Student Clinical Paper

Problem Identification in a Dairy Herd

Raanan Ariav, Dan Damman
Kevin Johnson & Jennifer Reha
Class of 1992, School of Veterinary Medicine
University of Wisconsin, Madison, WI

This study herd of 150 Holstein cows has a rolling herd average production of 17,200 lbs. The owners of the farm are concerned about the amount of income being generated from the dairy enterprise. The cow herd is housed in a free-stall barn which has automatic manure scrapers and above-ground liquid manure storage tanks. The stalls have rubber mat surfaces with no bedding. There are two lactating group total-mixed-rations. The double-six herringbone milking parlor has weigh jars. This report is the work of four senior veterinary students. Their assignment was to identify and prioritize the production problems on this dairy using the "Goal Form" from the *Bovine Practitioner, No. 26, September 1991, pages 21 to 28.*

Nutrition

Losses due to low peak milk weights:

7# * 87 cows * $14/lb	=	$8526.00
2# * 63 cows * $14/lb	=	$1764.00
Net gain	=	$10,290.00

On this farm the cows and heifers are all fed a total mixed ration (TMR). Ration ingredients include HMSC (high moisture silage content), haylage, cotton seed, corn silage and wet brewers grain. Dry matter content of forages is checked on a monthly basis and the entire ration is checked bi-yearly. There are three groups of milk cows that are fed separate rations: Heifers, low production cows, high production cows.

	Actual	Goal
First: later lactation peak milk ratio	79%	73%
Peak milk: 1st lactation	68	70
Other cows	86	93
Persistency: 1st lactation	91%	95-97%
Other cows	89%	90-95%
DM intake for 1400# cow	38	>42

Areas of improvement:

- First lactation:later lactation peak ratio is high (79%). This indicates the older cow peaks are too low.
- ME305 for first lactation cows is higher than that of later lactation cows - later lactation cow peaks are low and their persistency is poor.
- Inability of all cows to develop a normal lactation curve - peak milk and persistency are low.
- Inadequate bunk space and water supply for the number of cows in the free stall barn.
- Dry matter intake is low for size of the cows - may improve with improved ventilation.

Though the low peak milk weights, poor persistency and low ME 305's for later lactation cows suggests a nutritional problem, further investigation revealed that, based on heifer size and body condition, heifer nutrition was very good. Also the BCS of the milking herd did not reveal any nutritional problems (ie. too fat or too thin cows). Therefore it is believed that the nutritional program on this farm is adequate and that the major cause of the lowered milk production values can be traced to the poor environment in which the milk cows have been housed.

Udder Health

Economic losses due to mastitis and udder health problems are substantial. Opportunities for improvement total nearly $40,000 in the areas of clinical mastitis, subclinical mastitis, and premium losses (see Figure 1). Composite tests from individual cows reveal environmental pathogens (environmental Streps. and *E. coli*). In addition, *Staph. aureus* has been cultured from bulk tank samples. Management plans are currently aimed at eliminating environmental pathogens.

Current monitors and goals:

	Current	Goal
Clinical mastitis-cases/month	9%	<3%
Culling/death due to mastitis	15%	5%
Bulk tank SCC	252,000	125,000
Average LGSCC-heifers	3.2	2.5
% LGSCC < 3.0	37%	80%

Class advisor: Dr. Ken Nordlund

Causes:

Environment appears to be the main contributor to udder related health problems. Floors and stalls in the stallbarn are wet year around. Damp ground, stall dividers, and constant exposure to concrete all contribute to foot and leg problems. These conditions increase the stress levels in all cows, further predisposing them to increased mastitis problems.

Plans implemented to date:

1. Implementation of a new teat dipping procedure.
2. Pre-milk udder preparation without water.
3. Feed heifers immediately post-milking allow teat sphincter adequate time to close.
4. Installation of new ventilation system to decrease moisture and improve air quality in the free stall barn.

Further recommendations:

1. Replace seals on claw-cleaners on a regular basis.
2. Use of appropriate bedding in free-stall barn.

Comments:

Above implemented plans were started approximately two months ago. Most recent data indicates that monthly cases of clinical mastitis have declined (from 13 to 8.3). We would optimistically attribute this to management changes. It may also be a normal seasonal variation (summer dry period). Continued monitoring is essential to evaluate the success of current management changes.

Losses due to clinical cases of mastitis:	
156 cases/year x $163.00/case =	$25,428.00
Premium losses:	
172.82 cwt. x 147 cows =	
25,404.54# x $.30 premium loss =	7,621.00
Subclinical losses:	
1.2 lgscc diff. x 333# loss/lactation =	
399.60 x 147 cows = 587.41 cwt	
587.41 cwt x $11.46/cwt =	6,731.74
Total Losses	39,781.10

Figure 1.

