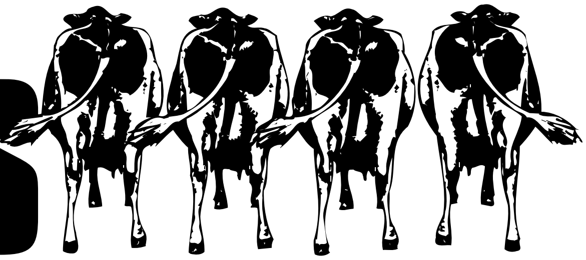
April 2000

Dairy Lines



Volume 6, Number 4

Upcoming Events

See the March issue of Dairy Lines for a more information

Southwest Dairy Field Day
May 11 • Horizon Dairy, Hico, TX

Dairy Field Days & Judging Clinics
June 8 • *Brown Swiss & Jersey*
June 9 • *Guernsey*
June 13 • *Grady Co. Dairy Judging Clinic & Milking Shorthorn*
June 15 • *Holstein*

Sooner State Dairy Cattle Judging Contest and Quiz Bowl
July 28 • Payne Co. Fairgrounds, Stillwater, OK

Kansas State University

OKLAHOMA COOPERATIVE EXTENSION SERVICE

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

Management Strategies to Control Heat Stress

J.F. Smith, J.P. Harner, M.J. Brouk , K-State Research & Extension Dairy Team

Heat stress occurs when a dairy cow's heat load is greater than her capacity to lose heat. The effects of heat stress include: increased respiration rate, increased water intake, increased sweating, decreased dry matter intake, slower rate of feed passage, decreased blood flow to internal organs, decreased milk production, and poor reproductive performance. The lower milk production and reproductive performance cause economic losses to commercial dairy producers.

Heat Loss in Dairy Cows

Dairy cows dissipate heat in several ways, including conduction, convection, radiation, and evaporative cooling. Conduction is based on the principal that heat flows from warm to cold. The method of heat loss requires physical contact with surrounding objects. An example of conductive cooling would be when a cow wades into a pond of water. Cooling by convection occurs when the layer of air next to the skin is replaced with cooler air. Radiation of body heat can occur when the ambient temperature is significantly cooler than the cow. At cooler temperatures, dairy cattle are efficient at radiating heat. Evaporative cooling occurs when sweat or moisture is evaporated away from the skin or respiratory tract. This is why dairy cattle perspire and increase respiratory rates during heat stress. High humidity limits the ability of the cow to take advantage of evaporative cooling. When the ambient temperature is under 50°F, nonevaporative methods of cooling account for 75% of the heat loss. At temperatures above 70°F, evaporative cooling is the cow's primary mechanism for heat loss. Dairy producers can take advantage of the same mechanisms to cool dairy cows on the farm. This is accomplished by soaking the cow and blowing air on her to evaporate the water.

Water Availability

Providing access to water during heat stress is critical. Lactating dairy cattle will typically require between 35 and 45 gallons of water per day. Studies completed in climatic chambers indicate that water needs increase 1.2 to 2 times when cows are under heat stress. A water system needs to be designed to meet both peak demand and daily needs of the dairy. Making water available to cows leaving the milking parlor will increase water intake by cows during heat stress. Access to an 8-foot water trough is adequate for milking parlors with ≤25 stalls per side. When using drylot housing, we recommend having water troughs at two locations using the following formula to calculate the required tank perimeter. Group size x .15 x 2 = tank perimeter in feet. In free-stall housing, one waterer or 2 foot of tank perimeter is adequate for every 15 to 20 cows. An ideal situation would be to have water available at every crossover between feed and resting areas.

