



Euroopa Maaelu Arengu
Põllumajandusfond:
Euroopa investeeringud
maapiirkondadesse

Performance Recording and the Genetic Evaluation of Beef Cattle

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Agricultural Business Research Institute

- Over 50 years providing genetic services for Australian and international clients
- ABRI beef cattle products include:
 - BREEDPLAN genetic evaluations
 - Database software for breed societies
 - Over 190 separate societies in 15 countries
 - Over 40 million Beef, dairy, sheep, goats, horses, alpacas and wildlife recorded on our databases
 - Breed registry services
 - Genetics extension services

AGRICULTURAL BUSINESS RESEARCH INSTITUTE

50
Years

OVER 50 YEARS OF PROVIDING
INNOVATIVE AGRIBUSINESS PRODUCTS,
SERVICES, AND TECHNOLOGY SOLUTIONS TO
THE AUSTRALIAN AND INTERNATIONAL
LIVESTOCK INDUSTRIES



 abri.une.edu.au



Beef Cattle Breeding Goals

- There are many possible beef cattle breeding goals
- These include:
 - Winning at shows
 - Cattle that are nice to be around
 - Performance
 - And many more



- I am going to focus on Performance in my talk

- Because performance makes money



- This doesn't mean the other breeding objectives are completely irrelevant



Profit (\$)

Number of Calves x Weight (kg) x Quality (c/kg)



Less

Cost of Production



Performance Recording

Profit Component	Example Production Traits
Number of Calves	Cow Fertility
	Calving Ease
Calf Weight	Weaning Weight
	Sale Weight



Performance Recording

Profit Component	Example Production Traits
Number of Calves	Cow Fertility
	Calving Ease
Calf Weight	Weaning Weight
	Sale Weight
Carcase Quality	Fat Depth
	Dressing Percent
	Marble Score



Performance Recording

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Number of Calves	Cow Fertility
	Calving Ease
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Carcase Quality	Fat Depth
	Dressing Percent
	Marble Score
Costs of Production	Cow Live Weight
	Feed Efficiency
	Body Condition Score



Improve these and make more €!

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Number of Calves	Cow Fertility
	Calving Ease
Calf Weight	Weaning Weight
	Sale Weight
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	Dressing Percent
	Marble Score
Costs of Production	Cow Live Weight
	Feed Efficiency
	Cow Body Condition Score



Problem: It is difficult to see an animal's genes (Breeding Value)



Performance Recording for Genetic Evaluation

What we see in an animal is not always what we get in their progeny

- An animal's appearance is influenced by many things, including:
 - **Age**
 - **Feeding levels**
 - **Sex**
 - **Genetics** – expressed as breeding values
 - **Etc.**
- Accurate measures of performance traits are required
 - More data = more variation = greater selection response
 - More data = more accuracy in genetic evaluation



Performance Recording for Genetic Evaluation

BREEDPLAN is an example of an integrated system of data recording and genetic evaluation, where breed improvement and breeder profitability is the goal.

Genetic evaluations require more than performance data. They also require:

- birth and measurement date to correct for the influence of age
- mob data to ensure that the animals being directly compared have an equal opportunity to perform
- sex to insure that the natural variation between heifers, steers and bulls is accounted for
- pedigree to establish the relationships between individuals
- genetic linkage across mobs, years, herds, counties and countries

Genomic data (when available) can help improve the accuracy of predictions in the genetic evaluation.



Genetic Evaluation: from herd to global

Single breed or multiple breed evaluation?

