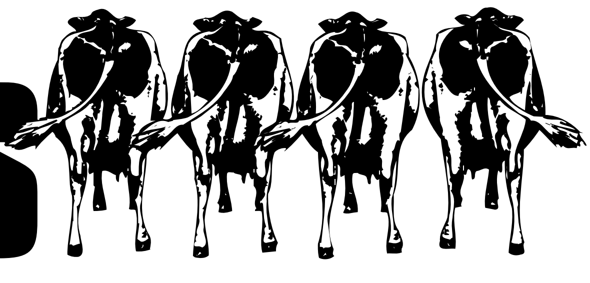
July 2000

Dairy Lines



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Upcoming Events

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August 17-19
Salina, KS

KSU Conference
Employee Management
for Animal Agriculture
August 10-11
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Silage management: three important practices

Keith Bolsen, professor, and the KSU silage group

Three important silage management practices that are in the control of dairy producers and that are sometimes poorly implemented or overlooked entirely include: sealing, managing the feedout face, and discarding spoiled silage.

Protect Silage from Air and Water. Until recently, most large bunker, trench, or drive-over pile silos in Kansas were left unsealed. Why? Because producers viewed covering silos with plastic and tires to be awkward, cumbersome, and labor intensive. Many believed the silage saved was not worth the time and effort required. But if left unprotected, dry matter (DM) losses in the top 1 to 3 feet can exceed 60 to 70%. This is particularly disturbing when one considers that in the typical “horizontal" silo, 15 to 25% of the silage might be within the top 3 feet. When the silo is opened, the spoilage is only apparent in the top 6 to 12 inches of silage, obscuring the fact that this area of spoiled silage represents substantially more silage as originally stored.

The most common sealing method is to place polyethylene sheeting (6 mil) over the ensiled forage and weight it down with discarded tires (approximately 20 to 25 tires per 100 ft^2 of surface area). Producers who do not seal need to take a second look at the economics of this highly troublesome “technology” before they reject it as unnecessary and uneconomical. The loss from a 40- by 100-foot silo filled with corn silage can exceed $2,000. Loss from a 100- by 250- foot silo can exceed $10,000.

Managing the Feedout Face. The silage feedout “face” should be maintained as a smooth surface that is perpendicular to the floor and sides in bunker, trench, and drive-over pile silos. This will minimize the square feet of surface that are exposed to air. The rate of feedout through the silage mass must be sufficient to prevent the exposed silage from heating and spoiling. An average removal rate of 6 to 12 inches from the “face” per day is a common recommendation. However, during periods of warm, humid weather, a removal rate of 18 inches or more might be required to prevent aerobic spoilage, particularly for corn, sorghum, and whole-plant wheat silages.

Implications of Feeding Spoiled Silage. Sealing with a polyethylene sheet weighted with tires is not 100 percent effective. Aerobic spoilage occurs to some degree in virtually all sealed silos. And the discarding of surface spoilage is not always a common

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Table 1. Effect of the level of spoiled silage on DM intake and nutrient digestibilities.

	Ration			
Item	**A**	**B**	**C**	**D**
DM intake, lbs/day	17.5[a]	16.2[b]	15.3[b,c]	14.7[c]
	------------------------- Digestibility, % -------------------------			
OM	75.6[a]	70.6[b]	69.0[b]	67.8[b]
CP	74.6[a]	70.5[b]	68.0[b]	62.8[c]
NDF	63.2[a]	56.0[b]	52.5[b]	52.3[b]
ADF	56.1[a]	46.2[b]	41.3[b]	40.5[b]

[a,b,c] Means within a row with no common superscript differ (P<.05).

