

# Plastic covers and silage density: What's new and basic in making good silage?

---

**R. E. Muck**

USDA, ARS, US Dairy Forage  
Research Center

**B. J. Holmes**

University of Wisconsin-Madison



**U.S. Dairy Forage  
Research Center**

# Losses During Silo Storage

- Dependent on exposure to oxygen
- Most important parameters:
  - Porosity/density of silage
  - Quality of surface sealing
  - Feed out rate



# New Tool For Potentially Improving Bunker Density

- What is the value of adding a packing device to the packing tractor?





# Formal Packing Device Trial



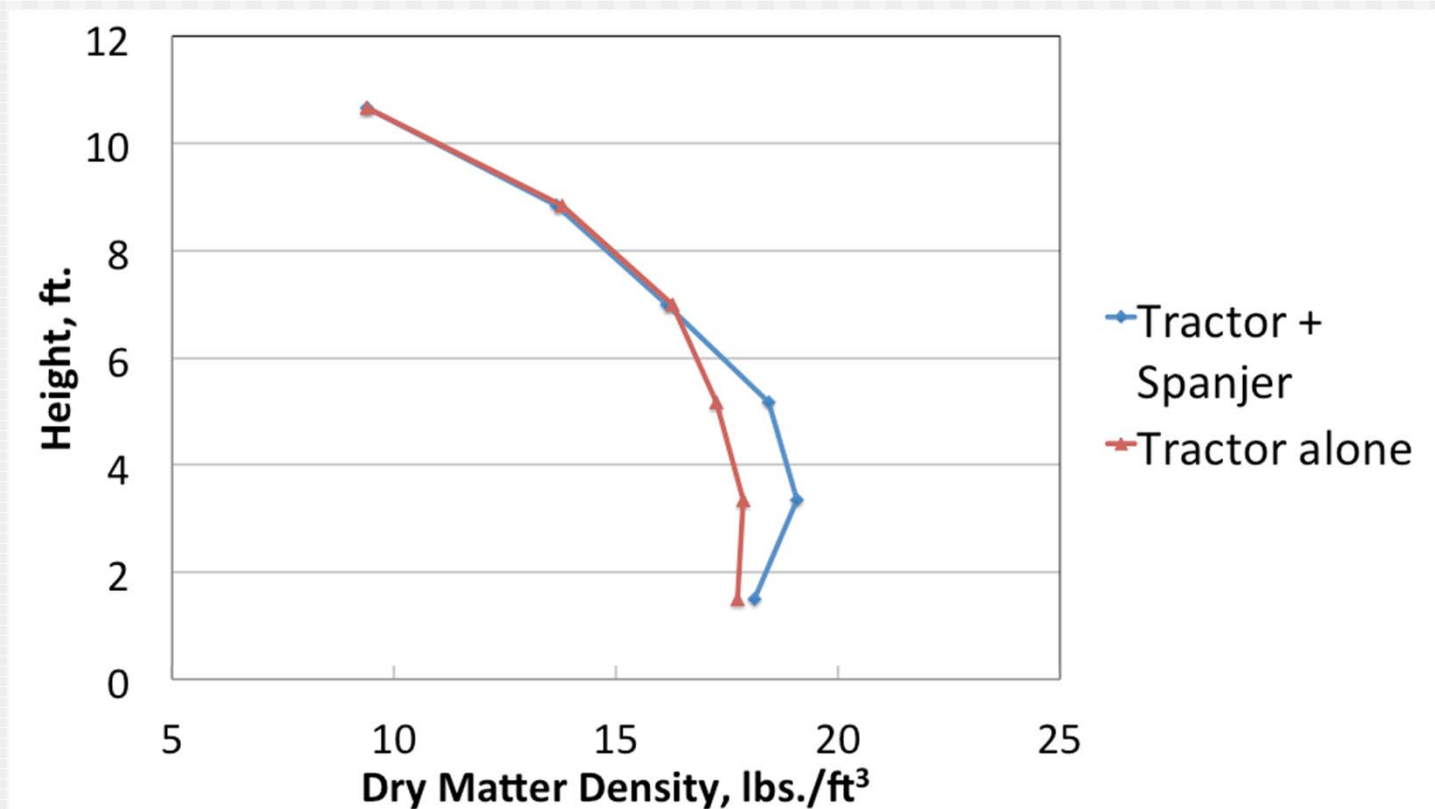


# Procedure

- 2 bunkers (50 x 200 x 12 ft.), filled 1 week apart
- 3 Similar Tractors (30,000 lbs.)
  - 1 for spreading
  - 1 for packing each half
- Spanjer packer (10,000 lbs.) on 3-point hitch
- Alternate loads to each half of a bunker
- Corn silage



