



IRISH CATTLE BREEDING FEDERATION

ICBF Dairy Industry Meeting; Update.

Teagasc, Moorepark
18th October 2007



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Work Priorities.

1. Update the EBI – LS & DB
2. Improve female fertility evaluations – DB
3. Beef Calf Quality - DB
4. Update calving performance - FK
5. Update linear type proofs - FK
6. Manage inbreeding - FK

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Agenda

7. Across breed proofs - RE
8. New indexes for farmer management traits - AC
9. Culling Index – *On hold*
10. Male fertility evaluations – *On hold*
11. Roll-out of proofs.
12. Any other business.

EBI Development

Overview

- Review of 2007
- Update costs and prices projected
- Cull cow liveweight

Review 2007

- Quota to Land Limiting
- Protein to fat value increased from 2 to 1 to 2.7
to 1

EBI Development 2007

- Land
 - Largest constraint in the future
 - Movement of land will affect the possibilities for expansion
- Labour
- Capital

Update all costs and prices

Methodology – Production and Fertility

- EV's where land is limiting with ratio of protein to fat of 2.6 to 1 with feed options

Update all costs and Prices

- Many changes have occurred to predicted prices in 2007;
 - Milk price
 - Grain price
- Some of reasons for these changes;
 - Biofuels
 - Global warming Australia
 - Demand for dairy products

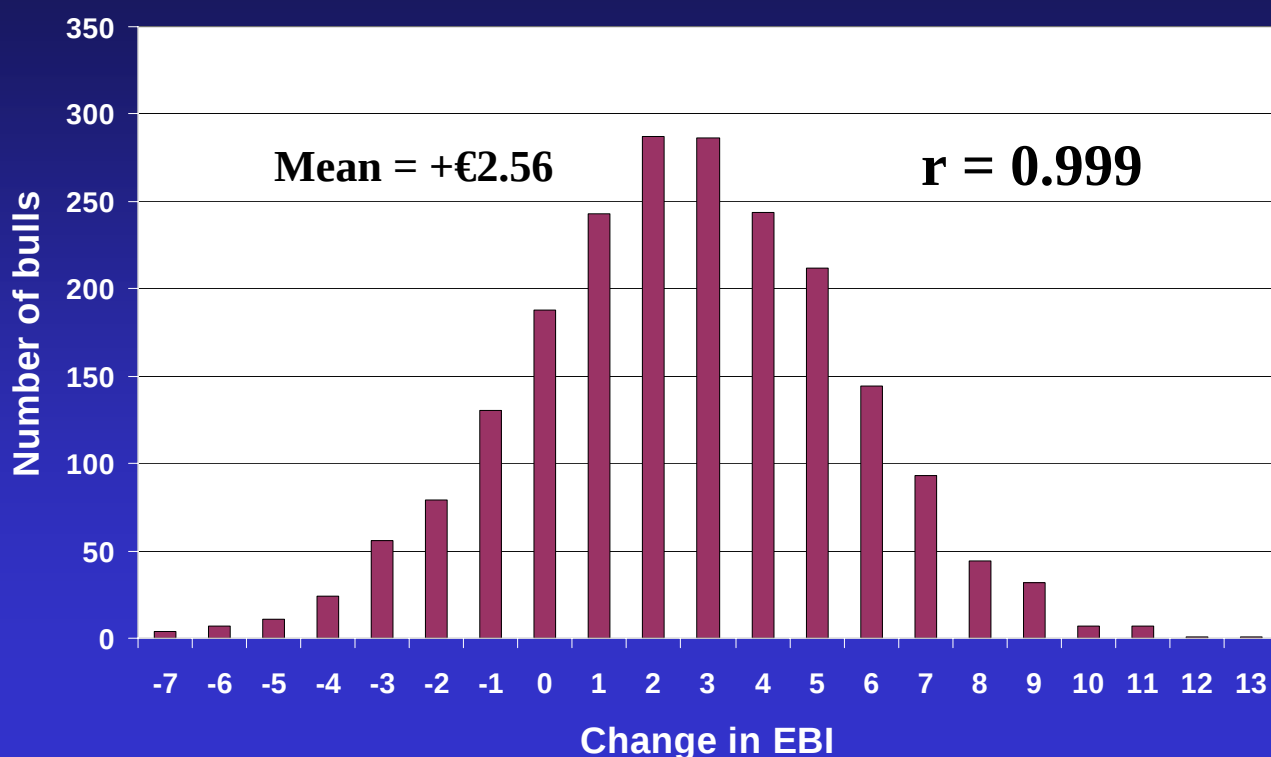
Assumptions for 2008

- All costs and prices
- Concentrate costs at €250/tonne
- Opportunity cost of land €500/Ha
- Milk price
 - 26c/l
 - 28c/l
 - 30c/l

Milk price 26c/l

		Spring (Feed input)
Yield	Protein	6.05
	Fat	0.92
	Milk	-0.09
Fertility	Survival	10.31
	Calving Interval	-11.83
Calving	Maternal	-1.73
	Direct calving	-3.26
	Direct gestation	-4.47
	Calf mortality	-2.58
Beef	Cow carcase wgt	0.04
	Carcase weight	1.40
	Conformation	10.32
	Fat score	-11.79
Health	Locomotion	1.13
	Udder	-55.48

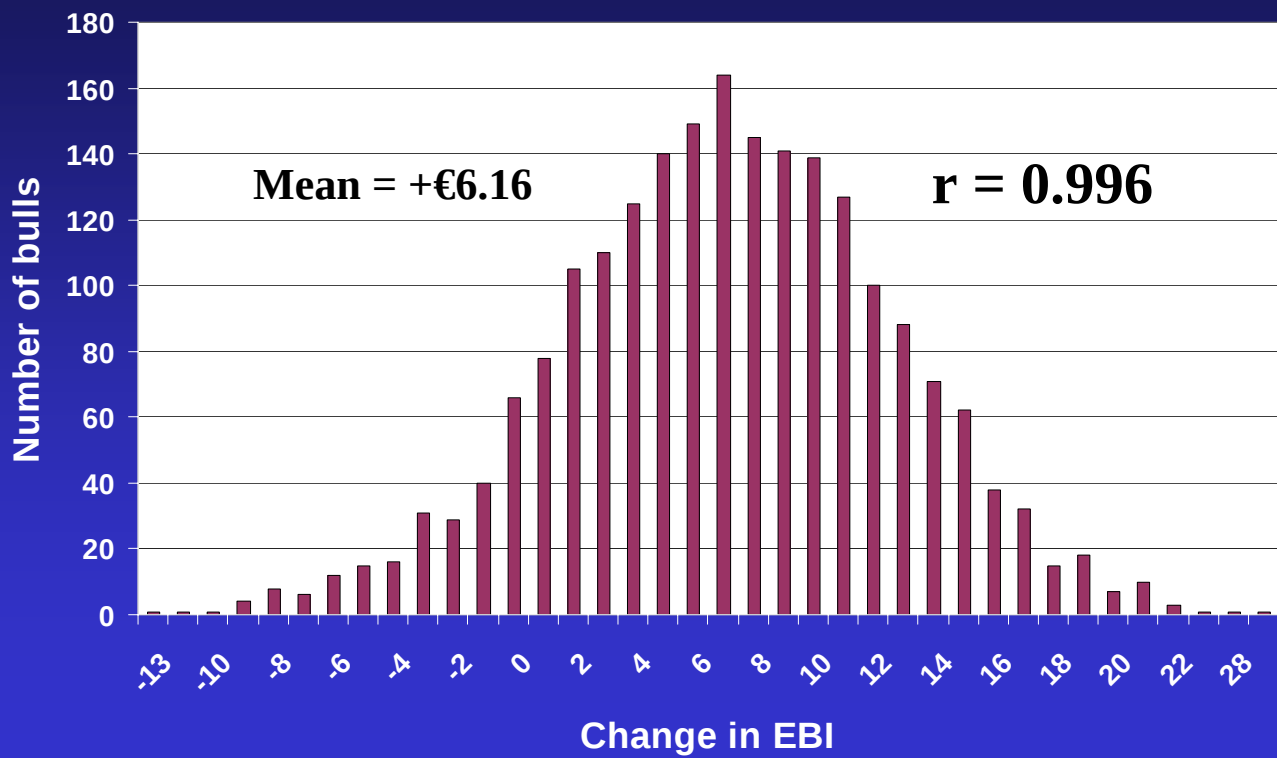
Impact on sire-proofs (n=2100)



