

A DESCRIPTION OF WOOLPLAN

F.D. Brien and R.W. Ponzoni
Department of Agriculture,
G.P.O. Box 1671, Adelaide SA 5001, Australia

INTRODUCTION

WOOLPLAN is the Australian scheme designed to meet the performance recording needs of ram breeders of the Merino and other wool sheep breeds. It brings together a number of earlier schemes and has been available since March 1987.

This paper updates a description of WOOLPLAN presented at an earlier congress (Lewer *et al.* 1986).

INDUSTRY STRUCTURE AND WOOLPLAN

The Merino is the major sheep breed in Australia and is a producer of apparel wool. Most of the Merino ram replacements are produced from approximately 2-3% of all the Merino ewes in the country (Banks, 1987). Hence, while commercial flocks produce nearly all of the wool in Australia the long-term genetic improvement of these flocks is almost solely dependent on the breeding and selection practices adopted in ram breeding flocks (McGuirk, 1976).

The aim of WOOLPLAN is to increase the rate of genetic improvement of the Merino and other wool sheep breeds in Australia. It will achieve this mainly by helping to improve the accuracy of selection of sires in ram breeding flocks, but it also can aid ewe selection. It is vital that WOOLPLAN be used together with normal ram breeding practices, not as a replacement for them.

The design of WOOLPLAN follows a set of 5 steps for the logical development of a breeding program (Ponzoni, 1982) namely: (i) definition of the breeding objective; (ii) choice of selection criteria; (iii) organisation of the performance recording scheme; (iv) presentation of the information recorded for use in making selection decisions; and (v) use of selected individuals by the breeder. WOOLPLAN is described below under Steps (i) to (iv).

BREEDING OBJECTIVES

The traits included in all breeding objective options in WOOLPLAN are as described by Lewer *et al.* (1986), however the relative economic values have been updated (Ponzoni, 1988a) and appear below in Table 1.

Table 1 Traits in the WOOLPLAN breeding objective, with the relative economic values recommended (after Ponzoni, 1988a)

| Trait | Abbreviation | Relative Economic Values |
|--|--------------|--------------------------|
| Clean fleece weight | CFW | 5.4 |
| Fibre diameter | FD | -1.0 |
| Reproduction rate | RR | 9.2 |
| Sale weight of surplus progeny | SW | 0.08 |
| Culled-for-age weight (mature body weight) | MW | 0.01 |

There may well be traits which breeders wish to improve which are not yet formally included in WOOLPLAN. Some emphasis can be given to these other traits in breeding programs, concurrent with using WOOLPLAN. Users of WOOLPLAN (mainly ram breeders) are offered a choice between either four standard but different objectives or a tailor made option (see table 2).

SELECTION CRITERIA

In WOOLPLAN, selection criteria are combined into sets that are used to estimate breeding values on individual sheep for the five traits in WOOLPLAN and for an overall score of merit based on a selection index. Standard sets of selection criteria are offered as options for the user, which are:

- | | |
|---|------------------------------------|
| 1. CFW, FD | 4. Greasy fleece weight (GFW), FD. |
| 2. CFW, FD, and hogget body weight (HBW). | 5. GFW, FD, HBW. |
| 3. CFW, FD, HBW and a single record of the dam's number of lambs weaned (dNLW). | 6. GFW, FD, HBW, dNLW. |

Measurements of fleece weight and fibre diameter are the minimum input requirements to obtain the WOOLPLAN service. Adding body weight records improves the accuracy of ranking sheep for merit, as does declaring whether the sheep was born or raised as a single or twin, although the improvement is only slight in this latter case (Lewer et al. 1986). Two more sets of selection criteria options have been made available recently, which are:

- | | |
|-------------|--------------------|
| 7. GFW, HBW | 8. GFW, HBW, dNLW. |
|-------------|--------------------|

These options are primarily designed for assisting ewe selection. Most Merino breeders do not fleece-sample test ewes available for selection, although there appears to have been an increase in ewe testing lately (Brien, 1990).

The phenotypic variances for greasy fleece weight and fibre diameter assumed in WOOLPLAN have been altered (Ponzoni, 1988a); that of fibre diameter is now adjusted by linear regression for mean fibre diameter (K. Atkins, personal communication).

Other optional information. If the information is provided, WOOLPLAN adjusts records of fleece and body weights for differences caused by sheep being:

- . born to a maiden rather than a mature ewe;
- . born and/or raised as a twin, rather than as a single;
- . born late in the lambing period rather than early;
- . grazed in different management groups, where these groups have been allocated at random ie, no deliberate selection.

These adjustments of the records improve the accuracy in ranking sheep. For randomly allocated management groups, it allows all performance recorded rams that are contemporaries within a flock to be ranked as one group.

