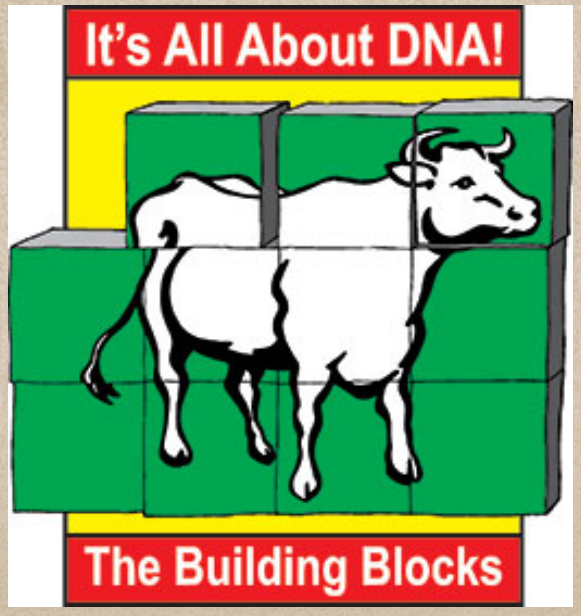
BeefTalk 644: It's All About DNA

SUPPORTING MATERIALS



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Life always has been about deoxyribonucleic acid, which commonly is called DNA. Early discussions about DNA were reserved for chemistry labs. However, as our scientific endeavors increased our understanding of DNA, the concept slowly gained in popular reading, and even grade school science books thoroughly cover the topic.

More recently, technical advances have allowed even more practical uses and applications of technologies that involve DNA. A case in point is that the beef industry now utilizes DNA technology to improve our understanding of beef animals.

To start with, cattle now can be DNA tracked. Just like people, if a cow was somewhere and she left some biological evidence of her presence, such as hair, she can be tracked. The DNA within the hair sample that was found at a previous location could be matched to the particular cow at her current location. Sounds like science fiction, but it is not.

Going even further, parentage can be determined with good probability when DNA samples are available from the potential sire and calves are anticipated to have the progeny of the sire. In fact, some animal breed registries actually require DNA sampling to determine parentage prior to registration.

Although beef registries still are predominately based on paper verification and owner authentication, it is good to know that all future pedigrees can be DNA verified. With the many vials of semen stored in liquid nitrogen around the world, past pedigrees also can be verified.

Again, this sounds like something out of science fiction, but such technology is readily available. The key to the

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advancement of technology is the ability to implement newer technology at the speed of commerce. Once new scientific findings can be mass produced at the speed of commerce, the marketplace will benefit from the technology.

Just like the many new devices we utilize for communicating with each other, the same is happening in the field of DNA. As beef producers, we just can't see new DNA technology like we can a new cell phone. The bottom line, DNA analysis can be done at the speed of commerce and will improve as time goes on. Therefore, as beef producers, we have access to technology that our predecessors did not. That is good, but the usefulness really rests with our understanding of what the technology is doing.

Let me repeat: Life always has been about deoxyribonucleic acid, which commonly is called DNA. These little pieces or strands are various combinations of four nucleic acids. The strand may be long, but all we need to know is that the strand exists.

What is even more interesting is that these strands make up chromosomes, which are the packages that store the DNA. Store is actually a poor term because DNA is stored and used. In very simple terms, each piece of DNA could be called a gene. These genes vary considerably in DNA length and where the various parts of each gene reside. Even the simplest gene is complicated in that it must be refined and shaped to be effective.

These processes also are controlled by the various DNA that is encoded in those long, springlike strands called chromosomes. The DNA helix is something we could ponder, but let's leave that for the afternoon lab class. Let's simply continue this image of these long strands of DNA. That is the point that makes DNA technology function at the speed of commerce.

If we are familiar with old adding machines or the paper that comes from more modern cash registers, one could apply that image to DNA. There are processes today that will read these long segments of DNA and report or print out the various nucleic acid arrangements.

Sounds simple and, in reality, it is. Again, advanced technology is being utilized to read or see something we could not in the past. How we use this new-found information still is in the early stages of development. However, if one thinks back to those wonderful building blocks we played with as a child, those same principles would be in play.

As producers, we will have some capacity to pick and choose what blocks we want to add and what blocks we don't. Unfortunately, the complete genetic process is much more complicated than that.

In its simplest form, those blocks we don't want are easy to eliminate from our breeding populations. Troubling single-gene defects in our cattle populations can be controlled or at least better understood.

May you find all your ear tags.

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