

Sheep CRC members/participants

The Sheep CRC members/participants are as follows:

Allflex Pty Ltd
Australian Meat Processor Corporation Ltd
Australian Wool Innovation Limited
Australian Wool Testing Authority Limited
Commonwealth Scientific & Industrial Research Organisation
Deakin University
Department of Agriculture & Food, Western Australia
Department of Agriculture, Fisheries & Forestry, Queensland
NSW Department of Primary Industries
Department of Environmental and Primary Industries, Victoria
Holmes Sackett
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Murdoch University
Sheepmeat Council of Australia
South Australian Research & Development Institute
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WoolProducers Australia Limited

Foreword

This special edition of *Animal Production Science* focuses on sheep reproduction, with the majority of the papers being work of the Cooperative Research Centre for Sheep Industry Innovation (Sheep CRC) which commenced in 2007.

First is a paper on research priorities in sheep reproduction for Australia, based on work carried out as part of national R, D & E strategies for the sheep meat and wool industries, with funding from Meat & Livestock Australia Limited (MLA) and Australian Wool Innovation Limited (AWI). It highlights that the largest pay-off from research in sheep reproduction is likely to come from improving lamb survival, especially of twins, followed by improvements in reproduction of ewe lambs, ewe survival, conception rates, reproduction from 2-year-old ewes and, finally, weaner survival.

Three reviews then follow. The first two reviews were originally written to guide work of the Sheep CRC, with the first providing insights into the latest understanding of contributing factors to and the extent and variability of lamb losses across Australia, finishing with an examination of strategies for improving lamb survival. The second review focuses on the prospects for obtaining genetic gain in lamb survival and helps identify selection strategies for boosting such gains to improve overall reproductive efficiency in the Australian sheep industry. A third review, written as part of larger MLA-funded project under the national sheep meat R, D & E strategy, examines the role of Vitamin E in underpinning sheep reproduction, provides recommendations on further investigations that would be desirable, given that pregnant sheep are often at risk of Vitamin E deficiency when grazing dried pasture in the autumn in southern Australia.

Next are several papers that utilised data on reproduction from the Sheep CRC's Information Nucleus, a large resource flock established in 2007 to support the work of the Sheep CRC and provide a system for rapid dissemination of improvements in genetic technologies to industry (van der Werf *et al.* 2010). These include

Geenty *et al.* – provides general results and interpretation of reproductive performance and lamb survival from the eight sites of the Information Nucleus from five annual artificial inseminations of the base ewes from 2007 to 2011.

Paganoni *et al.* – describes how increasing conception weights of ewes led to increases in birthweights, survival and weaning weights of their lambs, irrespective of ewe or sire breed, but that lamb birthweights in non-Merinos were less responsive than those in Merinos to changes in ewe live weights during pregnancy.

Brown *et al.* – conducted a genetic analysis of results from autopsy of lambs dying in the first 5 days after lambing, concluding that selection for improved lamb survival based on lamb autopsy results would impart little advantage over direct selection for lamb survival itself.

Hergenhan *et al.* – used Information Nucleus sires with a history of progeny either with high or low survival and found sire effects on neonatal lamb vigour and following behaviour, with progeny of low-survival sires being less vigorous and slower to follow their ewes than those of high survival sires.

Newton *et al.* – estimated the genetic relationships to be positive and moderate to strong between age of first oestrus and yearling reproductive performance in maternal-cross ewes born in the Information Nucleus. The paper also reports that there were moderate to strong relationships between reproductive performance at yearling, hogget and adult ages in both Merino and maternal cross ewes, but they were low enough to suggest that yearling performance should be treated as a separate trait.

A second paper by Paganoni *et al.*, based on different data from the Newton *et al.* paper, concludes that early reproductive losses, embryonic losses in particular, are a major factor contributing to the poor performance of Merino ewe lambs mated at 8–10 months of age.

A further paper on neonatal lamb survival by Young *et al.* assesses the financial benefit of providing shelter to reduce twin lamb losses. It concludes that profitability of many sheep enterprises in south-eastern Australia could be improved by providing low-cost shelter for twin-bearing Merino ewes lambing from July to September, a period of frequent high chill weather conditions. Another paper, by Campbell *et al.* based on a farmer survey, confirmed that poor post-weaning survival remains a widespread issue for the Australian sheep industry and identifies farm and management factors associated with reduced weaner mortality.

A paper by Fogarty and Mulholland widens the scope of the special edition and reports on reproduction from three lamb production systems, spring joining with autumn backup matings at two locations, Wagga Wagga and Cowra, with accelerated lambing at Cowra or annual autumn joining at Wagga Wagga. Border Leicester × Merino and Hyfer (Dorset × Merino composite) ewes were used at both sites. The authors concluded that using suitable breeds or genotypes, together with optimising management, could improve out-of-season lamb production.

Finally, three papers by Walkom *et al.* are included on resilience of breeding ewes to variable environmental conditions. The work utilised maternal-ewe data from the Maternal Central Progeny Test project and from a Merino resource flock to demonstrate that both live weight and body condition are highly consistent genetically over productive lifetime and that phenotypic variation that occurs in successive production cycles is mostly the result of variation in seasonal conditions and previous reproductive performance.

A second special edition on sheep reproduction, again based largely on work done as part of the Sheep CRC, will be published in *Animal Production Science*.

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Reference

van der Werf JHJ, Kinghorn BP, Banks RG (2010) Design and role of an information nucleus in sheep breeding programs. *Animal Production Science* **50**, 998–1003. doi:10.1071/AN10151