

A FEW SELECTED LINES

NEWSLETTER OF THE TRANGIE QPLUS PROJECT

ISSUE 6 ► JULY 2006

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Welcome to issue 6 of "A Few Selected lines". This Issue and Issue 7 we will present summaries of a number of papers delivered at this year's Qplu\$ Open Day held on May 11 at Trangie Agricultural Research Centre.

The open day was attended by 170 ram breeders, wool growers, sheep classers and Merino breeding advisors from NSW, South Australia, Victoria and Queensland.

The sheep display included more than 1,300 Qplu\$ ewes and rams drafted into their selection lines.



Improvements in clean fleece weight and mean fibre diameter resulting from 10 years of selection

Introduction

For the life of the Qplu\$ project we have provided annual updates on the progress of the Qplu\$ selection lines in terms of improvements in fleece weight and fibre diameter drop by drop from 1995 to 2003. Given that 10 years of index selection of the flock was completed with the birth of the 2004 drop and the final results collated from their measurement as hoggets in 2005, we can now show for the first time all of the annual improvements recorded from 1995 to 2004.

For each of the selection lines you will find a graph below that depicts the annual improvements recorded for clean fleece weight and mean fibre diameter. These are expressed as percentage change from the base flocks (1993 and 1994 drops) from which the selection lines were created. At the right-hand side of each graph we have labelled the improvements in clean fleece weight in kilograms and the improvements in fibre diameter in microns for the 2004 drop of that line.



We welcome your enquiries and feedback related to the Trangie QPLUS Project and this Newsletter. Depending on the nature of your questions/comments please contact one of the following people involved in the Project.

Pat Taylor (Livestock Research Officer)
Orange Agricultural Institute

Sue Mortimer (Livestock Research Officer) &
Tracie Bird-Gardiner (Project Officer)
Trangie Agricultural Research Centre



australian wool
innovation
• limited

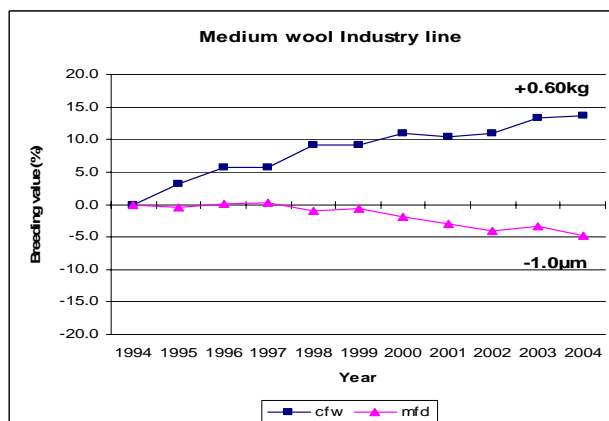
Improvements in the medium wool selection lines

Improvements in the Industry selected line

Breeding objective: Increase fleece weight, reduce fibre diameter by 0.5µm, improve / maintain fleece quality and physical conformation

The Industry line recorded steady improvements in fleece weight from 1995 to 2004 (13.7% or 0.6kg clean) with little change in fibre diameter through to 1999 drop. From that point until the 2004 drop, fibre diameter was steadily reduced by one micron with no apparent reduction in the rate of response in fleece weight. Selection of sires and dams on

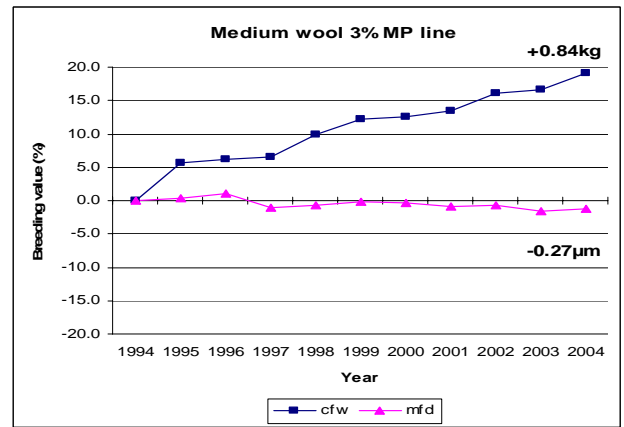
a combination of visual assessment and measured performance did not compromise improvements in fleece weight or fibre diameter.



