

MANAGING EQUIPMENT DURING HARVEST TO MINIMIZE LEAF AND YIELD LOSS

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How was the quality of alfalfa you harvested this year? Weather often has a large impact. However, harvest management can have a huge effect on drying rate and quality of the harvested forage. Now is the time to evaluate how this year went and to plan for what changes might be implemented next year.



We should consider that leaves have a Relative Forage Quality (RFQ) of about 550 while stems have an RFQ of 70 to 80. Thus, if we want quality forage we must focus on harvesting leaves. Figure 1, from a study of 4 rake types in 3 states, shows the effect of leaf percentage on RFQ of the harvested forage. Leaf percentage accounted for 71% of variation in forage quality!

If alfalfa is growing well, we should expect about 45-50% leaves when it is harvested at the bud stage. This shows up in figure 2 when interns in a Land O'Lakes by Winfield program monitored some fields through harvesting. The fields averaged about 45% leaves in the standing alfalfa before cutting. The leaf percentage fell slightly through mowing and conditioning (about 2%) and then fell dramatically in the harvesting process (about 13%). These were fields harvested for haylage where we would expect fewer losses than when alfalfa is harvested for hay. The chopping for haylage harvesting resulted in an average loss of about 40 RFQ points due to leaf loss.

What can be done to minimize leaf loss? Consider the following:

- 1) Evaluate the alfalfa stands – did you start with 45% or more leaves or did many fall to the ground prior to mowing? If the latter, especially under cool, wet conditions, determine if all varieties showed the same leaf loss – some varieties have more leaf disease resistance than other varieties. Also, consider that an application of fungicide at early regrowth stages may be beneficial. Evaluate carefully as fungicide is an expense that can be beneficial but may not always be needed.
- 2) Check after mowing and conditioning. Generally, we have seen small leaf loss at this stage but the following should be kept in mind:
 - a. A flail/impeller conditioner will result in increased leaf loss of alfalfa compared to a roller conditioner.
 - b. Placing alfalfa into a wide swath after mowing will enhance drying rate and reduce non-fibrous carbohydrate loss. NFC is 98% digestible to animals. The loss also results in a drop of RFQ. For larger operations, we recommend triple mowers rather than self-propelled mowers because the latter only makes windrows narrow enough to fit between the wheels. The yield loss of these windrows from respiration during drying and from next cutting (due to driving over alfalfa regrowth and delayed irrigation) can be significant.
- 3) Consider that leaf loss occurs every time you move the forage prior to harvest.
 - a. Wetter forage results in less leaf loss when moved. So rake/merge above 40% moisture if possible.
 - b. Try to rake/merge only, as each operation prior to harvest results in additional leaf loss, e.g., tedding, windrow inverting.
 - c. Rolling forage across the ground results in leaf loss.
 - i. Move forage to middle with large rake rather than to one side to reduce moved distance and rolling of the hay.
 - ii. Mergers result in less leaf loss than rakes since they pick up the forage and move it on a conveyor belt.
 - d. Thus, a recommended procedure would be to mow, place alfalfa into a swath covering 70% or more of the cut area, rake/merge when at 40-60% moisture, and harvest. In the Midwest and Northeast, haylage made with wide swaths can often be harvested the same day it is cut. In the West, hay can be harvested in 2-3 days rather than 5-7.
- 4) Minimize leaf loss during harvest. If the windrow is a size that is near capacity of the baler or chopper, then harvesting is more efficient in terms of fuel and labor. The larger windrow also results in less leaf loss at the harvester (either baler or chopper) pickup during the harvest. Also look behind the harvester: is there a layer of leaves falling on the ground behind the bale chute or from between the belts of a round baler? Is there a green cloud around the chopper wagon or truck? Each of these are signs of leaf loss which results in reduced harvested forage quality. A little toughness on the hay/haylage may reduce these losses.

Leaf loss cannot be eliminated. It can, however, be minimized. By being sensitive to the concept of “harvesting leaves” rather than “harvesting hay” one can observe where leaf loss is occurring in your operation, allowing you to take steps to

minimize it. In some cases, different machinery may be called for, but in most cases equipment adjustment and timing of use may make significant differences.

Fig 1. Effect of leaf percentage on RFQ

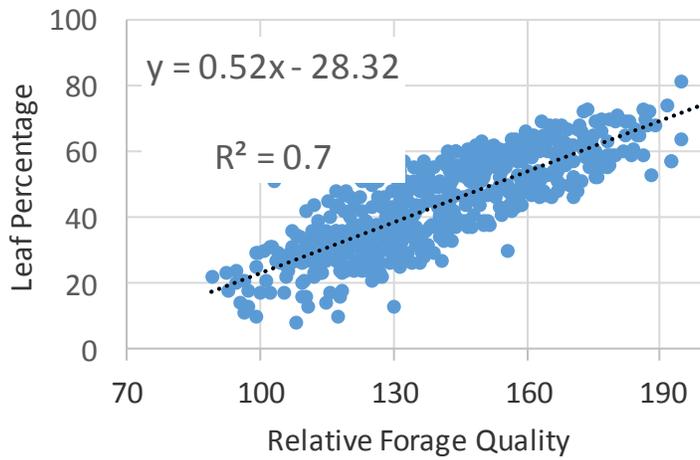


Fig 2. Change in leaf percentage through harvest