Heart of America Dairy Herd Improvement Summary (June)

	Quartiles 1	2	3	4	Your Herd
Ayrshire					
Rolling Herd Average	17,967	13,678	12,784	11,397	
Summit Milk Yield 1st	59	50	22.5	21.5	
Summit Milk Yield 2nd	79.5	58	59.5	54	
Summit Milk Yield 3rd	83	66.5	30.5	56	
Summit Milk Yield Avg.	73.5	59.5	63	56	
Income/Feed Cost	1,355	795.5	1,124.5	692.5	
SCC Average	330.5	376	125	277	
Days to 1st Service	110	59.5	61.50	56.5	
Days Open	139	132	146	120	
Projected Calving Interval	13.8	13.6	14	13.15	
Brown Swiss					
Rolling Herd Average	19,470	16,115	14,962	13,194	
Summit Milk Yield 1st	59.29	53.86	50.43	45.57	
Summit Milk Yield 2nd	77	65.57	67.57	59.14	
Summit Milk Yield 3rd	85.86	72.29	66	65.43	
Summit Milk Yield Avg.	72.14	64.43	62.29	57.57	
Income/Feed Cost	1,550	1286	1159	946.43	
SCC Average	462.71	374.14	269.71	315.29	
Days to 1st Service	130	133.14	77.57	72.29	
Days Open	178.43	165.71	169.86	228.14	
Projected Calving Interval	15.09	14.69	14.79	16.71	
Guernsey					
Rolling Herd Average	16,634	15,022	13,482	11,143	
Summit Milk Yield 1st	59	51	49.5	42.5	
Summit Milk Yield 2nd	69	62.5	59	50	
Summit Milk Yield 3rd	68	65.5	63.5	51.5	
Summit Milk Yield Avg.	65	59.5	58	47.5	
Income/Feed Cost	1483	1357	1,209.5	881.5	
SCC Average	226	265	345.5	362.5	
Days to 1st Service	107	81	89.5	126	
Days Open	181	165.5	173	201.5	
Projected Calving Interval	15.20	14.7	14.9	15.85	
Holstein					
Rolling Herd Average	23, 270	20,072	17,786	14,649	
Summit Milk Yield 1st	73.49	65.91	60.47	52.16	
Summit Milk Yield 2nd	95.16	83.93	74.77	63.92	
Summit Milk Yield 3rd	101.27	89.79	81.11	68.96	
Summit Milk Yield Avg.	88.63	79.55	72.79	62.95	
Income/Feed Cost	1,837	1,513	1,272.2	988.19	
SCC Average	348.32	360.81	385.12	508.84	
Days to 1st Service	90.75	90.15	89.56	92.34	
Days Open	162.4	166.87	177.88	191.25	
Projected Calving Interval	14.55	14.70	15.06	15.5	
Jersey					
Rolling Herd Average	17,549	14,678.3	13,286	11,365	
Summit Milk Yield 1st	55.70	49.8	44.5	37.55	
Summit Milk Yield 2nd	52.3	62.1	54	51.18	
Summit Milk Yield 3rd	73.4	58.9	59.4	46.36	
Summit Milk Yield Avg.	65.7	58.3	53.60	48.82	
Income/Feed Cost	1,702	1,467.22	1,153.75	941.4	
SCC Average	272.8	338.7	322.3	461.27	
Days to 1st Service	76.8	78.5	80.7	94.27	
Days Open	145.5	142	143.6	148.64	
Projected Calving Interval	14	13.88	13.93	14.08	
Milking Shorthorn					
Rolling Herd Average	14, 851	14,402	13,676	10,954	
Summit Milk Yield 1st	52.5	52.5	48	19.5	
Summit Milk Yield 2nd	68.5	65	55	52.5	
Summit Milk Yield 3rd	72.5	72.5	71	56.5	
Summit Milk Yield Avg.	63	65.5	59.5	53	
Income/Feed Cost	1244.5	1,169.5	1179.5	747	
SCC Average	295.5	257	228	313	
Days to 1st Service	79.5	55.5	82	59.5	
Days Open	131.5	214.5	114	109.5	
Projected Calving Interval	13.55	16.3	12.95	12.85	

