

# Global Evaluation for Herefords

## A feasibility Study for World Hereford Council

### Some Results

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# Overview

- Objectives
- Approach
- Linkage database
- Some Results
- Conclusions
- Next steps

# Objectives

- Evaluate if global beef cattle evaluation for Herefords is feasible
  - Global = 10 countries who provided data for this study
    - USA \*
    - Argentina \*
    - Sweden
    - South Africa
    - New Zealand \*
    - Canada \*
    - Uruguay \*
    - United Kingdom \*
    - Ireland
    - Australia \* \* same data format

# Approach

- Accumulate **pre-adjusted phenotypic** data from participating countries
  - Data on 6.65 million animals

# Records by country

	Aus	NZ	US	CAN	URU	ARG	UK*	SA	SWE
<b>BW</b>	276,492	114,625	2,024,619	464,316	58,399	29,544	18,698	45,882	53,461
<b>WWT</b>	523,190	218,946	2,668,672	553,453	156,370	39,480	40,712	38,859	41,497
<b>YWT</b>	323,631	97,030	1,089,404	321,421	108,560	12,546	34,994	18,012	27,951
<b>FWT</b>	218,160	92,862	-	-	121,662	10,339	11,782	12,491	-
<b>SS</b>	43,971	9,046	84,263	11,075	15,699	-	464	3,358	-
<b>Rib f H</b>	45,630	8,818	32,713	3,838	11,340	-	2,741	-	-
<b>Rib f B</b>	66,943	17,822	38,665	3,495	11,018	-	4,109	-	-
<b>IMF H</b>	24,272	3,422	30,738	3,742	-	-	-	-	-
<b>IMF B</b>	31,113	3,731	36,533	3,476	-	-	-	-	-

\*Ireland merged with UK

# Approach

- Accumulate pre-adjusted phenotypic data from participating countries
  - Data on 6.65 million animals
- **Identify / collate common animals in pedigrees**
  - direct links: sires with performance recorded progeny in more than one country
  - indirect links common parents in pedigree
    - eg embryos sold to various countries

# Outcomes

- Linkage database across 10 countries
  - AGBU with the help of many contributing parties in particular Agricultural Business Research Institute
  - Database is WEB based



INTERNATIONAL CROSS REFERENCE DATABASE

**Update Database**

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**Animal Details**

**Animal** BT BUTLER 452M  
**Origin** United States  
**Sex** M  
**Date of Birth** 28/02/1980  
**Is Verified** Yes

Country	Animal Code
Sweden	0000561984
United States	21830428
United Kingdom	452M/17
Argentina	629
South Africa	8794521
New Zealand	999980004
Canada	C02156670
Australia	H1017452M
Uruguay	SB1067

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**ANIMAL GENETICS  
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*A joint unit of NSW DPI and UNE*

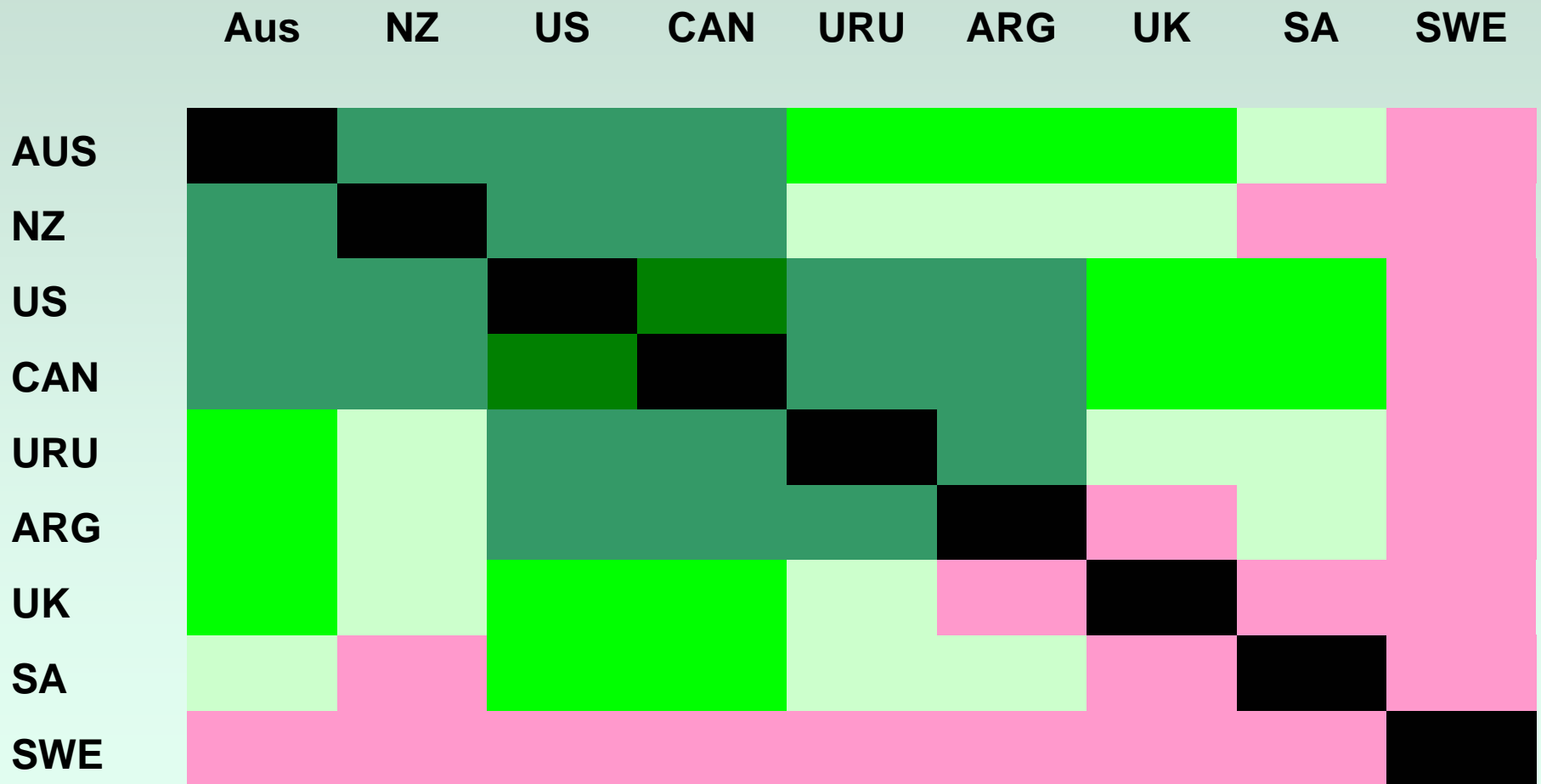
# Outcomes

- Linkage database across 10 countries
  - AGBU with the help of many contributing parties in particular Agricultural Business Research Institute
  - Database is WEB based
  - To date little use or updates have been recorded

