

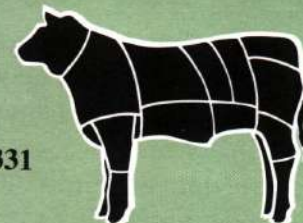
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A Review of Applied Beef Cattle Nutrition
MSU Extension
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A Review of Applied Beef Cattle Nutrition

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INTRODUCTION

The goal of this bulletin is to review the basics of everyday beef cattle nutrition. It will be of more value to the beginner than to the experienced cattle producer. Nevertheless, experienced producers may find it useful as a checklist for their nutritional programs. Readers will learn general information, nutrient requirements and the three principal phases of beef production. The points covered in this paper are most applicable to the Midwest.

GENERAL CONSIDERATIONS

Phases of Beef Production

1. Cow-calf phase: wean 500-lb calf at age 7 to 8 months.
2. Stocker (backgrounding) phase: grow calf for 4 to 6 months.
3. Finishing or feedlot phase: market after 3 to 6 months.

4. Total time, birth to market: 14 to 20 months.

Feed Costs

1. Cow-calf:
 - a. Total annual costs = \$350/cow-calf unit
 - b. 50 percent of total cost is feed
 - c. $\$350 \times .5 = \175 annual feed costs to produce a 500 lb calf
2. Post-weaning:
 - a. Total cost of gain: $\$55/\text{cwt gain} \times \$6.00 \text{ cwt gain} = \330
 - b. 65 to 70 percent of total cost of gain is feed (67 percent avg.)
 - (1) 50 to 60 percent is the energy component (55 percent avg.)
 - (2) 10 to 15 percent is the supplement (12 percent avg.)
 - c. $67 \text{ percent} \times \$55/\text{cwt gain} = \$37/\text{cwt gain}$ is feed costs

- d. Total feed costs: $\$37/\text{cwt gain} \times 6.00 \text{ cwt gain} = \222

3. Cost to produce an 1100-lb steer:
 - a. $\$350 + \$330 = \$680$ total costs
 - b. $\$175 + \$222 = \$397$ feed costs
 - c. $\$397 \div \$680 = 58 \text{ percent}$ or about 60 percent of total costs of producing a finished steer goes for feed.

Effect of Sex on Performance

1. Steers gain 8 to 15 percent faster than heifers of the same size.
2. Steers consume 5 to 10 percent more feed than heifers.
3. Heifers require 2 to 10 percent more feed per lb of gain than steers.
4. In order to be equal in profit potential, feeder heifers need to be purchased about 10-15 percent lower than feeder steers.

5. Part of the reason for poorer feed conversion of heifers is that many cattle feeders tend to over-fatten them compared to steers.
6. Bulls gain faster and more efficiently than steers, but there is only a very limited market for young bull beef in the U.S.

Effect of Age on Performance

1. Yearlings gain 10 to 20 percent faster than calves, depending upon relative weight and condition.
2. Yearlings consume 10 to 40 percent more feed than calves, depending upon relative weight and condition.
3. Yearlings require 10 to 20 percent more feed per lb of gain than calves.

Effect of Breed on Performance

1. Holsteins require about 10 percent more feed per lb gain than beef breeds. Average daily gain (ADG) is about the same.
2. Though larger exotic breeds gain faster than British breeds, they must be carried to heavier weights to grade Choice. When fed to Choice endpoint, they require slightly more feed per lb of gain than British breeds. When fed to the same weight, they require less feed per lb of gain.

Effect of Body Condition on Performance

1. When placed on comparable diets, thin cattle gain faster and more efficiently than fleshier cattle.
2. This is called “compensatory” gain.
3. For this reason, cattle feeders try to avoid buying “fleshy” feeder cattle unless they are priced somewhat lower than thin cattle.

