



Sheep,
Camelid
and Goat
Veterinarians
Conference

Proceedings

Wagga RSL Club, Wagga Wagga, NSW
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Debrief, Reboot and Retool 2021 Sheep, Camelid and Goat Veterinarians Conference *with a Sheep Reproduction Stream*



KNOWLEDGE



AUSTRALIAN
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VETERINARIANS



SHEEP, CAMELID
AND GOAT
VETERINARIANS

Welcome



On behalf of the Australian Sheep, Goat and Camelid, and Reproduction SIGs executive committees I would love to welcome you all to Wagga Wagga. This is the first face to face program the AVA has put on post COVID hitting our fine Australian shores. I am personally thrilled that it is a sheep conference in a rural town that is very accessible to many of our small ruminant veterinarians in Australia. No doubt this has helped us get plenty of people in attendance.

This conference is only possible due to our sponsors, and I wish to thank each of you for continuing to support our profession. The sheep (and agricultural) industry has not looked so strong since the wool boom in the 1950's, obviously not many of us remember these times but fortunately we have some great wisdom amongst the crew in attendance that can remember. The current profitability in Australian farms provides a great opportunity for professionals to get amongst the small ruminants and their producers. We have to continue to promote the skills and support we have to offer.

I do not need to go into the conference program, as you have obviously seen enough in it to get you here. But I do want to thank the hard working volunteers Susan Swaney, Tim Gole, Dione Howard and Scott Norman. This event doesn't happen without a lot of time preparing the content and we really appreciate the program you have all worked hard to bring together.

I hope you all enjoy the conference, I would ask you to think about the three main reasons you are here. For me it is about learning something new. It is also about getting away from the everyday work that is my job, but most importantly I believe conferences are about networking with your colleagues. We need to develop friendships within our community and I would encourage all of you to make the effort to get to know people that you wouldn't normally spend time with. Let us all leave here with a few extra phone numbers of like minded people that we can call upon in times of need or be there to support. Everyone has a lot to offer at the conference, let's make these three days resourceful and entertaining.

Regards,

Andrew Whale, SCGV President





Proceedings

2021 Sheep, Camelid and Goat Veterinarians Conference with a Sheep Reproduction Stream

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Can lucerne be safely grazed to flush ewes prior to joining?

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Introduction

Increasing the nutrition of ewes prior to and during joining (flushing) is well-recognised as increasing the ovulation rate of ewes ¹, with the aim of increasing the number of lambs weaned per ewe. Traditionally, lupin grain has been used to flush ewes in Australia, but lucerne (*Megicago sativa*) pasture is an alternative ². However, the advice given to industry includes either recommendation or condemnation of the practice of grazing lucerne pre/during joining. Some advisors and producers have a strong concern that lucerne will reduce the fertility or fecundity of ewes. This paper explores the factors which contribute to the reproductive outcome from grazing lucerne.

How is the flushing effect achieved?

Three states of flushing are recognised ⁴: a static effect, where there is a direct association between liveweight or condition score and ovulation rate; a dynamic effect, where ewes increasing in weight or condition will have higher ovulation rates, and an acute effect, where increased nutrition on days 10 – 14 of the oestrous cycle will result in increased ovulation, with non-measurable change in liveweight ³. Shorter periods of flushing may be more cost-effective than the traditional several weeks pre-joining. An ovulatory response to increased nutrition has been achieved for ewes on either sub-maintenance and above-maintenance rations ⁴. The response appears to be largely driven by an increase in energy intake ^{5,6}.

Increases in the number of lambs weaned result from the net effect of changes in insemination and fertilisation, ovulation rate, embryonic and foetal mortality and perinatal lamb survival. As such, flushing which increases ovulation rate may not result in more lambs weaned if there are adverse impacts on other stages.

Does lucerne reduce fertility/fecundity?

Coumestans are phyto-oestrogens found in lucerne which have been reported to reduce the ovulation rate of ewes by up to 34% ^{7,8}. The rate of embryo survival and conception rates have not been consistently reduced ^{7,8}, although a 20% reduction in conception rate was reported for ewes grazing lucerne with 107 mg coumestrol/kg DM ⁹. Other studies reviewed elsewhere have reported that much higher levels of coumestrol are required to impact ovulation rate, but also the expression of oestrus ¹⁰. Ovulation rate appears to be reduced when the coumestrol content is above 25 mg/kg DM, and these high levels are a plant response to damage induced by aphid or fungal attack, with healthy lucerne containing low concentrations ⁷. Drought stress does not increase coumestrol concentrations to levels which would impact ewe reproduction ¹¹. Removal of ewes from lucerne containing moderate (29 mg/kg DM) coumestrol concentrations at least two weeks prior to joining prevents a reduction in ovulation rate ¹².

