

The Silage Triangle and Important Practices often Overlooked

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Texas Tech University
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Keith K. Bolsen, Professor
Kansas State University



KSU Forage Preservation and Ruminant Nutrition Website

http://www.oznet.ksu.edu/pr_silage

1999-2000
KSU silage team members,
resumes, and project lists

1972-2000 MS and PhD
graduates under Keith Bolsen

Access to recent
articles and
presentations by the
KSU Silage Team

Silage Team Silage Team Alumni Publications
Silage Basics Silage History Silage-L Links

Four steps of
silage making

History of silage
and the silage
making process

Instructions to
join the listserv
Silage-L
and links
to the archives

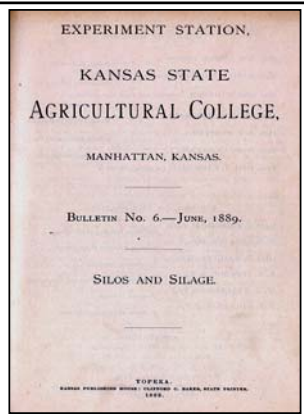
Links to other
university and
commercial forage
websites

Silos and Silage

Bulletin No. 6 in 1889

Reported cattle performance and sources of loss in an 80 ton-capacity tower silo.

Seven % of the weight of the whole-plant corn ensiled vs. weight of silage removed could not be accounted for, so the authors explained it as a loss by 'evaporation'.

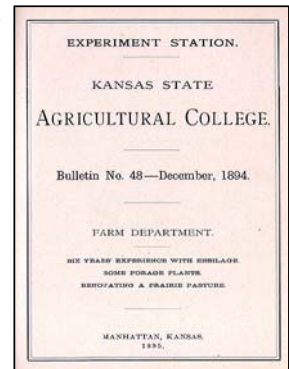


Experiences with Ensilage

Bulletin No. 48 in 1894

77% of the forage ensiled was 'sound' and 'available for feeding'.

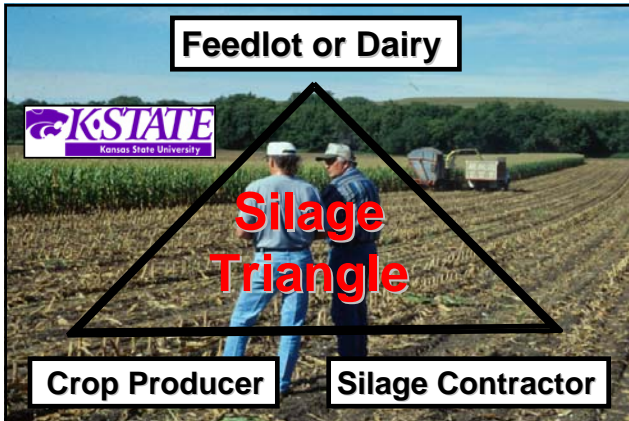
Shorter chop lengths of 1/2 inch compared to 1 inch resulted in 'closer packs' and cattle 'ate it up cleaner'.



Meetings in 2001/2002 ...

- ✓ Field days, producer events, nutrition conferences, workshops --- university, extension, and "industry" sponsors.
- ✓ Venues --- class rooms, conference rooms, on-farm (bunker silos, fields, barns, machine sheds, under "shade trees"), livestock arenas/sale barns, conference calls ...
- ✓ Dairy and beef producers, silage contractors, extension agents, educators, company sales and technical staff, nutritionists, consultants, crop producers, veterinarians, journalists, students ...





The Role of the Silage Contractor:

- ✓ Communicate and commit.
- ✓ Be on time.
- ✓ Cut, chop, cart, and compact.
- ✓ Have breakdown and mud plans.
- ✓ Come back (follow-up!!).

Is it better to ensile the crop ...

Too Early?

or Too Late?

Corn, Sorghum, and Dough-stage Cereals ... Be EARLY!!

Is it Better to ensile the Crop ...

Too Wet?

or

Too Dry?

ALFALFA

Queen of the Forages

but, as a silage crop, it is the

“Agent of the Devil”

- ✓ Low DM content
- ✓ High buffering capacity
- ✓ Low sugar content

The Role of the “Orchestra Conductor”



- ✓ When and how much to cut.
- ✓ How long (and how) to wilt.
- ✓ When to chop (and when to stop).
- ✓ Day after day & cutting after cutting!!



Alfalfa: too DRY!! Never too WET!!
Target: 40 – 45% DM

Grasses and boot-stage winter cereals



Target:
28 - 38% DM

What do the “Silage-makers” really control?



Remember to ...

- **Inoculate**
- Pack
- Seal
- Manage the face
- Pitch the spoilage



Why Inoculate??

- Control the fermentation.
- ↑ DM recovery (i.e., reduce shrink loss).
 - ↑ Milk (or gain) to feed DM ratio.
 - ↑ Milk production (or gain) per ton of crop ensiled.

