RAM BREEDING IN NEW ZEALAND TWO DECADES AFTER THE INTRODUCTION OF EXOTIC SHEEP BREEDS

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SUMMARY

Several new breeds of sheep including the Finnish Landrace, Texel and East Friesian were released into New Zealand during the early 1990s. As expected with any product in short supply, early prices paid for these new breeds were high and initial expansion of numbers was rapid. Fifteen to 20 years after the release of these new breeds, composites and the Texel contribute significantly to ram breeding in New Zealand; however the traditional Romney-based breeds still dominated. The future will hold some challenges for the new composite breeds given their numerically small numbers. This will make the long-term sustainability of new breed names difficult as aging Flock Masters sell their flocks in a market were few or no other flocks have rams of the same breed name. Another challenge will be whether genomic selection can be implemented in the new breeds given their numerically small number.

INTRODUCTION

The New Zealand sheep industry was genetically isolated from the rest of the world for nearly 40 years until the release from quarantine of the Finnish Landrace, Texel, Oxford Down and Gotland Pelt breeds in 1990. Sheep from a previous importation in 1972 were slaughtered while still in quarantine in 1977 following the identification of scrapie (Bruere, 2003).

The release of the so-called exotic sheep breeds in the 1990s provided both challenges and opportunities. One challenge was to ram breeders whose flocks were producing little more than 100% lambs born to ewes mated while an opportunity was available to those prepared to infuse genetic material from the exotic breeds into local breeds to make rapid genetic changes. Two further challenges conspired to make the introduction of exotic sheep breeds into New Zealand more difficult than it might otherwise have been. Firstly, the government-led research organisations (MAF and DSIR) had recently gone through tremendous reorganisation and the resulting Crown Research Institute, AgResearch, was in it infancy at a time when research on how best to utilise the new breeds was urgently required. Secondly, the way in which research was funded in New Zealand also received a major change with the establishment of the Foundation for Research Science and Technology which became the research purchasing agency of the government. One impact of this change was that long-term research was difficult to fund.

The structure of the New Zealand sheep industry is inadequately described in the recent literature due to the required data no longer being collected by Statistics New Zealand. Garrick et al (2000) provided the most recent attempt to describe the nucleus and commercial sheep populations in New Zealand and concluded that a nucleus ewe population of between 350,000 and 750,000 was required to support a national ewe population of 32 million. It is generally accepted that a significant amount of crossbreeding to terminal sires is practised by New Zealand farmers, however no data exist to accurately quantify what proportion of commercial ewes are mated to terminal sires.

The purpose of this investigation is to examine the influence of the new breeds released into New Zealand on the genetic makeup of the national flock.

DATA SOURCES

There are few sources of data to examine the influence of exotic and composite rams on the New Zealand sheep industry. There is no record of the total number of rams sold each year and also no census that counts rams by breed type. Stewart and Garrick (1996) used census data to examine the breed make-up of the commercial sheep population in New Zealand and Flock Books to compare the number of registered flocks, ewes and rams by breed. They showed the dual-purpose sector was dominated by Romney (59%), Coopworth (16%) and Perendale (10%), and that only the Texel of the newly imported breeds had reached significant numbers (2%) as represented by registered ewes. Cruickshank (2003) reported that there were 29 million ewes and 2400 ram-breeding flocks in 2002, with 700 flocks recording on SIL. He suggested that these 700 flocks generated about 60% of the rams sold. In 2010, there were about 22 million ewes in New Zealand which would require about 80,000 new rams each year.

For this study, flock and animal numbers from the SIL and SIL-ACE websites were used. Breeders must opt in to the SIL-ACE service, which will cause under-representation of flocks and rams. It is also recognised that not all ram breeding flocks use SIL services, and that composite breeds from numerically large studs such as Wairere, Rissington Breedline and One Stop Ram Shop are not represented in the SIL data. Thus, it is probable that the influence of breeds introduced since 1990 will be under-represented.

RESULTS AND DISCUSSION

New breeds released or introduced into New Zealand since 1990 include: American Suffolk (introduced 1992), Awassi (released 1994), Charollais (introduced 2010), Damara (introduced 2007), Dohne Merino (introduced 1998), Dorper (introduced 2001), East Friesian (released 1996), Finnish Landrace (released 1990), Gotland Pelt (released 1990), Ile de France (introduced 2008), Oxford Down (released 1990) and Texel (released 1990). The Awassi, Damara, Dohne Merino and Gotland Pelt will not be discussed further due to inadequate data; however, their numbers are minor. The Charollais and Ile de France are only recent arrivals and have not yet had time to expand.

The companies involved in the importation and release of the exotic sheep breeds sold their available stock at premium prices over a period of several years. This meant the new breeds were largely in the hands of ram breeders who then had to make decisions about how to use the new breeds based on a small number of research reports using data generated by these companies. However, there was inadequate time for research trials investigating the optimal genetic make-up of new composite breeds, requiring the new commercial owners to find the optima by trial and error. The release of the exotic sheep breeds coincided with significant economic pressures on commercial farmers who responded by increasing, in particular, meat production per hectare. After the initial trial and error approaches by some highly motivated breeders, the farming community decided that flocks with high proportions of the exotic breeds, except for the Texel, were not suitable for New Zealand farming conditions.