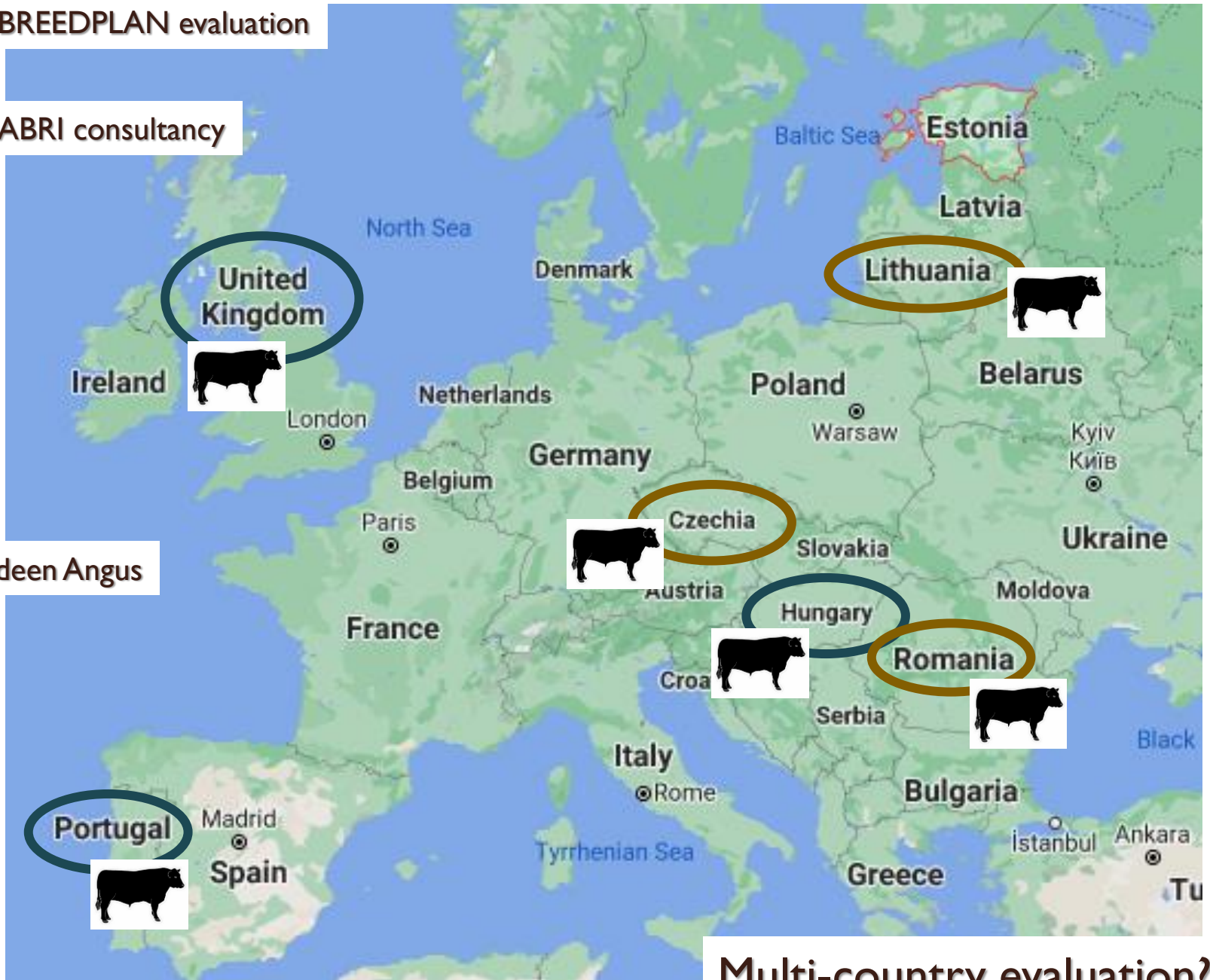


Single herd, single county or National evaluation?



BREEDPLAN evaluation

ABRI consultancy



Aberdeen Angus



Multi-country evaluation?

International Hereford Evaluation























Trait	Hereford-7
Birth weight	1,749,276
Weaning weight	2,229,446
Yearling weight	1,374,949
Final weight	769,455
Mature cow weight	128,461
Scrotal circumference	243,519
Scan EMA	469,172
Scan RIB	471,333
Scan IMF	270,090
Total records	7,705,701

