if the grass fails and the cattle do not gain then side effects may show up. RAL may have an advantage here since side effects are not a problem even if the cattle do not gain as expected.

In light of research at other Experiment Stations it is felt that more data concerning implants during the finishing period needs to be developed before a conclusion can be made.

THE VALUE OF QUALITY HAY FOR WEANER CALVES

Larry Foster and R. J. Raleigh

As the practice of warm-up operations in growing lots for cattle destined for the feedlot becomes more popular, so does the increased use of alfalfa hay. There has been an increased use of alfalfa in the intermountain area of the west. Much of this increase can be attributed to the fact that good gain can be supported on alfalfa hay alone. The work by the Nevada Experiment Station indicates that good hay produced in the intermountain area is of a quality capable of supporting gains approaching 2 pounds per head per day. This is higher than often thought possible and can be accomplished on 100% alfalfa without serious bloat losses if good management is applied.

In 1968, the Squaw Butte Experiment Station drained 60 acres of meadow land at Section 5, drilled an irrigation well and planted alfalfa to study the various aspects of producing alfalfa on these lands. This report is the evaluation of different quality hay on the performance of weaner calves.

EXPERIMENTAL PROCEDURE

Three qualities of alfalfa hay were produced by cutting the hay at varying stages of growth. The 1/10 bloom was cut when 10% of the flowering head is in bloom. This is generally recognized by many producers as the time to cut alfalfa. The late bud alfalfa was cut just as the blooms were about ready to emerge. The bud stage was cut when the buds were well formed. This is also the point where tiller growth is well started at the base of the plant but not high enough to be cut by the mower (1 to 2 inches). The other hay types were mixtures of grass and alfalfa (mostly alfalfa) or grass and clover (mostly grass) cut at the regular time. The meadow hay was part of the regular hay crop put up in July.

The hays were analyzed for chemical constituents which could indicate their quality, e.g. protein, acid detergent fiber (ADF), crude fiber and total digestible nutrients (TDN). These figures are presented in Table 1. It should be pointed out that no single chemical constituent can be used to estimate the quality of a hay and, even in combination, may be inadequate. In general, the higher the protein, the lower the fiber constituents and the higher the TDN values, the higher the quality of the hay. This is more applicable to alfalfa hay than to the grass hays.

Table 1. Composition of hays 1/

Description	Stage of growth cut	90% Dry matter basis			
		Protein	ADF	Crude fiber	TDN 2/
Alfalfa	1/10 bloom	15.1	24.7	29.1	56.2
Alfalfa	Late bud	16.0	23.5	27.8	57.4
Alfalfa	Bud	18.0	18.9	23.0	58.6
Clover-grass		9.0	30.7	35.8	51.1
Alfalfa-grass		13.5	23.5	27.9	54.9
Meadow hay		7.48	30.0	----	----

One hundred twelve weaner calves from the Squaw Butte spring herd were used in this study. The study was initiated on December 2 and lasted for 113 days continuing through March 25. Animals were assigned to treatment on the basis of sex and weight. All animals were individually identified and were weighed individually every 28 days during the trial. All weights were taken after an overnight restriction from water. Electric heated automatic waterers were in each pen and salt and a salt-bonemeal mixture were available free choice at all times. Animals receiving additional supplement with meadow hay were fed once each morning. The meadow hay plus supplement treatment (1 lb. barley and 3/4 lb. cottonseed meal/head/day) was designed to give animal gains of approximately 0.75 pounds per day. These animals were used in a compensatory gain study the following summer (reported elsewhere in this publication).

All hay was baled and fed in the long form. Close attention was paid to the amount of hay fed. Sufficient hay was fed the first thing each morning to be cleaned up within a 24-hour period without restricting intake. The hay amounts were checked at least twice daily to be certain that no cattle were out of hay. The hay was weighed in daily with orts weighed out weekly. Hay was fed in covered bunks to protect it from snow and rain. Close observations were kept on the calves for possible bloat.

RESULTS AND DISCUSSION

The effect that different hays and stage of cuttings had on animal performance can be seen in Table 2. The stage of growth when alfalfa is cut had a marked effect on the gains of weaner calves. Calves receiving the 1/10 bloom cutting of alfalfa hay gained 1.20 pounds per day, whereas those receiving the late bud and bud stage cutting gained 1.43 and 1.75 pounds per day, respectively. The clover-grass, alfalfa-grass, and meadow hay fed groups gained 1.00, 1.24, and 0.81 pounds per day, respectively. This again reflects lower performance in cattle fed lower quality hays.

Feed efficiency on the 1/10 bloom, late bud, and bud stage alfalfa hays were 13.6, 10.3, and 9.1 pounds hay per pound of gain. This does reflect an improved feed efficiency with improved hay quality.