The total number of breeders recorded on SIL is 446, however, there will be more ram breeding flocks due to several breeders owning more than one ram breeding flock. There are 76 breed types identified on SIL, and 15 of these could be considered crossbreds or composites incorporating at least one breed introduced since 1990. For these 15 composite breeds, there were 38 flocks, of which 23 were identified as "Composite". New breed names included: Easycare, Highlander, Lamb Supreme, Landmark, Meatmaker, Primera, Ranger and TEFRom.

The number of dual-purpose flocks and 2009-born rams available for sale in December 2010 are given in table 1. The numbers of rams available for sale are only given for those flocks that have opted in to SIL-ACE, hence the discrepancy between the total number of flocks on SIL and the number offering two-tooth rams for sale in 2010. Remembering that different data sources are

used, it would seem that the Romney has reduced dominance from 59% of registered ewes in 1994 (Stewart and Garrick, 1996) to 44% of two-tooth rams available for sale in 2010, while the Coopworth, Perendale and Texel breeds have remained relatively stable. New composite breeds that include at least 1 breed released since 1990 have come from a zero base in 1994 to nearly 20% of two-tooth rams offered for sale in 2010. However, except for the Texel, other recently introduced dual-purpose exotic breeds have few SIL-recorded flocks: East Friesian (6) and Finnish Landrace (4).

Table 1. Numbers of dual-purpose flocks offering two-tooth rams for sale (number of flocks listed on SIL in parenthesis) and numbers of two-tooth rams for sale by breed; SIL-ACE, 14 December 2010

Breed	Number of flocks		% of total flocks		Number of rams	% of total rams
Romney	61	(134)	33	(35)	25,256	44
Coopworth	19	(48)	10	(13)	11,464	20
Composite	37	(23)	20	(6)	8,526	15
Perendale	23	(53)	13	(14)	5,967	10
Texel	24	(64)	13	(17)	2,263	4
Poll Dorset	16	(53)	9	(14)	2,121	4
Kelso	1	(1)	1	(0.3)	914	2
TEFRom	2	(3)	1	(1)	535	1
Landmark	1	(1)	1	(0.3)	369	1
TOTAL	184	(380)			57,415	101

The data are somewhat confusing for terminal-sire breeds, because filtering the SIL-listed flocks by 'terminal-sire' results in very similar listings for most breeds as the 'dual-purpose' filter. Thus, it is difficult to decide whether Texel, Poll Dorset and Composite flocks are genuinely dual-purpose or terminal-sire. However, given that all Composite flocks except 1 and all Texel and Poll Dorset flocks recorded number of lambs born, it was assumed they belonged in the dual-purpose category. This left the following terminal sire breeds (number of two-tooth rams for sale in parenthesis): Suffolk (1311) Lamb Supreme (1054), South Suffolk (705), Ranger (647), Wiltshire (87), Southdown (74) and Hampshire (23), giving a total of 3,901 rams. The recently introduced terminal sires (Oxford Down and Dorper) seem to currently have little influence, however, the Texel breed has contributed through the Lamb Supreme and Ranger breeds. The New Zealand Sheepbreeders Association website lists 45 flocks of Dorper and 7 flocks of Oxford Down, so it must be remembered that the information from SIL does not provide a complete picture of the influence of the new exotic breeds in New Zealand.

To understand the relative additive genetic merit of composite versus straightbred rams in the New Zealand sheep industry, the SIL-ACE trait leader reports from October 2010 were investigated. The number of composite and Romney-based breeds (Romney, Perendale and Coopworth) in the top 30 rams for 7 different measures of overall genetic merit is presented in table 2. Given the significant numbers of composite rams appearing in the trait leader groups for most breeding objectives, it would seem that the new breeds are offering viable alternatives to straightbred rams for high additive genetic merit. It should be remembered that there are several large flocks breeding composite rams that do not record with SIL, which would suggest table 2 shows an underrepresentation of the impact of the exotic breeds.

Table 2. Numbers of rams from various breeds in the top 30 rams in the SIL-ACE trait leader lists; 18 October 2010

Objective	Number of Flocks in Analysis	Composite	Romney, Coopworth & Perendale	Other
DP Reproduction	240	5	24	1
DP Meat Yield	134	20	5	5
DP Lamb Growth & Adult Size	217	26	4	0
TS Lamb Growth	217	17	7	6
TS Meat Yield	134	24	0	6
Wool	141	10	17	3
WormFEC	39	18	11	1

DP = Dual Purpose; TS = Terminal Sire; WormFEC = worm faecal egg count

THE FUTURE

It is the author's impression that New Zealand sheep farmers are largely focussed on profitability of their stock and that they are readily prepared to choose the best option(s) from amongst potential breed combinations. That is, the issue of 'breed' per se is less important now than it was 10-15 years ago. There are a couple of challenges in front of the breeders of composite rams. Firstly, many of the composite breeds have only small population sizes (sometimes only 1 flock) and they will struggle to maintain genetic diversity. Once the current Flock Masters retire from their breeding responsibilities, it may be that some of these composite flocks will not survive as they cannot be dispersed to other like breeders. Secondly, with the current interest in genomic selection, a number of the numerically small breeds may find it difficult to generate populations with sufficient numbers to utilise this new technology.

ACKNOWLEDGEMENTS

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