

Hogget Lamb Survival Pilot Study using Dried Sauvignon Blanc Grape Marc supplementation from Scanning to Lambing

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Introduction

Efforts to find a major contributing cause for the high lamb loss between scanning and tailing in hoggets has invariably been unrewarding for those investigating it. The average loss for StockCare® properties is consistently close to 30% for this period, with much of that loss suspected to occur between scanning and lambing, rather than around the actual perinatal period.

Invariably infections or trace element deficiencies have been the first consideration when looking at evidence of embryonic loss or abortions in hoggets. Foetal programming as a contributing factor has also been investigated by the author but to date no common underlying factor has been confirmed.

In light of the finding by Dr Peter Smith (AgResearch) “Grape Marc – Potential to change lamb survival” and the significant improvement in lamb survival with multiple bearing ewes when fed dried grape marc during the last month of pregnancy, a trial feeding grape marc from scanning to lambing on a Marlborough property was run to see if this would help with the hogget lamb survival. This took place on a very high performing flock but one that has been consistently hampered by a high lamb loss in the well grown hoggets (50kg mating weight). The annual lamb loss in this group was 33,36,31, and 39% since 2017.

As these hoggets are grown out on a legume-based diet (Lucerne) it is conceivable that a high tannin + PUFA (Linoleic acid) containing supplement could help balance what is probably a very high ‘octane’ type diet and have a similar effect on the survival as experienced in the AgResearch trial.

Materials and Methods

At pregnancy scanning on the 1st July 2021, 200 of 525 twin bearing hoggets were randomly drafted off to make up the Treatment mob (T mob) – those to be fed dried and milled Sauvignon Blanc grape marc (GMS41).

Both mobs were weighed and fecal egg counts (FECs) taken and the T mob started on 50gm/h/day building up over 3-4 days to 120gm/h/day of the grape marc. This was fed out in 3 troughs with most hoggets readily taking to it. All efforts were taken to try and ensure both mobs were grazing very similar pastures in the way of composition and covers.

GMS41 was fed daily until set stocking for lambing on the 30th August. At no time did this mob get an anthelmintic treatment while all the Control hoggets (C mob) received a ‘drench’ at set stocking. A handful of lower condition score hoggets in both mobs did receive a drench at Tailing time.

Repeat FECs were taken through until tailing of their lambs. The hoggets were weighed again at set stocking and at tailing. Lambs were also weighed at tailing. FECs were taken again between Tailing and Weaning and a final FEC at weaning.

Accurate tallies of hoggets and lambs were collected, and autopsies carried out on as many perinatal lamb deaths as possible.

Results *(Statistical analysis in appendix)*

Hogget and Lamb Survival

	Event	Date	Control	GMS41
No Hoggets	Scanning	1/7/21	325	200
	Set Stocking	30/8/21	314	197
	Tailing	8/10/21	308	194
	Weaning	20/12/21	308	194
No Lambs	Tailing	8/10/21	404	262
	Weaning	20/12/21	398	257

Hogget Deaths

	Control	%	GMS41	%
Scanning – Set Stocking	11	3.4%	3	1.5%
Set stocking- Weaning	6	1.9%	3	1.5%
Total Deaths	17	5.2%	6	3%

Lambs lost

	Control	%	GMS41 Fed	%
Potential lambs	650		400	
Lambs Tailed	404		262	
Lambs lost. Scan – Tailing	246/650	38%	138/400	34.5%
Lambs lost. Set stock – Tail	246/628	39.2%	138/394	35%
Weaning	398		257	
Lambing % (to tailing)	404/325	124.3%	262/200	131%
Lambing % (to weaning)	398/325	122.5%	257/200	128.5%

Perinatal lamb death PMs

Between the 7th and 16th September 16 Control (C) and 7 GMS41 fed (T) lambs were autopsied.

	CONTROL	TREATMENT
Number of lambs PM'd	16	7
Ave Wt kg	2.67	2.47
Wt Range kg	1.6-3.8	1.4-3.5
<2kg	4	2
Not walked	7	2
Walked	9	5
Breathed	12	7
Breathed/No walk	3	1
Fed	0	0
Starvation-Mismother-exposure Complex	12	7

All lamb deaths of those autopsied were consistent with them being very small light weight lambs that died soon after birth from starvation and exposure.