KSU, 2002



A dairy producer who feeds corn silage and haylage ... gets a return of **5 to 12 dollars** for every ton of silage made!!



Remember to ...

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✓ Increases silage weight per volume = increased storage capacity!

✓ Decreases the movement of air through the silage mass = increased bunklife!



Density Summary from 81 Bunkers of Corn Silage Bunkers (Muck and Holmes, 1999)

Silage Characteristic	Corn Silage		
	Avg.	Range	SD*
Dry matter, %	34	25 - 45	5
Density on a fresh basis, lbs/ft ³	43	23 - 60	8
Density on a DM basis, lbs/ft ³	15	8 - 24	3

*SD = standard deviation.



Packing Time ...

Ranged from < 1 minute to > 4 minutes per ton of chopped forage on a fresh basis!



Achieving higher densities ...

- Forage delivery rate (?)
- Packing tractor weight
- Number of tractors
- Forage layer thickness (?)
- Fill silos to greater depths (?)
- Pack longer at the end of the day (?)



1875 —————→

Higher-capacity equipment can make it difficult to “keep up” with packing and achieve a high density!!

2002 —————→

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Do not assume a high density. Take a close LOOK! Silage might “feel” dense but if there are heat-damaged kernels, then there was a problem during filling!

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What is the proper size of a bunker, trench, or drive-over pile silo??

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Most Silos are Too Large: Too Wide, too Deep, or Both!

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Bigger is not always Better with Silage!!

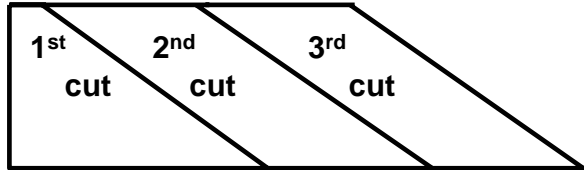
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Hay Bales and Ecology Blocks are usually total Disasters!

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Forage inventory control ...
Two silos are better than one,
and three are better than two!



Remember to ...

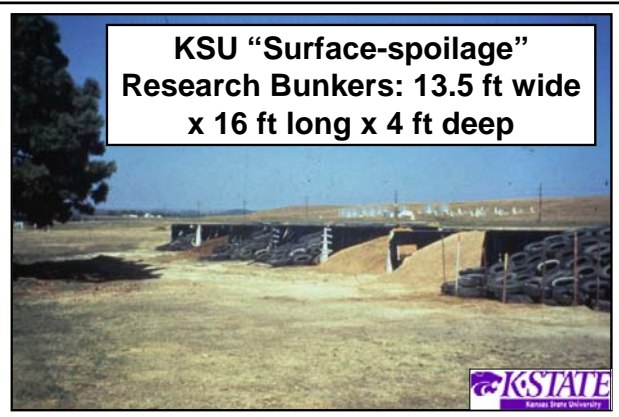
- Inoculate
- Pack
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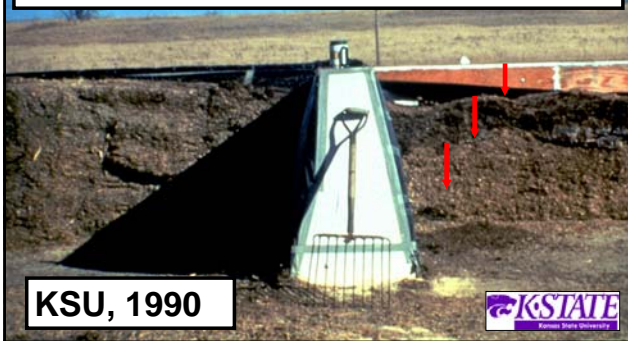
Not all silos are sealed, and not all seals are effective!



KSU "Surface-spoilage"
Research Bunkers: 13.5 ft wide
x 16 ft long x 4 ft deep



Sealed=12% loss vs. Unsealed=65% loss



KSU, 1990



The Solution
or
The Problem?



How many \$\$\$\$ is this feedlot loosing because the "pit" is NOT sealed?



The Answer: **\$125,000**



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Face Management

These are what we want ... but



Remember to ...

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How good is your feedout and your "feeders"?
Do you assess "silage and TMR" quality daily?



