What Difference Does How Many Years A Bull Is Used Make ? Something To Think About

Assumptions

The bull and his descendant bulls will produce ten offspring per year: Half bulls and half heifers.

One of the bull calves produced each year by this bull and his descendant bulls will be sold for breeding. The others will be raised for meat.

The cows produced by the bull and his descendants will breed for 10 years.

Nb = number of years the bull and descendant bulls are used for breeding.

In this situation:

The number of bulls with ½ the genetics of the original bull is Nb and the number of cows with ½ the genetics is 5Nb

The number of bulls with ¼ the genetics of the original bull is NbxNb +5xNb and the number of cows produced with ¼ the genetics of the original bull is 5xnumber of bulls with ¼ genetics.

The number of bulls with 1/8 the genetics of the original bull is NbxNbxNb+10xNbxNb + (NbxNcxNc)/4. The number of cows with 1/8 the genetics of the original bull is 5 x the number of bulls with 1/8 the original genetics.

The following chart shows these numbers for different values of Nb-“how long people are using their herd bull”.

Nb-years bulls breed	3 years	4 years	5 years	8 years	10 years
Bulls 1/2 genetics	**3**	**4**	**5**	**8**	**10**
Cows1/2 genetics	**15**	**20**	**25**	**40**	**80**
Bulls ¼ genetics	**24**	**30**	**50**	**104**	**150**
Cows ¼ genetics	**120**	**150**	**250**	**520**	**750**
Bulls 1/8 genetics	**192**	**324**	**500**	**1352**	**2500**
Cows 1/8 genetics	**960**	**1620**	**2500**	**6760**	**12500**
Years for all to be born:	**13**	**16**	**19**	**27**	**34**

This is a very important chart for yak breeders to think about:

First: As you consider the shear size of the numbers you quickly realize their impossibility since as the number years bulls are allowed to breed the number of offspring with 1/8 the genetics is greater than the size of the entire US yak herd. The actual numbers of offspring are limited by:

- The number of ranches to purchase the breeding bulls being produced;
- The fact that there aren't enough cows in the US herd for the bulls to breed;
- And by losses of animals as they mature.
- The actual numbers as Nb (number of years breeders are using their bulls for breeding) increases aren't important. What is important to see is how quickly the number of yaks with ¼th and 1/8th the genetics of the original herd sire grows. If you go back to around 2015, it seemed like every yak pedigree had Dreadlock, Prince Allente, Escalade and later Chewbacca somewhere in it. These were great bulls and they produced a large number of offspring (high Nb) including bulls that were sold to other breeders who used them to produce large numbers of yaks with one quarter their genetics and so on. These bulls and several others literally had built much of the registered US yak herd at that time (and much of the unregistered herd).

Second: A large Nb, which results in a significant percentage of the US yak herd having ¼ and 1/8th the genetics of a particular bull, increases the Coefficient of Inbreeding of the US herd as mating pairs are more likely to have common genetics. Note: The current Coefficient of Inbreeding of the US herd was calculated to be 43%.

Third: A high Nb such as ten, which has been and is still common for yak breeders, results in a significant percentage of the US yak herd having genetics of a specific breeding sire twenty-five years out. At this point you start having breeding pairs both of which have having genetics which trace back to the original sire; and if that original sire had a harmful or deadly recessive gene and if that gene has been passed on to both yaks in the breeding pair there is 25% the recessive gene will affect the offspring. Note: As discovered in the beef industry when artificial insemination allowed bulls great number of cows, it took about twenty-five before the evidence of a recessive gene in the original sire showed up. By that time all pone could do was to make sure both cattle in a breeding pair did not have lineage tracing back to the original sire.

Third: Because a large proportion of the US yak herd's genetics do trace back to a relatively small number of bulls from the early 1980's, about forty years ago. The evidence of a recessive gene in one or more of those bulls that much of the US herd developed from should now be present. The only way we will know if abortions, still born births, and different physical anomalies in calves were caused by a recessive gene is through record keeping: With annual birth and lineage information for every pregnancy being kept by every breeder and transferred to a common data base for analysis. This data collection and analysis is important since the only way to stop the impact of a recessive gene is by knowing what yaks cannot be paired due to common lineage to a bull (or cow) with a harmful recessive gene.

Fourth: As we consider what the implications of this chart with respect to breeding practices (Nb used) and the very real possibility of a recessive gene being present (The Beef Industry has seven recessive genes they must take into account in determining breeding pairs):

- We need to determine how many years we will use a bull in our breeding programs. And, unfortunately, we can't just sell the bull as who is using him for a herd bull does not make any difference. The bull must be retired.
- We need to include examination of lineage to minimize the chance of both animals in our breeding carrying a possible recessive gene.
- We need to consider keeping records of all our herd pregnancies, their outcomes and lineages of the sire and dam and the development of a national data base through which the identification of recessive genes and the lines they are in could be identified. Note: This does not mean the line is a bad line or that some animal in the past was "bad". Recessive genes just "happen" and we need to know what they are, what they cause, and how to avoid them in our breeding programs.