Table 2. Performance results

Kind of hay	Stage of growth cut	Daily intake	Avg. daily gain	lb. hay/ lb. gain	Cost of gain 1/	Value of hay 2/
		(lb.)	(lb.)	(lb.)	(¢)	($)
Alfalfa	1/10 bloom	16.3	1.20	13.6	17.0	25.00
Alfalfa	Late bud	14.8	1.43	10.3	12.9	33.00
Alfalfa	Bud	16.0	1.75	9.1	11.4	36.50
Clover-grass		15.6	1.00	15.5	19.4	21.50
Alfalfa-grass		16.2	1.24	13.0	16.5	26.25
Meadow hay + supplement 3/		10.4	0.81	12.9	12.8	-----

1/ Cost of gain figures include only cost of hay at $25/ton. Cost of production, handling, feeding, etc. vary from area to area and should be included in the individuals own situation.

2/ Value of hay is the relative amount an individual could pay for a ton of hay based on the feed efficiency when compared to 1/10 bloom alfalfa valued at $25/ton.

3/ Supplement consisted of 1 lb. barley and 3/4 lb. cottonseed meal/head/day.

The cost of gain (using a value for hay at $25/ton) indicates a difference of 5.6 cents per pound of gain between the 1/10 bloom and bud stage cutting. If the 1/10 bloom hay is used as a standard base (using $25/ton) and comparing other hays to it we find considerable difference in price that could be paid for the other hays. The bud stage harvest hay was worth $11.50 per ton more than the 1/10 bloom hay when using animal production as a criteria for quality .

Tonnage per acre figures were not available in this study. Even though it is expected that recut will weigh less, an extra cutting may be possible by shortening the time between each cutting. There was no bloat observed at any time on any of the animals during this study. Again, it should be pointed out that it is possible to feed this quality alfalfa hay without bloat provided good management is applied at all times particularly to eliminate variation in feeding times and amounts.

CONCLUSION

There was a marked relationship between animal performance and the quality of hay fed as reflected by laboratory measures of protein and energy. This is apparent with both legume and grass hays. These data indicate that high quality hay can support good gains for wintering calves without a grain supplement. It also points out that hays do vary in quality which is reflected in money returned to the feeder. Therefore, it appears that hay should, perhaps, be sold on the basis of quality rather than weight alone. This is being done in some areas now by producers who recognize that quality hay means faster more efficient gains for growing cattle.

Research is continuing in this area with further studies on hay quality and the physical form of the hay being fed in relation to animal performance.

THE EFFECT OF WINTER GAINS ON SUMMER PERFORMANCE

Larry Foster and R. J. Raleigh

Weaner calves wintered on meadow hay without supplementation make little or no gain. Feeding of 2-3 pounds of a protein-energy supplement will produce 1-1.5 pounds per head per day. Because of the concern over the effect of level of winter gain on summer gain, Castle, Wallace, and Bogart published an Oregon State University Technical Bulletin #56 in 1961. They concluded that the optimum economical feeding rate for wintering weaner calves to go on range the following summer was 1.66 pounds per day. Range supplements were not included in these evaluations.

The study reported here was designed to determine the influence of several rates of winter gain on performance of steers on summer range forage while receiving supplement.

EXPERIMENTAL PROCEDURE

Steers used during the summer phase had been on several different experiments and treatments during the winter. The winter studies involved four levels of nitrogen and two levels of energy all with and without the addition of trace minerals. Some steers were on a study involving different kinds and qualities of hay. The treatments were designed to give gains ranging from 0.50 to 1.75 pounds per day during the winter. The animals used in this study were the same group used to evaluate implants and all received summer range supplements.

All animals were handled in essentially the same manner, both winter and summer, except for the supplemental regimen or implant. Individual shrunk weights were taken every 28-days in all studies.

Linear regression analysis were made on the following comparisons; individual winter daily gain compared to summer daily gain; winter gain by lot compared to individual summer daily gain; initial summer weight compared to summer daily gain; and the final summer weight was compared to winter daily gain.

RESULTS AND DISCUSSION

The individual daily gains in the winter varied from 0.41 to 1.79 while the gains during the summer ranged from 1.81 to 5.13 pounds per head per day. Figure 1 shows the relationship between winter and summer daily gain. Within the units of this data no correlation existed between winter and summer daily gains. Figure 2 shows the relationship between final summer weight and winter daily gain. The lower line is weight at the end of the winter. This line was calculated using a 400 pound calf starting weight with 150-day winter using the respective daily gains shown on the graph. The upper line is final summer weight compared to the