September 2001

Dairy Lines

Volume 7, Number 8

Upcoming Events

K-State Dairy Days

Nov. 8–Whiteside, KS
Nov. 9–Seneca, KS

Oklahoma
Risk Management Agency
Dairy Options
Pilot Program Training

Oct. 4–Topic: Milk Marketing Options. Contact Ron Justice, Grady Co. Extension Office

Oct. 16–Topic: TBA. Contact Justin McDaniel, Coal Co. Extension Office

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

Are cows housed in six-row barns more prone to heat stress?

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Housing lactating dairy cows in six-row rather than four-row freestall buildings increases animal density and raises concerns about the level of heat stress. In the summer of 2000, Kansas State University conducted a trial to evaluate the effect of such housing arrangements on cow comfort. We measured temperature, barn humidity, and respiration rates of lactating Holstein cows in four-and six-row freestall barns located in northwest Iowa.

Procedures

Temperature and humidity readings were collected from six freestall barns (three, six-row and three, four-row) on five farms, at four locations in each barn. Ambient temperature and humidity were measured at two locations near each freestall barn. HOBO data loggers, programmed to record every 15 minutes 24 hours a day, gathered the information continuously from June 9, 2000, until September 27, 2000. Respiration rates of 50 cows in each barn were collected from 6 to 8 a.m. and 2 to 4 p.m. for three days.

Results

Average temperature, humidity, and temperature humidity index (THI) of four-row and six-row barns, and respiration measurements collected during the three days are listed in Table 1. Table 1 also contains average ambient temperature for four- and six-row barns.

Average temperature and THI were higher (P<.03) in six-row barns during the period in which respiration rates were measured. There were differences (P<.05) in ambient relative humidity and THI between the locations of four- and six-row

Continued on page 2

Table 1. Average Temperature, Relative Humidity and THI of Four-Row and Six Row Barns for Three Days and Respiration Measurements

Variable	4-Row	6-Row	Effect of Barn
Barn			
Temperature	74.1	74.4	0.03
Relative humidity	76.3	76.1	0.44
THI	71.6	71.9	0.01
Ambient			
Temperature	73.2	73.0	0.08
Relative humidity	79.1	78.2	0.01
THI	70.9	70.7	0.05
Difference Between Ambient and Boon Conditions			
Temperature	1.0	1.4	0.01
Relative humidity	-2.8	-2.1	0.01
THI	0.7	1.2	0.01

from page 1

barns. Although statistical differences exist in the number of variables associated with temperature and humidity between four- and six-row barns, numerically these differences are minimal and may not be biologically significant.

In Table 2 the averages for morning and afternoon observation periods are exhibited for barn type. Respiration rates were higher (P<.05) in the morning, afternoon, and on average in six-row barns than they were in four-row barns. Average morning and afternoon respiration rates are presented in Table 3. Respiration rates are presented by day in Table 4.

Conclusions

Temperature, relative humidity, and THI were higher in six-row than four-row freestall barns when compared to the surrounding air. Respiration rates were higher in six-row versus four-row buildings. The difference in temperature and humidity variables may not explain differences in respiration rates. It is possible that a relationship exists between animal density and social interaction and that this could increase respiration rates when animal density is increased. It also may be possible that more mechanical ventilation is required to keep cows comfortable in six-row barns.

Table 2. Average Morning and Afternoon Temperature and Humidity and THI During Respiration Measurements for Four- and Six-Row Freestall Barns.

Variable	4-Row Barn		6-Row Barn		Effect of Barn
	Morning	Afternoon	Morning	Afternoon	
Barn temperature, F	68.2	79.9	68.9	80.0	0.22
Barn relative humidity, %	88.4	62.1	87.1	61.8	0.27
Barn THI	67.6	75.3	68.2	75.3	0.18
Ambient temperature, F	66.6	79.4	66.5	80.0	0.44
Ambient relative humidity, %	93.7	63.3	91.5	60.7	0.01
Ambient THI	66.3	74.9	66.2	75.1	0.96
Temperature, F	1.6	0.5	2.4	0.0	0.49
Relative humidity, %	-5.4	-1.2	-4.4	1.1	0.01
THI	1.2	0.3	2.0	0.2	0.06

Table 3. Average Morning and Afternoon Respiration Rates of Cows Housed in Four-Row and Six-Row Freestall Barns located in NW Iowa.

	breaths /minute		
Barn Type	Morning	Afternoon	Average
4-Row	60.5[a]	73.8[a]	67.2[a]
6-Row	65.8[b]	78.4[b]	72.1[b]

[a,b] Means within the same column differ P<.05.

