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Premature mammary development in ewe lambs exposed to an oestrogenic lucerne pasture

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New Zealand's specialist land-based university



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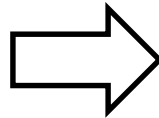
Lucerne (*Medicago sativa* L.)

- Used to increase the pre-mating weight of ewes.
- Increased liveweight benefits ovulation rate
- **This benefit can be confounded by the phyto-oestrogen coumestrol.**



Why is coumestrol a problem?

- Coumestrol consumed in lucerne by ewes during the mating period lowers ovulation rate.
 - This reduces fecundity (multiple births)



When does lucerne have high coumestrol?

Coumestrol in lucerne ranges from 0-600 mg/kg

Levels >25 mg/kg can reduce ovulation rate in ewes

Produced in response to fungal pathogens

Not caused by: Water stress, Development Stage



**Spring
Black Stem**



Stemphylium



**Common Leaf
Spot**



Lepto Leaf Spot



- Inadequate information about managing ewe reproductive performance on lucerne
- This study reports on premature mammary and teat development in ewe lambs grazing lucerne.

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Premature mammary development in ewe lambs on lucerne

- Observational study at Creedmoor Farm, 15 km SW of Oamaru (North Otago).
- Sheep were cross-bred ewes of Texel - East Friesian - Coopworth ancestry.
- At weaning, heavy ewe lambs on grass (n=22) and light lambs on lucerne (n=36).
- Udder development was observed in ewe lambs on lucerne, but not those on grass.

Methods

- 12 March 2015:
 - Teat length, teat width and mammary gland diameter.
 - Pasture samples analysed for coumestrol.
- 20 March 2015: lucerne-fed lambs moved from lucerne to grass.
- 16 April 2015: teat and mammary measurements repeated.
- From 20 April 2015: ewe lambs with the ram.
- Scanned at mid-gestation for number of fetuses per ewe.

Results- Pasture

- Lucerne in non-grazed stands was at late flowering/early seed set.
- Fungal diseases present.
- Coumestrol was 77.1 mg/kg DM in the lucerne being grazed by ewes on 12 March 2015.
- The grass-based pasture had 0.2 mg coumestrol/kg DM.



Spring Black Stem
(*Phoma medicaginis*)

Stemphylium
(*S. botryosum*)



Results- Live weight

- The lambs on lucerne remained lighter than those on grass from weaning until mating.

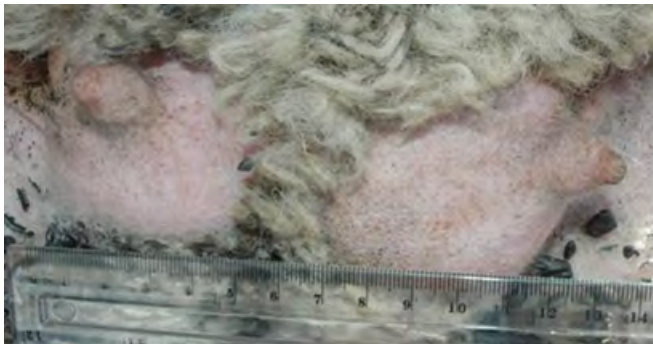
	Live weight (kg)		
	Mid Nov (Weaning)	12 Mar 2015	20 April (Mating)
Lucerne	25.1	45.4	53.0 (grass for 31 days)
Grass	34.7	53.2	57.5

Results- Mammary Development

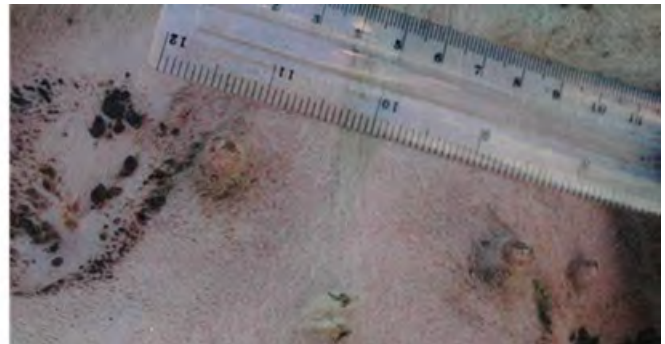
On 12 Mar 2015:

- 19/36 lucerne-fed lambs had protruding udders.
- Mean diameter of 61 mm.
- 0/22 grass-fed lambs had udders

