Triplet best practice guide

Maternal

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Section 1. Background

The number of lambs weaned per ewe joined in Australia has increased by 15% over the last 20 years. Better nutritional management and genetic selection of ewes for higher fecundity has led to a higher reproductive rate (foetuses scanned per 100 ewes), which has in turn increased the proportion of triplet-bearing ewes (see Table 1 in Section 2).

Mortality of triplet-bearing ewes and their lambs can be high, with producers in Australia reporting mortality averaging 5.3% and 5.8% for ewes of Merino and non-Merino breed, and mortality averaging 45% and 40% for their lambs. Scanning rates and lamb mortality can be underestimated if triplets are present in the flock but are not identified. Accurately identifying triplet-bearing ewes and optimising their management has potential to improve productivity, profitability, and welfare outcomes, which are outlined in this Best Practice Guide (BPG).

There are 7 sections to the Triplet BPG, including;

- Section 1. Background
- Section 2. Your triplet dams and their lambs- how many you have and how many survive
- Section 3. Your triplet opportunity – the value of triplet dams and their lambs
- Section 4. The identification of triplets – what's happening, when, why and how to address,
- Section 5. Triplet ewe loss – what's happening, when, why and how to mitigate the risks
- Section 6. Triplet lamb loss – what's happening, when, why and how to mitigate the risks
- Section 7. Summary of BPG actions and next steps.

Sections 2 and 3 are for self-discovery of the significance of the opportunity to improve survival of triplet-bearing ewes and their lambs on your farm, while Sections 4 to 6 follow the flow chart outlined below.

Aspect	Section of the BPG affecting triplet dams and their lambs		
What	Section 4. Identifying triplets	Section 5. Triplet ewe loss	Section 6. Triplet lamb loss
When	Day 75–100 of pregnancy	Late-pregnancy	Point of lambing
Why	As scanning rates increase so is the proportion of triplets	Pregnancy toxaemia	Low birthweight and Mismothering
How	Pregnancy scanning to identify triplets	Ewe CS management, grain supplementation	Ewe CS management optimum lambing mob size

Section 2. Your triplet dams and their lambs

	Guide/example	My flock data (fill in below)	Reference value
Number of adult ewes joined	E.g. 2,000 ewes		A
My typical adult scanning rate (Foetuses/ewes joined)* 100	Not counting triplets (ignore if already scan for triplets)		
	With triplets **if not known look up Table 1 – red column**		
Average proportion of triplets at my typical scanning rate	If known – enter average proportion of triplets that you scan (% of triplets ÷ 100) OR **If not known look up triplet proportion in Table 1 (figures in green column)**		B
My estimated number of triplet-bearing ewes	= A x B		C
Estimated usual mortality rate (proportion) for my triplet-bearing ewes	If known – enter the usual mortality rate (proportion) of my triplet-bearing ewes OR **If not known – look up mortality rate (proportion) in Table 2 (green column)**		D
My estimated number of triplet ewes that die	= C x D		E
My estimated number of triplet lambs born	= C x 3		F
Estimated usual survival rate (proportion) for my triplet-born lambs	Enter the usual survival rate of my triplet-born lambs (if lambed separate) OR **If not known – look up mortality rate (proportion) in Table 3 (green column)**		G
My estimated number of triplet lambs that survive	= F x G		H
My estimated number of triplet lambs that die	= F - H		I

Table 1. Average proportion of triplet-bearing ewes at various scanning rates

Multiple scanning rate (not counting triplets)	True scanning rate (counting triplets)	Percentage of triplets (%)	Proportion of triplets
120%	122.8%	2.8	0.028
130%	133.7%	3.7	0.037
140%	144.9%	4.9	0.049
150%	156.6%	6.6	0.066
160%	169.2%	9.2	0.092
170%	183.1%	13.1	0.131
175%	191.0%	16.0	0.160
180%	200.1%	20.1	0.201
185%	211.0%	26.0	0.260
190%	225.6%	35.6	0.356

Table 2. Ewe mortality during late-pregnancy and lambing, as a percentage and proportion, for twin and triplet Maternal ewes
(Use your mortality rate of twin bearing ewes to estimate your triplet ewe mortality rate.)

