

TECHNOLOGY TRANSFER: WOOLPLAN

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INTRODUCTION

In the past, the application of genetic theory to animal breeding programs has generally been directed at improving the response to selection in one trait or a number of closely related traits. These traits were generally those that could be readily improved by selection.

In more recent times, geneticists have come to think in terms of economic improvement of the whole herd or flock as a production system. A sequence of logical steps for developing breeding programs has been suggested (e.g. Cunningham 1976, 1979; Ponzoni 1982), starting off with the definition of the production system and the breeding objective, before going into the details of the performance recording system.

Concentrating attention on the whole production system, rather than considering genetic improvement in traits as end points *per se* has several advantages when transferring technology to the industry. The main advantages are:

- . A more economically sound approach to genetic improvement programs is taken.
- . Faster identification of gaps in knowledge.
- . Greater flexibility in breeding objectives and in the sets of selection criteria used for calculating breeding values.

The development of WOOLPLAN follows this recent approach for establishing breeding programs. This paper discusses the current status and anticipated developments of WOOLPLAN, together with the methods used to encourage its adoption within the wool industry of Australia.

CURRENT STATUS OF WOOLPLAN

WOOLPLAN is an Australian scheme designed to meet the performance recording needs of ram breeders of the Merino and other wool sheep breeds. It is provided as a service by fleece testing laboratories, who obtain accreditation from a committee which oversees the scheme. This decentralised system is seen as advantageous as breeders only have to submit samples and records to one organisation to obtain results from a performance recording service. It also capitalises on the established and well-used services of the major fleece-testing services, which agreed to offer WOOLPLAN results as one of their standard reports. Launched in March

1987, WOOLPLAN compares individual sheep born within the same flock. Comparisons are only made between sheep born in the same lambing period and normally within a single management group, unless they have been allocated to management groups at random.

Vital statistics on fleece testing at WOOLPLAN-accredited laboratories and WOOLPLAN usage in Australia are shown below, for the year ending June 30, 1989:

Variable	Number
Mid-side samples tested	436,643
WOOLPLAN reports dispatched	1,416
Requests for WOOLPLAN reports	1,100 (estimate)
Average number of samples tested per WOOLPLAN report	150 (estimate)

These figures represent a large increase in the number of mid-side samples tested since Fleet (1984) reported an annual figure of 200,000. As fleece-testing laboratories do not know for certain whether mid-side samples have been taken from rams or ewes, it is difficult to estimate the proportion of rams bred that are fleece sample tested.

Industry opinion suggests that there has been a large increase in the number of ewes fleece sample tested in the last few years. Within the Australian Merino Society, recommendations to test base flock ewes to aid selection of nucleus replacements have led to a large increase in the number of ewes being fleece sample tested within the organisation (Wheater, *pers comm*).

The introduction of the WOOLPLAN service at most fleece-testing laboratories would also have contributed to the increase in fleece sample testing, although it is impossible to estimate how much. As approximately 1,100 requests for a WOOLPLAN report were made in the year ended June 30, 1989, the service appears to be fulfilling a valuable function in the eyes of a significant number of breeders of rams for wool production. Surveys of breeders are being planned to determine how WOOLPLAN and performance records in general are being utilised.

TECHNICAL SPECIFICATIONS

Ponzoni (1987) gives a detailed account of the technical aspects of WOOLPLAN as it was at the time of its launch in March 1987. There have already been changes to economic values and the assumed phenotypic variances for greasy fleece weight and fibre diameter implemented since the launch (Ponzoni 1988a). A recent discovery of lower than expected variance for fibre diameter in fine wool Merino sheep has prompted the development of a linear regression adjustment of the variance for mean fibre diameter, which is to be implemented in 1990 (Atkins, *pers comm*).

WOOLPLAN provides estimated breeding values (EBVs) for five traits, clean fleece weight, fibre diameter, reproductive rate, body weights of hoggets and mature sheep as well as an index of total economic merit combining the 5 traits. Through the provision of options, WOOLPLAN enables users to pursue a range of breeding objectives and allows differing amounts of information to be used for calculating breeding values. Adjustments to fleece weight and body weight data can be made for age of dam, date and type of birth and for randomly-allocated management groups. A sire summary option is now offered, which uses an improved contemporary comparison approach to calculate EBVs (Ponzoni 1988b).

FUTURE DEVELOPMENTS

A major review of WOOLPLAN is due in 1990. A number of developments to WOOLPLAN have been raised as possibilities for implementation in the near future (Atkins and Rogan 1986; Lewer et al. 1986; Ponzoni 1987). These include:

- . Use of two stage selection procedures.
- . Use of performance records on collateral relatives in estimating EBVs.
- . Use of other characters as selection criteria in an index.
- . Basing sire EBVs on performance records of progeny from more than one lambing.

SOFTWARE

Six of the 11 laboratories offering a WOOLPLAN service now use a software program developed at the Melbourne College of Textiles. This program has been specifically developed for use in a fleece-testing laboratory environment. It is able to import and export data on diskette.

Ideally, it would be best if all laboratories used the one software program, or one of two or no more than, say, three. This would make the implementation of future developments and the checking of programs easier.

WOOLPLAN ADVISORY SERVICES

The need for a coordinated approach to the promotion and extension of WOOLPLAN across Australia was recognised in 1986 and the Wool Research and Development Fund granted finance for appointing a national coordinator for three years. Key contacts within each state department of agriculture have been established and, together with the national coordinator, are implementing a national extension program. Common to most states has been a division of the extension campaign into two sections, one aimed at ram breeders who form the main audience for direct WOOLPLAN service usage, and the other aimed at the majority of woolgrowers, who normally buy their ram replacements.

Relevant to the issue of technology transfer are the recommendations of a task force commissioned at an Australian Wool Corporation conference on research priorities on sheep breeding, held in May 1987. This 'Leura Task Force' made 5 main recommendations, which were:- the setting up of consultancy groups of geneticists (on a 'fee-for-service' basis), the development of schemes comparing animals born in different flocks, the development of low-cost artificial insemination techniques for utilising frozen thawed semen, the development of easy to read newsletters on advances in animal breeding and genetics technology for practical breeders and the establishment of formal consultations of scientists with industry classers.

Consultations with individual ram breeders on a 'fee-for-service' basis have begun in a number of Australian states. Since WOOLPLAN has many available options for breeding objectives and selection criteria, this allows the individually-tailored advice given by a consultant to be easily followed when breeders have their production records processed.

Active consultations between scientists and industry classers at workshops will take place in all states of Australia during 1990, funded by the Wool Research and Development Fund. As for development of newsletters for breeders, nothing formal has yet been attempted.

Although extension campaigns on the use of WOOLPLAN have not been going long in some states, it is already apparent that industry demonstration flocks would be of great assistance in convincing ram breeders and commercial woolgrowers to adopt the technology. Where industry flocks have had a long history of significant use of performance records in their breeding programs, their success has been used in a limited way as testimonials to use of the technology. However, there is a need for more such testimonials, and for demonstration flocks that are continually monitored for the industry to view. This work needs to be supported by industry funds, as the design of the trials needed will involve more measurements, record keeping and extra management costs than would be normal in a commercial breeding program.

Finally, as the extension campaign on WOOLPLAN progresses, more computer software is urgently needed to aid the WOOLPLAN adviser. There are only a small number of people in Australia with the necessary skills to properly develop scientifically-based breeding programs, so computer software offers a practical way of putting the knowledge of the specialist in the hands of the less-skilled advisers whose numbers are greater. Some advisers working closely with ram breeders are also seeking more technical training.

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