Shades

Cows housed in drylot or pasture situations should be provided with solid shade. Research from Florida and Arizona indicates that when high-producing cows are exposed to direct sunlight and a THI exceeds 80 during daylight hours, shaded cows will produce approximately 4 to 5 pounds of additional milk per day. Natural shading provided by trees is effective, but most often shades are constructed from solid steel or aluminum. Providing 38 to 45 square feet of solid shade per mature dairy cow is adequate to reduce solar radiation. Shades should be constructed at a height of

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Heart of America Dairy Herd Improvement Summary (March)

	Quartiles 1	2	3	4	Your Herd
Ayrshire					
Rolling Herd Average	17,039	13,985	13,131	10,823	
Summit Milk Yield 1st	58.5	50.5	24.5	41.3	
Summit Milk Yield 2nd	75	55	53	31.3	
Summit Milk Yield 3rd	79	63.5	32.5	55	
Summit Milk Yield Avg.	71	57.5	52.5	50.6	
Income/Feed Cost	1,413	762	1,109	681	
SCC Average	275	278	202	171	
Days to 1st Service	109.5	114	77	115	
Days Open	124.5	138.5	98.5	149	
Projected Calving Interval	13.3	13.8	12.5	14.1	
Brown Swiss					
Rolling Herd Average	19,435	16,086	14,754	12,178	
Summit Milk Yield 1st	60	51.7	47.7	45.1	
Summit Milk Yield 2nd	74.5	55.2	50.1	55.7	
Summit Milk Yield 3rd	85.5	69.8	65	55.2	
Summit Milk Yield Avg.	73.6	62.7	58.4	54.1	
Income/Feed Cost	1,697	1,292	1,379	1,008	
SCC Average	410	376	327	393	
Days to 1st Service	167	79.8	82	45	
Days Open	175	164	155	249	
Projected Calving Interval	15	14.6	13.8	17.4	
Guernsey					
Rolling Herd Average	16,886	15,618	14,794	12,238	
Summit Milk Yield 1st	62	54.5	51	44.5	
Summit Milk Yield 2nd	0	67.5	61	54.5	
Summit Milk Yield 3rd	0	61	72.5	54	
Summit Milk Yield Avg.	62	60.5	60.5	51.5	
Income/Feed Cost	1,643	1,422	1,305	1,015	
SCC Average	63	340	235	289	
Days to 1st Service	0	81	101.5	92	
Days Open	104	169.5	129	164	
Projected Calving Interval	12.6	14.8	13.4	14.6	
Holstein					
Rolling Herd Average	22,783	19,684	17,345	14,245	
Summit Milk Yield 1st	72.6	64.8	59.1	50.1	
Summit Milk Yield 2nd	92.2	82.4	73.3	61.4	
Summit Milk Yield 3rd	97.7	87.9	79.1	66.5	
Summit Milk Yield Avg.	86.3	78.0	71	61	
Income/Feed Cost	1,955	1,616	1,349	1,083	
SCC Average	332	368	382	478	
Days to 1st Service	89	92	85	86	
Days Open	159	163	172	195	
Projected Calving Interval	14.4	14.6	14.8	15.6	
Jersey					
Rolling Herd Average	17,235	14,194	13,000	10,576	
Summit Milk Yield 1st	54	50.5	45	38.5	
Summit Milk Yield 2nd	51	51.6	53.1	45.5	
Summit Milk Yield 3rd	72	55.9	59.4	49.1	
Summit Milk Yield Avg.	64.5	57.6	53.6	44.8	
Income/Feed Cost	1,794	1,472	1,296	761	
SCC Average	305	306	302	466	
Days to 1st Service	75	74	77	84	
Days Open	147	140	139	139	
Projected Calving Interval	14.0	13.8	13.8	13.8	
Milking Shorthorn					
Rolling Herd Average	16,471	14,308	13,121	11,132	
Summit Milk Yield 1st	61.0	52.0	51.0	41.0	
Summit Milk Yield 2nd	83	62.5	61.5	55.5	
Summit Milk Yield 3rd	84	73.0	68.5	63.5	
Summit Milk Yield Avg.	76.0	63.5	62	55.5	
Income/Feed Cost	—	1,450	1,196	850	
SCC Average	60	312	260	301	
Days to 1st Service	57	78	39.5	73	
Days Open	106	121	200	90	
Projected Calving Interval	12.7	13.2	15.7	12.2	

a least 14 feet with a north-south orientation to prevent wet areas from developing under them. Using more porous materials such as shade cloth or snow fence is not as effective as solid shades.

