

With high input costs and lower prices for finished cattle, it is imperative feedlot producers reduce expenses to increase profits and to remain competitive, says Jason Hartschuh, Ohio State University (OSU) Extension coordinator in agriculture and natural resources, explaining the vision behind a four-part webinar series focused on minimizing costs when feeding livestock.

Links to the 2015 Ohio Beef Feedlot School featuring presentations by OSU ruminant nutritionist Francis Fluharty are viewable online at u.osu.edu/beefteam/resource-library/#linkg.

“The recordings will allow producers to pick up valuable information across several key topics — from the management of feedlots and nutrients to how different handling practices impact yield and grade to offering strategies for weaning that affect the animals’ health,” Hartschuh says. “The focus of the entire program is to offer insights that can impact a livestock producer’s bottom line while improving profitability and becoming more efficient.”

While the webinars, each about 2-2½ hours long, are available online, we’ve captured some highlights in the segments that follow, including:

- ▶ Use low-stress strategies for receiving, growing calves;
- ▶ Control the feedbunk for efficient gain;
- ▶ Maximize lean growth with grain-based diet;
- ▶ Consider grain coproducts;
- ▶ Manage for proper protein digestion;
- ▶ Manage to maximize grading and pricing; and
- ▶ High-value niche may be best for U.S. beef.

Use low-stress strategies for receiving, growing calves

Successful weaning reduces stress and improves profitability. As part of the recent webinar series on minimizing feeding costs, OSU ruminant nutritionist Francis Fluharty shared some tips for low-stress weaning, calf handling and feeding.

“More than half of calves walk through an auction barn as weaning, and that is stressful,” he says. Other stresses include being deprived of feed and water during transport, followed by new sources of feed and water in a new environment. Processing and vaccinations also create stress.

Fluharty prefers two-stage weaning,

where cows and calves are sorted. Calves are taught to go to bunks and eat soy hulls.

“Take away the milk. Run the calves through the chute and stick calf weaners in their noses so they can’t nurse, but they can graze,” he says. “They will walk around less in the penned area than they do in traditional or fenceline weaning situations. That reduction in energy lowers maintenance requirements and allows more time at the feedbunk.”

Fluharty notes that newly weaned calves produce adrenaline with stress, which

suppresses their immune systems. As they are exposed to pathogens and get sick, maintenance requirements rise.

“Calves eat less and more sporadically, growth rates drop and they may even die,” he says. “When calves get pneumonia, that leaves lung lesions and leads to lower daily gains, lighter carcass weights and marbling, and less-tender steaks. Healthy animals deposit more marbling.”

About one-third of all feedlot steers will have lung lesions, he adds. Even if treated, lung damage has already occurred. When

Minimize Feeding Costs

Ruminant nutritionist provides tips ranging from starting calves on feed to managing the bunk to targeting the right niche.

by Barb Baylor Anderson, field editor



PHOTO BY MATT CALDWELL

calves have respiratory disease, they take nutrients from marbling to mount an immune response. Marbling ability may be reduced twice.

Handling creates additional stress and can cause shrink. Fluharty says factors that affect shrink are time in transit, distance, age, sex and fat. To minimize stress, he advises producers to not move calves in bad weather and avoid using electric prods. Corrals and chutes should be in proper repair, and calves should be fed only dry feed and no salt prior to shipping.

“Once calves arrive at the new location, provide electrolytes in the drinking water to resupply potassium and sodium salts,” he says. “Cattle may not want to eat right after they arrive, but they are always thirsty. If cattle are hauled more than 24-36 hours, supplementing B vitamins will support muscle function and feed intake, but this is the only time to feed B vitamins.”

Don’t just start calves on hay and limit energy, either. Fluharty says calves need grain in their receiving diets. He recommends adding Amaferm® to increase lactic acid

uptake, rumen bacteria growth and enzyme production, and to generate a 5% feed efficiency increase.

“Stressed calves and old people benefit from nutrition supplements. They have high nutritional requirements,” he says. “Increase nutrient density upon arrival, or use trainer animals. Research shows calves will come to the bunk more often with dry cows on Day 1. Increased feed and nutrient intake leads to increased performance and decreased disease.”

A more nutrient-dense diet allows bacteria in the rumen to provide the amino acids needed to get calves off to a better start. Higher protein also helps create higher average daily gain during the first week.

“Don’t worry about cost per pound the first two weeks in the feedlot. If a concentrated diet is fed, efficiency is three-to-one,” says Fluharty.

