

- Elk were first imported and wild released into Fiordland, New Zealand March 3rd 1905
- Commercially farming elk in New Zealand commenced in the late 1970's
- Importing North American pure elk into New Zealand commenced again in the early 1980's
- The term "wapiti" is used to describe elk that were derived from wild animals captured from Fiordland.
- The term "elk" is used to describe animals that were imported or derived from parents of animals imported from North America in the 1980's
- Science can now define the percentage of pure elk genetics in individual animals using the Genometer TM

Elk and Wapiti: the New Zealand definition.

To anyone outside the New Zealand deer farming scene the use of a combination of both elk and wapiti descriptively could be slightly confusing as both descriptions are essentially the same animal.

“Wapiti” (white rump deer) is the American Indian name given to elk. The first 18 imported elk, reportedly originated from the herd in Yellowstone National Park, Wyoming (but sourced from New Hampshire and San Francisco zoological parks) and gifted to NZ v by President Theodore Roosevelt, were liberated in George Sound, Fiordland, on the South Island of New Zealand on March 3rd 1905. It was thought at the time that these were of the sub species *Cervuselaphusnelsoni*. (Known as *Rocky Mountain Wapiti*) This subspecies is characterised as slightly smaller in height, but with a strong heavy body and were famed for strength and beam of classic typical elk antlers.

Interestingly in recent times there has been a view that some of these original wapiti, had a connection with the Murrumbidgee elk (now recently (1700-1800's) extinct that was an East coast mid west USA elk that was characterised by silver coloured massive antlers and a short stock body. That speculation remains as that.

In New Zealand we would now typically look at a larger elk type animal and describe it as either a New Zealand Wapiti or an elk. This came about with the evolution of deer farming and specifically wapiti farming which got underway in 1978 when a number of wapiti type animals were live captured from the Fiordland herd. These captured animals were selected from wild cross bred (crossed with wild red deer) animals. Although the 1905 pure elk were released into an area of Fiordland where there was no other deer, wild red deer soon moved south into the Wapiti country and cross breeding ensued. These captured animals were selected from wild cross bred (crossed with wild red deer) animals.

These first farmed elk in most cases were phenotypically elk looking. On the farm these animals were most often described as “Fiordland Wapiti”. In the early 1980's pure imported elk were again arriving in New Zealand from North America. It is at this point that a clear descriptive distinction evolved. The newly arrived imported animals were most often described as “elk” and considered to be of the subspecies *Cervuscanadensisrooseveltii* or *manitobensis*

Separating the two descriptive groups is also possible by way of physical size. The farmed wapiti animal would be identifiable to some extent by body weight difference and using females (cows) as an example the wapiti type animal as we know it could

weigh anywhere from 150kg through to 230kg. Typically the imported elk cow would weigh from 230kg through to 325kg.

At the turn of this century the distinction between the two groups is largely ignored and in most case with crossbreeding between the farmed New Zealand "wapiti" animal and the "pure imported" animal has resulted in "New Zealand elk". These animals in some cases would test "pure" matching the genotype values of the original pure imported North American elk.

The Definitions within the NZ context were somewhat aided in the early 1990's as DNA karyotyping, and further refined tests were developed, primarily at Invermay, through the GenomNZ lab.

At the time there were also concerns in imported English and German and other European sources of red deer that in history Elk had also been present some the great hunting herds. Breeders wished to clarify Red purity through DNA genome typing. A series of 12, then 14 specific gene alleles that were distinct to known pure red deer (essentially the wild Minaret deer liberation herd in Otago), and elk from North American and imported samples. The test compared the frequency that these alleles would be expected to be expressed across a range of pure sources genotypes, (it assumed that the deer were red) and tested for the degree of elk strains hybridisation that were expressed if present.

To clarify, in a crossbreeding elk to red programme not all the 14 specific genes will be expressed, but the nearer to the end type of either red or elk gets the combined frequency of expression scores get closer to the maximum total of ~23 units.

Ie , the purest expression (100%) of an elk from North America would score 23 and there would be little or no standard deviation around that score.

The reality is that the test in nature will never be perfect, primarily as it assumes that the animal is a red deer and tests the divergence from that.

This test has become the Genometer™ which is now used as a visual and graphic indicator of % elk genes in an elk wapiti. As with all biological tests, the results are expressed as a point and a defined standard error bar that accounts for the small biological variations around the mean, in effect a confidence level for the % figure quoted.

The lab and Invermay scientists (Dr Mike Tate) worked with the society to put some definitions and metrics around the NZ farmed elk wapiti, imported elk strains and the commercial crossbreds or as industry commonly refers to them as hybrids.

The society members provided DNA samples of all the imported elk and tested them, plus added sample data from existing elk farms in Canada, which had a history of certainty that there was no risk of red or sika crossbreeding with elk and defined scores that gave a lower allele frequency score for pure elk. This was in rounded terms about 19 out of a potential of 23 and the full range of scores between 19-23 were seen in the sampling.

That allowed confidence to define a pure end strain of Canadian elk (with all the dangers of using the word pure) with a Genometer score of 19 or greater or 90% plus on the graphical expression of that.

The EWSNZ defined these accurately as elk, with the implication that they were the original or within breeding lines progeny of the recent imports (since 1983). The society also initiated the first deer stud book with these animals registered to that with pedigree and genotype defined.

The Society then set the following objective definitions for the broad range of crossbred deer or hybrids, Fiordland wapiti, and proposed a new term for use to aid understanding as NZ Elk, to allow breeders who had base Fiordland wapiti cows and wanted to use imported new blood to upgrade these cows to the "pure or 90% or plus 19 score defining level. The EWSNZ also had access to a large number of genuine F1 50:50% elk X reds genotypes that had been produced at Invermay and could define the first cross genotype, which by definition has the highest minimal variation as progeny of the end type red and elk sires or dams)

Definitions then became

Elk or North American elk (or informally) pure elk; recently (modern imported Parents or DNA pedigree verified progeny (and at one time registered with the Society's formal register)

- Features were Genometer score of 19plus, minimum 90% with the Standard Error band on the Genometer scale and verified imported origins.

NZ Elk Upgraded elk using imported bloodlines across Fiordland wapiti to achieve the definitions above

Fiordland Wapiti. Assumed derived in NZ from base stock from the national Fiordland herd scoring between 50-90% on the Genometer and ~12-19 on the allele frequency curve.

- It was noted that there will always be a grey area at this level for some Fiordland wapiti in upgrading programmes with imported elk genes to not make the 90%,19 score threshold. The Society consider that individual pedigrees could distinguish these by breeding origin, but a separate sub class defining an upgrading transition was unnecessary

F1's First generation cross between imported or verified North American Elk and red deer(DNA pedigree verified)

Hybrids or crossbreds. Any deer with elk genes identified by pedigree or genometer that scored 50% or less on Genometer. The Society accepted that in terms of a starting point or a working definition of crossbred hinds that 25-50% elk genes was a useful description and that below that progeny were in effect commercial hybrids more destined for the early venison trade.

Currently with the advent of the industry's Deer Progeny Test (DPT) and the inclusion of elk /wapiti into this, and the hope that all deer can be recorded and reported on DEER Select with Breeding Values and Indexes on the same baseline, the definition and accurate description of elk/wapiti bloodlines and their progeny and terminal sire uses will again emerge as an important understanding in the industry.

Regardless of the descriptive range to identify New Zealand elk and crossbreds deer farmers in New Zealand are privileged to be still farming elk and we are indebted to President Roosevelt who encouraged the 1905 shipment of elk to New Zealand and to those who imported the pure elk of the 1980's.