



CATTLEMAN'S CORNER



Division of Agriculture Sciences and Natural Resources * Oklahoma State University

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Heritability estimates of fertility in replacement heifers

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“Heritability” is that portion of the difference in the performance of cattle that is due to genetics. The remainder of the differences are presumed to be due to differences in the environment (i.e. management, pastures, weather, etc). Previous estimates of the heritability of pregnancy rates in heifers ranged from 0 to 0.28. Iowa State University scientists studied records of 3144 heifers from 6 herds in 5 states. In the Iowa State study, the heritability of pregnancy rate was 0.13. **Pregnancy rate** is the percentage of the heifers exposed to artificial or natural breeding that were diagnosed pregnant after their first entire breeding season. **First service conception rate** is the likelihood that the heifer became pregnant on the first artificial insemination attempt to breed her. The heritability of first service conception rate was even lower at 0.03. This implies that 97% of the differences in the first service conception rate are due to the management environment in which the heifers were raised. (Source: Minick and co-workers. 2004 Iowa State University Beef Research Report.)

These low heritability estimates suggest that painfully slow progress could be made by selecting sires that produced heifers with greater pregnancy rates. Keeping heifers from cows that calve early in the calving season should also select for genetically improved reproduction. This data also reminds us that in any one year, management is still the key to successful pregnancy rates in replacement heifers. Remember, 87% of the differences in pregnancy rates were due to the "environment."

Although reproductive performance is a lowly heritable trait, some heifers are born with problems and they should be identified as soon as possible and removed from the herd. Spring born heifers are in their first breeding season now and should be checked for pregnancy about 60 days after the end of their first breeding season. Identifying and culling open heifers early will remove sub-fertile females from the herd. Lifetime cow studies from Montana indicated that properly developed heifers that were exposed to fertile bulls, but DID NOT become pregnant were often sub-fertile compared to the heifers that did conceive. In fact, when the heifers that failed to breed in the first breeding season were followed throughout their lifetimes, they averaged a 55% yearly calf crop. Therefore keeping them or rolling them over to a fall-calving herd is a bad bet. Selecting against poor reproduction may be painfully slow due to the low heritability. However, "painfully slow" progress is still better than no progress!

U.S. Beef Exports Remain Strong

James G. Robb, Livestock Marketing Information Center Director

Worldwide, beef trade this year has been impressive. For April, the U.S. and Australia lead the way regarding gains in tonnage of beef sold compared to a year ago. In terms of value, the U.S. remained the top exporter of beef and variety meats and posted a 20% dollar-value increase compared to a year earlier. Foreign markets for beef industry products continue to grow, especially in Asia.

Last week, USDA's Economic Research Service (USDA-ERS) published the U.S. monthly meat and poultry trade data for April. Those data are on a carcass weight equivalent basis. Both beef and pork export tonnage exceeded expectations, while chicken remained lackluster. At 254 million pounds, U.S. beef exports during April were 16% above 2017's and the largest ever for that month. U.S. beef imports declined year-over-year by 6%.

USDA-ERS reported that the U.S. sold beef directly to 93 different countries during the month of April. In order of size, the top six destinations were: Japan, South Korea, Mexico, Canada, Hong Kong, and Taiwan. Year-over-year, large percentage gains occurred to Mexico (rising 31%), Taiwan (up 19%), Canada (increasing 11%), and Japan (up 9%).

Surging U.S. pork exports helped mitigate the amount competition beef faced at the domestic meat case from pork. April's tonnage was 548 million pounds (carcass weight basis), which was the largest monthly number ever. Tonnage sold to Mexico, the largest market for U.S. pork, was record-large in April (182 million pounds) and increased a dramatic 41% from a year ago.

In the U.S. wholesale meat marketplace, robust exports have been a factor cushioning beef prices against large supplies. Will that situation continue? In the World Agricultural Supply and Demand Estimates (WASDE) issued last month by the USDA, their forecast was for U.S. beef exports in 2018 to be 3.03 billion pounds, 6% above 2017's. That would be the first time for foreign sales to exceed 3 billion pounds. Year-to-date trends are on the path to reach that level.