PERFORMANCE RECORDING SERVICE PROVIDERS

WOOLPLAN results are available as a normal report from nearly all fleece-testing laboratories in Australia, at no extra charge. When undertaking to provide the WOOLPLAN service, the laboratories agree to (i) use standardised wool testing procedures and documentation (ii) participate in inter-laboratory trials to check their wool testing procedures, and (iii) process the performance records as specified in the WOOLPLAN guidelines. The accrediting body is the WOOLPLAN Special Projects Committee, which controls the scheme.

PRESENTATION OF INFORMATION FOR BREEDERS

Users receive the following main results on WOOLPLAN selection lists:

- . Identity of individual sheep and the number (or code) of its sire, if supplied. If the breeder indicates that a sheep was born as a single or twin, this is indicated as a '1' or '2'.
- . **Physical Measurements** - averages of the tested group and deviations from these averages individual sheep. This includes GFW or CFW, FD, wool yield and HBW if measured.
- . **Estimated Breeding Values (EBVs)** - EBVs for CFW, FD, RR, SW and MW.
- . **Selection Index Score and Rank** - An index score, combining the 5 traits listed above by using the breeding objective option and thus the economic values chosen by the breeder.
 - A rank, with '1' being the highest, based on the sheep's index score.

A sire summary option is now offered, which uses an improved contemporary comparison approach to calculate EBVs (Ponzoni 1988b). The sire summary sheet is similar to the WOOLPLAN selection list, except that the figures given refer to sires, based on progeny performance.

Data from fleece-testing laboratories is available on computer diskette, although a policy on how much of the official WOOLPLAN results are to be supplied is still to be determined.

Predicted genetic gains. The genetic gains (per generation) predicted from use of the various options available in WOOLPLAN are shown in Table 2.

Table 2 The predicted dollar value of response (per generation) to one standard deviation of selection on the index options available in WOOLPLAN. The figures in brackets are for greasy fleece weight indexes.

| Breeding objective options | Index options----- | | | | |
|----------------------------------|--|-------------|----------------|---------|--------------|
| | FW,FD | FW,FD,HBW | FW,FD,HBW,dNLW | GFW,HBW | GFW,HBW,dNLW |
| | \$(Aust.) | \$ | \$ | \$ | \$ |
| 1. All traits (no restrictions) | 10.79(8.62) | 11.23(9.45) | 11.39(9.64) | (6.32) | (6.62) |
| 2. All traits (FD restricted) | 9.16(6.29) | 9.59(7.25) | 9.76(7.48) | * | * |
| 3. All traits (RR restricted) | 10.79(8.54) | 10.91(8.55) | 10.91(8.59) | * | * |
| 4. All traits (FD+RR restricted) | * | 9.58(7.01) | 9.65(7.01) | * | * |
| 5. All traits | (economic values specified by breeder) | | | | |

*Index provides insufficient information on the breeding objective.

CONCLUDING REMARKS

WOOLPLAN has already been updated since it was launched in Australia three years ago, and will be further updated as new research information becomes available and as experience with the scheme accumulates. It is too soon to evaluate whether the availability of WOOLPLAN to the Australian wool industry has made any difference to the rates of genetic gain achieved by breeders, although many breeders have requested the service and have been issued with WOOLPLAN selection lists since 1987 (Brien, 1990).

The introduction of WOOLPLAN to the wool industry of Australia has highlighted a number of aspects of sheep breeding programs (Brien, 1990):

- . the importance of ram breeders and their clients carefully defining their breeding objectives;
- . the importance of servicing the specialist needs of ram breeders;
- . the shortage of suitably trained extension (advisory and promotional) officers to service enquiries on sheep breeding programs;
- . the importance of adequately trained staff and appropriate facilities for data processing by WOOLPLAN service providers.

These aspects are being addressed by extension services and the WOOLPLAN Special Projects Committee. WOOLPLAN has also highlighted areas in which sheep breeding research knowledge is lacking. These areas are being presented as project proposals for funding and will hopefully receive priority.

ACKNOWLEDGMENTS

The salary and operating expenses of a national WOOLPLAN coordinator and the operating expenses of the WOOLPLAN Special Projects Committee has been supported by a grant from the Wool Research and Development Fund on the recommendation of the Australian Wool Corporation.

REFERENCES

- BANKS, R.G. 1987. In 'Merino Improvement Programs in Australia' (Ed. B.J. McQuirk) pp. 125-135 (Aust.Wool Corp. Melb.Aust.).
- BRIEN, F.D. 1990. These proceedings.
- LEWER, R.P., PONZONI, R.W., MORGAN, P.D. and VANRENNEN, D.S. 1986. Proc.3rd World Cong.Genet.Appl.Livest.Prod. 9: 645-650.
- MCQUIRK, B.J. 1976. Proc.Aust.Soc.Anim.Prod. 11: 13-16.
- PONZONI, R.W. 1982. Proc.2nd World Congr.Genet.Appl.Livest.Prod. 5: 619-34.
- PONZONI, R.W. 1988a. Wool Technol.Sheep Breed. 36: 70-75.
- PONZONI, R.W. 1988b. (Submitted to Wool Technol.Sheep Breed.).