Towards value-based marketing of UK lamb

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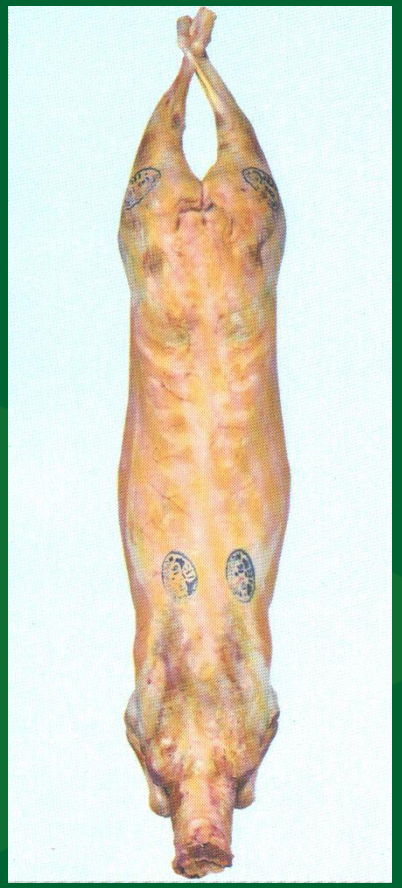

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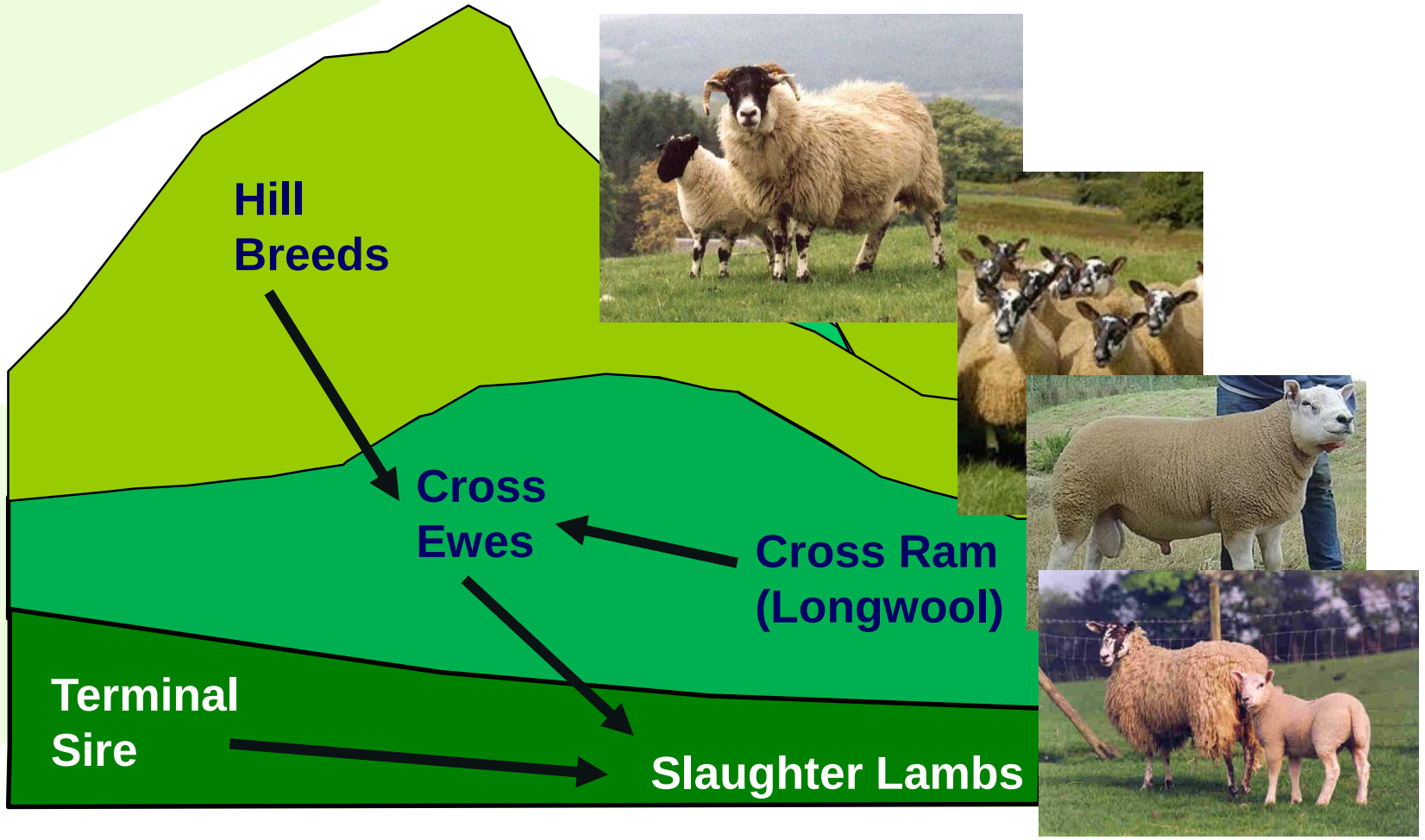
Introduction

