

AUGUST 2021

Sheep reproduction RD&A alert

This sheep reproduction RD&A alert is an initiative of the Sheep Reproduction Strategic Partnership (SRSP).

The SRSP Quarterly webinar series will commence on 22 September at 1pm (AEST). Dr William van Wettere from Adelaide University will be our inaugural presenter and will discuss the topic **Can melatonin improve twin lamb survival?** You can register for the webinar using this link [SRSP September webinar](#).

The SRSP aims to help sheep producers to profitability and sustainably increase lamb production through increasing lamb survival and weaning rates and will coordinate a national approach to improving sheep reproductive performance.

Program coordinator

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Review papers

The ovarian follicle of ruminants: the path from conceptus to adult

Jennifer L. Juengel (jenny.juengel@agresearch.co.nz), Robert A. Cushman, Joëlle Dupont, Stéphane Fabre, Richard G. Lea, Graeme B. Martin, Francesca Mossa, Janet L. Pitman, Christopher A. Price and Peter Smith
Reproduction, Fertility and Development, Volume 33(10), July 2021 **OPEN ACCESS**

DOI <https://doi.org/10.1071/RD21086>

Abstract

This review resulted from an international workshop and presents a consensus view of critical advances over the past decade in our understanding of follicle function in ruminants. The major concepts covered include: (1) the value of major genes; (2) the dynamics of fetal ovarian development and its sensitivity to nutritional and environmental influences; (3) the concept of an ovarian follicle reserve, aligned with the rise of anti-Müllerian hormone as a controller of ovarian processes; (4) renewed recognition of the diverse and important roles of theca cells; (5) the importance of follicular fluid as a microenvironment that determines oocyte quality; (6) the 'adipokinome' as a key concept linking metabolic inputs with follicle development; and (7) the contribution of follicle development to the success of conception. These concepts are important because, in sheep and cattle, ovulation rate is tightly regulated and, as the primary determinant of litter size, it is a major component of reproductive efficiency and therefore productivity. Nowadays, reproductive efficiency is also a target for improving the 'methane efficiency' of livestock enterprises, increasing the need to understand the processes of ovarian development and folliculogenesis, while avoiding detrimental trade-offs as greater performance is sought.

Lambs need colostrum: A review

Bianca Agenbag (bianca.agenbag@adelaide.edu.au), Alyce M. Swinbourne, Kiro Petrovski and William H.E.J. van Wettere

Livestock Science Volume 21, September 2021

DOI <https://doi.org/10.1016/j.livsci.2021.104624>

Highlights

- Colostrum contains bioactive components that significantly increases offspring survival.
- Colostrum improves development, future production and reproductive efficiency of offspring.
- Maternally-derived factors such as parity, nutrition and hormones effects colostrum quality.
- Colostrum quality can be assessed using both laboratory assays and hand-held devices.

Abstract

In contrast to pigs and cattle, research focussed on sheep colostrum is limited, especially regarding measuring and defining colostrum quality. Colostrum is the first mammary gland secretion available to offspring and it is accumulated during the last term of gestation. Colostrum is an essential source of nutrition, immunoglobulins and bio-actives, and adequate consumption significantly increases the neonate's chance of surviving the challenging ex utero environment. Colostrum plays an important role during development of the immune system, post-natal growth and thermoregulation, and also mediates the creation of the ewe-lamb bond. In addition to increasing the neonate's ability to survive, access to colostrum during the neonatal period has the potential to improve the future production, development and reproductive efficiency of lambs, as studies in pigs have shown that access to colostrum during the neonatal period promotes maturation of the reproductive tract and increases reproductive efficiency later in life. Colostrum effects many developmental aspects of the neonate therefore, it is important that it is of high quality to ensure maximum future productivity. This review summarises the information currently available on sheep colostrum, including supporting research conducted in cattle and pigs, with particular focus on the impact of colostrum composition and quality on progeny performance.

Scientific papers

The effects of divergent selection for reproduction and sex on quantitative and qualitative slaughter traits in Merinos

Schalk Cloete (schalkc2@sun.ac.za), C.S.Naudé, J.J.E.Cloete, A.J.Scholtz, A.C.M.Kruger and C.Vissers

Small Ruminant Research, Volume 202, September 2021

DOI <https://doi.org/10.1016/j.smallrumres.2021.106465>

Highlights

- Meat traits were studied in Merinos divergently selected for lamb output.
- The High line was selected upwards and the Low line downwards.
- Overall, High line hoggets were heavier than their Low line contemporaries.
- High line hoggets had a lower ultimate pH and slightly darker meat.
- Heritability ranged from 0.25–0.29 for fat depth to 0.63 for carcass weight.

