MEAT & LIVESTOCK AUSTRALIA

meatup FORUM

For the latest in red meat R&D

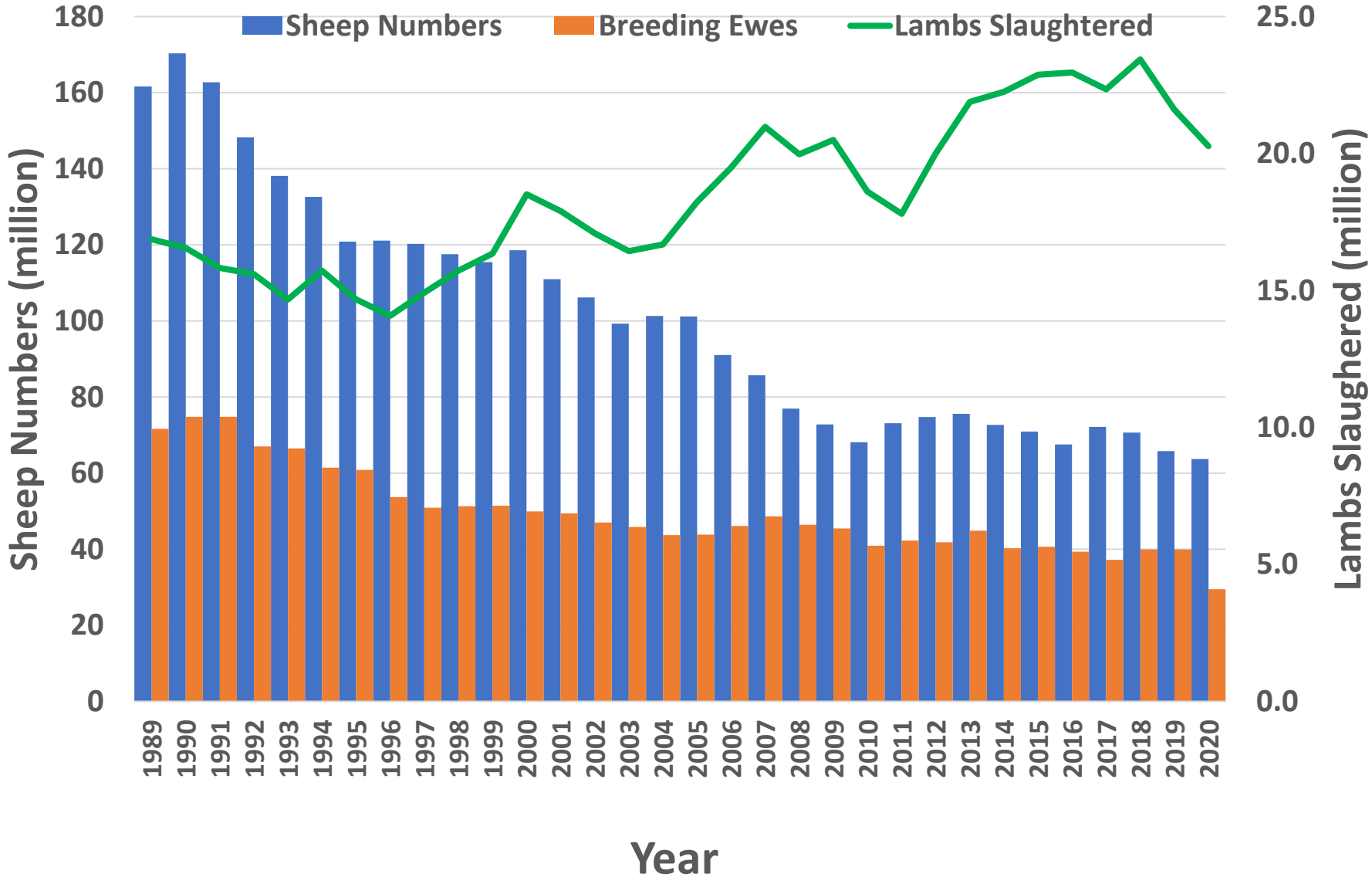
Sheep Reproduction – getting the best out of your ewe flock

