#### Chapter 6

# **Beef Cattle Feeding**



The greatest single cost in beef cattle production is feed. It represents from 65 to 75 percent of the total cost of keeping cows and represents an even greater cost item in finishing cattle.

It is very important that feeding practices be both adequate and economical. Feed has a tremendous effect on breeding efficiency and weaning weight of calves and, thus, influences both cow productivity and profit.

In feeding cattle there are two main goals: (1) determine the amount of each nutrient the animal needs (Table 6-2) and (2) determine how much and what kind of feed should be fed to cattle to supply their nutrient needs. For optimal performance, feeding a balanced ration which furnishes necessary nutrients in the amounts and proportions needed for proper nourishment is necessary.

Underfeeding and overfeeding are both costly problems for many Arkansas cattle producers. Underfeeding may result in lower calf crop percentage, lighter weaning weights, slower growth rates and increased parasite load depending upon the severity of undernourishment. Overfeeding is too expensive and cuts into profits.

Emphasis should be given to the amount and kind of feed needed each day. For example, thingrowing animals may consume up to 3 percent of their body weight as air-dry feed, while mature animals in fleshy condition may consume as little as 1.5 percent of their body weight.

The quality of the feedstuff has an effect on the amount an animal can consume as a percentage of its body weight. Physical fill and digestibility limit the intake of low-quality forage; whereas, metabolic control over satiety limits intake of high-quality feeds.

# **Feeding the Cow Herd**

Most Arkansas cow-calf producers should strive to meet the nutritional needs of the cow herd with a year-round forage production program. During certain periods of the production year, supplementing the available forage with other feeds (Table 6-3) may be necessary, but the easiest and most economical feeding program for the cow herd is based on forages the cow harvests by grazing. The Arkansas climate is fairly well suited to grow cool-season grasses and small grains that enable year-round grazing for the cow herd with good pasture management.

The beef cow's nutritional requirements vary depending upon the (1) stage of production, (2) level of production, (3) age, (4) weight, (5) condition, (6) weather and (7) specific nutrient deficiencies in the area.

## **Stage of Production**

The nutrient requirements of a beef cow change with her stage of production. The beef cow's production year begins at calving and ends with calving the next year. This period can be divided into four major stages of production: (1) the 82-day post-calving period, (2) a 123-day period during which the cow is lactating and attempting to breed or is in the early stages of pregnancy, (3) a 110-day mid-gestation period and (4) the 50 days just prior to calving.

TABLE 6-1. Calving					
Period 1 (82 Days)	Period 2 (123 Days)	Period 3 (110 Days)	Period 4 (50 Days)		
Early Lactation (1 to 3 months after calving)	Pregnant and Lactating (4 to 7 months after calving)	Mid-Gestation (8 to 10 months after calving)	Immediately Precalving (11 to 12 months after calving)		

**Period One** – This 82-day period is the most critical of the cow year. During this time, the cow has just undergone the stress of giving birth, is lactating at a peak level and must gain strength and condition to start the reproductive cycle and rebreed. Most Arkansas cattle calve in the late winter or early spring; therefore, this period usually starts in February or March. The cow is often being fed hay or some other form of stored feeds at this time.

As spring pasture arrives, the green grass may appear to solve many nutritional requirements for the cow. Because of the high moisture content in spring grass, the average lactating cow may not be able to consume enough to provide necessary energy and dry matter requirements. Continued feeding of dry hay or even grain may be economically feasible during this time if the cows are not milking well or slow in rebreeding.

