

Inside:

- **The relationship of milk production and milk EPD**
- **Real men eat tomatoes with their steak!**
- **More rangeland drought management strategies**
- **About Fort Keogh**
...and more!

Foot and Mouth Disease: Questions and Answers



*by John Paterson,
MSU Extension Beef Specialist*

European livestock producers are currently facing two diseases. The first is BSE (often called mad cow) and the second is foot and mouth disease (FMD). While the risk of BSE exposure in the U.S. is presently very remote, it is considered to be a food safety issue. Though FMD is not considered a human food safety issue, it has had huge economic consequences for livestock producers because of lowered animal productivity. The following information was summarized from the web site sponsored by the National Cattlemen's Beef Association (www.beef.org). If you have additional questions about FMD control measures in Montana, please do not hesitate to contact your county agent, state beef Extension specialists or the Montana Department of Livestock.

Q: What is foot and mouth disease?

A. Foot-and-mouth disease (FMD) is a highly contagious viral disease that does not affect humans but has devastating effects on animals with cloven hooves, such as cattle, swine, sheep, goats and deer. The U.S. has not had a case of foot-and-mouth disease since 1929, and that occurrence was contained and eradicated quickly.

There are seven types of the FMD virus, all of

continued on page 6

How are milk production and milk EPD related?

by M. D. MacNeil, USDA Agricultural Research Service, Miles City, Montana

Quite often I hear, “Does the milk EPD really predict differences in milk production?” It seems straightforward to analyze data for traits like birth weight or ribeye area that can be measured directly and obtain the resulting Expected Progeny Difference. However, the milk EPD is more difficult to grasp. Clearly, only on very rare occasions is milk production of beef cows measured directly. Rather than relying on measured milk production, the milk EPD results from dividing observed weaning weight into components due to the calf expressing its growth potential and its dam creating a favorable environment (milk) for growth. This complex process creates an innate distrust of the resulting milk EPD. Therefore, the objective of the research reported here was to determine if differences in measured milk production were associated with the milk EPD.

Milk production can be measured in beef cattle using the weigh-suckle-weigh technique. In early afternoon, calves are separated from their dams. Later that evening they are returned to their dams and allowed to nurse, which empties the cow’s udder of milk. The calves are again separated from their dams and they remain apart for 12 hours.

The next morning, the calves are weighed, reunited with their dams and allowed to nurse until no more milk is available, then quickly weighed again. The difference in each calf’s weight before and after nursing is a measure of its dam’s milk production.

We measured milk production by Line 1 Hereford cows four times during lactation (see Table 1). The first measurement was taken shortly before the beginning of the breeding season and the last measurement was collected at weaning. There were records from 76 two-

Table 1. Age and weight of Line 1 Hereford calves when weigh-suckle-weigh records of milk were collected.

Measurement	Age, days			Weight, pounds
	Mean	Oldest	Youngest	
1	52	87	9	179
2	93	132	53	250
3	137	180	93	332
4	180	215	137	399

Table 2. Milk EPD, peak yield, and total milk production from mature Line 1 Hereford cows.

Milk EPD	Peak yield, pounds/day	Total yield, pounds/lactation
-22	11.1	1537
-11	13.0	1806
0	15.0	2072
11	16.9	2341
22	18.8	2608

year-old cows, 83 three-year-old cows, 59 four-year-old cows, and 113 cows five years old and older.

A mathematical model of a lactation curve was fit to the resulting milk production records. The milk EPD was added to this general model, thus allowing different lactation curves for cows with different milk EPD.

Table 2 shows estimates of peak and total milk yields for various levels of milk EPD. The milk EPD themselves reflect differences in weaning weight of calves that presumably result from differences in milk production. Because several pounds of milk are required to produce a single pound increase in weight, differences in total milk production should be greater than differences in the milk EPD.

Other researchers have found similar close relationships between milk EPD and total milk yield. These results, showing a one-pound change in milk EPD corresponding to a 24-pound change in total yield, are among the most conservative. Other estimates range to slightly more than twice these and extend the relationship of milk EPD with milk production to other breeds.

