TOMORROW'S SHEEP INDUSTRY AND THE ROLE OF TAIC

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The Australian sheep industry today is vastly different to the one we all remember 20 years ago. The use of technology and genetic benchmarking has made extensive contributions into both lamb production and processing resulting in the industry leading the world in genetic gains. The use of DNA in predicting a whole range of traits; some we have previously been able to measure, some we have previously not be able to evaluate, has been instrumental in achieving this status through the findings from the Sheep CRC research program. The recent granting of a contract to run a Satellite flock at TAIC is crucial in ensuring the ongoing relevance of these findings.

There is little doubt the genetic gains we have made in a relatively short time frame have changed the suitability to market of the sheep we are now breeding. From the 18-20 Kg lambs, fat score 5 lambs that our fathers produced, we are now able to turn off lambs at much higher carcase weights with lower fat score values, a result of focussing on specific selection for individual traits. The same applies to the wool industry where the relationship between micron and fleece weight has been broken to allow increasing fleece weights without sacrificing micron. As we have increased growth rates across all breeds, we have been able to control the expected increase in birth weights to ensure our animal welfare and management issues are not compromised. All this, and much more, has been a result of the use of performance benchmarking through the use of ASBV's generated by Sheep Genetics. However, the generation of these ASBV's has been limited to those traits that breeders can realistically measure and record. The investigation of using DNA technology by the Sheep CRC has transformed not only the accuracy of the breeding values but enabled the evaluation of a whole new range of traits that previously have not been able to be measured or have been difficult to evaluate. The area of Meat Eating Quality (MEQ) is the one area that has been main focus and there are others that will come into relevance as further investigation continues.

The use of DNA to predict an individual animals performance and MEQ traits has been developed through the generation of massive amounts of data from 7 resource flock sites around Australia which has now been reduced to just 2 main sites, Katanning in WA and Kirby at Armidale (NSW). The cost to maintain this reference population to continually update the genomic correlations has been a main concern for most within industry and the development of the Satellite flock at TAIC is the next step in ensuring that the gains made

over the past 9 years, continue in providing accurate genomic information to the sheep industry and a blueprint for future flocks.

The process of linking DNA to both phenotypic and hard to measure traits is achieved through the analysis of a SNP (pronounced "snip") chip which contains 50,000 pieces of DNA or SNP's. In simple terms the presence or absence of these SNP's determines the presence or effect those SNP's have on the expression of that trait. DNA is collected on a blood card and sent to laboratories in America for processing. The information comes back to Sheep Genetics Australia and is presented to breeders or industry as a breeding value in the same way that ASBV's are expressed. Analysis is

200 ewes have been artificially inseminated to 61 sires comprising of predominately Poll Dorset and White Suffolk genetics with a few Southdown and Suffolk sires. These ewes are due to lamb early July which will kick start a whole range of measurements and data recording on each lamb including collection of DNA which will then be analysed against recorded data. When the lambs reach saleable weights, they will be sent as a group to a major processing plant where further measurements relating to carcase specifications will be conducted including samples for the calculation of MEQ traits such and Intra Muscular Fat and Tenderness. These lambs will also be trialled to evaluate the use of a machine to measure in-line the Intra muscular fat content of the lamb carcase. The cost to gather this level of information is high but essential if the relationships between DNA and the measured traits is to be maintained.

The process of constantly re- evaluating these relationships is essential as they begin to lose accuracy after 2-3 generations due to the introduction of new genetic lines and they cannot be cross referenced across breeds. The flock at TAIC is the first prototype of how we may continue to update the database into the future. Dedicated seedstock producers already provide much of the information needed through DNA testing their sires and collecting a lot of phenotypic information such as weights, muscle and fat scan information and reproduction data. The need for a specialist flock such as the satellite flock is required to collect the information on the hard to measure traits such as MEQ and LMY (Lean Meat Yield) and provide a central point where a large number of sires can be evaluated under the same conditions. Not only will it provide the necessary genomic information, but allow an evaluation of how to manage and make best use of smaller flocks to ensure maximum gain from what is essentially a commercial operation. The flocks at Katanning and Kirby are much larger and specialist research flocks designed to provide the bulk of the information; going forward can satellite flocks either supplement or potentially replace the need for expensive larger flocks. As the processing of the lamb carcase samples are the main expense, how can we make best use of available resources into the future.

The flock at TAIC is much more than just another sheep flock producing lambs. It will provide a template as to how the industry continues to validate the information developed to date and ensure that the Australian lamb industry continues to lead the globe in genetic gains.