Annual Project Report 2014

Trial of the Scandinavian AI method under British sheep farming conditions

Summary sheet (up to two pages)

Project number			
Start date	1/9/2014	**End date**	30/4/2015

Project aim and objectives
The aim of this study is to conduct a small scale trial utilising the Scandinavian ovine AI method (vaginal deposition of frozen-thawed semen) to investigate the effectiveness of this method under typical British conditions.

Key messages emerging from the project
Vaginal deposition of frozen-thawed semen can achieve conception rates of 50% under typical British sheep farming conditions.

Summary of results
Vaginal deposition of frozen-thawed semen (200-400 x 10^6 spermatozoa) at observed oestrus was performed. The 25 day non-return to oestrus rate was 55%. The conception rate based on lamb paternal identity and lambing date was 50%. These results are not statistically significantly different (p=0.151, p=0.138 respectively) to those described in Norway (67% conception rate) where the method is commonly used. The conception rate is identical to that reported from Sweden (50%). As an incidental finding the relationship between foetal abdominal diameter as determined by transabdominal ultrasonography and foetal age for Cheviot Mule X lambs was determined. The equation of the regression line was $y=7.552x + 39.14$, where y=estimated foetal age in days and x=foetal abdominal diameter in cm.

Lead partner	Royal (Dick) School of Veterinary Studies, University of Edinburgh
Scientific partners	Sveriges landbruksuniversitet, Uppsala, Sweden
Industry partners	Gård & Djurhälsan, Uppsala, Sweden
Government sponsor	

Has your project featured in any of the following in the last year?	
Events	***Press articles***
Conference presentations, papers or posters	***Scientific papers***
Other	

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Full Report

Q1: Financial reporting –

	Yes	No	N/a
Was the project expenditure in line with the agreed budget?	Yes		
Was the agreed split of the project budget between activities appropriate?	Yes		
If you answered no to any of the questions above please provide further details:			

Q2: Milestones – were the agreed milestones completed on time?

Project milestones	**Proposed completion date**	**Actual completion date**
Produce vasectomised ram	Mid-September 2014	12/9/2014
Introduce vasectomised ram	20th October 2014	20th October 2014
Remove vasectomised ram	22nd October 2014	22nd October 2014
Reintroduce vasectomised ram	2nd November 2014	2nd November 2014
Commence AI of oestrous ewes	3rd November 2014	3rd November 2014
Complete AI of 20 ewes	10th November 2014	7th November 2014
Commence lambing	2nd April 2015	30th March 2014
Last ewe lambs	23rd April 2015	28th April 2014

If any of the milestones above are incomplete/delayed, please provide further details:

Q3: Results – what did the work find?

- 50% conception rate using vaginal deposition of frozed-thawed semen (up to 400 x 10^6 spermatozoa per dose) from a Texel ram in Cheviot Mule ewes under typical British sheep farming conditions. This is not statistically significantly different from that achieved in Norway (67%) or Sweden (50%) where this technique is widely used (p=0.138, p=1.000 respectively).
- Non-return to oestrus rate is a reasonable estimate of conception rate (55% and 50% respectively).
- Transabdominal ultrasonographic measurement of foetal abdominal diameter at the level of the umbilicus can be used to estimate foetal age. The relationship found in this study is described by the equation y=7.552x + 39.14 where y=foetal age (days) and x= foetal abdominal diameter (cm).

Q4: Discussion – what do the results mean for levy payers?

The results indicate that vaginal deposition of frozen-thawed semen can achieve conception rates in the sheep of 50%, which suggests it may be a viable alternative to laparoscopic intrauterine deposition of frozen-thawed semen. The advantages of vaginal AI over laparoscopic intrauterine AI are that it would be cheaper, could potentially be performed by farmers themselves, and does not require an invasive procedure or chemical restraint of the sheep. As such it may increase the use of artificial insemination within the British sheep industry and so allows the importation of superior genetic merit germplasm into a flock without the need to purchase a ram. This reduces the risk of disease introduction and also is significantly less expensive than the purchase of a high-quality ram. It also allows small flocks to survive without the need to buy in a new ram every two years (a necessity otherwise in order to avoid father-daughter matings).

The study findings also indicate that transabdominal ultrasound can be used to estimate foetal age, which may have a role to play in the investigation of poor flock fertility in terms of providing estimates of the timing of events which may have affected conception rates.

Q5: New knowledge – what key bit of new knowledge that has come out of this project?

Vaginal deposition of frozen-thawed semen can achieve conception rates of 50%.

Q6: Gaps in knowledge – what gaps in knowledge did this project identify?

As this project utilised semen from a single ram, and all ewes were of the same breed and from the same farm further work is required to elucidate whether 50% conception rate is universally achievable or whether sire and dam breed have significant effects on conception rate and whether similar conception rates can be achieved on other farms and by other inseminators.

The timing of insemination and the semen-thawing procedure used were those previously described as producing the best results in Scandinavia but verification that these are the most appropriate in the UK is a further extension.

Insemination was performed to observed natural oestrus, albeit with a degree of synchronisation by use of a vasectomised ram, as this has previously been described to give higher conception rates than insemination to synchronised oestrus. The latter may be more convenient for the majority of farmers and so investigation of the conception rate achievable with this method at synchronised oestrus is also warranted.

The relationship between foetal abdominal diameter and foetal age was calculated partially using estimated conception dates (i.e. the ewes were known not to have conceived to AI and so were assumed to have come into oestrus and conceived 17 days later). Consequently the relationship is not as robust as if based on known conception dates. Equally it is known only for a relatively narrow range of foetal ages. Further measurements of foetal abdominal diameter throughout gestation from known conception rates would allow the development of a more robust method of estimation of foetal age.

Q7: Cost:benefit – what is value of this project?

The major value of this project lies in highlighting that acceptable conception rates are achievable using a cheap, simple and non-invasive technique of artificial insemination in sheep. It would be premature to suggest that this be widely promoted to farmers at the current time but the project does suggest that further work in this area could develop this technique into one suitable for widespread use.

Q8: Additional deliverables – what activity is planned with the results from this project?

Activity	What is planned?	When likely to happen?
Events		
Press articles		
Conference presentations, papers or posters	**Presentation at the Sheep Veterinary Society Spring Conference** **Presentation or poster at the**	**Wednesday 13th May 2015** **13th-17th September 2015**

	World Veterinary Congress 2015	
Scientific papers	**Publication of a scientific paper detailing the trial findings (target journal: Veterinary Record)**	**Initial submission July 2015**
Other		
Other		