IRISH CATTLE BREEDING FEDERATION

Current State of Cattle Breeding in Ireland.

UCD Seminar 11th January 2006

NDP
NATIONAL DEVELOPMENT PLAN

Program

- Introduction – Brian Wickham
- Data & Database – Andrew Cromie
- Breeding Objectives – Laurence Shalloo & Donagh Berry
- Genetic Evaluations – Ross Evans & Francis Kearney
- Genetic Gain – Andrew Cromie & Donagh Berry
- Discussion

Introduction - Topics

- Background
- Objective of Seminar
- Philosophy of Cattle Breeding
- Challenges
- Opportunities

Background

- ICBF established in 1998
  - Team of some 30 staff and contractors assembled and funded
  - Cattle breeding database now fully operational
  - Breeding objectives & genetic evaluations operational for wide range of traits and all breeds
  - Breeding scheme changes underway
- Fundamental changes in cattle breeding have occurred and more in near future.
- Overdue for UCD & ICBF to discuss future research and education strategy.

Objectives of Seminar

- Provide an insight into the current state of cattle breeding in Ireland.
- To discuss implications for research, education and extension.

ICBF Strategy for Cattle Breeding

- Focus on genetic improvement as a tool for improving future profit on Irish cattle farms.
- Exploit best technology, skills and knowledge available internationally.
- Maintain a comprehensive database of Irish animal performance data.
- Provide routine, timely, international genetic evaluations for all relevant breeds and traits.
- Ensure a breeding scheme of optimal design is operating in Ireland.
- Ensure continuous improvement based on excellent science.

Challenges

- Future profitability of Irish beef & dairy farms resulting from cost-price squeeze.
- International competition in farm products and breeding services.

Opportunities

- New information and genetic technologies.
- Modified organisational structures to reduce costs and increase breeding and information service quality.
- ICBF database as a tool for meeting the information needs of farm management and animal health.
- Commercial breeding population & database as source of research data and experimental material.
- Profitable cattle industry serving top-end of world markets for milk and meat products.

Program

- Introduction
- **Data & Database – Andrew Cromie**
- Breeding Objectives – Laurence Shalloo & Donagh Berry
- Genetic Evaluations – Ross Evans & Francis Kearney
- Genetic Gain – Andrew Cromie & Donagh Berry
- Discussion

Irish Cattle Breeding – Key Stats.

- ***Dairy cows/herds***
  - 1.15 m cows & 25 k herds.
  - 400 k cows (33%) & 6 k herds in milk recording (24%).
- ***Beef cows/herds.***
  - 1.2 m cows & 75 k herds.
  - 20 k cows (2%) & 6 k herds in ***"pedigree"*** beef recording (8%), i.e., linear scoring & weight recording.
- ***AI (across dairy & beef).***
  - Some 800k 1st inseminations.
  - 25% calves born to AI

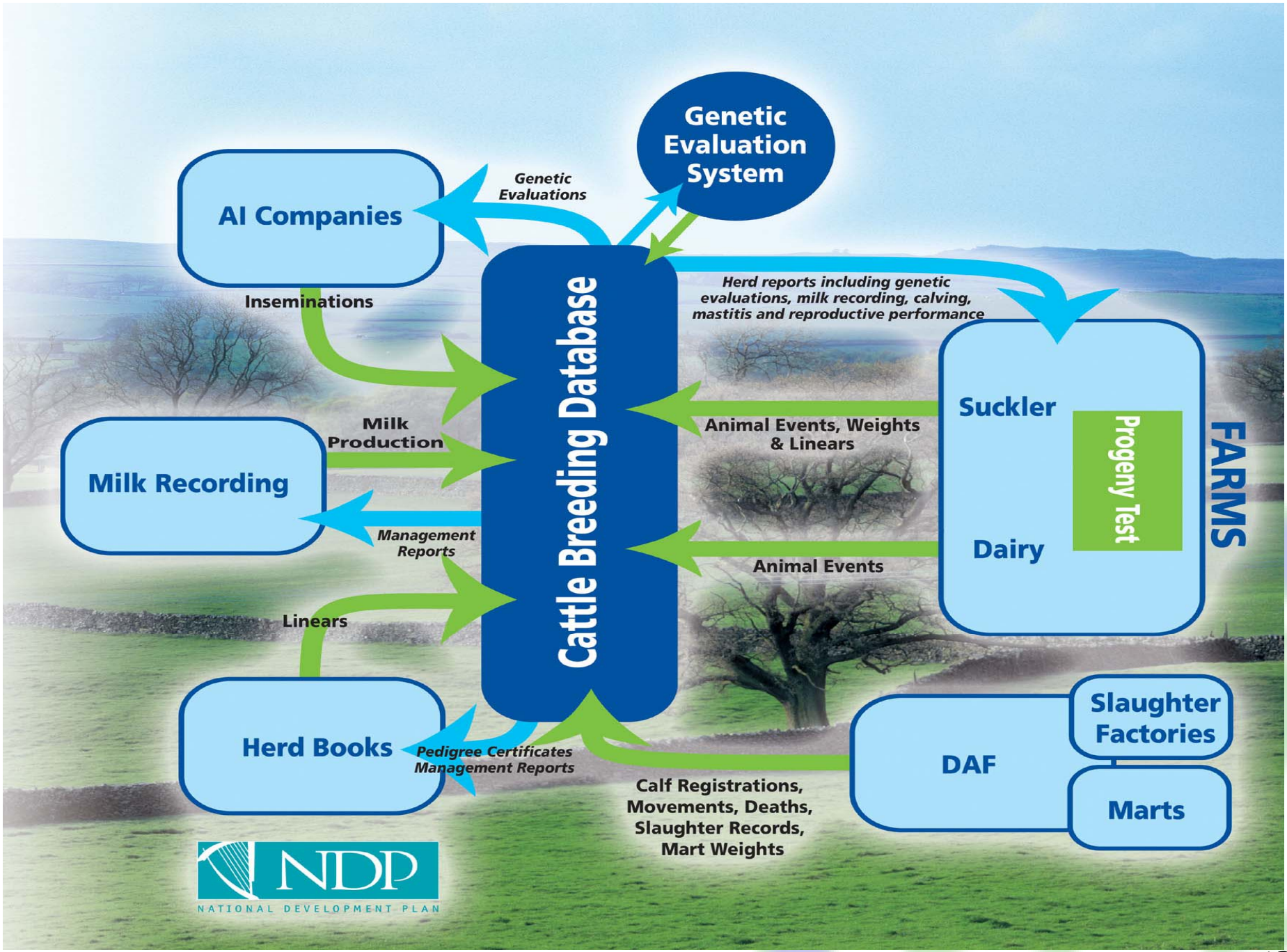
How do we compare? - Dairy

Country	Total Cows	% MR	Milk kg	F%	P%	F+P kg	% AI pen.	Bulls tested
Ireland	1.15 m	33%	4,649	3.71%	3.28%	325	35%	30
Norway	250 k	95%	5,639	4.14%	3.27%	418	90%	125
The Netherlands	1.47 m	86%	7,807	4.45%	3.51%	621	86%	225
New Zealand	3.85 m	74%	3,942	4.68%	3.54%	324	75%	300

- Low MR, AI & PT relative to other countries.
- Participation in cattle breeding is reflected in lower milk solids.
- Similar trends for beef (although not as dramatic)
- ***In future, we must give more focus to cattle breeding.***

Increasing data recording.

- Past - data recorded in many separate systems.
  - Notebooks, breeding charts, cigarette boxes(!)
  - DAF systems…
  - Industry systems (AI, factories, marts….)
- The cattle breeding database – 3 principles:
  1. Link all relevant systems into one simple system
  2. Make recording easier, e.g., Animal Events & greater use of technology
  3. Better management information & more end-users.


Genetic Evaluation System
AI Companies
Genetic Evaluations
Inseminations
Herd reports including genetic evaluations, milk recording, calving, mastitis and reproductive performance
Cattle Breeding Database
Suckler
Progeny Test
Dairy
FARMS
Animal Events, Weights & Linears
Milk Production
Milk Recording
Management Reports
Animal Events
Linears
Herd Books
Pedigree Certificates
Management Reports
DAF
Slaughter Factories
Marts
Calf Registrations, Movements, Deaths, Slaughter Records, Mart Weights
NDP
NATIONAL DEVELOPMENT PLAN