International Hereford: reporting

Selection Criteria: Observed Traits: Has Trait(s) Recorded,

Birth Wt. (kg) <= 3.1, 400 Day Wt. (kg) >= 48, Scrotal Size (cm) >= 1.5,

Ident.	Sex	Primary Country	Birth Wt. (kg)	200 Day Wt. (kg)	400 Day Wt. (kg)	600 Day Wt. (kg)	Mat. Cow Wt. (kg)	Milk (kg)	Scrotal Size (cm)	Eye Muscle Area (sq.cm)	Rib Fat (mm)	IMF %	Traits Observed
11765537	Male	Australia 	+1.6	+28	+53	+51	+58	+1	+3.0	+13.4	+0.1	-0.2	BWT 200WT, 400WT, SS, FAT, EMA, IMF
553053800	Male	Canada 	+1.5	+30	+64	+80	+62	+21	+2.3	+12.5	+0.7	+0.3	BWT 200WT, 400WT, FAT, EMA, IMF
1493725	Male	Australia 	+2.2	+32	+63	+74	+45	+23	+2.2	+11.9	+0.3	-0.4	BWT 200WT, 400WT, 600WT, SS, FAT, EMA, IMF
11869935	Male	Australia 	-0.3	+30	+62	+62	+26	+14	+3.6	+11.7	+0.8	-0.1	BWT 200WT, 400WT, SS, FAT, EMA, IMF
200561470	Male	New Zealand 	+2.2	+30	+66	+77	+62	+6	+1.5	+11.4	+0.6	+0.1	BWT 200WT, 400WT, SS, FAT, EMA, IMF
200449450	Male	New Zealand 	+3.0	+38	+89	+95	+72	+23	+2.9	+11.1	+1.0	+0.3	BWT 200WT, 400WT, 600WT, FAT, EMA, IMF
70565398	Male	Uruguay 	+1.3	+28	+62	+79	+41	+11	+1.6	+10.9	+0.8	+0.1	BWT 200WT, 400WT, 600WT, SS, FAT, EMA
12026503	Male	Australia 	+2.5	+41	+88	+108	+97	+21	+3.0	+10.9	+0.7	+0.2	BWT 200WT, 400WT, 600WT, SS, FAT, EMA, IMF
740521863	Male	United Kingdom 	+3.1	+34	+65	+76	+55	+24	+1.5	+10.7	+0.7	+0.1	BWT 400WT, 600WT, FAT, IMF
70604696	Male	Uruguay 	+2.0	+29	+50	+73	+62	+2	+1.9	+10.6	+0.5	+0.2	BWT 200WT, 400WT, 600WT, SS, FAT, EMA
200452645	Male	New Zealand 	+3.1	+36	+57	+61	+41	+5	+1.8	+10.4	+0.8	+0.2	BWT 200WT, 400WT, FAT, EMA, IMF
200483086	Male	New Zealand 	+2.5	+30	+71	+85	+75	+24	+1.6	+10.4	+0.7	+0.3	BWT 200WT, 400WT, 600WT, SS, FAT, EMA, IMF
70531719	Male	Uruguay 	+2.6	+28	+59	+78	+55	+11	+1.6	+10.4	+0.3	0.0	BWT 200WT, 400WT, 600WT, SS, EMA, IMF
70632902	Female	Uruguay 	+3.1	+33	+67	+84	+71	+16	+2.1	+10.3	+0.5	+0.1	BWT 200WT, 400WT, 600WT, FAT, EMA, IMF
553028423	Male	Canada 	+2.5	+33	+71	+85	+81	+20	+2.1	+10.1	+0.7	+0.3	BWT 200WT, 400WT, FAT, EMA, IMF
200391892	Male	New Zealand 	+1.9	+31	+53	+54	+28	+18	+2.6	+10.0	+0.9	+0.1	BWT 200WT, 400WT, SS, FAT, EMA
70621651	Male	Uruguay 	+2.2	+29	+64	+80	+69	+12	+2.4	+9.9	+0.8	+0.1	BWT 200WT, 400WT, SS
200519094	Male	New Zealand 	+2.1	+27	+53	+54	+49	+4	+3.8	+9.9	+0.7	-0.1	BWT 200WT, 400WT, SS, FAT, EMA, IMF
11948243	Male	Australia 	+2.6	+31	+64	+68	+55	+13	+2.2	+9.9	+0.7	+0.5	BWT 200WT, 600WT, SS, FAT, EMA, IMF
200417502	Male	New Zealand 	+2.2	+33	+61	+65	+53	+13	+1.6	+9.9	+1.3	+0.2	BWT 200WT, 400WT, 600WT, SS, FAT, EMA

Questions