Moisture

1. In formulating beef cattle diets, we **do not** balance on an air-dry basis.
2. Balance on a dry-matter (DM) basis.
3. Rules of thumb:
 - a. Most dry feeds = 85-90 percent DM
 - b. Most silages = 30-40 percent DM

Voluntary Feed (DM) Intake

1. Importance of voluntary DM intake:
 - a. Must know intake in order to balance diets.
 - b. To achieve maximum gain, we must maximize energy intake, which is related to DM intake.
2. Expressed in two ways:
 - a. Pounds per day
 - b. As a percent of body weight daily
3. Range in DM intake when fed *ad libitum*:

- a. Extreme range is 1.5 to 3.0 percent of body weight (BW).
 - b. Feedlot cattle start at about 2.8 percent of BW and decline to about 1.9 percent at the end of finishing period. Average from weaning to market is about 2.3 percent.
 - c. Mature cattle eat less as a percent of BW than younger cattle.
4. Many factors affect DM intake:
 - a. Weight, age, condition, sex and type:
 - (1) As an animal becomes heavier, older and fatter, absolute pounds of intake per day increase at a slower rate. Remember, intake as percent of BW declines from start to finish.
 - (2) At the same weight, thin cattle consume more feed than fleshier cattle.
 - (3) At the same weight, yearlings consume about 10 percent more feed than calves.
 - (4) At the same weight, steers consume 5 to 10 percent more feed than heifers.
 - (5) At the same weight, large-framed calves consume about 10 percent more feed than medium-framed calves.

- b. Intake of dry roughages is greater than fermented roughages, possibly because of two factors: moisture content and high organic acid content of silages.
- c. Caloric density of diet:
- (1) As digestibility of diet increases from 40 percent to about 66 percent, voluntary intake increases. This would be equivalent to going from 100 percent wheat straw up to a 40 percent corn, 60 percent hay diet.
 - (2) As digestibility goes over 66 percent, voluntary intake tends to decline. However, total energy intake continues to increase because caloric density is increasing faster than intake is declining.
 - (3) Total energy intake eventually plateaus and then declines when percent grain goes over 90 to 95 percent of the diet, because intake goes down faster than caloric density increases. This is why we seldom recommend finishing diets with less than 5 percent roughage (except for lightweight Holsteins).

- d. Physical preparation of the diet:
- (1) Hay : Intake of pelleted hay is greater than chopped hay and chopped hay is greater than long hay.
 - (2) Corn (in high-concentrate diets): Intake of whole shelled corn is greater than rolled corn and rolled corn is greater than finely ground corn.
- e. Level and stage of production:
- (1) Growthier cattle consume more than slower gaining cattle.
 - (2) Lactating cows consume more than dry cows.
- f. Climate:
- (1) Cold temperatures increase intake.
 - (2) Extreme heat stress reduces intake.
- g. Palatability of ingredients used to formulate the diet.

to nearly 2 gal per 100 lb body weight during the hottest weather.

3. Lactating beef cows require nearly twice as much water as dry cows.
4. Size of water system required to provide full-day consumption in a 4-hour period in hot weather:
 - a. Number of animals per cup or bowl:
 - (1) Drylot: 16 to 25, depending on age and size.
 - (2) Pasture: 10 to 18, depending on age and size.
 - b. Number of animals per foot of accessible tank perimeter:
 - (1) Drylot: 9 to 16, depending on age and size.
 - (2) Pasture: 7 to 10, depending on age and size.
5. Clean, fresh water is fundamental to achieving maximum performance. Keep waterers free of manure, dirt and other debris that can inhibit water consumption.

NUTRIENT REQUIREMENTS

Water

1. Daily water intake may vary from 3 to 30 gal per day, depending on age, body size, stage of production and the environment.
2. As a rule of thumb, consumption will range from about 1 gal per 100 lb body weight during cold weather,

Energy

1. For cow herd diets, use the TDN (total digestible nutrients) system.
 - a. Most cow diets are close to maintenance.
 - b. TDN does a reasonably good job on these kinds of diets.

