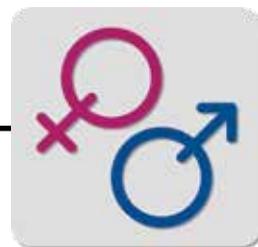


# Double Trouble

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## Freemartins pose unique challenges.

by Heather Smith Thomas

**D**elivering and raising twin calves can be challenging, especially if the cow won't accept or can't feed both calves. If the calves are raised successfully, odds are a heifer born twin to a bull calf is a freemartin — a female with an abnormal or undeveloped reproductive tract, incapable of becoming pregnant.

Specifically, 85-90% of female calves born as twins to bull calves will be freemartins, according to Colin Palmer, DVM, Western College of Veterinary Medicine at the University of Saskatchewan.

Scott Pock, DVM, Extension veterinarian with the University of Missouri College of Veterinary Medicine, explains freemartins are more common in dairy cattle than in beef cattle partly because twins occur more frequently in dairy cattle. He adds there is a higher incidence of twinning in some family lines and breeds.

"At the U.S. Meat Animal Research Center (USMARC) in Clay Center, Neb., they have a line of cattle with a very high percentage of twins. So, it can be partly due to genetics and to production levels with multiple eggs released, and more chance of male-female combinations," Pock says.

### Why freemartins occur

The freemartin is a result of shared hormone exposure in the uterus in early pregnancy, around 30 days of gestation. At that time, the two placentas surrounding the male and female calves can become closely connected or fused which allows exchange of cells and hormones.

"This is the same time some of the organs are starting to develop, including determination of sex," Palmer says. "The fusion of placentas and sharing blood supply can result in variability in how the sex organs develop. There are two reproductive systems developing — the male and the female. Development of the male reproductive system dominates early on. Through the exchange of cells as well as hormones like testosterone, the male chromosome (XY) also becomes present in the female calf (XX) causing the development of a freemartin heifer with a mixed XX/XY chromosome."

In this situation, the males tend to be normal, but the female embryo is impacted by a male hormone called anti-mullerian hormone (AMH).

"This hormone in the male helps in development of the male reproductive tract, but the female is influenced adversely," says Pock. "She is not a hermaphrodite [with both male and female sex organs], but her tract is not fully developed."

### Identifying freemartins

The mix of male and female chromosomes is one reason a freemartin heifer may look less feminine. As she gets past weaning age, she generally looks more masculine, more like a young bull or steer. Freemartins' pelvises also tend to be too narrow.

"The male pelvis is not as big as the female pelvis, and this is also true of a freemartin," says Pock.

Besides often having a more masculine appearance, male hormones can affect freemartin females' behavior.

"These heifers sometimes have masculine behavior, and are more likely to mount other cattle," Palmer says. "They don't have a penis and can't breed, but in their tiny ovaries, they might have what looks like testicular tissue."

He explains they are probably producing more male hormones than a normal heifer, and the extra testosterone leads to bullish behavior.

"They tend to play a little rough, more like a bull, and a few of them can make teaser animals if a person is doing heat detection for AI," he adds.

The reproductive tract in these heifers is not normal, even externally.

"There is generally shorter distance between the anus and the vulva. In a normal yearling heifer there is usually about 3 inches between the top of the vulva and the anus, and in a freemartin these are closer together. The vulva is tiny and the bottom part is often tipped up, with a large tuft of hair beneath it," Palmer says.

When Pock was working with dairies, replacement heifers would often be lined up in the headlocks so he could go down the line palpating and checking for pregnancy. "If I came to a freemartin, my first thought when I stuck my hand in to palpate would be that this is a bull. The pelvis is narrow, and there may be no ovaries or uterus. But then, I looked closer at the back end and realized it was a female, but a freemartin," he says.

### A missing twin

Most producers don't keep a heifer born twin to a bull as a replacement female. There are instances, however, in which they might not know that a heifer was a twin.

"Sometimes, I discover freemartins while preg-checking a group of heifers after their first breeding season. I occasionally find one that doesn't have a normal reproductive tract. Often, it's just a vestigial tract — very tiny and undeveloped," Palmer says. "When I discover a freemartin in a group of heifers and ask if she was a twin, usually the producer claims she was not. The best answer, however, is 'I don't know,' because there might be a situation where one of twin embryos is lost early and the pregnancy continues with just one fetus. Even if you were there at the birth of a female calf — with no bull calf born with her — there might have been exposure to a bull calf embryo in the uterus early in gestation."

