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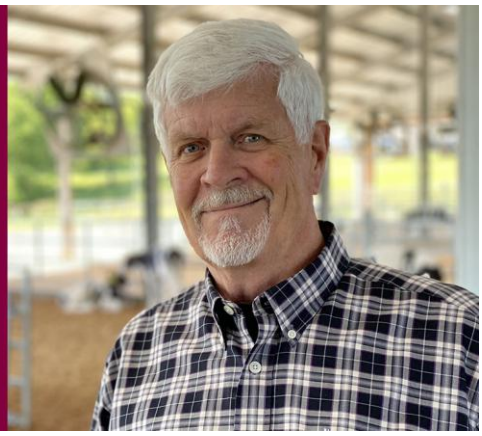

*Photo courtesy of Hoard's Dairyman.*

# Dairy Pipeline

**School of Animal Sciences**
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## Special Calf Issue

This issue is dedicated to the memory of our friend and colleague, Dr. Robert (Bob) James, who passed away on August 21, 2025. His scholarship and mentorship continues to inspire us.

Following are recent articles authored by Robert E. James, Professor Emeritus, Dairy Science, Virginia Tech; and Calf Blogger at Calfblog.com, reprinted from calfblog.com with permission from Förster-Technik.

## Is It Time for a Change?

Is your calf program due for a rethink? After decades of individual housing and restricted milk feeding, dairy consultant Robert James challenges the status quo. He explores the benefits of group housing, automated feeders, and data-driven management—all aimed at improving calf health, labor efficiency, and long-term performance. Discover why now might be the time for change.

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I was a professor in a dairy science department for 36 years while also raising high-genetic Jersey calves. What were my goals during the first half of my career? One was learning how soon we can wean calves to cut down on labor and cost for feeding expensive milk or milk replacer diets. Calves were prone to scours around this time, too. Another reason for earlier weaning was to avoid nose-to-nose contact and prevent disease transmission. We also had a surplus of heifer calves, and bull calves had limited economic value. Things have changed. Bull and dairy-beef cross calves are now a profit center on many farms. We now know that proactive heifer care can lead to earlier calving and better health and production during lactation, but labor availability and quality remain a concern on many farms, and the collection and use of data to manage our calf program has been limited.

**Can we achieve more?**
During the first 4 weeks of life, starter intake is minimal, and nutrient needs must be met by milk. On farms where calves are housed individually, this means large meals if calves are fed twice a day. Is this stressful? We are accustomed to calves bawling loudly at feeding time, but is it biologically normal to feed such a young animal twice a day? A common approach is to limit meal sizes to less than 3 quarts per feeding, which may meet maintenance requirements with little left over for growth, especially during cold weather.

Weaning is another feeding challenge. Traditional practice is to begin weaning as early as 5 weeks of age by feeding one meal instead of two for one week. Calves may be housed individually for a week post-weaning and then moved to group pens. When they are adjusting to the group pen, they run

into each other, the walls, and other objects in the pen. Of course, the net result is that growth occurring from feeding more milk is lost, as it's common for them to lose weight during the first month in the group pen. The incidence of respiratory disease is higher as well. The conclusion has been that feeding more milk is not a good practice, as calves commonly experience this setback.

Although individual housing of calves during the preweaning period has been strongly recommended for valid reasons, have we considered the possible stress on calves from this practice? Unfortunately, it is challenging to conduct controlled research studies comparing the systems, but behavior of group-housed or even pair-housed calves is very different, both during the preweaned period and later in life as cows. These calves adjust to new feeds and new situations much better than individually housed calves.

**Consider a change**

Transitioning to a group housing system with calf autofeeders is not a short-term financial decision. This is a long-term investment in a facility and equipment, as well as changes in cost for nutrition and labor. Calculate the annual cost with the assumption of a 10-year timeline for equipment and longer for the facility. Excellent maternity and colostrum management are important for all calf rearing systems, but probably more so for group housing. Looking at your current calf facility, a question to ask is whether to retrofit it or build a new facility. Ventilation and drainage must be optimal, and the design should result in labor-efficient and effective handling of calves, feed, and waste. Assume increased costs for milk or milk replacer as limit-feeding (less than 8 quarts or liters per day) is strongly discouraged, as undesirable calf behavior is more common. Measure feed costs in relation to cost per pound of gain rather than cost per day. The cost per pound of gain will be less as there are more nutrients left over to support growth after maintenance requirements are met.