In conclusion, a close relationship between milk EPD and actual milk production does exist. Selection of sires for increased milk EPD can be expected to increase milk production of resulting daughters. However, milk production is a trait for which maximum is not necessarily optimal. Whether an individual breeder should select for increased milk production depends on the particular situation. Too little milk production may compromise growth of the calves. Too much milk may add unnecessary feed costs or compromise reproductive efficiency of the cowherd.

Real men eat tomatoes with their steak



by Charlene Schuster, Executive Director, Montana Beef Council

When we think of men and food, meat and potatoes often come to mind. As one comic strip put it, “salad is what they serve while you are waitin’ for the real food to fry.” In terms of overall health, there’s nothing wrong with a lean steak and baked potato.

This is just one of the messages health care providers are hearing at numerous programs sponsored by the



Cardiac patients and health care providers learn how lean beef is an important part of a healthy diet

Montana Beef Council and designed for dietitians, doctors, physician assistants and cardiac rehab workers. A Montana dietitian who lectures nationally for the beef industry has been the keynote speaker at many Montana events this year. Dayle Hayes of Billings shares how studies show that eating plenty of tomatoes (along with your steak) can lower

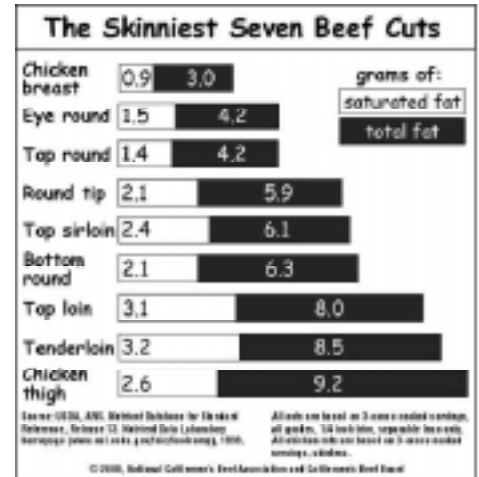
your risk of heart disease and cancers (like prostate and stomach). The benefits may come from a powerful antioxidant called lycopene. Experts note that lycopene is better absorbed from cooked or heat-processed tomatoes than raw ones.

But, the most important message provided is that lean beef *does* fit into the diet, including that of cardiac patients, and presenters share information on how healthcare providers can convey that message to patients. The beef industry’s objective is to develop relationships with professional organizations to provide information and materials that help convey positive messages about beef to consumers for whom they provide dietary counseling.

In addition to providing close to 400 health providers with a speaker from the beef industry, over 6,000 pieces of information about healthy cuts of beef go out each

year to Montanans.

Watch for an upcoming TV segment on Northern Ag Network about the work of Dayle Hayes and how the healthy beef message is reaching people all across the US. For more information, check out our website designed for healthcare providers: www.beefnutrition.org.



Beef: Questions and Answers is a joint project between MSU Extension and the Montana Beef Council. This column informs producers about current consumer education, promotion and research projects funded through the \$1 per head checkoff. For more information, contact the Montana Beef Council at (406) 442-5111 or at beefcncl@mt.net.

PHOTO OF THE MONTH:

MSU Student Wyatt Donald of Melville learns how to grade beef carcasses in the College of Ag's class on feedlot management.



Rangeland grazing management strategies, Part 2

by Rod Heitschmidt, research leader and superintendent,
Fort Keogh Livestock & Range Research Laboratory, Miles City



Although the recurring phenomenon of drought provides land managers lots of opportunities to sharpen their managerial skills, they seldom feel comfortable with their drought management skills. Drought management is such a challenge primarily because of our inability to accurately predict drought. This is particularly a problem in the Northern Great Plains, because we are generally within about two weeks of a drought, regardless of time of year. In other words, in this part of the country we have few pre-drought indicators, and we live constantly on the edge of drought. As a result, most of our drought management practices are more reactive than proactive.

But it doesn't have to be like this!

We could better deal with drought if we could improve our ability to predict it. Obviously, the US Weather Bureau is better than ever at predicting broadscale, regional droughts. But what about smaller-scale, more local droughts? Recently, a colleague and I researched a relationship between one month's precipitation and the amount received the next month. In other words, we wanted to know: If rainfall is below normal one month, what is the probability that it will be below normal the next month? Often we manage with the opposite viewpoint—if it is dry this month, we manage as if it will be wet next month. Sort of the eternal optimist's viewpoint!

