1-1-2001

Feeding and Supplementing of Low-Quality Forages as an Alternative for Wintering Beef Cows

R. D. Wiedmeier

Dale R. Zobell
Utah State University

C. Burrell

Utah State University Extension electronic publishing

FEEDING AND SUPPLEMENTATION OF LOW-QUALITY FORAGES AS AN ALTERNATIVE FOR WINTERING BEEF COWS

R. D. Wiedmeier*, *D. R. ZoBell* and *C. Burrell
Department of Animal, Dairy and Veterinary Sciences, Utah State University

September 2001 **AG 511**

INTRODUCTION

Feed can make up to two-thirds of the cow/calf producers's input costs In order to remain viable it is essential that feed costs be controlled and/or reduced. Low-quality forages are an alternative feed source which could be utilized due to their lower costs. There are, however, nutritional characteristics of low-quality forages that must be understood; this publication will address these issues and how to manage for optimum forage utilization.

LOW QUALITY FORAGES AS AN ALTERNATIVE FEED

Characteristics of a low quality roughage are:

- Low in crude protein, less than 6% crude protein (CP)
- High in fiber, greater than 70% neutral detergent fiber (NDF)
- Low in energy, less than 45% total digestible nutrients (TDN)

Table 1 shows four examples of low-quality forages, which are low in crude protein and energy relative to animal requirements, and readily available in the Intermountain west.

Table 1. Examples of Low-Quality Forage.

Forage	Crude Protein (%)	NDF (%)	TDN (%)
Meadow hay	8.5	60	58
Wheat straw	4.0	80	40
Wheatgrass range, post ripe	3.5	75	42
Weathered grass hay	5.8	70	45

With the exception of the meadow hay, the other three forages are relatively low in

energy and protein. By comparison, alfalfa hay has a TDN value of approx. 63% and CP of 16% and higher, depending on stage when harvested.

Table 2 compares wheat straw to the requirements of an 1100 lb cow under maintenance conditions. The wheat straw would provide only 57% of the CP requirement but 82% of the energy. The requirements for the cow have not been adjusted for cold weather or for lower than average body condition. Palatability of the wheat straw could be a concern as the cow may not consume it to the extent necessary.

Table 2. Nutrients in Feed/Nutrients Required.

Variable	**CP** (%)	**TDN** (%)	**Ca** (%)	**P** (%)	**Vitamin A** (KIU/lb)
Wheat Straw	4.0	40.0	0.3	0.07	0.9
1000 lb cow, mid-gestation	7.0	48.8	0.19	0.19	1.5
	X	X	X	X	X

Low-quality forages could be considered for wintering beef cows when:

- Droughts or other natural disasters reduce on-ranch hay production.
- Increasing cow numbers is deemed economically prudent and ranch carrying capacity is limited.
- It is more economical to sell hay produced on the ranch than to feed it to cows.
- Permits to graze public or private winter range or pasture are curtailed.

How should low-quality forages be fed to beef cows?

Most low-quality forages should be supplemented. Feeding large amounts of low-quality forages, such as the wheat straw example in Table 2, for extended periods of time, without proper supplementation, will result in two negative effects:

- Cows will lose a great deal of weight, over 2 lbs per day.
- A relatively high percentage of the cows could develop abomasal impaction, which is generally fatal (up to 25%).

I. Supplementing Dry Pregnant Cows in Mid Gestation

Types of Supplements That Should Be Used When Feeding Low-quality Forages

Deficiencies in most nutrients, including protein and energ**y,** are imposed on pregnant cows when they are fed low-quality forages. (Table 2). Since energy is the most costly nutrient requirement, it would be logical to rectify that deficiency first. In ruminant animals, like cattle,

protein and energy nutrition are strongly linked. This is particularly true with diets composed mainly of low-quality forages. When feeding low-quality forages, particular attention must be paid to the requirements of the microorganisms. Those that ferment forage fiber are very critical.

