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CATTLE SENSE

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FUELING THE COWHERD: Predicting & Managing Voluntary Intake

It's pretty difficult to formulate or evaluate a diet for the cowherd without knowing how much of the ration the animals are going to eat. But despite years of observation and research, voluntary intake prediction is still an imprecise exercise. We do know that cattle tend to eat a particular level of dry matter, irregardless of the water content of the diet, so almost all prediction equations and models deal with voluntary *dry matter* intake (DMI). But the actual volume consumed appears to be driven by a complex combination of animal factors, characteristics of the diet itself, and environmental conditions.

We naturally expect larger animals to eat more than smaller ones, but this relationship is not a completely direct one. Maintenance requirements vary more with surface area than total weight, and intakes mimic this relationship. To account for this, expected intake is often expressed per unit of *metabolic body weight*, or body weight to the .75 power ($BW^{.75}$). Other animal factors also influence voluntary feed consumption: condition – fat animals eat less; age – yearlings consume more than calves of the same size; breed type – dairy breeds eat more than beef, and crossbreds more than purebred cattle; sex – steers eat more than heifers; and stage and level of production. Beef cows tend to increase feed intake through mid-gestation, drop off just before calving, and then show as much as a 30% increase in intake with the onset of lactation. The magnitude of this increase is related to the level of milk production. As a general rule, each pound of milk produced equates to an additional .1 pound of DMI.

While the actual controls of voluntary intake are still debated and studied by animal scientists, it is generally believed that intake of high forage diets are limited *primarily* by physical fill, while the consumption of concentrate diets is limited *primarily* by physiologic controls. It is clear that the fiber in forage-based diets is digested relatively slowly, which delays passage out of the digestive system. In other words, it acts as "fill" for a longer period, restricting intake. Diets that are higher in energy stimulate ruminal fermentation and diet breakdown, thereby speeding passage and allowing additional intake. Other dietary factors which enhance fermentation will also stimulate increased forage intake, most notably the addition of ruminally-degradable protein or NPN to a protein-deficient diet. On the other hand, addition of higher levels (~ 4 or 5 pounds or more) of grain to a forage diet may result in 'substitution' of that supplement for forage. The form in which feed is offered can impact intake; cattle will eat more of a forage if it is chopped or ground…unless it becomes so fine it is dusty, at which point intakes will drop. Supplements offered in tubs or 'big blocks' are manufactured to physically limit animal intake. Additionally, cattle will consume more of a legume than a grass, and more of temperate species than tropical. Palatability and anti-quality factors, such as tannins, can also enter into the equation.

The cattle's environment – ambient and management – can also influence voluntary intake. Heat stress will reduce feed consumption, while moderate cold increases it. Extreme cold and mud reduce animal activity, and in turn reduce voluntary feed intake. Animals also seem to eat more with longer days. Availability of forage, as well as water quality and quantity, can also limit the amount of feed actually consumed. And the timing and frequency of supplementation can impact grazing patterns, and therefore intake.

Trying to model intake predictions can be complicated and cumbersome. For those not using a computer to develop or evaluate rations, the following chart is a practical way to estimate voluntary intake by beef cows.

DIET:	DRY, GESTATING COW	LACTATING COW
	-------- Expected Intake, % of Body Weigh --------	
Low-quality roughage (<7% CP), unsupplemented	1.5	2.0
Low-quality roughage, protein supplementation	1.8	2.2
Low-quality roughage, energy supplementation	1.5	2.0
[if > 4 pounds energy (grain) supplement, expect each pound of supplement to substitute for ~.6 pounds of forage]		
Moderate quality roughage, unsupplemented	2.0	2.3
Moderate quality roughage, protein supplementation	2.2	2.5
Moderate quality roughage, energy supplementation	2.0	2.3
[if > 4 pounds energy (grain) supplement, expect each pound of supplement to substitute for ~.6 pounds of forage]		
High quality roughage, with or without supplement	2.5	2.7
(alfalfa, good silage, green pasture)		

Adapted from Dr. Charles A. Hiberd, Oklahoma State University

In most instances, the goal of a cowherd feeding program is to meet the animals' nutritional needs while maximizing the utilization of available forages. Appropriate supplementation will draw on what we know about voluntary intake, and complement the roughage portion of the diet.

QLF liquid supplements, offered free-choice in lick-wheel feeders, are an ideal fit for the high-roughage diets of a cowherd. These *Timed Release*™ protein supplements contain high levels of rumen-degradable intake protein (DIP) and fermentable sugars to enhance fiber digestion, passage, and further intake. And it has been shown that this sugar energy (i.e., from molasses and whey) won't cause the negative associative effects seen when feeding high-starch feedstuffs like grain with forage-based diets. Molasses keeps the supplement highly palatable, too. And with the continuous access afforded by the self-feeders, supplement delivery will not interrupt natural grazing patterns.

Records show that actual intake of supplement from the lick-wheel tanks varies as the animals' need for supplementation varies. Unlike tubs or blocks, liquid supplement can be consumed at the level needed to fit changing animal requirements and seasonal variation in forage quality and quantity.