Dairy News

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Management Strategies to Control Heat Stress

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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. 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. This 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, non-evaporative 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 competed in climatic chambers indicate tat 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 during heat stress. Access to an 8-foot water trough is adequate for milking parlors with ≤25 stalls per side. When using dry-lot 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 dry-lot 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 the 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 of 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 at least 14 feet with a north-south orientation to prevent wet areas form developing under them. Using more porous materials such as shade cloth or show 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 the 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 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 and the udder will remain dry, so water will not interfere with post-milking 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 side-walls 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 greater 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. Providing openings in end wall 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.

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 is located over the lockups, and fans can 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 set 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.

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New Dairy Specialist Hired

Dr. Angelica Chapa will begin her duties at Extension Dairy Specialist in the Mississippi State University Animal and Dairy Science Department on August 1, 2000. Dr. Chapa will fill the position vacated by Dr. Reuben Moore last year.

A native of Texas, Dr. Chapa earned her Masters and Doctorate degrees from Louisiana State University. She is currently completing a post-Doctorate appointment in the Dairy Extension Department at the University of Georgia.

Dr. Chapa's position will be 75% Extension and 25% Research. Her research has been directed toward the utilization of Nitrogen by the dairy cow. In addition, she is coordinating a project that is using DHIA records and the internet to develop an expert system that can analyze a herd's performance via the internet.

Dr. Chapa's office will be located in the Animal and Dairy Science Department at the Wise Center on the MSU campus. I hope everyone will take the opportunity to welcome Dr. Chapa to Mississippi over the next few months.

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Upcoming Events

July 10 & 11 – Mississippi Farm Bureau Commodity Conference, Ramada Inn Southwest, Jackson, MS
Nov. 9 – Mississippi/Louisiana Dairy Mgt. Conference
Percy Quin State Park, McComb, MS

APRIL 2000 HONOR ROLL HERDS*

DAIRY	COUNTY	NO. COWS	LBS. ECM	2X 3X	Rolling Herd Average MILK	FAT	PROT	DOT
HERITAGE DAIRY	TATE	431	84.9	2X	23453	932	754	04/16
MELVIN NICHOLSON	NEWTON	123	83.1	2X	22269	778	747	04/24
MS.STATE UNIVERSITY	OKTIBBEHA	177	77.7	2X	19736	756	656	04/24
J & L DAIRY	WALTHALL	230	75.7	2X	20768	660	671	04/24
MACTOC FARM	OKTIBBEHA	184	75.0	2X	23470	863	776	04/27
RONALD H CLARK	LINCOLN	81	71.4	2X	21274	740	703	04/04
NORTH MS EXP STATION	MARSHALL	107	70.2	2X	20612	727	661	04/12
BRAD BEAN	AMITE	232	69.8	2X	21541	811	695	04/13
COASTAL PLAIN EXP STA	NEWTON	145	68.3	2X	21615	759	687	04/11
CAL MAINE FOODS DAIRY	HINDS	1641	66.9	3X	19512	702	625	04/09
ROWZEE JERSEY FARM	NEWTON	152	66.6	2X	17500	817	679	04/24
THOMPSON BROTHERS	MARSHALL	130	66.4	2X	20850	782	671	04/02
MILTON & TERRY JEFCOAT	JONES	225	64.7	2X	21706	707	703	04/10
A L BOYD JR	WALTHALL	76	64.6	2X	20603	654	661	04/19
PAUL W EDWARDS	NEWTON	142	64.2	2X	18255	680	596	04/17
FREEMAN DAIRY	PIKE	126	62.3	2X	20866	699	704	04/16
CLEMMER & HILL DAIRY	TIPPAH	130	61.7	2X	18909	638	620	04/25
G & B DAIRY	LINCOLN	80	60.3	2X	19826	818	726	04/08
RAY GALLOP & SONS	MONROE	79	59.8	2X	17974	592	576	04/13
RUTLAND FARM	LINCOLN	95	58.0	2X	17220	571	552	03/30
DAVID ROBINSON & SONS	RANKIN	134	58.0	2X	20367	719	630	04/17
SIMMONS DAIRY	MONROE	77	56.5	2X	15779	512	516	04/12
LEON BARDWELL DAIRY	LINCOLN	48	56.4	2X	20030	648	630	04/01
RUTLAND FARM	LINCOLN	94	56.2	2X	17503	576	563	04/25
BUFORD PIGOTT & SON	WALTHALL	124	54.8	2X	14240	517	483	04/20

Top 25 herds enrolled on supervised DHIA testing programs by test day energy corrected milk for all cows.
**** ECM = (.3246 x test day milk) + (12.86 x test day lbs. fat) + (7.04 x test day lbs. protein)**

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May 2000 BFP Price

Dr. C. W. "Bill" Herndon
Dairy Economist, MSU

Class I Price Increases by 22 cents to $14.80 per cwt.