In the case of low-quality forage diets, the energy released from the forage by the fermentation of fiber may have to account for 70 to 90% of the total energy requirement of the cow.

It follows, then, that the most practical feeds that a producer would consider as supplements for cows fed low-quality forage diets would be protein supplements, such as soybean meal or cottonseed meal, or energy supplements such as cereal grains like corn, barley or oats.

Protein supplements can increase intake, which is partially due to improved protein nutrition of the cow, but mainly due to improved fermentation of the forage by ruminal microorganisms. On the other hand, supplementing low-quality forages with high-energy feeds, such as cereal grains, generally result in a decrease in forage intake. This is likely the result of the rapidly fermented starches in these feeds actually interfering with the ruminal microorganisms that ferment the fiber from forages.

Table 3 represents a compilation of information regarding supplementation programs for beef cows wintered on wheat straw-based diets. Four types of supplements are presented: concentrated protein sources, higher quality forages, cereal grains, and cereal grain-urea (NPN) mixtures. Effects of the supplementation programs on both digestibility and intake of low-quality forage are reported so total digestible dry matter (DDM) intake is taken into account. In addition, total crude protein (CP) intakes are reported. Total DDM intake and CP intake for each supplement program are then compared to the approximate requirement of an 1100-1200 lb beef cow in mid-gestation. The DDM intake and CP requirements are for cows in reasonably good body condition (cow body weight gain not required) with a winter coat of hair and weather not too inclement.

Table 3 is useful in assisting one to choose a supplement program. No supplement is not an option. If one fed this low-quality forage for a very long period, the cows would lose tremendous amounts of weight since only half of the DDM intake and a third of the CP requirements are met.

When low-quality forage intake and digestibility as the amount of supplemental soybean meal is increased from .9 to 2.7 lbs of DM (1.0 to 3.0 lbs as-fed), intake is increased by nearly 32% while digestibility is increased by 20%. Thus DDM intake from the low-quality forage was increased by nearly 58 % when the wheat straw diet was supplemented with 2.7 lbs (DM) from soybean meal. Most of this improvement is due to stimulation of the ruminal microorganisms that utilize fiber.

There are many considerations on which supplementation strategy to employ for the SBM example. Feeding .9 lbs would result in only 7.0 lbs of DDM intake while the requirement is 10.0 lbs. There is also a deficiency of CP. The cow would lose weight (about 1.0 lb per day) but would not likely suffer from abomasal impaction. Feeding 1.8 lbs (DM) of soybean meal results in 9.5 lbs of DDM intake, which is only slightly deficient. Intake of crude protein is adequate. This program could be used if the cows were in better than average body condition. Feeding 2.7 lbs (DM) of soybean meal would result in a small excess of DDM and CP intake. This would be a good program if the cows needed to gain a small amount of body weight through this period or if the weather was extremely harsh.

Supplementing the cows with 2.7 lbs (DM) of soybean meal, the requirements for energy and protein are met. However, in low-quality forages there are at least three other nutrient deficiencies of importance: phosphorus, vitamin A, and trace minerals. Table 4 illustrates this problem:

Table 3. Effects of supplement types on intake and digestibility of wheat straw by 1100-1200 lb dry, pregnant beefs during mid-gestation.