2. For feedlot diets, use the net energy system:
 - a. TDN system over-evaluates roughages when the goal is near-maximum performance.
 - b. NE_m requirement = total amount of feed energy that will result in no loss or gain in body energy (body weight, from a practical point of view).
 - c. NE_g requirement = the amount of feed energy required for the deposition of protein and fat in the body.
 - d. The NE system is more precise for growing and finishing cattle.
 - e. When young cattle are gaining at maximum rate, about 50 percent of feed energy goes for maintenance and 50 percent for gain.
 - f. NE is used more efficiently for maintenance than for gain.
 - g. Each feedstuff is given a value for NE_m and NE_g . Relative to their NE_m , grains have a much higher NE_g value than roughages.
3. In feedlot cattle, feed a very energy-dense diet and try to maximize feed intake at the same time.
 - a. This leaves more NE for gain after maintenance needs have been met.
 - b. Feed conversion improves because a higher proportion of the energy is being used for gain and a lower proportion for maintenance.
4. The NE system in growing-finishing cattle diets:
 - a. Is used to predict the gain that can be generated by a given diet.
 - b. Helps to determine how long the cattle will have to be on feed before going to market, if we know ADG.
5. Example of using the NE system to predict ADG and days on feed.
 - a. Purchase 250 kg (550 lb) large-frame steer calf and feed to slaughter weight of 550 kg (1212 lb).
 - b. Median weight = 400 kg (880 lb)
 - (1) NE_m required = 6.89 Mcal/day (from NRC)
 - (2) Expected DM intake = 2.2% of BW = 8.8 kg (19.4 lb)
- c. Feed 50 percent corn, 50 percent corn silage diet (DM basis):
 - (1) $NE_m = (2.24 + 1.63) / 2 = 1.93$ Mcal/kg DM (from NRC)
 - (2) $NE_g = (1.55 + 1.03) / 2 = 1.29$ Mcal/kg DM (from NRC)
- d. DM needed for maintenance = 6.89 Mcal ÷ 1.93 Mcal/kg = 3.55 kg
- e. DM left for gain = 8.8 kg - 3.55 kg = 5.25 kg
- f. Mcal NE left for gain = 5.25 kg X 1.29 Mcal = 6.77 Mcal
- g. Expected ADG: 1.45 kg (3.2 lb) per day (from NRC)
- h. Days to finish = $(1212 - 575) ÷ 3.2 = 637 ÷ 3.2 = 199$ days

Protein

1. Beef cattle diets are balanced on the basis of crude protein (CP) requirements.
2. Normal range in CP requirements:
 - a. Brood cows:
 - (1) 7 to 13 percent of DM
 - (2) 1.2 to 2.9 lb/day, depending upon stage of production
 - b. Growing-finishing cattle:
 - (1) 10.5 to 14 percent of DM
 - (2) 1.4 to 2.8 lb/day (higher lean growth breeds require 15 percent more)

Feedstuff	NE_m	NE_g	Ratio, $NE_g:NE_m$
Shelled corn	2.24	1.55	.70
Mature alfalfa	.97	.42	.43

3. Use of NPN (non-protein nitrogen):
 - a. Feed costs can be reduced by using NPN in beef cattle diets. Gains are *not* improved. In younger cattle, NPN usually reduces average daily gain.
 - b. About 25 percent of Michigan cattle feeders treat corn silage with NPN to increase CP from 8 percent to 13 percent:
 - (1) 7 to 9 lb ammonia per ton, or
 - (2) 10 to 12 lb urea per ton
 - (3) Precise level depends upon DM content of the silage
 - c. Rules of thumb for using urea as a source of CP in dry supplements:
 - (1) Wait until calves are 600 lb or more before going to 100 percent supplemental NPN.
 - (2) Maximum levels to avoid toxicity: 1 percent of diet DM or 1/3 of total protein in diet or 0.25 lb/head/day.
 - (3) Maximum use of urea may reduce palatability of the supplement.

Macro-Minerals

1. Salt (NaCl):

- a. Cattle require 0.25 percent salt in the diet DM.