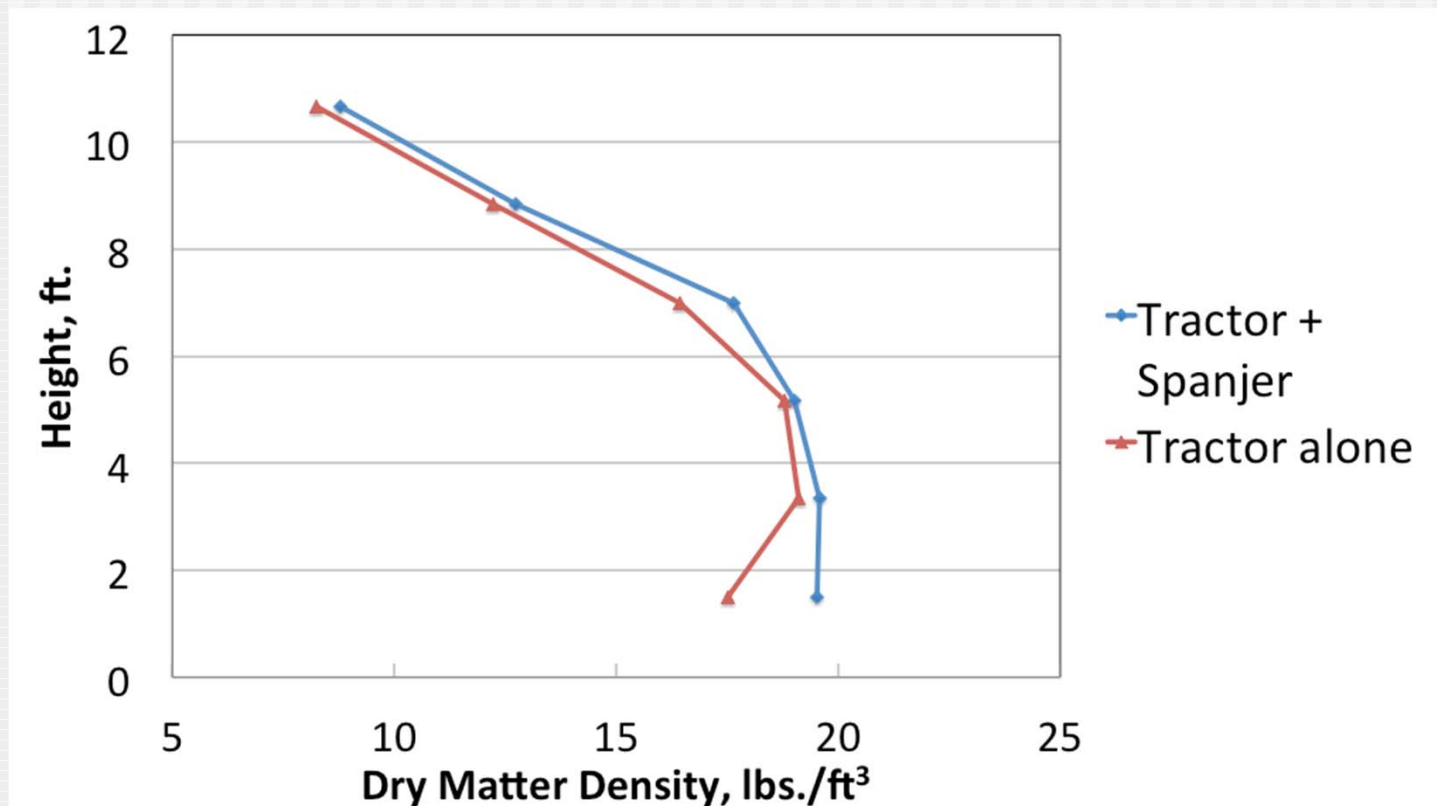
# Face Core Densities – Bunker 1



0.4 lbs./ft<sup>3</sup> improvement in density with Spanjer. However, the initial 3-point hitch set up limited Spanjer weight on the silage, transferring some Spanjer weight to the tractor.