	Maternal twins		Maternal triplets	
	%	Proportion	%	Proportion
Top 20%	1.7	0.017	2.5	0.025
Top 30%	2.3	0.023	3.3	0.033
Top 40%	2.5	0.025	4.5	0.045
Ave 50%	2.6	0.026	5.5	0.055
Lower 40%	3.3	0.033	6.7	0.067
Lower 30%	4.4	0.044	7.9	0.079
Lower 20%	5.2	0.052	10.0	0.100

Table 3. Lamb survival, as a percentage and proportion, for twin and triplet Maternal lambs
(Use your usual survival rate of twin born lambs to estimate your triplet lamb survival rate)

	Twin		Triplet	
	%	Proportion	%	Proportion
Top 10%	86	0.86	73	0.73
Top 20%	84	0.84	70	0.70
Top 30%	82	0.82	68	0.68
Top 40%	80	0.80	65	0.65
Ave 50%	79	0.79	62	0.62
Lower 60%	77	0.77	60	0.60
Lower 70%	74	0.74	57	0.57
Lower 80%	71	0.71	53	0.53
Lower 90%	68	0.68	49	0.49

Section 3. Your triplet opportunity ($)

For this section you will need to use Reference Values C, E, F and I from Section 2.

	Guide/example	My flock data (fill in below)	Reference value
My estimated number of triplet-bearing ewes	Refer to Part 1 for value C		C
My estimated number of triplet ewes that die	Refer to Part 1 for value E		E
Estimated value of my triplet-bearing ewes ($/ewe)	**Use Table 4 as a guide**		J
Total estimated value of my triplet-bearing ewes	= C x J		K
Total estimated value of my dead triplet-bearing ewes	= E x J		L
What do you believe are main causes of triplet ewe death?			
What have you tried to reduce triplet ewe mortality rates?			
My estimated number of triplet-born lambs	Refer to Part 1 for value F		F
My estimated number of triplet-born lambs that die	Refer to Part 1 for value I		I
Estimated value of my triplet-born lambs (net $/lamb)	**Use Table 5 as a guide**		M
Total estimated value of my triplet-born lambs	= F x M		N
Total estimated value of my dead triplet-born lambs	= I x M		O
What do you believe are main causes of triplet lamb loss?			
What have you tried to improve triplet lamb survival rates?			

Now use the triplet best practice guide to find ways to improve survival of your triplet ewes and lambs.

Table 4. The value of Maternal triplet bearing ewes at varying meat prices ($/hd*)

Meat price ($/kg for lamb)	Maternal
$4	170
$5	215
$6	260
$7	305
$8	345
$9	390
$10	435
$11	475

* The impact on farm profit if an extra triplet-bearing ewe and her lambs die at birth

Table 5. Value of an extra Maternal lamb weaned for a range of meat prices. Results are an average over 2 regions (SW Victoria and Great Southern of WA) and 2 times of lambing (Autumn & Spring) ($/hd** net of feeding and husbandry costs)

Meat price ($/kg for lamb)	Maternal
$4	54
$5	68
$6	81
$7	97
$8	110
$9	124
$10	137
$11	150

**The impact on farm profit if an extra triplet born lamb survives to weaning

Section 4. The identification of triplets – what's happening, when, why and how to address

What's happening on Australian sheep farms with triplets?

Lamb marking rates in Australia have increased by more than 15% over the last 20 years. As a result the proportion of triplet-bearing ewes in the national flock has increased.

A survey of Australian producers that pregnancy scan for triplets found that, on average, 6.6% of non-Merino ewes and 2.9% of Merino ewes in the flock were scanned as triplets. However, the proportion of ewes scanned as triplets was about the same when non-Merino and Merino flocks achieved the same scanning rate.

