1. Genetic evaluations in the UK
2. How is the UK going to incorporate interbeef EBVs into the routine evaluations?
3. Where are we on carcass traits?

Interbeef meeting - June, 2015
• Edinburgh Genetic Evaluation Services
  – Professor Mike Coffey
  – Geneticists (4.4) and Programmers (4+1)
• Routine genetic evaluations
  – UK dairy
  – UK beef and sheep
• Genetic evaluations and developments on behalf of industry bodies
• Not involved directly in phenotype collection and contact with breeders
Edinburgh Genetic Evaluation Services

Providing genetic evaluations to the UK dairy (on behalf of Dairy Co), beef and sheep (on behalf of Signet) industries

Database providers of the BASCO database and fish breeding companies

Implementing genomic breeding values for UK dairy and beef cattle

New web tools to assisting in managing selection decisions
BeefBreeder EBVs

**Weight**
- Birth weight
- 200-day growth
- 400-day weight

**Carcase**
- US Fat depth
- US Muscle depth
- Muscularity

**Fertility**
- 200-day milk
- Gestation Length
- Age at first calf
- Calving interval
- Calving Ease
- Life span
- Scrotal Circumference*

**Temperament**
- Docility*

*Mature Cow Weight*
*Body Condition score*

[Image of a person inspecting a cow]

[Image of cattle in a field]

[Image of a person writing in a clipboard]
Evaluations

• Animal models
• MiX99 software
• Pedigree herds
• Signet: Limousin, Stabiliser, British Blonde, Red Poll, Sussex, Highland, Lincoln Red & Longhorn
• ABRI: Aberdeen Angus, Beef Shorthorn, British Blue, British Charolais, British Simmental, Hereford, Murray Grey, Red Ruby Devon, South Devon and Welsh Black
Internationally enhanced UK Limousin breeding value

Kirsty Moore and Raphael Mrode
Interbeef

• 10,040 animals with interbeef and BLCS EBVs with reliability of 0.5+ (acc of 0.71+)
  – Correlation of 0.91

\[
y = 0.8371x - 4.9844
\]

\[
R^2 = 0.8232
\]
InterBeef publication rules

- To ensure quality of InterBeef publication
- National animals follow national publication rules
- Foreign animals follow Interbeef rules:

Interbeef reliability $\geq 50\%$ in at least 1 country scale

$\geq 25$ progenies with records in Interbeef run

- Proof is officially published in at least 1 country
- Bull has progeny in more than 1 country

Proof publication
First official results Feb 2015!

- Great source of information but how to use? SRUC
  - 2 EBVs for the same trait confusing
  - Will often be a time lag between the latest set of interbeef breeding values and BLCS breeding values
  - Interbeef are based just on 200 day weight while BLCS is a multiple trait evaluation
  - Not all animals will have an interbeef breeding value
  - Foreign animals that have never been used in the UK
  - Maternal component makes it more complicated
Internationally enhanced UK Limousin EBVs

- Incorporate the interbeef EBVs as a phenotype into the UK evaluation
- Interbeef EBVs then become an extra source of information

UK single trait evaluation to produce a UK 200WT & 200MILK EBVs

Undertake de-regression to produce UK 200WT & 200MILK dEBVs

Interbeef provide 200WT & 200MILK EBVs

Undertake de-regression to produce ITB 200WT & 200MILK dEBVs

YIELD DEVIATIONS

200 DAY WT = direct from the animal + maternal from the dam
Which dEBV?

UK multiple trait evaluation (all other traits remain the same but a choice is made per animal as to which dEBV)

Does the animal have a 200 day wt phenotype recorded with BLCS?
- No
  - Does the animal have a ITB EBV with rel>0.5 (acc 0.71+)?
    - No
      - No phenotype
    - Yes
      - Use ITB dEBV

- Yes
  - Does the animal have a ITB EBV with rel>0.3 (acc 0.55+)?
    - No
      - No phenotype
    - Yes
      - Use ITB dEBV
      - Use UK dEBV
Test run to include Interbeef

- A work in progress
UK multiple trait evaluation (all other traits remain the same but a choice is made per animal as to which dEBV)

Does the animal have a 200 day wt phenotype recorded with BLCS?

- No
- Yes
  - No phenotype
  - Use UK dEBV
**Expect no change**

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<th>RRENT</th>
<th>UK ONLY</th>
<th>Corr</th>
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<td>AVG</td>
<td>RANGE</td>
<td>AVG</td>
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<tr>
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<td>-0.5</td>
<td>-12.7 TO 10.2</td>
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UK multiple trait evaluation
(all other traits remain the same but a choice is made per animal as to which dEBV)

Does the animal have a 200 day wt phenotype recorded with BLCS?

No

Does the animal have a ITB EBV with rel>0.5 (and UK rel >0.5)

No

Use UK dEBV

Yes

Use ITB dEBV

N=631
Expect Little change

<table>
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<tr>
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<th>ITB for UK performance recorded</th>
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<td>200D MILK</td>
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<td>-13.1 TO 10.3</td>
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**AVG**

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<td>0.99</td>
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<tr>
<td>200D MILK</td>
<td>-0.7</td>
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Sires of 2010 born animals

Accuracy

EBV

After Interbeef

Before Interbeef

Accuracy
Foreign animals, never used in UK

• 16,034 bulls now with a 200 day EBV comparable to UK animals!
• Won’t be included in the BLCS evaluations as not known on the BASCO database
• EBVs accessible for checking for when making selection decisions (most likely on the BLCS website).
Dealing with the maternal component!

• Has been more difficult than expected!
• DYD for ITB results (based on discussions with ICBF)
  – Take the ITB ebvs for those meeting publish rule for UK, plus their parents ebvs
  – Bonaiti and Boichard, 1995 method to get DYD for both direct and maternal
  – But set some min levels to remove some ‘dodgy’ DYD
  – Phenotype(a) = DYDdirect(a) + DYDmaternal(d)
  – Unknown dams – given a dummy id and DYDmaternal(d) inferred
    • If not parents known it is DYDmaternal(d)=DYDmaternal(a)
    • Sire known then it is calculated based on the sire and animal values
• Undertake a single trait evaluation for wt200
• Compute YD for each animal
• YD = raw 200day weight – solutions for FE* - PE solution of the dam
  – Contains the direct(a) and maternal(d) components
• FE* - CG, birth month, sex, foster status, birth type, weaning dam breed, purebred status, age (linear & quadratic)
• We adjust both the ITB and UK to the respective mean and STD of the datasets
• Scale the ITB to be the same phenotypic variance components as the UK
• Substitute in the ‘new’ phenotype into the multi-trait evaluation using the national parameters
• No fixed effects
• Animal and dam as random effects
  – Weighted by ERC (at the moment all 1.0 as I get odd results – so next step is to figure this bit out)
Conclusion

• Still a work in progress
• Fine tuning / developing the method
• Still in control steps where I expect no change
• Yet to include animals that we are really interested in included
  – Those with low UK accuracy and high ITB accuracy.
Where are we on carcass traits?
International genetic and genomic evaluations for carcass traits in beef cattle

• PhD student
  – Tanya Englishby
  – 4 year project (2013-2017)
• Joint SRUC & Teagus
• Funding
  – Teagasc Walsh Fellowship Program
VIA genomic breeding values

- 4 year project (2012-2015)
- Limousin genomic breeding values for abattoir VIA carcase traits
  - Available 2015
- First UK genomic breeding values
EUROP Carcass Trait EBVs

- Levy board funded
- Using Abattoir Data and BCMS records for Carcass Trait Evaluations
  - Produce EBVs for EUROP carcass traits
    - Carcase weight
    - EUROP conformation class
    - EUROP fat class
    - Age at slaughter
    - Average daily carcass gain
Research projects

- Core research completed and wrapping up
- Exactly how it is getting rolled out is still being decided.....
Interbeef carcass traits

• Which traits?
  – Survey (2014)
  – Abattoir carcass weight, conformation and fat class
    • CHE, CZE, DNK, FIN, FRA, GBR, IRL & SWE
• Data call
  – Dependant on when we can load cross breeds into IDEA