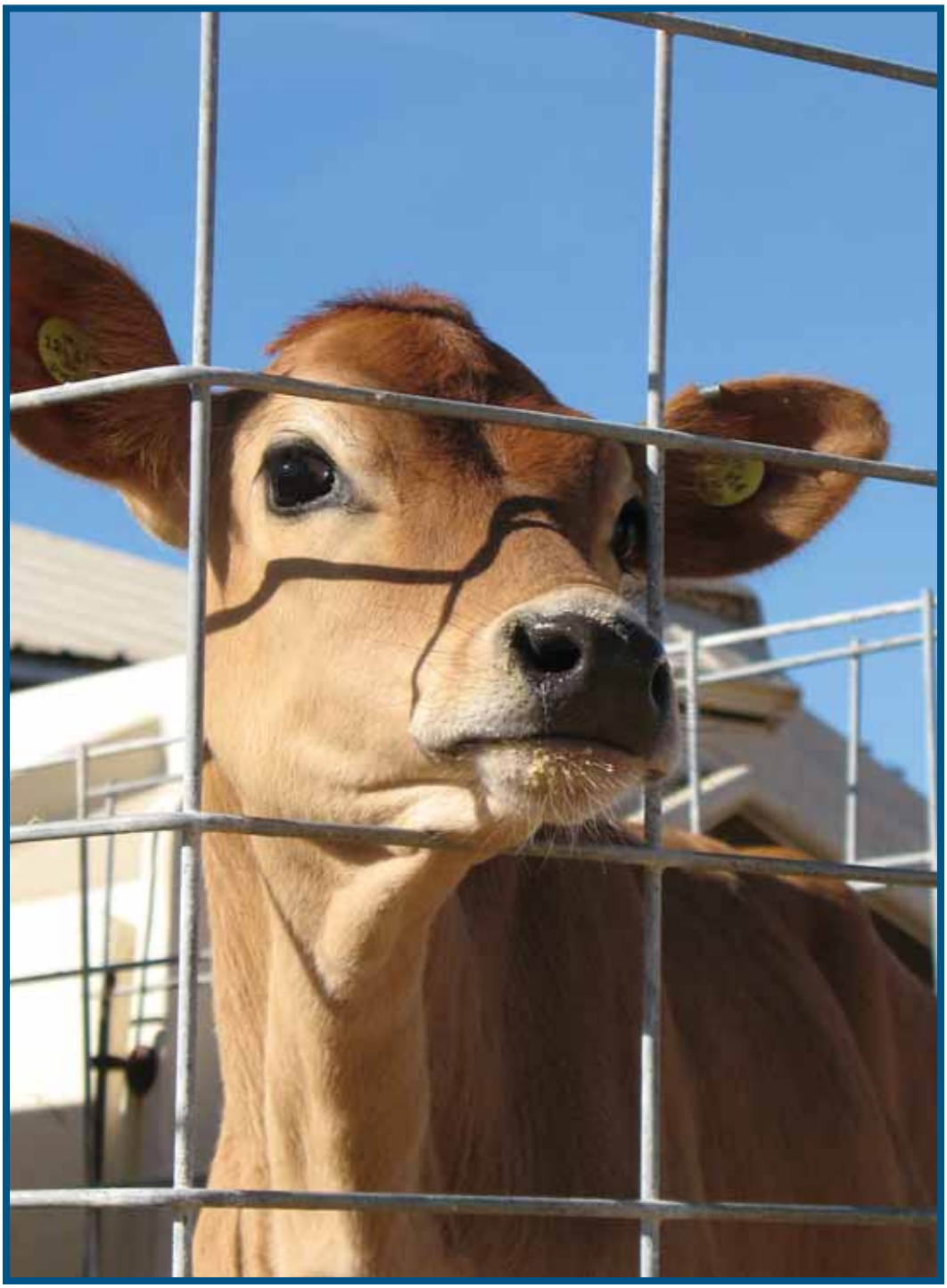
EVERY JERSEY HEIFER

A QUALITY HEIFER



Because she is bred to become a
Queen of Quality™

A QUALITY HEIFER

Jerseys are at work today in nearly one of every five dairy operations across the United States. According to a 2006 USDA survey, Jerseys are the primary breed on nearly 4% of U.S. dairies and are a significant part of the milk producing herd in another 14% of operations. And because of record-setting demand for Jersey cattle and Jersey genetics in the three years since that census, Jersey is the fastest growing breed in the United States today.

