

Merino Ewe Hogget: Best Practice Project.

Year trial began: 2000

Date of this report: January 2005

Group that proposed the trial: Marlborough Merino Association

Region: Marlborough

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Meat & Wool NZ (FITT Funding)
Merino Inc**

Introduction – background to the project

The Merino 100% Club identified that the performance of a young ewe from weaning until the two-tooth stage was crucial to long term productivity.

Poor growth rates as a ewe hogget can have a negative effect on the amount of wool a ewe clips over her lifetime, the quality of the wool and the number and quality of the lambs she produces. There was relatively little data available on ‘best practice’ management.

Key Aims – what was the project trying to achieve?

- By monitoring ewe hogget management from weaning until the two-tooth stage, the project aimed to see what management practices produced the fastest growing ewe hoggets and the best quality wool.
- To encourage merino farmers to monitor their ewe hoggets (weighing, faecal egg counts (FECs), Vit B12 tests, wool quality) and pasture (quality and quantity).
- To identify trends, rather than prove statistical relationships.
- To encourage farmers to adopt ‘best practice’ management guidelines.

Methodology – what was done in the trial?

There were 10 high country properties from the Awatere and Wairau Valleys in Marlborough involved in Year One (1999 – born hoggets). During the 4 years of the project some of the original properties pulled out while others joined up.

Every time the ewe hoggets were shifted, farmers were encouraged to complete a Management Form which showed the current weight of the hoggets at the time of the shift, pasture type, quality and quantity, stocking rate, what other stock were grazed with the hoggets, what had grazed previously on the block and for how long, and the pasture residual left when the hoggets were removed.

Data was also collected on animal health conditions experienced e.g. foot conditions, fly strike and parasitism, treatments such as Vit B12 injections and drenches, and results of monitoring - FECs, blood or liver tests for Vitamin B12 or Selenium and wool quality.

Wool samples were taken from 50 hoggets at the time of shearing and these were analysed by SGS Wool Testing Services in Wellington using an Optical Fibre Diameter Analysis Machine (OFTA 2000). This measures the variation in diameter along the length of the wool fibre. The fibre profiles produced by Peter Baxter at SGS were then plotted against hogget growth rates and liveweights. Management events and results of monitoring (eg faecal egg counts) were also plotted on the graphs to see if any particular event was associated with either good or poor performance.

Towards the end of the investigation it became clear that hogget performance was very dependent on their earlier pre-weaning development. As a result, ewe condition and pre-weaning lamb growth rate were also measured on a few properties in the last year of the project.

There were some difficulties for some farmers collecting data, especially body weights, and in a number of instances there were long gaps between weighings. Reasons for this included the fact that weighing sheep for some was a novelty and set-ups were perhaps not very user friendly. Hoggets would also spend long periods away from the yards and mustering for 'weighing only' was impractical. At other times weighing was a bit of a logistical nightmare especially when the job seemed to be of low priority.

While examining the following results one must bear in mind that these are from a limited number of on farm observations. The aim of the project was to look for trends. Not to statistically analyse.

See Appendix 1 for data collection forms.

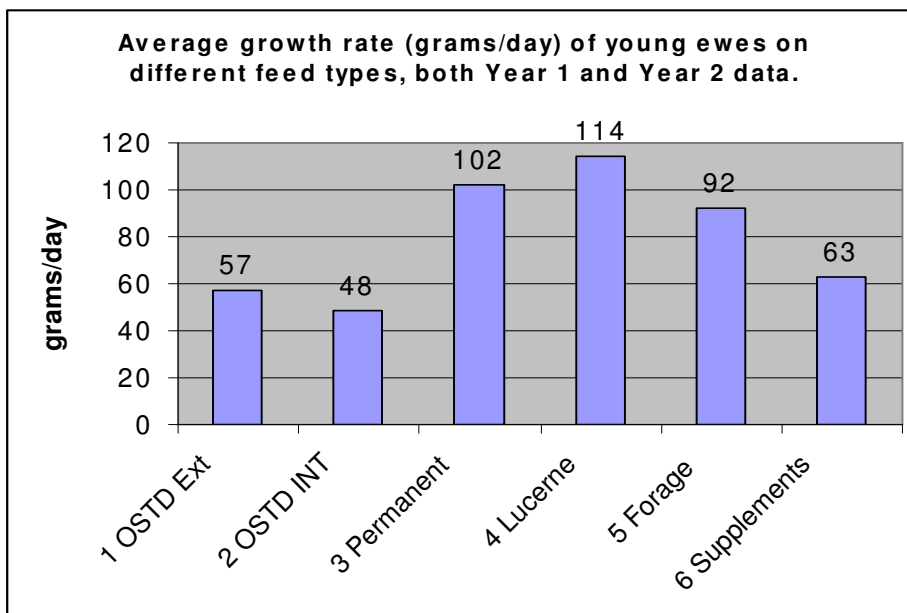
RESULTS

1. Hogget growth rate relative to grazing management practices

Definition of feed types

OSTD oversown top-dressed – intensive	More than 20 hoggets/ha. May include some native species, tussock, browntop, danthonia, yorkshire fog, borage, ryegrass and sub clover.
OSTD oversown top-dressed – extensive	Less than 20 hoggets/ha. As above.
Permanent pasture	Perennial ryegrass/clovers, cocksfoot, chicory or plantain mixed with grass, fescue, grazing brome, prairie grass
Forage	Brassica including turnips, pasja, short-term rotation ryegrass, lotus, sulla, straight chicory, clover crop.
Lucerne	
100% supplements	Silage, baleage, peas, grain, hay, nuts.

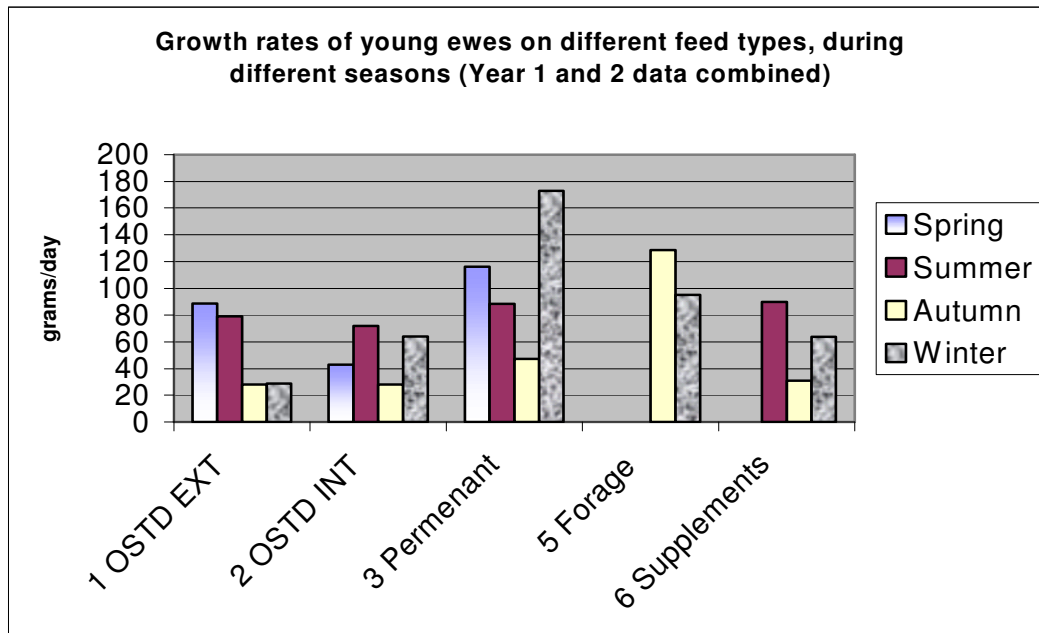
1.1. Graph 1: Growth rate of hoggets on different feed types.



Overall - poorest growth rates on OSTD pastures

Supplements marginally better than putting them 'on the hill'.

1.2.1. Graph 2: Average growth rate of hoggets on different feed types during the different seasons.



OSTD pastures: Hogget growth rates on OSTD pastures are particularly poor in the autumn. Besides the feed quality and quantity factor at this time of the year there are likely to be a number of contributing factors to this poor growth rate. This could include parasitism, Vit B12 deficiency, fungal toxins on pasture and endophyte issues e.g rye-grass staggers. Added to this is the fact that hoggets can tend to become a lower priority class of stock while tugging is in progress.

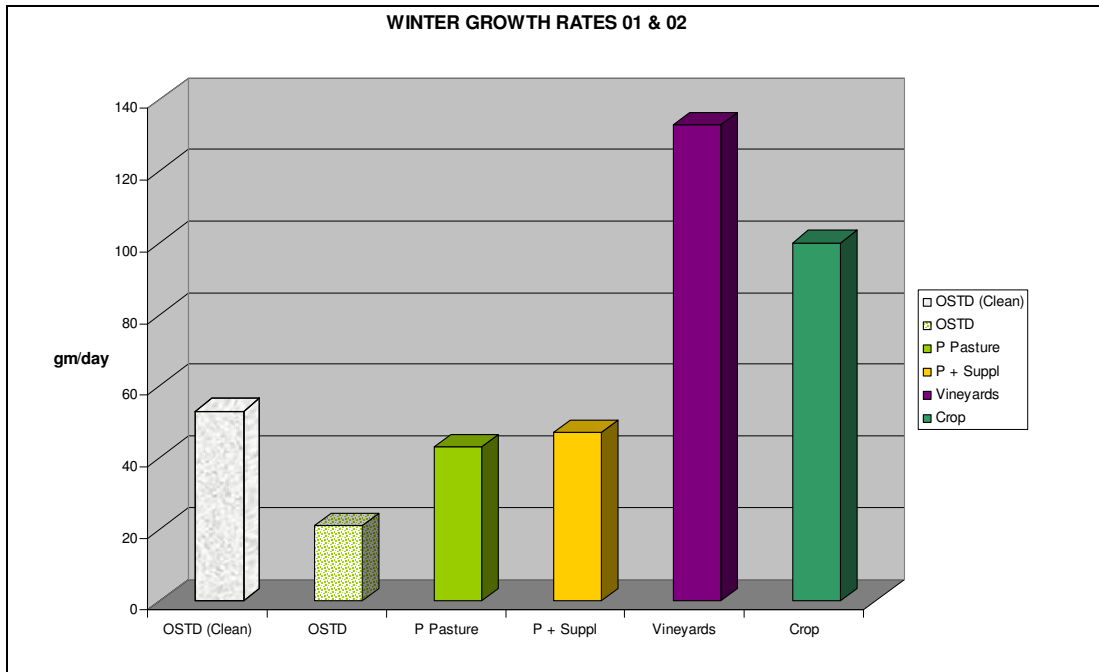
Forage: This seems to be particularly useful in the autumn with good average growth rates exceeding any other feed type for this time of the year.

Permanent Pastures: Except for the autumn, grazing permanent pasture results in acceptable growth rates during most times of the year. The best growth rates occurred in the winter. However winter growth rates on Permanent Pasture (Graph 2.) are significantly influenced by the increasingly popular practice of grazing hoggets (especially Merino hoggets) in vineyards. In graph 3 mean growth rate on vineyards is graphed separately showing the value of vineyard grazing.

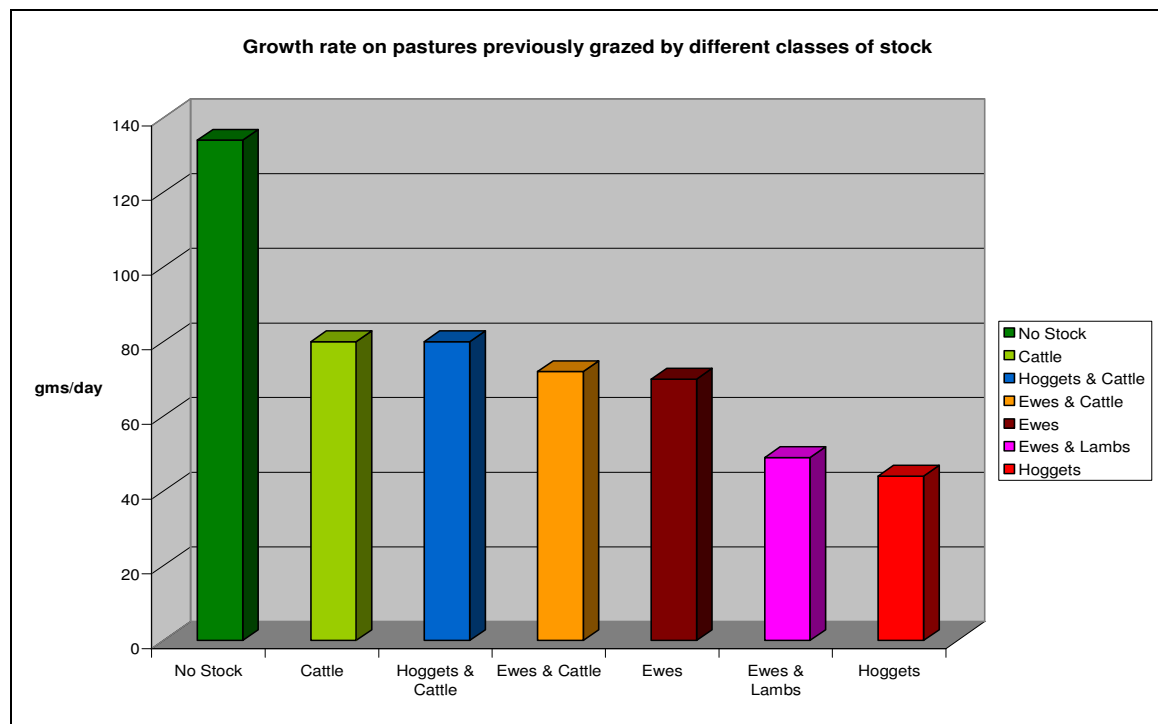
Supplements: The results suggest giving hoggets supplements in the autumn and winter is marginally better than putting them 'on the hill'. Supplements would seem to be the most useful during the summer.

The findings support the practice of putting in specialist forage crops for hoggets in the autumn and to graze vineyards in the winter. If feed is in short supply in the autumn and winter then spreading the hoggets out 'on the hill' may results in as good growth rates as confining and feeding supplements.

1.2.2 Graph 3: Average hogget growth rate on different feed types during the winter.

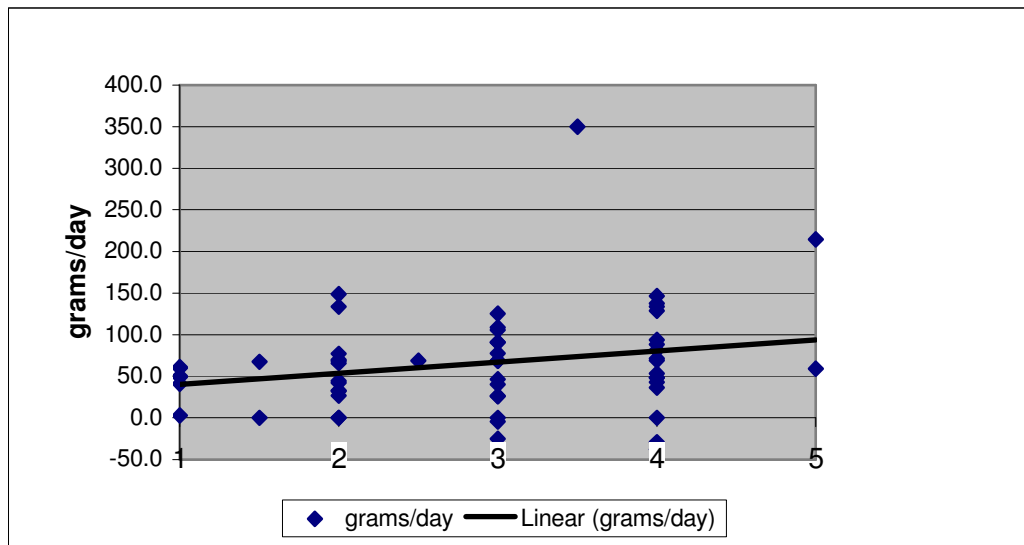


1.3. Graph 4: Average growth rate of hoggets grazed on all pasture types, previously grazed by different classes of stock.



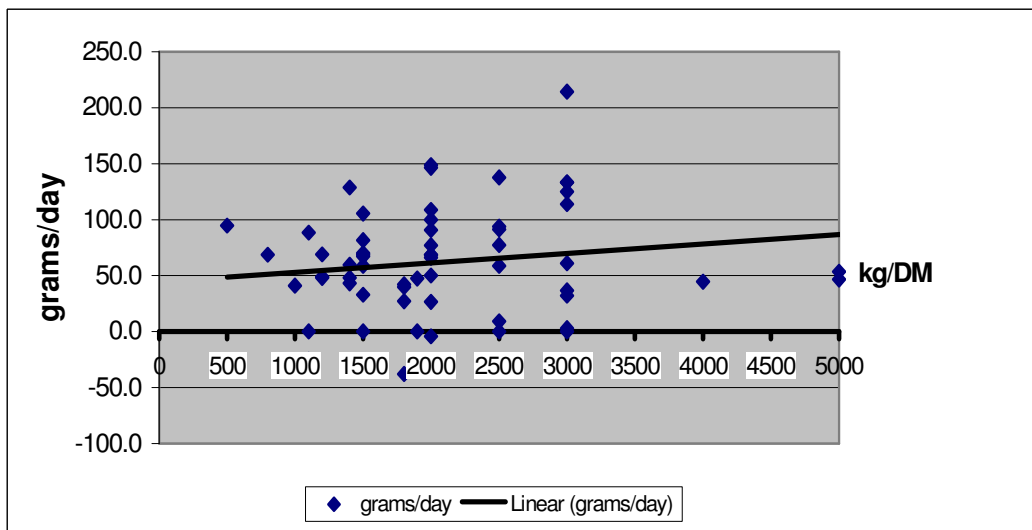
The results clearly show the benefits of grazing 'fresh/clean' pasture. In most cases this is from grazing vineyards or paddocks which were previously used for silage or hay. Pastures 'cleaned' by cattle also show better growth rates.

1.5. Graph 6: Growth rates of hoggets relative to the quality of pasture when they were removed. (for all types of pasture) Key: 1= poor quality. 5 = high quality.



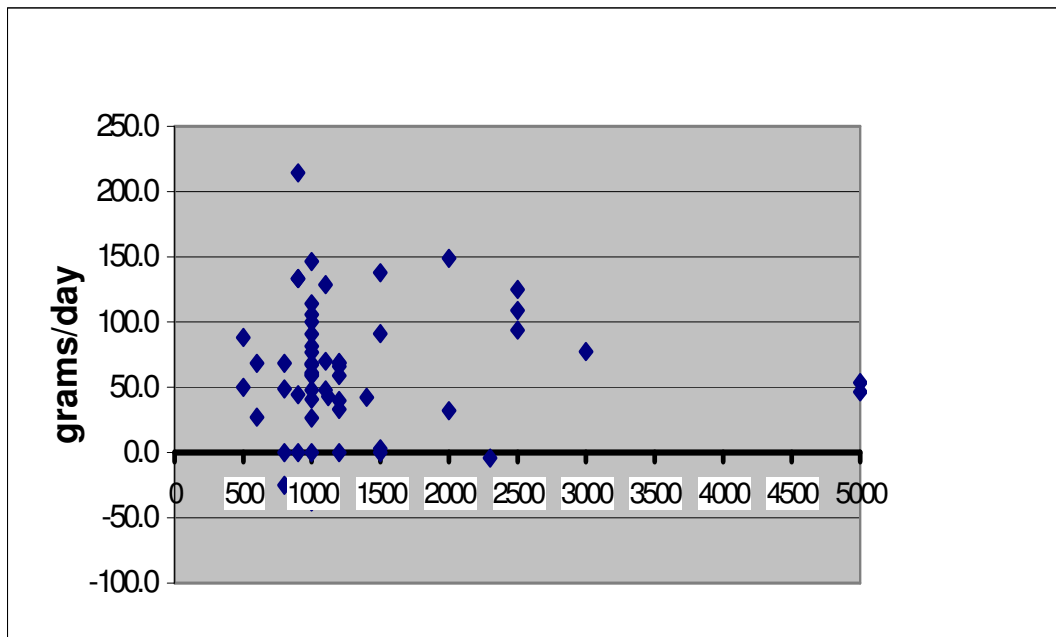
Conclusion: The growth rate of hoggets removed from pasture when pasture quality residual was high was double that of hoggets who stayed grazing pasture until quality was poor.

