Development of an Economic Breeding Index EBI for Ireland

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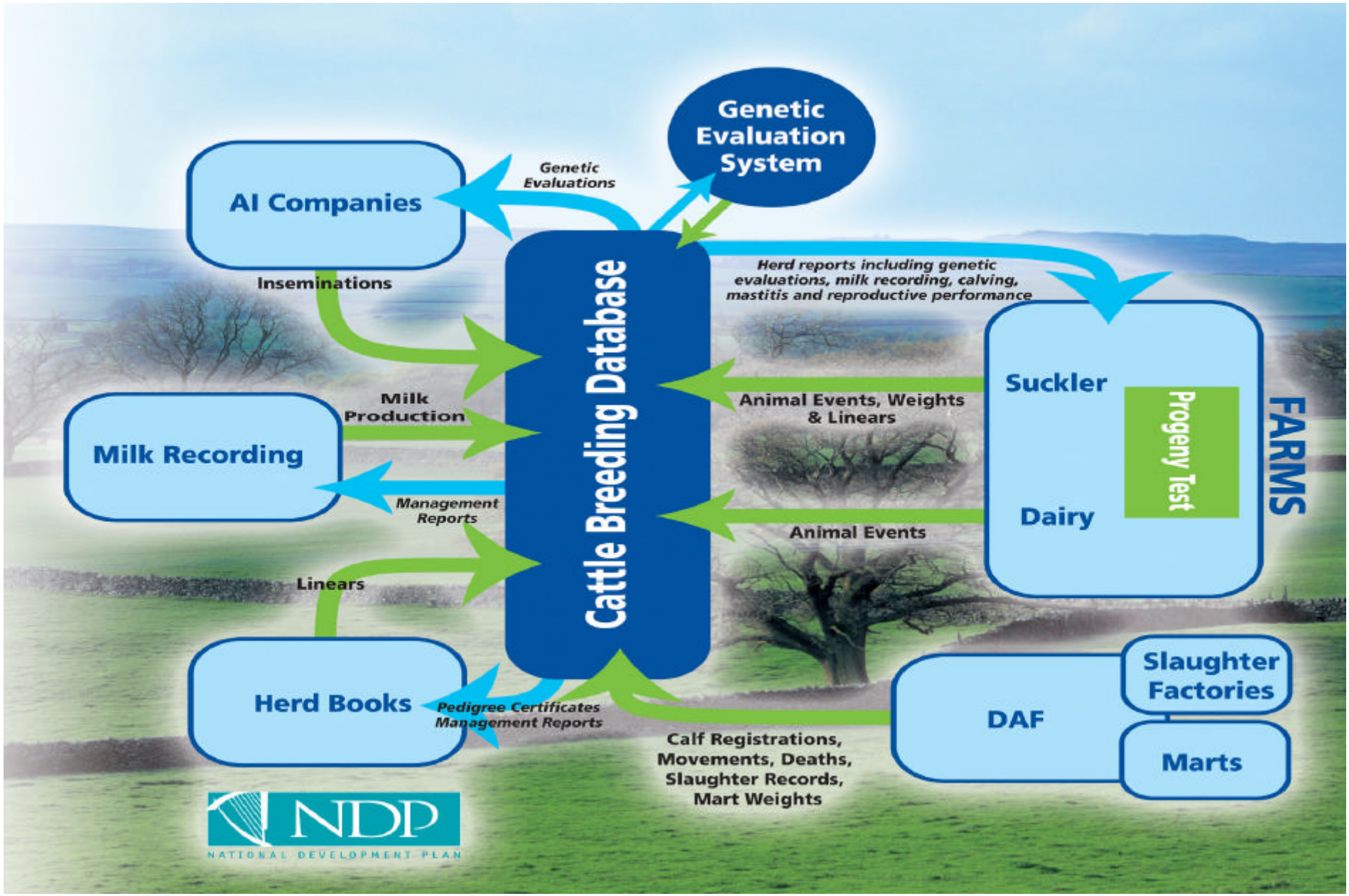
ICBF Strategy for increasing profit for Irish dairy farmers

- **Maintain a comprehensive database of Irish animal performance information**
  - **ICBF database**
- **Develop an economic breeding index to accurately identify superior profitable animals**
- **Set up an effective breeding program to ensure the best bulls go into AI and the best cows are bred for replacements**