- Current UK lamb production and marketing systems
  - Stratified industry structure



stratified: non-stratified
- 71:29% in 2003
- 55:45% in 2012

Crossbred ewes produce 66% of lambs

Terminal sire breeds
- sired 68% of lambs
- 45% of lamb meat genetics

Pollott, 2014

Introduction

- Current UK lamb production and marketing systems
  - Stratified industry structure
  - Breeding programmes (purebred → crossbred)
  - Carcass grading and payment system since 1970s

Carcass value:

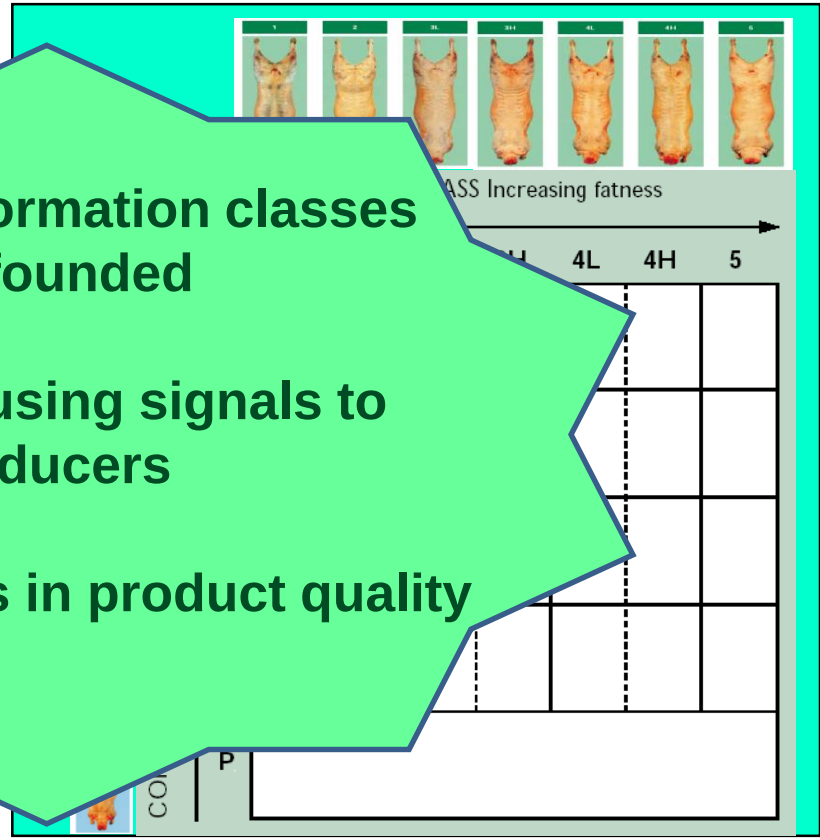
Conformation class (EUROP)