TABLE 6-2. Nutrient Requirements of Beef Cattle							
Growing Steer and Heifer Calves – 1,100 Pounds @ Finishing or Maturity							
(Replacement Heifers)							
Body	ADC	DMI	TON	00	6.		Vitemin A
(lb)	(lb)	(lb/day)	(lb)	(lb)	(lb)	(lb)	(1 000s IU)
400	1.5	10.7	6.8	1.30	0.053	0.026	11
İ	2.0	10.7	7.4	1.51	0.066	0.031	11
500	1.5	12.6	8.1	1.41	0.054	0.027	13
	2.0	12.7	8.8	1.63	0.066	0.032	13
600	1.5	14.4	9.2	1.53	0.054	0.028	14
	2.0	14.6	10.1	1.74	0.065	0.033	15
700	1.5	16.2	10.4	1.64	0.054	0.030	16
Brognar	2.0	16.3	11.2	1.85	0.064	0.034	10
riegilai				CP	Ca		Vitamin A
	Pregnant	(lb/day)	(lb)	(lb)	(lb)	(lb)	(1,000s IU)
	1	18.0	9.1	1.30	0.041	0.032	23
	2	18.5	9.3	1.33	0.041	0.032	23
	3	19.0	9.6	1.36	0.042	0.032	24
	4	19.5	9.9	1.41	0.043	0.033	25
	5	20.1	10.3	1.47	0.043	0.034	26
	6	20.8	10.9	1.57	0.044	0.035	26
		21.5	11.6	1.70	0.069	0.049	27
	0	22.3	12.0	1.92	0.069	0.049	28
Two-Vor		22.3		2.24 ook Mill	(0.009)	0.050	23
Mature	Weight	15 (20 PO			k) – 1,10	o Found	5
	Monthe						
	Since	DMI	TDN	СР	Са	Р	Vitamin A
	Calving	(lb/day)	(lb)	(lb)	(lb)	(lb)	(1,000s IU)
	2	22.5	13.9	2.45	0.072	0.045	40
	7	20.2	99	1 39	0.026	0 026	26
	J		0.0	1.00	0.030	0.020	20
	11	21.4	11.9	1.79	0.030	0.020	20
Mature	11 Beef Cows	21.4 (20 Pound	11.9 1 <b>s Peak</b>	1.79 Milk) -	0.030 0.060 - 1,100 F	0.020 0.036 Pounds N	27 27 lature Weight
Mature	11 Beef Cows Months	21.4 (20 Pound	11.9 1s Peak	1.79 Milk) -	0.060 - 1,100 F	0.020 0.036 Pounds N	27 lature Weight
Mature	11 Beef Cows Months Since Calving	21.4 (20 Pound DMI (lb/day)	11.9 ds Peak	1.79 Milk) -	0.030 0.060 - 1,100 F Ca (lb)	0.020 0.036 Pounds M P (Ib)	27 lature Weight Vitamin A (1 000s III)
Mature	11 Beef Cows Months Since Calving 1	21.4 (20 Pound DMI (Ib/day) 25.4	11.9 <b>1s Peak</b> <b>TDN</b> (Ib) 15.0	1.79 Milk) - CP (lb) 2.62	0.030 0.060 - 1,100 F Ca (lb) 0.075	0.020 0.036 Pounds M P (Ib) 0.051	27 lature Weight Vitamin A (1,000s IU) 45
Mature I	11 Beef Cows Months Since Calving 1 2	21.4 (20 Pound DMI (lb/day) 25.4 26.4	11.9 <b>15 Peak</b> <b>TDN</b> (Ib) 15.0 15.9	1.79 (IIIK) - CP (ID) 2.62 2.88	0.030 0.060 - 1,100 F Ca (lb) 0.075 0.084	0.020 0.036 Pounds M P (lb) 0.051 0.055	27 lature Weight Vitamin A (1,000s IU) 45 47
Mature I	11 Beef Cows Since Calving 1 2 3	21.4 (20 Pound (Ib/day) 25.4 26.4 26.9	11.9 <b>15.0</b> <b>15.0</b> <b>15.0</b> <b>15.0</b> <b>15.0</b> <b>15.0</b> <b>15.6</b>	1.79 Milk) - CP (lb) 2.62 2.88 2.73	0.030 0.060 - 1,100 F Ca (Ib) 0.075 0.084 0.077	0.020 0.036 Pounds M (Ib) 0.051 0.055 0.051	27 lature Weight Vitamin A (1,000s IU) 45 47 48
Mature I	11 Beef Cows Since Calving 1 2 3 4	21.4 (20 Pound DMI (lb/day) 25.4 26.4 26.9 26.0	11.9 <b>11.9</b> <b>15.0</b> 15.0 15.0 15.6 14.7	1.79 1.79 Milk) - CP (lb) 2.62 2.88 2.73 2.45	0.030 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068	0.020 0.036 <b>P</b> (Ib) 0.051 0.055 0.051 0.046	27 lature Weight Vitamin A (1,000s IU) 45 47 48 48 46
Mature	11 Beef Cows Since Calving 1 2 3 4 5	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0	11.9 <b>TDN</b> (Ib) 15.0 15.9 15.6 14.7 13.8	1.79 1.79 Milk) - CP (lb) 2.62 2.88 2.73 2.45 2.17	0.030 0.060 - 1,100 F (Ib) 0.075 0.084 0.077 0.068 0.060	0.020 0.036 P (Ib) 0.051 0.055 0.051 0.046 0.042	27 lature Weight Vitamin A (1,000s IU) 45 47 48 46 44
Mature	11 Beef Cows Since Calving 1 2 3 4 5 6 6	21.4 (20 Pound DMI (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2	11.9 11.9 15 Peak TDN (Ib) 15.0 15.9 15.6 14.7 13.8 13.0	1.79 1.79 (Milk) - CP (lb) 2.62 2.88 2.73 2.45 2.17 1.95	0.030 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053	0.026 0.036 Pounds N P (Ib) 0.051 0.055 0.051 0.046 0.042 0.037	27 lature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 43
Mature I	11 Beef Cows Since Calving 1 2 3 4 5 6 7 7	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 24.2 20.9	11.9 11.9 15.0 15.0 15.0 15.6 14.7 13.8 13.0 9.8 10.0 1	1.79 1.79 (Milk) - CP (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40	0.030 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033	0.036 0.036 Pounds N P (Ib) 0.051 0.055 0.051 0.046 0.042 0.037 0.026	27 1ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 07
Mature I	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 8	21.4 (20 Pound DMI (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.2 21.8	11.9 11.9 11.9 15.0 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4	1.79 1.79 <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45	0.030 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033	0.026 0.036 Pounds M P (Ib) 0.051 0.055 0.051 0.046 0.042 0.037 0.026 0.026	27 1ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28
Mature I	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 9	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6	11.9 11.9 11.9 15.0 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1	1.79 1.79 <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56	0.030 0.060 -1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033	0.026 0.036 Pounds N P (Ib) 0.051 0.055 0.051 0.046 0.042 0.037 0.026 0.026 0.026 0.026	27 1ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 20
Mature I	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5	11.9 11.9 <b>TDN</b> (Ib) 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7	1.79 1.79 <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73	0.060 0.060 -1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.057	0.026 0.036 Pounds M P (Ib) 0.051 0.055 0.051 0.046 0.046 0.042 0.037 0.026 0.026 0.026 0.036	27 27 1ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 29 29
Mature I	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 11 12	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0	11.9 11.9 <b>15 Peak</b> <b>TDN</b> ( <b>Ib</b> ) 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9	1.79 1.79 1.79 <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00	0.060 0.060 -1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.037 0.057 0.057	0.026 0.036 <b>Pounds M</b> <b>P</b> (Ib) 0.051 0.055 0.051 0.046 0.042 0.037 0.026 0.026 0.026 0.036 0.036 0.036	27 27 lature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 29 29 29 29
Mature I	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 12 12 and Breed	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls	11.9 11.9 <b>is Peak</b> <b>TDN</b> ( <b>Ib</b> ) 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 <b>– 2,000</b>	1.79 1.79 <b>Milk) -</b> <b>CP</b> ( <b>Ib</b> ) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b>	0.060 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033 0.057 0.057 0.057 0.057 I I I I I I I I I I I I I I I I I I I	0.026 0.036 0 unds M P (lb) 0.051 0.055 0.051 0.046 0.042 0.037 0.026 0.026 0.026 0.026 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.051 0.055 0.051 0.055 0.051 0.055 0.051 0.055 0.055 0.051 0.055 0.026 0.026 0.037 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.036 0.026 0.036 0.026 0.036 0.026 0.036 0.026 0.036 0.026 0.03	27 27 ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 28 29 29 29 29 a,b
Mature   Yearling Body	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 12 12 and Breed	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls	11.9 11.9 15.9 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 - 2,000	1.79 1.79 <b>Milk)</b> - <b>CP</b> ( <b>Ib</b> ) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b>	0.060 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033 0.057 0.057 0.057 IS Matur	0.026 0.036 <b>P</b> (Ib) 0.051 0.055 0.051 0.046 0.046 0.026 0.026 0.026 0.026 0.026 0.036 0.036 <b>e</b> Weight	27 27 ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 29 29 29 29 a,b
Mature I Yearling Body Wt.	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 11 12 and Breed ADG	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls	11.9 11.9 <b>is Peak</b> <b>TDN</b> ( <b>Ib</b> ) 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 <b>– 2,000</b>	1.79 1.79 <b>Milk)</b> - <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b>	0.060 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033 0.057 0.057 0.057 IS Matur Ca	0.026 0.036 0 unds M P (lb) 0.051 0.055 0.051 0.046 0.042 0.037 0.026 0.026 0.026 0.026 0.036 0.036 0.036 0.036 0.036 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.036 0.036 0.037 0.026 0.036 0.036 0.036 0.036 0.037 0.026 0.036 0.036 0.036 0.036 0.037 0.026 0.03	27 27 ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 29 29 29 29 a,b
Mature I Yearling Body Wt. (Ib)	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 12 and Breed (lb)	21.4 (20 Pound DMI (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls DMI (lb/day)	11.9 11.9 15.9 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 - 2,000 TDN (Ib)	1.79 1.79 1.79 <b>Milk)</b> - <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b> <b>CP</b> (lb)	0.060 0.060 - 1,100 F Ca (Ib) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033 0.033 0.057 0.057 0.057 IS Matur Ca (Ib)	0.026 0.036 0 unds M P (lb) 0.051 0.055 0.051 0.046 0.042 0.037 0.026 0.026 0.026 0.026 0.036 0.036 0.036 0.036 0.036 0.036 0.042 0.037 0.026 0.036 0.036 0.042 0.037 0.026 0.036 0.036 0.042 0.037 0.026 0.036 0.036 0.042 0.037 0.026 0.036 0.026 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.036 0.036 0.037 0.026 0.036 0.036 0.036 0.037 0.026 0.036 0.036 0.036 0.036 0.036 0.037 0.026 0.03	27 27 ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 29 29 29 29 a,b
Yearling Body Wt. (Ib) 1,000	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 11 12 and Breed ADG (lb) 1.73	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls DMI (lb/day) 25.2	11.9 11.9 15.9 15.0 15.0 15.0 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 - 2,000 TDN (Ib) 15.1	1.79 1.79 1.79 <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b> <b>CP</b> (lb) 1.89	0.060 0.060 - 1,100 F Ca (Ib) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033 0.033 0.057 0.057 0.057 Is Matur Ca (Ib) 0.062	0.026 0.036 0.036 0.040 P (lb) 0.055 0.051 0.055 0.051 0.046 0.026 0.026 0.026 0.026 0.026 0.036 0.036 0.036 0.036 0.036 0.036 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.036 0.037 0.026 0.036 0.036 0.036 0.037 0.026 0.036 0.036 0.036 0.037 0.026 0.036	27 27 ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 29 29 29 29 a,b