Holding Pen

The holding pen is where dairy cows probably experience the most heat stress. On most days, cows would benefit from shade over the holding pen and open-sided holding areas to provide ventilation. Cows can be cooled in the holding pen. This method uses low volume sprinklers to wet cows and fans to hasten evaporation of the water. In this way, cows are cooled as often as they are milked. Both spray and fans should be operated continuously using approximately 1000 CFM of air per cow per hour. Fans should be mounted overhead at a 30° angle from vertical, so that the air will blow down on cows. Fans of 36- to 48-inch diameter are used most commonly. Fans are typically spaced 6 to 8 feet side to side. The distance between rows of fans is 20 feet for 30- & 36-inch fans and 40 feet for 48-inch fans. Water can be sprayed on to the cows using a PVC grid at 360° nozzles. Water is applied 1 minute out of 6 minutes.

Exit Lane Cooling

Cows can be cooled as they exit the parlor. Typically three to four nozzles are installed in the exit lane, with a delivery of approximately 8 gallons of water per minute at 35 to 40 PSI. The nozzles are turned on and off with an electric eye or wand switch as the cow passes under the nozzles. If properly installed, the top and sides of the cow are wet, the udder will remain dry, so water will not interfere with postmilking teat dipping.

Free Stalls

Free-stall housing should be constructed to provide good natural ventilation. Side-walls should be 14 feet high to increase the volume of air in the housing area. The sidewalls should be open 75 to 100%. Fresh air should be introduced at the cow's level. Curtains on the sides of free-stall barns allows grater flexibility in controlling the ventilation. Because warm air rises, steeper sloped roofs provide upward flow of warm air. However, roofs with slopes steeper than a 6:12 pitch prevent incoming air from dropping into the area occupied by the cows. Roofs with slopes less than 4:12 may cause condensation and higher internal temperatures in the summer. Roof slopes for free stall housing should range from 4:12 to 4:16. Providing openings in end walls and alley doors will improve summer ventilation. Gable buildings should have a continuous ridge opening to allow warm air to escape. The ridge opening should be 2 inches for each 10 feet of building width. Naturally ventilated buildings should be spaced 1.5 x 2 times the building width.

Additional cooling in free-stall areas can be provided by adding fans and a sprinkler system. Free-stall bedding must not become wet. Typically, a sprinkler system could be located over the lock-ups, and fans could be used over the free-stalls, lockups, or both. Water is applied 3 minutes out of a 15-minute cycle. These spray and fan systems are turned on and off with a thermostat at 70-75°F.

What should I do first?

Priorities for reducing heat stress:

1. Water availability
2. Providing shade in the housing areas and holding pen
3. Reduce walking distance
4. Reduce time in the holding pen
5. Improve holding pen ventilation
6. Add holding pen cooling and exit lane cooling
7. Cool close-up cows (3 weeks prior to calving)
8. Cool fresh cows and early lactation cows
9. Cool mid & late lactation cows

Good luck keeping your cows cool this summer!

2000 Heart of America Dairy Management Conference

WEDNESDAY, JUNE 21

8:00 a.m. **Welcome, Implications of Heat Stress**, *Jim Smith, Farmland Industries*

8:10 a.m. **How Cows Dissipate Heat**, *Don Spiers, University of Missouri*

8:50 a.m. **Methods of Cooling Cows**, *Dennis Armstrong, University of Arizona*

9:30 a.m. **Improving Cow Comfort in the Milking Center,** *Gene Boomer, Monsanto*

10:10 a.m. **Breaks**

10:30 a.m. **Freestall Barn Design and Cooling Systems,** *Mike Brouk, Kansas State University*

11:10 a.m. **Fan Selection and Maintenance**, *Joe Harner, Kansas State University*

Noon **Lunch**

1:00 p.m. **Dry Cow Cooling**, *David Bray, University of Florida*

1:40 p.m. **Economics of Cooling CowS,** *Kevin Dhuyvetter, Kansas State University*

2:20 p.m. **Nutritional Considerations in Heat Stress,** *Joe West, University of Georgia*

