LOW COST COW/CALF PRODUCTION

The Bulletin ***For Alumni Of The School***

April 1997

Santa's Reindeer

How does the jolly ol' fellow carry those eight critters through the winter, especially since they have one heck of a workout only four days into the season? Grant Lastiwka figures if he knew that, he could do a better job with his cow herd during severe winters such as the last couple in Alberta. Grant is a student and proponent of standing reserve winter forage. He has excellent data on the quality of forage the cow is going to find beneath that snow cover. There are times, however, when you must feed, especially when calving out of season. Hay? Concentrate? Or both? The necessity of heat generated by forage fermentation and muscular activity from rumination (metabolic heat) will be discussed in a future Newsletter that will address critical temperatures. Suffice it to say, at times you need both.

I'm Confused

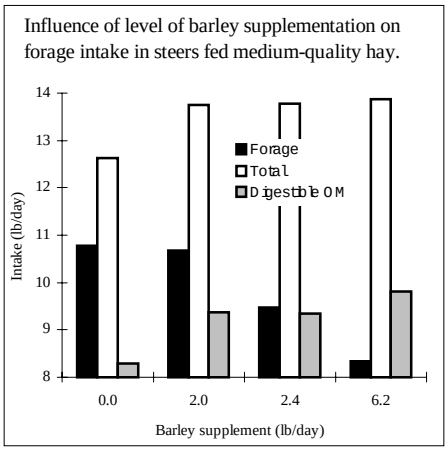
Although the authors[1] of a review on energy supplementation conclude that "more work is needed", they lay bare some reasons for the confusion. The root of the problem is that effective energy supplementation requires a knowledge of the foraging animal's energy requirements. We estimate this, for the greater part, from pen-fed data with whole plant forages. Plant part selection and energy for grazing activity are not considered. It has been said that energy required for grazing animals can be as much as 30% greater than for *caged* animals. Given the wiggly baseline, some aspects of energy supplementation, of other than the very highest quality forage, are obvious to the rancher:

1. Energy-containing supplements are fermented more readily than is forage.
2. As supplemental grain level increases, grazing time is reduced, with a concomitant reduced intake (substitution).
3. As grazing time is reduced, energy expended by grazing is reduced.
4. Generally, energy supplementation increases overall production rate of cattle.

What's in a Name?

An "Energy Supplement" consists of grain, oilseed meal, readily digestible fiber sources, e.g., soybean hulls and/or high quality forages. Each foodstuff can impact forage utilization differently.

Forage Intake. In the review it is concluded that supplementing with corn reduces forage intake. With sheep, however, low levels of corn may increase forage intake. *Sheep and cow data often are blended then reported as recommendations for ruminant animals.* The corn problem is associated with a reduction in rumen pH or carbohydrate effect. The necessity of keeping rumen pH above 6.2 is well hammered in the School. The carbohydrate effect refers to a shift to starch utilizing rumen microorganisms and away from cellulose users without a change in pH. Barley does a number on forage consumption as well. A study from the authors' own lab showed that incremental levels of barley reduced forage intake in steers. Total organic matter intake (thus



energy consumption) increased, however, when intakes of forage and barley were added. Responses to barley levels above 2 lb per day were not great, as shown in the chart above. Forage intake also is reduced when degradable fiber sources (such as soy hulls, corn gluten feed, wheat mids and beet pulp) are fed, but not to the extent as with grain. Supplementation with the oilseed meals does not appear to alter forage intake. In situations in which degradable protein is deficient, the meals increase forage consumption. Further, when the animal is deficient in dietary protein, animal performance is increased by feeding the meals. Invariably, the oil meals bring additional feed energy to the table. The extent to which forage intake is reduced by energy supplementation depends upon forage quality. Several investigators have shown that as forage crude protein increases, substitution (the supplement replaces more forage) also increases.

Digestibility. Several studies have found that grain supplements reduce total tract dry matter and organic matter digestion. Others have shown an increase. The polarization appears to be related to simultaneous protein supplementation. When oil meals are fed at levels that provide sufficient degradable protein to completely ferment both the forage and grain, grain feeding does not reduce digestibility.

Ruminal pH. At high ruminal pH, cellulolytic bacteria thrive and ferment fiber. At lower pH, soluble carbohydrate (sugar and starch) fermenting bacteria persist. The exact pH when these microbial shifts take place is, of course, argued by the scientists. Early work suggested that grain supplementation reduced forage fiber digestion when ruminal pH fell below 6.7. Later work indicated that the pH of the rumen could fall as low as 6.2 before the numbers of cellulolytic bacteria declined.

Keep your pH up and if you have any questions, call Santa.

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[1] Caton, J.S. and D.V. Dhuyvetter. 1997. Influence of energy supplementation on grazing ruminants: requirements and responses. J. Anim. Sci. 75:533.