

**CASE STUDES IN FEED EFFICIENCY;
CAN YOU PASS?**

**Mike Hutjens and Steve Wolfgang
Penn State Dairy Nutrition Workshop
November 13, 2007**

***Days in milk:* Add 0.15 unit for each 50 days in milk over 150 days**

***Mastitis:* For each linear score change, add or subtract 2.5 lb of milk**

***Change in Body Condition Score:* Add/subtract 1.4 pounds of milk over the lactation period of 300 days for each change of 0.5 BCS change**

***Walking:* subtract 0.2 lb of milk per 100 feet**

***Rumen acidosis (SARA):* Reduce FE by 0.1 unit for evidence of SARA**

***Protein level:* Higher protein crude protein (16.8 to 18.7%), decrease FE by 0.03 unit**

***Protein quality:* Favorable RUP amino acid profile, increase FE by 0.07 unit**

***Forage quality:* For each increase in NDFD in forage, add 0.59 lb of 3.5%FCM and 0.37 lb of DM**

***Heat stress:* 68 degrees F to 86 degrees F, reduce FE by 0.1 unit
86 degrees F to 95 degrees F, reduce FE by 0.3 unit**

***Bedding:* Sand instead of sawdust/mattress, add +0.03 FE**

***Photoperiod:* Long day vs. short day (winter), add +0.03 FE**

***TMR particle size:* Bottom Penn State box (< 56%), add +0.03 FE**

***Rumensin:* Add +0.03 FE**



Data Collection Sheet

Scoring date: 11/7/07

Herd ID

Evaluator

Fluid milk pricing:

\$/cwt milk	<input type="text"/>
Fat Differential	<input type="text"/>
Protein Differential	<input type="text" value="0"/>

Component milk pricing:

\$/lb fat	<input type="text"/>
\$/lb protein	<input type="text"/>
\$/lb solids	<input type="text"/>

HERD PROFILE						
Group ID	Group size	% BST usage	Avg DIM	Avg SCC	Avg MUN	Comments:
Group 1	2 year olds	153	40	223	151000	13
Group 2	High 1	144	45	232	181000	13
Group 3	High 2	153	45	218	377,000	13
Group 4	Fresh Pack	128	0	128	125000	13
Group 5	PACK	66	0	165	125000	13
Group 6						
Group 7						
Group 8						

PERCENT OF COWS BY CATEGORY								
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
1st lactation cows								
% <= 40 DIM	17.5			31				
% > 40 DIM	82.5				14			
Mature cows								
% <= 40 DIM		12	16	69				
% 41 to 105 DIM		38	45		22			
% > 105 DIM		50	39		64			

ENVIRONMENTAL CONDITIONS							
Ave Daily High Temp, °F	82	82	82	82	82		
Ave Daily Low Temp, °F	60	60	60	60	60		
Relative Humidity, %	75	75	75	75	75		
Wind Speed, mph	3	3	3	3	3		
Hours in Direct Sunlight	0	0	0	0	0		

Body Weight, lb

MILKING INFORMATION							
Milkings Per Day	Distance Walked, 1-way	# of Cows in Group	MILK				
			Yield, lb/d	Milk Fat, %	True Protein, %	Other Solids, %	
Group 1	3	720	79	3.6	2.9		
Group 2	3	720	68	3.5	3		
Group 3	3	720	75	3.7	3		
Group 4	3	480	82	3.9	2.8		
Group 5	3	480	75	3.7	2.9		
Group 6							
Group 7							
Group 8							

FEEDING INFORMATION							
# Feedings Per Day	Lbs as fed Per Feeding	RATION			Additives	FEED REFUSALS	
		DM Content %	Crude Protein, %	Feed Cost \$/lb/DM		Feed Refusals, lb/d	DM Content of Refusal, %
Group 1	1	15580	47	18	0.07	978	47.3
Group 2	1	17400	42.7	18	0.07	228	42.7
Group 3	1	17480	42.5	18	0.07	221	42.7
Group 4	1	5100	46.3	17.6	0.078	282	46.8
Group 5	1	5524	47	17.6	0.067	271	47.3
Group 6							
Group 7							
Group 8							



Data Collection Sheet

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Herd ID

Evaluator

Fluid milk pricing:
 \$/cwt milk
 Fat Differential
 Protein Differential

Component milk pricing:
 \$/lb fat
 \$/lb protein
 \$/lb solids

HERD PROFILE						
Group ID	Group size	% BST usage	Avg DIM	Avg SCC	Avg MUN	Comments:
Group 1	one group	81	0	185	160,000	12
Group 2						
Group 3						
Group 4						
Group 5						
Group 6						
Group 7						
Group 8						

PERCENT OF COWS BY CATEGORY								
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
1st lactation cows								
% <= 40 DIM	4.5							
% > 40 DIM	41.4							
Mature cows								
% <= 40 DIM	7.1							
% 41 to 105 DIM	9.6							
% > 105 DIM	37.4							