Table 4. Afternoon Respiration Rates, Barn Temperature, Relative Humidity and THI at Time of Respiration Measurements

	4-Row Barn			6-Row Barn		
	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
Afternoon respiration	82.1	71.4	68.0	91.1	76.4	67.6
Barn temperature	87.1	78.6	74.0	86.4	79.1	74.4
Humidity	61.3	58.3	66.7	63.0	55.7	66.7
THI	80.9	73.9	71.0	80.6	74.0	71.3

Heart of America Dairy Herd Improvement Summary

	Quartiles				Your Herd
	1	2	3	4	
Ayrshire					
Rolling Herd Average	17,538	15,042	13,970	12,478	
Summit Milk Yield 1st	60.0	28.5	24.5	40.5	
Summit Milk Yield 2nd	71.5	37.0	63.0	56.0	
Summit Milk Yield 3rd	78.5	41.5	31.0	63.50	
Summit Milk Yield Avg.	73.0	35.50	61.0	56.50	
Income/Feed Cost	1,369.0	901.0	881.5	456.0	
SCC Average	258.0	372.5	342.5	345.5	
Days to 1st Service	108.5	45.50	68.0	54.50	
Days Open	163.5	106.5	86.50	187.5	
Projected Calving Interval	14.60	8.10	12.05	15.40	
Brown Swiss					
Rolling Herd Average	20,117.8	17,261.6	16,003	14,464	
Summit Milk Yield 1st	63.40	56.80	51.4	48.67	
Summit Milk Yield 2nd	74.40	69.40	50.8	62.83	
Summit Milk Yield 3rd	84.80	75.60	69.60	68.5	
Summit Milk Yield Avg.	74.8	68.0	61.40	61.17	
Income/Feed Cost	1,793.25	1,523.4	1,325.75	1,144.7	
SCC Average	451.60	275	485.0	385.80	
Days to 1st Service	53.2	68.4	79.80	115.83	
Days Open	191.4	162.20	180.0	181.67	
Projected Calving Interval	15.5	14.52	15.12	15.20	
Guernsey					
Rolling Herd Average	17, 244	13,830.5	13,206	11,658	
Summit Milk Yield 1st	28.0	48.0	45.0	45.33	
Summit Milk Yield 2nd	60.50	58.5	54.0	40.33	
Summit Milk Yield 3rd	34.50	65.0	56.0	60.67	
Summit Milk Yield Avg.	59.50	57.0	51.50	57.0	
Income/Feed Cost	1633.5	1,039.0	1,339.0	1,068.67	
SCC Average	295.50	226.5	298.5	279.0	
Days to 1st Service	55.50	119.0	105.5	75.33	
Days Open	120.5	149.5	175.5	211.33	
Projected Calving Interval	13.20	14.15	14.95	16.17	
Holstein					
Rolling Herd Average	23,100	20,009.4	17,879	14,398	
Summit Milk Yield 1st	73.24	65.73	60.34	51.27	
Summit Milk Yield 2nd	93.19	82.95	74.86	62.72	
Summit Milk Yield 3rd	98.89	89.06	79.65	68.30	
Summit Milk Yield Avg.	87.12	78.79	71.78	61.96	
Income/Feed Cost	1,864.94	1,527.17	1,323.17	984.94	
SCC Average	366.46	421.99	448.56	612.89	
Days to 1st Service	97.16	96.44	94.34	88.96	
Days Open	171.11	179.04	180.08	214.59	
Projected Calving Interval	14.84	15.10	15.14	16.27	
Jersey					
Rolling Herd Average	17,667	14,587.4	13,425.6	11,534.7	
Summit Milk Yield 1st	42.22	48.3	44.40	41.50	
Summit Milk Yield 2nd	68.56	61.3	58.20	52.20	
Summit Milk Yield 3rd	74.0	64.3	58.80	54.90	
Summit Milk Yield Avg.	67.33	57.9	53.70	50.0	
Income/Feed Cost	1,824.33	1,530.29	1,205.0	767.83	
SCC Average	359.22	261.9	511.0	628.80	
Days to 1st Service	69.89	77.5	86.3	98.30	
Days Open	137.78	140.8	150.7	181.30	
Projected Calving Interval	13.73	13.85	14.17	15.18	
Milking Shorthorn					
Rolling Herd Average	—	14,429.0	13,890	9,300	
Summit Milk Yield 1st	—	60.0	53.0	51.0	
Summit Milk Yield 2nd	—	75.0	63.0	0.0	
Summit Milk Yield 3rd	—	76.0	68.0	63.0	
Summit Milk Yield Avg.	—	72.0	62.0	57.0	
Income/Feed Cost	—	1,110.0	1,268.0	—	
SCC Average	—	174	238	318.0	
Days to 1st Service	—	0.0	74.0	119.0	
Days Open	—	306.0	132.0	152.0	
Projected Calving Interval	—	19.30	13.50	14.20	

