

the Wool Press

The Newsletter of the Cooperative Research Centre for Premium Quality Wool

The China Connection

ONE OF THE OBJECTIVES of the Wool CRC's Education Program is to enhance the level of wool-related teaching and research at two of China's major textile teaching institutions, the China Textile University (CTU) in Shanghai, and the Beijing Institute of Clothing Technology (BICT). According to Peter Kidman, the Manager of the overseas project, 'it is vital that the customers for Australia's wool have a sound understanding of the technical issues related to early stage processing, wool and wool blend fabric structure and behaviour, wool and wool blend dyeing and dyestuff effluent management. This is particularly the case as China moves towards a market-driven wool

industry.' When this program commenced in 1994, China was Australia's biggest raw wool customer and imported more than 300 million kilograms of greasy wool, scoured wool and tops. In the following year it produced approximately 650 million metres of fabric of which 205 million was pure wool and 350 million was wool blend.

To achieve the objective of improving the quality of wool training and research in China, five PhD scholarships were granted at the two Chinese institutions, along with ten Masters of Science (MSc) scholarships. Such an ambitious project called for the development of unique relationships between Australian academics (at the University of NSW), researchers at CSIRO Wool Technology, academics at the Chinese institutions, and importantly, the Chinese wool processing sector. As Peter Kidman emphasised, 'this is an exciting development which ensures industry-focused research and development'. Two unique features of the PhD program are

1. The manner in which the students are supervised: two core partners of the CRC — the University of New South Wales and CSIRO Wool Technology — share the responsibilities and provide some of the facilities for the students to do part of their experimental work; and

'IT IS VITAL that the customers for Australia's wool have a sound understanding of the technical issues related to early stage processing, wool and wool blend fabric structure and behaviour, wool and wool blend dyeing and dyestuff effluent management.'

2. The links that have been created with the Chinese Wool Textile Industry: between the two universities in China, University of NSW and CSIRO with the Chinese processing sector.

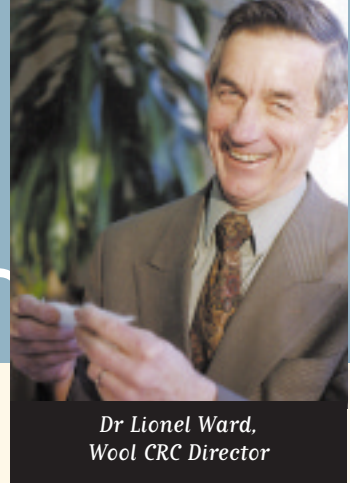
To facilitate these linkages, the Masters program was designed to encourage the two universities to work closely with mills and to identify topics which would satisfy the academic requirements of the universities and at the same time address a mill problem.

Peter Kidman was particularly pleased with the performance of the students at the Xian 2nd International Wool Textile Conference where they presented their papers. 'An audience of 80 delegates from 11 countries were very impressed with the professionalism of the students, and (The China Connection continued on page 4)



Peter Kidman and Professor Yu Weidong at the Xian 2nd International Wool Textile Conference

From the Director



Dr Lionel Ward,
Wool CRC Director

Adoption of our genetic technologies Ñ a matter of urgency

There was a certain amount of scepticism among Wool CRC researchers, when the graph below (figure 1) was produced for internal planning purposes.

USING A THREE YEAR moving average to minimise season-to-season effects, it shows that average fleece weights declined steadily through the 1990s by nearly 0.4 kilograms per head, having risen quite rapidly through the second half of the 1980s. Conversely, the proportion of fine wool produced (19.5 micron and finer), rose sharply (from 5% to 14%) having contracted slightly in the late eighties.

The inference is clear and hardly new. That is, production of finer wool means a sacrifice of fleece weight. That reality from the past has been

the major force behind one of the Wool CRC's research programs; namely, development of a breeding program that enables producers to lower fibre diameter and raise fleece weights in their flock.

