finalreport

SHEEP GENETICS

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Sheep Genetics Australia (SGA) Data Transfer Assistance

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Abstract

Why the work was done

Sheep Genetics Australia's objective is to achieve 'Genetic improvement for a sustainable and profitable Australian sheep industry facilitated by the world's best sheep genetic evaluation system'.

Prior to Sheep Genetics Australia (SGA) becoming operational a period of intense research and development was required during 2004 and 2005. To allow this research to be achieved the Merino Benchmark data needed to be added to the SGA database and then be able to be updated routinely.

When and how industry can benefit from the work?

All the required Merino Benchmark data was compiled, transferred and validated by this project to allow the required research to be successfully completed. As a result there has been a significant improvement in the accuracy of SGA EBV's and this in turn resulted in a large increase in industry confidence to a level that allowed SGA to be successfully launched in October 2005.

Over the next 5 five years the successful launch of SGA will provide **both ram breeders and commercial flock breeders** the opportunity to make a large increase in their profit by maximising genetic improvement in their flock.

Executive Summary

Why the work was done

Sheep Genetics Australia (SGA) is a national genetic information and evaluation service for the meat and wool sectors of the sheep industry. Its objective is to achieve 'Genetic improvement for a sustainable and profitable Australian sheep industry facilitated by the world's best sheep genetic evaluation system'.

Prior to SGA becoming operational a period of intense research and development was required in 2004 and 2005. The research ensured the SGA analysis could provide the most accurate breeding value estimation possible. Development was required to ensure that data could be effectively transferred from the SGA database in and out of the breeding value analysis and reported.

Prior to SGA being established a large proportion of the potential SGA Merino Database was being managed and reported by NSW DPI on behalf of the Merino Benchmark group of breeders. The SGA Technical Committee considered this data to be essential to the SGA research program.

To allow the SGA research and development objectives to be achieved Merino Benchmark data needed to be added to the SGA database and be able to be updated in a routine way.

The objective of this project

The aim of the "SGA Data Transfer Assistance" project was to assist the,

(i) research needed to establish the most appropriate across-flock genetic analysis for sheep, and
(ii) ongoing development that required client's data to be routinely transferred from NSW DPI's Merino database to the SGA database and back to NSW DPI's database.

What was achieved?

The objectives and milestones of the project were all achieved in a timely manner that allowed research, development and service to be successfully achieved as required by SGA.

All the required Merino Benchmark data was compiled and transferred to SGA to allow the Technical Committee's research to be conducted. Data transferred included major fleece traits, body weight, worm egg count and fibre curvature.

A suitable Access database was developed to compile and transfer NSW DPI Merino data.

All data anomalies identified by SGA validation and research were reviewed by NSW DPI as required and any appropriate adjustments were made to the database records.

Following the initial transfer of data new data supplied by clients was compiled and routinely transferred to SGA to continue research, development and allow SGA service to be provided in a timely way.

When and how industry can benefit from the work

This project has made a major contribution to the objective to maximising genetic improvement in the sheep industry.

In the short term the project has allowed the successful and timely completion of research by the SGA Technical Committee. This research allowed SGA to significantly improve the accuracy of the

EBVs it reports and build industry confidence to a level that allowed SGA to be successfully launched.

Over the next 5 five years the successful launch of SGA provides sheep breeders in Australian with the tools to maximise genetic improvement in their flocks and for this to flow through to the sheep industry in general.

Who can benefit from the results?

With the assistance of this project the research carried out by the SGA Technical Committee was the basis for a significant improvement in the quality of the EBVs reported and also much of the industry confidence that allowed SGA to be launched in a positive environment. With the launch of SGA **both ram breeders and commercial flock breeders** have the opportunity to benefit by being able to maximise genetic improvement in their flocks.

If ram breeders effectively use SGA the commercial producer technology transfer barrier is largely overcome. This is because the genetic improvement that is made in ram breeding flocks is passed directly on to their commercial flock ram buyers without the need for them to make a decision.

Genetic improvement by ram breeders will provide rapid genetic and production improvement for commercial producers that can lead to a large increase in profit.

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1 Background

Sheep Genetics Australia (SGA) – formally know as Australian Sheep Genetics Database (ASGD) - is a national genetic information and evaluation service for the meat and wool sectors of the sheep industry. Its objective is to achieve 'Genetic improvement for a sustainable and profitable Australian sheep industry facilitated by the world's best sheep genetic evaluation system'.

SGA is a Meat & Livestock Australia (MLA) and Australian Wool Innovation (AWI) project with a major contribution from AGBU, NSW DPI and CSIRO. Many other organisations and individuals have also contributed strongly.