1. ICBF Database

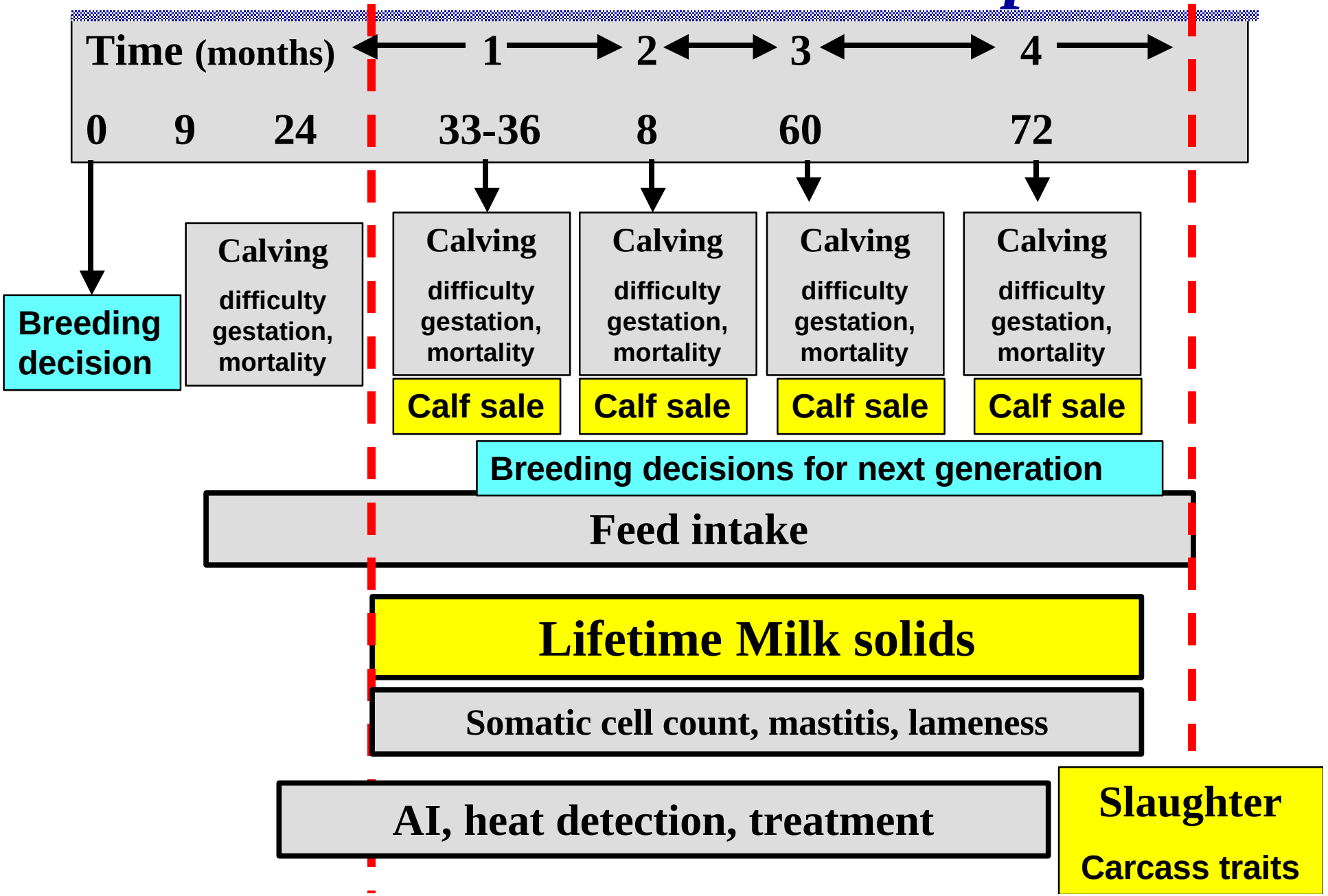


2. EBI

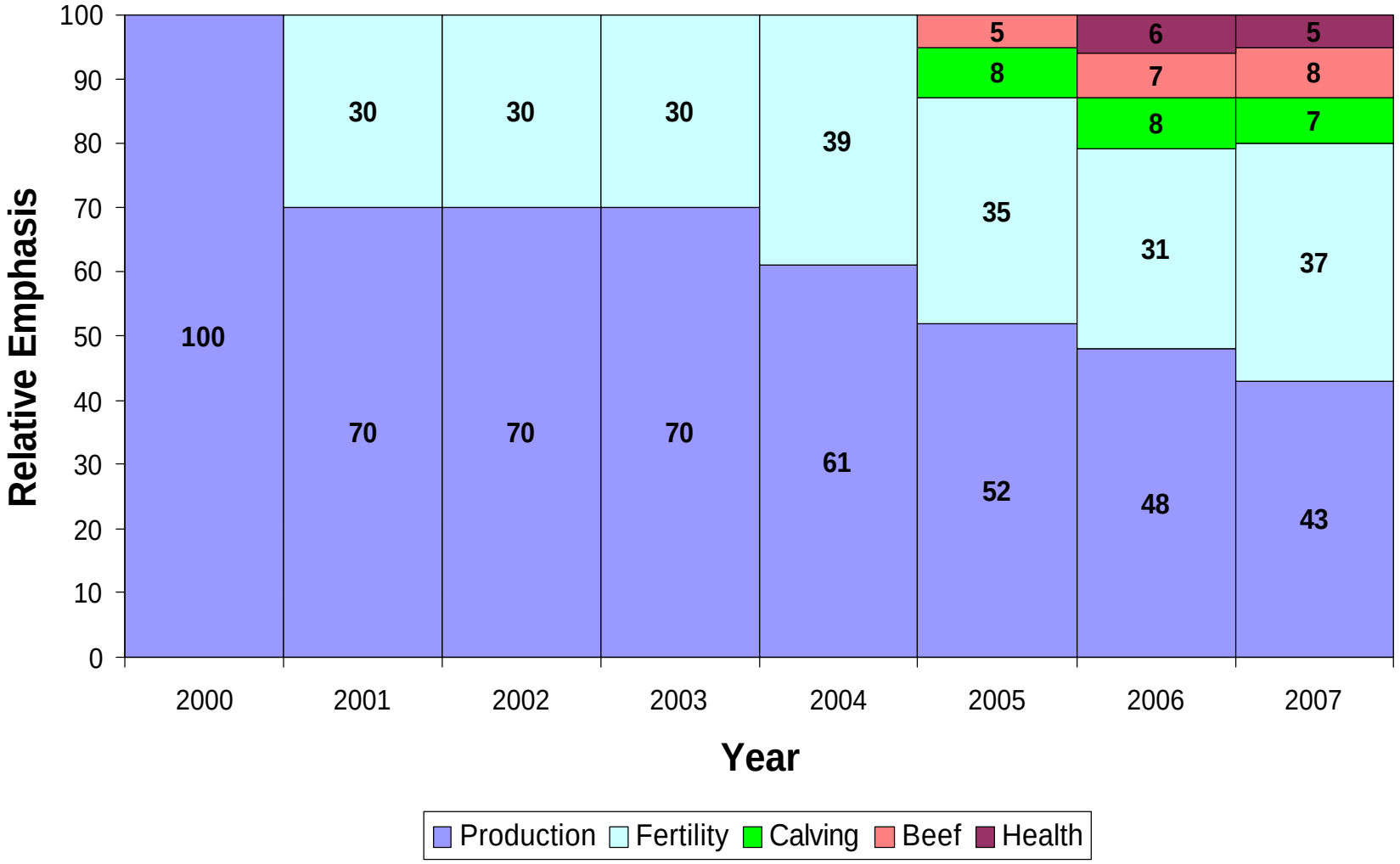
- Farmers need a tool which measures “profit” from breeding decisions.
  - Milk output – costs of production.
- Fertility declining and costs increasing
- Bulls 5-10 years ago were almost entirely sourced abroad, not selected for Irish environs