Forbes Brien

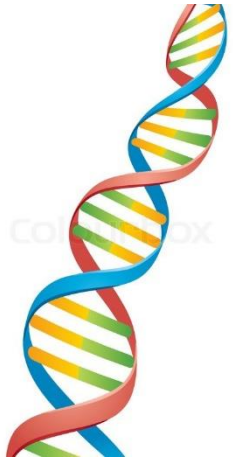
Davies Livestock Research Centre

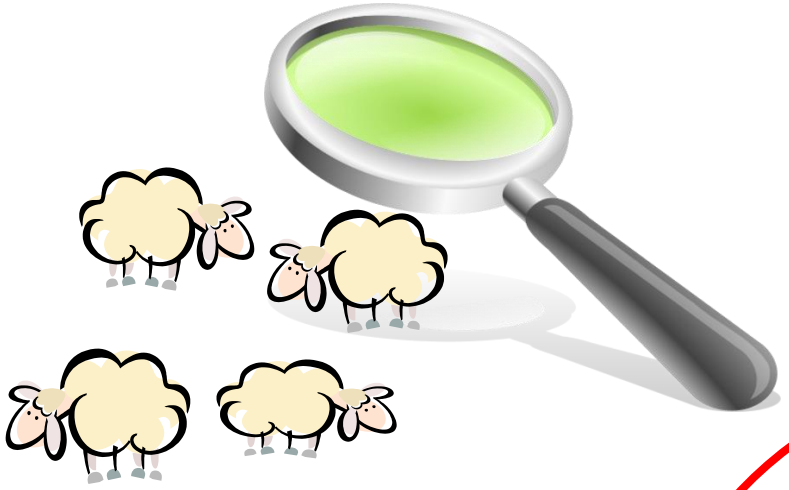
University of Adelaide

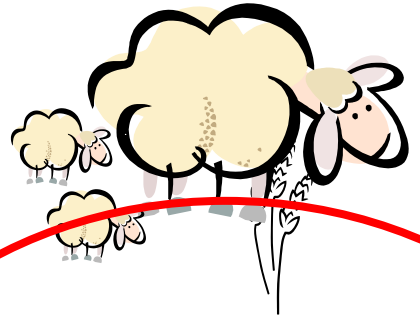
The Australian sheep flock



Improving reproduction







Breeding + **Cull/Retain** + **Management**

Which rams to use?

Longer term gains

Which ewes to keep in the flock?

Medium term gains
1-4 yrs

Nutrition, flock husbandry & novel approaches

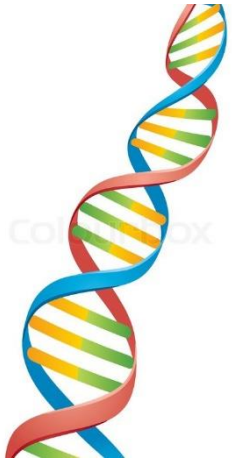
Short term gains
6 – 12 months

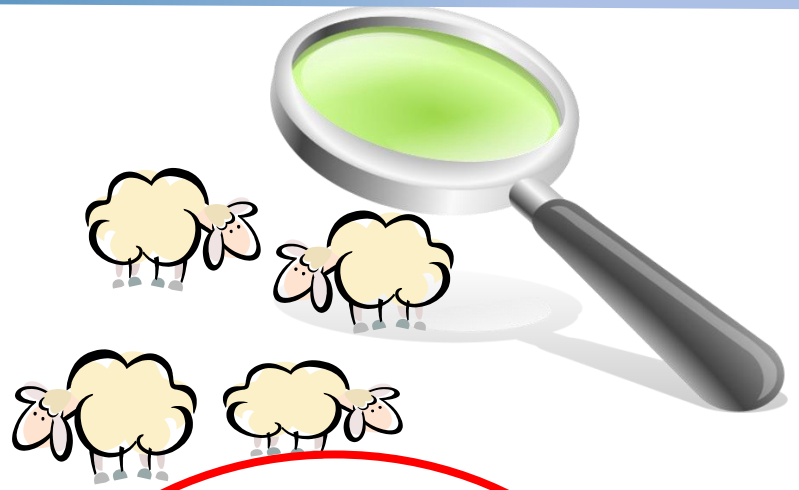
Impact of ewe condition score at lambing