# Linkage

- 5984 link animals identified
  - 82 % originate from US and Canada  
17 % from Aus and NZ  
86 from UK and 10 URU
  - 4297 in 2 countries  
1026 in 3 countries  
660 in 4 countries or more  
7 sires in 9 countries

# Linkage between countries



> 300 sires



< 20 sires

# Global Evaluation

- For each trait (eg Birth weight) we performed one evaluation
- Breeding Values between countries are correlated
  - Correlations have been estimated from EBVs from single country sire EBVs
- Each country gets an EBV for each animal in its unit of measurement

# Example of correlations between countries Birth Weight

	AUS	NZ	US	CAN	URU	ARG	UK	SA	SWE
AUS	1.00	0.88	0.90	0.89	0.73	0.71	0.84	0.82	0.70
NZ		1.00	0.89	0.97	0.91	0.84	0.64	0.82	0.60
US			1.00	0.93	0.77	0.84	0.89	0.71	0.43
CAN				1.00	0.80	0.86	0.79	0.58	0.54
URU					1.00	0.75	0.86	0.33	0.55
ARG						1.00	1.18(3)	0.55	0.69
UK							1.00	0.13	0.38
SA								1.00	0.73
SWE									1.00

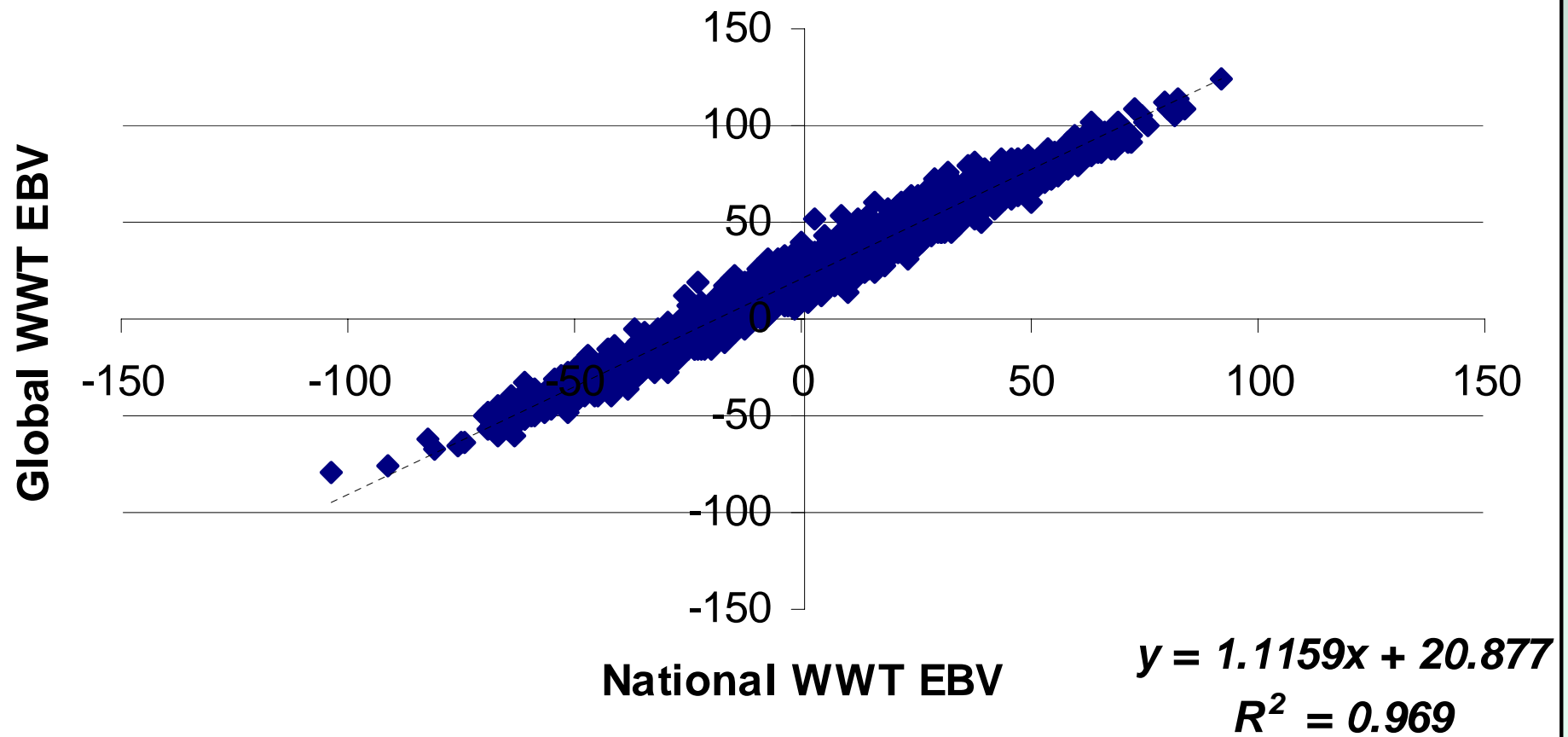
# Example of correlations between countries

