

When in doubt, test it

By Marike Hillocks, geneticist, SA Stud Book



Genomic testing is no longer a buzzword among goat breeders – it is reshaping the future of livestock breeding. At its core, genomics has the potential to unlock the secrets hidden in an animal's DNA. By understanding an animal's unique genetic blueprint, breeders can gain valuable insights into key traits, identify potential health risks associated with undesirable genes, and make more accurate predictions about the genetic potential an animal will pass on to future generations.

With SA Stud Book's new goat genomic services, breeders can refine estimates of genetic merit, safeguard pedigree integrity, and identify carriers of desirable single genes and undesirable mutations that influence herd performance.

What is genomics?

Every goat carries a genetic 'instruction manual' or DNA in each of its cells, determining traits such as growth, fertility, milk production, coat colour, and disease resistance. These traits are complex, influenced by multiple genes and environmental factors.

Consider a producer like John, who began breeding goats using only visual assessment and experience. He could identify a promising kid from across the kraal – a sturdy frame, a glossy coat, a doe that raised twins with ease. For many years, this approach worked reasonably well.

Yet there was always a surprise of some kind. A promising young ram that sired weak offspring. A doe from a top bloodline that struggled with fertility. Disease outbreaks that sometimes affected the animals he least expected. Some goats handled drought conditions better than others, while certain coat colours proved difficult to maintain in

a breeding line. These inconsistencies reflect a fundamental biological reality: phenotype does not always accurately predict genotype.

Genomics bridges this gap. John soon learned that it does not turn farms into laboratories or change animals – it reveals the genetic potential already present within the herd, giving producers the tools to make smarter breeding decisions.

From BLUP to genomics

Traditionally, producers estimated genetic differences by observing the performance of animals and their relatives. Animal geneticists later formalised this process by developing best linear unbiased prediction (BLUP) breeding values to capture performance differences between animals, account for family relationships, and estimate how much of that performance is passed on to the offspring.

Genomics represents the next major step forward. Instead of relying on guesswork, breeders now have insight into the animal's genetic blueprint. Genomic information improves the accuracy of breeding values (especially in young animals), selection decisions before animals have progeny, helps identify hidden genetic defects, and reduces a major limitation of traditional selection systems, namely good management (such as nutrition) that can mask poor genetic potential.

Returning to John's herd, he decided to test a small group of goats. The results were eye-opening. One of his most impressive-looking rams tested genetically average for growth and below average for fertility. Another ram, previously overlooked, carried strong genes for disease resistance and maternal performance. Without genomics, he would have made the wrong choice.

What SA Stud Book offers

- 100% parentage verification (if both parents and offspring are tested).
- Disease information, such as scrapie/lentivirus resistance status.
- Coat colour traits.
- Fertility traits.
- Milk production traits.
- Faster genetic progress.

The bottom line

Genomics does not replace good farming practices – it strengthens them. Nor does it eliminate the need for the producer to accurately record performance. Observation, measurement, and instinct remain vital, but genomics adds a new dimension: insight into an animal's DNA. Superior herds are built by integrating phenotype, pedigree, and genotype. The genetic potential is already there; the advantage lies in measuring and using it correctly.

Integrated recording: Where genomics meets Logix

Genomics delivers maximum value when combined with structured recording systems. In South Africa, this integration occurs through Logix, which combines pedigree, performance, and genomic data into a single evaluation framework.

Within Logix, pedigree data define relationships among animals; phenotypic records (weights, reproduction, milk, health) quantify observed performance; and genomic data add marker-based relationships and identify sampling differences. These information sources are combined in a unified evaluation (BLUP + genomic information), resulting in genomically enhanced breeding values. **SF**