

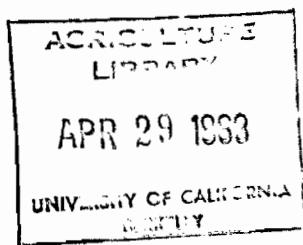


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BALED VS. CUBED ALFALFA HAY FED TO EWES AND LAMBS



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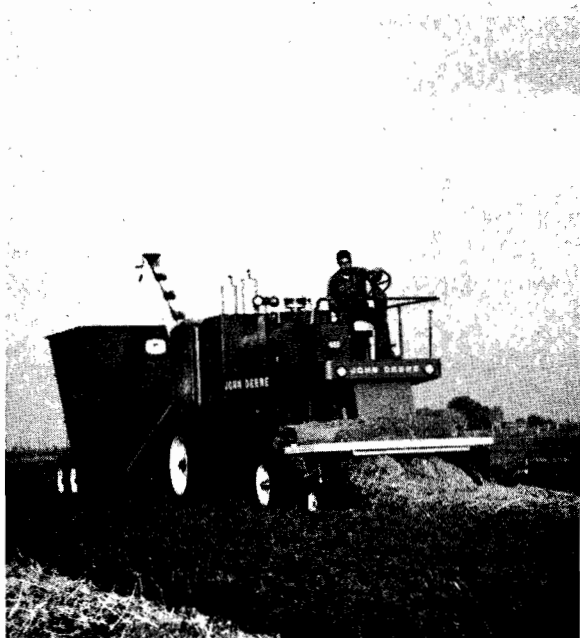
George Carter, Jr. and Jerry Richardson
M. & T. Ranch, Butte County

June 15, 1967

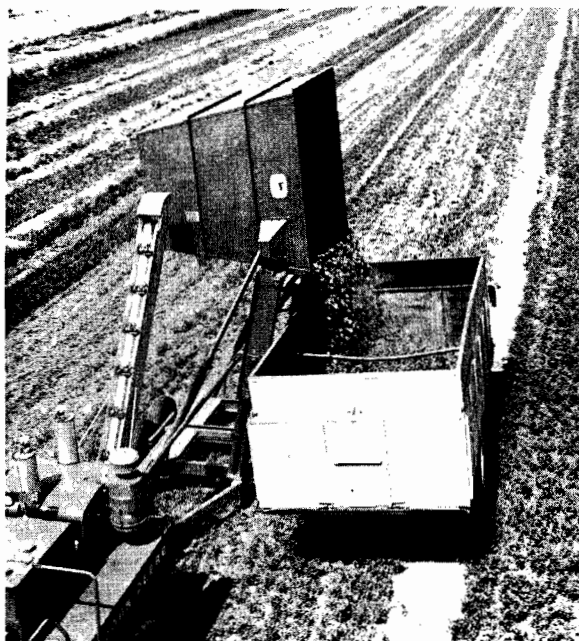
Making 1-1/4 inch cubes from windrowed alfalfa hay is a relatively new process (4). This hay package has the advantage of bulk handling and feeding compared to bales. Feeding trials with calves at the University of California (3) have shown a feeding advantage of cubes over bales in dry matter intake and consequently gains and feed conversion. There have been few reports comparing cubes with bales for feeding sheep. This experiment was conducted at the M. & T. Corporation Ranch south of Chico. This diversified ranch operation runs about 4,000 ewes on range,

irrigated pasture and stubble. Hay and grain are normally fed during November, December and January. The objective of the trial was to determine gains, feed efficiency and economic considerations of feeding alfalfa hay bales or cubes to ewes and lambs.

Experimental procedure. The hay used in this 46-day trial resulted from a replicated trial (5) comparing the dry matter yield per acre and quality as determined by chemical analysis of alfalfa hay harvested as bales or as cubes. The data



Alfalfa hay field cubing



Hay cubes handled in bulk

in Table 1 shows the hay was average in quality with 19% crude protein and 49% TDN. There was no significant difference between the cubes and bales in any measure taken. The estimated value of the hay on a net energy basis was \$29.00 per ton where barley was valued at \$50.00 per ton. This does not take into account any differential costs or savings between the two hay forms.

individually weighed after an overnight stand without water at the start of the trial November 28, 1966, and final shrunk weights were taken 46 days later.

Each group of ten ewe and lamb pairs were fed in adjoining corrals and had water and salt available at all times.

Dry matter determinations were made on the two hay forms at the beginning of the trial and on the refused hay at the end of the experiment. The hay was weighed and fed daily to each group according to consumption.



