

Weigh Your Hay Now, Save Money Later

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It is common for most farmers and livestock owners to “eyeball” a couple bales of hay: estimating the weight of the bales by their size, the settings on the baler, the type of forage, and even the cutting. However, this estimate is primarily based on visually assessing the bale. The convenience of this approach is overshadowed by inaccuracy of the actual hay bale weights. The Hay Bale Project found that a visual assessment of bale weights by farmers, livestock owners, and even experts, often was incorrect, leading to an over or underestimation of the actual bale weights.

What is the Hay Bale Project?

Between 2012 and 2014, the authors conducted 80 bale weight trials on 27 farms across Northwest Wisconsin. Farms raised a wide range of livestock, from dairy and beef, to horses and bison. All the hay was produced in the region. Over three-quarters of the bale owners produced it themselves, while the remainder purchased the hay from local farmers.

Three bales were randomly selected from each crop and cutting of hay, weighed individually and then an average of the three bale weights was taken. Before weighing, the bale owner, Extension educator, and any guest farmers or experts, were asked to estimate the average bale weight for the group of bales. Bales were weighed using two manure spreader scales placed on across from each other under a wood “cradle”. The farmer used a skid steer or tractor to place the bales on top of the cradle. The sum of the two displayed weights on the spreader scales was recorded for each of the three bales. Scales, with the wood cradle, were tared before each bale. The bales on top of the cradle. The sum of the two displayed weights on the spreader scales was recorded for each of the three bales. Scales, with the

wood cradle, were tared before each bale. The following information was recorded for each bale trial: weigh date, baler make and model, cutting number, harvest date, hay type, bale size, and whether bales were stored inside or outside.

Bale owners were also interested in the quality of their bales. A forage analysis was done on 36 of the bale trials in 2012 and 2013. Funding was not available in 2014 to continue the forage analysis.

What are the results?

Some people do better than others in estimating hay bale weights and their success is often due to luck, rather than expertise or experience. Neither experts nor long-time farmers were able to consistently “eyeball” the correct weights of hay bales. Even for farmers who produced their own hay, this research project found a lot of variability in their estimates and the actual weight of the bales. On average, both farmers and experts (Extension educators and agronomists) were incorrectly estimating bales by about 100 pounds - above and below - the actual weights of the bales. Farmers were incorrectly estimating the bales at an average difference of 130 pounds, while the experts’ average was 150 pounds.

One reason for this was the amount of variability of weights among the bales which made up each of the bale trials. The largest recorded coefficient of variability in a bale trial was 34.1%, while the smallest coefficient of variability in the project was recorded at .38%. Across all

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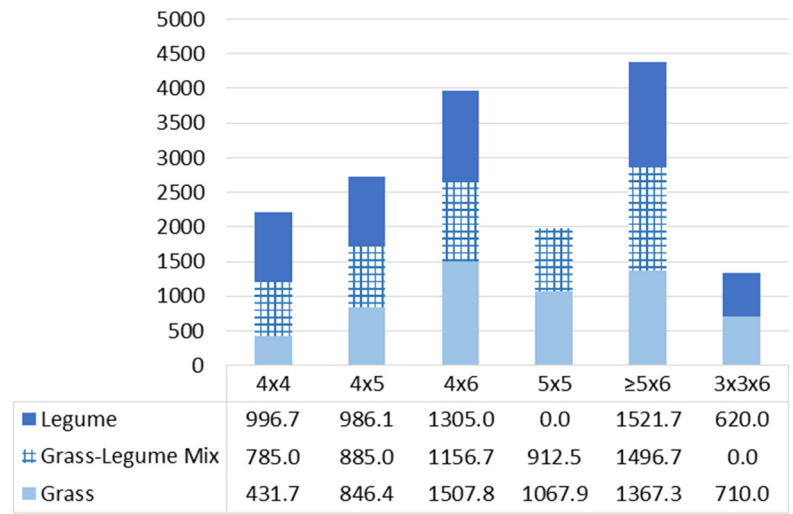
the bale trials, the average coefficient of variability was 7.04%.

The largest sample of bale trials was within the 4x5 round bale size. Both large round and large square bales were weighed. Bale trials were grouped into six categories of bale sizes: 4x4 (n=4), 4x5 (n=45), 4x6 (n=6), 5x5 (n=9), ≥5x6 (n=14), and 3x3x6 square (n=2). Bale trials were also grouped by the hay type: grass (n=31), grass-legume mix (n=31), and legume (n=11). Three bale trials were cornstalk or oat baleage. The size of the bale as well as the forage species which make up the hay all contribute to the weight of the bale. The average bale weights by size and by hay type are depicted in the graph to the right.

Data was collected on bale storage for each of the bale trials. 80% of the bales were stored outside. Research has shown a reduction in nutritional quality as well as feed value over time for bales stored outside. The data collected in this research project strengthens that conclusion. For both grass and grass-legume mix hay, forage tests results on relative feed quality (RFQ) were higher for bales stored under cover. Grass-legume mix bales stored under cover had a RFQ of 125 (n=6). Grass-only bales had a RFQ of 117 (n=3) for bales under cover compared to bales stored outside with a RFQ of 105 (n=17). There were not enough bale trials in the legume category to be able to make a correlation between storage and RFQ.

The nutritional content of the bales was as expected based on the manner in which the bales were stored and the forage species in

Average Bale Weights By Size and Hay Type



the hay. Legume-only bales had a crude protein (CP) content of 17.1% of dry matter (DM). Grass-legume mix and grass only bales had CP levels of 15% and 11.1%, respectively. On the other hand, the legume bales had the lowest total digestible nutrients content of all three hay type categories, with just 57.3% of DM. The grass-legume mix bales had the highest levels at 60.2% and the grass-only bales had 59.6%.

Why is it important?

Getting accurate hay bale weights is a way to take the gamble out of managing hay. A 100 pound error adds up in extra cost or lost feeding potential. As an example, consider Grade 1 hay (125 to 150 RFV/RFQ) at \$100 per ton for large round bales. An overestimation of 100 pounds per bale is a loss of \$10 per bale for the buyer.

Weighing individual bales in a load can be impractical for most farms. Often farmers haul loads of hay to local semi-truck scales to determine the average per bale weight. This process provides you with more accurate numbers than “eyeballing”. Accurate weights ensure that both buyers and sellers get a fair deal. Typically, buyers underestimate bale weights, while sellers overestimate. Before buying, selling, or feeding bales, it is important determining an accurate weight will help you to be better prepared.

Proper planning for your livestock’s forage needs is essential to keeping costs low and reducing waste. Even a slight under or over estimation of bale weights can hurt your bottom line, costing you time and money.



Photo Credit: Otto Wiegand