

LIVELWEIGHT GAIN OF YEARLING CATTLE ON HIGH QUALITY SILAGE-BASED DIETS

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The production of high quality silages provides beef producers with the opportunity to reduce the proportion of grain in cattle finishing diets. These silages can be produced from a range of crops and pastures and by cutting at an early stage of growth. The present studies were conducted to determine potential liveweight gains in steers on high silage/low grain diets.

Wilted silages were produced from subterranean clover (S), lucerne (L) and an oat/purple vetch crop (OV), and direct cut silages were produced from irrigated maize (M) and grain sorghum (GS) crops. Silages were harvested with a precision-chop harvester and stored in above-ground stacks, containing approximately 15 to 20 t DM, covered with plastic. The silages had DM contents of 465, 298, 354, 426 and 394 g/kg, contained 169, 154, 120, 56 and 68 g crude protein (CP)/kg DM, and had estimated metabolisable energy (ME) contents of 10.0, 9.5, 9.4, 11.0 and 10.1 MJ/kg DM respectively, the latter being estimated as *in vitro* digestibility of organic matter in the DM (percent) x 0.157, using the rumen fluid/pepsin method. Rolled grain was included in the diets at 0, 0.27, 0.54 and 0.80 of the total DM. The grain mix comprised 0.88 barley:0.12 lupins for S and M silages and 0.75:0.25 for other silages. All animals were given a mineral/vitamin supplement and urea was given to steers on M and GS silages at 20g/kg silage DM. Each diet was offered *ad lib.* to six Angus X Hereford steers, initially 285 kg, until the treatment mean liveweight reached approximately 396 kg when steers were slaughtered. Liveweights (full) were recorded weekly and gains are presented in Table 1.

Table 1. Effect of proportion of grain in silage-based diets on liveweight gain (kg/day) of yearling steers

Silage	Proportion of grain in diet				s.e.d. ^A
	0	0.27	0.54	0.80	
Subterranean clover (S)	1.14 ^a	1.42 ^b	1.34 ^{ab}	1.14 ^a	0.115
Lucerne (L)	0.85 ^a	0.99 ^{ab}	1.03 ^{ab}	1.12 ^b	0.114
Oat/purple vetch (OV)	0.85 ^a	0.98 ^{ab}	1.11 ^b	1.15 ^b	0.114
Maize (M)	1.03	0.97	1.13	0.98	0.098
Grain sorghum (GS)	0.91 ^a	1.05 ^{ab}	1.22 ^b	1.23 ^b	0.121

^A Means within a silage not sharing common superscripts are significantly different (P<0.05)

Excellent gains were observed on silage alone (mean 0.96 kg/day) and as expected were increased when grain was added to the diet, except on M silage. Although CP content of the M silage diets varied from 111 to 128 g/kg DM (on the 0 and 0.80 grain diets respectively), current feeding standards indicate that while these diets provided adequate metabolisable protein for a gain of 1.25 kg/day, the level of effective rumen degradable protein probably limited microbial protein synthesis (AFRC 1993). This could account for the lack of response to grain on M silage. On the other silages liveweight gain increased with grain proportion, although the optimum proportion of grain in the diet varied between silages.

With high quality silages (ME>9.5 MJ/kg DM) it should be possible to achieve sufficient liveweight gains to finish yearling steers on high silage/low grain diets with a potential reduction in feed costs. Although silage production costs can vary considerably, the average cost of silage (\$/t DM) would be expected to be lower than that for grain.

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AFRC (1993). 'Energy and Protein Requirements of Ruminants'. (CAB International: Wallingford, U.K.).