

Adapt and Thrive

The Dohne Merino - a practical example of successful adaptation to environment and economic factors



Cameron McMaster (cameron@haznet.co.za)

The coarse native grassland of the Eastern Cape (Sourveld) is a very harsh environment for Merinos.

The initial Adaptation - 1939

A programme initiated at the Dohne Agricultural Research Institute in 1939 to introduce genotypes for hardiness, fertility and better growth rate into the local Merino.

OBJECTIVE: To breed a well adapted dual-purpose, fine-woolled Merino for harsh environments.



Dohne Agricultural Research Institute



X



German Mutton Merino rams X Merino ewes



**Initiator:
JJ Kotzé**

Subsequent generations interbred and selected for desired type



Dohne lambs on sourveld

The Dohne Merino, as it became known, was very successful and expanded rapidly, to the extent that a breed Society was formed in 1966.

Adaptation No. 2 - Measurement as an aid to selection – 1973

Body weight at 100 and 365 days, Clean fleece weight and Fibre diameter.

From 1973 all animals were selected on the basis of measurement.

The pedigree and measured performance of every animal was recorded .

Ultimately this database enabled the Society to embrace new technology for the calculation of breeding values.

Steady genetic progress was made



Adaptation No. 3 –Competitive Shows scrapped in 1978

The success of a stud was now determined by its performance in a commercial environment - not by its performance in the show ring.

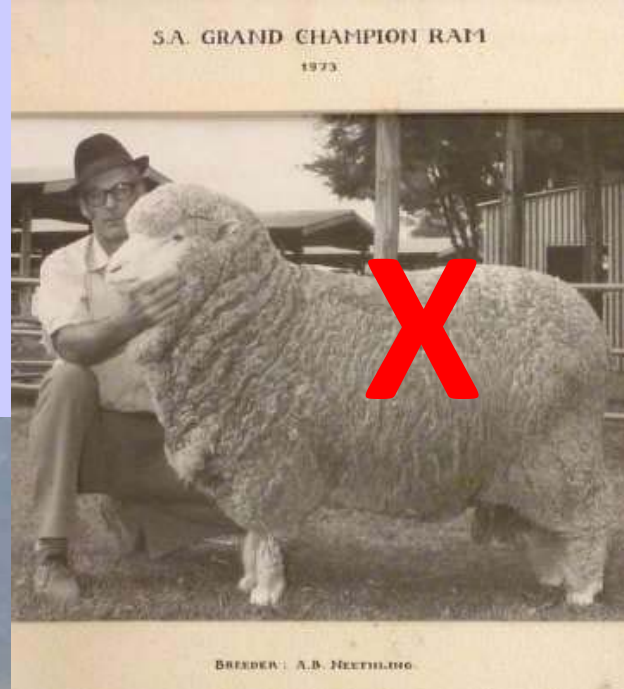
All animals were now evaluated according to their measured relative productivity. Breeders were reluctant to isolate sheep for show preparation.

Show success no longer of any use to breeders or their clients.



Nature is better than a show judge

When selecting on measurement in a natural commercial situation, Nature was far better at defining and demonstrating the most efficient type of animal.



Adaptation No. 4 – Innovative breeding systems – 1980 - Using the principles of Population Genetics

The Open Nucleus System – “open” to the introduction of high performing ewes from outside, even from affiliated commercial flocks by means of the Foundation Flock Register .

Increases size of genepool. Facilitates higher selection differentials

Co-operative Nucleus Flocks were formed to which participating Studs contributed their most productive ewes in exchange for the best rams bred in the Nucleus.

A large number of highly productive rams emerged from the system - rams that were widely used and had a profoundly positive effect on the productivity of the breed.

Sire SD92.763



Adaptation No. 5 – Ram Selection Indices (SI) – 1990-2014

Ram selection indices combine traits in an index according to their relative contribution to the overall economic performance of the breed.

Lamb prices improved and wool prices stagnated in the 1980s and 1990s.

Reproduction and growth rate , the main components of Meat production, became the most important income drivers and needed to receive high priority in the selection index.

Up to 1990 increasing fleece weight and reducing fibre diameter were top priorities

The Dohne SI up to 1990 was: **1BW + 15CFW - 2FD**



Adaptation No. 5 – Ram Selection Indices (SI)

A critical analysis of sire performance resulted in a major modification in 1995. **93% of our 30 top sires were breeding excessive fleece weight**. We had begun to deviate from the principle of true dual-purpose sheep.