It takes just three facts to explain why. One, Jerseys deliver bottom-line profitability, year after year, because of the greater market value of their milk and their higher efficiency of feed conversion. Two, Jerseys have the longest Productive Life in the industry. And three, with their longer herd life and reproductive advantages, Jerseys have the greatest potential for equity growth.

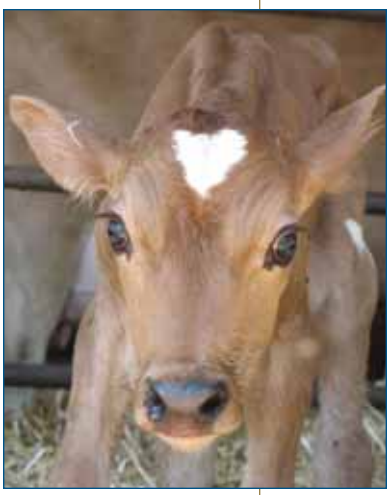
> IF OPPORTUNITIES FOR JERSEY BREED EXPANSION ARE TO BE ACHIEVED, EVERY JERSEY HEIFER BORN TODAY NEEDS TO BECOME A PRODUCTIVE COW TOMORROW.

In turn, Jerseys have tremendous market value. The national average for Jersey cows, heifers and calves sold at public auction has exceeded $2,000 per animal every year since 2004.

So, every Jersey heifer born today is an opportunity for profitability tomorrow. To better capitalize on that opportunity, new research is showing what Jerseys need in the first days and weeks of their lives in order to grow as we would like them to, and revealing how—when their early growth potential is supported—they will also be healthier and produce more milk in their lifetime.

JERSEYS ARE UNIQUE

The care and management of Jersey calves and heifers must take into account a number of unique breed characteristics.



Small Birth Weight and Minimal Fat Reserves

Jersey calves average 60 pounds at birth, with a range in birth weight from 42 to 72 pounds reported in a recent California calf study. A mere 3% of the calf's initial weight is body fat and is quickly expended by the calf to generate body heat.

Easy Births

Jersey calves are hardly ever subjected to dystocia and its associated problems. The difficult birth rate for Jersey cows is less than 1%, and that clearly makes things easier for Jersey calves at the start of life.

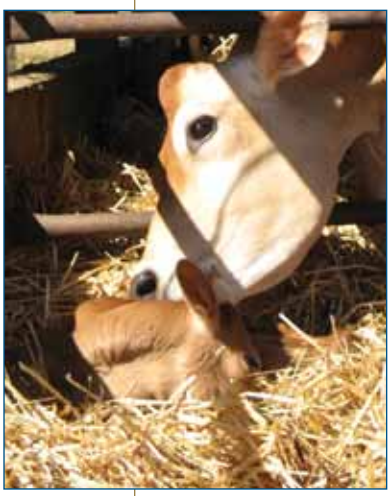
Surface Area to Body Weight Relationship

Body heat dissipates more quickly in Jersey calves because of the high ratio of body surface area to body mass. This can set Jersey calves up to be more prone to chilling and also dehydration.

Higher Maintenance Requirement

Virginia Tech scientists studying the growth performance of Jersey calves on

three milk replacers varying in protein and fat content, and also whole milk, fed per National Research Council (2001) recommendations, reported that all calves grew less than expected. This suggests that Jersey calves are not simply a "small frame breed" but have a higher maintenance energy requirement per unit of metabolic weight than previously thought.



Earlier Maturity

Jersey heifers reach sexual maturity earlier in life, making it possible to breed them at a younger age and getting them into the milking herd sooner. Jerseys have the youngest age at first calving of any breed. The potential payoff is significant: an earlier return on the money invested in raising each heifer.

Mature Size

The average mature size for Jerseys is approximately 1,000 pounds and the range in weight and height of mature Jersey cows is narrower compared to ranges described for larger dairy breeds.

TARGETING HEIFER GROWTH

Everything that is done in a heifer-raising program should lead to the ultimate goal: a well-grown, healthy herd replacement ready to calve at an optimum age and size to maximize her productive life. There's no doubt that it takes a considerable investment of time and money to raise Jersey replacement heifers. The challenge is, how to make those investments cost-effective for your operation.

Your ultimate objective is to move heifers from pens or pastures into production. That means that age at first calving should be the single most important benchmark for your heifer raising program—and it is one that *you* determine.