- b. Is commonly added to feedlot diets at 0.5% of DM.
- c. Can be fed free-choice.
 - (1) Young cattle will consume about 0.1 lb/day.
 - (2) Mature cattle will consume about 0.1 to 0.3 lb/day.
- d. Should be used in trace mineral (TM) form in the Great Lakes region unless you are supplying TMs separately.
- e. Can be tolerated by cattle at excessive levels as long as there is plenty of water available.
- f. Can be used in range country to limit intake of a free-choice supplement for grazing cattle.

2. Calcium and Phosphorus:

- a. Calcium (Ca):
 - (1) Breeding cattle require from 0.2 percent to 0.4 percent of diet DM, depending upon stage of production. Ca deficiency is seldom a problem in cow herds, because forages contain high Ca.
 - (2) Feedlot cattle should receive 0.4-0.5 percent Ca. Corn has little or no Ca, so supplementation is important.

b. Phosphorus (P):

- (1) Breeding cattle require from 0.2 to 0.3 percent of diet DM, depending

upon stage of production. Many cow herds are low or marginal in P. Free-choice mineral mixes for cow herds should contain 8 percent P.

- (2) Feedlot cattle should receive 0.25-0.35 percent P. Is seldom a problem because grains contain relatively high P.

- c. Phosphorus level should never be higher than calcium level, or urinary calculi can result. Ca:P can go as high as 7:1 without harmful effects (though palatability may be reduced).

3. Potassium (K):

- a. Requirement is 0.5 to 0.7 percent of diet DM.
- b. Is rarely deficient, except on high grain diets in the feedlot.
- c. Most forages contain high levels.
- d. Feedlot cattle should receive at least 0.6 percent.
- e. Research has demonstrated a benefit from increasing K level in feedlot receiving diets to 1.2-1.4 percent.
- f. Most common source of supplemental K is potassium chloride.

4. Magnesium (Mg):

- a. Requirement of 0.1 to 0.2 percent of diet DM.

- b. Deficiency is seldom seen in feedlot cattle.
- c. Most common deficiency symptom is grass tetany in beef cows grazing lush grass pastures in early spring.
- d. Risk of grass tetany is magnified on grass pastures heavily fertilized with N.
- e. Grass tetany can generally be prevented by feeding 11 percent Mg in free-choice mineral mix. In some cases, higher levels may be needed.
- f. Most common source of supplemental Mg is magnesium oxide.

5. Sulfur (S):

- a. Requirement is 0.10 to 0.15 percent of diet DM.
- b. Corn and corn silage contain 0.12 to 0.13%; legume and grass hays contain about 0.18%.
- c. Deficiency is seldom a problem.
- d. Is needed by rumen bacteria to synthesize sulfur-containing amino acids.
- e. If NPN is used, it is recommended to add 1 part S for every 10 to 15 parts of N from NPN (18 lb calcium sulfate for every 100 lb of urea).

Vitamins

1. The only vitamins of practical concern in every-

day beef cattle nutrition are A, D and E.

2. Vitamin A

a. Requirements:

- (1) 1000 IU/lb DM for feedlot cattle
- (2) 1270 IU/lb DM for pregnant females
- (3) 1770 IU/lb DM for lactating females and for bulls

b. Most likely to be deficient in high grain diets and/or when diet lacks green forages.

c. Can also be injected:

- (1) 2 million IU for feedlot cattle
- (2) 3 million IU for breeding cattle
- (3) 1 million IU for newborn calves
- (4) Injections last for 90 to 100 days

3. Vitamin D:

- a. Requirement is 125 IU/lb of diet DM.
- b. Cattle exposed to direct sunlight or fed sun-cured forages will receive adequate amounts.
- c. Cattle in total confinement without sun-cured feeds may become deficient.
- d. Is available as injection.

4. Vitamin E:

- a. Requirement is 7 to 27 IU/lb of diet DM.
- b. Is interrelated with selenium in white muscle disease in young calves.

- c. Placental transfer of vitamin E to the fetus is low, so calves are born with low levels. However, vitamin E in milk of cows that received adequate E provides the newborn beef calf with its needs.