Mortality of triplet-bearing ewes and their lambs can be high, with producers in Australia reporting mortality averaging 6.4% for triplet-bearing ewes regardless of Maternal or Merino breed. These producers reported survival of triplet-born lambs of 52.9% for Merinos which was significantly lower than that for Maternals at 60.1%.

Scanning rates and lamb mortality can be underestimated if triplets are present in the flock but are not identified. This is significant challenge given that only about 25% of the national ewe flock is scanned for twins and less than 5% are scanned for triplets. Accurately identifying triplet-bearing ewes and optimising their management has potential to improve productivity, profitability, and welfare outcomes. This section of the BPG outlines when, why, how, and economic basis to scanning for Maternal triplets.

When

Triplet-bearing ewes should be identified at pregnancy scanning. The optimum time to pregnancy scan ewes for triplets is 80–90 days from the start of joining. The earliest and optimum time that ewes can be pregnancy scanned is shown in Table 6. Ewes cannot be scanned before 40 days from the end of joining or beyond 100 days from the start of joining.

Table 6. Earliest and optimum time that ewes can be pregnancy scanned for triplets for a 35-day or 42-day joining.

Length of joining	Earliest	Optimum
35 days/5 weeks	40 days after the rams have been removed	45 days after the rams have been removed
42 days/6 weeks		45 days after the rams have been removed

Tips for preparing for pregnancy scanning include:

- joining for no more than six weeks
- withholding feed and water the night before scanning
- ensuring adequate staff are available to keep ewes up to the scanner
- good yard set-up with secure, separate pens for each pregnancy status (dry, single, twin, triplet)
- avoid having wet or daggy ewes
- book your scanner early.

Why some producers should be scanning for triplets

Currently in Australia around 25% of producers' pregnancy scan ewes for either pregnant or empty, 25% scan for multiples (empty, singles and multiples), less than 5% scan for triplets (empty, singles, twins and triplets), and the balance (around 45%) do not scan at all. Therefore, most producers do not have an accurate picture of the true scanning percentage of their flocks. As the scanning percentage determined from scanning multiples increases, the expected proportion of triplets in the flock increases and the gap between the 'multiples-only' scanning percentage and the true scanning percentage increases (Table 7).

The true scanning percentage can then be used to estimate the proportion of triplet-bearing ewes in the flock. Table 7 below shows the average percentage of triplet-bearing ewes at various scanning rates.

Table 7. Average percentage of triplet-bearing ewes at various scanning rates

Multiple scanning rate (not counting triplets)	True scanning rate (counting triplets)	Percentage of triplets (%)
120%	122.8%	2.8
130%	133.7%	3.7
140%	144.9%	4.9
150%	156.6%	6.6
160%	169.2%	9.2
170%	183.1%	13.1
175%	191.0%	16.0
180%	200.1%	20.1
185%	211.0%	26.0
190%	225.6%	35.6

The rule of thumb to do a conversion is to add 2% for every 10% that the 'multiples-only' scanning percentage is above 100%. For example, if the 'multiples-only' scanning percentage is 160% then the true scanning percentage is 172% (160 + 6 * 2). This rule of thumb only works up to a multiple scanning percentage of 175%. Beyond that the rule of thumb is under-estimating the true reproductive rate.

True scanning %=Multiples only %+2* (multiples only %-100)/10

How triplet-bearing ewes should be identified at scanning and differentially managed

The national triplet research project has determined that the survival of triplet-bearing ewes and/or their lambs can be improved by managing the condition score between pregnancy scanning and lambing, and lambing triplet-bearing ewes in smaller mobs. Each of which are covered in the next sections of the BPG.

Scanning and identifying Maternal triplet-bearing ewes, costing an extra $0.40/ewe scanned, is justified from the benefits of better nutritional management of the triplet bearing ewes and differential paddock allocation at lambing to reduce mob size, if the proportion of triplet-bearing ewes is 3% or greater. This occurs at true scanning rate of 123% or 120% if scanning for multiples only (Table 7 – green highlight).

