

DAIRY CONNECTION

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EDITORIAL

Has Ag Lost Its Identity in N.D.?

Tuesday evening, Feb. 26, in Carrington, after four hours of testimony during the Foster County Zoning Board's public hearing to site a new dairy, I was painfully reminded that even the most agriculturally based communities in one of the

most ag-dependent states in the U.S. no longer embrace our No. 1 industry – agriculture.

Let me share my observations. Here is a group of progressive citizens who have carefully planned for the future of this community. They, like others, come to realize the importance of livestock, namely dairy, in their long-range plan. Following three years of methodical and thorough study, what seemed like a "slam dunk" turned into a NIMBY (not in my backyard) fest riddled with emotion based on perception guided by naysayers.

The proponents were calm, objective and respectful of the board. The opposition ranged from concerned to nearly hysterical, laying testament for me that perception is far more effective than reason when it comes to siting a new dairy, or any livestock operation, for that matter. Of course, I have to admit I have my own biases, but I had almost forgotten how radical opposing visions can be, especially when armed with conjecture and pseudoscience.

I will spare you my personal answers to their extreme examples. I will, however, share with you a recollection of a presentation by a well-known journalist whose message was entitled "Poisoning of the Mind."

In that lecture, he noted how often journalists will quote other journalists, who use the research and interpretation of other journalists as fact, without an objective review from the source. Granted, the presenter's message was to help the scientist types in the crowd better understand the need to learn the art of communicating. I think it applies here as well. Flashbacks to this lecture resulted when I witnessed what some of the presenters used as their source of so-called fact. With literally no knowledge of the situation, the opposition expected (and demanded) the audience to accept its interpretation of hearsay and journalism as nonrefutable truth.

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NDSU
Extensive State University

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Well, for me, one trained as a scientist and an Extension professional who relies on unbiased and research-based information, permit me to say that just sitting and tolerating their emotional words – words designed to scare, not teach or inform – was difficult at times.

The next meeting is March 11. Despite the opposition's inability or unwillingness to abide by the time limit set by the zoning board, I commend the board members on their calmness and tolerance of some rather undignified attempts to disrupt the meeting. By giving the opposition all the time it required to make its case, it cannot suggest its First Amendment rights were violated.

Despite the radical display of that February evening, I am happy to say our right to freedom of speech is intact. That the Foster County Zoning Board has the best interests of the community in mind is apparent, but does the opposition walk its talk? I see dairy as a real economic opportunity for the Carrington area. Let's hope that calmer heads will prevail.

Here's to a safe and successful new year ahead.

Sincerely,



J.W. Schroeder
Extension Dairy Specialist

■ MILK PRODUCERS ASSOCIATION SURVEY

Your Milk Producers Association (MPA) of North Dakota has a 41-year history as the dairy farm family's watchdog. Among its varied responsibilities are serving as a watchdog for laws that affect your dairy enterprise, providing input to representatives related to the marketing of milk and ensuring animal health. Included in the list of responsibilities has been a dairy convention.

The convention has served a variety of purposes, the foremost of which has been an educational forum for technology transfer. However, the way we all receive

our information has changed drastically, especially with the World Wide Web. Hence, the question is, "Has the role of the convention become outdated?"

While various forms of media have established themselves as primary sources of industry information, the role of socially oriented events such as the convention remains important. You won't find any substitute for getting together with people to share ideas, discuss challenges or devise solutions for common problems. So, what is the role of the dairy convention? That's where you come in. I am working with the MPA of North Dakota to survey your input. Under a separate cover, you should have received a one-page survey form. I ask that you take a few minutes to complete the survey and provide comments.

Upon completion, you have the option of signing it, then folding and placing it in the pre-addressed, postage-paid envelop and mailing it to me for summarization. Your input does matter.