Milk price 28c/l

			Spring (Feed input)
	Yield	Protein	6.48
		Fat	1.09
		Milk	-0.09
	Fertility	Survival	10.74
		Calving Interval	-11.90
	Calving	Maternal	-1.73
		Direct calving	-3.26
		Direct gestation	-4.47
		Calf mortality	-2.58
	Beef	Cow carcase wgt	0.04
		Carcase weight	1.40
		Conformation	10.32
		Fat score	-11.79
	Health	Locomotion	1.13
		Udder	-55.48

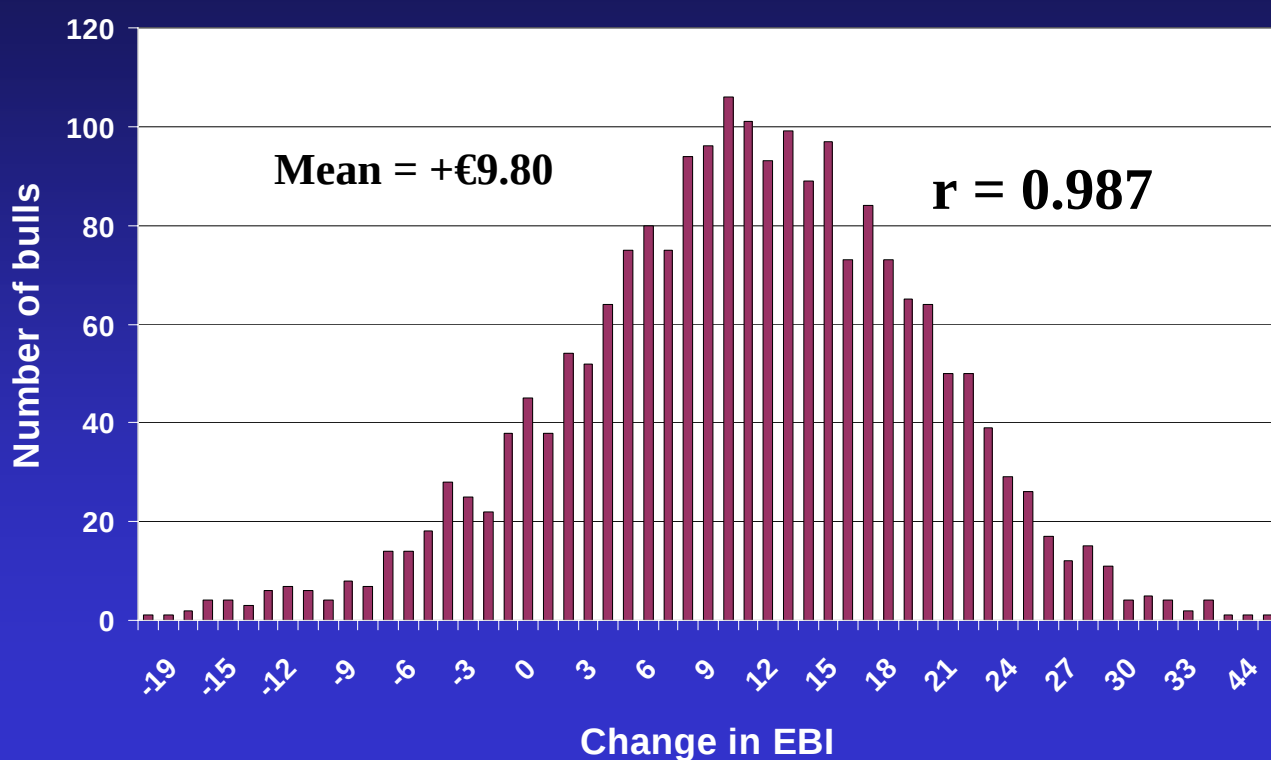
Impact on sire-proofs (n=2100)



Milk price 30c/l

		Spring (Feed input)
Yield	Protein	6.91
	Fat	1.26
	Milk	-0.09
Fertility	Survival	11.17
	Calving Interval	-11.97
Calving	Maternal	-1.73
	Direct calving	-3.26
	Direct gestation	-4.47
	Calf mortality	-2.58
Beef	Cow carcase wgt	0.04
	Carcase weight	1.40
	Conformation	10.32
	Fat score	-11.79
Health	Locomotion	1.13
	Udder	-55.48

Impact on sire-proofs (n=2100)



Calving Interval

	365 €	366 €
Receipts	1956.4	1955.8
Costs	1802.5	1813.9
Net	153.9	141.9

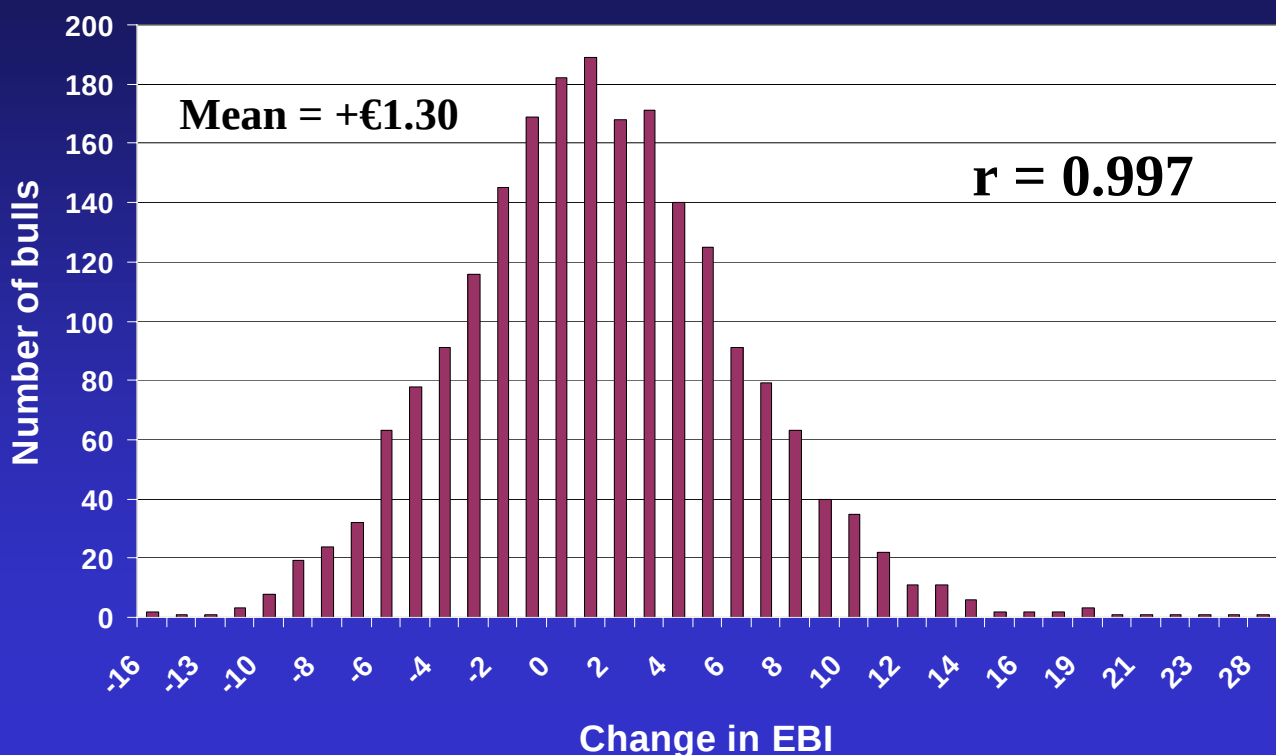
Cull cow

- Revenue → more carcase and higher price
 - No change
- Feed costs based on land limitng
 - Costs → growth & maintenance
 - Feed costs increased to €176/tDM
- Old economic weight = +€0.04
- New economic weight = -€0.513

Summary cost and price update

- Little effect on economic values
- Economic value for live-weight is negative
- 26c/l milk price projection
- Update feed costs

Impact on sire-proofs (n=2100)



Conclusions

- EBI continually developing
- EBI 2007 based on land being the limiting constraint at farm level rather than milk quota
- Costs and prices updated

Preliminary genetic evaluation of female fertility in Ireland

Current situation

- Legally required to record dam ID and date of birth
 - *Calving interval*
 - Survival
 - *To account for non-reappearance*
 - 14-trait analysis
 - *Milk yield*
 - *Calving interval*
 - *Survival*
 - *BCS, ANG, FA, UD, LSP*
- } **Parities 1 to 3**