  Economic Breeding Index developed in 2001 in conjunction with Teagasc.
- Based on national farm economic model.
- Identifies the main “drivers” of ***future*** dairy farm profit & weights accordingly.
- ***Single profit figure; € profit/lactation***

When does bull selection impact?



EBI Developments (00–07)



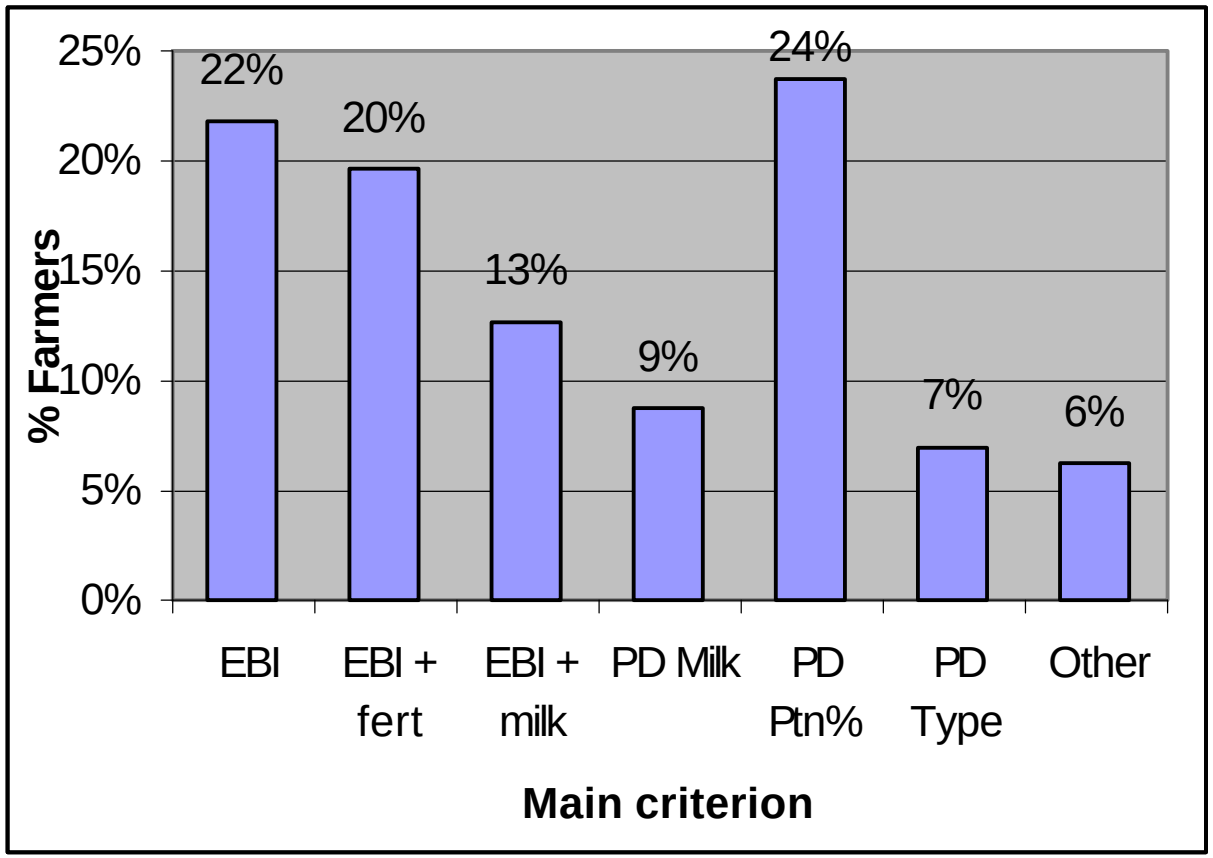
Similar trends around the world: US, NLD, UK