Finally, since the MPA of North Dakota represents all North Dakota dairy farm families, consider joining this year. For more information, contact one of these district representatives:

MPA of North Dakota Membership Drive Committee

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■ MANAGEMENT

Calf-housing Protocols

Sunshine Genetics of Whitewater, Wis., maintains a calf death loss of less than 1 percent with Holstein and Brown Swiss calves born on-farm. That's especially important, given that all calves born here are high-value embryo-transfer calves.

Karen Marsh, calf manager, says keys to success include the following calf-housing protocols:

- All calves are raised in hutches placed 5 to 6 feet apart.
- Hutches are placed on a gravel pad.
- The hutches are rotated seasonally among three different gravel-pad locations.
- Each pad is cleaned following the removal of calves and remains unused for three to six months.
- New gravel is applied before calves return to the area.
- Hutches, front panels and feed pails are washed and sanitized between each calf.
- Absolutely no visitors are allowed in the calf-housing area. This includes employees who work in other areas on the farm.
- Hutches are bedded with straw in winter and dry-wood shavings in summer.

Source: Dairy Herd Management, Volume 45, No. 2.

Mud and Animal Performance

While mired tractors and sucked-off boots are annoying reminders of the inconveniences of mud, its effect on animal performance often is overlooked. Animal performance, whether that is making milk or pounds of growth, is determined by the nutrients the animal is consuming, one of which is energy.

As the environmental temperature decreases below the thermo-neutral zone, the maintenance energy requirement increases. The thermo-neutral zone is between 23 and 77 degrees Fahrenheit, depending on cattle age and size. The maintenance energy requirement is the amount of energy required to maintain an animal, not including growing, producing milk or maintaining pregnancy.

Exposure to mud affects the energy requirement of cattle in two ways. First, the animal has to exert more

energy to move from point A to point B. Second, mud caked to the animal decreases its insulating capabilities. The caked mud acts as a "wick" that draws energy out of the animal in cold temperatures. The table shows the negative effect different depths of mud, relative to the animal, has on weight gain.

As seen in the table, housing cattle in mud not only looks bad, but also can be expensive. Loss of potential gain affects the overall feed efficiency of the animal, translating into a higher cost per pound of gain. Another consideration when reviewing the table: Reaching the hock on younger cattle takes less mud. This cost is further compounded by current high feed costs. As you look at your operation this winter, consider the following:

- If using movable hay feeders and/or troughs, move feeders often to minimize manure/mud accumulation.
- Consider rolling out round bales of hay.
- Rotate feeding areas.
- Restrict cattle access to poorly drained areas.
- Scrape feeding pads more often.

Loss of gain caused by mud, 21 to 39 F.

Mud depth on the animal	Potential loss of gain
No mud	0%
Dewclaw deep	7%
Shin deep	14%
Below hock	21%
Hock deep	28%
Belly deep	35%

Source M.C. Scott, Virginia Extension Service

Adapted from Beef Feeder, University of Nebraska, 1991.

Not Just Corn Prices Are High

Anyone feeding calves has noticed that the price of milk replacers (and whole milk) is up drastically. Dried whey and whey protein concentrate, two principal sources of proteins in milk replacers, increased from 52 cents to 80 cents per pound and from \$1 to \$1.65 per pound, respectively. Whey protein prices have increased due to its popularity as a protein source for health foods

and because it also is used as a substitute for skim milk powder in baking. Edible lard, a primary fat source in milk replacers, increased from \$425 to more than \$700 per ton during the same time period due to demand for its use as biodiesel.

How should one respond to these price increases? First, remember that the calves' nutrient requirements have not changed. These are young animals that require large quantities of high-quality energy and protein for optimal growth. Deficiencies cause increased illness, mortality and poor growth.

