

# LITTER SIZE DETERMINATION IN HIGH FECUNDITY MERINO FLOCKS: A COMPARISON OF REAL-TIME ULTRASOUND IMAGING WITH TWICE DAILY OBSERVATIONS OF LAMBING

D.H. SMITH\*, D.O. KLEEMANN\* and R.J. GRIMSON\*

Real-time ultrasound imaging (RUI) offers a quick, accurate alternative to twice daily lambing observations (TDLO) for determination of litter size. TDLO is labour intensive, costly and prone to error (Alexander et al. 1983).

Five high fecundity Merino flocks (2 PMSG treated, 3 Booroola cross) were imaged during 1986 and 1987. Approximate foetal age at imaging was 50 days for flocks 1 and 2 (PMSG treated), and 80 days for flocks 3-5. Flocks 1 and 2 were slaughtered immediately post imaging and the number of foetuses recorded. Flocks 3-5 lambed during June-July in groups of 80-100 in 9-22 ha paddocks. These flocks were observed twice daily (0900 h and 1600 h) and lambs were tagged and identified with their mothers. All lambing paddocks were gently undulating and completely arable. Pasture height rarely exceeded 5-10 cm enabling easy detection of dead lambs. Ewes which displayed at least two of the following signs were assumed to have lambed even if no lambs were found; bloodstained udder or hocks, agitation, afterbirth, sudden loss of abdominal fill. Ewes pregnant at imaging but not recorded as either lambing or having any of the above signs were assumed to have aborted between imaging and lambing.

Table 1 Accuracy of prediction (%) of (a) RUI as determined at slaughter (flocks 1 and 2) and of (b) TDLO compared with RUI (flocks 3-5). Number of ewes observed is given in parenthesis

| Litter size    | 0           | 1          | 2          | 3 and 4    | Total      |
|----------------|-------------|------------|------------|------------|------------|
| Flocks 1 and 2 | 99.1 (123)  | 98.6 ( 70) | 92.0 ( 50) | 73.1 ( 26) | 95.2 (269) |
| Flocks 3-5     | 100.0 (209) | 93.6 (171) | 84.2 (292) | 68.8 (170) | 86.9 (842) |

Data was analysed by a series of hierarchical log-linear models described by McCloud (1987). RUI (flocks 1 and 2) was an excellent predictor of litter size as determined at slaughter (likelihood ratio statistic  $G^2 = 0.19$ , 4 df, ns) and accuracy (Table 1) was comparable with published estimates (Wilkins and Fowler 1984). TDLO (flocks 3-5) predicted a lower [higher] litter size than observed, by RUI in 16% [1%] of ewes ( $G^2 = 58.28$ , 4 df,  $P < 0.001$ ). One hundred and twenty eight lambs present at imaging (10.1%) were not detected during TDLO. Only 12 ewes were assumed to have aborted (1.8%) accounting for 17 lambs (1.3%). Accuracy for those ewes which lambed during the day was 94.2%, compared to 80.4% for those which lambed during the night. We suggest that the majority of foetuses present at imaging (day 80) survive to term but up to 10% may not be detected by TDLO. Removal of lambs by predators, particularly at night, may offer an explanation for this important source of error.

We conclude that RUI provides a better estimate of litter size at birth in high fecundity Merino ewes than does twice daily lambing observations.

ALEXANDER, G., STEVENS, D. and MOTTERSHEAD, B. (1983). Aust. J. Exp. Agric. Anim. Husb. 23: 361.

McCLOUD, P.I. (1987). PhD Thesis, Flinders University, Adelaide.

WILKINS, J.F. and FOWLER, D.G. (1984). In "Reproduction in Sheep", p182, editors D.R. Lindsay and D.T. Pearce, (Aust. Acad. Sci., Canberra).

\* Dept of Agriculture, Turretfield Research Centre, Rosedale, S.A. 5350.