## Weaning weight – Milk/Maternal

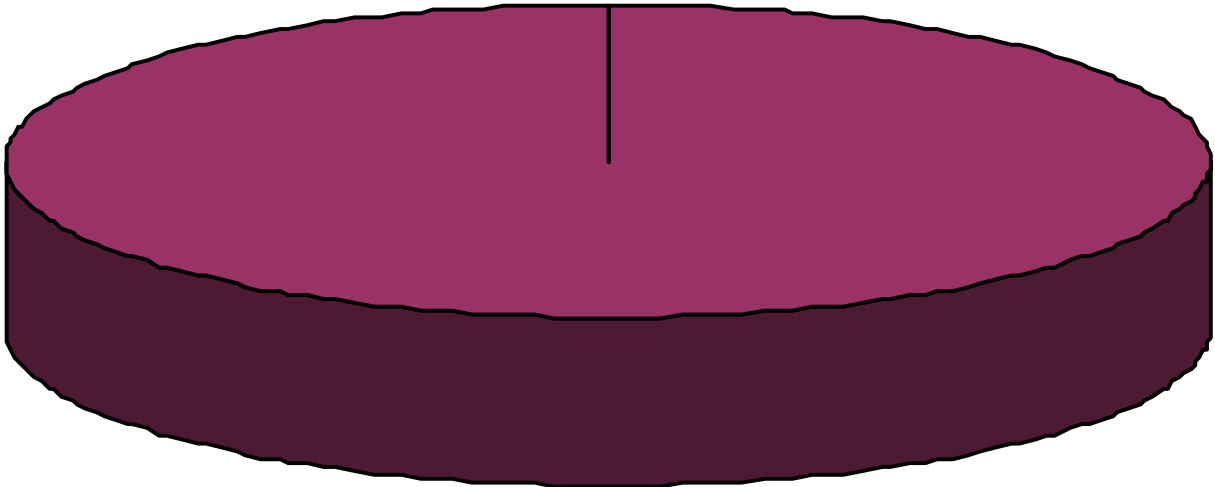
	AUS	NZ	US	CAN	URU	ARG	UK	SA	SWE
AUS	1.00	0.82	0.66	0.81	0.45	0.39	0.76	0.01	0.20
NZ		1.00	0.68	0.75	0.32	0.69	0.71	-0.08	-0.04
US			1.00	0.90	0.61	0.67	0.78	0.50	0.27
CAN				1.00	0.49	0.83	0.72	0.55	0.25
URU					1.00	0.82	-0.43	0.48	0.31
ARG						1.00	-	0.74	0.33
UK							1.00	0.13	0.38
SA								1.00	0.49
SWE									1.00

Some results restricted to  
Weaning Weight  
and high accuracy sires  
and three countries  
US, UK and SWE