# Face Core Densities – Bunker 2



0.8 lbs. DM/ft<sup>3</sup> improvement in density with Spanjer when 3-point hitch was set up properly.

# Informal Trial – Running With Spanjer Raised



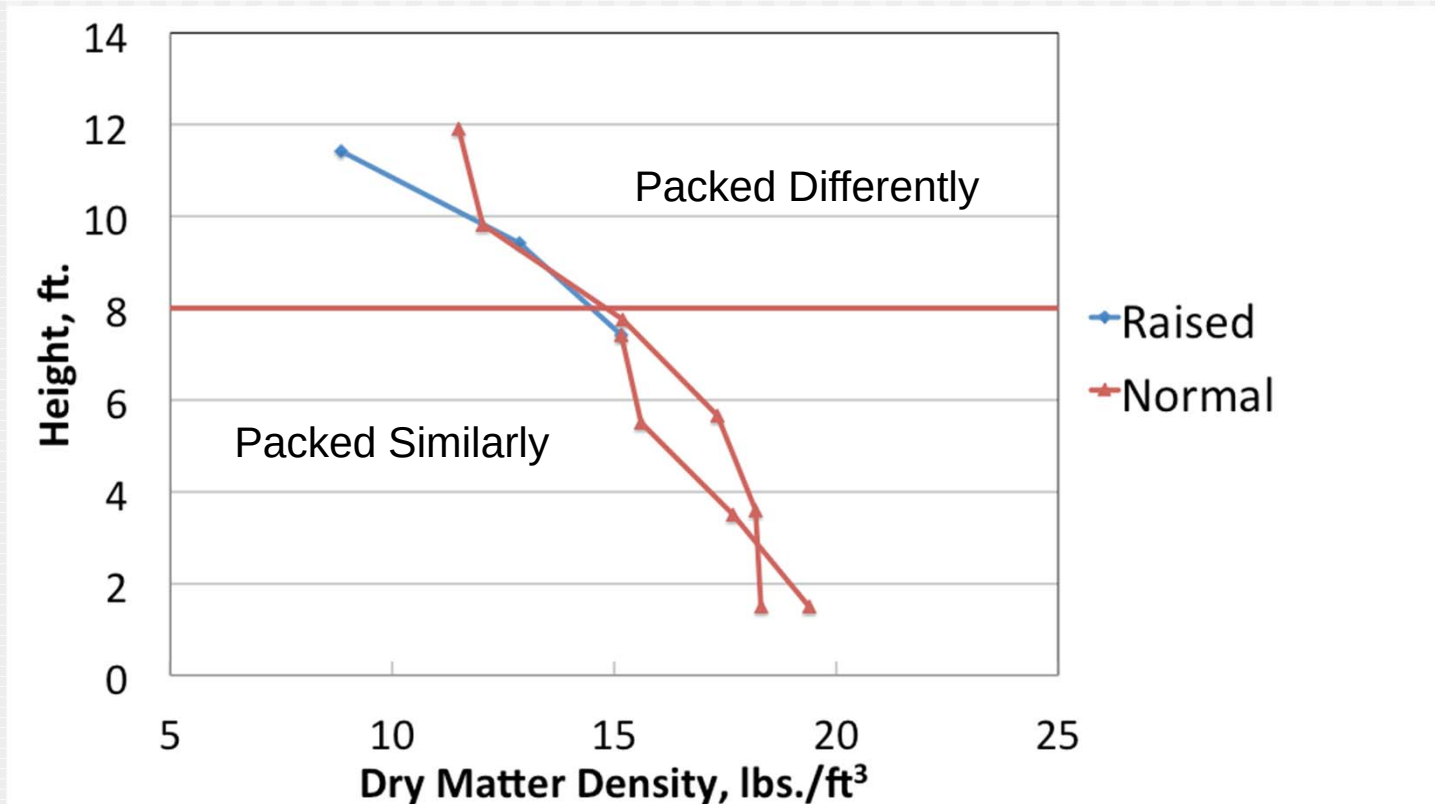
# Procedure

---

- 2 bunkers filled simultaneously with corn silage
- 1 packing tractor with a Spanjer packer alternating between the bunkers
- One bunker was packed using the Spanjer unit as intended.
- Other bunker packed normally with the Spanjer until 2/3 full; thereafter the Spanjer unit was carried on the 3-point hitch while packing.
- Packing times were not recorded.
- Face cores taken when bunkers were emptied.



