November/December 1999

Dairy Lines

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Co-Editors

John F. Smith
Extension Specialist, Dairy Science

Dan Waldner
Extension Specialist, Dairy Science

Mike Brouk
Extension Specialist, Dairy Science

Contributors

Karen Schmidt
Associate Professor, Dairy Products

John Shirley
Associate Professor, Dairy Science

Jeff Stevenson
Professor, Dairy Science

Dave Sukup
Manager, Heart of America DHI

Upcoming Events

OK Breed Association Annual Meetings
Nov. 13—Jersey, Cushing
Dec. 09—Holstein, OKC
Dec. 11—Guernsey, Cushing
Jan. 08—Brown Swiss, Stillwater
Jan. 15—Milking Shorthorn, OKC
Jan. 17—PDCA Annual Mtg, Stillwater

K-State Research and Extension 1999 Dairy Day
November 17—Whiteside, KS
November 18—Hillsboro, KS
November 19—Seneca, KS

DAIRY RESEARCH & EXTENSION NEWS
http://www.oznet.ksu.edu/dp_ansi/dairylin.htm

Sizing the Milk Parlor

J.F. Smith, M.J. Brouk and J.P. Harner III

Performance of milking parlors has been evaluated by time and motion studies to measure steady state throughput (cows per hour). Steady-state throughput does not include time for cleaning the milking system, maintenance of equipment, effects of group changing, and milking the hospital string. These studies also allow us to look at the effect of different management variables, including milking interval, detachers, pre-milking hygiene, number of operators and construction. Examples of different management techniques that affect parlor performance are listed below:

- Data collected in parallel milking parlors indicates that milking cows 3× per day, versus 2× per day, increases throughput 8 to 10 percent.
- The use of detachers does not increase throughput with the same number of operators.
- The use of pre-dip milking hygiene reduces parlor performance 15 to 20 percent.
- The average number of cows milked per operator hour decreases as the number of operators increases from one to four.
- Steady-state throughput is 10 to 12 percent higher in new parlors than in renovated parlors.

Sizing Parallel and Herringbone Milking Parlors

Typically milking parlors are sized so that cows can be milked once in 8 hours when milking 2× per day; 6.5 hours when milking 3× per day; and 5 hours when milking 4× per day. Using these criteria, the milking parlor will be sized to accommodate the cleaning and maintenance of the parlor. In smaller dairies or diverse operations, the parlor may be sized to milk in a fixed number of hours. We also want to milk one group in 60 minutes when milking 2×, 45 minutes when milking 3×, and 30 minutes when milking 4×. Group size should be divisible by the number of stalls on one side of the milking parlor. Having as many occupied stalls as possible per cycle maximizes parlor efficiency. Typically, when sizing the milking parlor it should be assumed that the parlor could be turned over four and one-half times per hour. The number of cows that will be milked per hour can be calculated using the following formula:

Total # of stalls × 4.5 = cows milked per hour (CPH)

 # Of milking cows = CPH × shift length (hours)

Sizing Rotary Parlors

Rotation time or entry time (seconds/stall), number of empty stalls, number of cows which go around a second time, entry and exit stops and the size of the parlor (number of stalls) influence the performance of rotary parlors. The rotation time will determine the maximum number of cows that can be milked per hour. For example if the rotation time is 10 seconds, the maximum throughput will be 360 cows per hour (3600 seconds per hour / 10 seconds per stall = 360 cows per hour). This is referred to as theoretical throughput.

Theoretical throughput assumes that the parlor never stops and that a new cow at entry occupies every stall. In reality, there are empty stalls, cows that go around a second time and times when the parlor is stopped. In Table 1, rotary parlor performance at different theoretical percentages is presented. As the number of empty stalls, cows making a second trip around, and number of stops increases the percent of theoretical throughput is decreased.

If we look at data collected on 14 dairies, which recently constructed new rotary parlors, the average rotation time averaged 11:45 seconds and the percent of theoretical throughput averaged 79%. The number of stalls or size of the rotary parlor will affect the available unit on time. Table 3 lists available unit on time for different sizes of rotary parlors at different rotation times. A rotary parlor must be large enough to allow approximately 90% of the cows to be milked out in one trip around the parlor.

