

4. SELECTION OF SUPERIOR GENETICS

Introduction

Running a productive bloodline of Merino sheep is critical for long-term flock profitability. As flocks are being rebuilt coming out of the drought, there is an opportunity to stand back and consider the breeding direction of your flock. At the same time, the wool market has looked completely different over the last 12 months than it did at any point during the previous decade. Not only have prices for medium and broad wool risen to extremes, but the premiums for fine wool have virtually disappeared. The third factor to take into account is the high mutton prices and to what extent this should influence breeding decisions.

Therefore many producers are at a critical decision point when it comes to the future direction of their flock.

This section highlights the lag effect that bloodline differences can have on flock profitability and provides some data which will help producers make their decisions.

Most producers underestimate the powerful effect of small changes in fleece weight and fibre diameter on the profitability of the flock.

Currently, a range of sources of information are used to determine which bloodlines are preferred. These range from pub talk to people's opinions including the neighbours, stock agents, brokers and sheep classers.

Many of these people have a lot of experience upon which to base their opinions. Their opinions need to be taken on board but their limitations recognised.

The major deficiency with opinions is that they rarely quantify differences between bloodlines or, if they do, there is also a multitude of confounding factors such as management and nutrition such that one can never have a lot of confidence in the information. As discussed below, the differences between bloodlines, even if reasonably small, have such large effects on profitability that you need to be sure of them, and the best way to be sure is by good quality, objective information.

Whatever source you use for advice be sure that the information is of good quality and is independent.

SECTION KEY MESSAGES

It is critical to establish long-term genetic goals for your sheep enterprise, and restocking after the drought may provide an opportunity to speed progress.

In setting goals, keep in mind that the current micron-price differentials are unusual, in the context of long-term trends.

There are enormous differences between Merino bloodlines in their profitability per hectare. Do you know how your bloodline is performing?

The differences between bloodlines, even if reasonably small, have such large effects on profitability that you need to be sure of them, and the best way to be sure is by good quality, objective information.

Effect on profit

Once you have taken on board the information and are contemplating changes, always be sure to measure the effect of any change. Small differences can have large effects on your profitability and those small differences are often very difficult to detect by visual assessment.

Dollars are obviously the key measure, but they need to be measured per hectare as well as per head.

This section presents information on bloodline differences and quantifies the effect of these differences on profitability.

Always be sure to measure the effect of any change. Small differences can have large effects on your profitability and those small differences are often very difficult to detect by visual assessment.

This section presents information on bloodline differences and quantifies the effect of these differences on profitability.

To analyse the effects of bloodline on profitability, we assume each bloodline is run under commercial conditions with the appropriate income and all the expenses required to run a flock. The expenses include variable costs such as shearing, crutching and health costs, as well as all the fixed costs such as insurance, rates, labour and depreciation.

The reason for using this method of analysis is that simply looking at productivity (fleece weight and fibre diameter) or gross margins (per hectare or per DSE) seriously underestimates the differences in net profit between bloodlines. This is because gross margins only take into account the variable costs of running sheep such as shearing, health, supplementary feed etc. In most flocks these costs represent approximately 30-40 per cent of the total costs of running a farm. The other 60-70 per cent of costs are overheads. That is, you have to pay them regardless of the number of sheep you run or the type of enterprise you run. Examples of overhead costs include rates, insurances, repairs and maintenance and so on.

The difference between gross margin and profit analysis is shown in Table 4.1. Note that the difference in gross margin between the two bloodlines is 37 per cent whereas the difference in profit is 87 per cent.

Table 4.1: Why small productivity differences result in large differences in net farm income

	CFW (KG)	FD (MICRON)	GROSS MARGIN/DSE	GROSS MARGIN/HA @ 10 DSE/HA	OVERHEAD COSTS/HA	PROFIT /HA
Bloodline 1	4.5	22.0	\$13.69	\$137	\$80	\$57
Bloodline 2	4.8	21.0	\$18.67	\$187	\$80	\$107
Difference	+6.7%	-4.5%	+37%	+37%	-	+87%

Source: HSA Analysis of NSW Agriculture pooled wether trial data

If you consider that the average profitability of wool flocks analysed through Holmes Sackett & Associates Farm Benchmarking in 1997/98 to 2001/02 was \$3.99/DSE, any increase in profitability is very welcome.