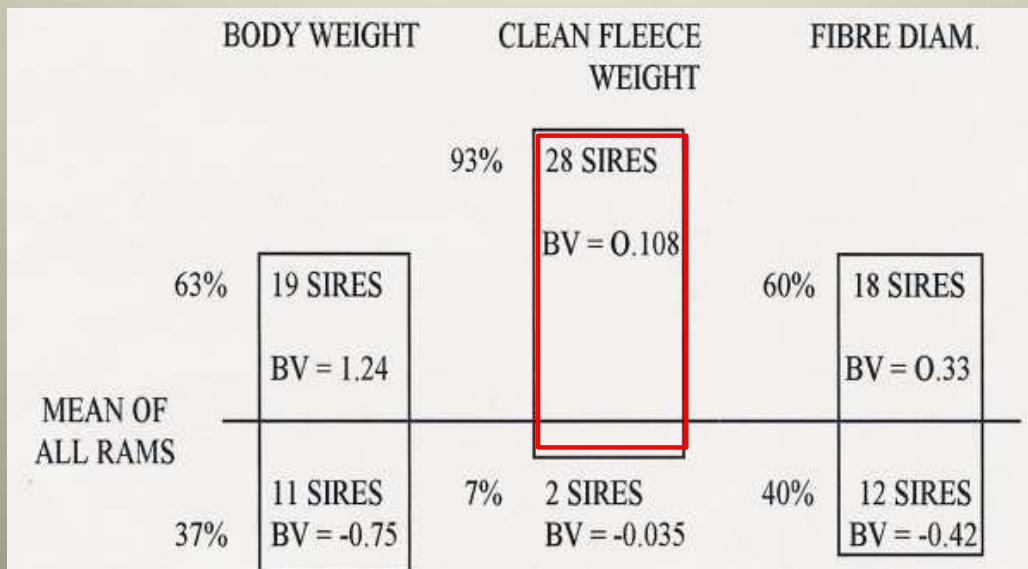


Figure:
Henri Londt

From the 1990s wool was no longer the main income driver. The key to increasing profitability was not fleece weight but rather **the correct relationship between fleece weight and body weight** – a ratio defined as **the Wool Production Potential**, where clean fleece weight was expressed as a percentage of body weight at test age (**WPP%**).

Adaptation No. 5 – Ram Selection Indices (SI)

Excessively high fleece weight, relative to body weight, is negatively correlated with the traits that promote meat production – hardiness, reproduction rate and growth rate. Wentzel (1991) Herselman *et al* (1993)

Our sheep were probably already genetically capable of growing more wool than the environment could sustain, and **this was impeding their potential for meat production.**

Looking at the most profitable flocks we saw that the optimum ratio for maximising income from meat and wool lay between **5% and 6% WPP%**. Sheep that fall within this range live easier, have more lambs that grow faster and can handle more stress.

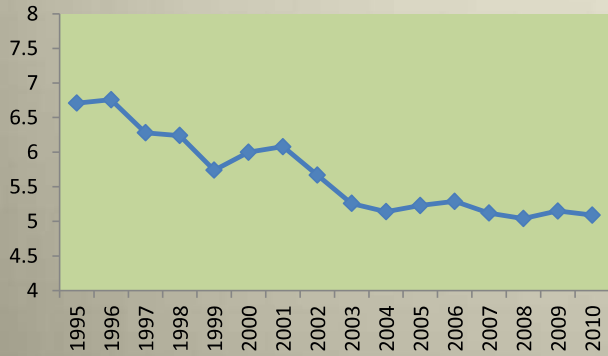
In 1995 we amended the Selection index to **(1 x BW) + (8 x CFW) + (-5 x FD)** reducing the fleece weight component and increasing the emphasis on fibre diameter.



