The Drought: Commodity Feeding

Randy Wiedmeier, Livestock Specialist, Southcentral Area

When a dry weather pattern results in chronic shortages of livestock forages, livestock producers are left with few options, i.e.; buy extra hay, early wean suckling animals, sell extra reproducing females. Buying extra hay is problematic during drought periods due to scarcity, high price, and often low quality. In addition, although off-farm hay purchases can add nutrients to the soil on your farm, such hay can also be contaminated with weed seeds and insects. During such circumstances, the value of nutrients in high-priced hay often exceeds that of commodities such as cereal grains and co-byproducts. The following table shows the difference in the value of energy (TDN) and crude protein (CP) of **drought-priced hay** compared to some commonly used commodities. This is an example. Prices can vary considerably:

Feed	$/ton	$/lb.	TDN, %	Cost/lb. TDN	CP, % DM	Cost/lb. CP
Grass Hay	155.55	.0780	(÷ .50) 50.0	= .160	(.078÷.07) 7.0	1.11
Corn Grain	170.00	.0850	(÷ .80) 80.0	= **.106**	(.085÷.08) 8.0	1.06
Corn DDG	200.00	.1000	(÷ .80) 80.0	= .125	(.100÷.29) 29.0	**.35**

The arithmetic in the table above illustrates that commodities can be used to replace and/or extend hay in the diets of our ruminant livestock when hay prices are high. However, caution must be used when using commodities at high rates in ruminant livestock diets: 1) Most commodities digest/ferment at much more rapid rate and more extensively compared to hays, so proper adaptation and careful feeding management are necessary. 2) Ruminant livestock require some course fiber in their diet to remain healthy and, although some commodities are quite high in fiber, it is usually not in an appropriate form to promote proper rumen function, e.g., effective neutral detergent fiber (eNDF). 3) The physical and nutrient density of commodities is much higher than that of most forages, so the volume of a commodity-based diet is much less than that of a hay-based diet. Consequently, animals may not feel full even though nutrient requirements are being met. 4) The mineral and vitamin composition of commodities is usually quite different from that of most hays and other forages. Some corn co-byproducts contain very high concentrations of sulfur and proper care must be taken in that regard. The following table illustrates some of these differences:

Feed	TDN, % of DM	Digestion Rate, %/hr	Digestion Extent, % of DM	Calcium, % of DM	Phosphorus, % of DM	Potassium, % of DM	Sulfur, % of DM	Zinc, ppm	Copper, ppm	Selenium, ppm
Commodity Mix	90	25	85	.25	.38	.50	.24	40	15	.20
Mixed Hay	50	5	50	.45	.15	1.50	.11	20	5	.05
Requirement	**55**	**----**	**----**	**.40**	**.20**	**.70**	**.15**	**30**	**10**	**.10**

Least-cost diet formulation involves comparing the **cost per unit of nutrient** of the feeds available and then selecting the feeds that will results in the nutrient requirements of the animal being met at the **"least cost".** In the Cost/Unit of Nutrient table above, corn grain is by far the least expensive source of energy (TDN) ($.106/lb. of TDN versus $.16 for the grass hay and $.125 for corn DDG). This is important since **80% of livestock diet cost is associated with supplying needed energy**. If protein supplementation is required, corn DDG is by far the cheapest source of protein ($.35/lb. protein versus $1.11 for the mixed hay and $1.06 for corn grain).

The following is a **least-cost diet** for 1200 lb. beef cows producing about 10 lbs. of milk/day using the feeds in the cost/unit of nutrient table above (balanced for TDN and crude protein only):

Feed	lbs./cow/day	$/cow/day
Corn Grain	11.25	.96
Corn DDG	5.00	.50
GrassHay	0	---------
Total	**16.25**	**1.46**

As predicted, corn grain and corn DDG were selected for the least-cost diet($1.46/cow/day). Although the energy and protein requirements of the cows are being met, this is **NOT** a healthy diet for the cows: 1) the rapid digestion/fermentation rate of this diet would result in digestive upsets 2) at only 16.25 lbs. of diet intake (about 4 gallons), a cow with a 40 gallon rumen is going to be looking for something to fill her belly. **A hay-only diet for these cows would cost $2.26/cow/day, $.80/cow/day difference.**

A 1200 lb. cow requires about 5.0 lbs. of eNDF/day (20% of DM), which helps minimize digestive upsets. eNDF is course, low density fiber that causes the cow to chew and ruminate more, and improves rumen function. Forages such as hay are excellent sources of eNDF. Commodities are normally not good sources of eNDF. The following table shows the same least-cost diet as above but with an eNDF requirement of 5.0 lb./cow/day:

Feed	lbs./cow/day	$/cow/day
Corn Grain	9.27	.79
Corn DDG	3.49	.35
Grass Hay	6.98	.54
Total	**19.74**	**1.68**

The inclusion of the mixed hay resulted in an increase in price of **$.22/cow/day,** but is a much safer diet than the least-cost diet. The next question, "How do we deliver this diet to the cows?" If mixing equipment is available, a total mixed ration (TMR) is an option, but that is seldom the case on most southern Missouri beef farms. If the hay is ground to accommodate a TMR, although the NDF (fiber) of the hay is unchanged, the eNDF is reduced because the cows will chew and ruminate less. The corn grain and corn DDG could be proportionately mixed and fed at (9.27 +3.49) 12.76 lbs./cow/day, which would have to accomplished in feed bunks to avoid waste. This could require considerable time if being accomplished with 5 gallon buckets. The next problem would be limit feeding the grass hay portion of the diet. If small square bales were been fed, simply counting and delivering bales of a known weight is all that would be necessary. However, large bale packages are more problematic. One method is to allow cows time-limited access to a large drylot equipped with an ample supply of large bale feeders. Although there is variation, cows usually consume long-stem hay at a rate of about **10.0 lbs./hour**. So allowing the cows access to the grass hay for about 45 minutes/day is one method of limiting intake. Another method is to limit access to hay using an electric polywire.