The overhead component of running the property has to be paid out, no matter how productive the flock and it is not influenced by the choice of bloodline. The extra income, as a result of a more productive bloodline, comes at no cost assuming the same ram price and therefore the extra income is all profit.

The extra income, as a result of a more productive bloodline, comes at no cost assuming the same ram price and therefore the extra income is all profit.

Long and short-term wool prices

The data in Table 4.3 lists bloodlines in alphabetical order and indicates their rank based on profit per hectare and fleece value. This ranking is based on an estimate of wool prices for the period 2001 to 2010. These prices have been compiled by ICS and aimed to adjust prices for the oversupply problems which depressed medium and broad wool for much of the 1990s. The actual prices are shown in Table 4.2.

Because it takes at least 10 years for a flock to change bloodlines by just buying rams, the decision should not be based on short-term price trends.

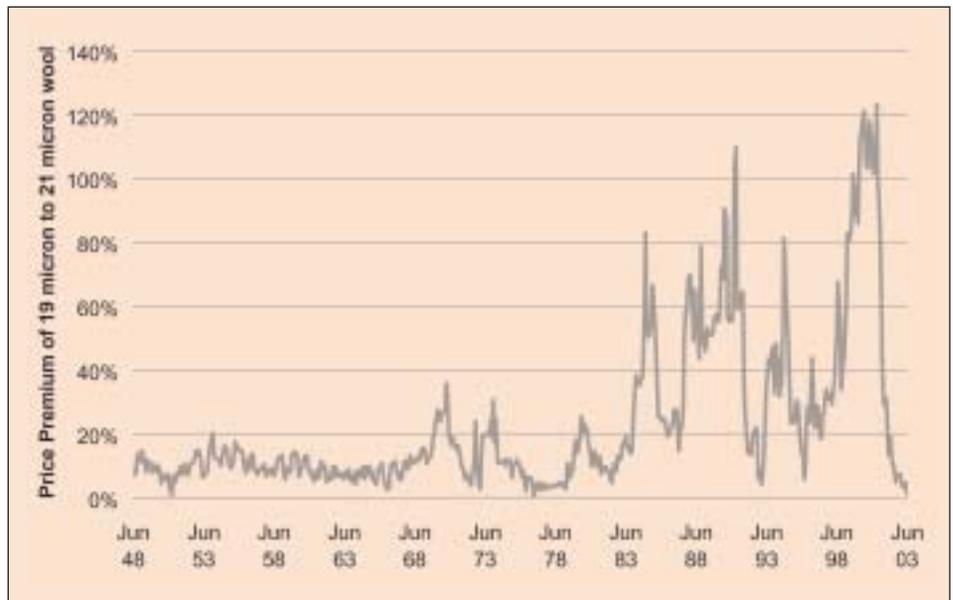
Table 4.2: Estimated median wool prices for 2001-2010

MICRON	MEDIAN WOOL PRICE 2001-2010
17	2062
18	1402
19	1101
20	901
21	789
22	737
23	677
24	645

Source: Independent Commodity Services

Obviously these prices bear little resemblance to the prices over the last year, particularly for medium and broad wool. However, we must be careful to avoid confusing short-term price movements with long-term trends. A good example has been the premium for 19 micron wool compared to 21 micron (Graph 4.1). It has been variable over the last twenty years and current prices are at an extreme end of that volatility.

Graph 4.1: Price premium of 19 micron to 21 micron wool



Be careful to avoid confusing short-term price movements with long-term trends. A good example has been the premium for 19 micron wool compared to 21 micron (Graph 4.1). It has been variable over the last twenty years and current prices are at an extreme end of that volatility.

Source: Independent Commodity Services

Because it takes at least 10 years for a flock to change bloodlines by just buying rams, the decision should not be based on short-term price trends. The only difficulty with using long-term trends, is that the relativity between price grades may change over time, and therefore the historical difference will not always be a good pointer to the extent of future differences.

