

SEPTEMBER 2021

## Sheep reproduction RD&A alert

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

The recording of the first SRSP webinar featuring Dr William van Wettere (Adelaide University) discussing the topic **Can melatonin improve twin lamb survival?** is now available to view from the [SRSP website](#). The next SRSP webinar will be held on 16 November, registration details will be provided in the October RD&A alert.

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

Dr Sue Hatcher

M: 0407 006 454

E: [sue@makinoutcomes.com.au](mailto:sue@makinoutcomes.com.au)

### Scientific papers

#### **Utilising dual-purpose crops in an Australian high-rainfall livestock production system to increase meat and wool production. 2. Production from breeding-ewe flocks**

Shawn McGrath ([shmcgrath@csu.edu.au](mailto:shmcgrath@csu.edu.au)), Cesar Pinares-Patiño, Scott McDonald, Richard Simpson and Andrew Moore

Animal Production Science, Volume 61(11), July 2021

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#### **Abstract**

**Context:** The use of dual-purpose crops (for grazing and grain) has increased in the high-rainfall zone in southern Australia.

**Aim:** A systems experiment examined the impact on livestock production and supplementary feeding when dual-purpose crops were incorporated into a production system based on Merino ewes producing yearling lambs for sale.

**Methods:** The experimental site near Canberra, ACT, was subdivided into nine experimental units ('farmlets') with three replicate farmlets for each of three production-system treatments. Each farmlet was managed as a self-contained unit with six Merino ewes and their progeny during 2013–16 (4 years). Ewes were joined in February, lambed in July and shorn in spring; the original cohort of ewes (born 2009) was replaced by a new cohort (born 2012) at the midpoint of the experiment. Six weaners were retained after weaning in each farmlet and sold as yearlings. Control farmlets were sown to pasture based on phalaris (*Phalaris aquatica* L.) and subterranean clover (*Trifolium subterraneum* L.) and comprised sub-paddocks to allow rotational grazing. Farmlets in treatments that included dual-purpose crops comprised six sub-paddocks (0.231 ha), with two sown to permanent pasture, and four supporting a rotation of pasture–pasture–dual-purpose canola (*Brassica napus* L.)–dual-purpose wheat (*Triticum aestivum* L.). In one of the crop–pasture production

system treatments, crop-grazing was prioritised for ewes (ECG treatment); in the other, crop-grazing was prioritised for their progeny weaners (WCG treatment).

**Key results:** Greasy fleece weight from ECG (5.3 kg) and WCG (5.1 kg) ewes was higher ( $P < 0.001$ ) than from control ewes (4.7 kg) averaged over the 4 years. The final sale weight of yearling weaners from the WCG system (44.3 kg) was higher ( $P < 0.001$ ) than from the control (39.2 kg) or ECG (39.1 kg) systems when averaged over the 4 years. The benefit was predominantly due to greater weight gain during the period when weaners grazed the crop during late autumn and winter. Sale weight of lamb per hectare was higher ( $P = 0.003$ ) in the WCG treatment (216 kg) compared with the ECG treatment (186 kg) when averaged over the 4 years of the experiment but did not differ ( $P > 0.05$ ) to the control (201 kg). Meat production over the 4 years was higher ( $P < 0.001$ ) in the WCG system (226 kg/ha) than other treatments when weight gain from wethers in 2014 was included. The impact of including dual-purpose crops on supplementary feeding was variable and depended on seasonal conditions.

**Conclusions:** Incorporation of dual-purpose crops into the high-rainfall production system can increase meat and wool production, with the highest meat production being obtained when crop grazing was prioritised for young carry-over livestock.

**Implications:** Prioritising dual-purpose crops for young growing livestock can increase meat production from the system while allowing other livestock classes (wethers or ewes) to graze the crops in better seasons when there was excess forage that would otherwise have been under-utilised.

