

## **BALING, WRAPPING, AND STORAGE STRATEGIES FOR GREAT BALEAGE**

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With a fair amount of moisture in March and early April, many cattlemen have been able to produce an appreciable amount of forage to start this production season. Baleage is a great way to efficiently conserve this forage, as it allows the forage to be harvested in a more timely manner. Timely harvest increases the chances of storing higher quality forage. Plus, the storage losses in baleage are substantially less than hay stored outside on the ground. In the past few weeks, we’ve received a lot of questions about how to bale, wrap, and store baleage. So, this month’s article builds on my article in the March issue, continuing a series where we will dive a little deeper into the management and use of baleage.

### **BALE AT THE RIGHT MOISTURE**

Moisture is crucial for success with baled silage. The target moisture for baleage should be 45-60% moisture (equal to 40-55% dry matter). Having the moisture in this range will enable fermentation, assuming oxygen is excluded by the plastic. When baled and ensiled at the right moisture, lactic acid forming bacteria drop the pH and stabilize the forage as long as anaerobic (low oxygen) conditions are sustained. If the moisture is below 40% moisture, there is a higher risk of spoilage. If the forage is wetter than 65%, there is an increased risk of activity by clostridium bacteria. Clostridial fermentation results in butyric acid, which gives silage a putrid smell. Clostridial fermentation can also result in botulism poisoning in the animals forced to consume the forage. When too dry, the lactic acid forming bacteria are slow to drop the pH. In those conditions, the bacterium responsible for causing listeriosis, *Listeria monocytogenes*, can proliferate. Baling at the right moisture, along with inoculating the forage with beneficial lactic acid forming bacteria, can ensure that the forage becomes properly ensiled and free of toxins.

### **MAKE GOOD BALES**

Dense and uniform bales greatly improve the conditions for proper fermentation. Densely packed bales enable the populations of desirable bacteria to build quickly and drop the pH faster. Dense bales also economize space in the storage area. Bale uniformity is also important. When wrapped with the stretch film plastic, bales with uniformly square edges have more consistent plastic coverage and, therefore, minimize oxygen influx (Fig. 1). Bales with uniformly square edges also align well with one another, which is especially important when wrapping with an inline wrapper. Irregularity between bales can cause oxygen intrusion where the bales adjoin one another. It is also a good idea to use net wrap when baling baleage bales.



**Figure 1.** Uniform bales abut one another more evenly and lower the risk of compromising the plastic.

Net wrap prevents deformation or “squatting” of the bales. This maintains the integrity of the plastic, preventing oxygen influx. Avoid using sisal twine that has been treated. Oils and pesticides applied during the manufacturing of sisal twine can leach through the plastic and breakdown the UV-inhibitor. This can result in plastic failure and oxygen intrusion into the bale.

Another key consideration is to ensure that the size of the bales is appropriate for the size of the equipment used to transport and wrap the bales. Baleage bales will be roughly twice the weight of a hay bale of the equivalent size. Most producers find that a 4' x 5' bale is the most efficient size for their equipment, as these generally will be around 1100-1400 lbs.

#### **CHOOSE AN APPROPRIATE SITE FOR WRAPPING**

Another key consideration is in the selection of an appropriate site for storage. It is best to wrap the bales where they will be stored, even if the bales are individually wrapped. Excessive handling of the bales after wrapping can compromise the integrity of the plastic wrap and introduce oxygen to the forage. It is also critical for the bales to be wrapped within 12 hrs of being baled. This prevents excessive heating and aerobic deterioration of the material, as well as minimizing bale deformations that can cause wrapping challenges.

When choosing a site, the proximity to the field and to the site where the forage will be fed are equally important to consider. It is best to place the bales on a solid sod or along a firm roadbed so that adverse conditions during feed-out will cause minimal damage or soil disturbance. Bales should also be placed in an area so as to protect them from punctures. Avoid areas with stubs, exposed roots, or rocks. Groundhogs, birds, and other vermin will sometimes damage bales. By storing baleage in an open area and at least 10 ft from a fence-line, field borders, or other areas of shelter for wildlife, the bales will be less prone to damage from these pests.

#### **APPLY ENOUGH PLASTIC BUT NO MORE**

It is important to ensure that enough plastic is placed around the bales to exclude oxygen and allow for fermentation. However, too much plastic will drastically increase the cost of producing baled silage. For in-line bale wrappers, a minimum of 6 – 8 layers of plastic needs to be applied. If the bale wrapper design allows, it is recommended to apply up to 10 – 12 layers at the joints where two bales abut one another for extra protection against strain on the plastic. For individual bales, at least 6 layers of plastic (2 layers made on the first pass, and 2 additional layers on two additional passes) are necessary. If the bales are expected to be stored for a long period of time (> 8 months), then 2 more layers of plastic should be applied.

The failure to apply enough plastic can cause unstable silage and reduce animal acceptance of the forage. Baleage that has been properly formed can be very palatable and can, in fact, be more acceptable to the animals than alfalfa hay of similar quality (Figure 2).

Ensure that the plastic is being pre-stretched according to the manufacturer's instructions (usually 55% stretch) and that it is being applied with the tacky side toward the bale. The stretching along with the wrap's adhesive ensure a sufficient seal.

**TO BE CONTINUED...**

In upcoming articles, we will continue this series on the management and use of baleage by discussing best management practices for feeding baleage and handling the plastic after it has been removed from the bales. For more tips on baleage production and other forage management recommendations, visit our website, [www.georgiaforages.com](http://www.georgiaforages.com). If you have additional forage management questions, visit or contact your local University of Georgia Cooperative Extension office by dialing 1-800-ASK-UGA1.



**Figure 2.** Animal acceptance of baleage prepared with varying levels of plastic coverage relative to hay of comparable quality.