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- Stevenson, J. M., Sernan, D. L., Littlejohn, R. P. 1992: Seasonal variation in venison quality of mature, farmed red deer stags in New Zealand. *Journal of Animal Science*. 70(5): 1389-1396
- Suttie, J.M., Fennessy, P.F., Corson, I. D., Laas, F. J., Elgar, H.J., Lapwood, K.R. 1989. LH and testosterone responses to GnRH in red deer (*Cervus elaphus*) stags kept in a manipulated photoperiod. *Journal of Reproduction and Fertility*. 85(1): 213-219.
- Suttie, J. M., Simpson, A. M. 1983: Photoperiodic control of appetite, growth, antlers and endocrine status of red deer. *Biology of Deer Production*. Proceedings of an International Conference held at Dunedin, New Zealand, 13-18 February 1983 [edited by Fennessy, P.F.; Drew, K.R.]. 1985, 429-432; Bulletin 22 of the Royal Society of New Zealand, 15 ref. Wellington, New Zealand. 1985.
- Wheeler, T.; Koohmaraie, M. 1991. A Modified Procedure For Simultaneous Extraction and Subsequent Assay of Calcium-dependent and Lysosomal Protease Systems from a Skeletal Muscle Biopsy. *Journal of Animal Science*. 69(4): 1559-1565.
- Whipple, G., Koohmaraie, M. 1992: Effects of lamb age, muscle type, and 24hour activity of endogenous proteinases on post mortem proteolysis. *Journal of Animal Science*. 70(3): 798-804

## The Calpain System – genotype, nutrition and their interactions

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### ABSTRACT

Muscle proteolysis is controlled by a number of enzyme systems. The reported effects of the calcium dependent proteinases (or calpains) on myofibrillar structure have led to the speculation that this enzyme system may have an important role in regulating muscle growth and the post mortem ageing process. Although at present there is no clear economic incentive, meat quality has to be taken into account since the white meats of poultry and pork are out competing the traditional red meats of lamb and beef. Meat quality attributes may largely depend on slaughtering and post mortem ageing regimes, however, variability also originates from the biological characteristics of muscles which are undoubtedly environmentally and genetically controlled. The aim of the present experiment is to examine the effect of genotype, nutrition and their interactions on the calpain system.

Progeny from 3 sire breeds (Texel, Fat Southdowns and Lean Southdowns) were weaned in December and placed onto one of two growth paths until May (high (H) or low (L) rate of gain), from May until July these groups were further divided into groups HH, HL, LL and LH. Animals were slaughtered at the Ruakura commercial slaughter facility, samples for calpain analysis were taken from the distal portion of the longissimus dorsi of the animal within 20 minutes of slaughter. The assays were performed as outlined by Dobbie *et al.*, (1995).

Calpain-I differed significantly ( $p < 0.05$ ) between genotype (Texel 0.57 SDFat 0.50 SDLean 0.41 U/g (SED 0.060)). Calpastatin was significantly ( $P < 0.05$ ) affected by plane of nutrition immediately after weaning. (H:2.61 L:2.35 U/g SED 0.126).

The results taken together suggest that complex physiological interactions exist between genotype and nutrition with respect to the calpain system.

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