COW-CALF NUTRITION

Common Feedstuffs

1. Pasture from May 15 to Oct. 30 (165 days)
2. Harvested forages from Nov. 1 to May 15 (200 days)
 - a. Graze corn stalks (if no snow cover) from Nov. 1 to Dec. 1
 - b. Mixed grass-legume hay, Dec. 1 to May 15 (most common winter feedstuff)
 - c. Corn silage (occasionally)
 - d. Haylage (occasionally)
3. Grains:
 - a. Corn in southern Michigan
 - b. Oats and barley in the upper Great Lakes and extreme Northern Plains
4. Protein supplements (seldom used in cow herds, except for young stock):
 - a. Soybean meal
 - b. Cottonseed meal
 - c. Lick tanks or blocks with molasses and NPN (overconsumption and undue expense can be a problem)
5. Minerals:

- a. Free-choice in weather-protected feeders
 - b. Should contain 8 percent P and 40-60 ppm Se
6. By-product feeds:
- a. Corn stover (stalks)
 - b. Cereal straws
 - c. By-products of fruit and vegetable industries (apple pomace, potatoes, etc.)

Common Nutritional Problems in Cow Herds

1. Thin cows - lack of dietary energy
 - a. Pregnant cows require 9-13 lb TDN (20 to 30 lb hay), depending on body size and stage of gestation
 - b. Lactating cows require 13-18 lb TDN (30 to 40 lb hay), depending on body size and milking ability
 - c. Condition score should be at least moderate (5 on a 9-point scale).
 - d. Is often a result of inadequate feeder space
2. Fat cows - overfeeding
 - a. Except during early lactation and pasture season, beef cows do not need to be full-fed, or they will become too fat
3. Reduced cow fertility:
 - a. Lack of energy (common)
 - b. Low phosphorus (common)
 - c. Low selenium (common)
 - d. Low copper or zinc (not as common)
4. Reduced calf survival:
 - a. Failure to consume colostrum
 - b. Low selenium and/or vitamin E
5. Retained placenta:
 - a. Low selenium (common)
 - b. Other possibilities: low vitamin A, copper, or less commonly, iodine
6. Legume bloat on pasture
7. Grass tetany (magnesium deficiency)

Pasture Considerations

1. Over-stocked pastures:
 - a. Normal carrying capacity in north central states is 1 to 5 acres per cow-calf pair for the pasture season (160 days)
 - b. Approximate forage requirement:
 - (1) Animal unit (AU) = 1000 lbs of ruminant
 - (2) Assume cow-calf pair = 1.5 AU
 - (3) Assume 25 lb DM intake/AU to maintain wt.
 - (4) $1.5 \text{ AU} \times 25 \text{ lb DM} = 37.5 \text{ lb DM/day}$
 - (5) $37.5 \text{ lb DM} \times 160 \text{ days} = 6000 \text{ lb forage DM consumed}$
 - (6) Assume 60 percent utilization of available herbage: $6000 \text{ lb} \div .6 = 10,000 \text{ lb (5T)}$ forage DM needed per cow-calf pair
- (7) Pasture yields normally range from 1 to 5 tons DM per acre
2. Over-production of cool season grasses in May and June, followed by a shortage from July to September:
 - a. Seed legumes in pasture mix
 - b. Use controlled grazing (eight or more paddocks, grazed three to seven days at a time).
 - c. Harvest excess pasture in June as first cutting hay
 - d. Consider a summer annual such as sudangrass (yield is high, but so are the inputs)
3. Alfalfa problems (most common legume):
 - a. Bloat - use poloxalene blocks
 - b. Won't persist under continuous grazing pressure - must have four to six weeks rest between grazings
4. Weed infestations:
 - a. Use controlled grazing
 - b. Chemical weed control may be necessary

Other Nutritional Considerations

1. Energy requirements increase during extremely cold weather:
 - a. Average winter haircoat = 1 percent increase in TDN requirement for each 1° decline in wind chill below 30°F