Comparison of different countries

Country	Ireland - Economic Breeding Index (EBI)									
ratio	Production 42%			Functional 58%						
trait	milk	fat	protein	Fertility	Calving	Beef	Health			
emphasis %	13%	5%	24%	37%	8%	8%	5%			
Economic weight	-0.02	0.96	5.36							
Country	The Netherlands - NVI									
ratio	Production 40%			Functional 60%						
trait	milk	fat	protein	Fertility	SCC	UDDER	Feet&L	Other		
emphasis %	12	6	23	16%	9%	14%	13%	8%		
Economic weight	-0.06	0.7	4.2							
Country	United States - Net Merit (NM)									
ratio	Production 46%			Functional 54%						
trait	milk	fat	protein	PL	SCC	UDDER	Feet&L	Body Size	Fertility	Calving
emphasis %	0%	23%	23%	17%	9%	6%	3%	4%	9%	6%
Economic weight	0	2.7	3.55							
Country	Norway -Total Merit Index (TMI)									
ratio	24%	Functional 76%								
trait	protein	mastitis	fertility	udder	growth	legs	temp	diseases	calving	stillborn
emphasis %	24%	22%	15%	15%	9%	6%	4%	3%	1%	1%

Survey; EBI is No.1 Criterion

- EBI is no.1 criterion in bull selection (55% of farmers).
- 3 out of 4 farmers believe EBI is increasing their dairy farm profit.



Does EBI work?

Group	EBI	Lacts	F Kg	P Kg	F+P Kg	Diff
Top 20%	€60	4.1	1,052	922	1,973	
20-40%	€36	3.9	983	870	1,854	
40-60%	€21	3.9	975	866	1,841	
60-80%	€2	3.8	955	852	1,808	
Btm 20%	-€27	3.6	937	837	1,774	**199 kg**

- Analysis based on 15,503 cows that were culled to the factory in 2004.
- Top 20% of cows on EBI yielded 199 kg more milk solids (milk value = €727/cow) for 100 cows = +€7K
- ***High EBI = high milk solids + long herd life.***