Some Wool CRC colleagues thought, however, with good reason, that the effect may have been overstated due to the impact of seasonal conditions and flock structure. Our attempt to examine this more thoroughly was thwarted a little by discontinuity of the data but we were able to make some observations from the data available:

- A series of 'good seasons' in the late 1980s would have contributed to higher fleece weights and increased fibre diameter in that period. Conversely, the 'poor

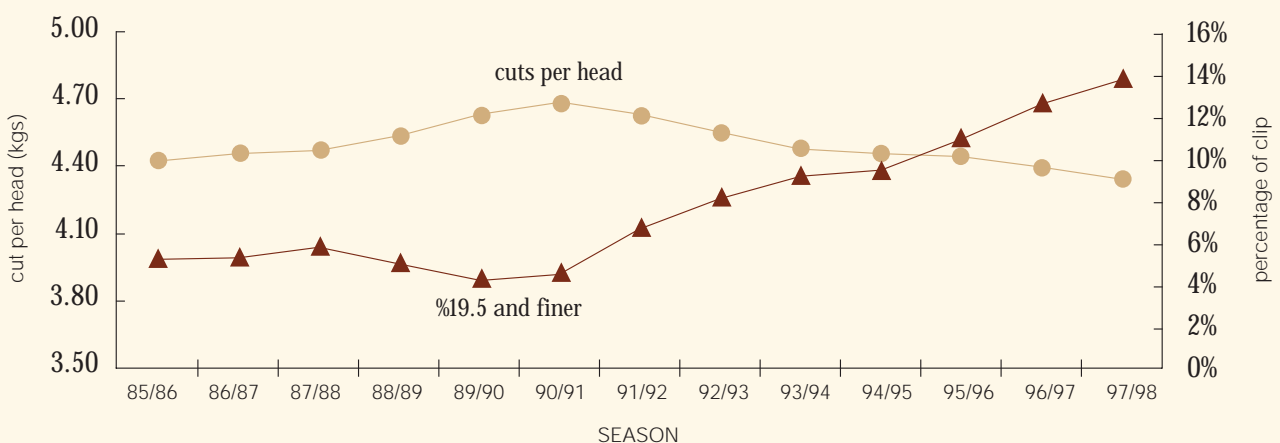
seasons' in the 1990s would have caused the reverse effect.

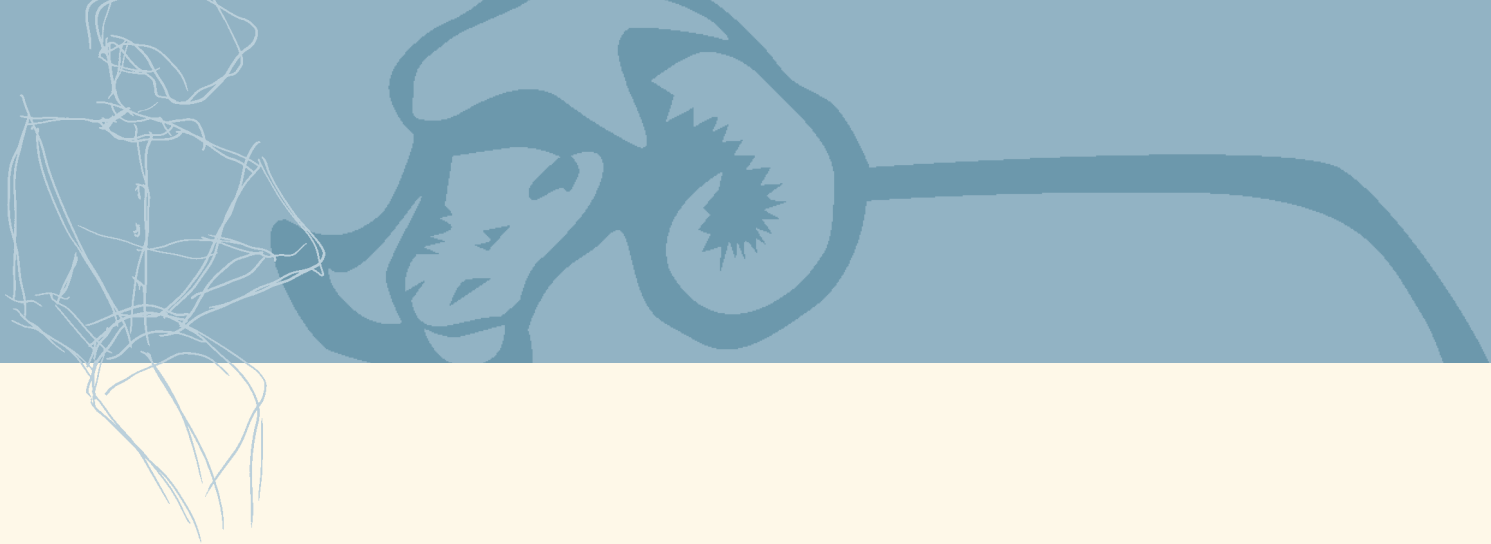
However, the pasture growth index (used in production forecasting by the Bureau of Agriculture and Resource Economics) shows that the overall trends established by the graph were not materially affected by seasonal conditions.