Yearling Body Wt. (Ib) 1,000	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 12 and Breed ADG (lb) 1.73 2.75	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls DMI (lb/day) 25.2 24.6	11.9 11.9 15.9 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 - 2,000 TDN (Ib) 15.1 17.2	1.79 1.79 1.79 <b>Milk)</b> - <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b> <b>CP</b> (lb) 1.89 2.23	0.060 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033 0.057 0.057 0.057 0.057 Is Matur Ca (lb) 0.062 0.078	0.026 0.036 0.036 0.040 P (lb) 0.051 0.055 0.051 0.046 0.026 0.026 0.026 0.026 0.026 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.042 0.037 0.026 0.036 0.042 0.037 0.026 0.036 0.042 0.037 0.026 0.036 0.046 0.042 0.037 0.026 0.036 0.026 0.037 0.026 0.036 0.036 0.046 0.042 0.037 0.026 0.036 0.026 0.036 0.026 0.036 0.026 0.036 0.026 0.036 0.026 0.036 0.043 0.036 0.043 0.043 0.045	27 27 ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 29 29 29 29 a,b
Mature I Yearling Body Wt. (Ib) 1,000 1,200	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 12 and Breed ADG (Ib) 1.73 2.75 1.73 2.75	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls (lb/day) 25.2 24.6 28.9 25.2 24.6 28.9	11.9 11.9 15.9 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 - 2,000 TDN (Ib) 15.1 17.2 17.3 16.1 17.2 17.3	1.79 1.79 1.79 <b>Milk)</b> - <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b> <b>CP</b> (lb) 1.89 2.23 1.96 2.23	0.060 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.063 0.033 0.033 0.033 0.033 0.033 0.057 0.057 0.057 0.057 Is Matur Ca (lb) 0.062 0.078 0.063 0.063	0.026 0.036 0.036 0.046 0.055 0.051 0.055 0.051 0.046 0.026 0.026 0.026 0.026 0.026 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.037 0.026 0.036 0.042 0.037 0.026 0.036 0.042 0.037 0.026 0.036 0.042 0.037 0.026 0.036 0.026 0.036 0.046 0.042 0.037 0.026 0.036 0.036 0.026 0.036 0.036 0.046 0.026 0.036 0.026 0.036 0.026 0.033 0.033 0.033 0.033 0.035 0.035 0.035 0.036 0.	27 27 ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 29 29 29 29 a,b
Yearling Body Wt. (Ib) 1,200	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 12 and Breed ADG (Ib) 1.73 2.75 1.73 2.75 1.73	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls (lb/day) 25.2 24.6 28.9 28.2 20.7	11.9 11.9 15 Peak TDN (Ib) 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 - 2,000 TDN (Ib) 15.1 17.2 17.3 19.7 15.4	1.79 1.79 1.79 <b>Milk)</b> - <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b> <b>CP</b> (lb) 1.89 2.23 1.96 2.23 1.96 2.23 1.96	0.060 0.060 - 1,100 F Ca (Ib) 0.075 0.084 0.077 0.068 0.063 0.033 0.033 0.033 0.033 0.033 0.057 0.057 0.057 0.057 Is Matur Ca (Ib) 0.062 0.078 0.063 0.063 0.075	0.026 0.036 0.036 0.040 P (lb) 0.051 0.055 0.051 0.046 0.026 0.026 0.026 0.026 0.026 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.042 0.037 0.026 0.026 0.036 0.042 0.037 0.026 0.036 0.026 0.037 0.026 0.036 0.026 0.037 0.026 0.036 0.036 0.026 0.037 0.026 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.026 0.036	27 27 ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 29 29 29 29 a,b
Mature I           Yearling           Body           Wt.           (Ib)           1,000           1,200           1,400	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 12 and Breed ADG (Ib) 1.73 2.75 1.73 2.75 1.73 2.75 0.49 1 73	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls (lb/day) 25.2 24.6 28.9 28.2 30.7 32.4	11.9 11.9 15 Peak TDN (Ib) 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 <b>- 2,000</b> <b>TDN</b> (Ib) 15.1 17.2 17.3 19.7 15.4 19.4	1.79 1.79 1.79 <b>Milk)</b> - <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b> <b>CP</b> (lb) 1.89 2.23 1.96 2.22 1.96 2.22 1.96	0.060 0.060 - 1,100 F Ca (Ib) 0.075 0.084 0.077 0.068 0.063 0.033 0.033 0.033 0.033 0.033 0.057 0.057 0.057 Is Matur Ca (Ib) 0.062 0.078 0.063 0.063 0.075 0.051	0.026 0.036 0.036 0.036 0.035 0.051 0.055 0.051 0.046 0.026 0.026 0.026 0.026 0.026 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.036 0.043 0.039 0.044 0.036 0.041 0.036 0.041 0.055 0.051 0.046 0.026 0.036 0.026 0.036 0.042 0.036 0.036 0.036 0.036 0.036 0.036 0.043 0.044 0.039 0.044 0.039 0.044 0.039 0.044 0.036 0.044 0.039 0.044 0.036 0.044 0.039 0.044 0.036 0.044 0.039 0.044 0.036 0.044 0.039 0.044 0.036 0.045 0.	27 27 ature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 27 28 29 29 29 29 a,b
Mature I Yearling Body Wt. (Ib) 1,200 1,200 1,400	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 12 and Breed 10 11 12 12 and Breed 10 11 12 12 and Breed 10 11 12 3 4 5 6 7 8 9 10 10 11 12 3 4 5 6 7 8 9 10 10 11 12 3 4 4 5 6 7 8 9 10 10 10 10 10 10 2 3 4 4 5 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls (lb/day) 25.2 24.6 28.9 28.2 30.7 32.4 33.9	11.9 11.9 15 Peak TDN (Ib) 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 <b>- 2,000</b> <b>TDN</b> (Ib) 15.1 17.2 17.3 19.7 15.4 19.7 15.4 19.7	1.79 1.79 1.79 <b>Milk)</b> - <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b> <b>CP</b> (lb) 1.89 2.23 1.96 2.22 1.74 2.03 1.88	0.060 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033 0.033 0.033 0.057 0.057 Is Matur Ca (lb) 0.062 0.075 0.062 0.075 0.063 0.075 0.061 0.062 0.075 0.051 0.065 0.065 0.055 0.055 0.055 0.055 0.055 0.057 0.0	0.036 ounds M P (lb) 0.051 0.055 0.051 0.042 0.037 0.026 0.026 0.026 0.026 0.026 0.036 0.044 0.036 0.044 0.036 0.044 0.036 0.044 0.036 0.044 0.036 0.044 0.036 0.044 0.036 0.044 0.044 0.036 0.044	27 27 lature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 28 29 29 29 29 a,b
Mature I           Yearling           Body           Wt.           (Ib)           1,000           1,200           1,400           1,600	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 10 11 12 and Breed (lb) 1.73 2.75 1.73 2.75 1.73 2.75 1.73 2.75 0.49 1.73 0.49 1.73	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls (lb/day) 25.2 24.6 28.9 28.2 30.7 32.4 33.9 35.8	11.9 11.9 15 Peak TDN (Ib) 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 <b>TDN</b> (Ib) 15.1 17.2 17.3 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4	1.79 1.79 1.79 <b>Milk)</b> - <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b> <b>CP</b> (lb) 1.89 2.23 1.96 2.22 1.74 2.03 1.88 2.09	0.060 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033 0.033 0.033 0.057 0.057 Is Matur Ca (lb) 0.062 0.075 0.062 0.075 0.063 0.075 0.061 0.062 0.075 0.062 0.062 0.075 0.064 0.066 0.066	0.036 ounds M P (lb) 0.051 0.055 0.051 0.042 0.037 0.026 0.026 0.026 0.026 0.026 0.036 0.044 0.036 0.044 0.036 0.044 0.036 0.044 0.036 0.044 0.036 0.044 0.036 0.044	27 27 lature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 28 29 29 29 29 a,b
Mature I           Yearling           Body           Wt.           (Ib)           1,000           1,200           1,400           1,600           1,800	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 12 and Breed 10 11 12 12 and Breed 10 11 12 12 and Breed 10 11 12 12 and Breed 10 10 11 12 3 4 5 6 7 8 9 10 11 12 3 4 4 5 6 7 8 9 10 11 12 3 4 4 5 6 7 8 9 10 10 11 12 3 4 4 5 6 7 8 9 10 10 11 12 3 4 4 5 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls (lb/day) 25.2 24.6 28.9 28.2 30.7 32.4 33.9 35.8 37.0	11.9 11.9 15 Peak TDN (Ib) 15.0 15.9 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 <b>TDN</b> (Ib) 15.1 17.2 17.3 19.7 15.4 19.7 15.5 18.5	1.79 1.79 1.79 <b>Milk)</b> - <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 <b>Pound</b> <b>CP</b> (lb) 1.89 2.23 1.96 2.22 1.74 2.03 1.89 2.09 2.02	0.060 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033 0.033 0.033 0.057 0.057 Is Matur Ca (lb) 0.062 0.075 0.062 0.075 0.061	0.036 ounds M P (lb) 0.051 0.055 0.051 0.042 0.037 0.026 0.026 0.026 0.026 0.026 0.026 0.036 0.0442 0.036 0.0442 0.036 0.036 0.036 0.036 0.036 0.0442 0.036 0.0442 0.036 0.0444 0.036 0.0444 0.036 0.0444 0.036 0.0444 0.036 0.0444 0.036 0.0444 0.036 0.0444 0.036 0.0444 0.036 0.0444 0.0444 0.0444 0.0444	27 27 lature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 28 29 29 29 29 a,b
Mature I           Yearling           Body           Wt.           (Ib)           1,200           1,400           1,600           1,800	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 10 11 12 and Breed 10 11 12 12 and Breed 10 11 12 12 and Breed 10 11 12 12 and Breed 10 11 12 3 4 5 6 7 8 9 10 10 11 12 3 4 5 6 7 8 9 10 10 11 12 3 4 4 5 6 7 8 9 10 10 11 12 3 4 4 5 6 7 8 9 10 10 11 12 3 4 4 5 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls (lb/day) 25.2 24.6 28.9 28.2 30.7 32.4 33.9 35.8 37.0 39.1	11.9 11.9 15 Peak TDN (Ib) 15.0 15.9 15.0 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 <b>TDN</b> (Ib) 15.1 17.2 17.3 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.5 13.5 10.0 15.1 17.2 17.3 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.5 13.5 10.0 15.1 17.2 17.3 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.4 19.7 15.5 18.5 19.7 15.4 19.7 15.4 19.7 15.5 18.5 18.5 19.5 18.5 19.5	1.79 1.79 1.79 <b>Milk)</b> - <b>CP</b> (lb) 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.40 1.45 1.56 1.73 2.00 <b>Pound</b> <b>CP</b> (lb) 1.89 2.23 1.96 2.22 1.74 2.03 1.89 2.02 2.16	0.060 0.060 - 1,100 F Ca (lb) 0.075 0.084 0.077 0.068 0.060 0.053 0.033 0.033 0.033 0.033 0.033 0.033 0.057 0.057 Is Matur Ca (lb) 0.062 0.075 0.061 0.066 0.066 0.066 0.066 0.065 0.051 0.055 0.051 0.064 0.056 0.066 0.066 0.066 0.065 0.055 0.055 0.057 0.062 0.075 0.051 0.066 0.066 0.066 0.057 0.056 0.064 0.066 0.0661 0.067 0.067 0.057 0.	0.036 ounds M P (lb) 0.051 0.055 0.051 0.046 0.026 0.026 0.026 0.026 0.026 0.026 0.026 0.036 0.044 0.036 0.044 0.045	27 27 lature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 28 29 29 29 29 a,b
Mature I           Yearling           Body           Wt.           (Ib)           1,000           1,200           1,400           1,600           1,800           2,000	11 Beef Cows Since Calving 1 2 3 4 5 6 7 8 9 10 11 11 2 9 10 11 11 12 and Breed (Ib) 1.73 2.75 1.73 2.75 1.73 2.75 1.73 2.75 0.49 1.73 0.49 1.73 0.49 1.73 0.49	21.4 (20 Pound (lb/day) 25.4 26.4 26.9 26.0 25.0 24.2 20.9 21.2 21.8 22.6 22.5 23.0 ling Bulls (lb/day) 25.2 24.6 28.9 28.2 30.7 32.4 33.9 35.8 37.0 39.1 37.2	11.9 11.9 15.9 15.0 15.0 15.0 15.6 14.7 13.8 13.0 9.8 10.0 10.4 11.1 11.7 12.9 <b>- 2,000</b> <b>TDN</b> <b>(Ib)</b> 15.1 17.2 17.3 19.7 15.4 19.4 17.0 21.5 18.5 23.5 17.1	1.79 1.79 1.79 1.79 1.79 2.62 2.88 2.73 2.45 2.17 1.95 1.36 1.40 1.45 1.56 1.73 2.00 Pound CP (lb) 1.89 2.23 1.96 2.22 1.74 2.03 1.88 2.02 2.16 2.02 2.16 2.07	0.060 0.060 0.060 0.075 0.084 0.075 0.084 0.077 0.068 0.063 0.033 0.033 0.033 0.033 0.033 0.033 0.057 0.057 <b>Is Matur</b> <b>Ca</b> ( <b>Ib</b> ) 0.062 0.062 0.075 0.051 0.064 0.066 0.066 0.066 0.066 0.066 0.066 0.066	0.036 ounds M P (lb) 0.051 0.055 0.051 0.046 0.042 0.037 0.026 0.026 0.026 0.026 0.026 0.026 0.036 0.044 0.036 0.044 0.045	27 27 lature Weight Vitamin A (1,000s IU) 45 47 48 46 44 43 27 27 28 29 29 29 29 a,b

