Developing Nutrition Programs for the Cow/Calf Herd

William S. Swecker, Jr., *DVM, PhD, Dipl ACVN*
College of Veterinary Medicine
Virginia Tech.
Blacksburg, VA 24061-0442

Cow calf producers have the tools and technology to produce a 95% calf crop that weans at 525-550 lbs. at 205 days. A multitude of publications from industry and extension services are available to these producers, yet only an estimated 70-85% of cows exposed to the bull wean calves. The veterinarian, as part of a production team, should help the producer match genetic, nutritional, and management resources to optimize productivity. The author suggests that the development of an effective nutrition program for the cow/calf herd to meet these goals requires 4 steps:

1. Evaluate the producer.
2. Evaluate the cows.
3. Evaluate the feeds.
4. Evaluate the feeding management.

Evaluate the producer: The Beef Cow/Calf Health and Productivity Audit (CHAPA) completed by the National Animal Health Monitoring System (NAHMS) in 1993-4 provides several insights to the industry. The data are presented below.

Part 1: Beef Cow/Calf Herd Management Practices in the United States

Data set: 2,539 producers that participated in a computer-assisted telephone interview from Sept. 29 through Oct. 9, 1992. The cow inventory in those herds was 646,019 (an average of 254 cows/herd)

Observations

1. The first step will be individual animal identification for many producers.
2. Most cows were in large herds, however, 60% of potential clients have less than 100 cows.
3. The calving percentages (89-92%) were very high compared to previous estimates of 70-80%. This was a phone interview not actual data.
4. Sixty percent of the producers did **not** have injections given by the veterinarian. These producers may not use a veterinarian.

Part II: Beef Cow/Calf Reproductive and Nutritional Management Practices

Data Set: 799 producers surveyed between 11/9/92 and 12/4/92. 18 states, 50% or more of 1992 calves born from Jan. to June. 245,273 cows and 224,315 calves.

Observations

1. Less than 35% of operations separate heifers from cows before or after calving.
2. Fifty three percent of operations do not have a set calving season, weather during calving (4%) forage availability (6%) have minimal impact on determination of calving season.
3. Calf age or weight (53%) and tradition (15%) are the most important factors in determination of when to wean calves: forage availability (7%) and cow condition (7%) have less impact.
4. The average estimated weight of a cull cow is 1047 lbs.
5. One half of operations calculate a winter feed schedule or ration based on animal's requirements and the quality of feedstuffs available.
6. Less than 10% of operations conduct laboratory nutritional analysis completed on homegrown or purchased feeds.
7. Salt/mineral supplementation (% of operations) Trace mineral salt (79%), Salt (62%), Magnesium (46%), AND Phosphorus (31%).
8. Operations that had identified mineral deficiencies Magnesium (5%), Selenium (4%) Phosphorus (3%) Copper (2%) Manganese (2%) Iodine (1%) Zinc (1%) Cobalt (0.5%).
9. **Veterinarians are the most important source of information for animal health and beef production information, family members are second. Nutritional information, however, comes from personal knowledge/education, veterinarians are second in importance but 27% are not important sources of nutritional information.**

Part III: Beef Cow/Calf Health and Health Management

540 producers from 18 states data collection 1/4/93 to 2/28/93 Fifty per cent or more of calves born between January to June.

1. Less than 5% of operations condition score cows.
2. Less than 16% of operations have cows examined for pregnancy by palpation.
3. Approximately 1/3 of operations feed heifers separately from cows.
4. One out of seven producers flush cows.
5. Average weaning weight 483.2 lbs, at $419.32.

The complete data set for the National Beef Study 1993-1994 can be obtained from:

USDA:APHIS:VS, Attn., NAHMS
555 South Howes, Suite 200
Fort Collins, Colorado 80521
(303) 490-7800
Email: NAHMS-INDO@aphis.ag.gov

The first part of your nutrition program then should be an assessment of the producer because the average cow/calf producer probably does not exist. This assessment should include the goals of the operation and available resources: financial and land/facilities. This assessment could be as simple as filling out a form. In the author's opinion, the cow/calf industry is composed of many producers that do not rely on the profitability of their operation to fund family living expenses. Do not assume, therefore, that profitability is the primary goal. A final suggestion is to conduct an actual interview with your cow-calf clients at your clinic. This gives both of you the opportunity to discuss goals, perceived problems, and potential solutions away from the farm.

Evaluate the cows

As veterinarians, we traditionally evaluated sick cows or calves, made a diagnosis, and initiated therapy or vaccination programs. The occurrence of several common diseases of the cow/calf herd should initiate thinking on the nutritional program of the herd.

