average intake of lick (g/heifer/day)	140	176	140	176

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