- b. Heavy winter haircoat = 0.8 percent increase in TDN requirement for each 1° decline in wind chill below 18°F
2. Creep feeding of calves:
- a. Conversion rate is about 1 lb of extra gain for each 9 lb of creep consumed.
 - b. If grain costs 6¢/lb, breakeven sale price for calves is 54¢/lb.
 - c. Creep-fed heifer calves produce less milk when they are kept as replacement females.
 - d. Cattle feeders will discount feeder calves if they are too “fleshy.”
 - e. A good compromise is to start creep feeding the last four to six weeks prior to weaning and sale, so calves are accustomed to eating grain.
 - f. Oats-corn mixtures are preferred; protein supplementation is not necessary, unless pasture is dried up.

BACKGROUNDED (STOCKER) CATTLE NUTRITION

Options

1. Buy weaned calves in fall, grow over winter and sell in spring:
 - a. Aim for about 1.5 to 1.75 lb ADG. Don't get them too fleshy.

- b. Will require a concentrate-to-roughage ratio of about 50:50.
 - c. Same can be accomplished by grazing winter wheat in the southern plains (Kans., Okla., Tex.) from Nov. to March.
2. Buy yearlings in late winter and graze in the summer:
- a. Can put on 180- to 300-lb gain in 120 to 150 days of grazing.
 - b. If cattle weigh 500 to 600 lb, it will take from 1-3 acres per steer, depending upon productivity of the pasture.
 - c. Sell before feeder cattle reach 800 lb, or they will be discounted in price.

Supplementing Yearlings on Pastures

1. Can increase gain and carrying capacity by feeding 1 to 4 lb grain per head per day:
 - a. Best results are with 1 to 2 lb per day.
 - b. Feeding over 4 lb per day is not efficient (forage intake and utilization decline dramatically).
2. Including an ionophore in a grain mix or molasses-mineral block can increase ADG by 0.1 to 0.15 lb over that of the supplement alone. This requires 100 to 150 mg of ionophore consumed per day.

FEEDLOT NUTRITION

Common Feedstuffs

1. Grains:
 - a. Corn in northern U.S.
 - b. Milo *and* corn in southern plains
2. Roughages:
 - a. Corn silage (most common in north)
 - b. Sorghum silage
 - c. Alfalfa hay and haylage
3. Protein supplements:
 - a. Soybean meal
 - b. Urea
 - c. Ammonia
 - d. Brewers grains
 - e. Cottonseed meal

Common Nutritional Problems

1. Acidosis on high concentrate diets:
 - a. May be either acute or chronic
 - b. Using an ionophore reduces incidence of acidosis
2. Founder (laminitis) on high concentrate diet (often in conjunction with acidosis and grain bloat)
3. Grain bloat
4. Urinary calculi:
 - a. Ca to P ratio may be too low
 - b. Commonly seen after calves are weaned and started on high grain (high P) diets

Starting Cattle on Feed

1. Start cattle on top quality grass or mixed grass-legume hay.
2. Feed starting diet (grain, silage, supplement, etc.) on second day by sprinkling on top of hay. Gradually decrease hay and increase starting diet.
3. Feed twice a day; keep feeding times consistent to avoid digestive upset.
4. To maximize intake, keep bunks clean of manure, stale feed, silage, trash, etc.
5. Until calves are 600 lb, make at least 50 percent of the supplemental protein preformed protein. After they reach 600 lb, can use NPN as the sole source of supplemental protein.
6. The transition to a high-energy finishing diet should occur over a two- to three-week period of time to avoid digestive upset.

Finishing Diets

1. Unless the price of corn exceeds \$3.00 per bushel and interest rates fall substantially, it is generally profitable to maximize gain and thereby minimize time on feed. Also, feed conversion is improved.
2. To prevent digestive disturbances (acidosis, bloat, etc.), feedlot cattle require a minimum level of fiber

(roughage) in the diet.