Note that the most profitable bloodlines have average or above average fleece weights and below average fibre diameter. Therefore, even when premiums for fine wool are relatively small, the fact that some of the bloodlines still cut as much, if not more, than the strong wools, will result in them maintaining their profitability advantage.

Table 4.3: Productivity and profitability of Merino bloodlines

	CLEAN FLEECE WEIGHT (kg)	FIBRE DIAMETER* (micron)	Live weight kg	2001-10 Profit/hectare*		2001-10 Net Fleece Value/head		No. of Rams	Accuracy
				\$	Rank	\$	Rank		
A.M.S.	3.8	20.7	58.1	38	64	20	64	7	M
Amaroo	4.3	20.5	48.9	99	20	34	22	4	M
Anable	4.5	20.2	48.7	128	5	37	6	5	M
Avenel	4.5	21.0	51.0	84	32	33	36	25	H
Bilandi	4.5	20.8	53.7	101	19	36	15	5	M
Birlawarra	4.5	20.0	51.8	136	4	38	3	10	M
Boorook	4.7	21.5	56.4	75	46	33	31	4	M
Boyang	4.4	20.4	49.3	112	13	36	16	5	M
Brockley	4.3	21.0	48.8	76	43	32	52	8	M
Bungulla	4.3	20.2	47.9	112	12	36	18	14	H
Buttobone Stud Park	4.4	21.3	51.7	59	57	31	58	7	M
Cleveland	4.1	21.2	50.8	66	58	30	61	10	M
Collinsville	4.6	21.7	54.3	73	48	33	48	13	H
Concordia	4.9	21.8	52.3	90	28	34	24	9	M
Coorong	4.3	21.8	53.4	47	62	30	62	8	M
Cottage Park	4.6	20.5	51.9	111	14	36	10	10	H
Cranmore Park	4.1	20.9	57.9	47	63	31	58	6	M
Edithvale	4.5	21.0	53.0	80	33	33	33	5	M
Egelabra	4.3	20.9	48.7	71	53	31	55	45	H
Eynal	4.3	20.9	49.2	80	34	32	47	8	M
Ginge	4.3	21.0	49.5	77	39	32	50	5	M
Gleopine	4.8	21.7	49.3	93	24	34	29	7	M
Goodumbra	4.5	21.1	57.3	71	50	33	38	4	M
Greenlands	3.8	19.2	49.9	126	8	37	5	3	M
Haddon Rig	4.2	20.9	50.4	71	51	32	53	42	H
Hazeldean	4.7	21.0	51.5	98	22	35	30	35	H
Inglewood Estate	4.6	20.4	50.3	122	8	37	7	5	M
Ketton Plain	4.8	21.7	49.5	92	25	34	30	3	M
Kia-Wana	4.6	22.5	53.6	52	80	30	60	5	M
Maryville	3.5	19.0	48.8	126	7	37	8	40	H
Middle View	4.3	20.3	49.9	99	21	34	21	5	M
Mogila	4.2	21.7	50.8	90	61	30	63	11	M
Mumbabone	4.1	20.8	48.5	77	38	32	51	9	M
Mungadi	4.6	21.7	55.3	71	52	33	39	10	H
Mummbacca	4.7	21.5	49.3	91	27	33	32	8	H
Myocum	4.0	19.9	50.5	167	1	41	1	5	M
Nerburn	4.1	20.2	50.5	91	26	34	28	6	M
One Oak	4.7	21.2	53.8	86	29	34	29	8	M
One Oak No 2	4.3	20.3	51.9	103	18	35	17	7	M
Pencow	4.2	20.4	49.1	97	23	34	20	13	H
Pleva	4.4	21.8	51.2	82	56	31	57	4	M
Prognook	4.5	21.2	52.3	79	36	33	37	34	H
Rocklyn	4.4	21.7	52.2	65	55	31	56	6	M
Roseville Park	4.4	20.3	49.3	117	10	36	12	9	M
Rossmore	4.1	20.5	49.0	77	40	32	49	8	M
Sandy Creek	4.7	22.1	51.7	76	44	33	45	3	M
Seam Park	4.7	20.9	49.9	106	17	35	19	7	M
Snowy Plain	3.9	19.2	48.7	145	2	36	2	3	M
Tea Lake	4.8	20.9	47.8	122	9	36	11	5	M
The Yanks	4.7	20.7	54.1	105	15	36	9	7	M
Uardy	4.5	21.3	51.2	77	41	33	48	16	H
Waliner	4.7	21.4	53.3	86	30	34	27	4	M
Wanganella	4.7	21.8	53.6	74	48	33	42	17	H
Warfana	4.4	21.2	51.3	77	42	33	44	3	M
Westray	4.7	21.9	51.6	78	37	33	43	12	M
Willandra	4.7	21.4	54.9	85	31	34	23	11	H
Willerah	4.7	21.9	55.1	89	54	33	41	8	M
Wonga	4.7	21.8	53.5	79	35	33	34	10	H
Woodpark	4.4	20.9	54.3	73	47	33	38	6	M
Woolaroo	4.3	20.2	52.0	109	16	36	14	5	M
Wyambek	4.1	19.5	49.0	137	3	38	4	8	M
Yarrawonga	4.6	20.9	52.5	113	11	36	13	13	H
Average	4.41	20.9	51.7	87.78		33.7			