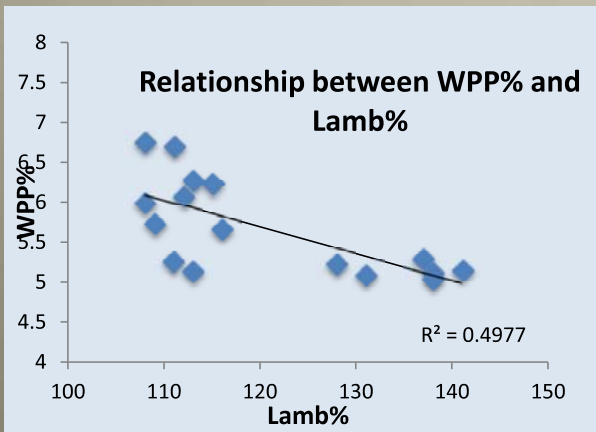
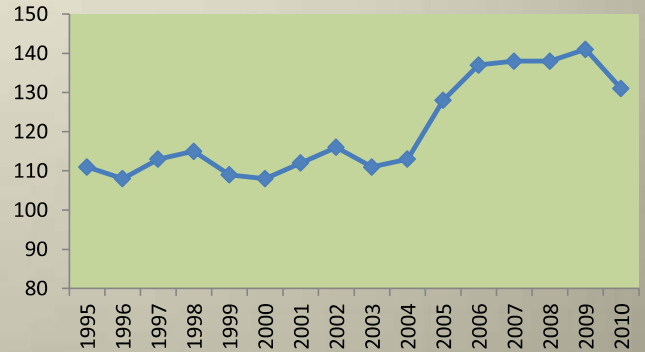
Result:

The WPP% and fibre diameter declined, the fitness of our sheep improved dramatically as did lambing percentages and growth rate. In 1996 the average WPP% of all Dohnes was 6.76% and the average lambing % was 108%. **Thirteen years later in 2009 the WPP% was 5.15% and the lambing % over all studs had risen to 141%!**

WPP%



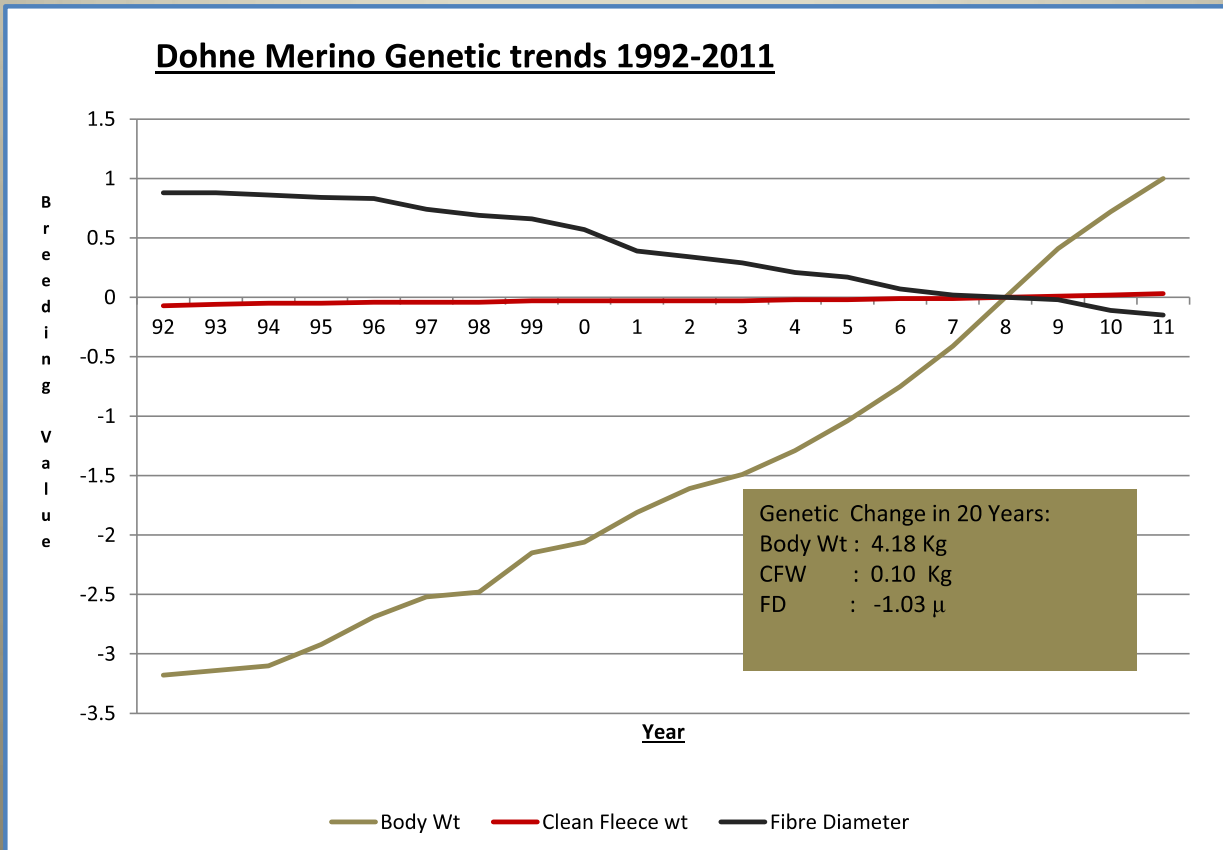
Lamb%



While a proportion of the improved reproduction must be attributed to better management, there is nevertheless a strong relationship between reproduction and WPP%

Genetic trends

The various adaptations that have been made over the past 20 years have been highly successful in increasing the productivity and adaptability of the Dohne Merino in the many habitats and environments in which they are being run in world today, fully realising the original breeding objective.



