

## J H Harrison, Washington State University - Puyallup

Bagged silage can be an effective storage system and can offer the following advantages over bunker or upright silos:

- ▶ Cost effective - evaluations have shown that bagged silage can be cost competitive when compared to silage stored in bunkers and can be a good option when expanding a livestock operation. Bagged silage offers a lower initial investment cost, low annual storage costs, and lower loss of DM during storage.
- ▶ Flexibility - you can store different qualities, different forage types, and different cuttings and feed according to quality for different production classes of livestock.
- ▶ Safety - Use of bags avoids the need for packing tractors to traverse the heights needed to pack silage into bunker silos.

### Disadvantages to Bagged Silage

Storing forage in silage bags can result in significant losses of DM if bags are not routinely monitored for holes and tears that have resulted from rodents, wildlife, and farm machinery. Dry matter losses have been measured at as low as 4% but can exceed 20% if conditions for storage are not optimum. While rare, bags have split open and the forage is then exposed to oxygen and can spoil if not re-bagged as soon as possible. The plastic from silage bags needs to be disposed of properly. Recycling opportunities exist in some areas. When forage is ensiled that varies greatly in DM content from load to load, this can create variability in DM content at the time of feeding.



### Effect of Packing on Particle Size, Broken Cobs, and Whole Kernels of Corn Silage

The process of packing forage in a bag, particularly corn silage, can result in significant additional mechanical treatment to the forage. This additional mechanical action of the packing fingers has been shown to reduce particle size, decrease the number of whole cobs, and decrease the number of whole kernels in the final silage (Tables 12 & 13).

**Table 12: Physical Properties of Processed and Unprocessed Whole Plant Corn Silage Stored in a Bag**

Silage	Mean particle size before bagging (mm)	Mean particle size after bagging (mm)	Course fiber action before bagging %	Course fiber action after bagging %
Unprocessed 9.5 mm TLC	11.3	7.3	17.4	4.6
Processed 9.5 mm TLC	8.9	5.6	5.1	1.2
Processed 14 mm TLC	10.5	7.4	24.7	6.5
Processed 19 mm TLC	14.1	7.6	44.5	13.5

**Table 13: Fraction of Total Kernel Mass Damaged Before Bagging**

Silage	Fraction of total kernel mass damaged before bagging %	Fraction of total kernel mass damaged after bagging %	Fraction of particle-size sample as whole cob before bagging %	Fraction of particle-size sample as whole cob after bagging %
Unprocessed 9.5 mm TLC	68	83	9.9	4.3
Processed 9.5 mm TLC	100	100	0	0
Processed 14 mm TLC	100	100	0	0
Processed 19 mm TLC	10	100	0.4	0.6

### Essential Management Tips for Successfully Using Bagged Silage

- ▶ Harvest the silage at desirable DM content (25-45%)
- ▶ Chop the forage to the desired chop length (see section “Crops for Silage”), keeping in mind that the forage will receive additional mechanical processing going into the bag.
- ▶ Use a proven inoculant.
- ▶ Use a quality bag for ensiling.
- ▶ Select a clean and hard surface for the bag.
- ▶ Leave about 4 feet of space between bags since the silage will settle during storage, this make it easier when the silage is fed.
- ▶ Locate bags away from heavily trafficked areas where other farm equipment may cause damage to the bags.
- ▶ Collect samples of forage periodically to determine the variability in DM content.
- ▶ Pack tightly to exclude oxygen (avoid ripples along side of bag), target a packed density of 14 pounds of DM per cubic ft.
- ▶ Don't overfill the bag. (Table 14).
- ▶ Seal the bag well, release the gases produced during the fermentation (with the use of bag vent) to avoid bag becoming pressurized and ripping or blowing open.
- ▶ Monitor for tears and holes created by machinery and rodents and patch holes or tears with an effective adhesive tape



**Table 14: Silage Bag Dimensions**

Bag Diameter	Ground-to-ground Measurement
8 ft	19.5 ft
9 ft	20.5 ft
10 ft	21.5 ft
12 ft	27 ft

immediately.

- ▶ Feed the silage at a rate that will allow for ~2 ft of silage bag length to be fed each day. Feeding less than this in warm weather can result in silage that becomes hot and moldy.

### Selecting a Clean and Hard Surface for Bags and Maintaining a Sealed Bag

It is critical that a clean, hard, and dry surface be available to store the filled silage bags. This will provide for ease in filling as well as emptying. You want to select an area that is convenient for feeding and one where you can avoid having to traffic through deep mud. Some points to consider are:

- ▶ Keep area free of grass and weeds, this will discourage rodents and wildlife.
- ▶ Develop a firm and well drained base, this can be achieved with a packed gravel base, or with greater expense, a concrete or blacktop pad.
- ▶ Make sure that you provide an firm "apron" area at the end of the bag for use when initially opening and feeding the silage.
- ▶ If wildlife are an issue, consider using a double strand electric fence to keep animals away.
- ▶ If birds are a common problem in your area, bird netting is available. One effective tip is to place tires on top of the bag and under the netting at intervals to keep the net up off the bag.
- ▶ A suggested rodent inhibitor is mothballs, either whole or by mixing with water and pouring around the base of the bag

### Online Resources Available

The University of Wisconsin web site (<http://www.uwex.edu/ces/crops/uwforage/storage.htm>) has some very useful information available, including additional information on bag capacities and forage storage cost calculators.