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## **Dairy Heifer Raising as a Business**

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### **Historical perspective and growth**

From an historical perspective, it is probably safe to say that dairy heifer raising as a business separate from the dairy farm is in its infancy. Of course, as long as there have been dairy farms there have always been arrangements among neighboring dairy farms to “take care of” a few heifers. Probably only over the past thirty years have “heifer growers” begun to specialize in this business.

The first statistical data that I know about comes from a survey completed by *Dairy Herd Management* magazine in the mid-1990's. At that time about 4,000 of their subscribers classified their primary agricultural function as “heifer grower.” We have no information about the scale of their operations. They could have ranged from 5 to 50,000.

The growth rate in numbers of growers apparently began to accelerate in the mid-1990's. In 1996 NRAES (a northeastern US regional Land-Grant University coordinating group) sponsored the “Calves, Heifers, and Dairy Profitability Conference” in Pennsylvania. A small group formed from those attending this conference initiated planning for a conference in Georgia in 1997. That event drew over 250 attendees. More than 100 of them were heifer growers. Many attending were dairy farmers raising their own heifers. Even for the dairy farmers, heifer raising was emerging as a distinct enterprise within the larger dairy operations.

After that Georgia meeting the Professional Dairy Heifer Growers Association was formed. Annual conferences have been held every year since then. This Association has six administrative regions in the U.S. Three regions (Southeast, Northeast, and North Central) have held regional conferences in addition to the national meetings with attendance in excess of 200 persons. National conference proceedings from 1998 through 2003 are available from the PDHGA headquarters office (<http://www.pdhga.org> or [pdhga@pdhga.org](mailto:pdhga@pdhga.org) or 1-877-434-3377). PDHGA farm membership has an annual fee of \$125.

### **Structure of heifer growing businesses**

This analysis is focused on heifer growing businesses that exist separately from dairy farms that are raising their own heifers. One dimension of industry structure is concentration.

For example, the U.S. broiler industry is highly concentrated. Nearly all the broilers are raised, packed and wholesaled by just a few players.

In contrast, we do not have just a few growers or milling companies that dominate the production processes for the wheat and corn grain industry (e.g., land preparation, planting, harvesting,

marketing). Rather, we have thousands of cash crop producers who grow for an open market. They own the land and machinery, put up the operating money, assume all the risk. And, there are many country elevators and mills that make the marketing system work.

A second industry characteristic is the decision-making pattern. Both the broiler and pork industries have an integrated pattern. A company typically owns most of the capital and operating resources (e.g., animals, feed, trucks, packing plants, wholesale facilities). Decisions from top to bottom are coordinated. Even if the farmers own the land and buildings where broilers or hogs are raised, they are essentially employees so far as production decision-making is concerned. This pattern is called “vertically integrated.”

Decision-making in the wheat and corn grain industry is “horizontal.” There are many, many participants that both produce and market the products. Each ownership unit retains the right to make decisions independently of the others. The heifer raising industry is closer to this horizontal model rather than a vertically integrated structure. A recent survey of growers showed that fully 85 percent contracted directly with their dairy farm clients rather than participating in some kind of vertically integrated structure (Wolf, 2003).

There have been a few attempts by feed companies to assemble resources and coordinate marketing and raising dairy heifers. I do not know of any that have successfully pulled together a large number (e.g., 50,000) of heifers into a centrally planned raising system.

As a means of marketing products for preweaned heifers, a few feed companies are trying to encourage the brokering of heifer raising among dairies and growers. For example, working in Ohio, Indiana, Kentucky and Michigan a small-scale brokerage business or network is providing heifer-raising services for eleven dairies by connecting them with a number of growers. While one dairy retains ownership of the heifers the other ten dairies have a “sell/buy back” agreement with the network. The producers agree to provide good neonatal care and to pay for raising them. At one point in the past producer compliance with best management newborn care practices was low. Often, these heifer calves were treated by producers just like their bull calves – “we don’t have to raise them so who cares.” The network now does periodic quality control checks. They measure blood serum total proteins in newborn calves and have colostrum samples cultured for bacterial contamination. Producers with problems are assisted in identifying management changes that are needed to meet quality thresholds. Others that consistently fail to meet quality control standards are being eliminated from the network.