WASDE forecasts can only incorporate "current known" U.S. policy and that of foreign governments. Of course, in the last 30 days, the unknowns regarding trade policy and hence implication on U.S. meat exports have greatly increased. The new WASDE will be released on Tuesday (June 12th), clear-cut assessments of the trade environment may be several months down the road.

More than just insights into actual policy changes and tariff rates are required to forecast exports. For example, in the current world economic environment, exchange rates adjustments can have a significant impact on the price paid by a foreign buyer for U.S. agricultural products. Exchange rates are determined by macroeconomic forces and by sectors much bigger than the agriculture and food trade sphere. That is, exchange rates are realistically exogenous, using an economics term, to the trade of agricultural and food products. The value of the Mexican peso could drop versus the U.S. dollar, mitigating, at least partially, the short-term impacts of any new tariffs on U.S. exports to that country.

Note: Thank you to Mr. Robb for providing the above commentary while Dr. Peel returns from a study of China's agriculture.

"Preg" check and cull replacement heifers early

Glenn Selk, Oklahoma State University Emeritus Extension Animal Scientist

Many Oklahoma ranchers choose to breed the replacement heifers about a month ahead of the mature cows in the herd. In addition, they like to use a shortened 45 to 60-day breeding season for the replacement heifers. The next logical step is to determine which of these heifers failed to conceive in their first breeding season. This is more important today than ever before.

As the bulls are being removed from the replacement heifers, this would be an ideal time to call and make arrangements with your local veterinarian to have those heifers evaluated for pregnancy in about 60 days. In two months, experienced palpators should have no difficulty identifying which heifers are pregnant and which heifers are not pregnant (open). Those heifers that are determined to be "open" after this breeding season, should be strong candidates for culling. Culling these heifers immediately after pregnancy checking serves three very economically valuable purposes.

- 1) Identifying and culling open heifers early will **remove sub-fertile females from the herd**. Lifetime cow studies from Montana indicated that properly developed heifers that were exposed to fertile bulls, but DID NOT become pregnant were often sub-fertile compared to the heifers that did conceive. In fact,

when the heifers that failed to breed in the first breeding season were followed throughout their lifetimes, they averaged a 55% yearly calf crop. Despite the fact that reproduction is not a highly heritable trait, it also makes sense to remove this genetic material from the herd so as to not proliferate females that are difficult to get bred.

- 2) Culling open heifers early **will reduce summer forage and winter costs**. If the rancher waits until next spring to find out which heifers do not calve, the pasture use and winter feed expense will still be lost and there will be no calf to eventually help pay the bills. This is money that can better be spent in properly feeding cows that are pregnant and will be producing a salable product the following fall.
- 3) Identifying the open heifers shortly after (60 days) the breeding season is over will **allow for marketing the heifers while still young** enough to go to a feedlot and be fed for the choice beef market. "B" maturity carcasses (those estimated to be 30 months of age or older) are very unlikely to be graded Choice and cannot be graded Select. As a result, the heifers that are close to two years of age will suffer a price discount. If we wait until next spring to identify which two year-olds did not get bred, then we will be culling a female that will be marketed at a noticeable discount compared to the price/pound that she would have brought this summer as a much younger animal.

Certainly the percentage of open heifers will vary from ranch to ranch. Do not be concerned, if after a good heifer development program and adequate breeding season, that you find that 10% of the heifers still are not bred. Resist the temptation to keep these open heifers and "roll them over" to a fall-calving herd. These are the very heifers that you want to identify early and remove from the herd. It just makes good economic business sense to identify and cull non-pregnant replacement heifers as soon as possible.

Beef supply and demand challenges continue

Derrell S. Peel, Oklahoma State University Extension Livestock Marketing Specialist

As expected, supply pressures continue to build in beef markets. Beef production so far this year is up 3.6 percent on larger cattle slaughter and increased carcass weights. Year to date cattle slaughter is up 3.8 percent driven by increases in female slaughter. Heifer slaughter is up 8.0 percent year over year and cow slaughter is up 8.1 percent so far this year. Beef cow slaughter is up 12.2 percent and dairy cow slaughter is 4.5 percent more than last year. Steer slaughter is up a scant 0.1 percent year over year.

