



BeefTalk 645: The Science and Awe of DNA

SUPPORTING MATERIALS

One Word Makes a Big Difference!

Old Textbook Name:

"iGenetics: A Mendelian Approach" by Peter J. Russell.

New Textbook Name:

"iGenetics: A Molecular Approach" by Peter J. Russell.

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For most cow-calf producers, the change probably would go unnoticed. However, the change is huge and so is what we are expected to know. The cow-calf business, or any other segment of the beef industry, cannot be excused from class.

Understanding changing technology is critical to the development of cattle management plans and the subsequent review of herd progress. Today, college students who grew up on farms and ranches raising cattle are expected to spend time in the classroom learning genetic principles as they apply to livestock improvement and the genetic basis of selection and systems of mating beef cattle.

These principles are applied at the ranch for the development of breeding programs based upon the principles of population genetics. A basic understanding of hereditary principles, including gene action, random segregation, independent assortment, sex-linkage, epistasis, mutations and chromosomal abnormalities, are taught. Also taught are polygenic inheritance and population and molecular genetics.

There are some subtle differences from this textbook, compared with the book of a decade ago. The first five chapters in the older textbook are Chapter 1 - Genetics: An Introduction; Chapter 2 - Mendelian Genetics; Chapter 3 - Chromosomal Basis of Inheritance; Chapter 4 - Extensions of Mendelian Genetic Principles; and Chapter 5 - Quantitative Genetics.

The first five chapters in the newer textbook are Chapter 1 - Genetics: An Introduction; Chapter 2 - DNA the Genetic

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The DNA discussion is real and active in the world of beef cattle, so the better one understands it, the better one can utilize the information.

When I started teaching a course on genetics several years ago, the textbook name was "iGenetics: A Mendelian Approach" by Peter J. Russell. This fall, I am teaching the same course. However, the text is now "iGenetics: A Molecular



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Material; Chapter 3 - DNA Replication; Chapter 4 - Gene Function; and Chapter 5 - Gene Expression: Transcription.

In the past, the early components of the course were an introduction to the history of the study of genetics, classical Mendelian genetics and the physical basis of heredity, genetic linkage, multiple alleles, sex determination and chromosomal aberrations. Those topics now are offered later in the textbook as reviews, so students are expected to start their learning with molecular genetics.

These topics include gene replication, function and expression. Population and quantitative genetics, the founding principles of previous livestock improvement, have been moved from chapters 5 and 24 to chapters 21 and 22. These chapters develop the application of genetic principles to population genetics and quantitative inheritance as they relate to the breeding and improvement of animals.

Some might say: So what? The point, if we discuss DNA, is that we can put DNA into nice advertising and we can incorporate new technology involving DNA into our cow-calf systems.

If we better understand the science of DNA, we will be able to better understand what we are asking of the technology we are trying to implement. Even beyond that, we cannot help but stand in awe at these marvelous biological systems that function even though we may lack all the skills and technology to truly get involved.

Perhaps that is why both textbooks conclude with a chapter on molecular evolution. We may not ever truly understand life, but our understanding of genetics certainly has improved. Our implementation of technology will rest with our ability to evaluate and discuss the complex principles guiding genetics and associated animal breeding plans.

As producers who seek to understand more about this simple term called DNA, we will be able to analyze more critically and propose better solutions to the problems related to genetics and animal breeding on our farm and ranch operations.

Gregor Johann Mendel from the Augustinian Monastery was the founder of the science of genetics. As with any new field of science, he probably did not understand totally just how much impact his early science would have on the world.

Now is the time to engage the world of DNA as it relates to genetics and animal breeding and to seek to better understand it.

May you find all your ear tags.

Your comments are always welcome at <http://www.BeefTalk.com>. For more information, contact the NDBCIA Office, 1041 State Ave., Dickinson, ND 58601, or go to <http://www.CHAPS2000.com> on the Internet.

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