Economics

A big driver of the profitability of scanning for litter size is the number of triplet-bearing ewes identified from which to recoup the cost of scanning. The increase in the cost associated with paying the contractor and the cost of staff to muster and yard the ewes was assumed to be $0.40/hd. The ultimate cost per triplet-bearing ewe identified is determined by the proportion of triplets in the flock (Table 8).

Table 8. The cost per triplet ewe identified at varying triplet % assuming $0.40/hd to scan for triplets..

Triplet percentage	Cost/triplet ewe identified
5%	$8
10%	$4
20%	$2

Profitability can be increased if Maternal flocks are scanned for litter size and the information is utilised to optimise the management of triplet-bearing ewes, however it is dependent on the level of reproductive rate. At reproduction rates of 123%, which includes 3% triplets, differential management of Maternal flocks increased profit. For Maternal flocks achieving higher reproductive rates such as 170%, with 10% triplet-bearing ewes, there is an increase in profit of $2.35 per ewe scanned or $23.50/triplet-bearing ewe identified (Table 9).

Table 9. Potential increase in profit from scanning for litter size and applying optimum management for Maternal flocks with 10% triplet-bearing ewes (scanning 170%).

	Maternal
Proportion of triplets	10%
$/ewe	+2.35
$/triplet ewe	+23.50

For a given reproductive rate (or proportion of triplets), there is more value in scanning the autumn-lambing flocks than the spring-lambing flocks. This is driven partly by the slightly higher value of the autumn-born lambs and partly by the value of reallocating the feed in the post-scanning period.

Increasing meat price increases the value of scanning for litter size. It increases overall profit and increases the value of an extra ewe or lamb surviving; however, higher meat prices also increase the opportunity cost of the feed. Specifically, a $1/kg increase raises the value of a Maternal ewe by $45 per ewe and the value of a Maternal lamb by $13.50 per lamb. Differentially managing the triplet-bearing ewes and their progeny is done at the expense of single- or twin-bearing ewes, or by reducing total stock numbers, both of which have a higher cost when meat price increases.

The value of scanning for litter size is a trade-off between the cost of scanning and the benefits achieved from better mob size at lambing and better allocation of feed to ewes with different litter size. On average, 70% of the benefit of identifying the Maternal triplet-bearing ewes is from differentially allocating to lambing paddocks, with the remainder of the benefit from differential nutrition.

In summary, if there are 10% triplet ewes in the Maternal flock (170% scanning), then the net value of scanning for litter size is $2.35/ewe scanned. This is an increment on top of the value of scanning for multiples of $5.75/ewe (Young and Brien 2023) and increases the total value of scanning to $8.10/Maternal ewe scanned.

What are the best-practice recommendations?

- Scanning for triplets and managing them separately from pregnancy scanning onwards can increase the survival of triplet-bearing Maternal ewes and lambs.
- The improvements in survival of triplet-bearing Maternal ewes and lambs is achieved through both better nutritional management and better paddock allocation for lambing.
- The profitability of scanning Maternal flocks for triplets is dependent on the reproductive rate of the flock, in particular the proportion of triplets, and the meat price.
- Scanning and identifying Maternal triplet-bearing ewes, costing an extra $0.40/ewe scanned, is justified if the proportion of triplet-bearing ewes is 3% or greater.
- 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.
- There are social license, animal welfare and potential market access benefits from improving management of triplet-bearing ewes and these benefits have not been included in the values outlined.

Section 5. Triplet ewe loss – 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 10).

Table 10. 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 increases in 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 ewes up to CS 4 die at a greater rate (Figure 2).
- Maternal triplet-bearing ewe mortality rates increase slightly across the age range presented in Figure 3, with a 7-year ewe dying at 6% compared to 2-year old dying at 4.5%.