Supplement Type	Supple. DMI lbs	Supple. digest., %	DDMI[a] from supp, lbs	CP intake from suppl, lbs	LQF[b] DM I lbs	LQF digest., %	DDM I from LQF, lbs	CP intake from LQF, lbs	Total DDMI lbs	DDM required	Total CP intake, lbs	CP Required
None	None	None	None	None	13.0	40	5.2	.52	5.2	10.0	.52	1.4
SBM[c]	.9	90	.81	.44	14.5	43	6.2	.58	7.0	10.0	1.0	1.4
SBM	1.8	90	1.6	.88	16.8	47	7.9	.67	9.5	10.0	1.6	1.4
SBM	2.7	90	2.4	1.32	17.2	48	8.2	.69	10.6	10.0	2.0	1.4
NPN-MOL[d]	1.8	80	1.4	.86	15.0	45	6.8	.60	8.2	10.0	1.46	1.4
Alfalfa hay[e]	5.4	60	3.2	.97	16.0	47	7.5	.64	10.7	10.0	1.61	1.4
HQ grass hay[f]	6.3	60	3.8	.76	15.0	45	6.8	.60	10.6	10.0	1.36	1.4
Corn[g]	1.8	95	1.7	.18	14.0	41	5.7	.56	7.4	10.0	.74	1.4
Corn	3.6	95	3.4	.36	12.8	39	5.0	.51	8.4	10.0	.87	1.4
Corn	5.4	95	5.1	.54	11.5	35	4.0	.46	9.1	10.0	1.0	1.4
Corn	7.2	95	6.8	.72	10.5	32	3.4	.42	10.2	10.0	1.14	1.4
Barley[h]	7.2	90	6.5	.94	11.0	33	3.6	.44	10.1	10.0	1.38	1.4
40% CP Barley-Urea[i]	1.8	81	1.5	.72	15.5	46	7.1	.62	8.6	10.0	1.34	1.4
20% CP Barley-Urea[j]	4.5	88	4.0	.90	14.3	42	6.0	.57	10.0	10.0	1.47	1.4

[a]DDM = Digestible dry matter intake; [b]LQF = Low-quality forage; [c]SBM = Soybean meal (49% CP, dry basis); [d]NPN-MOL = Urea-Molasses mix, 48% CP protein (30% from NPN); [e]Alfalfa hay; 18% CP, 60% TDN; [f]High-quality grass hay; 12% CP, 60% TDN; [g]Corn (ground); 10% CP, 95% TDN; [h]Barley (ground); 13% CP, 90% TDN
[i]Barley-Urea mix; 40% CP, 81% TDN; [j]Barley-Urea mix; 20% CP, 88% TDN.

Table 4. Supplementing Straw with Soybean Meal

Feedstuff	DM/day (lbs)	CP (lbs)	DDM (lbs)	Ca (lbs)	P (lbs)	Vit A (KIU)
SBM	2.7	1.32	2.43	.008	.018	0
Straw	17.2	.69	8.26	.052	.012	7.0
Total	19.9	2.01	10.7	.06	.03	7.0
Required		1.40	10.0	.04	.037	25.0
		OK	OK	OK	X	X

In addition to the phosphorus and vitamin A deficiencies associated with this diet, other trace minerals will also be deficient (zinc, manganese, copper, etc.). These deficiencies must be addressed or the performance of the cows will eventually be compromised. In some cases, performance could be greatly decreased. The cost of supplying these nutrients is usually less than $.05/cow/day.

In Table 3 there is a NPN-MOL supplement that indicates that 1.8 lbs DM of this supplement would not result in as high a DDM intake as 1.8 lbs of soybean meal, even though the CP content of the two supplements are nearly the same. The major difference is the type of CP associated with these supplements. The CP of the soybean meal supplement is almost entirely true or natural protein composed of amino acids. The CP of the NPN-MOL supplement is composed mainly of nonprotein nitrogen (NPN). This type of CP generally works well as a supplement for the rapidly fermented starches of the cereal grain-based diets commonly fed in feedlots, but it is not nearly as effective with the slowly fermented fibrous carbohydrates of low-quality forages. However, the use of the NPN-MOL did stimulate DDM intake of the low-quality forage. Although intake and digestibility would not be stimulated enough to meet the cows requirement, enough nutrition would be supplied for cows in above average body condition that could afford to lose a little body weight during this period. Ordinarily, these mixtures of urea and molasses are much less expensive than natural protein sources, and are conveniently delivered.

