



final report

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Executive Summary

Routine analyses for Sheep Genetics have been completed on a fortnightly basis without interruption. A significant number of additional research and development runs were also conducted, usually arising from ongoing consultation between AGBU and Sheep Genetics. Several new versions of OVIS have been developed which add additional traits as well as other functionality to improve estimation of breeding values. The programs which run the routine analyses have been enhanced significantly to use these new versions of OVIS and associated parameter files. Each time changes have been made significant amounts of testing were performed and reported to Sheep Genetics and the Sheep Genetics Technical Committee.

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1 Background

Sheep Genetics (SG), a business unit of Meat and Livestock Australia, provides genetic evaluation services to Australian and overseas sheep breeders. Sheep Genetics wanted to continue the arrangements of the last four years where AGBU provided the routine fortnightly evaluations for all SG clients as developed and approved by SG executive committee. This project was funded to undertake the routine genetic evaluation at AGBU for the period July 2010 to June 2016.

2 Project objectives

- Maintain sufficient computer hardware (plus backup) to accommodate two runs per month for each SG sheep evaluation in Australia and for overseas customers using OVIS software.
- Perform evaluations for all SG data sets to an approved timetable using approved models and parameters using the OVIS software, calculate approved Indices using the Sheep Object system or other subroutines and provide diagnostic support.
- Test new parameters and traits for genetic evaluation into OVIS as approved by the Technical Committee of SG.
- Develop and contribute to improved diagnostic and reporting tools and internet solutions

3 Methodology

3.1 ASBV's delivered on time

3.2 Diagnostic support provided as required

3.3 Provision of suitable hardware to maintain acceptable run time

3.4 Timetable of runs firmly embedded into the R&D group's modus of weekly operation.

3.5 Test protocols for new software, models and parameters updated and documented

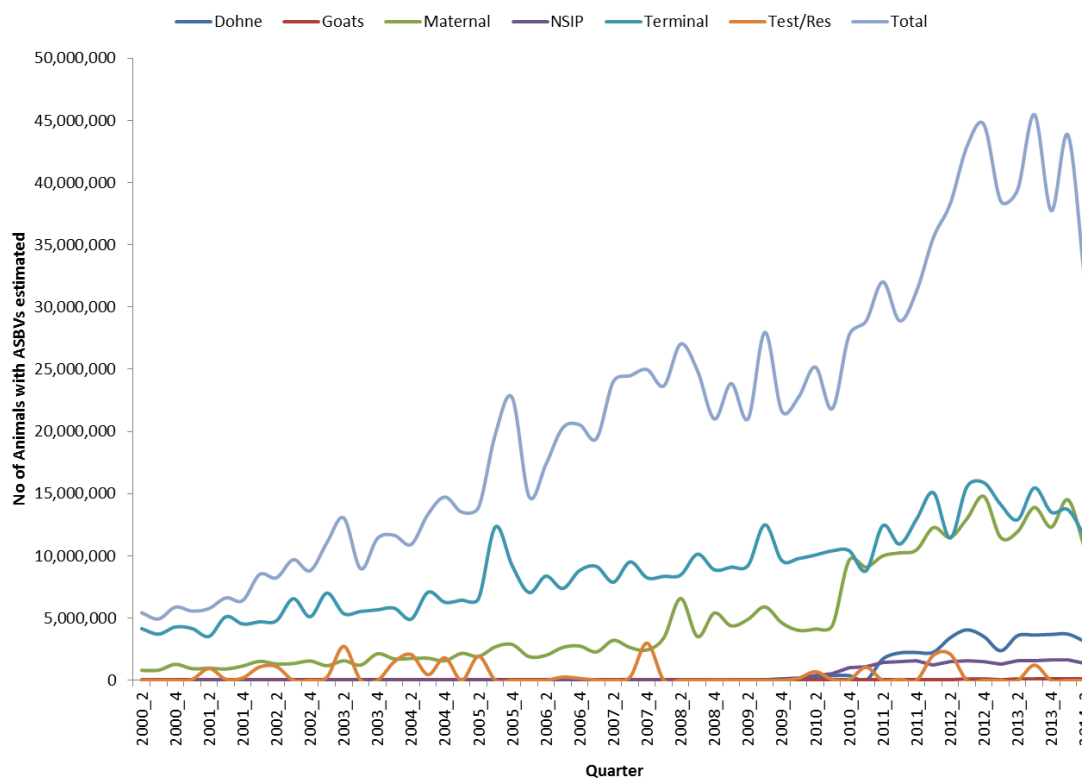
4 Results

4.1 ASBV's delivered on time

Routine analysis has been completed on a fortnightly basis without interruption. The routine analyses in January 2011 contained approximately 1.8, 1.3 and 1.5 million animals in the Terminal Sire, Merino and Maternal analyses respectively. As of January 2016 these

analyses had increased to approximately 2.5, 2.1 and 1.9 million animals in the Terminal Sire, Merino and Maternal analyses respectively.