Ewes and lambs fed baled hay in a rack



Ewes and lambs fed cubes in a grain bunk

Twenty head of mixed age ewes with single day-old lambs were randomly, within age of ewe and sex of lamb, assigned to one of two groups. The ewes and lambs were

TABLE 1. YIELD, CHEMICAL ANALYSIS AND ESTIMATED FEED VALUE OF ALFALFA HAY BALES OR CUBES^a

Hay form	Tons per acre ^b	Crude fiber ^b	Crude protein ^b	Calcium ^b	Phosphorus ^b	Est. TDN	Value with barley @ \$50/ton ^c
Bale	.88	28.1	19.2	.95	.22	-	-
Cube	.91	27.5	19.5	.95	.24	-	-
Average	.90	27.8	19.4	.95	.23	49.2	\$29/ton

^aMethod of analysis described by Meyer (2). All figures on 90% dry matter basis.

^bThere were no significant differences at the 5% level. Data on only one cutting.

^cNot including any price differential due to processing, handling or feeding costs.

TABLE II. PERFORMANCE OF EWES AND LAMBS DURING THE 46-DAY FEEDING PERIOD

Item	Hay Form	
	Bale	Cube
Number of pairs	10	10
Age of ewe, years	1.5	1.6 ^a
Initial ewe weight, lbs.	134.6 ^a	140.9 ^b
Final ewe weight, lbs.	134.1 ^a	145.3 ^b
Gain or loss, lbs.	- 0.5 ^a	+ 4.4 ^b
Initial lamb weight, lbs.	9.0	9.6
Final lamb weight, lbs.	30.7	32.8
Gain, lbs.	21.7 ^c	23.2 ^d

^{a,b}Means bearing different superscripts approach significant differences ($P < .10$).
^{c,d}Means bearing different superscripts are significantly different ($P < .05$).

Results and discussion. Table II shows the performance of the ewes and lambs. The ewes fed baled hay lost 0.5 lbs. per head over the 46 days compared to a gain of 4.4 lbs. for the ewes fed cubes. The probability that the difference was due to chance rather than to the hay form is less than 1 in 10.

The lambs in the cube fed group gained significantly more than those fed baled hay. The gains were 23.2 and 21.7 pounds respectively (probability less than 1 in 20 that gain differences were due to chance).

It took five days for the ewes to get used to the cubes and to eat an amount equal to those fed baled hay (Table III). During this time the bale fed ewes looked full, whereas the ewes fed cubes were gaunt appearing.

Both groups were fed daily in feed bunks exposed to weather and the apparent consumption for the 46 days was similar for the two groups, averaging 5.6 lbs. for the bale and 5.7 lbs. for the cube fed pairs daily. As waste feed built up, it was removed to another feed bunk out of the weather, but the ewes still had access to it.

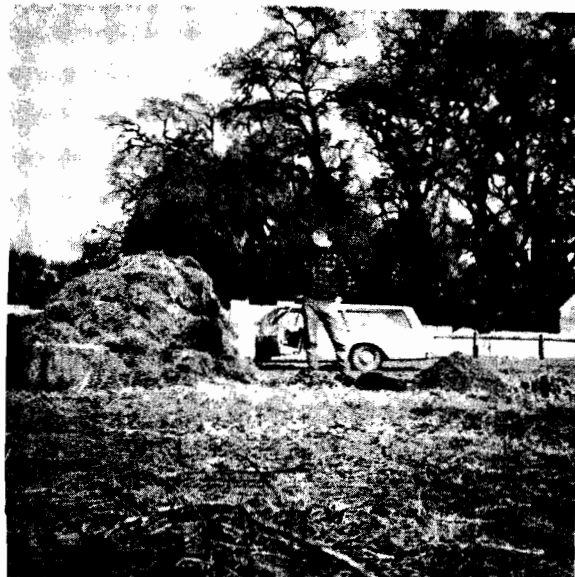
TABLE III. HAY CONSUMED AND REFUSED, 90% DM BASIS^a

	Hay Form	
	Bale	Cube
Total hay fed during 46 day trial, lbs.	2575	2609
Hay fed daily per pair during first 5 days, lbs.	5.3	2.6
Hay fed daily per pair, 46 days, lbs.	5.6	5.7
Hay refused ^b , lbs.	422	153
Hay refused as % of fed	16.4%	5.9%
Hay actually eaten daily per pair, lbs.	4.7	5.3

^aDry matter of the hay sampled at beginning of trial - cube, 89.2%; bale, 88.9%.

^bHay weighed back that was left in the feed rack or on the ground.

