



The Impact of Tedding on the Economic Production of Alfalfa Silage

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OBJECTIVES

Studying the impact of tedding on the economics of silage production through field observations.

Summarizing the operating costs of modern tedders into a decision-tool for alfalfa producers.

STUDY DESCRIPTION

- The field experiment was conducted on a 5-acre alfalfa field at the Mann Valley Farm located in River Falls, WI. Three cuttings were observed, and pre-harvest samples were collected prior to cutting for each. Immediately after cutting, the field was divided to minimize field variability. In each cutting, this resulted in 8 tedded and 8 untended windrows (Figure 1). Once the field was divided, the tedded treatment was completed using a KUHN GF222T tedder (Figure 2).
- The day after cutting, the field was merged. After merging both the tedded and untended sections, resulting in four windrows for each, the field was harvested. The wagons of chopped alfalfa were then unloaded into a bagger, where samples for quality and moisture content were collected. Twenty samples were taken for both the tedded and untended sections.

Figure 1. Tedded (left, right) and untended (middle) treatments.



Figure 2. Preparing the tedded treatments with the Kuhn GF 222T tedder.



RESULTS

- The results of the field trials are summarized in Table 1. Major factors to note across the three cuttings are the resulting moisture content at harvest for the tedded and untended treatments, 51 and 62% respectively. A difference was also observed in water-soluble carbohydrates (WSC) with the values of the tedded and untended treatments being 7.3 and 6.5%, respectively. Both factors impact forage quality. In the case of improved drying rate, the harvest window is shortened, and the higher level of WSC will be beneficial to the fermentation process yielding a higher quality silage. Conversely, crude protein (CP) and neutral detergent fiber (NDF) data indicate a small but consistent lower value in crop quality. These small differences, however, were not observed in total digestible nutrients (TDN).

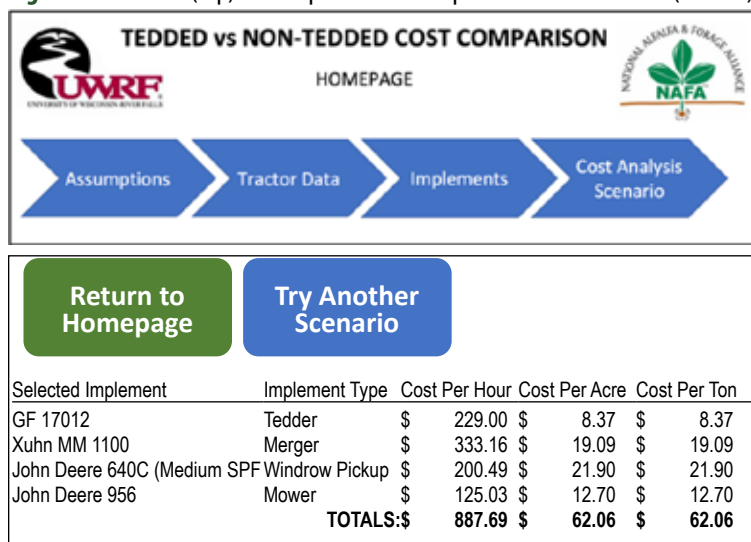
Table 1. Composition of tedded and untended treatments averaged across each cutting.

Treatment	Moisture content	CP	NDF	WSC	Ash	TDN
	%w.b.					
At cutting	83	24	36	8.3	10.5	69
Un-tedded	62 _a	22 _a	39 _a	6.5 _a	11.0 _a	66 _a
Tedded	51 _b	21 _b	40 _b	7.3 _b	10.2 _b	66 _b

Within column comparisons with differing subscripts are statistically different ($p < 0.05$).

- In addition to the field trial, the research team worked on developing a user-friendly decision-tool for alfalfa producers to consider the costs of introducing tedding into their operation (Figure 3). In this decision-tool, tractors and implements have been set up for producers to use, but there is also the option for the user to add their own tractors and implements to better fit their operation. Producers can also change the assumptions made on acreage and more. As a result, the cost per hour, acre, and ton are calculated for each implement and tractor. The user can then create different scenarios with different combinations of implements and the total cost per hour, acre, and ton for the operation are computed for the user.

Figure 3. Workflow (top) and output from cost of production decision tool (bottom).



CONCLUSIONS/SUGGESTIONS

- In summary, tedding in a silage production system would have a minor impact on crop quality mostly from increasing drying rate but the added field operation would need to be paid for by this difference. Tedding would be most beneficial when a short harvest window was available or the mower wasn't able to achieve a high cut-to-swath width ratio.