The most profitable bloodlines have average or above average fleece weights and below average fibre diameter.

A critical point is that for sheep of the same weight, there can be a three-fold difference in their ability to generate profit for you per hectare, simply through picking the right bloodline.

* Assume 10 DSE/ha and numbers adjusted for liveweight, that is, fewer heavy sheep per hectare than light sheep

Source: NSW Agriculture pooled wether trial data / Holmes Sackett & Associates price and profitability analysis

Which bloodline?

Producers will often limit the bloodlines they will consider running in a district, because it is 'fine wool country' or 'bread and butter wool' country. In many instances, this is over-emphasised and causes people to limit the bloodlines which are considered. In the process, some potentially profitable sheep could be overlooked.

All the available evidence indicates that sheep which have above average profitability, if taken to another district, will still have above average profitability.

If your objective is to maximise flock profitability, you should be selecting bloodlines from within the top 20 per cent. Within that group, there is a range of types of sheep to suit most districts.

All the available evidence indicates that sheep which have above average profitability, if taken to another district, will still have above average profitability.

Therefore, keep in mind your local environment, but don't assume that only a certain few bloodlines are suited. If the information indicates they may have something to offer, try them yourself.

If your objective is to maximise flock profitability, you should be selecting bloodlines from within the top 20 per cent. If you go below this, you will be sacrificing too much profit. Table 4.4 shows the large difference in profitability between the top 20 per cent and the average. Note that the top 20 per cent has average fleece weights and finer microns (-1.1 microns) than the average bloodline. The bottom 20 per cent has below average fleece weight, and above average fibre diameter (+0.4 micron). Therefore, it is quite clear that there are sheep out there which have the right combination of a good cut and relatively fine wool.

Table 4.4: Profitability of the top and bottom 20 per cent of bloodlines compared to the average

	CLEAN FLEECE WEIGHT (KG)	FIBRE DIAMETER (MICRON)	LIVEWEIGHT (KG)	PROFIT/HA 2001-2010	NET FLEECE VALUE/HD 2001-2010
Top 20%	4.3	19.9	50.4	\$128	\$37
Average	4.4	21.0	51.8	\$68	\$34
Bottom 20%	4.0	21.4	52.6	\$54	\$31

Source: Holmes Sackett & Associates analysis of NSW Agricultural data

Among the top 20 per cent there is a range of types of sheep to suit most districts.

It is important to bear in mind that this data has to be tempered with some homework and judgement on your part. For example, data on flystrike susceptibility is not available. Nor are other factors which may influence labour requirements and therefore affect profitability.

Also, the data represents past performance of the bloodline. The data is drawn from wether trials which have been run over the last 10 years, and the wethers in a trial 10 years ago would have been bred by rams purchased between two and five years before the trial. Therefore, in most cases, the information will be representative of a flock's performance 5-10 years ago.