The growers in the network agree to provide quality care using feeds from the feed company that is backing the broker. By enlisting growers to provide specialized care at different stages of development (preweaned, transition to breeding age, bred heifers) this network is successfully tapping into an array of both small and medium size growers. The network coordinator is seeking to achieve high compliance for protocols for many practices (navel dipping on producers’ farms, sanitation procedures for milk replacer feeding equipment, vaccinations). He actively monitors protocol compliance by both producers and growers.

Michigan State University completed a heifer grower survey in 2001 (Wolf, 2003). The sample was quite small, N=187. The response rate was 38.5 percent. Thus, the results are based on 65 respondents. The grower current heifer inventory among these respondents varied from 30 to 20,000. This variation is significant. If we make an educated guess about the U.S. grower population, there are probably a small number of quite large operations (greater than 10,000 inventory). There are a modest number of medium size businesses (1-2,000 in inventory). I'm quite certain there are many, many small operators (less than 250 heifers). This size distribution suggests that heifer raising is still pretty much a "cottage" industry.

The vision of the Midwestern "network" that I just described is to link together the "cottage" size units. As a linked "network" these small units then begin to take advantage of large heifer grower's economies of scale. These small units frequently have access to low cost capital resources (housing, equipment). Economically these are on the plus side of profit. Even more important for successful heifer raising, some of the small units have access to skilled, livestock savvy labor that may very well be underemployed. Wolf notes that only one out of five survey respondents had no other farm enterprises. Thus, the potential for underemployment may be large enough to make a "small" heifer raising enterprise attractive.

### **Contract specifications**

Contracts are not a given in this industry. Fully 31 percent of Wolf's respondents operate without a written contract. My guess is that among the smaller growers contracts are the exception rather than the rule. This not to say that contracts are undesirable. Written contracts have the advantage of formalizing arrangements between the grower and dairy producer. Regardless, whether written or not, the agreements most frequently deal with issues of the amount of payment, when payments are made, responsibility in the event of mortality or culling, treatment costs for sick heifers, vet bills, selection of semen and breeding expenses.

My best estimate is that at least four out of five grower operations do not own the animals. This proportion agrees with Wolf's sample, as well. They accept responsibility for them but don't buy them from the producers. When the grower doesn't own the heifers, as in a sell-buy back arrangement, all the issues of who pays for what become very important in defining the enterprise profitability. For example, the Michigan State survey showed that while 71 percent of the growers paid the vet bills only 40 percent of them took full financial responsibility in the event of an on-farm heifer death.

Two-thirds of Wolf's contract raisers specified a daily charge per heifer per day as their payment method. "By age group, the average charge was \$1.88/d from birth to weaning; \$1.49/d from weaning to 6 mo. of age; \$1.50/d from 6 mo to breeding; and \$1.59/d while bred." (Wolf, p. 3020) If growers raised the heifer from preweaning to springing the charges averaged \$1.60/d. When growers only have the heifers for the labor-intensive months as pre-weaned calves, I have clients that charge as high as \$2.75/d.

Sixteen percent of them were paid based on gains. Wolf reports, "The range [for gain based charges] was quite wide. Half of the respondents charged between \$0.75 and \$0.99/lb of gain." (Wolf, p3020)

Some contracts include clauses for bonuses and/or penalties. While not common, a few contracts allow for bonuses for the grower if growth goals are exceeded. I have a grower that added a penalty clause last year for calves arriving with excessively low blood serum total protein levels (compromised immunity).

