



## Maximizing Hay Supplies When Feeding Beef Cattle During Limited Forage Situations

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Beef cattle operations in the Southwest utilize extensive pasture systems, which often make feeding hay difficult. However, during periods of drought or inadequate forage production, it may become necessary to utilize hay as a forage replacement for all or part of the herd. Unfortunately, in New Mexico, hay prices are higher compared to many other regions in the United States, and feeding hay can significantly increase the annual cow cost. When hay is utilized to replace forage, it imperative to maximize the use of purchased hay and minimize associated waste or excessive feeding.

### Hay Quality and Cow Requirements

If the operation has a defined calving season, supplementation and forage replacement strategies are much easier to implement. If part of the herd must be culled due to drought, it may be beneficial to retain those at similar stages of age and pregnancy to better manage the feeding program. It is also important to consider that replacement females who are still growing will require additional supplementation. Hay quality can greatly impact cow performance and hay should be tested prior to determining a feeding strategy.

lbs or Mcal	1100 lb mature cow (mod milk)	Heifer (800 lbs)	1100 lb mature cow (mid 1/3)	Supplied by Poor Quality	Supplied by Good Quality
<b>TDN</b>	<b>16.5</b>	<b>14.1</b>	<b>9.7</b>	<b>7.4</b>	<b>12.5</b>
<b>NEm</b>	<b>15.8</b>	<b>14.3</b>	<b>8.5</b>	<b>6.4</b>	<b>11.7</b>
<b>CP</b>	<b>2.7</b>	<b>2.5</b>	<b>1.4</b>	<b>1.1</b>	<b>2.2</b>

**Table 1:** Example of Total Digestible Nutrients (TDN), Net Energy for Maintenance (NEm), and Crude Protein (CP) requirements for 1100 lb mature cow with moderate milk during lactation (column 2), an 800 lb heifer (column 3), and an 1100 lb mature cow in the middle 3<sup>rd</sup> of gestation (column 4). Columns 5 and 6 show nutrient supply when fed poor and good quality hay, respectively.

Poor quality hay: Dry matter = 92%, TDN (as fed) = 49%, NEm (as fed) = 0.42 Mcal/lb; CP = 7% (as fed); cow consumption = 1.5% of body weight.

Good quality hay: Dry matter = 92%, TDN (as fed) = 62%, NEm (as fed) = 0.58 Mcal/lb; CP = 11% (as fed); cow consumption = 2.0% of body weight.

Table 1 highlights the challenges with mixed groups of cattle and the impacts of hay quality. Poor hay quality, especially low protein hay, can be a double edge sword by not fulfilling cow requirements and also depressing hay intake. It is also worth noting, that even the good quality hay can be deficient for growing heifers and cows in early lactation. In New Mexico, the most likely time producers would consider hay as an option for limited forage would be through the winter months in hopes for moisture in the spring. Thus, if planning to feed cattle through limited forage conditions, it is important to plan for physiological state and consider options should the limited forage situation persist. As cattle near parturition and during early lactation, nutrient demands and subsequent hay requirements will increase.

## Strategies to Maximize Hay Utilization

### *Limit Feeding*

Limiting the amount of hay fed by controlling distribution of hay or limiting access to hay will reduce hay consumption. Both strategies can be difficult with larger herds in extensive pastures. Limit feeding centers on the ability to control the amount of hay that is fed to cattle each day. To limit feed, hay must be distributed daily and spread out sufficiently to prevent dominant animals from overconsuming. Thus, it is important to have an accurate weight of the hay bales; size of the bale is not a reliable indicator of weight. Cattle that are fed hay free-choice will overconsume and waste more hay than those that are limit fed.

Another strategy is to limit access to hay. This is probably most applicable to smaller herds or smaller pastures. Table 2 shows cow performance in late gestation when access to hay is limited. With as little as 3 hours of access to hay per day, cows still maintained body condition score (BCS) while only consuming 17.6 lbs DM/head/day versus 27 lbs when allowed access to hay for 9 hours. It is worth noting that all groups demonstrated an increase in weight gain, but monitoring BCS is the most reliable indicator in pregnant cows because increased weight can stem from a growing calf while the cow is still losing condition. Additionally, cows that are being limit fed may exhibit decreased mass of the internal organs and appear thinner yet still be at an adequate body condition score. A major challenge for limited access is providing sufficient feeding space for the entire herd otherwise dominant cattle will prevent others from eating.

Item	3 hr Access	6 hr Access	9 hr Access
Initial BW, lbs	1257	1280	1284
Final BW, lbs	1376	1440	1458
Initial BCS	5.7	5.6	5.6
Final BCS	5.8	6.0	6.3
Hay Use lb DM/head/day	17.6	24.0	27

**Table 2.** Cow performance with limited access to hay. Data are an average of 2 experiments summarized from Miller et al. 2007.

### *Hay Feeder Design*

When planning to feed hay, producers should also account for waste, and feeder design can greatly impact the amount of waste. Work from Oklahoma State University demonstrated that waste associate with feeder type can range from 5% to as much as 20%. Cone feeders were the most efficient followed by round bale feeders that had sheeting (13% waste) and hay rings with no sheeting

having over 20% hay loss. Table 3 shows the economic impact of hay waste assuming the hay is purchased at \$160/ton and the cow herd averages 1100 lbs that require 25 lbs of hay/head/day. At 20% waste, cow cost can increase by \$40/head/month.

	Waste/head/day, lbs	Cost/head/day	Cost/100 head/day	Cost/100 head/month
5% Hay Waste	1.25	\$0.10	\$10	\$300
20% Hay Waste	5	\$0.40	\$40	\$1,200

**Table 3.** Assuming hay costs are \$160/ton and cow requirements are 25 pounds of hay/day. Impacts of 5% and 20% hay waste on pounds of hay wasted per day (column 2), cost of waste per head per day (column 3), cost per 100 head per day (column 4), and cost per 100 head per month (column 5).

### Further Considerations

Managing cattle nutrition through limited forage conditions can be challenging for producers regardless of herd size. If producers elect to utilize hay to replace forage, feeding decisions can significantly impact hay utilization. In the worst case scenarios presented above, management decisions can impact hay utilization by as much as 10-15 pounds hay/head/day when cows are allowed ad libitum access to hay provided in feeders with the most waste. Hay quality and weight should also be considered when making purchasing decisions. Buying hay by the bale is the least desirable; purchasing tested hay on a per ton basis is optimum.

### References

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