As calf feed costs have increased, so has the value of calves, with day-old calves selling for more than \$500. At these high prices, a saving of \$50 in calf-rearing costs can be offset rapidly by increased illness or death of one calf. What's the best strategy to control costs? Some dos and don'ts follow:

Dos

- Wean calves early. Feeding even the lowest-quality milk replacer in limited amounts costs more than \$1.50 per day. Most calves can be weaned by 6 weeks when they are eating at least 1.5 to 2 pounds of calf starter per day. Producers do not gain an advantage by feeding milk for extended periods of time. Early weaning requires good ventilation and an abundant supply of water. Each extra week of milk or milk replacer feeding adds more than \$10 to the cost of rearing the calf.
- Feed the highest-quality milk replacer to calves during the first month of life as it's the sole source of nutrients and they don't digest vegetable proteins well. Milk replacers with all milk-based protein sources typically will be low in fiber (<15 percent). Beware of off-brand milk replacers that seem very low in price. Reputable manufacturers of milk replacers test incoming loads of whey proteins and reject sources that are high in salmonella or E. coli or may be heat-damaged.
- Economize by feeding milk replacers with soy or wheat proteins only to older calves (more than 4 weeks of age) since they more readily digest plant proteins than the younger calves.
- Provide fresh, clean water every day. Consider wiping or rinsing water buckets in diluted chlorinated water to retard growth of algae and harmful bacteria.

Don'ts

- Don't use unpasteurized waste milk. Every farm has unsalable milk that has no value and might be dumped. Although it can be an economical source of nutrients, significant risks are involved in feeding raw waste milk. Milk is a great growth medium and field studies have shown that it can transmit Johne's, bovine viral diarrhea, staph and E. coli to the calf. On-farm pasteurizers are available, but they require a significant investment in equipment and facilities, as well as labor and supervision. Waste milk must be refrigerated if not pasteurized immediately after milking. Allowing it to warm to room temperature results in rapid bacterial growth and significant risk of digestive upsets.
- Purchase milk replacer on a lowest-cost-per-bag basis. Low-cost milk replacers use vegetable proteins in place of milk proteins. Avoid milk replacers containing egg products or unprocessed soy flour. These proteins are not digested well by the calf and may cause allergic reactions in the intestine.

Regardless of the economic conditions, maintaining a high-quality nutrient supply to baby calves is necessary. Would you feed low-quality or limited feed to a human infant? Why should the calf be different?

Source: B. James, Extension dairy scientist, Virginia State University

■ HERD HEALTH

Timing is Critical for Vaccination

The goal of your vaccination program should be to prime a calf's immune system as it develops. However, some times are better to vaccinate than others. For example, a specific type of white blood cell, called a T-cell, which calves receive from their dam's fresh colostrum, disappears between 3 and 5 weeks of age.

This is a very poor time to vaccinate a calf because its immune system is going through a stage of development. Your best window of opportunity is either between 1 and 3 weeks of age or after 5 weeks of age. Be sure to follow product labels and avoid vaccinations during times of stress, such as dehorning and weaning.

Source: R. Corbett, DVM, Spring City, Utah.

Lice and Dairy Cattle

Lice are the most noticeable winter parasites of cattle. The two clinical signs of lice are hair loss and scratching. Lice have been considered by many to be more of a nuisance parasite than an important health problem in cattle. While not a lot of study has gone into the milk production and body condition loss issues associated with lice in dairy cattle, I believe that severe lice infestations do cause some milk production and body condition score loss in dairy cattle.

Lice are of two types: biting and sucking. The only value in knowing this fact is that ivermectin, Dectomax and injectable Cydectin are effective only against sucking lice.

Lice spend their entire life cycle on cattle. Lice have three stages of their life cycle. These three stages are egg (nymph), larvae and adult. An egg takes about three weeks to hatch and develop into an egg-laying adult. No lice treatment products are effective against eggs. Winter weather has a significant impact on the severity of lice problems in cattle. The longer the winter and the more winter moisture, the more severe the winter weather conditions.

Lice treatment is best applied to cows around the first of the year before lice numbers have started to explode on cattle. Once the clinical signs of hair loss are seen, the numbers of lice on the cattle have exploded and the number of eggs present has risen significantly, which makes breaking the life cycle more difficult. Macrocylic lactones (ivermectins, Dectomax, Eprinex and Cydectin) have persistent activity. These compounds stay in the body long enough to kill the larvae as they hatch and, thus, break the lice life cycle with one application. All other products only kill the larvae and adults on the cattle at the time of application. These compounds must be reapplied in two to three weeks to kill off the larvae that have hatched since the first application.