Future situation

- 2005 – breeding charts
- 2006 – electronic handhelds piloted by some technicians
- >2007 – electronic handhelds with all technicians

Objective

- To quantify the potential usefulness of the insemination data
 - *Trait definitions*
 - *Models of analysis*
 - *Degree of genetic variation*
 - *Genetic correlations*
 - *Use in editing criteria*

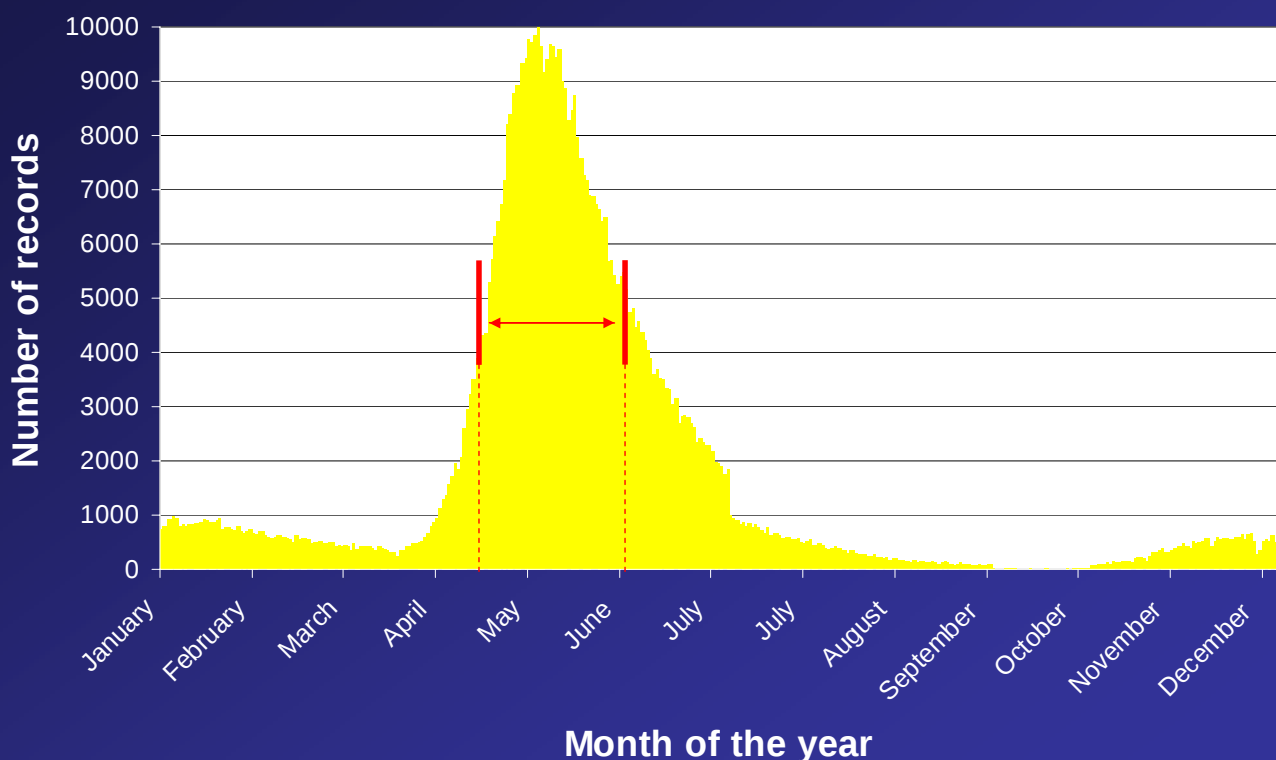
Data

- 790,452 AI records
- 85,500 natural mating records
- 128,141 pregnancy diagnosis
- 618,119 lactations
- 453,500 cows
- For age at first calving 100,585 records

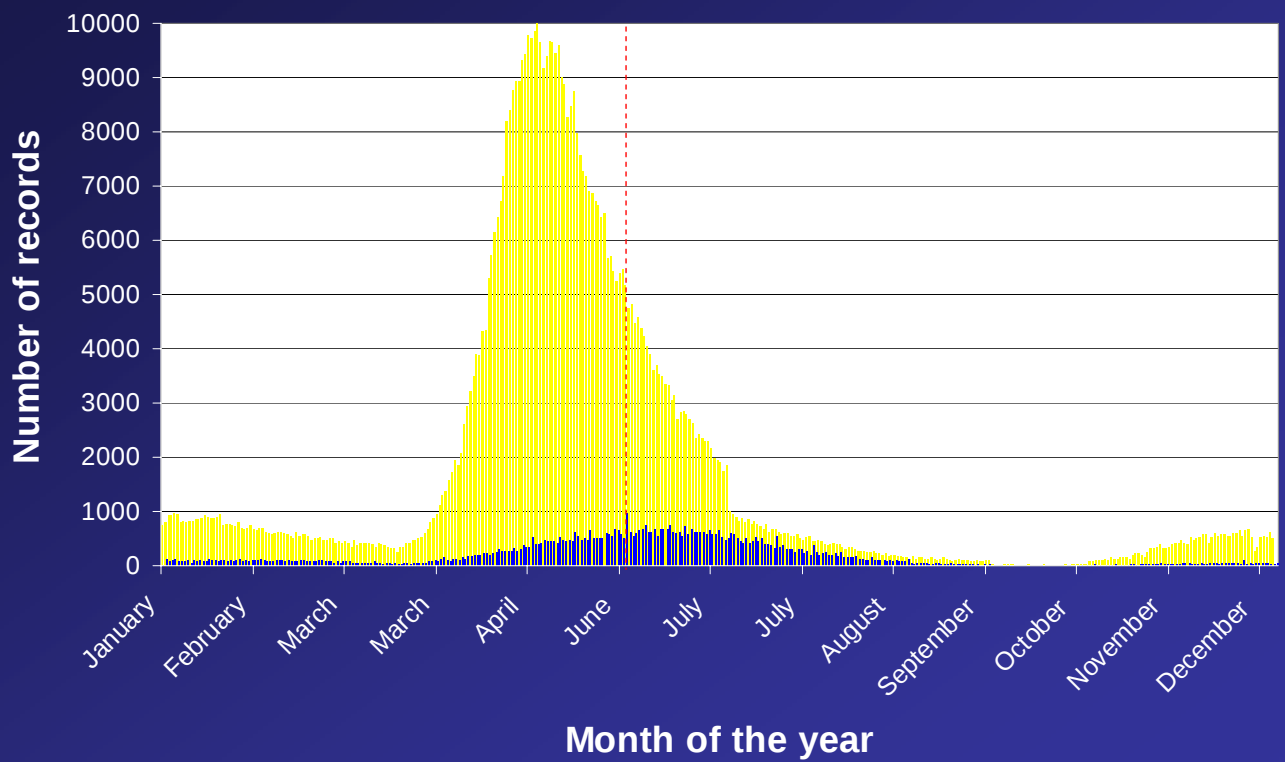
Edits

- Dairy animals >75% Holstein-Friesian
- Only meaningful service dates
- Herd-years >20 records
- Contemporary groups >5 records
- AFC – only animals calving in the same herd as born