Fat class (1-5)

Cold carcass weight (kg)

Dressing specifications

Category (lamb, mature sheep etc)



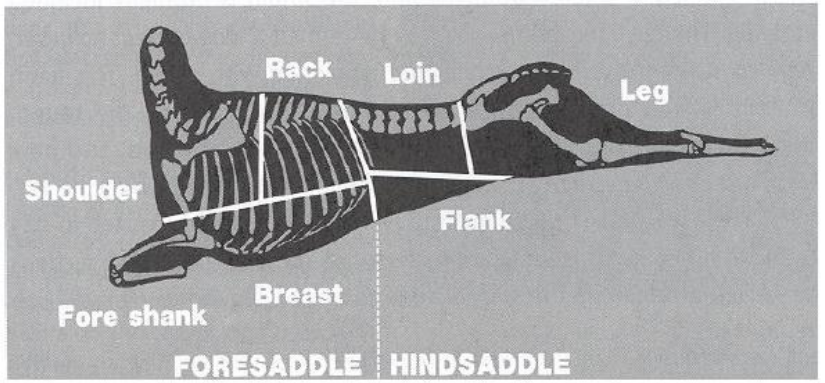
Fat and conformation classes confounded

Sends confusing signals to producers

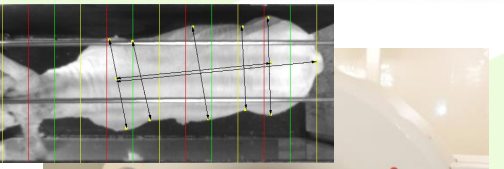
Limits progress in product quality

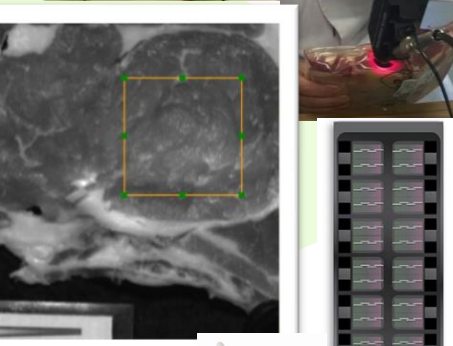
Value-based marketing systems

- Payment system accurately reflects carcass value
- Value to butcher / retailer = lean meat yield / distribution, meat quality
- Reward sellers who match these criteria
- Encourage producers & breeders to improve carcass & meat quality
- Provide clear economic signals through the supply chain



New technological advances





– EID and PLF technologies

- Traceability; automated data collection

– Technologies to predict carcass / meat quality

- Live animal – ultrasound; CT ; Video Image Analysis…
- Carcass – VIA; NIR; Hyperspectral imaging; CT …

– Advanced genetics and genomics

- Estimated breeding values (EBVs) for product quality traits
- Genomic selection: hard-to-measure traits
- Combining pure- and crossbred data

UK research

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Integrate the supply-chain to harness the benefits of (new?) technologies to improve lamb product quality

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Breeding for more taste and less waste (2014-19)