Replacements

Problem #1: In order to support a 46% cull rate, required replacement herd size would have to be 165 animals. Current replacement herd size of 140 animals falls about 15% short of this target (Figure 2).

Problem #2: High cow cull rate.

Other problems include the calf barn facility, specifically the ventilation system and the lack of space. Size and age of first calf heifers are at recommended breeding standards (24 months at first calving, heart girth 77", withers height at 54").

Economics: There are different ways to evaluate the economic impact of shortage of replacement heifers on this farm. This evaluation depends heavily on the projected cow culling rate in the next two years, and the financial situation this dairyman is facing.

1. A first scenario will require the owners to purchase 25 springing heifers in the next two years, in order to maintain his current herd size of 147 cows.

   Springer heifer purchase: $1200/heifer x 25 = $30,000 - (price for culled cows).

   Other aspects of such a purchase are the unknown (most likely decreased) value of new genetics into the herd, and the possibility of introducing new disease into the herd.

2. A second scenario in which the owners can not raise the money for purchasing new heifers will lead to a continuous decrease in milking cow numbers, a continuous decrease in level of production, and subsequent lower income.

Recommendations:

The current culling rate of 46% requires a larger herd of replacement heifers (12 extra female starts per year). With a low calf mortality rate (8%), an acceptable heifer cull rate (12%), and an excellent age at first calving (24 months), the only variable which can change easily and cause a significant impact is the cow culling rate.

Cow culling rates should be kept to a minimum (30%) by decreasing major causes of involuntary culling, namely mastitis, feet/leg problems, and reproduction problems. Reducing the culling for these factors will allow more voluntary culling of low producing cows (genetic progress), reduce expenses for replacements, and result in a longer producing life for high production cows.

INVENTORY: Number of heifers on farm: 140

# cows in herd		cow culling rate factor		heifer mortality & cull. rate factor		age at 1st calf factor		required size of replac. herd
147	x	0.46	x	$\frac{1}{\frac{1-0.08}{\frac{1}{1-0.11}}}$	x	[1+{24/24}]	=	165

Shortage of replacement herd: 165-140 = 25

$\frac{\text{Actual No. 140}}{\text{Required 165}} = 85\%$

Figure 2.

Reproduction

Current monitors and goals:

	Current	Goal
Genetic value of older cows	+ 77	+ 84
PTA$ of service sires	+187	+220-240
Bull bred heifers	-	IA bred
Average days dry	76	60
Low percent of heat detection	10%	75%
Calving interval	13.5 mo and extending	12.5
Days in milk to first breeding	90 days	55-60
Current calving to conception	144 days	85 days
Services per conception	2.5	2.0
Culling rate due to reproduction	31%	<10%

Losses due to reproduction:

1. PTA losses in herd from unidentified sires
   first lactation cows = 63-45=18 x $134 = $2412
   later lactation cows = 87-47=40 x $134 = $5360
   total = $7772

   PTA losses of bull bred heifers = 70 x $134 = $9380

2. Reproduction failure and delayed breedings
   a. Reduced number of calves
   b. Decreased milk yield
      154 - 150 x .17/100 x $11.46 x 365 days = $4181
   c. Cull/replacement costs
      1990: 23 of 74 culled for reproduction
      Replacements = $1300
      Culling price = $500-600
      Cost per replacement = $700-800
      $700-$800 x 23 = $16,100 - 18,400
   d. Semen efficiency
   e. Veterinary check fees and drugs

Causes of reproductive failure and delayed breedings:

1. Inadequate ventilation-ammonia, wet conditions, poor air circulation.
2. Wet, slippery concrete flooring-hoof overgrowth and lameness.
3. Poorly designed stall dividers-bodily abrasions.
4. Inadequate bedding-superficial abrasions.

The problems listed result in a very uncomfortable and stressed cow. This tends to suppress signs of estrus and reduces the farmer's ability to detect heat.

Recommendations:

1. Re-assess conditions once ventilation system is in full use and other environmental changes have been made.
2. Designate a time for daily heat detectors.
3. Implement AI breeding in heifers.
4. Use bull semen with higher PTA$ value.

Current Economic Losses

Udder Health	
Losses due to clinical cases of mastitis:	$25,428
Premium losses:	7,621
Subclinical losses	6,731
Reproduction	
PTA losses-unidentified sires:	$7,772
PTA losses-unidentified sires/heifers only	9,380
Reproduction failure and delayed breedings:	$22,581
Nutrition	
Loss due to low peak milk weights:	$10,290
Replacements	
Shortage of 12 heifers per year	?
TOTAL	$89,803