> "A quality heifer is one that carries no limitations that would hinder its ability to produce under the farm's management system."
>
> *Cornell PRO-DAIRY, "Dairy Calves and Heifers: Integrating Biology and Management" (2005)*

To get there, you need a plan—one with clearly defined performance goals and consistently leading to the calving age you want.

Principles of Targeted Growth

Targeted heifer growth is a straightforward system that you can use to develop growth goals for your replacement heifers, given the age at which you want them to enter the milking herd.

A key advantage of this method is that your program will be tailored to *your* management and environmental conditions, as well as your preferences for mature size of your cow herd.

Three targets are set for heifer size at:

- Puberty, which happens when heifers reach 45% to 50% of mature size;
- Breeding weight, at third estrus following puberty, 55% of mature weight; *and*

REPLACEMENT HEIFER MANAGEMENT EVALUATION SNAPSHOT

The *Biological Advantage Score* and *Quality Heifer Score* reflect the ability of replacement heifers to generate their first profit for the business. Costs of raising heifers, post-freshening inputs, fixed costs and milk price also influence when that may occur.

Replacement Generation Capacity is related to heifers' contribution to long-term asset growth. This measure is adapted from Farm Credit business consultants' Heifer Management Index (*see Northeast DairyBusiness*, September 2007).

Measure	Description	Reasonable Goal	Your Herd
Biological Advantage Score *Information from blood testing, animal weights*			
Passive Immunity Achievement	*At 48 hours,* blood IgG > 10mg/ml or blood serum protein >5.5g/dl	>= 85% of calves	
Optimize Pre-weaning Gains	Double birth weight in 56 days	>= 90% of calves	
Nail Biological Growth Targets	55% mature weight at breeding	>= 90% of heifers	
	85% mature weight after first calving	>= 90% of heifers	
Quality Heifer Score *Information from health records, DHIA reports, DairyComp 305*	% of first-calf heifers treated as calf-heifer *Further break as scours vs. respiratory treatments, if records allow*	<= 30%	
	% as calves *(24 h. to 3 m.)* _____		
	% as heifers *(4 m. to calving)* _____		
	DOA calves from first-calf heifers	< 5%	
	Male DOAs: ____ Female DOAs: ____		
	First-calf average peak production *Or,* first-calf lactation total yield	>= 80% of mature cows	
	First-calf culls by 60 days in milk	<= 5%	
	First-calf mature equivalent (ME) averages	>= mature cows	
	First-calf treated during lactation	<= 15%	
	Retention to second lactation	>= 85%	
	Lower #1 reason for first lactation culls *Reason:* _____	Continuous improvement	
Replacement Generation Capacity *Calculate or use DairyComp 305 commands*			
Herd Birth Rate	Freshening events as percentage of average cow numbers	>= 108%	
% Heifers Born	Female births divided by all births	>= 46%	
% Heifers DOA 9-24 hours	Female births DOA divided by all births	<= 3%	
Annualized Heifer Cull Rate	Heifers died/culled divided by average number of heifers	<= 3%	
Age at First Calving	Average	22–23 mos.	

Adapted from worksheet prepared by Cornell University PRO-DAIRY, 2008

- Desired age at first calving, based on freshening at 85% of mature weight, a size associated with optimal first-lactation production.

The steps you take to determine these target weights for your herd are outlined in the chart at right. Here's a quick illustration of how the system works.

If you want the average age at first calving to be 22 months and the average size of your mature cows is 1,000 pounds, by breeding *(13 months of age)* your heifers should weigh 550 pounds. Then they should be grown out to weigh 850 pounds *after* they calve.

Once specific heifer weights for your targets have been calculated, you can develop a calf feeding program and rations for your older heifers to achieve all three target weights, and especially age at first calving.

Targeted Heifer Growth System

Step 1. Determine average body weight of mature cows in herd (by breed). Using a girth tape or scale, weigh a group of cows in good body condition *(3 on the BCS scale of 1 to 5)* that have had three or more calves and determine the average.

Step 2. Multiply the mature weight by 0.85 to determine the target weight for heifers after their first calving.

Step 3. Set the desired target age at first calving.

Step 4. Multiply mature weight by 0.55 to determine the target weight for heifers at breeding time.

Step 5. Set target age for breeding (target age at first calving minus nine months).

Step 6. Develop diets and management protocols to achieve desired targets for breeding age and weight.

