

## Farm Update

Our area has had a comparatively cool summer with average rainfall except for September when rainfall has been 500% above normal. This should translate to some good fall pasture, which is a rarity in Oregon. Breeding season has been quite successful as we have initiated our new IVF embryo production model utilizing the latest technology. Our first IVF calf is on its way. Some of the bulls we expect calves from next year include Mandalong Super Flag, Mollie's Defender Adair, Columbus, and Pleasant Dawn Seal 2nd. Definitely an eclectic group of bulls that will infuse some long lost genetics back into the Shorthorn breed.

Quarterly Topic: Diminished Shorthorn Genetic Diversity: Are We Headed For A Crash?

## Prologue

Recently there has been a lot of discussion within the Holstein breed about the fact that over 99% of all Holsteins (9 million cows) trace to only 2 bulls that were born in the 1960s. This means that there are just two different Y chromosomes in almost all Holstein males effectively narrowing the genetic base contribution of Holstein bulls. How this can happen, and its possible implication for Shorthorns, will be discussed. Many of the changes happening in the Shorthorn breed are also occurring in all types of livestock as breeders try to maximize production with little deference to the negative impact of this narrow selection process.

## History

For over 100 years, essentially 1850-1950, Shorthorns were the most popular purebred breed of cattle in the world. Because of this Shorthorns had a very diverse genetic base since many different bulls were utilized throughout the world. With the change in dominant cattle breeds, Holsteins became the dominant milk breed and Angus became the dominant beef breed. Beginning in the early 1950's the number of Shorthorns registered started to decrease and essentially they have been decreasing ever since. As Shorthorn breeders exited the industry many Shorthorn genetic lines were also lost as many Shorthorns simply went to slaughter resulting in a loss of their genetic contribution to the gene pool.

## Changing Genetic Selection

As breeders have tried to focus on single traits or on show cattle they lose many genetic traits that may be important to maintaining a sound animal. Certainly that has been the case with Holsteins as breeders chased higher milk production. In Shorthorns, particular show bulls have often dominated with resultant loss of many utilitarian genes that made Shorthorns so popular for so many years. The disregard for genetic balance eliminates many genetic options and produces what I call "cookie cutter" cattle. Probably the most famous historical example

in Shorthorns of a particular bloodline becoming preeminent was the “Duchess mania” in the mid-nineteenth century when there was an attempt to make the Duchess line dominant in the Shorthorn breed. Prices of “Duchess Shorthorns” escalated as the fad peaked, then because of the constant inbreeding the “Duchess Shorthorns” were pushed toward infertility. As breeders came to realize there were tremendous negative consequences from this type of narrow emphasis, prices crashed and outcrossing took hold in an attempt to resurrect functional Shorthorns.

### Artificial Insemination

The increase in the utilization of artificial insemination (AI) has definitely been an important part of the loss of genetic diversity in cattle as single bulls may sire tens of thousands of calves in a lifetime instead of hundreds. This increases the impact of an individual bull while decreasing the overall gene pool. Artificial insemination has been used more in dairy cattle than in beef cattle, but it has affected both. Since Shorthorns encompass both dairy and beef, a consequential loss to the Shorthorn genetic base has taken place. This has happened as Beef Shorthorns have concentrated on particular traits, such as birth weight, while Milking Shorthorns have fixated on milk production.

### Impact of Genetic Defects

Genetic defects also can play a significant part in the loss of genetic diversity if a very popular bull is a hidden carrier for a specific defect. The popularity of the bull will cause his genes to be infused throughout the breed. When the defect raises its ugly head there is a rush to the exit door as animals carrying his blood are sent to slaughter with the concomitant loss of many of the other attributes that make for a distinctive useful breed. The best example of this is dwarfism in Herefords. It took Herefords a long time to recover because the dwarfism gene became so pervasive that many Herefords were shipped and their good genes lost. Genetic defects such as Tibial Hemimelia (TH) in Beef Shorthorns and Haplotype Cholesterol Deficiency (HCD) now seen in Milking Shorthorns, (through the introduction of Holstein blood), are examples of genetic defects that can result in culling and elimination of both bad and good genes from the gene pool.

### Crossbreeding

Finally the ongoing dilution of the gene pool by crossbreeding is a huge issue because as pure Heritage Shorthorn genetics are not selected for, they are subsequently permanently lost. Most modern Shorthorns are really crossbreeds in the sense that the beef side has incorporated Maine Anjou while Milking Shorthorns have added Illawarra along with Red and White Holsteins. As was discussed in a recent prominent cattle forum, many Milking Shorthorn owners would be surprised to find out how little true Milking Shorthorn blood is in their cows despite having the Milking Shorthorn moniker. It is believed there are only about 500-700 pure Heritage Shorthorns left in the world and many of those trace to just one large herd. At least

the Shorthorn breed has more to work with than the Angus breed as it is thought there are only 200 pure Heritage Angus left in the world.

### Genetic Diversity In Shorthorns Today

Regrettably all of the aforementioned causes of diminished genetic diversity are impacting today's Shorthorns. The number of both Beef and Dairy Shorthorns registrations has decreased dramatically in the last seventy years resulting in a decrease in diversity as particular bloodlines are "wiped out". Many Shorthorn breeders have embraced the concept of limiting their selection process to a single trait, such as milk production or birthweight. Show sires often predominate in Beef Shorthorns since "ribbon chasers" believe that a particular show bull will put them in the winners circle thus focusing only on his genes in their breeding programs. AI has allowed certain bulls to dominate the breed to its detriment. Crossbreeding has introduced several major genetic defects into Shorthorns which never existed before. Crossbreeding also has a huge impact as pure breed characteristics are lost and with it the potential for true heterosis when Shorthorns are used in crossing with other cattle to intentionally create composites. All of these factors have played a significant role in diminishing the genetic diversity in the Shorthorn breed.

### What Can Be Done

Fortunately the Shorthorn breed still has options to not only maintain but increase breed diversity. There is a large amount of Heritage Shorthorn semen still sitting in semen tanks across the USA from a very diverse group of bulls, from as far back as the 1950's. This group of bulls would include mostly Dual Purpose Heritage Shorthorns with certain bulls tending to be either more beef or more dairy. With this semen, and proper selection parameters, many of the specific genes that made Shorthorns a special breed can be reintroduced while rebuilding their gene pool. It will take a lot of foresight and discipline by concerned Shorthorn breeders but it can be done. I know of several Heritage Shorthorn breeders already taking this approach with very positive results. Given the evolving cattle industry it is unrealistic to expect Shorthorns to return to their "glory years" but there is absolutely no reason why they can not play a significant role in the cattle industry instead of joining the many other cattle breeds that have lost their way and are no longer considered genetically viable.

Shorthorn Bulletin Topic for Volume 5 Issue 1: Turning The Cattle Business Upside Down

