



What is the Crop Storage Institute

There are many universities researching different elements of forage production and storage. However, much of the information that they release is fragmented and difficult to understand. The Crop Storage Institute was created in 1994 for the purpose of compiling university information for use by the agricultural industry. We seek to piece together information from universities across the country and finally bring the facts to a meaningful conclusion for livestock producers.

We are in a continuous effort to better our organization. If you have any suggestions for how we can better collect, organize, or distribute information pertaining to storing livestock feeds, please feel free to contact us.

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**University of Wisconsin
Research**

Silage Bag Information

-Dry Matter Losses

-Dry Matter Density

Factors Affecting Density

-Filling Speeds

**Literature Created By:
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Summary

The University of Wisconsin, one of the nation's land grant universities, has been conducting research trials at three of its research farms since the summer of 1999. The information coming from these trials is among the most complete and well documented information available on silage bags. The focus of the research has been measuring the dry matter densities and losses in silage bags as well as determining the factors that affect the density and loss.



Methods

- 3 research farms (Arlington, Prairie du Sac, West Madison) have used baggers for several years
- 3 machines: 9 ft. Kelly-Ryan, 8 ft. Ag Bag, 9 ft. Ag Bag (rental)
- Each load going in to the bags is weighed and tested for dry matter
- Each load is marked on the bag and the length each load occupies is measured
- Each load out is weighed and tested for dry matter as well as various quality characteristics

Dry Matter Losses (Shrink)

Two types of dry matter losses were measured, gaseous and spoilage. Spoilage was the feed that was obviously spoiled and moldy. Gaseous losses is what is typically called shrink, or the total dry matter weight in less the total dry matter out. This is the forage that is consumed in the aerobic and anaerobic activities.

Loss Averages and Ranges

Type	Range	Average	Without Worst 3
Gaseous:	-0.3 to 15.7	8.4	7.9
Spoilage:	0.0 to 25.4	5.8	1.9
Total:	-0.3 to 38.2	14.2	9.7

Dry matter loss is one of the most expensive aspects of storing any feed. In this study total **dry matter loss averaged 14.2%**. Three of the 15 bags in the study had dry matter losses that exceeded 25%. In one of the bags the large loss was attributed to bird damage that went unnoticed. This emphasizes the need to routinely monitor bags. However, in two of the three bags there was no noticeable reason for the large losses. If these three bags are not included, the average dry matter loss falls to 9.7%.

Management Recommendations

- The recommended DM range of 30 to 40% is a good target for ensiling
- Monitor of bags routinely for damage and patch with special tape
- Feed out rate is important; it is best if you can take out at 2 feet a day or more

Density (Pounds of Dry Matter/Cubic Foot)

In measuring density, we assumed the volume of the bag to the surface area of the bag's face, assuming it is a perfect circle and multiplying by the length of the bag.

A great variation in density was found across the face of the bag. Near the top and sides of the bag the average density was only 40% of the density measured near the base of the bag. This seems to have detrimental effects on dry matter retention, as mold was consistently found near the top and sides of the bag.

Average Dry Matter Densities

Bagger	Station	Hay	Corn	
8' Ag Bag	Prairie du Sac	12.6	17.0	U
			14.7	P
9' Ag Bag	Arlington	-----	12.1	P
9' Kelly Ryan		13.1	12.1	P
9' Kelly Ryan	W. Madison	11.5	11.2	U

U=Unprocessed / P=Processed

An estimate of dry matter density enables the user of a forage storage system estimate their storage needs. Higher dry matter density slows dry matter loss. The average dry matter density in silage bags is **near 12.5 pounds of dry matter per cubic foot of storage**. The average density in tower silos is about 22 pounds of dry matter per cubic foot, and those in bunker silos average 14. The research information also seems to indicate yields of approximately .4 tons of dry matter per linear foot of 9-foot diameter silage bag, and about .34 tons of dry matter per linear foot of 8-foot diameter silage bag.