Source: Bovine Alliance on Management & Nutrition, 2007

TAKING AIM ON LIFETIME PROFITABILITY

Target growth is just part of the picture when it comes to running a cost-effective calf and heifer program. In addition to a nutrition program that will support growth goals, a plan must also specify goals for health management, the reproductive program and calving management. The Replacement Heifer Management Evaluation Snapshot (*Cornell PRO-DAIRY, 2008, opposite page)* gets at the bigger picture of a comprehensive program, using key benchmarks from all of these areas.

Relative to calf and heifer management, there are five goals:

- Achieve passive immunity in the newborn calf.
- Double the calf's birth weight in 56 days.
- Achieve two additional growth targets, those being weight at breeding *(pregnancy)* and after first calving.
- For herd health, have no more than 30% of heifers requiring significant treatment, as for scours or respiratory problems.
- Limit death losses.

What Happens In The Calf Barn Stays With Them For A Lifetime

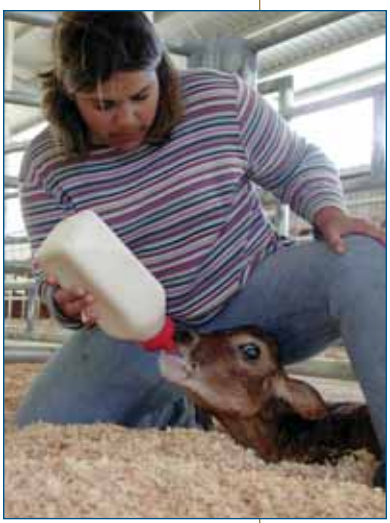
That's the bottom line from scientific research tracking the performance of calves from birth to the birth of their own calf, and then after they enter the milking herd. While some of the immediate effects have been known for some time, other longer-term effects—particularly for lifetime milk production—are just now being recognized.

Colostrum. Feeding high-quality colostrum—in sufficient quantity, soon

after birth—to achieve passive immunity is vital for immediate survival and ongoing health of the calf. But colostrum status also has a positive relationship with growth rate to puberty and as well as lactation yield. As Dr. Mike Van Amburgh of Cornell University related at a March, 2008 seminar for Jersey owners, studies show that calves with failure of passive transfer *(less than 10 mg/mL serum immunoglobulin G at 48 hours of age)* had *(1)* lower daily weight gains to 180 days of age and *(2)* lower milk and fat production in first lactation. The opposite happened in calves that did achieve passive transfer, and there was a notable increase in milk yield for the calves that had IgG levels higher than 12 mg/mL.

> "Items such as better diets or facility improvements that add costs, more often than not improve performance and returns at a greater rate."
> *Cornell PRO-DAIRY, "Targeted Heifer Growth" (2008)*

The practical effects of early-life colostrum status are apparent from one study where colostrum intake at birth was the only difference in the way 68 heifers of comparable genetic merit were fed and managed. The growth rate to puberty for heifers fed more colostrum was 30% greater, and veterinary costs half of those for the low-intake heifers. Difference in production for the first and second lactations combined was over 2,250 pounds milk in favor of the high colostrum intake group, and there was a 16% difference in survival to the end of the second lactation.



Nutrient intake through liquid feed. "Calves clearly respond to greater intake of milk or milk replacer with greater body weight gains," says Dr. James Drackley of the University of Illinois, adding that higher nutrient intake is also related to calves' greater ability to withstand infectious diseases.

Compelling evidence is also emerging that a higher plane of nutrition in liquid feed results in greater first-lactation milk yield. At his seminar, Dr. Van Amburgh reported that when calves were fed at least 50% more nutrients than the traditional rate *(two quarts, twice daily of 20% protein, 20% fat milk replacer)*, as cows they produced from 1,000 to 3,000 additional pounds of milk. The average increase across seven studies was 1,700 pounds.

Achieving passive immunity and raising the plane of nutrition through feeding milk or milk replacer will not only produce healthier calves and appreciable gains in growth—thus shortening the time to breeding and first calving—but also result in greater lifetime milk production.

> "The five C's provide an effective formula for managing the young dairy calf: colostrum, cleanliness, comfort, calories, consistency."
> *Sheila M. McGuirk, University of Wisconsin–Madison, "Managing the Young Calf: Keep It Simple!"*

That means there are profits to be gained by investing more resources in the first two months of the life of every Jersey heifer calf—particularly in colostrum management as well as feeding to support more growth up to weaning.