The following figure to demonstrate the number of animals for which ASBVs were published in each quarter. This now equates to approximately 7.1 million animals per fortnight.



In addition to these ASBVs we have also produced within flock and within management group breeding values (marketed as RAMPOWER - www.rampower.com.au) for approximately 300 flocks totalling to over 181,432 animals receiving breeding values.

4.2 Diagnostic support provided as required

Diagnostic support was provided to Sheep Genetics, MLA, Sheep CRC and NSIP staff on a range of issues covering all breed groups as required. The majority of this diagnostic work was related to changes in ASBVs over time or problematic data structures. A range of more intensive diagnostic analyses were also conducted including:

- Collation of better reproduction records for INF
- Summary of records by trait and year for SG staff and other researchers
- Influence of animals with no pedigree or who are the offspring of syndicate matings in industry flocks
- Calculation of breeding values which exclude the Sheep CRC Information Nucleus Flock (INF)
- Supply of data for researchers outside AGBU
- Calculation of special ASBVs for some researchers and breeders

- Supply of INF pedigree and genomic relationship information to Sheep CRC and Sheep Genetics
- Supply of Breed Composition information to SG and breeders

An internal AGBU diagnostic web site was also developed and released to AGBU and Sheep Genetics staff. This web site hosts an extensive range of diagnostic tools to investigate ASBVs and data from current and historical analyses.

4.3 Provision of suitable hardware to maintain acceptable run time

During the life of the project the routine analyses have been conducted on 5 different servers in order to maintain acceptable run times. Key improvements have been made to OVIS and the programs which run the routine analysis, separating tasks which can be run independently and therefore simultaneously, as well as re-writing several programs to decrease run-time through parallel processing, including index calculation and the genomic pipeline. These developments have contributed to significant speed enhancements which have enabled overall run-time to remain stable in the face of increasing size of data sets.

The current server capacity has been increased from 2 CPU's with 16 GB RAM on the old server (used at the start of this project) to 16 twin core CPU's with 256 GB of RAM on the new server.

Additional disk space has also been purchased so that at least 3 years of prior analyses can be kept on the new server as opposed to only a few months on the older servers.

4.4 Timetable of runs firmly embedded into the R&D group's modus of weekly operation.

Completing the Sheep Genetics routine runs on time has always been the highest priority for AGBU staff and as a result routine analysis has been completed on a fortnightly basis without interruption and delivered on time.

4.5 Test protocols for new software, models and parameters updated and documented

Each year when changes were made to the routine runs extensive test runs were completed and made available to Sheep Genetic staff via an internal web site, and regularly reviewed by the Technical Committee.

Documentation of the changes being made to OVIS and the Sheep Genetics analyses each year have been completed and distributed to Sheep Genetic and breeders. This has also included newsletter articles for breeders, presentations at field days and workshops and scientific publications.

OVIS and its supporting programs to complete the routine analyses has been documented.

5 Conclusions

Routine analysis has been completed on a fortnightly basis without interruption.

Significant enhancements have been made to OVIS, the programs which run the routine analyses as well as the diagnostic support tool provided to sheep Genetics

A significant amount of diagnostic support was provided to Sheep Genetics staff on a range of issues covering all breed groups. The majority of this diagnostic work was related to changes in ASBVs over time.

6 Appendix

6.1 Milestone Reports (excluding budget reports)

Jan 2011	B SGN 0128 Milestone Report 2
Jul 2011	B SGN 0128 Milestone Report 3
Jan 2012	B SGN 0128 Milestone Report 4
Jul 2012	B SGN 0128 Milestone Report 6
Jan 2013	B SGN 0128 Milestone Report 8
Jul 2013	B SGN 0128 Milestone Report 9
Jan 2014	B SGN 0128 Milestone Report 11
Jul 2014	B SGN 0128 Milestone Report 12
Jan 2015	B SGN 0128 Milestone Report 14
Aug 2015	B SGN 0128 Milestone Report 15
Jan 2016	B SGN 0128 Milestone Report 16