In reviewing the data available today, rotary parlor should be sized at a 10–12 sec/stall rotation and 80% of theoretical throughput. The parlor should be large enough to allow 9 minutes of available unit on time.

continued on page 2

Heart of America Dairy Herd Improvement Summary (October)

	Quartiles				Your Herd
	1	2	3	4	
Ayrshire					
Rolling Herd Average	13,099	16,753	13,792	9,532	
Summit Milk Yield 1st	50.5	62.0	48.5	39.0	
Summit Milk Yield 2nd	46.5	73.5	58.0	31.6	
Summit Milk Yield 3rd	32.0	77.5	61.0	48.6	
Summit Milk Yield Avg.	48.5	72.0	55.5	46.3	
Income/Feed Cost	878	1,581	1,211	661	
SCC Average	221	256	280	227	
Days to 1st Service	57	81	84	67.3	
Days Open	170	144	128	173	
Projected Calving Interval	14.8	13.9	13.4	14.9	
Brown Swiss					
Rolling Herd Average	14,981	17,794	15,927	12,822	
Summit Milk Yield 1st	54.0	55.2	49.6	46.3	
Summit Milk Yield 2nd	62.2	72.0	49.6	57.1	
Summit Milk Yield 3rd	69.0	77.8	68.0	52.3	
Summit Milk Yield Avg.	63.8	68.0	60.4	54.8	
Income/Feed Cost	1,635	1,716	1,546	1,252	
SCC Average	272	313	438	356	
Days to 1st Service	88	76	70	86	
Days Open	158	180	164	194	
Projected Calving Interval	14.4	15.1	14.6	15.6	
Guernsey					
Rolling Herd Average	13,739	15,386	14,479	11,418	
Summit Milk Yield 1st	51.5	51.5	47.5	43.0	
Summit Milk Yield 2nd	60.0	63.5	60.5	59.0	
Summit Milk Yield 3rd	63.0	71.0	68.0	61.5	
Summit Milk Yield Avg.	58.0	63.0	60.0	54.0	
Income/Feed Cost	1,491	1,789	870	1,223	
SCC Average	348	185	253	289	
Days to 1st Service	69	91	106	81	
Days Open	153	147	161	199	
Projected Calving Interval	14.2	14.1	14.5	15.8	
Holstein					
Rolling Herd Average	17,637	22,669	19,662	14,195	
Summit Milk Yield 1st	59.7	72.1	64.8	50.5	
Summit Milk Yield 2nd	73.4	91.2	82.3	61.3	
Summit Milk Yield 3rd	79.1	95.9	86.9	67.4	
Summit Milk Yield Avg.	70.9	85.4	77.4	61.2	
Income/Feed Cost	1,601	2,204	1,817	1,239	
SCC Average	405	324	386	521	
Days to 1st Service	87	88	90	83	
Days Open	181	166	169	200	
Projected Calving Interval	15.1	14.6	14.7	15.7	
Jersey					
Rolling Herd Average	13,093	16,777	14,209	10,828	
Summit Milk Yield 1st	49.5	46.7	45.3	37.8	
Summit Milk Yield 2nd	47.4	63.4	55.8	45.3	
Summit Milk Yield 3rd	52.8	71.7	63.6	47.4	
Summit Milk Yield Avg.	54.7	64.0	55.6	43.8	
Income/Feed Cost	1,403	1,850	1,654	1,000	
SCC Average	328	284	298	448	
Days to 1st Service	91	71	80	60	
Days Open	139	138	137	139	
Projected Calving Interval	13.7	13.7	13.7	13.7	
Milking Shorthorn					
Rolling Herd Average	12,999	15,152	13,659	11,948	
Summit Milk Yield 1st	52.0	52.0	50.0	42.5	
Summit Milk Yield 2nd	66.0	51.0	63.0	50.5	
Summit Milk Yield 3rd	72.0	67.0	72.5	61.5	
Summit Milk Yield Avg.	63.0	58.0	62.0	52.0	
Income/Feed Cost	1,517	—	1,581	1,010	
SCC Average	209	136	326	386	
Days to 1st Service	0	93	76	83	
Days Open	335	131	113	141	
Projected Calving Interval	20.2	13.5	12.9	13.8	