JERSEYS AND COLOSTRUM

Quality, quantity and timing have always mattered when it comes to colostrum, but it's now understood that Jersey calves have unique requirements for all three. There is one, clear recommendation for the best way to feed colostrum to Jerseys. Remove the calf from its dam immediately, then hand feed two (2) quarts of clean Superior Grade 1 colostrum, followed by a second feeding of two quarts of colostrum when the calf is 12 hours old. Jersey calves fed colostrum this way had the highest serum IgG levels at 48 hours of age of all feeding methods tested *(Jaster, 2005)*.

Immunoglobulin concentration is highest immediately after calving, but declines markedly after six hours. So colostrum should be collected as soon as possible after calving, ideally within the first hour. Even so, Ig levels can vary dramatically because of many factors, such as the age of dam, the nutrition and/or vaccination program for dry cows, and length of the dry period. This makes it important to actually test the immunoglobulin content of colostrum before deciding to feed it. A Colostrometer™ *(Biogenics, Mapleton, Ore.)* is useful at cowside to help make that decision.

Because colostrum is one of the first ways a calf can be exposed to disease-causing bacteria, special care must be taken to properly prep the udder, milk into a clean, sanitized bucket, and use clean, sanitized feeding equipment to deliver this essential first meal.

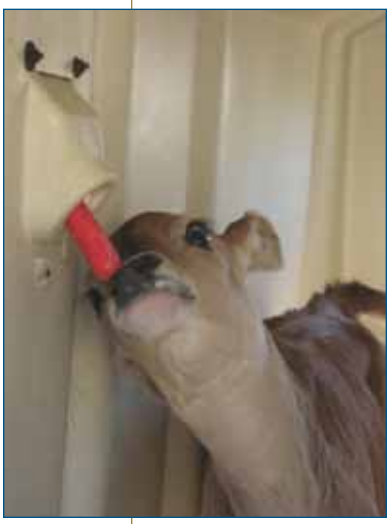
They Need To Nest

It might surprise you when it starts getting cold outside for a baby Jersey calf. The lower end of the thermoneutral range for newborn dairy calves is 59°F. Visible shivering has been observed at 48°F in Jersey calves, even though their hair was dry, they were well fed, and the wind was calm.

So when temperatures drop to the point that you are just thinking about putting on a jacket, make sure that your calves have plenty of clean, dry straw to nest in. It will help them trap body heat and cope with chilly temperatures.

Nesting Score		Description
1	Minimum	Calf lies on top of bedding with its legs exposed
2	Moderate	Calf nestles slightly into bedding but parts of legs are visible above bedding
3	Excellent	Calf appears to nestle deeply into the bedding and legs are not visible

Source: K.V. Nordlund, DVM, University of Wisconsin-Madison



JERSEYS TO WEANING

Day 2 to weaning, at two months of age, is the critical window of opportunity to promote a heifer's growth that will result in her reaching the desired age at first calving. The goal for this period is to double the birth weight by 56 days. For the 60-pound Jersey calf, this translates to supporting a consistent rate of daily gain at 1.1 pounds until weaning *(see table, next page)*.

Just as they do for colostrum, Jerseys have unique nutritional requirements at this important stage of life. Jersey calves have a higher net energy for maintenance requirement than other breeds. Research at Virginia Tech has shown that to grow efficiently and maintain good health, Jerseys need higher concentrations for

> "While nutrient requirements for calves are actually much more complex than the industry has recognized, practical feeding systems still can be made rather simple."
>
> *James K. Drackley, University of Illinois (2008)*

both fat and protein in the liquid diet, and increased dry matter intake. Studies to formulate a Jersey-specific milk replacer settled on the levels of 28% protein and 25% fat as optimum. And as the table at the bottom of this page shows, 1.25 pounds of dry replacer at that formulation will support a daily body weight gain of 1.1 pounds in Jersey calves—weight that is not added as fat, but rather as lean tissue, reflected in increased height and body length.

A substantial increase in feed efficiency follows this higher plane of nutrition. Studies show that calves fed at higher nutrient intake levels achieved feed efficiencies of 0.59 to 0.78 pounds of gain per pound of feed intake. This compares to efficiencies at traditional levels *(with 20:20 milk replacer)* in the range of 0.29 to 0.37 pounds of gain per pound of dry replacer.