1.6. Graph 7: Growth rates of hoggets relative to the kg dry matter (kgDM/ha) on the pasture they went onto (all pasture types)



Conclusion: Higher growth rates of hoggets tended to be associated with higher pasture DM . Most farmers put hoggets on pasture that had 2000kgDM/ha or less.

1.7. Graph 8: Growth rates of hoggets relative to the residual kg dry matter (kgDM/ha) on the pasture when the hoggets were removed (all pasture types)

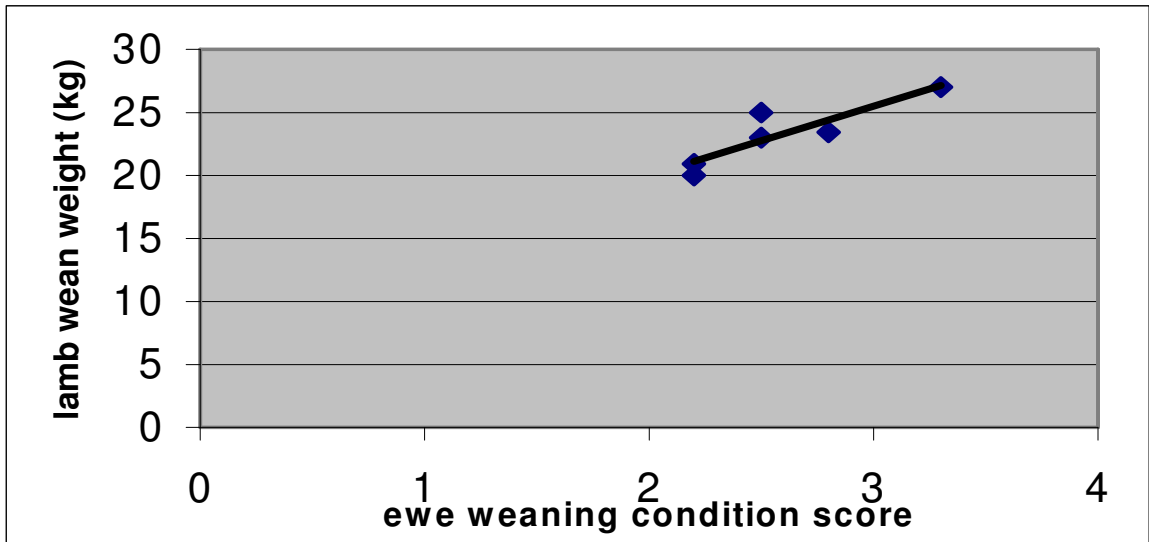


Conclusion: There appears to be no obvious relationship between the amount of residual left on the pasture and hogget growth rates. However farmers did not achieve growth rates over 100g/day if the pasture was less than 800kgDM/ha when the hoggets were removed.

Main conclusion: Feed quality would seem to be more important than kgDM/ha. for hogget growth.

2. Hogget growth rates relative to ewe CS at weaning

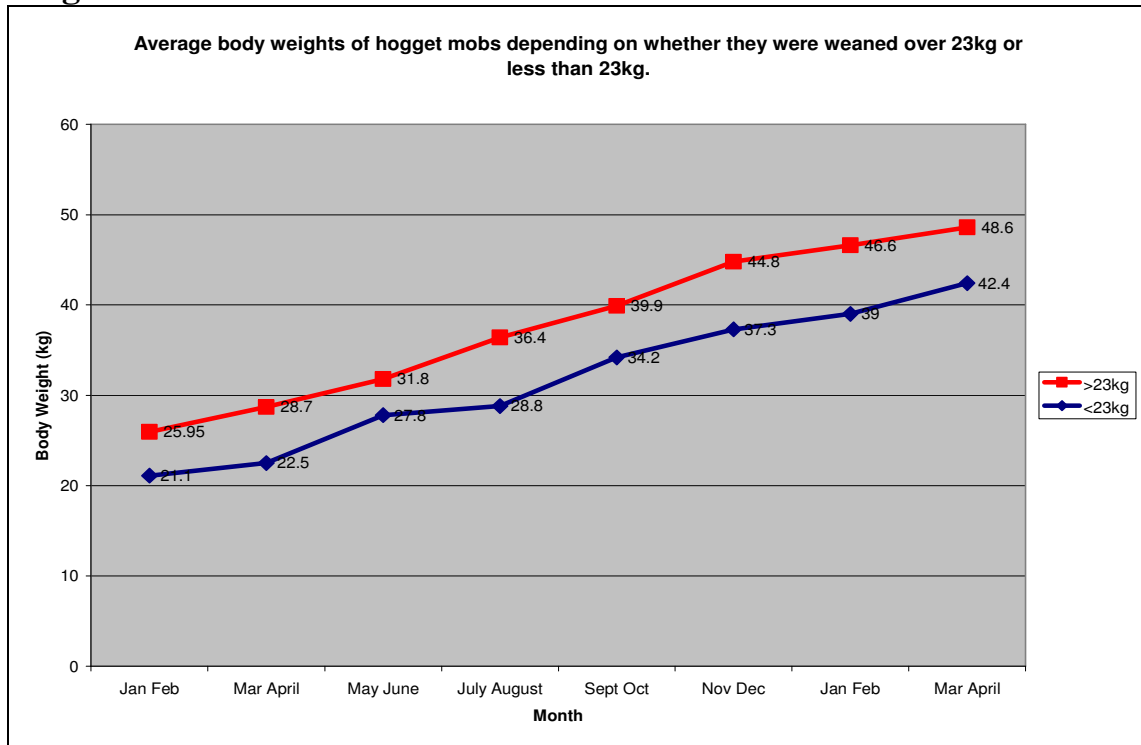
2.1. Graph 9: Average lamb weaning weight relative to ewe Condition Score at weaning.



Conclusion: Ewes in better condition at weaning wean heavier lambs.

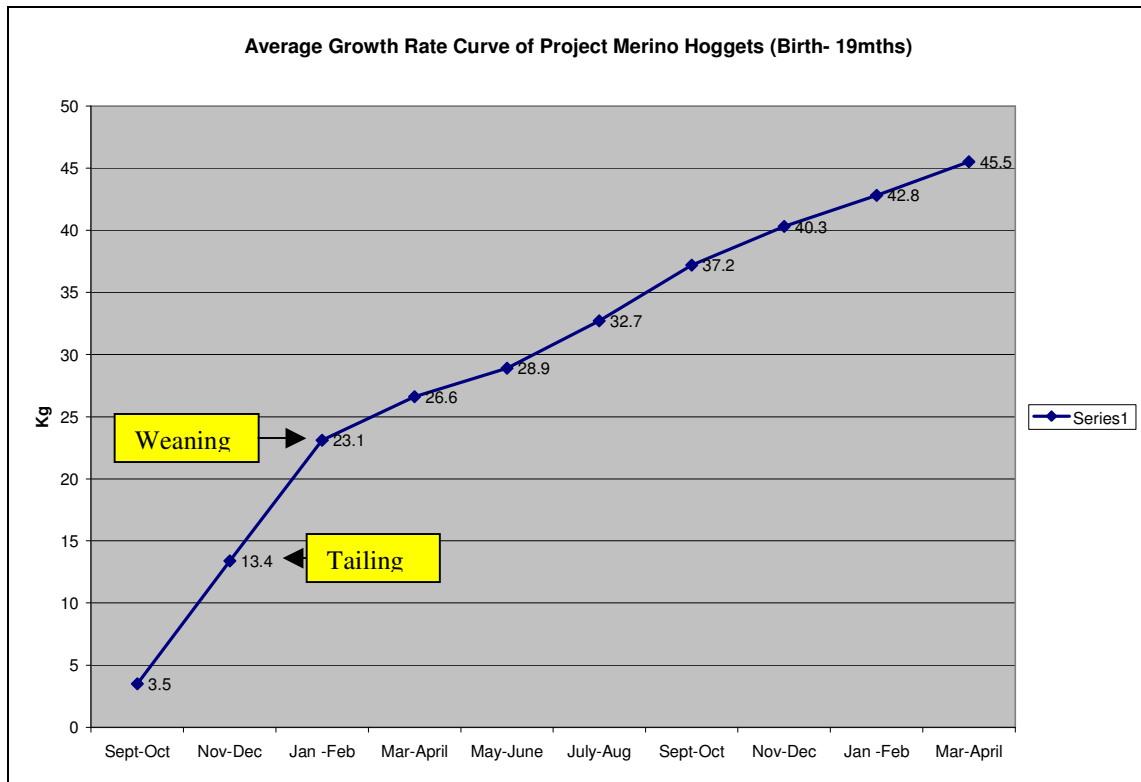
3. Hogget growth rates

3.1. Graph 10 : Post weaning growth rates relative to weaning weight



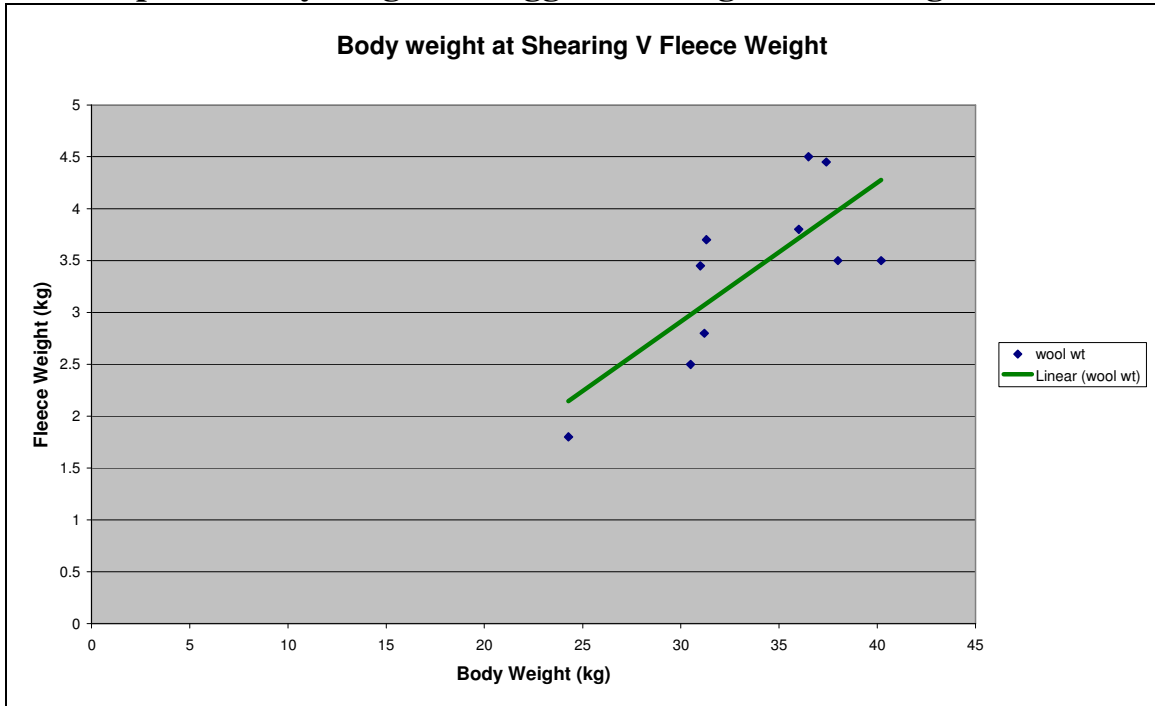
Conclusion: Post weaning growth rates appear to be determined to a large extent by weaning weight. In other breeds the post weaning growth rate of lambs weaned at less than 25kg is invariably poor. In this exercise the mobs were split depending on whether they had an average weaning weight of over 23kg or 23kg and less. Approximately half fell into each group.

3.2. Graph 11: Average growth rate of project hoggets. All years.

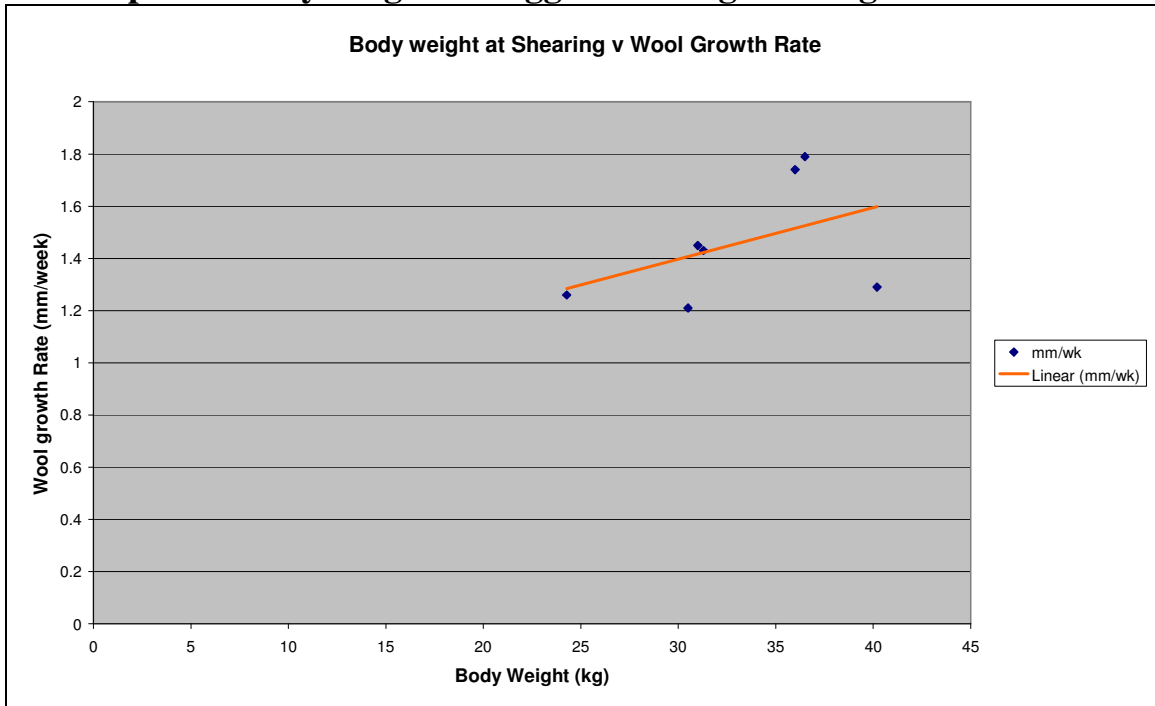


4. Wool production: Fleece weight, fibre length, and fibre diameter relative to body weight.

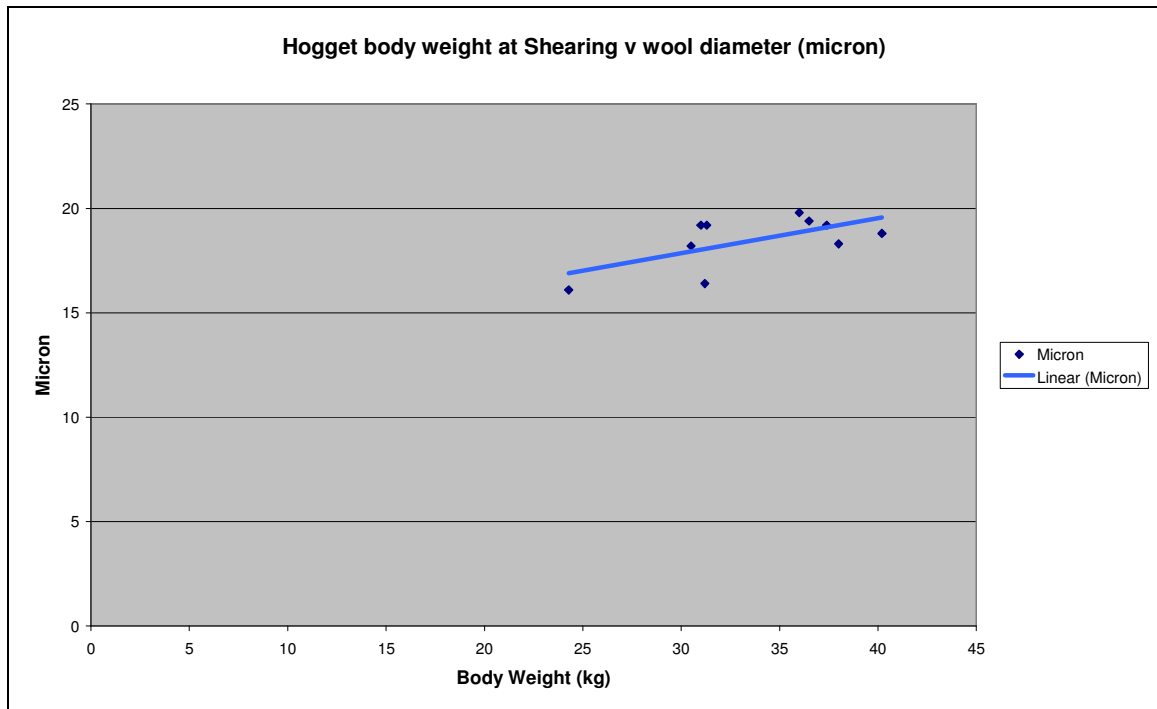
4.1. Graph12: Body weight at hogget shearing v fleece weight.



4.2. Graph 13: Body weight at hogget shearing v wool growth rate.



4.3. Graph 14: Body weight at shearing v fibre diameter (micron)



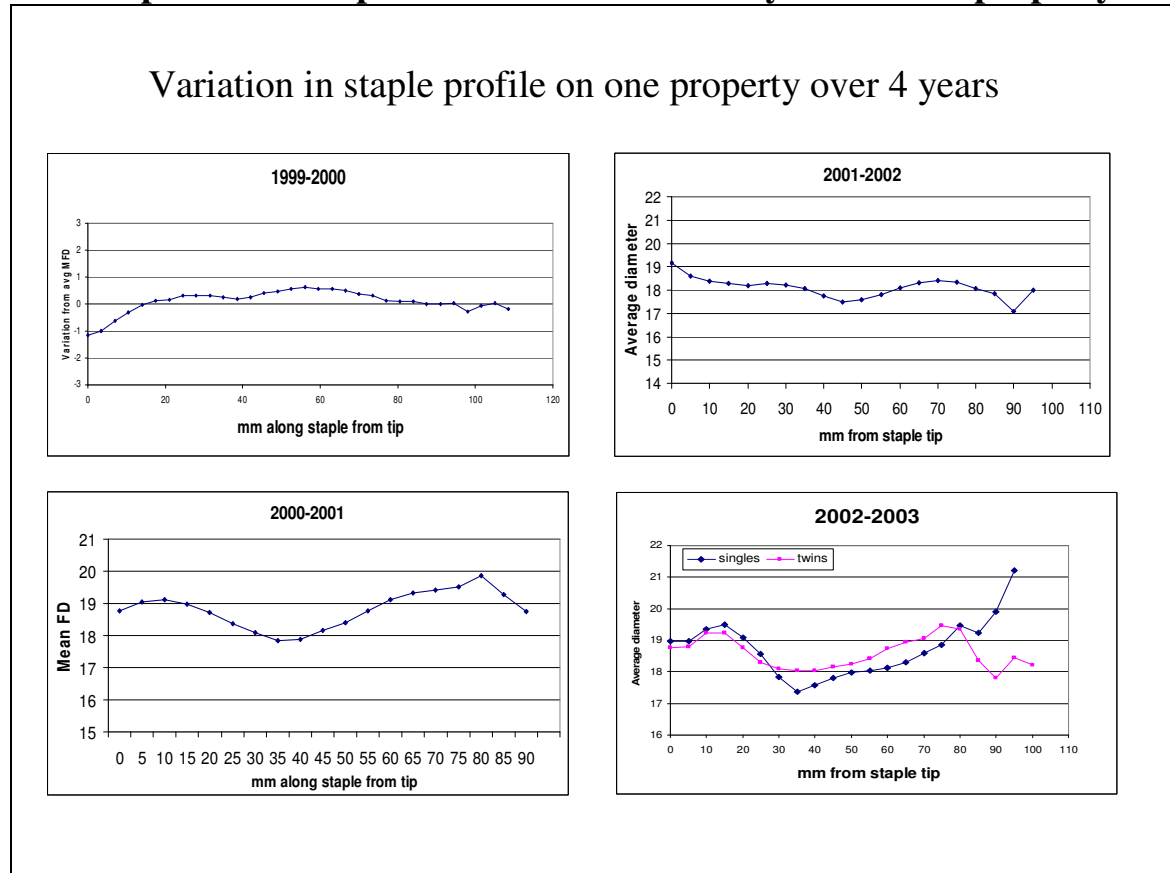
4.4 Conclusion

Heavier hoggets shear significantly more wool. For each extra 5kg body weight at shearing there was on average another 700gm wool. There was a large range in hogget weights at shearing. Wool from heavier hoggets tended to be stronger.

