COMPARING ROUND BALE FEEDING METHODS, WITH OR WITHOUT RINGS AND THROUGH A BALE PROCESSOR

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ABSTRACT: Hay, independent of storage or feeding method, is the most expensive feed most producers provide for beef cattle. Researchers have reported production costs of over $20/bale, dependent on the number of bales produced. Unprotected storage leads to storage losses of 30-50% and an additional 10-20% loss from animal refusal. Studies have shown that storage losses can be reduced to less than 5% with barn or shed storage but feeding losses still remain. Feeding round bales in rings may eliminate 10-15% of the feeding loss, but with or without rings a refusal pad and a muddy ring, approximately 30 feet in diameter, remains where every bale is fed. This disturbed area must be renovated or a weedy, nonproductive area may remain in the pasture for 2-3 years. Spreading out the feeding areas may cause animals to use feed more efficiently, eliminate feed refusal piles and mud, and also provide a more equitable feeding opportunity for all animals in the herd.

In this project three round bale-feeding methods were evaluated; 1) bales without rings; 2) bales fed in rings; and 3) round bales fed from a bale processor. Where whole bales were fed, with or without hay rings, approximately 706.5 square feet or 1/62 of an acre of productive pasture was lost. To renovate this area, a time of approximately 4 minutes/bale was calculated at a cost of $1.76/bale for tractor, implement, labor, seed and fertilizer and weed control costs. Where hay was fed in small windrows (24-30 in wide and 18-24 in high) with the distributor there was little evidence that hay had been fed in that area of the pasture.

CITATION: Evans, R.R. and T.F. Best, 2004. Comparing Round Bale Feeding Methods, With or Without Rings and Through a Bale Processor. Annual Report 2004 of the North Mississippi Research and Extension Center, Mississippi & Forestry Experiment Station Information Bulletin 419:184-187.

KEY WORDS: Round bales, bale processor, hay feeding costs.

MATERIALS AND METHODS: Ninety mature crossbred cows, weighing from 900 to 1250 pounds, were used in this study. They will be allotted equitably by weight and breed type to one of six (6) groups of fifteen (15) cows. The hay used in this study was stored in a barn from harvest to feeding. There were three round bale-feeding treatments with two replications. The treatments were round bales fed on the ground without hay rings, bales fed in hay rings and round bales fed through a bale processor. Cows with an average body condition score (BCS) of 5 or greater (1=extremely thin cow and 9=extremely fat cow) were used in the study. At trial initiation cows were in late gestation, and BCS, a visual estimate of fat cover, is more indicative of animal well-being than changes in body weight. As calves were born, a birth weight was taken, calves tattooed, given an ear tag and males castrated.

Hay was fed three times weekly with all methods on the highest and driest areas in the pastures. If rain had not caused extremely muddy areas in the pasture, two bales may be fed in the same area, but this was not a typical situation. In the fall of 2002, Hurricane Isadore initiated an extremely wet winter in 2002-2003 and the wet pattern followed in the winter of 2003-2004. It was necessary to move feeding areas at each feeding time. With the hay distributor several different distribution methods were evaluated comparing large windrows over a short distance against a fence to discourage trampling on one extreme to feeding small windrows over greater distances over more the pasture to decrease thatch and trampling.

In the spring of 2004, residual piles (where bales had been fed with or without rings) were burned, disked and smoothed with a do-all. The number of times each implement was run in an area and how long each pass took were recorded. Some of the feeding areas were not renovated as a comparison.

RESULTS AND DISCUSSION: When hurricanes Isadore and Lili hit the east coast in a two-week period in September of 2002, pastures and production fields in Mississippi became waterlogged and these conditions persisted through the fall and winter of 2002 into early summer of 2003. Late fall is usually dry but this excessive hurricane rainfall plus additional rains caused the pastures to have the wet conditions in October that are usually experienced in January. Gates and areas that have repeated travel are usually muddy, but there was abnormal rutting even in established pastures just from the weight of the tractor and hay trailer traveling to the feeding areas. These wet conditions were also seen again in the winter of 2003-2004. Rainfall for 2004 was 20+ inches above normal. Typically mud is experienced in the Prairie soils during the winter, but these two years were extreme.

Feeding with rings is more efficient than feeding without them due to hay savings, but pasture renovation costs were the same for ground feeding systems. In dry winters more than one bale may be fed in a single spot, but in normal winters due to mud, it is necessary to move feeding areas each time a new bale is fed. The muddy circle and hay refusal pile where bales were feed averaged 30 feet in diameter and constituted a 706.5 square foot loss (1/62 ac) of productive pasture for each bale fed. To renovate a feeding area the refusal hay pad must first be burned as best one can. Generally if a producer waits until the hay pile is dry enough to burn completely, then it is usually too late in the spring to renovate the area and then produce beneficial forages. The options for early renovation are few, burning, spreading out the remaining wet material and then piling and burning again when it dries, or running over the area with a disk and attempting to cut it into the soil. After disking the area two or three times, it must be smoothed with a do-all or a drag. Even with disking and smoothing, we usually end up with a number of small wet piles of decaying material in the pasture.