Moorepark Production and fertility results

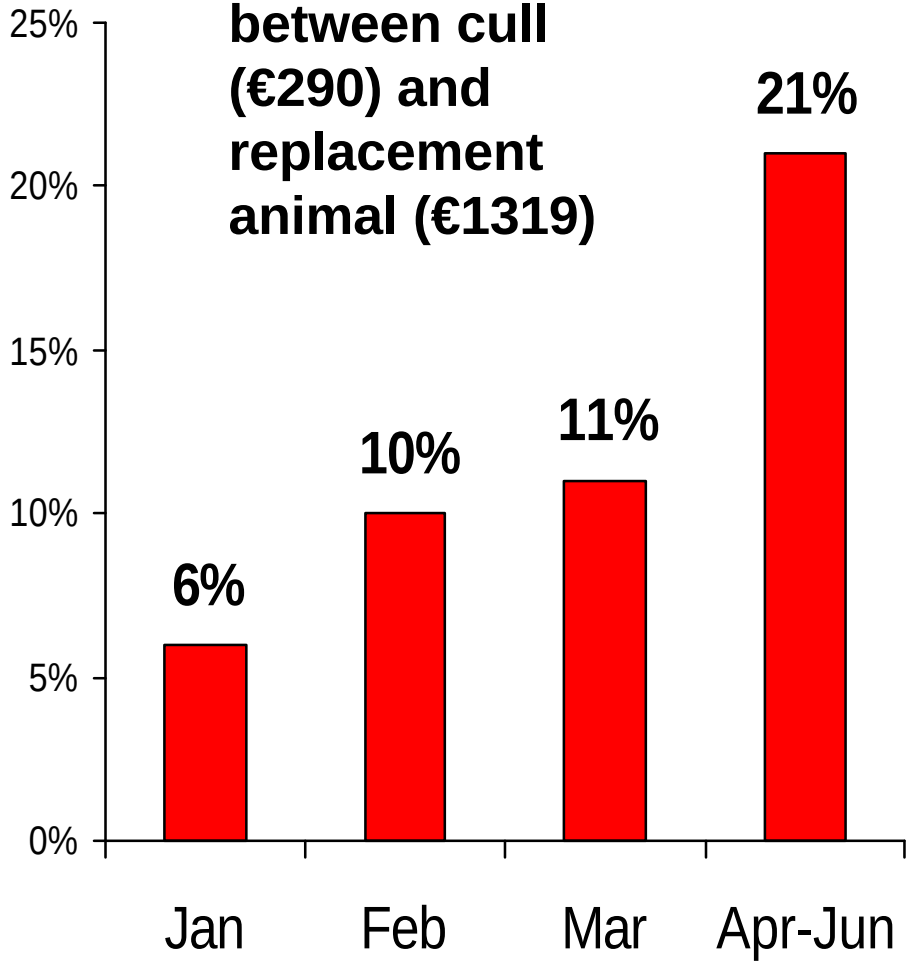
	EBI €51	EBI €58	EBI €75
Milk (kg)	6,748	6,656	6,335
Fat (%)	4.06	4.09	4.39
Pr (%)	3.45	3.56	3.65
Milk solid (kg)	506	506	509
6-wk in-calf (%)	54	65	74
Pregnancy (%)	74	86	93
Services/cow	2.07	1.79	1.61

Updating the EBI (2007)

- Current EBI is based on (a+b)-c system of milk payment since 2001
- Until now model assumed quota was the main limiting factor to milk production
- Quota eliminated in next 5 years therefore need to change EBI now to reflect this
- Updated EBI assumes land will be the limiting factor to production post quota
- Update costs of production (e.g cost of infertility, vet, land rental etc) and milk price

Effect of month of calving on empty rate

➢**differential between cull (€290) and replacement animal (€1319)**



–Later calving; cheap grass being displaced by silage & concentrates (profit reduces).

–Land limiting; longer calving interval = less cows resulting in less milk produced & less sales (profit reduces).

3. Breeding Program
G€N€ IR€LAND

Farmers need new top bulls each year.

Program focused on EBI (€ profit)

Increase scale of progeny test program

- **100 bulls each with 100 daughters.**

Increase EBI of young bulls.

- **New “top 10” bull each year.**

Increase efficiencies of progeny test.

- **Targeted herd approach.**

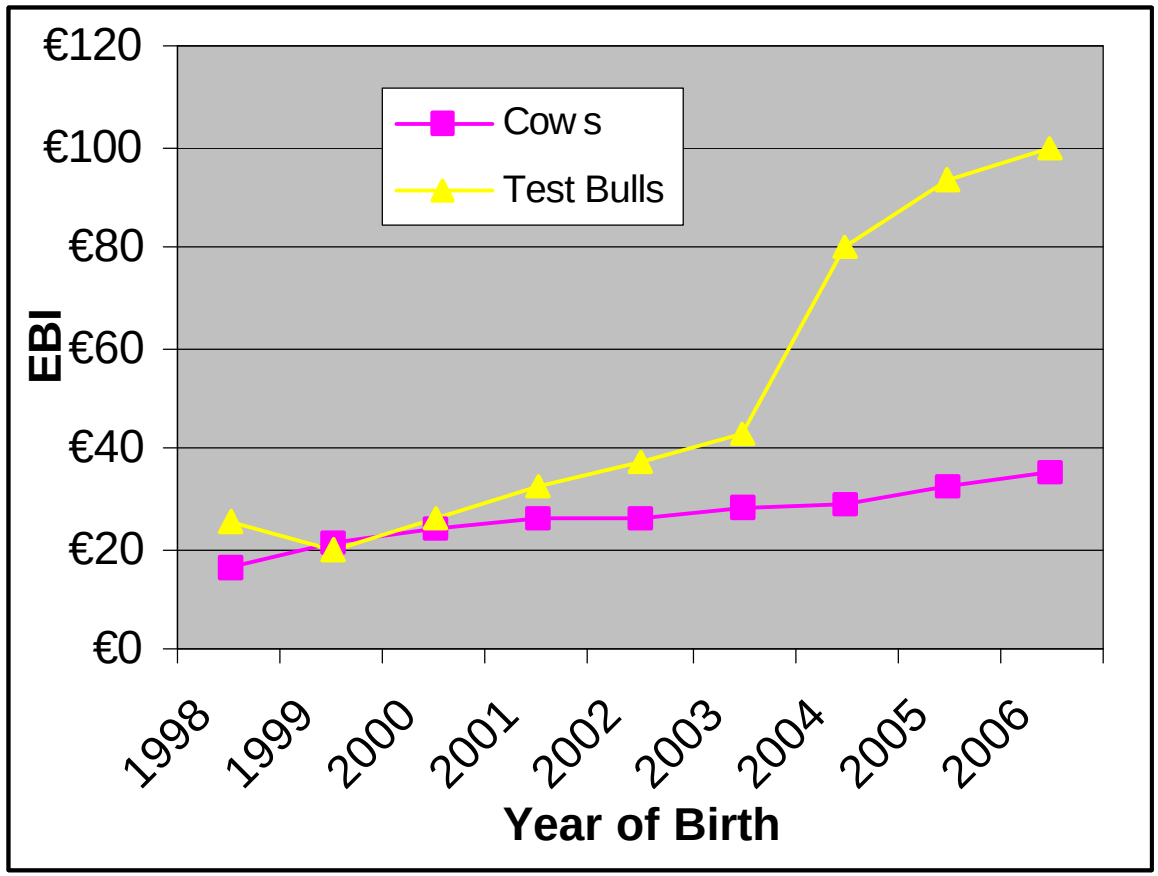
First bulls due for proofs Spring 2008.