By analyzing Miles City weather records, we found some relationships between months, but our ability to predict the amount of precipitation for one month based upon the preceding month was very low. In fact, the strongest relationship found was between December and January. We found only about eight percent of the variation of January precipitation was related to the amount of December precipitation. We then examined two-month relationships, again finding only one relationship, a very weak one between November-December and January-February precipitation. We also looked at seasonal relationships (three-month periods), again finding very weak relationships. These analyses showed that it is rather futile to attempt to predict next month's

precipitation.

We also examined the relationships between monthly, bi-monthly and seasonal precipitation and total annual precipitation. As expected, the closest, most meaningful relationships were related to June, May-June and springtime (April, May, June) precipitation. We found we could explain about 30 percent of the variation in annual precipitation based upon June precipitation alone, 57 percent based upon May-June precipitation together, and 62 percent based on spring precipitation. This makes good sense, since we normally receive the bulk of our yearly precipitation in spring. But these data are also a warning flag, because they indicate that if you don't receive springtime precipitation, don't expect to make up the deficiency anytime thereafter. In other words, if we come out of the spring dry, we should expect to remain dry a majority of the time.

We also reviewed some of our forage production data, and guess what we found? Normally, 50 percent of our annual forage is produced by June 1 and 80 percent by July 1. Make sense? Absolutely!

So what does all this mean? It means you would be well-advised to react to what you see on the ground in late spring, because most often that is what you are going to live with for the rest of the year! If you do not grow forage in this part of the country in April, May and June, it is risky business to manage thereafter under the assumption that you will grow it later on in the year. And surprisingly, this is true throughout much of the Great Plains. For example, in Texas, where I worked prior to Montana, the only difference was that the growing season shifted about one month. We generally grew about 50 percent of our forage by May 1 and about 80 percent by June 1.

Reacting to what you see in the rain gauge during spring and what you see on the ground in late spring is proactive management for the remainder of the year. In grazing management, we attempt to maintain a balance between forage demand and availability. Thus, if forage availability is below normal in late spring, we need to consider reducing demand sooner rather than later!

Fort Keogh researchers help producers increase the bottom line

by Rod Heitschmidt

The Fort Keogh Livestock and Range Research Laboratory is a USDA Agricultural Research Service (ARS) facility run in cooperation with the Montana Agricultural Experiment Station (MAES). The mission of the 55,000-acre laboratory is to develop ecologically and economically sustainable range beef cattle production systems.

Research is focused around four broad disciplines: range ecology and management; range animal nutrition; and beef cattle genetics and reproductive physiology. Full-time staff consists of 22 ARS employees, eight of whom are scientists, and 19 MAES employees. Rick Funston, MSU Extension Beef Cattle Specialist, also is stationed at Ft. Keogh. In addition, five to 10 employees work part-time during the spring calving season and summer field season.

We have approximately 1,500 head of mother cows. About 240 are Line 1 Herefords, 360 are composite gene combination cows (i.e., 1/2 Red Angus, 1/4 Tarentaise, 1/4 Charolais), and 120 are Wagyu-Limousine crosses, with the remainder a mix of genotypes used largely for physiology and nutrition research. We have about 700 acres of flood-irrigated cropland on which we raise alfalfa, barley, sudan and corn silage and about 400 acres of sprinkler-irrigated tame pasture used to congregate cows for artificial insemination. We have about 1,300 acres of Yellowstone River running through the Fort, 285 miles of fence, 150 miles of roads and trails, 43 buildings, a modern 40,000-bushel feed mill and a 3,000-head feedlot capacity. The land, buildings and most equipment belong to ARS. The cattle belong to MAES. Our annual



About 1,500 Herefords, Wagyu-Limousine and cross-bred cows call Ft. Keogh home.



Since 1924, Fort Keogh near Miles City has conducted agricultural research. Before that, it was a military post.

budget is about \$2.2 million of federally appropriated funds and about \$500,000 state funds garnered through the sale of animals. No state funds are appropriated for use at Fort Keogh.