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## Utilising dual-purpose crops to produce prime lambs: comparison of White Dorper and Merino sheep on crops and pasture

Shawn McGrath ([shm McGrath@csu.edu.au](mailto:shm McGrath@csu.edu.au)), Sue Street, Gaye Krebs, F. Ataollahi, M. S. Bhanugopan and Michael Friend

Animal Production Science, Volume 61 (11), July 2021

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### Abstract

**Context:** Dual-purpose crops (for grazing and grain) are an important part of the feedbase in mixed farming systems in the medium-rainfall zone of southern Australia. On these farms, non-wool sheep breeds such as the Dorper may provide an opportunity to increase lamb production while reducing labour costs compared with traditional sheep breeds.

**Aims:** This study was designed to compare lamb production systems based on White Dorper and Merino ewes joined to a terminal sire, while exploiting a feedbase that included dual-purpose crops.

**Methods:** Two experiments were conducted at Wagga Wagga, New South Wales, during 2013 (Expt 1) and 2014 (Expt 2). In February in both experiments, White Dorper ewes were joined to either White Dorper or White Suffolk rams (lambs designated DD and WSD, respectively), and Merino ewes were joined to White Suffolk rams (lambs designated WSM). In Expt 1 a dual-purpose wheat (*Triticum aestivum* L.) crop was established and the paddock subdivided into nine plots (0.93 ha each). Pregnant ewes were allocated to plots on the basis of genotype (DD, WSD or WSM grazing separate plots) after blocking for number of fetuses identified at mid-pregnancy scanning, with three replicates based on genotype. Lambing commenced on 28 June, and ewes grazed the crop from 27 June to 14 August and then continued to graze in the same groups on a lucerne (*Medicago sativa* L.)–clover (*Trifolium* spp.) pasture subdivided into nine plots (2.1 ha), maintaining the same replicates until weaning on 2 October. In Expt 2, the cropping paddock was subdivided into six plots (1.86 ha each) sown to either dual-purpose wheat or canola (*Brassica napus* L.), with three replicates. Lambing commenced on 13 July. Merino and White Dorper ewes grazed the crops concurrently

from 19 June to 12 August, and then lucerne–clover pasture until weaning on 29 September. In both experiments a mineral supplement was fed to ewes grazing wheat during the crop-grazing period.

**Key results:** Feed on offer was low (0.33 t/ha) in dual-purpose wheat crops at the start of grazing in Expt 1 and did not differ among genotypes at the cessation of grazing crops. Feed on offer was higher in wheat than canola at the commencement of grazing in Expt 2 (2.6 vs 2.3 t/ha;  $P = 0.009$ ), and a higher stocking rate was maintained on wheat than canola from the start of lambing. White Dorper ewes maintained a higher body condition score than Merino ewes throughout both experiments. In Expt 2, some ewes had serum magnesium and calcium levels below the normal range, and a high number of ewes (20%) required assistance at lambing. Number of lambs weaned per ewe scanned pregnant was similar among genotypes in both experiments. WSD lambs were heaviest ( $P < 0.05$ ) at weaning and DD lambs had greatest ( $P < 0.05$ ) fat depth over the eye muscle at weaning.

**Conclusions and implications:** When grazed on a feedbase typical of mixed farms in the medium-rainfall zone of southern NSW, White Dorper ewes were in higher body condition than Merino ewes; however, reproductive rates were similar. Joining White Dorper ewes to a terminal sire may increase weaning weight of lambs compared with joining to a White Dorper ram, or a Merino maternal system.

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## Effect of grazing different forage systems prior to and during mating on the liveweight, condition score, conception and reproductive rate of maternal-composite ewe lambs

Margaret Raeside ([margaret.raeside@agriculture.vic.gov.au](mailto:margaret.raeside@agriculture.vic.gov.au)), J. Byron, F. Cameron, C. MacDonald, S. Rochfort, D. L. Partington, G. A. Kearney and R. Behrendt

Animal Production Science, Volume 61 (11), July 2021

DOI <https://doi.org/10.1071/AN19183>

### Abstract

**Context:** Economic modelling identified that mating of ewe lambs for lambing at 1 year of age has the potential to increase the profitability of sheep-production systems in south-western Victoria. In order to optimise reproductive rates, ewe lambs should weigh at least 35–40 kg, have a condition score (CS) of 3.0 at mating, and be gaining weight (100–150 g/day) during mating. However, typical perennial ryegrass (*Lolium perenne* L.) pastures in south-west Victoria do not support the attainment of these targets without additional supplementation.