Target weights and required gains for Jersey calves and heifers with expected mature weight of 1,000 pounds

Milestone	Growth Target	Start Weight	Necessary Average Daily Gain
Birth		60	—
At 56 days	*Twice birth weight*	120	1.1
Puberty	*45% of mature weight*	450	1.2
Breeding	*55% of mature weight*	550	1.2
After first calf	*85% of mature weight*	850	
Average Daily Gain (ADG): *Birth to pregnancy*			**1.2**

Baby, It's Cold Outside

The thermoneutral zone is the range of environmental temperature in which calves do not have to actively regulate their body temperature. For calves less than 21 days old, the lower end of that range is 60°F. Under 60°F, more energy is required by calves just to keep warm, directing nutrients away from growth.

This is an important management consideration for the vast majority of Jersey owners. Across an average year in Minnesota, for example, there will be 262 days under 60°F. Surprisingly, even in California *(Sacramento data)*, 181 days of the year will be under 60°F. Because Jersey calves are even more sensitive to the lower end of the thermoneutral zone, due to their greater surface area relative to body weight, pre-weaning feeding levels need to be actively monitored when temperatures drop and nutrient intakes adjusted to counteract heat loss and support normal growth.

It's particularly important to avoid setbacks in early life growth, because young calves of all breeds—not just Jerseys—do not have compensatory gain mechanisms. If early growth is interrupted, health will also likely be impaired because immune function requires energy too. "Calves will never grow to their full potential," Mike Van Amburgh said at the 2008 Jersey calf seminar.

Expected gain of Jersey calves fed milk replacer formulated at 28% protein / 25% fat at varying temperatures and feeding rates, based on National Research Council (2001)

	Temperature in Degrees Fahrenheit						
	60	50	32	15	5	-5	-20
Lb. dry replacer	*Pounds gain per day*						
1.25	**1.1**	.8	.4	.2	*Weight loss*	*Weight loss*	*Weight loss*
1.50	**1.4**	**1.2**	.9	.7	.4	.2	*Weight loss*
1.75	**1.7**	**1.5**	**1.3**	**1.1**	.8	.6	.5
2.00	**2.0**	**1.9**	**1.6**	**1.5**	**1.2**	**1.1**	.9

About Pasteurized Waste Milk

Pasteurized waste milk can be a viable source of nutrients for baby calves, if and when it is properly handled, fed and stored. After studying 13 herds in North Carolina and California, Dr. Bob James of Virginia Tech determined that nutrient content can vary widely, and so can cleanliness. Particular care must be taken to ensure that an on-farm pasteurizer is properly operated and cleaned. Equally important, fat and protein levels in pasteurized waste milk must be monitored and, if necessary, nutritionally balanced.

Rumen Development

Calves should be encouraged to begin eating grain as soon as possible to support rumen development. Weaning cannot occur until the rumen has developed. More specifically, Jersey calves should be consuming 1.5 pounds of high-quality starter grain for three consecutive days before they are weaned.

Rumen development is directly related to the consumption of dry feeds high in fermentable carbohydrates. Production of volatile fatty acids (VFAs) from fermented carbohydrates promotes development and growth of rumen tissue and particularly the papillae, the fingerlike projections which absorb nutrients.

Consumption of dry forages prior to weaning can delay rumen development. The photographs at right show the differences in rumen development on a milk and grain diet *(top)*, compared to diets including hay *(bottom)*.

Milk and grain diet, 6 weeks

Milk and hay diet, 6 weeks

These management tips will encourage starter intake.

- Offer free choice water beginning at day 2. Promote intake at all times, even during cold spells.
- Introduce a 22% protein starter at day 2, and offer it free choice. Replace uneaten starter daily,
- Keep calf starter out of the water by keeping feed and water buckets 12" apart, and keep buckets clean.
- Feed milk replacer once a day during the last week before weaning, in order to encourage more calf starter intake.
- Do not offer hay until calves are 12 weeks old. This will encourage greater rumen development and nutrient intake. The small amount of fiber that calves need should be provided by the calf starter.