# Face Core Densities – Raised vs. Normal Operation



Increased density 18 in. below the top with Spanjer when run as designed, but difficult to know how much is real.

# Summary of Experience with the Spanjer Packing Device

---

- Worked best when 3-point hitch allowed the Spanjer device to fully exert its weight while riding on the forage.
- Modest improvements in density (~0.8 lbs. DM/ft<sup>3</sup>)

# Plastic Covers

---



**U.S. Dairy Forage  
Research Center**



# 6 mil Black vs. 8.5 mil White



- Thicker white better by 5% points in 2 tests in top 6 inches
- Field crew liked working with the thicker white
  - Better in wind
  - Easier to walk on

# White Plastic But Different Sides Up

- No significant differences in losses between black or white side up
- But more heat damage in top 1" when black side up

White up



Black up

# Oxygen Barrier Films

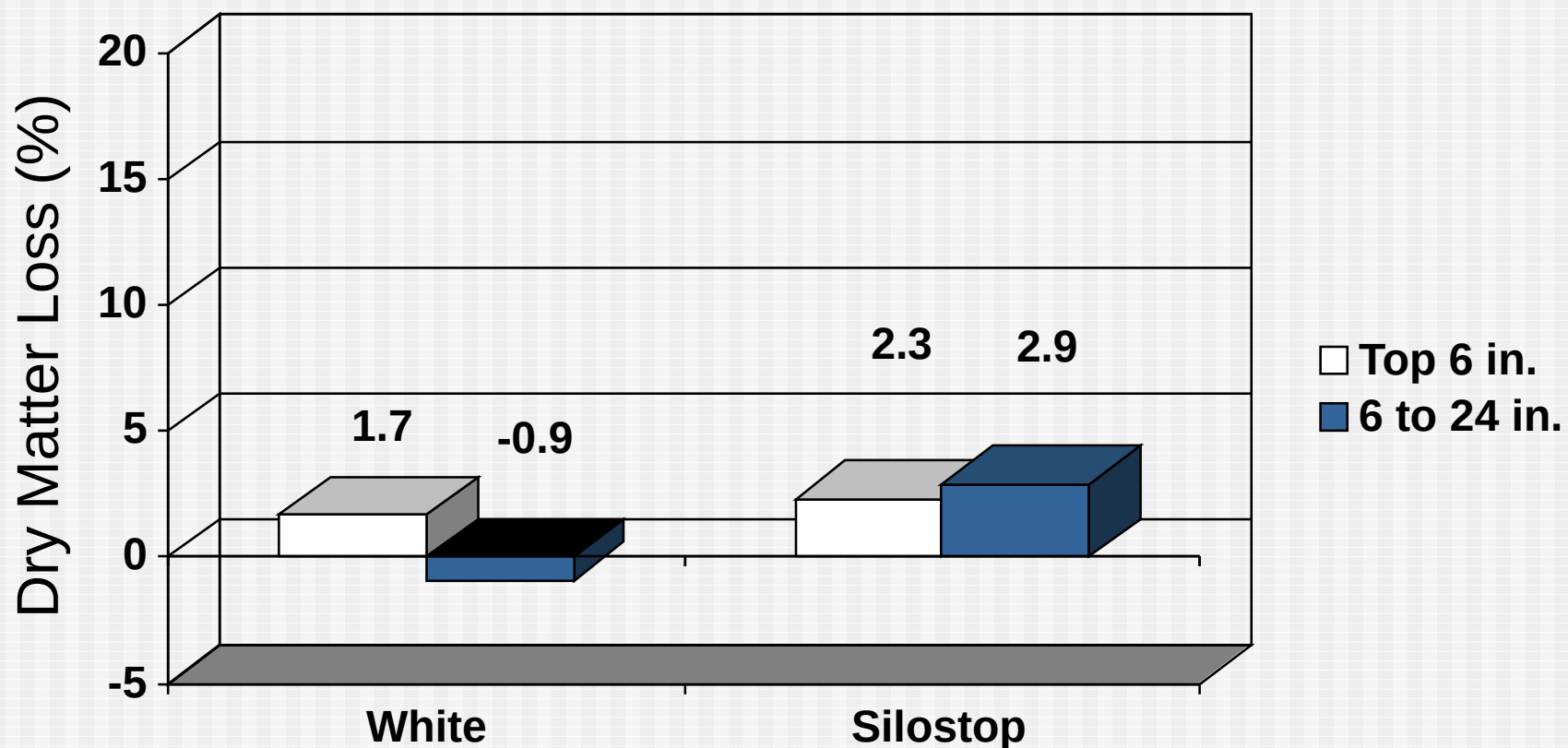


Worked with two companies' products:

- Silostop
- Raven FeedFresh



## % DM Losses under the Middle of a Sheet - 2 Alfalfa Bunkers, Silostop



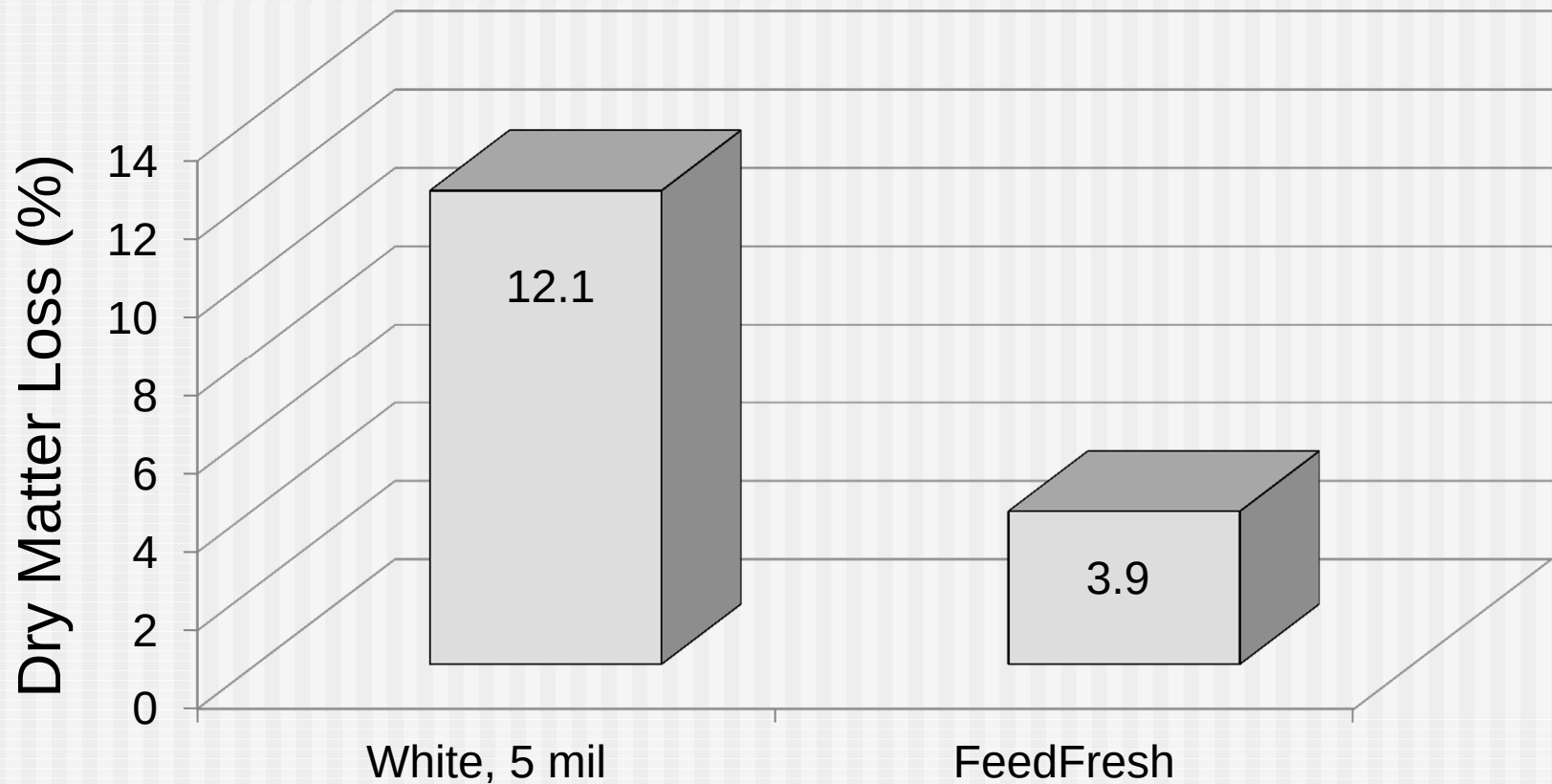
No significant difference between plastics but 8.5 mil white film (thicker than what most farmers use) and ...

