CSIRO

Finewool Newsletter

Issue 3

May 1992

Fine-wool Project

All ewes have now arrived at Longford and 11 bloodlines have been mated during May 1992.

The 1991 drop has been subjected to an artificial worm challenge to estimate genetic parameters for resistance to parasites.

The 1990-drop hoggets were sampled and shorn in September 1991 and measurements are being analysed for handle, tip shape, dust penetration, colour, crimp definition, number of crimps, staple length, staple strength, greasy fleece weight, yield diameter and shorn fleece weight. Skin measurements are also being taken.

Representatives from the owner of each bloodline classed their own 1990-drop ewe hoggets using similar criteria to those used in the NSW Sire Reference Scheme. Because of shortage of numbers, all hogget ewes entered the flock, but records will be kept on those classed out.

John Lax

Fine-wool Project Sheep in Medium-wool Environments

From 1992 on, sheep from the Fine-wool Project will be run in traditional medium wool growing environments as well as Armidale. At the end of June, 400 ewes will be sent to Western Australia, of which 200 will be from "Hazeldean" and 200 from "Mirani". "Hazeldean" has been included as a reference to the traditional Peppin bloodlines used in Western Australia. Each bloodline will be divided equally and run at two locations, the Great Southern Research Institute at Katanning (WA Department of Agriculture) and CSIRO's Yalanbee Research Station. These ewes have been purchased from the respective studs rather than taken from the Longford flock, which is still in a building up phase. Rams used in previous matings at Longford will be shipped to WA each year to create genetic ties between each location. Progeny from the WA flocks will be subject to the same measurement regime as the Longford flock.

In addition to the WA project, a proportion of the wether drop from Longford will be run at Condobolin by NSW Agriculture. In this case, all bloodlines will be represented. The sheep will be transported to Condobolin following hogget shearing and sampling at Longford.

The information generated by these experiments will be used to characterise the production of fine-wool genotypes in areas traditionally devoted to medium-wool production. The results will be of considerable interest to wool growers throughout Australia, particularly with the recent publicity given to "fining the national clip".

Andrew Swan

CSIRO Division of Wool Technology & the CSIRO Fine-wool Project

There are many other research areas at CSIRO Division of Wool Technology which complement or are important to the success of the CSIRO Fine-wool Project. Some of them are introduced here.

Style

CSIRO Division of Wool Technology is developing an instrument for the measurement of wool "style". The instrument makes use of staples (prepared similarly to those for AWTA's length and strength measurement). Staples pass beneath a high-resolution camera which is connected to a computer. The camera and computer mimic the interaction of the human eye and brain: the camera captures an image of each staple and these images are analysed by the computer to obtain measurements of such characteristics as greasy colour, crimp definition and frequency, dust content (measured as penetration and area), dust colour and tip and staple dimensions. The computer is programmed to analyse and report a summary of these measurements.

The characteristics to be measured were chosen after analysis of the decisions made when human

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appraisers subjectively assess wool for style. Many examples from a large range of wool types are being measured, including fine and superfine wools, some of which have come from the Fine-wool Research Flock at Longford. Trials are also under way to examine the processing consequences of each style component. Fine-wool lots are included in these trials.

One of the aims of the "on-farm" project, introduced by Kerry Hansford elsewhere in this Newsletter, is to investigate the use of the style project technology for the assessment of fleece style.

Handle

The last Newsletter introduced research at CSIRO Division of Wool Technology into greasy wool handle. Since then many readers will have received and returned a trial questionnaire seeking information from breeders and woolgrowers on their understanding and use of handle assessments. The information contained in the 60 or so replies received is now being collated and analysed. Measurements are also being made on a range of characteristics in about 800 adult and 160 hogget midside samples, subjectively scored for handle and collected from the Fine-wool Research Flock in 1991. Later, a series of blind handle trials is planned to thoroughly test the relationships which become apparent from these two exercises.

Superfine Wool Processing Technology

A new project at the Geelong Laboratory of the Division of Wool Technology, funded by CSIRO's allocation to projects of national priority, will develop the skills and scientific understanding required to facilitate the conversion of superfine combing wools to very high quality yarns in Australia. The project will concentrate initially on scouring technology to reduce entanglement and on optimum conditions for carding and combing of wools with fine diameters. Recent scientific developments in these areas and in spinning and raw wool specification at CSIRO Division of Wool Technology provide the best available springboard for a thrust into superfine research and development anywhere in the world.