“I want two receiving diets; one for the first week that is high in protein — 20%-24% with an increase in minerals,” he continues. “The second week, cut feed intake to 14% protein through the rest of the receiving period. Excess protein stresses the animal through its kidneys.”

Fluharty says typical receiving diets for feedlot steers are 14%-16% crude protein, once they reach 2% of body weight on a dry-matter basis, 40%-60% corn silage for dietary fiber with distillers’ grains at 20% dry matter. Soybean meal and/or urea can be included.

“Protein concentration must be sufficient to allow for reduced feed intake during the first two weeks following arrival. Supplement vitamin E and zinc, selenium and copper,” he says. “Feedlot receiving diets need to be formulated to meet the energy and protein requirements of animals undergoing periods of reduced feed intake. If animals become sick, recovery time is reduced and marbling ability is not severely reduced.”

Control the feedbunk for efficient gain

What is the worst way to feed cattle from an animal health and cost-of-gain standpoint?

That would be to keep them constantly in mud, feed them at different times during the day with a high-forage/low-concentrate diet, and substitute feed ingredients indiscriminately, says Fluharty, who specializes in feedlot nutrition and animal growth.

He urged beef producers to instead

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manage the feedbunk for maximum efficient gain.

“Feedbunk management is the most important operation to maximize performance, minimize digestive disorders and keep animals eating a consistent amount of feed,” he says. “Use a feedbunk-management protocol and scoring system. Start with a slick bunk. Give them what they will consume in 24 hours and adjust in 5% increments rather than having bunks with feed always available. Our research found a better average daily gain (ADG) of 3.78 versus 2.07.”

However, Fluharty adds, not all average daily gain is the same. With a 100% forage diet, the acetate that results is used in fatty acid synthesis, creating backfat and seam fat. Propionate goes to glucose in the liver and butyrate goes to development of fatty acid.

The better option, he says, is a grain-based diet. Producers see increased propionate production relative to acetate, which results in higher levels of glucose in the liver. More glucose leads to greater average daily gain, more lean-tissue growth per day and ultimately more marbling.

In addition, Fluharty says visceral organs increase in weight when there is more forage in the diet. Greater organ weights result in decreased feed efficiency and dressing percentage. Maintenance of visceral organs requires 40%-50% of an animal's daily energy intake and 30%-40% of an animal's daily protein intake with a forage-based diet. Plus, feeding forages results in less microbial protein per pound of dry matter consumed than grain diets. Long-stemmed hay reduces digestible energy intake as the animal expends energy ruminating.

“Increasing dietary crude protein in receiving diets does not increase dry-matter intake, but it does improve average daily gain and feed efficiency,” he says. “Moist grain with more surface area is most rapidly digested, including wheat, barley, and high-moisture and steam-flaked corn. You can go from a Yield Grade (YG) 3 to 4 or 5 when you add grain.”

Fluharty warns acute acidosis can occur with highly processed grain diets, followed by bloat in some situations. Animals may become listless, anorexic, get diarrhea, have decreased blood bicarbonate and sometimes increased blood lactate. Also, varied feed intake increases bacterial populations and lactate production, decreases rumination and lowers blood pH.

“Prevent acidosis with increased frequency of feeding and increased percent

of roughage in the diet. Feed complementary grain sources to increase the time of ruminal digestion so that less starch is available at any one time. Implement a gradual diet adaptation period of 10-14 days, and use products that minimize the effect of lactic acid-producing organisms,” he says.

He encourages producers to respect the hierarchy of nutrient use. Nutrients first go toward maintenance, then development, growth, lactation, reproduction and fattening. Feedlot steers use as much as 70%-80% of feed intake for maintenance, leaving only 20%-30% for growth.

“When feed intake is controlled daily so there is just enough feed for every animal to be full, they eat in excess of maintenance and gain weight more efficiently because there are fewer or no days when they eat less than maintenance, leaving nothing for gain,” he says. “Knowing the amount fed per animal daily is critical to optimizing efficiency of feed use for gain.”

Maximize lean growth with grain-based diet

If you want a growing diet that maximizes efficiency throughout the life of your feedlot animals, a grain-based diet is the way to go, says Fluharty. He says grain rations with as little forage as possible help maximize use of propionate within the rumen so animals can make the best use of feed for lean growth.

