FEED INTAKE
AN INDUSTRY PERSPECTIVE

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Accurate prediction of feed intake allows feedlot managers and nutritionists to formulate proper nutrient densities in diets and to predict animal performance. However, factors driving intake are numerous and vary in their degree of influence. The purpose of this paper is to look at intake as a performance predictor, make some assumptions about the macro-environment of cattle feeding in the future, and address some nagging unknowns facing the feeding industry today.

Factors Driving Intake. One factor driving feed intake is body weight. Intake often is expressed as percent of body weight. Tables 1, 2 and 3 list ADG, dry conversion and dry matter intake expressed as a percent of average mean feeding weight over 21 months in one high plains feedyard. These months were included due to the harsh winter weather during 92-93 (period 1) compared to the mild winter of 93-94 (period 2). This particular feedyard feeds steam flaked corn or corn/milo rations to steers, predominantly yearlings, starting at 650 to 800 lbs.

Intakes were not different between period 1 (Oct. 92 - June 93) and period 2 (July 93 - June 94). However, differences in performance were sizable. This can be explained partially due to an increased maintenance requirement during the extremely harsh winter of 92-93. Yet, it was surprising to find no difference in intake despite the extreme differences in temperature, mud, moisture and pen conditions. The range in feed intake expressed as percent of mean feeding weight was small, ranging from a high of 2.10% to a low of 1.95%. This difference, approximately 1.4 lbs. of dry matter per animal daily, demonstrates the consistency of intake with steam flaked diets. Management practices also can affect intake levels. Because intakes did not differ even though performance did, these data demonstrate the limitations of predicting performance from intake alone.

Diets of the Future. It would behoove us at all times to predict the environment of the future before we invest time and money into conducting research to improve the future. The next portion of this paper is dedicated to provoking thought into that future. One basic question should be: what rations will we be fed during the next 10 years?

Energy Content. With the current status of world feed grain supply and demand, and high grain production capabilities, high energy, grain-rich rations will be fed for some time to come. Only great extremes in nature, such as drought and flood, are likely to change this, and even then effects be of a short term. Fats and oils have become quite popular ingredients in feedlot diets during the past 10 years. Only during short periods of depleted supply will these ingredients not economically fit into typical feedlot rations. This would indicate that future rations typically will contain .68 to .73 Mcal of NEg per pound of dry matter.

Roughages. Roughages will continue to be a high cost item in feedlot diets. The storage, processing and transportation costs of roughage plus their low caloric density will keep pressure on ration formulators to exclude roughage from feedlot diets. The primary purposes for roughage in feedlot rations are to maintain a healthy rumen and to prevent bloat and acidosis. I maintain that this paradigm is subject to change as new thought processes enter practice. This leads to the simple conclusion that roughage levels must be kept to a minimum while maintaining animal performance.

Most modern feedmills have a limited capacity to manufacture a large number of rations and store a variety of ingredients. Future feeding regimens must be formulated with this limitation in mind. The average feedlot will be larger in ten years. Tight margins, stiff competition and benefits of economies of scale will continue to emphasize size to remain as a sustainable player in the animal protein production business. This leads one to rationalize that new technology must have the ability to be applied on a large scale if it is to significant impact the feedlot industry.

Byproducts. The agricultural product processing industry continues to grow in this country. By-

TABLE 1. WEIGHTS, GAINS, EFFICIENCIES AND INTAKES DURING PERIOD 1.

MONTH	AVG. WT [1]	DRY CONV [2]	ADG	% BODY WT [3]
OCT 92	958	6.09	3.27	2.08
NOV 92	945	6.34	3.13	2.10
DEC 92	940	7.00	2.79	2.08
JAN 93	940	6.88	2.75	2.01
FEB 93	917	6.87	2.67	2.00
MAR 93	913	6.93	2.73	2.07
APR 93	904	6.21	2.94	2.02
MAY 93	884	6.03	2.87	1.96
JUN 93	920	5.74	3.20	2.00
N = 9	925	6.45	2.93	2.03

TABLE 2. WEIGHTS, GAINS, EFFICIENCIES AND INTAKES DURING PERIOD 2.