The ICBF cattle breeding database

One Database, Many Partners
less duplication and cost for farmers

AI

Munster AI
1 - Dairygold
2 - Kerry
3 - SWS
4 Progressive Genetics
5 Dovea AI

Milk Recording

1 Dairygold
2 Kerry
3 SWS
4 Progressive Genetics
6 Arrabawn
7 Tipperary
8 Connacht Gold

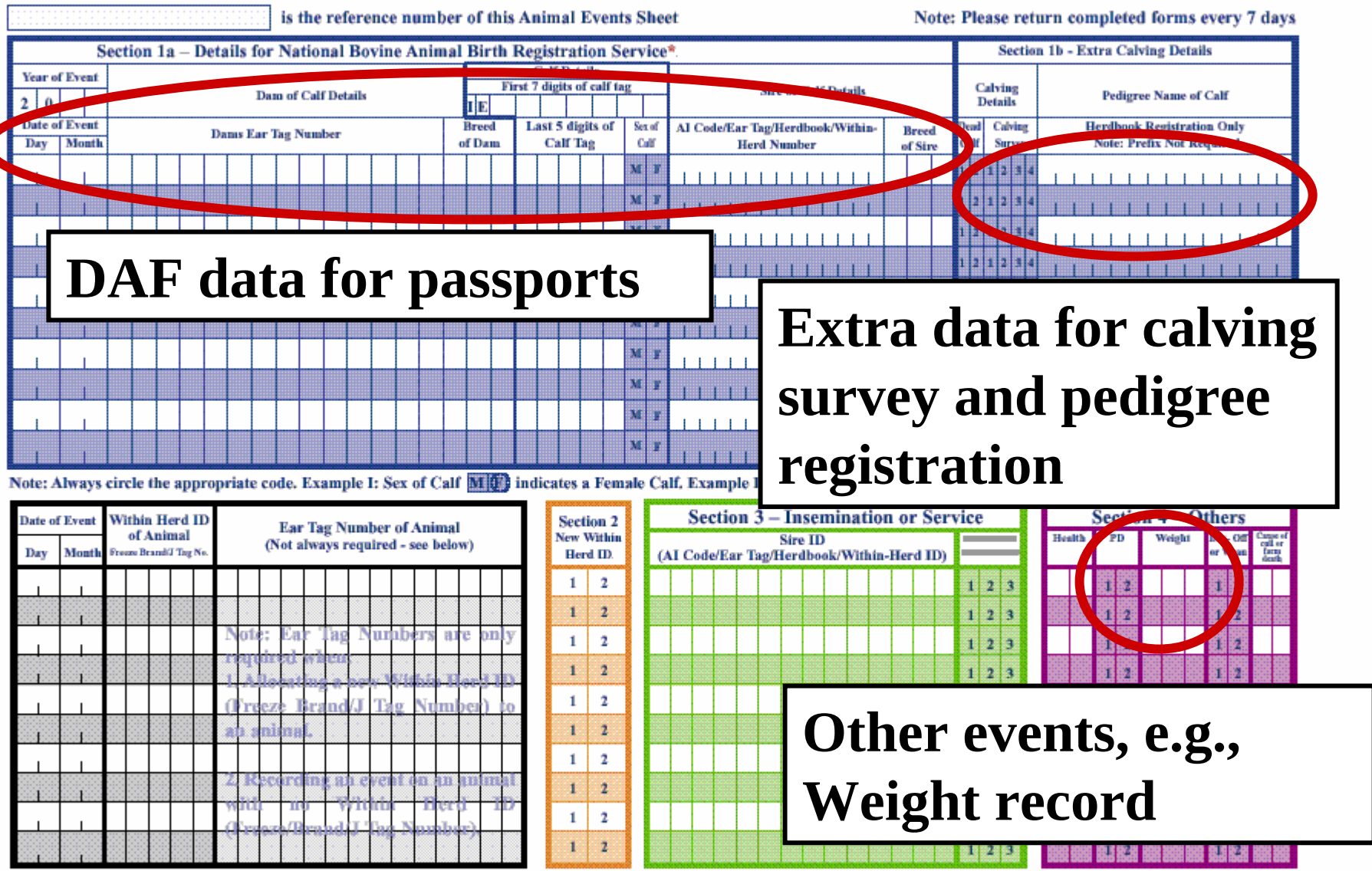
Farm Organisations

9 IFA
10 ICMSA

Herdbooks

Holstein Friesian 11
Belgian Blue 12
Angus 13
Aubrac 14
Blonde d'Aquataine 15
Charolais 16
Hereford 17
Limousin 18
Normande 19
Parthenais 20
Piedmontese 21
Shorthorn 22
Simmental 23
Jersey 24
Kerry 25
MRI 26
Montbeliarde 27
Rotbunt 28
Saler 29

ICBF 30


is the reference number of this Animal Events Sheet
Note: Please return completed forms every 7 days
Section 1a – Details for National Bovine Animal Birth Registration Service*.
Section 1b - Extra Calving Details
Year of Event
Dam of Calf Details
First 7 digits of calf tag
Date of Event
Day
Month
Dams Ear Tag Number
Breed of Dam
Last 5 digits of Calf Tag
Sex of Calf
AI Code/Ear Tag/Herdbook/Within-Herd Number
Breed of Sire
Calving Details
Pedigree Name of Calf
Herdbook Registration Only
Note: Prefix Not Required
DAF data for passports
Extra data for calving survey and pedigree registration
Note: Always circle the appropriate code. Example I: Sex of Calf M F indicates a Female Calf. Example I
Within Herd ID of Animal
Freeze Brand/J Tag No.
Ear Tag Number of Animal
(Not always required - see below)
Note: Ear Tag Numbers are only required when:
1. Allocating a new Within Herd ID (Freeze Brand/J Tag Number) to an animal.
2. Recording an event on an animal with no Within Herd ID (Freeze Brand/J Tag Number).
Section 2
New Within Herd ID
Section 3 – Insemination or Service
Sire ID
(AI Code/Ear Tag/Herdbook/Within-Herd ID)
Section 4 – Others
Health
PD
Weight
Other events, e.g., Weight record
DECLARATION FOR NATIONAL BOVINE ANIMAL BIRTH REGISTRATION
Declaration of owner/keeper of Herd in which animal was born: I herby declare that the details given by me in all sections of this Application form to be true and accurate: This application to be completed by owner/keeper of the Herd in which animal was born, at the time of tagging, and posted immediately to the registration service
Signature of herd owner:
Date:
PLEASE ENSURE YOU HAVE FULLY COMPLETED SECTION 1a AND SIGNED & DATED THIS FORM BEFORE POSTING.
*Please record all calving events. Only those that result in the birth of a live calf will be used for National Bovine Animal Birth Registration. Those that result in the birth of a dead calf will be used by ICBF for cattle breeding purposes only. Please record dead calves by leaving the calf ID field (last 5 digits of the calf tag) blank.

New data - Animal Events

	2001	2005
Animal Event Births		535,209
Calving Performance	12,064	435,667
Pedigree registration	85,416	92,560

- Launched in 6,000 milk recording herds (Jan' 02).
- Expanded to further 6,000 beef herds (Jan' 04).
- Further 3,000 commercial beef/dairy herds in 2005
- 15% of total herds & 26% of total births.
- ***Better data for cattle breeding***

Greater use of technology

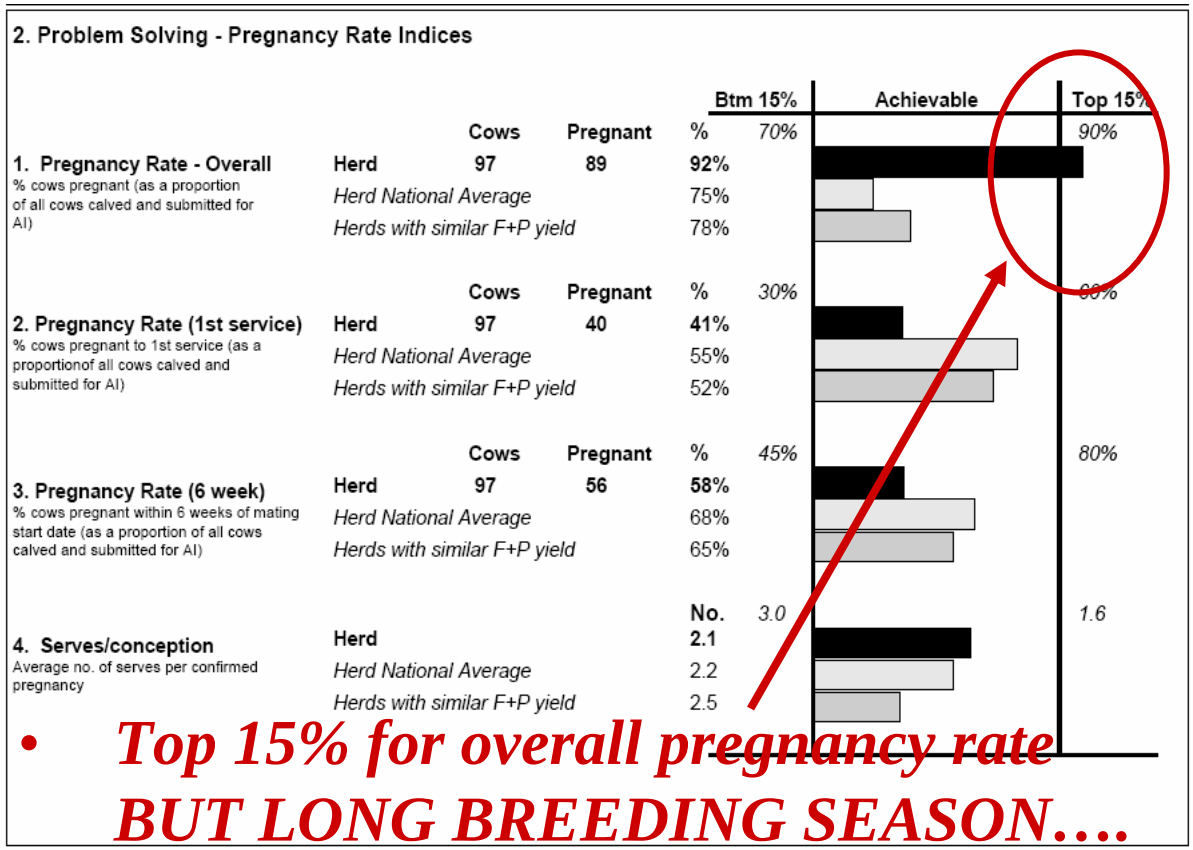
- Electronic DIY milk recording;
  - No capital cost for farmer.
  - Expanding to 10 cells in 2006 (1,500 herds & 100k cows).
- AI handhelds;
  - Being rolled out nationwide in 2006.
  - Better management data; inbreeding, fertility…..
- Beef linear scores;
  - Operational for 10 scorers (30 k weanlings – ped & comm).
- On farm events;
  - Mobile phones, e.g., AI, DRY, MA….
  - Website recording, e.g., DRY
  - Farm packages (& pocket PC's).

Better reports & more end-users

- Past - cattle breeding for insurance & premia purposes.
- Must shift focus to ***benefits*** of "herd recording" for breeding & management purposes.
- All data linked into one system….new and better reports (all data linked together).
  - Old reports re-developed (milk recording, pedigree certs)
  - New reports (calving, fertility, SCC/mastitis, factory……)
- More end-users, e.g., Teagasc advisors, vets….
- Easy access to reports via website (farmers & advisors).
- Text messaging services, e.g., SCC.
- ***Benefits must outweigh hassle/cost of data recording.***

Example – New fertility reports

- Developed with CVERA & Teagasc
- Reports available at 9, 12, 15 & final.
- Key indicators
  - Pregnancy rate
  - 1st service
  - 6 weeks
  - Serves per conception



- ***Top 15% for overall pregnancy rate***
  BUT LONG BREEDING SEASON….

