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Merino ewes that are genetically fatter lose less weight when nutrition is restricted

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Ewes that lose less weight when there is a shortage of paddock feed are potentially more profitable because they require less supplementary feeding or can be grazed at higher stocking rates during autumn/winter (Young *et al*. 2011). Adams *et al.* (2006) have shown that sheep genotypes which lose more weight when underfed have lower metabolic reserves including fat. This paper tested the hypothesis that selection for increased fatness would reduce the rate of liveweight loss in adult Merino ewes when nutrition was restricted.

Sixty four adult Merino ewes from four flocks were housed indoors. They were fed about 200 g of lupins per day plus *ad libitum* barley straw or a restricted amount of a similar ration. The rations were formulated to achieve liveweight maintenance or an average liveweight loss of about 100g/day. Ewes were weighed twice weekly over 51 days. Daily weight change was analysed using a linear mixed effects model with fixed effects for flock of origin and diet, and included covariates for individual average weight (within flock), condition score at the start of the experiment and estimated breeding values for muscling, fat and growth. Sire was included as a random term.

As expected average liveweight loss was greater for ewes on the restricted diet than the maintenance diet (-97 *versus* +14 g/day; P<0.01). Within this group increasing the yearling fat value from -1.28 to +1.01 reduced liveweight loss by about 50g/day (P<0.05; Fig 1). In the *ad libitum* diet group yearling fat had no significant effect on liveweight change.

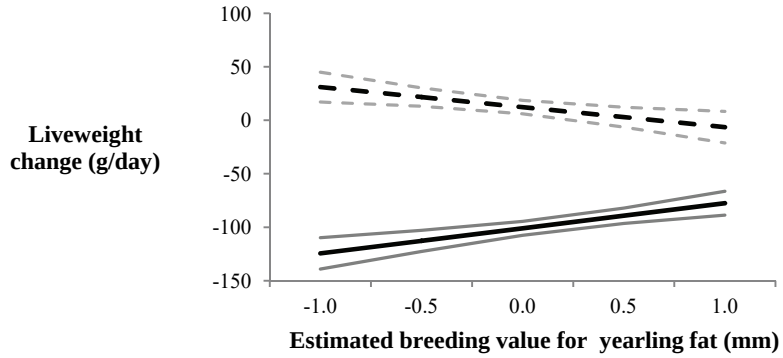

Figure 1. Effect of breeding values for yearling fat on liveweight change in ewes fed a restricted (solid line) or *ad libitum* but low quality diet (dashed line).

In line with our hypothesis, increasing yearling fat breeding values reduced the rate of liveweight loss in ewes on restricted nutrition. Extrapolation of our data suggests that ewes with yearling fat values 2 mm higher could be up to 5 kg heavier if a restriction on nutrition similar to this study was imposed for 3 months. While the biological basis for these differences in liveweight loss are yet to be established, the association with an easily measured trait like yearling fat will potentially provide industry with tools to select animals better able to withstand periods of restricted nutrition.

Adams N.R, Briegel J.R, Greeff J.C, Bermingham E.N. (2006). Feed intake, body composition, and plasma metabolic hormones in Merino sheep that differ genetically in fleece weight or fibre diameter**.** *Australian Journal of Agricultural Research* 57(1) 27–32.

Young J. Ferguson M. and Thompson A. (2011). The potential value of genetic differences in liveweight loss during summer and autumn in merino ewes differs with production environment. *Proc. Assoc. Adv. An. Breed. Gen.* 19, 307-310.