

Erratum to “Nutrient Requirements of Beef Cattle 8th Revised Edition”

January 2018

Chapter 12

Calculations for data presented in Table 12-1 (pp. 188-189) are incorrect. Equations 12-2 and 12-3 should use RE as Mcal/kg to derive proportion of fat and proportion of protein in gain, respectively. RE (Mcal/d) should be divided by EBG (kg/d) to derive proportions. Fat in the gain and protein in the gain must be calculated on an empty body basis. A revised version of the table is shown below.

TABLE 12-1 Relationship of stage of growth and rate of gain to body composition, based on NRC (1984) medium-framed steer

Shrunk ADG, kg	Shrunk body weight, kg						
	200	250	300	350	400	450	500
<i>NEg required, Mcal/d^a</i>							
0.6	1.68	1.99	2.28	2.56	2.83	3.09	3.35
0.8	2.31	2.73	3.13	3.51	3.88	4.24	4.59
1.0	2.95	3.48	4.00	4.49	4.96	5.42	5.86
1.3	3.93	4.65	5.33	5.98	6.61	7.22	7.82
<i>Protein in gain, %^b</i>							
0.6	17.4	15.9	14.6	13.2	12.0	10.7	9.5
0.8	17.2	15.7	14.3	12.9	11.6	10.3	9.1
1.0	17.0	15.5	14.0	12.6	11.3	10.0	8.7
1.3	16.8	15.2	13.7	12.3	10.9	9.6	8.3
<i>Fat in gain, %^b</i>							
0.6	21.2	27.6	33.7	39.6	45.2	50.7	56.0
0.8	22.2	28.8	35.1	41.1	46.9	52.5	58.0
1.0	23.0	29.7	36.2	42.3	48.2	54.0	59.6
1.3	24.0	30.9	37.4	43.8	49.8	55.7	61.5
<i>Body fat, %^c</i>							
0.6	11.6	13.6	15.9	18.3	20.7	23.2	25.6
0.8	11.6	13.8	16.2	18.8	21.3	23.9	26.4
1.0	11.6	14.0	16.5	19.2	21.8	24.4	27.1
1.3	11.6	14.1	16.9	19.6	22.4	25.1	27.8
1 then 1.3	11.6	14.0	16.5	19.3	22.1	24.9	27.6

^aComputed from the NRC (1984) equation which was determined from 72 comparative slaughter experiments (Garrett, 1980); retained energy (RE) = $0.0635 \times \text{EBW}^{0.75} \times \text{EBG}^{1.097}$, where EBW is 0.891 SBW and EBG is 0.956 SBG.

^bComputed from the equations of Garrett (1987), which were determined from the NRC (1984) data base; proportion of fat in the shrunk body weight gain = $0.12 \times \text{RE} - 0.14$, and proportion of protein = $0.253 - 0.027 \times \text{RE}$.

^cPercentage body fat = $0.037 \times \text{EBW} + 0.00054 \times \text{EBW}^2 - 0.610$ (Simpfendorfer, 1974) and was determined when grown at 1 kg ADG to 300 kg and 1.3 kg ADG to each subsequent weight as described above.

Chapter 13

Page 222, Eq. 13-46, 0.92 was changed to 0.092 to read:

$$E = (0.092 \times \text{MkFat}) + (0.049 \times \text{MkSNF}) - 0.0569, \quad (\text{Eq. 13-46})$$

Chapter 19

Page 364, Eq. 19.97. The coefficient 0.0000764 was changed to 0.000074 to read:

$$\text{GRAZE} = \begin{cases} 1, & \text{FORA} > 4 \times \text{GI} \text{ or } \text{FM} > 1150 \\ \left(\frac{0.17 \times \text{FM} - 0.000074 \times \text{FM}^2 + 2.4}{100} \right), & \text{GU, FM, and DOP} > 0 \end{cases} \quad (\text{Eq. 19-97})$$

Chapter 20

Calculations for Tables 20-1 and 20-2 assumed a constant efficiency of metabolizable protein (MP) to net protein (NP) of 49.2%. The MP-to-NP efficiency can be modified in *Inputs/Options*: enter 49.2 in cell D90.

When the efficiency of MP-to-NP is computed using the NRC (1996, 2000) equation, the MP required for gain for animals less than 300 kg of equivalent SBW is decreased, as shown in the revised Table 20-1 below. The NRC (1996, 2000) equation is the default for the BCNRM, and it can be modified in *Inputs/Options*: enter 0 in cell D90. The simulation for diet D for 500 kg in Table 20-1 was inadvertently omitted; it is shown below.

