

The Importance of Environmental Fitness



Figure 1: Near identical phenotypes within a species of naturally selected animal populations.

Some 150 years ago Charles Darwin made the profound observation:

“When we compare the individuals of the same variety or sub-variety of our older cultivated plants and animals, one of the first points which strikes us is that they generally differ more from each other than do the individuals of any one species or variety in a state of nature.”

In nature, individuals of the same subspecies look like clones (Figure 1).

This aspect of natural selection is fundamentally important to the sustainable breeding of environmentally fit Merino sheep. It is a clue to the meaning of “survival of the fittest”.

One of the key features that stand out in SRS® Merinos is that the sheep look like clones (Figure 2). The sheep are plain bodied, open faced, have long floppy ears, bare points, and have a distinctive “triple wedge” body shape. The sheep have been bred to produce fleeces with minimal variation between individuals for density and length of fibres.

If one thinks about the way the Australian Merino has been traditionally bred, it is certainly not an animal population of similar or identical phenotypes. In fact, sheep are classified into four separate strains within the Merino breed (fine wool Merino, Medium Peppin Merino, medium non-Peppin Merino and strong wool Merino), each with distinctly different body and fleece types. Moreover, Merino studbreeders often make statements like “you need an intense ram to make progress”, or “that ram will breed champions or culls”, or “you need to breed different rams for the wants of ram buying clients”.

These statements indicate wide variation in the physical type has always existed and is considered desirable. On the contrary, it is indicative that undesirable animal types are being perpetuated. It is well known that plain-bodied and open faced Merinos are much more fertile than traditionally bred Merinos with wrinkly skins and closed faces.

The lifetime reproductive performance of the Merino dam is a key genetic driver, instilling **survival** and **fitness** into the flock. Many SRS® Merino flocks are now averaging weaning rates of 120% lambs with some as high as 160%. At the same time, lamb losses have been reduced to low levels.

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Mimicking Aspects of Natural Selection

Commercial producers using the SRS® Breeding System have seen major improvements in survivability and reproductive fitness across a wide range of Australian environments, from the Snowy Mountains of New South Wales to the hot and vast pastoral country of Longreach, Queensland. It has been achieved by following the basic principles below:

- 1. One Body and Fleece Type:** Classing ewes and rams for the one body type and fleece type and being strict on ram selection at all times.
- 2. Autumn Joining:** Joining the ewes and rams in the autumn wherever possible, and as close to the autumn equinox as possible, to ensure that excellent quality embryos with the potential to maximise their gene expression are produced. Autumn joining coincides with the time when the DNA integrity of the sperm is maximised whereas in the spring, it is more likely to be damaged. The bulbourethral gland produces a proteolytic enzyme which can damage sperm DNA during ejaculation. When the volume of the protective seminal vesicular fluid is greatest, as occurs in the autumn, the sperm are unlikely to be damaged. Conversely, when the volume of seminal vesicular fluid is low, as occurs in the spring (and particularly when spring collected semen is cryopreserved), sperm are more likely to be damaged. Sperm DNA damage can lead to male mediated embryonic death, foetal resorption and birth defects.

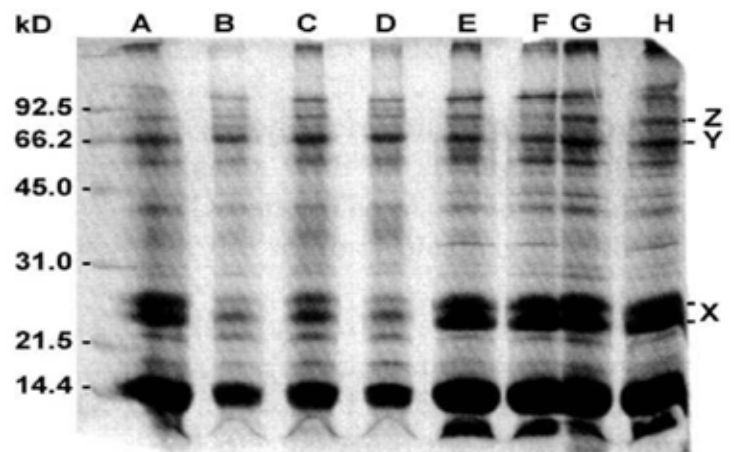


Figure 2 (top right): SRS® Merino ewes.

Figure 3 (bottom right): The protein band showing at 92.5 kilodaltons on the gel electrophoresis profile (top) is a proteolytic enzyme produced by the ram's bulbourethral glands. It will damage the DNA of the sperm if there is not enough protective seminal plasma in the ejaculate. Well-formed embryo (bottom).

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Figure 4 (above): These 7 month old Karbullah SRS® Merino ram lambs were born with long, soft and fine outer coats, which provide excellent weather protection for the newborn lamb and are also an early indicator of high fibre density and length. This important trait is too often mistaken by breeders as undesirable.

3. Short Joining Periods: Short joining periods of no longer than 4 weeks. Our aim is to identify the ewes that will get pregnant in the first oestrus cycle (17 days). We try to avoid 6 week joinings.

4. Sire Selection: Identifying sires with minimal lamb losses in their progeny. Where single joinings and lambings are possible, we try to record lambs weaned and lambs lost according to the sire used. In addition to the effect of shortening the gestation length on lamb vigour, we have observed that the progeny of certain sires are more vigorous immediately following birth and able to break free of the foetal membranes and start suckling in rapid time. A set of genes, known as the MEST genes, are only inherited (epigenetically) from the sire. This gene set probably influences the lamb's bonding and suckling behaviour immediately following birth.



Figure 5 (left): Breeding SRS® Merino ewes with 4 milking teats has lifted weaning percentage and weaning body weight by 10% to 15%.

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- 5. Ewe Selection:** Identifying the ewes which rear multiple lambs repeatedly throughout life. Breeding ewes which produce more milk of high quality and are able to nurture more lambs by having four (rather than two) milking teats (*Figure 5*).
- 6.** Preferring lambs with long, fine and soft birthcoats (identified at marking time) in order to ensure good protection of lamb progeny from rain, wind and cold (*Figure 4*).
- 7.** Selecting sires and dams with high breeding values for: body weight at weaning; scrotal circumference; fat cover and eye muscle depth.

Contact Us

For more information on the SRS® Breeding System or sourcing SRS® Genetics please contact: SRS® Business Co-ordinator on 0428 569 639, or email admin@srsgenetics.com.au

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Figure 6 (below): *Very protective mums*