We generally have one on-going project that is truly multi-disciplinary. Currently, we are studying season-of-calving. We are calving about 200 cows in February, 200 in April and 200 in June. We wean the February and April calves at either six or eight months of age and the June calves at either four or six months of age. This gives us sets of calves from all three herds that are either weaned on the same date (i.e., mid-October) or at the same age (i.e., six months old). When weaned, 1/3 of the calves are shipped to Oklahoma for wintering on wheat pasture before being finished in the feedlot. We winter the other 2/3 here. In spring when the Oklahoma calves enter the feedlot, we send half of our over-wintered calves to Oklahoma to be finished in the feedlot with the Oklahoma calves. The other half is finished here. All carcasses are subject to a full carcass evaluation.

The analyses of these data include evaluations for both biological efficiency and economic profitability. We keep detailed production cost and animal sale records for production level economic analyses. Our goal is to not only determine how season-of-calving affects profit levels, but also why and how. We must understand why something works or fails if we are going to provide producers with quality information that helps their bottom line. 🐄

Foot and Mouth, cont. from page 1

which have similar symptoms. Immunity to one type does not protect animals from other types. The average incubation period for FMD is between three and eight days, but it can be up to two weeks in some cases. The disease is rarely fatal, but may kill very young animals. Those that survive are often debilitated and experience severe loss in milk or meat production. FMD does not affect humans, although people can carry the virus on clothing and other surfaces.

Q. What are the symptoms of FMD?

A. The most obvious signs of the disease in animals are excessive slobbering, going off feed and lameness. Affected animals may have a sudden rise in temperature, followed by blisters in the mouth or other areas of tender skin such as udders in females, nostrils and on the feet—particularly near the hooves. Soft tissues under the hoof are often inflamed, and the animal can become lame and may even shed its hooves. Eating becomes painful, and many animals go off feed, causing weight loss, declined milk production for dairy cattle and goats, and declined meat production. In some cases, affected animals can suffer from sterility, chronic lameness, aborted pregnancies and chronic mastitis.

Q. How does the disease spread?

A. Foot-and-mouth disease is a highly contagious virus and can be spread by movement of infected animals or contaminated vehicles, and by contaminated facilities used to hold animals. It also can infect animals through contaminated hay or feedstuffs and if susceptible animals drink from a common water source. While FMD is not considered a threat to human health, people who come in contact with the virus can spread it to animals through clothing, footwear or other equipment/materials. The virus can harbor in the human nasal passages for as long as 28 hours. Wind also can spread the virus through the air.

Q. Can people contract foot-and-mouth disease?

A. Foot-and-mouth disease typically does not affect humans. There is only one recorded case from Britain in 1966, and that person experienced symptoms similar to the flu with some blisters. People can, however, spread the virus to animals because it can persist on contaminated clothing, footwear, and other materials for several weeks.

Q. If foot-and-mouth disease rarely kills animals, and if people can't contract the virus, why is there so much concern?

A. Foot-and-mouth disease is a very contagious virus, with nearly 100 percent of exposed animals ultimately becoming infected. If the disease grew to be widespread in any country, the economic impact could be severe. The most serious effects would include severe decline in milk from dairy cattle and goats, decline in meat production, possible sterility of animals, chronic lameness and chronic mastitis among affected.

Q. Is there a treatment or cure?

A. The virus can be killed by heat, low humidity and some disinfectants. It is rarely fatal to animals but may kill very young animals. There is no cure, and the virus usually runs its course in two to three weeks with most animals recovering. However, affected animals can become debilitated and suffer loss of milk or meat production.

Q. Is foot-and-mouth disease present in U.S. cattle herds?

A. No. The U.S. has not had a case of foot-and-mouth disease since 1929, which was contained and eradicated quickly. The U.S. Department of Agriculture regularly monitors for any disease among U.S. cattle herds and takes aggressive steps to prevent FMD from spreading to the U.S. whenever there is an outbreak in other countries.

- As part of its ongoing surveillance program, the USDA conducts hundreds of field inquires each year in an effort to detect animal diseases that might affect livestock.
- When there is an outbreak of FMD in another country, the U.S. temporarily prohibits the importation of animals and animal products from that country. These restrictions augment those already in place on ruminant products to prevent the introduction of BSE into the U.S.
- The government also prohibits travelers from carrying into the U.S. any agricultural products, particularly animal products that could spread FMD. Passengers are required to identify any farm contact to customs and USDA officials. All baggage is subject to inspection. Violations could result in penalties of up to \$1,000.