Cows: Starvation, hypomagnesemia ± hypocalcemia, poor pregnancy rates, and bloat.

Calves: White muscle disease, weaning weights less than 450 lbs, >5% occurrence of calf scours, >2% pneumonia in baby calves.

Nutritional requirements of cows

The author recommends three information resources for cow/calf nutrition: The first is Nutrient Requirements of Beef Cattle, 1984. The requirements for beef cattle are currently being reviewed and a new NRC for Beef Cattle may be available in 1995, so you may want to delay your purchase. Several factors are used in the 1984 to determine the nutrient requirements of cows: body weight, gestation status, lactation potential, and age/growth (heifers vs. mature cows). A list of several cow groups and requirements are shown in Table 1. The superior milk production group (20 lbs/day) should be considered average for most beef cows today. This becomes important when nutrient requirements are compared to common feeds.

Table 1. Requirements for Beef and Dairy Cows.

Cow Classification	DMI (lbs)	TDN (lbs)	Cprot (lbs)
950 lb heifer, last 1/3 pregnancy, gaining 1.9 lb/day	20	13.0	1.8
First calf heifer, 950 lbs first 3-4 months post-partum	20	12.5	2.0
Pregnant dry mature cow: middle third of pregnancy	19.5	9.5	1.4
Pregnant mature cow last 1/3 pregnancy	21	11.2	1.6
Lactating cow, 1100 lbs. average milking ability, 10 lbs/day	21.6	12.1	2.0
Lactating cows, 1100 lbs superior milking ability, 20 lbs/day	22.3	14.5	2.6
Lactating dairy cow 1100 lbs, 18 lbs/milk/day 4.5% fat	24.6	15.4	3.0

We now recognize that planned changes in body condition should be factored into nutritional programs. The second resource and an excellent review of this subject and cow nutrition was given by Dr. Larry Corah in the Proceedings of the 25th AABP Conference, volume 2, pages 244-265.

The third resource is Beef Cow Ration Balancer, a software program developed at Kansas State. This program allows you to enter the present condition score and the desired condition score and will then determine nutrient requirements. This program will not balance rations but compares your feeding program to estimated requirements. The ration can then be balanced through iteration.

Evaluate the feeds

Cow calf operations, like most livestock operations, spend a majority of variable costs on nutrition. Forage, in the form of pasture and hay, provides a majority of the feed for many operations yet, as a feed, forages are variable in nutrient content and tend to be seasonally available. Supplemental energy is difficult and expensive to provide for many producers.[1] A primary question for many producers should be whether to match the forages to the cow or the match the cows to the forage. Timing of calving and weaning, for example, are two management decisions to match the cows to the forage.

Pasture is a commonly used, yet highly variable forage used for cow/calf operations. Pasture should produce a low cost source of nutrients, yet pastures can be mismanaged like any other resource. You may want to

have your producers consider rotational grazing, fertilization, or seeding of other forages to increase pasture productivity. Fescue toxicosis or summer slump is a common problem of cattle grazing on fungus-infected fescue pastures during hot months. Several solutions have been offered to fescue toxicosis, however, avoidance of infected pastures or supplemental feed may be the only management tool for some pastures. Bloat is also a potential problem of clover or other legume pastures.

Grass hay is a common winter feed for cow/calf operations. A summary of 2061 grass hay analyses from the Northeast DHI lab at Ithaca, New York is presented in Table 2. This hay would provide for the energy and protein requirement for mature cows in late gestation or average (low) milk production. Additional energy would be needed for gestating and lactating heifers; additional protein and energy would be needed for superior (average today) milk production in mature cows. The author's observation is that eastern forages tend to be low in energy, whereas Midwestern hays tend to be low in protein. Another observation from the average analysis is the variation in nutrient content. Forage analysis ($10-30/sample) should be performed to most accurately meet nutrient requirements.

Table 2. Analysis of Grass Hay (2061 samples) from Northeast DHIA lab.

Nutrient	%	Nutrient	%	Nutrient	ppm
Dry Matter	92 + 1.3	Calcium	0.61 + .23	Zn	31 + 17
C Protein	11 + 3.0	Phosphorus	0.23 + 0.06	Cu	10 + 6
TDN	62 + 2.0	Magnesium	0.20 + 0.06	Mn	79 + 52
NEm	0.54 + 0.04				
ADF	37.9 + 3.6				
NDF	61.5 + 6.4				

Corn and soybean meal can be considered as the standard energy and protein supplements respectively. Other novel and byproduct feeds have been used successfully by cow-calf producers yet the price of these feeds should be compared to corn and soybean meal.

