MANAGEMENT OF SELECTION PROGRAMS FOR MOHAIR PRODUCTION

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INTRODUCTION

The Australian Angora/Mohair industry is characterised by extremely small flocks which are almost entirely within the control of the two major breed socities. Mohair production, though obviously considered as important, is over-shadowed by the production of breeding animals and this has resulted in much emphasis being placed on appearance, preparation and promotion of individual animals. The influence of the show ring is great and there is a singular lack of understanding of mass selection techniques. Without a mohair production industry outside the stud circle, the industry is vulnerable to fads and fancy points which may or may not be important to the breed and for mohair production.

In this context this paper is set and it must be stressed that there are few flocks big enough or sufficiently motivated, to adopt the new breeding philosophies. The industry is just beginning to see the results of upgrading processes and has not yet seriously confronted the problem of improving the "purebred" population. As the population grows however, the need for selection techniques for mohair production will become more evident.

BREEDING OBJECTIVES

These can be placed into three categories:-

fleece quantity and quality

adaption to the environment

elimination or control of genetic faults

The first is possibly the most important since it has been shown that Australian mohair fleeces are little more than half the weight, and contain twice as much kemp fibre as those of Texas and South Africa while the fibre diameter of Australian mohair appears to compare favourably with that produced in other countries (Stapleton 1978). The presence of high levels of medullated fibres, variously referred to as heterotypes, long kemp or gare, has also been noted (Stapleton, 1976; Eppleston 1977) and though the importance of the fault if not clearly understood, it is regarded with concern by manufacturers.

High fleece weight with an upper limit on diameter and a lower limit on staple length, low kemp and low gare fibre content would appear to be clear objectives of the mohair breeders. Stapleton (1978)

has shown that measurements on mohair from the midside reflect the average quality of the fleece; however considerable variation in quality over the fleece is observed and selection may be required to correct this problem.

Survival of kids is a major problem to breeders and while adjustment of kidding time may provide a partial solution, the small size and poor energy reserves of the new-born kid, render it vulnerable to even mild cold stress. The relatively high fertility and fecundity of the breed may justify added costs of supervision of kidding but the survival of twin and triplets is even more precarious due to lowered birth weight. One approach to improving the situation may be to record and select against weak kids (these are presently given assistance and enter the breeding population).

Mothering ability in the Angora is good. However, the survival of one or more of triplets is dependent on the vigour of the kids and their ability to be recognised during the early post-natal period.

The adult Angora is susceptible to cold stress off shears and though the problem may be lessened as follicle density increases with increased fleece weight, this problem is likely to remain.

There are a number of specific faults present in the Angora population which are thought to be inherited and must be considered. Pigmentation is a serious fault in mohair and while generalised pigmentation appears to be controlled by a single autosomal gene with three alleles (white, red and black) there are also other mechanisms present. Small black spots on the skin, sometimes producing black fibre may be a similar characteristic to the "piebald" character in sheep. The presence of red fibres at low frequency in the fleece is another problem and may be related to the "golden kid" syndrome (Stapleton 1977), tan skin and low follicle density. The character may be similar to the red spot commonly seen on the neck of carpet wool lambs.

The gare fibre problem has been discussed above but there are several other problems where the genetic control mechanism is not understood. Cryptorchidism *atresia ani*, deformities and congenital coughs are all seen and may require the culling of the parents. Where such faults result from single recessive alleles, the culling of the sires is obviously important but it is not generally realised that a high proportion of the flock remain as undetected carriers and the necessity or the effect of culling the dam is generally over-rated.

PROBLEMS OF ASSESSMENT

With an emphasis on appearance in the sale ring, visual assessment of conformation, coverage, uniformity of staple structure over the body and the absence of both a hairy backline and a kempy breech are considered important by breeders. Assessment in these terms are not entirely unrelated to fleece quality though the relation to quantity may be weak. The practice of selling young animals from the flock and the resultant changing of shearing times often renders the use of fleece weights difficult. Even where groups of young animals are retained intact, the practice of joining kid does

at eight months of age further complicates objective assessment which would otherwise be carried out on the third fleece (shorn at 18 months of age). Selection of does on objective criteria may therefore occur at the second shearing and even then some animals may suffer some effects of pregnancy.

