

TABLE 4

DXP REQUIREMENTS OF BULLS (CATEGORY A) AND OF YOUNG CATTLE TO BE USED LATER FOR MILK PRODUCTION (CATEGORY B)

Bodyweight (kg)	Category A			Category B	
	daily gain in kg			daily gain in kg	
	0.75	1.00	1.25	0.5	0.7
200	410	460	520	340	380
300	480	530	580	400	440
400	510	570	620	440	480
500	530	580	630		
600	540	590	640		

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## Swedish energy and protein feeding standards for growing and fattening cattle

I. OLSSON

*Swedish University of Agricultural Sciences,  
Division of Ruminants Research,  
S-755 90 Uppsala, Sweden.*

### Introduction

The majority of beef meat in Sweden is produced by rearing calves from the dairy herds. These calves are mainly purebred Swedish Red and White or Swedish Friesian cattle. A small proportion of Swedish cows (approximately 10 per cent) are used for suckler calf production. In this type of production, different beef breeds (mainly Hereford and Charolais) are frequently used for crossing with the dairy breeds.

Revised energy and protein feeding recommendations for growing cattle were published in Sweden in 1977 (NORRMAN, 1977). The recommendations are intended for direct use in practical feeding and therefore a safety margin is included in the figures.

### Energy feeding standards

Energy allowances are given as metabolisable energy (ME). The standard is based mainly on the British recommendations as they appear in MAFF 33, 1975. Different allowances are given for animals fed mainly concentrate (barley beef type rations) and for animals fed rations containing more roughage, as is shown in Table 1. In comparison with the British standards, the Swedish standards have been slightly modified, in accordance with results of feeding experiments. Estimates of the energy requirements for maintenance according to THORBECK and HENCKEL, 1976 are used.

TABLE 1  
METABOLISABLE ENERGY RECOMMENDATIONS FOR GROWING CATTLE (MJ). (NORRMAN, 1977).

Liveweight kg		Daily gain, g							
		0	200	400	600	800	1000	1200	1400
100	MINEC*)	7.5	8.4	9.2	10.0	10.9	11.7	12.6	
	BBR** )	15.0	18.5	22.0	26.5	31.5	37.5	44.5	
	MR*** )	15.0	19.0	23.5	28.5	34.5	42.0	50.0	
200	MINEC	7.5	8.4	9.2	10.0	10.9	11.3	11.7	12.1
	BBR	25.0	29.5	34.0	39.5	45.5	52.5	61.5	71.5
	MR	25.0	30.0	35.5	42.0	49.5	58.0	68.5	81.0
300	MINEC	7.1	8.0	8.8	9.2	9.6	10.5	11.3	11.7
	BBR	34.0	39.0	44.5	51.0	58.0	67.0	76.5	89.5
	MR	34.0	40.0	46.5	54.0	63.0	73.5	85.5	100.5
400	MINEC	7.1	7.5	8.4	8.8	9.2	10.0	10.9	11.3
	BBR	42.5	48.0	54.5	61.5	70.0	80.0	92.0	106.0
	MR	42.5	49.0	57.0	65.5	76.0	87.5	102.0	119.0
500	MINEC	7.1	7.5	8.4	8.8	9.2	10.0	10.9	11.3
	BBR	50.0	56.5	64.0	72.0	82.0	93.0	106.5	122.5
	MR	50.0	58.0	66.5	76.5	88.0	101.5	117.5	137.0
600	MINEC	7.1	7.5	8.4	8.8	9.2	10.0	10.9	11.3
	BBR	57.5	64.5	73.0	82.0	93.0	105.5	120.5	138.5
	MR	57.5	66.0	76.0	87.0	100.0	115.0	133.0	155.0

\*) Minimum metabolisable Energy Concentration per kg dry matter (MJ ME/kg dry matter)

\*\*) Baby Beef type Rations (*ad libitum* concentrate feeding, restricted amounts of hay or straw, concentrate/roughage ratio > 90/10 on ME basis)

\*\*\*) Mixed type Rations

The basic recommendations given in Table 1 refer to male animals of the Swedish Red and White breed. For heifers and steers and for animals of other breeds the recommendations have to be adjusted in accordance with Table 2. The adjustments are based on experimental data from, for example, JOHNSSON, 1972; LINDHE and HENNINGSSON, 1968, and seem to be confirmed by other experimental and practical experiences.

In practice, metabolisable energy in the feed is most often determined from tabulated values (ERIKSSON *et al.*, 1976). However, calculations of metabolisable energy in roughage from *in vitro* digestibility of organic matter according to the method described by LINDGREN, 1979, have become more common.

TABLE 2

USE OF THE ENERGY RECOMMENDATIONS FOR DIFFERENT SEXES AND BREEDS  
(NORRMAN, 1977)

Sex and breed	Restrictions
<b>Bulls:</b>	
Swedish Red and White	No
Swedish Friesian	5% less energy for growth rates over 1000 g per day
Crosses (at least 50% beef breed)	5-10% less energy for growth rates over 800 g per day
<b>Steers:</b>	
Swedish Red and White	More than the recommendations for growth rates over 600-700 g per day
Swedish Friesian	More than the recommendations for growth rates over 800-900 g per day
Crosses (at least 50% beef breed)	No
<b>Heifers:</b>	
Swedish Red and White	More than the recommendations for growth rates over 600 g per day
Swedish Friesian	More than the recommendations for growth rates over 600-700 g per day
Crosses (at least 50% beef breed)	More than the recommendations for growth rates over 700 g per day

TABLE 3

PROTEIN FEEDING RECOMMENDATIONS FOR GROWING CATTLE, g DIGESTIBLE CRUDE PROTEIN PER MJ ME (NORRMAN, 1977)

Liveweight kg	Daily gain	
	less than 750 g	more than 750 g
100	11.5	11.5
150	10.0	10.0
200	9.1	9.3
250	8.4	8.6
300	7.9	8.1
350	7.4	7.9
400	7.2	7.6
450	6.9	7.4
500	6.7	7.2
550	6.4	6.9

### Protein feeding standards

The protein feeding recommendations are related to energy intake and liveweight ; daily allowances of apparently digestible crude protein per MJ metabolisable energy are given in Table 3. The recommendations are mainly based on the protein requirements established by NRC, 1970 and results from Swedish and Danish feeding experiments (OLSSON, 1976 ; ANDERSEN *et al.*, 1973). In practice, digestible crude protein is calculated from tabulated digestibility coefficients (ERIKSSON *et al.*, 1976).

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### Energy feeding standards for beef cattle used in Switzerland

H. BICKEL

*Institute of Animal Production, Nutrition Group,  
Swiss Federal Institute of Technology, Zurich (Switzerland).*

#### 1. — Energy evaluation

The new method for assessing energy value of feeds for beef cattle is based on net energy growth as outlined by VAN ES *et al.* (1978) and BICKEL and LANDIS (1978). The determination of metabolizable energy (ME) and the estimation of net energy of the feed for fattening beef and lamb (NEW = Netto Energie Wachstum, NEV = Énergie Nette Viande) follows the procedures given in table 1. To derive NEW values a combined efficiency of utilization of ME for maintenance and growth was chosen at a production level (intensity of production,  $i_p$ ) of 1.5. The  $i_p$  is defined as the total NE-intake divided by the requirement for maintenance ( $NE_m$ ).