- A team of experts (40 federal, state and university officials) is sent to the European Union—or other country with an outbreak—to monitor, evaluate and assist in containment efforts.
- There is heightened alert at ports of entry and airports to ensure passengers, luggage and cargo are checked appropriately. This includes placing additional inspectors and dog teams at airports to check incoming flights and passengers.
- USDA officials also are stationed worldwide to monitor and coordinate with the state agriculture officials.
- USDA recently initiated an aggressive public education campaign that includes additional signage in airports, public service announcements, website, and other tools to inform the public about this important issue and steps they can take to prevent it from entering the United States. The USDA also recently established an 800 number to respond to questions from the public, industry and media about the foot-and-mouth outbreak in Europe.

Q. What can beef producers in the U.S. do to help prevent foot-and-mouth disease?

A. While there are currently no cases of foot-and-mouth disease in the U.S., there are several steps producers can take to help prevent the virus from spreading if it ever did show up here:

- Know who is on your farms/ranches/property at all times. If people from other countries where confirmed cases of FMD have been found are scheduled to visit your property, make sure they wear freshly cleaned clothing and footwear.
- Make sure people wash their clothes and footwear before traveling to another farm/ranch/property.
- Immediately contact your state veterinarian, state or federal animal disease control centers or your country agricultural agent if you suspect symptoms of FMD.

Q. What can consumers do to help prevent foot-and-mouth disease from occurring in the U.S.?


- All international travelers coming into the U.S. must state on their Customs declaration form whether or not they have been on a farm or have been in contact with livestock. If they have:

- Any soiled footwear must be disinfected with detergent and bleach.
- Dirty clothing must be washed and disinfected prior to returning to the U.S.
- All international travelers also must declare if they are bringing any meat or dairy products into the U.S. USDA officials will then inspect baggage of those travelers and confiscate products from swine and ruminants (cattle, sheep, goats, deer and other cloven-hoofed animals), with the exception of hard cheeses and canned products with a shelf life.
- If travelers are around livestock in the UK and other affected countries they should avoid contact with susceptible animals for at least five days after returning to the U.S.

Q. Is the meat or milk from affected animals also contaminated?

A. Uncooked meat and some types of milk products from contaminated animals can carry the virus. However, since the virus does not affect humans and would be destroyed when products are cooked, the primary risk of raw products is transmission of the virus to susceptible animals.

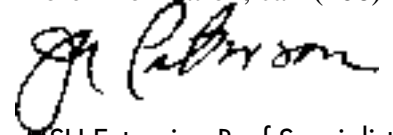
Q. With so much attention to diseases like foot-and mouth disease and BSE, should consumers stop eating beef for a while?

A. The U.S. remains free of BSE and FMD, so U.S. consumers can continue to enjoy their favorite beef dishes. Neither disease has been detected here in the U.S., and it's not for a lack of looking. Raising healthy cattle is key to the livelihood of America's one million beef producers. And, market research tells us the confidence of U.S. consumers in the safety of U.S. beef products remains very strong. 

**Don't forget! Montana Nutrition Conference
May 1 and 2 in Bozeman
"Show Me the Money for My Calves!" 994-3414**



Beef: Questions & Answers is published every winter through Montana State University Extension. To subscribe, change your address, suggest article ideas, or for more information, call (406) 994-3414.



John Paterson, MSU Extension Beef Specialist
and Newsletter Editor, MSU Bozeman
(406) 994-5562
johnp@montana.edu

Attend the Steer-a-Year auction May 19 at Miller Pavilion in Bozeman. All proceeds benefit MSU students in the College of Agriculture, Rodeo Club and Athletics. For more information, contact Lisa Duffey at (406) 994-4323.

The programs of the MSU Extension Service are available to all people regardless of race, creed, color, sex, disability or national origin. Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, David A. Bryant, Vice Provost and Director, Extension Service, Montana State University, Bozeman, MT 59717.

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE: \$300

MONTANA STATE UNIVERSITY
Extension Service
Bozeman, MT 59717

COOPERATIVE EXTENSION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

PRESORTED STANDARD
US POSTAGE PAID
PERMIT G268
BOZEMAN, MT