Terminal sire rams
CT scanned

Mated to Mule ewes

n ~ 5000
crossbred
lambs

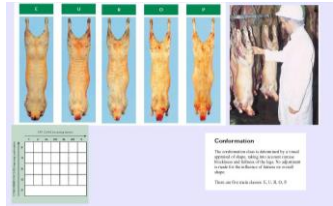
Nasal
sampling

EBVs based on
meat and carcass quality
of crossbred lambs

Taste Panel

Loin info

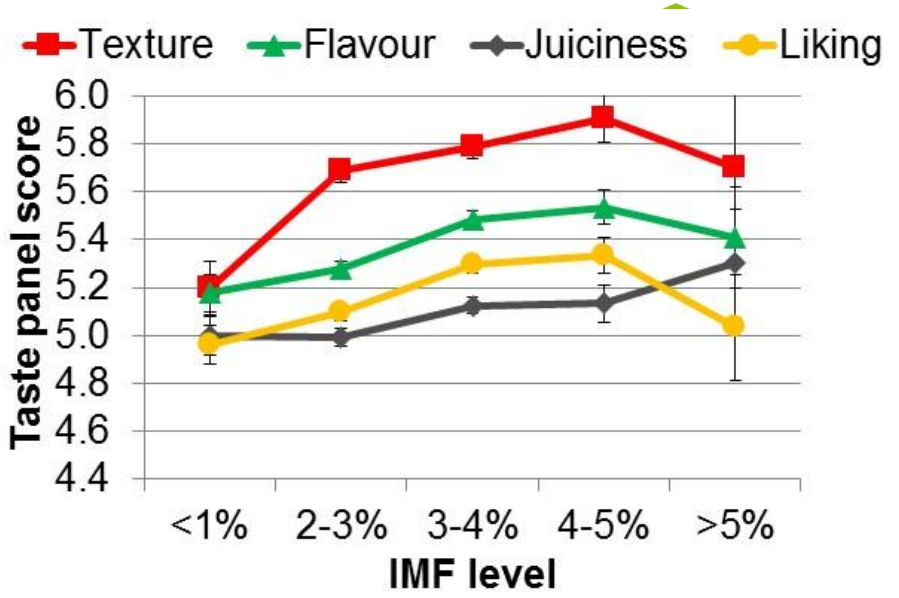
CT

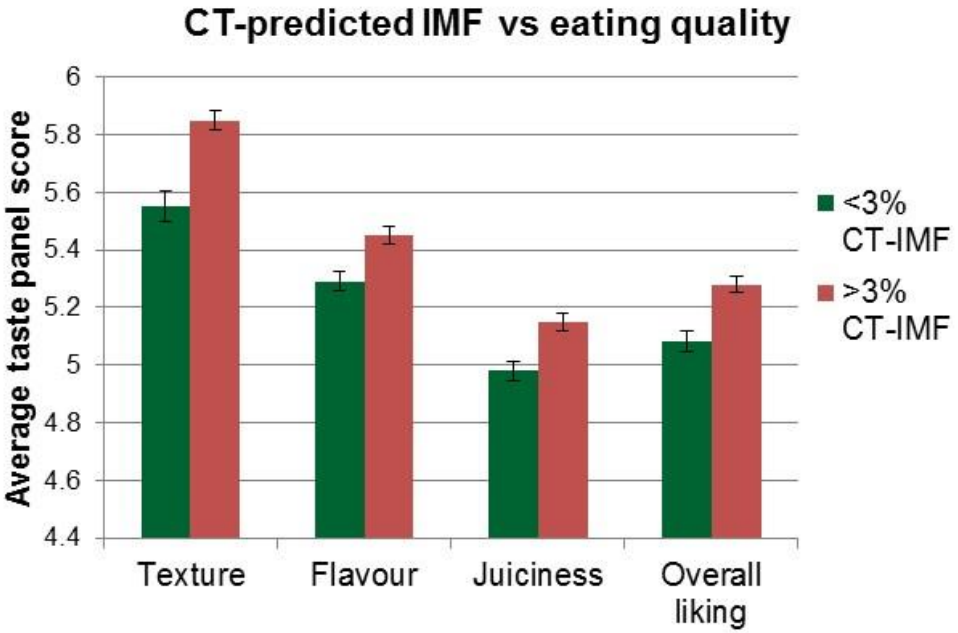


Carcass info

Taste vs Waste - Key findings

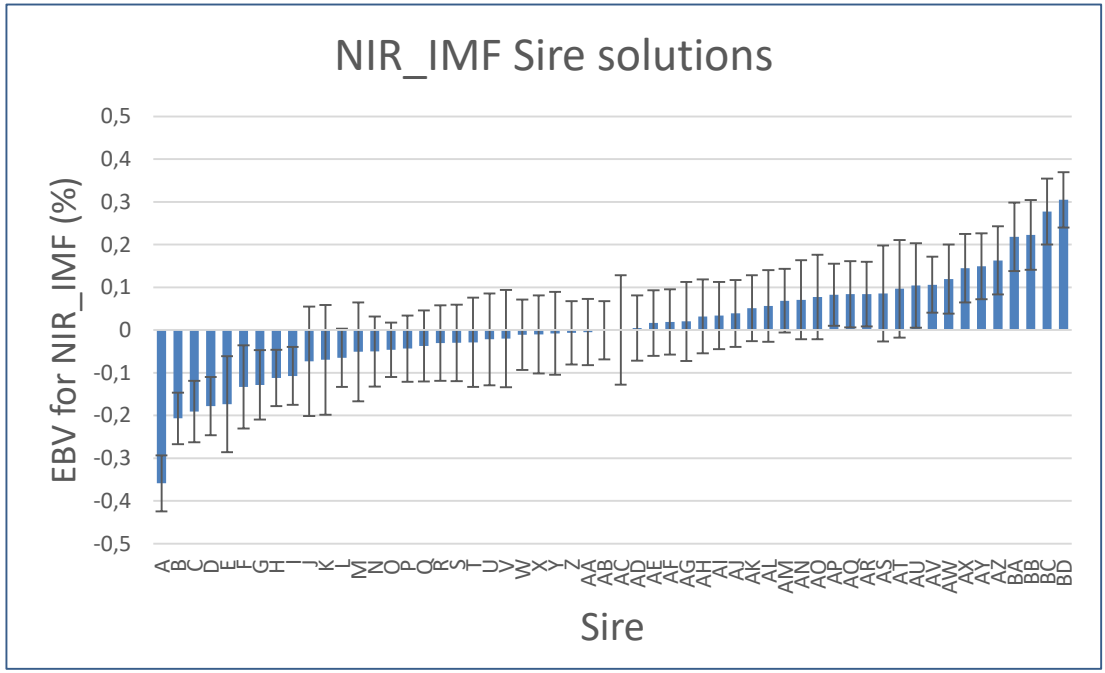
- Lamb intramuscular fat (IMF) linked to eating quality
