Proc. Assoc. Advmt. Anim. Breed. Genet. 20:18-21

A SURVEY EXAMINING THE NEW ZEALAND BREED COMPOSITION, MANAGEMENT TOOL USE AND RESEARCH NEEDS OF COMMERCIAL SHEEP FARMERS AND RAM BREEDERS

R.A. Corner-Thomas[1], P.R. Kenyon[1], S.T. Morris[1], A.W. Greer[2], C.M. Logan[2], A.L. Ridler[1], R.E. Hickson[1], H.T. Blair[1]

[1] International Sheep Research Centre, Massey University, Private Bag 11222, Palmerston North, New Zealand 4442

[2] Faculty of Agriculture and Life Sciences, PO Box 85084 Lincoln University, Lincoln, New Zealand 7647

SUMMARY

This survey has highlighted the extent of cross-breeding and wide-spread use of composites, particularly with the use of Finnish Landrace, Texel and East Friesian breeds within the New Zealand sheep flock. Forty percent of the flocks in this survey were composite flocks indicating the level of cross breeding that has occurred in the last 20 years. Overall, there was greater use of management tools by ram breeders than commercials farmers, although the use of some tools was not as great as expected with BVs used by only 22% of commercial farmers and 59% of ram breeders. Lastly, this survey outlined those areas farmers perceive as warranting more research which are primarily those that directly affect farm income.

INTRODUCTION

In recent times there have been considerable changes to the structure and productivity of the New Zealand sheep flock. The New Zealand sheep flock through the 1900's was dominated by the Romney breed. In the late 1980's the national flock, of 60 million sheep, consisted primarily of the Romney, Coopworth and Perendale breeds which made up 46, 13, and 8% of the flock, respectively (Stewart and Garrick 1996). At this time the national lambing percentage was 102% and the average carcass weight was 13.5 kg (NZMWES 1988). In 2011, the national flock had been reduced to 31.9 million but achieved a lambing percentage of 122% and an average carcass weight of 18.25 kg (Beef + Lamb NZ 2013). The net effect of these increases in individual performance traits is that the total amount of lamb meat produced now is very similar to that produced in the late 1980s (Bray 2004). Although the scale of the improvements in productivity in the New Zealand sheep flock during this short time are impressive, this has only been possible due to a multitude of factors. There have been considerable changes in land-use at either end of the spectrum with marginal country either retired through the land tenure review process or planted into forestry while large areas of more fertile land have been converted to dairy, viticulture or consumed within urban sprawl. In addition, there has been a gradual and continued increase in on-farm productivity as a result of improved managerial capability and animal genetic merit. There is an increasing array of managerial tools and access to information. In addition, there has been a considerable increase in the utilisation of cross-breeding following the introduction of 'Exotic' breeds such as Finnish Landrace, Texel and East Friesian in the early 1990s (Blair 2011). However, while these advances have been accessible by farmers, there is minimal information available on the uptake of such managerial tools or the impact cross-breeding has had on the number of composite flocks in New Zealand.

The ultimate goal of sheep research is to provide information and or tools that will assist with improving productivity. The adoption and utilisation of this research is dependent on the perceived benefits accrued by the end-user. However, little information is available on what New Zealand farmers rate as important areas of research. Research programmes are typically based on either the beliefs of scientists, or a few 'focus group farmers', and which may be driven by the strategic direction of funding bodies. Knowledge of what farmers perceive to be important research areas will allow for better use of available research funds and assist with the development of managerial tools which encourage farmer uptake and provide the greatest benefit.

The purpose of this survey was to determine the current genetic structure of the New Zealand sheep flock, the use of management tools and the perceived research needs of sheep farmers in New Zealand.

METHODS AND MATERIALS

A printed survey was sent to approximately 12,000 sheep and beef farmers whose addresses were on the Beef + Lamb New Zealand database. The survey was included within the 'Heartland Sheep (NZX Agri, Feilding New Zealand) magazine in October 2012. Farmers had the opportunity to either, fill in the survey and return it via a pre-paid envelope, or to fill it in electronically via a website "www.SurveyMonkey.com". A total of 971 surveys were returned (934 by post and 37 completed online).

Part A of the survey asked farmers to identify themselves based on their farm type (ram breeder or commercial farm) and the breed(s) of sheep on their farm. If a farmer indicated they had both a stud flock and a commercial flock on their farm they were classified as being a ram breeder (94 vs. 844 ram breeder and commercial farmers respectively).

In Part B of the survey farmers were asked to indicate if they had used a range of management tools in the last three-years on their farm. In addition, they were asked to indicate on a one to four scale (1 = not important, 2 = little importance, 3 = important, 4 = very important) the relative importance of potential research areas for their sheep enterprise.

