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**Exposure of ewes to stressors in mid- and late-  
pregnancy: Postnatal effects on the ewe and lamb**



**A thesis presented in partial fulfilment of the requirements for the  
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## ABSTRACT

This thesis set out to examine the effect of maternal undernutrition and exposure to stressors between pregnancy day 50 to 100 and 100 to 147 of pregnancy on the ewe and her lamb. The long-term effects of these stressors during pregnancy on lamb growth, plasma cortisol response to a stressor, metabolism, behaviour and future reproductive success were examined.

### *Mid-pregnancy shearing*

The component of mid-pregnancy shearing that causes the increase in lamb birth weight is unknown. It was hypothesised that the increase in lamb birth weight was due to the stress response of the ewe to shearing. This work examined the effect of a range of stressors at approximately day 80 of pregnancy. These stressors included yarding, crutching and sham-shearing that may be components of the shearing procedure that produce a stress response. In addition, repeated stressors between day 74 and 106 of pregnancy including isolation, sham-shearing and exogenous cortisol injection were used to examine the role of a longer-term stress response on lamb birth weight.

Mid-pregnancy shearing has consistently resulted in an increase in lamb birth weight, however all the other stressors investigated had no effect. Therefore, the hormonal stress response of ewes to shearing was unlikely to be the cause of the increase in lamb birth weight. Mid-pregnancy shearing also resulted in minor changes in ewe and lamb behaviour 12 to 24 h after birth. Shearing during pregnancy had no effect on the cortisol response of ram lambs to handling or castration however differences were observed between singleton- and twin-born lambs.

### *Ewe nutrition during pregnancy*

Ewes mildly undernourished in between days 70 and 107 of pregnancy that were then provided with adequate nutrition between days 108-145 of pregnancy gave birth to lambs with similar birth weights as ewes well-fed during both periods. Therefore the effects of undernutrition on lamb birth weight can be minimised if undernutrition can be limited to the earlier period (day 70-107 and 108-147 of pregnancy). Mild undernutrition in both periods (day 70 – 145 of pregnancy), resulted in lambs that were lighter and that exhibited behaviours associated with a greater ‘drive’ to maintain contact with their dam than lambs born to ewes well-fed during the same period. This suggests that even mild undernutrition in both mid- and late- pregnancy should be avoided.

The effect of maternal nutrition and lamb litter size on the behaviour of female offspring was examined at 1 and 2 years of age. Litter size had no effect on ewe behaviour at 1 year of age however at 2 years of age twin-born ewes had higher maternal behaviour scores than triplet-born ewe lambs. Nutrition of the maternal grand dam during pregnancy had only a minor effect on the behaviour of female offspring at 1 year of age and no effect on maternal behaviour at 2 years of age.

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