Lice treatment often is applied in the fall, when cattle traditionally are worked. If the winter weather is not too severe, then application in the fall with macrocyclic lactones should provide winterlong lice control. Cydectin, Eprinex and most pyrethrins are labeled for lactating dairy cows with no milk withdrawal. Be sure to check the label on the product before using on lactating dairy cows. The table below details the products available for lice control and their important facts.

Source: J. Currin, Extension veterinarian, Vermont

Lice control products available in the U.S.

Trade name	Chemical	Persistent activity	Effective against biting lice	Effective against sucking lice	Labeled for lactating cows
Various generics	Permethrin	No	Yes	Yes	Most
Cylence	Cyfluthrin	No	Yes	Yes	Yes
Saber	lambdacyhalothrin	No	Yes	Yes	No
Various generic injectables	Ivermectin	Yes	No	Yes	No
Various generic pour-ons	Ivermectin	Yes	Yes	Yes	No
Dectomax injectable	Doramectin	Yes	No	Yes	No
Dectomax pour-on	Doramectin	Yes	Yes	Yes	No
Eprinex pour-on	Eprinomectin	Yes	Yes	Yes	Yes
Cydectin pour-on	Moxidectin	Yes	Yes	Yes	Yes
Cydectin injectable	Moxidectin	Yes	No	Yes	No
Elector	Spinosad	No	Yes	Yes	Yes

Troubleshooting Vaccination Problems

A good vaccination program is an integral part of successful dairy management. While success of the vaccination program may appear relatively simple on paper, it depends upon, among other things, proper implementation and timing.

Further, regular monitoring and feedback can improve the success of any vaccination program greatly.

What happens if you use a vaccine product and your cattle don't appear to demonstrate the expected protection? You and your veterinarian have several major areas to troubleshoot that can help you pinpoint where the problem might be.

Compromised animal – Sometimes vaccination appears to be less than optimally effective when given to animals that are unable to properly respond to it.

This could include animals that have been stressed from calving, transport, weather, other illness, nutritional deficiencies and other management factors. Vaccines are a great tool for prevention, but the animal must have an intact and properly functioning immune system to properly respond to the vaccine.

Whenever possible, try to time vaccination at points in the production cycle that don't coincide with other stressful events.

Overwhelming challenge – A vaccine is made to protect against a specific level of disease in the environment. If a vaccinated animal is exposed to a higher level of disease than the degree of protection, you might see less than optimal results from the vaccine.

Good sanitation and biosecurity programs can help minimize environmental challenge to both vaccinated and unvaccinated animals.

Improper vaccine handling – Improper vaccine handling, administration and timing are also risk factors for vaccine failure. Ensure that you handle and administer vaccines according to their specific label instructions.

Modified live vaccines should be protected from light and heat when mixed. They should be used within one hour after mixing.

Work with your veterinarian to determine when the best times may be to administer specific vaccines. For example, some vaccines are more effective and more appropriate for disease control when used during a certain season or at a certain point in the production cycle (e.g., bovine viral diarrhea virus vaccination in cows prior to breeding).

Weather conditions also can be a factor to look at when considering the use of certain vaccines. Finally, the route of administration can be an important factor in maximizing immune response. For example, if a vaccine label states IM (intramuscular) only, it means that the immune response is probably inadequate if administered SC (subcutaneously).

Confirmed diagnosis – Another common problem is not having a properly confirmed diagnosis before beginning a vaccination program. Ensure that you have worked with your veterinarian to diagnose a problem or assess the risk of a problem before undertaking a vaccination protocol.

Since many pathogens cause similar symptoms, you may be vaccinating for a disease that looks like the one you are seeing, when in reality, it is caused by an entirely different organism that the vaccine does not protect against. In most cases, the only way to make this distinction is laboratory diagnosis.