Cattle carcass weights are up year over year after dropping sharply in 2017. Overall carcass weights are up about 5 pounds for the year. Steer carcass weights are up nearly 7 pounds while heifer carcass weights are up over 8 pounds year over year for the year to date. Cow carcass weights are also up nearly 8 pounds compared to last year. Steer and heifer carcass weights have bottomed seasonally and will increase to seasonal peaks in the fall but the question will be how much and how fast will the seasonal increase in carcass weights be compared to last year. Beef production is typically larger in the second half of the year and continued year over year growth in beef production is expected to contribute to annual beef production growth over 4 percent year over year in 2018.

In 2017, unexpectedly strong domestic and international beef demand provided extra support for cattle and beef prices in the face of growing beef supplies. To some extent that has continued in 2018, though not as pronounced as a year ago. After holding quite firm through May, boxed beef prices were under pressure into mid-June with Choice boxed beef price dropping about \$5/cwt. last week. Large beef supplies are weighing on markets and the challenge may grow moving into the summer doldrums between July 4 and Labor Day. However, relative fed cattle supplies are expected to tighten in the third quarter.

Fed cattle prices have declined seasonally but are holding generally better than expected. Remember in early April when June Live Cattle futures dropped under \$100/cwt. and have since traded as high as \$110/cwt. and now are trading about \$108. Of course, June isn't over and the next couple of weeks could have a big impact on commodity markets as the reality of a trade war settles on markets. Feeder cattle prices have declined seasonally from spring peaks but have remained quite robust thus far.

There are a variety of supply and demand factors to watch in the second half of the year. Beef production will be determined by slaughter rates but even more by carcass weights moving forward. Drought conditions do not appear to be causing significant herd liquidation at this time but the threat is still there. Further slowing of heifer retention and herd growth (in part due to drought conditions) continues to add to female slaughter and could continue through the end of the year.

The uncertainty, volatility and reality of a trade war will likely have greater negative impacts on beef and other markets in the second half of the year. Beef trade in early 2018 has been very supportive to cattle and beef markets but this could change going forward. Beef markets may be directly impacted in terms of exports but significant, if not bigger, impacts may be the indirect result, for example, of reduced pork exports and increased domestic supplies of competing meats. A multitude of markets are likely to be impacted and impacts will pulse through markets in a complex set of primary and secondary effects and more. The net effect is difficult to sort out though there is no doubt it is negative.

Mid to late summer supplementation for fall-born replacement heifers

Glenn Selk, Oklahoma State University Emeritus Extension Animal Scientist

Fall born replacement heifers have been (or soon will be) weaned and will be at a very critical growing period. It is important that they grow at about 1.5 pounds per day from weaning until the start of the breeding season. Currently summer pastures are green, growing, and adequate in protein content. However, warm season pastures such as native grass or bermudagrass can be expected to be declining in forage quality in the hot, dry days of July, August, and September. Also these grasses will be reaching plant maturity which accelerates the decline in protein content.

To expect a very high percentage (greater than 90%) to be cycling at the start of the breeding season, the heifers need to be at least 60% of their mature weight. Therefore, the young heifers must receive supplemental protein to continue to grow at the necessary pace of 1.5 pounds per head per day going into their first breeding season. An economical solution would be to give these heifers 1.5 to 2 pounds per head per day of the protein supplement called Oklahoma Gold. This is an OSU-developed protein supplement scheme that consists of a high protein (38% - 45%) pellet that contains the label-recommended dosage of one of the ionophores. Ionophores are feed additives (monensin or lasalocid) that improve feed utilization, inhibit coccidiosis, and enhance the onset of puberty in growing heifers. Research from Texas A&M in the 1970's indicated that heifers receiving an ionophore reached puberty about 2 weeks earlier than counterparts that did not receive an ionophore. Inclusion of the ionophore in the growing program should cause a few more heifers to be cycling early in the breeding season.