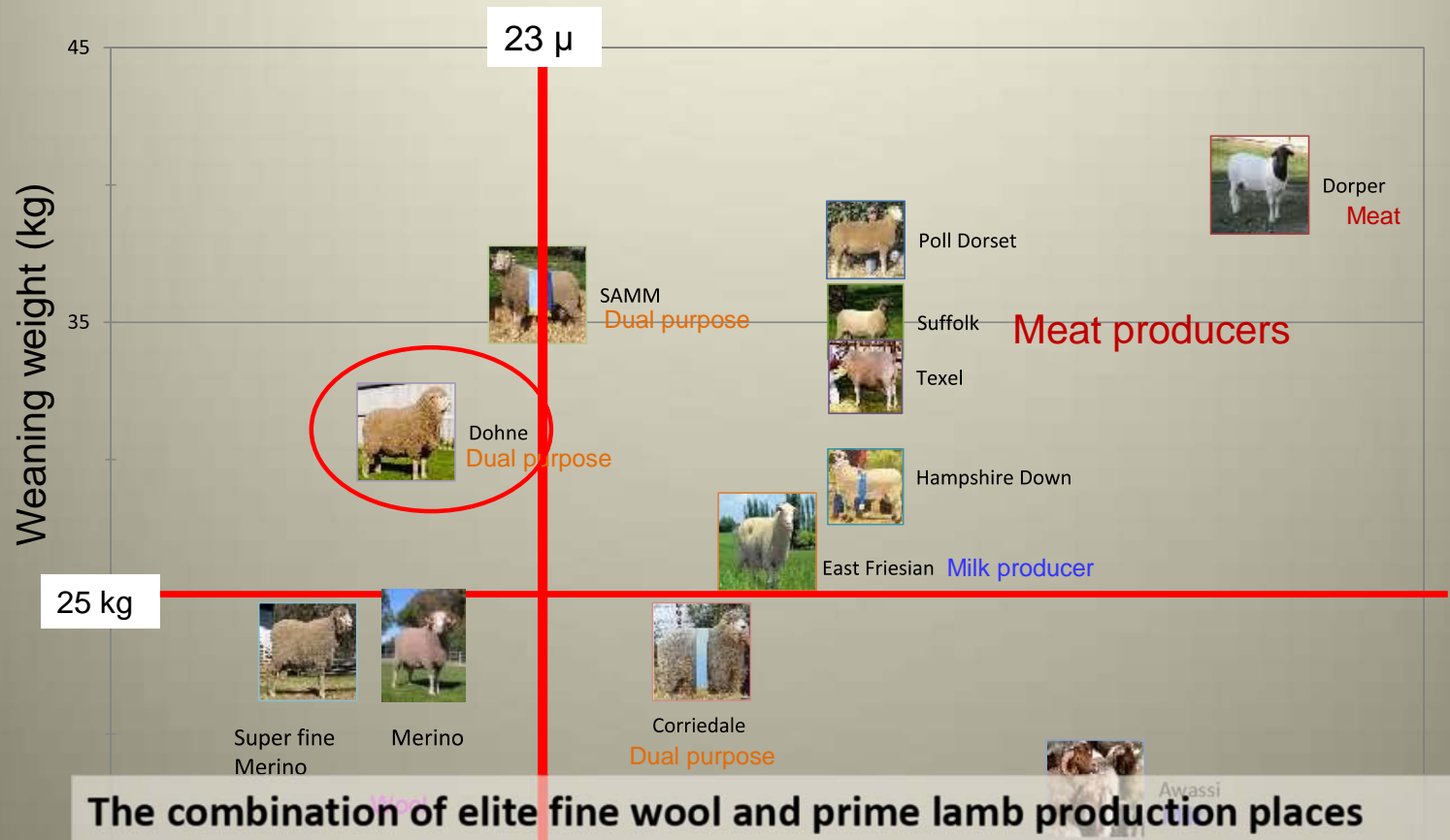
Where do Dohne Merinos rank amongst world sheep breeds?

