

ALFALFA'S RESPONSE TO BALING VERSUS BAGGING

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Abstract: Greenchopping and bagging alfalfa resulted in a 12% yield increase compared to conventional baling of alfalfa. These results are an average of all seven cuttings for a large "field scale" replicated experiment.

Keywords: Harvesting methods, greenchopping, baling, leaf shattering, traffic losses, quality, and yield.

INTRODUCTION

Most alfalfa hay is harvested by baling in California. However, for the past few years a significant amount of alfalfa has been greenchopped and ensiled in large plastic bags (e.g. 10' by 250'). The purpose of this experiment was to accurately measure any yield differences between greenchopping and baling alfalfa.

Greenchopping has the potential to decrease shattering losses at harvest, reduce traffic losses from raking, baling, and roadsiding, and to reduce water stress with more timely irrigations. Greenchopped hay is harvested at about 65% moisture compared to baling at 12 1/2%, resulting in less leaf loss at harvest. Traffic losses are reduced because all harvest traffic occurs within several hours after swathing so 5 to 7 day regrowth is not damaged. Also, with greenchopping 60 foot wide checks are raked into a single windrow compared to two windrows for baling in a 60 foot wide check. Through much of the summer at least parts of an alfalfa field are water stressed before the bales are out of the field, but with greenchopping the field can be irrigated almost immediately after cutting, avoiding any water stress.

In this trial, only the losses from leaf shatter and traffic were measured, because of the difficulty of irrigating greenchopped checks before the alfalfa was baled in the adjacent checks. So both baled and greenchopped treatments were irrigated the same, right after the bales were removed.

In addition to increased yields, greenchopping and bagging may result in increased quality and reduced risk of rain damage. Some disadvantages include the need for a large storage yard for the bags, relatively few custom baggers are available and there is a limited market for bagged alfalfa.

MATERIALS AND METHODS

The experiment consisted of two treatments, baling and greenchopping, replicated four times in a randomized complete block design. Each plot was one 60' x 1290' check occupying 1.75 acres. The eight checks in the experiment were side by side occupying 14 acres in the middle of a second year, 80 acre alfalfa field.

All of the greenchopped alfalfa off each plot was weighed and a two pound subsample was taken for moisture analysis. All of the bales off each plot were weighted on the roadsider and a moisture sample was taken from each plot of the first four cuttings. Average moisture contents of the first four cuttings were used for cuttings 5 through 7. All weights were taken on a portable electronic platform scale. All samples were oven dried at 150° F for at least 3 days.

RESULTS AND DISCUSSION

The results of baling and greenchopping are shown in table 1. Since the different harvest methods were first used on the first cutting, the difference in yield is only due to decreased leaf shattering and not to decreased traffic losses. Yield increases from both decreased leaf shattering and traffic losses are reflected in cuttings 2 through 7.

The yield increase of greenchopping over baling ranges from 6.4 to 21.9 percent. Some of the individual cuttings are not statistically different at the 95% level of confidence, but the average yield

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increase of 12% across all cuttings for the season is significant at the 99% confidence level. All yields in this table are expressed on a 100% dry matter basis. - A similar experiment done for two cuttings by Doug Gisi and Carol Collar, U.C. Cooperative Extension Merced and Kings Counties, respectively, showed a 10.8% yield increase for bagging compared to baling.

The baling moisture contents are very closely grouped for the first four cuttings measured. The average moisture content of the first four cuttings was used for cuttings 5 through 7. The moisture contents of the greenchopped hay ranged from 57.3 to 69.9 percent. Determining the moisture content of a high moisture feed is very critical, because a change of just a few percentage points greatly changes the amount of dry matter in the load. For this reason greenchopped hay moisture contents should be measured and sold on an adjusted dry matter basis.

TABLE 1: Harvest moisture contents and 100% dry matter yields of baled compared to greenchopped alfalfa hay.

CUTTING	BALED		GREENCHOPPED			LSD _{.05}
	HAR. M (%)	YIELD @ 100% d.m. (ton/acre)	HAR. M. (%)	YIELD @ 100% d.m.(ton/acre)	YIELD INCREASE (%)	
1	15.9	1.57	57.3	1.67	6.4	N.S
2	11.2	1.61	64.8	1.79	11.2	.09
3	11.2	1.60	58.0	1.95	21.9	.21
4	12.0	1.61	69.9	1.80	11.8	N.S
5	12.5	1.38	58.1	1.49	8.0	N.S
6	12.5	1.06	67.5	1.19	12.3	.08
7	12.5	0.80	58.3	0.90	12.5	.08
AVERAGE	12.5	1.38	62.0	1.54	12.0	.08
TOTAL		9.63		10.79		

The seasonal 100% dry matter yields of baled and greenchopped alfalfa of 9.63 and 10.79 tons per acre respectively would be 11.0 and 12.3 tons per acre respectively, when adjusted to 12 1/2% moisture content. The greenchopped yield was 30.8 tons per acre when adjusted to 65% moisture.

Table 2 shows an economic comparison of the value of greenchopped alfalfa compared to baled alfalfa. The analyses is based on greenchopped hay at 65% moisture, baled hay at 12 1/2% moisture, and a \$25 per ton cost for swathing raking, baling and roadsiding. The equivalent value of baled alfalfa in the third column is based on the 12% yield increase which was 3.3 tons per acre greenchopped hay at 65% moisture.

For example \$27 per ton for greenchopped alfalfa standing in the field is equivalent to \$92.50 per ton for baled alfalfa roadside. If you take into account the 12% yield increase from greenchopping, the \$27 per ton greenchop is equivalent to \$100.00 per ton baled at roadside.

TABLE 2: An economic comparison of the value of greenchopped alfalfa hay in the field compared to baled alfalfa roadside. Greenchopped @ 65% moisture and baled hay @ 12 1/2% moisture. \$25/ton for swathing, raking, baling and roadsiding. 3.3 ton/acre @ 65% moisture additional yield for greenchopping in third column.

GREENCHOP VALUE (\$/ton standing)	EQUIVALENT BALED (\$/ton/roadside)	EQUIVALENT BALED WITH YIELD INCREASE (\$/ton/roadside)
25	87.50	95.00
26	90.00	98.00
27	92.50	100.00
28	95.00	103.00
29	97.50	106.00
30	100.00	109.00

If greenchopped alfalfa is sampled for moisture content and adjusted to a standard 65% moisture, then growers can use table 2 to compare their potential income from greenchopped compared to baled alfalfa hay.

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