Extension
UNIVERSITY OF WISCONSIN–MADISON

Bale Grazing:
A Winter Feeding Strategy

UW-Madison Division of Extension

Many grazing operations across Wisconsin may look similar during the growing season, but what differentiates them is winter management. Graziers employ a variety of winter-feeding strategies. For those who choose to keep their livestock outdoors year-round, bale grazing is an effective, low-cost approach. In bale grazing, bales are placed on pasture, often pre-set in a grid pattern prior to winter. A temporary electric fence wire is used to limit access to only a few bales at a time, which are often fed using bale rings. The bales are kept stationary while livestock are progressively moved through the grid by moving the wire and bale ring throughout the winter. This strategy of feeding hay is an effective way to outwinter several classes of livestock – predominantly cattle – while also distributing nutrients, building soil fertility, and reducing the costs of inputs and labor.

Outwintering Management

Outwintering can be described as any method of feeding livestock outdoors over winter. Due to the potential for adverse weather conditions, outwintering carries additional responsibility for the farmer. Careful management is required to sustain livestock wellbeing and performance. Cattle being raised in outdoor environments require approximately 20% more energy in winter compared to summer.[1] Yet, they have a great capacity to generate metabolic heat through internal body processes like system fermentation.[2] Many breeds of cattle are naturally resilient to cold, but constant access to high-quality feed and water is critically important. Closely monitoring hay supplies and water sources is required for bale grazing success.

Photo 1: Beef cattle bale-grazing using a plastic bale ring.

Site Selection

Like any other method of livestock agriculture, measures must be taken to minimize the potential environmental impacts of bale grazing. Environmentally sensitive areas such as water quality management areas (300’ from streams/rivers, 1,000’ from lakes/ponds) and concentrated flow channels should be avoided, as well as low spots that are susceptible to ponding and mud. Areas that are in most need of nutrient buildup as indicated by soil testing should be targeted first.

Infrastructure

Cattle may not require as much water during winter as in summer but monitoring water availability through winter is equally important because of susceptibility to freezing. A dependable frost-free water source is a prerequisite of bale grazing. Winter water sources should be centrally

Photo 2: A centrally-located, 2-hole water source can serve two separate groups of cattle through the winter; located on a high point with good drainage.

located in an accessible area that is well drained – preferably a high spot on the land.

Despite their resilience, cattle may occasionally require protection from adverse weather. It is important to have a plan for providing shelter during extreme weather conditions, such as very low temperatures, high winds, and especially cold rain. For cattle that are well acclimated to winter conditions, a wet haircoat at 30 degrees is more harmful than snow at zero degrees. The goal must be to maintain wellbeing and performance through winter by ensuring proper cleanness, comfort, and feed intake. But preparing for these extreme conditions doesn't mean investing in a building. Studies have shown that the inclusion of a windbreak[3] can minimize stress for cattle fed outdoors during winter. The bales themselves can serve as protection when situated between the cattle and the predominant wind direction. Natural features like woodlots and hills also provide effective protection. Portable constructed windbreaks are also cost-effective and more efficient than stationary structures, which are costly and cause cattle to congregate, minimizing the capacity to distribute nutrients.

Assuming that a good perimeter fence is in place, the only additional materials needed for bale grazing are fiberglass posts and a single poly-wire. Since normal temporary fenceposts cannot be used in winter due to frozen ground, fiberglass posts can be inserted into the sides of bales to hold the wire (see the "bale grazing tips" and photos on page 3).

Setup

Planning for bale grazing begins during the previous growing season. An appropriate site must be selected and a supply of high-quality hay must be secured. The amount of land needed for outwintering will vary, depending on the density (bales per acre) at which bales are pre-set and the amount of hay needed for the herd. Calculations will also be influenced by the amount of dry matter

Photo 3: Forest edges and hay bales can serve as protection from adverse winter weather conditions such as

Photo 4: Bales pre-set in a 25' grid after the last grazing event in October. Bales are on edge with net wrap removed.

per bale. Cattle will consume about 3% of their body weight in dry matter per day. Bales of grass/legume hay are about 85% dry matter. A typical 4' x 5' round bale will contain about 765 lbs of dry matter – enough to feed one cow for nearly a month. To be safe, factor an additional 20% for increased winter intake plus 10% for waste, and a bale will feed a cow for about 20 days in winter.

