Cooperative Extension System

Cattle Producer's Library

Cow-Calf Section CL1140

Substituting Grain for Hay

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Wintering rations for cows and calves commonly are largely roughage. However, substituting grain for roughage may be economical depending upon availability and price relationships between the two. Drought often shifts the economics toward grain, because more energy per ton can be transported, compared to hay.

Depending upon the goals of a cow wintering or calf growing program, producers must determine how to provide an adequate ration at the least possible cost. To find this answer, the producer needs to know:

1. The animals' daily nutrient requirements.
2. The nutritive value of common feeds available.
3. The substitution value of available feeds in relation to the nutritive properties and cost.

Table 1 is a comparison of various grains with several common hays, based upon their energy value. On this basis, corn grain is worth 1.9 times as much as average quality prairie hay. Said another way, 1 pound of corn will replace 1.9 pounds of prairie hay in a wintering ration.

Table 2 compares the value of various grains per hundredweight with the cost per ton of hay. For example, if good quality alfalfa hay cost $80 per ton delivered, you could pay up to $6.80 for corn or $6.40 for barley delivered in a form ready to feed. If grain can be bought for less than the value indicated in Table 2, substituting grain for part of the roughage in the ration would be economical.

These examples value only the energy in the feed. Protein is not considered, nor are minerals and vitamins. It should be recognized that the ration must be balanced for all of the nutrients if it is expected to perform adequately at the energy level provided.

Grains may also create some possible feeding problems. It is suggested in most publications that wheat make up no more than one-half of the grain to be fed, because of possible digestive disturbances. Because of the need for roughage in the ration, one-half pound of hay per 100 pounds of body weight is suggested as a minimum roughage. This may need to be increased during severe cold weather.

When substituting values are a possibility, it may be well for producers to plan for winter feed programs during the hay harvesting season.

Table 1. Energy value of various grains compared to prairie, sorghum-sudan, alfalfa, and mixed hay.*

		Amount of hay that can be replaced by 1 pound of grain			
Grain	**TDN**	**Prairie hay**	**Sorghum-sudan**	**Alfalfa hay**	**Mixed hay***
		(47% TDN)	(56% TDN)	(60% TDN)	(53% TDN)
Corn	91	1.9	1.6	1.5	1.7
Barley	83	1.8	1.5	1.4	1.5
Oats	76	1.6	1.3	1.2	1.4
Wheat	88	1.9	1.6	1.5	1.6
Ear corn	80	1.7	1.4	1.3	1.5

*Mixed hay is equal to 50 percent prairie and 50 percent alfalfa hay.

Table 2. Comparative value of hay* and grain for wintering cows or ewes.

Cost per	Cost per cwt delivered				
ton hay	Corn	Barley	Oats	Wheat	Ear corn
($)	($)	($)	($)	($)	($)
30	2.55	2.40	2.10	2.55	2.25
40	3.40	3.20	2.80	3.40	3.00
50	4.25	4.00	3.50	4.25	3.75
60	5.10	4.80	4.20	5.10	4.50
70	5.95	5.60	4.90	5.95	5.25
80	6.80	6.40	5.60	6.80	6.00
90	7.65	7.20	6.30	7.65	6.75
100	8.50	8.00	7.00	8.50	7.50

*Hay is mixed hay equal to 50 percent prairie and 50 percent alfalfa hay.

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