



GRI

AGRI-CONCEPTS

# THE CUTTING EDGE OF NUTRITION

## The Bulletin for Alumni of the Beef Cattle Nutrition School

**November 95**

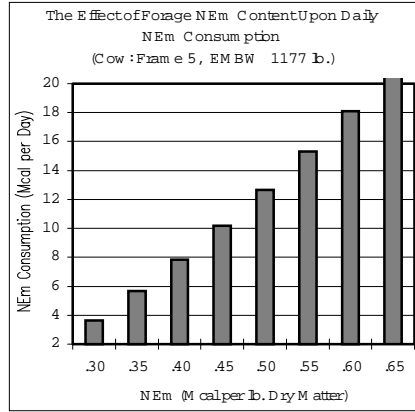
### Forage Consumption

There are three subjects we never delve into in the Beef Cattle Nutrition School—Politics, Religion and Dry Matter Consumption. Avoidance of the latter is difficult. We've grown up with rules of thumb such as "3% of body weight" and others.

Other than forage quantity, there are two mechanisms that regulate consumption:

1. **Rumen capacity.** The foraging ruminant eats until the rumen is satiated. The rumen then must empty, at least to some degree, before more forage is consumed. Reference materials that we often deal with invariably relate consumption to the size of the animal. It is generally an estimation of body mass via a function of body weight, e.g., (body weight)<sup>.75</sup>. This relationship is used in the School but only to a point. It fits the young growing animal's enlarging rumen size quite well. It is not suitable, however, for the mature animal. Just because a cow deposits or relinquishes 100 lb of fat does not mean she has a corresponding change in rumen capacity. A more meaningful estimate is to relate rumen capacity to mature body weight. Until shown otherwise, we estimate that maximum rumen size is achieved when the animal reaches 65% of empty mature body weight (EMBW). See the August 1995 Bulletin for EMBW relative to frame size.

2. **Fermentable energy content of forage.** NEm is one of several estimators of fermentable energy contained in forage. It is used in the School. Others include TDN, digestible energy, metabolizable energy, etc. The NEm consumption curve (top column 2) indicates the higher the NEm (fermentable energy) content of the forage, the more energy will be consumed. This is not simply that each bite of forage contains more energy; it also means that there are more bites.

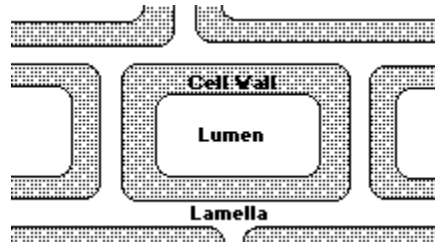


NEm consumption is related directly to the rate of feed disappearance from the rumen. There are two avenues for disappearance:

1. Fermented end-products
  - a. Passing across the rumen wall.
  - b. Being utilized by the rumen microorganisms.
2. Unfermented feed passing through the gut.

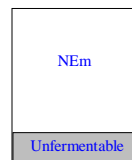
### Plant Cell Structure

Simplistically, plant cell growth (and development) is divided into two phases.



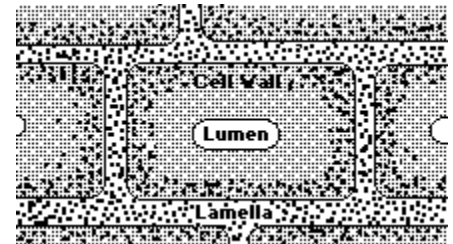
Primary cell growth is the increasing in size through wall elongation. Lignin formation does not commence in this phase. Thus, the plant is highly fermentable as suggested by the following schematic.

The NEm portion of the plant disappears rapidly across the rumen wall. The unfermentable portion must be regurgitated, ground to a small size and then passed from the rumen through the gut and excreted as feces. Once the fermentable portion of the forage is gone,

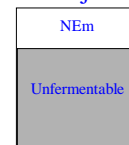


the cow resumes eating.

The second phase of plant cell growth involves cell wall thickening and the deposition of lignin. Lignin formation begins in the lamella region between the cells and spreads inward through the cell wall.



The fermentability of the plant in this stage of maturity can be represented by the adjacent schematic. Again, the NEm



portion of the forage leaves the rumen fairly rapidly across the rumen wall. The unfermentable portion, however, must be ground by the teeth to fine particles and then passed into the lower portion of the digestive tract and excreted. It is clear that the considerable unfermentable material will be in the rumen for some time. Some of this undigested stuff must pass from the rumen before eating is resumed. It is a slow process that impedes the consumption of additional NEm.

### Schools in '96

- San Angelo, TX January 8 - 11
  - Albuquerque, NM February 13 - 16
  - Tucson, AZ March 19 - 22
  - North Platte, NE September 10 - 13
- Additional Schools currently are being scheduled. Call for future dates if you would enjoy repeating the School.

Your questions and comments sincerely are appreciated. Please call or write:

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