Mineral supplementation can be absent to an excessive cost. In addition, many producers tend to confuse trace mineral salt (97% salt and 3% trace minerals) with salt-mineral mixes (10-20% salt, Ca, P, + Mg and trace minerals). Phosphorus tends to be the most expensive mineral and thus supplements should contain minimal amounts needed. Most commercial mixes contain between 3 and 12% phosphorus. Magnesium should be supplied in the late winter through spring to prevent winter and grass tetany. Magnesium is reported to be unpalatable and thus should be supplemented at least 30 days prior to anticipated deficiencies. High magnesium mineral mixes contain 10-12% magnesium. Copper, Manganese, and Zinc should be supplied in the trace element mix. Selenium should be supplied at 3 mg/head/day if Congress passes legislation to prohibit the FDA from enforcing the stay of the 1987 amendment on Selenium. Organic forms of the trace elements (especially zinc and copper) may be better absorbed than the traditional inorganic salts.

Evaluate the Feeding Management

The nutritional management of the cow herd can be divided into 4 feeding periods as suggested by Dr. Corah: 1. Calving to breeding 80 days; 2. Breeding to weaning: 125 days, 3. Weaning to late lactation: 110 days, 4. Precalving 50 days. An alternate view of these periods would be:

Cows tend to lose weight: Calving to breeding and Breeding to weaning
Cows tend to gain weight: Weaning to late lactation

Gestation length is constant so the selection of weaning date and the breeding period are important to the management of cows. When forage is limited, e.g. drought, early weaning of calves allows for better weight gains of calves through supplemental feeding and cows either do not lose as much condition or they have an extended time period to regain weight. Likewise, placement and removal of the bulls should correspond to an optimal calving season based on forage availability.

External factors can also alter feeding management. Energy requirements for the beef cow increase when ambient temperature decreases below 30°F. A rule of thumb is to increase feed by 10% for each 10°F drop in temperature below 30°F. Mud and wet hair coats will increase energy requirements and energy losses beyond the temperature changes. Intake of poor quality forages will be limited by fiber, so alternate feeds such as corn may be needed under adverse environmental conditions.

Table 3. Hay loss from different management systems.

	Bale Size		
Storage Method	4'	5'	6'
Shed	8	8	8
Covered Stack	11	9.8	9.0
Plastic Wrap elevated	14.6	11.4	10
Uncovered / Elevated	26.2	17.4	13.4
Uncovered on ground	32.4	23.8	19.6

Summary

In conclusion, follow four steps to develop a nutrition program for the cow-calf herd:

1. Evaluate the producer and his/her goals.
2. Evaluate the cows through determination of signalment and condition scoring at pregnancy check.

3. Evaluate the available feeds and utilize forage analysis.
4. Utilize weaning dates as a management tool and adjust feeding to environmental conditions and losses.

Evaluation Sheet: Cow/Calf Herd

Date: _____

Producer _____ Veterinarian _____

Goals for Operation

1

2

3.

Cow Evaluation	**Number / Condition Score**			
	Calving Pre Calving	Lactating to Breeding	mid and Gestating	gestation
Mature Cows (3+ years)	_____	_____	_____	_____
First Calf heifers (2 years)	_____	_____	_____	_____
First Calf Heifers (3 years)	_____	_____	_____	_____

Number of Yearling Heifers Pre breeding _____ Pregnant _____

Number of Replacement Heifer Calves _____

Number of Bulls _____

Feed Evaluation: Description / Amount / Analysis? / Price

Hays

Pastures

Protein/ energy supplements

Minerals supplements

Other

Feeding Management

Feed Storage

Feed Delivery

Feed Person

Calving Season

Weaning Date

Reference

1. Planned Animal Health and Production in Beef Cattle Breeding Herds. *in* Herd Health, Food Animal Production Medicine, Second ed. Radostitis, Leslie and Fetrow eds.

Abstract

Parasitism and production in farm animals

Sykes, A. R.

Animal Production (1994) **59,** 155

This review considers the impact of internal and external parasitism on the productivity of cattle, sheep, pigs and poultry. A common feature of all such infestations is a reduction in the efficiency of food utilization through a reduction in the animal's food intake, although in some cases the animal's requirement for food is increased either as a result of damage to its tissues or the loss of some tissues. The assessment of the effect of parasitism on productivity is very difficult, because it must take into account not only the fluctuations in the challenge, which may be determined by environmental changes and/or management decisions, but also the manager's objectives for the performance of a particular category of livestock. The article considers the results of experimental pathophysiological studies and the results of field trials on the use of pesticides.