Abstract

The impact of selection of sheep for reproduction on meat traits are not evident, while genetic parameters for meat traits is absent for South African pure breeds. Quantitative and qualitative meat traits were

therefore studied in progeny of two Merino selection lines that were divergently selected for number of lambs weaned per ewe joined (NLW) since 1986. The historic divergent selection resulted in two lines (High (H) and Low (L)) differing widely for NLW. Slaughter data were recorded during the routine slaughter of surplus 14-month-old ram and ewe hoggets from these lines and assessed for selection line and sex. Single-trait heritability estimates were derived for meat traits by average information restricted maximum likelihood methods. Depending on the trait, data were available for between 340 and 576 animals that were recorded between 2015 and 2018. Hoggets from the H line were heavier than their L line contemporaries, with a slightly lower ultimate pH after 48 h in the cooler and slightly darker meat. H line ewes had, on average, redder meat than the other selection line x sex groups. Single-trait heritability estimates amounted to 0.44 ± 0.16 for slaughter weight, 0.63 ± 0.15 for carcass weight, 0.34 ± 0.15 for dressing percentage, 0.25 ± 0.11 for fat depth at the 13th rib, 0.29 ± 0.11 for fat depth at the rump, 0.12 ± 0.11 for ultimate pH, 0.32 ± 0.12 for lightness, 0.11 ± 0.09 for redness, 0.04 ± 0.06 for yellowness, 0.05 ± 0.08 for cooking loss and 0.06 ± 0.07 for drip loss. Parameter estimates for initial pH and shear force of the meat went to the boundary of parameter space and were not estimable. It was concluded that selection for NLW did not compromise any of the meat traits and that most quantitative meat traits were heritable and variable, making selection for improvement of these traits feasible. Additional research is indicated on the qualitative meat traits studied.

The effect of tree shade on ambient conditions and heat stress indicator traits of new-born South African Mutton Merino and Dormer lambs: Preliminary results

Schalk W.P.Cloete (schalkc2@sun.au.za), Anieka Muller, Shannon Steyn, Daniël A. van der Merwe, Cornelius L. Nel, Schalk Cloete, Anna C.M. Kruger and Tertius S.Brand

Journal of Thermal Biology, Volume 99, July 2021

DOI <https://doi.org/10.1016/j.jtherbio.2021.103024>

Highlights

- Shade and a temperature-humidity index (THI) were studied on lambs.
- Tree shade tempered the ambient climate experienced by lambs.
- Respiration rate (RR) was at first independent of THI in both treatments.
- RR of unshaded lambs rose faster than shaded lambs above a THI of 77-78.
- Shade benefitted recently born lambs in ethical and welfare terms.

Abstract

This preliminary study investigated the provision of shade on heat stress indicators of South African Mutton Merino (SAMM) and Dormer lambs shortly after birth, during the autumn 2017 and 2018 lambing seasons. Newborn lambs were assessed to determine whether welfare, as assessed by respiratory response and rectal temperature as heat stress indicators, survival and early growth benefitted from the provision of shade. Groups consisting of 4–17 pregnant SAMM and Dormer ewes were randomly allocated to 5–10 paddocks with natural shade from trees and 5–9 paddocks that were directly in the sun with no shade available. The lambs were recorded within 24 h of birth at noon. Climate data were obtained from a nearby weather station. The lambs were also weighed at 12 (SD = 2) days of age at tail-docking. Tree shade had a moderating effect on temperature, resulting in lower maximum daytime and higher minimum night-time temperatures. There was an interaction between a temperature-humidity index (THI) and the treatments (access to shade or no access to shade) for respiration and rectal temperature ($P < 0.01$). Both traits were relatively unaffected by the THI at values below 77. Unshaded lambs exhibited a pronounced upwards trend following a THI-threshold of 77–78. Tailing weight tended to be higher while lamb survival of live-born lambs to tail-docking was lower

in lambs born in shaded paddocks but these trends did not persist to weaning. Shade is needed to enhance animal welfare by alleviating the effect of high THI-values on hot days in an autumn lambing season.

Upcoming events

Date	Event	Location
1 September 2021	Livestock Forum - Jamestown PIRSA	Jamestown, SA
2 September 2021	Livestock Forum - Kimba PIRSA	Kimba, SA
9 September 2021	Sheep Innovation Day and Farm Tour WALRC	Kojonup, WA
22 September 2021	Can melatonin improve twin lamb survival? Sheep Reproduction Strategic Partnership (SRSP)	Webinar
22 September 2021	Winning With Weaners The Sheep's Back	Frankland River, WA
22 October 2021	Pingelly 2021 MLP Field Day Merino Lifetime Productivity Project (MLP)	Pingelly, WA