5. Fibre diameter profiles

5.1. Graph 15: Fibre profile variation between years on one property

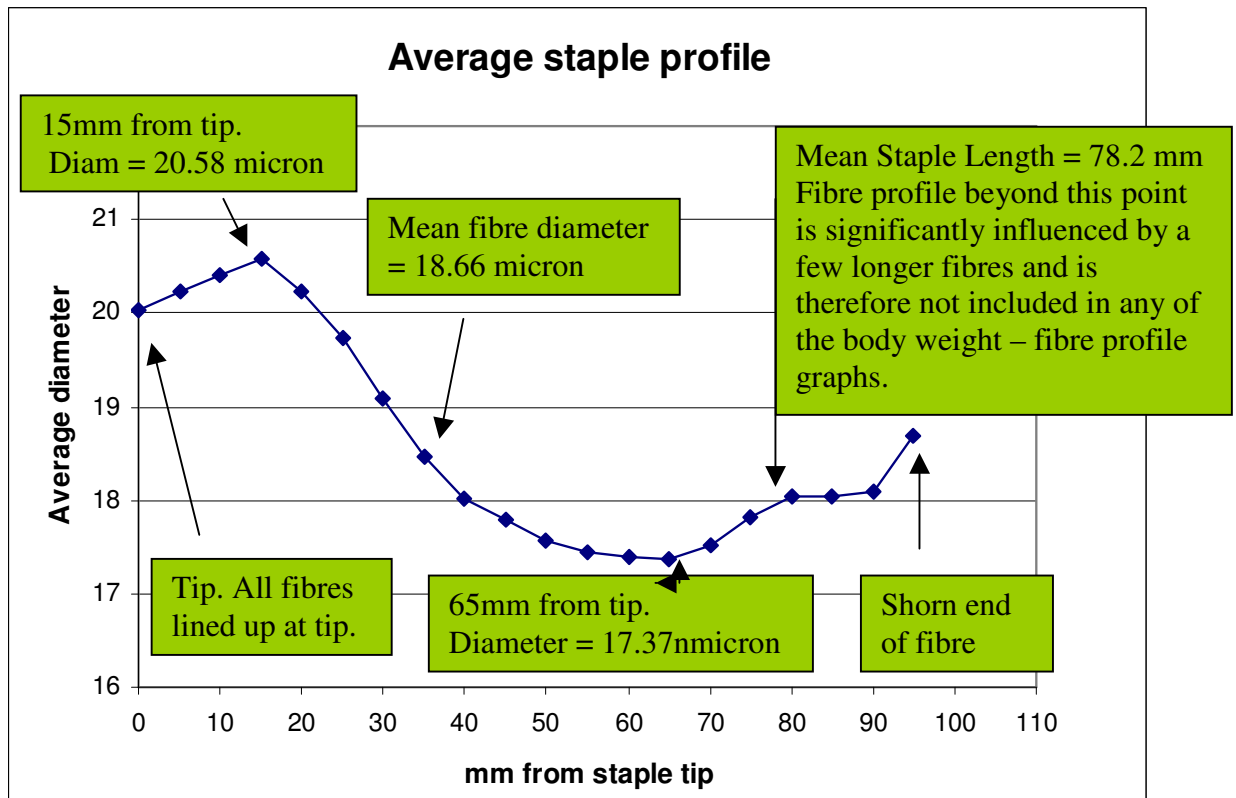
Variation in staple profile on one property over 4 years



Results of the OFDA tests done on the wool clips revealed a large variation in fibre profile between properties in the same year and between years on the same property. However generally the profile was one showing a reduction in fibre diameter somewhere along the mid part of the fibre. A more desirable fibre is one finer at the tips (Graph 15. 1999-2000). Fibres with finer ends relative to the mean diameter are more comfortable when worn next to the skin. There is also less chance of them having a 'weak point' mid fibre and thus a lower staple strength (SS).

We believed that if we could determine the events that were associated with these changes along the fibre then this could allow farmers to modify management to reduce the severity of some of the changes. Fibre strength being reduced when there is a large variation in diameter along the fibre.

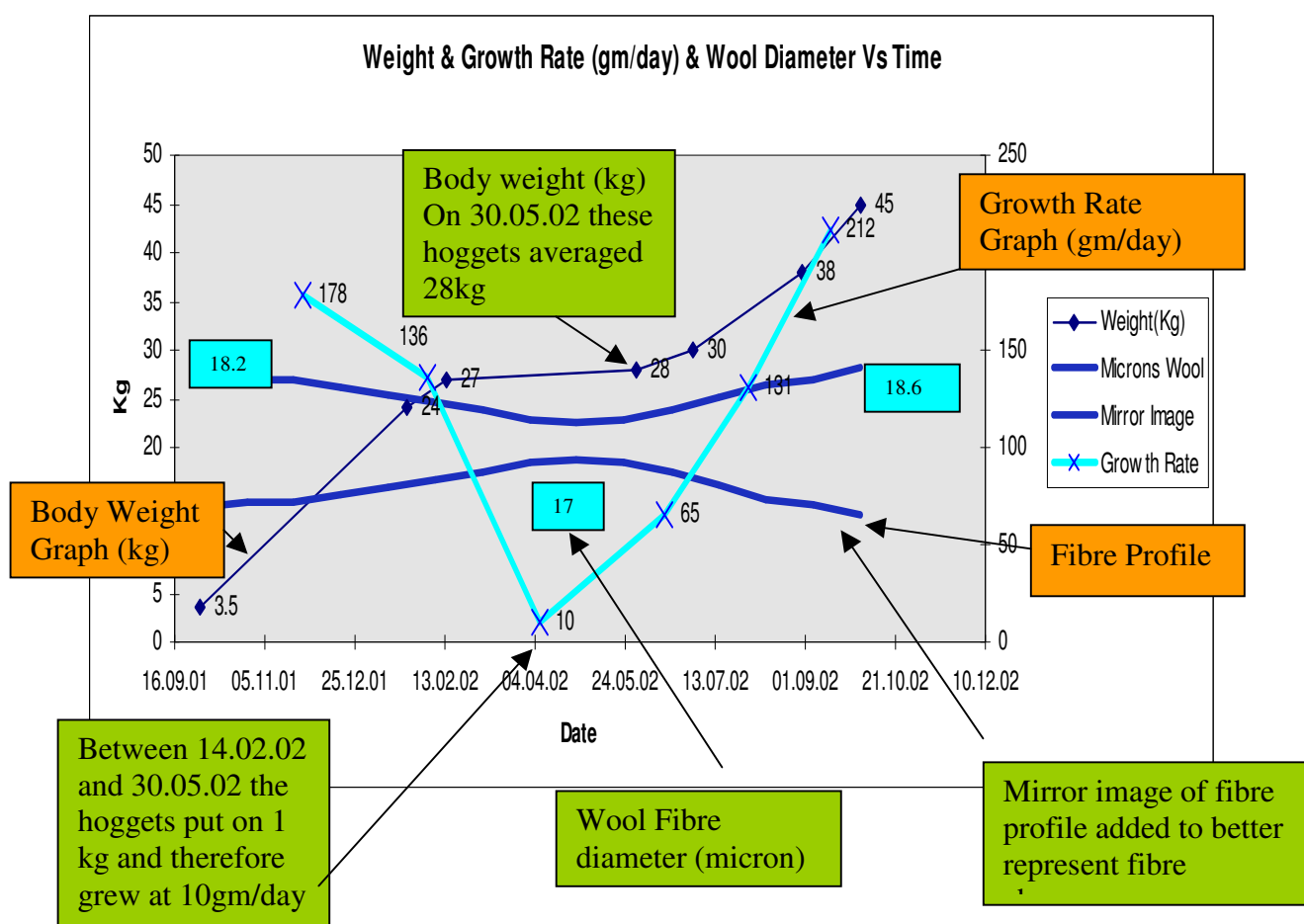
5.2. Graph 16: Explanation of fibre profile for one property.



5.3. Changes in fibre diameter associated with live weight changes

Explanation of graphs

The body weights and growth rates of the hoggets from the properties involved have been graphed with the results of OFDA tests superimposed on these. Events have also been superimposed to see what sort of association, if any, there is between Growth Rate, Fibre Diameter, and Management Practice.

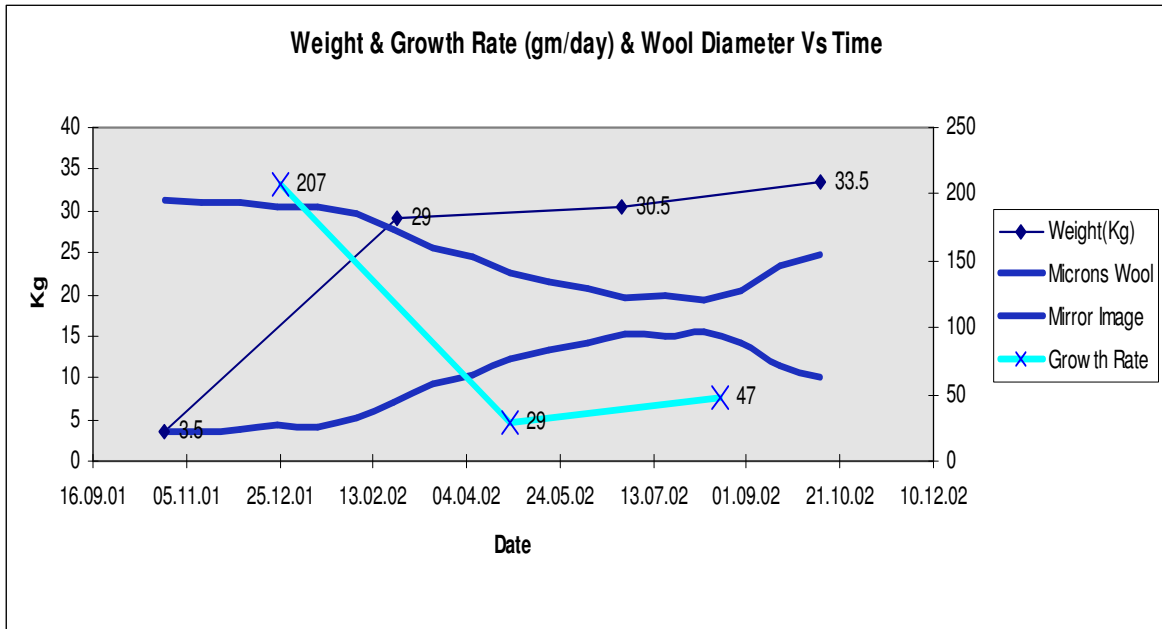


It is not always possible to easily line up a point on the fibre profile with a body weight change or some management event for several reasons:

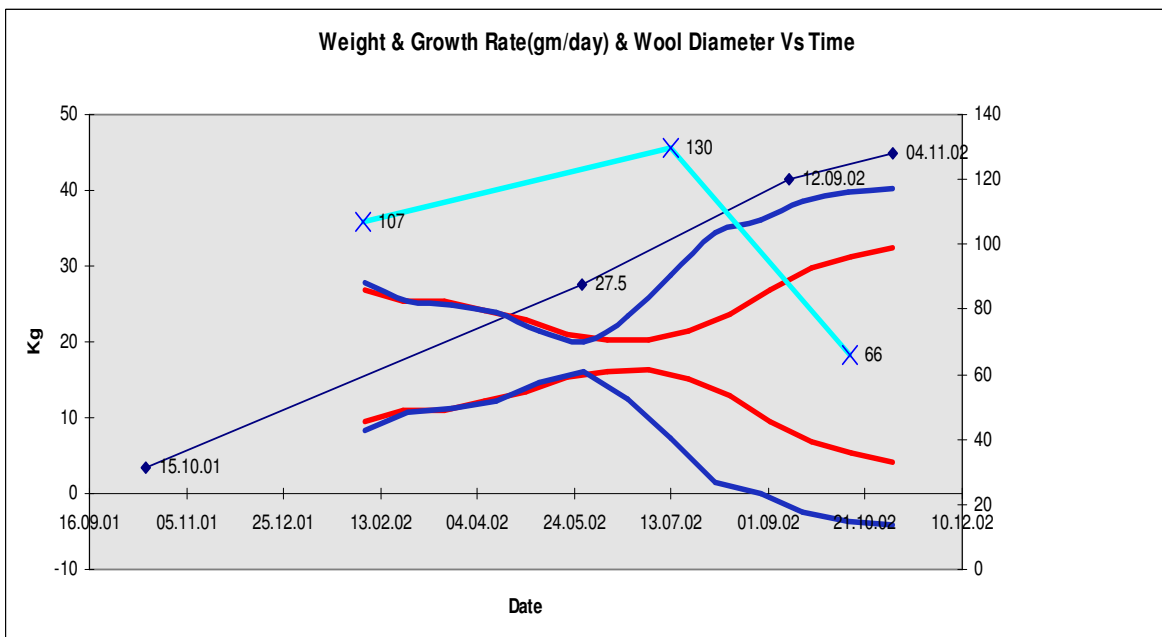
1. The fibre profile is superimposed as if wool growth rate is constant which it is not.
2. Changes in profile do not manifest themselves for some weeks after the event. Therefore some severe nutritional stress may not appear as a marked reduction in fibre diameter until 6 weeks later.
3. There is always some wool left on the sheep. Although the base of the fibre is lined up with shearing date there will be some weeks of "history" in the fibre left behind.
4. Time between weighings often exceeded 3-4 months. A lot can happen during such a period with several episodes of weight gain and loss occurring.
5. To a large extent fibre profile is a more accurate and efficient measure of management effects and body weight changes than intermittent weighings.