Information at the Click of Your Mouse

Management Tools

Heifer Enterprise Management Worksheets *(Cornell University)*
www.ansci.cornell.edu/prodairy/wdm

Internal Herd Growth Calculator
http://scnyat.cce.cornell.edu/dairy, *option "Business Mgt. Principles"*

Evaluation Tools: Calves *(University of Wisconsin)*
www.vetmed.wisc.edu/dms/fapm/fapmtools/calves.htm

Calf Track™ Training System and Chore Plans *(Penn State)*
http://das.psu.edu/dairy/dairy-nutrition/calves/calftrack *to order*

Fact Sheets and Newsletters

Bovine Alliance on Management and Nutrition *(BAMN)*
http://nahms.aphis.usda.gov/dairy/#bamn

National Dairy Animal Well-Being Initiative
www.dairywellbeing.org/guidelines.php *for final report (October 2008)*

Calf & Heifer Resource Center *(Dairy Herd Management)*
www.dairyherd.com, *menu option "Calf & Heifer Resource Center"*

Calf Notes *(Jim Quigley, Ph.D.)*
www.calfnotes.com

Calving Ease *(Sam Leadley, Ph.D., Editor)*
www.atticacows.com, *menu option "Calf Facts"*

EVERY JERSEY HEIFER, A QUALITY HEIFER

There's "no one size fits all" formula for success in a Jersey replacement heifer program. When it comes right down to the bottom line, the best program is the one that works for you.

But it's not a "program" unless it has written goals with standard operating procedures (SOPs) to be followed by everyone who works with your calves. If you don't have a program, there's no time like the present to get one set up. Take a look at Penn State's Calf Track™ system. Chore plans have been developed for seven areas *(newborn calf management, colostrum management, liquid feed management, cleaning and sanitation, dry feed and weaning, calf comfort and calf health)*, accompanied by extensive training materials. Calf Track can be used as-is, but more likely you'll decide to use its SOPs as starting points to develop protocols that fit your situation.

And if you have a program in place now, it's always a good idea to review it on a regular basis. Schedule time with your veterinarian and nutrition specialist and see if there are areas where you can make improvements.

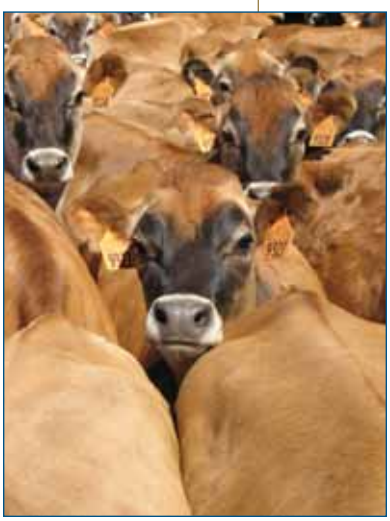
Every Jersey heifer deserves the opportunity to achieve her full potential, because when she does, you will profit too.

Caring For Calves Is A Really Big Job!

If you are the one who raises calves for your Jersey herd, "take great pride in the fact that you are literally being entrusted with the future of your herd," says Dr. Tom Earleywine, Director of Nutritional Services for Land O'Lakes Animal Milk Products Co. So that the calves you are feeding today can produce at their full genetic potential and pay the bills in just two short years—*or less*—follow these basics.

- Remember that calves are babies. They require lots of "tender loving care."
- Be sure that each calf receives adequate colostrum. Colostrum is truly a life-or-death element of every calf's life. Use a Colostrometer and feed only colostrum with a green zone (Superior) reading.
- Calves' needs change with the seasons. Depending where you live, there may actually be very few months of the year during which the climate is perfect for raising calves.
- Calf nutrition is not a "one size fits all" proposition. But studies show that feeding a higher plane of nutrition helps calves gain weight faster, grow taller, and avoid a postweaning lag in feed consumption, health and weight gain.
- Just like a garden, your calf "crop" needs regular feeding and watering. Keep feeding times consistent from day to day.
- Do not stop feeding milk to scouring calves. When calves are sick, they need more nutrients, not less. Work with your veterinarian to develop scours therapies, but leave scouring calves on their regular milk or milk replacer diet.
- Practice good biosecurity. Everyone can and should take steps to prevent the spread of disease.
- The pencil is more powerful than the needle. Focus on doing all of the little things consistently that prevent calves from getting sick in the first place. It is much more enjoyable to work with healthy calves, not to mention less expensive and time consuming.

Read Dr. Earleywine's complete article for "Young Dairymen" in Hoard's Dairyman, January 25, 2008, page 68.



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Rumen photographs courtesy of Department of Dairy and Animal Science, Pennsylvania State University. Additional information at http://das.psu.edu/dairy/dairy-nutrition/calves/rumen

EVERY JERSEY HEIFER

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