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RESEARCH NOTE

THE PERFORMANCE DURING WINTER, OF HEIFERS FED GRASS SILAGE, MADE UNDER UNFAVOURABLE WEATHER CONDITIONS AND *E. curvula* HAY, PRODUCED FROM THE SAME SWARD

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E. curvula hay is by far the most commonly fed hay in beef enterprises in the mixed and sourveld areas of South Africa. One of the basic requirements for optimum production of the grass is a minimum rainfall of 600 mm per annum. However, the rainfall which is so essential for growth is also responsible for a considerable amount of hay being reduced to expensive bedding each year. It is estimated that in Natal alone, 50 000 tonnes of hay are spoiled by unfavourable weather conditions annually. If it were feasible to ensile the grass when unfavourable conditions prevented hay-making, new growth for the subsequent hay-cut would not be impeded and the farmer could, to a large extent, make up the shortfall in conserved forage that would result from the loss of a hay-cut. The objective of this experiment was to establish the feasibility of such a procedure.

Sixty-nine Simmenthaler heifers with an average mass of 188 kg were fed either *E. curvula* hay or grass silage or hay and silage together. Hay was made from an *E. curvula* sward cut in the early to late piping stage. Nitrogenous fertilizers were applied at the rate of 112 kg N/ha in spring and 84 kg N/ha after each cutting. P and K fertilizers were applied at the rate of 45 kg P/ha and 100 kg K/ha. Grass silage was made from the same sward used for hay when one of the following conditions prevailed: Firstly, when the grass had been cut for hay, but inclement weather prevented the grass from being baled. Secondly, when unfavourable conditions prevented the grass from being cut at the correct stage for hay-making (10% ear emmergence). The grass was picked-up and chopped with a forage harvester and ensiled into an above-ground bunker. The chop length was set at 6 cms. No preservatives were added and the bunkers were sealed with plastic sheeting.

Table 1

Feed regimes, feed intakes and mass changes of animals

	Tr. 1 n=12	Tr. 2 n=13	Tr. 3 n=13	Tr. 4 n=13	Tr. 5 n=14	Tr. 6 n=13
E. Curvula hay	*ad lib*	*ad lib*	2 kg	2 kg	nil	nil
Grass silage	nil	nil	*ad lib*	*ad lib*	*ad lib*	*ad lib*
Lick A	*ad lib*	nil	*ad lib*	nil	*ad lib*	nil
Lick B	nil	*ad lib*	nil	*ad lib*	nil	*ad lib*
Initial mass	185,73	198,95	183,49	187,27	186,23	186,41
Final mass	211,12	229,02	194,48	192,31	178,77	177,83
Mass change	+25,39[a]	+ 30,7[a]	+10,99[b]	+ 4,04[b]	– 7,46[c]	– 9,58[c]
ADG (107 days)	0,24	0,28	0,10	0,05	– 0,07	– 0,09
Total DM intake	394,27	419,82	347,43	254,45	264,23	272,68
DM/day (actual)	3,68	3,92	3,24	2,37	2,47	2,55
DM/day (minimum)+	3,50	3,50	3,50	3,50	3,50	3,50
DM/kg live mass gain	15,52[b]	13,96[a]	31,64[c]	50,49[d]		

Figures within rows having different superscrips differ significantly $P < 0,01$
+ Minimum dry matter intake for 200 kg heifer to maintain mass (NRC, 1976).

The performance of young beef cattle is largely dependent upon dry matter intake (Jackson & Forbes, 1970; Wilkins, Hutchinson, Wilson & Harris, 1971). However, voluntary dry matter intakes on diets consisting of silage only are often low (Harris & Raymond, 1963; Forbes & Irwin, 1968). In this experiment, heifers in 4 of the 6 treatments failed to achieve the minimum dry matter intake suggested by NRC (1976) for a 200 kg heifer to maintain mass. Nevertheless, the heifers in Tr. 1 and Tr. 2 gained 25,39 kg and 30,07 kg respectively, during the 107 day feed period, on a dry matter intake only marginally above that recommended by NRC. This mass gain was significantly ($P < 0,01$) better than the mass gains achieved by the heifers in the other 4 treatments. The heifers offered only silage recorded very poor dry matter intakes and consequently lost mass at the rate of 0,07 kg and 0,09 kg per day in Tr. 5 and Tr. 6 respectively. When the grass silage was supplemented with hay (Tr. 3 and Tr. 4) mass gains were significantly ($P < 0,01$) better than the mass gains of the heifers offered only silage (Tr. 5 & Tr. 6; Table 1). Although the difference in mass gain between the heifers in Tr. 3 and Tr. 4 was not significant the heifers in Tr. 3 with a feed conversion (kg DM/kg live mass gain) of 31,64 were significantly ($P < 0,01$) more efficient than the heifers in Tr. 4 (50,49). The heifers in Tr. 2 (hay plus Lick B; Table 1) were significantly ($P < 0,01$) more efficient in terms of feed conversion than the heifers in Tr. 1 (hay plus Lick A; Table 1). Since the degree of NPN utilization is dependent upon energy intake (Virtanen, 1966; Egan, 1974) the higher energy value of the hay (Table 2) resulted in better utilization of the NPN in the urea supplement than was the case with the silage-fed animals. It is likely that hydrolysis of the urea by urease activity, coupled with the deamination of the easily degradable protein in the silage (Table 3), resulted in the production of ammonia at a rate faster than the micro-organisms could utilize it for protein synthesis (McDonald, Edwards & Greenhalgh, 1973).

Table 2

Nutrient composition of the E. curvula hay and grass silage fed in the experiment (Presented on a 100% dry matter (DM) basis)

	E. curvula hay %	Grass silage %
Crude protein	10,89	10,27
True protein	8,75	5,87
NPN as % of total N	19,68	42,80
Crude fibre	30,06	34,09
Metabolisable energy (ME) (MJ/kg DM)	8,80	8,35

Table 3

Composition of the lick supplements fed to the heifers in the experiment

	Lick A %	Lick B %
Maize meal	–	24
Urea	–	15
Molasses meal	–	10
Salt	50	31
Dicalciumphosphate	50	31

It is apparent from these results that whilst the animals could not be maintained on the grass silage only, the addition of hay to the ration resulted in a significant ($P < 0,01$) increase in mass gain over the heifers fed silage only. It appears feasible therefore, that the grass could be ensiled when conditions inhibit hay-making and fed together with hay to beef animals with low nutritional requirements.

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