The dual-purpose combination of elite fine wool and prime lamb production places the Dohne firmly in a position to meet current international demand.



Photos: Vicki Hewitt, Pineside Dohnes

Classification of the potential of the different breeds of sheep for fine wool and heavy lamb production



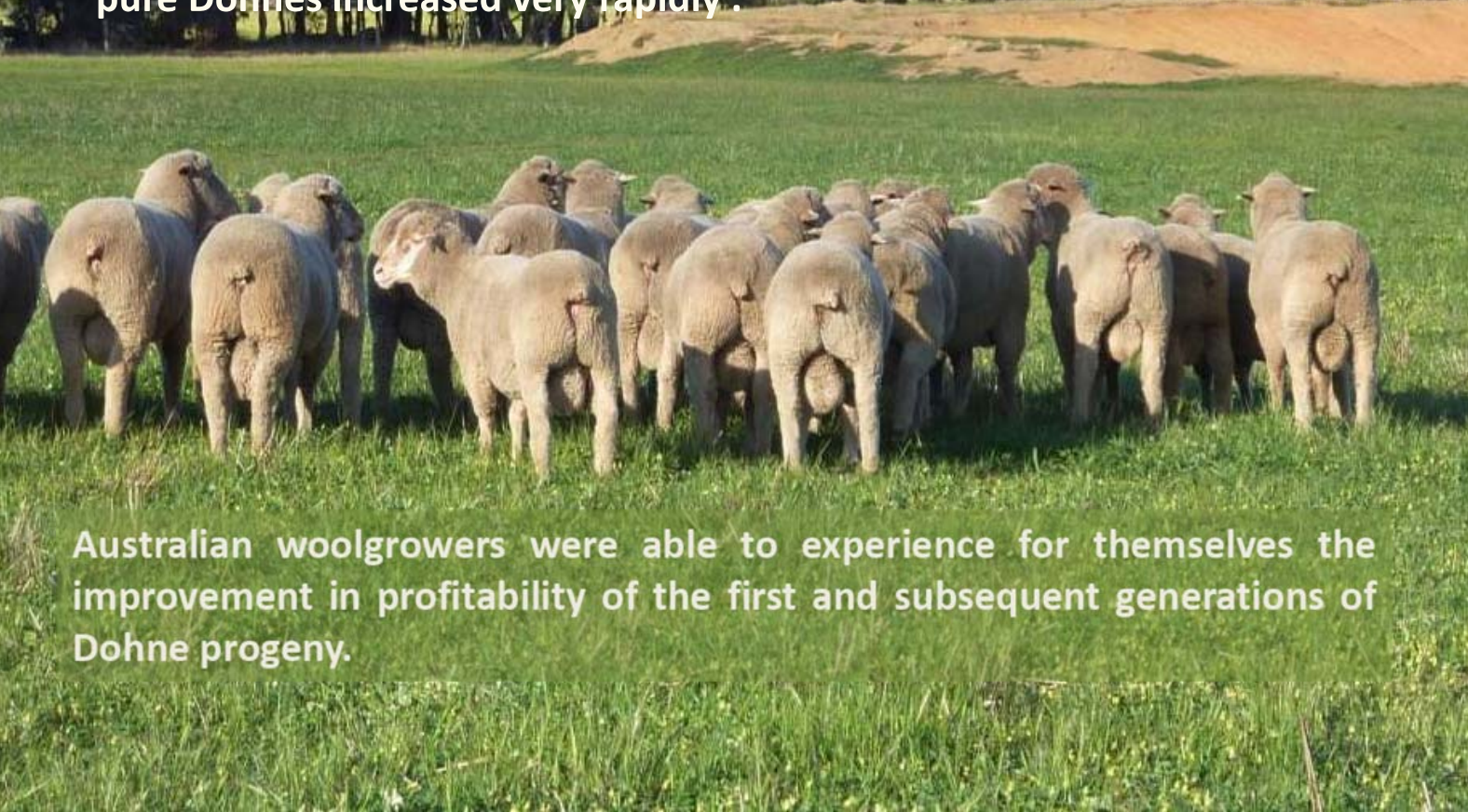
The combination of elite fine wool and prime lamb production places the Dohne firmly in a position to meet current international demand - focused on fine wool (ideally in the range of 17 to 20 microns) and lamb meat (weaned at 110 days) or hogget (24 to 32 weeks of age) with carcass weights of 15 to 25 Kg.