## US national vs global WWT EBV

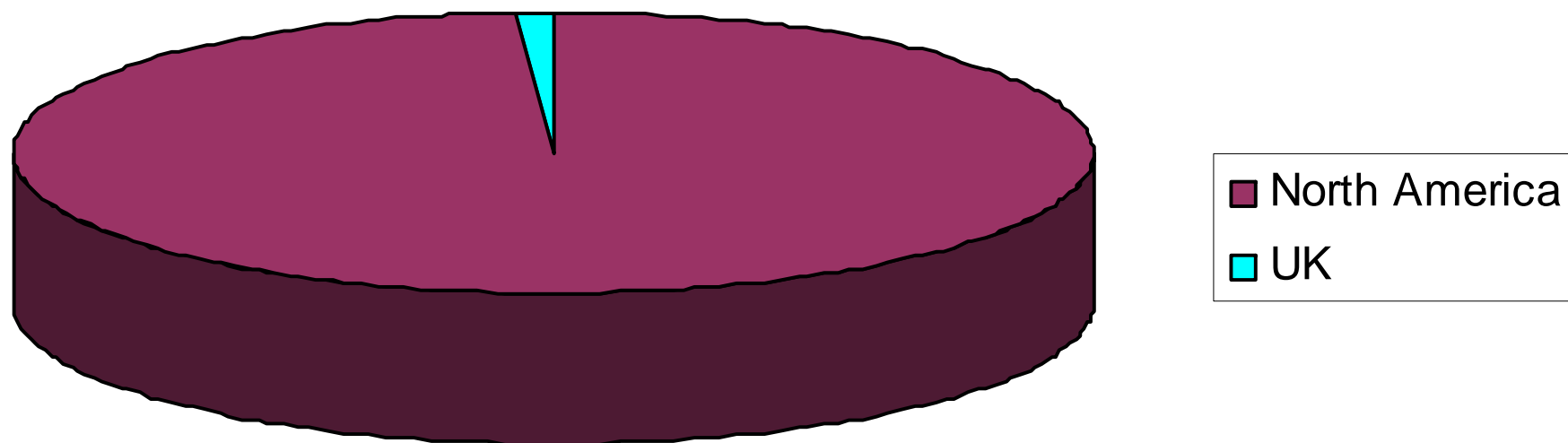


# Origin of Top 100 sires sorted by US national EBV

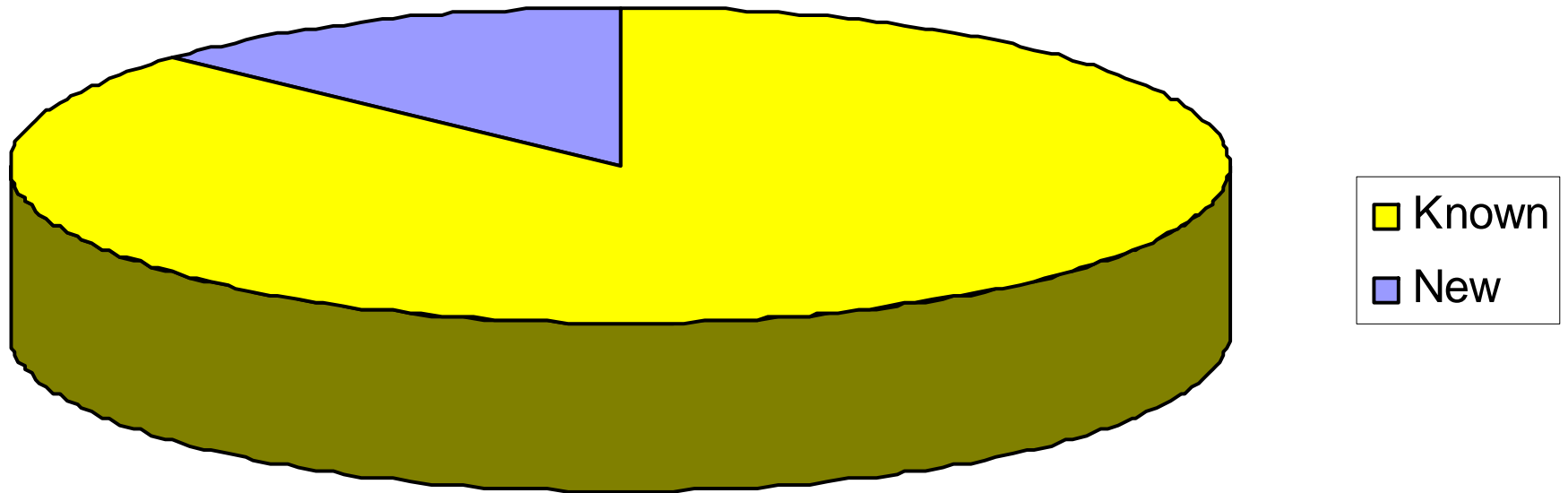


■ North America

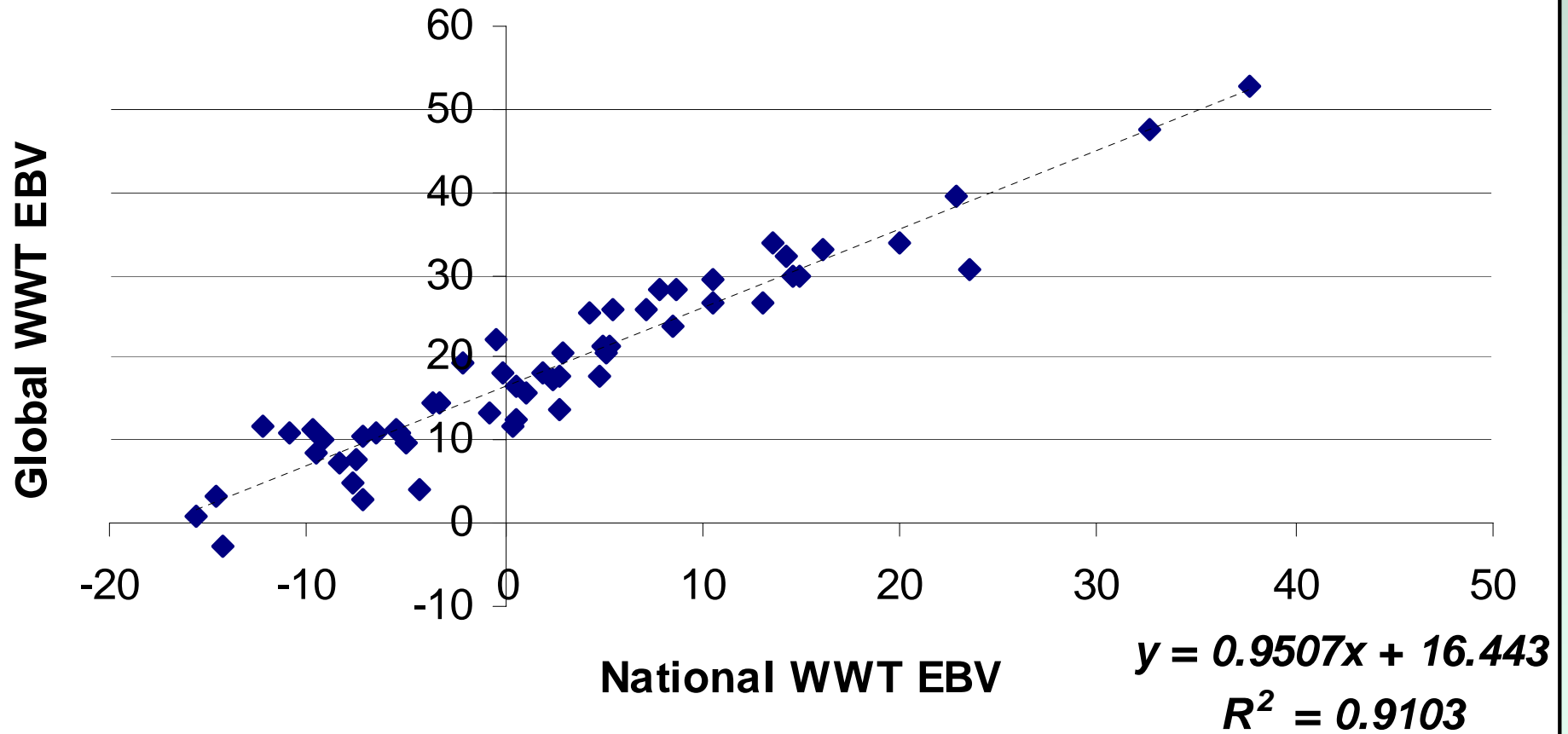
## Origin of Top 100 sires sorted by US global EBV



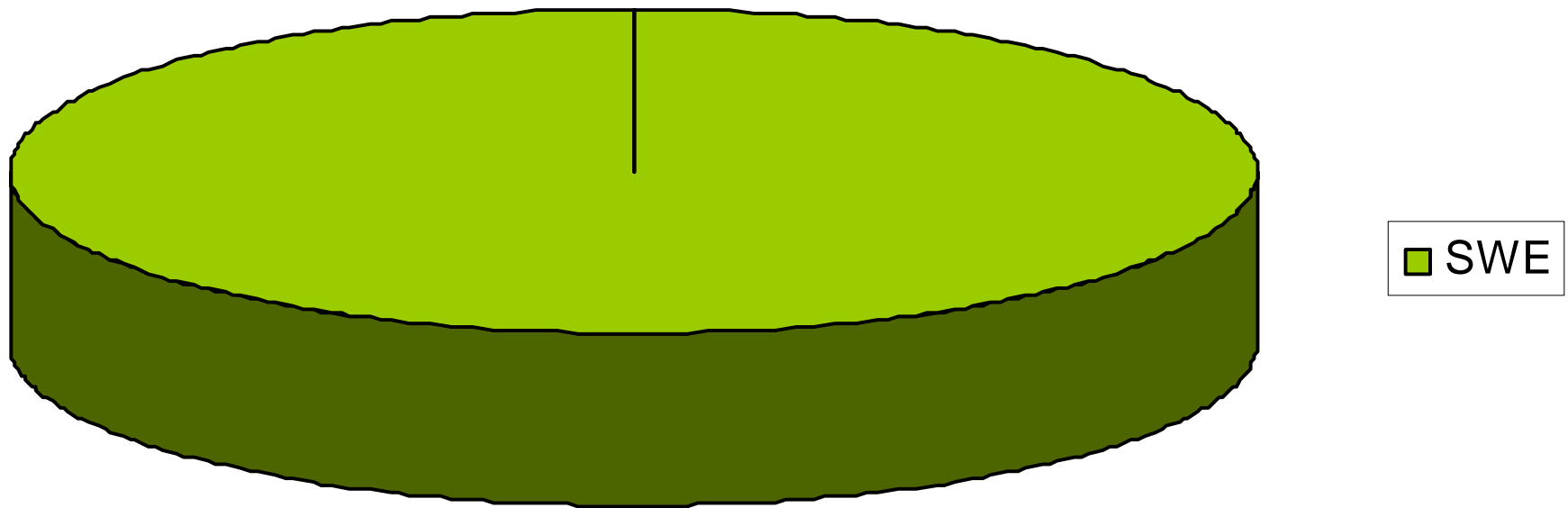
## New and known sires with US global EBV