Summary

- Data recording; first major component in genetic improvement.
- Historical participation in cattle breeding is low.
- Database & structure now in place to increase level of data recording (single simple system).
- Reduce hassle & costs for farmers
- Increase value of output (breeding/management)
- 10 year target = 80% of cows & herds recording.
- ***Working together it can be achieved.***

Program

- Introduction
- Data & Database – Andrew Cromie
- **Breeding Objectives – Laurence Shalloo & Donagh Berry**
- Genetic Evaluations – Ross Evans & Francis Kearney
- Genetic Gain – Andrew Cromie & Donagh Berry
- Discussion

Breeding objective traits

1) **Important (economic/environment/welfare)**
   - Must quantify importance
2) **Measurable**
   - Optimal method to record
   - Incentives to increase recording
   - Use of predictor traits
     - Need to know genetic and phenotypic parameters
3) **Heritable**
   - Population specific

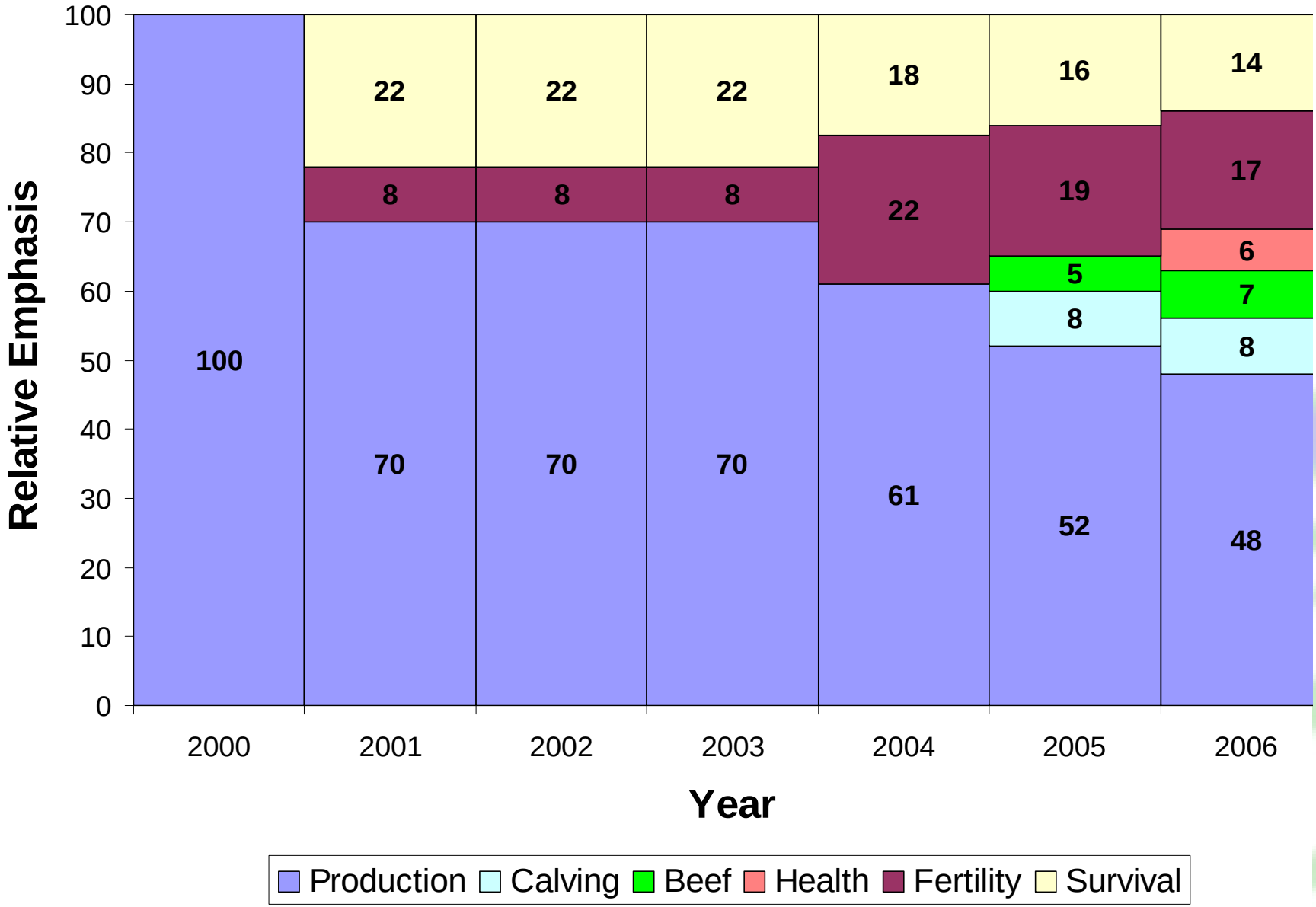
Mastitis - Example

1) **Important (economic/environmental/welfare)**
   - Veterinary costs (callout + labour + medicine + milk withdrawl)
   - Farmer labour
2) **Measurable**
   - Possible to measure BUT currently not!
   - How increase recording?
   - Predictor traits ??
     - Udder conformation and/or somatic cell count
     - Need to know relationships
3) **Heritable**
   - Probably? ← Incidence?
   - Have data on udder conformation and SCC

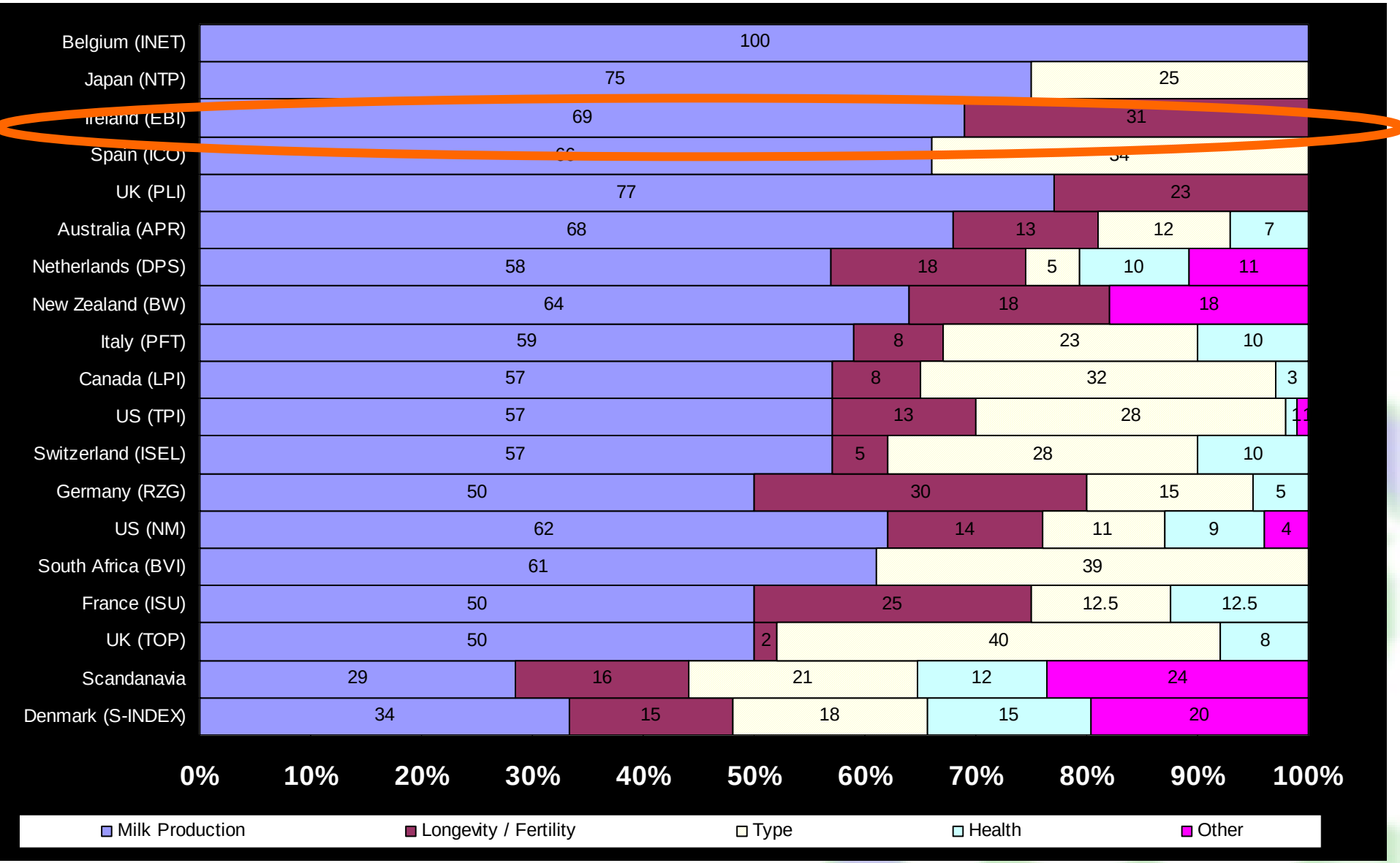
Economic Breeding index

- **Launched**
  - Dairy in 2001
  - Beef in 2005
- **Increased EBI = Increased Farm Profitability**
- **Continual development**
  - Scenarios changing
  - Continual research

Development of dairy EBI



International Comparison



Relative emphasis – Dairy EBI

Sub-index	Trait	Economic Weight	Relative Emphasis	Relative Emphasis
Production	Milk	-0.084	-14%	49%
	Fat	1.55	9%	
	Protein	5.27	25%	
Fertility	Calving interval	-7.17	-17%	32%
	Survival	10.80	14%	
Calving	Calving difficulty direct	-3.26	-3%	8%
	Calving difficulty maternal	-1.73	-1%	
	Gestation	-4.47	-3%	
	Calf mortality	-2.58	-1%	
Beef	Cull cow	0.04	0.2%	7%
	Carcase weight	1.38	5%	
	Carcase conformation	5.99	1%	
	Carcase fat	-4.49	-1%	
Health	Lameness	1.13	0.4%	6%
	Udder Health	-55.48	-5%	

Emphasis based on top 100 sires → 59:30:6:3:2

Relative emphasis – Beef EBI

Subindex	Trait	Economic weight	Relative emphasis
Dairy calving	Calving difficulty	-3.38	43%
	Gestation	-7.10	47%
	Calf Mortality	-2.96	10%
Beef calving	Calving difficulty	-2.22	54%
	Gestation	-1.58	20%
	Calf Mortality	-4.30	26%
Weaned calf	Weaning weight	1.30	31%
	Calf quality	1.30	69%
Beef production	Weaning weight	1.04	20%
	Feed intake	-21.94	8%
	Carcass weight	2.34	55%
	Carcass conformation	6.24	12%
	Carcass fat	-2.34	5%
Maternal	Survival	3.27	14%
	Calving interval	-2.59	20%
	Age at first calving	-0.59	11%
	Calvign difficulty	-4.32	14%
	Weaning weight	3.30	40%
	Cull cow weight	0.07	2%

Collaborators

- ICBF team
- Teagasc – L. Shalloo, P. Dillon, D Berry
- Lelystad/Wageningen – R. Veerkamp, M. Pool
- Abacus Biotech (NZ) – P. Amer
- Dairy and Beef Industry

