Overview of Tested Improved Measurement Techniques for Meat Quality in Beef and Lamb to be Used in Breeding Programmes

Programme 2

- ☐ Control of Viral Diseases
- ☐ Control of Bacterial Diseases
- ☐ Control of Parasitic Diseases
- ☐ Livestock Welfare
- ■ Livestock Genetics

Rainer Roehe, Elly Navajas, Dave Ross, Nuria Prieto, Jimmy Hyslop, Kirsty McLean, Elisenda Rius , Nicola Lambe, Lutz Bünger and Geoff Simm
SAC
West Mains Road, Edinburgh
Email: Rainer.Roehe@sac.ac.uk

Background

•Efficiency of red meat production and marketing is reduced by a lack of objective, practical and accurate techniques for measuring carcass and meat eating quality.

•Research on improved measurement techniques has been highlighted as a priority by both Government and industry stakeholders from across the supply chain.

•Designing breeding programmes including new improved measurement techniques and selection strategies is crucial for improvement of carcass and meat eating quality in order to develop a more sustainable Scottish livestock industry.

Aims and Objectives

•Investigate techniques for predicting beef and lamb carcass and meat eating quality from live animal and carcass measurements.

•Identify the most cost-effective breeding programme designs to achieve genetic improvement of carcass and meat eating quality in beef and lamb.

•Investigate the influence of marker genotypes on predicted and direct measures of carcass and meat eating quality.

Policy Relevance

•*A Forward Strategy for Scottish Agriculture* emphasizes the importance of Scotland's livestock farmers adopting practices and technologies that enable them to operate more effectively in an increasingly competitive food chain.

•The project will provide a substantial contributions to produce safe and high quality food at appropriate price and account for changing market signals.

•The use of new improved measurements techniques and selection strategies in optimized breeding programmes, with emphasis on high quality food, is expected to result in a permanent, cumulative and highly cost-effective improvement of meat quality.

Relevance to Cross-Cutting Themes

CCT 1: Responding to Climate Change	★ ☆ ☆
CCT 2: Protecting Biodiversity	★ ★ ☆
CCT 3: Environmental, Social and Economic Sustainability of Rural Scotland	★ ★ ★

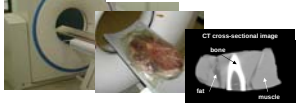
Improved measurement techniques for Meat Quality

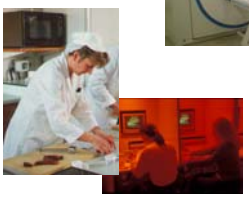
Live animal measures (e.g. Ultrasound scanning, Video Image Analysis)

Meat colour & pH in the abattoir

Instrumental meat texture

Scanning of primals using X-ray Computed Tomography





Trained assessors evaluate beef eating quality

Carcass composition by dissection

Near-Infra-Red scanner for meat quality prediction

Designing breeding programme for Meat Quality

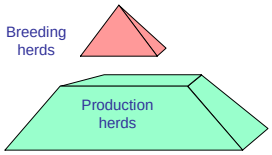
Optimal integration of all information from improved measurement techniques to enhance meat quality

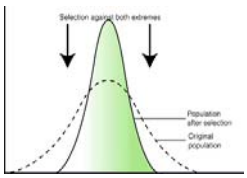
Use of population genetic and simulation techniques to determine:

•the optimal integration of above new measurements in breeding programmes

•the efficiency of canalised selection

•the optimal integration of molecular and conventional quantitative genetic information in breeding programmes





Progress to Date

•Sophisticated measurement techniques to predict meat quality have been identified in a pilot trial of 44 steers and various datasets in sheep. Additional data from 150 cattle of 2007/08 are being collected.

•Generally the results indicate that Video Image Analysis (VIA), Near- Infra-Red spectroscopy (NIR) and Computer Tomography (CT) provide valuable information for genetic improvement of meat quality.

Acknowledgements

The Rural & Environment Research & Analysis Directorate is gratefully acknowledged for supporting this work.

Moredun SAC THE MACAULAY INSTITUTE research today for land use tomorrow BioSS