An area where seven bales had been fed on Prairie soils was renovated by running over the area three times with a 12 foot disk and three times with a 22 foot do-all to provide a fairly smooth seed bed. It took 4 minutes per bale to renovate the area at a cost of $1.76/bale. These costs included tractor ($0.27), implement ($0.24), labor ($0.62), seed and fertilizer ($0.65) and weed control costs ($0.03). The costs were calculated using costs/a figures obtained from the MSU Agricultural Economic Extension Cow-Calf Budgets publication, and costs/bale were calculated

using costs/a values divided by 62 (43560 sq ft/a ÷ 706.5 sq ft/bale, 1/62 a). The times recorded were for actual tillage times and not for travel time to and from the field.

Feeding hay through the bale processor has an advantage over feeding round bales on the ground, primarily from the elimination of renovation costs of the feeding area. Several different sizes of hay windrows were used to determine which of these provided feed for all animals in the group, minimized soil disturbance and residual thatch in the feeding area. Hay was fed against the fence line to provide a backdrop so that cattle would not walk through the feed, much like using a hay ring. Using the fence line is a good practice, but it was found that putting out large windrows of hay in a short distance, even against the fence, generated too much waste and cows used uneaten hay for bedding. When this happened the thatch pile was not as thick as where whole bales were fed, but hay was wasted and pasture regrowth retarded. The best feeding procedure for the hay distributor was to make a small windrow approximately 24-30 inches wide and 18-24 inches high spread over about 500 feet. With a large feeding area, all animals are able to feed, there was little ground disturbance and there was virtually no sign of residue or retarded forage growth in the pasture the next spring. The small windrows did not encourage animals to use the feed for bedding, as little hay remained in an area after feeding, and also, the animals were spread out and less inclined to bed as individuals. Windrows may be larger and shorter if large numbers of animals are fed in an area and feed is consumed more quickly. To minimize waste and decrease mud, hay should be fed once or even twice daily over different areas of the pasture. Also, hay should not be provided until all of the previous feeding had been consumed.

The time to load hay and travel, to and from the hay barn to the pastures, was not measured since this time was equal for all systems. Many producers routinely remove strings before feeding, and it took an average of 2 minutes and 14 seconds to cut and remove the strings from each bale. If these are plastic strings, they would certainly need to be removed before feeding to keep cattle from consuming them and to also prevent damage to equipment, especially rotary pasture cutters. The fastest feeding method was feeding on the ground without a ring as hay was just transported into the pasture and dropped. Next was with a ring and it took a skilled operator approximately one minute to remove the hay ring from the old bale and place it onto the new bale. Once a bale was loaded into the bale processor, it took an average of 1 minute and 30 seconds to feed the bale into a windrow 3 feet wide and 30 inches high, slightly longer than the time needed to feed in a ring. These times were measured with the same experienced operator and times would certainly vary with different operators.

The pastures that had old hay piles that were not renovated appeared, as one would expect, weedy and unproductive. There was yellow top (Ranunculus ssp.), smooth and curly dock, henbit, redroot pigweed and other assorted weeds growing in the feeding areas. All of these are prolific seed producers and pigweed with its thorns makes these old feeding areas very inhospitable to cattle for 2 or 3 years. The renovated areas still had weeds, but they were less numerous and had more grazable forages. Where too much forage was fed in a single area with the bale processor, the weeds were also present, but when small windrows were spread over a larger area in the pasture there was no thatch or evidence of ground disturbance. Whether a producer uses a bale processor or some other method, it is a good practice to distribute hay in small quantities over a large area to eliminate the need for costly pasture renovation. In addition

to distributors, above ground hay racks, devices that unroll bales using the tractor PTO, or even a method as simple as unrolling a bale down a hill work well.

Another advantage noted for the processor was that it allowed all animals in the herd equal access to feed. There was no difference in BCS between groups, nor was any expected, since all animals consumed hay as needed. It was observed that the younger, more timid animals were able to feed at will by distancing themselves from the boss cows and consume hay on a first choice basis rather than having to wait until the boss animals fed. As a rule, it is the younger growing 2 and 3 year old animals that have the greatest nutritional needs, but since they are not as aggressive, nor big enough to push aside the boss cows, they often get the leftovers.