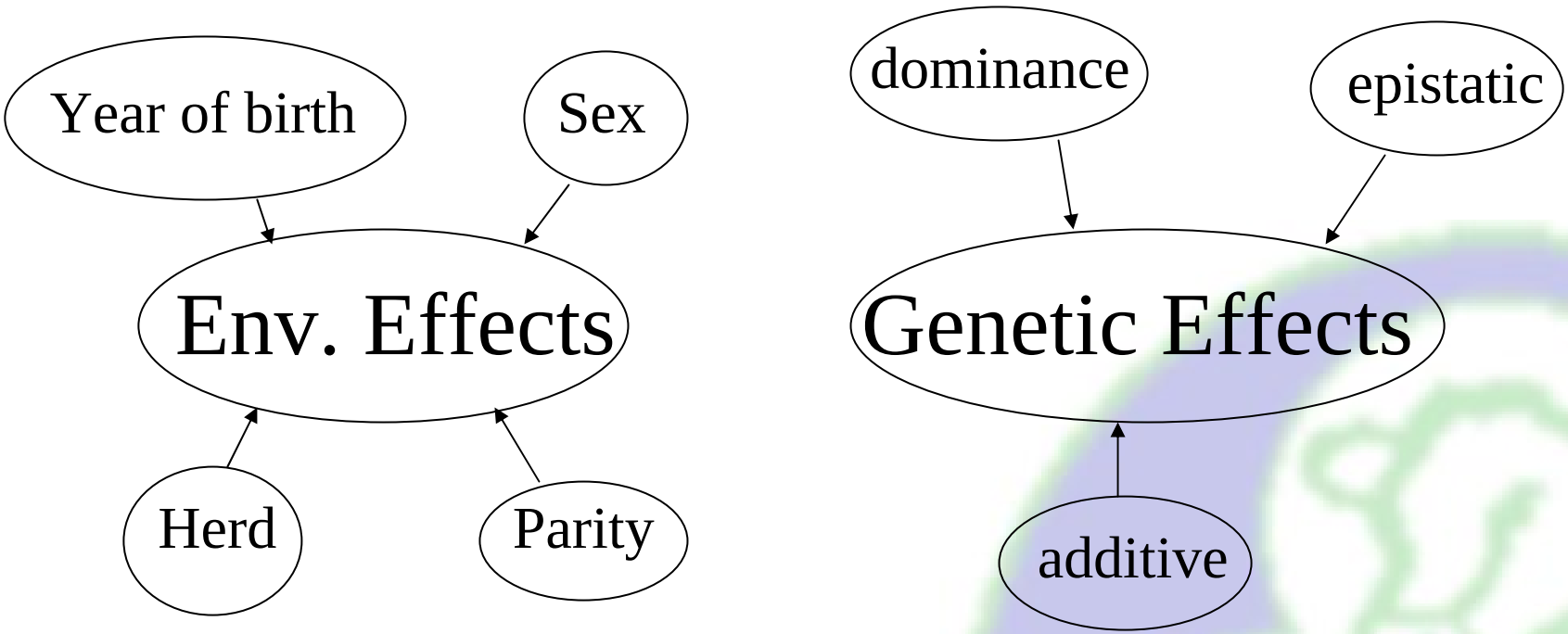
Program

- Introduction
- Data & Database – Andrew Cromie
- Breeding Objectives – Laurence Shalloo & Donagh Berry
- **Genetic Evaluations – Ross Evans & Francis Kearney**
- Genetic Gain – Andrew Cromie & Donagh Berry
- Discussion

Genetic Evaluations

- Prediction of breeding values is an integral part of any genetic improvement programme
- Harness the power of information to disentangle environmental and genetic effects
- Phenotype = Env effects+Gen effect+Res effect
  - $Y_{ij}=u_i+g_i+e_{ij}$

Genetic Evaluations



Genetic Evaluations

- Additive genetic value is average additive effect of genes received by an individual from its parents
- Interested primarily in additive values as this is component that is transmitted
  - Dominance & Epitasis included in residual term
- Additive genetic value = Breeding Value
  - $BV_i = g_{ai} = 0.5bv_s + 0.5bv_d + m_i$
- Predicted Transmitting Ability(PTA) = 0.5* BV

Genetic Evaluations

- Requirements for genetic evaluation
  - Accurate phenotypic information e.g. milk yield
  - Accurate pedigree information
  - Correct statistical model
  - Genetic Parameters – e.g. heritability & (co)variance
- Method of evaluation
  - Best Linear Unbiased Predicton (BLUP)
  - Animal model – uses information on all relatives
  - Fixed effects and breeding values can be estimated simultaneously

Production

- Univariate evaluations for milk(kg), fat(kg), protein (kg), and somatic cell count
- 305-yields using ISLC (Olori & Galesfoot) for all complete or in progress lactations
- 5 parities used
- Across breed evaluation

Production

- Env effects
  - HYS-parity
  - Year*Mo Calving
  - Age at calving (within parity)
  - Days pregnant during 305d
  - Days dry
  - Heterosis & recombination
- Adjustment for heterogeneity of variance
- h^2=0.35 milk, fat and protein
- h^2 =0.11 somatic cell count

Production

- Evaluation conducted using customised software housed at CR-Delta in NLD
- ~3 days to complete evaluation – 4 traits
- Returns solutions of fixed effects and breeding values for ~1.3m animals
- Different breeds comparable on same scale

Production

- Phenotypic means

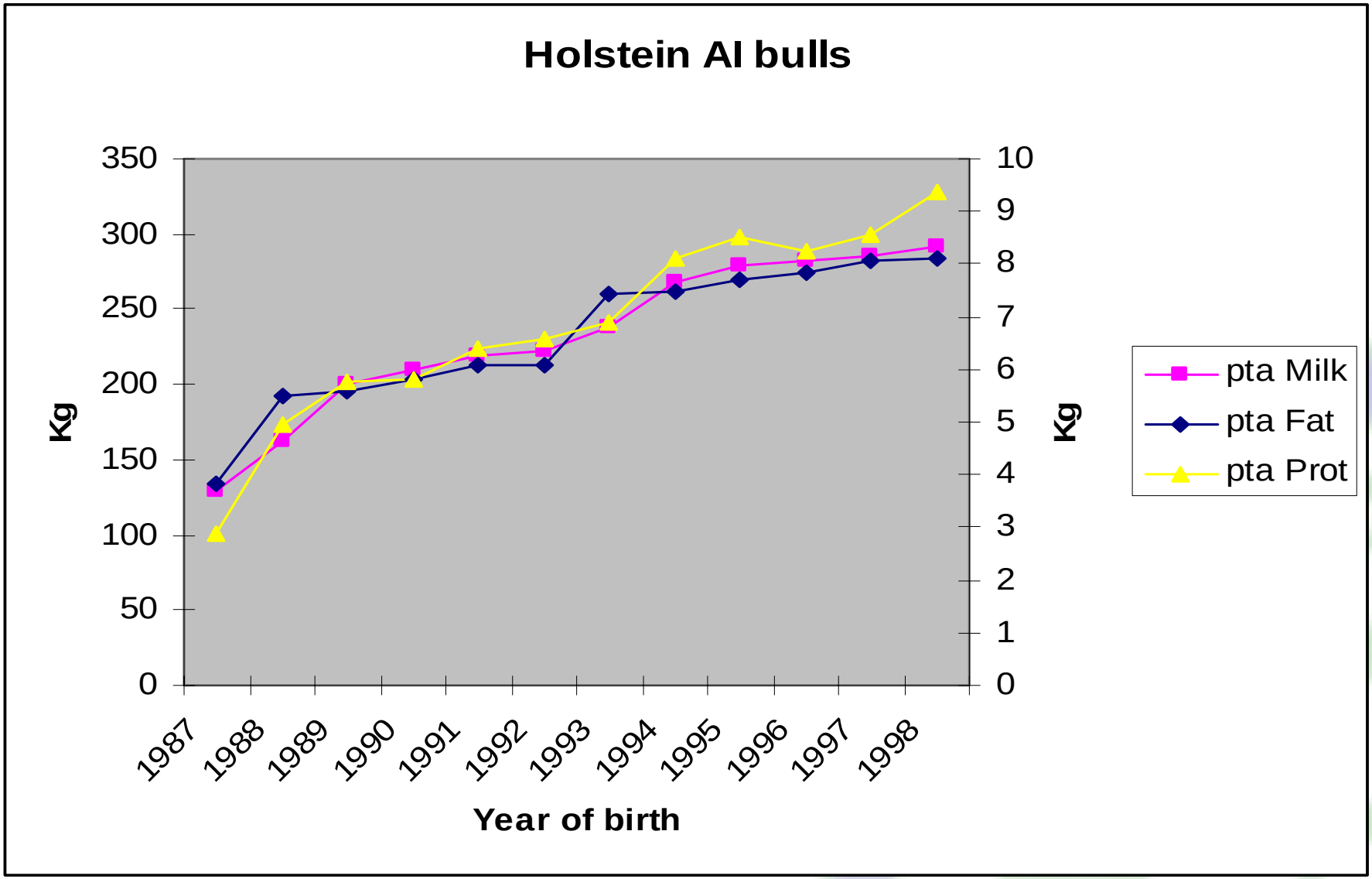
	No bulls	Dau	Herds	Milk kg	Fat kg	Prot kg	Fat %	Prot %
FR	114	411	102	4734	184.25	160.77	3.89	3.39
HF	88	200	50	4692	181.98	156.95	3.88	3.34
HO	1087	384	180	5776	216.72	190.60	3.76	3.30
JE	10	87	19	4392	217.70	164.70	4.97	3.76
MO	40	125	51	5409	205.28	185.78	3.80	3.44
MY	7	74	27	4786	186.43	168.14	3.90	3.51
NO	4	80	32	4702	187.50	164.25	4.00	3.49
RB	9	162	63	5071	198.89	177.67	3.92	3.50
SI	5	55	17	4692	181.98	156.95	3.88	3.34

Production

- PTA means

	No bulls	Dau	Herds	Milk kg	Fat kg	Prot kg	Fat %	Prot %
FR	114	411	102	-180	-3.46	-3.71	0.07	0.05
HF	88	200	50	-75	1.19	-1.47	0.08	0.02
HO	1087	384	180	235	6.77	6.89	-0.03	-0.01
JE	10	87	19	-389	19.60	0.35	0.79	0.31
MO	40	125	51	-67	-3.16	0.13	-0.01	0.05
MY	7	74	27	-343	-9.43	-6.07	0.09	0.12
NO	4	80	32	-357	-7.13	-6.88	0.15	0.12
RB	9	162	63	-237	-4.72	-2.83	0.10	0.11
SI	5	55	17	-75	1.19	-1.47	0.08	0.02

Production


Holstein AI bulls
Kg
350
300
250
200
150
100
50
0
10
9
8
7
6
5
4
3
2
1
0
Kg
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
Year of birth
pta Milk
pta Fat
pta Prot

Fertility

- Two main traits
  - Calving Interval – interval between successive calvings
  - Survival – Re-appearance from one lactation to the next
- Predictor traits
  - BCS, Angularity, Udder depth
- Parities 1-3
  - Also includes Lifespan – accounts for parity >3