Wet/Dry Hoggets (Twin bearing Hoggets scanned in lamb that did not rear a lamb)

		Control	GMS41 Fed
Tailing	8/10/21	46	30
Tailing (lates)	27/10/21	14	6
Total		60=19.5%	36=18.6%

Hogget and Lamb Weights

Hogget Wts

EVENT	DATE	CONTROL	TREATMENT
Scanning	25/6/21	59.3kg	59.5kg
Set Stocking	30/8/21	69.8kg	70.8kg
Tailing	8/10/21	71.6 kg	64.1kg
Condition Score		3.2	2.4
Tailing (lates) C S	27/10/21	3.1	2.7
Weaning	20/12/21	73.8 (57.6-87.8)	68.2 (53.6-81.4)

Lamb Wts

Tailing	8/10/21	14.5	13
Tailing (lates)	27/10/21	16.9	14.7
Weaning	20/12/21	36.1	33.4

Parasite Control

	EVENT	DATE	CONTROL	TREATMENT
Drenches	Set stocking	30/8/21	Triple	-----
	Tailing	8/10/21	A few Low CS only	A few Low CS only
GMS41 Feeding	Scanning	1/7/21	-----	120gm/h/d
	Set Stocking	30/8/21	-----	GMS41 feeding stopped over lambing
	Tailing	8/10/21	-----	GMS41 re-introduced