5.4. Fibre profile and live weight changes for each property (2001-2002)

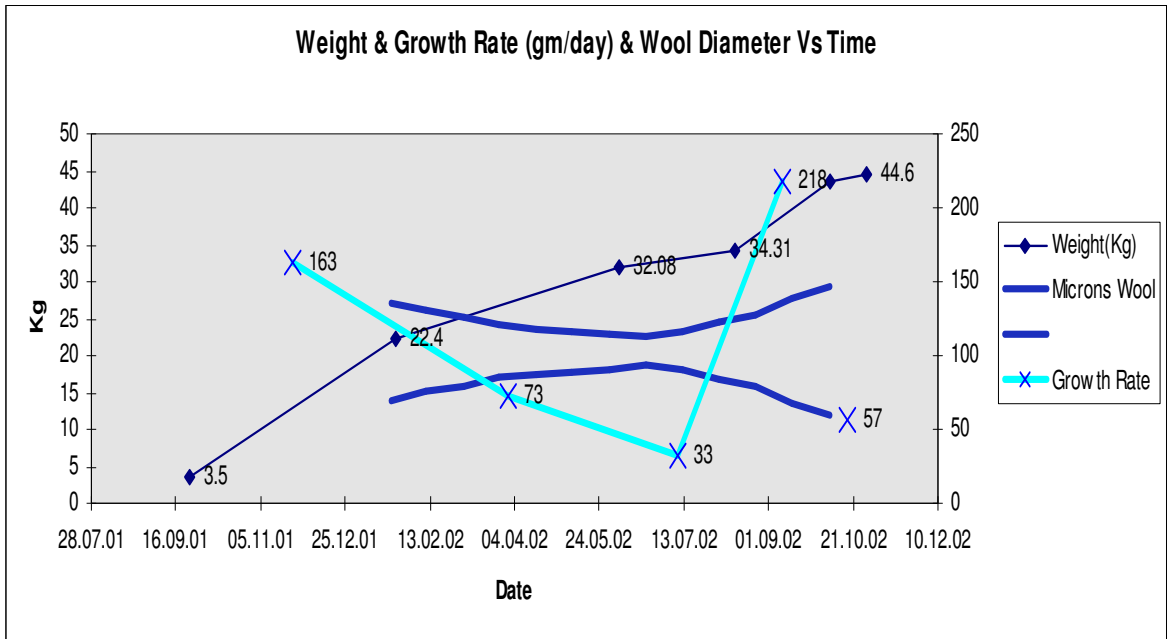
Farm 1



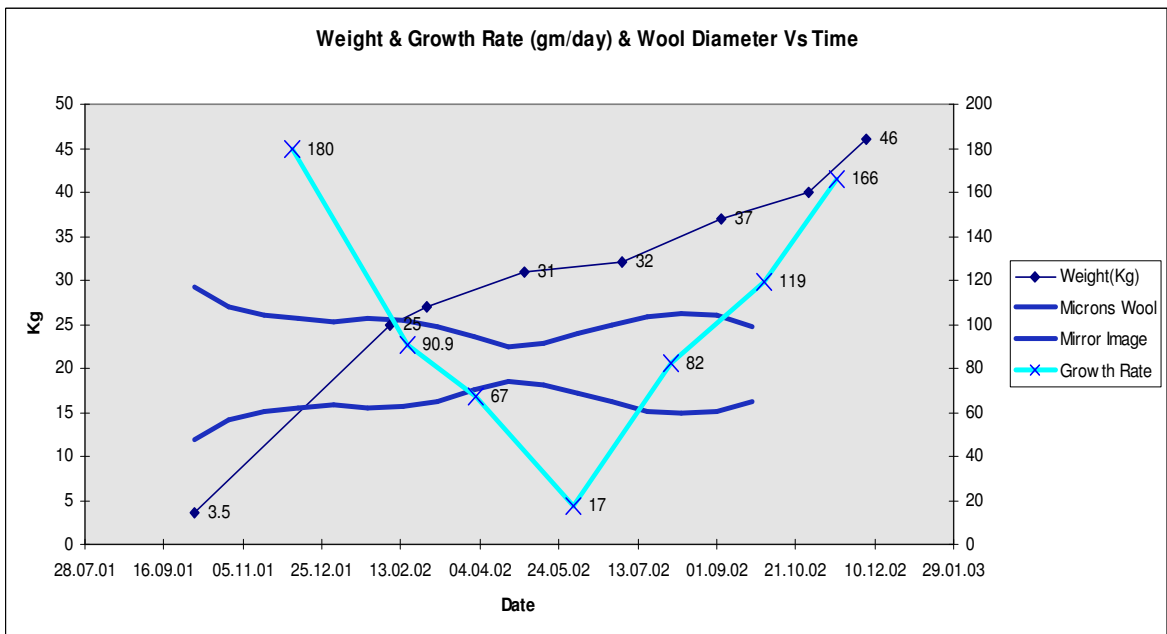
Farm 2



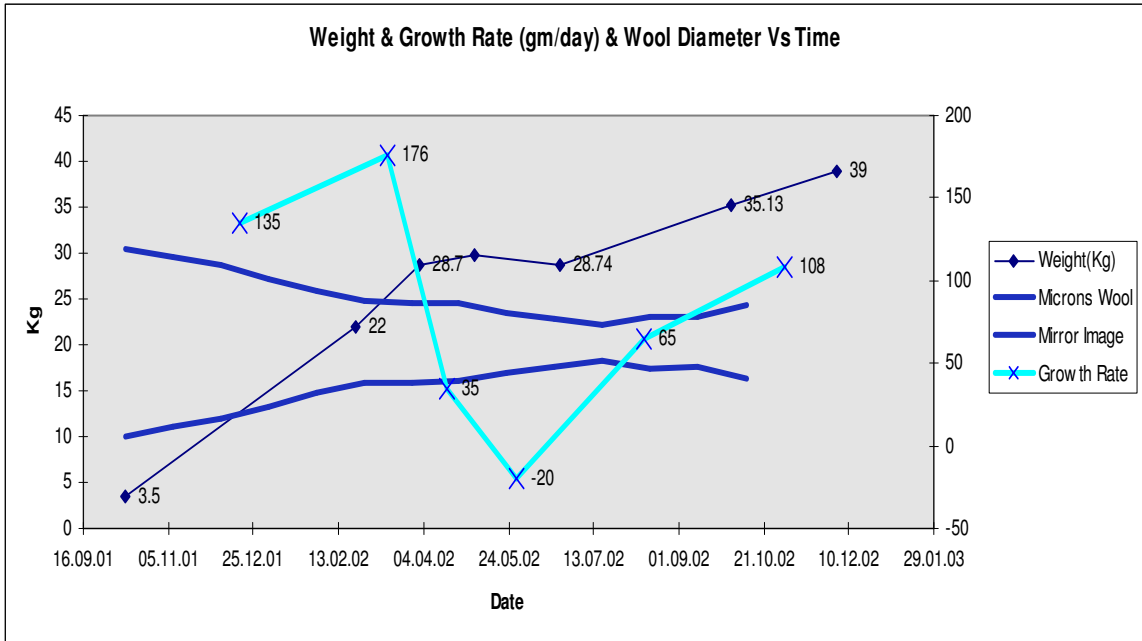
Farm 3



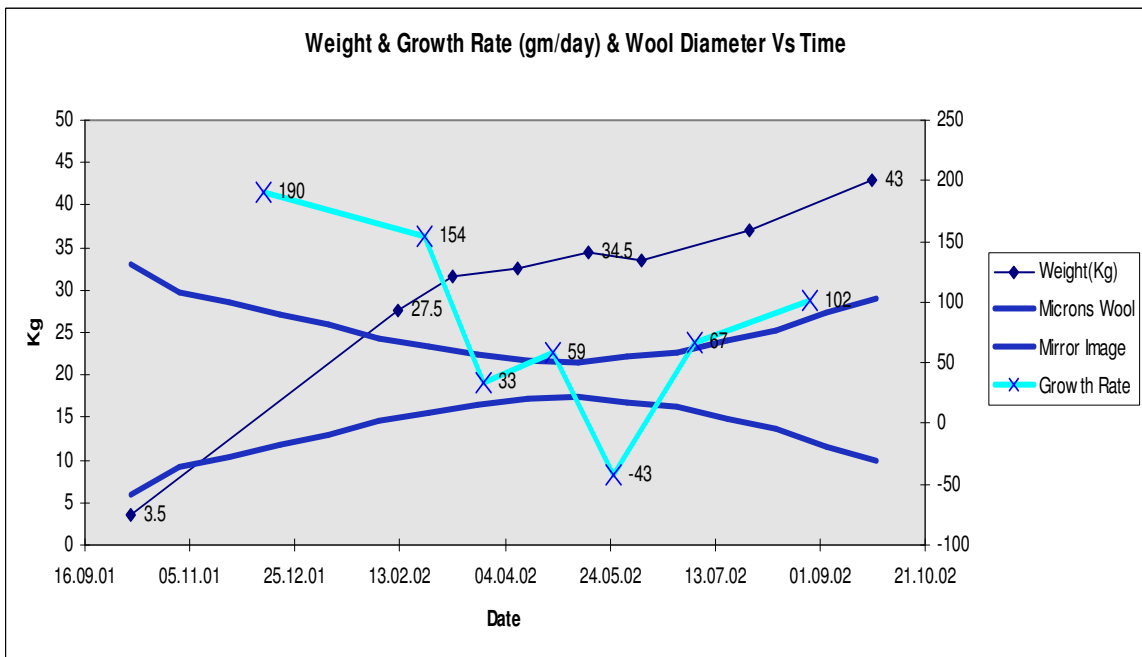
Farm 5



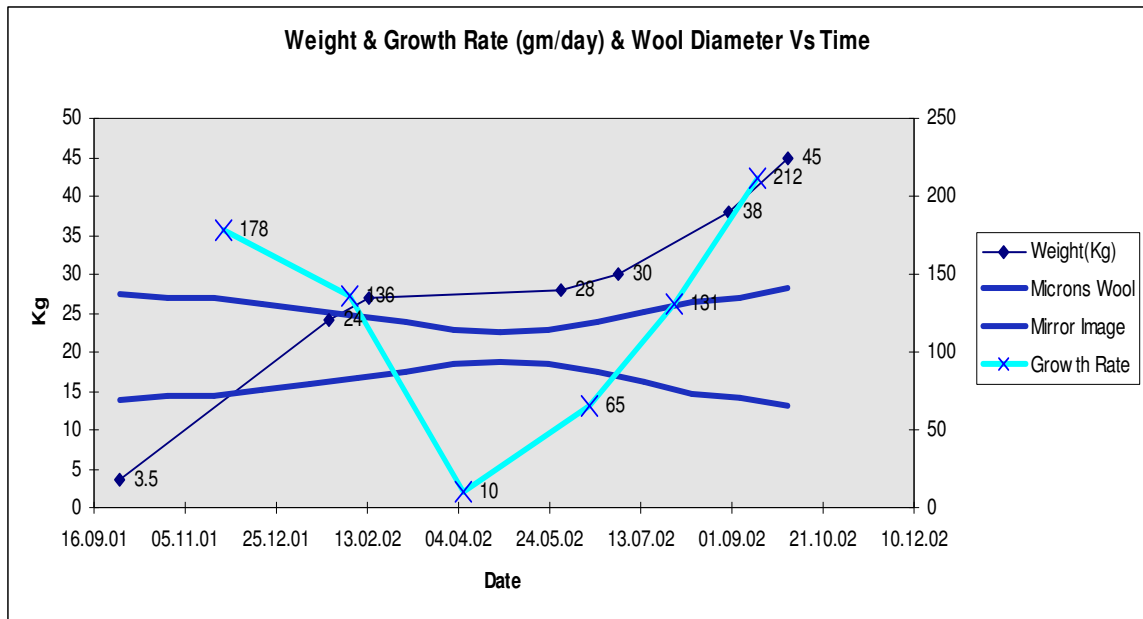
Farm 8



Farm 9



Farm 11



5.5. Discussion on fibre profiles and body weight / growth rates.

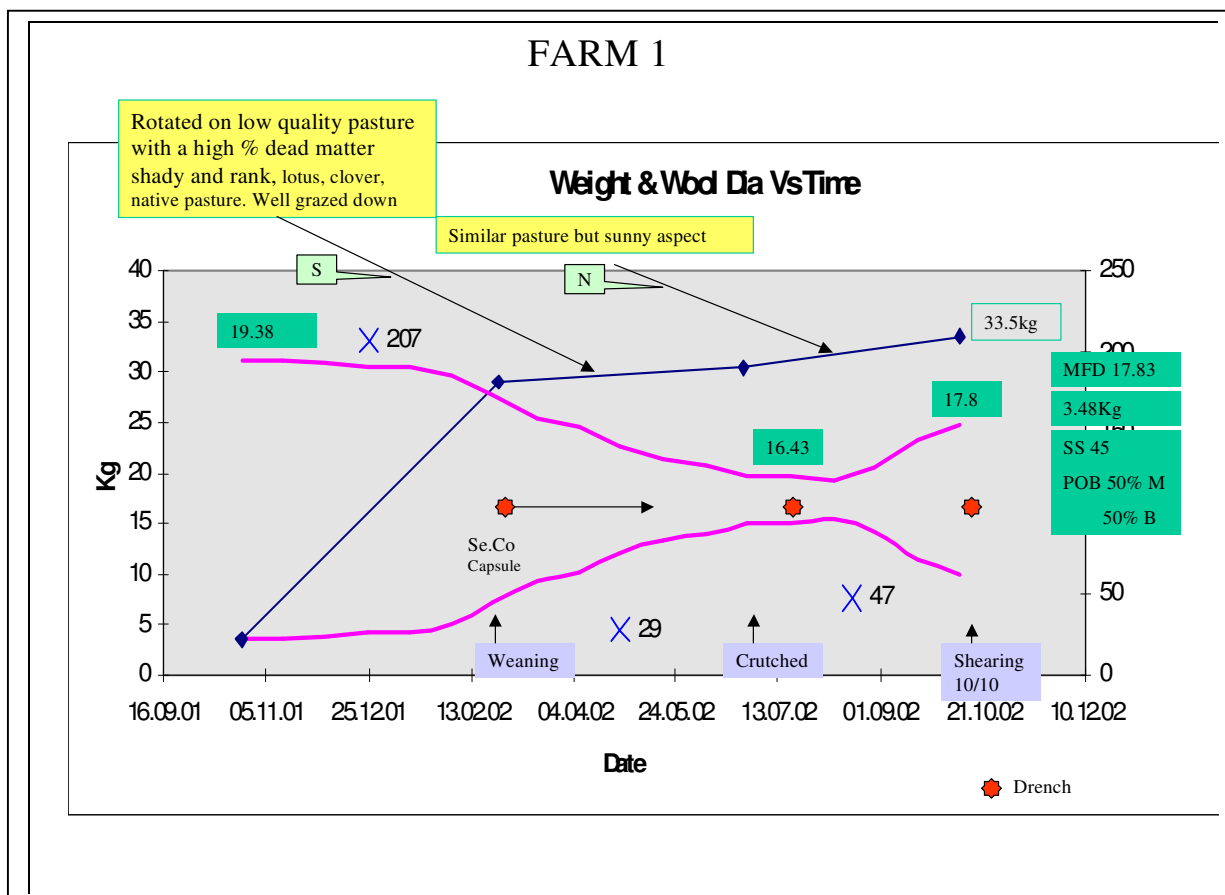
Not unexpectedly a narrowing of fibre diameter usually coincides with low body growth rate.

If we assume that any reduction in fibre diameter represents a less than optimum growth rate and wool production then it should be possible to target management to reduce the impact at this time.

Efforts to maintain a reasonably constant growth rate should therefore help reduce fibre diameter changes and maintain staple strength.

In the following graphs we look at the management events which were associated with different growth rates and fibre changes.

6. Management practices affecting hogget growth rate and fibre profile (2001-2002) Weaning to shearing.



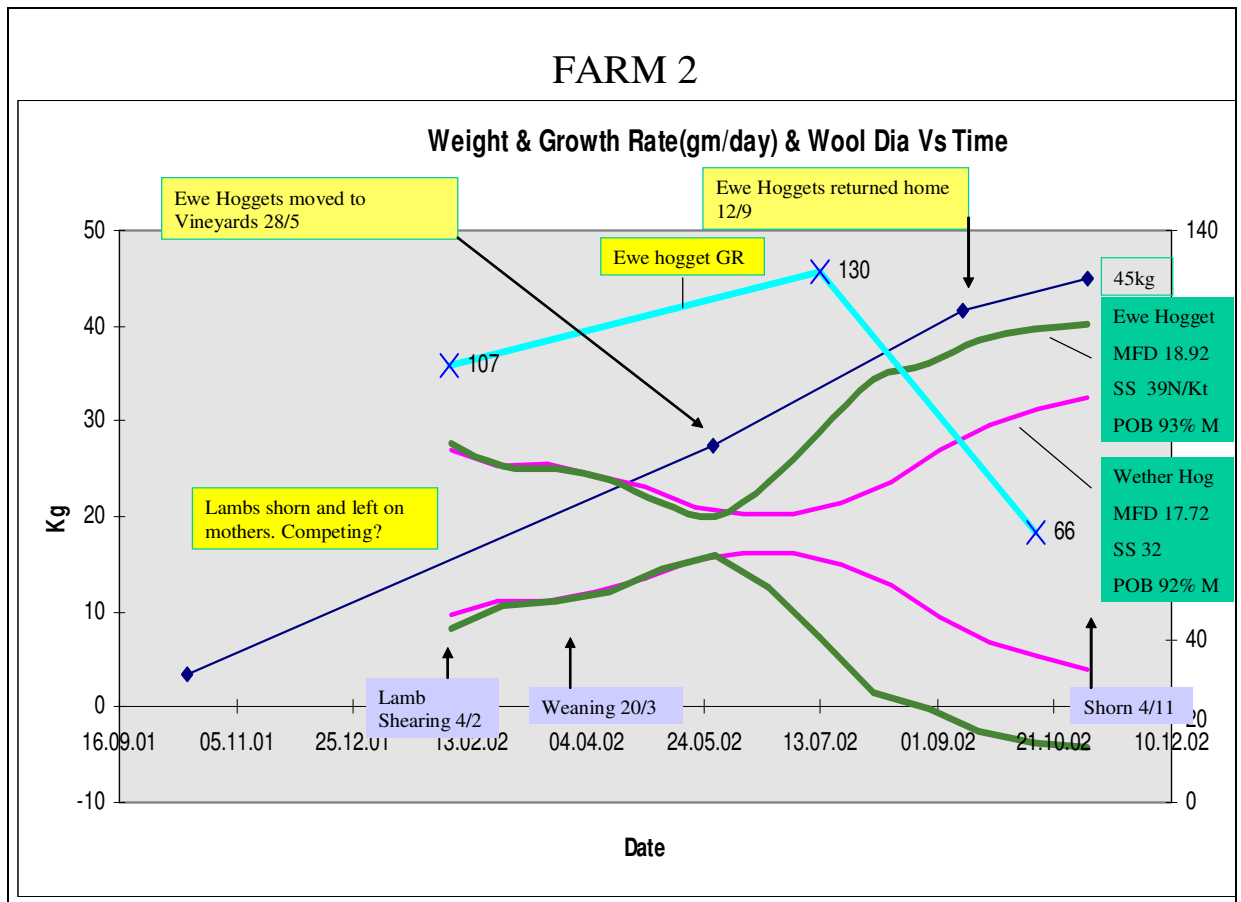
S = South facing
N = North

A constant fibre diameter was maintained through to weaning. This coincides with a very good growth rate of 207gm/day. Lambs were weaned at 29kg. There is a marked decline in growth rate after weaning when the lambs were rotated on low quality pasture with a high % of dead matter. Paddocks were well chewed out before shifting. Feed quality was the likely contributing factor since these lambs were grazing pastures previously “cleaned” by cattle plus they had been given a long acting anthelmintic capsule containing Cobalt (Vit B12).

Although an outbreak of footrot in this mob in the winter was not too severe, mustering and yarding for treatment could have contributed to the marked narrowing of the fibre.

An increase in fibre diameter coincides with a shift in July-August to blocks with a more sunny aspect and better pasture quality/quantity.

There was a 1.4micron difference between the mean fibre diameter and the finest part of the fibre. This is a relatively large difference and usually means there will be a weak point in the staple though surprisingly staple strength has been retained.

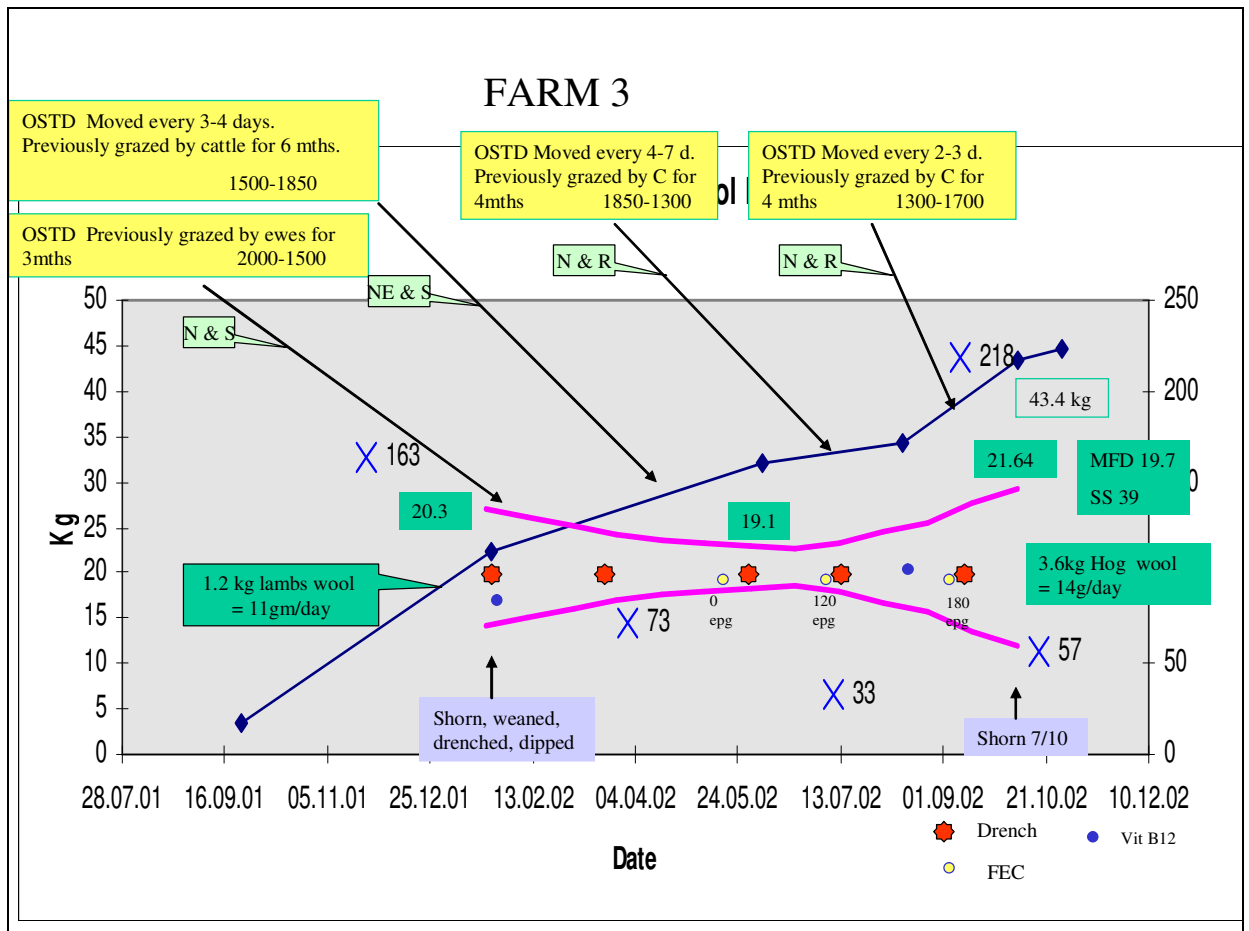


Because of very dry conditions and little lamb feed available lambs were shorn on the 4th February and left on their mothers until weaning on the 20th March. On the 28th May the ewe hoggets were removed from the property and grazed on a vineyard until the 12th September.

Despite not being weighed until May when the hoggets had reached an average weight of 27.5kg, the fibre profile suggests declining growth rates through until this period. Shifting to the vineyards resulted in a marked increase in fibre diameter and staple strength in the ewe hogget wool. It was another 2 months before there was any change in the wether hogget fibre profile. No doubt this would have been even later if all hoggets had been retained on the property.

Although there is a greater change in fibre diameter in the ewe hogget wool of 3.34 microns (17.26 – 20.6) compared to 3.04 (16.53 – 19.57) the ewe hogget wool still has a greater staple strength.

The difference between these two profiles illustrates the importance of nutrition on wool production. Merino hoggets will still grow wool in the middle of winter if they are well fed. Wool weights between the two lines were not compared but the difference could have been interesting.



N & S = North facing and steep
 N & R = North facing and rolling

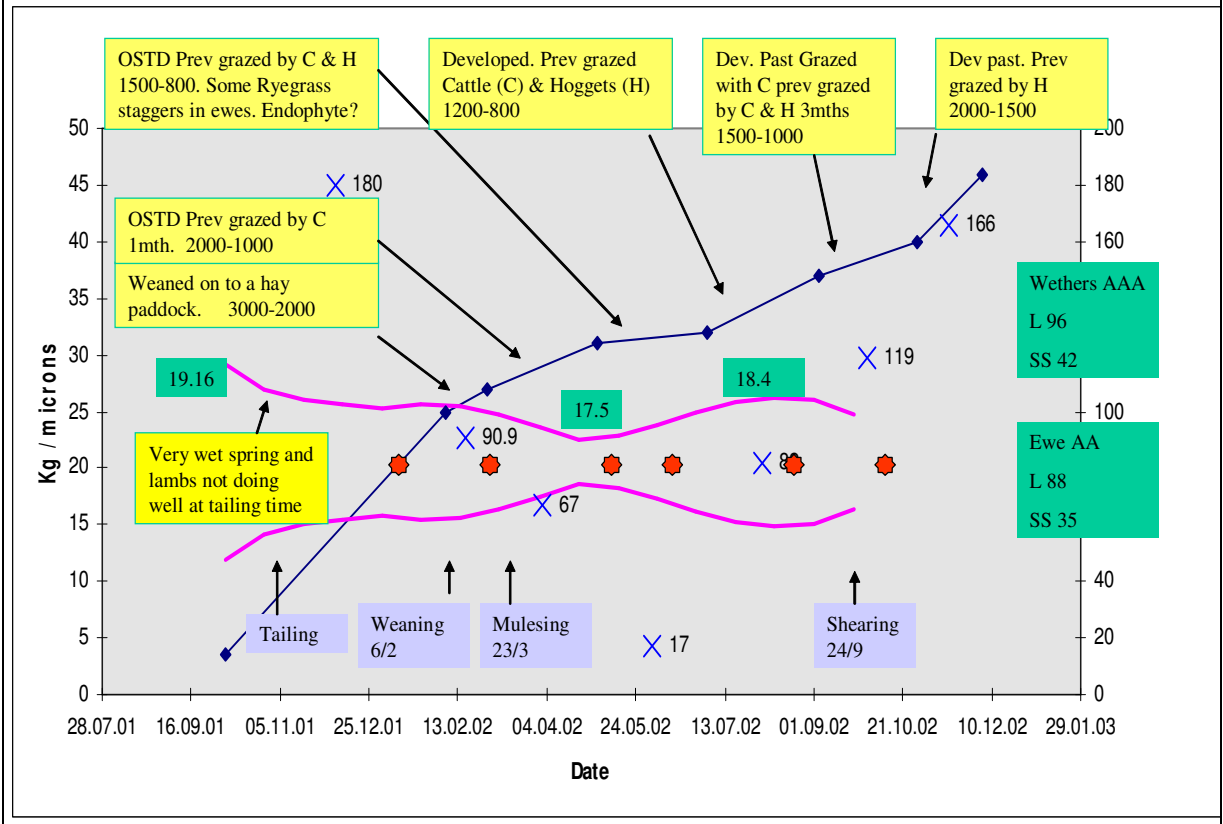
The fibre profile reflects a reasonably steady growth rate from weaning through the winter followed by a high spring time growth rate and increased fibre diameter.