Fertility

- Phenotypic means

		Survival			Calving Interval		
GROUP	**Number**	**1**	**2**	**3**	**1**	**2**	**3**
FR	65172	0.85	0.84	0.82	374	373	373
FR50HO50	25992	0.84	0.83	0.81	380	377	377
FR50..75	17454	0.84	0.83	0.81	379	376	377
FR75..100	22752	0.84	0.83	0.82	375	374	374
HO	401965	0.84	0.83	0.81	388	387	386
HO50..75	48571	0.84	0.83	0.82	378	379	378
HO75..100	93710	0.84	0.83	0.81	384	384	382
JE	1844	0.85	0.84	0.88	378	378	379
MO	8514	0.83	0.77	0.68	389	380	376
ND	662	0.87	0.87	0.89	376	381	379
NO	363	0.83	0.84	0.85	375	370	374
RB	2064	0.85	0.87	0.86	372	373	374

Fertility

- PTA means

Group	No. sires	No. Dau	SU	SU rel	CIV	CIV rel
FR	2585	56	0.79	0.14	-6.49	0.20
FR..50HO..50	1277	42	0.47	0.20	-3.40	0.27
FR50..75	1461	23	0.45	0.19	-4.50	0.25
FR75..100	1406	33	0.79	0.16	-5.61	0.22
HO	6797	69	-0.06	0.21	0.55	0.27
HO50..75	2687	34	0.38	0.21	-2.01	0.27
HO75..100	2948	40	0.10	0.21	-0.04	0.27
JE	179	11	0.87	0.04	-6.51	0.10
MO	762	11	2.53	0.09	-2.66	0.14
ND	51	18	0.81	0.04	-5.56	0.10
NO	26	19	3.19	0.07	-6.36	0.14
RB	129	26	2.09	0.06	-5.90	0.13

Other sub-indices

- Sub-indices included in EBI for calving, beef and Health
- Emphasis is much lower than milk or fertility
- Can be used as selection criteria to strenghten specific weaknesses

Interbull

- Many bulls have daughters producing in several countries not included in domestic evaluations
- Large trade in international semen – want to get an idea of how good a foreign bull might be in Ireland
- Interbull utilises information from all participating counties, provides breeding values on the Irish scale

Interbull

- Eliminates need to develop country specific conversion equations
- Currently we receive Interbull evaluations for:
  - Milk, fat and protein
  - Somatic cell score
  - Longevity
  - Type
- Fertility and Calving in 2006

Future

- Test-day model – use of individual test day milk records
  - Better able to account for environmental effects
  - More accurate evaluations
- Identification of new traits of economic importance
  - Mastitis/lameness incidence
  - Environmental traits – methane/nitrogen?
- Use of marker information?

Relative emphasis – Beef EBI

Subindex	Trait	Economic weight	Relative emphasis
Dairy calving	Calving difficulty	-3.38	43%
	Gestation	-7.10	47%
	Calf Mortality	-2.96	10%
Beef calving	Calving difficulty	-2.22	54%
	Gestation	-1.58	20%
	Calf Mortality	-4.30	26%
Weaned calf	Weaning weight	1.30	31%
	Calf quality	1.30	69%
Beef production	Weaning weight	1.04	20%
	Feed intake	-21.94	8%
	Carcass weight	2.34	55%
	Carcass conformation	6.24	12%
	Carcass fat	-2.34	5%
Maternal	Survival	3.27	14%
	Calving interval	-2.59	20%
	Age at first calving	-0.59	11%
	Calvign difficulty	-4.32	14%
	Weaning weight	3.30	40%
	Cull cow weight	0.07	2%

Starting point for Evaluations

Routine extraction of files from ICBF database

Pedigree file: ~8 million animals from 36 different breeds and crosses on Iris database.

Data file: ~4 million records from various sources

Calving performance data **–** Animal events herds
Linear score data **–** Linear scoring herds
Weaning weight, calf value **–** Livestock marts, Linear scorers
Carcass data **–** Factories
Liveweight, Feed Intake data **–** Tully performance Test Centre

Data Editing: Microsoft Access and SAS

Pedigree file after edits

Breed	count of main breed
Holstein	1,988,861
Friesian	560,062
Charolais	206,754
Limousine	190,546
Aberdeen Angus	140,512
Belgian Blue	124,367
Simmental	101,744
Hereford	97,247
Montbeliarde	36,025
Shorthorn	11,058
Jersey	9,444
Blonde Aquitaine	7,225
Brown Swiss	1,132

Data file after edits

Trait	Extraction date	
	Jun-05	*Nov-05*
height withers	48,876	53,256
width at withers	47,879	50,066
length back	47,881	52,246
pelvic length	47,881	50,063
width behind withers	47,879	52,246
loin development	48,872	53,255
dev hind quarter	48,905	53,285
Live weight	34,464	35,636
Carcass weight	133,022	138,255
carcass conf	132,802	138,035
carcass fat	132,786	137,998
cull cow	24,160	26,646
weaning weight	30,699	32,590
Feed Intake	1,512	1,778
Total data records	827,618	875,355
Extra		47,737

Predictor traits:

- *Correlated to goal traits*
- *Heritable*
- *Measurable*
- *Available early*

Goal traits:

- *Economically important*
- *Heritable*

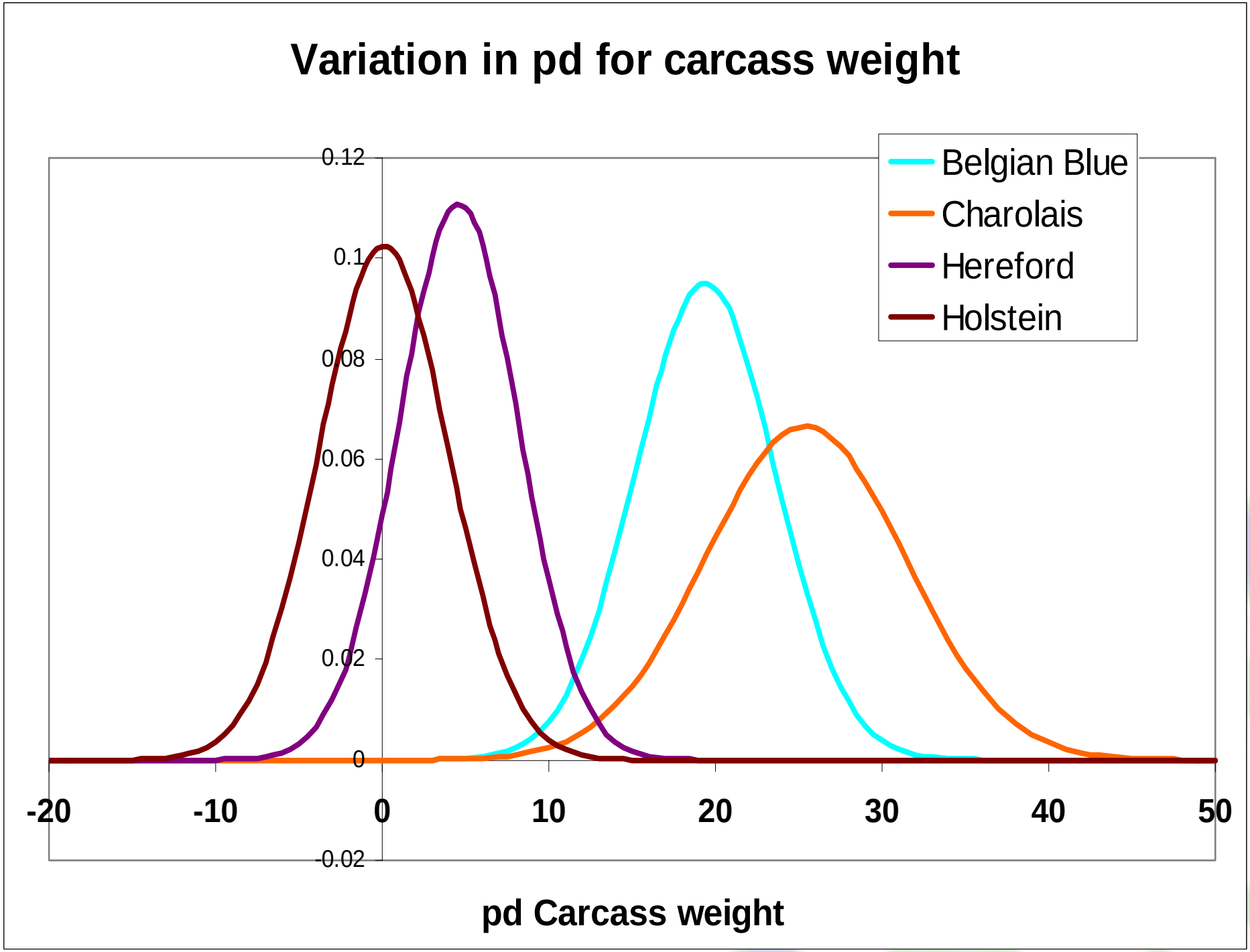
BPSI model

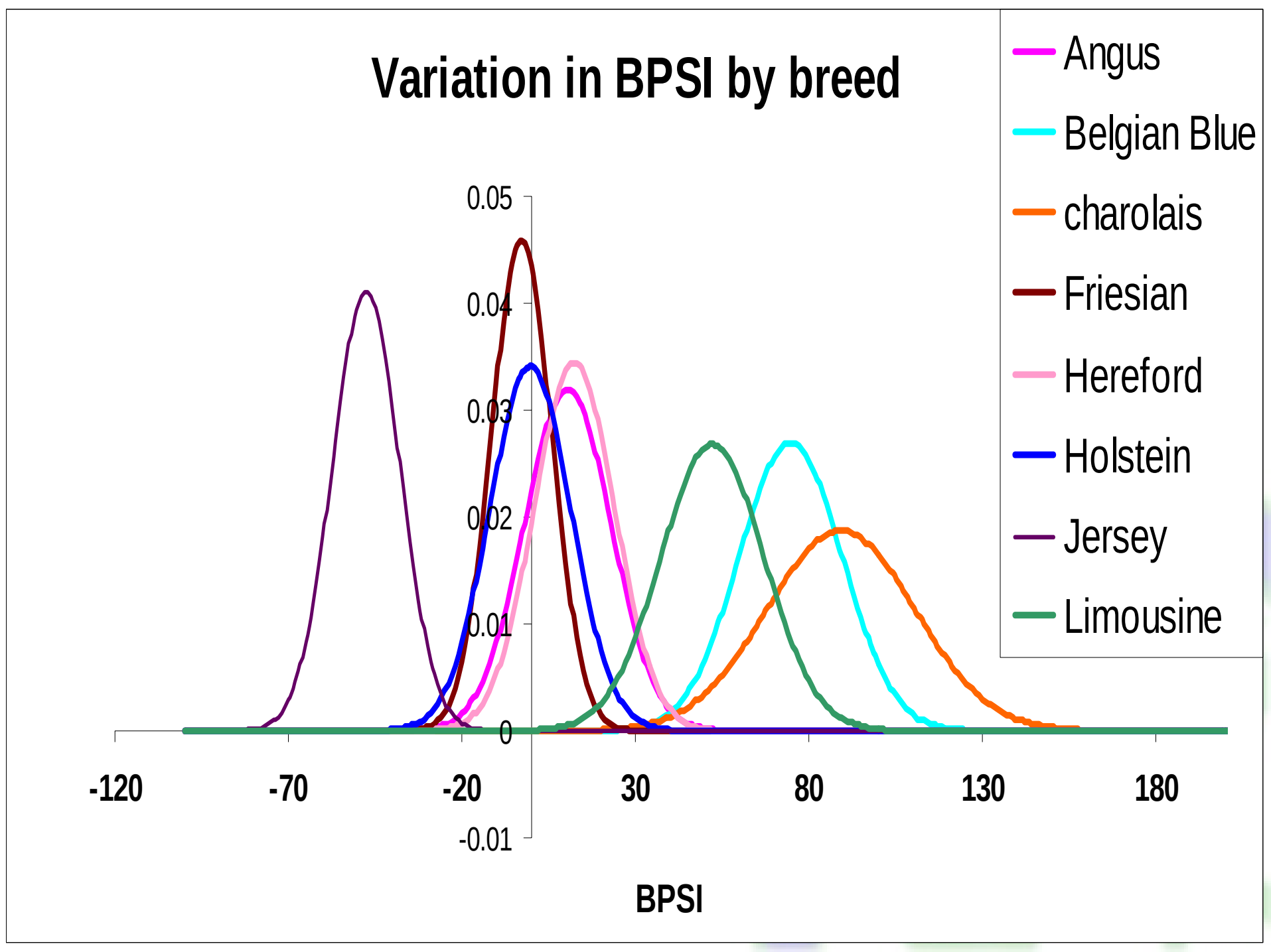
Model - Multivariate Animal Model
Software - PEST
Breeds - All breeds with sufficient numbers of animals with data including crossbreds hence referred to as an **"across breed evaluation"**
Pedigree file - oldest animals coded into breed groups
Starting point – animals with data, then include 4 generations of ancestry, finally one generation forward to facilitate parent averages for young stock
Fixed effects: age, herd x year x season, scorer (linear type traits), recombination, heterosis

Base adjustment

102 - Holstein-Friesian sires born between 1988 and 1992 average of 900 carcass records.
Same 102 sires used as base correction for calving traits

	raw values	pd
Carcass weight (kg)	**314**	**-2.5**
Carcass conformation (1-15)	**4.36**	**-0.59**
Carcass fat (1-15)	**2.89**	**-0.11**
Cull cow carcass weight (kg)	**231**	**+2.12**


Variation in pd for carcass weight
Belgian Blue
Charolais
Hereford
Holstein
0.12
0.1
0.08
0.06
0.04
0.02
0
-0.02
-20
-10
0
10
20
30
40
50
pd Carcass weight


Variation in BPSI by breed
Angus
Belgian Blue
charolais
Friesian
Hereford
Holstein
Jersey
Limousine
0.05
0.04
0.03
0.02
0.01
0
-0.01
-120
-70
-20
30
80
130
180
BPSI

Calving Performance

Model - Sire-Maternal grandsire

Software - ASREML

Breeds - Across breed evaluation

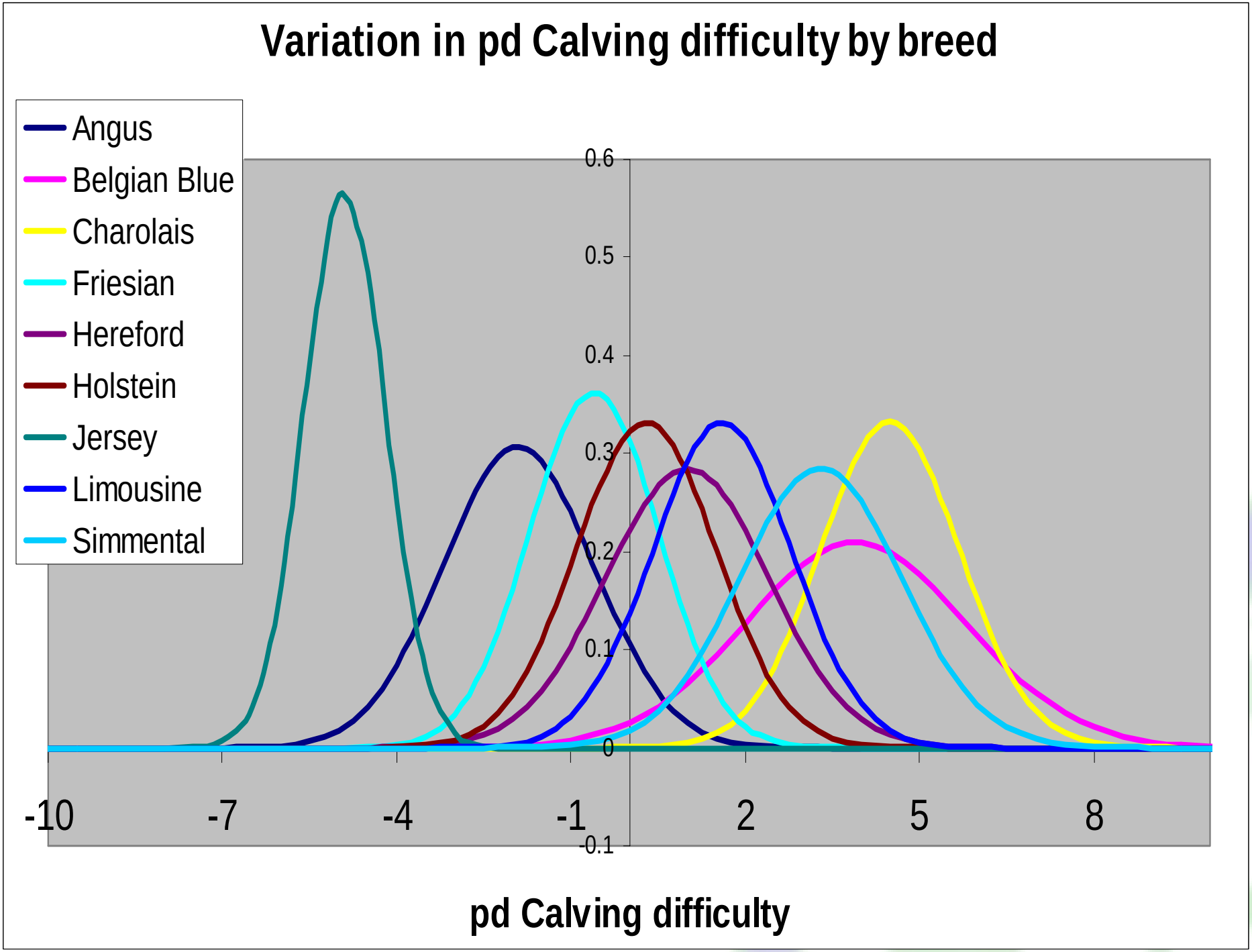
Traits evaluated:	***heritability***
direct calving ease	23%
maternal calving ease	4.2%
gestation length	39%
mortality	1.4%

Fixed effects: herd x year x season, breed of dam, parity, sex of calf, heterosis and recombination of dam and calf

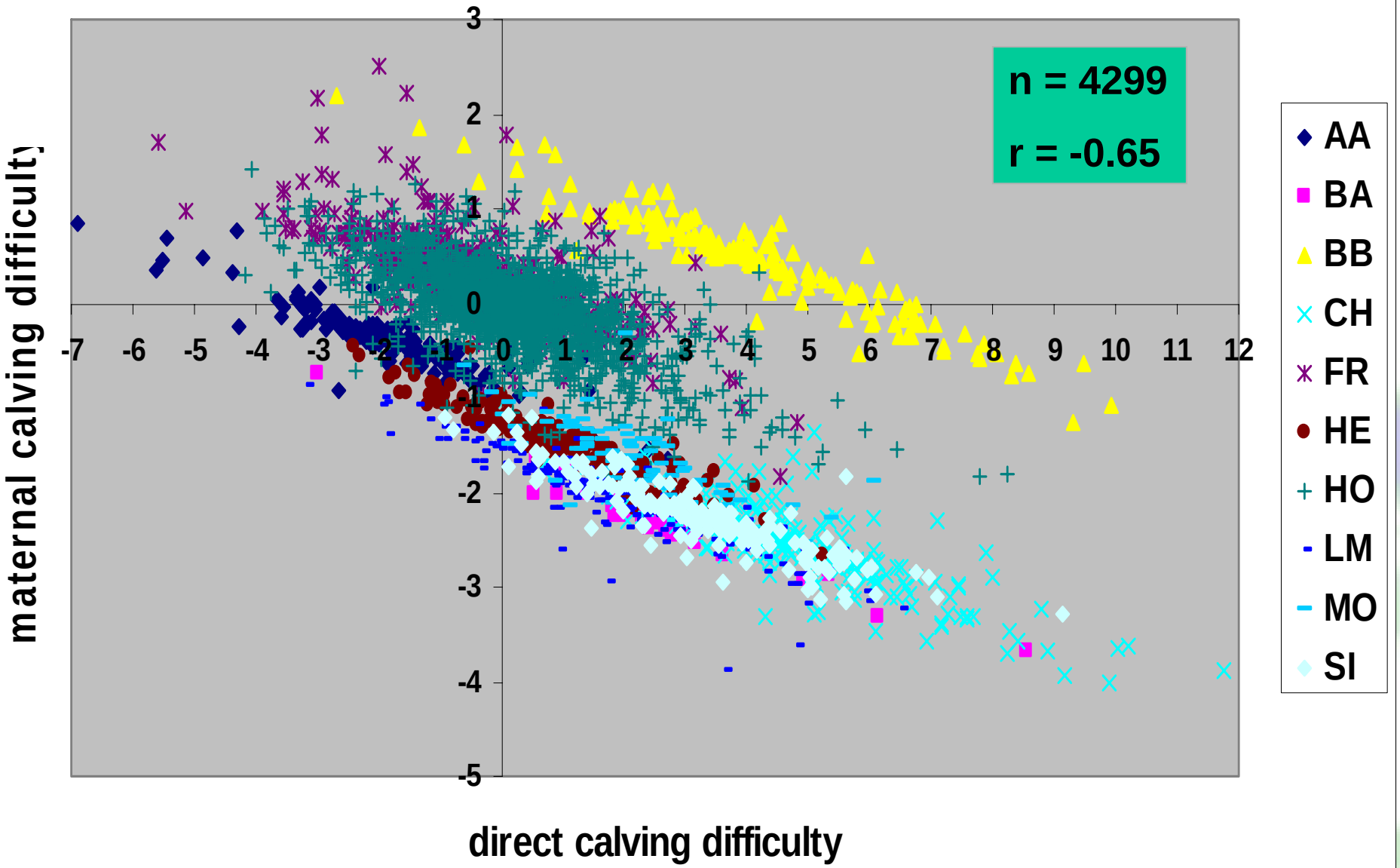
Base adjustment

102 - Holstein-Friesian sires born between 1988 and 1992 average of 2880 records available over 4 traits
Same 102 sires used as base correction for beef traits

	raw values	pd
Calving ease direct (%3/4)	**6.4%**	**+1.42**
Calving ease maternal (%3/4)	**7.2%**	**-3.49**
Gestation length (days)	**281.9**	**-1.04**
Mortality at birth (%)	**5.6%**	**+0.28**