The final consideration for making the choice between a natural protein supplement and a high-NPN supplement would be the quality of the low-quality forage. The wheat straw in Table 3 is very low for nutrients of the low-quality forages. The poorer the quality of the low-quality forage, and the poorer the body condition of the cattle, the more natural protein supplements are indicated. If the cows are in reasonably good body condition and forage is of a higher quality (5-6% CP, 45-47% TDN), less expensive CP supplements, higher in NPN, may be adequate.

Alfalfa and Other Higher Quality Forages as Supplements

Alfalfa hay or high-quality grass hay should also be considered as supplements for cows being fed low-quality forage diets. Supplementing with either 5.4 lbs (6.0 lbs as-fed) alfalfa hay or 6.3 lbs (7.0 lbs as-fed) grass hay results in an adequate energy and protein intake. Hay is readily consumed by almost all cows and most ranches have the equipment necessary to feed hay, therefore supplementing hay has distinct advantages. Hay supplements are of a density similar to that of low-quality forages in the rumen. As a result there is much more intermingling and mixing of the forage and the supplement than is the case with more dense supplements such as soybean meal. Hay feeding does require more labor than using a self-fed supplement.

Sometimes hay feeding can result in an uneven distribution of supplements to individual cows since the more aggressive cows will likely consume more than their fair share when small amounts of hay are offered once per day. Self-fed CP supplements such as soybean meal, salt meals, urea-molasses lick-tanks or blocks generally offer cows equal access to supplements because supplements are available at all times. Often supplementing cows that are grazing low-quality forages on public lands with hay is prohibited.

CONCENTRATES AS A SUPPLEMENT

Table 3 also shows the effects of feeding increasing amounts of corn to cows offered low-quality forage diets. There would be a slight increase in low-quality forage intake and digestibility when a small amount of corn (1.8 lbs DM) is fed. However, as the amount of corn fed increases, the intake and digestibility of the low-quality forage decreases. The high level of corn (7.2 lbs DM) results in adequate DDM intake with most of the DDM, from the corn. All of these diets are deficient in CP because corn is a low-protein cereal grain. Feeding 7.2 lbs (DM) of barley results in a slight increase in DDM intake from low-quality forage, compared to feeding the same amount of corn. The diet also provided adequate CP because barley is higher in CP than corn. This added protein not only stimulates the ruminal microorganisms to digest more fiber but provides the cow with adequate protein. A reduction of DDM intake would result when fairly large amounts of cereal grains are fed to cows consuming low-quality forages. Rapidly fermented carbohydrates of cereal grains interfere with ruminal microorganisms that ferment fiber. This phenomenon is called a negative-associative effect. Cereal grains are often considered for supplementing cows fed low-quality forage due to their relatively inexpensive cost. Also, another consideration when using cereal grains in this manner is that they may be used to actually limit the intake of low-quality forages. This may be an advantage when there is a limited supply of forage and conservation is indicated. Barley-urea mixtures described in Table 3 can be utilized to winter beef cows on low-quality forage diets.

SUPPLEMENTATION GUIDELINES

The supplementation program selected should be determined by considering the following factors:

1. Body condition of the cows
    - Need to maintain present body condition
    - Could lose a little body condition
    - Required to gain some body condition

When some body condition gain is necessary, supplements containing mostly natural protein will be required. This is particularly true with extremely low-quality forages.

2. Quality of forage being used
    - With higher quality, low-quality forages (5-6% CP, 45-47% TDN), supplements higher in non-protein nitrogen may be adequate.
    - With lower, low-quality forages (3-4% CP, 38-43% TDN), supplements composed mainly of natural protein will be needed.
    - If cows have access to some higher protein browse, along with the low-quality forage, supplements higher in non-protein nitrogen may be adequate.

3. Price

- As the level of natural protein in a supplement increases, the price generally increases.
- Select a supplement that will result in the desired effect at the cheapest price.