Protection         Protection         TDN         Cal. Phy Page         Phy Page           In Alfalfa hay, early bloom         90         18.0         60         1.41         0.2           2. Affalfa hay, mid bloom         90         17.0         58         1.41         0.2           3. Bermudagrass hay         87         12.3         59         0.51         0.2           4. Bromegrass hay         88         11.0         56         0.63         0.12         0.0           5. Conrobs         90         4.2         42         0.15         0.0         3.3           9. Grass-clover hay, 65%-35%         88         12.2         55         0.83         0.2           10. Ladino clover hay         89         12.8         65         0.27         0.3           11. Lespedeza hay, mid bloom         93         14.5         50         1.04         0.2           12. Oath ay         91         9.5         53         0.32         0.2         0.2           13. Orchardgrass hay, early bloom         84         5.2         54         0.52         0.17         0.0           14. Red clover hay         88         5.2         54         0.52         0.2		TABLE 6-3. Composition of Feeds           (All values except dry matter are shown on a dry-matter basis.)						
Dry Forages           1.         Alfalfa hay, early bloom         90         18.0         60         1.41         0.2           2.         Alfalfa hay, mid bloom         90         17.0         58         1.41         0.2           3.         Bermudagrass hay         87         12.3         59         0.51         0.2           4.         Bromegrass hay         88         11.0         56         0.63         0.1           5.         Corncobs         90         2.8         50         0.12         0.0           6.         Corn stover         85         6.6         50         0.57         0.1           7.         Cottonseed hulls         90         4.2         42         0.15         0.0           9.         Grass-clover hay, 65%-35%         88         12.2         55         0.83         0.2           10.         Ladino clover hay         89         15.0         55         1.38         0.2           11.         Lespedeza hay, mid bloom         89         12.8         65         0.27         0.3           12.         Oat hay         91         4.5         40         0.17         0.0           12.		Feedstuffs	Dry Matter	Crude Protein %	TDN	Cal- cium %	Phos- phorus %	
1.       Alfalfa hay, early bloom       90       18.0       60       1.41       0.2         2.       Alfalfa hay, mid bloom       90       17.0       58       1.41       0.2         3.       Bermudagrass hay       87       12.3       59       0.51       0.2         4.       Bromegrass hay       88       11.0       56       0.63       0.1         5.       Corncobs       90       2.8       50       0.12       0.0         6.       Corn stover       85       6.6       50       0.57       0.1         7.       Cottonseed hulls       90       4.2       42       0.15       0.0         9.       Grass-clover hay, 65%-35%       88       12.2       55       0.83       0.2       0.2         10.       Ladino clover hay       89       12.8       65       0.27       0.3         12.       Oat hay       91       9.5       53       0.32       0.2         12.       Oat hay       91       9.5       53       0.25       0.1         13.       Orchardgrass hay, early bloom       89       12.8       65       0.22       0.2         15.       Rice s		Dry	Forages	/0	/0	/0	/0	
2.       Alfalfa hay, mid bloom       90       17.0       58       1.41       0.2         3.       Bernudagrass hay       87       12.3       59       0.51       0.2         4.       Bromegrass hay       88       11.0       56       0.63       0.1         5.       Corncobs       90       2.8       50       0.12       0.0         6.       Corn stover       85       6.6       50       0.57       0.1         7.       Cottonseed hulls       90       4.2       42       0.15       0.0         9.       Grass-clover hay, 65%-35%       88       12.2       55       0.83       0.2         10.       Ladino clover hay       81       91       9.5       53       0.32       0.2         12.       Oathay       91       9.5       53       0.32       0.2       0.2         13.       Orchardgrass hay, early bloom       89       15.8       0.55       1.34       0.21       0.0         14.       Red clover hay       91       1.5       40       0.52       0.1         15.       Rice straw       91       3.5       40       0.2       0.2	1.	Alfalfa hay, early bloom	90	18.0	60	1.41	0.22	
3.       Bermudagrass hay       87       12.3       59       0.51       0.2         4.       Bromegrass hay       88       11.0       56       0.63       0.11         5.       Corncobs       90       2.8       50       0.12       0.02         6.       Corn stover       85       6.6       50       0.57       0.1         7.       Cottonseed hulls       90       4.2       42       0.15       0.0         8.       Fescue hay       87       11.2       54       0.50       0.3         9.       Grass-clover hay, 65%-35%       88       12.2       60       1.45       0.52         10.       Ladino clover hay       89       12.8       65       0.27       0.3         11.       Lespedez hay, mid bloom       91       4.3       41       0.21       0.0         12.       Oathary       89       15.0       55       1.38       0.2       0.1         15.       Rice straw       91       4.3       41       0.21       0.0         15.       Sorghum stover       88       5.2       1.0       1.0       0.2         16.       Sorghum stover <t< td=""><td>2.</td><td>Alfalfa hay, mid bloom</td><td>90</td><td>17.0</td><td>58</td><td>1.41</td><td>0.24</td></t<>	2.	Alfalfa hay, mid bloom	90	17.0	58	1.41	0.24	
4.         Bromegrass hay         88         11.0         56         0.63         0.11           5.         Corncobs         90         2.8         50         0.12         0.0           6.         Corn stover         85         6.6         50         0.57         0.1           7.         Cottonseed hulls         90         4.2         42         0.15         0.0           8.         Fescue hay         87         11.2         54         0.50         0.3           9.         Grass-clover hay, 65%-35%         88         12.2         55         0.83         0.2           10.         Ladino clover hay         89         15.0         55         1.38         0.2           12.         Oat hay         19         9.5         1.38         0.2         0.2           13.         Orchardgrass hay, early bloom         89         15.0         55         1.38         0.2           15.         Rice straw         91         4.3         41         0.21         0.0           16.         Sorghum stover         88         5.2         5.4         0.52         0.2           17.         Soybean hay, mid bloom         35         <	3.	Bermudagrass hay	87	12.3	59	0.51	0.27	
5.         Corncobs         90         2.8         50         0.12         0.0           6.         Corn stover         85         6.6         50         0.57         0.11           7.         Cottonseed hulls         90         4.2         42         0.15         0.02           8.         Fescue hay         87         11.2         54         0.50         0.33           9.         Grass-clover hay, 65%-35%         88         12.2         50         1.04         0.2           10.         Ladino clover hay         89         22.4         60         1.45         0.3           11.         Lespedeza hay, mid bloom         93         14.5         50         0.14         0.2           12.         Oat hay         89         15.0         55         1.38         0.2           13.         Orchardgrass hay, early bloom         94         17.8         53         1.2         0.4           14.         Red clover hay         91         3.5         40         0.7         0.2           15.         Rice straw         91         3.5         40         0.7         0.2           15.         Nice straw         91	4.	Bromegrass hay	88	11.0	56	0.63	0.10	
6.         Corn stover         85         6.6         50         0.57         0.17           7.         Cottonseed hulls         90         4.2         42         0.15         0.0           8.         Fescue hay         87         11.2         54         0.50         0.2           9.         Grass-clover hay, 65%-35%         88         12.2         55         0.33         0.2           10.         Ladino clover hay         89         12.8         65         0.27         0.2           13.         Orchardgrass hay, early bloom         89         15.0         55         1.38         0.22           14.         Red clover hay         89         15.0         55         1.38         0.21         0.01           15.         Rice straw         91         3.5         40         0.52         0.1           17.         Soybean hay, mid bloom         94         17.8         53         1.26         0.2           18.         Meat straw         91         3.5         10         0.2         0.2           20.         Corn, well eared         35         17.0         60         1.00         0.2           21.         Gras-legume </td <td>5.</td> <td>Corncobs</td> <td>90</td> <td>2.8</td> <td>50</td> <td>0.12</td> <td>0.04</td>	5.	Corncobs	90	2.8	50	0.12	0.04	
7.       Cottonseed hulls       90       4.2       4.2       0.15       0.0         8.       Fescue hay       87       11.2       54       0.50       0.3         9.       Grass-clover hay, 65%-35%       88       12.2       55       0.83       0.2         10.       Ladino clover hay       89       22.4       60       1.45       0.3         11.       Lespedeza hay, mid bloom       93       14.5       50       1.04       0.2         12.       Oat hay       91       9.5       53       0.32       0.2         13.       Orchardgrass hay, early bloom       89       15.0       55       1.38       0.2         15.       Rice straw       91       4.3       41       0.21       0.0         16.       Sorghum stover       88       5.2       54       0.52       0.2         17.       Soybean hay, mid bloom       35       17.0       60       1.00       0.2         20.       Corn, well eared       35       8.7       72       0.25       0.2         21.       Grass-legume       28       12.1       57       0.86       0.2         22.       Sorghum-sudan	6.	Corn stover	85	6.6	50	0.57	0.10	
8.       Fescue hay       87       11.2       54       0.50       0.3         9.       Grass-clover hay, 65%-35%       88       12.2       55       0.83       0.2         10.       Ladino clover hay       89       22.4       60       1.45       0.3         11.       Lespedeza hay, mid bloom       93       14.5       50       0.32       0.22         12.       Oat hay       91       9.5       53       0.32       0.22         13.       Orchardgrass hay, early bloom       89       15.0       55       1.38       0.22         15.       Rice straw       91       4.3       41       0.21       0.01         16.       Sorghum stover       88       5.2       54       0.52       0.1         17.       Soybean hay, mid bloom       94       17.8       53       1.26       0.2         18.       Wheat straw       91       3.5       40       0.17       0.02         20.       Corn, well eared       35       8.7       72       0.25       0.22         21.       Grass-legume       28       12.1       57       0.86       0.2         22.       Sorghum	7.	Cottonseed hulls	90	4.2	42	0.15	0.09	
9.         Grass-clover hay, 65%-35%         88         12.2         55         0.83         0.2           10.         Ladino clover hay         89         22.4         60         1.45         0.5           11.         Lespedeza hay, mid bloom         93         14.5         50         1.04         0.2           12.         Oat hay         91         9.5         53         0.32         0.2           13.         Orchardgrass hay, early bloom         89         15.0         55         1.38         0.2           14.         Red clover hay         89         15.0         55         1.38         0.2           15.         Rice straw         91         4.3         41         0.21         0.0           16.         Sorghum stover         88         5.2         54         0.52         0.1           17.         Soybean hay, mid bloom         35         17.0         60         1.00         0.2           20.         Corn, well eared         35         8.7         72         0.25         0.2           21.         Grass-legume         28         12.1         57         0.86         0.2           22.         Sorghum-sudangrass	8.	Fescue hay	87	11.2	54	0.50	0.31	
10.       Ladino clover hay       89       22.4       60       1.45       0.3         11.       Lespedeza hay, mid bloom       93       14.5       50       1.04       0.2         12.       Oat hay       91       9.5       53       0.32       0.2         13.       Orchardgrass hay, early bloom       89       115.0       55       1.38       0.2         14.       Red clover hay       89       115.0       55       1.38       0.2         15.       Rice straw       91       4.3       41       0.21       0.0         16.       Sorghum stover       88       5.2       54       0.52       0.1         17.       Soybean hay, mid bloom       94       17.8       53       1.26       0.2         18.       Wheat straw       91       3.5       17.0       60       1.00       0.2         20.       Corn, well eared       35       8.7       72       0.25       0.2         21.       Grass-legume       28       12.1       57       0.86       0.2         22.       Sorghum-sudangrass       30       9.0       62       0.49       0.2         22. <t< td=""><td>9.</td><td>Grass-clover hay, 65%-35%</td><td>88</td><td>12.2</td><td>55</td><td>0.83</td><td>0.27</td></t<>	9.	Grass-clover hay, 65%-35%	88	12.2	55	0.83	0.27	
11.       Lespedeza hay, mid bloom       93       14.5       50       1.04       0.2         12.       Oat hay       91       9.5       53       0.32       0.2         13.       Orchardgrass hay, early bloom       89       12.8       65       0.27       0.3         14.       Red clover hay       89       15.0       55       1.38       0.2         15.       Rice straw       91       4.3       41       0.21       0.0         16.       Sorghum stover       88       5.2       54       0.52       0.1         17.       Soybean hay, mid bloom       94       17.8       53       1.26       0.2         18.       Wheat straw       91       3.5       40       0.17       0.0         20.       Corn, well eared       35       8.7       72       0.25       0.2         21.       Grass-legume       28       12.1       57       0.86       0.2         22.       Sorghum-sudangrass       30       9.0       62       0.49       0.2         23.       Sorghum-sudangrass       30       9.0       29.2       66       0.29       0.7         24.	10.	Ladino clover hay	89	22.4	60	1.45	0.33	
12. Oat hay       91       9.5       53       0.32       0.2         13. Orchardgrass hay, early bloom       89       12.8       65       0.27       0.3         14. Red clover hay       89       15.0       55       1.38       0.2         15. Rice straw       91       4.3       41       0.21       0.0         16. Sorghum stover       88       5.2       54       0.52       0.17       0.0         17. Soybean hay, mid bloom       94       17.8       53       1.26       0.2         18. Wheat straw       91       3.5       40       0.17       0.0         20. Corn, well eared       35       8.7       72       0.25       0.2         21. Grass-legume       28       12.1       57       0.86       0.2         22. Sorghum       33       10.1       56       1.03       0.4         23. Sorghum-sudangrass       30       9.0       62       0.49       0.7         24. Barley       88       13.2       84       0.05       0.5         25. Brewers grains, dehydrated       90       29.2       66       0.29       0.7         26. Corn gluten feed       90       23.8	11.	Lespedeza hay, mid bloom	93	14.5	50	1.04	0.23	
13.       Orchardgrass hay, early bloom       89       12.8       65       0.27       0.3         14.       Red clover hay       89       15.0       55       1.38       0.2         15.       Rice straw       91       4.3       41       0.21       0.0         16.       Sorghum stover       88       5.2       54       0.52       0.1         17.       Soybean hay, mid bloom       94       17.8       53       1.26       0.2         18.       Wheat straw       91       3.5       40       0.17       0.0         20.       Corn, well eared       35       8.7       72       0.25       0.2         21.       Grass-legume       28       12.1       57       0.86       0.2         22.       Sorghum-sudangrass       30       9.0       62       0.49       0.2         23.       Sorghum-sudangrass       30       9.0       0.3       0.3       2.         24.       Barley       88       13.2       84       0.05       0.5         25.       Brewers grains, wet       21       26.0       70       0.29       0.7         27.       Cord, eht, grade 2	12.	Oat hay	91	9.5	53	0.32	0.25	