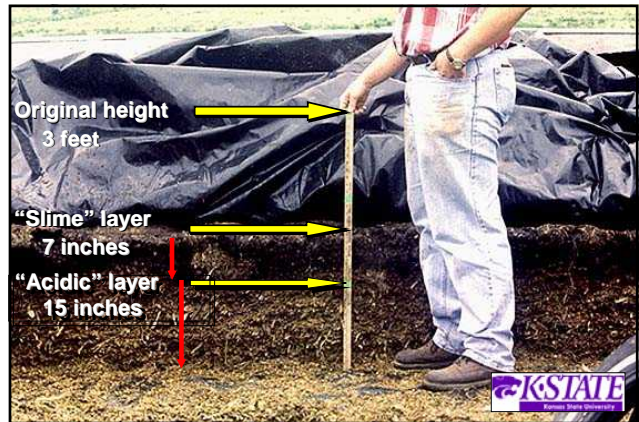
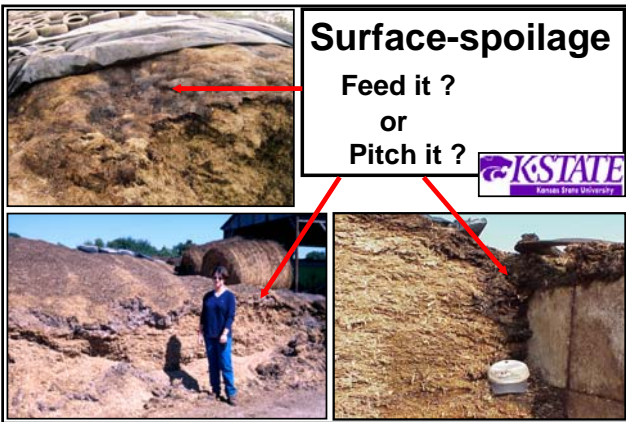


What is the real cost of silage?

- \$25 ton ÷ 90% = \$27.77
- \$25 ton ÷ 75% = \$33.33

“Forage In” versus “Silage Out”

Why is this dairy losing **1.3 million dollars** of milk every year?

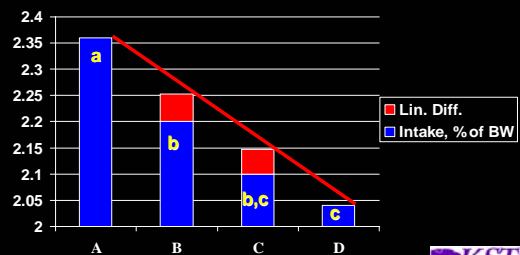


Amount of the “Slime” Layer in the Rations (DM basis):

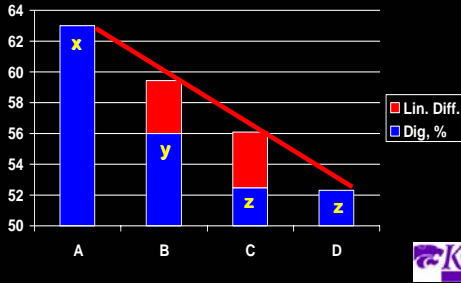
- A. 0
- B. 5.4%
- C. 10.7%
- D. 16.0%



Dry Matter Intake



NDF Digestibility



Implications of Feeding "Surface-spoiled" Silage

- Negative associative effects on nutritive value, and the largest decrease occurred with the 1st increment of "surface-spoiled" silage.
- Destroyed the "forage mat" in the rumen.
- Reduced fiber digestibilities dramatically.



SPOILAGE BOTTOM LINE??

Disaster" (20 to 30% shrink loss) and feeding the spoilage ...

means a 3.0 to 4.0 lb decrease in milk per cow per day (and this is probably a conservative estimate!!).

= **\$140 to \$150** "loss" per cow per year!!

9,000 cows X **\$145** = **\$1.3 million** (KSU, 2002)



Backgrounding Cattle: Does "Pitching Spoilage" Pay??

730 lb steer; 2.5% "slime"	Pitched	Not Pitched
DM intake, lbs	18.5	18.2
ADG, lbs	2.34	2.20
DM / lb of gain, lbs	7.9	8.3
Extra gain / ton ensiled, lbs	4.7	---
LWG @ \$0.90/lb	\$4.25	---



How "Safe" is Your Silage Program?





Mac Rickels, a nutritionist in Comanche, Texas, almost lost his life the day he took silage samples from a bunker silo.

“Even though I was standing 20 ft from the face, 12 tons of silage collapsed on me”.

“I did not hear or see anything”.

Dairy Herd Management; October, 2000



“I had been in (silage) pits hundreds of times, and you just become kind of complacent because nothing ever happens.

It just took that one time.”

Dairy Herd Management; October, 2000



On December 3, 1999, at 3:45 p.m., 6 tons of haylage in a bunker silo collapsed on Nick Schriener of Athens, Wisconsin. Schriener was rescued in a matter of minutes but he suffered a C6 spinal cord injury, which classifies him as a quadriplegic.

Successful Farming; September, 2000



He and his wife, Nicole, have three children, ages 7, 5, and 3.

His goal of continuing to farm is supported by family and friends.

Successful Farming; September, 2000

Think Again: “Avalanches” can and do Happen!



Packing tractor “roll-over” accidents can and do happen!!



**THANK
You!**



www.oznet.ksu.edu/pr_silage