4. Convenience

- The feeding of hay supplements may be precluded by distance and/or labor and mechanization limitations.
- The delivery of soybean meal or cereal grain-urea mixtures can be accomplished using self-fed salt meals. This method of delivery can be quite inexpensive compared to other methods of delivery. However, there are drawbacks that must also be considered. In many areas of the Intermountain West the salt content of the soil and/or water is already quite high and using salt meals would add to this burden. Salt meals must always be situated close to water. This will increase the impact damage due to animal congregation, and will limit the practice of using physical separation of supplements and water to improve animal distribution when cows are grazing low-quality forages on winter range. Additionally, salt meals will drastically increase water consumption by cows. If there is ample live water available this is not a problem, but if water is being hauled this can add substantially to costs. Other problems with salt meals are losses associated with wind and wildlife, mainly large birds such as crows. Other self-fed methods of delivery, such as blocking, rectify these disadvantages. However, blocking is expensive and cannot be accomplished with farm equipment. Blocking can increase costs by $25 to $30/ton.

WHICH SUPPLEMENTATION PROGRAM TO CHOOSE

- Feeding 1.8 lbs DM of soybean meal could be considered if the cows being fed were in better than average body condition, however, energy provided is slightly deficient. Protein is normally provided in excess of the requirement, which is often necessary with low-quality forage diets.

- Feeding 2.7 lbs DM of soybean meal could be considered for cows in slightly below average body condition or for cows in good body condition experiencing harsher weather conditions. Energy provided is approximately 6% above requirement and protein is provided in excess.

- Using natural protein supplements, like soybean meal, with low-quality forages assumes an ample forage supply because about half of the improvement in DDM intake is due to increased intake. If the supply of low-quality forage is limited due to factors like sparseness or snow cover, the result would be a deficiency in energy.

- Both alfalfa and grass hay supplements would result in adequate energy (DDM) and protein intake. The hays described in Table 3 are good to excellent quality. Using poor quality alfalfa hay (14-15% CP, 50% TDN) or poor quality grass hay (6-8% CP, 45-50% TDN), to supplement low-quality forage diets, will not result in the desired effect. An ample supply of low-quality forage is necessary.

- None of the supplemental levels of corn would supply adequate amounts of both DDM and CP. However, feeding 7.2 lbs DM of barley resulted in adequate amounts of both nutrients. This was due to the higher CP content of barley compared to corn. In Table 3 the intake of low-quality forage was substantially reduced with corn compared to supplementation with natural proteins. The reduction in forage intake is substantial, nearly 56% lower than supplementation with soybean meal. Therefore, corn would be the preferred supplement if the low-quality forage supply was limited.

- The moderate protein (20% CP) barley-urea mixture resulted in adequate intake of both DDM and CP. Similar mixtures of cereal grains like corn, sorghum, wheat or oats would provide similar results. Notice that this supplementation program required about 20% less low-quality forage than programs emphasizing natural proteins.

COST OF SUPPLEMENTATION

Table 5 compares five of the supplementation programs from Table 3 that resulted in adequate DDM and CP intake. In order to compare the cost of each program, a dollar value is assigned to each feed ingredient and calculated, providing the cost per cow per day.

Table 5. Comparison of the cost of five supplementation alternatives

Supplement				Low Quality Forage				Total $/cow/day
feed	lbs/day*	$/lb*	$/day*	feed	lbs/day*	$/lb*	$/day*	
soybean meal (2.7 DM)	3.0 x	.11 =	.33 +	straw (17.2 DM)	19.0 x	.0125=	.24	.57
alfalfa hay (5.4 DM)	6.0 x	.045=	.27 +	straw (16.0 DM)	17.8 x	.0125=	.22	.49
grass hay (6.3 DM)	7.0 x	.035=	.25 +	straw (15.0 DM)	16.7 x	.0125=	.21	.46
barley (7.2 DM)	8.0 x	.06 =	.48 +	straw (11.0 DM)	12.2 x	.0125=	.15	.63
barley-urea (4.5 DM)	5.0 x	.07 =	.35 +	straw (14.3 DM)	15.9 x	.0125=	.20	.55

*Calculated on an as-fed basis

COST OF UTILIZING OTHER FORAGES

Feeding (10.0 lbs DM ÷ .60) =16.7 lbs DM, or 18.5 lbs as-fed, of either hay, would supply sufficient DDM and CP.