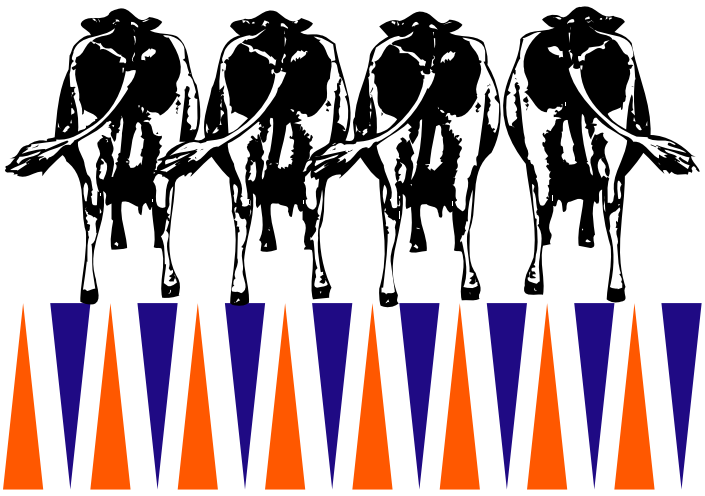
Table 1. Rotary Parlor Performance (Cows per hour)

	Theoretical cows/hr				
Rotation Time (sec/stall)	100%	90%	80%	70%	60%
8	450	405	360	315	270
9	400	360	320	280	240
10	360	324	288	252	216
11	327	295	262	229	196
12	300	270	240	210	180
13	277	249	222	194	166
14	257	231	206	180	154
15	240	216	192	168	144
16	225	203	180	158	135

Table 3. Available Unit On Time Calculated for Rotary Parlors at Different Rotation Times*

		Revolution Time		Available Unit on Time	
# of Stalls	Rotation time sec/stall	Seconds/Revolution	Minutes/Revolution	Seconds/Revolution	Minutes/Revolution
40	8	320	5:20	240	4:00
	10	400	6:40	300	5:00
	12	480	8:00	360	6:00
60	8	480	8:00	400	6:40
	10	600	10:00	500	8:20
	12	720	12:00	600	10:00
72	8	576	9:22	496	8:16
	10	720	12:00	620	10:20
	12	864	14:24	744	12:24
80	8	640	10:40	560	9:20
	10	800	13:20	700	11:40
	12	960	16:00	840	14:00

* Assumes 5 stalls for entry and exit, 3 stalls for pre-milking hygiene, 2 stalls to detach and post dip.
Sizing the milking parlor correctly will ensure that you can meet your goals now and in the future.



District DHIA Meeting

January 20	January 21
Valentino's Restaurant SENECA	Gerrards West 54 Hwy GODDARD
January 26	**January 27**
Amish Community Building WHITESIDE	Extension Office OTTAWA

To plan for meals, please make your reservation by **January 15**. Please clip and return the reservation slip or call one of the following K-State Research and Extension Offices:

Darren Hibdon (Ottawa)
Franklin County Agent
1418 S. Main, Suite 2
Ottawa, KS 66067
785-229-3520

David Key (Seneca)
Nemaha County Agent
604 Nemaha, Ste. 201
Seneca, KS 66538
785-336-2184

Dave Sukup (Goddard)
Heart of America DHIA
628 Pottawatomie
Manhattan, KS 66502
785-539-1784

Greg McCormack (Whiteside)
Reno County Agent
2 W. 10th
South Hutchinson, KS 67505
316-662-2371

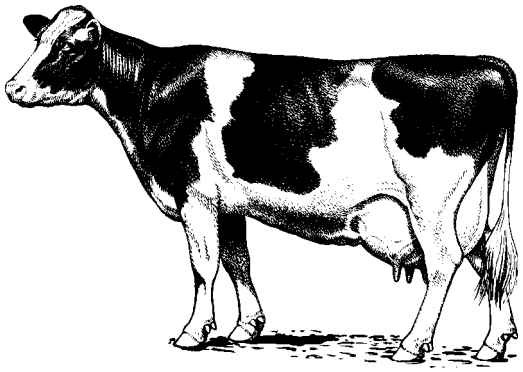
Clip and send to one of the addresses to the right.

Please reserve (No.) ____ meals for the District DHIA Meeting.