3:00 p.m. **Break**

3:20 p.m. **Summary and Order of Importance in Cow Cooling**, *John Smith, Kansas State University*

4:00 p.m. **Issues Associated with Handling Sand-Laden Manure**, *Joe Harner, Kansas State University*

4:40 p.m. **Instructions for the Farm Tours**

5:00 p.m. **Reception**

6:00 p.m. **Dinner - Dairy Expansion in the Midwest,** *Monte Hemenover, Avenues for Change*

THURSDAY, JUNE 22

7:30 a.m.– **Farm Tours**
7:00 p.m. Tours of 2 to 3 dairy farms with excellent cooling systems and manure management systems to handle sand-laden manure.

For additional information, contact: John Smith or Mike Brouk 785-532-1203 or 785-532-1207

REGISTRATION

Managed by Conference Management Services, LLC

June 21 and 22 at the
Ramada Inn • 4016 Frederick Blvd. • St. Joseph, MO 64506
816-233-6192 • Room Rate: $63/night

Preregistration–$200 per participant*
Preregistration deadline is May 20, 2000
After May 20, 2000–$225 per participant*
No refunds after May 20, 2000

Name ______________________________

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State ______________ Zip ____________

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Your check, **payable to *Heart of America Dairy Management Conference***, must accompany your preregistration or you will not be considered registered.

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785-532-2370/FAX: 785-532-2333

*Registration fee includes breakfast, lunch and dinner on the 21st, and breakfast and lunch on the 22nd. It also includes bus transportation for the dairy tours.

Hay Prices*—Kansas

	Location	Quality	Price ($/ton)
Alfalfa	Southwestern Kansas	Supreme	95–115
Alfalfa	Southwestern Kansas	Premium	70–105
Alfalfa	Southwestern Kansas	Good	---
Alfalfa	South Central Kansas	Supreme	95–110
Alfalfa	South Central Kansas	Premium	75–90
Alfalfa	South Central Kansas	Good	55–75
Alfalfa	Southeastern Kansas	Supreme	---
Alfalfa	Southeastern Kansas	Premium	80–90
Alfalfa	Southeastern Kansas	Good	60–75
Alfalfa	Northwestern Kansas	Supreme	—
Alfalfa	Northwestern Kansas	Premium	80–90
Alfalfa	Northwestern Kansas	Good	50–70
Alfalfa	North Central Kansas	Supreme	---
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, *April 4, 2000*

Hay Prices—Oklahoma

	Location	Quality	Price ($/ton)
Alfalfa	Central/Western, OK	Premium	80–120
Alfalfa	Central/Western, OK	Good	75–85
Alfalfa	Panhandle, OK	Premium	85–95
Alfalfa	Panhandle, OK	Good	65–85

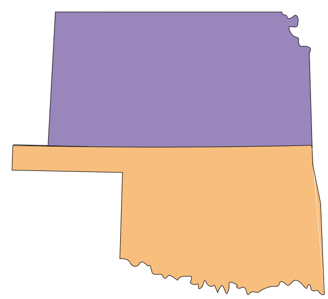
Source: Oklahoma Department of Agriculture, *April 3, 2000*

Feed Stuffs Prices

	Location	Price ($/ton)
Blood Meal	Texas Panhandle	413-420
Corn Gluten Feed	Kansas City	55-62
Corn Gluten Meal	Kansas City	245–255
Corn Hominy	Kansas City	75–76
Cotton Seed Meal	Kansas City	128
Whole Cotton Seed	Memphis	116
Distillers Grains	Central Illinois	68-74
Pork—Meat and Bone Meal	Texas Panhandle	170-171
SBM 48%	Kansas City	164–170
Wheat Middlings	Kansas City	40-45

Source: USDA Feedstuff Market Review, *April 5, 2000*

Dairy Lines is jointly published for dairy producers by the Department of Animal Sciences and Industry, K-State Research and Extension, and the Department of Animal Science, Oklahoma Cooperative Extension Service. For more information or questions, please contact 785.532.5654 (K-State) or 405.744.6058 (OSU).



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