In most cases, this will not have a large effect on the accuracy of the rankings because the rate of progress in studs is generally one per cent per annum or less.

The only time you would expect the difference to be greater is when the ram breeder has made extensive use of a sire(s) from a bloodline which is considerably different to his own. These situations will be the exception rather than the rule, but should be kept in mind when making decisions.

As well, the stud that particularly appeals to you may be 'flavour of the month' at present and it may be difficult to buy rams there. You need to travel. Visit your short-list of studs and gather as much information as you can before making a decision.

Selection methods

Nothing seems to raise more passion among wool producers than how to go about selecting sheep. There is an enormous diversity of ideas, and the views are often held with extreme passion.

Work done in South Australia in the Merino Demonstration Flock, shows that selection methods at the ram breeding level can have a large effect on fleece values.

The managers of these flocks have been selecting and breeding using a variety of methods with the aim of improving the profitability of typical South Australian-type Merinos. The first lambs were born in these flocks in 1997.

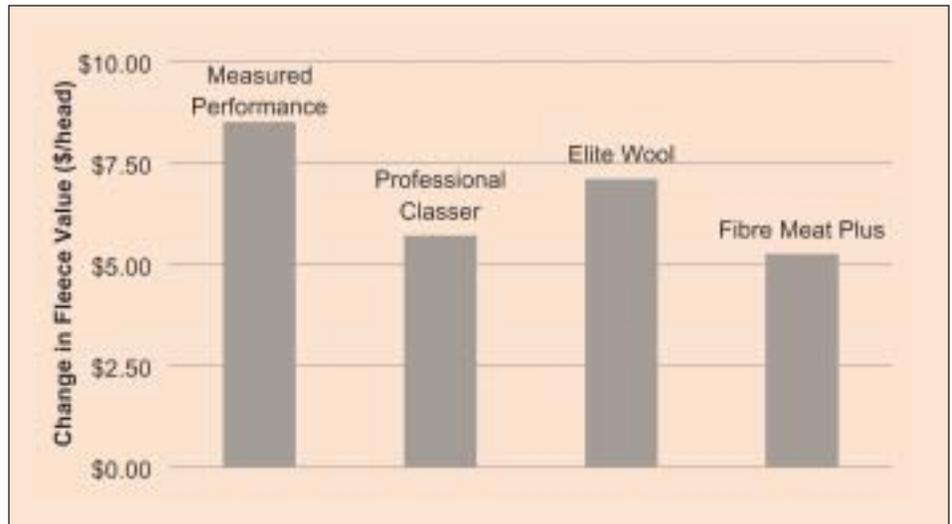
The average fleece value, compared to the control (unselected), of all the ewes in these flocks at the 2002 shearing are shown in Graph 4.2.

In seven years, it has been possible to lift fleece value by \$7-8 per ewe in both the measured performance flock and the elite wool flock. The professional classer flock has improved by approximately \$5 per head, which is significantly lower than the other two methods. The fibre/meat flock has a similar fleece value to the professional classer, but it has only been recently introduced to the Demonstration Flocks.

Bear in mind that the wether trial data represents past performance of the bloodlines. Visit your short-list of studs and gather as much information as you can before making a decision.

Work done in South Australia in the Merino Demonstration Flock, shows that selection methods at the ram breeding level can have a large effect on fleece values.

Graph 4.2: Change in ewe flock fleece value (per head)* (1997 - 2002)



Source: SARDI Demonstration Flocks, March 2003

* 1997 wool prices

The conclusion from the trial shows quite clearly three points:

Returns can be lifted substantially by introducing superior genetics to a typical South Australian flock.

- Returns can be lifted substantially by introducing superior genetics to a typical South Australian flock.
- At this stage, either performance measured or elite wool will provide larger gains than the professional classer approach.
- Having a clear and feasible goal is critical

At this stage, either performance measured or elite wool will provide larger gains than the professional classer approach.