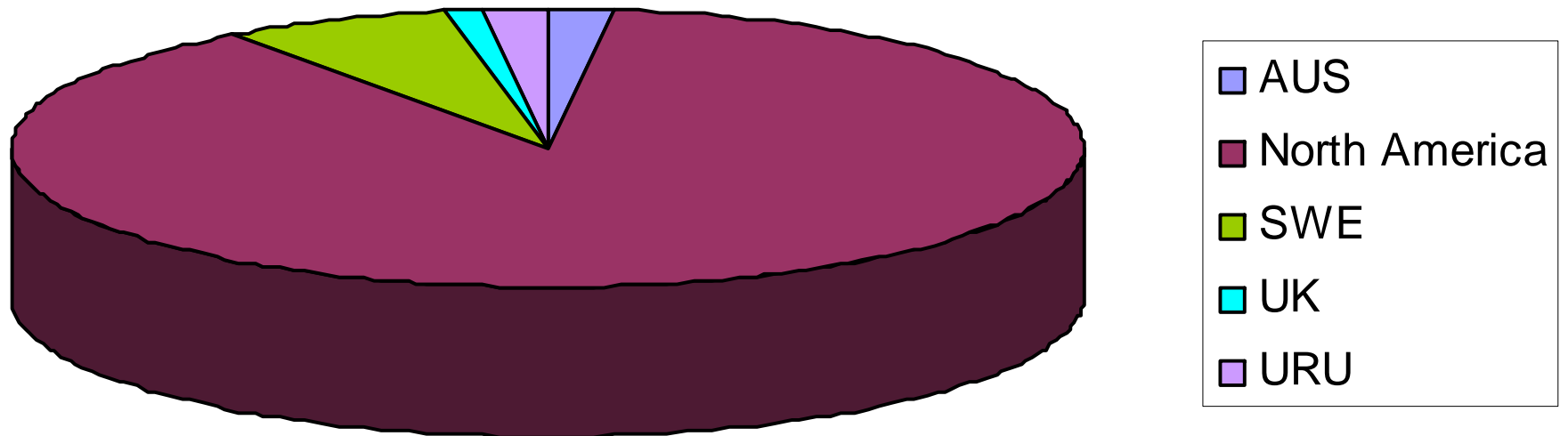
### SWE national vs global WWT EBV



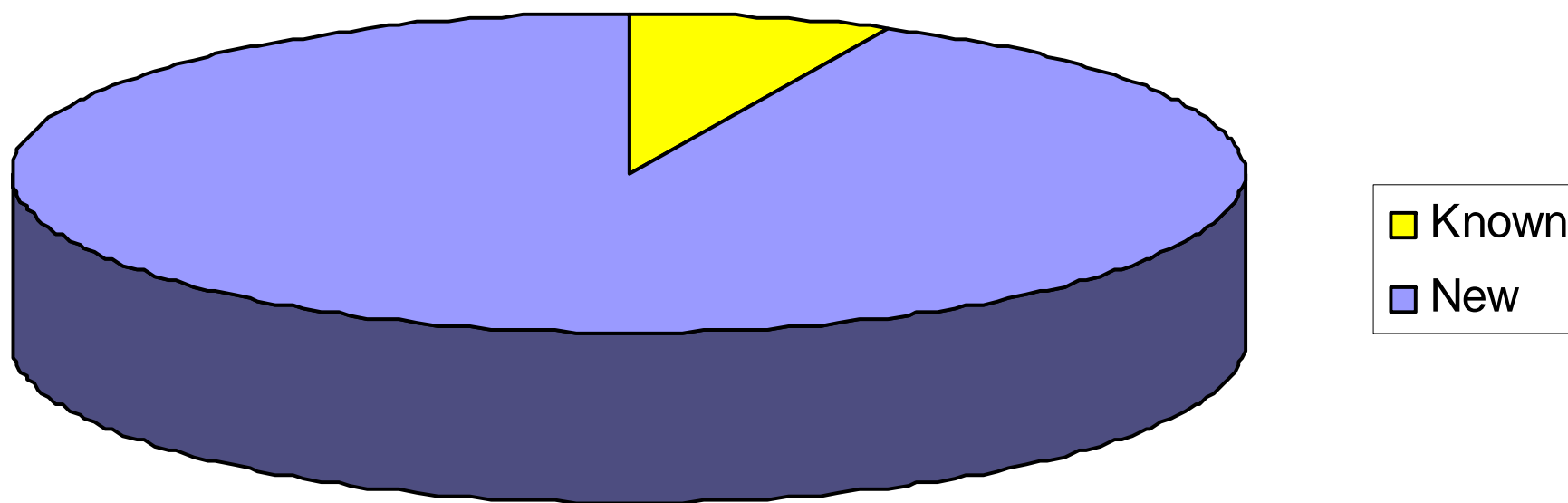
## Origin of Top 100 sires sorted by SWE national EBV