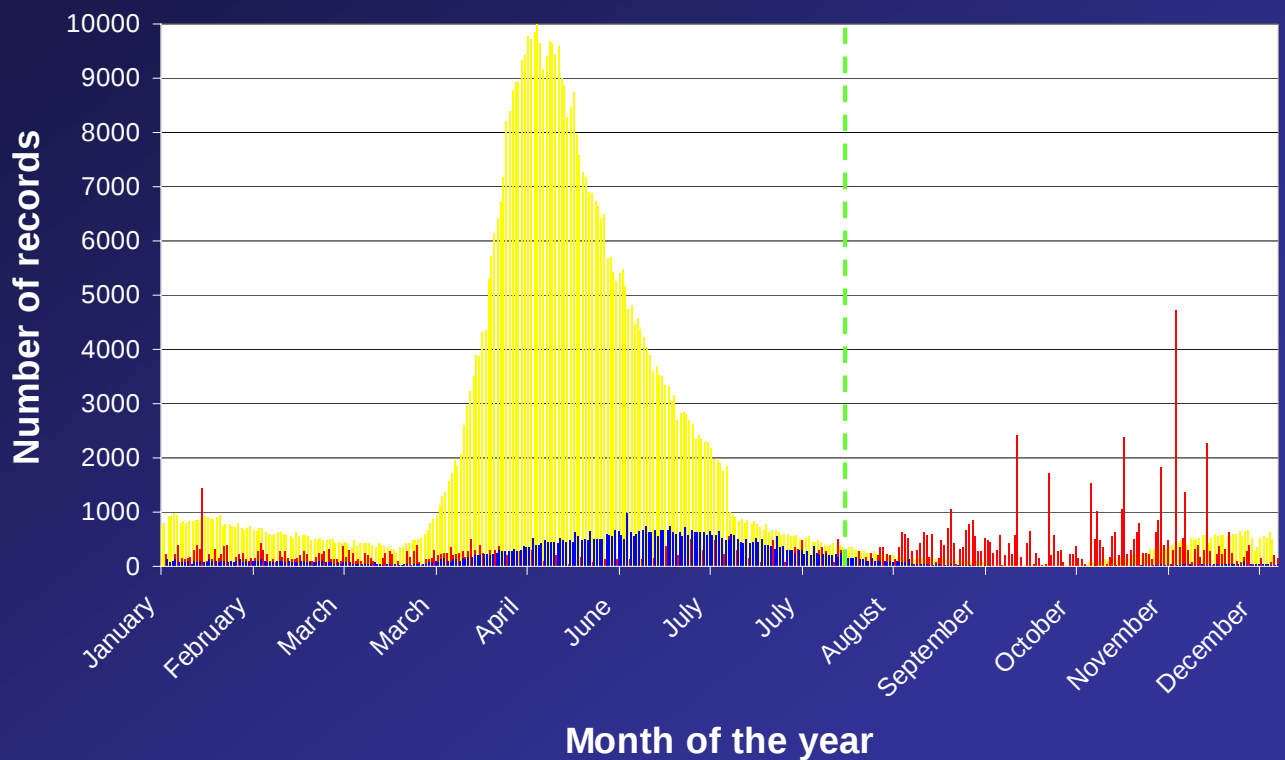
Distribution of data



Distribution of data



Distribution of data



Fertility traits - cows

1. Calving to first service interval (CFS)

- Between 10 and 250 days

2. Days open (DO)

- Calving to last mating interval
- Only in herd-years with >10 weeks breeding
- If negative PD then set to missing

3. Number of services

- Only in herd-years with >10 weeks breeding

Fertility traits - cows

4. Submission rate (SR21)

- Start of breeding season was where 3 lactating cows were inseminated within 10 days
- No cognisance of calving date
- SR21_35 – cows had to be calved 35 days by start of breeding season

Fertility traits - cows

5. Non-return 56 (NR56)

- Non-return to 1st service
- Set to zero
 - Second service within 56 days
- Set to missing
 - Served within 56-days of last AI service / date of culling / date of death
- NR56_valid – validated using subsequent calving dates where available

Fertility traits - cows

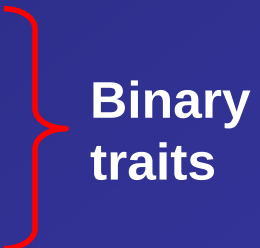
6. Pregnancy rate to first service (PRFS)

- Set to zero
 - Second service
 - Scanned not in calf
- Set to missing
 - Served within 30-days of last AI service / date of culling / date of death
- PRFS_valid – validated using subsequent calving dates where available

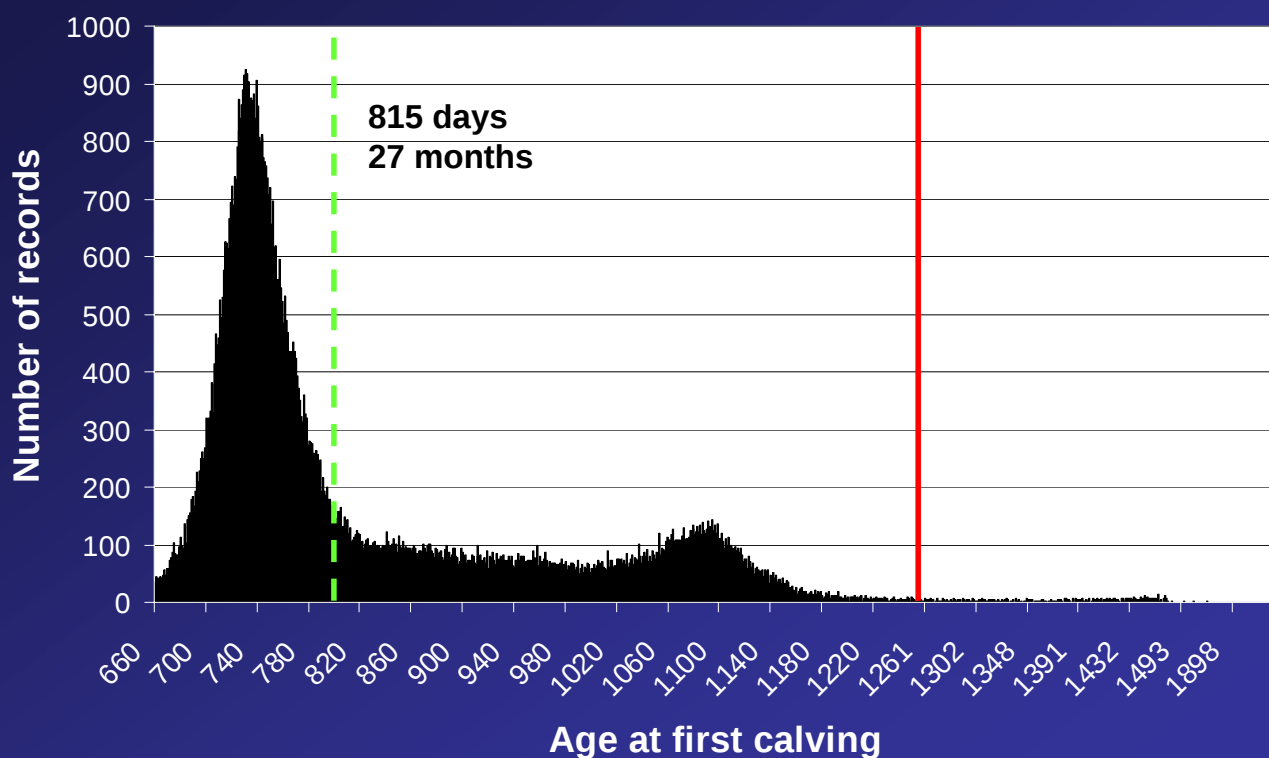
Fertility traits - heifers

1. Age at first calving (AFC)
 - 600 and 1260 days
2. Age at first service (AFS)
 - 365 and 500 days
3. NR56
4. PRFS

Analysis

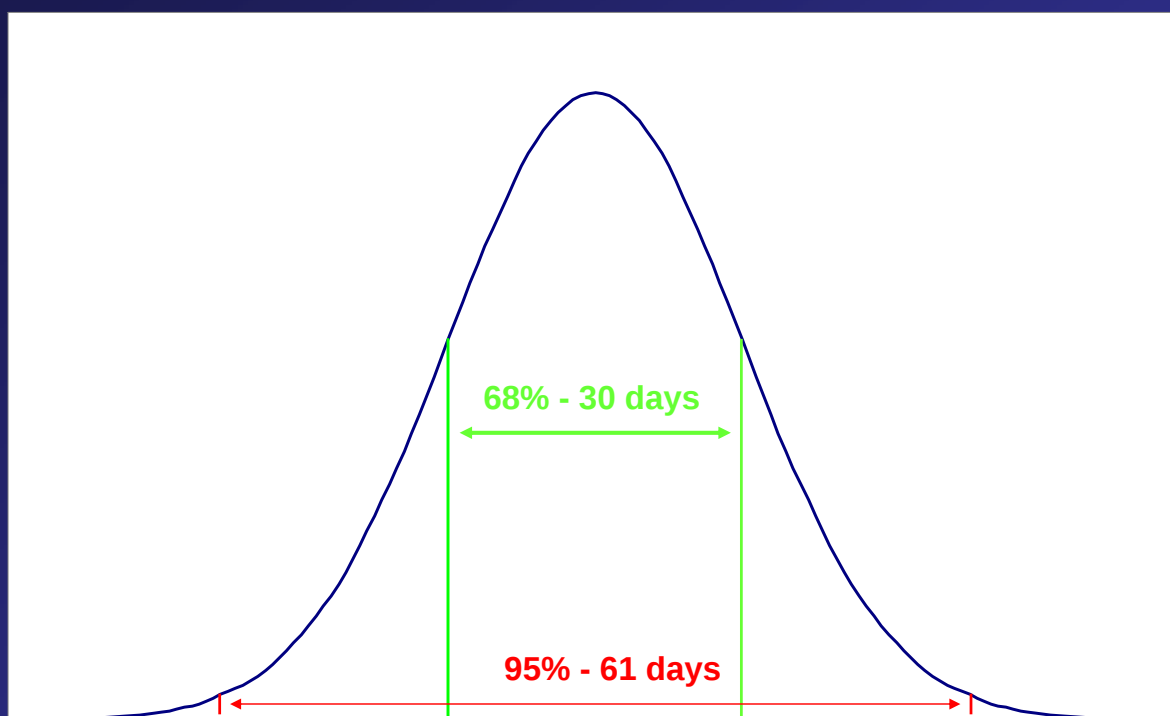
- Series of single-trait animal linear model
 - Fixed effects
 - *Contemporary group of birth / calving*
 - *Cow Holstein, Friesian and “other” breed proportion*
 - *Heterosis and recombination loss*
 - *Year-month of service*
 - *Service sire status*
 - *Heterosis and recombination of mating*
 - *Calving to first service interval*
 - Random effects
- 
- Binary traits