14.       Red clover hay       89       15.0       55       1.38       0.2         15.       Rice straw       91       4.3       41       0.21       0.0         16.       Sorghum stover       88       5.2       54       0.52       0.1         17.       Soybean hay, mid bloom       94       17.8       53       1.26       0.2         18.       Wheat straw       91       3.5       40       0.17       0.0         18.       Wheat straw       91       3.5       40       0.17       0.0         20.       Corn, well eared       35       8.7       72       0.25       0.2         21.       Grass-legume       28       12.1       57       0.86       0.2         22.       Sorghum-sudangrass       30       9.0       62       0.49       0.2         22.       Sorghum-sudangrass       30       9.0       63       0.02       0.7         23.       Sorghum-sudangrass       90       29.2       66       0.29       0.7         24.       Barley       88       13.2       84       0.05       0.2         25.       Brewers grains, dehydrated       90<	13.	Orchardgrass hay, early bloom	89	12.8	65	0.27	0.34	
15.       Hicc straw       91       4.3       41       0.21       0.0         16.       Sorghum stover       88       5.2       54       0.52       0.1         17.       Soybean hay, mid bloom       94       17.8       53       1.26       0.2         18.       Wheat straw       91       3.5       40       0.17       0.0         18.       Wheat straw       91       3.5       40       0.17       0.0         20.       Corn, well eared       35       8.7       72       0.25       0.2         21.       Grass-legume       28       12.1       57       0.86       0.2         22.       Sorghum-sudangrass       30       9.0       62       0.49       0.2         23.       Sorghum-sudangrass       30       9.0       62       0.49       0.2         24.       Barley       88       13.2       84       0.05       0.3         25.       Brewers grains, dehydrated       90       23.8       80       0.07       0.2         26.       Corn gluten feed       90       23.8       80       0.07       0.2         27.       Corn, dent, grade 2	14.	Red clover hay	89	15.0	55	1.38	0.24	
16.       Sorghum stover       88       5.2       54       0.52       0.1         17.       Soybean hay, mid bloom       94       17.8       53       1.26       0.2         18.       Wheat straw       91       3.5       40       0.17       0.0         Silages         Silages         20.       Corn, well eared       35       8.7       72       0.25       0.2         21.       Grass-legume       28       12.1       57       0.86       0.2         22.       Sorghum-sudangrass       30       9.0       62       0.49       0.2         23.       Sorghum-sudangrass       30       9.0       62       0.49       0.2         24.       Barley       88       13.2       84       0.05       0.3         25.       Brewers grains, dehydrated       90       29.2       66       0.29       0.7         27.       Corn dent, grade 2       90       9.8       90       0.03       0.3         28.       Brewers grains, wet       21       25.8       130       0.92       0.6         30.       Octonseed meal, 41%       90       46.1       7	15.	Rice straw	91	4.3	41	0.21	0.08	
17.       Soybean hay, mid bloom       94       17.8       53       1.26       0.2         18.       Wheat straw       91       3.5       40       0.17       0.0         Silages         19.       Alfalfa, wilted, early bloom       35       17.0       60       1.00       0.2         20.       Corn, well eared       35       8.7       72       0.25       0.2         21.       Grass-legume       28       12.1       57       0.86       0.2         22.       Sorghum-sudangrass       30       9.0       62       0.49       0.2         23.       Sorghum-sudangrass       30       9.0       62       0.49       0.3         24.       Barley       88       13.2       84       0.05       0.3         25.       Brewers grains, dehydrated       90       29.2       66       0.29       0.7         27.       Corn, dent, grade 2       90       9.8       90       0.03       0.3         28.       Corn gluten feed       90       24.8       95       0.17       0.6         30.       Octtonseed, whole       89       24.4       95       0.17       0.6 <td>16.</td> <td>Sorghum stover</td> <td>88</td> <td>5.2</td> <td>54</td> <td>0.52</td> <td>0.13</td>	16.	Sorghum stover	88	5.2	54	0.52	0.13	
Number Straw       91       3.5       40       0.17       0.0         Silages         19.       Alfalfa, wilted, early bloom       35       17.0       60       1.00       0.2         20.       Corn, well eared       35       8.7       72       0.25       0.2         21.       Grass-legume       28       12.1       57       0.86       0.2         22.       Sorghum-sudangrass       30       9.0       62       0.49       0.2         23.       Sorghum-sudangrass       30       9.0       62       0.49       0.3         24.       Barley       88       13.2       84       0.05       0.3         25.       Brewers grains, dehydrated       90       29.2       66       0.29       0.7         27.       Corn, dent, grade 2       90       9.8       90       0.03       0.3         28.       Corr gluten feed       90       23.8       80       0.07       0.5         30.       Cottonseed meal, 41%       90       46.1       75       0.20       1.1         31.       Cottonseed, whole       89       24.4       95       0.17       0.6	17.	Soybean hay, mid bloom	94	17.8	53	1.26	0.27	
In Shages           19.         Alfalfa, wilted, early bloom         35         17.0         60         1.00         0.2           20.         Corn, well eared         35         8.7         72         0.25         0.2           21.         Grass-legume         28         12.1         57         0.86         0.2           22.         Sorghum         33         10.1         56         1.03         0.4           22.         Sorghum-sudangrass         30         9.0         62         0.49         0.2           23.         Sorghum-sudangrass         30         9.0         62         0.49         0.2           24.         Barley         88         13.2         84         0.05         0.3           25.         Brewers grains, wet         21         26.0         70         0.29         0.7           27.         Corn, dent, grade 2         90         9.8         90         0.03         0.3           28.         Corn gluten feed         90         23.8         80         0.77         0.6           30.         Cottonseed meal, 41%         90         46.1         75         0.20         1.1           <	18.	vvneat straw	91	3.5	40	0.17	0.05	
13. Antalia, while, early bloch       35       17.0       80       1.00       0.2         20. Corn, well eared       35       8.7       72       0.25       0.2         21. Grass-legume       28       12.1       57       0.86       0.2         22. Sorghum       33       10.1       56       1.03       0.4         23. Sorghum-sudangrass       30       9.0       62       0.49       0.2         24. Barley       88       13.2       84       0.05       0.3         25. Brewers grains, dehydrated       90       29.2       66       0.29       0.7         26. Brewers grains, wet       21       26.0       70       0.29       0.7         27. Corn, dent, grade 2       90       9.8       90       0.03       0.3         28. Corn gluten feed       90       23.8       80       0.07       0.5         29. Cows milk       12       25.8       130       0.92       0.6         30. Cottonseed meal, 41%       90       46.1       75       0.20       1.1         31. Cottonseed, whole       89       24.4       95       0.17       0.6         32. Dehydrated alfalfa, 17%       92       18	10	Alfolfo wilted control bloom	liages	17.0	60	1.00	0.00	
20. Corn, weineared       35       8.7       72       0.23       0.23         21. Grass-legume       28       12.1       57       0.86       0.2         22. Sorghum       33       10.1       56       1.03       0.4         23. Sorghum-sudangrass       30       9.0       62       0.49       0.2         Concentrates         Concentrates         Concentrates         24. Barley       88       13.2       84       0.05       0.3         25. Brewers grains, dehydrated       90       29.2       66       0.29       0.7         26. Brewers grains, wet       21       26.0       70       0.29       0.7         27. Corn, dent, grade 2       90       9.8       90       0.03       0.3         28. Corn gluten feed       90       23.8       80       0.07       0.5         29. Cows milk       12       25.8       130       0.92       0.6         30. Cottonseed meal, 41%       90       46.1       75       0.20       1.1         31. Cottonseed, whole       89       24.4       95       0.17       0.6         32. Dehydrated alfalfa, 17%       92 </td <td>19.</td> <td>Allalla, willed, early bloom</td> <td>35</td> <td>17.0</td> <td>70</td> <td>0.05</td> <td>0.22</td>	19.	Allalla, willed, early bloom	35	17.0	70	0.05	0.22	
21. Grass-legurite       28       12.1       57       0.66       0.2         22. Sorghum       33       10.1       56       1.03       0.4         23. Sorghum-sudangrass       30       9.0       62       0.49       0.2         Concentrates         24. Barley       88       13.2       84       0.05       0.3         25. Brewers grains, dehydrated       90       29.2       66       0.29       0.7         26. Brewers grains, wet       21       26.0       70       0.29       0.7         27. Corn, dent, grade 2       90       9.8       90       0.03       0.3         28. Corn gluten feed       90       23.8       80       0.07       0.2         29. Cows milk       12       25.8       130       0.92       0.6         30. Cottonseed meal, 41%       90       46.1       75       0.20       1.1         31. Cottonseed, whole       89       24.4       95       0.17       0.6         32. Dehydrated alfalfa, 17%       92       18.9       61       1.51       0.2         33. Ground ear corn       87       9.0       82       0.07       0.3         34. Mol	20.	Corn, well eared	35	8./	72	0.25	0.22	
22.         Sorghum         33         10.1         56         1.03         0.4           23.         Sorghum-sudangrass         30         9.0         62         0.49         0.2           Concentrates           24.         Barley         88         13.2         84         0.05         0.3           25.         Brewers grains, dehydrated         90         29.2         66         0.29         0.7           26.         Brewers grains, wet         21         26.0         70         0.29         0.7           27.         Corn, dent, grade 2         90         9.8         90         0.03         0.3           28.         Corn gluten feed         90         23.8         80         0.07         0.9           29.         Cows milk         12         25.8         130         0.92         0.6           30.         Cottonseed meal, 41%         90         46.1         75         0.20         1.1           31.         Cottonseed whole         89         24.4         95         0.17         0.6           32.         Dehydrated alfalfa, 17%         92         18.9         61         1.51         0.2	21.	Grass-legume	28	12.1	57	1.00	0.29	
Sol galutinesidarity ass         Sol gal	22.	Sorghum audangraaa	33	10.1	50	0.40	0.40	
Concentrates           24.         Barley         88         13.2         84         0.05         0.3           25.         Brewers grains, dehydrated         90         29.2         66         0.29         0.7           26.         Brewers grains, wet         21         26.0         70         0.29         0.7           27.         Corn, dent, grade 2         90         9.8         90         0.03         0.3           28.         Corn gluten feed         90         23.8         80         0.07         0.5           29.         Cows milk         12         25.8         130         0.92         0.6           30.         Cottonseed meal, 41%         90         46.1         75         0.20         1.1           31.         Cottonseed, whole         89         24.4         95         0.17         0.6           32.         Dehydrated alfalfa, 17%         92         18.9         61         1.51         0.2           33.         Ground ear corn         87         9.0         82         0.07         0.2           34.         Molasses, sugarcane (black strap)         94         10.3         70         1.10         0.1	20.	Sorghum-sudarigrass	Sontrato	9.0	02	0.49	0.20	
21. Darky       20.       10.1       0.1       0.10       0.10         25. Brewers grains, dehydrated       90       29.2       66       0.29       0.7         26. Brewers grains, wet       21       26.0       70       0.29       0.7         27. Corn, dent, grade 2       90       9.8       90       0.03       0.3         28. Corn gluten feed       90       23.8       80       0.07       0.5         29. Cows milk       12       25.8       130       0.92       0.6         30. Cottonseed meal, 41%       90       46.1       75       0.20       1.1         31. Cottonseed, whole       89       24.4       95       0.17       0.6         32. Dehydrated alfalfa, 17%       92       18.9       61       1.51       0.2         33. Ground ear corn       87       9.0       82       0.07       0.2         34. Molasses, sugarcane, (black strap)       94       10.3       70       1.10       0.1         35. Molasses, sugarcane (black strap)       74       5.8       72       1.00       0.1         36. Oats       89       13.6       77       0.01       0.4         37. Rice, rough <td< td=""><td>24</td><td>Barley</td><td>88</td><td>13.2</td><td>84</td><td>0.05</td><td>0.35</td></td<>	24	Barley	88	13.2	84	0.05	0.35	
22.       Dronolo graino, derivando de 100       20.2       00       0.2.5       0.7         22.       Brewers grains, wet       21       26.0       70       0.29       0.7         27.       Corn, dent, grade 2       90       9.8       90       0.03       0.2         28.       Corn gluten feed       90       23.8       80       0.07       0.5         29.       Cows milk       12       25.8       130       0.92       0.6         30.       Cottonseed meal, 41%       90       46.1       75       0.20       1.1         31.       Cottonseed, whole       89       24.4       95       0.17       0.6         32.       Dehydrated alfalfa, 17%       92       18.9       61       1.51       0.2         33.       Ground ear corn       87       9.0       82       0.07       0.2         34.       Molasses, sugarcane, (black strap)       94       10.3       70       1.10       0.1         35.       Molasses, sugarcane (black strap)       74       5.8       72       1.00       0.4         36.       Oats       89       13.6       77       0.01       0.4         37. </td <td>25</td> <td>Brewers grains dehydrated</td> <td>90</td> <td>29.2</td> <td>66</td> <td>0.00</td> <td>0.00</td>	25	Brewers grains dehydrated	90	29.2	66	0.00	0.00	
27.       Corn, dent, grade 2       90       9.8       90       0.03       0.5         28.       Corn gluten feed       90       23.8       80       0.07       0.5         29.       Cows milk       12       25.8       130       0.92       0.6         30.       Cottonseed meal, 41%       90       46.1       75       0.20       1.1         31.       Cottonseed, whole       89       24.4       95       0.17       0.6         32.       Dehydrated alfalfa, 17%       92       18.9       61       1.51       0.2         33.       Ground ear corn       87       9.0       82       0.07       0.2         34.       Molasses, sugarcane, dehydrated       94       10.3       70       1.10       0.1         35.       Molasses, sugarcane (black strap)       74       5.8       72       1.00       0.1         36.       Oats       89       13.6       77       0.01       0.4         37.       Rice, rough       89       8.9       79       0.7       0.5         38.       Sorghum grain       90       12.2       77       0.53       0.1         40.       S	26	Brewers grains wet	21	26.0	70	0.29	0.70	
International and the set of the	27.	Corn. dent. grade 2	90	9.8	90	0.03	0.32	