The Angora has a restricted breeding season and high ovulation rates result in a high proportion of does holding to service on the first cycle. The effect of age of kid is therefore minimal but since there is a high twinning rate the effects of multiple births on the fleece growth of the kid might be expected. Such effects may remain and affect productivity at 12 months of age. The progeny of kid does are usually two to three months younger than those of mature does (having been joined later in the season) and this effect, combined with the lower milk production of the young does has an effect which may well last to 18 months of age.

The lack of mohair testing facilities presents a further problem to the breeders contemplating objective selection techniques. There are several groups testing mohair but both the number of parameters and the application of the results vary. The measurements of follicle density and S:P ratio are being used by several breeders though the effects of selection on such characters can only be guessed at. Indeed, even the extent of genetic correlations between fleece characters has not been determined with any accuracy.

A further problem of accuracy of selection is introduced when single animals are required and are selected from a small group of available animals.

APPLICATION OF SELECTION TECHNIQUES

There appears to be too many characters, too many environmental effects, too few measurement procedures available and too few animals to work on. One could question whether it is possible to make any progress with the breed until flocks become larger and standardised management procedures can be implemented. The establishment of a mohair based industry might also provide clearer objectives for breeders, not only in terms of breeding but also in terms of the production of large groups of animals rather than individuals.

The size of present flocks has another effect; that of increased inbreeding, if selection and use of bucks within the stud is carried on for more than several generations. The pressure to close the stud and, indeed the herd book, is considerable in the commercial breeding game and should be resisted. The introduction of bucks from outside the stud presents problems of both obtaining suitable animals and maintaining selection pressure. The practice of joining introduced bucks to a sub-group of does within the stud and subjecting the progeny to objective assessment may be one solution.

Once, selected, a buck is often used for many years and this practice ignores the problem of long generation interval on genetic gains. Similarly, does are often retained in the stud until death up

to 12 years of age. It is argued that "you may wish to go back and repeat a particular cross" or "you can't sell the genetic heritage of the stud". This only underlines the lack of understanding of the principles of mass selection.

Selection procedures might be arranged in the following way:-

(1) By joining single bucks to 20 does; groups of 10-15 kids of each sex might be expected.

(2) Provided no recessive characters appear, animals should be run in single sex groups after weaning with little or no culling except for extreme abnormalities. The progeny of doe kids should be examined separately though they may be run with kids of mature does.

(3) First shearing fleece weights and fleece classes should be recorded and it might be of some use to score animals on coverage.

(4) At the second shearing the fleece weights, classes and scores should be considered and does producing light and kempy fleeces culled with their kid (if joining has already occurred).

(5) Bucks could be assessed at this stage but final selection should wait until the third shearing and should also involve either visual classing for intermediate fineness (possibly inaccurate) or midside sampling and testing. Levels of gare fibre can be assessed with the use of a benzene tray of by microscopy. The use of twin animals and only those which were vigorous at birth might be considered.

The use of visual assessment of the fleece as opposed to that of conformation may well be effective, provided it is only done on contemporary animals. The variation which exists may allow considerable progress, but eventually, objective measures of quality will be necessary.

REFERENCES

EPPLESTON, J. (1977). The use of reproductive techniques to increase numbers of mohair producing goats. Proc. Symp. "Goats for fibre and meat production". Uni. Syd.

STAPLETON, D.L. (1976) Medullated fibre in the Australian Angora goat fleece. *Proc. Aust. Soc. Anim. Prod.* 11, 45.

STAPLETON, D.L. (1977) The golden kid. Angora Breed Bulletin 3.

STAPLETON, D.L. (1978) Mohair production and seasonality in the fleece of the Australian Angora goat. Ph.D. Thesis, University of New England.