Sheep Genetics Australia has been developed over the last three years to provide sheep breeders throughout Australia with the quality tools that will allow them to maximise the genetic change they wish to make.

SGA has utilised the very best knowledge and experience it could access to develop tools that are now available for breeders – both ram breeders and commercial flock breeders. These tools are leading edge and there is no reason for a breeder to hesitate using the tools that are appropriate to their needs and can be cost effectively employed. SGA will increase the range and quality of tools and will make them available in such a way that will allow many more breeders to use these tools in conjunction with their normal breeding practices.

Prior to SGA becoming operational a period of intense research and development was required in 2004 and 2005. The research ensured the SGA analysis could provide the most accurate breeding value estimation. This was particularly important for the Merino analysis that combine flocks from a wide range of production levels and traditionally did not have good levels of genetic linkage essential for across-flock analysis. Development was required to ensure that data could be effectively transferred from the SGA database in and out of the breeding value analysis software and be reported.

Prior to SGA being established a large proportion of the potential SGA Merino Database was being managed and reported by NSW DPI on behalf of the Merino Benchmark group of breeders. Because the Merino Benchmark data contributed approximately 50% of the expected SGA data records this data was considered essential to the SGA research program.

To allow the SGA research and development objectives to be achieved Merino Benchmark data needed to be added to the SGA database and be able to be updated in a routine way.

2 Project Objectives

By 28 February 2006

Research
Transfer and validate Merino Benchmark flocks' data required at AGBU to assist the development of the most appropriate across-flock genetic analysis for Merino sheep.

Service
Compile, transfer and validate Merino flock data that will allow routine transfer of records to and from NSW DPI and SGA databases for a period of 12 months.

3 Methodology

(i) NSW DPI, SGA Technical Committee and SGA to hold discussions to establish the requirements for transferring data.

(ii) NSW DPI's most experienced Merino data manager – Johanne Taylor – be appointed to coordinate, review and carry out all data transfer. NSW DPI to employ two temporary staff to prepare Merino Benchmark records in a format suitable for SGA.

(iii) Johanne Taylor established a NSW DPI Merino database to allow the efficient transfer of Merino data to AGBU.

(iv) Johanne Taylor to review all data anomalies that were identified by validation and research to ensure the Merino Benchmark data in the SGA database was the most appropriate.

Milestone 1; Compile, transfer and validate data – NSW DPI to AGBU.

(v) Compile and routinely transfer Merino flock's, (i) CSV and, (ii) base trait data into the NSW DPI database for routine transfer to SGA as requested by clients.

Milestone 2; Routinely compile and transfer data – NSW DPI to SGA.

(vi) Johanne Taylor routinely used NSW DPI database to transfer Merino data to SGA and report data when requested by clients.

Final Report - Milestone 3; Final Report – outcomes and recommendations.

4 Results and Discussion

(i) Discussions were held between NSW DPI, SGA Technical Committee and SGA to clearly establish the requirements for transferring data.

Outcome
Discussions provided a clear plan to achieve the transfer of data, both initially as required for research and following this routine transfer for the estimation of breeding values. Database development was planned and it was agreed that NSW could obtain the basic structure of the SGA database to maximise the efficiency of the NSW DPI database development as well as ensure the compatibility of records maintained and transferred to SGA.

(ii) NSW DPI's most experienced Merino data manager – Johanne Taylor – was appointed to coordinate, review and carry out all data transfer. Two temporary staff were employed by NSW DPI to prepare Merino Benchmark records in a format suitable for SGA within the timeline required.

Outcome
All the required Merino Benchmark data was compiled and transferred to SGA to allow the Technical Committee research to be conducted on time. Data transferred included major fleece traits, body weight, worm egg count (formally FEC), and fibre curvature where these traits had been evaluated by the flock.

Estimation of the time needed to compile the data (based on a trial of sections of 3 representative flocks) underestimated the time required by 30%.

(iii) Johanne Taylor established NSW DPI Merino database to allow the transfer of Merino data to AGBU.

Outcome
A suitable Access database was developed to compile and transfer NSW DPI Merino data. At the same time the SGA database was also being developed and therefore it was not possible to obtain a suitable basic structure of the SGA database to assist in the development of the NSW DPI Merino database (as described in 4 (i)).

(iv) Johanne Taylor reviewed all data anomalies that were identified by validation or research to ensure the data in the SGA database was the most appropriate.

Outcome
Validation of Merino Benchmark data as it was transferred into the SGA database identified data anomalies and research identified further anomalies. All anomalies identified were reviewed and changes made as required.

