



IRISH CATTLE BREEDING FEDERATION

How Ireland is capturing the benefits of genomic selection.

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Chief Executive, ICBF.

SMO Conference – Melbourne, Australia
Applied Genomics for Sustainable Livestock Breeding
Tuesday 2nd May 2011



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Content

- Background & Structure
- What do Irish farmers need?
- Data & information
- How might genomic selection help?
- Research
 - Skills, Knowledge, Data, Genotypes, Funding
- Implementation
 - Systems, DNA sampling, Genotypes, Evaluations, Communications
- Results - so far
- Breeding Scheme

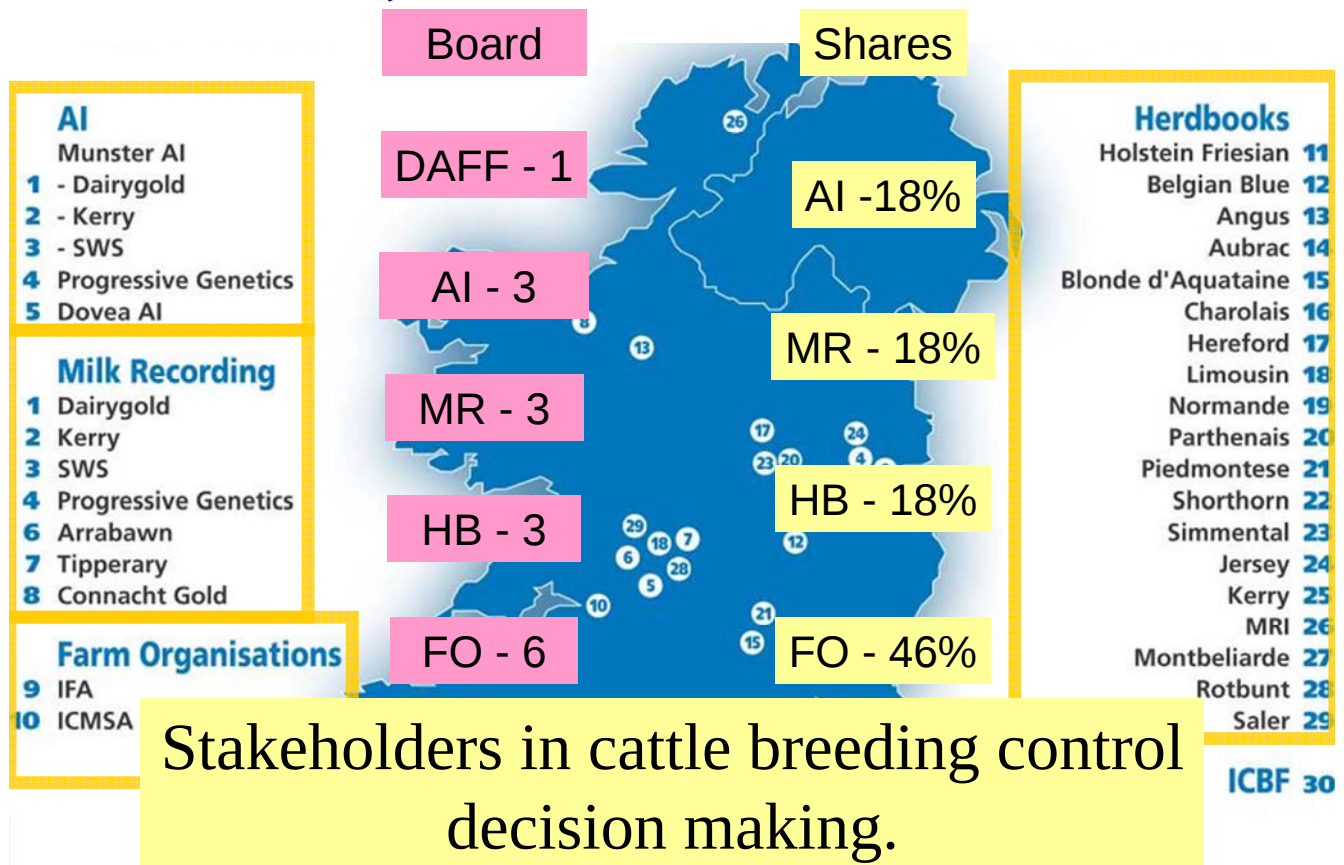


Our Cattle Industry

- 1.1 million dairy cows
 - 80% of dairy products exported
 - 80% seasonal-calving pasture-based production
 - One of lowest cost producers in EU
 - Good margins
- 0.9 million suckler cows
 - 30% of dairy cows mated to beef bulls
 - Large amount of cross breeding
 - 85% of beef exported as carcass or live animals
 - Many small herds (<10 cows) and few large herds
 - Poor margins