“You see a cow with a new calf and write it down that she calved, and that it's a heifer calf, but you might not know that there's a dead bull calf back in the brush, and that the baby heifer is a twin. This happens fairly frequently, and the rancher doesn't realize the heifer might be a freemartin.”

— Colin Palmer, DVM,  
Western College of Veterinary Medicine  
at the University of Saskatchewan

## Freemartin Myths

Since a heifer born as a twin to a bull can be a freemartin, some producers logically wonder about the fertility of a bull born twin to a heifer.

"There was one report that indicates bull calves might not be fully normal and might have problems when they reach puberty, with testicular function, etc. We have raised a lot of twins here, and many were bulls that were twins to heifers. I was aware of that report, so I followed those bulls to see how they did, and they were all just fine," Palmer explains. "I never published our results, but we followed them after they were sold and checked on them later."

Even years later, the bull calf twins seemed to perform well.

"One fellow phoned me later when he was looking for another bull. He was really pleased with the one he had bought earlier. I looked that one up, and it was one of these twins. The bull was 5 years old and had done very well in that client's herd," he says.

One common myth suggests that a bull born twin to a heifer will sire mostly female calves. That is not true. **HW**

By using an early ultrasound to pregnancy-check cattle, such cases of twins are detected, Poock says.

“In dairies we often do an early ultrasound, and again in another month to determine fetal sex or to reconfirm the pregnancy is still there. You might find twins at 32 days, and then do the next ultrasound at 70 days and find the cow only has one fetus. It might be a heifer, but you don’t know if the one that was lost was a bull or if it might have damaged the heifer,” he explains.

While the loss of a bull twin in utero may make it hard to identify freemartins, it’s a rare occurrence.

“Generally, if twins get past embryonic stage [40 to 60 days], if one twin dies, it will eventually cause demise of the other one, but not always,” Palmer says. “The female calf you witnessed being born may be a freemartin if her twin that died early was male.”

In other instances, twins born at pasture might not be observed at birth and one might die — and you don’t realize the surviving heifer is a freemartin.

“You see a cow with a new calf and write it down that she calved, and that it’s a heifer calf, but you might not know there’s a dead bull calf back in the brush, and that the baby heifer is a twin. This happens fairly frequently, and the rancher doesn’t realize the heifer might be a freemartin,” Palmer explains.

If the heifer is selected as a replacement (because she’s larger, like a male calf would be), her true status may not be suspected or discovered until she does not become pregnant.

More producers are calving later in the spring, out on pasture. If a cow has twins and one of those calves is lost, you may not know it. Likewise, if both twins are born, but the cow only mothers one of them, the rejected twin may die or be eaten by predators.

“If the freemartin heifer is palpated later, however, we discover a very short vagina, and her reproductive tract is almost absent,” Palmer says. “When I was teaching veterinary students, they would put their hand in there and get a very puzzled look because what they were finding felt very tiny.”

### Checking for freemartins

There are ways to check a heifer to determine whether she is a freemartin.

“Before the advent of DNA testing, we’d wait until the heifer was a little older and bigger, and use a tube to probe the vagina and see if it was normal or short in comparison with herdmates of similar age,” Palmer says.

Having a veterinarian palpate the animal to determine if the reproductive tract is normal remains a common way to determine if the heifer is a freemartin. Today, though, there is also a DNA test.

“A freemartin has both XX (female chromosome makeup) as well as XY chromosome makeup in her blood and gonadal cells, but not every cell type in the body will express this genotype. If you contact a lab that does DNA testing and want them to see if a heifer is a freemartin, the lab will likely ask for a whole-blood sample,” Palmer says. He explains a hair sample may not be adequate.

If it’s a nice heifer, especially a purebred, the owner might want to ensure the heifer is normal.

“Up to 15% of co-twin heifers are normal, and there is no reason not to keep them as cows,” Palmer says.

If you are selling open heifers as replacement females, testing provides assurance the heifer twin is not a freemartin. **HW**

**Editor’s Note:** Heather Smith Thomas and her husband, Lynn, have ranched near Salmon, Idaho for more than four decades. She also writes cattle articles that appear in numerous U.S. and Canadian cattle publications, including *Hereford World*. She is the author of numerous books, including “The Cattle Health Handbook.”