G€N€ IR€LAND – Objectives.

1. Increase scale of progeny test program
   - 100 bulls each with 100 daughters.
2. Increase EBI of young bulls.
   - New “top 10” bull each year.
3. Increase efficiencies of progeny test.
   - Targeted herd approach.

2. Average EBI of young bulls.

- Average EBI of young bulls has doubled.
- Chances of finding a new “top bull” have doubled
- Average = €90 [+/- €70] – new top bull = €160?



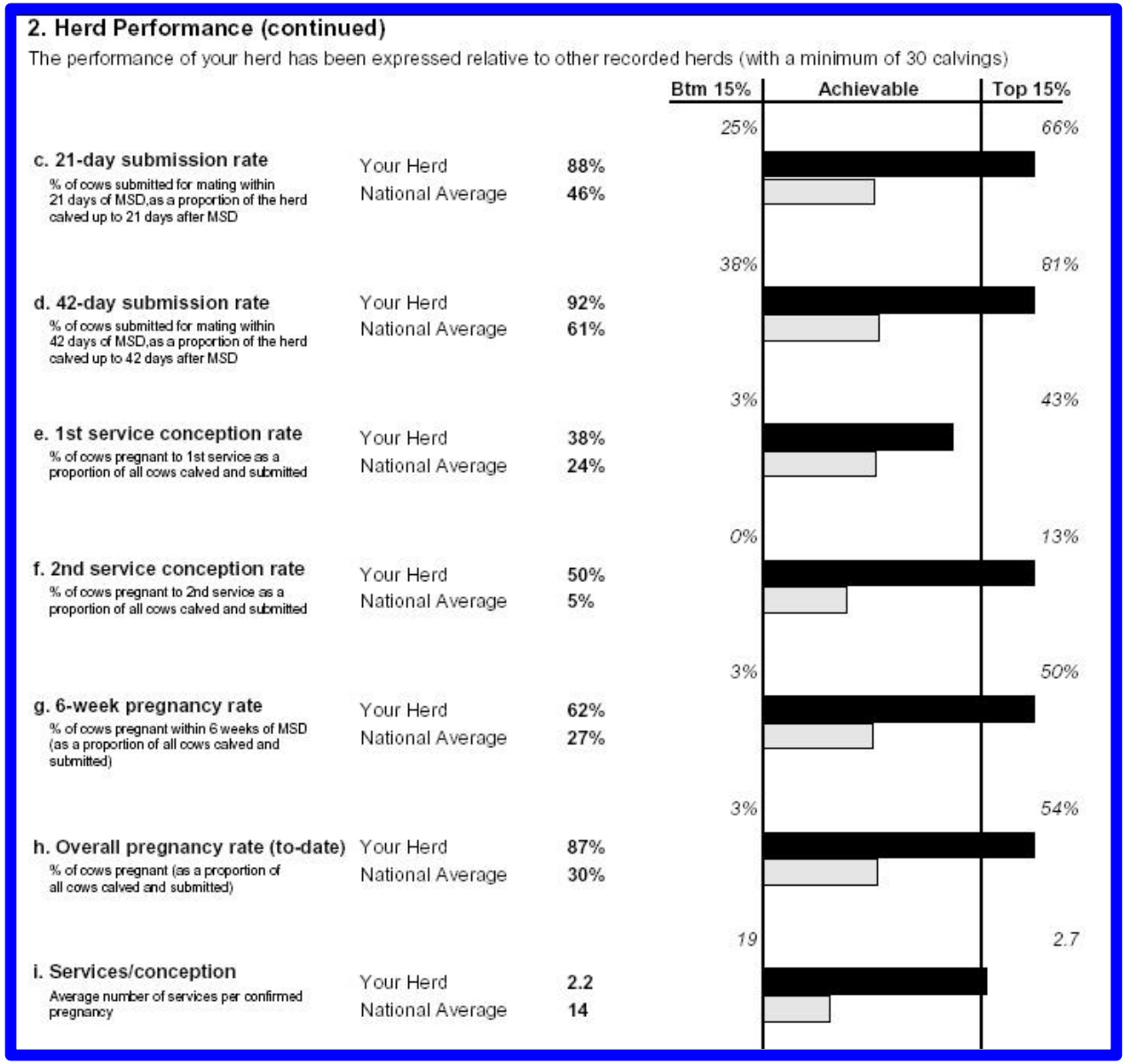
ICBF HerdPlus Services & Teagasc Discussion Group Reports