When the cubes were fed in conventional sheep hay racks, the ewes had difficulty reaching them and rain would create puddles of water. This water was more detrimental to the cubes than to the bale flakes. Sheep grain bunks were a little too shallow for the cubes; finally a false bottom in the hay racks seemed to work satisfactorily. 4.76 inches of rain fell during the test period.



The pairs fed baled hay refused 16.4% of the amount fed compared to 5.9% for the pairs fed cubes. Since they were fed the same amount, this resulted in an actual feed intake of 4.7 and 5.3 lbs. daily per pair for the bale and cube fed groups respectively. The difference in feed intake accounted for the differences between the groups in weight gain since the quality of the hay was similar. This much waste would not be expected where the amount of feed is restricted.

Jerry Richardson stands between baled hay and cubed hay refused during the trial.

TABLE IV. ESTIMATED COSTS OF HAULING, STORING AND FEEDING BALES OR CUBES PER TON OF 90% DRY HAY^a

<u>Cost Item</u>	<u>Hay Form</u>		<u>Savings with Cubes</u>
	<u>Bale</u>	<u>Cube</u>	
Hauling and placing in storage	\$3.00	\$1.35	\$1.65
Storage (building only)	.92	.75	.17
Feeding labor @ \$1.50/hour	2.16	1.00	1.16
Feeding equipment	1.30	1.37	-.07
Weight of wire	.13	0	.13
Wasted feed (hay @ \$29/ton)	<u>4.76</u>	<u>1.71</u>	<u>3.05</u>
Total with equal purchase price and moisture content	\$12.27	\$6.18	\$6.09

^aAssumptions: Diversified ranch maximizing equipment use. Hay raised by sheepman, hauled 2 miles. Feeding: 1.44 man-hours per ton baled hay, two men using 1-1/2 ton truck; .67 man-hours per ton cubed hay, one man with scoop tractor and feed wagon.

In an attempt to evaluate the results in economic terms, costs of hauling, storing and feeding baled hay have been compared with estimated costs of cube handling (Table IV) (1).

The ranch is diversified and large purchases of special equipment (other than harvesting) would not be needed in order to handle, store and feed the cubes. Also, tractors, feed wagons and dump trucks could be used for other jobs when not required in the sheep enterprise. This may not be the case in strictly range sheep operations.

The estimated savings with cubes in hauling, storing and feeding amounted to \$3.04 per ton fed. The difference in waste was \$3.05 per ton with a price of \$29.00 per ton for 90% dry hay. The estimated overall savings with cubes compared to bales was \$6.09 per ton in this test.

Evaluating gain is another way to figure the feeding value of the hay forms. If lambs are worth 25¢ and ewes 6¢ per lb., one ton of cubes produced \$3.56 more meat than did the baled alfalfa.

The sheep could have been forced to eat more of the hay offered and the effect this would have had on comparisons of percent waste and gains is not known. However, in most circumstances it is economical to liberally feed ewes nursing lambs. Also, if hay is purchased from the field during harvest, there could be substantial differences in percent moisture between the bales and cubes.

A small sample of cubes and of bale flakes were exposed to the weather, but not to animals to observe how rain would affect

the different hay forms when scattered on the ground. After four inches of rain, the cubes still retained some green color inside and did not mold as badly as the bale flakes.

Summary and conclusions. Ten pair of mixed age ewes with single new-born lambs were drylot fed alfalfa hay as bales or as cubes for a 46-day period. The hay was harvested from adjacent checks and there were no significant differences in chemical analysis between the baled or cubed hay.

The ewes ($P < .10$) and the lambs ($P < .05$) in the cube-fed lot gained more than the ewes or lambs fed baled hay. These gain differences were due primarily to differences in actual feed intake. Each group was fed ad lib resulting in similar apparent feed intake, but the pairs fed baled hay refused 16.4% of the hay compared to 5.9% for the cube fed pairs.

The ewes fed cubes required five days to become accustomed to eating cubes and some modification of the hay rack was necessary. The cubes did not appear to be as adversely affected by rain as did the bale flakes,

Using the same price (\$29.00 per ton) and moisture content (10%) for baled or cubed alfalfa hay, the cubes were worth \$3.05 per ton more because of less waste and an estimated additional \$3.04 per ton for cubes may result from less expensive hauling, storing and feeding compared to baled hay.

Cost studies of various ranch feeding situations are needed to further evaluate the economics of feeding cubes to sheep.

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* In order that the information contained in this newsletter may be simplified,
* it is sometimes necessary to use trade names of products or equipment. No
* endorsement of named products is intended, nor is criticism implied of simi-
* lar products which are not mentioned.
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