Figure 2. Impact of CS at lambing on mortality of triplet-bearing Maternal ewes between pregnancy scanning and lamb marking

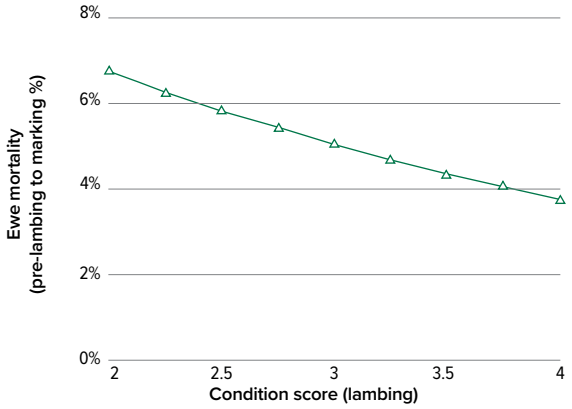
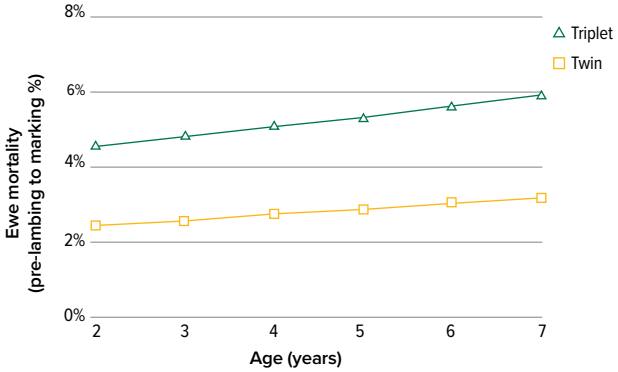


Figure 3. Impact of age in twin and triplet-bearing Maternal ewes on ewe mortality



Why triplet ewe loss is occuring – pregnancy toxemia

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.

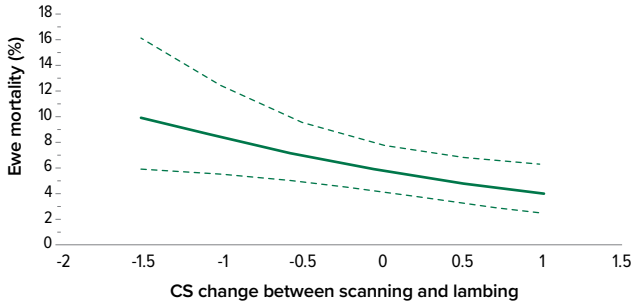
To provide energy, the ewe starts to breakdown body reserve especially fat, however, the liver cannot cope. The blood sugar (glucose) levels fall dramatically, and the ewe does not have enough energy to function normally- especially the brain, muscles and there is kidney damage. Glucose (energy) is essential 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 – https://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 4).

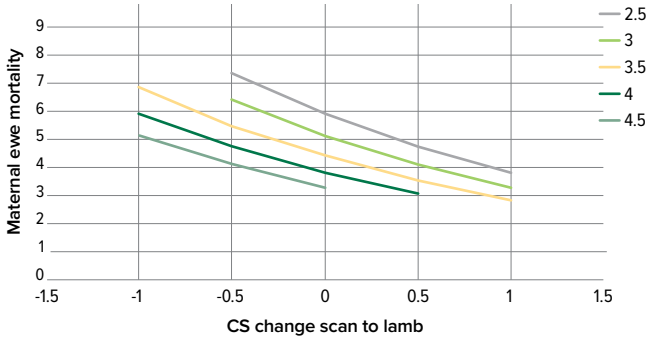
Figure 4. The effect (± 95% confidence intervals; dotted lines) of the change in condition score (CS) of triplet-bearing Maternal ewes between pregnancy scanning and pre-lambing on their mortality to marking at 12 commercial research sites across southern Australia between 2019 and 2021. The average CS at pregnancy scanning was 3.4 (range 2.0–5.0).



How to minimise triplet ewe loss – Maternal triplets

Gaining condition score between pregnancy scanning and lambing improved Maternal ewe survival rates regardless of starting CS at pregnancy scanning (Figure 5), where gaining 1.0 CS from scanning to lambing reduced ewe death by at least 1.5%. For triplets-bearing ewes 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 losing 0.5 CS to lambing.