- Contrary to expectations, the proportion of 'ewes for mating' in the national flock was higher in the 1980s than the 1990s (breeding ewes normally have a lower fleece weight).
- That observation was borne out by the proportion of lambs and hoggets (lower fleece weights) in the flock being slightly higher in the late 1980s than the first half of the 1990s.

Figure 1

Three year moving average of cuts per head and quantity of 19.5 micron and finer expressed as a percentage of total clip for period 85/86 to 97/98





- Average staple length of wool sold at auction also declined from the late 1980s, particularly at traditional 'fine wool' selling centres (Goulburn, Newcastle and Launceston), a trend that is also associated with increased fine wool production.

On balance, therefore, much of the falling average fleece weights in the 1990s can be attributed to the rising proportion of fine wool production — a result of substituting typical medium wool strains with conventional fine wool strains. It means that, although the value of the clip has benefited significantly from the big increase in fine wool production, the gross gain has been eroded by more than \$180 million due to lower fleece weights.

That sort of estimate places a high priority on achieving success in the adoption of the Wool CRC's genetic technologies. CSIRO Animal Production and NSW Agriculture have combined to show how producers can successfully breed sheep from within their own flocks to reduce fibre


diameter AND raise average fleece weights. Now they are working through their respective service arms (Select Breeding Services and Advance Breeding Services) to encourage all growers to adopt the new breeding practices.

Importantly, the NSW Agriculture trials have shown that medium micron producers have available bloodlines that will lead to declining fibre diameter with similar/better fleece weights.

Account needs also to be taken, however, of potential negative price effects caused by the increased supply of finer wool. Figure 2 looks at the quantity of wool 19.5 micron and finer over recent years, and shows that the steady increase has not significantly eroded the premium of 19 micron wool over 22 micron (aside from the distorted markets of 1989–92).

It is true that the margins for fine wool in 1998-99 will be down (due to the depressed market), but that does not represent a long-term situation.

Trends in consumer demand will continue to favour lighter weight fabrics and that should be reflected in a return of historic premiums for fine wool categories.

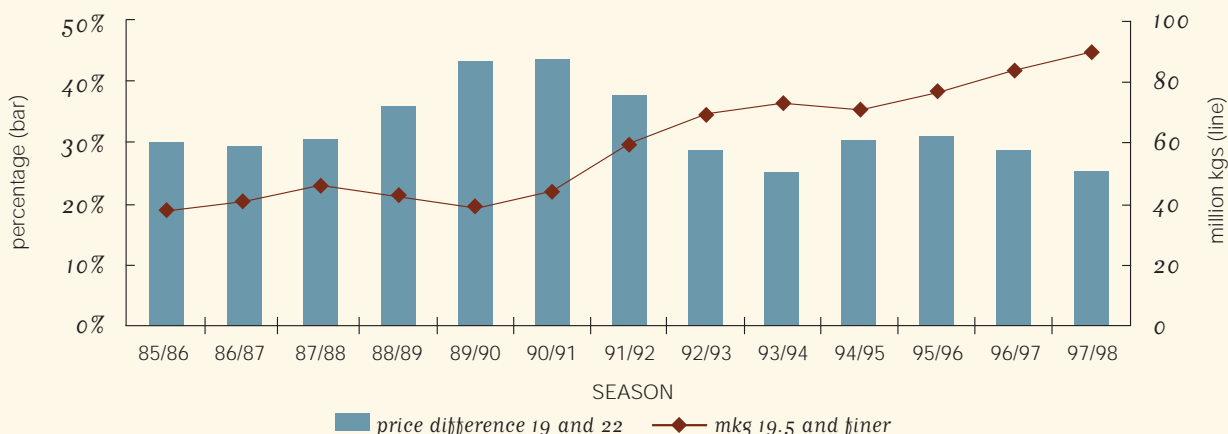
Although the focus here has been on wool 19.5 micron and finer (where premiums are greatest), the principle of moving finer plus gaining fleece weight, applies generally to all apparel wool in all growing conditions. The technology transfer challenge we face is truly national in its dimensions. 