Lucerne-fed ewe lamb



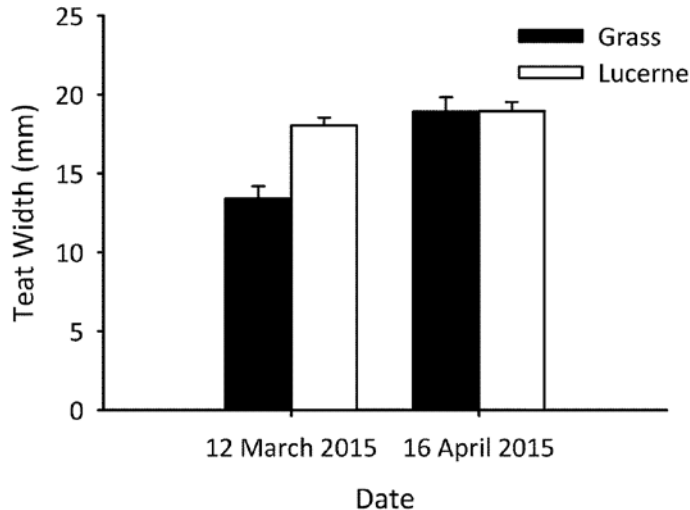
Grass-fed ewe lamb



Results- Mammary Development

On 12 Mar 2015

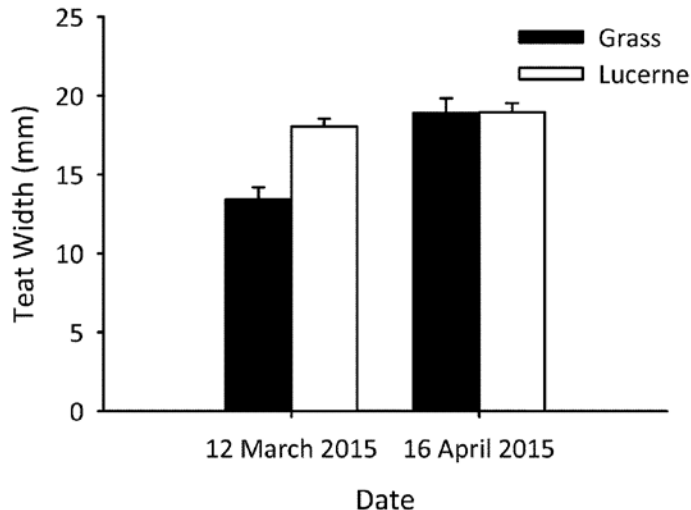
- Lucerne-fed teat **width**: 17.9 mm.
- Grass-fed teat **width**: 13.4 mm.
- No effect on teat **length** (22.1 mm).



Results: After removal from lucerne

16 Apr 2015

- four weeks after ewe lambs moved from lucerne to grass:
 - No change in udder size compared to 12 Mar.
 - No teat width or teat length difference between treatments



Results: Reproductive Performance

- All ewes were marked by rams.
- When only ewes over 53 kg were compared there was no difference in live weight, multiples or scanning rate:

Diet	<i>n</i>	Mating LWt	Scanning Rate	% of ewes with multiples
Grass-fed	22	57.5 ± 0.60 _a	2.05 ± 0.10 _a	91 _a
Ex-lucerne-fed	36	53.0 ± 1.01 _b	1.66 ± 0.10 _b	67 _b
Ex-lucerne fed >53 kg	19	57.8 ± 0.70 _a	1.95 ± 0.14 _a	89 _a

Discussion

- Ewe lambs on lucerne had mammary gland protrusion and greater teat width.
- Lucerne coumestrol was 77 mg/kg DM- above the 25 mg/kg DM suggested to affect ovulation rate.
- Removal of lambs from lucerne a month before mating resulted in no difference in scanning rate when animals within a similar live weight range were compared.
- Further experimentation blocked for live weight required
- Further experimentation to determine how long animals should be removed from an oestrogenic pasture before mating.

Conclusions

- Mammary gland and teat growth can be used by farmers as an indicator of oestrogenic lucerne feed.
- These symptoms could be used by farmers as an indicator of whether to remove the ewes from lucerne during the pre-mating period.
- ***Disclaimer-** If there is no good alternative to lucerne it is better for the animals to be gaining/maintaining weight on lucerne than losing weight on low quality, dead pasture.*
- *There is a strong, well-documented, relationship between liveweight and ovulation rate.*

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