I tried a Google search on “heifer raising contract” and got 4190 hits. A brief review of the first twenty hits turned up very specific information on what should be included in a contract as well as rates for various services [See for example, Jack Rodenburg at Ont. Ministry of Agr. & Food, David Fisher at Univ. Ill., Geoff Benson at North Carolina St. Univ., Joseph Beiler at Ohio State Univ., Janice Endsley at Michigan State].

### **Process Monitoring**

It is to both the dairy producer’s and grower’s advantage to have standards. These guidelines define “good practice” or the “right way to do things.” After two years of intensive work, the Best Management Practices committee of PDHGA published such a set of guidelines. Entitled, “Raising Quality Replacement Heifers,” this booklet defines Best Management Practices (BMP) for heifer raising.

The seven areas included cover the life of a heifer from birth to calving. Each area is broken up into specific best management practices. For example, for preweaned calves fifty-two practices are defined ranging from navel dipping to weaning.

For the dairy producer this BMP booklet provides a practical yardstick for assessing a heifer raiser’s practices. How does this grower stack up against these industry association approved standards? If there are some gaps, am I willing to live with them?

For the heifer grower this BMP booklet provides a marketing tool. A top-notch grower will be doing most of the recommended practices. When making a sales presentation to a producer the grower can refer to the booklet. It defines the practices used when doing a good job of heifer raising.

### **References**

- Wolf, C.A. 2003 Custom dairy heifer grower industry characteristics and contract terms. J. Dairy Sci. 86:3016-3022.
- Professional Dairy Heifer Growers Association. 2002. Raising Quality Replacement Heifers. Stratford, IA: Quality Assurance Center, Inc.

## **Practical Management Approaches to Enhance Heifer Health**

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Being practical is a tough job. It means making choices. There are many courses of action. Only a minority promise to deliver results without excessive expense. A good manager's skill is to pick out the actions that have the greatest potential to deliver benefits for a given expense.

Raising healthy dairy replacement heifers involves making many of these choices. On one hand, we are guided by basic biological knowledge that does not vary from farm to farm. This knowledge is a constant. On the other hand, each farm is a unique combination of biology, human resources and environment. Thus, while we find it easy to generalize about practical management approaches to enhance heifer health, it is clear that the implementation of these ideas will assume a nearly infinite variation of combination of day-to-day practices.

### **Checklists, outlines and protocols**

The attached pages provide the tools for reviewing on-farm heifer rearing practices. Each resource is aimed at a critical control point for heifer health.

1. Healthy Calving – preventing “manure meals” is an essential part of getting a calf off to a good start.
2. Colostrum Checklist – colostrum management must get calves past a crucial threshold both for immunity and nutrition in order to survive and be healthy.
3. Milk Replacer Checklist – clean milk replacer (or milk) fed in adequate quantities is essential for maintenance and growth.
4. Protocols for washing milk equipment – in both English and Spanish these protocols define basic standards for achieving minimal bacterial contamination of calf feed.
5. Intensive feeding compared to conventional programs – this side-by-side comparison sets out the practical differences between the feeding programs.

## NEWBORN HEALTH STARTS AT CALVING

Preventing infection costs much less than treating disease. We all know this. But it's hard to put into practice. What can we do to prevent calfhood infections?

### **Well bedded dry cow facilities are profitable.**

Close up cows are cleaner when we move them to pre-fresh or calving housing. Their coats are less matted and udders are cleaner.

If a birth is unattended calves are much less likely to get a mouth full of manure before their first swallow of colostrum.

### **Well bedded calving facilities are profitable.**

The cows are cleaner at calving. Especially important, calves rest on clean, dry bedding as they are born.

Severe pathogen exposure at birth often is an impossible challenge to overcome even with superior colostrum feeding practices.

### **Prompt milking of fresh dams is profitable.**

The amount of antibodies to be harvested in the colostrum is fixed at calving. By six hours post-calving the dam's milk production will have diluted the antibody concentration to only sixty percent of what it was at calving time.

Low antibody concentrations in colostrum are not only due to leaking after calving but also to dilution by milk produced between calving and the first milking.