The key point to remember is that the extra \$7.50 per head was achieved at little or no additional cost. Over a typical flock of say 4,000 sheep, this accounts for an additional \$30,000 per annum. Over twenty years, that adds up to \$600,000 of extra profit, assuming the same ram prices and cost of selection.

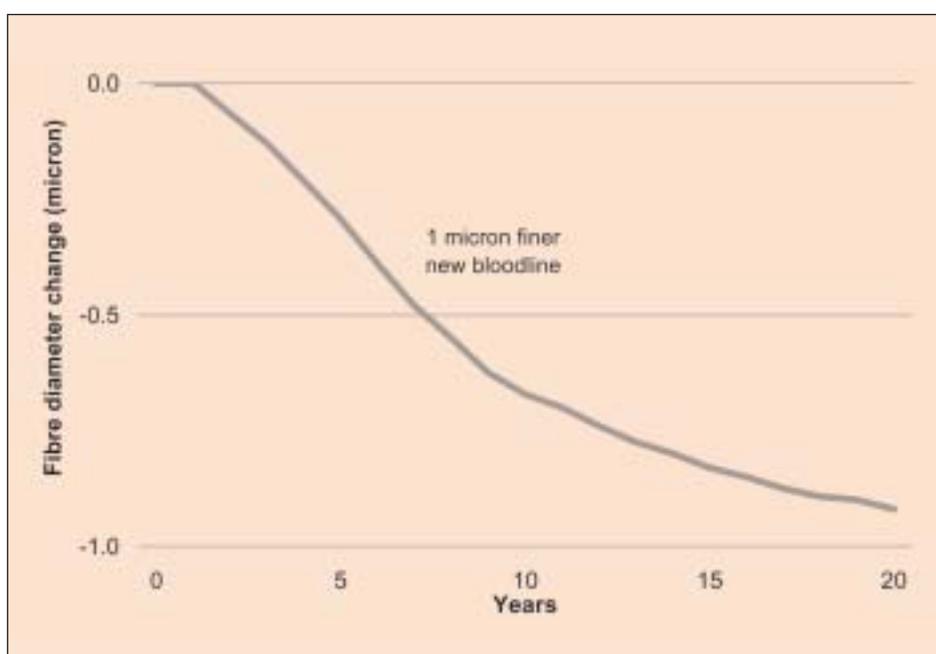
Having a clear and feasible goal is critical.

It takes time

It is critical to remember the time that it takes for a change in ram source to feed through a conventional flock. Graph 4.3 shows how long it takes for a bloodline change of one micron to feed through the flock. In this case, it would take seven years to change by 0.5 micron. This means it is critical to take a long-term view when it comes to selecting rams. You must be thinking about what the market is going to be like in 5-10 years when you buy your rams, not what the market is like on the day.

You must be thinking about what the market is going to be like in 5-10 years when you buy your rams, not what the market is like on the day.

Graph 4.3: Changing ram source takes substantial time to flow through the flock



Source: K Atkins, NSW Agriculture

Case Study - Genetics

As owners of a 3,000 sheep flock, which is a minor component of our farm business compared to the 2,800 hectares of crop, we were reviewing the role of the flock, particularly its profitability, or more specifically, the lack of it. This was particularly pertinent following the drought. We had spent a small fortune getting them through, numbers were down to about half, and if we were going to rebuild, it had to be worthwhile.

The options were to improve the performance of the flock, or to get out of sheep and maximise the area of crop, then take on agistment when sheep are necessary for stubble or lucerne grazing.

The options were to improve the performance of the flock, or to get out of sheep and maximise the area of crop, then take on agistment when sheep are necessary for stubble or lucerne grazing.

Our enterprise had been a long-term (47 years) client of a leading merino stud. They provided an early pick at ram selling time, and always provided at least 30 rams from which we usually selected six. The classer was always there to help with selection and once a year he went through the young ewes to identify which ewes we should keep.

The feedback from the classer and the wool broker was always good, the flock was headed in the right direction and it improved each year. Much of the 1990s have been painful for producers of our 'bread and butter' type wools, especially with the stockpile depressing prices.