Milestone 1; Compile, transfer and validate data – NSW DPI to AGBU. **Completed**

(v) Compile and routinely transfer Merino flocks', (i) CSV and, (ii) base trait data into the NSW DPI database for routine transfer to SGA as requested by clients.

Outcome
Data was routinely compiled and transferred when requested by clients.

Milestone 2; Routinely compile and transfer data – NSW DPI to SGA. **Completed**

(vi) Johanne Taylor routinely used NSW DPI database to transfer Merino data to SGA and report data to clients as they requested.

Outcome
Data was routinely compiled, transferred and reported as requested by clients

Final Report - Milestone 3; Final Report – outcomes and recommendations. **Completed**

5 Success in Achieving Objectives

Research
Objective: Transfer and validate Merino Benchmark (MB) flocks' data required at AGBU to assist the development of the most appropriate across-flock genetic analysis for Merino sheep.

Success in achieving the research objective
As the Merino Benchmark data formed approximately 50% of the Merino database this data was essential for the successful completion of the research of the most appropriate across-flock analysis. The Merino Benchmark data was absolutely essential to the understanding of the level of linkage between flocks and the relative performance between Merino Benchmark EBVs and SGA EBVs of the Merino Benchmark data.

Without these research outcomes the ability to provide industry confidence in the SGA EBVs would not have been possible.

Service
Objective: Compile, transfer and validate Merino flock data that will allow routine transfer of records to and from NSW DPI and SGA database for a period of 12 months.

Success in achieving the service objective
The compiling, transfer and validation of the data of the Merino Benchmark flocks with in the SGA database allow all the relevant Merino flocks to become involved in SGA and for the SGA launch to take place as soon as the necessary research was completed. A delay of approximately six to twelve months in the launch would have resulted if this project would not have been undertaken and completed by the end of the research phase prior to the launch of SGA.

A suitable Access database was developed as specified by the project however it was not possible to obtain the basic structure of the SGA database to assist in the development of the NSW DPI Merino database (as described in 4 (i)) because the SGA database was not yet completed.

Maximising genetic gain in the sheep industry

The research that was conducted with the aid of the data transferred by this project was the basis reason for the building of industry confidence in SGA's ability to deliver accurate EBVs to the sheep industry.

If the data transfer that was assisted by this project had not taken place it is unlikely that by now the SGA's objective to achieve a single Merino EBV analysis and a single genetic language across the sheep industry would have been achieved. Both of these objectives are essential if genetic improvement in the sheep industry is to be maximised.

6 Impact on Meat and Livestock Industry

The impact now
The project allowed the successful and timely completion of research by the SGA Technical Committee. This research allowed SGA to,
(i) significantly improve the accuracy of the EBV's it reports, and
(ii) build industry confidence to a level that allowed SGA to be successfully launched.

The impact in five years time
The successful launch of SGA provides sheep breeders in Australian with the tools to maximise genetic improvement in their flocks and the sheep industry as a whole.

7 Conclusions and Recommendations

Conclusion
The successful and timely completion of this project has made a major contribution to the development of SGA and the confidence of the industry to use its services. The improvement in quality of SGA services and the launch of SGA in a positive and confident environment will have a large and lasting benefit to the sheep industry.

Recommendation

Updating database structure and validation routines

The efficiency of the NSW DPI Merino database can be improved by incorporating basic structural elements of the SGA database. The compatibility of data delivered to SGA and its validation prior to delivery will maximise efficiency and improve the quality of SGA service. This development was not an objective of the project however during the project it was identified as a valuable improvement that could be made. Although it was attempted to be incorporate this development it could not be achieved within the project.

It is recommended that at the time when the SGA Technical Committee circulate the additional records it would like added to data submitted to SGA that SGA assist NSW DPI to improve the efficiency of Merino database by updating its structure and validation routines in line with those in the SGA database.

New clients data preparation

Now that clients of the previously established across-flock databases have been incorporated into the SGA database the future challenge is to encourage additional breeders to obtain SGA service. In many cases potential clients of SGA will have valuable back records but in a format that is not suitable to be incorporated into SGA. Without the back records new client's EBVs are likely to be poorly linked, conservatively estimated and show a higher level of variation of EBVs over the coming years. These outcomes are likely to reduce the number of breeders prepared to join SGA and increase the concerns of new breeders that join SGA. The outcome will be a negative message that will be circulated within the industry in regard to the value of becoming involved in joining SGA.

It is recommended that breeders who would like NSW DPI (or another service provider) to manage their entry into SGA have their back years of data (to a maximum of 12 years) developed to a required standard and incorporated into the NSW DPI and SGA database with financial assistance from SGA.