**Aim:** Our research aimed to determine how grazing summer-active pastures or brassica (*Brassica napus* L.) forages affects the liveweight, CS, conception and reproductive rate of ewe lambs when offered before and during mating compared with a system using perennial ryegrass plus supplement.

**Methods:** A field experiment was conducted at Hamilton, Victoria, Australia, in 2014 and 2016 testing seven forage treatments replicated four times in a complete block design. The treatments were: canola (*B. napus*, two treatments of different cultivars), forage brassica, lucerne (*Medicago sativa* L.), chicory (*Cichorium intybus* L.), plantain (*Plantago lanceolata* L.) and perennial ryegrass.

**Key results:** Ewe lambs grazing canola or forage brassica had higher ( $P < 0.05$ ) liveweight gains during the pre-mating and mating periods than those grazing the perennial ryegrass treatment (148 vs 75 g/day in 2014, s.e.m. 17; 139 vs 54 g/day in 2016, s.e.m. 17). In 2014, spring-sown dual-purpose canola, lucerne and chicory resulted in higher ( $P < 0.05$ ) reproductive rates (144–151%) than the perennial ryegrass treatment (103%); forage brassica and plantain gave intermediate results (128% and 129%).

**Conclusion:** Brassica forages (including spring-sown canola), lucerne and chicory can support the attainment of key liveweight and CS targets for successful mating of ewe lambs in autumn.

Implications: Spring-sown canola is therefore a viable alternative forage for use by livestock producers in southern Australia and presents an opportunity to incorporate an alternative income stream in mixed-farming systems.

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## The impact of ewe lamb mating and different feeding strategies over summer–autumn on profit and risk: a case study in south-west Victoria

Jonathon Tocker ([jonathontocker@hotmail.com](mailto:jonathontocker@hotmail.com)), Ralph Behrendt, Margaret Raeside and Bill Malcolm

Animal Production Science, Volume 61 (11), July 2021

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### Abstract

Context: Mating ewe lambs at ~7 months of age is viewed as a way to increase the profit of sheep farms in south-west Victoria, Australia. For a successful mating and high reproductive rate, ewe lambs need to be of >40 kg liveweight and condition score 3 at mating. The region has a temperate Mediterranean climate, and as such, dry summer pastures do not provide adequate nutrition for the weight gain required over summer and autumn if ewe lambs are to be mated early. There is limited economic information on the whole-farm benefits and risks associated with different feeding strategies for meeting the feed requirements of mating ewe lambs.

Aims: The aims were to test, for a prime-lamb system, whether profit would be increased by the mating of ewe lambs and whether there would be a reduction in whole-farm business risk. We hypothesised that different forage systems would offer profit and risk advantages over current dry-pasture and supplement systems for growing out ewe lambs.

Method: The biophysical and economic characteristics of a prime-lamb case-study farm were modelled to examine how six different pasture and forage systems for mating ewe lambs would perform under varying seasonal, price and cost conditions. Systems 1 and 2 were based on perennial ryegrass and subterranean clover pastures. System 1 compared lambing at 2 years of age, and System 2 lambing at 1 year of age. The other four systems simulated the use of different forages on a portion of the farm to grow out the ewe lambs for lambing at 1 year of age: System 3, spring-sown forage brassica rape; System 4, spring-sown winter-type canola; and System 5, lucerne; System 6, as for System 4 but at a higher lamb marking rate.

Results and conclusions: Lambing at 1 year of age increased profit and reduced business risk compared with lambing at 2 years of age. Use of spring-sown canola or lucerne forage for ewe-lamb mating provided the best returns on capital relative to the risk involved. Use of spring-sown canola reduced variability of annual returns, in part because of the diversification of income received from both lamb and canola.

Implications: The results of this modelling study indicate that some feed systems can increase farm profit and reduce business risk.