Results – *age at first calving*

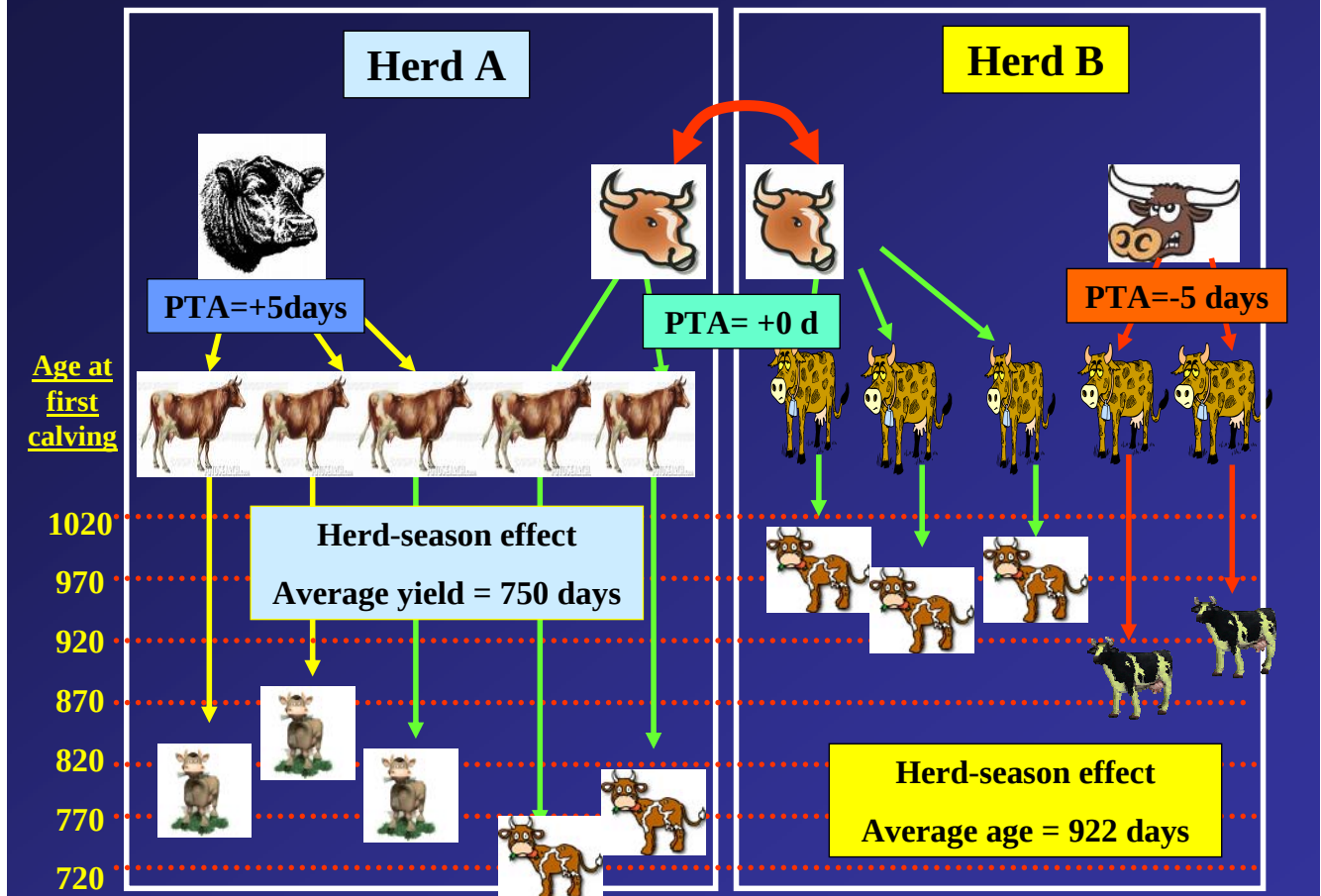


Results – *age at first calving*

- Heritability – 0.03 (SE=0.006)