FECs

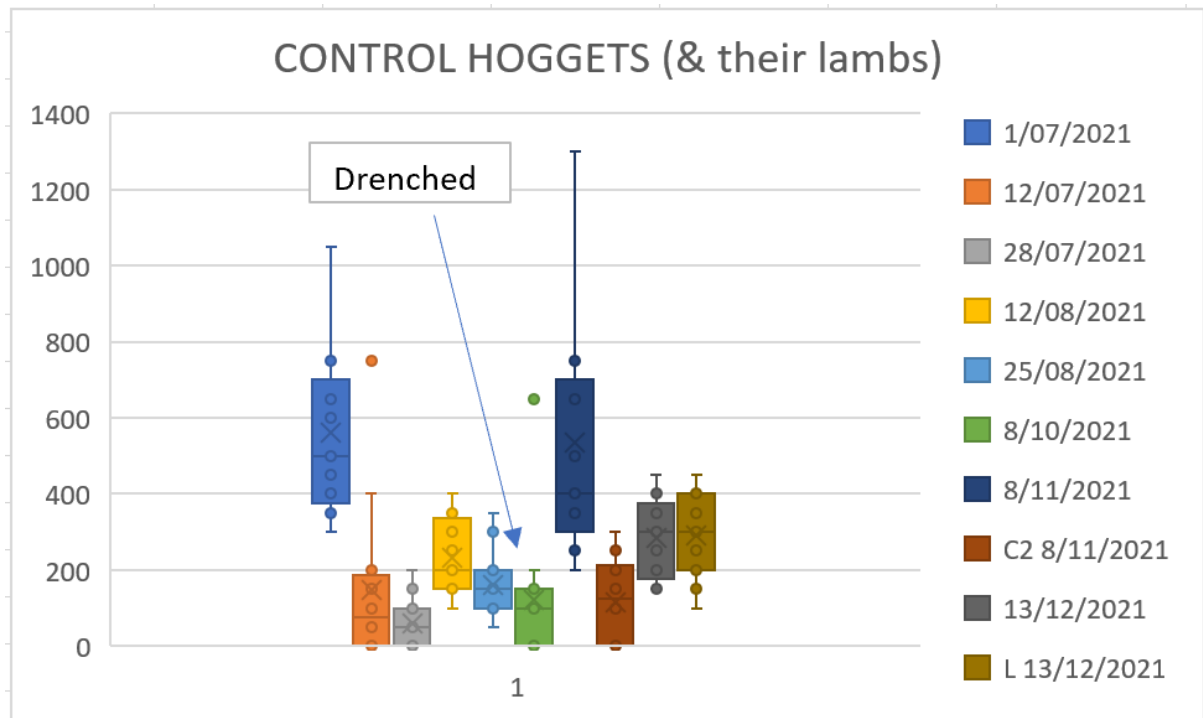
CONTROL

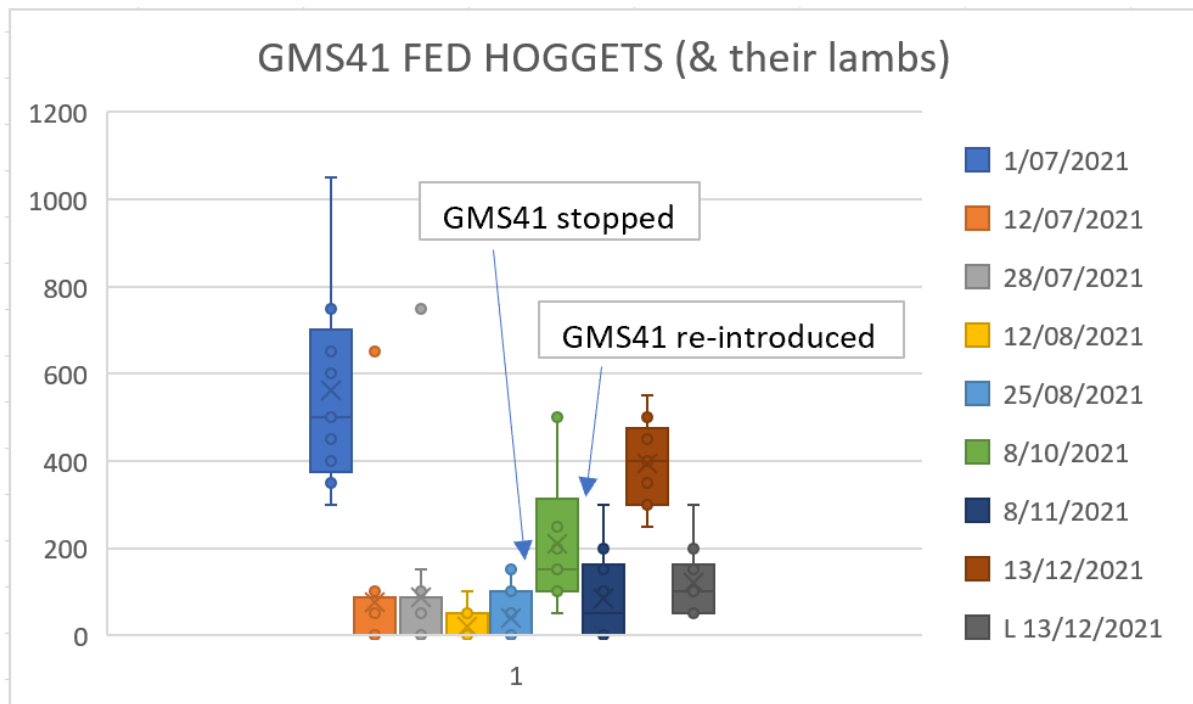
1/07/2021	12/07/2021	28/07/2021	12/08/2021	25/08/2021	8/10/2021	8/11/2021	C2 8/11/2021	13/12/2021	L 13/12/2021
1050	100	100	150	300	0	1300	0	400	150
400	50	50	200	150	650	500	150	300	200
600	750	150	200	150	100	200	0	300	350
650	0	0	100	350	0	400	200	450	100
500	0	0	350	100	0	750	100	200	400
450	0	0	150	200	200	350	0	350	300
300	150	100	300	100	0	650	0	150	450
350	0	200	200	50	150	250	300	250	250
750	100	50	400	150	100	400	150	150	400
	200	50	150	100	0		250		300
	400	0	350	100	120				300
	0	0	250						
561	146	58	233	159	120	533	115	283	291

A similar mob of twin lambing hoggets was also FEC tested on the 8/11/21 (C2). Lambs from C hoggets and T hoggets (L) were tested at weaning on the 13/12/21.

