MOPLAN - A NATIONAL PERFORMANCE RECORDING SCHEME FOR ANGORA GOATS

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SUMMARY

The RIRDC funded project "The Development and Extension of Performance Recording and Evaluation in the Australian Angora/Mohair Industry" had as its major aim, the establishment of a performance recording scheme for Angora goats. One of the major obstacles in achieving this aim was the availability of a set of genetic parameters. The imported Texan Coats at Kirra Quarantine Station in South Australia provided a unique opportunity to generate some of the data essential for the establishment of the scheme. This paper provides details of the development of Moplan, how it will function, and how it will be promoted and extended to the industry.

INTRODUCTION

The establishment of Moplan has been a co-operative effort by AMBA Ltd., NSW Agriculture and ABRI (University of New England, Armidale) and was funded through a project supported by RIRDC. Moplan is a bureau based service and is the first nationally available genetic evaluation package for Angora goats. It uses both Estimated Breeding Values and an index based on Relative Economic Values.

Moplan established a data set from some 3700 Texan and Texan cross animals at the Kirra Quarantine Station in South Australia and also evaluated imported South African Angoras from Zimbabwe while in quarantine in New Zealand. Moplan has been available as a bureau service to Australian breeders since October 1994.

FEATURES OF MOPLAN

Moplan was originally developed by the Australian Mohair Research Foundation and is now overseen by a committee made up of representatives of AMBA Ltd., NSW Agriculture and ABRI. The following traits are analysed by Moplan:

120 Day weight 365 Day weight 2nd Fleece weight 2nd Fibre Diameter 1st Staple length Scrotal circumference
180 Day weight 1st Fleece weight 1st Fibre Diameter 1st Kemp score 2nd Staple length Visual score (coverage)

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**Use of Objective and Subjective Assessment**

Performance recording schemes generally rely on the objective assessment or measurement of traits eg, Lambplan, Breedplan and Rampower (formerly Woolplan). The costs associated with the measurement and collection of the required data for these schemes is reasonable. In the Angora industry the costs of measurement eg, for Fibre diameter and Kemp is prohibitively high and likely to discourage whole drop recording which is essential for accurate estimates of breeding values. For this reason the use of subjective assessment by skilled classers has been built into the scheme to estimate values for fibre diameter,kemp score and yield.

Classing scores are equated to measurements for analysis. For example, fineness classes of Fine Kid, Kid, Young Goat, Fine Hair and Hair are equated to 22.5, 25.5, 29.0, 33.0, 37.5 microns, respectively. Kemp classes of Free, Nearly Free, Light and Heavy are equated to 1, 2, 4, 6% respectively. The remaining traits, ie liveweight, greasy fleece weight, staple length and scrotal circumference are based on objective measurement.

**Information from Relatives**

Moplan uses BLUP technology to enable it to use information from relatives in calculating EBV's. Relatives can include, ancestors such as sire and dam, parental half brothers and sisters, and progeny. Each source is appropriately weighted according to the relationships between the relatives and the animal itself. Once an animal has many progeny then less emphasis is based on pedigree information and the animal's own performance. The performance of the progeny become the major determinant of the EBV. The reliability factor for an EBV based on progeny information (progeny test) approaches 1.0 depending on the number of progeny. (Atkins 1987).

**Genetic Parameters Used in Moplan**

There are a number of papers reporting heritability estimates for Angoras but there are few reliable estimates of genetic and phenotypic correlation. The effect of age of dam, litter size, kidding date and sex of kid on kid performance have been studied. Moplan adjusts trait values to account for environmental factors but at present sets genetic correlations at zero.

Heritability estimates used by Moplan include, 120 Day Weight 0.20, 180 Day Weight 0.25, 365 Day Weight 0.25, 1st Fleece Weight 0.25, 2nd Fleece Weight 0.35, 1st Fibre Diameter 0.20, 2nd Fibre Diameter 0.20, 1st Kemp Score 0.25, 2nd Kemp Score 0.30, 1st Staple Length 0.20, 2nd Staple Length 0.25, Scrotal Circumference 0.35 and Visual Score 0.25. Dam age and litter size corrections are presented in Table 1.

**Guidelines for Moplan Users**

The first step in becoming a Moplan user is to enrol through ABRI. Pedigree recording forms used to collect the necessary information on the latest kid drop will be provided. Once a complete doe inventory has been established a recording form for the drop is issued, followed by recording forms for collection of body weight and fleece data. When the data has been collected and returned it will be processed and a Moplan report produced. A dam inventory form will also be provided to allow the next drop of kids to be recorded. The inventory will include a list of all active females in the flock and space to include purchases and additional females.

Pedigree information is vital for the BLUP analysis. The complete tattoo of each animal is important and the AMBA Herd Book Number can also be included as this may assist if the performance recording system is extended to include across flock evaluations.
Unlike other performance recording schemes, Moplan relies on the breeder to collect and record all performance data. Data can be recorded on pre-printed record sheets or on computer using Mohair Magic (Saltbush) or another Data Base program with data being transferred using high density disc in ASCII format (DOS System).

Table 1. Dam age and litter size corrections applied to Moplan data.