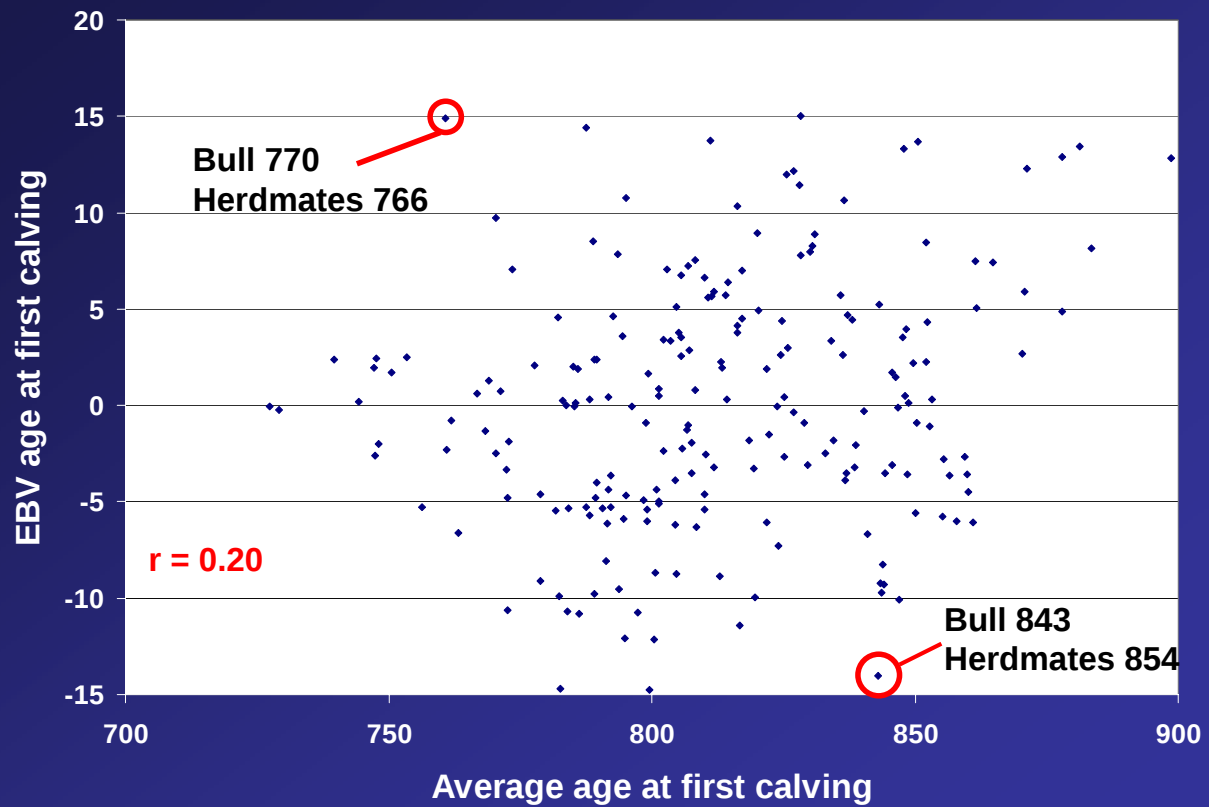
Progeny testing



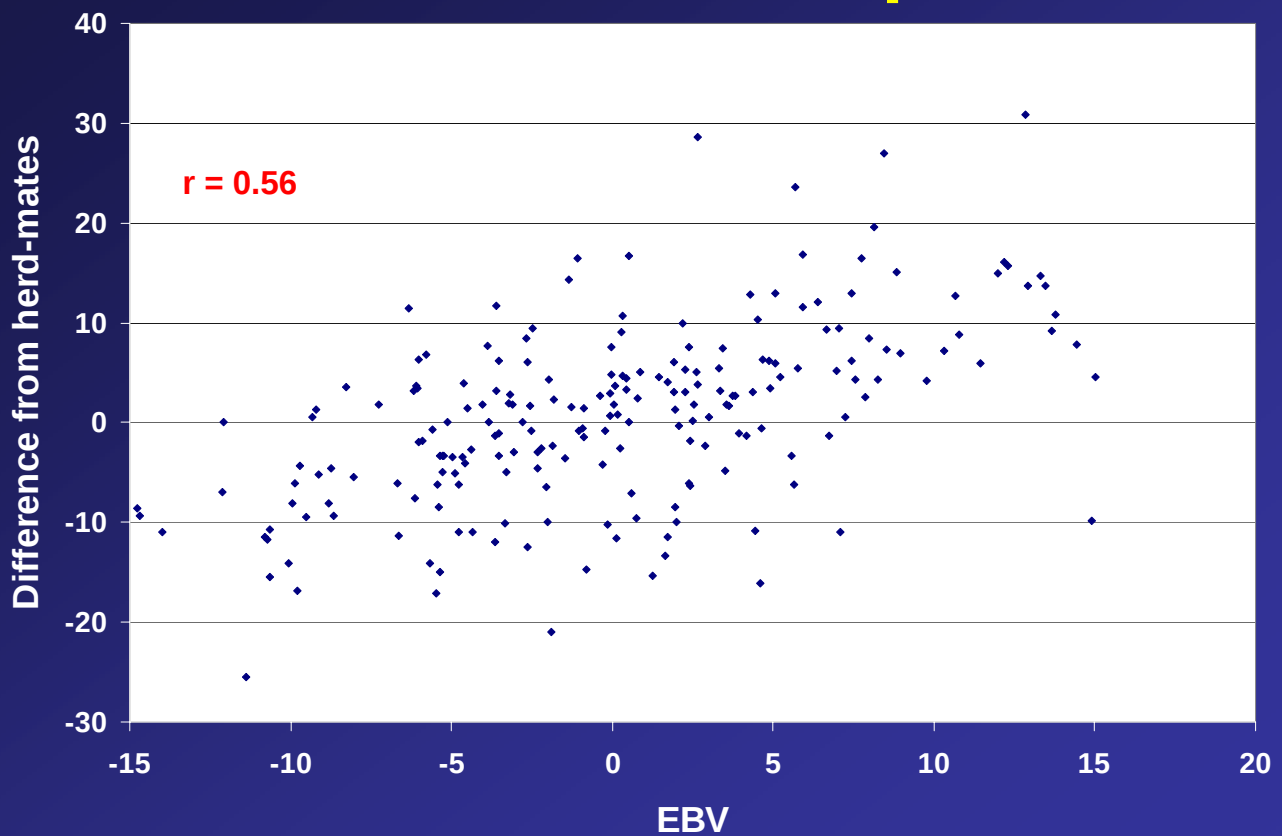
Results – *age at first calving*

	1	2	3
Milk yield	-0.23	-0.32	-0.26
Calving interval	0.46	0.16	0.38
Survival	0.62	0.34	0.28
Body condition score		-0.44	
Angularity		0.08	
Foot angle		0.35	
Udder depth		0.52	

EBVs versus raw



EBVs versus contemporaries



Results

Trait	Parity	Mean	h ²	SE
AFS	0	447	0.16	(0.023)
	1	75	0.019	(0.0060)
CFS	2	73	0.012	(0.0057)
	3	71	0.021	(0.0097)
DO	1	90	0.008	(0.0041)
	2	87	0.010	(0.0052)
	3	84	0.012	(0.0165)
NS	1	1.4	0.004	(0.0028)
	2	1.5	0.008	(0.0049)
	3	1.4	0.007	(0.0053)

Results

Trait	Parity	Mean	h ²	SE
NR56	1	0.43	0.004	(0.0043)
	2	0.39	0.006	(0.0064)
	3	0.40	0.000	(0.0000)
PRFS	1	0.57	0.001	(0.0023)
	2	0.55	0.012	(0.0070)
	3	0.56	0.009	(0.0076)
SR21	1	0.75	0.008	(0.0040)
	2	0.75	0.014	(0.0064)
	3	0.74	0.021	(0.0098)

Conclusions

- Significant genetic variation in age at first calving
 - *Goal trait*
 - *Predictor trait*
- Genetic variation in other fertility traits but large standard errors
- Potential as predictor traits for calving interval and survival

Economic value

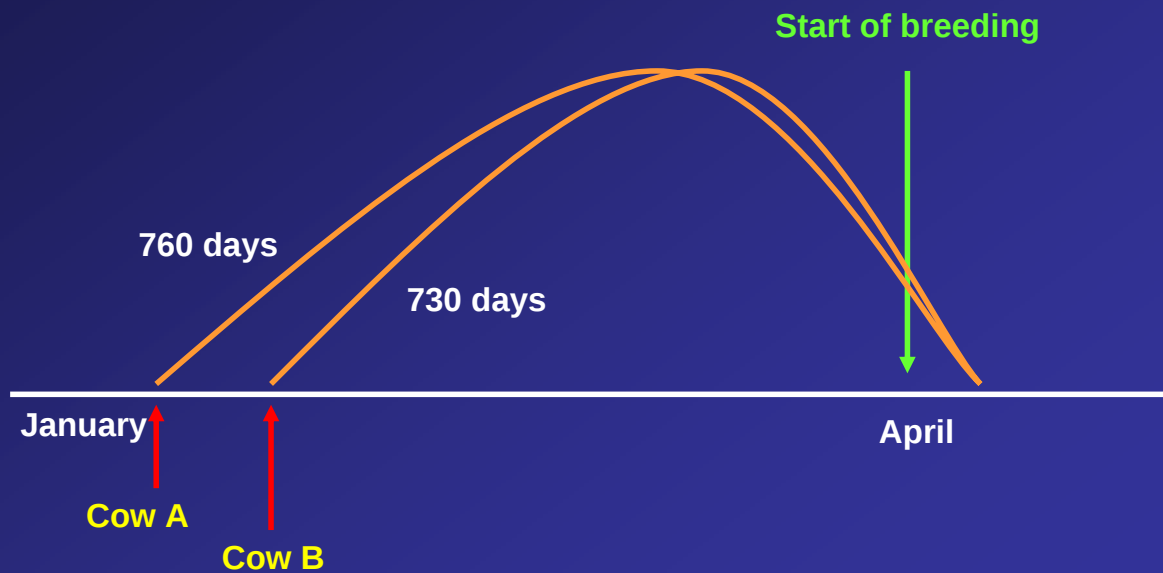
Economic value

- One day longer maintenance
- May be heavier throughout lifetime??
- Impact on subsequent performance
 - Milk production
 - Fertility
 - Survival
 - Calving difficulty
- Impact on feed budget by shifting calving pattern

Longer to maintain

- 1 day extra maintenance
- Average live-weight = 450 kg
- UFL system
- All imported feed
- €176 / ton DM
- €0.8017 / day * 0.3146 (CDE)

Impact of feed budget



Impact on feed budget

- Based on average scenario
- Changes calving pattern
- Increases feed cost
- €0.648 / day * 1 (CDE)

Economic value

- Maintenance → €0.252
- Shift in calving → €0.648
- Economic weight → €0.90 / day

Mart calf drop data edits

- Contemporary group 5 animals or greater
- Calves up to 42 days of age
- Price per calf available, no calf weight
- Sold as individuals
- Years 2002 to 2006 (some 2007 but not many young calves at time of data extract)