Figure 5. The impact of CS at pregnancy scanning and change in CS from pregnancy scanning to lambing on ewe 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 11). The provision of an energy dense cereal grain, regardless of the level of pasture (FOO levels ranged from 800–2,500 kg DM/ha) reduced mortality rates by over 40% from 7.8% down to 4.6% (Table 11).

Table 11. 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 Maternal 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 Maternal ewes are 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 for single-bearing ewes to be at CS 3.0, with some latitude to be lower, the target for twin-bearing ewes is CS 3.5 but erring on the lower side, and the target for triplet-bearing ewes is CS 3.5 (Table 12).

Table 12. Recommended CS targets at lambing for single, twin and triplet-bearing Maternal ewes

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

At reproduction rates of 170%, which includes about 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 Maternal ewes on Australian 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 7yrs 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 (500g/ 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 Maternal triplet-bearing 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 is CS 3.5 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.

Section 6. Triplet lamb loss – what's happening, when, why, and how to mitigate the risks

What's happening on Australian sheep farms with triplet lamb survival?

Producers in Australia that have been identifying and managing triplet-bearing ewes separately have reported average survival of triplet-born lambs of 52.9% for Merinos and 60.1% for Maternals. By contrast, the average survival of twin-born lambs was reported to be 75.5% for Merinos and 81.4% for Maternals.

This level of triplet lamb mortality limits the productivity of this cohort and in turn overall flock performance. 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.

When is the majority of triplet lamb mortality happening on Australian farms?

Most (>80%) lamb mortality occurs in the first few days following birth. Lamb birthweight is the biggest contributor to lamb survival, which is heavily influenced by ewe nutrition in late pregnancy. Smaller mob sizes are known to improve the survival of single- and twin-born lambs. The national triplet research project has determined the impact of mob size at lambing on the survival of triplet-born lambs. This project has also identified that ewe condition score and differential management of triplets significantly impact lamb survival.

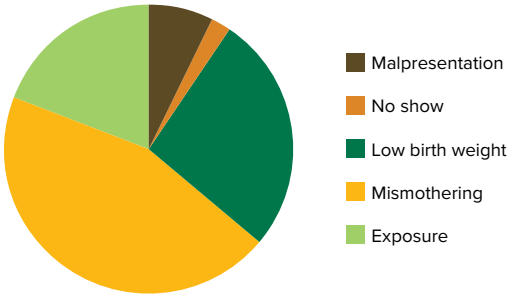
Survival of triplet-born lambs is lower:

- when triplet-bearing ewes lamb in bigger mobs
- when twins and triplets are managed together between pregnancy scanning and lamb marking rather than managing them separately.

Why do triplet lambs die?

The main causes of mortality of single- and twin-born lambs are dystocia and the starvation-mismothering-exposure complex. In comparison to twins, the triplet lamb is born at lower birthweight, more metabolically challenged, has lower body temperature, and receives less colostrum and milk which combined results in lower survival rates. Poorer ewe-lamb behaviour of triplet ewes and lambs also increases the risk of mismothering (Kenyon et al. 2019). Producers in Australia who differentially manage triplets have reported the top three causes of mortality of triplet-born lambs to be mismothering, low birthweight and exposure to adverse weather conditions resulting in hypothermia (Figure 6).

Figure 6. Top causes of death for triplet-born lambs reported by producers in Australia who differentially manage triplets (Thompson et al. 2023)



How to minimise mortality of triplet-born lambs due to mismothering

Adult Merino or Maternal ewes were allocated to a 'High' or 'Low' mob size treatment about 15 days before the start of lambing. Ewes in each treatment were allocated to lamb in paddocks with similar characteristics including feed-on-offer and shelter. Lamb survival was measured to lamb marking (Table 13).