The proportion of respondents that selected a particular management tool was analysed using the Genmod procedure using a binomial distribution and a log-transformation (SAS 2011) and included the fixed effect of farm type. A comparison of the score given to each research area was analysed using the Genmod procedure using a Poisson distribution and a log-transformation and included the fixed effects of farmer age and farm type.

RESULTS AND DISCUSSION

Ewe breeds / composites. The 971 farmers, that completed the survey, identified a total of 1306 flocks present on their farms (700 farmers had 1 flock, 161 had 2 flocks, 53 had 3 flocks and 28 had 4 or more). Of these flocks, there were 780 straightbred (26 individual breeds were listed) and 526 composite flocks. Romney was the dominant straightbred breed (n=369, 47%) followed by Perendale (n=114, 15%), Coopworth (n=87, 11%) and Merino (n=36, 5%). This finding is similar to that of Blair (2011) who reported, that of flocks listed on SIL, Romney made up 35%, Perendale 14% and Coopworth 13%. In contrast, Stewart and Garrick (1996) reported that in the 1989 breed census 59% of registered ewes were Romney, 16% Coopworth and 10% Perendale.

Farmers also identified 135 terminal straightbred flocks (12 individual breeds were listed), with the most numerous being Texel (n=43), Suffolk (n=21), and Poll Dorset (n=17). In the present study, the Texel represented 30% of the terminal straightbred flocks, indicating the success of this breed since first being introduced in the early 1990s. By comparison, the prevalence of Finn (n=8) and East Friesian (n=4) breeds reported in this survey was relatively low.

Of the 526 composite flocks 449 were Romney based (these included composites that were Coopworth or Perendale based). The vast majority of the composites could be classed as a maternal type (n=451) compared with terminal type (n=49). Within the composites, 220 (42%) had Texel, 111 (21%) had Finn and 52 (10%) had East Friesian genetics. In addition, of the composite flocks that contained Finn, East Friesian or Texel genetics, 89 had two of these types and 10 had all three. Overall, in this survey 40% of the total flocks listed were composites, indicating their relative importance within the New Zealand sheep industry.

Farm management tools used. The percentage of either commercial farmers or ram breeders that have used various management tools is given in Table 1. The management tools that were most frequently used were ewe teeth and udder examination, ultrasound pregnancy diagnosis, and weighing of sale lambs, all being used by more than 71% of respondents. In comparison, the tool least used was EID, being 4% of commercial farmers and 15.6% of ram breeders. Overall, for the management tools listed, they were more likely to be utilised by ram breeders than commercial farmers. The only exceptions being ewe teeth examination, ewe feet examination, ewe body condition scoring and ultrasound pregnancy scanning, largely due to the fact that nearly all of these were utilised by a high percentage of both commercial farmers and ram breeders. Increased use of management tools by ram breeders was largely anticipated and presumably reflects the greater collection of phenotypic data to assist with selection decisions compared with commercial farmers. Of particular note was the utilisation of breeding values (BVs). While the utilisation of BVs by ram breeders was nearly three-fold that of commercial farmers, more than 40% of breeders do not use this as a management tool. The reasons for the relatively low use of BVs by ram breeders could not be determined from the current survey but is worthy of further investigation. The lower use of BVs by commercial farmers is either because they do not readily identify the benefit from using BVs when selecting rams or that they rely on their ram breeders to do this for them.

Table 1. The percentage of respondents that indicated they had used the management tools listed on their operation within the previous 3 years (transformed mean ± SEM (back-transformed %))

Management tools	Commercial (n=844)	Ram breeder (n=96)	Commercial vs Ram breeder
Non EID Ear tags	-1.18 ± 0.08 (23.6 [1]) [b]	0.79 ± 0.22 (68.8) [de]	P<0.001
EID ear tags	-3.17 ± 0.18 (4.0) [a]	-1.69 ± 0.28 (15.6) [a]	P<0.001
Ewe teeth examination	1.96 ± 0.10 (87.7) [h]	1.95 ± 0.31 (87.5) [f]	P=0.970
Ewe feet examination	0.26 ± 0.07 (56.5) [e]	0.69 ± 0.22 (66.7) [cde]	P=0.057
Ewe udder examination	1.27 ± 0.08 (78.1) [g]	2.15 ± 0.33 (89.6) [f]	P=0.011
Weigh ewes	-0.62 ± 0.07 (35.1) [c]	-0.17 ± 0.20 (45.8) [b]	P=0.039
Ewe body condition scoring	-0.30 ± 0.07 (42.5) [d]	-0.17 ± 0.20 (45.8) [b]	P=0.541
Weigh sale lambs	0.91 ± 0.08 (71.3) [f]	1.77 ± 0.29 (85.4) [f]	P=0.004
Weigh replacements	-0.32 ± 0.07 (42.1) [d]	0.56 ± 0.21 (63.5) c[d]	P<0.001
Breeding Values	-1.28 ± 0.08 (21.8) [b]	0.38 ± 0.21 (59.4) [cd]	P<0.001
Mating harness	-1.16 ± 0.08 (23.9) [b]	0.17 ± 0.20 (54.2) [bc]	P<0.001
Ultrasound pregnancy scanning	0.93 + 0.08 (71.7) [f]	1.04 + 0.23 (73.9) [e]	P=0.644