TABLE 20-1 Nutrient Requirements (left) and Diet Evaluation (right) for Growing and Finishing Cattle

Mature SBW, kg		550						Diets	TDN	ME	NEm	NEg						
									%DM	Mcal/kg	Mcal/kg	Mcal/kg						
<i>Maintenance</i>		<i>Shrunk Body weight (SBW), kg</i>						A	65	2.40	1.52	0.93						
		250	300	350	400	450	500	B	70	2.59	1.68	1.07						
NEm	Mcal/d	4.8	5.6	6.2	6.9	7.5	8.1	C	75	2.77	1.84	1.21						
MP	g/d	239	274	307	340	371	402	D	80	2.96	2.00	1.34						
Ca	g/d	7.7	9.2	10.8	12.3	13.9	15.4											
P	g/d	5.9	7.1	8.2	9.4	10.6	11.8	SBW	Diets	DMI	ADG	CP	RDP	MP	Ca	P		
								kg		kg/d	kg/d	%DM	%CP	g/d	% DM	% DM		
<i>Growth (ADG)</i>		<i>NEg required for gain, Mcal/d</i>						250	A	6.06	0.86	11.5	55.1	498	0.48	0.24		
0.4	kg/d	1.2	1.3	1.5	1.6	1.8	1.9	B	5.93	1.04	12.9	52.7	548	0.56	0.27			
0.8	kg/d	2.5	2.8	3.2	3.5	3.8	4.1	C	5.72	1.17	14.3	51.0	586	0.64	0.31			
1.2	kg/d	3.8	4.4	5	5.5	6	6.5	D	5.42	1.25	15.6	49.7	609	0.71	0.34			
1.6	kg/d	5.3	6.1	6.8	7.5	8.2	8.9	300	A	7.27	0.94	10.8	57.6	557	0.42	0.22		
2	kg/d	6.7	7.7	8.7	9.6	10.5	11.3	B	7.11	1.12	12.0	55.6	609	0.49	0.24			
		<i>MP required for gain, g/d</i>						C	6.86	1.26	13.2	54.0	648	0.55	0.27			
0.4	kg/d	125	127	129	120	111	102	D	6.51	1.35	14.4	52.8	672	0.61	0.30			
0.8	kg/d	242	244	246	226	207	188	350	A	8.48	1.00	10.2	60.2	611	0.38	0.20		
1.2	kg/d	355	357	358	326	296	267	B	8.30	1.19	11.3	58.4	664	0.43	0.22			
1.6	kg/d	467	467	466	423	381	341	C	8.00	1.34	12.4	56.9	703	0.48	0.24			
2	kg/d	576	575	571	516	463	412	D	7.59	1.43	13.5	55.8	728	0.53	0.26			
		<i>Calcium required for gain, g/d</i>						400	A	9.69	1.06	9.4	65.0	632	0.34	0.18		
0.4	kg/d	10.4	9.7	9	8.4	7.7	7.1	B	9.49	1.26	10.3	63.6	681	0.38	0.20			
0.8	kg/d	20.1	18.6	17.2	15.8	14.4	13.1	C	9.15	1.41	11.2	62.4	718	0.42	0.22			
1.2	kg/d	29.6	27.2	25	22.8	20.7	18.6	D	8.68	1.51	12.2	61.3	741	0.46	0.24			

1.6	kg/d	38.9	35.6	32.5	29.5	26.6	23.8	450	A	10.90	1.12	8.7	69.9	649	0.31	0.17	
2	kg/d	48	43.8	39.9	36.1	32.4	28.8		B	10.67	1.32	9.4	68.9	694	0.34	0.18	
		<i>Phosphorus required for gain, g/d</i>								C	10.29	1.48	10.2	67.9	727	0.38	0.20
0.4	kg/d	4.2	3.9	3.6	3.4	3.1	2.9		D	9.76	1.58	11.0	67.0	748	0.41	0.22	
0.8	kg/d	8.1	7.5	6.9	6.4	5.8	5.3	500	A	12.12	1.17	8.0	74.8	662	0.28	0.16	
1.2	kg/d	12	11	10.1	9.2	8.4	7.5		B	11.86	1.38	8.7	74.2	702	0.31	0.17	
1.6	kg/d	15.7	14.4	13.1	11.9	10.8	9.6		C	11.43	1.54	9.4	73.6	731	0.34	0.18	
2	kg/d	19.4	17.7	16.1	14.6	13.1	11.6		D	10.85	1.64	10.1	72.7	750	0.37	0.20	