Winter production has been achieved by regular moves onto fresh pasture “cleaned” by cattle and keeping them on the warmer north facing country. Regular monitoring and treatment for parasites when deemed necessary has been undertaken.

By shearing time in early October the hoggets had achieved a body weight of 43.4kg.

FARM 5

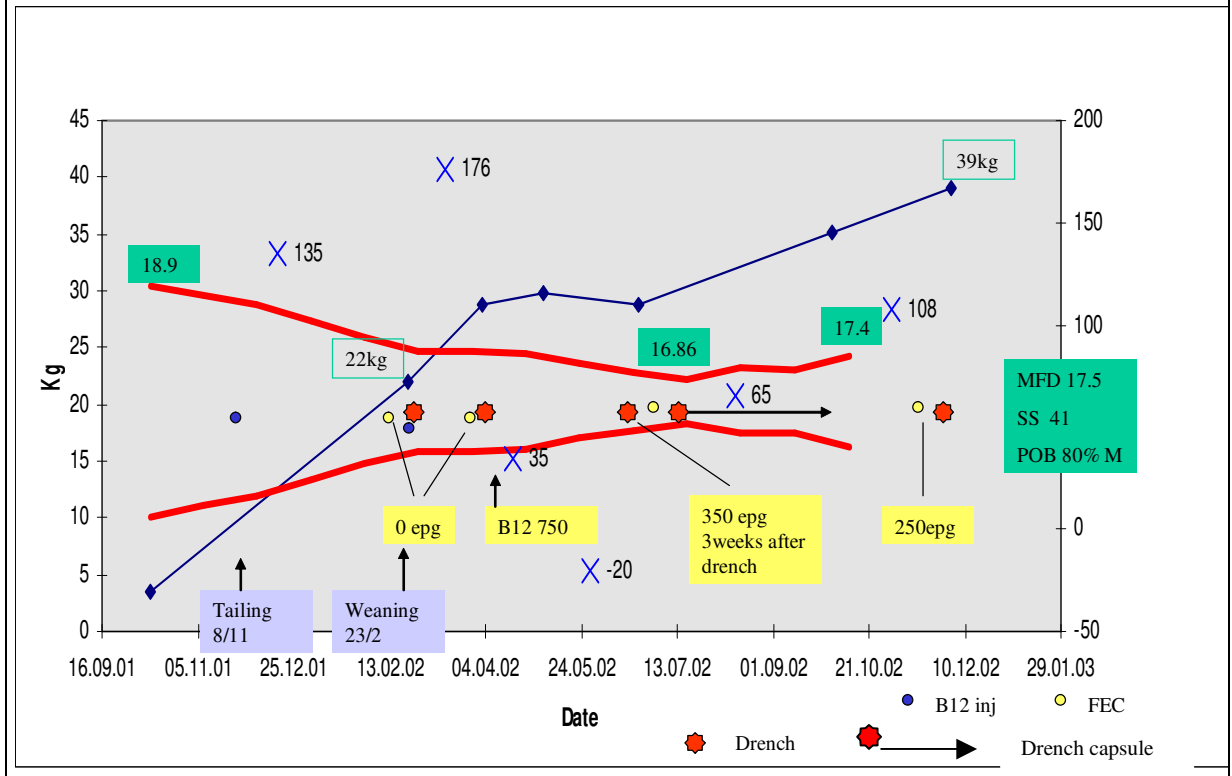
Some hoggets run on vineyards



A distinct narrowing occurred mid way along the fibre. This probably coincided with the autumn period when the hoggets were grazing high endophyte pasture and were only growing at 17gm/day. Pasture quantity was also likely to be involved.

Growth rate and fibre diameter increased when hoggets were grazed on pasture of better quality that had also been well grazed previously by cattle. A number of the hoggets were also grazed on a vineyard.

FARM 8

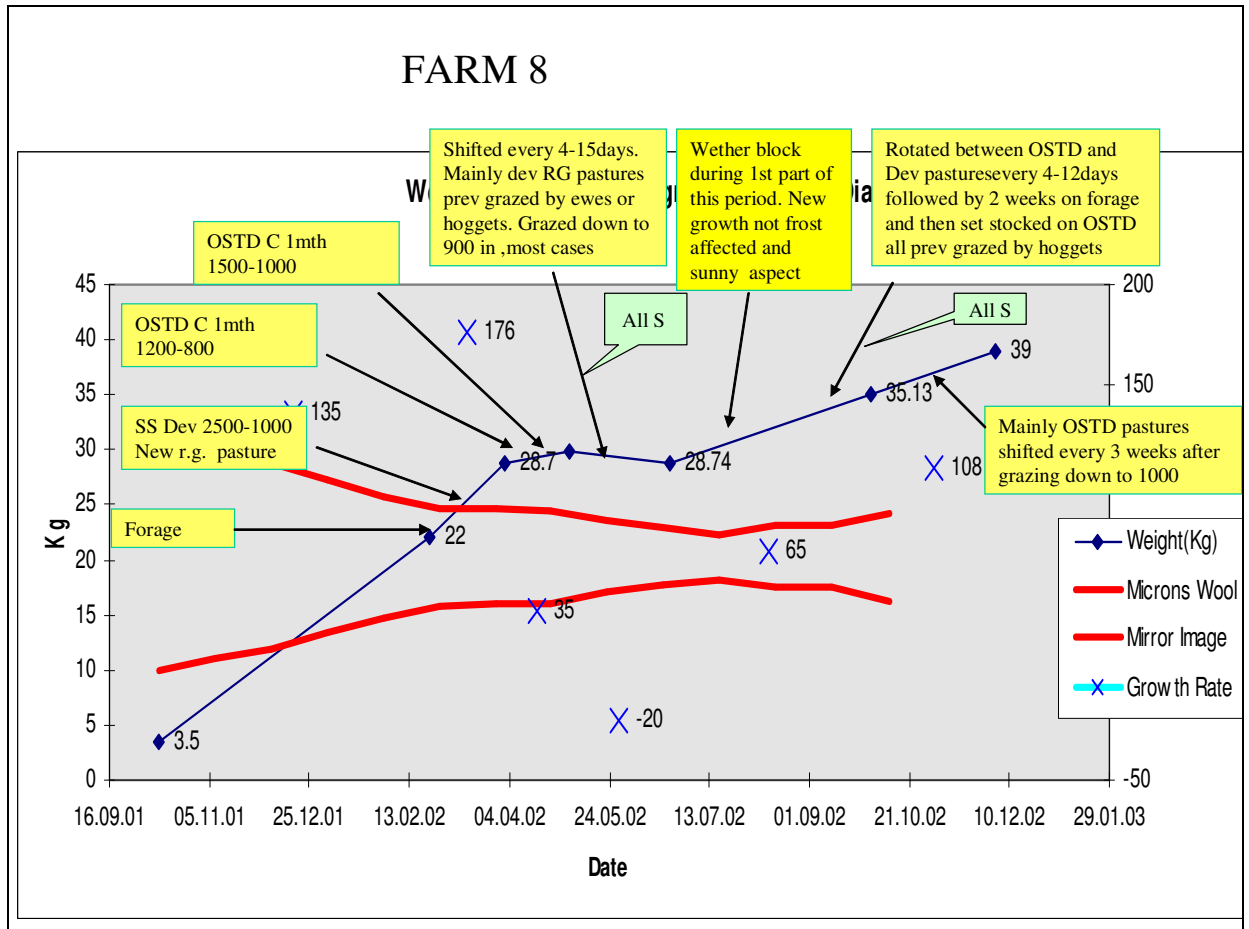


Features of this property are the excellent post weaning growth rate (176gm/day) followed by slow autumn-winter growth and a reduction in fibre diameter. Parasitism would appear to have been an issue until the hoggets were given an anthelmintic capsule in July.

Despite the difficulties encountered in the winter and some loss of body weight, staple strength did not seem to be significantly affected.

Grazing management for this property is outlined below.

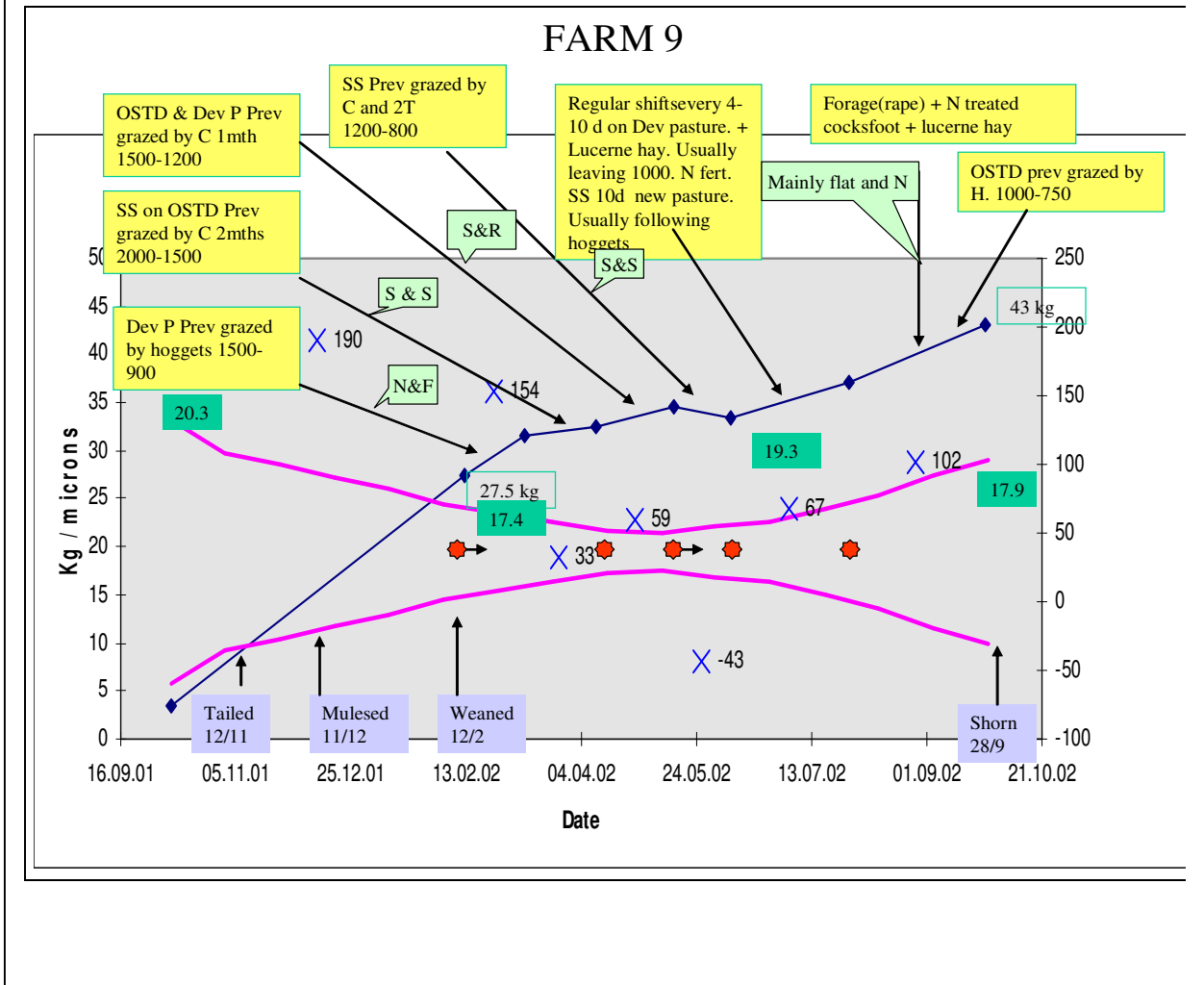
FARM 8



All S = All blocks south facing

The excellent post weaning growth rate occurred when the lambs were weaned onto a forage crop and new ryegrass pasture. For most of the late autumn- winter period poor growth rates were observed. During this period hoggets grazed colder southerly facing hill blocks with older pastures which were usually previously grazed by ewes and / or hoggets.

Growth rate improved and fibre diameter increased once they were given an anthelmintic capsule and moved to country with a more sunny aspect.

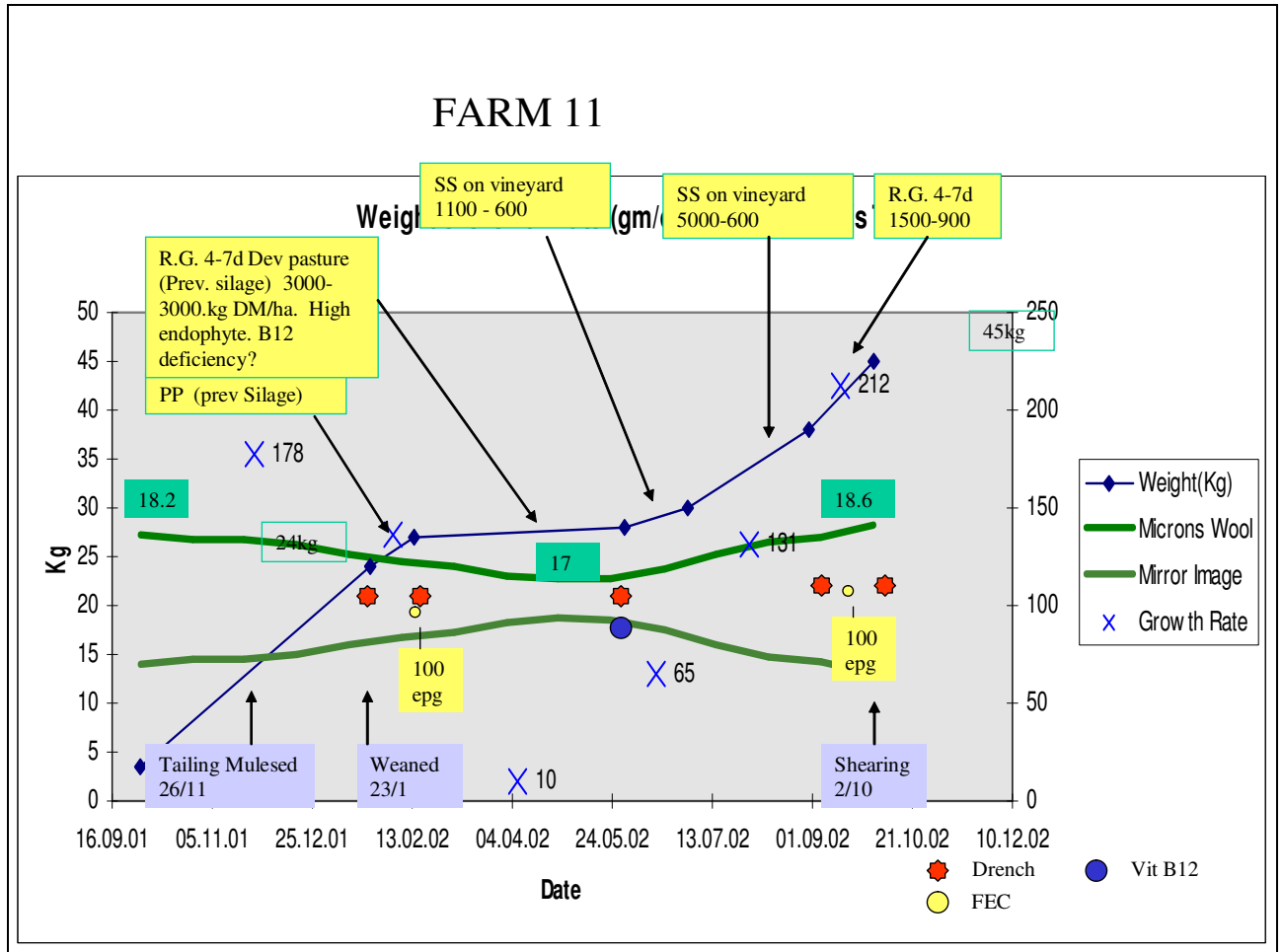


Drench
Moxidectin inj

SS = Set stocked
OSTD = Oversown topdressed

This is a typical fibre profile and growth rate when early lamb growth is good. This good growth rate can continue for some time after weaning if they are weaned onto specialist crops or high quality pastures.

However in most cases fibre diameter and growth rates decline as pasture quality deteriorates in the summer. The narrowing of fibre and slow growth rates continue into the autumn-winter period as hoggets are rotationally grazed or set-stocked on the best “green pick” which tends to be the south facing blocks. These unfortunately are the colder areas of the property and are also likely to be carrying higher parasite larvae populations.



Poorest growth rate and lowest fibre diameter occurred on this property in the summer and autumn despite good pasture covers.

There were a number of factors contributing to the poor growth rate. This included pasture quality, low Vitamin B12 levels and high endophyte levels.

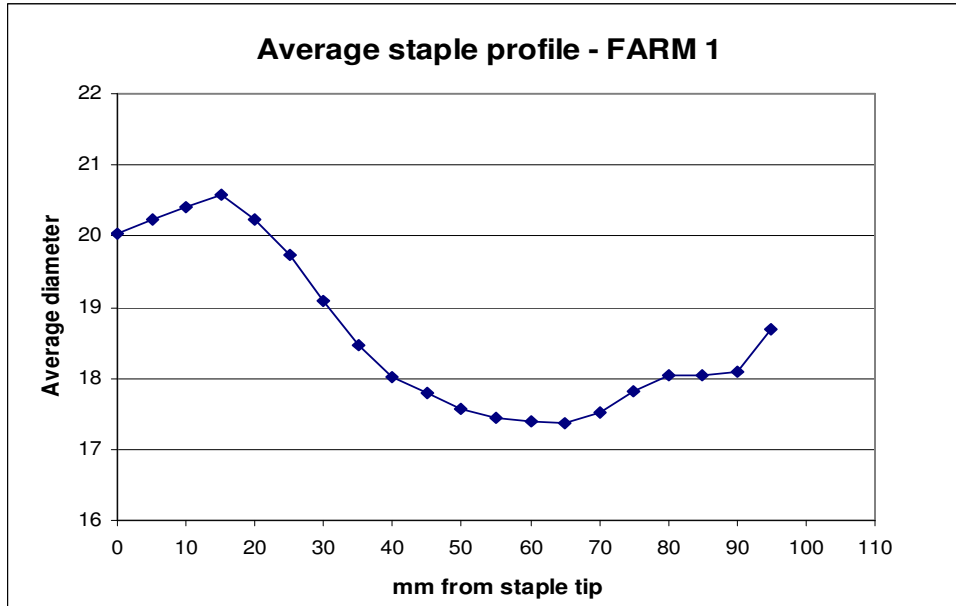
Growth rate improved and fibre diameter increased once the hoggets were moved onto vineyards in June.

6.1. Discussion on fibre profile, growth rate and management events

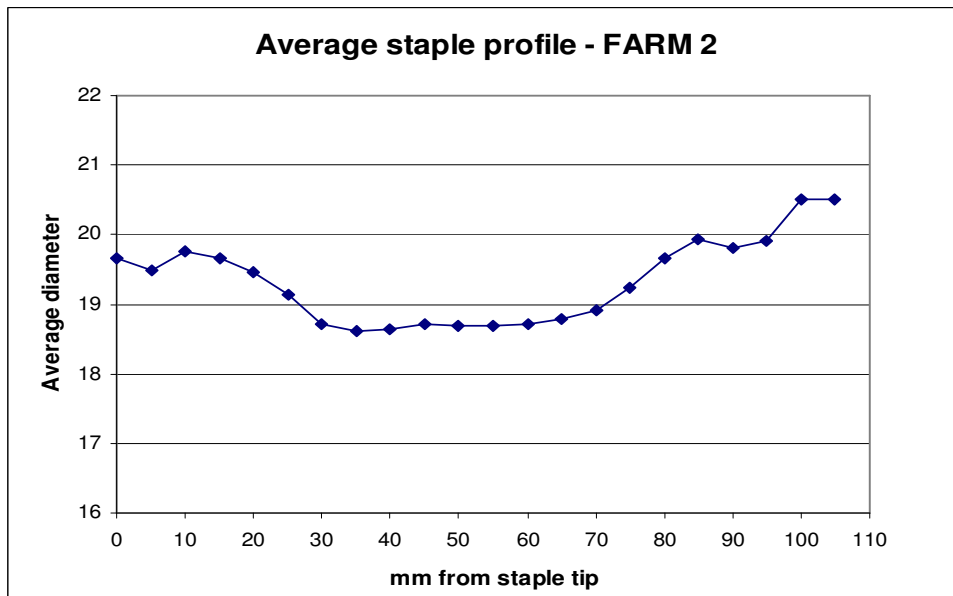
A full discussion on the impact management events and growth rates have on fibre profile is at the end of the project. However it became evident that events occurring before weaning were actually having a significant impact on hogget performance. For this reason during the last year of the project some data was collected on pre-weaning ewe and lamb performance on four properties. A comparison in performance was also made between single and twin born lambs.