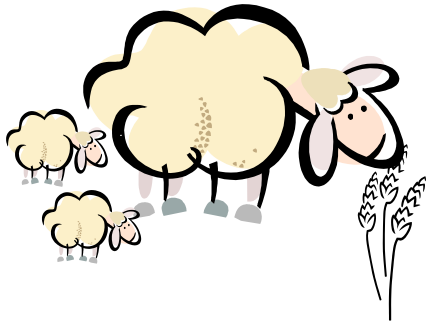
Lambs Beared by Ewe	Ewe Condition Score at Lambing	Lamb Survival (%)	
Single Bearing	2.3	85	+6
Single Bearing	3.2	91	
Twin Bearing	2.2	57	+14
Twin Bearing	3.2	71	

Adapted from Behrendt *et al. (*2011). Animal Production Science 51, pp 805-812

Improving reproduction







Breeding + **Selection** + **Management**

Which rams to use?

Which ewes to keep in the flock?

Nutrition, flock husbandry & novel approaches

Longer term 3+ years

Medium term 1+ years

Short term 6 – 12 months

Variation in a flock than can be used

Performance at 2 & 3 years old

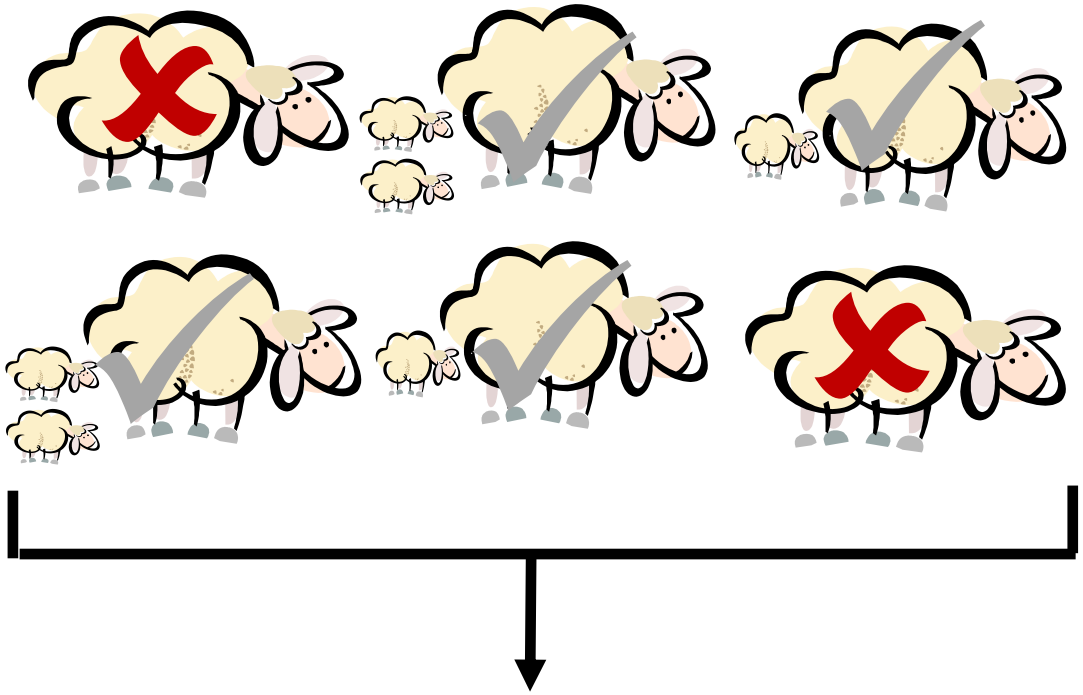
Trait	Dry Twice	Dry Once	Weaned Twice
Ewes Lambing/Ewe Joined	0.52	0.74	0.80
Lambs Weaned/Ewe Joined	0.47	0.78	0.91
Lambs Survival (Lambs Weaned/Lambs Born)	0.62	0.74	0.76