Hay Prices—Kansas*

	Location	*Quality*	*Price ($/ton)*
Alfalfa	Southwestern Kansas	Supreme	90–100
Alfalfa	Southwestern Kansas	Premium	75–90
Alfalfa	Southwestern Kansas	Good	—
Alfalfa	South Central Kansas	Supreme	90–105
Alfalfa	South Central Kansas	Premium	80–90
Alfalfa	South Central Kansas	Good	70–75
Alfalfa	Southeastern Kansas	Supreme	—
Alfalfa	Southeastern Kansas	Premium	75–95
Alfalfa	Southeastern Kansas	Good	60–75
Alfalfa	Northwestern Kansas	Supreme	90–105
Alfalfa	Northwestern Kansas	Premium	80–90
Alfalfa	Northwestern Kansas	Good	60–70
Alfalfa	North Central Kansas	Supreme	—
Alfalfa	North Central Kansas	Premium	80–90
Alfalfa	North Central Kansas	Good	50–70

Supreme = over 180 RFV (less than 27 ADF)
Premium = 150–180 RFV (27–30 ADF)
Good = 125–150 RFV (30–32 ADF)

Source: USDA Kansas Hay Market Report, *July 7, 2000*

Hay Prices—Oklahoma

	Location	*Quality*	*Price ($/ton)*
Alfalfa	Central/Western, OK	Premium	85–95
Alfalfa	Central/Western, OK	Good	65–85
Alfalfa	Panhandle, OK	Premium	85–95
Alfalfa	Panhandle, OK	Good	60–80

Source: Oklahoma Department of Agriculture, *July 6, 2000*

continued from page 1

practice on the farm. But results of a recent study at Kansas State University (Table 1) showed that feeding surface spoilage had a significant negative impact on the nutritive value of a whole-plant corn silage-based ration.

The original top 3 feet of corn silage in a bunker silo was allowed to spoil, and it was fed to steers fitted with ruminal cannulas. The four experimental rations contained 90% silage and 10% supplement (on a DM basis), and the proportions of silage in the rations were: A) 100% normal, B) 75% normal:25% spoiled; C) 50% normal:50% spoiled, and D) 25% normal:75% spoiled.

The proportion of the original top 18-inch and bottom 18-inch spoilage layers in the composited surface-spoiled silage was 24 and 76%, respectively. The original top 18-inch layer was visually quite typical of an unsealed layer of silage that had undergone several months of exposure to air and rainfall. It had a foul odor, was black in color, and had a slimy, “mud-like” texture. Its extensive deterioration during storage also was reflected in very high pH, ash, and fiber values. The original bottom 18-inch layer had an aroma and appearance usually associated with wet, high-acid corn silages, i.e., a bright yellow to orange color, a low pH, and a very strong acetic acid smell.

The addition of surface-spoiled silage had large negative associative effects on DM intake and OM, NDF, and ADF digestibilities. The first 25% increment of spoilage had the greatest negative impact. When the rumen contents were evacuated, the spoiled silage had also partially or totally destroyed the integrity of the “forage mat” in the rumen. The results clearly showed that surface spoilage reduced the nutritive value of corn silage-based rations more than was expected.

For more information about these and other silage management practices visit the Kansas State University Silage Team’s website at *http://www.oznet.ksu.edu/pr_silage.*

Achieving higher silage densities

Mary Kay Siefers, Tobina Schmidt, and Estela Uriarte; Graduate students in the KSU silage group

Achieving a high density of the ensiled forage in a silo is an important goal for dairy producers. First, density and crop DM content determine the porosity of the silage, which affects the rate at which air can enter the silage mass at the feedout face. Second, the higher the density, the greater the capacity of the silo. Thus, higher densities typically reduce the annual storage cost per ton of crop by both increasing the amount of crop entering the silo and reducing crop losses during storage. Recommendations have usually been to spread the chopped forage in thin layers and pack continuously with heavy, single-wheeled tractors. But the factors that affect silage density in a bunker, trench, or drive-over pile silo are not completely understood. Kurt Ruppel (Pioneer Hi-Bred) measured the DM losses in alfalfa silage in bunker silos and developed an equation to relate these losses to the density of the ensiled forage (Table 1). He found that tractor weight and packing time per ton were important factors; however, the variability in density suggested there were other important factors not considered.

Table 1. Dry matter loss as influenced by silage density.