- NIR and CT of lamb loin cuts can predict IMF with moderate accuracy (R^2 ~ 0.3-0.6)
- IMF predictors in crossbred lambs are heritable (sire model):
  - NIR-IMF h^2= 0.29 (s.e. 0.07)
  - CT-IMF h^2= 0.21 (s.e. 0.06)



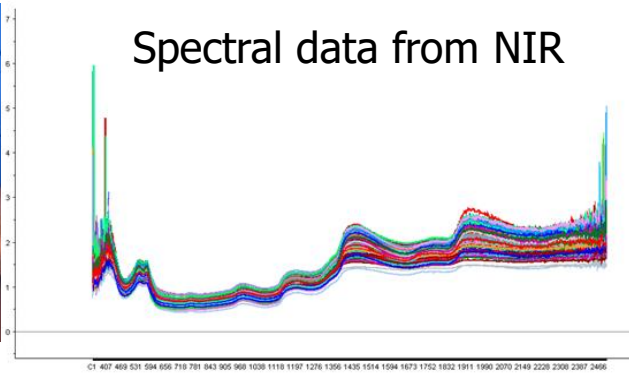


Taste vs Waste - Key findings

- NIR predicted IMF potential for exploitation:
  - more practical to implement in abattoir
  - largely independent of FAT class (r_g = 0.19)
  - strong r_p with various IMF lab tests
  - high r_g with lab-extracted IMF (0.9)



