Fact sheet

Mortality of triplet-bearing Maternal ewes – what's happening, when, why and how to mitigate the risks?

What's happening on Australian sheep farms with triplet ewe loss?

Producers in Australia, that have been identifying and managing triplet bearing ewes separately have reported average mortality of triplet-bearing ewes to be 6.4%, regardless of ewe breed. By contrast the average mortality of twin bearing ewes was almost half that of triplets at 3.3% and the mortality of single bearing ewes was much lower again at 1.6% (see Table 10).

This level of triplet ewe loss limits the productivity of this cohort of ewes and in turn overall flock performance and it also represents an animal welfare challenge that needs to be addressed, especially given an increasing number of triplets are being conceived as reproductive rates (foetuses per 100 ewes) on Australian farms are rising. There were no differences in the average mortality of single, twin or triplet bearing ewes between ewe breeds (Table 1).

Table 1. Mortality of single, twin or triplet bearing ewes on Australian farms.

Ewe mortality (%)	Average	10th percentile	90th percentile
Single	1.6%	0.5%	3.0%
Twin	3.3%	1.2%	5.0%
Triplet	**6.4%**	**1.8%**	**14.5%**

When is the majority of triplet ewe loss happening on Australian farms?

The considerable nutritional demand of triplet-bearing ewes in late pregnancy and lactation is often not matched by feed intake, especially under extensive grazing conditions, and is a likely contributor to mortality of triplet-bearing ewes and their lambs. Ewe nutrition during late pregnancy and resultant condition score at

lambing is known to be a determinant of ewe and lamb survival in both Merino and Maternal breeds, particularly in twin-bearing ewes as discovered by the Lifetime Wool and Lifetime Maternals Projects. The national triplet research project has determined the impact of late pregnancy nutrition and condition score at lambing on the survival triplet dams and their lambs for Maternals.

Most of the triplet ewe loss occurs in late-pregnancy and during lambing, and loss rates are greater:

- when CS at lambing is lower – for Maternals with 1 CS lower at lambing increasing ewe mortality by 1.5%, and no evidence that fatter triplet-bearing ewes up to CS 4 die at a greater rate (Figure 1)
- mortality rate of triplet-bearing Maternal ewes increase slightly across the age range presented in Figure 2, with a 7-year old Maternal triplet dying at 6% compared to 2-year old dying at 4.5%.

Figure 1. Impact of CS at lambing on mortality of triple-bearing Maternal ewes between pregnancy scanning and lamb marking.

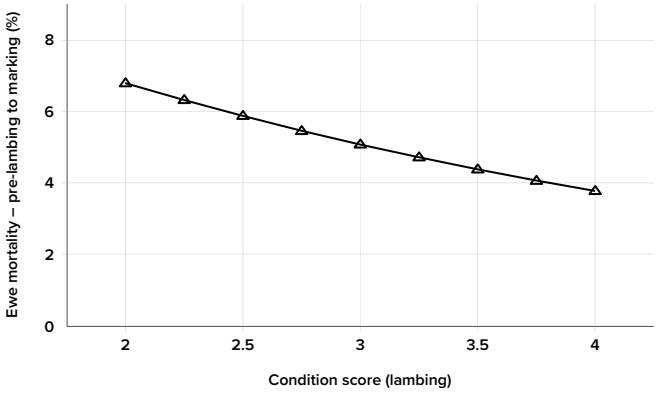
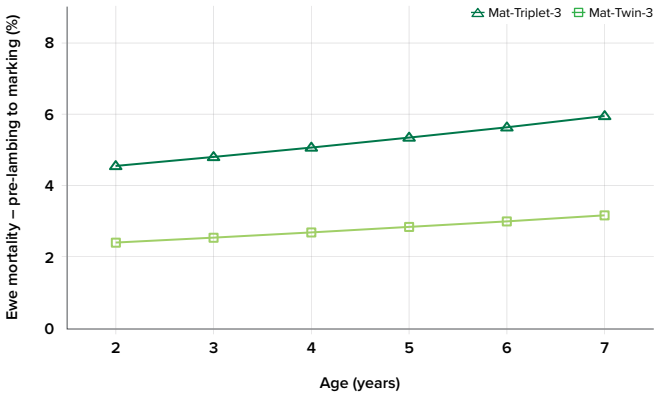


Figure 2. Impact of ewe age on mortality of triplet-bearing Maternal ewes between pregnancy scanning and lamb marking.