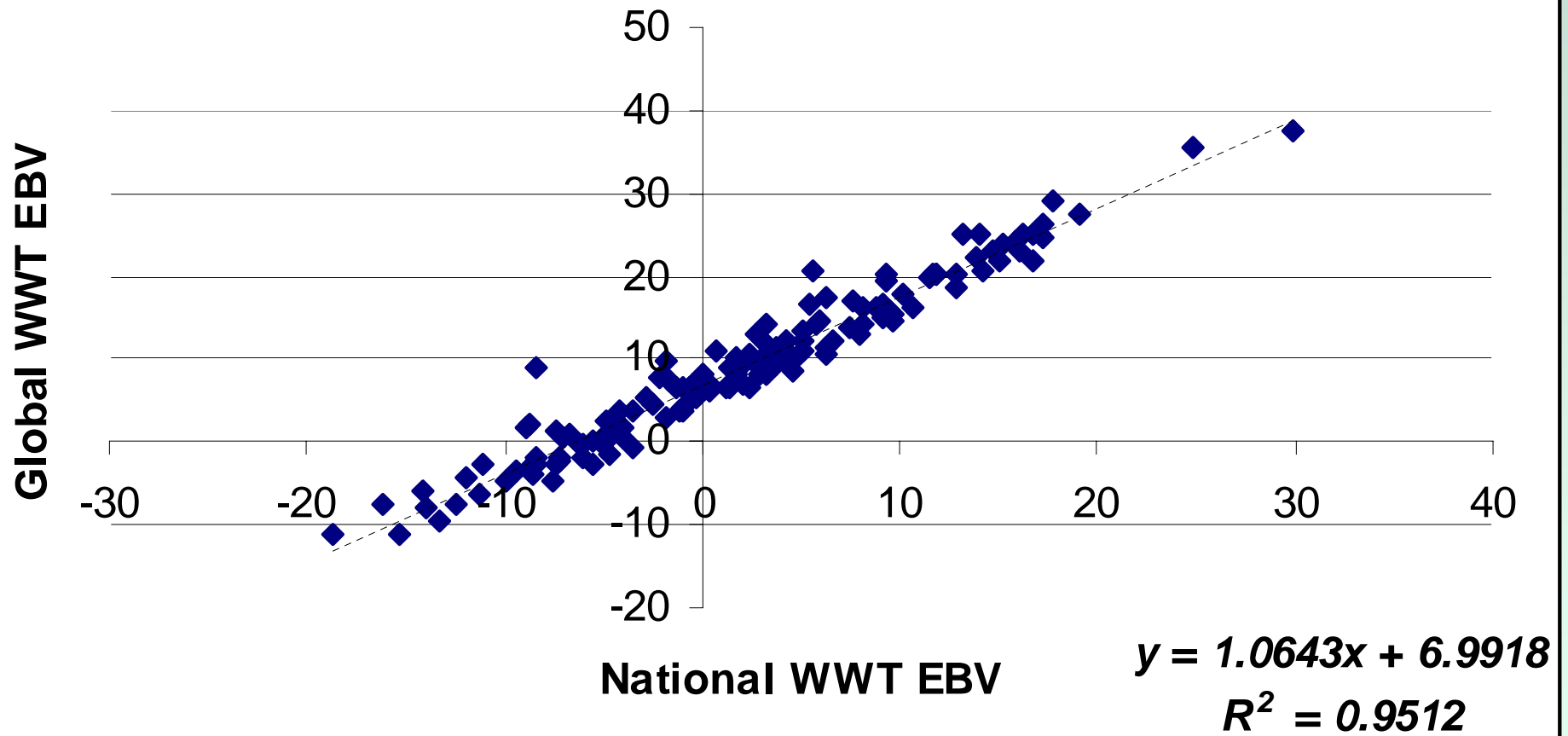
## Origin of Top 100 sires sorted by SWE global EBV



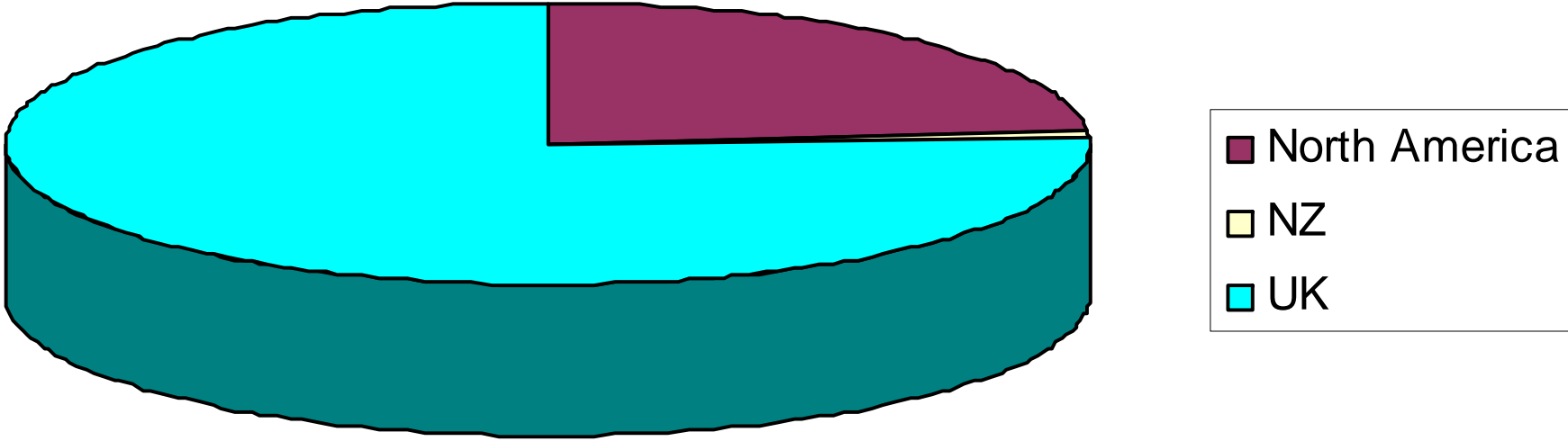
## New and known sires with SWE global EBV