Performance at 4, 5 & 6 years

Source: Lee & Atkins (1996)

- Compared with <u>weaned twice</u> at 2 & 3 years of age, <u>dry twice</u> ewes at 2 & 3 years:
  - were less fertile between 4 and 6 years of age
  - weaned less than half their lambs
  - had 14% lower lamb survival

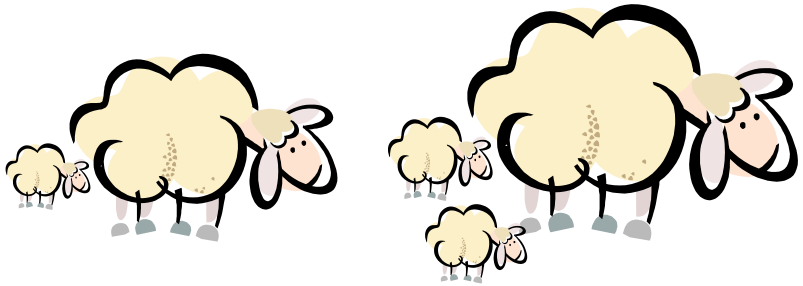
A more flexible flock structure



2 years of age
and
3 years of age

Remove the non-performers

Annually join the proven performers
(higher fertility + better mothers)



Retain the proven performers for a little longer
(join at 5½ or 6 ½ years of age)

Sold

Enhancing pregnancy scanning

Increasing lambing percentages through better use of pregnancy scanning technology

How are producers currently using pregnancy scanning?

- Nationally, half of all sheep producers surveyed pregnancy scan (wet/dry and litter size scanning combined)

- 69% of sheep producers DO NOT scan for litter size, so CAN NOT target nutrition according to litter size
  - Considerable variation b/w states

- Reasons why producers not scanning (Howard & Beattie, 2018 – MLA Final Report):
  - See no benefit, lack time/labour, impractical, cost, happy with lambing%

What could be achieved by enhancing pregnancy scanning?

By 2032, across Australia we could increase twin-lamb survival by 5% (286,000 more lambs weaned from same ewe flock) from:

- Increasing pregnancy scanning adoption by 10%
- 15% more of the scanned flocks providing optimal ewe nutrition according to the number of lambs they carry (litter size)
- Easier to use scanning results by linking with EID (tags & data capture)

Profit increase from differential feeding

	$/ewe
Differentially manage dry ewes	$0.35
Differentially manage singles & twins	$1.85
Pay for scanning	-$0.80
Overall	$1.40

This analysis will be expanded to include other benefits of scanning, more regions, extra genotypes and a wider range of time of lambing

Adapted from Young *et al.* (2016). Animal Production Science 56, pp 669-678
Extrapolated to $7/kg for lamb

THE UNIVERSITY of ADELAIDE

DAVIES LIVESTOCK RESEARCH CENTRE

New supplementation opportunities to improve twin lamb survival

Tom Flinn, Alyce Swinbourne, Dave Kleemann, Will van Wettere

Government of South Australia
Department of Primary Industries and Regions

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The problem: the birth process is dangerous

- All lambs experience some oxygen deprivation (hypoxia) during birth
- Degree of hypoxia increases with labour length and is higher in multiples
- Consequences of hypoxia are severe:
  - Damage to the brain, nervous system, vital organs
  - Impaired neuro-motor activity, udder seeking behaviour, vocalisation
  - Delays in standing and suckling
  - Impaired thermoregulation
  - Greater chance of maternal rejection

Increasing the likelihood of death

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The problem: the cost of birth hypoxia

Birth hypoxia is associated with

- ~ 70% of early lamb deaths

- 115 to 197 dead lambs from a mob of 1000 ewes (30% twinning rate).

Why Melatonin?