Hay Prices*—Kansas

	Location	Quality	Price ($/ton)
Alfalfa	Southwestern Kansas	Supreme	125
Alfalfa	Southwestern Kansas	Premium	110-125
Alfalfa	Southwestern Kansas	Good	100
Alfalfa	South Central Kansas	Supreme	110-120
Alfalfa	South Central Kansas	Premium	100-115
Alfalfa	South Central Kansas	Good	—
Alfalfa	Southeastern Kansas	Supreme	110
Alfalfa	Southeastern Kansas	Premium	100-110
Alfalfa	Southeastern Kansas	Good	—
Alfalfa	Northwestern Kansas	Supreme	100-105
Alfalfa	Northwestern Kansas	Premium	90-95
Alfalfa	Northwestern Kansas	Good	—
Alfalfa	North Central/East Kansas	Supreme	105-120
Alfalfa	North Central/East Kansas	Premium	90-105
Alfalfa	North Central/East Kansas	Good	80-85

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, *September 11, 2001.*

Hay Prices—Oklahoma

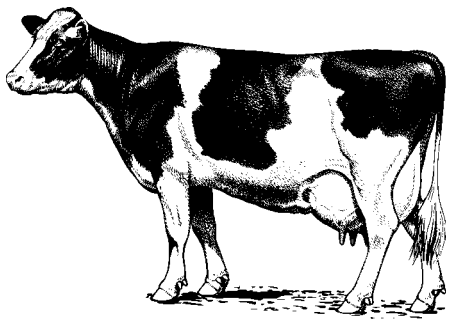
	Location	Quality	Price ($/ton)
Alfalfa	Central/Western, OK	Premium	100-120
Alfalfa	Central/Western, OK	Good	95-110
Alfalfa	Panhandle, OK	Premium	100-120
Alfalfa	Panhandle, OK	Good	100-110

Source: Oklahoma Department of Agriculture, *September 6, 2001*

Feed Stuffs Prices

	Location	Price ($/ton)
Blood Meal	Texas Panhandle	405
Canola Meal		—
Corn Gluten Feed	Kansas City	75-79
Corn Gluten Meal	Kansas City	275-280
Corn Hominy	Kansas City	78
Cotton Seed Meal	Kansas City	145
Whole Cotton Seed	Memphis	130
Distillers Grains	Central Illinois	80-85
Pork—Meat and Bone Meal	Texas Panhandle	185
SBM 48%	Kansas City	145
Sunflower Meal		95
Wheat Middlings	Kansas City	75-87

Source: USDA Feedstuff Market Review, *September 12, 2001*



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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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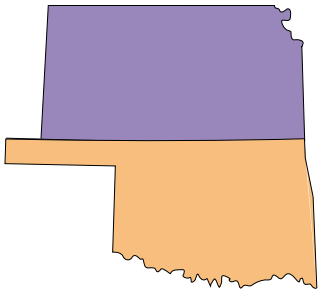

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