With the USDA's implementation of Federal Order reform on January 1, 2000, this newsletter began reporting the Advanced Class I milk price as a barometer, or indicator, of the direction and magnitude of movements in milk prices. The Advanced Class I milk price is to be announced by the USDA each month on the Friday on or before the 23rd of each month and will represent the Class I milk price for the next (or subsequent) month. Thus, the USDA announced on May 19 that the June 2000 Advanced Class I "base" milk price was $11.70 per cwt. (for 3.5% butterfat milk). After adding the $3.10 Class I price differential for the pricing zone which includes Atlanta and Starkville (Oktibbeha County) to this "base" price, the Advanced Class I milk price for June will be $14.80 per cwt. (Please review the map located on the back page of this newsletter and note that the Mississippi counties grouped in Zones 6, 7 and 8 are ALL part of the $3.10 Class I price differential area.)

Both the near-term and intermediate-term market outlook for dairy product and milk prices are described at the best as "discouraging" and thus, dairy farmers across the South face a disheartening economic forecast for rest of 2000 and 2001. Cheese and nonfat dry milk prices continue to remain at government support levels with these low dairy product prices having been attributed to a prolonged period of increased milk production. Despite six straight months of milk prices at or near the government support level of $10 per cwt., few dairy producers have been inclined to reduced the number of cows in their herds nor reduce the costs of feeding those cows. April milk production statistics again illustrate these trends in that (in the 20 reporting states) there were about 64,000 more cows being milked and these cows produced an average of 46 more pounds per cow when compared to April 1999. While milk output has already started to decline across the South, the spring "flush" in the North continues to increase output that is expected to level off in late May. Florida milk handlers have maintained their pace of milk exports in excess of 100 to 110 truckloads to processors located outside the state and region (this compares to only 25 to 30 loads exported during these weeks of 1999). These "excess" milk supplies have depressed dairy product prices down to USDA support levels and has forced the USDA's Commodity Credit Corporation (CCC) to sustain their practice weekly purchases of 12 to 15 million pounds of nonfat dry milk and block and processed cheddar cheese products. Most dairy industry observers predict that milk prices will linger at the current depressed levels where the Class III milk price will languish below $10.00 per cwt. for the next several months. Then, a slow and methodical recovery in milk prices is foreseen as the fall deficit months approach and should reach a "usual seasonal" peak in either October or November. This disheartening news has been tempered with the amazing (but confusing) performance of butter prices that have increased almost 25% during late April and May. This strength in butter prices has provided a small, silver lining to the current dark cloud of milk prices and has propped up Class I milk prices. The June Advanced Class I price (for the Atlanta and Starkville, Zones 6, 7 and 8) was reported at $14.80 per cwt. and represents an INCREASE of 22 cents per cwt. (+1.5%) ABOVE the corresponding April price of $14.58. The June 2000 Class I price is only nine (9) cents per cwt. (or -0.6%) LOWER than the June 1999 Class I price of $14.89. Dairy producers should be aware that the June Class I price will be the most important factor that will influence the revenues derived from the sale of their milk produced during June. Because 60 percent of Mississippi milk is utilized as Class I products, farmers will not realize any increases in revenues from this 22-cent increase in the June price until they receive their "settlement" checks in mid-July as payment for milk sold in June 2000.

Milk Production.

Growing and excessive milk supplies continues to afflict the U.S. dairy industry with the lowest milk and dairy pro duct prices suffered since the late 1970's. It also appears that these exceedingly low milk prices have not prompted dairy farmers to decrease milk output by culling the number of cows in their herds or by feeding these cows less nutrients. As a result, national milk production increased 3.7% (or 513 million pounds) between April 1999 and April 2000 that was realized from milking 64,000 more cows which yielded an average of 46 more pounds per cow. A comparison of the statistics for these same two Aprils found that for the 20 states which the USDA reports monthly data finds that 18 states recorded increased output while the other two states noted steady production. Of these 20 states, the greatest increases in April to April output were registered in Indiana (+13.5%), Idaho (+11.9%), New Mexico (10.0%), Kentucky (+8.7%), Virginia (+6.2%) and California (+6.1%). The only states noting steady milk output between these months were Florida and Michigan. While warmer, summer weather along with the prolonged dry weather (drought) in the South has curtailed milk production, the persistent cool, spring temperatures across the northern tier of states has fostered increased milk output. The dairy industry anticipates that the peak of the northern region's spring flush to have occurred in late May and are expecting declining milk production as the seasonably warmer summer weather starts to affect and stress milk cows. The onset of hotter, drier conditions should promote a reduction in the number of cows in most dairy herds as farmers cull some of the animals retained in their herds during the milder, "less costly" spring weather conditions. However, cow numbers are expected to decline neither very quickly nor very significantly over the next several months. Thus, increased milk output and excessive milk supplies are likely to continue to trouble the dairy industry for the next year to 18 months.

