Adding value to Merino wool in the woolshed -Clip Preparation, Classing and Quality Control"

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It is important that farmers, woolhandlers and classers understand the biological complexities of Merino wool in order that they can make informed assessments and decisions on the most profitable and effective way of preparing and classing a Merino wool clip for sale. Knowing how the wool follicles form and how the fibres grow, along with the factors affecting animal production are as equally important as having the physical wool-handling and classing skills to perform the task effectively. Flock management, nutrition, breeding programmes and the environment are the major factors that contribute to the variability of the fibre characteristics within and between fleeces from a flock of sheep. Unfortunately there are no recopies, but fortunately it's mostly to do with common sense.

The main objective of **"Clip Preparation"** is to prepare wool for sale in the most efficient and economical way in order to;

- Maximise the net income to the farmer.
- Provide a textile fibre that processors can use with confidence.

This can generally be achieved by paying attention to the things that classers and woolhandlers can control and manage such as;

- Making as few uniform lines as possible for fineness, length and style.
- Removing all sources of contamination from the wool clip, such as urine stained and pigmented fibres, yellow discolouration, heavy vegetable matter and any sources of non wool contaminants such as clothing, towels, wool-pack material and metal objects.

It is important to understand the factors that have a major influence on the quality and variability of a woolclip.

The whole flock, i.e. all the different classes and ages of sheep farmed on the property.

Individual mobs, sheep of the same class and breed that have been grazed together under similar environmental conditions since their previous shearing.

Wool clip, all the wool from the whole sheep flock on a property, i.e. adult ewes and whethers, two tooths, hoggets, rams.

Wool handling and classing (Quality Control):
Wool handling and classing will do very little to reduce the overall variability of fibre diameter, fibre length, fibre strength, colour or the style of a wool clip.

The purpose of skirting is to minimise the extreme visual variation of style and staple length within individual fleeces, by removing faults, which would otherwise downgrade the overall value of a line of greasy wool.

The purpose of classing is to group fleeces of similar style, fineness, staple length, soundness and colour into lines for sale to a buyer. In doing this, the classer has less than 20 per cent of the total fibre diameter variability between fleeces within a mob to work with. Achieving consistency of fibre length within a line of fleece wool is even more difficult, in that the classer has only 10 per cent of the overall fibre length variability between fleeces within a mob to work with.

Wool Industry standards

There are set industry standards and recommendations that farmers, woolclassers and woolhandlers must adhere to. These are set out in the **"NZ Wool Industry Code of Practice for Clip Preparation"**. Classers and leading woolhandlers should know and clearly understand their responsibilities listed in this document in order that they can apply the recommendations in many different conditions to maximise the value of a farmers wool clip.

Wool Characteristics

Staple Strength, (Soundness)

Before making any decisions on fineness and staple length, the classer should assess every fleece for soundness to identify if the fleece is sound or tender. While there will be varying degrees of soundness within and between fleeces within a mob, classers can reasonably accurately assess each fleece by applying uniform pressure to several staples. If the staples break easily by applying a consistent pressure, the fleece will be classed into a separate line for tender wool. Staples from within individual fleeces will vary in strength, but the greatest variation in strength will be between fleeces and different mobs. The classer's expertise is in being able to identify fleeces that are tender or part tender from fleeces that are sound. Discussing the management of a mob since the previous shearing with the farmer, will help the classer and woolhandlers to understand the reasons for the wool from different mobs being sound or tender.

Nutrition and feeding levels have a major influence on soundness, and while individual sheep within a mob respond differently to nutritional stress, the fleeces from a mob of sheep grazed in the same conditions will have a uniform pattern of wool growth. *A loss of 2kg in body weight from under feeding* is enough to cause wool tenderness. Other factors affecting staple strength of fleeces from individual sheep within a mob are sickness, internal and external parasite infestations, footrot, pregnancy and rearing a lamb, or sudden changes of diet.

Style Grade:

This is the most important factor for classers and woolhandlers to understand. Better style wool clips require high standards of clip preparation. Good style wools are pearly white, have excellent crimp definition along the entire length of a staple, are sound and free from fault, while poor style wools will have poor crimp definition, be discoloured and have varying degrees of faults such as tenderness, degrees of cotting, yellow discolouration, water stain, vegetable matter and dust contamination. The individual staples within a fleece will be tippy and pointed rather than blunt.

The **"knowledge and skills"** of woolhandlers and classers in knowing how to assess the "style grade" of a wool clip, and of individual fleeces is the most important factor in "adding value" to a wool clip. Assessing the skirting levels for each fleece is important so that only inferior wool is removed and all good quality wool is left in the fleece. Improving the "style grade" of a fleece by skirting off inferior wool can add $5.00 to $20.00 per fleece, provided the wool remaining in the fleece is good quality. However, if the overall quality of fleece wool is not improved due to inconsistent and poor skirting standards then the value of both fleece and oddments could be $5.00 to $20.00 per fleece lower. For the farmer, this is an additional cost to the cost of labour.

Style grade is affected by a combination of factors such as;

- Environment:

The environment where sheep live will have a major effect on the amount of contamination from moit and seed, or dust and dirt that can penetrate into the fleeces. Climate has a major effect on wool colour and soundness. Also drought conditions and low quality pasture will cause a loss of strength (tenderness) in the fibre.