Ineffective vaccine – After troubleshooting the aforementioned factors and you still see cases where a vaccine has not appeared to work properly, your natural human reaction might lean toward blaming the vaccine.

In reality, most of the causes of perceived vaccination failure don't lie in the vaccines. Rather, as mentioned, these problems usually occur due to immune-compromised animals, overwhelming pathogen challenges or problems in vaccine handling and/or administration.

In all cases where a vaccine does not seem to be as effective as you think it should be, work with your veterinarian to try to discover the root cause of the problem. Further, many vaccine manufacturers also can be a great resource in your troubleshooting efforts.

AgriLabs, for example, has veterinarians on staff who can work with you and your veterinarian to try to figure out why your animals don't appear to be optimally protected against illness.

AgriLabs provides a dairy vaccination chart as a guide that can help you and your veterinarian design a specific protocol for your dairy.

Source: T. Thayer, DVM, AgriLabs technical service veterinarian

■ NUTRITION

Measures to Increase Profitability

Feed costs represent from 35 percent to 50 percent of the total cost to produce milk, so reviewing feed costs and determining if your herd is at optimal levels is critical. The following suggestions may be useful when evaluating farm feed costs:

- Control feed costs – A 25-cent savings in feed costs per 100 pounds of milk produced can provide an extra \$50 per cow each year. But use caution. A 2-pound drop in milk will result in a loss.
- Raise milk components – A 0.1 percent gain in milk protein can add \$27 per cow per year, and a 0.2 increase in milk fat adds \$45 per cow per year, based on 60 pounds of milk.
- Increase peak milk – One pound of higher peak milk leads to 200 pounds more milk in the lactation, for an extra \$18 per cow each year.
- Lower somatic cell count (SCC) – Dropping one linear SCC score can add \$86 per cow annually, based on higher milk yield. Quality premiums may add additional profit.
- Lower culling rates – If a replacement heifer is valued at \$1,400 and a cull cow at \$400, reducing cow cull rates can provide an extra \$900 income per cow when she is able to remain in the herd for another lactation.
- Lower age at first calving – Reducing the age of heifers at first calving by one month reduces added forage costs by \$30 per heifer.

Source: M. Hutjens, University of Illinois

Preparing Your Feeding Program for Declining Milk Prices and Increasing Feed Prices

Feeding involves many decisions that impact both income and expenses, especially when milk prices are low. The first reaction might be to reduce supplement feeding, as this is the largest purchased expense for most farms. However, its impact on income might be greater than the savings realized.

The dairy business can learn a great deal from the feedlot business. Notably, the tight profit margins in feedlots have demanded that feed managers become shrewd businesspeople. Following are some feedlot tips that could well apply to the dairy feeding program:

1. Closely examine all additives in the ration, particularly those high in daily cost and whose benefits are not supported by documented research.
2. Feedlots focus on the five R's for good feed management. They are:
 - Right feed
 - Right pen
 - Right amount
 - Right time
 - Right way

Right feed – Ration formulation is only as good as the information provided to the nutritionist. Allocate the best forages to the transition and high-producing herds. Measure dry-matter percentage on at least a weekly basis for all fermented and wet byproduct feeds. (This can be accomplished by using a Koster tester or a microwave oven.) Make ration adjustments to maintain the desired dry-matter intake (DMI).

Right pen – Providing the best feeding environment is essential. Feed bunks should be protected from the effects of sun, rain and excessive heat. Soakers are recommended during the heat of the summer. Clean up refusals every day and remove spoiled feed. Cleaning of water tanks on a dairy (or every other day) basis is encouraged.

Right amount – Most dairies feed for 5 percent to 10 percent refusal, which encourages DMI for the

milking herd, but this results in a significant amount of refusal that must be discarded. (Remember, refusals fed to the heifer can spread diseases such as Johne's). Many feedlots feed to a clean bunk, with cattle consuming the last amount within an hour of the next feeding. This is challenging and requires a feed or bunk manager adept at predicting intake patterns of the herd.

