Considerations for Baleage

- Baleage is a baled silage or a forage higher in moisture content wrapped in plastic, which undergoes a fermentation process.
- Baleage allows the option to harvest earlier while maintaining a high quality forage product.
- A key to a successful baleage system is baling forage at the proper moisture content.
- Forage for dry hay is typically harvested at a 15% to 18% moisture content, while baleage can be harvested at a higher moisture content of 40% to 60%.

High Moisture Forages

Frequent rains can make timely hay harvest and drying time common challenges for hay production. To mitigate this challenge, farmers may want to consider baleage (Figure 1). Baleage, which is baled silage, has become an increasingly popular method of harvesting and storing forage crops such as alfalfa, cool-season grasses, clover, small grains, etc. Forages are harvested at their optimum maturity and baled at 40% to 60% moisture content, wrapped in plastic, stored, and allowed to ferment.

When high moisture content forage is baled and wrapped in the air-tight plastic wrap, the naturally occurring anaerobic microorganisms allow the forage to go through an ensilage process inside the plastic. Once ensiled, the baleage can be fed to dairy or beef cattle, goats, sheep or horses.[1]

Storage. Baleage forage may be stored up to a year, depending on the forage moisture content and maturity:

- If forages are baled at more than 60% moisture content, feed value can be reduced after three months of storage, due to butyric acid production during fermentation. Feeding these forages before three months is highly recommended.
- Feed values for forages baled at 30% to 40% moisture content can decline after six months of storage.

Figure 1. Loading and wrapping forage for baleage. Photo courtesy of Doug Mayo, University of Florida.

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- In general, the feed value of forages baled at 40% to 60% moisture content can be maintained for about a year, provided the integrity of the plastic wrap has been maintained; however, it is highly recommended to feed baleage within nine months after harvest.[1]

Baleage Advantages

- Forages can be harvested at optimum maturities.
- Forages are harvested at a higher moisture content, which can decrease curing time.
- Forages made as baleage can have a higher quality of feed because of less leaf shatter losses than dry hay.
- As long as the plastic is not torn, there should be minimal spoilage and weathering.
- Baleage often has higher palatability than dry hay.[2]

Baleage Disadvantages

- There may be additional equipment expenses with this system. Consider the costs of a baler that will handle heavier, wet forage, as well as the cost of a bale wrapper and plastic wrap.
- Wrapping high moisture content forage into bales takes more time and may be more labor intensive than baling dry hay.
- The handling and disposal of the plastic wrapping may be more cumbersome than dry hay materials.[2]

Equipment Needs

Much of the equipment used for handling dry hay and large round bales can work for a baleage system. These pieces include a mower, rake, baler, bale spear, and tractor. However, the baler should be capable of baling wet forage, the tractor should be large enough to handle large wet bales, and a bale spear may be used as an option.

Mower-conditioners may be the best choice for cutting baleage because they form narrow and more even swaths and expose more of the forage's surface area to the microbes involved in fermentation. This can result in a faster pH drop and better fermentation earlier in the ensiling process. Narrow swaths can reduce or eliminate the need for raking and potential loss of forage quality.[2]

While many variable chamber balers can bale wet forage, special silage balers, specifically designed to bale wet forage, may be a better choice. Heavy-duty bearings on these balers are built to handle increased bale weight and scrapers on the belts and rollers prevent buildup of material. As another option, silage kits can be added to some older balers to improve their performance when handling baleage. Driving slowly and maintaining a high PTO speed when using a variable chamber baler (preferred) or a fixed chamber baler can hellp form uniform and tight bales.[2]

If spears are used to move the bales, they should be used before wrapping as they may leave holes in the plastic wrap, which can lead to spoilage.

Bale Wrapping

Baleage should be wrapped with a minimum of four layers of one-mil plastic as soon as practical after baling. Wrapping within 12 hours of baling prevents undesirable microbial activity and excessive heating from lower forage quality. Bagging delays can also allow bales to sag, making them more difficult to wrap.[2]

Baleage wrapper types include: platform, swinging arm, in-line, and bale spear. Each has advantages and disadvantages. The in-line wrappers place bales end-to-end in a row while wrapping. This type of wrapper uses less plastic because the ends of individual bales are not covered.

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Figure 2. Wrapped in-line baleage.

Some in-line wrappers also allow extra plastic to be wrapped at the joints between bales to help keep oxygen from penetrating the bale and causing spoilage, mold growth, and feed losses.[2]

Bales should be moved, handled, and wrapped in a storage site to minimize the potential for damaging the plastic. Using bale squeeze attachments can help in transporting and stacking the silage bales.

Consider the following tips to minimize degradation of both the plastic and the silage:[1]

- Individually wrapped silage bales should be stacked at their ends or sides to minimize UV degradation of the plastic because the ends have more plastic layers.
- Bales should be stored on a well-drained site. They should be away from trees and weeds that harbor insects and rodents, which attract birds leading to potential plastic damage.[1]

Bale wrappers can cost from $6,000 to more than $30,000. Some farmers may elect to hire a custom operator to wrap silage. Wrappers may also be available for rent from conservation districts, county Extension offices, or other sources.

Sources (verified 7/29/20)

[1] Teutsch, C., Sears, B., Smith, R., Henning, J.C., and Hancock, D.W. 2018. Baleage: frequently asked questions. University of Kentucky. AGR-235. http://www.ca.uky.edu/.

[2] Andrae, J. 2005. Baleage pros and cons. University of Georgia. http://www.caes.uga.edu/.

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