Table 6. Cost of feeding hay

Feed	lbs/day		$/lb.	Total $/cow/day
Alfalfa hay	18.5	x	.045=	.83
Grass hay	18.5	x	.035=	.65

Using alfalfa hay appears to be out of the question. However, a grass hay diet is competitive in price compared to some of the supplemented straw diets, particularly if higher vitamin-mineral supplement costs are added to the straw-based diets (Table 7).

COST OF SUPPLEMENTING VITAMINS AND MINERALS

Table 7. Cost of diets + vitamin/mineral supplements

Feed	Main Feed Cost, $/cow/day		Supplement Cost, $/cow/day		Total
soybean meal-straw	.57	+	.05	=	.62
alfalfa hay-straw	.49	+	.05	=	.54
grass hay-straw	.46	+	.05	=	.51
barley-straw	.63	+	.05	=	.68
barley/urea-straw	.55	+	.05	=	.60
grass hay only	.65	+	.02	=	.67

Delivery costs would also have to be considered. Self-fed salt meals would be a very convenient and inexpensive delivery method for soybean meal, barley, etc. If blocking was necessary to deliver these types of feeds, costs could be increased by $.0125/lb.

Comparing the diets in Table 8, the most expensive winter feeding program was the purchase of alfalfa hay and feeding 18.5 lbs/cow/day. The least expensive program was a low-quality forage diet supplemented with high quality grass hay. The difference in price between these two programs is (.91 - .57)= $.34/cow/day. Thus, for a 100-day wintering period this would amount to a $34 difference in annual cow cost. Therefore, low-quality forages are worth considering in certain situations.

II. Supplementing Dry, Pregnant Cows in Late Gestation

Nutrient requirements increase substantially during the last third of gestation. The requirements for this phase of production increases to 13.0 lbs of DDM intake and 1.7 lbs of CP.

Table 3 showed that some of the diets provided at least 1.7 lbs of CP but none of the diets provide 13.0 lbs. DDM. Would increasing the amount of supplementation, intake and digestibility of the straw meet requirements for late gestation? This probably would not occur . If the amount of soybean meal fed was increased from 2.7 lbs to 3.6 lbs (DMB) there would be only a slight increase in the intake and digestibility of the low-quality forage because the maximum potential digestibility and intake have been achieved with 2.7 lbs. (DMB) soybean meal. Feeding more soybean meal would increase the DDM and CP intake but the increase would be coming mainly from the supplement, not the low-quality forage. Since natural protein supplements, like soybean meal, are expensive, using them as energy supplements would not be economically prudent.

Table 8. Increasing SBM to increase energy intake.

Supple.	Supple. DM Intake	DDM[a] from Supple.	DDM from LQF[b]	CP from Supple.	CP from LQF[a]	Total DDM Intake, lbs.	DDM Required, lbs.	Total CP intake, lbs.	CP Required, lbs.
SBM[c]	2.7	2.4	8.2	1.32	.69	10.6	13.0	2.0	1.7
SBM	3.6	3.2	8.5	1.76	.70	11.7	13.0	2.5	1.7

[a]DDM = Digestible dry matter
[b]LQF = Low-quality forage, wheat straw
[c]SBM = Soybean meal

The DDM intake from straw in Table 8 increased only slightly (.3 lbs) with the addition of another pound of soybean meal. Adding another pound of soybean meal would increase the feed cost per cow per day from $.62 to $.74. The cost per unit of DDM would increase from (.62 ÷ 10.6) =$.058 to (.74 ÷ 11.7)= $.063.

To meet the DDM requirements for cows in late gestation using soybean meal and wheat straw, 5.0 lbs (DM) soybean meal would have to be fed (Table 9). Since DDM intake from wheat straw is maximized, all additional DDM required would have to come from soybean meal.