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## Differences in lamb production between ewe lambs and mature ewes

Emma Pettigrew ([E.Pettigrew@massey.ac.nz](mailto:E.Pettigrew@massey.ac.nz)), Rebecca Hickson, Hugh Blair, Kate Griffiths, Anne Ridler, Steve Morris, and Paul Kenyon

New Zealand Journal of Agricultural Research Volume 64 (4)

DOI <https://doi.org/10.1080/00288233.2020.1713177>

### Abstract

Currently, comparisons of lamb output from either ewe lambs or mature ewes are confounded, as the age groups are bred to different sires, and lamb at different times. The aim of this experiment was to compare the reproductive performance of ewe lambs and mature ewes, bred at the same time to the same sires, and lambing in the same climatic conditions. The experiment included 1082 mature ewes and 1014 ewe lambs that gave birth to 2656 lambs. Birth weights of lambs were  $3.92 \pm 0.06$  kg and  $5.02 \pm 0.06$  kg, and weaning weights of lambs were  $24.03 \pm 0.24$  kg and  $26.68 \pm 0.29$  kg for ewe lambs and mature ewes, respectively. Lambs born to ewe lambs were less vigorous than lambs born to mature ewes, even when adjusted for their lighter birth weights. Lamb survival during the neonatal period was 92.2% and 97.3% for lambs born to ewe lambs or mature ewes, respectively. The effect of birth weight on survival within each dam age and lamb birth rank followed a quadratic form, and differed for each group. Farmers should preferentially allocate all ewe lambs and mature ewes bearing triplets to lamb in paddocks that provide better conditions for lambing.

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### Effect of birth rank and age at first lambing on lifetime performance and ewe efficiency

Beverly Thomson ([bev@on-farm.co.nz](mailto:bev@on-farm.co.nz)), Noel Smith and Paul Muir

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#### Abstract

Composite ewes (244 single, 258 twin and 255 triplet born) lambed first either as a one or two-year-old. One-year-old lambing resulted in lighter ewes at both 2nd and 3rd mating. Twin and triplet born ewes were lighter than single born ewes throughout their life. Ewe losses due to lambing as a one-year-old meant fewer ewes left to lamb in later years. This meant that after the two-year-old lambing the ewes that first lambed as a two-year-old weaned more lambs per original ewe than ewes that had lambed previously. This difference got smaller over time and the extra lambing meant the ewes that first lambed as a hogget produced more weaned lambs in total (6.7 vs. 5.9 lambs,  $P < 0.05$ ). Lifetime weaning weight per original ewe did not differ with ewe birth rank groups but the triplet and twin born ewes were smaller than single born ewes. Thus, mating ewes to lamb as a hogget produced an advantage in the amount of lamb weaning weight produced over a ewe's lifetime but other than frame size, there was no effect of the ewes own birth rank on lamb production.

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### Productivity and Reproductive Performance of Mixed-Age Ewes across 20 Years of Selection for Ultrafine Wool in Uruguay

Zully Ramos ([Z.RamosAlvez@massey.ac.nz](mailto:Z.RamosAlvez@massey.ac.nz)), Hugh Blair, Ignacio De Barbieri, Gabriel Ciappesoni, Fabio Montossi and Paul Kenyon

agriculture, Volume 11(8), 28 July 2021 **OPEN ACCESS**

DOI <https://doi.org/10.3390/agriculture11080712>

#### Abstract

This study reports the phenotypic trends for wool, growth, and reproductive traits in mixed-age ewes after twenty years of genetic selection. Data were obtained from the Merino nucleus flock in Uruguay between 1999 and 2020. Overall, the aim of this selection flock was to reduce the fiber diameter (FD) and increase both the clean fleece weight (CFW) and live weight (LW). Data on ewe wool traits, LW, body condition score (BCS), the total number of lambs weaned (TLW), and the total LW of lambs weaned (TWW) across all lambing opportunities (1–8 mating seasons) were analyzed. Between 1292 and 2063 ewes were measured, depending on the trait considered. Ewe FD decreased by approximately 3  $\mu\text{m}$  (19–16  $\mu\text{m}$ ), whereas greasy fleece weight

(GFW) increased by 0.2 kg. This improvement in wool traits was accompanied by increases in LW at mating (3 kg), decreases in BCS at mating (approximately by 1 unit), and a small positive change in TWW across years. This study demonstrated that increasing farmer income by selecting for finer wool, heavier fleeces, and heavier animals can be obtained without compromising ewe lifetime reproduction.