HOW DO I COMPARE WITH THE NATIONAL FIGURES?

WHAT ARE MY SUBMISSION AND CONCEPTION RATES?

HOW MANY SERVES PER CONCEPTION?

BREAKDOWN OF RESULTS BY LACT., CALVING EASE & DAYS CALVED



Fertility Performance Reports during the breeding season to help you manage your herd .

Sire Advice

- Farmers spend ~ €1000/year on AI.
- Sire Advice Tool is aimed at maximising this return on investment by ensuring that;
  - Farmers select bulls that are consistent with their breeding goal
  - Bulls are matched to cows to reflect the farmers breeding objectives
  - Inbreeding/lethal genes (e.g. Blad, CVM) are avoided
  - Those assisting in AI are made aware of the bull choices via charts/AI Technician Handhelds
  - Available via website

Teagasc Discussion Group Reports

Suite of Dairy Reports - Spring '07

- Membership Report
- EBI
- Milk Production
- Fertility
- Lameness
- SCC/Mastitis
- Digestive/Health

EBI Group Report

Discussion Group Members EBI's

- Only Available to Advisor / chairman within the discussion group.
- No more posting of information to your advisor prior to meetings.
- Compare yourself with Group Averages, Group Top & National Top 15%.

Discussion Group Name: Teagasc/ICBF HerdPlus **EBI Report October 2006**

Name	Herd Size	Herd EBI, €	Milk Subindex €	Milk Subindex %	Fertility Subindex €	Fertility Subindex %	1st lactation animals No.	1st lactation animals EBI, €	1st lactation animals v herd	04/05 heifers No.	04/05 heifers EBI, €	04/05 heifers v herd
	70	58	34	57	20	34	11	69	11	27	68	10
	85	31	20	60	5	18	6	75	15	25	65	2
	90	40	30	67	12	23	15	68	36	33	69	14
Group Average	81.7	43.0	28.0	61.3	12.3	25.0	10.7	70.7	20.7	28.3	67.3	8.7
Group Top	90	58	34	67	20	34	15	75	36	33	69	14
National Top 15%	79	35	28	68								

Top performer in group – what can we learn?

Simple Breeding Advice

- 6 straws to get a heifer replacement.
- Keep breeding until all semen is used (50 cows = 80 straws) or 90% submission.
- Breed all cows during breeding season
- Use EBI (& sub-indexes) as main criterion.
- Identify herd weaknesses; fertility, milk…?
- Select a team of bulls accordingly.
  - Team of 4 (proven bulls) or G€N€ IR€LAND bulls
  - Do not use a stock bull (difference of €80 profit/lactation).
- Cull lower EBI cows (if possible).

Advice for future

- Record all your farm events:
- insemination data will be used next year to give early fertility predictors
- Mastitis event recording will eventually allow ICBF to identify more resistant bulls and cows
- EBI will benefit you a lot more if you actively record and send in your own data

€value – Calving Interval

- CI (€-10.87/day)
  - Effect of 1 day increase in calving interval for each cow in the herd
  - 1 day slippage in calving interval:
    - Effect on milk production €-0.60/day
    - Effect on livestock sales €+0.20/day
    - Effect on total costs <u>€-10.47/day</u>
    - Economic Value = €-10.87/day

Relevance of the subindexes

	Winter/liquid		Spring*	
	c/litre	**€/cow**	**c/litre**	**€/cow**
Herd EBI	+0.12	+€6.07	+0.06	+€3.6
Milk SI (€)	+ 0.10	€8.48	No effect	No effect
Fertility SI (€)	+ 0.09	No effect	+ 0.06	+€3.60