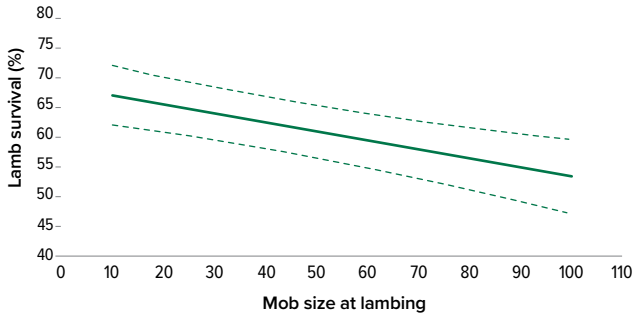
Table 13. Average mob size of ewes at lambing, condition score (CS) of ewes and feed-on-offer (FOO) pre-lambing, and survival of lambs to marking for mobs of Merinos and Maternals managed at the 'Low' and 'High' mob sizes at lambing

	Low mob size	High mob size
Mob size of triplet-bearing ewes	20	63
Ewe CS pre-lambing	3.2	3.1
FOO pre-lambing (kg DM/ha)	1,210	1,110
Lamb survival	65.6%	56.6%

Key findings:

- Survival of triplet-born lambs was greater when born at the Low mob sizes (Table 13).
- Reducing mob size at lambing by 10 triplet-bearing ewes increased the survival of their lambs to marking by 1.5%, when mob size ranged from 10–139 ewes and stocking rates ranged from 0.7–13.4 ewes/ha (Figure 7).

Figure 7. The effect (±95% confidence intervals) of the mob size of triplet-bearing ewes of Merino and non-Merino breeds at lambing on the survival of their lambs to marking at 15 research sites across southern Australia between 2019 and 2021



Economics

The optimum mob size at lambing varies depending on enterprise-specific factors such as the target return-on-investment, stocking rate of the ewes, breed and lamb price. The optimum mob size for triplet-bearing ewes is approximately 30% that for twins if ewes are allocated to existing paddocks.

The optimum mob size for triplet-bearing ewes is between 19 and 23 ewes when paddocks are subdivided using permanent fencing with lamb price at $7/kg and a target return-on-investment of 5% (Table 14). This optimum mob size for Maternal triplets when subdividing paddocks is approximately 28% that for twins, which reflects the greater response in lamb survival for triplets compared with twins, when paddocks are subdivided.

The economic analysis is that scanning and identifying triplet-bearing ewes, costing an extra $0.40/ewe scanned, **is justified purely from the benefits of differential paddock allocation** even if the scanning percentage is only 135% (4% triplets).

On average, 70% of the benefit of identifying the Maternal triplet-bearing ewes is from differentially allocating to lambing paddocks improving lamb survival, with the remainder of the benefit from differential nutrition that's improves both ewe and lamb survival. Collectively, differential management (lambing paddock allocation and nutritional management) of triplet bearing ewes, for a Maternal flock with 10% triplets, increases profit by about $2.35/ewe scanned or $23.50/triplet bearing ewe after the costs associated with scanning, labour and supplementary feeding.

Table 14. Optimum mob size and paddock size for twin- and triplet-bearing Maternal ewes when paddocks are permanently subdivided with lamb price at $7/kg and a target return-on-investment of 5%

		Maternal	
	DSE/ha	**Twin**	**Triplet**
Optimum mob size	2.1	87	23
	4.2	78	21
	8.4	70	20
	14.7	66	19
Optimum paddock size (ha)	2.1	85	26
	4.2	38	12
	8.4	17	6
	14.7	9	3

What are the best-practice recommendations?

- Survival of Maternal triplet-born lambs on Australian farms has been reported to be about 20% lower than that of Maternal twin-born lambs.
- Reducing mob size at lambing increases the survival of triplet-born lambs.
- The optimum mob size at lambing varies depending on enterprise-specific factors such as the target return-on-investment, stocking rate of the ewes, breed and lamb price.
- The optimum mob size for triplet-bearing ewes is approximately 30% that for twins if ewes are allocated to existing paddock.,
- The optimum mob size for Maternal triplet-bearing ewes is between 19 and 23 ewes when paddocks are subdivided using permanent fencing with lamb price at $7/kg and a target return-on-investment of 5%.
- For a Maternal flock with 10% triplets, differential management increases profit by about $2.35/ewe scanned or $23.50/triplet bearing ewe after the costs associated with scanning, labour and supplementary feeding.
- On average, 70% of the benefit of identifying the Maternal triplet-bearing ewes is from differentially allocating to lambing paddocks improving lamb survival, with the remainder of the benefit from differential nutrition that's improves both ewe and lamb survival.