Variation in pd Calving difficulty by breed
Angus
Belgian Blue
Charolais
Friesian
Hereford
Holstein
Jersey
Limousine
Simmental
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-10
-7
-4
-1
2
5
8
pd Calving difficulty

relationship between direct and maternal cdiff



Extreme sires

Low	**n**	**raw values**	**pd**
Calving ease direct (%3/4)	211	**2.9%**	**-3.17**
Calving ease maternal (%3/4)	316	**5.7%**	**-2.54**
Gestation length (days)	164	**279.9**	**-1.61**
Mortality at birth (%)	220	**4.2%**	**-0.68**

High	**n**	**raw values**	**pd**
Calving ease direct (%3/4)	214	**15%**	**+5.59**
Calving ease maternal (%3/4)	310	**14%**	**+0.76**
Gestation length (days)	165	**289.3**	**+5.24**
Mortality at birth (%)	206	**9.6%**	**+2.11**

Finishing point

Series of routine checks to ensure evaluation corresponds well to previous:

- Detailed analysis of AI sires with high reliabilities Should expect correlations to increase with increasing reliability
- Check details of proofs which show extreme change to decipher reason for change
- Meet with industry partners to discuss new proofs
- If approved then loading of new proofs back into IRIS to replace existing proofs
- Calculation of herd reports and release to entire industry

Future developments

- More automation of evaluation process will lead to more frequent evaluations ~ 2 runs/month
- Development of an across breed evaluation for linear type traits to replace old BLUP within breed evaluation ~ well advanced
- Use of indexes in selection of bulls entering Tully
- INTERBEEF: develop an across country evaluation for common breeds similar to INTERBULL for dairy
  Interested partners include: Ireland, France, Scandinavian countries, UK

Goal: Increase genetic progress through larger gene pool and increased selection intensity

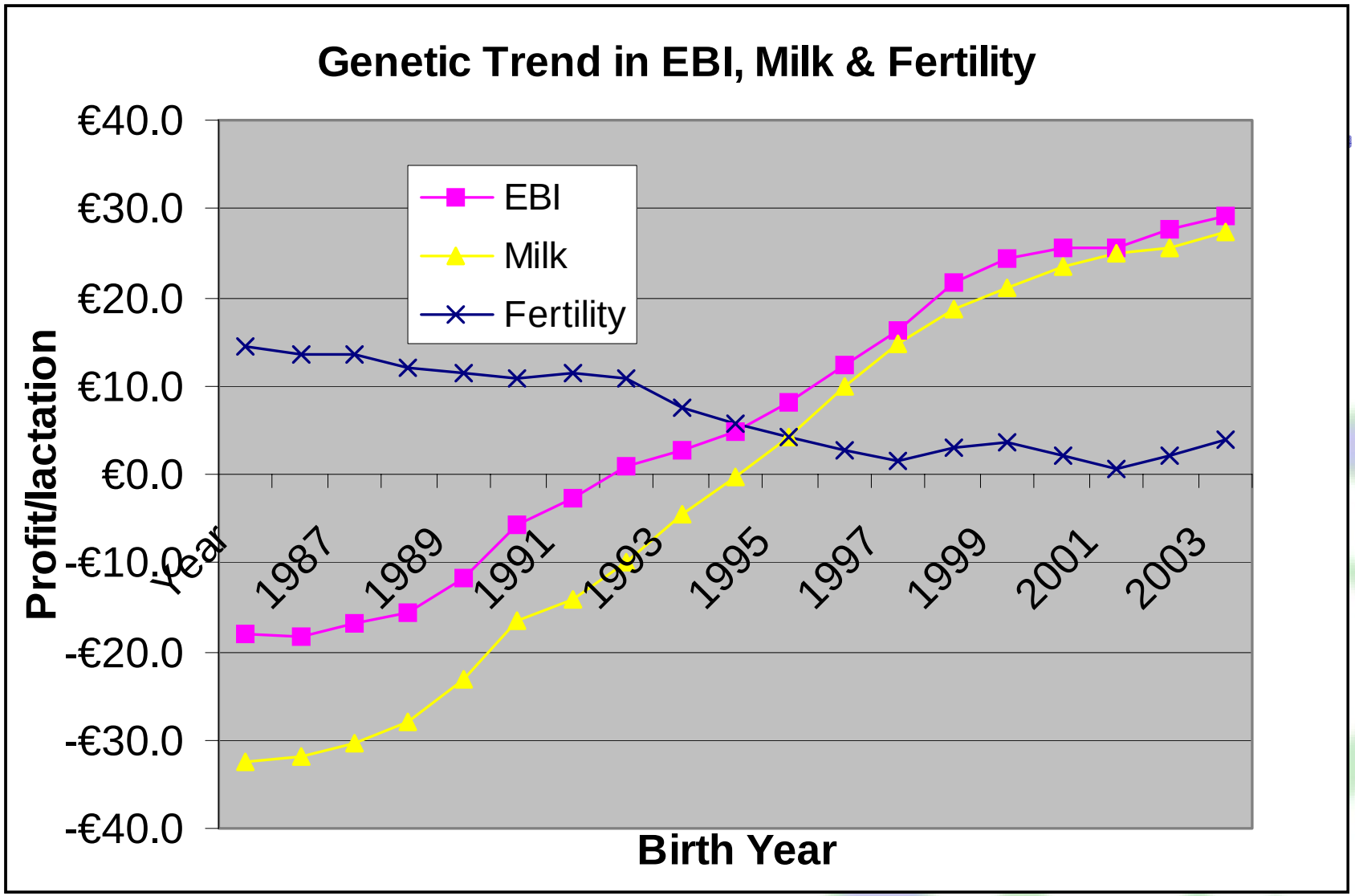
Program

- Introduction
- Data & Database – Andrew Cromie
- Breeding Objectives – Laurence Shalloo & Donagh Berry
- Genetic Evaluations – Ross Evans & Francis Kearney
- **Genetic Gain – Andrew Cromie & Donagh Berry**
- Discussion

Increasing Genetic Gain (€)

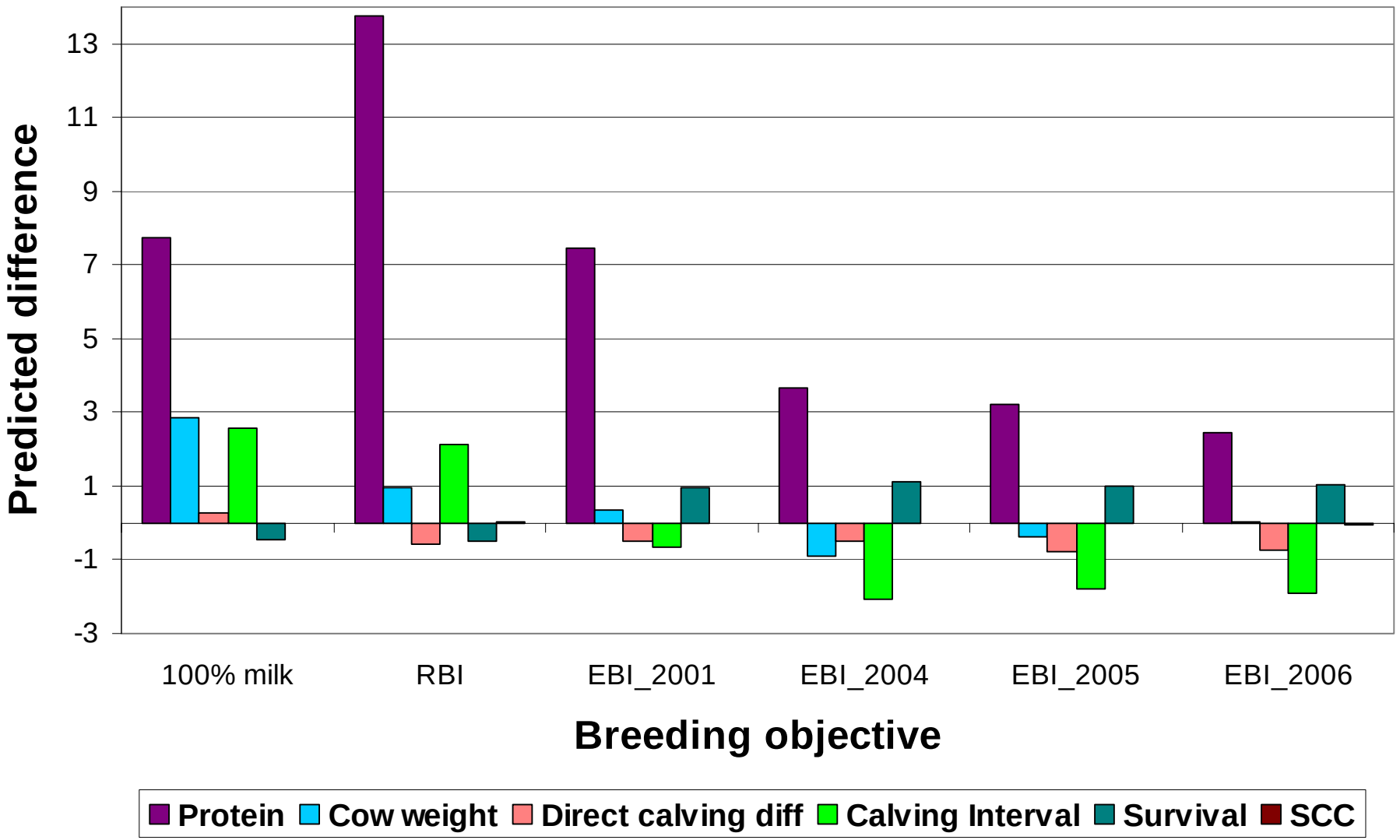
- Increasing Gain – 3 simple principles.
  1. ID, ancestry & performance
     - Good data & remove duplication (Animal Events, cattle breeding database, link to other systems)
  2. Genetic indexes, e.g., Dairy EBI,
     - Index that identifies the most profitable animals for breeding.
  3. Optimal breeding programme;
     - Best young bulls are performance/progeny tested & top 2/3 bulls returned to AI each year.
- ***What rate of gains are we currently achieving?***