29.       Cows milk       12       25.8       130       0.92       0.6         30.       Cottonseed meal, 41%       90       46.1       75       0.20       1.1         31.       Cottonseed, whole       89       24.4       95       0.17       0.6         32.       Dehydrated alfalfa, 17%       92       18.9       61       1.51       0.2         33.       Ground ear corn       87       9.0       82       0.07       0.2         34.       Molasses, sugarcane, dehydrated       94       10.3       70       1.10       0.1         35.       Molasses, sugarcane (black strap)       74       5.8       72       1.00       0.1         36.       Oats       89       13.6       77       0.01       0.4         37.       Rice, rough       89       8.9       79       0.07       0.3         38.       Sorghum grain       90       11.6       82       0.04       0.3         39.       Soybean hulls       90       12.2       77       0.53       0.1         40.       Soybeans, whole       90       40.3       94       0.27       0.6         42.       Wheat<	28.	Corn gluten feed	90	23.8	80	0.07	0.95	
30.       Cottonseed meal, 41%       90       46.1       75       0.20       1.1         31.       Cottonseed, whole       89       24.4       95       0.17       0.6         32.       Dehydrated alfalfa, 17%       92       18.9       61       1.51       0.2         33.       Ground ear corn       87       9.0       82       0.07       0.2         34.       Molasses, sugarcane, dehydrated       94       10.3       70       1.10       0.1         35.       Molasses, sugarcane (black strap)       74       5.8       72       1.00       0.1         36.       Oats       89       13.6       77       0.01       0.4         37.       Rice, rough       89       8.9       79       0.07       0.3         38.       Sorghum grain       90       11.6       82       0.04       0.3         39.       Soybean hulls       90       12.2       77       0.53       0.1         40.       Soybeans, whole       90       40.3       94       0.40       0.7         41.       Soybeans, whole       90       14.2       88       0.05       0.4         43.       W	29.	Cows milk	12	25.8	130	0.92	0.67	
31.       Cottonseed, whole       89       24.4       95       0.17       0.6         32.       Dehydrated alfalfa, 17%       92       18.9       61       1.51       0.2         33.       Ground ear corn       87       9.0       82       0.07       0.2         34.       Molasses, sugarcane, dehydrated       94       10.3       70       1.10       0.1         35.       Molasses, sugarcane (black strap)       74       5.8       72       1.00       0.1         36.       Oats       89       13.6       77       0.01       0.4         37.       Rice, rough       89       8.9       79       0.07       0.3         38.       Sorghum grain       90       11.6       82       0.04       0.3         39.       Soybean hulls       90       12.2       77       0.53       0.1         40.       Soybeans, whole       90       40.3       94       0.27       0.6         42.       Wheat       90       14.2       88       0.05       0.4         43.       Wheat middlings       89       18.4       83       0.15       1.0	30.	Cottonseed meal. 41%	90	46.1	75	0.20	1.16	
32.       Dehydrated alfalfa, 17%       92       18.9       61       1.51       0.2         33.       Ground ear corn       87       9.0       82       0.07       0.2         34.       Molasses, sugarcane, dehydrated       94       10.3       70       1.10       0.1         35.       Molasses, sugarcane (black strap)       74       5.8       72       1.00       0.1         36.       Oats       89       13.6       77       0.01       0.4         37.       Rice, rough       89       8.9       79       0.07       0.3         38.       Sorghum grain       90       11.6       82       0.04       0.3         39.       Soybean hulls       90       12.2       77       0.53       0.1         40.       Soybeans, whole       90       40.3       94       0.40       0.7         41.       Soybeans, whole       90       14.2       88       0.05       0.4         43.       Wheat       middlings       89       18.4       83       0.15       1.0         44.       Dicalcium phosphate       97        32.0       18         46.       Limeston	31.	Cottonseed, whole	89	24.4	95	0.17	0.62	
33.       Ground ear corn       87       9.0       82       0.07       0.2         34.       Molasses, sugarcane, dehydrated       94       10.3       70       1.10       0.1         35.       Molasses, sugarcane (black strap)       74       5.8       72       1.00       0.1         36.       Molasses, sugarcane (black strap)       74       5.8       72       1.00       0.1         36.       Oats       89       13.6       77       0.01       0.4         37.       Rice, rough       89       8.9       79       0.07       0.3         38.       Sorghum grain       90       11.6       82       0.04       0.3         39.       Soybean hulls       90       12.2       77       0.53       0.1         40.       Soybeans, whole       90       40.3       94       0.40       0.7         41.       Soybeans, whole       90       14.2       88       0.05       0.4         43.       Wheat       90       14.2       88       0.15       1.0         Mineral Sources         44         Dicalcium phosphate       97        32.0 <td>32.</td> <td>Dehydrated alfalfa, 17%</td> <td>92</td> <td>18.9</td> <td>61</td> <td>1.51</td> <td>0.25</td>	32.	Dehydrated alfalfa, 17%	92	18.9	61	1.51	0.25	
34.       Molasses, sugarcane, dehydrated       94       10.3       70       1.10       0.1         35.       Molasses, sugarcane (black strap)       74       5.8       72       1.00       0.1         36.       Oats       89       13.6       77       0.01       0.4         37.       Rice, rough       89       8.9       79       0.07       0.3         38.       Sorghum grain       90       11.6       82       0.04       0.3         39.       Soybean hulls       90       12.2       77       0.53       0.1         40.       Soybean meal, 44%       89       49.9       84       0.40       0.7         41.       Soybeans, whole       90       14.2       88       0.55       0.4         43.       Wheat       90       14.2       88       0.15       1.0         Mineral Sources         44         Dicalcium phosphate       97        22.0       19         45.       Deflorinated phosphate       100        34.0          47.       Magnesium oxide (55% magnesium)       98        3.1      <	33.	Ground ear corn	87	9.0	82	0.07	0.27	
35.         Molasses, sugarcane (black strap)         74         5.8         72         1.00         0.1           36.         Oats         89         13.6         77         0.01         0.4           37.         Rice, rough         89         8.9         79         0.07         0.3           38.         Sorghum grain         90         11.6         82         0.04         0.3           39.         Soybean hulls         90         12.2         77         0.53         0.1           40.         Soybean meal, 44%         89         49.9         84         0.40         0.7           41.         Soybeans, whole         90         14.2         88         0.05         0.4           43.         Wheat         90         14.2         88         0.15         1.0           Mineral Sources           44.           Dicalcium phosphate         97          22.0         19           45.         Deflorinated phosphate         100          34.0            47.         Magnesium oxide (55% magnesium)         98          3.1            48.	34.	Molasses, sugarcane, dehydrated	94	10.3	70	1.10	0.15	
36.       Oats       89       13.6       77       0.01       0.4         37.       Rice, rough       89       8.9       79       0.07       0.3         38.       Sorghum grain       90       11.6       82       0.04       0.3         39.       Soybean hulls       90       12.2       77       0.53       0.1         40.       Soybean meal, 44%       89       49.9       84       0.40       0.7         41.       Soybeans, whole       90       40.3       94       0.27       0.6         42.       Wheat       90       14.2       88       0.05       0.4         43.       Wheat middlings       89       18.4       83       0.15       1.0         Mineral Sources         44.       Dicalcium phosphate       97        22.0       19         45.       Deflorinated phosphate       100        32.0       18         46.       Limestone, calcium carbonate       100        3.1          47.       Magnesium oxide (55% magnesium)       98         3.1          48.       Sodium tr	35.	Molasses, sugarcane (black strap)	74	5.8	72	1.00	0.10	
37.       Rice, rough       89       8.9       79       0.07       0.3         38.       Sorghum grain       90       11.6       82       0.04       0.3         39.       Soybean hulls       90       12.2       77       0.53       0.1         40.       Soybean meal, 44%       89       49.9       84       0.40       0.7         41.       Soybeans, whole       90       40.3       94       0.27       0.6         42.       Wheat       90       14.2       88       0.05       0.4         43.       Wheat middlings       89       18.4       83       0.15       1.0         Mineral Sources         44.       Dicalcium phosphate       97        22.0       19         45.       Deflorinated phosphate       100        32.0       18         46.       Limestone, calcium carbonate       100        31.1          47.       Magnesium oxide (55% magnesium)       98        3.1          48.       Sodium tripolyphosphate       96        27.0       12 <tr td="">       49.       Steamed bone meal</tr>	36.	Oats	89	13.6	77	0.01	0.41	
38. Sorghum grain       90       11.6       82       0.04       0.3         39. Soybean hulls       90       12.2       77       0.53       0.1         40. Soybean meal, 44%       89       49.9       84       0.40       0.7         41. Soybeans, whole       90       40.3       94       0.27       0.6         42. Wheat       90       14.2       88       0.05       0.4         43. Wheat middlings       89       18.4       83       0.15       1.0         Mineral Sources         44. Dicalcium phosphate       97        32.0       18         46. Limestone, calcium carbonate       100        34.0          47. Magnesium oxide (55% magnesium)       98        3.1          48. Sodium tripolyphosphate       96        27.0       12         49. Steamed bone meal       97       13.2        27.0       12	37.	Rice, rough	89	8.9	79	0.07	0.32	
39.       Soybean hulls       90       12.2       77       0.53       0.1         40.       Soybean meal, 44%       89       49.9       84       0.40       0.7         41.       Soybeans, whole       90       40.3       94       0.27       0.6         42.       Wheat       90       14.2       88       0.05       0.4         43.       Wheat middlings       89       18.4       83       0.15       1.0         Mineral Sources         Mineral Sources         44.       Dicalcium phosphate       97        22.0       19         45.       Deflorinated phosphate       100        32.0       18         46.       Limestone, calcium carbonate       100        34.0          47.       Magnesium oxide (55% magnesium)       98         3.1          48.       Sodium tripolyphosphate       96        27.0       12         49.       Steamed bone meal       97       13.2        27.0       12	38.	Sorghum grain	90	11.6	82	0.04	0.34	
40.       Soybean meal, 44%       89       49.9       84       0.40       0.7         41.       Soybeans, whole       90       40.3       94       0.27       0.6         42.       Wheat       90       14.2       88       0.05       0.4         43.       Wheat middlings       89       18.4       83       0.15       1.0         Mineral Sources         44.       Dicalcium phosphate       97         22.0       19         45.       Deflorinated phosphate       100         32.0       18         46.       Limestone, calcium carbonate       100         34.0          47.       Magnesium oxide (55% magnesium)       98         3.1          48.       Sodium tripolyphosphate       96         25       27.0       12         49.       Steamed bone meal       97       13.2        27.0       12	39.	Soybean hulls	90	12.2	77	0.53	0.18	
41.       Soybeans, whole       90       40.3       94       0.27       0.6         42.       Wheat       90       14.2       88       0.05       0.4         43.       Wheat middlings       89       18.4       83       0.15       1.0         Mineral Sources         44.       Dicalcium phosphate       97        22.0       19         45.       Deflorinated phosphate       100        32.0       18         46.       Limestone, calcium carbonate       100        34.0          47.       Magnesium oxide (55% magnesium)       98        3.1          48.       Sodium tripolyphosphate       96        27.0       12         49.       Steamed bone meal       97       13.2        27.0       12	40.	Soybean meal, 44%	89	49.9	84	0.40	0.71	
42.         Wheat         90         14.2         88         0.05         0.4           43.         Wheat middlings         89         18.4         83         0.15         1.0           Mineral Sources           44.         Dicalcium phosphate         97          22.0         19           45.         Deflorinated phosphate         100          32.0         18           46.         Limestone, calcium carbonate         100          34.0            47.         Magnesium oxide (55% magnesium)         98          3.1            48.         Sodium tripolyphosphate         96          27.0         12           49.         Steamed bone meal         97         13.2          27.0         12	41.	Soybeans, whole	90	40.3	94	0.27	0.65	
43.         Wheat middlings         89         18.4         83         0.15         1.0           Mineral Sources           44.         Dicalcium phosphate         97          22.0         19           45.         Deflorinated phosphate         100          32.0         18           46.         Limestone, calcium carbonate         100          34.0            47.         Magnesium oxide (55% magnesium)         98          3.1            48.         Sodium tripolyphosphate         96          27.0         12           49.         Steamed bone meal         97         13.2          27.0         12	42.	Wheat	90	14.2	88	0.05	0.44	
Mineral Sources           44.         Dicalcium phosphate         97          22.0         19           45.         Deflorinated phosphate         100          32.0         18           46.         Limestone, calcium carbonate         100          34.0            47.         Magnesium oxide (55% magnesium)         98          3.1            48.         Sodium tripolyphosphate         96           25           49.         Steamed bone meal         97         13.2          27.0         12	43.	Wheat middlings	89	18.4	83	0.15	1.00	
44.       Dicalcium phosphate       97        22.0       19         45.       Deflorinated phosphate       100        32.0       18         46.       Limestone, calcium carbonate       100        34.0          47.       Magnesium oxide (55% magnesium)       98        3.1          48.       Sodium tripolyphosphate       96        25.0       12         49.       Steamed bone meal       97       13.2        27.0       12		Mineral Sources						
45.       Deflorinated phosphate       100        32.0       18         46.       Limestone, calcium carbonate       100        34.0          47.       Magnesium oxide (55% magnesium)       98        3.1          48.       Sodium tripolyphosphate       96        25       25         49.       Steamed bone meal       97       13.2        27.0       12	44.	Dicalcium phosphate	97			22.0	19.3	
46.         Limestone, calcium carbonate         100          34.0            47.         Magnesium oxide (55% magnesium)         98           3.1            48.         Sodium tripolyphosphate         96           25           49.         Steamed bone meal         97         13.2          27.0         12	45.	Deflorinated phosphate	100			32.0	18.0	
Magnesium oxide (55% magnesium)         98          3.1            48.         Sodium tripolyphosphate         96          25         25           49.         Steamed bone meal         97         13.2          27.0         12	46.	Limestone, calcium carbonate	100			34.0		
48.         Sodium tripolyphosphate         96           25           49.         Steamed bone meal         97         13.2          27.0         12	47.	Magnesium oxide (55% magnesium)	98			3.1		
49. Steamed bone meal   97   13.2     27.0   12	48.	Sodium tripolyphosphate	96				25.0	
· · · · · · · · · · · · · · · · · · ·	49.	Steamed bone meal	97	13.2		27.0	12.7	