GMS41

1/07/2021	12/07/2021	28/07/2021	12/08/2021	25/08/2021	8/10/2021	8/11/2021	13/12/2021	L 13/12/2021
1050	0	0	0	0	100	0	400	50
400	0	0	0	0	50	0	500	50
600	0	750	50	150	500	150	300	100
650	50	0	0	50	200	0	300	300
500	0	0	0	150	500	0	450	100
450	100	100	100	0	100	100	550	50
300	650	50	0	0	150	200	350	150
350	0	0	50	0	250	0	250	100
750	0	0	50	100	100	100	450	100
	100	150	0	0	150	300		200
	0	0	0	0				
	0	0	0					
561	75	88	21	41	210	85	394	120





Neither T nor C mobs were drenched at Scanning time on the 1st July. This is when the T mob were started on the GMS41. By set stocking on the 30th August the T mob average was 1kg heavier. At this time GMS41 supplementation was stopped while all the C mob were given an anthelmintic. At all times all efforts were made to ensure both mobs were grazing as similar pastures as possible but by Tailing time the T mob was significantly lighter (7.5kg).

Discussion

The possible influence of GMS41 supplementation to in-lamb hoggets on final lambing %s.

Overall, there appears to have been a slight improvement in the final lambing % through a reduced hogget loss as well as a better lamb survival. The percentage of hogget deaths were similar for both groups between set stocking and tailing when the Treatment group were not being fed GMS41, but less than half the deaths from scanning to set stocking earlier when they were being fed. Tannins in the diet have been shown to influence rumen fermentation products, reduce methane production, improve protein availability and reduce the incidence of ruminal acidosis as well as bloat.

While hogget loss is a component of the lamb loss there is still a greater lamb loss in the Control mob from set stocking to tailing suggesting the GMS41 had some effect on lamb survival. Both C and T hoggets were split into small lambing mobs (~50/lambing mob) from set stocking before lambing until tailing time.

Interestingly there is really no difference in the wet/dry %s between mobs. (C 19.5 v T 18.6%) which was one of the main reasons for the study.

The effect of feeding GMS41 on FECs

GMS41 does have an effect on parasites while fed to hoggets. GMS41 fed animals have significantly lower FECs. However, as seen in our other trials stock seem to need constant access to it. Not feeding it during the critical early lambing period through until tailing and not giving a drench at set stocking is quite possibly the main cause of theirs and their lambs significantly lower weights and their lower Condition Score compared to the C mob at Tailing time, as well as their lambs' growth rates. However, unlike the C mob, at no time while being fed GMS41 did their average FEC get higher than 100epg (except at weaning time) and compared to the C mob while fed it during pregnancy they gained a little more weight (1kg). The results do suggest that while GMS41 was in their diet they were less susceptible to parasitism.

While the GMS41 was readily consumed farmer observation suggested that there was a variation in individual hogget demand for it. Their lambs also very quickly started eating the GMS41 after tailing when it was re-introduced, so perhaps a number of hoggets were not getting their daily requirement while their lambs were consuming a significant amount and could possibly explain the lower FEC in the lambs (120epg Lamb v 394epg hogget), compared to the C mob. (291L v 283H). It could also explain their weaning FEC – the highest FEC for the T mob of the trial.

Appendix

Results

Hogget and lamb survival

The survival of hogget and lambs are presented in Table 1 and Table 2 respectively. Survival analysis and log rank test result show survival of lambs ($P=0.22$) and hogget ($P=0.33$) are not significantly different between control and supplemented groups.

Table 1. The probability of survival of hogget supplemented (T) and not supplemented (C) with GMS41

Time (day)	Control Mean(SE)	Treatment Mean(SE)
66	96.61 (1.04)	98.50 (0.87)
105	94.76 (1.30)	97.00 (1.24)
178	94.76 (1.30)	97.00 (1.24)

Table 2. The probability of survival of lambs by hogget supplemented (T) and not supplemented (C) with GMS41

Time (day)	Control Mean(SE)	Treatment Mean(SE)
105	62.15 (3.06)	65.50 (3.63)
178	61.23 (3.12)	64.25 (3.73)

Fecal egg counts in lamb and hogget

The fecal egg counts of hogget are presented in Table 3. The fecal egg count is significantly ($P<0.05$) lower in supplemented group compared to control group on 3 collection dates: 12/8/2021, 25/8/2021, 8/11/2022. Whereas fecal egg counts were not different between groups on other collection dates.