Genetic Gain – Dairy Profit

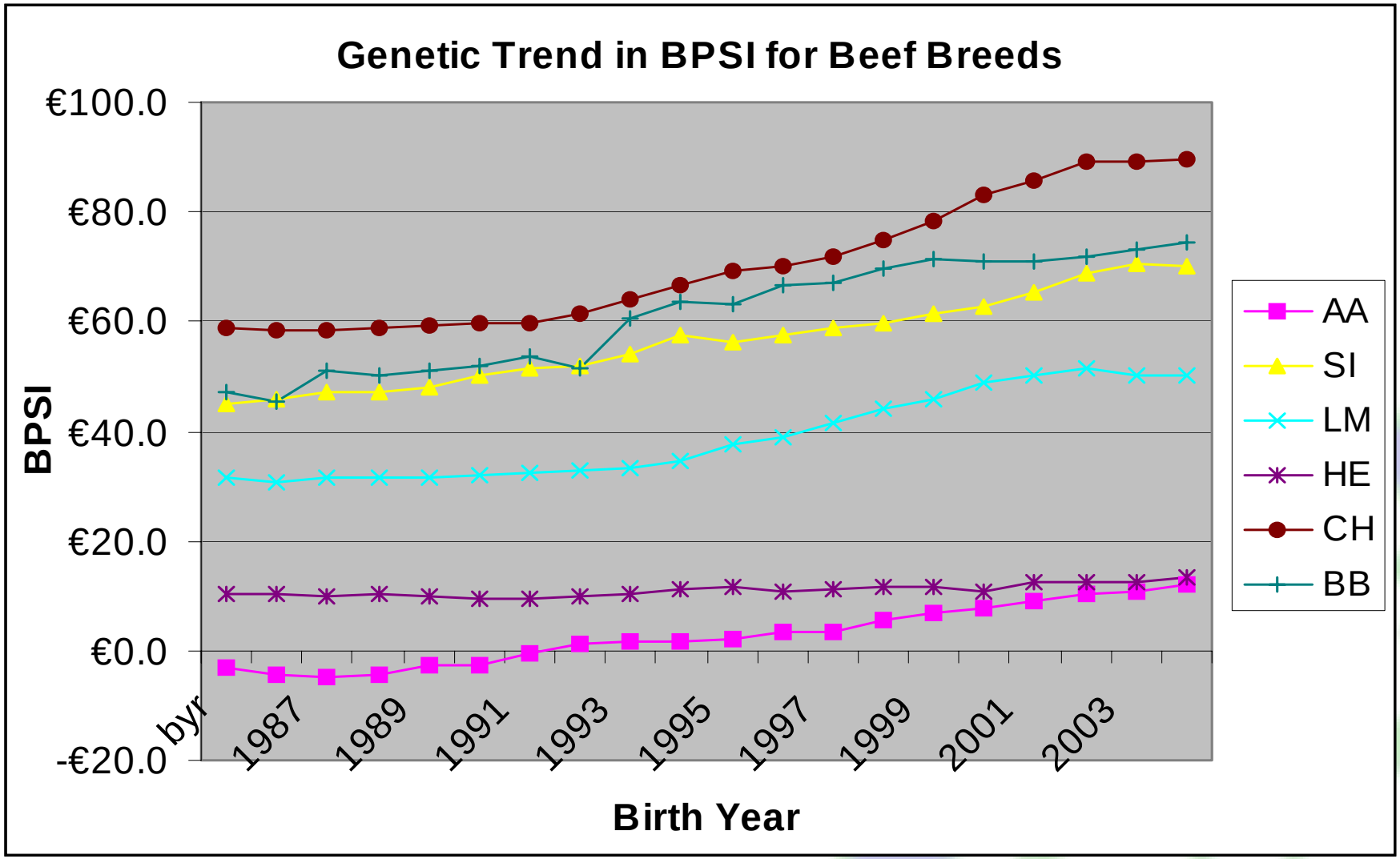


- Current level of gain = €5/year (20% of optimum)

Genetic Gain in Dairying

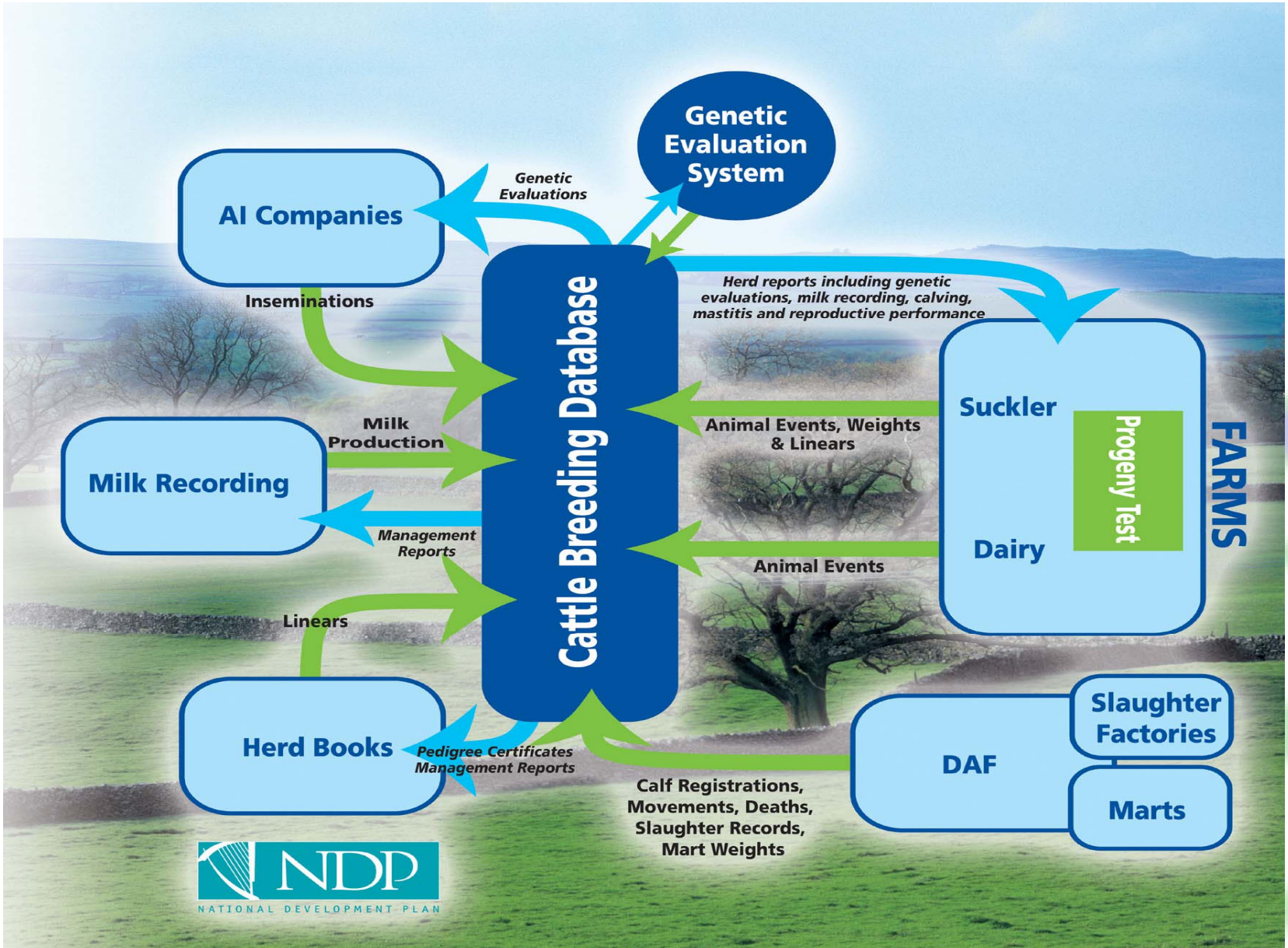


Genetic Gain – Beef Carcass Profit



- Current level of gain = €2/year (% of optimum?)

1. ID, Ancestry & Performance



2. Most profitable animals.

	EBI	M kg	F kg	P kg	F%	P%	CI	Total
Top 40	€100	5,740	232	217	4.05%	3.75%	365	
Bottom 40	€34	5,730	215	207	3.75%	3.62%	379	
Difference	€66	10	17	10			-14	
Value		**-€1**	**€26**	**€52**			**€99**	**€176**

- Pat & Pauline Ryan – EBI €100 winner.
- 40 cows with an EBI of €100.
- High EBI cows were €176 more profitable/lactation (or €7,000/year for 40 cows – ***equivalent to 3 cents/litre***).
- EBI = Profit; High milk solids + Trouble free.
- ***How quickly do we want to move from high to low….5/6 years (€23/year) or 25 years?***

3. Optimal Breeding Program.

- New database + new indexes = new progeny test program – ***G€N€ IR€LAND***
- Joint initiative involving ICBF, NCBC & Dovea AI.
- ICBF provides progeny test services to AI organisations & farmers, e.g., lists of potential bulls, lists of candidate herds, incentives…..
- Dairy program (launched Spring 2005)
  - Focused on EBI (100 bulls/year * 100 daughters).
- Beef program (to be launched this Spring)
  - Focused on maternal sub-index (10-15 bulls tested per year * 100 daughters)
- Industry supported; FBD & MII.

Summary & outlook

- Need “developed breeding program” - new top 10 beef & dairy bull each year.
- Playing “catch-up” with our competitors (data recording).
- But strategic advantages;
  - Central database with close links to industry.
  - New indexes linked to profit.
  - Committed dairy & beef farmers.
- Need to set clear genetic gain targets (e.g., €23/cow/year for dairy profit)
- ***Working together they can be achieved.***

Program

- Introduction
- Data & Database – Andrew Cromie
- Breeding Objectives – Laurence Shalloo & Donagh Berry
- Genetic Evaluations – Ross Evans & Francis Kearney
- Genetic Gain – Andrew Cromie & Donagh Berry
- **Discussion**