As part of our review of the flock we asked three questions:

- Were we up to scratch with our management?
- Were our pastures up to scratch?
- Were our sheep up to scratch?

On the first two points, we were doing well - our management program was efficient and it was a pretty-low cost operation.

Pastures have always been our strong point, because without good pastures we can't grow good crops.

That left the third issue of the quality of the sheep. The problem was, we were unsure how they really stacked up. About eight years ago, we entered a few wethers in a local wether trial.

Our sheep performed badly, in fact they were second last based on fleece value, and thankfully there were Macarthur Merinos being shown or we would certainly have been last. It wasn't a result to be proud of, but we selected the sheep by just running the wethers out through the draft, whereas some of the really good producers in the district had selected out wethers from 1,000 head or more. One, we understand, had even collected some mid-side samples. So, did we have poor quality sheep, or did we just pick the poor ones?

We assessed the data from a number of wether trials based on a range of bloodlines to try to overcome some of those problems, and fortunately the stud we buy rams from was included. The comparisons in Table 4.5 include the results from the top three bloodlines based on fleece value.

We assessed the data from a number of wether trials based on a range of bloodlines to try to overcome some of those problems, and fortunately the stud we buy rams from was included.

Table 4.5: Our bloodline compared to pooled wether trial results

	Clean Fleece weight (kg)	Fibre Diameter	Bodyweight (kg)	Fleece value (5 year average price)
Our bloodline	4.5	22.1	56	\$28.20
Average of all bloodlines	4.4	20.9	52	\$33.70
No 1	4.0	18.9	51	\$41.00
No 2	4.5	20.0	52	\$39.00
No 3	3.9	19.2	49	\$39.00

Source: HSA Analysis of NSW Agriculture pooled wether trial data

To be honest, the results gave us a bit of a fright - our sheep had pretty close to average fleece weight but were 1.2 micron stronger than average. Our fleece value was \$5.50 below average. And then you look at the top performers. No 2 had exactly the same fleece weight as ours but was 2.1 micron finer and four kilograms lower liveweight.

It was the fleece value that blew us away though - an extra \$10.80 per head. We ran a few numbers and across our flock (we actually shear close to 4,000 sheep allowing for lambs and sale sheep) and that added up to a potential \$43,000 of extra income. Over the next twenty years, that would represent an extra \$860,000 of wool income. And at no extra cost, so it all goes straight to the bottom line.

This was too big to ignore - action was required. Our aim was to retain fleece weight but to reduce fibre diameter without sacrificing too much liveweight. We looked at the data and there seemed to be about three or four studs we could consider, all with good results. After talking to them we settled on one that ranked No 5 with a fleece value of \$38. Liveweight for this bloodline was only two kilograms below ours which wasn't an issue - we had plenty of that. Then there was the dilemma of how to go about the change. There were a couple of options - sell our flock and start again by buying ewes in or change rams over now to a better source and let the benefits filter through to the flock over time.

With the difficulty of finding good clean sheep after the drought, we decided to change the rams over at once (ram sales were weak with the small national flock), keep our reduced ewe flock and build up as quickly as we can. At the same time, we would look for opportunities to buy ewes in the next 1-2 years to speed up the process. Although it will take about 10 years for the flock to change over completely, we will start to see the benefits of first lamb shearing, and the first cross should cut an extra \$5 per head. Over 1,200 lambs, that would pay for half the ram change-over in the first year.

While some may disagree just when the medium and broad wool prices are coming good, we are in it for the long-haul and it is definitely the way to go. We can reduce the fibre diameter without losing fleece weight, so we can't possibly be worse-off and by the time we see substantial change in our flock, the wool market will have settled down. The thing that still amazes us is how the decision on ram source can have such a large effect on profitability.

There were a couple of options - sell our flock and start again by buying ewes in or change rams over now to a better source and let the benefits filter through to the flock over time.

The thing that still amazes us is how the decision on ram source can have such a large effect on profitability.

With the difficulty of finding good clean sheep after the drought, we decided to change the rams over at once (ram sales were weak with the small national flock), keep our reduced ewe flock, and build up as quickly as we can.