Adaptations in Australia 1998 – 2014

The first Dohne Merinos reached Australia in 1998. Many other importations of Dohne embryos followed.

By using sophisticated reproduction techniques the numbers of pure Dohnes increased very rapidly .



Australian woolgrowers were able to experience for themselves the improvement in profitability of the first and subsequent generations of Dohne progeny.

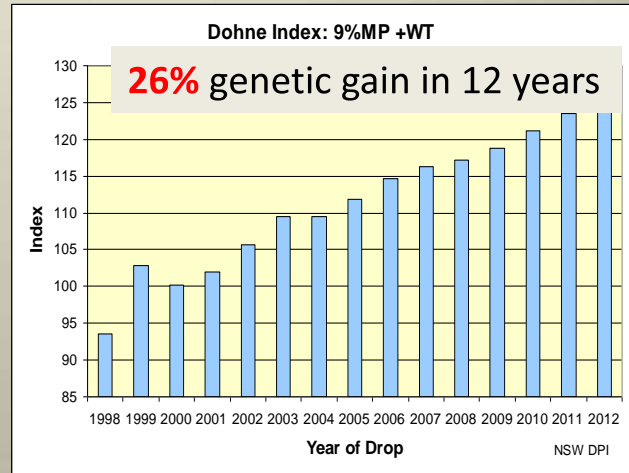
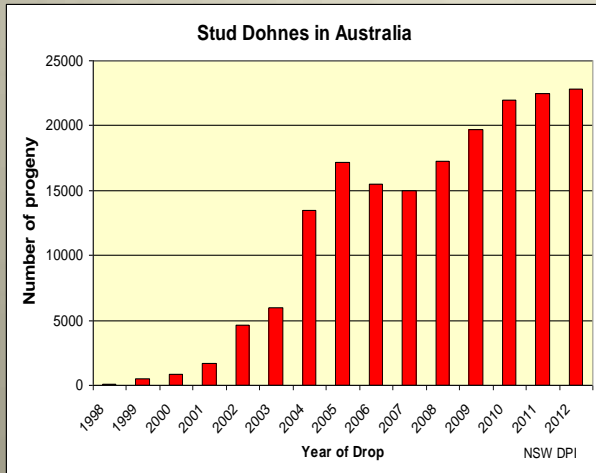
In the better environments in Australia the results were even more impressive than in South Africa.

While fully maintaining the amount and quality of Merino wool, **the most important adaptation** that was now available to Australian wool growers **was the addition of prime lamb production** in self replacing flocks.

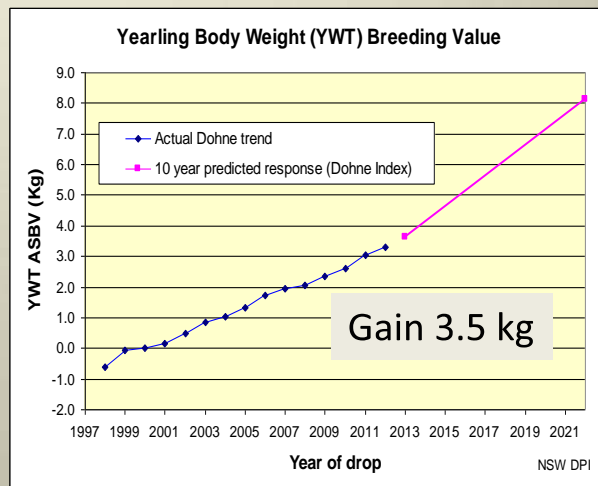
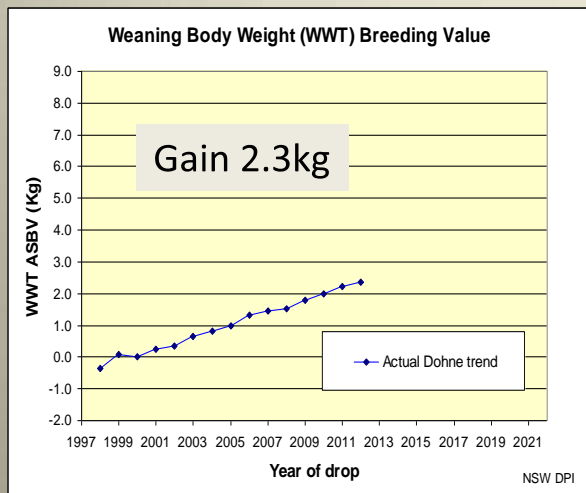
This was an additional lucrative income source for traditional wool growing enterprises. Even F1 (first cross) Dohne lambs easily met prime lamb export standards

