Rice or barley straw for pregnant beef cows

John L. Hull ☐ William N. Garrett ☐ John R. Dunbar

Low phosphorus and energy intake by cows fed barley straw caused calving difficulties; but cows fed rice-straw rations had no difficulty and produced calves within the normal weight range.

When straw is fed as a major portion of a growing ration for calves or yearlings, there is little if any energy available for growth after maintenance requirements have been met. But the use of straw for pregnant cows might be more suitable: cows can usually handle large volumes of roughage, provided protein, mineral, and vitamin requirements are met. Furthermore, cows have a 25 percent lower protein requirement than growing animals and need less costly protein supplementation. And even though a pregnant cow's nutrient requirement increases significantly during the last 25 to 30 percent of the gestation period, research has shown that cows beginning gestation in good flesh can lose 25 to 50 kilograms (50 to 100 pounds) during the last half of gestation with little or no effect on the birth weights of their calves and, if placed in a high level of nutrition following calving, have no rebreeding problems.

Feeding trials

Barley and rice straw was fed pregnant beef cows, during the last trimester of pregnancy, in rations that were formulated by a computer using nutrient composition values based on previous studies. Nutrient specifications and restrictions were placed on the rations: a minimum value of 50 megacalories net energy for maintenance per hundredweight, 8 percent crude protein, 0.22 percent calcium, and 0.2 percent phosphorus along with either 75 or 85 percent straw was forced into the rations (see table 1).

After the spring grass season and weaning of their calves, pregnant mature Hereford and Hereford X Angus cows were brought to Davis from the University of California's Sierra Foothill Range Field Station (SFRFS). The cows were identified, randomly assigned to three straw rations with eight head per treatment, and housed in individual pens. Feed was available at all times. Mature pregnant Hereford cows maintained at the SFRFS either on irrigated pasture with no supplements or on dry native range supplemented with cottonseed meal (1 kilogram per head per day during the last month of pregnancy) provided a basis for comparison with more conventional management practices.

Feeding the 85 percent barley-straw ration resulted in cow weight loss over the 127-day feeding period and severe problems at calving time (table 2). As calving time approached, the cows fed barley straw became weak, stopped eating, and eventually some could not rise. Three calved without assistance. The remainder of the calves were taken by Caesarean section. Calves appeared normal, but were slightly smaller than those of the cows on other rations. Five calves and only three cows survived on the ration of 85 percent barley straw. An analysis of the feed indicated all straw rations were above the 8 percent crude protein requirements and the .2 percent required for calcium. However, the barley-straw diet

was low in phosphorus (.16 percent, compared with .22 percent in the rice-straw rations). National Research Council requirements are 12 to 13 grams or 0.18 percent phosphorus per day for pregnant cows. Barley-straw feed consumption was only 6.4 kilograms (14.2 pounds) per day, making the phosphorus intake below the recommended allowance. Low phosphorus along with low energy intake probably caused the calving difficulties of cows on the barley-straw ration.

The rice-straw fed cows had no difficulty calving and their precalving weight gains were adequate. The birth weights of their calves were within the normal weight range.

In comparing the performance of cows fed rice straw with that of cows consuming two different types of forage at the SFRFS (see table 3), there were no differences that can be attributed to diet. The heavier weaning weights of the calves previously fed rice straw is probably due to the cows being Hereford X Angus and the good feed conditions in the area where they were wintered after calving. The rebreeding data indicate that the precalving diet had no adverse effect on the cows during the following breeding season.

Conclusions

Rice straw is palatable and a satisfactory feed for pregnant beef cows, provided protein, mineral, and vitamin requirements are met. Diets containing high levels of barley straw are unpalatable even when supplemented with protein, minerals, and vitamins. They should not be fed to pregnant beef cows unless special precautions are taken to ensure that adequate quantities of nutrients will be consumed.

J. L. Hull is Specialist, Department of Animal Science, W.N. Garrett is Professor, Department of Animal Science, and J.R. Dunbar is Extension Animal Scientist, UC, Davis.

TABLE 1. Composition of Rice- and Barley- Straw Rations Fed Pregnant Cows

Ingredient	Rice- straw ration (% of ration)	Rice- or barley- straw ration (% of ration)
Straw	75.0	85.0
Alfalfa hay	3.7	0
Corn	7.1	2.9
Cottonseed meal	2.8	4.4
Molasses	10.0	6.5
Monosodium phosphate	0.4	0.2
Urea	1.0	1.0
Vitamin A	+	+
TOTAL	100.0	100.0

TABLE 2. Effects of Barley or Rice- Straw Feeding Regimes on Pregnant Beef Cows — 127- Day Trial

	Rations		
	85% barley straw	85% rice straw	75% rice straw
No. of cows	8*	8	8
Initial wt., kg	446(983)†	462 (1019)	454 (1001)
Final wt., kg	‡	514 (1133)	512 (1129)
Daily gain, kg §	0.13 (0.29)b**	0.41 (0.90)a	0.45 (0.99)a
Ration/day, kg	6.44 (14.20)	10.57 (23.31)	10.89 (24.01)
Birth wt. of calves, kg ††	26.8 (59.1)	32.7 (72.1)	34.5 (76.1)

* One animal died after 79 days of trial.
† Values in parentheses are in pounds.
‡ Cows were too weak to obtain a shrunk weight.
§ Based on full weights.
** Weights followed by different letters are significantly different (P>0.01).
†† Average for 5 calves born alive.

TABLE 3. Effects of Precalving Diet on Cow and Calf Weights and Cow Rebreeding

	Type of diet		
Cow data	Rice straw*	Dry range †	Irrigated Pasture
No. of cows	16	23	23
Wt. at weaning, kg June 77	458.6 (1011) ‡	473.4 (1044)	460.5 (1015)
Precalving wt., kg	513.0 (1131)	497.5 (1097)	516.6 (1139)
Oct. 77 [gain]	[54.4] (120)	[24.1] (53)	[56.1] (124)
Post calving wt., kg	452.4 (997)	456.1 (1006)	474.0 (1045)
Dec. 77 [loss]	[60.6] (134)	[41.4] (91)	[42.6] (94)
Wt. at weaning, kg	492.6 (1086)	486.75 (1073)	484.4 (1068)
June 78 [gain]	[40.2] (89)	[30.6] (67)	[10.4] (23)
Percent rebreeding	93	90	86
Calf data			
No. calves	14	20	21
Birth wt., kg	33.4 (74)	33.5 (74)	32.2 (71)
Weaning wt., § kg	218.6 (482)	(439)	191.9 (423)
ADG., kg	1.07 (2.36)	0.97 (2.14)	0.94 (2.07)

* Fed from 6/15 to 10/19 (126 days).
† Supplement fed starting one month precalving.
‡ Values in parentheses are in pounds.
§ 205 days.

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