In previous studies, supplementing pregnant ewes with melatonin:

- Reduced brain damage & improved udder seeking behaviour in hypoxic lambs
- Increased brown adipose tissue & birthweight, when nutrition and photoperiod were sub-optimal

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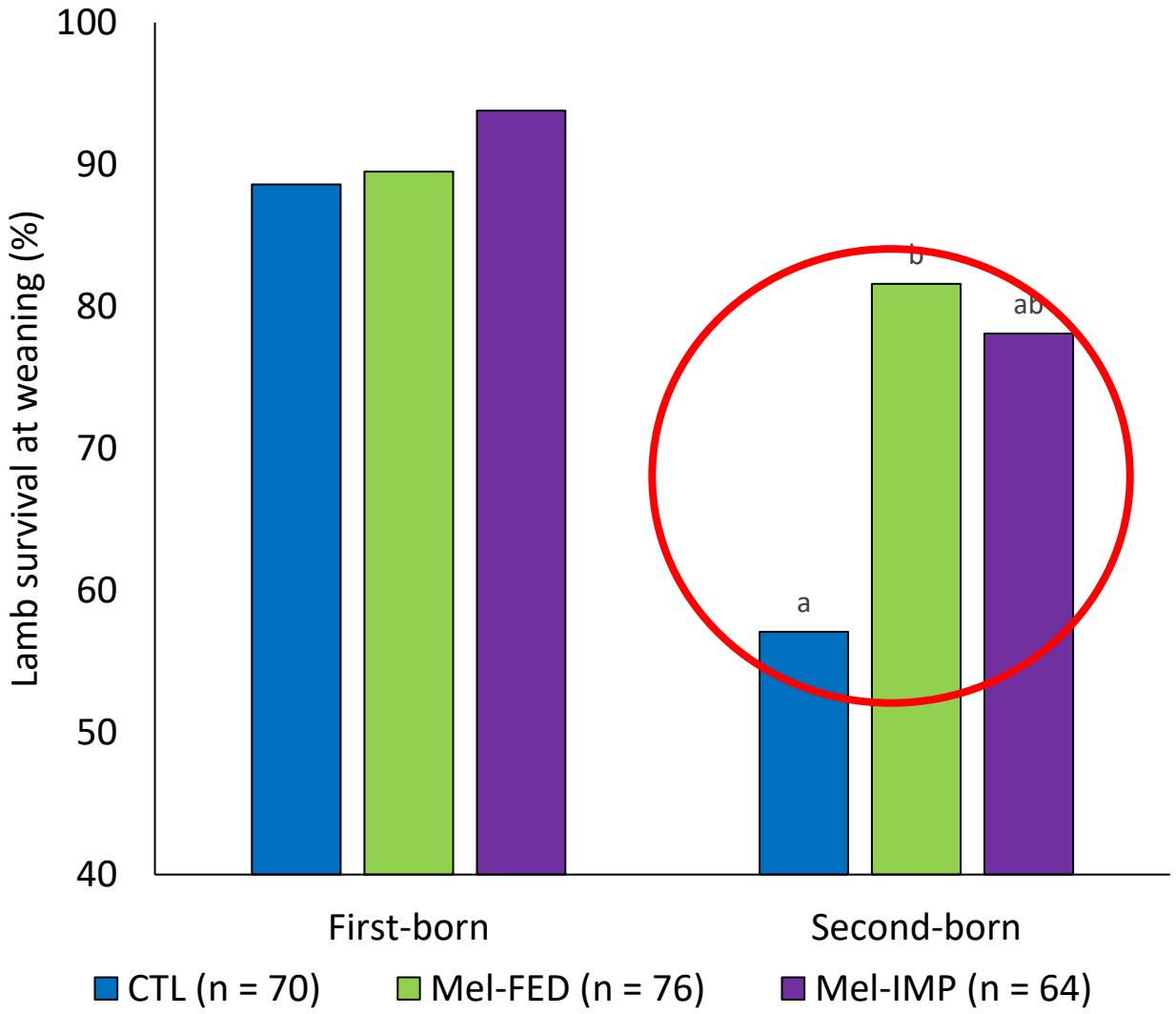
Melatonin improves twin lamb survival