High coumestrol concentrations can be expected in situations where aphid attack or fungal disease of lucerne occurs. The risk is increased in wet, humid environments ¹³. A survey by Hall ¹⁴ indicates that the coumestrol content of lucerne in inland Australia was generally below the level

that would cause reduced ovulation rates, although some pastures with fungal infection would be risky. Irrigated pastures may have an increased risk. Varieties of lucerne with good resistance to fungal pathogens are desirable to minimise any risk to ewe reproduction.

One pen study has shown a 10% reduction in foetal number associated with feeding *ad libitum* irrigated lucerne, rather than a maintenance level of grain-based pellet¹⁵. However, coumestan levels were not measured, and these ewes were artificially inseminated, so several factors may have caused the result. Maintenance levels of lucerne produced similar reproductive performance as the pellet, indicating lucerne *per se* was not a risk. The current recommendation is therefore to feed artificially inseminated ewes at maintenance levels during joining.

The high protein content of lucerne has been considered a risk for joining ewes. Excess protein or urea can increase embryonic mortality, although this appears to only be likely when ruminants are in negative energy balance, or if the nitrogen levels fed are extreme¹⁶. Grazing lucerne with 32% crude protein during joining has not increased the non-pregnant or return-to-service rate in ewes compared with grazing grass with 5% crude protein¹⁷.

What is the evidence? Reproductive performance of ewes grazing lucerne in Australia

The reproductive performance of ewes in studies designed to compare flushing on lucerne with other feeds is summarised in Table 1. The reproductive performance was not reduced by lucerne in any of these studies, although it was not always increased. The reasons why flushing may not result in increased foetal numbers include:

- Ewes were not flushed at the appropriate time. For example, Border Leicester x Merino ewes were not cycling by early February, so insufficient ewes were mated when flushing was withdrawn (Experiment 3)¹⁸. A longer period of flushing will be required for ewes joined outside the breeding season, in order to target days 10 – 14 of the oestrous cycle.
- Insufficient increase in energy intake. A response in ovulation can be obtained with small quantities of live pasture (< 350 kg DM/ha)², but lucerne needs to be leafy, since stalk is of low digestibility.
- The comparative pasture contained a similar quantity of live herbage. The response is to energy intake, not lucerne *per se*. For example, 750 kg DM/ha live lucerne produced similar foetal numbers as 347 kg DM/ha live weeds (Experiment 4; Table 1)¹⁸.

Less controlled demonstration studies in Victoria report similar or better performance from ewes grazing lucerne compared with senescent pastures¹⁹. Of 21 sites, 12 reported a significant increase in foetal number per ewe pregnancy scanned, ranging from 10 to 33%. Only one site showed reduced performance, but the cause was unclear. Importantly, this study supported earlier studies which showed that grazing lucerne either for 7 days before and for the first 7 days of joining, or throughout joining in naturally cycling ewes, can increase the number of foetuses scanned, without a reduction in pregnancy rate¹⁷.

A consequence of successful flushing is an increased twinning rate. The perinatal mortality of twin lambs averages 30%, while for singles is 10%, but twins will be more susceptible under unfavourable conditions²⁰, so the consequences for lamb survival require consideration. Flushing has resulted in a large (18%) increase in lamb marking percentages¹ (Table 1) but this may not occur if adverse weather occurs during lambing, or if nutrition is suboptimal.

Table 1. Reproductive performance of ewes flushed on lucerne in various Australian grazing studies.

Reference	Treatment	Variable	Response	P value
17	lucerne days -7 to day 36 of joining cv. senescent grass	non-pregnant (%)	grass 12 lucerne 6	>0.05
		twinning rate (%)	grass 43 lucerne 67	<0.05
		lambs marked/ewe joined	grass 0.96; lucerne 1.14	< 0.05
18	lucerne cv. cereal stubble days -7 to 7 of joining	non-pregnant (%)	stubble 5 lucerne 6	>0.05
		twinning rate (%)	stubble 53 lucerne 69	>0.05
	lucerne cv. stubble/live weeds	non-pregnant (%)	stubble 2 lucerne 7	>0.05
		twinning rate (%)	stubble 67 lucerne 63	>0.05
21	lucerne cv. various before and during joining (lambs)	non-pregnant (%)	various 10-20 lucerne 0	>0.05
		foetus/ewe	various 1-1.5	varied
			lucerne 1.5	
2	lucerne vs various for 9 days pre-ovulation	multiple ovulators (%)	various 27-38 lucerne 36	varied

Conclusion

Lucerne pastures can be safely grazed before and during joining to gain large increases in reproductive rate. Gains result primarily from an increase in ovulation rate, so attention to perinatal lamb survival is needed to maximise any benefit. High coumestan concentrations are a significant risk where wet, humid weather promotes fungal infection, and grazing of affected pastures within two weeks of joining should be avoided. However, there appears to be a low risk for healthy, dryland, inland pastures in Australia.

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