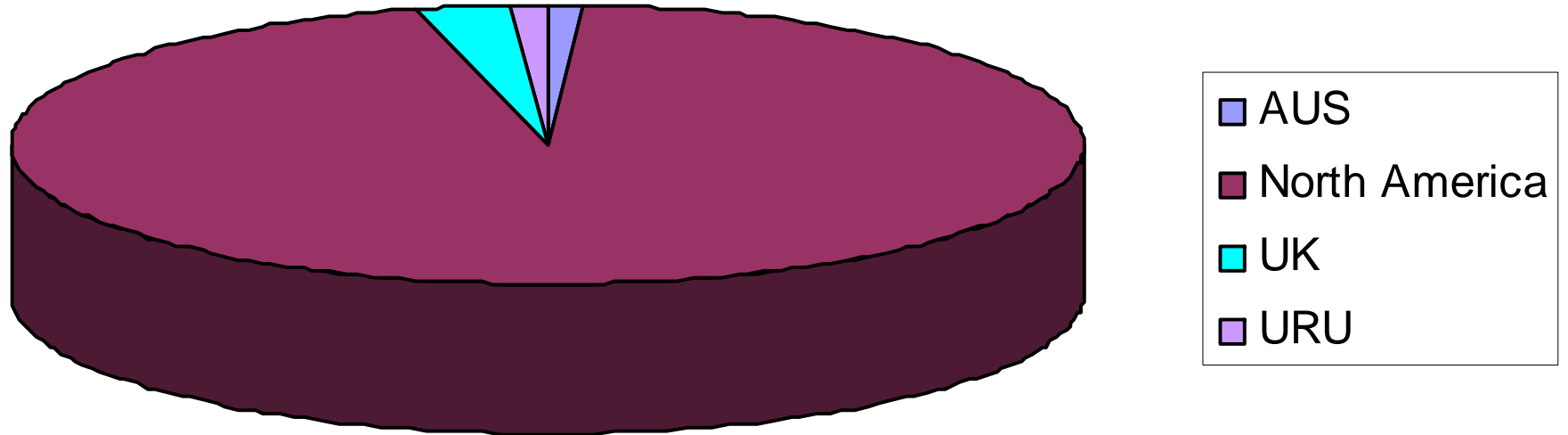
### UK national vs global WWT EBV



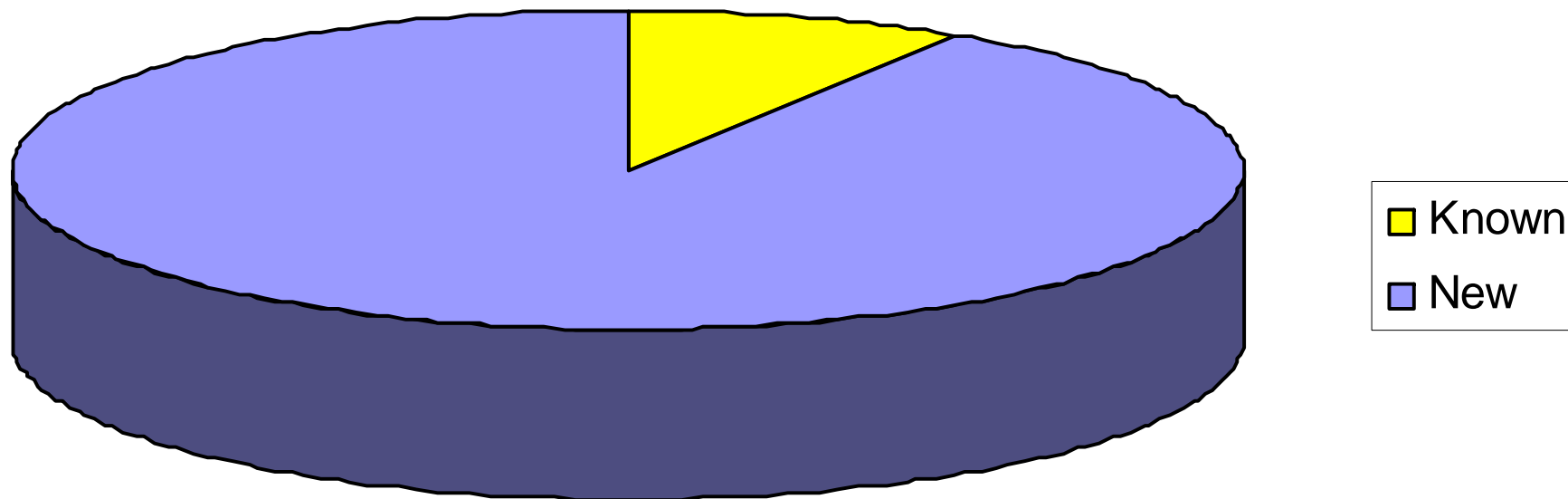
# Origin of Top 100 sires sorted by UK national EBV