- Overall, melatonin improved survival to weaning ($P < 0.06$)
  - Control: 73%
  - Melatonin FED: 86%
  - Melatonin-IMPLANTS: 86%
- Survival similar for first born twins
- Melatonin improved survival of second-born twins ($P< 0.05$)



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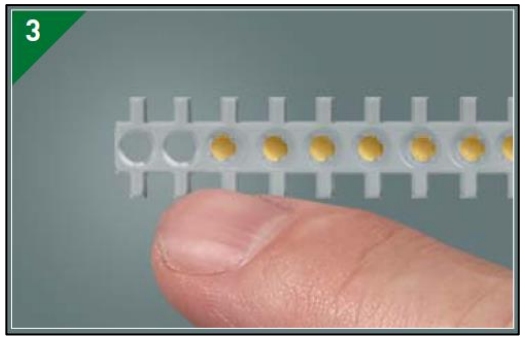
Melatonin: stage two

- Three treatments x two birth types (singleton vs. twin) at Minnipa Research Centre

- Pregnant Merino ewe treatment groups:
  - Control: no melatonin treatment
  - M1: one 18 mg implant ~90 d post-joining
  - M2: two 18 mg implants ~90 d post-joining



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Melatonin increases twin lamb survival

Twin lamb survival

	Control (n = 108)	1 Implant (n = 100)	2 Implants (n = 106)	*P*
Born alive (%)	93.5[a]	100.0[b]	99.1[b]	**0.005**

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Benefits of melatonin for twin lamb survival

- Implanting twin bearing ewes with melatonin (Regulin) on ~ day 90 of pregnancy:
  - Protects the lamb from the damage caused by birth hypoxia
  - Increases lamb survival to **weaning by 13 – 14%**
  - Results in an additional **26 – 28 lambs weaned** per 100 twin bearing ewes

- Regulin is commercially available, however it will require a label change to extend its use

- Further field trials are underway

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Return on investment

Producers **already scanning for litter size** (mob of 1000, **30% twinning rate**)

- Costs for twin bearing ewes: $2,400 for implants (@ $7 each + $1 labour / ewe)
- Benefit: 84 additional lambs (14% increase in survival)

Ewe type	Profit	
	$5/kg cwt	$8/kg cwt
Merino	$1,968	$5,244
Terminal Merino	$3,816	$8,478
Maternal	$3,480	$7,890

Validation of effects in commercial flocks

- Merino, Terminal Merino and Maternal ewes
- Ewes scanned for litter size, and fetal age
- Ability to implant Regulin ~90 – 100 days post-conception (not ram entry)
- Willingness to
  - House implanted ewes separately from untreated ewes during lambing or pedigree match
  - Conduct lambing rounds, to confirm
    - Litter size born, and lamb mortalities through to marking/weaning
  - Confirm wet / dry status at marking
  - Work with researchers and provide (blinded) data

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Staff:

Alyce Swinbourne, Emma Greenwood, Alice Weaver, Jen Kelly, Simon Walker, Karen Kind, Kathy Gatford and **Dave Kleemann**

Take home messages

Proven and potential strategies to increase reproductive rate:

- ❑ Achieving recommended targets for ewe condition score
- ❑ Culling dry ewes & retaining top ewes longer
- ❑ Better targeting of ewe nutrition from scanning for litter size
- ❑ Potential of Melatonin implants to boost twin-lamb survival

Tools and resources

- For condition score recommendations, see: http://www.lifetimewool.com.au/guidelines.aspx for Merinos and

https://www.mla.com.au/research-and-development/search-rd-reports/final-report-details/Lifetime-maternals-Development-of-management-guidelines-for-non-merino-ewes/3548 for Non-Merinos

- For decisions on culling and retention of ewes, see: https://www.mla.com.au/globalassets/mla-corporate/research-and-development/final-reports/2019/l.lsm.0011_final_report.pdf

- For pregnancy scanning of ewes, see: https://www.sheepconnectsa.com.au/management/livestock-management/ewe/pregnancy-scanning-ewes

- For Melatonin trials – contact: william.vanwettere@adelaide.edu.au