<table>
<thead>
<tr>
<th>TRAIT</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth weight single</td>
<td>1.15</td>
<td>1.09</td>
<td>1.00</td>
</tr>
<tr>
<td>Birth weight twin</td>
<td>1.21</td>
<td>1.15</td>
<td>1.00</td>
</tr>
<tr>
<td>120 Day Weight single</td>
<td>1.20</td>
<td>1.10</td>
<td>1.00</td>
</tr>
<tr>
<td>120 Day Weight twin</td>
<td>1.30</td>
<td>1.16</td>
<td>1.00</td>
</tr>
<tr>
<td>180 Day Weight single</td>
<td>1.16</td>
<td>1.06</td>
<td>1.00</td>
</tr>
<tr>
<td>180 Day Weight twin</td>
<td>1.24</td>
<td>1.12</td>
<td>1.00</td>
</tr>
<tr>
<td>365 Day Weight single</td>
<td>1.12</td>
<td>1.04</td>
<td>1.00</td>
</tr>
<tr>
<td>365 Day Weight twin</td>
<td>1.20</td>
<td>1.10</td>
<td>1.00</td>
</tr>
<tr>
<td>1st Fleece Weight single</td>
<td>1.20</td>
<td>1.05</td>
<td>1.00</td>
</tr>
<tr>
<td>1st Fleece Weight twin</td>
<td>1.30</td>
<td>1.13</td>
<td>1.00</td>
</tr>
<tr>
<td>2nd Fleece Weight single</td>
<td>1.08</td>
<td>1.02</td>
<td>1.00</td>
</tr>
<tr>
<td>2nd Fleece Weight twin</td>
<td>1.14</td>
<td>1.06</td>
<td>1.00</td>
</tr>
</tbody>
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Management Groups
Ideally the entire kid drop should be run together as one management group until assessment of all traits has been completed. This may not be practical and Moplan allows for the identification of management groups in an attempt to reduce errors related to different management. It is recognised that some bias may be introduced by breeders selecting special groups of dams or kids for special treatments.

Calculating EBV's
Moplan EBV's are calculated using data derived from measurement and subjective assessment. The procedure is as follows:
1. Measure and/or assess performance - data is collected on all traits necessary to achieve the breeding objective.
2. Adjust the data for known environmental effects, i.e. sex, dam age, birth date and birth type.
3. Weight the adjusted record by its heritability. This indicates how much of the observed differences in adjusted records is likely to be due to genetic differences.
4. Add information from relatives to produce the Estimated Breeding Value for each trait.

The Moplan index is then calculated using EBV's and the Relative Economic Values for the particular traits. The index offers a "best bet" value for overall performance based on the expected economic returns for mohair and meat. Dollar values used in Moplan calculations are listed in Table 2.

Table 2. Dollar Values for Traits used in calculating the Moplan Index.

<table>
<thead>
<tr>
<th>TRAIT</th>
<th>Value ($/unit)</th>
<th>TRAIT</th>
<th>Value ($/unit)</th>
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</thead>
<tbody>
<tr>
<td>180 Day Weight (kg)</td>
<td>0.70</td>
<td>Fibre Diameter (micron)</td>
<td>0.67</td>
</tr>
<tr>
<td>Scrotal Circumference (cm)</td>
<td>20.00</td>
<td>Kemp Score (%)</td>
<td>1.33</td>
</tr>
<tr>
<td>Fleece Weight (kg)</td>
<td>6.70</td>
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</table>
Accuracy of Sire EBV’s
Sire EBV accuracy values are calculated and presented in the Moplan report. They are expressed as a percentage and depend on the amount of information available to estimate the breeding value, and on the heritability. Values between 0 and 39% are preliminary and could change substantially. Values between 40 and 66% are poor and could change substantially if progeny information were included. Values from 67 to 84% are of moderate accuracy and were achieved with some progeny information. Values of over 85% indicate that the EBV is unlikely to change much with the addition of more progeny to analysis.

Breeding Objectives and Moplan
At this stage Moplan does not offer any breeding objective options but provides EBV’s for individual traits and an index based on the weighted sum of EBV’s for liveweight, fleeceweight, fineness, kemp and scrotal circumference. It is important that Angora breeders appreciate the importance of clearly defining their breeding objective as the first step in setting up an efficient breeding program. A selection index is the most efficient means of achieving a breeding objective and perhaps this should be one of the early refinements of Moplan i.e. to offer some Breeding Objective options. More importantly Moplan should be flexible enough to handle customised breeding objectives for breeders. To this end, the program allows for a set of value parameters to be applied to specific flocks.

Technical Support for Moplan
Technical support for users of Moplan in NSW is provided through ABRI and NSW Agriculture sheep and wool advisers. It is hoped that interstate users of Moplan will receive similar support from extension services in their state. Unlike Breedplan, Lamplan and Rampower, Moplan is unlikely to be supported by a full time technical coordinator and so the responsibility for advisory support, promotion and further development will be left to state extensions services, ABRI and industry organisations. A technical manual will be available to all Moplan users.

DISCUSSION
The mohair industry in Australia is very small with an annual production estimated to be about 350,000 kg. Nevertheless, the industry has a strong breed structure and a well developed mohair marketing system. The introduction of Texan and South African strains present an enormous challenge to breeders who have struggled to rationalise the demands of small scale hobby enthusiasts, a traditional and small scale textile processing industry and demands of economic viability. Performance recording hopefully focuses the attention of breeders on production characteristics and, not only assists with animal evaluation, but also provides a means to achieve optimal management systems for the production of quality mohair.

ACKNOWLEDGMENTS
The Authors would like to acknowledge the invaluable input of Moplan Committee members. Mrs Margaret Harris of AMBA, Mr Arthur Richards of ABRI and Mr Trevor May of NSW Agriculture. The research efforts of Dr. R. Scarth are also acknowledged.

REFERENCES