

Improving the productivity and climate resilience of the Australian Sheep Industry

Davies Research Centre University of Adelaide, SARDI, SA Sheep Industry Fund, and the South Australian Drought Resilience Adoption and Innovation Hub

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Key Outcomes:

- On the Eyre Peninsula, Regulin® or ADE supplementation improved ewes bearing multiple fetuses and overall pregnancy scanning rates across two consecutive joining periods.
- Across all sites in South Australia, Regulin®, showed the greatest improvement in ewe fertility, with a 16% and 7% increase in fetal number per ewe scanned across the two years.



Image - Project lead, William van Wettere, implanting melatonin at a trial site

Background

Health, reproduction, and welfare of sheep are compromised when heat events occur during mating and pregnancy. Each day in excess of 32°C during the week of mating reduces the number of lambs born per 100 ewes mated by 3.5% (van Wettere *et al.* 2021). Incidences of heat can impair oestrus expression, increase embryo loss, retard fetal growth, and decrease pregnancy and lambing rates.

To combat the negative effects of heat stress, alleviation strategies need to be explored, with both melatonin and vitamins ADE as potential candidates. Both supplements are strong antioxidants that reduce free radicals within the body that cause cell damage and are produced during times of heat stress. Determining the ability of melatonin and ADE on reducing the negative effects of heat stress in sheep will provide producers with information to make informed choices about adoption of these amelioration strategies.

The aim of this project was to determine the impact of supplementation with either melatonin implants (Regulin®) or a vitamin ADE drench on the fertility and fecundity of sheep across South Australia.

Methodology

Work commenced in November 2023 and is still running, involving 29 producer sites, across South Australia. The producer sites were obtained through collaborations with multiple farming systems group including; South Australian Research and Development Institute (SARDI), MacKillop Farm Management Group (MFMG), Barossa Improved Grazing Group (BIGG), Upper North Farming Systems Group (UNFS), Northern and Yorke Landscape Board (NYLB), Mallee Sustainable Farming Systems Group (MSF), Murray Plains Farming Systems Group (MPF), and Agricultural Innovation and Research Eyre Peninsula (AIR EP).

Treatments consisted of control (no supplementation), melatonin (Regulin®), or ADE; with each site acting as a replicate. Treatment was given just prior to joining, with ewes randomly allocated to a treatment; ewes were separated by age where applicable. Melatonin was administered through an 18 mg melatonin capsule (Regulin®) via a subcutaneous injection behind the ear, and the ADE was administered through a 10 ml oral drench of Maxivit Vitamin A, D & E Oral (Compass Feeds). At sites where applicable, an additional treatment group was added with ewes receiving a combination of both melatonin and ADE, and/or rams received a melatonin implant.

Post treatment the ewes were returned to be managed as one mob according to standard husbandry procedures for that site. At each site pregnancy status and fetal number was determined by a commercial operator using ultrasound to determine the percentage of ewes pregnant, and the percentage of ewes carrying 1, 2 or 3 fetuses, which in turn was used to calculate potential lambing rate (expressed as fetuses as a percentage of ewes joined).

Results

There were three trial sites located in the Eyre Peninsula for this trial; two based near Kyancutta and one based near Wudinna. The joining periods of the three properties are between December-January, with all properties running Merino sheep. Table 1 shows the pregnancy scanning data for the properties across two summer joining periods (2023/24 and 2024/25); highlighting that supplementation with either Regulin® or ADE increased fertility outcomes for both seasons. Regulin® increased pregnancy rates in both joining seasons and overall fetal number per ewe joined by 13 and 5% respectively. Drenching with ADE increased pregnancy rates in the 2024/25 joining season but not the 2023/24 season; however, overall fetal number per ewe joined increased in both by 7 and 12% respectively.

For all properties involved in the trial across South Australia the use of Regulin® had the greatest impact on ewe fertility with an increase in pregnancy rates by 4%, multiple fetuses by 13%, and fetal number per ewe joined by 19% in 2023/24; and an increase in multiple fetuses by 5%, and greater fetal number per ewe joined by 7% in 2024/5 (Table 2).

The improvement seen in ewe fertility with the use of Regulin® during joining in summer months suggests its action as an antioxidant benefits ewe productivity and can improve economic return through greater lambs born.

Table 1: Effects of a single Regulin® implant or a 10 ml oral Vitamin ADE drench administered just prior to joining on pregnancy outcomes across three properties on the Eyre Peninsula across two consecutive summers 2023/24 and 2024/5.

Ewes from trial sites from the Eyre Peninsula region						
		Total Ewes	% Pregnant	% Single	% Multiple	Fetuses/joined (%)
Summer 2023/24	Control	250	93	38	56	149
	Regulin®	351	97	32	65	162
	ADE	339	94	34	61	156
Summer 2024/25	Control	311	77	33	43	121
	Regulin®	331	81	36	44	126
	ADE	291	83	33	48	133

Table 2: Effects of a single Regulin® implant or a 10 ml oral Vitamin ADE drench administered just prior to joining on pregnancy outcomes from all participating properties in South Australia across two consecutive summers 2023/24 and 2024/5.

Ewes from all producer sites across South Australia						
		Total Ewes	% Pregnant	% Single	% Multiple	Fetuses/joined (%)
Summer 2023/24	Control	3266	90	46	44	135
	Regulin®	2984	92	35	57	151
	ADE	2662	91	45	47	139
Summer 2024/25	Control	1566	84	44	44	130
	Regulin®	1415	87	41	49	137
	ADE	756	85	40	46	131



Image - Adelaide University researcher, Megan Tschärke, and trial participant, Tom Trengove at pregnancy scanning

Reference

van Wettere WHEJ, Kind KL, Gatford KL, Swinbourne AM, Leu ST, Hayman PT, Kelly JM, Weaver AC, Kleemann DO, Walker SK. Review of the impact of heat stress on reproductive performance of sheep. J Anim Sci Biotechnol. 2021 Feb 15;12(1):26. doi: 10.1186/s40104-020-00537-z. PMID: 33583422; PMCID: PMC7883430

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