### **Prompt colostrum feeding is profitable.**

In the first six hours after birth, a calf's ability to absorb antibodies from her first colostrum feeding drops about fifty percent. At twelve hours post calving the antibody absorption rate is down to only one-quarter of what it was when the calf was born. Early colostrum feeding gets a larger number of antibodies into a calf's bloodstream than delayed feeding. Antibodies equal immunity. Calves with greater immunity are healthier overall. They have fewer infectious diseases.

## FEEDING PREWEANED CALVES: Colostrum

Let's consider procedures for feeding colostrum. Compare your routines with the standards that follow. When making this evaluation I like to use these scores:

1=never, 2=seldom, 3=often, 4=usually, and 5=almost always.

- \_\_\_\_\_ 1. All feeding equipment that comes in contact with colostrum is scrubbed after every use.
- \_\_\_\_\_ 2. When periodically cultured for bacteria, colostrum as fed to calves is not contaminated with environmental bacteria thus reducing septicemia and scours. Badly contaminated colostrum may also substantially reduce the rate of antibody transfer as well.
- \_\_\_\_\_ 3. Colostrum contaminated with mastitis and blood is discarded.
- \_\_\_\_\_ 4. Colostrum quality (antibody concentration) is estimated and the best quality available fed to heifer calves. While only a very rough guide to quality, a Colostrometer® may be used to exclude the lowest quality colostrum. Feeding more of poor quality colostrum is not an effective substitute for a good quality product.
- \_\_\_\_\_ 5. Colostrum is fed to heifer calves no more than four hours after birth and to at least one-half of the heifer calves within one hour after birth. One-half of a heifer's ability to absorb antibodies is gone within six hours; three-quarters of this capability is gone within twelve hours after birth.
- \_\_\_\_\_ 6. Plenty of good quality colostrum is fed. Average and large calves are fed four quarts within the first six hours. Smaller calves are fed proportionately less but still more than two quarts.
- \_\_\_\_\_ 7. When only low quality colostrum (low antibody concentration) is available, an effective colostrum supplement is added to boost its antibody content.
- \_\_\_\_\_ 8. When possible, fresh or refrigerated colostrum is fed rather than frozen colostrum. Thus, the calf gets a full dose of maternal immune cells as well as the maternal antibodies.
- \_\_\_\_\_ 9. When periodically assessed with blood samples, the Blood Serum Total Protein values are 80 percent 5.0 and over, 50 percent 5.5 and over.

## FEEDING PREWEANED CALVES: Milk Replacer

How do your procedures measure up? Do they provide the opportunity for your calves to grow into their genetic potential?

Let's consider procedures for feeding milk replacer. Compare your routines with the standards that follow. When making this evaluation I like to use these scores:

1=never, 2=seldom, 3=often, 4=usually, and 5=almost always.

- \_\_\_\_\_ 1. All feeding equipment that comes in contact with milk is scrubbed after every use.
- \_\_\_\_\_ 2. Equipment sanitation procedures meet these standards: (a) prewash rinse between 105-110°F; (b) chlorinated hot water wash consistently over 120°F and includes manual brushing; (c) acid rinse between 50-100°F; and (d) equipment dries between uses.
- \_\_\_\_\_ 3. Milk replacer is stored so that it remains both clean and dry to promote good mixing and reduce scours.
- \_\_\_\_\_ 4. Milk replacer is mixed at the temperature recommended by the manufacturer to promote even distribution of fat and reduce denaturing of proteins.
- \_\_\_\_\_ 5. Milk replacer is 100-105° when drunk by the calves to promote favorable feed conversion.
- \_\_\_\_\_ 6. Milk replacer is fed regularly at the same time daily according to the same routine preferably by the same caretakers to promote good eating habits and favorable feed conversion.
- \_\_\_\_\_ 7. When periodically cultured for bacteria, milk replacer mix as fed to calves is not contaminated by environmental bacteria thus reducing scours.
- \_\_\_\_\_ 8. For farms feeding waste milk, when periodically cultured for bacteria, the waste milk as fed to calves is not contaminated by environmental bacteria thus reducing scours and improving feeding conversion rates.