“Growing diets are used for bone and muscle growth for small-framed breeds like Angus,” he says. “Many producers think they need to feed as much as the animals will take



PHOTO BY MATT CALDWELL

with high-grain diets, but that is not the case. The animals can also use haylage and corn silage in feedlot situations with moderately high-fiber feedstuffs and byproducts. Gains may average about 2.2 pounds (lb.) per day with 50%-70% grain and 30%-50% fiber.”

Fluharty notes grass-fed cattle grow more slowly and have a higher maintenance energy cost because of the low digestibility of forage that leads to greater visceral organ weights. Grain-fed cattle also get visceral fat but grow faster and more efficiently in a feedlot.

“Fat is not all the same. High-concentrate diets fed at restricted intakes may be used effectively because they do not lead to more seam and back fat. Seam fat is the largest fat depot between the muscles. By the time



► Feedbunk management can help maximize performance, minimize digestive disorders and improve intake consistency.

PHOTO BY KASEY BROWN

steers have $\frac{1}{10}$ of an inch of backfat, there is already a lot of seam fat, and that means weight fat is greatest in the rib and chuck areas," he says.

Fluharty adds forage in feedlots to prevent digestive disorders.

"Roughage particles should be relatively small when highly processed grain diets are fed, or undigested grain will pass through the rumen," he says. "It also helps maximize net energy for gain intake by cattle. Don't provide unlimited access to a round bale of hay. Feed has to be in the bunk and be controlled."

To maximize lean growth and feed efficiency, Fluharty recommends a prescription or programmed-intake corn-based diet.

"We want to control pattern of growth, improve efficiency and change composition of growth. Try to get the cattle to gain with propionate and limit the visceral organ weight," he explains. "If you feed cattle *ad libitum* all the way through, it costs you unnecessary feed. But you don't want to over-restrict your cattle on feed, either."

An automated feed-delivery system can reduce human error, he says, as well as limit feed waste and metabolic disorders that may decrease feed efficiency.

"You can control intake and improve feed efficiency and reduce overall feed costs. Work with a nutritionist to increase gain over time and remove visceral fat, increase propionate and marble well," he says. "Increasing levels of protein must be fed as intake is reduced or it reduces the animal's ability for lean tissue growth. You end up with fatter, lighter-weight cattle."

Consider grain coproducts

When it comes to coproducts, no one size fits all, says Fluharty. "U.S. corn use for ethanol production has increased significantly, which has created more coproduct availability for animal feed rations, but differences in coproducts exist. To be sure producers feed for the best response, they need to have coproduct batches analyzed."

Fluharty says aflatoxins may not all be destroyed during ethanol production, which can cause a reduced growth rate. In addition, variance in both nutrient and sulfuric acid levels can occur at the ethanol plant level. For example, sulfuric acid levels may range from 0.5% to 1.8% sulfur, while the maximum tolerable level for cattle feed use is 0.4% of diet dry matter.

"Modified, wet, dried and distillers'

Manage to maximize grading and pricing

The right genetics combined with sound management can improve profitability when it comes time to market feedlot cattle, says Francis Fluharty, ruminant nutrition professor at Ohio State University.

"Quality grades predict palatability, and palatability is determined by fat. It is the overall combination of traits that lead to eating satisfaction — taste and flavor, tenderness, juiciness and mouth feel," says Fluharty. "Prime grade is not based on days on feed. Quality grade is determined by marbling, and genetics affect the ability to marble. Research suggests the right marbling comes when animals are 167 to 236 days old and weigh 835 to 945 pounds."

Fluharty says many animals that don't grade USDA Choice at an advanced age probably would have graded Choice at a younger age with management and diet strategies that used a high-concentrate diet earlier in life. High levels of dietary vitamin A can reduce marbling by 30%.

In addition, beef gets darker as animals get older, which affects grade.

"Poor disposition and use of implants have a negative impact on quality grade, too," he says. "Prior health history can influence carcass quality. Sick cattle mean lower quality grades."

Yield grades predict the cutability, or the amount of boneless, closely trimmed retail cuts that can be obtained from the carcass. Yield grade is determined by criteria that include subcutaneous fat thickness at the 12th rib; ribeye area; hot carcass weight; and kidney, pelvic and heart fat.

"Both quality and yield grade go into grid pricing, and more than 70% of carcasses are marketed on that basis. Grid pricing varies from plant to plant and day to day," he says. "Plants look at a number of factors like the Choice-Select spread and drop credit. Choice [Yield Grade] 3 is used as the base in grid pricing to determine premiums and discounts with various yield and quality grades."