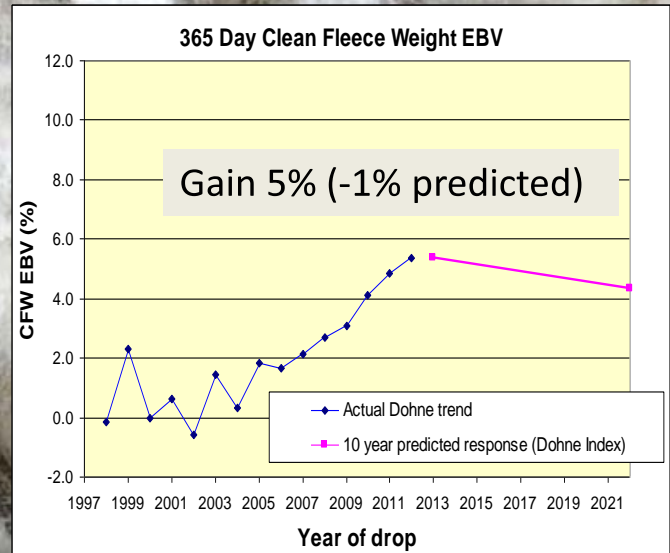
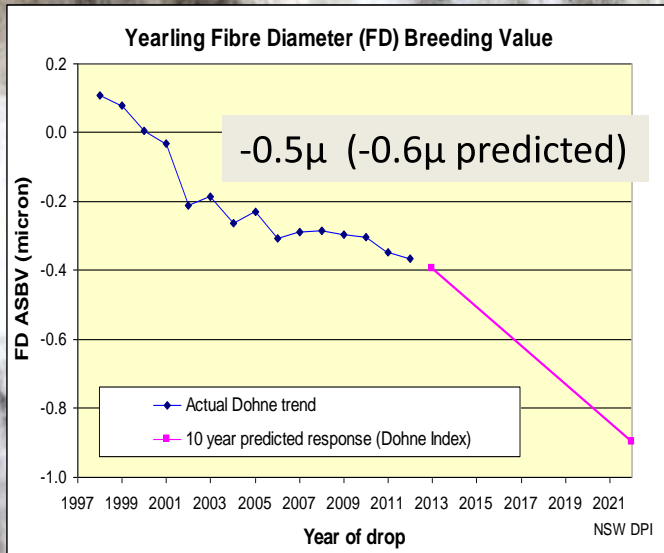


The Australian Dohne Breeders Association was formed in 2000. The South African breeding, recording and grading system was adopted, and later enhanced by the addition of traits such as CV% and carcass traits (muscle and fat depth). All records were recorded on the ABS database and evidence of genetic improvement rapidly became apparent.



The rate of progress to date in respect of all traits recorded has been very positive. The Breeding Values reported in the Figures are "Australian Sheep Breeding Values" (ASBVs) generated by Sheep Genetics.





The rapid increase in Clean Fleece Weight, as indicated in the fig. right concerns me, but I have been assured that it has been only 2.5% in 5 years which is a relatively small change. At the same time Body Weight has also been increasing so the crucial balance between Clean Fleece Weight and Body Weight is being maintained. (Alan Casey)

When the index is revised, no undue pressure should be placed on increasing fleece weight. Excessive fleece weight in relation to body weight will have a negative impact on fitness traits which will impair the inherent excellent dual-purpose characteristics of the breed.

Adaptations in South America 2002 – 2014

An important adaptation currently taking place in South America is the reduction of Fibre Diameter in the local Corriedale and other broad woolled breeds.

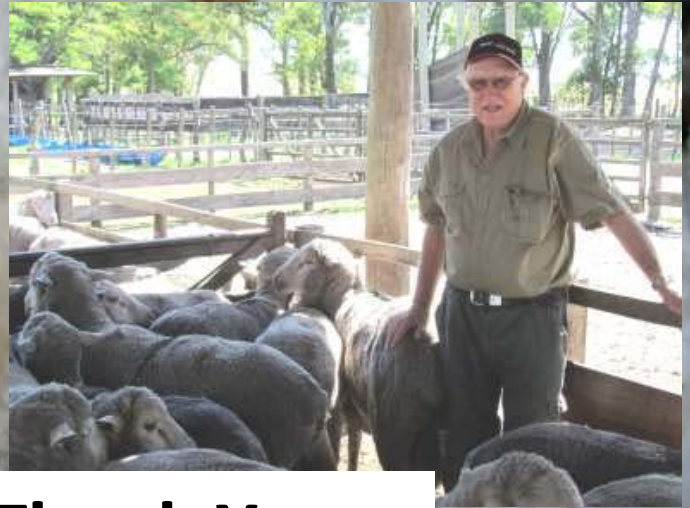
Because lamb meat is an export commodity it was important to consider a breed capable of weaning weights of 30kg and wool under 21 microns.