Why triplet ewe loss is occuring – pregnancy toxaemia

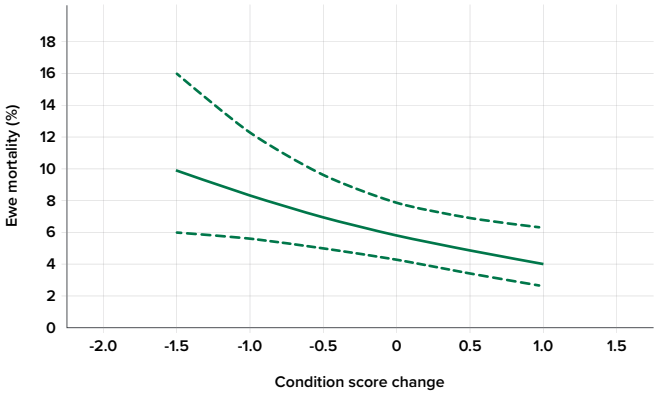
Pregnancy toxaemia is basically due to lack of energy in late pregnant ewes when the foetuses take more energy than the ewe can provide. The lack of energy is caused by a combination of poor feed in late pregnancy (insufficient energy density of ration), decreased rumen capacity and a dramatic increase in energy requirements. The energy requirement for a ewe with triplets lambs in the last few weeks is more than double maintenance.

To provide energy, the ewe starts to breakdown body reserve especially fat, however, the liver cannot cope. The blood sugar (glucose) levels fall dramatically, and the ewe does not have enough energy to function normally – especially the brain, muscles and there is kidney damage. Glucose (energy) is essential for proper brain function; a deficiency will result in nervous dysfunction and eventually coma and death. Glucose is also required for the muscles during grazing, deficiency leads to a drowsy ewe with a reduced appetite, while the foetuses are demanding more and more glucose. For more information visit beeflambnz.com/knowledge-hub/PDF/metabolic-diseases-ewes.pdf

When triplet ewes are in negative energy balance (precursor for pregnancy toxaemia) and losing condition score in late pregnancy their risk of death escalates:

- -1 CS compared to maintenance increases mortality of triplet-bearing Maternal ewes by 2.8% (Figure 3).

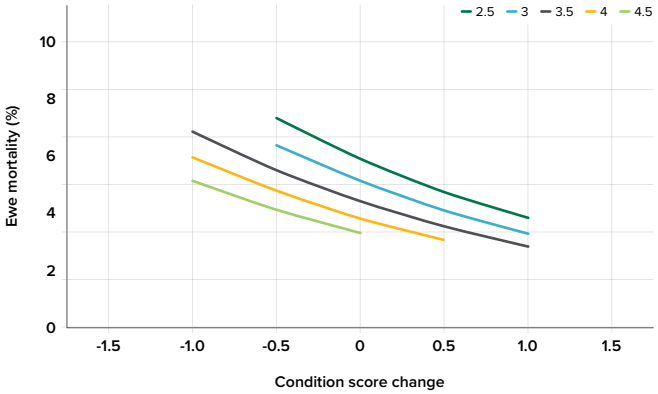
Figure 3. The effect (± 95% confidence intervals; dotted lines) of the change in condition score (CS) of triplet-bearing Maternal ewes between pregnancy scanning and pre-lambing on their mortality to marking at 12 commercial research sites across southern Australia between 2019 and 2021. The average CS at pregnancy scanning was 3.4 (range 2.0–5.0).



How to minimise Maternal triplet ewe loss?

Gaining condition score between pregnancy scanning and lambing improved Maternal ewe survival rates regardless of starting CS at scanning (Figure 4), where gaining 1.0 CS from scanning to lambing reduced ewe death by at least 1.5%. For triplets lambing at CS 3.5, the profile of CS 3.0 at scanning and gaining 0.5 CS to lambing achieves a slightly lower ewe mortality that the profile of CS 4.0 at scanning and loosing 0.5 CS to lambing.

