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**Want  
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# WANT MORE HEIFER BABIES?

by Mark Gilliland

**H**ow many times have you heard a Longhorn breeder complain about the high percentage of bull calves in any given year? Is it totally random, or is there some science behind the sex of our calves?

Bear Davidson once related a story to me about stocking his water tanks with goldfish to reduce the algae. He had a lot of bull calves that breeding season. He removed the goldfish, and the heifer calves returned the following year. I have also complained to Justin Rombeck about the high percentage of bull calves in my herd two years ago. He told me that it would turn around the next year, because we had a lot of rain during the breeding season. When I asked why, he told me that old-timers in the commercial cattle industry had noticed through the years that more bull calves were born when the climate had been dry at the time of conception. During the wet years, there was a higher percentage of heifers. These anecdotal stories may have some scientific basis in sex determination based on the water the cows are drinking and the pH of the reproductive system.

Reproductive medicine is big business in the cattle industry, but it is even bigger in humans. Many couples have two-three children of the same sex and want to increase the likelihood

of having the opposite sex for their next child. As it turns out, there are some preconception factors that can be manipulated to affect the gender of the baby. Both human and bovine DNA have been fully decoded and sequenced. Eighty percent of the DNA is similar. The major difference is an extraordinary duplication in the specific genes related to milk production and digestion. Otherwise, 14,000 out of the 22,000 genes are identical. So, I think it is fair to make some guarded extrapolation from humans to cattle.

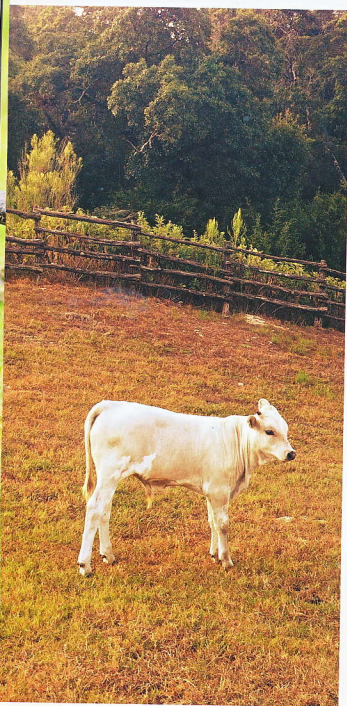
We all know that the DNA in the sperm determines sex at the moment of fertilization. The egg (X chromosome) encounters the sperm carrying an X (female) or Y (male) chromosome. Males have an XY chromosome, females, XX. Y-sperm chromosomes are faster but more fragile than the X-sperm, so they can potentially get to the egg in higher numbers under favorable pH conditions. Experts in human reproductive medicine say the pH environment in the female reproductive tract affects gender of the offspring. An alkaline pH in vaginal fluid will favor Y-sperm (male) because Y-sperm deteriorate quickly in an acidic vagina. Conversely, an acidic pH in the vaginal fluid gives preference to an X-sperm (female) because most of the Y-sperm (male) have

been destroyed. A breeder needs to know the potential environmental conditions that affect pH.

One factor may be the water cattle are drinking. The pH of the water is primarily determined by the fish excretion of ammonia. The fecal solids excreted by fish and the dead algae settle to the pond bottom where they decompose and produce ammonia – a strong alkaline chemical. A cow can drink up to 30 gallons of water in a day, so it makes sense that this ammonia could potentially slightly raise the vaginal pH (normally quite acidic with a pH of 3.5) to a more alkaline environment. If the cows were drinking from a water tank filled with goldfish or drought concentrated pond water stocked with fish, the alkalinity of the water would be higher thus promoting bull calves (Y-sperm swim better in a basic environment). A wet year would dilute the alkalinity towards a more neutral pH, thereby, promoting heifer calves by decreasing the number of surviving Y-sperm in vaginal secretions.

It may be an oversimplification to condemn alkaline water as the definitive cause for a higher percentage of bull calves. Other factors may come into play: (1) Mother Nature has already given a slight advantage

(cont'd)



to male births. Worldwide, approximately 105 baby boys are born to every 100 girls; (2) There is other scientific evidence that a higher caloric intake (i.e. a high glucose level) around the time of conception shifts the odds of having a male from 50 to 55 percent. For some reason, high glucose levels encourage the development of male embryos and inhibit female embryos. Teleologically, this makes sense. If the human race was having a famine during the Stone Age, it makes more sense to preserve the species with more female births. That said, breeders should be extremely cautious about using diet to try to influence offspring sex – especially when the difference is only 5 percent; (3) Finally, there is also evidence that a gene in our DNA controls whether male sperm has more X or Y chromosomes. There are three groups: (A) Y-sperm greater than X, (B) Y-sperm equals X-sperm, (C) X-sperm greater than Y. This means that a bull with many brothers is more likely to sire males; a bull with many sisters is more likely to have females.

In conclusion, none of these ideas have met any statistical standards for absolute validity. I do not really have the time to put fish in a tank, use that as the exclusive water source for my cows, get them in the chute periodically to check vaginal pH during breeding season and monitor calf gender compared to a water tank without fish. However, there are some simple things a

breeder can do to potentially increase heifer births without changing their program much and potentially doing harm.

1. Don't overly stock your ponds with fish and aggressively remove them during the dry years.
2. Don't put any fish in water tanks.
3. Get your cows into body condition score of five or six without making them obese with higher glucose levels.
4. Buy bulls with more sisters than brothers.

These ideas may help, but in the final analysis, it is Mother Nature who decides. Besides, the laws of economics dictate that if we are producing twice the number of heifers with the same demand, we are going to get half the price. Maybe we should be saying that bull calf will make my next heifer more valuable, i.e., there will be some delayed gratification down the line. Still, the first question I inevitably ask when I hear a new baby calf is born is... "Is it a heifer?" If it is, I do as Dale Hunt prescribes.

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