# Customised sheep = consumer satisfaction

The 'modern' consumer increasingly views the inherent naturalness of merino wool fibre as a desirable property. A product of the merino breed of sheep, the fibre is produced in an annually renewable cycle involving high levels of management skill as the farmer, or grower, uses the various parts of his farm, in conjunction with the changing seasons, to produce fibre types customised for a variety of end-uses. Merinos freely graze the high alpine slopes in summer and are brought down to the lower, more productive, pastures in winter, when the snow covers the alpine grasslands. The fleece is harvested by hand-held shearing machines in spring (September-November). Ewes are mated in autumn (March to May) with lambing occurring in late spring.

Of approximately 700 merino farms in New Zealand, around 240 are the 'runs' (properties with an average size of 10,000 hectares) mostly situated in the South Island's alpine high country. Farming in this environment is characterised by the use of native pastures or those improved through the addition of highly nutritious grasses or legumes, such as clover. Natural supplements - hay, silage and grain - are used at certain times of the year to supplement the feed when pasture may be insufficient, particularly during the cold winter months and before and after lambing. These are natural 'low artificial input' systems, quite different to many of the animal farming systems seen in Europe and North America.

Not only are New Zealand's Southern Alps the home of a high performance fibre, but they are also the training ground for elite athletes from New Zealand and around the world. They have been the venue for a number of multi-sport events including the Eco Challenge and New Zealand's Southern Traverse and Coast-to-Coast events. The fibre is returning home, too, with many of the athletes now wearing base layer products in merino knit.

## Customisation

One of the historical challenges associated with the use of wool fibre has been the variable nature of the raw material in a number of key quality characteristics as a result of its production in a biological, rather than a controlled industrial, system. However, with the advent of modern measurement technologies and The New Zealand Merino Company's managed supply chain approach, the variables can now be closely monitored and controlled with benefits for both the textile chain and the garment end-user.

Raw material and production system customisation have been central to this transformation and to the emergence of merino fibre in the active outdoor market. Direct supply contracts to companies such as Smartwool (USA) have allowed the management of both quality and price, removing the variability and volatility in each. In turn this not only delivers stability to the customer, but also enables production efficiencies to be gained – some partner companies reporting efficiency gains of up to 20%.



*With surroundings as stunning as Matheson Lake it is not surprising that New Zealand's merinos produce quality yarns.*

This customised approach starts prior to the annual production cycle on merino farms in New Zealand. Commercial staff from the New Zealand Merino Company work with their clients on individual marketing plans through a process known as the 'Individual Performance Program' (IP2). These match anticipated wool production and the likely changes in production qualities due to seasonal or genetic shift, with the requirements of the various contracted customers in the textile supply chain. The result is a customised wool supply for better garment outcomes.

From the consumers' perspective, the customised approach delivers significant benefits. For example, traditional consumer concerns relating to wool fabrics such as "they're heavy, itchy and hard to care for", can all be managed through appropriate raw wool selection and the interpretation of the various raw wool measurements such as fibre diameter, fibre diameter variability, staple length, staple strength, position of break in the staple (a bundle of wool in the fleece). New measurements such as fibre curvature, staple diameter profiles and fibre end diameter, along with new understanding of how these impact on garment characteristics, will allow this process to evolve further. The result is a customised product which is light, machine washable, can be worn comfortably next to the skin, and - through capturing the attributes and benefits of the merino fibre - can be used effectively in apparel for active outdoor leisure.