Dropped calf prices from mart data 2002 - 2006

Breed	Raw (HO dam)	No	Price effect	Std Err	No	No/yr
FR	168	1453	-57	4	4199	907
HO	160	20108	-70	3	51068	12064
JE	89	209	-215	9	199	62
MO	228	210	41	6	557	156
AA	210	4144	37	4	8601	2425
BB	297	1590	208	5	2541	494
CH	284	257	290	5	1458	307
LM	237	548	150	5	2084	514

4. Calving Performance

- Switching to new software and new model
- Include more data (>5th lact) and evaluations on both males and females.
- Also looking at heifers v later lactations.
- Evaluations just complete & analysis currently underway.
- Full update at next meeting.
- Interbull test-run April '08 – International proofs August 08

5. Linear Type Proofs

- New definition of Overall Type

	Dairy Strength	Feet & Legs	Mammary	Rump	Body
Old TM	25	25	40	10	0
New TM	0	35	40	0	25

$$\text{Body} = 0.974 \cdot \text{STA} + 0.184 \cdot \text{CW} - 1.060 \cdot \text{BD} - 0.545 \cdot \text{ANG} - 0.167 \cdot \text{RA} - 0.335 \cdot \text{RW}$$

- More emphasis on Feet & Legs
- Less on angularity & body depth
- Overall correlation 0.95
 - GMI 0.10 to 0.29
 - RUU 0.04 to 0.23

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Linear Type Proofs

- Interbull test run results just back
- Little changes expected
- 2 new traits have just completed Interbull test run – Locomotion & BCS
 - Inclusion in routine evaluations to be decided
 - Useful for foreign bulls; domestic evaluations in place
- Interbull pilot study commenced on milking speed & temperament
- New Irish base & scale also being investigated

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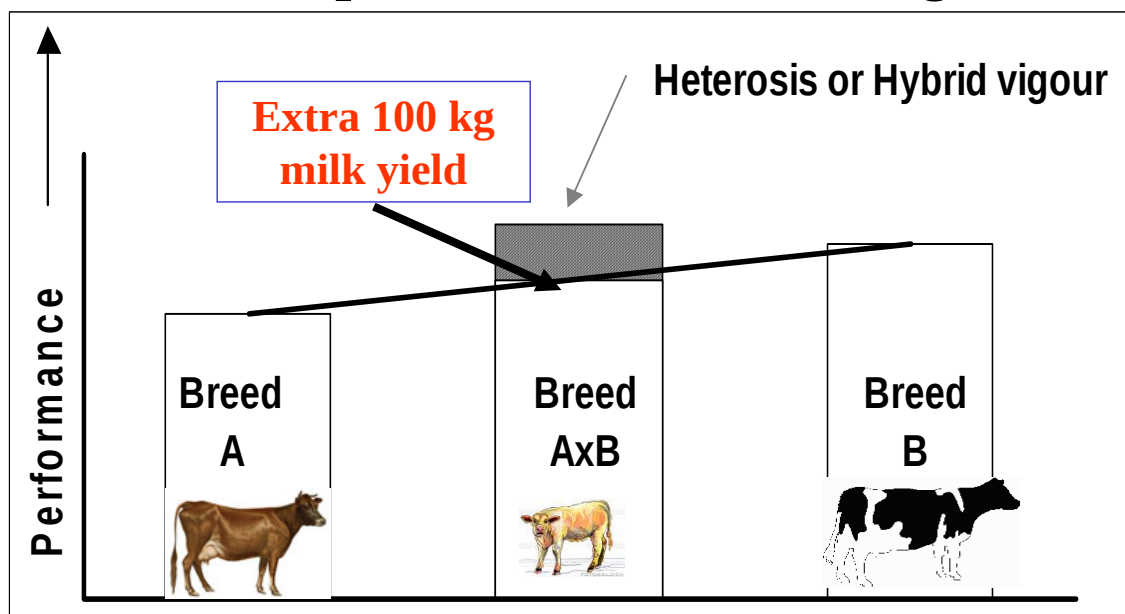
6. Managing Inbreeding

- Short-term – avoid inbreeding at herd level
 - Sire advice will help farmers avoid close mating of relatives
 - AI handheld have capability to prevent mating close relative
 - Producing potential future inbreeding values for bulls as indication of their relatedness to population
- Long-term – control inbreeding at breeding scheme level
 - GENE Ireland progeny testing

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7. Heterosis or Hybrid Vigour

= extra kick in performance from being crossbred



But different breed crosses could have different heterosis !

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Example: current Fertility evaluation

All animals in CIS evaluation	1147199
>66% of Breed Fraction Known	838419
>75% of Breed Fraction Known	833196
>87.5 of Breed Fraction Known	557360
100% of Breed Fraction Known	373350

- To account fully for heterosis we need full fractions known on the sire and dam of the animal in the evaluation
- Current fertility evaluation estimates heterosis for all animals by creating an UNKN breed and categorising the animals into known breed fractions in the evaluation
- Current milk evaluation (run in NRS) calculates heterosis using only the known breed fraction on the animal.

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Fertility evaluation

ANIMAL	animal				sire				dam			
	HO	FR	MO	JE	HO	FR	MO	JE	HO	FR	MO	JE
1	32	0	0	0	32	0	0	0	32	0	0	0
2	0	16	16	0	0	0	32	0	0	32	0	0
3	16	0	0	16	32	0	0	0	0	0	0	32
4	8	8	0	16	0	0	0	32	16	16	0	0
5	16	0	0	12	32	0	0	0	0	0	0	24

Current model

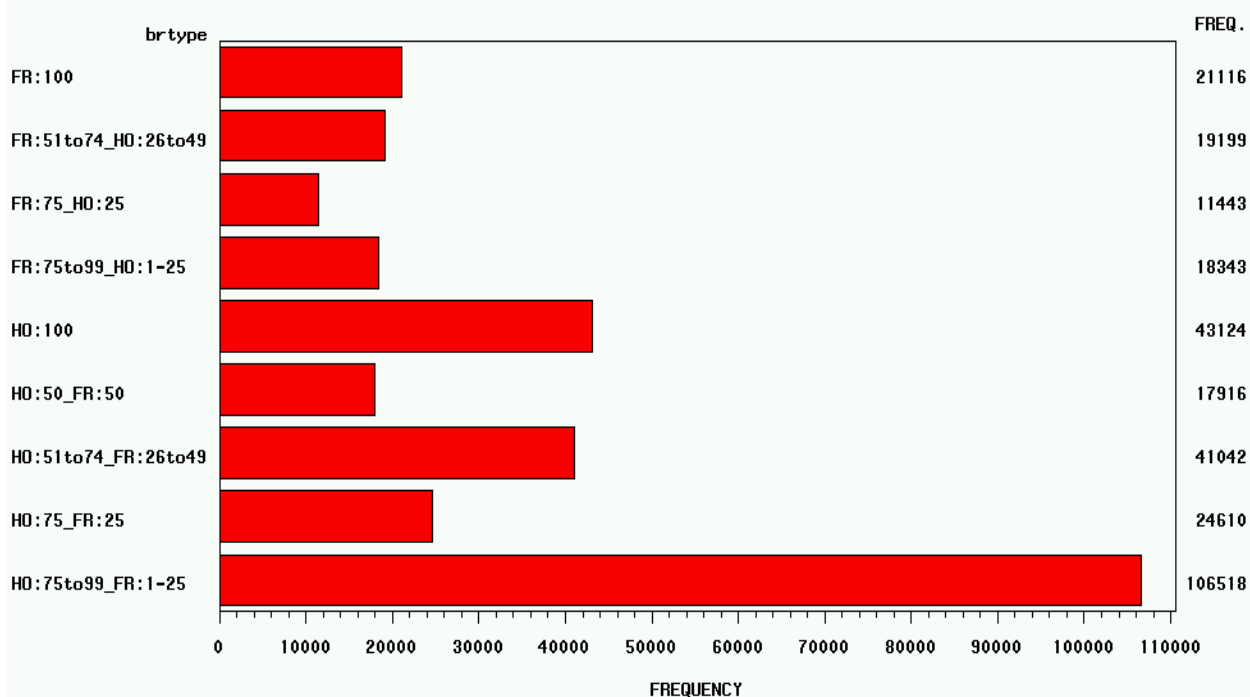
General heterosis	General recomb
1	0
1	0.25
1	0.1875
0	0
0	0