The protein supplement will allow microbial digestion of the average quality late summer forage which in turn provides the energy needed to support the desired amount of gain. If forage quantity is very limited, the protein supplement alone will not produce adequate gains. In this scenario, a rancher first needs to decide if keeping more replacement heifers is really in his or her best interest.

Light-weight or young, weaned heifers that need an added boost while still on late summer pasture may benefit more from the Oklahoma Super Gold supplementation program. "Super Gold" consists of feeding 3 pounds per

head per day of a 25% crude protein pellet. Once again, an ionophore is included at the proper dosage and will be beneficial to these young growing heifers. Plan ahead for late summer supplementation of fall-born replacement heifers.

Make a record of twins (or other multiple births)

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Estimates of the percentage of beef cattle births that produce twins vary. One estimate ([Gilmore \(Herd Health, Hoard's Dairyman, 1993\)](#)) puts the percentage at about 0.5% or 1 in every 227 births. Approximately one-half of the sets of twins should contain both a bull and a heifer calf. Make sure to write down these calf numbers of twin births while they are still nursing the cow. Be certain to **not** retain the heifer born twin to a bull as a replacement female.

Freemartinism is recognized as one of the most severe forms of sexual abnormality among cattle. This condition causes infertility in most of the female cattle born twin to a male. When a heifer twin shares the uterus with a bull fetus, they also share the placental membranes connecting the fetuses with the dam.

A joining of the placental membranes occurs at about the fortieth day of pregnancy, and thereafter, the fluids of the two fetuses are mixed. This causes exchange of blood and antigens carrying characteristics that are unique to each heifers and bulls. When these antigens mix, they affect each other in a way that causes each to develop with some characteristics of the other sex.

Although the male twin in this case is rarely affected by reduced fertility, in over ninety percent of the cases, the female twin is completely infertile. Because of a transfer of hormones or a transfer of cells, the heifer's reproductive tract is severely underdeveloped and sometimes even contains some elements of a bull's reproductive tract. A freemartin is genetically female, but has many characteristics of a male. The ovaries of the freemartin do not develop correctly, and they remain very small. Also, the ovaries of a freemartin do not produce the hormones necessary to induce the behavioral signs of heat. The external vulvar region can range from a very normal looking female to a female that appears to be male. Usually, the vulva is normal except that in some animals an enlarged clitoris and large tufts of vulvar hair exist.

Freemartinism cannot be prevented; however, it can be diagnosed in a number of ways ranging from simple examination of the placental membranes to chromosomal evaluation. The cattleman can predict the reproductive value of this heifer calf at birth and save the feed and development costs if he is aware of the high probability of freemartinism. (Source: "The Causes and Effects of Freemartinism in Cattle" by Laurie Ann Lyon.)

In some cases, there are few, if any, symptoms of freemartinism because the male twin may have been aborted at an earlier stage of gestation. Hidden "freemartins" are often difficult to identify if replacement heifers are purchased. Therefore this is another good reason to cull any open (non-pregnant) replacement heifer soon after her first breeding season.

Cows that are nursing twin calves will require an estimated 13% more energy intake to maintain body condition. The additional suckling pressure on the cow will extend the post-calving anestrus period. Therefore, cows nursing twins will take longer to re-cycle to rebreed for next year's calf crop. In some cases, producers may want to consider early weaning of the twin calves to allow the cow to re-cycle in time to stay with the other cows in the herd.

Cow disposition affects pregnancy rate

Glenn Selk, Oklahoma State University Emeritus Extension Animal Scientist

Now we have another good excuse to cull cows due to bad temperament. Producers that routinely breed cows artificially realize that cows that are unruly and nervous are less likely to conceive to artificial insemination. Presumably the lowered conception rates were because they have been stressed as they are passed through the working facilities and restrained while being synchronized and inseminated. Elevated core body temperature could be one reason that conception rates of agitated cows after artificial insemination are lowered. Now it seems that, even in the serenity of a natural breeding pasture, cows with bad dispositions are less likely to conceive when mated with bulls.