Suggested minimum roughage levels for three corn processing methods and various classes of cattle:

- a. Dry whole corn:
 - (1) Beef-type cattle: 5%
 - (2) Holstein calves: 0 to 5%
 - b. Dry rolled or coarsely ground corn:
 - (1) Yearlings: 6%
 - (2) Calves: 10%
 - c. High moisture corn:
 - (1) Yearlings: 8%
 - (2) Calves: 12%
 - d. 15% roughage is a safe, manageable level under many situations.
3. Keep fresh, palatable feed in front of cattle at all times. Don't let feedbunks stay empty more than one hour a day. Don't let stale feed build up.
 4. When assessing dietary roughage level, assume that well-eared corn silage contains about 50 percent roughage and 50 percent grain on a DM basis.
 5. Example of a finishing diet for yearling cattle utilizing high moisture corn and corn silage (DM basis):

<u>Ingredient</u>	<u>Percent</u>
Corn	75
Corn silage	20
42% CP supplement	5
	100

Nutrient specifications, total ration DM

Crude protein	11.0%
Calcium	0.5%
Phosphorus	.35%
Salt	.5%
Selenium	.045 mg/lb
Vitamin A	1,000 IU/lb
Monensin	10 mg/lb
NE _g	.63 Mcal/lb

Expected Performance of Feedlot Cattle

1. The relationship between NE_g (Mcal per kg or per lb of DM) of diet and average daily gain for a 350 kg (770-lb) medium frame steer is shown below (adapted from Appendix Table 22, Livestock Feeds and Feeding, 1986, D.C. Church).

Using Alfalfa and Corn

<u>Average daily gain</u>		<u>Mcal NE_g required in diet</u>		<u>Example of diet^a</u>
kg	lb	per kg	per lb	
0.3	0.7	.50	.23	Mid-bloom alfalfa hay
0.5	1.1	.70	.32	20% corn, 80% alfalfa
0.7	1.5	.95	.43	40% corn, 60% alfalfa
0.9	2.0	1.10	.50	60% corn, 40% alfalfa
1.1	2.4	1.25	.57	75% corn, 25% alfalfa
1.2	2.6	1.37	.62	85% corn, 15% alfalfa

Using Alfalfa, Corn Silage and Corn

<u>Average daily gain</u>		<u>Mcal NE_g required in diet</u>		<u>Example of diet^a</u>
kg	lb	per kg	per lb	
0.3	0.7	.50	.23	Mid-bloom alfalfa hay
0.5	1.1	.70	.32	40% CS, 60% alfalfa
0.7	1.5	.95	.43	85% CS, 15% alfalfa
0.8	1.75	1.01	.46	100% CS
0.9	2.0	1.10	.50	80% CS, 20% corn
1.1	2.4	1.25	.57	50% CS, 50% corn
1.2	2.6	1.37	.62	30% CS, 70% corn

^aNE_g values (Mcal/lb): mid-bloom alfalfa hay, .23; corn, .70; corn silage, .46.

2. A good set of standards for feedlot performance is published annually by DeKalb Feeds, Inc. The data below is a summary of nearly 1 million head of cattle fed out by DeKalb's clients in northern Illinois.

Summary of Performance of Cattle in Northern Illinois Feedlots (DeKalb Feeds, Inc., DeKalb, IL)				
Item	Class of Cattle			
	Steer calves	Yearling steers	Heifer calves	Holstein Yearling steers
Initial wt., lb	550	830	525	900
Final wt., lb	1100	1190	1000	1300
Total gain, lb	550	360	475	400
Ration NE _g , Mcal/lb	.58	.61	.56	.62
Avg. daily gain, lb	2.55	2.85	2.25	2.70
DM/gain, lb/lb	6.70	7.80	7.25	8.75
Days on feed	215	126	211	148
Death loss, %	1.35	0.70	1.50	0.75
<u>Total feed</u>				
Corn, bu.	47.5	46.2	44.1	56.1
Corn silage (35% DM), T	1.61	0.58	1.63	0.91
Supplement, lb	293	188	313	217



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