Fluharty says the value difference between a USDA Prime YG 1 and a USDA Select YG 5 can be as much as \$400, depending on the price and weight of the carcasses. He says YG 2s or lower YG 3s are the goal, and the main objective is to avoid YG 4 and 5 carcasses.

"Don't chase premiums, but avoid discounts," he says. "If 50%-60% of your cattle grade Choice and are efficient, you are OK in some regions of the U.S. Other regions require 80% or more Choice cattle. Control the diet, days on feed and amount of fat on them. You also need to know the market, and use risk-management tools."

A heavier carcass does not always mean more profit, especially if the cattle don't have the genetics to perform, he adds. For example, if a steer appears to gain \$60 in carcass value with more days on feed, count in yardage and feed costs. With \$136 more additional cost of gain, you end up with a \$76 loss of revenue. That is the loss from a YG 3 to a YG 4 and 1,210 lb. to 1,300 lb.

In the future, Fluharty predicts discounts will be greater for cattle that are too small [ribeyes less than 10 square inches (sq. in.)] or too large (ribeyes larger than 13 or 14 sq. in.) for the case and excessively fat. Use of growth promoters and feed additives may also negatively impact pricing.

"Know what affects the eating quality of your beef product before you use it," Fluharty says.

solubles all have varied dry matter. Small producers who buy the coproduct one time and use it in a feeding program without doing sulfur analyses could be in trouble. They may incorrectly estimate the percentage," he says. "Large feedlots with several loads a day can probably run 0.6%-0.7% with no problem if intake fluctuates."

Coproduct fat levels also vary. Fluharty says the more distillers' fed, the greater the chance of urinary calculi if phosphorus is being supplemented. Full-fat distillers' grain research shows fat should not be more than 6%, as fat will coat feed particles in the rumen. Coated particles do not allow bacteria to attach in the rumen and ultimately lower feed digestibility.

"On a growing forage diet, keep the dietary fat level below 4%. Otherwise fiber-

digesting bacteria attach to the forage and the fat limits the attachment," he explains. "With grain feedlot diets and fat at 6%, you can increase the diet energy density. That may be beneficial to animal performance, especially in hot weather."

Adding too much fat or too much sulfur can result in abnormal animal behavior. Resulting hydrogen sulfide gas can be eructated by the animal and then inhaled. The gas directly enters circulation through the pulmonary system and may disrupt energy metabolism in the brain.

To prevent such problems, Fluharty says producers can add monensin (Rumensin®) to rations.

"Animals fed 60% dried distillers' grains in the ration along with monensin and

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haylage may see rumen pH fall six to 14 hours after feeding. The hydrogen sulfide gas is then more acceptable, and cattle have the best gain," says Fluharty, citing feedlot research.

Coproduct particle size is another consideration. A big difference exists between corn kernel and dried distillers' grains sizes, for example. Fluharty recommends a smaller particle size for quicker movement through the rumen, as propionate increases glucose production, which means better average daily gain and marbling. Dried distillers' grains can be 20%-60% of the ration.

"Between 20% and 40%, there is no difference in average daily gain. Average daily gain and feed to gain are better at a 40% dried distillers' inclusion rate than at zero versus an all-corn diet," says Fluharty. "About 25% is good. But at 50%, protein

and sulfur may be too high. Crude protein also is a negative, depending on how you value and handle manure. While there are no differences in marbling scores or ribeye, more research needs to be done before we can recommend more than 40% distillers' grains be fed."

Fluharty adds corn gluten is another option that is 80% ruminally degradable and improves fiber digestibility. Soy hulls are highly digestible, and used for fiber, but not energy or protein.

Manage for proper protein digestion

Providing the right protein source improves forage digestion and animal performance. Fluharty told producers the goal with protein is to feed the bacteria in the rumen. Microbial protein provides 50% of the amino acids used by an animal

on a forage diet, and 80% of the amino acids needed for an animal on a high-grain diet.

"Ruminant animals in grazing situations need to maximize forage digestion in order to increase performance parameters such as average daily gain or milk production," he says. "Ruminally speaking, degradable intake protein is the first limiting nutrient for beef cattle grazing low-quality forages. Highly available protein sources are urea, soybean meal and corn gluten feed."

Nitrogen is needed for microbial growth and fermentation in the rumen, and is broken down into ammonia. Fluharty says some combination of proteins is needed to maintain ammonia.