7. Management factors associated with growth rate and fibre profile from birth to hogget shearing (2002-2003)

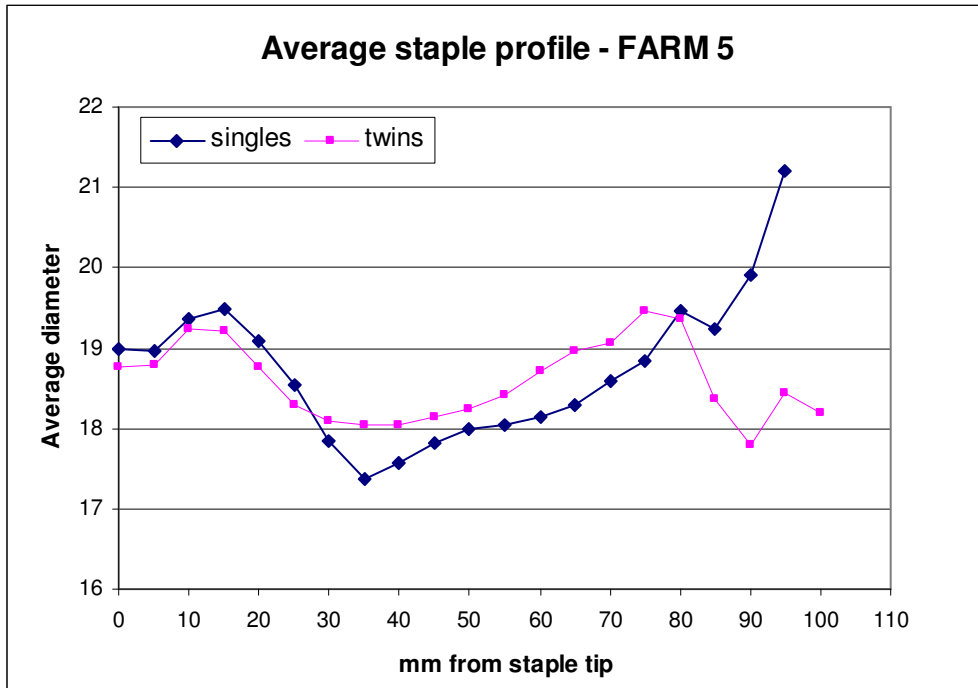
7.1. Fibre profiles of properties tested 2002-2003 (Including singles and twins where tested)



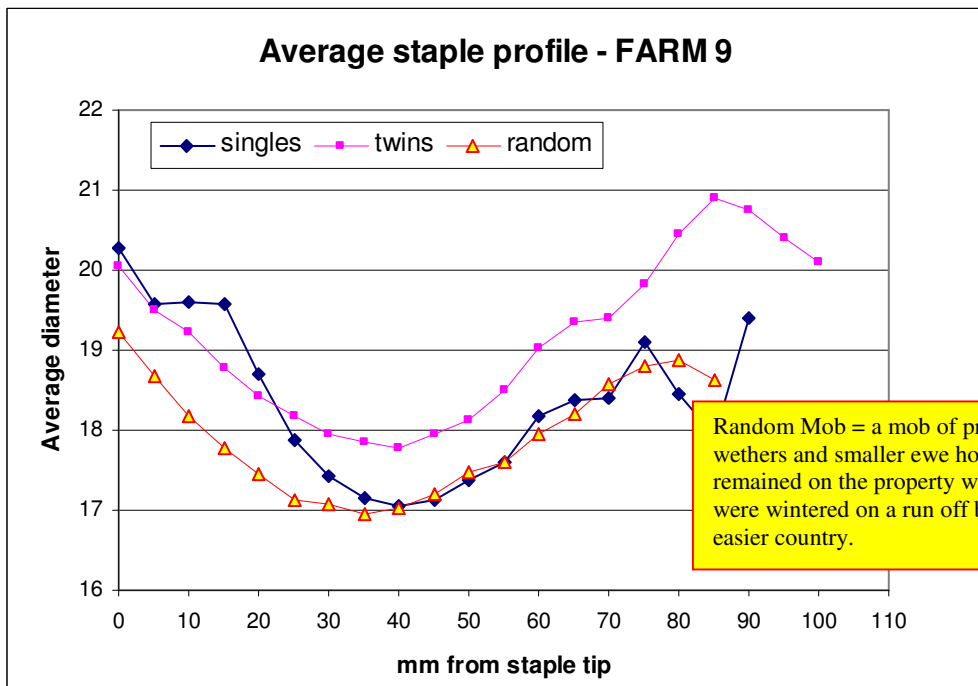
	MFD	MSL	SD
All lambs	18.6	78.2	11.8



	MFD	MSL	SD
All lambs	18.99	79.4	8.8

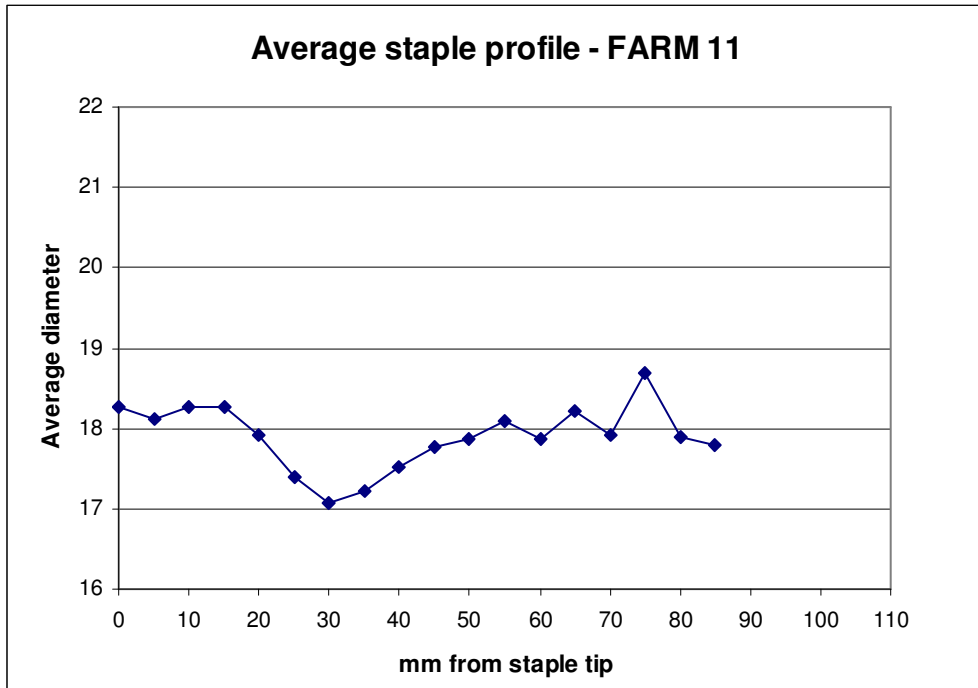


	MFD	MSL	SD
Single	18.39	78.5	10.5
Twin	18.57	80	11

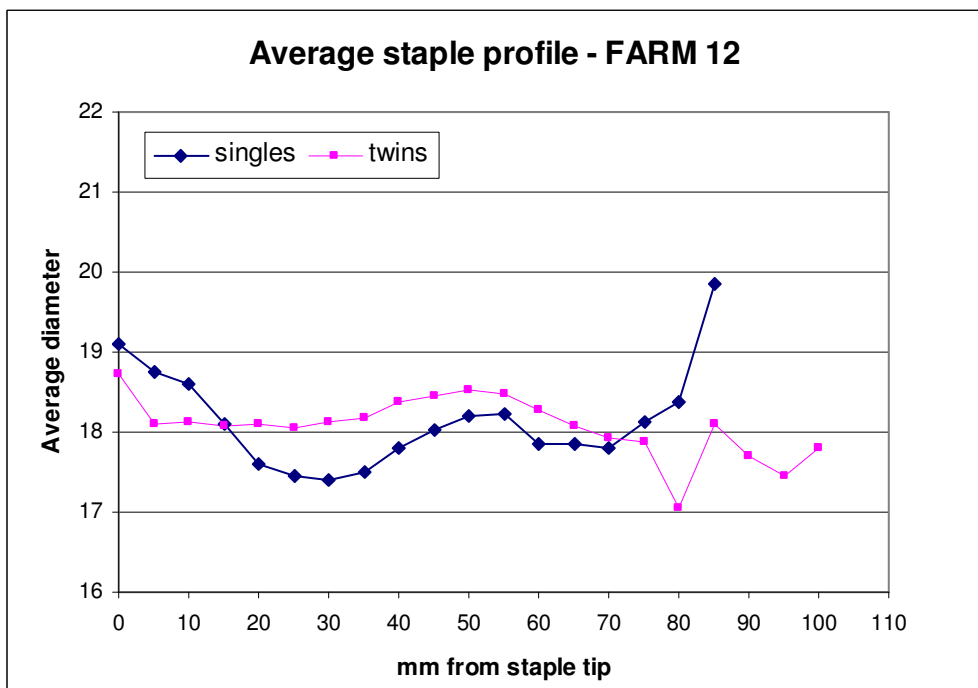


Random Mob = a mob of predominately wethers and smaller ewe hoggets. These remained on the property while the rest were wintered on a run off block on easier country.

	MFD	MSL	SD
Single	18.23	77.8	8
Twin	18.7	82.5	9.9
Random	17.67	75.5	9.6



	MFD	MSL	SD
All lambs	17.75	64.7	7.9



	MFD	MSL	SD
Single	17.94	72.4	9.9
Twin	18.14	80.3	9.7

7.2. Comments on fibre profiles

It has been shown that ewe nutrition during pregnancy has a significant effect on the mean fibre diameter of her lamb's fleece and her lamb's fleece weight. This effect is permanent. (Unpublished data. Andrew Thompson. Appendix 3) A fleece of lambs from well fed ewes being finer and heavier than that of less well fed ewes. The explanation for this is that lambs born to better fed ewes lay down more secondary follicles. Secondary fibres are finer and shorter than fibres from primary follicles so that the mean fibre diameter of a fleece will decrease with increasing numbers of secondary fibres.

We can probably assume that in most cases twin lambs 'in utero' are not going to be as nutritionally well off as single lambs and will thus have a slightly coarser mean fibre diameter. The mean fibre length of wool from the twins is also longer because there are relatively more primary fibres than secondary fibres.

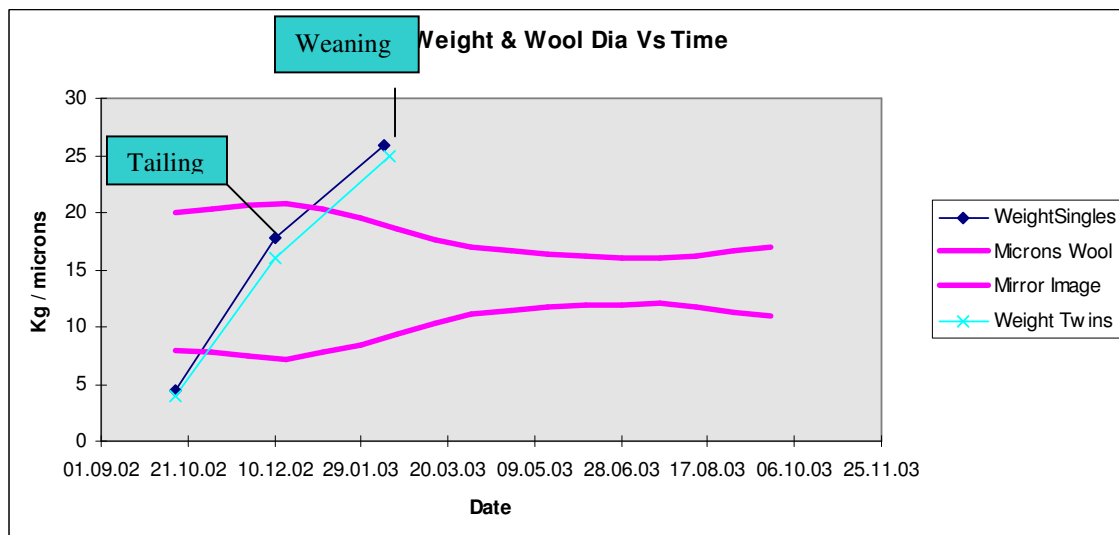
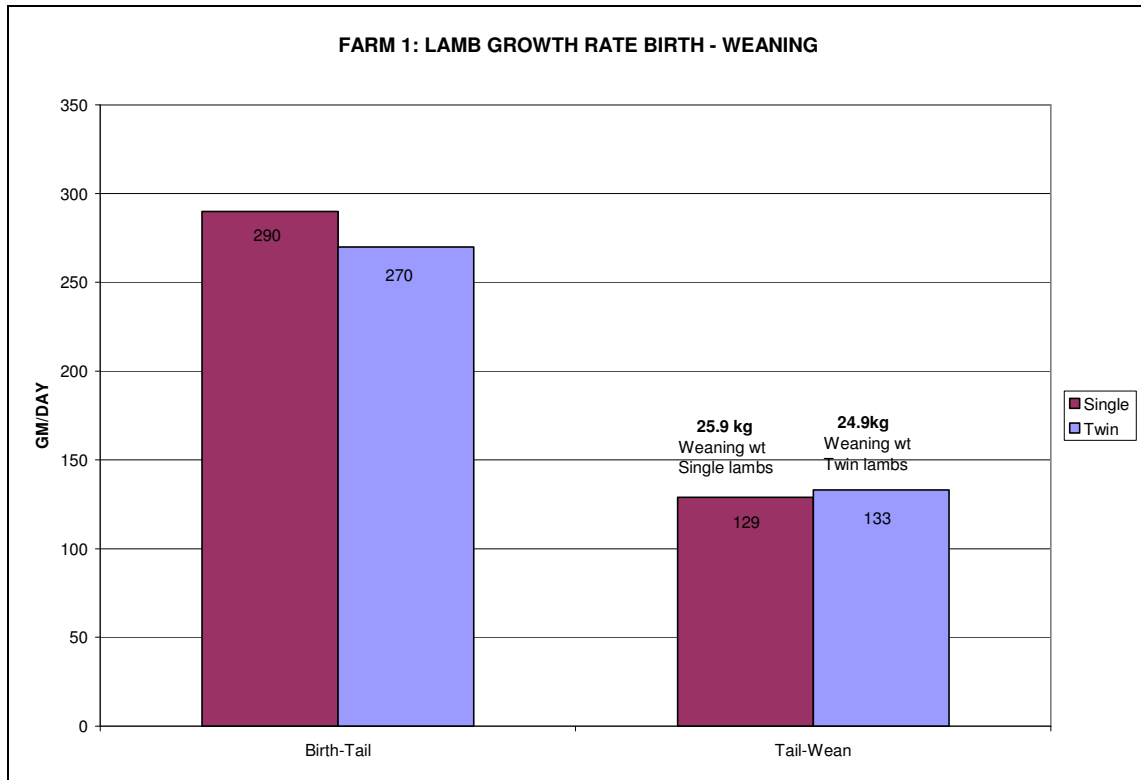
When measured in this project, the difference in mean fibre diameter between singles and twins was a minimum of 0.2 microns on one property to 0.47 microns on another. The singles being the finer. Fibres from twin hoggets however were 2-10mm longer.

In all cases where twin and single profiles were compared the tips of the twin profiles were finer, but between 15-25mm from the tip the profile became marginally stronger. The explanation for this is that because the secondary fibres are shorter the bulk of fibres measured at the tip are primary fibres. We have to then assume that the diameter of primary fibres of twin lambs or lambs born to nutritionally deprived ewes are going to be finer. Good feeding during pregnancy would therefore increase the diameter of primary fibres as well as increase the number of finer secondary fibres. The overall end result being a finer fleece.

If we assume that the tip is what the lamb is born with then the change in profile here may be a good indicator of ewe management in late pregnancy. Any decrease in fibre diameter from the tip of the fibre indicating poor and deteriorating nutrition in late pregnancy. (7.1. Farms 9 & 12). Conversely an increase would indicate improving pre-lamb nutrition. (7.1 Farms 1 & 5).

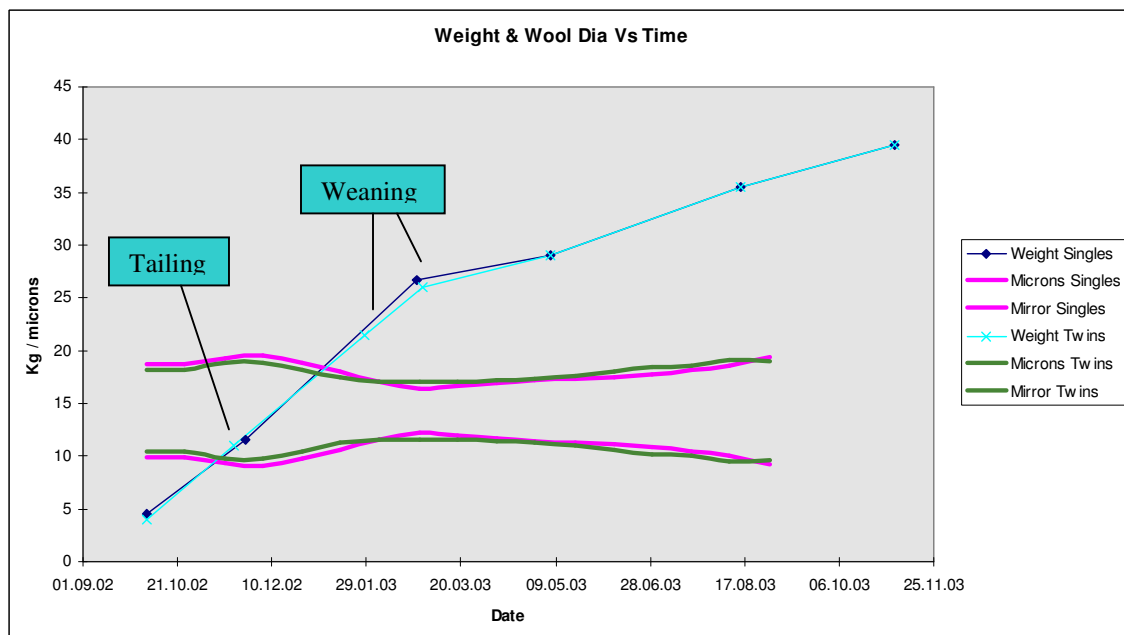
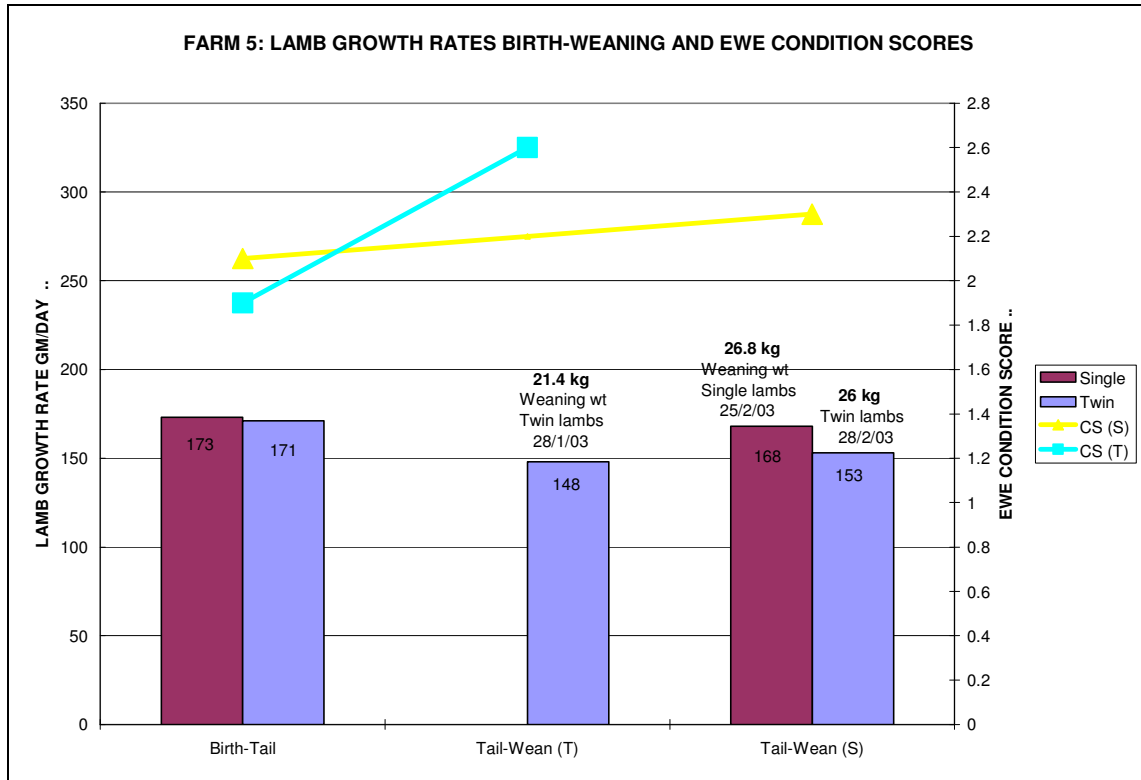
If the tip profile of a hogget fleece is a good indicator of ewe management in late pregnancy, then it would be interesting to be able to compare the profile of tips with ewe body weight and condition score prior to and at lambing time, as well as lamb survival.