## **LAVANDO LOS RECIPIENTES DE LA LECHE**

### **1. ENJUAGAR**

Use agua tibia. No enjuague con agua caliente. Hay que sacar la mugre y el residuo de la leche.

### **2. LAVAR**

Use agua caliente. Añada jabón y cloro. Hay que fregar todas las superficies, sacando el residuo de la leche que quede pegada. Mantenga el agua arriba de 120° F.

### **3. ENJUAGAR**

Use agua tibia. Añada ácido. Enjuague los recipientes de la leche con esta solución. No enjuague esta solución acídica de los recipientes. Hay que dejar el residuo de esta solución en las botellas y las cubetas mientras se secan.

### **4. SECAR**

Deje que las botellas y las cubetas escurran y se sequen. No hay que dejarlas volteadas sobre el piso de concreto o metidas una dentro de otra.

## WASHING MILK CONTAINERS

### 1. RINSE

USE LUKEWARM WATER. Do not rinse with hot water. Rinse off dirt and milk residue.

### 2. WASH

USE HOT WATER. Add soap and bleach. Brush all surfaces. Scrub off remaining milk residue. Keep water above 120° (49° C) at all times.

### 3. RINSE

Use warm water. Add acid. Rinse containers. Do not rinse off the acid. Leave it on the bottles and pails while they dry.

### 4. DRY

Allow the bottles and pails to drain and dry. Do not stack pails inside each other. Do not sit pails upside down on a concrete floor.

## COMPARISON OF CONVENTIONAL AND INTENSIVE CALF FEEDING PROGRAMS

Characteristic	Intensive Feeding	Conventional Feeding
Average daily gain (49days)	1.7-2.0	1.2-1.5
Normal appearance of manure	Lighter, looser	Darker, more firm
Milk replacer protein level	Higher, 26-28%	Lower, 18-22%
Milk replacer fat level(cold)	18-20%	18-20% common
Milk replacer fat level(warm)	15%	18-20% common
M.R. Mixing rate	10 oz./2 quarts	8 oz./2 quarts usually
Waste milk	Pasteurized only	Pasteurized preferred
Amount M.R. fed		
2-10 days	2-2 1/2 quarts 2X	2 quarts 2X
11-20 days	2 1/2-3 quarts 2X	2 quarts 2X
21-35 days	3-4 quarts 2X	2 quarts 2X
36-wean	2 quarts 1X	2 quarts 2X
Weaning	By grain intake	By age
Free-choice water	Essential, daily	Preferred
Starter grain, free-choice	Essential	Preferred
Starter grain, fresh daily	Essential for small calves Desirable for all calves	Preferred Preferred, not common
Starter grain, protein level	20% or higher	16-18% common
Equipment cleanliness	Very good to excellent	Average
Colostrum management	Very good to excellent	Average

## Calf Raising Profit Starts with Colostrum Management

**The Study:** 2,016 calves were evaluated for passive transfer immunoglobulins (IgG). They were followed through their first four weeks of life.

### The Results:

	Serum Ig Level	Serum Ig Level	Difference between
	<u>Low Ig Calves</u>	<u>High Ig Calves</u>	<u>Low &amp; High Group</u>
Number of Calves	353	1663	
Percent of Calves	17.5	82.5	
4-Week Wt. Gain	22.7 pounds	24.9 pounds	+2.2 pounds
Feed Conversion	2.4 #feed/#gain	2 #feed/#gain	-0.4 #feed/#gain
Scour Days	6.3 days	4.9 days	-1.4 days
Mortality	21 percent	9 percent	-12 percent

(Adapted from Table 3 from Fowler)