MONTH	AVG. WT [1]	DRY CONV [2]	ADG	% BODY WT [3]
JUL 93	958	5.66	3.47	2.05
AUG 93	959	5.71	3.43	2.05
SEP 93	975	5.79	3.43	2.04
OCT 93	969	5.91	3.32	2.02
NOV 93	968	6.09	3.31	2.08
DEC 93	958	6.15	3.27	2.10
JAN 94	974	6.02	3.37	2.08
FEB 94	938	6.13	3.08	2.01
MAR 94	935	6.05	3.08	1.99
APR 94	951	6.07	3.06	1.95
MAY 94	945	5.86	3.20	1.99
JUN 94	958	5.72	3.30	1.97
N = 12	957	5.93	3.28	2.03

TABLE 3. MEAN WEIGHTS, GAINS, EFFICIENCIES AND INTAKES DURING PERIODS 1 AND 2.

MONTHS	AVG WT [1]	DRY CONV [2]	ADG	% BODY WT [3]
N = 9	925	6.45	2.93	2.03
N = 12	957	5.93	3.28	2.03
		.52	.35	0

[1] Mean feeding WT: (sale WT - purchase WT)/2
[2] Feed to grain ratio
[3] Dry matter intake as a percentage of mean feeding WT

products from flour milling, ethanol production and many other sources will continue to be available to include in feedlot diets. Processing plants traditionally have been locate around the river systems of this country, but today they are moving deeper into the interior. It would be useful to exploit opportunities to formulate these by-products into our experimental diets. Further information is needed about the effects of these ingredients on feed intake and cattle performance.

Lastly, ration formulators and research scientists must remember the fact that economics always takes precedence over sound animal husbandry practices. Macro- and micro-economics of the overall feeding environment should be considered when testing futuristic diets and feeding practices.

Current and Future Problems. Many issues trouble the cattle feeding industry today. This section will discuss some issues which affect our ability to predict feed intake and make meaningful use of intake data.

Grain Processing Measurements. The extent to which grain is processed affects intake. However, we use a shotgun approach to determine starch availability. Current processing methods and starch analysis give us wide ranges to find our comfort zones. Since grain processing influences feed intake, a more precise evaluation of starch damage must be developed in order to forecast intake and utilization.

Roughage Evaluation. Roughage source and maturity at harvest impact feed intake. Although we have understood this for years, little quantitative data exist to aid in evaluating effects of different roughage sources on intake. Evaluating one parameter at the time has not proven successful. Perhaps compiling several parameters into an index would help.

Protein Source and Level. Evidence continues to mount indicating that protein levels in most modern finishing diets are not adequate. Studies demonstrate that dry matter intake and performance will increase as protein level is increased. Current levels must be evaluated in order to re-establish the proper level of this basic nutrient. Also, the maximum usable urea level must be re-defined. The economics of feeding higher protein levels is very dependent upon the amount of urea which can be fed.

Acidosis. We approach the control of subclinical acidosis and the modulation of meal frequency and size as if they were two different subjects. Perhaps we are starting at two different ends of the rope, but the central goal should be the same. Control of subclinical acidosis can be approached by using buffers or lactic acid-consuming bacteria. Intake modulation comes in chemical and mechanical forms. Purina's IMPACT program is an example of chemical control. Bunk management, timing of feeding, and ration changes are examples of mechanical control of intake. More study and thought should be given to approaching subclinical acidosis from all fronts. Knowledge extrapolated from all the areas above could render profound answers to this problem.

Feeding Management. Often we use the same rules for working cattle up on feed as we do once cattle are on the finishing diet. This approach simply does not work. Working cattle through the starting rations to the finishing diet is not the same game as maintaining intake by cattle already on their finishing ration. Feedlots and nutritionists need more information about the effect of various starting programs on intake and performance during the remainder of the feeding period.

Cattle spend as little as 90 days to as much as 12 months in commercial feedlots. With these different finishing periods, do we need to feed the same energy density and roughage levels to maximize performance? Should energy and roughage levels be varied at different times of the feeding period for long-fed cattle? These are very basic questions that the industry faces each day for which we have no clear answers.

The most pressing need for our industry regarding intake is a practical means of evaluating field data. As the tables above show, intake alone is not reliable as a predictor of performance even though we use estimates of energy values, along with intake, to forecast the performance of estimates of average animals. This industry has not had the luxury of measuring the effect of decisions made today in just a few days or weeks like the dairy, poultry or pork industries can. We must have a more reliable method to take available data and project our responses and our costs more rapidly and accurately. If we do not deal with this issue, the cost of our product will continue to widen against that of our competition. Understanding what drives feed intake is vital to our business. There are tremendous possibilities and exciting opportunities for the future if we pursue the challenges ahead of us. By rationalizing where we are today, assessing our current needs, and forecasting the environment of tomorrow, we can address all these hurdles. The ability to predict production cost accurately must be our bottom line.