Lionel Ward
Director, Wool CRC

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Select Breeding Services
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Advance Breeding Services
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Figure 2

Three year moving average of price differentials between 19 and 22 micron categories expressed as a percentage and quantity of 19.5 micron and finer expressed in mkg for period '85/86 to '97/98





From the Editor

A BIG THANK YOU to everyone who returned their surveys from the last issue. The response was excellent, and suggestions and comments have been taken on board. We hope you like our new, more contemporary look.

The Wool Press is produced for you, the reader, so we endeavour to include information that is in some way interesting and/or relevant to you. And don't forget, we love to hear from readers.

Seasons greetings and best wishes for 1999.

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The China Connection

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their presentations generated many questions which they handled extremely well', he said.

Accompanying the students to the Xian conference were their

supervisors, Dr Ron Postle and Dr Xungai Wang from the University of New South Wales and Dr Alan DeBoos, Dr David Phillips, Dr Rex Brady and Dr Shouren Yang from CSIRO. The University of NSW's

supervisors have presented a number of lectures to both the universities and the industry. They have also visited a number of mills and discussed the outcomes of their student's work and, in addition, considered and provided advice on problems raised by the mills' technical staff. Likewise the CSIRO supervisors have presented lectures and workshops for the universities and the mills and now the CSIRO is currently developing a program with CTU and two mills in the Jiangsu Province, which addresses quality issues related to the production of wool and wool blend worsted yarns.

Four of the PhD students have since returned to Australia to complete their research work, reviewed their findings and designed their theses with both their University of NSW and CSIRO supervisors. The fifth student is completing her research work in China and will return to Australia in the new year to finish her research work with CSIRO. The students have since presented further findings and results of their work at a seminar held at the University of New South Wales. All the Masters students scholarships have been granted and the first two students at CTU have graduated, with one now working for a Chinese wool buying company and the other for The Woolmark Company.

An important feature of the collaborative links which have been established by the program is that the two Chinese universities are now doing collaborative work with a

number of mills and beginning to work more closely with The Woolmark Company via two laboratories which were established under the program. These two laboratories have various items of CSIRO-developed

equipment which are useful for Chinese mills needing to monitor and improve the quality of their yarns and fabrics.

Since the commencement of the program the Chinese government has dropped the condition that textile university graduates must be employed in the textile industry and, as a consequence, the graduates are now free to choose their own career path. It is therefore a significant outcome that the first three MSc graduates have chosen and obtained positions in the Chinese wool textile industry.

A sound basis for wool related teaching and research programs has now been established at the associated universities, and positive links with the industry have been formed. However, Peter Kidman does warn that it may well be necessary to provide further support to ensure that the Chinese wool textile industry does have the necessary assistance to make it a robust, competitive, long-term user of Australian wool. Building on and expanding the current program will go some way towards this goal.