Proposed model

Heterosis				Recombination			
HOXFR	HOXMO	FRXMO	remaining heterosis	HOXFR	HOXMO	FRXMO	remaining recombination
0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0
0.25	0	0	0.75	0	0	0	0.1875
0	0	0	1	0.25	0	0	0
0	0	0	0.75	0	0	0	0

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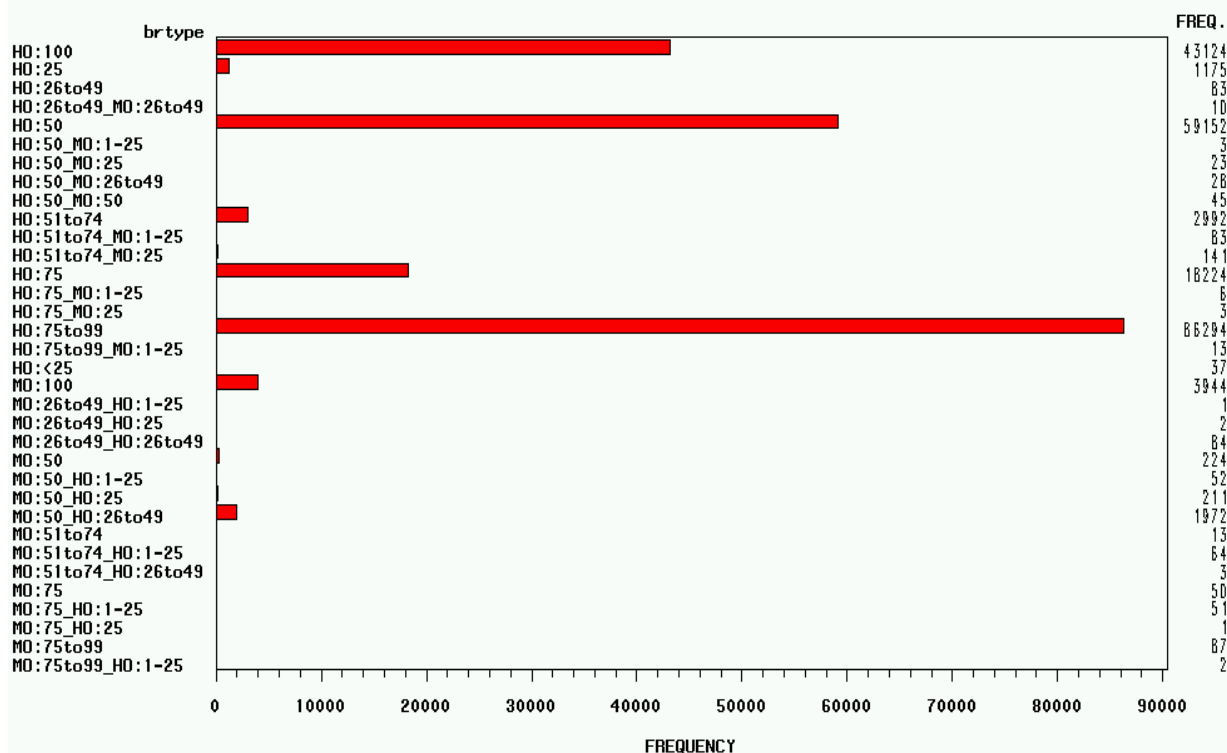
Holstein x Friesian crosses in CIS eval with full fraction known



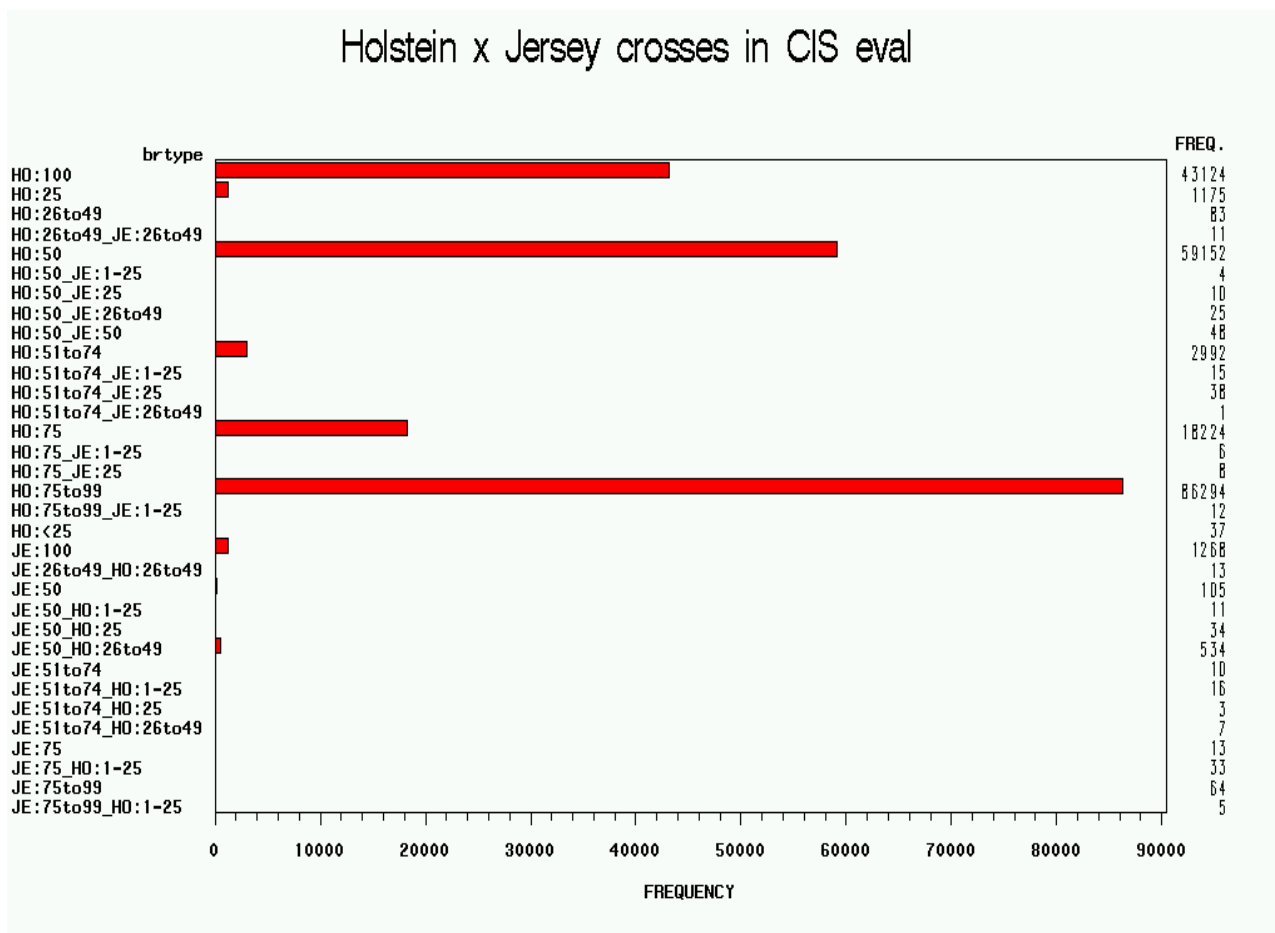
NATIONAL DEVELOPMENT PLAN

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Holstein x Montbeliarde crosses in CIS eval



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Further work

- Decide on criteria which qualifies a cross to enter the evaluation
- Implement a similar analysis across all evaluations
 - Milk, fertility, calving beef, health
- Report back in due course with test run results
- Work should allow a more accurate prediction of genetic merit on both purebred and crossbred animals by correcting the effects of heterosis and recombination in specific breed crosses.
- Eventual incorporation into Sire advice program

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8. Farmer Management Traits (i)

- Farmer Satisfaction.
- Farmer satisfaction scored as part of current LIFT program ~ 2,000 records.
- Plan to include “farmers satisfaction” as an event to record on website.
- Update at next meeting.
- New trait for Spring 2008?

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Farmer Management Traits (ii)

- Temperament & Milking Speed.
- Currently evaluated as part of LIFT.
 - Sires with daughters in Ireland.
- Data now included in new Interbull “pilot” study.
- Expect international proofs in 2008.
- Potential role of data from EDIY MR meters.
 - Research project for 2008.

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1 1. Roll-out Plan

- Next meeting Tuesday 27th November.
 - Finalise changes for 2008.
- Plan for official proof release;
 - Interbull evaluation - December 07
 - Further domestic evaluation (all traits) – January 07
 - Official proofs ~ 25th January 2008.