**Autofeeder payback**

You will see better growth if a better feeding system is implemented. Strive to place calves in groups and on the autofeeder before 7 days of life. Delaying this teaches calves to expect milk twice per day and may delay transitioning to the autofeeder. Free choice access to milk or milk replacer is recommended for at least the first month of life. Limit intake to about 2 liters every two hours. Remember that calves are not forced to consume large volumes of milk, they adjust their intake to changing environmental conditions. A multistage weaning plan works well 30 days after calves enter the system, reducing milk or milk replacer intake from 12 liters per day to around 8 liters or less over four days. This is a good stimulus for the calf to consume starter. Hold this reduced level constant for about 10 days and then gradually wean calves over 14 days. When calves are already housed in groups, this program eliminates the stress of moving calves into group pens. Generally, plan to move calves out of the autofeeder pen a week or so after weaning. It is rare for calves reared in this system to experience a setback once they are in the weaned calf pen. The autofeeder systems were promoted as labor saving. However, this should be qualified, as one should have a calf manager who has skills in observing calves using behavior data and maintaining equipment in working and clean condition. The employee will spend less time doing jobs such as washing buckets and bottles, and mixing and delivering feed, and more time managing calves. This way the farm may spend as much on labor, but they pay fewer skilled personnel more, have fewer employees to manage, and the calf team enjoys their work more, resulting in less employee turnover. The calf is the first animal that consumers consider when evaluating how we manage animal welfare. Consumer research has shown that they perceive group housed calves much more positively. The additional advantage to the farm is that these animals adjust to new feeds and new situations more rapidly than calves raised individually. These behaviors persist later into life. What prevents change on the farm? If we perceive that we are achieving good success with our current system, why change? Our industry is adapting to upcoming market conditions and perceptions by our consumers. Is it time for change on your farm?

The 40FIT program allows the calf to drink as much as it wants within 24 hours. However, we limit intake to 2L every 2 hours which prevents the calf from eating too much at one meal. This is a distinct advantage of the autofeeder as compared to feeding calves by bottle when achieving intakes of

8L requires some large meals if calves are only fed twice a day.

Focus attention on calves consuming less than 4L for more than one day. This is where some judgement comes into managing these young calves. Check their feeding behavior! What is daily intake? The calf shown below has consumed less than 4L/day for the first few days of life. How much do they consume at each meal? What is their drinking speed? Failure to consume less than 2L/meal may be concerning. Drinking speeds less than .5L/min indicate less than aggressive eating. This calf may need another training session but don't do this too often as it may make them dependent upon the person.

*Figure 1. A pair of Jersey calves. One is a cause of concern due to low intake.*

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# Milk vs. Milk Replacer: Which Is Better for Calves?

When it comes to feeding young calves, choosing between whole milk and milk replacer isn't as simple as it seems. This article breaks down the pros and cons of each option—from nutrition and sanitation to labor and cost—helping you make the right decision for your farm management style and calf health goals.

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Mother nature knows best, right? Under ideal conditions, this is probably a true statement. However, on most farms ideal conditions rarely exist. Remember that nothing is as simple as it first appears. Every decision on the farm involves an evaluation of the benefits, costs, risks and determining the likelihood of a positive outcome. Let's consider the alternatives.

**Milk**

It's hard to beat mother nature. Milk is the mammal's way of nourishing her offspring. Yes, we may have altered the product to meet our manufacturing needs, but it's still great for calves. Casein is the primary protein, and it forms a "clot" in the abomasum which results in slower degradation over time. Fat is an important nutrient providing energy for the calf in a very digestible form. On a powder basis, milk contains about 25 to 27% protein and 27 to 34% fat. Lactose (38%), vitamins, and minerals round out the other primary nutrients. Sounds great, right?

What are the other considerations? How does one maintain the quality of the milk from the cow's teat to the calf's mouth? Milk is not only great for the calf, but it also is great for bacteria. At room temperature bacteria counts double every 20 minutes. Maintaining sanitation of milk contact surfaces—milking equipment, transfer lines, storage vessels, and feeding equipment—is challenging at times. Milk should be either fed immediately or cooled to < 40°F for storage and then rewarmed prior to feeding the calf. Treat this milk with the same care as milk intended for human consumption. Would you drink the calf milk? If not, then don't expect success when feeding this to a young calf! Pasteurization of milk is highly recommended as the herd may experience some diseases which can be communicated to the calf such as Bovine Viral Diarrhea (BVD), Johne's, Mycoplasma, etc. Will unsaleable milk be utilized? Does this have antibiotic residue? Ultimately, this represents an "off label" use of antibiotics and may not be best for the calf's delicate digestive system. If one elects to use unsaleable milk remember that supply is highly variable. Although pasteurization impairs bacterial growth it also destroys most of the beneficial vitamins provided by the cow. One farm involved in a Virginia Tech field study monitored waste milk volume daily for 7 months and found a variation between 300 and 800 lb./day. This necessitates use of "good" milk to maintain a uniform nutrient supply for the calves.

