

The Color of Grass:

Clint Peck Senior Editor | Sep 01, 2006 | beefmagazine.com

As pastures and native ranges turn from green to brown, the nutritional value of standing and stockpiled forage supplies takes on a whole new meaning. When New Mexico State University beef cattle specialist Clay Mathis looks at fall cow nutrition, he begins by asking the rancher a simple question. “Is there enough forage out there for her to eat all she can?”

- If the answer is “no,” the alternatives are obvious — wean calves early and reduce cow numbers, or find a way to increase the amount of available forage.
- If the answer is “yes,” or once the manager finds a way to balance available forage with animal numbers, Mathis asks what might seem like a strange follow-up: “What color is the forage — green or brown?” It’s an astute question because as pastures and native ranges turn from green to brown, the nutritional value of standing and stockpiled forage supplies takes on a whole new meaning.

An immediate next question is, “Are the cows in adequate body condition?” This is critical, especially as producers look at grazing prospects, and the degree of supplementation, to make the best use of available pasture and range forages as the cattle head into winter.

“Most ranchers know intuitively how far available forages will last given the degree of grazing pressure on them,” Mathis says. But it’s not always as easy to size up the nutritive value of the forages available after drought. In fact, in times of drought, the forage that does grow can offer slightly better quality than when more normal growth occurs.

“We’ve certainly seen this when we’ve looked at the mineral content of forages following a droughty summer in New Mexico,” he says. “Often, in the Southwest, on ranches that do a really good job of balancing forage supply with the needs of the cow herd, producers report heavier weaning weights following a droughty summer, and they attribute the extra pounds to ‘stronger’ forage quality.” Nevertheless, Mathis says when the grass is brown you’re probably going to be short on protein.

“The rule of thumb is: brown grass is probably less than about 7% protein,” he says.

Intake/digestibility issues

When crude protein (CP) in forage falls below about 7%, intake declines rapidly as a result of a deficiency of nitrogen (protein) in the rumen, which limits microbial activity. Thus, even with enough forage for a cow to consume a full feed, there's probably not enough protein available for body condition maintenance at any point in time. “Lower-quality forage remains in the rumen longer before exiting and is less digestible,” Mathis adds.

In about any region, cows grazing those forages are likely to show a positive response to protein supplementation. If forage quality is less than 7% and a protein supplement is provided, grazing intake and forage digestibility will be improved.

Mathis likes to include a dietary protein supplement of 32% or higher, supplied at 0.1-0.3% of body weight/day for cows with a 4.5 or better body condition score when forage is brown. “By fixing the protein-deficiency problem, we've increased the cow's energy intake substantially,” he says. “If the cow is too thin, I'd look at a 28-32% protein — fed at 0.25-0.4% of body weight/day.”

Then the question is — what do ranchers supplement with — and how much?

There are numerous commercial feed supplements available to producers, and an unlimited number of options in developing custom supplements. It may be difficult to decide which supplement type (i.e., energy, protein, etc.) best fits the goals of a particular production system. “To optimize intake and digestion of low-quality forages, supplements should contain more than 30% CP,” Mathis explains. “This is true even though supplements with less than 30% CP still may yield a slight enhancement in forage intake” (See Table 1). In the “bad, bad scenario” where there's not enough forage for the cows, and the forages are brown, Mathis says it's a matter of balancing supplemental protein and additional energy. In that case, he suggests a 20-28% protein supplement fed at 0.3-0.5% of body weight/day.

“As your energy needs increase, it's better to feed a lower-protein supplement and feed more of it,” he says. “But if the forage is brown, we still must ensure the rumen microbes function as efficiently as possible.”

Energy-feeding tips

While most dietary energy limitations can be managed with adequate forages, increasing energy intake with a direct energy supplement (low protein, high energy) may be cost-effective in some situations. Mathis says energy supplements typically cost less per ton than protein supplements, but response can vary.

“A common result of feeding supplemental energy is the ‘substitution effect,’ which occurs when the supplemental feed reduces forage intake,” Mathis says.

He likes fiber-based energy sources such as wheat-mids, soy hulls, even grass or alfalfa hay. Corn gluten feed works well, too.

“If fed at more than 5 lbs./head/day, corn gluten feed should be tested for sulfur content to avoid polio problems,” he adds.

A chief concern when feeding additional energy to beef cows consuming forage is the supplement's starch content. Research demonstrates high-starch feeds (i.e., corn, grain sorghum, wheat, barley, etc.) can suppress forage intake and digestion, especially when protein is deficient. “Ultimately this reduces the energy the cattle derive from the grazed forage or hay,” Mathis says. “To truly supplement energy to grazing cattle, highly digestible fiber sources are generally more desirable, as fiber sources don't elicit the same negative effect on forage intake.”

Any time substitution occurs, the animal's energy intake may not increase to the desired level because of a corresponding reduction in forage intake.

As a general rule, 1 lb. of high-starch feed reduces forage dry matter intake by 1-1½ lbs. Supplementing energy with highly digestible fiber sources will have a lesser impact on forage intake until the feeding rate exceeds about 6 lbs./day. Feeding high levels of hay may also cause substitution. Generally, 1 lb. of hay replaces 1 lb. of pasture forage.

Researchers have demonstrated a significant decline in reproductive performance when the frequency of feeding a high-starch grain cube was decreased from daily to twice/week. Thus, energy supplements should be consumed daily or every other day (see sidebar below).

Cost-effective supplementation

Supplemental feeds for livestock are often classified as energy or protein supplements by considering the percentage of protein alone. This is because the primary feedstuffs used in supplements are generally 75-90% total digestible nutrients (TDN; energy).

“Yet, the protein content of high-protein feedstuffs like cottonseed meal or soybean meal are 3-5 times higher than commonly used sources of energy like corn or sorghum grain,” Mathis continues. Because of this relationship, the primary difference in nutrient content of a 20% and 40% protein supplement is the protein concentration, not energy.

Developing a cost-effective supplementation program is dependent on identifying the nutrient most limiting to productivity, and providing it at the lowest cost. If protein is deficient (i.e., less than 7% CP), supplements should be evaluated based on cost/lb. of protein.

“Similarly, if forage supply is limited and energy is deficient, supplements should be evaluated based on cost/lb. of TDN,” Mathis explains. “Sometimes, both energy and protein are limiting, so a balanced approach to provide supplemental protein and energy is recommended.”

Generally, high-protein feedstuffs are more expensive than lower-protein supplements, grains or energy byproducts. It's critical to evaluate potential supplements based on cost per unit of nutrient needed.

“When considering supplemental feeding, it’s important that money is spent on nutrients that don’t limit animal performance,” Mathis concludes. “The primary considerations when purchasing or formulating supplements for grazing cattle are forage supply, forage CP content and cow condition.”

Table 1. Average improvement in low-quality forage (<7% crude protein) intake in response to various concentrations of crude protein in supplements fed in 31 trials.

Supplement protein content, %	Improvement in forage intake above unsupplemented, %
Less than 15	3
15 to 20	10
20 to 30	21
Greater than 30	44

Source: Heldt, 1998.

Feeding frequency

Feeding frequency (daily vs. 3x/week vs. 1x/week) of some supplements may affect animal response. New Mexico and Texas research indicates hand feeding high-protein supplements once/week doesn’t significantly reduce performance when compared to feeding supplement three times/week or daily. This is important because transportation and labor costs are reduced with less frequent distribution.

As a conservative rule of thumb, supplements containing 30% protein or more can be delivered twice/week without a significant performance decline. So, instead of feeding 2 lbs. of a protein supplement 7 days/week, 7 lbs. of the same supplement can be fed twice/week.