Right time – Cattle thrive on consistency. Feeding groups within minutes of the same time each day is critical. This also applies to other areas of the operation, such as milking and lot scraping.

Right way – A key to promoting intake and digestive health is reducing variability. Rations should be mixed in the same order each time and delivered in a uniform manner down the bunk. Dairies should evaluate particle size through spot checks on a weekly basis to make sure mixing time is not too long or short. Accurate delivery of the total mixed ration (TMR) requires experience to prevent wasteful pileups of TMR at the end of the bunk.

The R's listed above may seem like common sense, but they are critical to achieving consistency in a feeding program. Excessive variability in rations leads to displaced abomasums, ketosis and other metabolic disorders that rob cows of high peak milk and lactation yield.

Sources: R.E. James, Virginia Tech Extension

■ FORAGES

Rules for Silage Inoculants

The U.S. Dairy Forage Research Center lists the following rules for using silage inoculants:

- Always use products designated for the crop you are ensiling.
- Inoculants work only if the bacteria go on the crop alive. Store in a cool, dry place and don't use chlorinated water to dilute them unless the chlorine level is less than 1 part per million.
- The bacteria cannot move around. You must spread them uniformly on the crop.
- Ask for research data, especially independent results, to back up product claims.

Mistakes in Making Silage

Keith Bolsen, professor emeritus at Kansas State University, has seen his share of mistakes in silage making through the years. Here are some of the top errors he frequently sees happen on the farm:

1. Overfilled bunkers and gigantic drive-over piles: Each poses a huge safety risk from tractor rollovers and silage avalanches. "We have got to start taking silage safety seriously today," says Bolsen.
2. Applying silage inoculant when you weigh: To get a good, uniform application, inoculant should be applied by the forage harvester.
3. Not enough pack tractors: Many operations will see an improvement in silage quality from adding another pack tractor.
4. Not covered or poorly covered bunkers and piles: This leads to an excessive amount of surface-spoiled silage. Research at Kansas State has documented dry-matter losses of 65 percent in uncovered bunkers, compared with just 12 percent dry-matter losses in a well-covered bunker silo.

■ LABOR

Milking Can Lead to Repetitive Stress Injury

Milking is a task that has a high risk of repetitive stress injury. Milking in round-the-barn pipeline systems places repetitive stress on knee, hip and lower back joints. Milking in an elevated milking parlor shifts the major stress zones to wrists, elbows, shoulders and upper back regions. Highlights from a review of papers published on the subject of milking ergonomics follows (for the complete article and references, see www.uwex.edu/uwvnril/):

- Hand and wrist problems are common for milkers. A study quantifying the positions and movements of the wrist during machine milking showed high values of dorsiflexion and radial deviation, which might contribute to the high prevalence of hand and wrists symptoms (e.g., carpal tunnel syndrome) among milkers. Furthermore, the velocity and repetitiveness were close to those values described in repetitive work with a high risk of elbow and wrist disorders. The negative effects on wrists positions and movements must be observed when building new milking systems.

- High muscle loads in combination with extreme positions and movements of the hand and forearm during machine milking might contribute to the development of injuries among milkers. Technical improvements of the milking equipment could help decrease the risk of arm, wrist and hand disorders.
- The working posture in an elevated milking parlor should be as close as possible to an erect stance, with arms and hands in a natural working position. The dimensions of the parlor and location of milking stations and stalls must be designed to accommodate good working postures.
- In a study of carpal tunnel syndrome (CTS), 1.38 percent of the cases were associated with manual milking, indicating that manual milking could be a natural model for occupational CTS.
- In a Swedish study, 83 percent of the male and 90 percent of the female dairy farmers reported some kind of musculoskeletal symptoms. This is an increase compared with the farmers in 1988. The highest significant changes were an increase of symptoms in the shoulder, neck and wrists/hands. The milkers reported most often incidental, as well as persistent, symptoms in the shoulders. The milkers studied in 2002 had, on average, increased their working time per week and increased the number of cows milked, as well as the use of more milking units. In 1988, almost all the milkers studied were working in tethering systems, while in 2002, more than one-quarter was working in loose-housing systems. The opinion among most of the farmers, both in 1988 and in 2002, regardless of age or sex, was that silage handling and the milking procedure were the most strenuous work operations.
- The efficiency of even highly trained and experienced operators can decrease after two hours of uninterrupted work because of physical tiredness, resulting in interruptions and errors that adversely affect productivity.

