

PRESERVING QUALITY AND OTHER ADVANTAGES OF BALE WRAPPING

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INTRODUCTION

Everyone in attendance today is here with a common goal, the successful harvest of high quality hay for long term storage and eventual feedout, and to do it economically. Stored forage as we all know must be harvested at a low moisture content or completely void of oxygen to avoid spoilage. Likely the most common method is to reduce the moisture content to an acceptable level before baling. While tried and true for many, this method will result in an extremely high failure rate in much of the US, where frequent and often unpredictable rainfall, coupled with high dew points and humidity, prevents the necessary drydown to make high quality hay. Our discussion today will focus on the other method, the elimination of oxygen.

MAKE HAY EVEN WHEN THE SUN ISN'T SHINING

Bale wrapping came to my farm in late 2010 as a result of some hasty internet searches and a desperate need to reduce our failure rate harvesting hay. Our miserable, humid weather had been worse than usual and we had almost no dairy quality feed. Our arsenal of equipment included nearly every hay drying/preserving tool in the industry, but the weather just wouldn't cooperate. I settled on individually wrapped bales after ruining 120 ton of really pretty third cutting alfalfa with an inline wrapper, and then visited with growers from the eastern US who assured me that success was very consistent wrapping each bale by itself. That first year we wrapped about 800 bales and were wildly impressed with the results over a range of moisture from 18-60%. The wrapped hay sold very quickly and customers were eager for more. But plastic was expensive, the process was slow, and handling was a bit cumbersome, so the goal was still to use wrapping only as a last resort.

REFINE THE PROCESS, EXPLORE THE POTENTIAL

In the off-season all good hay producers reflect on the previous season, evaluate successes and failures, and go to forage symposiums in an effort to do it all better the next year. I couldn't have been more eager to take what we had learned into the next season. Our uncooperative weather was as bad as ever in the spring of 2011, and I nearly killed my crew wrapping hay. Luckily I bought another wrapper from an online auction that turned out to be much faster, and combined with better handling tools (which we built ourselves) unleashed the potential for much higher productivity. At the same time hay test results kept getting better, and customer feedback was all very positive. Suddenly wrapping became a proactive management choice rather than a last resort. While the process adds around \$20 per dry ton to harvest costs, it was quickly

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becoming obvious that it would dramatically reduce our failure rate and provide customers with excellent feed that produced more milk. Over the next few years we upgraded more equipment and increased forage acres, ultimately wrapping 10,000 bales per year with less effort than we had into a few thousand in the early days.

PRACTICAL APPLICATIONS AND BENEFITS INDUSTRY-WIDE

By now many here are likely questioning what value wrapping hay could ever have for them in a mostly drier climate. Additional harvest cost probably has little appeal as well. For my operation the cost of wrapping is more than offset by the increase in quality and quantity even when conditions are favorable. Harvesting at higher moisture content always results in higher quality feed due to reducing the leaf loss that is inevitable to at least some degree when harvesting dry hay. Results of course will vary by region and management style. The process will yield economic gain as well in allowing a huge expansion of the harvest window. For my operation it has meant that we can typically bale over 300 acres in a day with one baler, since we can start earlier and run later if necessary. Before wrapping it was impossible to plan for more than 80 acres in any one day since we had such a small opportunity to get hay baled dry. Overall quality of every batch of feed is also much improved because we can almost always cut on time rather than waiting until the weather looks more favorable. Finally, wrapped bales can be stored outside, eliminating the need for tarping and/or buildings to preserve quality.

THE BASICS. FUNDAMENTALS OF SUCCESSFUL WRAPPING

The primary goal with wrapped forage is quite simply the complete occlusion of oxygen. To achieve this goal, we must apply enough high quality film to each bale to create a perfect seal, and then handle and store the bales carefully to maintain that seal. We have found that for long term storage of large square bales we need 8 layers of film. Feed that will be used within a month or two can be wrapped with six layers, but then may require extra care in handling. Hay that is nearly dry is more susceptible to spoilage because it doesn't ferment. Harvesting at 40-60% moisture will provide excellent fermentation which naturally preserves the feed, making a little imperfection in the wrap somewhat forgivable. Attention should be given to bale density as much as possible. Higher density not only improves feed quality, it also reduces wrapping costs. Additionally, 3x4 bales are more cost effective to wrap than 3x3 bales. In general, there are some basic principles that we have learned through mostly trial and error, and try to follow. Drier forage of almost any type, usually less than 20% will be the most difficult to wrap, and because of the lack of moisture won't ferment. However, this "sweet hay" has the advantage of being cheaper to haul, and is quite popular among my customer base. Forage that is harvested at higher moisture, unless it is very mature, will most likely ferment and become "baleage." The possibilities here are limitless. We have baled and wrapped grass, alfalfa, cereal grains, cover crop blends, drought ravaged field corn, soybeans, and even corn residue. Any of these products make excellent feedstuffs which have better palatability than any of them have when baled dry. The single largest determinant of quality is always plant maturity at mowing time, assuming weather is a constant. Ideally we like to bale at 50% moisture for fermented baleage, but anything under 70% will work. It is always important to keep baleage free of dirt as much as possible. Severe contamination with dirt or other contaminants such as animal carcasses can result in toxic feedstuffs, but it's generally rare. Excessive moisture can make toxic feed too, but

baling it wet enough to cause a problem is extremely difficult. Baling with a rotor/cutter baler is ideal for easier TMR mixing and achieving higher bale density, but isn't a requirement for making good wrapped feed. Bales made with higher moisture will start to heat almost immediately, so getting them wrapped as soon as possible is best for optimum quality. I always have my wrappers running right behind the baler to avoid any heat damage, which becomes measurable and significant as early as eight hours after baling. In our experience, having wrapped tens of thousands of bales, failures have been rare. I sell the vast majority of what we bale and wrap, however I also maintain a herd of cows that are fed wrapped bales daily, year round. The cows get fed bales from experiments, and any hay which is of questionable quality. Feeding wrapped bales myself provides perspective that can't be had from customer feedback, and has helped us to refine our management practices even further.