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## 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](mailto: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.

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## The Number of Offspring Weaned from Ewe Lambs Is Affected Differently by Liveweight and Age at Breeding

Andrew N. Thompson ([Andrew.thompson@murdoch.edu.au](mailto:Andrew.thompson@murdoch.edu.au)), Elise Bowen, John Keiller, Don Pegler, Gavin Kearney and Cesar A. Rosales-Nieto

Animals, Volume 11(9), September 2021 **OPEN ACCESS**

DOI <https://doi.org/10.3390/ani11092733>

### Simple Summary

Ewe lambs can reach puberty and conceive at 7 to 10 months of age and those that are heavier at breeding are consistently more fertile. The aim of this research was to quantify the separate effects of age and liveweight at the start of breeding on the components of weaning rate. The analysis of data from more than 11,500 maternal composite ewe lambs indicated that ewe lambs that were heavier at the start of the breeding period weaned more offspring than lighter ewes, but if ewe lambs reached 45 kg their weaning rate was within 5% of their maximum for a given age. By contrast, the effects of age at breeding on weaning rate was linear and increased by 0.4% per day. Within the range from 35 to 45 kg liveweight and 6 to 9 months of age, a 1-kg increase in the liveweight at the start of breeding had the equivalent effect on weaning rate as an extra 7 days of age at the start of breeding. This understanding of the trade-off between age and liveweight at breeding will assist farmers to optimize the management and reproductive performance of ewe lambs.

### Abstract

In this paper, we tested the hypothesis that ewe lambs that are heavier and older at breeding will wean more offspring, due to increased reproductive rate and offspring survival and lower maternal mortality. To test this hypothesis, we analyzed data from more than 11,500 maternal composite ewe lambs collected over eight years. The ewe lambs had full pedigree records including birth type, age and liveweight at breeding plus records of the birthweight and survival of their offspring and the dam. The average liveweight and age at breeding was 40.2 kg and 228 days. The reproductive rate and weaning rate responses to liveweight at breeding were curvilinear ( $p < 0.001$ ), and if ewe lambs achieved 45 kg by the start of breeding, their reproductive rate and weaning rate were within 5% of their maximum. By contrast, the effects of age at breeding on weaning rate was linear and increased by 0.4% per day, despite a quadratic ( $p < 0.01$ ) effect of age at breeding on reproductive rate which increased only marginally when ewe lambs were older than 8 months at breeding. Increasing liveweight ( $p < 0.05$ ) or age ( $p < 0.001$ ) at breeding increased survival of their offspring, however an extra 10 kg of liveweight or 30 days of age at breeding increased offspring survival by less than 5%. Both liveweight ( $p < 0.001$ ) and age ( $p < 0.01$ ) at breeding also influenced survival of the ewe lamb dam but survival rates exceeded 95% across the range in liveweights from 30 to 55 kg and ages from 6 to 9 months. This understanding of the trade-off between age and liveweight at breeding will assist farmers to optimize the management of their ewe lambs, given the earlier they can be bred successfully the easier they can be integrated with the breeding of the adult ewe flock the following year.

## Upcoming events

Date	Event	Location
6 October 2021	<a href="#">Investigating flock rebuild strategies</a> MLA	Webinar
7 October 2021	<a href="#">Sheep health this Spring and Summer</a> Sheep Connect NSW	Webinar
8 October 2021	<a href="#">MLA Sheep projections</a> MLA	Webinar
13 October 2021	<a href="#">SheepLinks FEED365</a> DPIRD WA & MLA	Katanning, WA
13 October 2021	<a href="#">Winning With Weaners</a> The Sheep's Back	Boyup Brook, WA
15 October 2021	<a href="#">RAMping up Repro</a> The Sheep's Back	Wickepin, WA
22 October 2021	<a href="#">Pingelly 2021 MLP Field Day</a> Merino Lifetime Productivity Project/AWI	West Pingelly, WA
28 October 2021	<a href="#">Sheep Field Day</a>	Katanning, WA

DPIRD Katanning & Federation of Performance Sheep  
Breeders