### Results translated into \$DOLLARS

Performance	Benefit of High Ig	Potential Economic
Measurement	Status Calves	Benefit per Calf
Weight Gain	2.2 pounds more	\$1.53
Feed Conversion	12 pounds less feed	\$5.70
Mortality	12 percent less of total	\$12.10
Health Treatment per calf	\$3.74 less per calf	\$3.74
<b>TOTAL ECONOMIC</b>	<b>BENEFIT</b>	<b>\$23.07</b>

(Adapted from Table 4 from Fowler)

### Assumptions:

1. Feed conversion value calculated with 0.4 pounds of feed per pound of gain difference times thirty pounds of gain in four weeks equals twelve pounds of feed saved. Milk replacer valued at \$40/50# bag and calf starter grain valued at \$15/100# bag. Average value of feed set at \$.475/pound.
2. Mortality value calculated with 12 percent difference times initial calf value of \$100.
3. Health treatment costs observed in sample of 633 calves where antibiotic and electrolyte treatment costs were recorded.
4. Weight gain value calculated with 2.2 pounds difference times \$.70 per pound of gain.
5. Small differences between table values and those calculated from these assumptions are due to rounding errors.

Reference: Fowler, Mike "What is it worth to know a calf's Ig Level?" in Proceedings of the Professional Dairy Heifer Grower Annual Conference, March 1999, pp. 31-36.

Low Ig = <1000 mg/ml, High Ig = 1000 mg/ml and higher. Comparable values for Blood Serum Total Protein are Low = less than 5.2, High = 5.2 or greater.

## Production Profit Starts with Colostrum Management

**The Study:** 1000 calves were evaluated for passive transfer immunoglobulins (IgG) at 1 to 2 days of age. They were followed through to first calving and 180 days into their first lactation.

### **The Results:**

- Age at first calving (AFC): Average AFC was 26.5 months. Most calving took place between 24.5 and 28.5 months. NO EFFECT of calf IgG levels on AFC.

- Milk Production:

ME milk - As IgG levels in the calves went up the amount of milk they gave as heifers went up. Each 100mg/dL increase in calf IgG predicted 18.7 pounds more milk. For example, a heifer with an IgG level of 1800mg/dL compared to one with an IgG level of 800 produced in the first 180 days 187 (18.7 x 10) pounds more milk.

ME fat – As IgG levels in the calves went up the amount of fat they gave as heifers went up. Each 100mg/dL increase in calf IgG predicted .62 pounds more fat. For example, a heifer with an IgG level of 1800 mg/dL compared to one with an IgG level of 800 produced in the first 180 days 6.2 (.62 x 10) pounds more fat.

- Survival in the herd: Heifers with calf IgG levels below 1200mg/dL had combined death losses (1 percent) and culling losses (20.5 percent). These rates were 52 percent higher than heifers with higher calfhood IgG levels.
- \$\$\$ Comparison: Comparison is between heifers that started out in life low in IgG's (less than 1200mg/dL) and heifers that started out in life high in IgG's (more than 1200mg/dL).

Net difference for this dairy, total = \$31,340

**Net difference for this dairy, per heifer = \$70.59**

Reference: S.K. DeNise, J.D. Robison, G.H. Stott and D.V. Armstrong, " Effects of Passive Immunity on Subsequent Production in Dairy Heifers." 1989 Journal of Dairy Science 72:552-554

Calculations: Net difference for this dairy, total = difference in death loss (\$14,000) plus difference in milk productions between groups (\$17,340). Net difference for this dairy, per heifer = net difference for this dairy, total divided by number of heifers post-culling with complete records (444). Death and culling losses were computed at 14 greater losses for the low group compared to the high group valued at a net loss of \$1,000 (herd value of \$1,500 less salvage value of \$500) or \$14,000 total. Milk production was computed for each group above 1200 mg/dL using average total protein levels and actual post culling heifer numbers. Higher IgG levels resulted in 144,503 extra milk pounds. Valued at \$12.00 per cwt. This equals \$17,340.

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