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Improved wool fabric comfort by Autumn shearing

IF WOOL is to compete effectively with synthetics and cotton it must meet the market requirements. A recent Woolmark Company survey revealed that consumers want fabrics which are convenient, casual, cost effective, clean and comfortable. CRC researchers at CSIRO Wool Technology are tackling the *comfort* issue head-on. Their work has revealed that the skin comfort factor (prickle) of wool fabrics is largely determined by the bending characteristics of the fibre ends. Dr Geoff Naylor, the leader of the comfort project says, 'these bending characteristics are a function of the

fibre diameter over the last 1mm or so of the fibre'. It follows that anything that reduces the diameter of fibre ends in the fabric will improve the comfort.

While breeding sheep with reduced mean diameter is one way of achieving this, the CSIRO researchers have identified another approach which can have immediate effect. 'By simply changing the time of shearing in the highly seasonal Mediterranean environment we can reduce the effective mean fibre diameter by as much as 2 microns', says Geoff Naylor. This can best be explained by looking at the profile of fibre diameter

along the fibre, as shown schematically in figure 1 below.

Clearly after shearing the Autumn-shorn wools have finer fabric ends. However, during processing many fibres are broken, giving rise to new fibre ends. Dr Kerry Hansford, Jane Sambell and Dr Geoff Naylor of CSIRO Wool Technology studied the fibre ends after processing. They examined a large number of Western Australian fleeces covering a range of shearing times. Sample 'tops' were made from these fleeces and the fibre end diameter characteristics related to the raw wool measurements.

Figure 1
Effect of time of shearing on the fibre diameter profile of wools from Western Australia



The following conclusions were made about the fibre ends in the processed top:

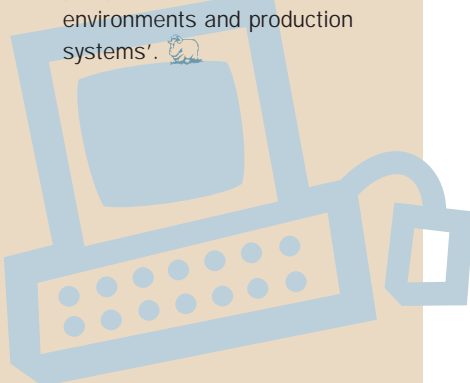
- Autumn shearing produced fibre ends 2µm finer than Spring shearing.
- Autumn shearing of Western Australian wools produced fibre ends 1µm finer than Eastern States' wools.
- Autumn shearing reduced the number of fibres > 30µm). 

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Wool Undergraduates on the Net!

THE UNDERGRADUATE students doing the wool science, production and marketing subjects through the Wool CRC now have 'discussions' with each other on the Internet. 'This is a new and exciting way for the students to interact and to have lively and provocative debates on current subjects relevant to the wool industry', said the Education Program's Helen Daily. With some supervision to prevent all out interstate rivalry, the students conduct a running discussion on a topic given to them by one of the CRC coordinators (Brad Crook at University of New England, Janelle Hocking Edwards at University of Western Australia, Peter Auer at University of NSW or Helen Daily at University of Adelaide). The topics so far have included 'How would you create more demand for wool?', 'Why would you use price risk management techniques?', and 'Design a new Marketing System for Australian wool'.

As one of the students remarked, 'this is a great way to have a tutorial because you get to see things from the perspective of other environments and production systems'.



Turretfield Wool Fair

THE WOOL CRC'S Adelaide-based team displayed their research at this year's Turretfield Wool Fair (18 and 19 of September). This celebration of all things woollen was organised and sponsored by SARDI (South Australian Research & Development Institute), Michell & Co., Elders, The Woolmark Company, Christine Rogers Interiors, University of Adelaide and TAFE, SA.

School groups were the focus of the first day (Friday), while the general city public were encouraged to attend on the Saturday. Competing with the Adelaide Crows in the race for the AFL premiership dampened numbers slightly but organisers were generally happy with crowd numbers.

Staff and postgraduate students from Adelaide Uni and SARDI combined to present the Wool CRC's Sheep Transgenesis Program to the public. Transgenic sheep and wool were on display, as well as semen and cultured embryos and follicles. Poster boards formed a backdrop of general information about the techniques used, and many staff members generously gave their time to talk to the public about the aims and application of the work. The involvement of Wool CRC's Education Program was also important, given the strong educational focus of the first day. Potential undergraduate students were able to identify degrees and diplomas with a strong wool education focus only through universities such as Adelaide participating in the Education Program.