The Dohne Merino adequately meets these criteria. Increases of up to 60% in wool income have been reported wherever Dohnes have been used.

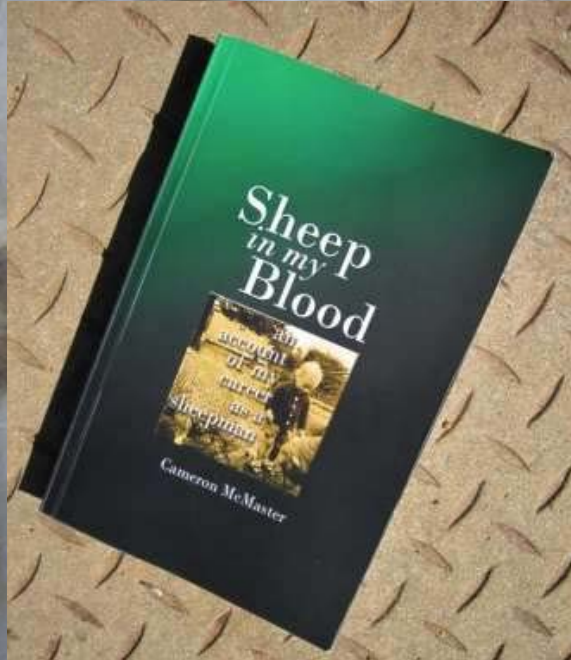
Photo: Juan Gysling, Tierra del Fuego



The Dohne is truly an example of how the Merino has been successfully adapted to meet the requirements of a range of different applications in different countries.



Thank You



URUGUAY



Uruguay (INIA Uruguay and Cabaña TresArboles) introduced the Dohne in 2002. It is well established in Uruguay. At least three studs and their satellite flocks supply rams in increasing numbers to commercial sheep breeders.

Chile

The Dohne programme was developed within the framework of a project funded by the Foundation for Agrarian Innovation (FIA). The first Dohne embryos were imported in 2004 by Hugo Vera of Cabaña Josefina in the Magallanes region.



Dohne X Corrie ewes



Many thousands of Corriedale ewes have been inseminated over the last few years and the improvement of the wool clips has been very positive with a decrease in the order of 5 to 8 microns.

Argentina

Dohnes imported from Australia by INTA in 2005. Numbers have increased rapidly. INTA is responsible for the genetic evaluation and the assessment of Dohnes as a pure breed and for crossbreeding on Corriedales and Merinos.

The Stud Register and the breeding programme is supervised by the Association of Argentina Merino breeders and there are 5 private studs



PERU

At the instigation of Dr William Vivanco, INIA Peru initiated a Dohne breeding programme in 2005 with material from Australian Dohne studs. The objective is to provide rams and semen to upgrade the local very unproductive "Criollo" sheep.

The programme aims to move sheep production towards fine wool and high quality lamb meat in the deep rural areas using the Dohne Merino as the basis.



Falkland Islands

The establishment of an abattoir giving access to international meat markets, together with a decline in price of strong wools, provided the incentive to **adapt to a dual-purpose fine wool breed in the 18 to 23 micron category.**

Dohne Merinos were a clear option. From 2003 Dohnes were imported from both Australia and South Africa. Outstanding results have been achieved with an increase in production and revenue from finer wool and meat.



Dohne hoggetts



**Sandy Bay
Abattoir**



Adaptation No. 5 – Ram Selection Indices (SI)

In 2006 the Selection Index was again adjusted to $(1 \times BW) + (6.7 \times CFW) + (-4 \times FD)$ to maintain fleece weight at a constant level.

From March 2014 yearling body weight was replaced by weaning weight and weaning weight maternal in the selection index, **which will effectively enhance the early growth and prime lamb attributes of the breed.**



Commercial ewe hoggetts on Veld – Eastern Free State