Figure 4. The impact of CS at pregnancy scanning and change in CS from pregnancy scanning to lambing on mortality rate (%) of triplet-bearing Maternal ewes.



An additional approach that has been identified for mitigating the loss of triplet-bearing Maternal ewes to pregnancy toxaemia is the provision of grain supplementation at a rate of 500g/day (high treatment) in late pregnancy (from day 120 of pregnancy onwards). This was found to significantly reduce ewe mortality in late-pregnancy and during lambing, compared to feeding grain at a low rate (100 g/day) of supplementation (Table 2). The provision of an energy dense cereal grain, regardless of the level of pasture (FOO levels ranged from 800–2,500 kg DM/ha) reduce mortality rates by over 40%, from 7.8% down to 4.6% (Table 2).

Table 2. Impact of supplementary feeding level on the mortality rate (%) of Maternal triplet ewes in late-pregnancy and during lambing.

	Supplement level	
	High (500g/day)	**Low (100g/day)**
Ewe mortality (%)	4.6[a]	7.8[b]

Economics

The analysis focused on determining the optimal CS profile of triplet-bearing ewes when the flock is scanned for litter size, allowing triplet-bearing ewes to be managed separately from twin-bearing ewes after scanning. The recommended nutrition targets for Maternals is to have the twins and triplets at similar CS at lambing, erring on having the triplets in slightly better condition than the twins. This requires scanning and differential nutrition because if the ewes are not scanned for litter size the triplet-bearing ewes will be 0.2CS lower than the twin-bearing ewes.

The recommended targets for absolute CS at lambing for maternal ewes is CS 3.0 for single-bearing ewes, with some latitude to be lower, CS 3.5 for twin-bearing ewes but erring on the lower side, and CS 3.5 for triplet-bearing ewes (Table 3).

Table 3. Recommended CS targets for Maternal ewes at lambing for single, twin and triplet-bearing ewes.

	Ewe litter size		
	Single	**Twin**	**Triplet**
Maternal ewes	3.0	3.5-	3.5

At reproduction rates of 170%, which includes 10% triplets, differential management of Maternal flocks increased profit by $2.35 per ewe scanned or $23.50/ triplet-bearing ewe identified. On average, 30% of the benefit of identifying the Maternal triplet-bearing ewes is from the differential nutrition outlined above, and 70% is from differentially allocating to lambing paddocks.

What are the best practice key messages for Maternal triplet bearing ewe loss?

- Currently, triplet-bearing ewes on commercial farms are dying at about double the rate of twin bearing ewes, even when being identified at scanning and differentially managed.
- Most of the triplet ewe loss occurs in late-pregnancy and during lambing.
- Triplet ewe mortality rate is greater when CS at lambing is lower – target CS 3.5 at lambing.
- Maternal triplet ewe mortality increases slightly with age (2yr olds die at 4.5% versus 7yr olds at 6.0%).
- Triplet ewe mortality rate escalates when ewes are in negative energy balance and losing condition score in late pregnancy, primarily due to pregnancy toxaemia.
- Supplementing triplet-bearing ewes with grain (500 g/day) in late-pregnancy (day 120 onwards), regardless of pasture FOO levels (800–2,500 kg DM/ha), reduces ewe mortality rate significantly.
- Gaining CS between scanning and lambing improves triplet ewe survival regardless of starting CS.
- Manage triplet ewes separate from twins from scanning, so triplet-bearing Maternal ewes lamb at least equal in CS to that of twins, rather than 0.2CS lower that would have occurred if triplets were left with the twins.
- The recommended targets at lambing for Maternal ewes is CS 3.0 for single-bearing ewes, with some latitude to be lower, CS 3.5 for twin-bearing ewes but erring on the lower side, and CS 3.5 for triplet-bearing ewes.
- For a flock with 10% triplets, differential management (nutritional management & lambing paddock allocation) of Maternal triplet bearing ewes increases profit by about $2.35/ewe scanned or $23.50/ triplet bearing ewe after the costs associated with scanning, labour and supplementary feeding.

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