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WINTER SUPPLEMENTATION OF CATTLE, PART II: ENERGY & PROTEIN

Supplementing cattle is one of the largest costs in maintaining beef cattle on a yearly basis. If we make mistakes in our supplementation program it usually costs in terms of cattle health and/or productivity. This month we are going to consider energy and protein supplementation. While the best supplementation program will vary from ranch to ranch and from year to year, there are some "rules of thumb" that will be helpful in considering what decisions to make.

The first consideration is the amount of energy and protein the cattle will require. This amount will vary with the following: (1) the size of the cattle, (2) the stage of pregnancy or lactation, (3) the available forage (amount and quality), and (4) the weather. First, we will consider total energy requirements and later total protein requirements. For purposes of this article, we will discuss energy requirements in terms of TDN (Total Digestible Nutrients). Other units of energy measure could be used, such as Metabolizable Energy (ME), Net Energy of maintenance (NEm), or Net Energy of gain (NEg). All of these units are interchangeable and most of us are familiar with TDN, so we will use it for this column. Listed below are the TDN requirements (and protein requirements) for a variety of cattle sizes, ages, and stages of lactation or pregnancy. The TDN and protein requirements are on a dry matter basis for the total diet on a per day basis.

Class of Cattle	**Body Weight**	**TDN**	**Total Protein**
	lbs.	lbs./day	lbs./day
Heifers-pregnant,	880	10	1.7
last three months	1,100	14	1.9
Dry, pregnant cows,	1,100	11.3	1.7
last three months	1,325	12.6	1.8
Lactating heifers	880	12	2.0
	1,100	13.7	2.2
Lactating cows,	1,100	12.3	2.1
average milkers	1,325	13.7	2.3
Lactating cows,	1,100	15	2.7
superior milkers	1,325	16.5	3.0

Not all the weights or possible factors are listed in this brief table; however, more of this information can be obtained from your farm advisor, veterinarian, or other sources. It is important to notice that younger animals have higher energy and protein requirements for the same body weight. The younger cattle are still growing, in addition to the demands for pregnancy or lactation. Also, as milk production increases, protein and energy requirements increase.

The next factor to be considered is the **quality** of the forage available. In general, the quality of the forage determines how much of it can be consumed by the cattle. **The lower the quality, the less they can eat.** The amount cattle can eat is referred to as Maximum Dry Matter Intake (DMI) and is expressed as a percent of body weight per day or amount per day (lbs.). For high quality forages, such as good quality alfalfa hay, or green pasture the Maximum DMI is about 2.5% or for a 1,000 lb. cow about 25 lbs. dry matter per day (28 lbs. as fed, since hay is about 90% dry matter). For medium quality forages, such as meadow hay, the DMI is about 2.0%. **For low quality forages, such as dry foothill feed or straw the DMI is 1.5% or less.**

Let's use an average milking cow of 1,325 lbs. on dry foothill feed as an example (her requirements are listed in the table above). The foothill feed is 55% TDN and 8.5% crude protein. Since it is low quality feed, we will assume the Maximum DMI is 1.5%; therefore, 1,325 lbs BW X 0.015 = 20 lbs. DMI of the foothill feed. The feed is 55% TDN; therefore, 20 X 0.55 = 11 lbs. TDN versus the 13.7 TDN requirement or 2.7 lbs. TDN short of meeting requirements. This is the amount of TDN needed for supplementation to meet her requirements. If we wanted to supplement with medium quality alfalfa (58% TDN), we would need about 4.6 lbs. of medium quality alfalfa hay per day on a dry matter basis, or 5.2 lbs. as fed. If we chose to use molasses (72% TDN), we would need 3.75 lbs. of molasses to meet this energy requirement.

Looking at the protein requirements for this same cow, the 20 lbs. of DMI times the 8.5% crude protein yields 20 lbs. X 0.085 = 1.7 lbs. total protein or about 0.6 lbs. of protein short (total protein requirements are 2.3 lbs. from the table above). The 4.6 pounds of alfalfa (17% crude protein) would have 4.6 lbs. X 0.17 = 0.78 pounds of protein, which meets the 0.6 lbs. additional protein necessary. Using molasses (5.8% crude protein) the 3.75 lbs. X 0.058 = 0.22 lbs. of supplemental protein, which is less than the 0.6 lbs. of protein needed. Some molasses products have added protein, which may meet the requirements; however, this varies and should be carefully checked. Diets low in protein decrease milk production and therefore, lower weaning weights. Additionally, if low protein diets are fed to pregnant cows and heifers the quantity and quality of colostrum is decreased and this results in more sick and dead calves as they are more susceptible to neonatal diseases such as scours and pneumonia.

With the Fall rains and subsequent growth of grass in the foothills, the need for supplementation would decrease. In those years when the rains do not come as expected, the need to supplement may continue or increase as the dry forage is consumed. On the other hand, in northern California when it snows, the entire diet would need to be supplemented. Thus, the amount needed to supplement is an ever-changing target.

As the weather becomes colder the Maximum DMI of forages increases; however, the digestibility decreases so it is basically a push. However, rapid changes in weather will decrease feed intake and this must be taken into account. In California, the most common problem is cold, wet storms with wind. This type of condition results in decreased feed intake and increased energy requirements. Maximum DMI will usually decrease by 10-30% and the existence of mud further decreases intake by another 15-30%. At the same time, energy requirements increase by 30% or more. Therefore, provision of a high quality forage or other supplements during these storms is necessary.

The above guidelines can be helpful in planning for energy and protein supplementation of beef cattle in California. Next month we will examine various options for supplementation and look at some of the costs and other economic considerations.

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