- Management and Feeding:
  If farmers get their management wrong when their ewe flock is halfway through pregnancy or during the ewes' lactation period, then the variability of fibre diameter and fibre length within their next generation of sheep will be affected.

- Animal Health and Welfare
  If a mob is stressed due to internal or external parasite infestation, fly strike, footrot, sudden changes of diet or feed shortages, fibre strength will be affected creating a tender wool clip.

- Winter feeding can also affect style: feeding out hay and silage can cause back wool in the fleece to be contaminated with moit, or sheep may get mud contamination in their fleeces when feeding on winter crops.

- Shearing time and frequency can affect staple length, soundness and colour. Pre-lamb shorn wool has high tensile fibre strength and very good colour. Post-lamb shorn wool can have lower tensile strength and greater degrees of yellowness.

- Crutching and dagging reduce the chances of the fleeces being contaminated by urine or dung stain.

- Wool-handling and Classing
  The standard of woolhandling and classing will determine the percentage of a woolclip that can be classified as superior, good, average or poor quality. Woolhandlers and classers cannot change a poor quality wool clip, but they can prepare a wool clip to ensure the best quality wool is separated from the poor quality wool.

- Breeding:
  Farmers breeding programmes have an effect on the style and quality of a wool clip. Rams have the greatest influence on the fibre characteristics of a sheep flock. Approximately 80 per cent of genetic improvement will come from them. Care must be taken when selecting them to avoid wool faults, particularly black fibre, hairy britch and yellow discolouration. Wool-handlers and classers can't remove these faults from a wool clip, but they can identify fleeces that have these faults and class or grade them into lines of poor quality wool.

- Sheep selection
  The farmer's responsibility of selecting sheep with fleeces of good character and style is important so the fleeces can survive the challenges from the environment in which the sheep live. This means selecting sheep with fleeces that have clearly defined staple formation and thickness, well-defined even crimp from the tip to base of the staple. Tips of staples should be blunt rather than pointed. Selecting sheep with fleeces of good style and character will help to reduce the amount of dust and vegetable matter contamination penetrating into the fleece. Good character fleeces will shed water and will be less prone to discolouration and fly strike. The other benefit is that more fleeces from each mob can be classed into a minimum number of uniform lines of high quality wool.

Fibre diameter (fineness):
Fineness is the most economically important fibre characteristic of Merino wool. Average fibre diameter accounts for more than 50 per cent of the clean fleece value. The variation in fibre diameter within and between fleeces from a mob of Merinos is complex to say the least. 80 percent of the variation in fibre diameter is between individual fibres within a single staple. With a further 4 percent of variation between individual staples within a fleece, and a further 16 percent between fleeces. The other important factor affecting fineness is variability along the length of the fibre.

Nutrition has a major effect on wool follicle growth and development, and changes in fibre diameter along the length of individual fibres.

Woolhandlers and woolclassers can do very little to reduce the overall variability of fibre diameter within or between fleeces from a mob of sheep. Attempting to make lines with minimal differences only adds to the cost of selling through additional testing, interlotting and reclassing charges. Classers should only separate fleeces that are obviously finer or stronger compared to the mob average.

Fibre length:
80 per cent of fibre length variability is due to variation between fibres within a staple. Only around 10 per cent of length variability is due to variation between staples within a fleece, the remaining 10 per cent is due to variation between fleeces. Therefore woolhandlers and woolclassers cannot reduce fibre length variability by creating extra lines with minimal staple length differences. The classer only has 10% of the fibre length variability between fleeces to work with, so should only remove the very short wool from individual fleeces, along with individual fleeces that are obviously very short compared to the mob average.

Mill deliveries
It is also important to remember that after the wool has been sold, the buyers will group together many lines of wool from different mobs and properties to make up mill deliveries, this will introduce further length variability. The other factor to remember is that fibre length changes dramatically as the wool is further processed. Scouring can contribute to fibre entanglement and a large percentage of fibres break during the carding process.

Colour:
The environment and climate have the greatest overall effect on colour for a wool clip. High rainfall with warm humid temperatures cause canary yellow, green, blue and brown bacterial stains to develop. Low rainfall and low humidity levels result in good colour white wool. Other factors such as breeding, feeding and parasite management also have an effect on colour. The skill and expertise of woolhandlers and classers is in knowing how to quickly distinguish between permanently discoloured wool such as canary yellow and water stain and wool that is heavier in condition, creamy and will scour to a pearly white colour. The whitest and brightest fleeces require careful and thorough skirting levels to remove vegetable matter contamination, stains, neck collars and dirty pieces, while the poorer colour fleeces require minimal skirting levels to remove urine stain and extremely yellow fribs.

Communication and team work
It is what classers and woolhandlers can control that is important to achieve high standards of clip preparation.

Building team work, working as a team, rather than as individuals, talking to everyone who is involved in doing the job, the farmer, shearing contractor, shearers, woolhandlers and

pressers. Listening to advice from wool brokers, private merchants, wool exporters, wool processors and specialist advisers is also important in helping to determine what is expected from the industry pipeline.

Knowing what advice is useful and what isn't is equally important.

Finally, by concentrating on what we can see and control in the woolshed, by using our knowledge and skills as professional wool classers, woolhandlers and pressers, we will achieve the best monetary returns for a farmer's investment in our continued employment.