Improvement in the 3% MP line

Breeding objective: Maximum increase in fleece weight and maintain fibre diameter.

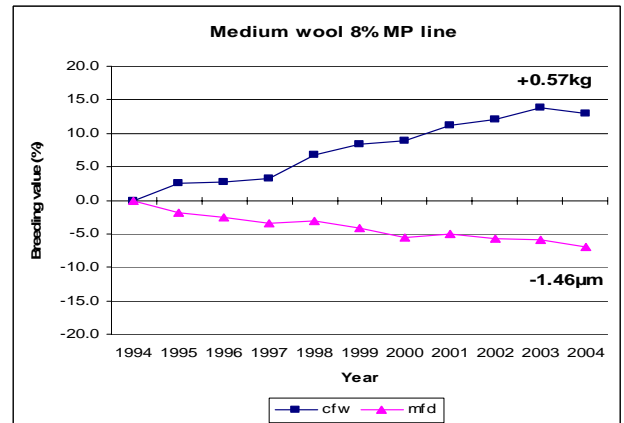
In accord with the breeding objective, the 3% MP line showed the largest increase in fleece weight (19.2% or 0.84kg clean) with a small reduction in fibre diameter of 0.27 μ m.



Improvement in the 8% MP line

Breeding objective: Equal emphasis on increasing fleece weight and reducing fibre diameter.

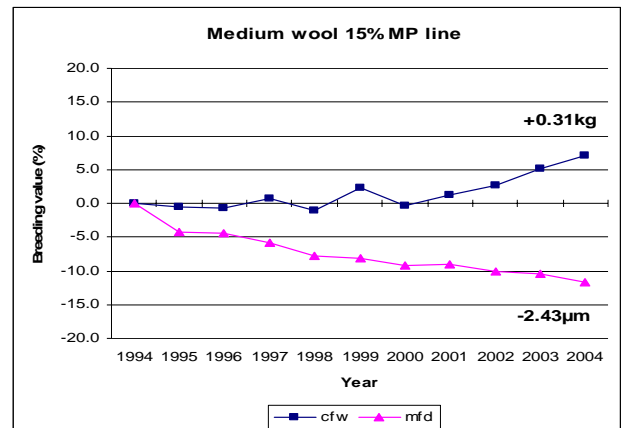
The 8% MP line showed consistent incremental improvements in fibre diameter that culminated in a reduction of 1.46 μ m in the 2004 drop. Response in fleece weight was more variable from year to year with little change from 1996 to 1998 but relatively rapid gains to 2003 drop. Response in fleece weight in the 2004 drop was about 1% below that of 2003 drop at 13% or 0.57kg above the base flock



Improvement in the 15% MP line

Breeding objective: Maximum reduction in fibre diameter and maintain fleece weight.

The 15% MP line recorded the largest reduction in fibre diameter of 2.43 μ m in the 2004 drop with consistent steady reductions from 1995 onwards. Response in fleece weight was around zero until 2000 drop followed by an unexpected steady increase of 7.1% or 0.31kg by 2004 drop.

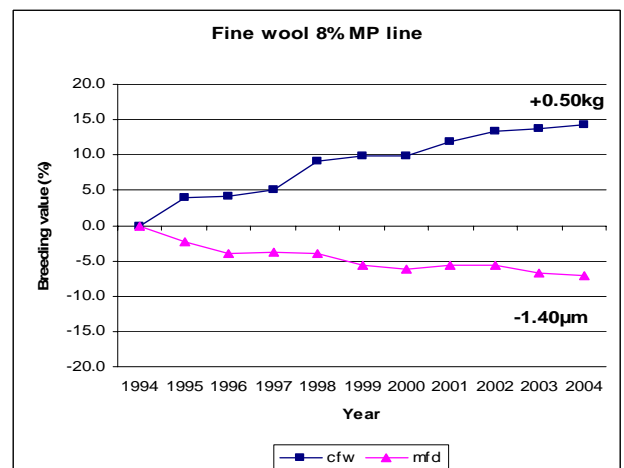


Improvements in the fine wool selected line

Improvements in the fine wool 8%MP selected line

Breeding objective: Equal emphasis on increasing fleece weight and reducing fibre diameter.