<sup>a</sup>For bulls that are at least 12 months of age and weigh more than 50 percent of their mature weight. <sup>b</sup>Vitamin A requirements per pound of dry feed are 1,000 IUs for growing bulls and 1,770 IUs for breeding bulls.

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**Period Two** – For the next 123 days, the cow is in the early stages of pregnancy and is also nursing a calf. Milk production declines during this period, and the calf increases its grass consumption to meet its own needs. Drought and the accompanying shortage of total feed supply are often the main concern during this time. Short grass growth usually results in decreased milk production and lighter calf weights but should not affect the reproductive capability of the cow during this period as long as she stays healthy. Supplemental feeding of the cow for greater milk production is rarely economical. Creep feeding the calf 30 to 45 days prior to weaning will usually improve weight gain and reduce weaning stress; however, the economic return to creep feeding is affected by the quality and quantity of pasture forage as well as the cost of the creep feed supplement.

**Period Three** – This mid-gestation period of around 110 days is the time when the cow's needs are at her lowest level. If the cow is on stored forage, the worst hay in the barn should usually be fed.

**Period Four** – This 50-day period is the second most important in the cow's year. This is in midwinter for most Arkansas cattle operations. During this time, 70 to 80 percent of fetal growth occurs. At the time of calving, the cow should be in a moderate body condition (body condition score of 5 on a 1 to 9 scale) and gaining weight to withstand the stress of calving, beginning of lactation and rebreeding on time.