Ave Daily High Temp, °F	90							
Ave Daily Low Temp, °F	60							
Relative Humidity, %	70							
Wind Speed, mph	2							
Hours in Direct Sunlight	0							

Body Weight, lb	1500							
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MILKING INFORMATION							
Milkings Per Day	Distance Walked, 1-way	# of Cows in Group	MILK				
			Yield, lb/d	Milk Fat, %	True Protein, %	Other Solids, %	
Group 1	2	240	81	63.7	3	3.1	
Group 2							
Group 3							
Group 4							
Group 5							
Group 6							
Group 7							
Group 8							

FEEDING INFORMATION							
# Feedings Per Day	Lbs as fed Per Feeding	RATION			Additives	FEED REFUSALS	
		DM Content %	Crude Protein, %	Feed Cost \$/lb/DM		Feed Refusals, lb/d	DM Content of Refusal, %
Group 1	1	7280	43.3	17.9	0.09	229	43.7
Group 2							
Group 3							
Group 4							
Group 5							
Group 6							
Group 7							
Group 8							



Data Collection Sheet

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Herd ID

Evaluator

Fluid milk pricing:
 \$/cwt milk
 Fat Differential
 Protein Differential

Component milk pricing:
 \$/lb fat
 \$/lb protein
 \$/lb solids

HERD PROFILE						
Group ID	Group size	% BST usage	Avg DIM	Avg SCC	Avg MUN	Comments:
Group 1	Fresh & High	82	0	120	72000	17
Group 2	Medium	87	42	221	151,000	17
Group 3	Low	88	50	320	210,000	17
Group 4						
Group 5						
Group 6						
Group 7						
Group 8						

PERCENT OF COWS BY CATEGORY								
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
1st lactation cows								
% <= 40 DIM	14							
% > 40 DIM	20	29	44.9					
Mature cows								
% <= 40 DIM	30	22						
% 41 to 105 DIM	36	49	55.1					
% > 105 DIM								

ENVIRONMENTAL CONDITIONS							
Ave Daily High Temp, °F	85						
Ave Daily Low Temp, °F	60						
Relative Humidity, %	75						
Wind Speed, mph	2						
Hours in Direct Sunlight	6						

Body Weight, lb	1450	1500	1500				
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MILKING INFORMATION						
Milkings Per Day	Distance Walked, 1-way	# of Cows in Group	MILK			
			Yield, lb/d	Milk Fat, %	True Protein, %	Other Solids, %
Group 1	3	750	82	87	3.6	3
Group 2	3	500	87	82	3.6	3
Group 3	3	500	88	69	3.6	3
Group 4						
Group 5						
Group 6						
Group 7						
Group 8						

FEEDING INFORMATION							
# Feedings Per Day	Lbs as fed Per Feeding	RATION			Additives	FEED REFUSALS	
		DM Content %	Crude Protein, %	Feed Cost \$/lb/DM		Feed Refusals, lb/d	DM Content of Refusal, %
Group 1	1	11850	44.7	18.32	0.0626	725	45
Group 2	1	11053	45	18.4	0.0664	292	45
Group 3	1	9919	44	18.33	0.0693	983	44
Group 4							
Group 5							
Group 6							
Group 7							
Group 8							



Data Collection Sheet

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Fluid milk pricing:
 \$/cwt milk
 Fat Differential
 Protein Differential

Component milk pricing:
 \$/lb fat
 \$/lb protein
 \$/lb solids

HERD PROFILE						
Group ID	Group size	% BST usage	Avg DIM	Avg SCC	Avg MUN	Comments:
Group 1	High	57	10	120	431,000	12
Group 2	Bull	45	40	195	495,000	14
Group 3	Low	44	30	260	415,000	13
Group 4						
Group 5						
Group 6						
Group 7						
Group 8						

PERCENT OF COWS BY CATEGORY								
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
1st lactation cows								
% <= 40 DIM	6							
% > 40 DIM	10	34	37					
Mature cows								
% <= 40 DIM	30							
% 41 to 105 DIM	47	17	10					
% > 105 DIM	7	49	53					

ENVIRONMENTAL CONDITIONS								
Ave Daily High Temp, °F	80							
Ave Daily Low Temp, °F	60							
Relative Humidity, %	65							
Wind Speed, mph	1							
Hours in Direct Sunlight	0							

Body Weight, lb	1500	1500	1600					
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MILKING INFORMATION							
Milking Per Day	Distance Walked, 1-way	# of Cows in Group	MILK				
			Yield, lb/d	Milk Fat, %	True Protein, %	Other Solids, %	
Group 1	2	240	80	3.7	2.9		
Group 2	2	240	85	3.7	2.9		
Group 3	2	480	55	3.7	3		
Group 4							
Group 5							
Group 6							
Group 7							
Group 8							