* Common profit

Friesian v Holstein Beef Merit

AI sires with records in the beef evaluation:
676 Friesian Sires,

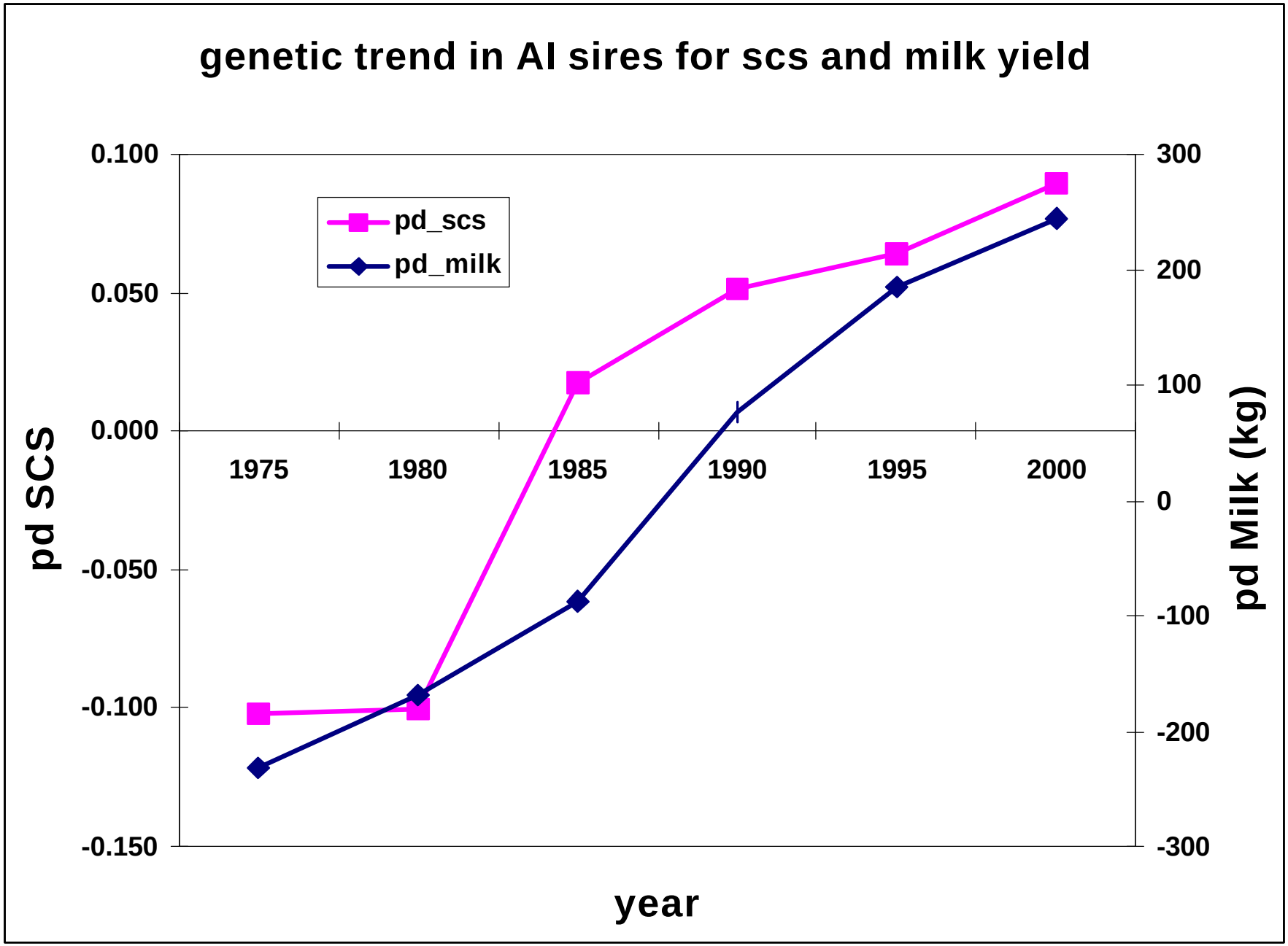
1,289 Holstein Sires

60% of records on progeny of FR sires are out of Ho Dams

16% of records on progeny of HO sires are out of FR Dams

AI sire Breed	average carcass records	BSI			pd carcass wt	average carcass wt (kgs)	age at carcass	pd carc conf	average carcass conf
	avg	average	min	max	avg	avg	avg	avg	avg
HO	75	-8	-46	38	-2	319	767	-0.6	O
FR	34	-8	-52	36	-5	317	773	-0.1	O+
Difference		**0**			**3**	**2**	**-6**	**-0.5**	

Conclusion: Large variation within each of the breeds


genetic trend in AI sires for scs and milk yield
pd_scs
pd_milk
0.100
0.050
0.000
-0.050
-0.100
-0.150
1975
1980
1985
1990
1995
2000
300
200
100
0
-100
-200
-300
pd SCS
pd Milk (kg)
year

Extreme sires >90% reliability

Lowest 10% out of 662 sires >90% reliability					
n	pd scs	reliab	sd	daugter scc	herd mates
63	-0.14	95	0.04	55047	62753
Highest 10% out of 662 sires >90% reliability					
n	pd scs	reliab	sd	daugter scc	herd mates
64	0.21	95	0.05	84352	69748

Difference of 29,305 cells/ml

€19.4 difference in health costs per cow per lactation