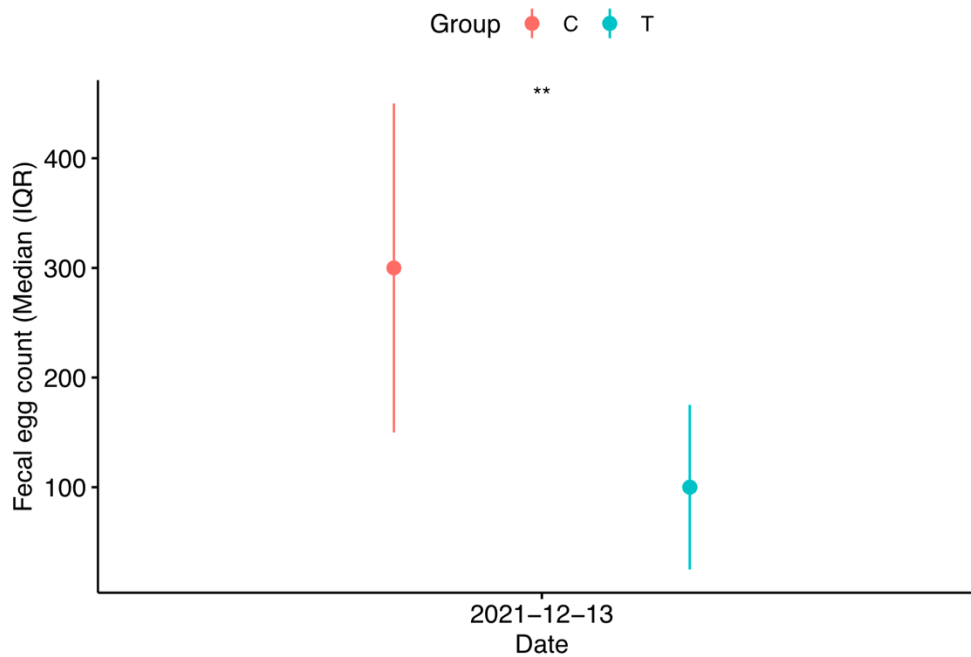
The fecal egg counts were significantly lower ($P=0.00193$) in lambs by hogget in supplemented group compared to lambs by hogget in control group (Figure 1).

Table 3. Median (IQR) fecal egg counts of hogget supplemented (T) and not supplemented with GMS41.

Date	Control	Treatment	P-value	Signif
12/7/21	75 (0-162.5)	0 (0-62.5)	0.185	NS
28/7/21	50 (0-100)	0 (0-62.5)	0.394	NS
12/8/21	200 (150-312.5)	0 (0-50)	0.000028	****
25/8/21	150 (100-175)	0 (0-75)	0.003	**
8/10/21	100 (0-135)	150(100-137.5)	0.086	NS
8/10/21 (late)	400 (350-650)	50 (0-137.5)	0.000531	***
13/12/21	300 (200-350)	400 (300-450)	0.055	NS

NS: no difference between groups

Figure 1. The fecal egg count of lambs by hogget supplemented (T) and not supplemented (C) with GMS41.



Statistical analysis

Survival analysis

Survival analysis is used to analyze the rates of occurrence of events over time.

The survival of lambs and hoggets from start to end of study period was analysed using Kaplan-Meier survival curve and the differences between groups were compared using Log-Rank test using the

“survival” and “survminer” packages in Rstudio. The number of animals alive were recorded at each follow up date. This information was then used to estimate the number of animals that died during the period between follow up dates. The survival time (days) was calculated using the start date of trial and “time of death”. It should be noted that the “time of death” is not the exact date when the death occurred. Instead, it indicates that an animal is known to have not survived past this date.

Fecal egg count

The distribution of fecal egg count data from lambs and hogget were examined using histogram and Shapiro- Wilk test. Data was not normally distributed. Data was transformed using log, log10, square root, and box cox methods. Shapiro-Wilk tests were repeated using the transformed values and data did not achieve normality after the transformations. Therefore, non-parametric test was used to examine difference between groups. For each collection date, the difference in fecal egg count between treatment and control group was tested using Kruskal-Wallis test and post-hoc test was conducted using Pairwise-Wilcox test.

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Hoggets showing immediate interest in a bucket of Grape Marc when first introduced to it.