The effort received a good deal of positive comment, with many people appreciating the interactive nature of the displays, and the ability of the CRC people to explain the science in lay terms. Woolgrowers suggested the CRC should seriously consider presenting all our work in a similar style at wool field days, with Karoonda Sheep Fair being cited as an example.

What do other readers think? Please let us know. 

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Interested onlookers at the Wool CRC stand at the Turretfield Wool Fair

How fine

Fine fibre prices and offerings

fibre diameter (μm)	fibre price (A\$/kg clean)	offering 1995/96 (mill kg/ann)
<i>wool 16μm</i>	<i>16.41</i>	<i>0.33</i>
<i>wool 17μm</i>	<i>10.81</i>	<i>2.53</i>
<i>wool 18μm</i>	<i>8.33</i>	<i>14.1</i>
<i>wool 19μm</i>	<i>7.68</i>	<i>32.8</i>
<i>cashmere 15μm</i>	<i>80–150</i>	<i>4.0</i>
<i>silk 10μm</i>	<i>35–50</i>	<i>60</i>
<i>angora 13μm</i>	<i>40–80</i>	<i>na</i>

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Student Profile



Natalie Barnett
Optimising the use of pedigree information in Merino breeding programs (CSIRO/UNE scholarship)

Natalie Barnett

NATALIE INITIALLY looked at the accuracy of current pedigree recording methods employed by Merino breeders. She did this by DNA fingerprinting more than 2000 pedigree animals from flocks in NSW and WA. The Wool CRC provided funds to complete the DNA fingerprints and she worked at two CRC sites to complete this work. Natalie compared the DNA fingerprints to the studs pedigree records and was able to ascertain the reliability of current pedigree recording practices. From the DNA fingerprints it was found that pedigree errors existed for 6–17% of lambs in each flock and that determining pedigrees of lambs close to the time of birth was more accurate than determining pedigrees several weeks after birth.

Knowing that pedigree errors existed Natalie then wanted to estimate the effect on genetic gain when using this incorrect pedigree information. With funding from the

CRC she travelled to Denmark and worked with geneticists there for three months. During that time they developed a simulation program which estimated the effects of pedigree errors on genetic gain. When a breeding objective of increasing clean fleece weight and decreasing mean fibre diameter was simulated 25% pedigree errors reduced genetic gain in the order of 4–5%. The effect was larger when traits with lower heritabilities were included in the breeding objective.

With this information and having knowledge of the cost of current pedigree recording practices Natalie was then able to determine the cost effectiveness of current pedigree recording strategies. Having full pedigree information allows breeders to more accurately select the best animals and so increase the rate of genetic gain. Full pedigree recording will only be cost effective for breeders who are commanding premiums for genetically superior stud stock. It will also be cost effective for breeders

who are running large wether flocks in addition to their stud flocks to which the added genetic gain can be passed.

Natalie also conducted benefit cost analyses of DNA fingerprinting as a pedigree recording system, knowing that pedigree information from DNA fingerprinting is very close to 100% accurate. DNA fingerprinting will be a cost effective pedigree recording method if breeders are receiving premiums for selling rams with a guaranteed pedigree which are genetically superior. It will also be a cost effective option if breeders are additionally running large wether flocks. Natalie is still working on optimal ways that breeders can incorporate DNA fingerprinting into their flocks. She has just submitted her thesis.

Congratulations Natalie! 🐏



Former Wool CRC Business Manager Ian Stewart and Director Lionel Ward draw the winner of the woollen undergarment competition

Winner of the Underwoolies Competition

Regular readers of *The Wool Press* will remember the competition we ran in the last edition. The prize was 'underwoolies' to the value of \$200.00 from Merino Selections, 93–95 High Street, Fremantle, Western Australia. Phone 08 9336 6256.

**We are pleased to announce that the winner was ...
Mr Mervyn Hardie of Western Australia 🐏**

Congratulations!