TABLE 20-2 Nutrient Requirements (left) and Diet Evaluation (right) for Growing Bulls

Mature SBW, kg		900						Diets	TDN	ME	NEm	NEg						
									%DM	Mcal/kg	Mcal/kg	Mcal/kg						
<i>Maintenance</i>		<i>Shrunk Body weight (SBW), kg</i>						A	65	2.40	1.52	0.93						
		300	400	500	600	700	800	B	70	2.59	1.68	1.07						
NEm	Mcal/d	6.4	7.9	9.4	10.7	12.1	13.3	C	75	2.77	1.84	1.21						
MP	g/d	274	340	402	461	517	572	D	80	2.96	2.00	1.34						
Ca	g/d	9.2	12.3	15.4	18.5	21.6	24.6											
P	g/d	7.1	9.4	11.8	14.1	16.5	18.8	SBW	Diets	DMI	ADG	CP	RDP	MP	Ca	P		
								kg		kg/d	kg/d	%DM	%CP	g/d	% DM	% DM		
<i>Growth (ADG)</i>		<i>NEg required for gain, Mcal/d</i>						300	A	7.27	1.13	11.7	53.2	609	0.55	0.27		
0.4	kg/d	0.9	1.1	1.3	1.5	1.7	1.9	B	7.11	1.38	13.3	50.3	681	0.66	0.31			
0.8	kg/d	2	2.4	2.9	3.3	3.7	4.1	C	6.86	1.57	14.8	48.2	736	0.76	0.35			
1.2	kg/d	3.1	3.8	4.5	5.1	5.8	6.4	D	6.51	1.69	16.3	46.7	769	0.85	0.39			
1.6	kg/d	4.2	5.2	6.1	7	7.9	8.7	400	A	9.69	1.31	10.6	57.6	726	0.46	0.23		
2	kg/d	5.3	6.6	7.8	9	10.1	11.1	B	9.49	1.58	11.9	55.1	802	0.54	0.26			
		<i>MP required for gain, g/d</i>						C	9.15	1.79	13.1	53.2	859	0.61	0.30			
0.4	kg/d	123	125	128	126	115	104	D	8.68	1.92	14.4	51.8	894	0.68	0.33			
0.8	kg/d	241	242	245	239	215	192	500	A	12.12	1.46	9.8	61.5	830	0.39	0.20		
1.2	kg/d	355	355	358	347	310	273	B	11.86	1.75	10.9	59.3	909	0.45	0.23			
1.6	kg/d	469	467	468	451	400	350	C	11.43	1.96	12.0	57.7	968	0.51	0.25			
2	kg/d	581	576	575	553	487	423	D	10.85	2.10	13.0	56.4	1005	0.56	0.28			
		<i>Calcium required for gain, g/d</i>						600	A	14.54	1.58	9.0	66.2	907	0.34	0.18		
0.4	kg/d	11.4	10.5	9.6	8.8	8	7.3	B	14.23	1.88	9.9	64.4	984	0.39	0.20			
0.8	kg/d	22.3	20.3	18.5	16.7	15	13.4	C	13.72	2.11	10.9	62.9	1042	0.43	0.22			
1.2	kg/d	32.9	29.9	27	24.2	21.6	19.1	D	13.02	2.26	11.8	61.7	1078	0.47	0.24			

1.6	kg/d	43.4	39.2	35.3	31.5	27.9	24.5	700	A	16.96	1.69	8.1	73.1	937	0.30	0.17
2	kg/d	53.8	48.4	43.4	38.6	34	29.6		B	16.60	2.01	8.8	71.8	1005	0.34	0.18
		<i>Phosphorus required for gain, g/d</i>							C	16.00	2.25	9.6	70.7	1056	0.37	0.20
0.4	kg/d	4.6	4.2	3.9	3.6	3.2	2.9		D	15.19	2.40	10.4	69.6	1088	0.40	0.21
0.8	kg/d	9	8.2	7.5	6.8	6.1	5.4	800	A	19.39	1.79	7.3	80.0	957	0.27	0.15
1.2	kg/d	13.3	12.1	10.9	9.8	8.7	7.7		B	18.97	2.12	8.0	79.4	1015	0.29	0.17
1.6	kg/d	17.5	15.8	14.2	12.7	11.3	9.9		C	18.29	2.36	8.6	78.7	1059	0.32	0.18
2	kg/d	21.7	19.6	17.5	15.6	13.7	11.9		D	17.36	2.52	9.3	77.8	1086	0.35	0.19