



ADVANCED AG SYSTEMS'

Crop Soil News

<http://www.advancedagsys.com/>

May 2021

"It is the crops that feed the cows that make the milk which creates the money."

Advanced Ag Systems
Research, Education, Consulting

Winter Forage: Windrow Compost vs Photosynthetic Drying

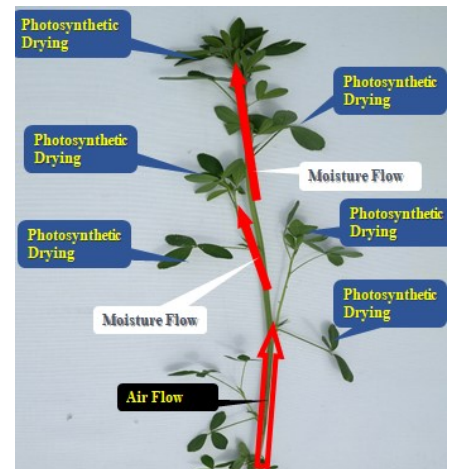
Winter forage has yielded **more in one cutting than all 5 cutting of many alfalfa harvests**. It is both a benefit and a problem. The heavy crop comes out the back of the mower and lands with a splat. It is a lot of material to get to 35% DM.

Winter forage harvested at the flag leaf stage has very highly digestible components. The fiber digestibility is **higher than many Brown Mid Rib forages**. I have measured sugar levels over 20% on a dry matter basis. The nutritional quality when the mower pulls into the field and what reaches the mouth of the cow can be **two very different forages**. For those who are still using the old traditional mowing directly to windrow and letting it sit for 2-3 days, what reaches the cow's mouth is far, far, less quality than what you mowed. Mowing directly to windrow is **windrow composting** – it is **not** preserving high-quality forage – it is **not drying the forage** as fast as it could. It simply **aerobically composts** the most readily digestible components that could be used to produce milk as it slowly **over-dries** on the outside. It makes a major difference in the amount of digestible energy reaching the mouth of the cow.

Many of today's farms are mowing, without conditioning, directly to a swath greater than 80% of the cutter bar. The majority of the leaves and intact stems are in the sun. This allows **PHOTOSYNTHETIC DRYING** to remove moisture faster than any machine manipulation. Photosynthesis in sunlight converts carbon dioxide (CO₂) and the plant's water (H₂O), into carbohydrates. The plant, even cut off, is still alive. **If the leaves are in sunlight** they continue to photosynthesize down to about 50% dry matter; **removing water in the cut plant**, while producing sugar and other highly digestible components – thus **increasing feed quality** as it simultaneously **dries the forage**. It commonly *increases the energy reaching the cow's mouth 20%*. The key bonus is that **it will dry it faster than any machine handling**. By not conditioning the stem, the leaves will wick the moisture out of the stem. Thus, the stem dries first and the leaves last. Mowing without conditioning results in a swath with leaves on the top in the sun to maximize photosynthesis, and the stems underneath. In a **narrow windrow** and/or if you leave it overnight,



Narrow rows on right are ready to chop in 2-3 days. Wide swath on left in 2-3 hours.



Leaves in sunlight continue to photosynthesize and use water at a rapid rate. If the stem is not damaged from conditioning it will draw nearly all the water out of the stem and draw air in the bottom drying the stem first and the leaves last.

the reverse happens and the plant respiration burns up digestible components and produces water – **it is composting**. The outside is dry as corn flakes and the center as wet as direct mowed. As the center of the windrow re-spires the digestible parts, it leaves no substrate for inoculants to properly ferment. Thus, Clostridia organisms take advantage of the situation, degrading the protein and producing Butyric acid. These are the flat, wet, butyric smelly lumps in your silo.

That said, remember winter forage yields are **30% - 250% heavier** than first cut alfalfa. Top management yields are a 2 – 3 times thicker swath than alfalfa. Laying the swath at greater than 80% of cutter bar allows for photosynthetic drying – for the top couple of inches. For a heavy crop like winter forage, the swath is thicker than the sun can penetrate. We have found that after 2 hours of drying the top is getting very dry to the point it stops photosynthetically drying; while the bottom is as wet as when you mowed it. **Tedding winter forage 2 hours after mowing** is key to bringing up the lower layers to the sunshine for photosynthesis to dry it. Watch your tedder forward speed. Going too fast forward will make nondrying tedder lumps rather than lifting the lower layers and spreading them to dry. The tedder must be set to the top of the stubble or else it will be rooting in the dirt, increasing ash level, and decreasing milk production. Some tedders have the top tine longer than the bottom so it can move the crop without rooting in the dirt. Others have hooked teeth that do an excellent job of bringing up the bottom layers to the top. I have seen 3-ton dry matter yield triticale mowed without conditioning at 80% of cutter bar width at 10 am; tugged at noon, and merged and chopped at 35% dry matter by 3 pm.

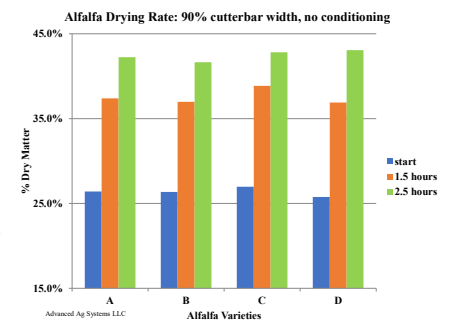
Photosynthetic drying also works with other haylage crops. They don't usually need to be tugged. This drying results in **forage that is higher in digestible components than when the mower cut it**. Old style multi-day haylage had Net Energy of Lactation of .58-.60. Wide swath same day was .71 or more; almost the same as corn silage. The sugar boost produced in photosynthetic drying provides substrate for the inoculant (highly recommended) to quickly drop the pH to stable silage levels, thus eliminating clostridia and butyric formation even in wetter forages. The quick pH drop conserves even more nutrients for the cow. The higher sugar also supports higher milk protein production. The other result is that you only need one day to get the crop ensiled. What gets **mowed today, gets ensiled today**. Taking smaller acreage in a one day mow/ensile system can get more done than waiting until the crop is past prime until you get a 2 or 3-day window to mow the entire countryside. This is especially beneficial for labor limited farms. As you can see in the graph above-right, in the study we conducted on four alfalfa varieties, leaving a swath 90% of the cutterbar width and with NO conditioning, 38 inch tall first cutting on a humid sunny day was **ready to chop in 1.5 hours**. The biggest problem the first year farmers try this, is the silage gets too dry. It dries faster than they think. Farmers have proven that **the system works**.



The better quality the feed the more it packs in the windrow. This maintains 100% humidity and so it does not dry inside the windrow. 80% of the forage is in the dark and respiring away the digestible components that make milk—decreasing feed quality



As winter forage yields are passing 3 tons of dry matter (reaching 4 & 5 tons on farms) even with wide swath the layer is too thick and tedding 2 hours after mowing is key to making 35% DM same day haylage.



Sincerely,

Thomas Kilcer,
Certified Crop Advisor

172 Sunnyside Rd
Kinderhook, NY
12106

Tel: 518-421-2132

tfk1@cornell.edu

**The Helping
Hand
to Better
Agriculture**