Name: _____

_____

Dairy Lines



Hay Prices—Kansas*

	Location	Quality	Price ($/ton)
Alfalfa	Southwestern Kansas	Supreme	95–125
Alfalfa	Southwestern Kansas	Premium	65–90
Alfalfa	Southwestern Kansas	Good	—
Alfalfa	South Central Kansas	Supreme	95–120
Alfalfa	South Central Kansas	Premium	75–90
Alfalfa	South Central Kansas	Good	65–75
Alfalfa	Southeastern Kansas	Supreme	90–95
Alfalfa	Southeastern Kansas	Premium	80–90
Alfalfa	Southeastern Kansas	Good	65–75
Alfalfa	Northwestern Kansas	Supreme	50 cents / pt RFV
Alfalfa	Northwestern Kansas	Premium	80–90
Alfalfa	Northwestern Kansas	Good	50–70
Alfalfa	North Central Kansas	Supreme	50 cents / pt RFV
Alfalfa	North Central Kansas	Premium	75–100
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, *October 26, 1999*

Hay Prices—Oklahoma

	Location	Quality	Price ($/ton)
Alfalfa	Central / Western, OK	Premium	80–100
Alfalfa	Central / Western, OK	Good	75–85
Alfalfa	Panhandle, OK	Premium	80–90
Alfalfa	Panhandle, OK	Good	70–80

Source: Oklahoma Department of Agriculture, *October, 1999*

Feed Stuffs Prices

	Location	Price ($/ton)
Blood Meal	Texas Panhandle	—
Corn Gluten Feed	Kansas City	61–65
Corn Gluten Meal	Kansas City	260–270
Corn Hominy	Kansas City	60
Cotton Seed Meal	Kansas City	130–132
Whole Cotton Seed	Memphis	95
Distillers Grains	Central Illinois	80–85
Pork—Meat and Bone Meal	Texas Panhandle	—
SBM 48%	Kansas City	145–155
Wheat Middlings	Kansas City	48–51

Source: USDA Feedstuff Market Review, *October 27, 1999*

COOPERATIVE EXTENSION SERVICE
U.S. DEPARTMENT OF AGRICULTURE
KANSAS STATE UNIVERSITY
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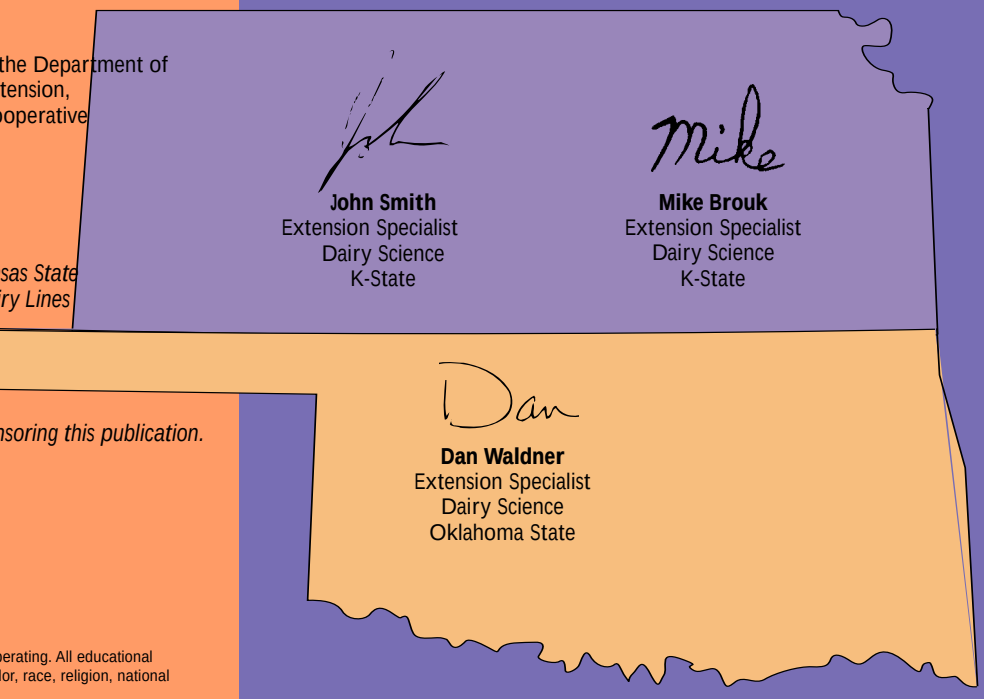
For more information or questions, please contact 785.532.5654 (K-State) or 405.744.6058 (OSU).

Kansas State University
K-State Research & Extension
Department of Animal Sciences and Industry
Call Hall, Room 139
Kansas State University
Manhattan, Kansas 66506



John Smith
Extension Specialist
Dairy Science
K-State

Mike Brouk
Extension Specialist
Dairy Science
K-State

Dan Waldner
Extension Specialist
Dairy Science
Oklahoma State

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