Source: D.J. Reinemann, University of Wisconsin

■ INDUSTRY

Cloning: Copies, Not Concoctions

The concept went from the world of science fiction to reality in 1996 when Scottish researchers produced the first cloned animal, Dolly, the sheep. Since that time, research groups and companies have been creating numerous cloned animals. And when cloning became apparent that it would become a commercial venture, the Food and Drug Administration's Center for Veterinary Medicine began an intensive study to determine the safety of food produced from cloned animals.

After nearly five years of review, the Food and Drug Administration (FDA) concluded that meat and milk from clones of adult cattle, pigs and goats, and their offspring, are as safe to eat as food from conventionally bred animals. To download more than 700 pages from the study released December 2006, go to www.fda.gov/cvm/cloneRiskAssessment.htm.

While the study was being conducted, the FDA asked producers and breeders not to introduce food from clones into the food supply. That voluntary ban is still in effect while the public submits comments on the FDA's findings and until the FDA makes a final decision. At this point, the FDA believes that no country has yet allowed food from cloned animals into their food supply.

What is cloning?

Cloning is the newest reproductive technology that has followed techniques such as artificial insemination embryo transfer, embryo splitting and in vitro fertilization. Clones are born just like other animals. They are similar to identical twins, only they are born at different times.

You can't tell the difference between meat from a cloned cow and meat from a conventionally bred cow, even under a microscope. Likewise, FDA scientists found that the milk components from dairy clones were the same as milk sold every day. And if food from clones is indistinguishable, then the FDA doesn't have the authority to require labels, says Stephen Sundlof, director of the FDA Center for Veterinary Medicine.

In a sense, cloning isn't new. Vegetative propagation has been done for decades. Vegetative parts of plants, such as bananas, potatoes, apples and grapes, have been grafted onto other plants, which allows the genes from the copied plant to live for decades.

To produce an animal clone, the nucleus of a donor egg is removed and replaced with the DNA of a cow or other animal. A tiny electric shock coaxes the egg to grow into a copy of the original animal. After the egg is implanted, the process is not any different than embryo transfer itself.

Cloning is not the same as genetic engineering. Cloning does not change the gene sequence. Genetic engineering involves adding or subtracting genes. The December report by the FDA does not cover animals that have been genetically engineered.

The main use of clones is to produce breeding stock, not food. One hundred fifty-five clones are recorded in dairy breed organizations in Canada and the U.S. Those clones came from 56 different sources. A partial list of cloned females and males is shown in the table. Most of the cloned dairy cattle are either show animals or artificial insemination sires. The cost of cloning an animal ranges from \$10,000 to \$20,000. As the technology progresses, costs likely will drop.

The FDA is seeking comments from the public on cloning. To submit electronic comments on the three documents, visit www.accessdata.fda.gov/scripts/oc/dockets/comments/commentdocket.cfm?AGENCY=FDA.

Written comments may be sent to: Division of Dockets Management (HFA-305), Food and Drug Administration, 5630 Fishers Lane, Room 1061, Rockville, MD, 20852. Comments must be received by April 2, 2008, and should include the docket number 2003N-0573.

