

### RAPIDLY DRYING FORAGE IMMEDIATELY AFTER CUTTING HELPS KEEP YIELD, QUALITY

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From the time forage is cut until it is fed, the goal is to minimize dry matter and forage quality loss. While all forage declines in dry matter and forage quality after cutting, the amount of decline is determined by the management used.

One of the often overlooked sources of dry matter and forage quality loss is respiration after mowing. Respiration is the breaking down of starch and sugars to produce energy (heat) and carbon dioxide. The process occurs in growing plants and continues after mowing, even in baleage and silage when heat is produced.

Data suggest that 2-8% of the dry matter may be lost due to respiration. Table 1 shows that, at current hay prices in the Midwest, a 4% dry matter loss results in \$8.80 loss per ton of hay. Losses are greatest in the West where forage is often cut with large cutter bars and put into windrows that fit between swather tires. This hay often takes five to seven days to dry for baling, while some farmers of the same region put forage into wide swaths and bale it in two days. Not only does the faster drying time result in less dry matter loss, but getting the hay off the field faster results in less wheel traffic damage to regrowth and higher yields of subsequent cuttings.

Respiration also causes a significant forage quality loss, since lost starch and sugar are 100% digestible. As Table 1 shows, loss of sugar/starch increases the content of remaining components. A 4% starch/sugar loss would increase NDF slightly over 3%. Note that this is a drop of almost 20 points of RFQ. Thus, if one had cut alfalfa at just below 40% NDF and lost 4% sugar/starch, the harvested quality would be above 40% NDF, which is currently selling for about \$50/ton less!

**Table 1. Losses Due to Respiration**

| Dry Matter Loss   | 2%     | 4%     | 8%            |
|---|--------|--------|---------------|
| Economic Dry Matter Loss (\$/ton)   |        |        |               |
| Hay value \$220/ton   | \$4.40 | \$8.80 | \$17.60       |
| Forage Quality Loss from 4% sugar/starch loss   |        |        |               |
| ADF, %  | NDF, % | RFQ    | Value, \$/ton |
| 30.0  | 40.0   | 153    | \$220         |
| --Forage quality if lose 4% dry matter of starch/sugars--   |        |        |               |
| 33.0  | 43.4   | 134    | \$166         |
| Prices based on Midwest Hay Market Report-May 29, 2018<br><a href="https://fyi.uwex.edu/forage/files/2018/05/05-29-2018.pdf">https://fyi.uwex.edu/forage/files/2018/05/05-29-2018.pdf</a> |        |        |               |

What can be done to minimize losses from respiration? The first good practice is to spread forage into a wide swath so that more sunlight is intercepted and stomates (breathing holes in the leaves) stay open to allow rapid drying of the leaves. Hay should be managed to dry to 60% moisture or less as quickly as possible, but at least the day it is cut. When forage moisture falls below 60%, respiration is greatly reduced.

Hay that is put immediately into a windrow dries slowly inside the windrow and has high respiration rates for an extended time. Thus, growers should spread cut hay into a wide swath (and drive over it) rather than to make a windrow that fits between the wheels.

Note that if a grower insists on putting forage immediately into a windrow and taking the respiration losses of sugar and starch, then the forage must be cut earlier to be below 40% NDF (150 RFQ) at baling or chopping if that is the goal. Cutting earlier to allow for the respiration losses means at least a 10% yield

loss and greater stress on the stand, thereby shortening its stand life.

A second method to reduce respiration losses is to make haylage in a pile or bunker or to make and wrap bales in plastic. Respiration requires oxygen. If packed tightly, the forage respiration will quickly use up the oxygen and respiration will stop. This practice is most effective in reducing respiration losses if combined with forage put into a wide swath at cutting, dried quickly to 60-65% moisture, and then ensiled or wrapped in bales.

Forage is often 75-78% moisture when cut, so the key to high yield of high-quality forage is to manage so the first 15% moisture is lost as rapidly as possible. Reducing the unseen losses of respiration will increase yield and forage quality. Additionally, getting hay off the field faster will increase the yield of the next cutting.