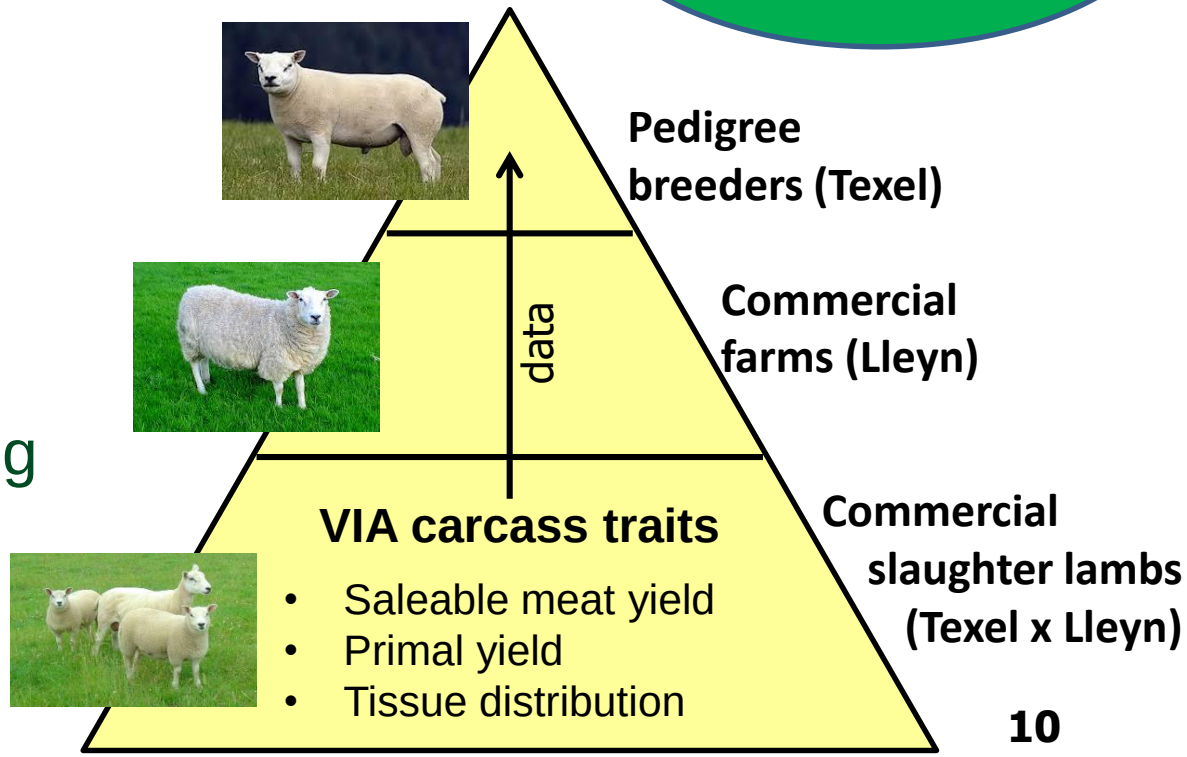
- Scope within breeding programmes to:
  - maintain IMF for eating quality
  - decrease total fat
  - improve carcass quality and reduce waste in commercial slaughter lambs



Carcass trait phenotype feedback for genomic selection in sheep (2017-2020)