Bales should be pre-set when the weather and field conditions are favorable in the fall. The density of the grid, or bale spacing, should be determined by the nutrient needs of the soil. Typical spacings range between 25' and 50' on center. Tighter spacings result in higher nutrient deposition rates, more uniform distribution, and less land used. Larger spacings will result in lower nutrient rates and more variable distribution but may be necessary where soil fertility is already high.

Nutrient Distribution

The manure and hay residue that remains on the soil surface after bale grazing can increase soil fertility and subsequent forage productivity to a greater extent than the mechanical application of manure.[4] While some of the soil fertility benefit is derived from the hay residue, much of the benefit comes from the complimentary action of manure application and hoof disturbance by cattle.

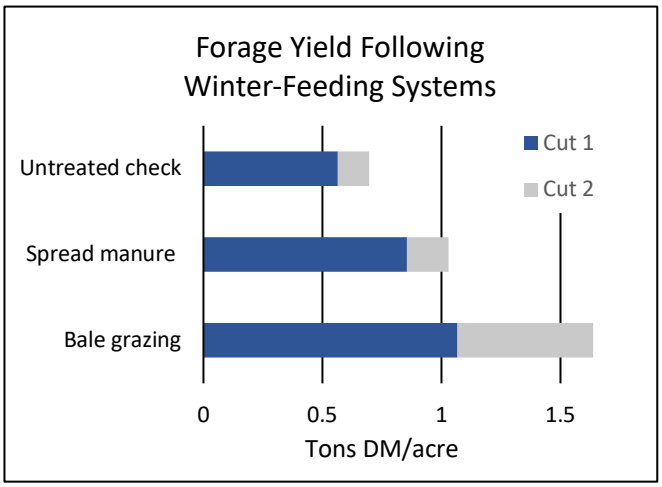

Figure 1. Bale grazing resulted in greater forage yield in the following season compared to the mechanical application of manure. Data from: Jungnitsch, 2008.

Confined systems that collect manure to be mechanically applied typically lose nutrients at several points in the handling process, but since manure being deposited directly by the animal is not handled at all, it retains much more of its original fertility – especially nitrogen and potassium which are deposited primarily through urine. The efficient application of these nutrients by cattle contributes to sustained forage productivity across pastures.

Cost Benefits

Bale grazing is not without its management requirements and labor, but financial savings is one of the greatest benefits of the system. Outwintering on pasture provides low-cost opportunities for beginning farmers and gives established farmers the opportunity to implement grazing into their operation without a large capital investment in infrastructure. Additionally, bale grazing minimizes wear and tear on facilities and equipment during the winter months. The increased fertility helps avoid costs of off-farm fertilizer sources, in addition to the costs associated with storing, hauling, and spreading manure.

Every farm is unique and must determine whether bale grazing is a good fit or not. Bale grazing requires a different set of skills and work that may not fit the goals and interests of some operations. It is also a flexible practice that varies greatly from farm to farm and can be adapted to many different systems. Bale grazing has become a proven winter feeding and soil fertility-building strategy for livestock producers in Wisconsin.

For more information on bale grazing, check out Episode 3: "Introduction to Bale Grazing" on the Field Notes podcast by UW-Madison Extension: https://cropsandsoils.extension.wisc.edu/field-notes-podcast/

Bale Grazing Tips

- Begin planning the site during the grazing season – as bales are collected in the growing season, consider storing bales near the area to accommodate pre-setting in fall
- Mark individual bale locations ahead of time with spray paint to serve as a visual aid when pre-setting bales and to ensure a uniform grid
- Begin pre-setting bales in October while field conditions are suitable
- Set bales on edge (round side down) to allow them to shed rain and snow through winter
- Remove net wrap or twine before setting bales to keep it from freezing on and avoid debris left behind in spring
- Fashion a "bale post" by adding a pigtail made of high tensile wire and duct tape to a 5' post that can be inserted into bales
- Residual hay that remains after moving bale rings can serve as bedding – consider spreading out by hand to avoid mounds in spring
- Steel bale rings are heavy to move by hand, but carry an electrical current when pushed into the wire by livestock, limiting pushing
- Plastic bale rings are recommended as they do not rust and are easier to move, but can be pushed into the wire by cattle when empty
- A temporary lane can direct cattle to a water source while excluding them from the non-outwintered area, limiting damage
- Feeding hay consisting of mature legumes will aid in reseeding legumes on the outwintered area

Temporary Fencing for Winter

Photos: (top left) bale post using 5' fence post with pigtail fashioned from high-tensile wire, (top right) bale post inserted into round bale, (left) temporary lane using steel t-posts leading to water

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