The fine wool selected line achieved similar improvements in fleece weight and fibre diameter to the medium wool 8% MP line with a 14.4% (0.50kg) increase in clean fleece weight and 1.4 μ m reduction in mean fibre diameter during the 10 years of selection

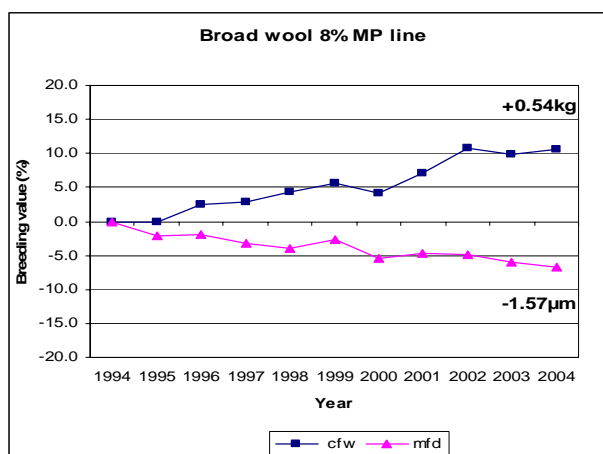


Improvements in the broad wool selected line

Improvements in the broad wool 8%MP selected line

Breeding objective: Equal emphasis on increasing fleece weight and reducing fibre diameter.

The broad wool 8% MP selected line achieved similar improvement in fleece weight (0.54kg) to the fine and medium wool 8% MP lines (0.5kg and 0.57kg respectively) but a slightly larger reduction in mean fibre diameter of 1.57 μ m compared to 1.40 μ m and 1.46 μ m respectively.



Changes in the fine, medium and broad wool control lines

Breeding objectives: Random selection to maintain the fleece weight and fibre diameter of the base flocks

Random selection of sires and dams was effective in maintaining the average breeding values of the control lines for fleece weight and fibre diameter close to those of the three base flocks. Over the 10 years of random selection the largest difference between control line fleece weight breeding values and relevant base flocks was 2.5%, 3.0% and 3.5% for the fine, medium and broad wool controls respectively. The equivalent figures for fibre diameter breeding values were 0.26 μ m, 0.27 μ m and 0.66 μ m respectively.

Conclusions

- All selection lines have demonstrated large improvements in fleece weight and/or fibre diameter in line with predetermined breeding objectives.
- The incremental improvements in fleece weight and fibre diameter observed across the drops have accumulated and are permanent.
- Traits with unfavourable genetic relationships, such as fleece weight and fibre diameter, can be improved simultaneously using appropriate selection indexes.
- Within-flock selection based on measured performance with or without visual assessment has delivered predictable and substantial improvements that have increased the profitability of the Qplu\$ selection lines (see next section).

Changes in other wool traits and fleece value resulting from 10 years of selection

Introduction

As well as providing evidence of improvements in the traits under selection, an equally important role for the Qplu\$ selection lines has been to serve as monitor flocks for any favourable or unfavourable side effects of selection. Only by measuring changes in a comprehensive list of wool, carcass, reproduction, growth and efficiency traits can we fully evaluate the impact of selection on the profitability of the Qplu\$ lines and the implications for other industry flocks pursuing similar breeding objectives using similar selection practices. Although some of these have been reported for some of the drops born since selection started in 1995, because the 2004 drop, represents the most genetically divergent for fleece weight and fibre diameter, differences between the selected and control lines of that drop offer the best opportunity to detect any favourable or unfavourable changes in these other traits.

The changes observed in wool style traits, carcass traits, reproduction and feed intake in the Qplu\$ lines will be reported in forthcoming editions of "A few Selected Lines". This article will focus only on differences between the lines in the wool quality characteristics that are primarily used in the valuation of raw wool so that in conjunction with clean fleece weight we can estimate differences between the lines in wool revenue per head.

Fleece valuation traits

After mean fibre diameter the next most important wool quality traits to influence wool price are staple strength, staple length, position of break and yield. These were measured on mid-side samples collected from the 2004 drop ewe fleeces shorn in 2005. The averages for each line are given in Table 1 (page 4). Although style is also used by the wool trade to value fleeces and can attract large premiums, particularly for fine and superfine clips, it will be included in more comprehensive analyses to be reported in a later issue. For the purposes of this report we have assumed an MF6 type for all lines (see below).