While Australia grows 90% of the world's superfine wool, 98% is processed overseas, particularly in Italy and Japan. The potential to match or surpass their technology and "know how" is good, with the added advantage of a scientific understanding to strengthen and complement the technological developments.

Denise Stevens

On-farm Ramifications of Increased Raw Wool Specification

Background

As the industry moves towards the complete objective specification of wool it is important that woolgrowers become familiar with the new measurements and their application to sheep management, breeding practices and clip preparation. The broad thrust of work within this project is to study raw wool specification to assist growers in identifying and producing wool in terms of a market product. In effect we are linking wool production (or wool growth) to specification and processing. Links back to the woolgrower are important as this is the environment where changes can be made to the raw material.

In order to compete in the highly specified textile market it is important that our product meets the customers' requirements. Increased specification may allow a grower to more accurately and appropriately monitor and improve his product to suit the requirements of the end-user. The studies being conducted at Ryde as part of the CSIRO Fine-wool Project fit within the framework of the "on-farm" project.

Fibre Diameter Distribution

One of the newer raw wool measurements being studied within the "on-farm" project is fibre diameter distribution (FDD). The commercial release of the Fibre Diameter Analyser (FDA200) has allowed the rapid measurement of mean fibre diameter (MFD) and FDD, for example, standard deviation (SD) and coefficient of variation (CV). Industry interest in this measurement has been high as it is thought that FDD may be associated with fleece rot and flystrike, wool quality (style) and quantity, as well as processing performance and fabric comfort or prickle.

A CSIRO FDD Task Force, established to co-ordinate and evaluate research into FDD, recently held a workshop to review current research knowledge on the effects and implications of FDD on genetics and wool production, marketing and metrology as well as processing and product performance. A brief summary of the workshop will be available from CSIRO in June, and more detailed information will be available in the research papers to be published in Wool Technology and Sheep Breeding (special issue, 1992).

Some Points of Interest from the FDD Workshop

The commercial development of equipment to measure MFD is largely based on the desire to have a better, more convenient method than Airflow. CSIRO recently reviewed the operation of FDA-200, which has been out of its control for many years. It found errors that while not greatly influencing MFD, would result in an over-estimate of FDD such as SD and the coarse tail of the distribution. Therefore some caution is needed when interpreting these measurements. The errors have been corrected in the revised instrument, the Sirolan-FDA.

For wool metrology, the main issues are the sampling and measurement procedures and the interpretation of results. As FDD consists of several components, for example variation along fibres and between fibres, correct interpretation of results if highly dependent on appropriate sampling and measurement techniques. There is a need for standard flock testing and sampling procedures and this issue will soon be addressed by the Standards Association of Australia.

As well as the statistical terms, other less defined terms such as "prickle factor" and "coarse edge" are in current use in the industry. One derivation of these is the percentage of fibres greater than 30 μm. This figure is based on research showing that fibre ends this thick can cause mechanical irritation of the skin or prickle. Here, a number of points are worth noting:

- Prickle is generally only a problem in wools worn against the skin.
- Standard deviation and percentage greater than 30 µm are related to the mean, that is, the coarser the wool, the higher the SD and percentage greater than 30 µm. Therefore wools of MFD 21 µm or finer are not likely to cause prickle if worn against the skin.
- Because of fibre breakage and loss during processing (and because many sale lots are combined to form processing consignments), it is not appropriate to relate FDD measurements on a fleece to processing or end product performance.

Genetic studies showed that it is possible to breed for a narrow FDD and a lower MFD. Selection to reduce MFD will also reduce SD although at a slower rate, and CV may be marginally increased. Before FDD can be incorporated into breeding programs such as Woolplan, more research is required to determine its relative economic importance and its interaction with other characteristics.

At present, current marketing procedures for wool, including the need to develop large consignments, appear to negate the selection of wools with narrow FDD. This may change if new information is available at the point of sale.

The wool properties of primary importance to processing and product performance are diameter, length, strength and contamination. Although studies on yarn production and properties (i.e., spinning) showed that a change in CV of 5% was equivalent to a 1 µm change in MFD, in comparison FDD is still considered to be of secondary importance. This is in agreement with a small international survey of processors on the processing effects of FDD. The survey did not indicate any clear requirement for this specification.

The trend towards more comfort against the skin continues. Acceptable wools for this use are generally finer than 21 µm, and they are less acceptable as the diameter increases. Data on product use and wool type are required for broader wool types appropriate to product applications of low skin contact.

Kerry Hansford