Dairy Product Prices.

Excessive supplies of milk continue to depress dairy product prices for cheddar cheese and nonfat milk powder, which have languished at or near the CCC support price levels for the past several months. Remarkably, Grade AA butter have shown astounding strength since late-April and have demonstrated this strength with an almost 25% increase in prices over the four week period in April and May. The only movement in cheddar cheese prices has been a correction in the relationship between block and barrel prices where the barrel price fell to its "normal" level of about 3 to 4 cents per pound below the corresponding block price. Cheese prices remain mired just below the USDA/CCC support price level of $1.10 and $1.085 per pound for 40# block and barrel cheddar cheese, respectively. The situation for nonfat dry milk (NDM) continues to be where *NO* price movements have occurred during the past seven months and remains only slightly above the government support level of $1.01 per pound. On the Chicago Mercantile Exchange (CME), 40# block prices

were reported at $1.0925 on April 26 and have displayed very little price movements and were to $1.09 on May 19 -- a 25-cent (-0.2%) decrease over this 4-week period. Barrel prices have witnessed a market "correction" and have fallen to their usual position of being slightly below the respective 40# block price. Thus, barrel prices have trended downward since late April when the CME reported a cash price for 500# processed barrel cheddar cheese at $1.10 per pound on April 26 compared to $1.065 on May 19 – a 3.5 cent (-3.2%) decrease during this time period. The real surprise -- and confusion -- in the dairy market has been the persistent strength and recent upward spiral in butter prices. On May 19, the Grade AA butter price was $1.335 per pound compared to $1.08 on April 26 -- an increase of 25.5 cents (+23.6%) per pound. Most market analysts express dismay about how to explain and what demand/supply factors can be cited for causing this unexpected price increase. The only reasons being mentioned have been that butter inventories are below "desired" levels for some handlers and that there has been the usual sharp increase in ice cream demand with the onset of warm summer weather. Since September 1999, Grade A NDM prices on the CME has remained absolutely constant near the government support price level and have been recorded at $1.03 per pound. The persistence of excessive amounts of raw milk supplies that have been processed into NDM and cheeses has compelled the CCC to sustain its weekly purchases of non-fortified and fortified NDM along with processed and block cheddar cheese during April and May. Between October 1 and May 19, the CCC has purchased almost 305 million pounds of NDM and 5.8 million pounds of processed and block cheddar cheeses.

Near-term Market Outlook.

The recent upward movements of butter prices have brightened the rather stark dairy market outlook for 2000. But, the dairy industry continues its struggle to manage and dispose of robust milk supplies and large inventories of dairy products. Milk, cheddar cheese and NDM prices are expected to remain depressed and linger near government price support levels through June or July. However, the spike in butter prices during May should induce an upward movement in Class I milk prices with the July Advanced Class I milk price for Mississippi (Starkville zone) reaching the $15.25 to $15.50 per cwt. level. The usual heat stress produced by an onset hot and humid summer weather is expected to curtail milk output per cow and restrain milk supplies. When coupled with the normal increases in dairy product demand due to the conclusion of summer school recesses, milk prices are anticipated to peak sometime during the fall (usually during October or November) with Class I milk predicted near reach the $16.50 to $17.00 level. The May Class III (which replaced the BFP) is expected to remain below the $9.50 per cwt. level and again be reported near $9.40 level. The CME reported on May 23 that the Class III futures contracts settlement prices were $9.38 for the May contract, $9.91 for June, $11.43 for July, and $12.20 for August. While the "spring flush" has begun to ebb, excessive quantities of milk persist and very few dairy industry analysts predict any dramatic increases in milk prices during 2000 and 2001. But, most are forecasting that there will be slow and gradual price increases through the rest of this summer and fall. However, several factors that can initiate substantial near-term price increases are unfavorable summer weather and/or significant dairy herd culling that will curb excessive milk supplies. Dairy farmers and forecasters must remain cognizant of the fact that milk prices during the past decade have been *very* volatile and (wildly) responsive to weather conditions, forage quality and availability, feed costs, and dairy policy and programs that have influenced the quantity of milk production.