7.3. Lamb Growth Rate and Ewe Condition Score Birth – Tailing Tailing - Weaning



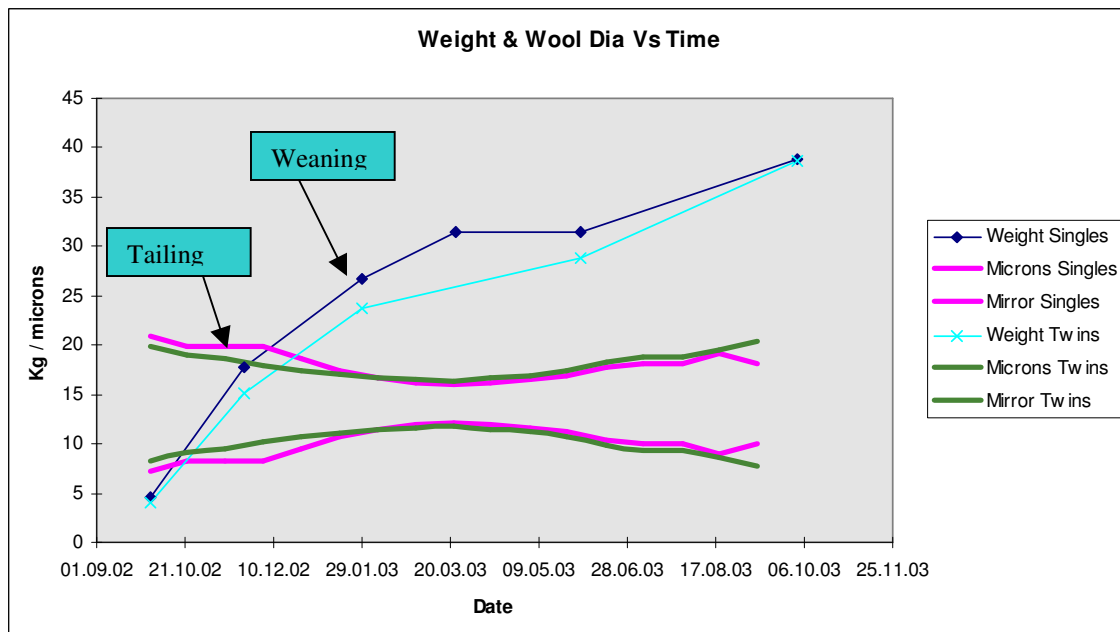
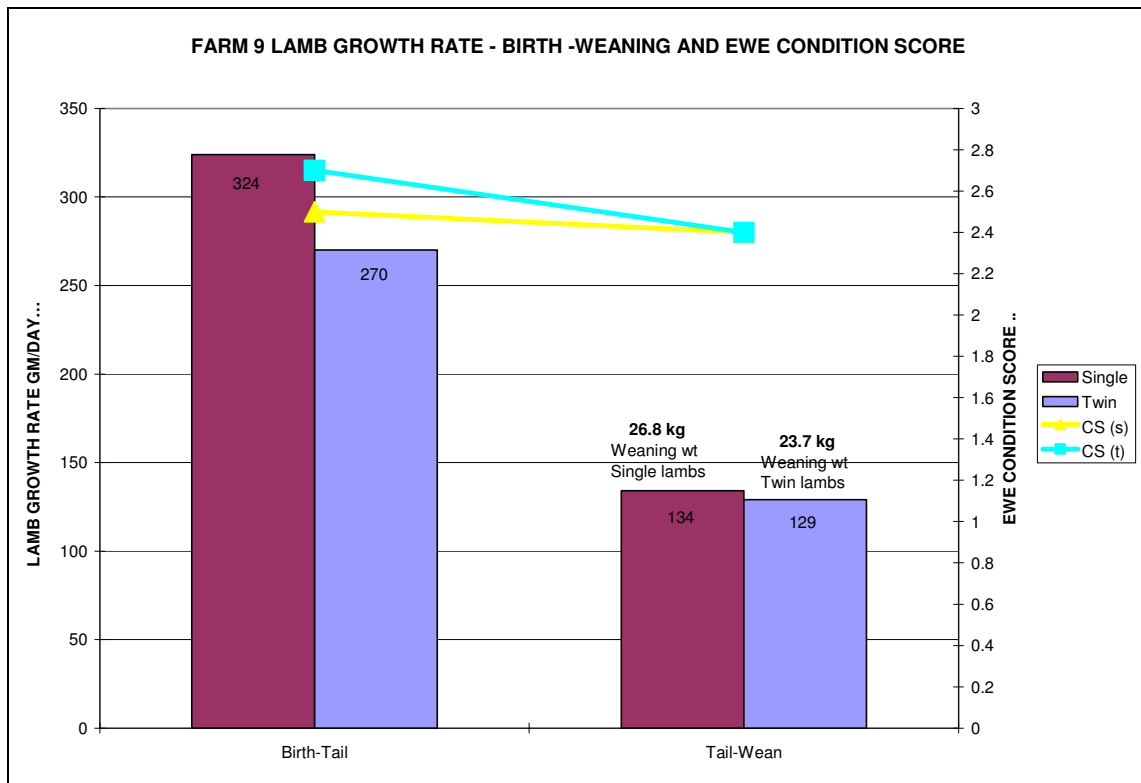
On this property there has been a high growth rate for all lambs from birth to tailing. However between tailing and weaning growth rate of the lambs had more than halved what it was before tailing. Although no ewe condition scores were measured, the data suggests that the twin bearing ewes and lambs were fed significantly better. Twin lambs grew slightly faster than the single lambs during this period and only weaned 1kg lighter.

The change in growth rate is also reflected in the change in fibre profile.



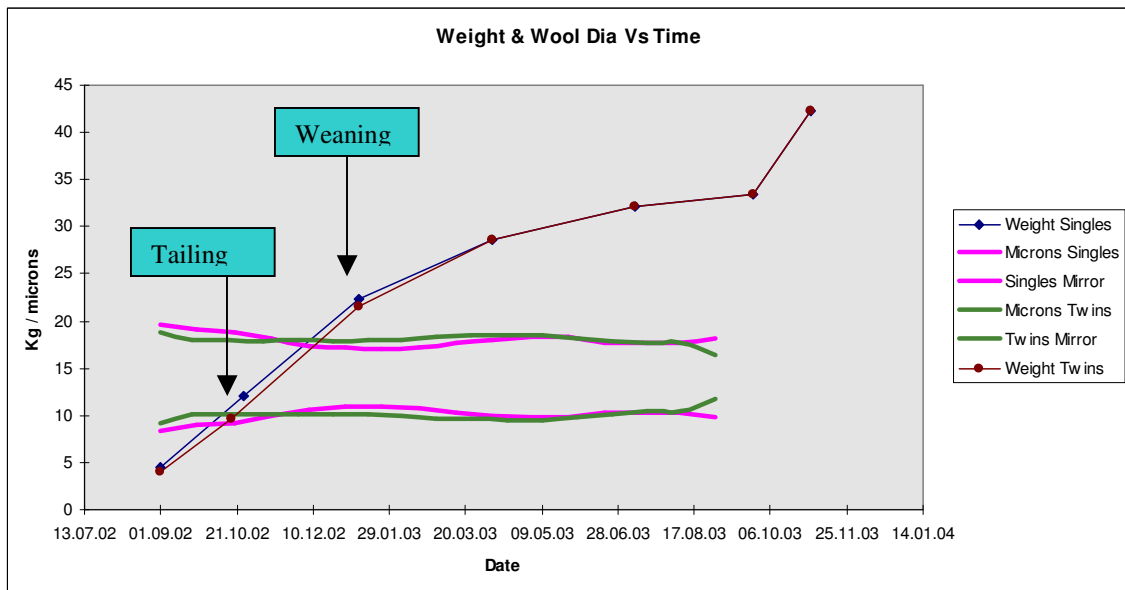
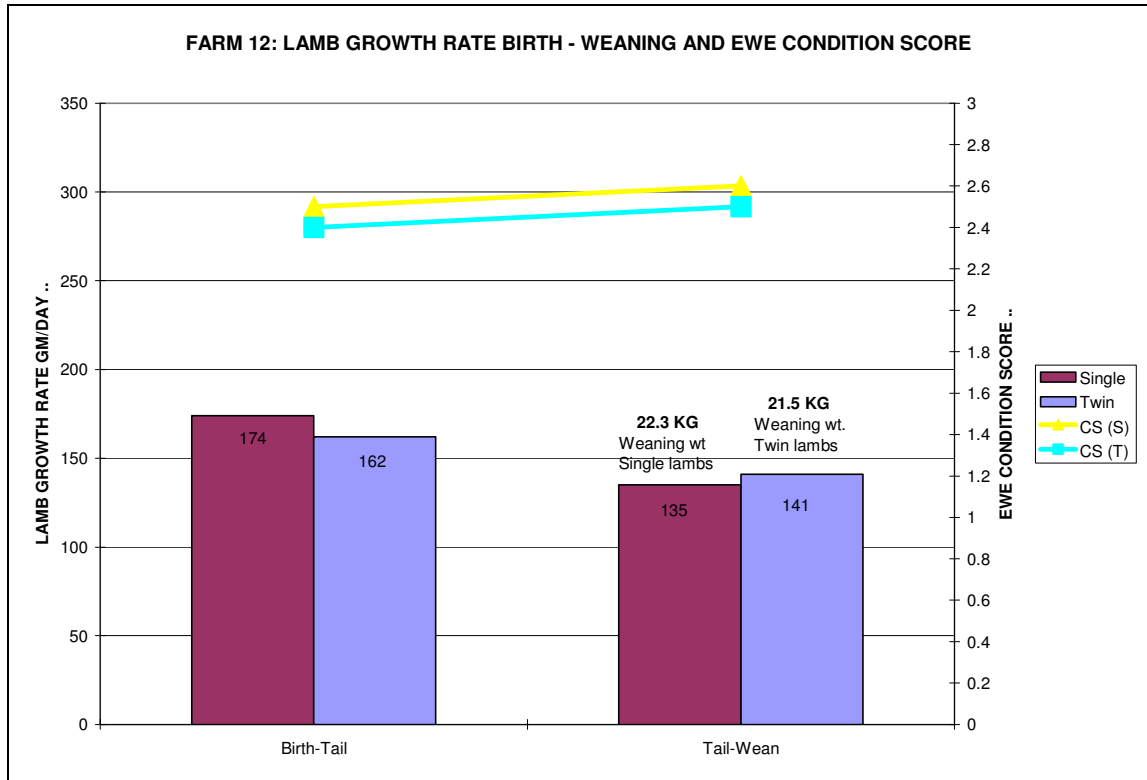
In this flock a low ewe condition score at tailing is associated with moderate pre-tailing lamb growth rates. Although the twin bearing ewes gained a significant amount of condition after tailing their lambs were weaned a month earlier than the single lambs. Despite early weaning of twin lambs their growth rate remained relatively constant. Their average body weight was less than 1kg behind the single lambs when this group was weaned.

The relatively constant growth rate of the twin lambs is reflected in a relatively even fibre profile.



Although pre-tailing lamb growth rates are high a decline in ewe condition from tailing to weaning is associated with a marked slow down in lamb growth rate. The single lamb growth rate after tailing being less than a half it was before tailing.

Although management of the single and twin lamb mobs is different the results suggests that any decline in ewe condition during lactation has more effect on twin lamb growth rate than single lamb growth rate. In this case the twin lambs averaged 3kg lighter than the singles at weaning. The twin lambs did not catch up to the singles until October. There is a steady decline in fibre diameter, especially the singles, through until weaning.



Management from tailing to weaning meant that both twin ewes and single ewes put on a similar amount of condition. This is reflected in very similar growth rates between singles and twins. Twin lambs actually grew 6gm/day faster and at weaning were only 0.8kg lighter. By April they had caught up with the singles.

The fibre profile for the twin lambs is probably as close to ideal as has been seen in the project.

7.4. Comments on early lamb growth rate and ewe condition score (CS)

The Condition Scoring (CS) technique was not compared between operators so it is difficult to compare properties. And while ewe CS and lamb weights were only recorded on a few properties in the 2002-2003 season, the results support earlier work where ewes in better condition tailed and weaned heavier lambs.

The real significance of this is that if twin bearing ewes are in good condition prior to lambing and this condition is maintained through tailing to weaning then this will ensure that they raise two well grown lambs. On Farms 1 and 12 twin lamb growth rate from tailing to weaning actually exceeded that of the singles and they weaned only 1kg lighter.

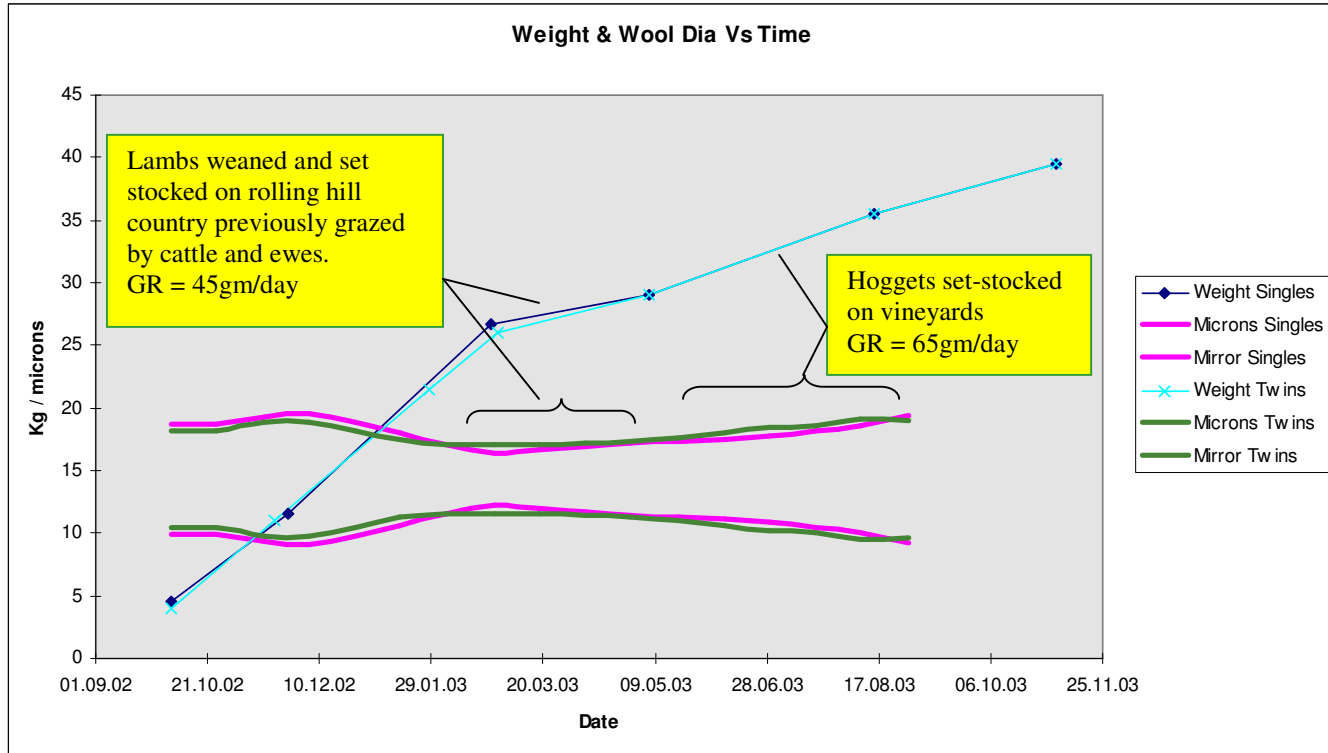
Conversely not giving twin bearing ewes preferential treatment and forcing them to compete with singles will ensure they raise lighter twin lambs. A loss in ewe CS had a greater impact on twin lamb growth rate than on singles. On Farm 9 twin lambs weaned over 3kg lighter than the singles with ewes losing condition between tailing and weaning.

In situations where feed quality/quantity is declining after tailing more consideration should perhaps be given to weaning early. As can be seen on Farm 5 twin lambs did not suffer from being weaned at a light weight (21.4kg) when they were put onto high quality pasture and stopped competing with their mothers. They were less than 1kg lighter than the singles when these were weaned. Successful weaning at light weights however can only be achieved if they are weaned onto high quality feed.

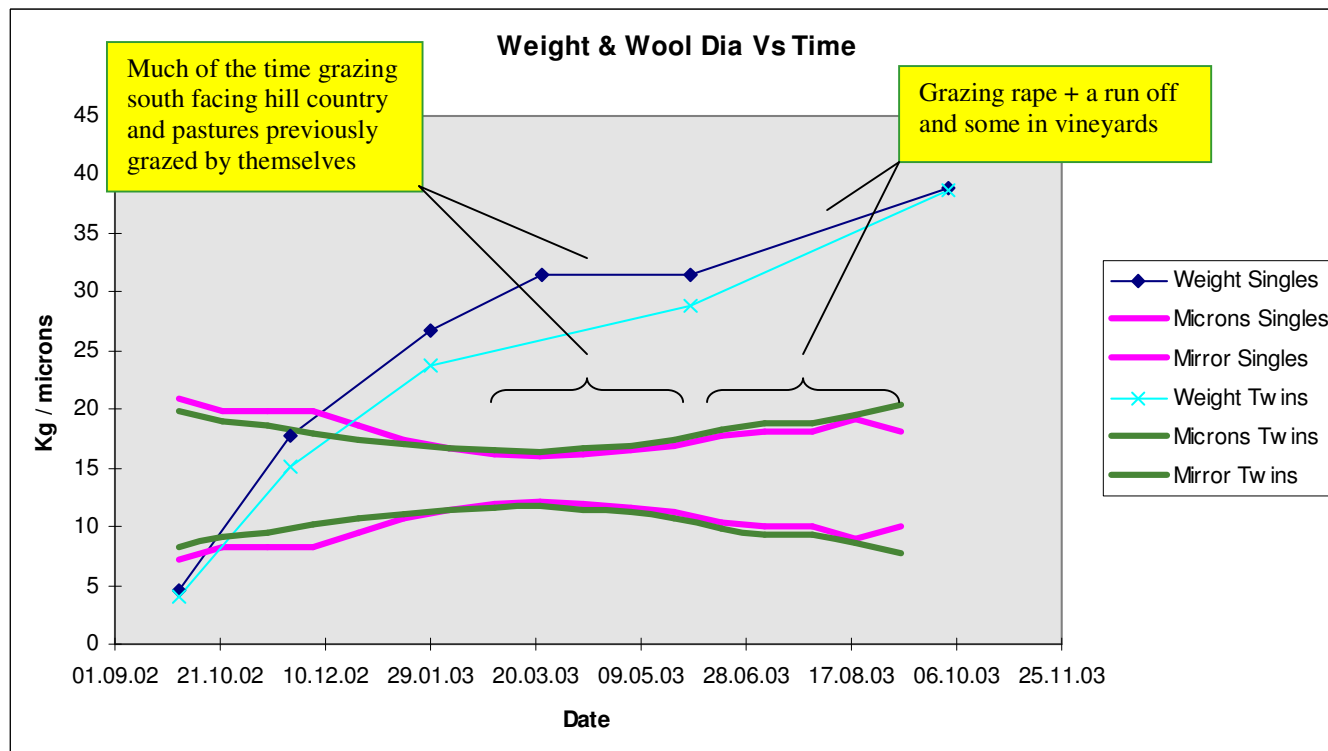
While it is likely that some of these twin lambs were actually reared as singles it still shows that twin lambs need not be the “runts” and can perform as well as singles given the opportunity. The most logical way for farmers to ensure they can achieve excellent growth rates in twin lambs is through pregnancy scanning and preferential treatment of twin bearing ewes from scanning through to weaning.