University of Florida animal scientists recorded disposition scores over two years on 160 Braford and 235 Brahman x British crossbred cows. They wanted to evaluate the effects of cow temperament and energy status on the probability to become pregnant during a 90-day natural breeding season. Cows were scored as 1= calm, no movement to 5= violent and continuous struggling while in the working chute. Also a pen score assessment was assigned as 1= unalarmed and unexcited to 5 = very excited and aggressive toward technician. An exit velocity speed score was measured as the cows exited the working chute as 1= slowest and 5 = fastest. An overall temperament index score was calculated by averaging the chute score, pen score and exit velocity score. Blood samples were analyzed for cortisol concentrations. Cortisol is a hormone released when mammals are stressed or excited. Increased cow temperament score and elevated plasma cortisol concentrations both were associated with decreased probability of pregnancy.

These results suggest that excitable temperament and the consequent elevated cortisol concentrations are detrimental to reproductive function of cows. These authors concluded that management strategies that improve cow disposition, enhance their immune status, and maintain the cow herd at adequate levels of nutrition are required for optimal reproductive performance. Source: [Cooke and co-workers. 2009 Florida Beef Research Report](#). In addition to the danger that wild, crazy cows create for cattle producers, the wear and tear on equipment and fences, reduced likelihood of reproductive success is another good reason to cull poor disposition from the herd.

Working Cattle in Summertime Heat

Understanding and avoiding heat stress in cattle can be a valuable management tool for summertime in Oklahoma. According to the latest Oklahoma Climatological Survey most areas of Oklahoma have 10 or more days each year above 100 degrees and 70 or more days with high temperatures above 90 degrees Fahrenheit. This means that most cow/calf operations will be working cattle on days when heat stress to cattle is possible. Cattle have an upper critical temperature approximately 20 degrees cooler than humans. When humans are uncomfortable at 80 degrees and feel hot at 90 degrees, cattle may well be in the danger zone for extreme heat stress. Humidity is an additional stressor that intensifies the heat by making body heat dissipation more difficult. The signs of overheating may develop suddenly and depend upon the environmental conditions and the health of the cattle exposed to the heat. Panting often occurs in overheated cattle along with other visible signs such as restlessness, excitement and spasms of certain muscles. A protruding tongue may be covered with saliva, and frothy mucus discharged at the nostrils.

Overheating in cattle can be prevented under most management conditions. If management practices calls for cattle to be gathered and put through a working chute for immunizations, implanting or other operations, then a few common sense rules should be followed.

1) During hot weather, cattle should be worked before 8:00 am, if possible. Certainly all cattle working must be complete by about 10:00am.

- 2) Cattle that must be handled during hot weather should spend less than 30 minutes in the working facility.
- 3) Make every effort to see that cool, fresh water is available to cattle in close confined areas for any length of time. During hot weather conditions cattle will drink more than 1% of their body weight per hour.
- 4) Shade and free air circulation should be provided if at all possible.

For more information on heat management for cattle, contact your local OSU Extension Office.

Storing Large Round Bales

Hay production is almost wrapped up (pardon the attempt at humor) here in Pittsburg County, now is a good time to look at storing round bales. A couple of years ago University of Tennessee animal scientists conducted a trial to compare different methods of storing large round bales of grass hay. The hay was cut and baled in June in Moore County, Tennessee. The bales were weighed at the time of harvest and storage. Then they were weighed again the following January at the time of winter feeding. The following table lists the type of storage and the resulting percentage hay loss.

Table 1. Losses of Hay Stored using Six Methods of Storage

Type of Storage	Percent (%) Hay Loss
On ground, no cover	37%
On tires, no cover	29%
On ground, covered	29%
On tires, covered	8%
Net wrap on ground	19%
In barn	6%

Obviously, it would be ideal to store the hay inside, but that will not often be practical. The next best option is when the hay is stored on something that gets the hay off of the ground under a rain shedding cover. For more information contact your local OSU Extension Office.

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This Newsletter is one way of communicating cattle information to those interested.

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