## The attributes of merino

In addition to the use of raw material customisation as a route for improving garment

value, merino has a number of attributes that can be captured as benefits in garments for the outdoor activist. These arise from the complex physical and chemical structure of the merino fibre. A typical summarisation reads:

1. Wool is natural, renewable, can be easily recycled and is biodegradable.
2. Wool 'buffers' the body's microclimate in changing conditions, maintaining comfort through natural air-conditioning.
3. Wool releases a significant and perceptible amount of heat as it absorbs moisture through a process known as 'heat of sorption', assisting in preventing the chilling of the wearer when they enter a cool, damp environment.
4. Wool can hold up to 30% of its own dry weight in moisture without feeling damp, binding the moisture as vapour in the core of the fibre through a process of hydrogen bonding.
5. Wool's breathability allows higher levels of aerobic stress to be achieved before the wearer becomes exhausted, as heat is more readily transmitted to the environment through the fabric.
6. Wool resists the build up of static electricity, preventing cling and reducing garment soiling since dirt particles don't 'stick' to the garment as easily.
7. Wool's natural resilience gives it outstanding wrinkle recovery and the natural crimp or wave of the fibre gives wool fabrics good insulation properties and soft handle.
8. Wool naturally resists the build-up of unpleasant odours.
9. Wool is naturally flame-retardant.
10. Wool is quiet and unobtrusive to wear.
11. Wool fibres have a complex structure with a hydrophilic (water-holding) interior and hydrophobic (water-repelling) surface, giving the fibre the unique ability to both absorb and repel moisture.



*Dedicated to the production of Smartwool socks, this element of the managed supply chain proudly sports its allegiance.*

## *Current fabrics and future developments for the active outdoor market*

A significant contributor to the emergence of merino as a performance fibre has been the development of soft, lightweight knitted fabrics which can be worn next to the skin and still retain the benefits described. At the forefront of merino fabric development has been New Zealand's Designer Textiles International.

These innovations have not been confined to knitted fabrics, with Italy's Loro Piana bringing about exciting developments in wovens using 100% New Zealand Merino and Merino-rich blends. The company has developed water repelling woven fabrics for active sportswear uses under the name Storm System, the latest version of which is the Storm System Lightframe, a blend of 70% merino with 30% nylon. This is being used for Team New Zealand's current defence of yachting's America's Cup, taking place in Auckland in February-March 2003, and takes merino wool into exciting new high performance applications and markets.

The New Zealand Merino Company is also pushing ahead in the area of new fabric development. Through partnering with key manufacturers and science providers, and using the latest measurement technologies and applications of textile science, it is seeking to improve understanding of the factors that cause fabrics and garments to either hinder or improve the performance of participants in targeted outdoor activities. Once collected, this data will form the basis for the development of future generations of merino fabrics in an approach that continues the theme of customisation, extending it from the farm through to the fabric.

## *A short history of merino*

The merino is thought to be the oldest sheep breed in the world.

In the 8th century, the Moors brought it to Spain, where the Spanish royal family developed the breed significantly in the 14th and 15th centuries. Export of merino genetics from Spain was punishable by death at this time. However, in the 18th century, some animals were dispersed around the world to the Elector of Saxony (Germany), the King of France, George III of England and the Dutch government. The first successful southern hemisphere merinos were landed at Port Jackson (now Sydney), Australia, in 1797.

Captain James Cook was the first to introduce the merino to New Zealand in 1773, but the animals died shortly afterwards through eating poisonous native plants. The second introduction was by an early Australian settler who, in 1814, brought merinos into New Zealand from his Australian property and by 1835 was exporting wool back to Sydney for sale. In 1844, 2000 merinos imported from Australia were introduced to the Otago region of the South Island, now the centre of New Zealand's merino industry. Within 10 years the breed was firmly established throughout the country.

The breed has 'claimed' the South Island high country as its home, prospering in the harsh but clean natural environment, characterised by high altitude and temperatures ranging from 35˚C in the summer to -15˚C in the winter. These conditions have contributed to the softness and bright white appearance that is a prominent and desirable feature of New Zealand merino fibre.

Today, approximately 700 farmers manage 3.3 million sheep, 97% of which are 'run' in the South Island, where the human population is only 942,000. With the production region centred on 45˚S, it is further south than Australia's island state of Tasmania and with only the landmasses of southern parts of Chile and Argentina's Patagonia sharing the latitude.

*Scott Champion*

***Dr Champion is the research, development and product innovation manager with The New Zealand Merino Company Ltd, based in Christchurch, New Zealand.***