Class I "Mover" Milk Price and Mailbox Milk Prices

As has been described in recent issues of this newsletter, the USDA implemented its provisions for federal milk order reform on January 1, 2000. One of the most important features of federal order reform was a change in how Class I milk prices are calculated and reported under this revised classified milk pricing system. In the May issue, this newsletter was so bold that it stated that "the Advanced Class I milk price has become the single milk price which has the most influence on the amount milk sales revenues generated each month by Mississippi and Southern dairy farmers." One of the most meaningful features of the calculation of the monthly Advanced Class I price was the use of a Class I "mover" price which is the higher of either the Advanced Class III and Class IV Skim Milk Pricing Factors for that month. This Class I "mover" price was designed to allow dairy farmers to NOT be penalized and suffer lower milk prices and revenues when butter prices are relatively higher than cheese prices (as has been the case on several occasions in the past 5 to 10 years). This has certainly been the case during 2000 when butter prices have been relatively (but NOT absolutely) and substantially higher than the corresponding cheese prices. As a result, this Class I "mover" price feature has resulted significantly more milk sales revenues in the hands and pockets of dairy producers.

To illustrate how this "mover" price has influenced milk revenues, a comparison of the *actual* Advanced Class III and Class IV Skim Milk Pricing Factors for the first six months of 2000 has found that the Class IV price has averaged $1.4933 per cwt. MORE than the respective Class III pricing factor. Thus, the Class I "mover" price has meant that dairy farmers have received an average of $1.4933 per cwt. more for the quantities of their milk used in Class I uses (or more than 60 percent) that has been produced during 2000. If a farmer produced 1.2 million pounds of milk during the first six

months of 2000, this Class I "mover" price feature has resulted in about $11,000 of "additional" milk sales revenues and gross income than would have been generated using the Class III skim milk pricing factor, only. Clearly, the Class I "mover" price provision implemented under the recent federal milk order reform has been beneficial to dairy farmers by providing more dollars from milk sales.

Southeast "Blend" Increases to $12.88 in April

The Southeast Federal Order Milk Market Administrator reported the April 2000 "blend" or uniform price for milk delivered in Atlanta and Starkville "base" zone of Federal Order (FO) #7 at $12.88 per cwt. for 3.5% Butterfat milk. (Please see the Mississippi map for zones where Zone 5 is minus $0.20, Zone 6, 7 and 8 are the "base" zones, Zones 9 is plus $0.20, Zone 10 is plus $0.30, and Zone 11 is plus $0.40 per cwt. The April "blend" price of $12.88 for the "base" zone of FO #7 represents a INCREASE of 5 cents per cwt. (+0.4%) compared to the March price of $12.83. The April 2000 blend price is only 12 cents per cwt. (or 0.9%) BELOW the April 1999 blend price of $13.00. Average butterfat test in each of the four milk class categories has a direct impact on the value of milk pooled in FO #7 and the amount of milk revenues available to be distributed to dairy farmers (but NOT reported in this newsletter). For April, the average butterfat test for each milk class was: Class I, 2.146%; Class II, 7.782%; Class III, 4.008%; and, Class IV, 5.429%. Factoring the average butterfat test, or number of pounds of butterfat, with the pounds of skim milk used in each of the four milk classes provides what this newsletter will describe as the "net" milk price for each class of milk. The April "blend" price was determined using the following factors: (1) a "net" Class I price of $12.64 on 57.09% of the milk marketed; (2) the "net" price for Class II of $16.23 on 10.42% of the milk; (3) a "net" price of $10.00 on 18.10% of the milk used for Class III products; and, (4) the "net" Class IV price of $13.54 on 14.39% of the milk marketed. This newsletter will be publishing a "revised" map of Mississippi depicting the changes in the pricing zones which were the result of federal order reform, but this "new" map is not yet available at this time of publishing in this newsletter.

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Uniform or "BLEND" Price – April 2000

North Mississippi:	**$12.68**
North Central Mississippi:	**$12.88**
South Central Mississippi:	**$13.08**
South Mississippi:	**$13.18**
Coastal Mississippi:	**$13.28**

Class I Price for June 2000 (Advanced Price)

North Mississippi:	**$14.60**
North Central Mississippi:	**$14.80**
South Central Mississippi:	**$15.00**
South Mississippi:	**$15.10**
Coastal Mississippi:	**$15.20**