# INTRAMUSCULAR FAT LEVELS IN SHEEP MUSCLE DURING GROWTH

David Hopkins[1], Malcolm McPhee[2] and David Pethick[3]
[1] NSW DPI, Centre for Sheep Meat Development, PO Box 129, Cowra, NSW Australia 2794. david.hopkins@dpi.nsw.gov.au
[2] NSW DPI Beef Industry Centre of Excellence, JSF Barker Building, Trevenna Road, UNE, Armidale, NSW Australia 2351
[3] Department of Veterinary Biology and Biomedical Science, Murdoch University, South Street, Murdoch, WA 6150

## INTRODUCTION

A concern raised by the Australian lamb industry was that very low levels of intramuscular fat could lead to meat that is perceived as dry and less tasty. Such a situation has been found in young highly muscled lean cattle and in many cuts from modern pig genotypes.

The minimum requirement for ether extractable fat to achieve acceptable consumer satisfaction for grilling 'red meat' cuts (beef and lamb) is quoted at 3–4% and 5% for sheep meat based on NIR spectroscopy. For pork, a figure of 2–2.5% is cited on a fresh uncooked basis while a maximum level of 3.5% is thought to achieve optimal consumer acceptability.

In this poster we outline the influence of maturity effects on the expression of intramuscular fat in lambs and young fully mature sheep.

## OBJECTIVE

To examine the maturity pattern of intramuscular fat development and understand how this is influenced by the genetic potential for growth and muscling in different maternal scenarios.

## METHODS

### Animals

A serial experiment was conducted with animals representing the major genotypes used for lamb meat production in Australia. Animals (wethers and ewes) were slaughtered at 4 ages, from weaning at 4 months (110 days) to 22 months (662 days).

### Measurements

Carcase composition (fat, ash and protein (lean) was determined for 595 animals by dual energy X-ray absorptiometry. The entire *longissimus* (loin) muscle was removed, weighed and the intramuscular fat percentage (IMF%) determined using NIR.

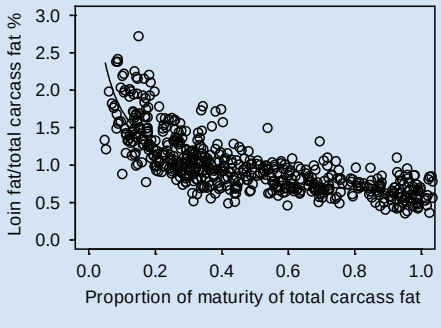
The mean total carcase fat at 22 months for each genotype and sex was used as an index of maturity to calculate the proportion of maturity of total carcass fat for each individual animal at each slaughter age. This approach, proportion = individual carcass fat/mean carcass fat at 22 months, was based on the principles of Butterfield (1988).

Non-linear regression was applied to the weight of intramuscular fat in the loin as a proportion of the weight of carcase fat.

## RESULTS

As the animals matured the proportion of intramuscular fat relative to total carcass fat declined (Figure 1) thus indicating that IMF is early maturing.

*Figure. 1. Relationship of the proportion of intramuscular fat (IMF) in the loin in relation to total carcass fat as function of the maturity pattern of total carcase fat.*




## CONCLUSIONS

The results suggest that feeding sheep to increase IMF levels is counter productive for profitable production systems. The practice would not meet consumer expectations for low levels of fat surrounding retail meat cuts. In the case of prime lambs there is virtually no eating quality gain associated with over fattening lambs and the minimum desirable fat score of 2 is sufficient.


ACKNOWLEDGEMENTS
The financial support provided by Meat and Livestock Australia, the Australian Sheep Industry CRC and NSW DPI is greatly acknowledged. Tracy Lamb, Megan Moppett and David Stanley (NSW DPI) are thanked for their technical assistance.

NSW DEPARTMENT OF PRIMARY INDUSTRIES