**Cost**

When feeding milk or waste milk, the cost for

feeding calves is not readily apparent since the value of that milk is not charged against the calf enterprise. Frequently, farms indicate that unsaleable milk is "free." No! There is a cost in producing milk regardless of whether it can be sold or not. The farm should at least charge the cost of production, and the milk volume used for calves should be tracked! Field research conducted with dairy farms by Virginia Tech researchers found that most farms produced only enough unsaleable milk to meet 30% of the needs of the calf enterprise. If the farm has more of this, then the herd health programs for the lactating herds need to be re-evaluated.

**Additional concerns**
To achieve consistent success in using milk or waste milk, the initial and operating cost of facilities to transport, store, pasteurize, cool, and rewarm milk need to be considered. Does the farm have the labor resources to manage this important part of the calf feeding program?

**Milk replacers**
One of the greatest benefits of milk replacers is convenience. Open a bag, reconstitute with water, and feed it to the calf. The powder can be stored for extended periods without impairing quality. Bacteria counts are low. Additives such as vitamins, minerals, and beneficial products such as ionophores, fly control products, and pre- and post-biotics are also commonly added. Simplifying the feeding program is a tremendous advantage, contributing to consistency in the feeding program and labor efficiency and effectiveness.

Historically, the early goal for milk replacers was to reduce cost through lower levels of protein and fat and the utilization of less costly sources of protein and fat which resulted in poor growth during the first month of life. More desirable milk replacers emphasize the use of protein and fat sources with digestibility's which are competitive with whole milk. Research at Virginia Tech compared growth in Holstein, Jersey, and cross-bred calves fed equal amounts of dry matter from whole milk and a 28% protein: 20% fat milk replacer, and found no difference in average daily gain or health through 8 weeks of life. Unfortunately, it is often difficult to evaluate a milk replacer by examination of the feed tag. Only consider milk replacers with a proven reputation for quality.

**Choices for farms utilizing calf autofeeders**
Calf autofeeders can utilize milk, milk replacer, or a combination of both. When using milk, consideration must be made for handling milk from the cow to the calf. How will the milk be collected, pasteurized, precooled, stored, and then transferred to the calf with little deterioration in quality or bacterial growth? The feeder warms the milk just before feeding and can blend the powder with water to ensure a consistent mix for the calf. The farm has the choice of specifying the % whole milk and the desired final % solids in the mixture consumed by the calf.

Below is a combi feeder in which the farm uses milk and a pasteurizer balancer milk replacer that adds small amounts of supplemental vitamins, minerals, and other additives just prior to consumption by the calf.

*Figure 2. An automated combi feeder installed by a calf pen.*

**What will you do?**
Evaluate the pros and cons for your management style and preferences. Success is possible with any system. Remember that the utilization of milk requires a higher level of management to achieve success. What is success? According to the Dairy Calf and Heifer Association Gold Standards, calves should double their birth weight by 56 days of life and have < 25% scours and < 10% respiratory disease.

# Upcoming Events

**September 29 – October 3, 2025**
World Dairy Expo

***CANCELLED*** **October 13, 2025**
Hokie Cow Classic

**October 17, 2025**
Adding Value in Beef and Dairy Operations
Farm Credit of the Virginias - Harrisonburg Branch

**October 25, 2025**
Farm to Table Harvest Celebration

**November 7-8, 2025**
Cattle WISE & Equipment WISE
Abingdon, VA

**November 8, 2025**
National 4-H Dairy Quiz Bowl

**November 10, 2025**
Hoof Trimming Workshop – Hillview Farm, Bridgewater, VA

**November 12, 2025**
Hoof Trimming Workshop – Golden View Dairy, Glade Hill, VA

**Early December TBD, 2025**
Current updates on HPAI on dairy farms and worker safety

**2026 Winter Meeting Series Dates TBD**
**John Currin, DVM**
Zoom Meetings

*If you are a person with a disability and require any auxiliary aids, services, or other accommodations for any Extension event, please discuss your accommodation needs with the Extension staff at your local Extension office at least 1 week prior to the event.*

# Additional Notes:

- The dairy extension group is working with VDH to assist in distributing PPE to dairy farms. Request a kit online at https://shorturl.at/ethov or contact your local extension agent. Requests will be filled as supplies allow.

- Your input could guide future programming! Please complete the short survey at https://tinyurl.com/dairy-extension.

For more information on Dairy Extension or to learn more about our current programs, visit us at VTDairy—Home of the Dairy Extension Program online at www.sas.vt.edu/extension/vtdairy.html

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