



GENETICS OF THE SURI

There have been many debates about the genetic inheritance of the suri. Most of what we know is based on observation and experimentation rather than actual scientific research. Australian geneticists seem to agree on the following principles.

SURI/HUACAYA FLEECE TYPE

The gene that determines fleece **type** (suri/huacaya) is found on a single locus on the chromosome. The gene has two different alleles: suri (denoted by "S" and showing a fleece type that hangs down in locks) and huacaya (denoted by "s" and showing a fleece type that grows perpendicular to the body in bundles). The alleles interact with each other in a dominant-recessive manner.

In determining the fleece type, there are two phenotypes (what the fleece looks like). Suri and Huacaya. However, there are three genotypes (the genetic makeup of the fleece). Because the huacaya fleece is seen when only the recessive allele is present, the genetic make-up of the huacaya fleece type must be "ss". The suri fleece type is dominant and will be seen whenever there is an "S" allele present. Therefore, we have two genotypes..."SS" and "Ss".

We know that the offspring receive a *random* sample of half the genes in a series from each parent. When an animal has an identical pair of alleles (ie. "SS" or "ss") it is said to be homozygous for that trait. When an animal receives different alleles from each parent (ie. "Ss") it is said to be heterozygous for that trait. Perhaps a graph will illustrate this better:

Two homozygous suri's (SS) will always result in homozygous offspring. The parents genes are on the edge of the graph and the offspring are in the boxes.

	S	S
S	SS	SS
S	SS	SS

Two heterozygous suri's (Ss) will result in one chance of a homozygous suri (SS), two chances of a heterozygous suri (Ss) and one chance of a huacaya (ss).

	S	s
S	SS	Ss
s	Ss	ss

A homozygous suri (SS) crossed with a huacaya (ss, always homozygous) will result in a heterozygous suri (Ss) every time.

	S	S
Ss	Ss	Ss
Ss	Ss	Ss

A homozygous suri (SS) crossed with a heterozygous suri (Ss) will result in two chances of a homozygous suri (SS) and two chances of a heterozygous suri (Ss).

	S	S
SS	SS	SS
Ss	Ss	Ss

In crossing suri and huacaya phenotypes, we do NOT embark on several generations of upgrading from a huacaya to a suri. The suri gene is seen in the first generation of offspring. A third or fourth or even tenth generation suri is no better than a first generation suri with regard to fleece TYPE. A huacaya produced from two suri parents will *never* throw a suri offspring as it does *not* have a suri gene. A homozygous suri is not necessarily better than a heterozygous suri. The **quality** of a fleece is determined by the fleece **characteristics** not by the fleece **type**. These genes that determine fleece **quality** are separate from the gene that determines fleece **type**.

SURI/HUACAYA FLEECE QUALITY

The genes that determine fleece **characteristics** (fineness, density, character, etc) appear to be separate from the gene that determines fleece type. They are large series of gene pairs. The genes interact in a co-dominant manner and contribute incrementally to the traits. The **quality** of the offspring's fleece will usually fall *between* the quality of the sire and dam.

Again, findings from research on alpacas have yet to be published. Most of what we know is derived from experimentation and adapted from other fleece industries (mainly sheep and goats). Whether huacaya or suri, the goal is to produce animals that are homozygous for traits that determine fleece **quality**. We want fine animals to produce low micron offspring EVERY time. We want to improve density and fleece weight in our herds by using sires that improve this trait EVERY time. We are working on producing huacayas that pass on well-defined crimp to *all* their offspring and suris that have well-structured locks all the way to the skin. When our animals produce offspring with improved traits in these areas every time, then we are producing homozygous animals for all these traits. This homozygous animal is far more valuable than one that is just homozygous for fleece type.

Genetics is a confusing issue, especially as we don't have all the facts and often play guessing games based on experience. However, as more research is done on larger numbers of animals, our guesswork will be replaced by a true understanding of the underlying gene action that produces outstanding animals.