# Fermentation Products at Middle of Two Bunkers

|                | Depth, in. | pH   | Lactic Acid | Acetic Acid | L:A |
|----------------|------------|------|-------------|-------------|-----|
| <i>Haylage</i> |            |      |             |             |     |
| White          | 3          | 4.89 | 2.5         | 4.0         | 0.6 |
| Silostop       | 3          | 4.82 | 4.5         | 2.2         | 2.1 |
| White          | 9          | 4.82 | 4.5         | 1.7         | 2.6 |
| Silostop       | 9          | 4.75 | 3.8         | 1.4         | 2.7 |
| <i>Corn</i>    |            |      |             |             |     |
| White          | 3          | 4.02 | 3.2         | 1.6         | 2.0 |
| Silostop       | 3          | 3.98 | 3.0         | 1.2         | 2.6 |
| White          | 9          | 4.00 | 4.1         | 1.4         | 2.9 |
| Silostop       | 9          | 3.97 | 3.9         | 1.2         | 3.1 |

Consistently better fermentation quality under Silostop.

# % DM Loss in Top 6 in. with FeedFresh vs. 5 mil White





# Summary of Plastic Films

---

- Oxygen barrier films, properly secured, can produce a surface free of mold and of the highest quality.
- Among normal polyethylene films, the thinner the film the greater the loss. Five-point difference between 6 and 8.5 mil in top 6 in.
- An 8.5 mil polyethylene approaches an oxygen barrier film relative to losses.

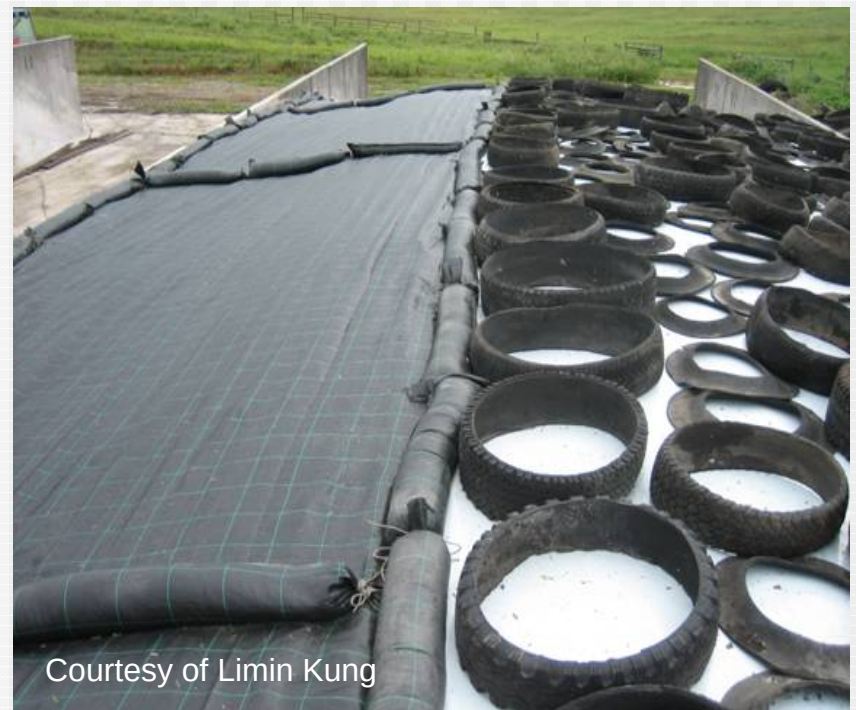
# Film Quality Is Not Enough



- Left: two layers of white plastic and still pitching about 6" of spoiled silage
- Right: one layer of white plastic; no visible mold
- Moral: securing the plastic well is equally as important as choosing a good film.