Notable dairy cows and bulls that have been cloned

Breed	Cows	Number
Holstein	Lauduc Broker Mandy	5
Jersey	Goodnow Midnight Blue-ET	5
Holstein	Stookey Elmpark Blackrose-ET	4
Holstein	Krull Broker Elegance	4
Holstein	Vandyk-K Integrity Paradise	4
Holstein	UConn Cleo B Aspen	4
Jersey	PH Jewel	3
Holstein	Regancrest Jed Deborah	3
Holstein	Ernest-Anthony SD Tobi-ET	3
Holstein	Jerian Mason Sterling	3
Holstein	Villarosa BC Ida	3
Holstein	Southwind Valiant Naoma-ET	3
Holstein	Snow-N Denises Dellia	2
Holstein	Aitkenbrae Starbuck Ada	2
Holstein	Con-Acres HS Zita-ET	2
Holstein	Nabblin Vanguard Annabell	2
Holstein	Tri-Day Ashlyn-ET	2
Holstein	Rainyridge Tony Beauty	2
Holstein	Merkley Starbuck Whitney	2
Holstein	Taraley Astro Sherry	2
Guernsey	Westlyn Tom Dee	1
Brown Swiss	Blue Heaven JW Snowplow ET	1
Holstein	Shoremar S Alicia-ET	1
Holstein	Donnek Pearl Skychief	1
Holstein	Miss Mark Maui	1
Holstein	Nelsons Estimate Liz	1

Breed	Bulls	Number
Holstein	Lexvold Luke Hershel-ET	7
Holstein	Ricecrest Marshall-ET	6
Holstein	Altagen-I Merchant-ET	6
Holstein	Starstruck J Paradox-Red-ET	3
Holstein	Bosside Ruben-ET	3
Holstein	Timlynn Adam-ET	3
Holstein	Canyon Breeze Allen	3
Holstein	Sikkema Star Air Magna-ET	2
Holstein	Pursuit September Storm	1
Holstein	Ladino Park Talent	1
Holstein	Braedale Goldwyn	1
Holstein	Hanoverhill Starbuck	1
Holstein	Hartline Titanic-ET	1
Holstein	Calbrett-1 HH Champion	1
Holstein	Regancrest Emory Derry-ET	1
Holstein	Diamond-Oak Duster Dante-ET	1

Breed	Cows cloned for research	Number
Holstein	Kregmol Infigen 109-ETM	20
Jersey	Tenn Sooner HHH Maid	15

■ MISCELLANEOUS

Test Your Dairy Knowledge

- Americans eat the equivalent of _____ acres of pizza (and mozzarella cheese) every day.
 - 10
 - 8
 - 12
 - 15
- Cheddar cheese was developed in the town of Cheddar Gorge, England, more than _____ years ago.
 - 200
 - 400
 - 20
 - 600
- A gallon of milk weighs _____ pounds.
 - 10.06
 - 5.72
 - 8.59
 - 6
- An average cow produces about _____ glasses of milk in her lifetime.
 - 350,000
 - 450,750
 - 100,000
 - 505,920
- If you open the refrigerator in _____ percent of all households, you'll find a container of milk; 94 percent of all households have cheese. Total cheese consumption per capita was 31 pounds in 2004.
 - 75%
 - 96%
 - 82%
 - 99%
- _____ of all cheese is served at restaurants and cafeterias.
 - 25%
 - 67%
 - 33%
 - 40%
- Cows have an acute sense of smell and can smell something up to _____ miles away.
 - 3
 - 6
 - 8
 - 10
- An average dairy cow weighs 1,400 pounds and consumes about 50 pounds of dry matter (e.g., hay, grass, grain) each day. The average cow drinks from _____ gallons of water each day – about a bathtub's worth.
 - 10 to 20
 - 30 to 40
 - 50 to 60
 - 80 to 90
- Cows arrived in America with the Jamestown settlers in _____.
 - 1492
 - 1537
 - 1829
 - 1611
- Tank trucks for transporting fluid milk were introduced in _____.
 - 1914
 - 1890
 - 1937
 - 1945

10. A
9. D
8. A
7. B
6. D
5. B
4. A
3. C
2. B
1. A

**Dairy
Knowledge
Answers**

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