Table 9. Supplementing SBM in a straw-based diet.

Supple.	Supple. DM Intake	DDM[a] from Supple.	DDM from LQF[b]	CP from Supple.	CP from LQF[a]	Total DDM Intake, lbs	DDM Required, lbs	Total CP intake, lbs	CP Required, lbs
SBM[c]	5.0	4.5	8.5	2.45	.70	13.0	13.0	3.2	1.7

[a]DDM = Digestible dry matter
[b]LQF = Low-quality forage, wheat straw
[c]SBM = Soybean meal

The cost of this program would be:

SBM	Straw
(5.0 ÷ .90) =5.6 lbs x $.11/lb +	19.5 lbs x $.0125 = $.86/cow/day

If 24.0 lbs of the grass hay were fed, the cows would receive the 13.0 lbs of DDM required plus 2.45 lbs CP. If the market value of the grass is $.035/lb ($70/ton), the cost would be $.84/cow/day. If there are sufficient supplies of the grass hay, there is no need to feed straw and SBM.

Another consideration would be feeding more alfalfa hay or grass hay along with the wheat straw in an attempt to meet nutrient requirements for late gestation. Assuming maximum DDM intake from the wheat straw to be 8.5 lbs the amount of alfalfa would have to be consumed to supply the requirement of 13.0 lbs of DDM would be calculated as follows: The cow would require (13.0 - 8.5) = 4.5 lbs of DDM from alfalfa or (4.5 ÷ .60)= 7.5 lbs of alfalfa hay (DM). At a maximum DM digestibility of wheat straw of 48.5%, 8.5 lbs of DDM represents (8.5 ÷ .485) = 17.5 lbs of DM from wheat straw.

Will a 1100-1200 lb cow consume 7.5 lbs DM from alfalfa plus 17.5 lbs DM from wheat straw (25.0 lbs DM) daily on a consistent basis? Ifgood quality forage diet intakes are approximately 2.25% of body weight, an 1150 lb cow should be able to consume about (1150 x .0225) = 25.8 lbs of DM. However, many low-quality forages are extremely bulky and rumen fill factors can limit intake. Cows can consistently maintain DM intakes from wheat straw of 17.0 to 17.5 lbs when supplementing with dense protein supplements, such as soybean or cottonseed meal. However, cows usually maintain straw DM intakes from 14.0 to 16.0 lbs. when supplemented with higher quality forages. Cows consuming 7.5 lbs DM alfalfa would likely maintain a DM intake from wheat straw of about 14.0 lbs The digestibility of the straw would likely be maintained at about 48%. Therefore, a diet of 7.5 lbs DM alfalfa hay + 14.0 lbs DM wheat straw would result in only 11.2 lbs of DDM and 1.91 lbs CP. This diet would not meet the cows DDM requirement for late gestation. The problem of reduced straw intake would be even more pronounced if cows were supplemented with high-quality grass since grass hays are generally even more bulky than alfalfa hays. If the amount of high-quality forage fed were increased, the amount of low-quality forage consumed would decrease incrementally until there would no longer be any advantage to its use.

Another option would be the consideration of feeding more of the cereal grain-urea mixture supplements during late gestation. Feeding increasing amounts of “starchy” supplements, like cereal grains, or “sugary” supplements, such as molasses, will incrementally decrease both intake and digestibility of low-quality forages.

To use low-quality forages in the diet of beef cows during late gestation, the potential digestibility and/or intake must be increased. The potential digestibility and intake of low-quality forages can be increased by using higher quality, low-quality forages.

CONCLUSION

The feeding of low-quality forages can decrease costs of production, however, attention to feeding properly balanced rations is critical for success. It is advisable to consult with a knowledgeable nutritionist if exploring this possibility.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Jack M. Payne, Vice-President and Director, Cooperative Extension Service, Utah State University, Logan, Utah. (EP/DF/09-01)