## Origin of Top 100 sires sorted by UK global EBV

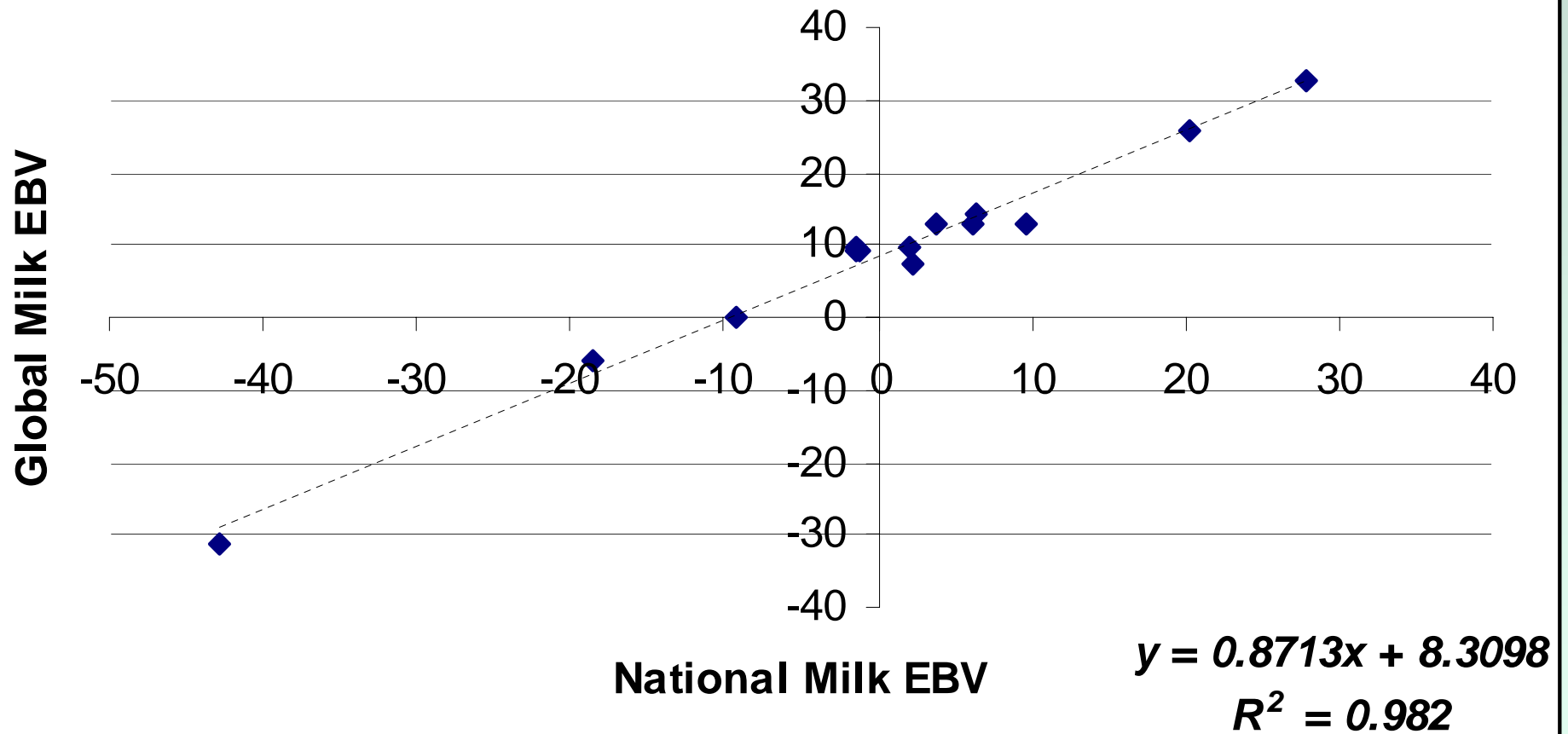


## New and known sires with UK global EBV

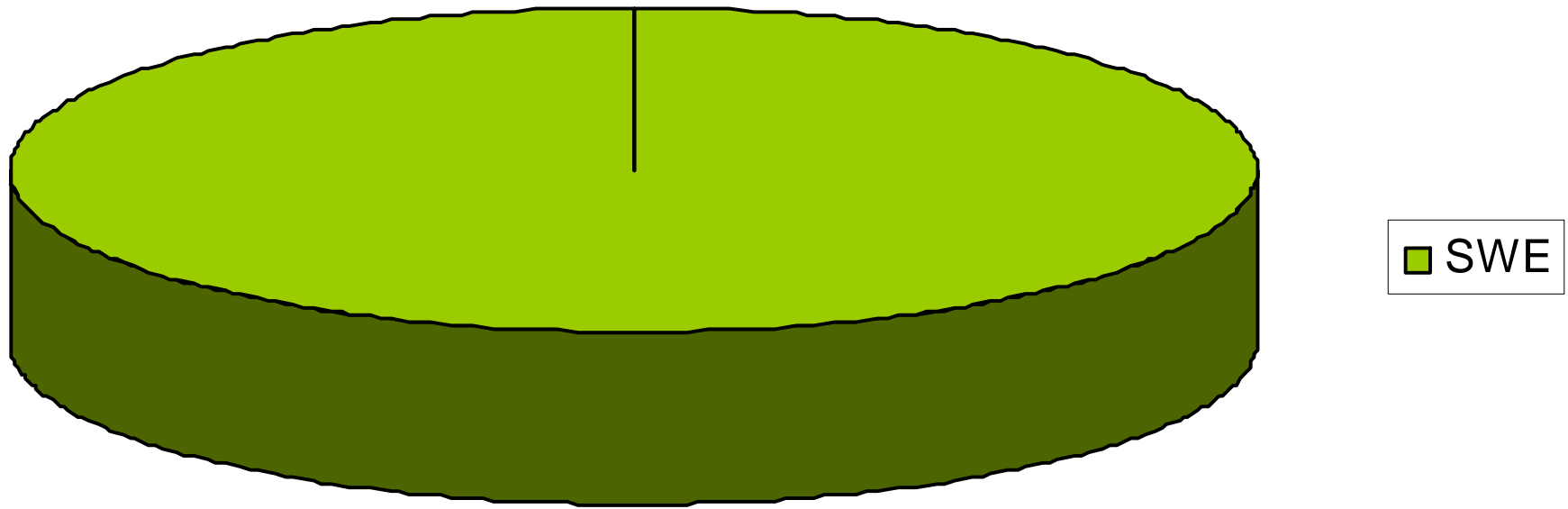


# Weaning Weight Milk

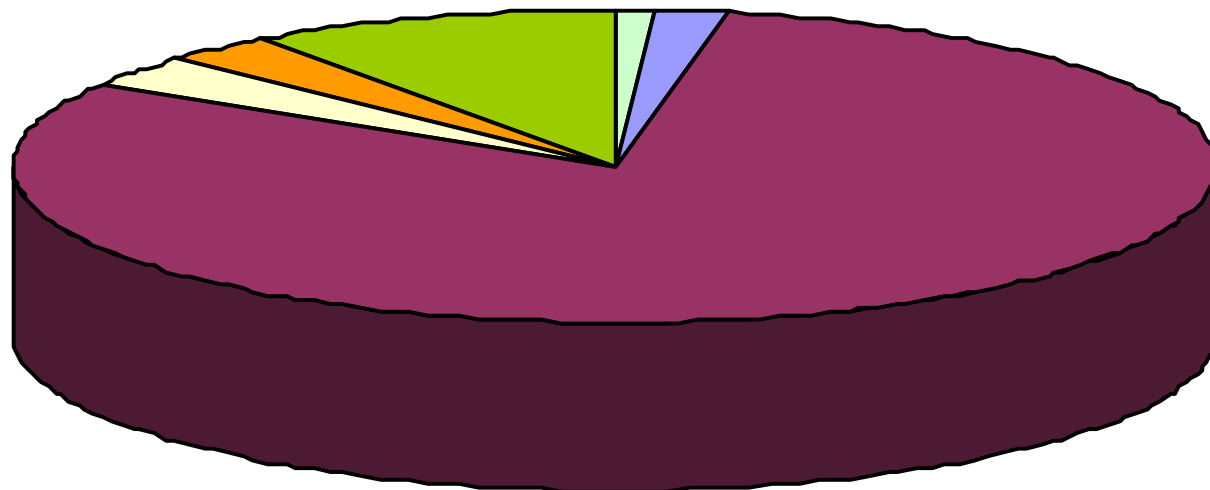
### SWE national vs global Milk EBV



## Origin of Top 100 sires sorted by SWE national EBV



## Origin of Top 100 sires sorted by SWE global EBV



- ARG
- AUS
- North America
- NZ
- SA
- SWE

# Conclusions

- Global evaluations for single traits are feasible
- Linkage for some countries might have caused problems estimating “realistic” genetic correlations – use conservative values
- All participating countries will be benefit
- More work required before single sire values can be presented.

# Our next steps

- Assemble new extract by 09/2008
- Use estimated genetic correlations
- Trait by trait evaluation
- Report best 100 sires for each trait and country back to each country?
  - Or we publish those sires on a web side to give everybody access
- Write short articles for each Country?

# Acknowledgement

- The work for this feasibility study has been performed by

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NSW Department of Primary Industries

and

Dr Bruce Tier, AGBU

Dr David Johnston

Mr Andrew McCann (Linkage database)