Staple strength of the selected lines ranged from 3.1 N/ktex below (15% MP vs medium Control) to 4.8 N/ktex above (8% MP fine vs fine Control) respective Control lines. The latter was the only statistically significant difference between a selected and control line. With the exception of the 15% MP line, all selected lines produced longer wool staples than control lines. The 6mm increase in the selected broad wool line was the only significant difference. Percent mid-breaks were lower in the selected fine, 3% MP and broad wool lines compared to controls but higher in the other selected medium wool lines. Both the fine and broad wool 8% lines recorded significant increases in yield of around 3% in the 2004 drop. Changes within the medium wool selected lines were smaller, variable and not significant.

Table 1 Line averages for hogget ewe wool valuation traits, prices per kilogram and total fleece value per head – 2004 drop

Trait	Fine wool		Medium-Peppin					Broad wool	
	8%	C	Ind.	3%	8%	15%	C	8%	C
Clean fleece weight (kg)	4.0	3.5	5.0	5.2	5.0	4.7	4.4	5.5	5.0
Mean diameter (µm)	18.3	19.7	19.8	20.5	19.3	18.4	20.8	21.6	23.2
Staple strength (N/ktex)	31.1✓	26.3	32.4	35.8	32.1	30.4	33.5	30.4	27.7
Length (mm)	103	98	105	108	106	101	103	121✓	115
% Mid-break (%)	44	49	52	34✓	55	58	48	17	26
Yield (%)	62.2✓	59.2	63.0	64.1	65.5	62.5	63.8	67.7✓	65.1
Type	MF6	MF6	MF6	MF6	MF6	MF6	MF6	MF6	MF6
VM (%)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Wool chq. (c/kg clean)	1088	920	932	906	1001	1071	895	872	841
\$/head	43.52	32.20	46.60	47.11	50.05	50.34	39.38	47.96	42.05
\$ improvement (%)	35.2	-	18.3	19.6	27.1	27.8	-	14.1	-

✓ denotes a significant improvement compared to the Control line of that strain. (P<0.05)

✗ denotes a significant deterioration compared to the Control line of that strain (P<0.05)

Fleece values

Based on improvements in fleece weight and fibre diameter reported in the preceding article together with changes in staple strength, staple length, percent mid-breaks and yield we have most of the wool measurements required to value the 2004 drop hogget ewe fleeces with reasonable accuracy. For the purpose of the exercise we need to assume that the line means reported for each trait represent the true differences between the lines such that all are significantly different from each other and those of the control lines. By entering the line means for fibre diameter, staple strength, length, percent mid-breaks and yield into “wool cheque” an estimate of the clean price per kilogram is calculated for each line. In the absence of line means we assume two percent vegetable fault and because of the extent of dust penetration an MF6 type (Average Topmakers on the old scale) across all lines. The input data, clean prices based on the past three years of wool sales and fleece values for each line are also given in Table 1.

The final drop of hogget ewes from the selected lines have produced fleece values that range from \$5.91 (broad 8% MP) to \$11.32 (fine 8% MP) above those of the control line ewes of each strain. These represent improvements in fleece value of between 14% and 35%. Ewes from the selected medium wool lines produced fleeces that ranged from around 18% to almost 28% above the value of the fleeces of control line ewes.



Conclusions

As a consequence of the selection imposed on fleece weight and fibre diameter within the Qplu\$ lines

- there were variable responses in staple strength, with the only significant change a 4.8 N/ktex increase in the fine selected line.
- staple length generally increased in the selected lines
- yield increased significantly in the fine and broad 8% lines
- clean price increases ranged from 11 to 168 cents/kg based on wool prices 2003-2005
- fleece value increases ranged from \$5.91 to \$11.32 per head
- fleece values increased from 14% – 35% per head.

These estimates are based on a market period of relatively low wool prices and historically low premiums for fine wool. The fleeces also suffered the effects of drought conditions for much of the wool growing period (high dust content, low yield and low staple strength). Over the next 12 months we will undertake more comprehensive economic analyses covering a broader range of wool market and micron premium scenarios.

The information contained in this publication is based on knowledge and understanding at the time of writing (10/07/06). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.