## **Level of Production**

Heavy weaning weights are usually accompanied by high milk production in the cow herd and often by larger cows. Both milk production and cow size influence nutrient requirements. Failure to supply the adequate nutritional level reduces the milk supply and prevents the calf from growing to its full genetic potential and, more importantly, affects the cow's ability to cycle and rebreed on time. Table 6-4 shows differences in nutritional requirements that may exist.

TABLE 6-4. Nutritional Requirements as Influenced by Weight and Milk Production					
	Peak Milk Production				
Mature	10 lb	s/day	20 lbs/day		
Mature Cow Weight	900 lbs	1,200 lbs	900 lbs	1,200 lbs	
	Requirements daily, lbs				
Dry matter	20.6	24.9	23.5	27.8	
Crude protein	1.92	2.19	2.70	2.97	
TDN	11.7	13.9	14.5	16.7	
Calcium	0.053	0.062	0.077	0.086	
Phosphorus	0.035	0.042	0.051	0.057	

## Age

The nutrient requirements of females vary greatly between the young, growing heifer or first-calf cow and the mature cow. Replacement heifers and first-calf cows must perform all the reproductive functions of the mature cow plus maintain an adequate level of growth. Requirements for mature cows are primarily related to size and the stage of production. Separating replacement heifers from mature cows is necessary to provide the most adequate and economical feeding system.

## Weight

Nutrient requirements vary with cow size. Large cows have greater nutrient requirements than small cows and must be fed accordingly if adequate reproduction levels are to be maintained.

## Condition

Condition, or the amount of flesh on the cow, is important. In a spring calving program, cows that are in above-average condition in the fall can be fed less and lose weight over the winter but still maintain an adequate reproduction level. (See information on body condition scores in the section on "Beef Cattle Management Practices.") Thin cows will have to be fed more and gain weight prior to calving or reproductive efficiency will be adversely affected. Table 6-5 shows reproductive performance of cows in different body conditions at calving.

TABLE 6-5. Reproduction of Cows in Different Body Conditions				
Body Condition at	Percent Pregnant after Breeding for			
Calving	20 Days	80 Days		
Thin	33	76		
Moderate	47	93		
Fleshy 58 96				
Source: Dr. J. N. Wiltbank, Texas A & M University				

## Weather Stress

The cow's energy requirements will increase 20 percent or more in extremely cold or cold and wet weather.

Some of the guesswork while feeding during severe winter months is eliminated by using a cattle feed index as a guideline to adjust the quantity of feed fed. The National Weather Service issues the index so that cattle producers can schedule extra feed deliveries or determine labor requirements.

Cattle producers can associate the feed index with the percent of additional feed energy an exposed animal needs during the next 24 hours to maintain body heat without weight loss. If, for example, an animal normally consumes 20 pounds of hay, but the index is 30, then 6 more pounds of hay would be required for that day ( $20 \times 30\% = 6$ ). The new ration would be 26 pounds. If the animal would not consume this amount, then supplemental grain or higher quality forage should be fed so that daily feed energy (TDN) could be increased by 30 percent.

## **Special Nutrient Deficiencies**

Some specific nutrients, primarily minerals, may be deficient on a farm depending on the forage production system and the intensity of grazing. Copper, selenium, zinc and magnesium all have been shown to be deficient under some Arkansas conditions.

## **Feeds Produced in Arkansas**

Arkansas has an abundance of forage and a surplus of protein supplements, but grain production is limited. Most cropland suitable for grain production is used for soybeans, cotton or rice.

#### **Energy Feeds**

**Milo** and some **other grain sorghums** are produced in relatively large quantities in some sections of Arkansas. Much of the sorghum grain produced is used in poultry and swine rations. One limitation to using grain sorghum as a cattle feed is grain sorghum should be processed for feeding.

Wheat is relatively abundant in some areas, but most wheat grain is sold for milling rather than use in cattle rations. As a feed grain, wheat is often more costly than other grains. Similar to milo, wheat grain requires processing for cattle to digest the wheat at its fullest potential. Wheat that is ground into a flour should not be used without seeking advice from a nutritionist.

**Corn** acreage in Arkansas increased with demand for fuel ethanol. Despite Arkansas not being a major corn production state, its abundant supply makes it a competitive energy supplement for beef cattle. The energy value of many feedstuffs is tied to corn price. Unlike the smaller grains, corn can be fed whole to beef cattle.

**Rice bran** often serve as both energy and protein sources. Rice bran (unless de-oiled) is quite high in fat content which limits its inclusion rate in some rations.

**Soybean hulls (seed coats)** often serve as a good source of both energy and protein, especially for cattle on forage diets. They are usually used in rations for cows and growing animals. Although the hulls are relatively high in fiber content, the fiber is highly digestible.

#### **Protein Feeds**

**Soybean meal** and **cottonseed meal** are produced in large quantities in Arkansas. They are commonly

used to supplement low-protein feeds. Both are very satisfactory feeds used for beef cattle.

**Brewers grain** is moderately high in both protein and energy. It is available to some producers in Arkansas from sources within the state or in close proximity to the state. It is usually fed as a highmoisture feed; therefore, spoilage and the additional expense of hauling water are two issues to consider with brewers grains.

**Corn gluten feed** and **corn distillers grains** are by-products of corn syrup and corn ethanol production. These feeds are routinely used as both protein and energy supplements in Arkansas.

#### Roughages

**Cottonseed hulls**, a by-product of the cotton industry, are used as a roughage substitute for beef cattle. Hulls are easily mixed with other ingredients and are eaten quite readily by cattle. The nutritional value of cottonseed hulls is low; therefore, cottonseed hulls do not work well as a sole feed source for beef cattle.

Bermudagrass, fescue, johnsongrass, orchardgrass and other grass hays furnish a large portion of the harvested forages fed to beef cattle in Arkansas. They tend to be moderately low in protein (8 to 10 percent) unless heavily fertilized and cut in early stages of growth. Energy supplementation is often necessary for lactating cows, and protein supplementation is sometimes needed when these forages are fed to lactating cows.

Legume hays, such as clover, alfalfa or lespedeza, are good sources of protein, calcium and energy. No protein supplement is needed for beef cattle if at least half of their feed supply is good-quality legume hay. Nutritional requirements of the animal and stage of harvest for the legume hay will dictate how much supplemental energy is needed.

Haylages and silages. Both corn silage and grass hay silage continue to grow in popularity. Corn silage harvested at the right stage of maturity will only require protein supplementation. Many cattle producers inaccurately assume grass silage is of greater quality than grass hay. Grass silage can often be of lesser quality if not ensiled properly. One common mistake made on ranches using round bale silage for the first time is not feeding enough. Round bale silage is 50 to 60 percent moisture, whereas hay is 10 percent moisture. Cow intake is generally attributed to the amount of diet dry matter; therefore cows need to be fed a lot more silage round bales compared to dry hay bales for them to be able to meet their daily dry matter fill.