Investigation on High Twinning Rates in Cattle Using Sanger Sequencing

Figueroa, Lilly (School: Mancos High School)

On average, beef cattle have twins once in every 100 births or a 1% twinning rate. My family's herd of 35 cattle had five sets of twins in the 2020 calving season, which is 14% of the herd. My question was: Was it a genetic factor that caused one in every seven of our cows to give birth to twins? I hypothesized that the cause of our high twinning rate was not genetic, but rather environmental or other. This is because none of the twinning cows were related and none were twins themselves. Determining if genetics played a role will allow agribusinesses to better understand the genetic variants that lead to twinning. To receive results, I extracted hair samples from five of our twinning cows and five of our non-twinning cows to compare. I then communicated with researchers in a university to extract the DNA, determine its molecular weight, quantify samples, complete polymerase chain reaction products, and use Sanger sequencing to produce images of DNA bases. I found that my cows had single nucleotide polymorphism "A" in the same location that is associated with normal fecundity. This supports my hypothesis that none of the ten cows experienced any markers associated with higher fecundity. In turn, the cause was most likely not genetic. I have considered the following as other possibilities of our high twinning rate: change in nutrition, increased rain/snow, or epigenetics. I will be focusing on one or more of these factors for my next project.

Awards Won: