



SMALL RuminanTs breeding for Efficiency and Resilience

Can we do international evaluations for sheep? The case of UK - Ireland

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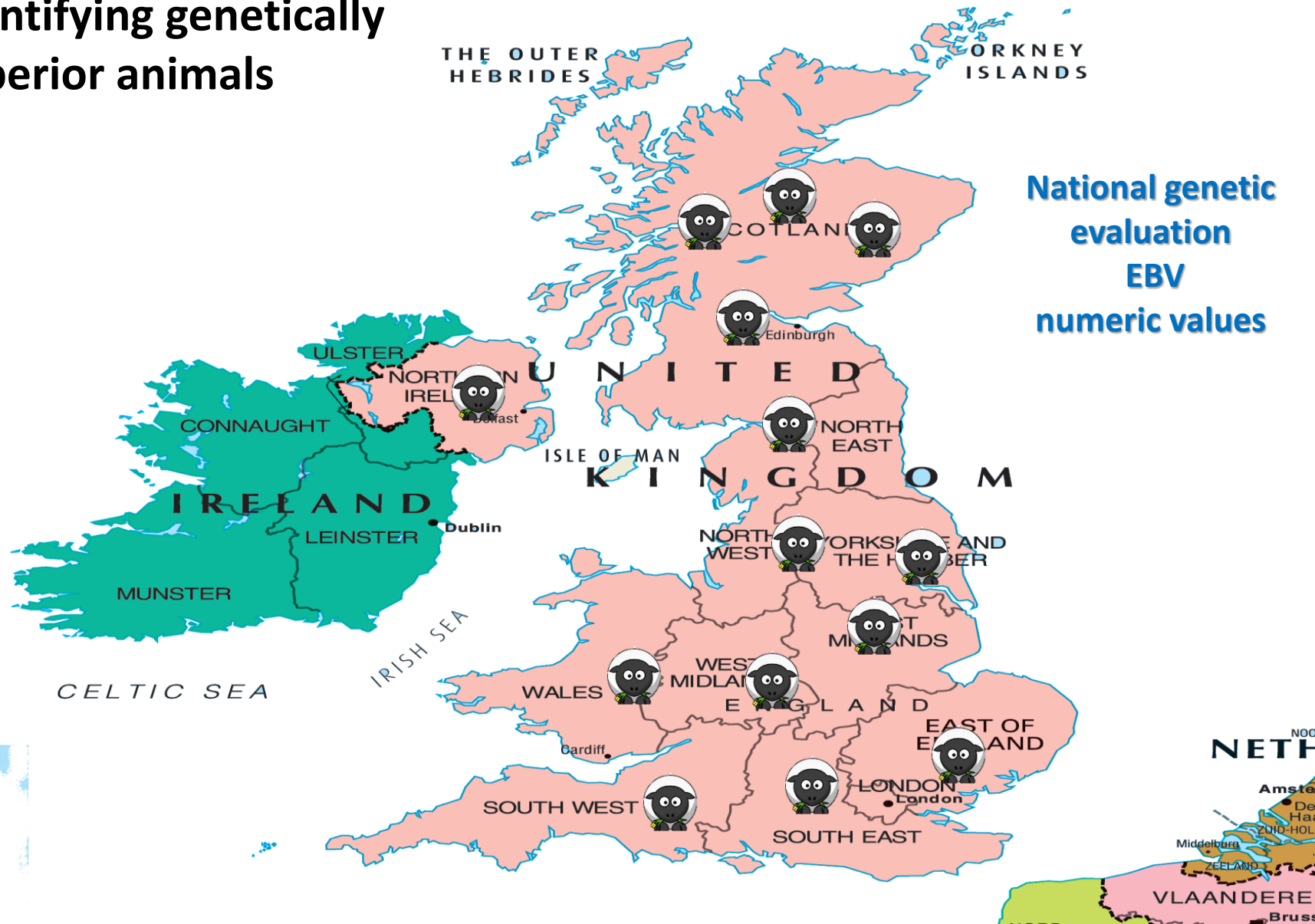


**Selective breeding is
based on identifying
genetically superior
animals**

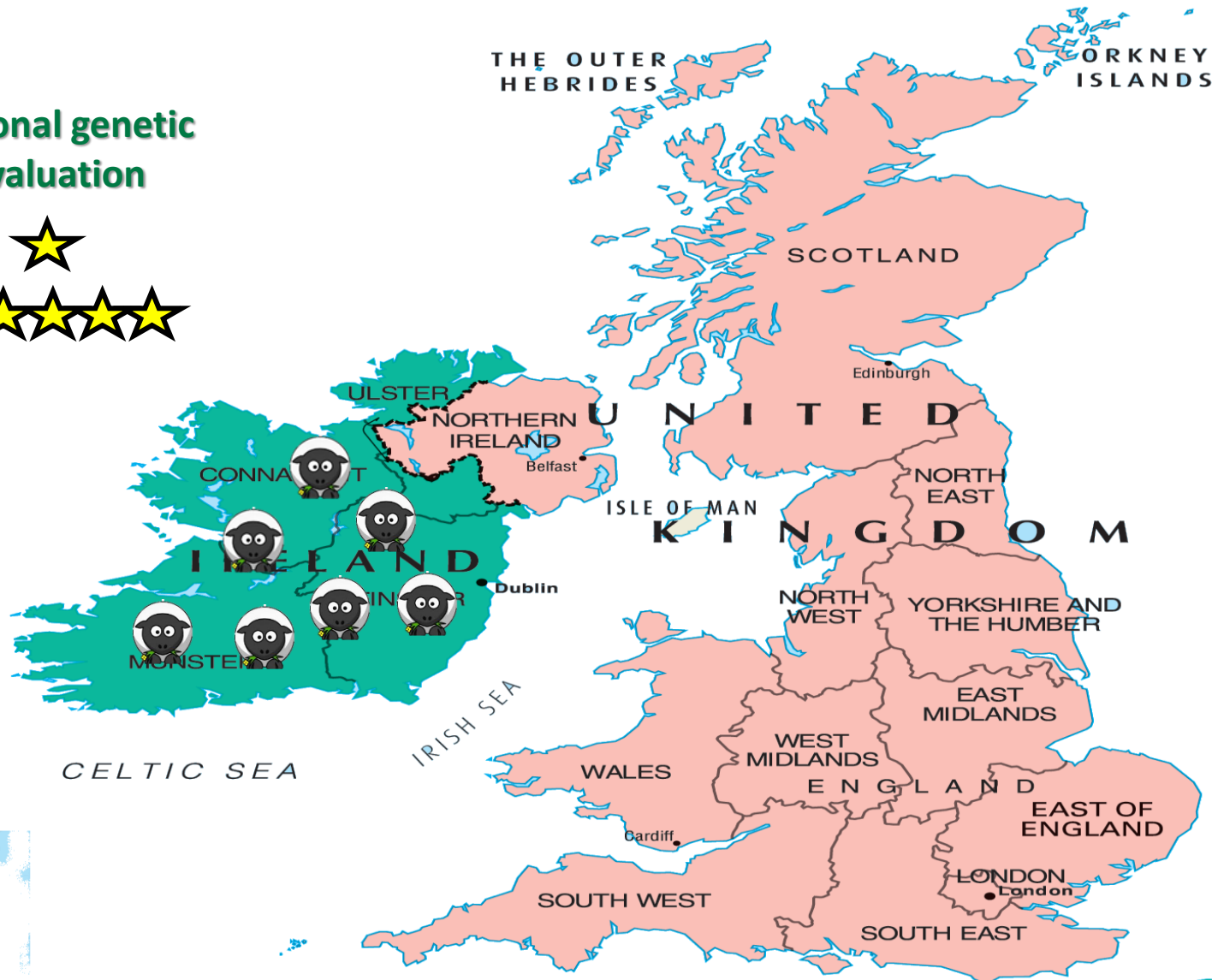


**The bigger the
selection pool the
better**

Identifying genetically superior animals



National genetic evaluation



NETH

Amster
De Ha
ZUID-HOLL

Middelburg

VLAANDEREI

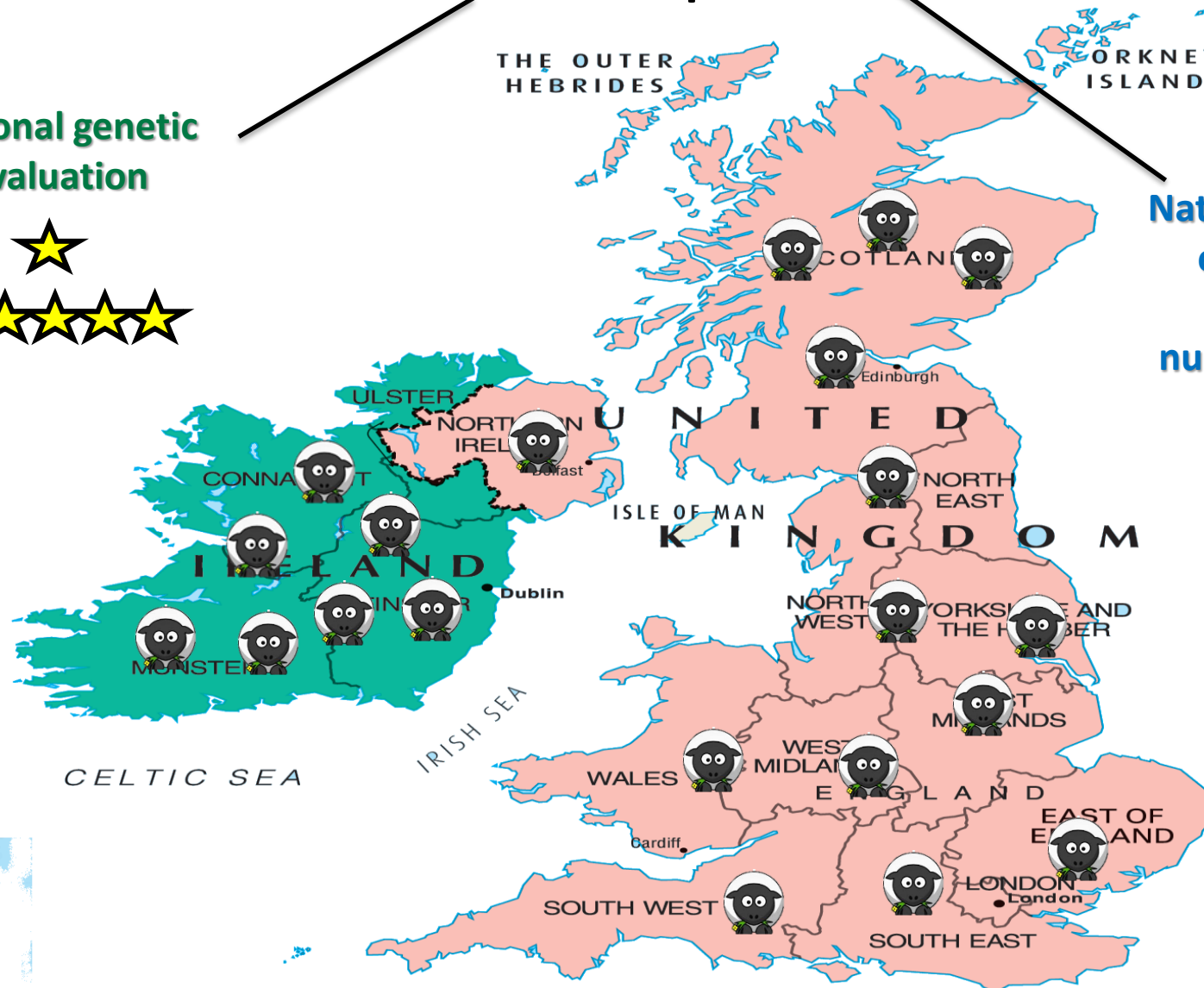
Brus

Not comparable

National genetic
evaluation



National genetic
evaluation
EBV
numeric values



NETH

Amster
De Ha
ZUID-HOLL

Middelburg

VLAANDERE
Brus

The dairy cattle example:

- Make national genetic evaluations comparable
- Requires genetic links between countries



The beef cattle example:

- Jointly analyse animal records across country
- Requires genetic links between countries



The dairy cattle example:

- Make national genetic evaluations comparable
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The beef cattle example:

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Pedigree connections
Genomic connections

Texel



Suffolk



Charollais



Common animals between the UK and Ireland

8,392



3,313

1,727

Common animals with progeny in Ireland

Males

2,594

Females

5,798

Males

1,040

Females

2,273

Males

604

Females

1,123



Common animals with progeny in both countries

1,188

2,323

252

513

103

211



To recap:

- 1. Good animal records in each country**
- 2. Genetic links between countries**
- 3. Precedents, methods**

**Can we do international
evaluations for sheep?**

Yes, we can!

Should we?



Ireland:

- Pre weaning weight
- Weaning weight
- Post weaning weight
- Muscle depth
- Fat depth

UK:

- 8 week weight
- Scan weight
- Muscle depth
- Fat depth

Ireland:

Pre-weaning weight (47 d)



"8-week" weight (65 d)

Post-weaning weight (145 d)



Scan weight (147 d)

Muscle depth (145 d)



Muscle depth (145 d)

Fat depth (145 d)



Fat depth (145 d)

$$Y = \textit{Group} + \textit{Parity} + \textit{Dam age} + \textit{Sex} * \textit{Age} + \textit{Birth type} * \textit{Rearing type} + \textit{Country} + \textit{Animal} + \textit{Dam} + \textit{Litter} + e$$

Trait	Country	h ²	Genetic correlation
Early-life (47-65 d) weight (kg)	Ireland	0.19	0.82
	UK	0.18	
145-147 d weight (kg)	Ireland	0.32	0.88
	UK	0.22	
Muscle depth (mm)	Ireland	0.31	0.85
	UK	0.19	
Fat depth (mm)	Ireland	0.20	0.85
	UK	0.18	

Estimates of genetic merit of each animal in the two countries

National genetic evaluations



Ram1
Ram2
Ram3
Ram4
Ram5
Ram6
Ram7

EBV

Ram6
Ram7
Ram8
Ram9
Ram10

International genetic evaluations

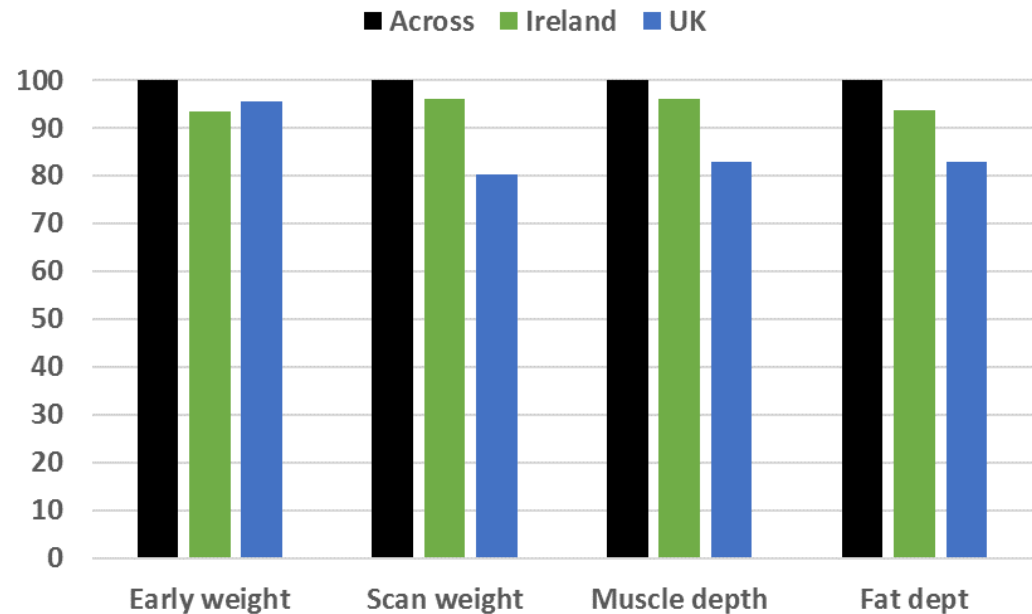
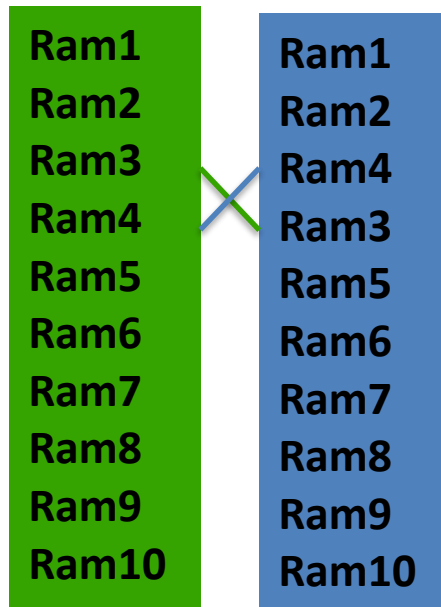


EBV

Ram1
Ram2
Ram3
Ram4
Ram5
Ram6
Ram7
Ram8
Ram9
Ram10

Ram1
Ram2
Ram3
Ram4
Ram5
Ram6
Ram7
Ram8
Ram9
Ram10

International rankings



4-20% benefit depending on:

- Population size
- Trait genetic parameters
- Country correlation

Should we?

Opportunities	Caveats
Greater selection pool	Genetics links between countries
Faster progress	Trait definition harmonisation
Facilitate selection (fair)	Recording harmonisation
Facilitate trade	Locally adapted breeds
Increase genetic diversity	Genetic diversity
International collaboration	G x E
Successful precedents	Data sharing issues

Should be done properly!

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Thank you for your attention

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