# Two Alternatives for Securing Plastic

- Tires touching tires/tire sidewalls
- Tarp anchored with gravel bags
  - At wall
  - At seams in plastic, tarps



# Minimizing Shoulder Spoilage with Plastic on the Walls

---



**U.S. Dairy Forage  
Research Center**



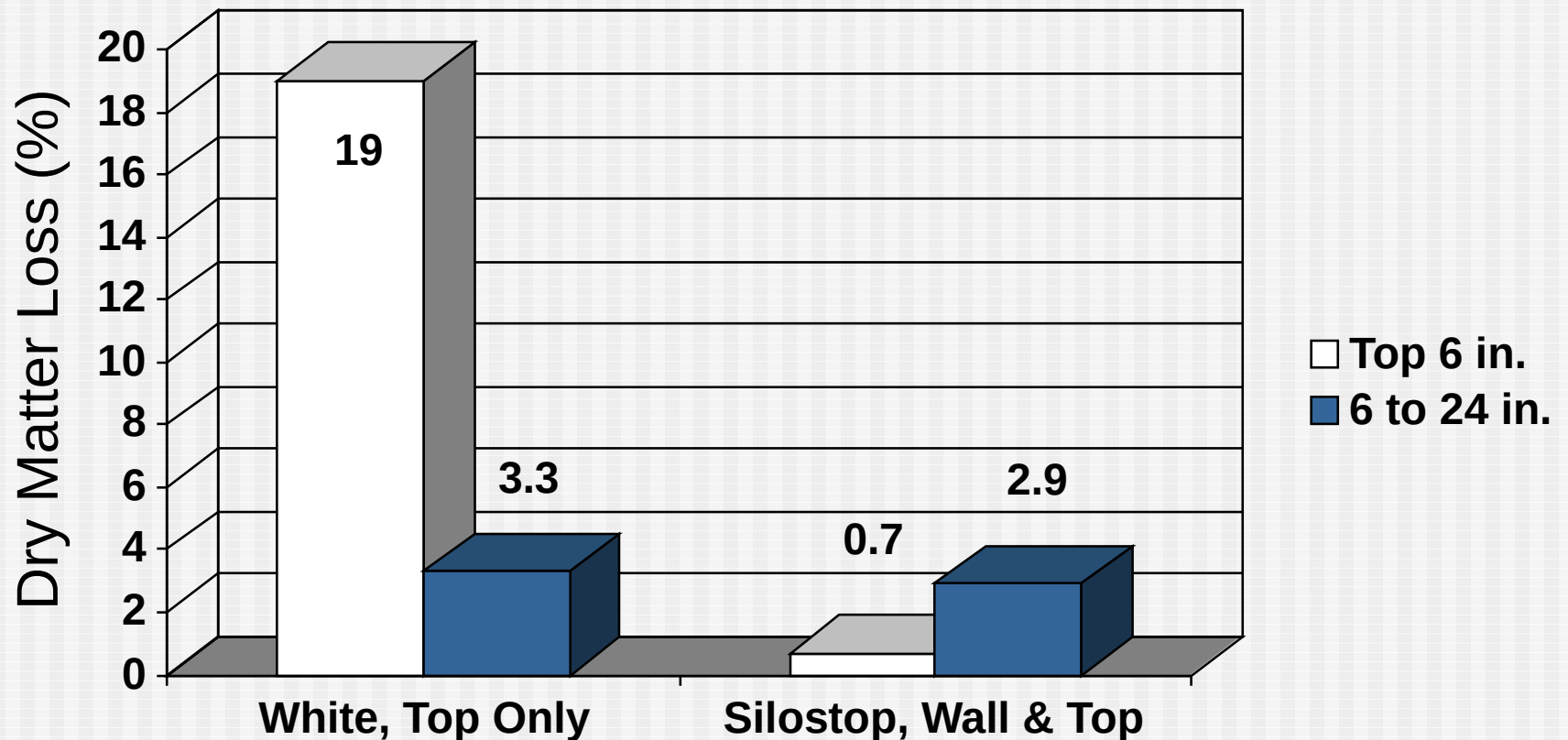
# The Use of Wall Film

- Side-wall plastic
- Top sheet



Silostop

# Estimated % DM Losses near the Wall - 2 Alfalfa Bunkers



Reduced spoilage near the wall in top 6 in. with Silostop.

# Summary on Wall Film

---

- It is possible to greatly reduce shoulder losses, even eliminating moldy silage.
- While we have not studied regular polyethylene film as a wall covering, we have seen it work on various farms, both at the UW-Arlington farm and commercial farms.



Thank You for  
Your Attention!

Questions?