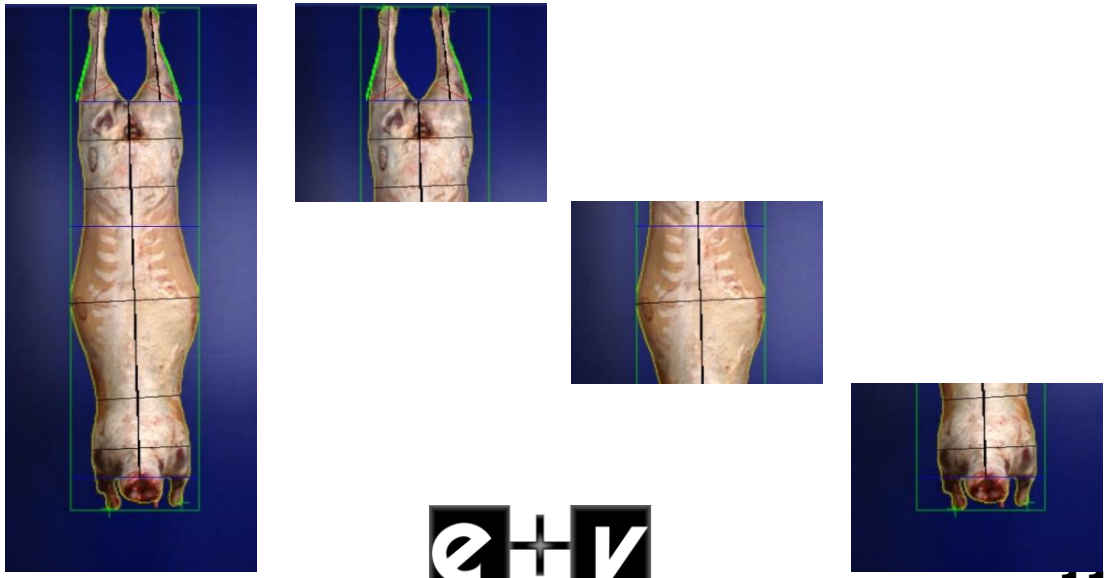
- Outputs target improved carcass value and animal health
- Novel phenotype collection in abattoir:
  - Carcass merit (VIA scans)
  - Meat hygiene data
- Data analysed to identify genetic / genomic variation
  - Production of genomic estimated breeding values (GEBVs) to aid selection

~3400 cross lambs
~80 Texel sires



“VIA project” - Progress to date

- New video image analysis (VIA) carcass value traits validated against CT scanning
  - Weights of lean meat, fat and bone in:
    - Total carcass
    - Shoulder primal cut
    - Saddle primal cut
    - Hind-leg primal cut
  - r ~ 0.8 - 0.96 (E+V)



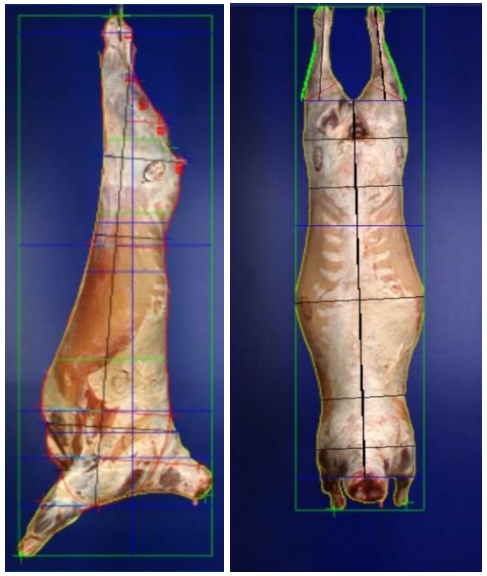
“VIA project” - Progress to date

- ***Preliminary*** genetic analysis: h^2 of crossbred VIA traits (sire models)

Tissue wt	Whole carcass	Primal regions
Lean	0.34 (0.13)	0.08 – 0.41
Fat	0.15 (0.08)	0.06 – 0.17
Bone	0.50 (0.15)	0.24 – 0.49

Arjan Tolkamp

1474 cross lambs
32 Texel sires



- Genotypes collected
  - Will be linked with phenotypes across 2 years
  - GEBVs will be produced for crossbred carcass value traits
- EBVs and GEBVs will allow prediction of Texel sires’ ability to produce valuable crossbred slaughter lambs

Towards exploitation…

- Technology to differentiate lamb quality in the abattoir
  - equipment, protocols, prediction equations, data feedback mechanisms
- Building blocks for breeding programme incorporation
  - genetic parameters, models, EBVs, GEBVs
- Considerations for practical exploitation
    - abattoir implementation (e.g. differentiated producer group product)
    - genotyping & phenotyping strategy
    - simple selection tools for breeders and ram buyers

Towards exploitation…

- Whole supply-chain collaboration
  - harness technological advances
  - enable a value-based marketing system to incentivise product quality

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