Section 7. Summary of the triplet BPG for Maternals and next steps

Accurately identifying triplet-bearing ewes and optimising their management has potential to improve productivity, profitability, and welfare outcomes, which has been outlined in this Best Practice Guide. According to survey data collected in this project, triplet bearing ewes are dying at about double the rate of twin bearing ewes, even when being identified at scanning and differentially managed. The average survival of Maternal triplet-born lambs is 60.1% (180% lambs marked) compared to the average survival of Maternal twin-born lambs of 81.4% (163% lambs marked), reported on the same farms.

The self-discovery sections of the BPG (Sections 2 and 3) enables producers to identify how many triplet-bearing ewes and therefore triplet-born lambs they have on their farm, for which most producers are unaware. This is critical because as Australia lamb marking percentage has increased by more than 15% over the last 20 years, the proportion of triplet-bearing ewes in the national flock has increased. Section 3 then enabled producers to the value of their opportunity to reduce triplet ewe and lamb loss.

What are the best-practice recommendations for Maternal triplets?

Scanning for litter size (empty, single, twin and triplet) in Maternals:

- Scanning for triplets and managing them separately from pregnancy scanning onwards can increase the survival of triplet-bearing ewes and lambs.
- The profitability of scanning Maternal flocks for triplets is affected by the reproductive rate of the flock, in particular the proportion of triplets, and to a lesser extent the meat price.
- Scanning and identifying Maternal triplet-bearing ewes, costing an extra $0.40/ewe scanned, is justified if the proportion of triplet-bearing ewes is 3% or greater.
- The improvements in Maternal triplet ewe and lamb survival is achieved through both better nutritional management and better paddock allocation for lambing.

Maternal triplet ewe mortality;

- 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 rate increases slightly with age (2-yr olds 4.5% v's 7-yr olds 6%).
- 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 (500g/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 triplets lamb in at least the same CS as twins, rather than 0.2CS lower that would occur if triplets were left with the twins.
- The targets for CS at lambing for Maternal ewes is CS 3.0 for single-bearing ewes, CS 3.5 twin-bearing ewes but erring on the lower side and CS 3.5 for triplet-bearing ewes.

Maternal triplet lamb survival;

- Reducing mob size at lambing increases the survival of triplet-born lambs.
- The optimum mob size at lambing varies depending on enterprise-specific factors such as the target return-on-investment, stocking rate of the ewes, breed and lamb price.
- The optimum mob size for triplet-bearing ewes is approximately 30% that for twins if ewes are allocated to existing paddocks.
- The optimum mob size for Maternal triplet-bearing ewes is between 19 and 23 ewes when paddocks are subdivided using permanent fencing with lamb price at $7/kg and a target return-on-investment of 5%.
- At reproduction rates of 170%, which includes 10% triplets, differential management (nutritional management and lambing paddock allocation) of Maternal flocks increased profit by $2.35 per ewe scanned or $23.50/triplet-bearing ewe after the costs associated with scanning, labour and supplementary feeding.
- On average, 70% of the benefit of identifying the Maternal triplet-bearing ewes is from differentially allocating to lambing paddocks improving lamb survival, with the remainder of the benefit from differential nutrition that's improves both ewe and lamb survival.
- There are social license, animal welfare and potential market access benefits from improving management of triplet-bearing ewes and these benefits have not been included in the values outlined.

Next steps:

- Refer back to Section 3 of BPG (page 6), where you calculated your opportunity with triplets, and
- Identify your future management strategies that will improve triplet and lamb survival in your Maternal enterprise that will deliver productivity, profit, and welfare benefits.

Notes

Notes

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