"From a cost and protein percentage standpoint, there is never a cheaper or higher protein source than urea in a high-grain diet," he says. "Substituting urea for a portion of degradable, true protein in supplements for range cows is a viable option. It also has applications for growing diets that are high in forage, as long as forage is adequate to accompany a lick tank with urea."

Fluharty says urea is the most misunderstood protein supplement available, noting it is used most efficiently on high-energy, low-protein diets where there are readily available carbohydrates. Urea increases diet organic matter digestion with straw and increases microbial protein synthesis.

"When urea is fed, sulfur, potassium and phosphorus must be supplemented or available in sufficient quantities. If you are feeding any distillers' grains, you may already have enough phosphorus. You need to check the rest of the ration for those minerals," he says.

Producers also must be aware urea can create ammonia toxicity and reduce feed intake. Fluharty advises never exceeding 1% of diet dry matter and one-third of the total dietary protein with urea. Overfeeding urea can increase rumen pH and lead to ammonia toxicity.

"Don't use urea in less than 300-pound calves or on highly stressed newly arrived feedlot cattle, either," he says. "The first three to four days, cattle are getting used to a new feed. For receiving calves with no urea, use soybean meal to provide ruminant-available nitrogen."

Other concerns with nutrient sources include heat-damaged proteins from the milling process. Any browning creates

High-value niche may be best for U.S. beef

U.S. beef producers may find the best future bang for their buck is to concentrate on producing high-value, top-quality meat for home and abroad. As part of a recent webinar series on minimizing feeding costs, Ohio State University ruminant nutrition professor Francis Fluharty told producers that to know what they must produce, they must understand consumer demand.

"What is our role? The U.S. needs to be the high-value producer. We are not the biggest kid on the block, but we have the highest quality," he says. "There will be 400 megacities by 2050, mostly in Asia, compared with two megacities in 1950. We are adding 51 million middle-class consumers per year, primarily in Asia, and they have an interest in high-quality beef."

Per capita beef consumption currently is highest in Uruguay, followed by Argentina, Brazil and the United States. Top-value beef markets are Japan, Hong Kong, Canada, Mexico and South Korea.

"We only export about 25% of our middle-meat cuts. End meats are the rest of the volume, and consumers in these countries want fat and flavor," he says. "Big packers allow for this export market to succeed and add hundreds of dollars to cattle prices because they are able to ship not only all of the demanded cuts, but also the byproducts worldwide."

Yet, as demand rises, U.S. beef inventory is at its lowest level in 50 years. Fluharty says cow herds are shrinking in the Midwest, Southeast and Southwest and expanding in the Upper Plains and Northwest. As U.S. inventory declines, the Brazilian cattle herd is growing. Brazil is the second-largest producer with 190 million head, compared with 92 million head in the United States.

"Brazil has several cow herds with more than 20,000 head. They are looking at better fertility and are adding Angus and other English breeds into their mix," says Fluharty. "Where row crops occur, livestock production follows in Brazil. Both will increase over the next decade."

While domestic consumers will continue to buy beef for flavor, Fluharty says U.S. consumers are very price-conscious.

"Consumers expect palatability and tenderness, and that drives consumer satisfaction. In addition, the beef industry has expanded to offer all kinds of choices, from natural to all grass-fed and more," he says. "We better listen to our consumers because some element of health and wellness is important to three-quarters of American shoppers."

Fluharty notes that U.S. families with a female head of household 50 years old or older are most likely to purchase branded meat products. Households in the West are more likely to purchase branded meat than in the East.

"Consumers are beginning to look for 100% traceability. Niche markets exist because we have a safe beef supply, good feeding and management technologies, and a packing system that makes money selling byproducts overseas," he says.

off-spec product. “It still gets marketed, but you get what you pay for. If you use it as a protein supplement with cows and heifers, you may lose animals or see prolapses. Send in a feed sample so you know whether you are feeding less protein than animals need.”

Remember, protein requirements change with age and size. Fluharty says young animals need a higher percent of protein in

their diet due to rapid tissue growth and low feed intake.

“The actual amount of protein requirement and intake increases as body frame or projected mature body size increases. Higher-growth-potential animals have bigger intestines and higher protein requirements,” he says. “Also, animals that grow faster or milk more than their counterparts have a higher gram protein

requirement. As the animal grows, the gram protein requirement increases, but the percent of protein in the diet needed to meet the requirement decreases. I like to see a 13.5% to 14% protein from a variety of sources, not just urea.”



Editor's Note: A former National Junior Angus Board member, Barb Baylor Anderson is a freelancer from Edwardsville, Ill.