FEEDING INFORMATION							
# Feedings Per Day	Lbs as fed Per Feeding	RATION			Additives	FEED REFUSALS	
		DM Content %	Crude Protein, %	Feed Cost \$/lb/DM		Feed Refusals, lb/d	DM Content of Refusal, %
Group 1	1	5680	43.8	17	0.07	70	44
Group 2	1	4375	43	17.7	0.07	75	44
Group 3	1	4725	42	18.6	0.06	117	43
Group 4							
Group 5							
Group 6							
Group 7							
Group 8							



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Herd ID

Evaluator

Fluid milk pricing:
 \$/cwt milk
 Fat Differential
 Protein Differential

Component milk pricing:
 \$/lb fat
 \$/lb protein
 \$/lb solids

HERD PROFILE						
Group ID	Group size	% BST usage	Avg DIM	Avg SCC	Avg MUN	Comments:
Group 1	High Fresh	130	45	112	65,000	13
Group 2	High 3	130	93	125	180,000	13
Group 3	High 4	120	89	277	550,000	13
Group 4	High 5	129	93	299	300,000	13
Group 5						
Group 6						
Group 7						
Group 8						

PERCENT OF COWS BY CATEGORY								
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
1st lactation cows								
% <= 40 DIM	15							
% > 40 DIM	74		80					
Mature cows								
% <= 40 DIM	11	8.5						
% 41 to 105 DIM		40						
% > 105 DIM		51.5	20	100				

ENVIRONMENTAL CONDITIONS							
Ave Daily High Temp, °F	95						
Ave Daily Low Temp, °F	75						
Relative Humidity, %	75						
Wind Speed, mph	3						
Hours in Direct Sunlight	4						

Body Weight, lb	1450	1500	1475	1500			
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MILKING INFORMATION						
Milkings Per Day	Distance Walked, 1-way	# of Cows in Group	MILK			
			Yield, lb/d	Milk Fat, %	True Protein, %	Other Solids, %
Group 1	3	900	74	3.6		3
Group 2	3	900	97	3.4		3
Group 3	3	900	72	3.6		2.9
Group 4	3	900	74	3.5		2.9
Group 5						
Group 6						
Group 7						
Group 8						

FEEDING INFORMATION							
# Feedings Per Day	Lbs as fed Per Feeding	RATION			Additives	FEED REFUSALS	
		DM Content %	Crude Protein, %	Feed Cost \$/lb/DM		Feed Refusals, lb/d	DM Content of Refusal, %
Group 1	1	11600	46.3	17.4	0.066	340	48
Group 2	1	13800	47.7	17.5	0.066	450	48
Group 3	1	12300	46	17.5	0.066	370	48
Group 4	1	13200	46	17.5	0.066	370	48
Group 5							
Group 6							
Group 7							
Group 8							



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Fluid milk pricing:
 \$/cwt milk
 Fat Differential
 Protein Differential

Component milk pricing:
 \$/lb fat
 \$/lb protein
 \$/lb solids

HERD PROFILE						
Group ID	Group size	% BST usage	Avg DIM	Avg SCC	Avg MUN	Comments:
Group 1	High	96	50	91	110,000	17
Group 2	Low	103	95	303	460,000	17
Group 3						
Group 4						
Group 5						
Group 6						
Group 7						
Group 8						

PERCENT OF COWS BY CATEGORY								
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
1st lactation cows								
% <= 40 DIM	7.3							
% > 40 DIM	29.2	28.2						
Mature cows								
% <= 40 DIM	9.4							
% 41 to 105 DIM	26							
% > 105 DIM	28.1	71.8						

ENVIRONMENTAL CONDITIONS								
Ave Daily High Temp, °F	95							
Ave Daily Low Temp, °F	70							
Relative Humidity, %	75							
Wind Speed, mph	3							
Hours in Direct Sunlight	0							

Body Weight, lb	1475	1500						
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MILKING INFORMATION							
Milkings Per Day	Distance Walked, 1-way	# of Cows in Group	MILK				
			Yield, lb/d	Milk Fat, %	True Protein, %	Other Solids, %	
Group 1	2	600	88	3.5	2.9		
Group 2	2	600	74	4.15	2.9		
Group 3							
Group 4							
Group 5							
Group 6							
Group 7							
Group 8							

FEEDING INFORMATION							
# Feedings Per Day	Lbs as fed Per Feeding	RATION			Additives	FEED REFUSALS	
		DM Content %	Crude Protein, %	Feed Cost \$/lb/DM		Feed Refusals, lb/d	DM Content of Refusal, %
Group 1	1	12717	42.5	19.2	0.085	381	43
Group 2	1	13785	41.5	19	0.074	413	42
Group 3							
Group 4							
Group 5							
Group 6							
Group 7							
Group 8							