7.5. Major events associated with weight and fibre changes (2002-2003)

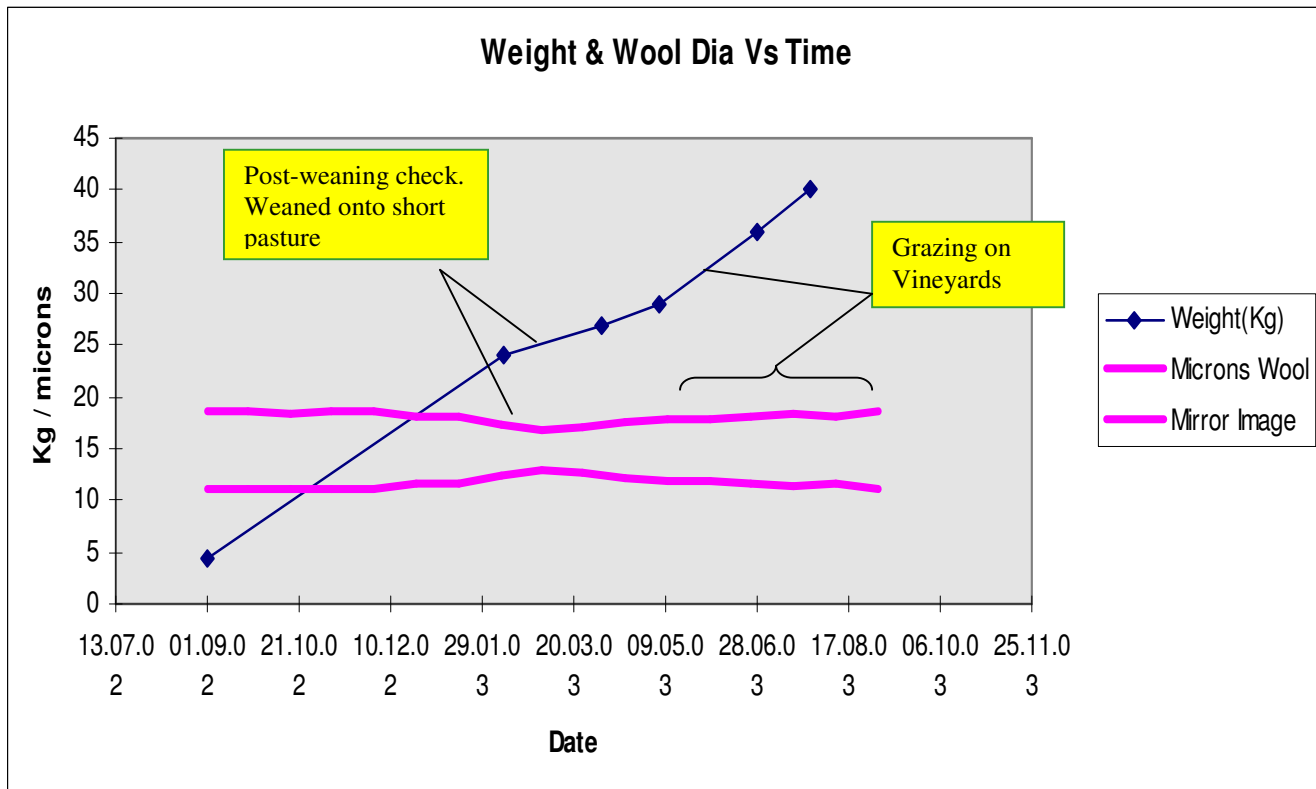
Farm 5



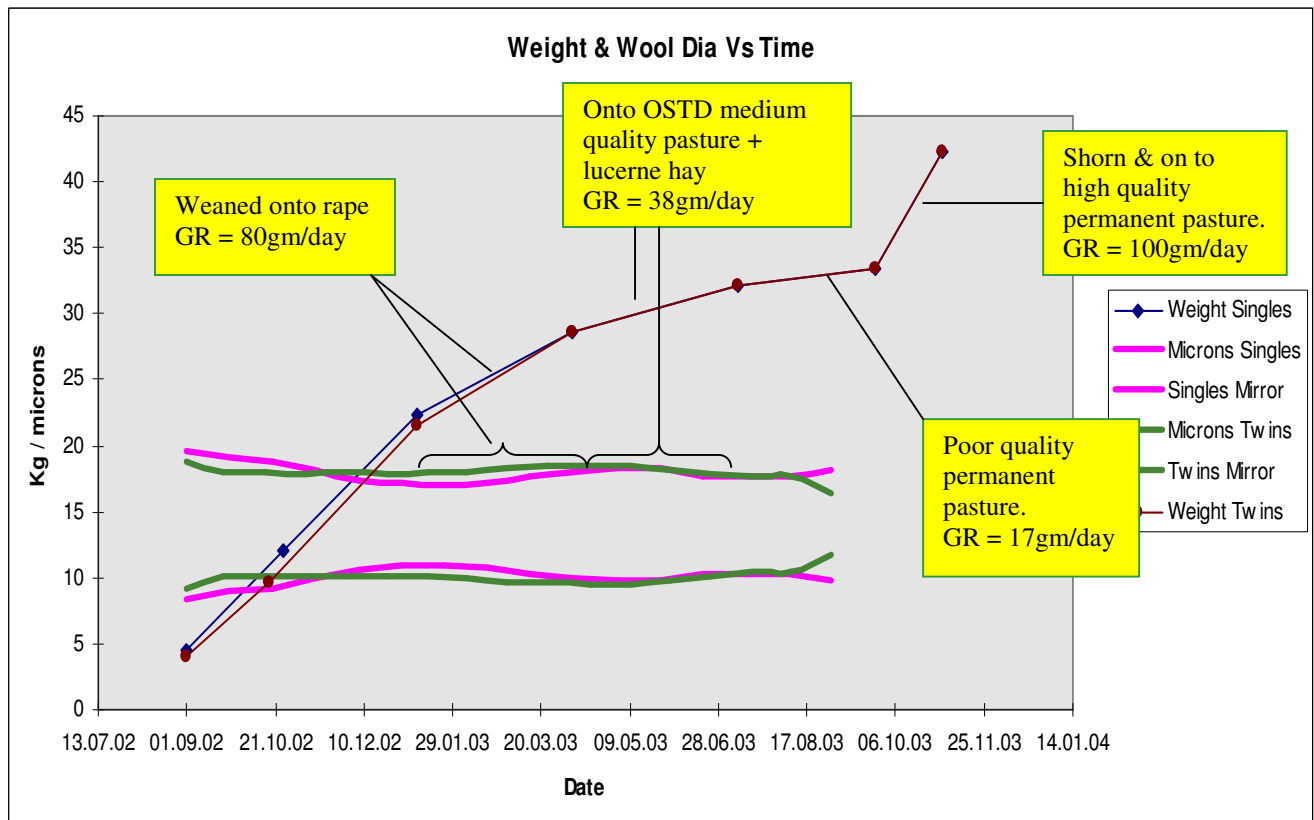
Farm 9



Farm 11



Farm 12



8. Discussion

Hogget fibre profiles and growth rates.

Fibre profile (FP) is influenced by management factors that also affect lamb and hogget growth rate (GR). However FP may be a more sensitive and more practical indicator of hogget management than weighing, although its use is going to be retrospective. It could also be a useful indicator of ewe management and nutrition in late pregnancy.

While mean fibre diameter is an important factor influencing the financial return from wool, breeding and selection of replacements are the only methods usually considered to alter this. However there are management practices, perhaps more practical and rewarding than changing genetics, which can be implemented to produce a heavier and finer clip. These management practices, especially improved ewe nutrition in late pregnancy, are the very ones that will also improve lamb survival and weaning percentages. Improved weaning percentages allowing better selection and the option of retaining fewer older sheep with stronger wool. (Appendix 3)

While a finer fleece may be desired, fleece weight and staple strength (SS) are really “what makes money” and every endeavor should be made to maximize these.

SS is dependent on profile and we have seen many management factors that can influence this profile. All attempts should be made to prevent significant reductions in diameter by managing hoggets to reduce the impact of these factors. One can also view a narrowing of fibre as a period of lost opportunity – a loss of weight, length and strength of wool, and of body weight.

There is evidence from the investigation that good nutrition for ewes in pregnancy and during lactation is necessary to prevent large changes to the tip of the fibre profile, and to ensure that adequate weaning weight is achieved. As long as a satisfactory weaning weight (>23kg) is achieved then good management of the lambs after weaning and as hoggets in the autumn and winter is important to achieve constant growth rates and more desirable FPs without too much of a narrowing mid fibre and a reduction in SS.

The most desirable fibre profile is one finer at the tips. It may be difficult to constantly produce such a profile for the opposite seems to be the “norm”. However shearing dates could possibly be used to alter this profile. For instance shearing at weaning which is practiced by some to prevent seed damage to fleece and skin would remove the stronger tips often seen. However it would be vital that post shearing nutrition was excellent to ensure the profile increased from the tip.

As hogget shearing is usually done in the spring when growth rates are high the diameter at the base of the fibre is at its maximum. It is possible that as feed quality declines into the summer, diameter will reduce. Would delaying hogget shearing a month or two and having a weaning shearing improve the profile?

Limited observations in this project support work of others that lamb growth rate to weaning is determined by ewe feeding during pregnancy and lactation. Lamb weaning weight was shown to be lighter when ewe condition at tailing and weaning was lower. This carried through until hogget shearing because lambs weaned at less than 23kg never seemed to catch up with those weaned above this weight.

It was clearly shown that twin lambs could perform very well but not to expect this if twin ewe management was substandard. Good twin lamb performance could be attributed to identifying twinning ewes and preferentially treating them from well before lambing. It would be naive to expect twin lambs to perform as well as single lambs if their mothers were not identified at scanning and preferentially treated.

Some conditions and management practices repeatedly cropped up that were associated with poor hogget performance. These included grazing 'dirty pastures' (high parasite contaminated pastures) – which were invariably those grazed by ewes and lambs or by themselves previously, grazing poor quality pasture or pasture with a residual less than 1000kg DM/ha, grazing cold south facing country in the winter, and grazing high endophyte pastures.

Conversely, management practices that invariably resulted in acceptable growth rates were when hoggets grazed 'clean' pasture – pasture that had low parasite burdens. This included vineyards, orchards and crops and pastures 'cleaned' by cattle. Cattle cleaned pasture could realistically involve six months being 'sheep free'. Invariably these 'clean' pastures were also high quality pastures with a lower content of dead material and a higher content of young grasses and legumes or herbs, or were actual specialist pastures (annual ryegrasses) or crops.

Generally, management practices that encourage a consistent and satisfactory growth rate from birth through to mating as a 2-Tooth, will not only determine her fibre profile and financial return from hogget wool, but also her lifetime performance - lambs and wool. No matter how good her genes, ewes that have had their growth affected as young stock will never be able to fully express their potential. Growth in their first year of life is critical.

This project was designed to collect data from Merino farmers, and from the analysis of that to show when and where hoggets were likely to perform well and when they might not perform so well. It has been a "best practice" project. What practical management practices work best.

We hope it will highlight the pros and cons of different management practices. Some of these practices are to be encouraged, while others are difficult to avoid or cannot be avoided. Nevertheless understanding better the times and the reasons for poor growth rates should hopefully help farmers improve management and avoid the severity of some of the set backs seen.

9. Conclusions – ‘take home’ messages

- Hogget growth rate and performance starts with ewe management.
- Preferentially manage twin bearing ewes.
- Twin lambs can perform as well as single born lambs.
- Plan for hoggets to graze ‘clean’ pastures.
- Pasture quality is of more significance than quantity.
- Don’t put hoggets onto cold south facing blocks in the winter.
- Consider grazing off property or more specialist weaning and winter pastures or crops.
- Avoid high endophyte pastures.
- Monitor more – weights, trace element levels, faecal egg counts.
- Aim for a minimum weaning weight of 23kg.
- Consider early weaning if ewe condition score is declining.
- Use hogget fibre profiles to gauge past management.
- Plan for excellent ewe nutrition in late pregnancy.

Acknowledgements

The farmers involved. For being prepared to start monitoring and collecting data and to continue to make recordings despite at times busy schedules.

S & M Satterthwaite	Muller Station
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B & N Dick	Netherwood
M & N Giles	Richmondale
C & P Bowron	Malvern Hills
J & T Turnbull	Glengyle
D & J Grigg	Tempello
R & C Beech	Stronsay
M & W & L Westenra	Rossmore

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Appendix 2. Assessing pasture quality

Marlborough Merino Association Ewe Hogget Project

Guidelines for filling out the new MANAGEMENT FORM -

Estimating pasture quality score-

1 = dead dry pasture (age dead is poorer than drought dead), total absence of green leaf or stem or legumes.

2 = Some green leaf but mainly aged or dry dead grass stem and seedhead. High proportion of dead material. Few legumes.

3 = Some green leaf and some legumes e.g. clover. Medium proportion of dead matter and seedhead.

4 = Leafy green pasture with reasonable amount of legume. Some seedhead and small amount of dead matter.

5 = High quantity of legume or herb, young grass leaf and no stems or dead matter. Forage crops are usually a 5.

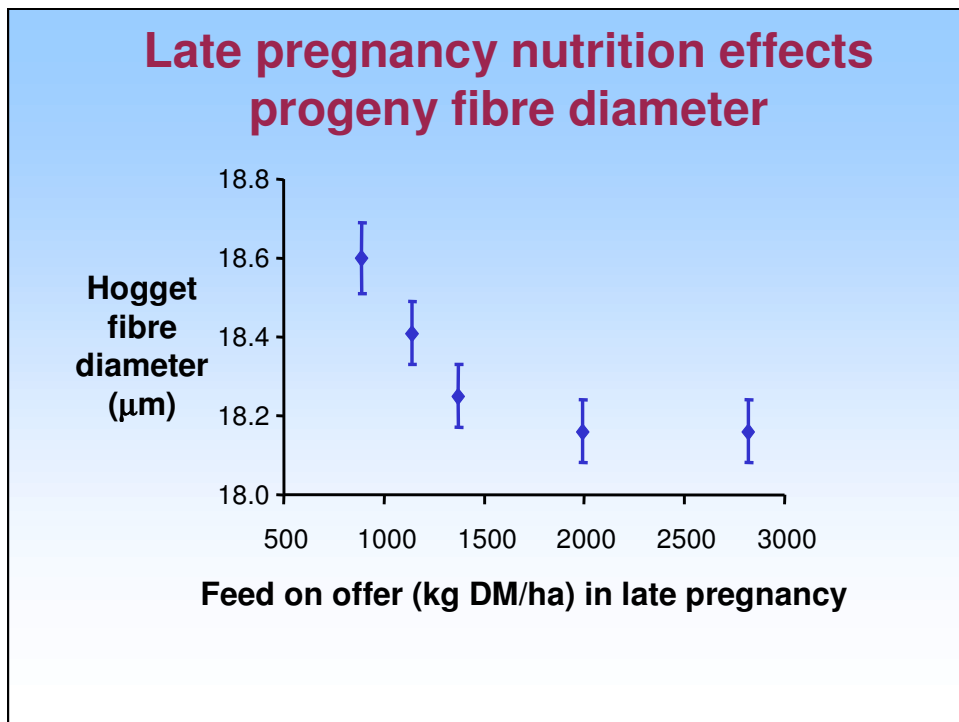
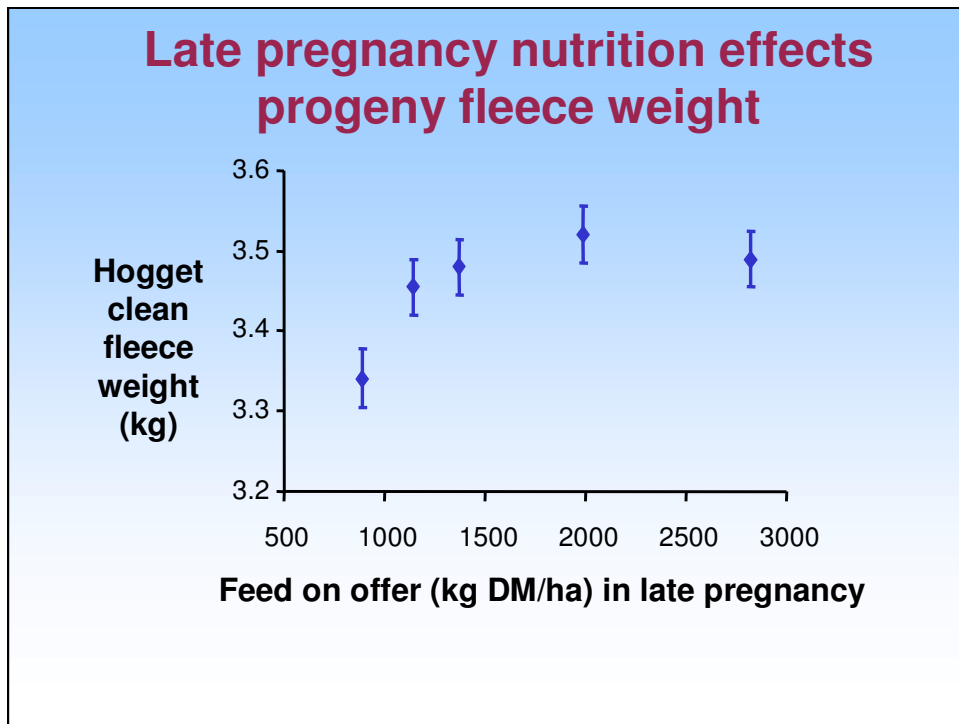
Remember to think QUALITY not quantity.

Feed types (for Year 2 data onwards)

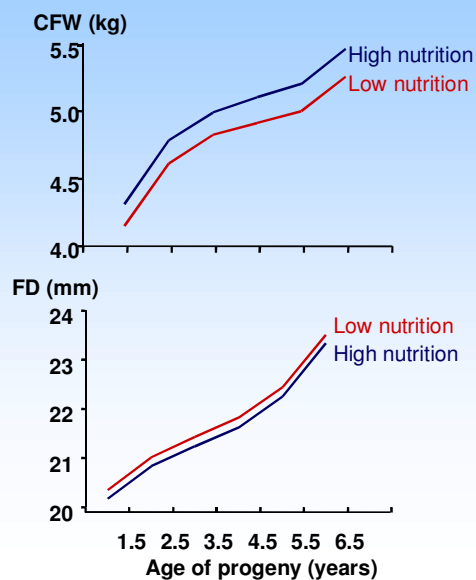
OSTD oversown top-dressed – intensive	More than 20 hoggets/ha. May include some native species, tussock, browntop, danthonia, yorkshire fog, borage, ryegrass and sub clover.
OSTD oversown top-dressed – extensive	Less than 20 hoggets/ha. As above.
Permanent pasture	Perennial ryegrass/clovers, cocksfoot, chicory or plantain mixed with grass, fescue, grazing brome, prairie grass
Forage	Brassica including turnips, pasja, short-term rotation ryegrass, lotus, sulla, straight chicory, clover crop.
Lucerne	
100% supplements	Silage, baleage, peas, grain, hay, nuts.

The main thing is that you are consistent over time, and we have consistency among the group.

Appendix 3. Late pregnancy ewe nutrition effects on progeny fleece weights and fibre diameter. (“Lifetime Wool” Project. Andrew Thompson et al. Dept of Primary Industries, Hamilton, Victoria. Unpublished data)



Effects on progeny fleece weight and fibre diameter are permanent



'Wool follicles are profit drivers' - progeny fleece value is a driver of the importance of ewe nutrition

Proportion of variation in value of production (\$/farm) described by each component

Progeny fleece value	34
Ewe fleece value	8
Lamb survival	35
Ewe reproductive rate	23

cv. 70% in pre-experimental modelling