Nutrition modeling helps reduce

Research

with
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NUTRITIONAL modeling systems developed in the Texas A&M University department of animal science have helped participating Texas feedlot operators keep feed costs in check and produce beef more profitably.

Now, these models have the potential to be applied to help reduce greenhouse gas emissions, according to researchers.

Dr. Luis Tedeschi, Texas A&M AgriLife Research nutritionist and associate professor in the department of animal science, has extensively studied decision support systems, specifically nutritional modeling. As a doctoral student at Cornell University, Tedeschi worked with Dr. Danny Fox to develop the Cornell Net Carbohydrate & Protein System model for evaluating herd nutrition and nutrient excretion.

At Texas A&M, Tedeschi built upon that work in developing the Cattle Value Discovery System (CVDS), which helps feedyards sort animals into homogenous groups so a higher percentage reach a desired level of grade on the day the pen is marketed.

"Usually, when feedlots receive animals, they group them in pens by weight," he said. "We changed the paradigm to grouping them according to CVDS-predicted days to reach the target U.S. Department of Agriculture quality grade — usually USDA low Choice."

Also, nutritionists typically have formulated cattle rations that con-

tain excess nutrients to ensure that the growth rate is maximized, which often increased nutrient excretion and contributed to adverse effects on water and air quality, Tedeschi said.

The Large Ruminant Nutrition System (LRNS) is a computer model that estimates beef and dairy cattle nutrient requirements and supply under specific conditions of animal type, climate, management and the physiochemical composition of available feeds. This model uses the same computational engine of the Cornell Net Carbohydrate & Protein system, Tedeschi said.

The CVDS modeling system is used by Performance Cattle Co. and Micro Beef Technologies, among others. When used in combination with LRNS, CVDS creates a complete ration for each animal and predicts a day to reach the target USDA grade. A radiofrequency identification ear tag system monitors which lots of animals receive a certain kind and amount of feed ration.

"It's a very complete model for nutrition," Tedeschi said. "In addition to improving performance and profitability while reducing environmental impact, these models help producers and consultants understand nutrient

NUTRITION MODELS: In support of cattle nutrition models, Dr. Luis Tedeschi at Texas A&M University has developed *in vitro* gas production systems to assess digestion characteristics and biological values of feeds based on their pattern of accumulated gas during incubation with rumen fluid under anaerobic conditions.

requirements and feed utilization in beef, sheep and goats."

The modeling system can also be applied in predicting expected progeny differences for breeding herd replacements.

At Texas A&M, in support of the LRNS and CVDS models, Tedeschi has developed *in vitro* gas production systems to assess digestion char-

acteristics and biological values of feeds based on their pattern of accumulated gas during incubation with rumen fluid under anaerobic conditions. This process is a re-engineered version of one developed by Cornell researchers Dr. Alice Pell and Peter Schofield, who designed a computerized closed system using flasks connected to pressure sensors, Tedeschi