Means within columns with differing letter superscripts are significantly different P<0.05

Perceived research requirements. The perceived future research needs of respondents are given in Table 2. Those research areas that affected farmer income directly (improved lamb survival, live weight gain in young stock, and reproduction) or that affected cost and influenced animal performance (health/disease, soils/fertiliser, and nutrition) scored at a higher level. In comparison, those areas that have less direct relevance to farm performance received a lower score (animal welfare/behaviour, economic and systems modelling, environmental/sustainability and forages/agronomy). This information, across a significant number of farmers, could help prioritise future research strategy to better match the perceived needs of the intended end-user.

The only differences in perceived research needs between commercial farmers and ram breeders occurred in the areas of environmental/sustainability and genetics/genetic technologies. The reasoning for the latter can be expected given the greater prevalence of BVs as a management tool by ram breeders and also the expectation that the benefits accrued through utilising BVs will be greater and more apparent to ram breeders than commercial farmers. The reasoning for the perceived differences in need for research in the areas of environmental/sustainability between commercial and ram breeders is unclear.

Table 2. The number of respondents that provided a rating to each research area and the rating given (transformed mean ± SEM (back-transformed mean score))

	Commercial (n=844)		Ram breeder (n=96)		Commercial vs. Ram breeder
Research areas [1]	**n**	**Score**	**n**	**Score**	
Animal Welfare/Behaviour	810	1.04 ± 0.02 (2.8 [1]) [cd]	95	1.06 ± 0.06 (2.9) [ab]	P=0.739
Economic and systems modelling	774	0.90 ± 0.02 (2.5) [a]	92	0.92 ± 0.07 (2.5) [a]	P=0.794
Environmental/ Sustainability	801	1.01 ± 0.02 (2.7) [bc]	93	1.14 ± 0.06 (3.1) [bc]	P=0.038
Forages/Agronomy	787	1.02 ± 0.02 (2.8) [bcd]	90	1.07 ± 0.06 (2.9) [ab]	P=0.495
Genetics/Genetic technologies	792	1.07 ± 0.02 (2.9) [d]	91	1.24 ± 0.06 (3.5) [c]	P=0.005
Health/Disease	819	1.22 ± 0.02 (3.4) [fg]	94	1.27 ± 0.05 (3.6) [c]	P=0.332
Lamb Survival	824	1.25 ± 0.02 (3.5) [g]	92	1.27 ± 0.06 (3.6) [c]	P=0.720
Live weight gain in young stock	815	1.22 ± 0.02 (3.4) [fg]	94	1.24 ± 0.06 (3.5) [c]	P=0.745
Meat yield and quality	804	1.16 ± 0.02 (3.2) [e]	93	1.24 ± 0.06 (3.4) [c]	P=0.224
Nutrition	809	1.19 ± 0.02 (3.3) [f]	94	1.22 ± 0.06 (3.4) [bc]	P=0.649
Reproduction	804	1.19 ± 0.02 (3.3) [ef]	93	1.21 ± 0.06 (3.3) [bc]	P=0.742
Soils/Fertiliser	824	1.24 ± 0.02 (3.4) [fg]	94	1.22 ± 0.06 (3.4) [bc]	P=0.775
Wool	805	0.98 ± 0.02 (2.7) [b]	90	0.95 ± 0.07 (2.6) [a]	P=0.716

Means within columns with differing superscripts are significantly different P<0.05

[1] Back-transformed mean score. Mean value, 1 = not important, 2 = little importance, 3 = important, 4 = very important

ACKNOWLEDGEMENTS

Funding for this work was provided by Massey-Lincoln and Agricultural Industry Trust and the Gravida (the National Centre for Growth and Development).

REFERENCES

Beef + Lamb NZ (2013) Annual Report 2011-2012.

Blair H.T. (2011) *Proc. Assoc. Advmt. Anim. Breed. Genet.* **19:** 407.

Bray A. (2004) *Prim. Indus. Manage.* **7:** 32.

NZMWES (NZ Meat & Wool Boards' Economic Service) (1988) Annual review of the New Zealand sheep and beef industry 1987-1988. Wellington, New Zealand.

SAS (2011) Statistical Analysis System. SAS Institute Inc., Cary, NC, USA.

Stewart J.B., Garrick D.J. (1996) *Proc. N. Z. Soc. Anim. Prod.* **56:** 301.