Density (lbs of DM/ft³)	DM loss at 180 days % of DM ensiled
10	20.2
14	16.8
16	15.1
18	13.4
22	10.0

In a recent study, Brian Holmes, extension specialist at the University of Wisconsin-Madison, and Rich Muck, agricultural engineer at the U.S. Dairy Forage Research Center in Madison, measured silage densities over a wide range of bunker silos in Wisconsin, and the densities were correlated with crop/forage characteristics and harvesting and filling practices. Samples were collected from 168 bunker silos and a questionnaire completed about how each bunker was filled. Four core samples were taken from each bunker feedout face and core depth, height of the core hole above the floor, and height of silage above the core hole were recorded. Density and particle size distribution were also measured.

The range of DM contents, densities, and average particle size observed in the hay crop and corn silages are shown in Table 2. As expected, the range in DM content was narrower for the corn silages compared to the hay crop silages. The average DM content of the corn silages was in the recommended range of 30-35%. But several of the haylages were too wet (less than 30% DM), which can lead to effluent loss and a clostridial fermentation, or too dry (more than 45% DM), which can lead to extensive heat damage, mold, and the risk of a fire. The average DM density for the hay crop and corn silages was similar and slightly higher than a commonly recommended minimum DM density of 14.0lbs/ft³. Some producers were achieving very high DM densities, while others were severely underpacking. One very practical issue was packing time relative to the chopped forage delivery rate to the bunker. Packing time per ton was highest (1 to 4 minutes/ton on a fresh basis) under low delivery rates (less than 30 tons/hour on a fresh basis). Packing times were consistently less than 1 minute/ton (on a fresh basis) at delivery rates above 60 tons/hour.

Table 2. Summary of core sample analysis from bunker silos.

Silage characteristic	Hay crop silage (87 silos)		Corn silage (81 silos)	
	Avg	Range	Avg	Range
Dry matter, %	42	24-67	34	25-46
Density, fresh basis (lbs / ft³)	37	13-61	43	23-60
Density, DM basis (lbs / ft³)	14.8	6.6-27.1	14.5	7.8-23.6
Avg. particle size (inches)	0.46	0.3-1.2	0.43	0.3-0.7

There are several key factors that dairy producers can control to achieve higher densities, which will minimize DM and nutrient losses during ensiling, storage and feedout.

Forage delivery rate. Reducing the delivery rate is somewhat difficult to accomplish, as very few dairy producers or silage contractors are inclined to slow the harvest rate so that additional packing can be accomplished.

Packing tractor weight. This can be increased by adding weight to the front of the tractor or 3-point hitch and filling the tires with water.

Number of tractors. Adding a second or third packing tractor as delivery rate increases can help keep packing time in the optimum range of 1 to 3 minutes per ton of fresh forage.

Forage layer thickness. Chopped forage should be spread in thin layers (6 to 12 inches). In a properly-packed bunker silo, the tires of the packing tractor should pass over the entire surface before the next forage layer is distributed.

Filling the silo to a greater depth. Greater silage depth increases density. But there are practical limits to the final forage depth in a bunker, trench, or drive-over pile. Safety of employees who operate packing tractors and who unload silage at the feedout face becomes a concern. Packing in bunkers that are filled beyond their capacity and the chance of an "avalanche" of silage from the feedout face pose serious risks.

Feed Stuffs Prices

	Location	*Price ($/ton)*
Blood Meal	Central US	355-360
Corn Gluten Feed	Kansas City	50–55
Corn Gluten Meal	Kansas City	225–235
Corn Hominy	Kansas City	57–65
Cotton Seed Meal	Kansas City	151
Whole Cotton Seed	Memphis	135
Distillers Grains	Central Illinois	70–73
Pork—Meat and Bone Meal	Texas Panhandle	172
SBM 48%	Kansas City	168–175
Wheat Middlings	Kansas City	46-52

Source: USDA Feedstuff Market Review, *July 6, 2000*

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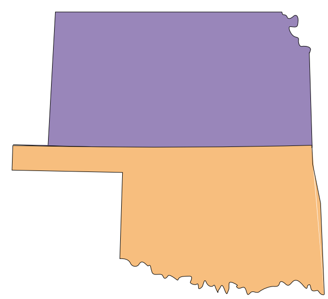

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