OUR STRUCTURE

MEMBERS, BOARD & SHARES - ICBF



What do Irish cattle farmers need?

BREEDING OBJECTIVES & SELECTION CRITERIA

Dairy Selection Criteria

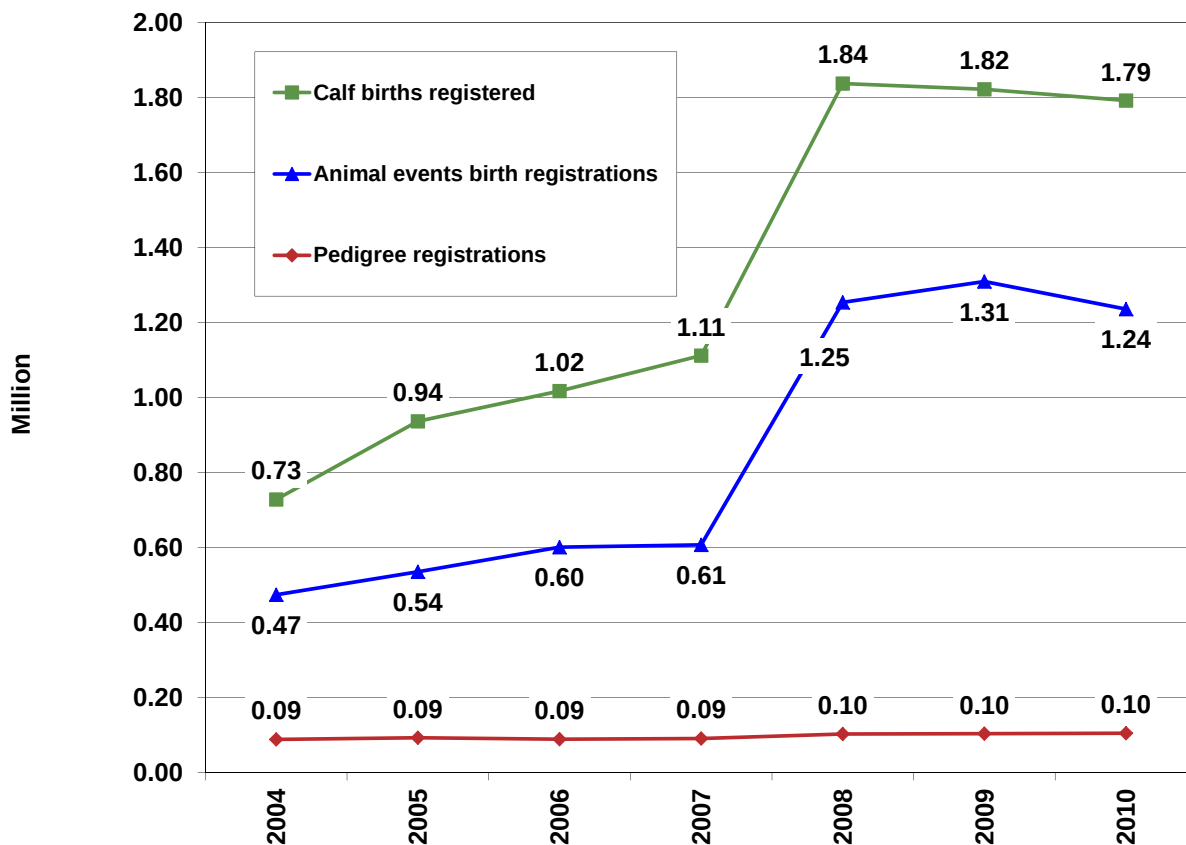
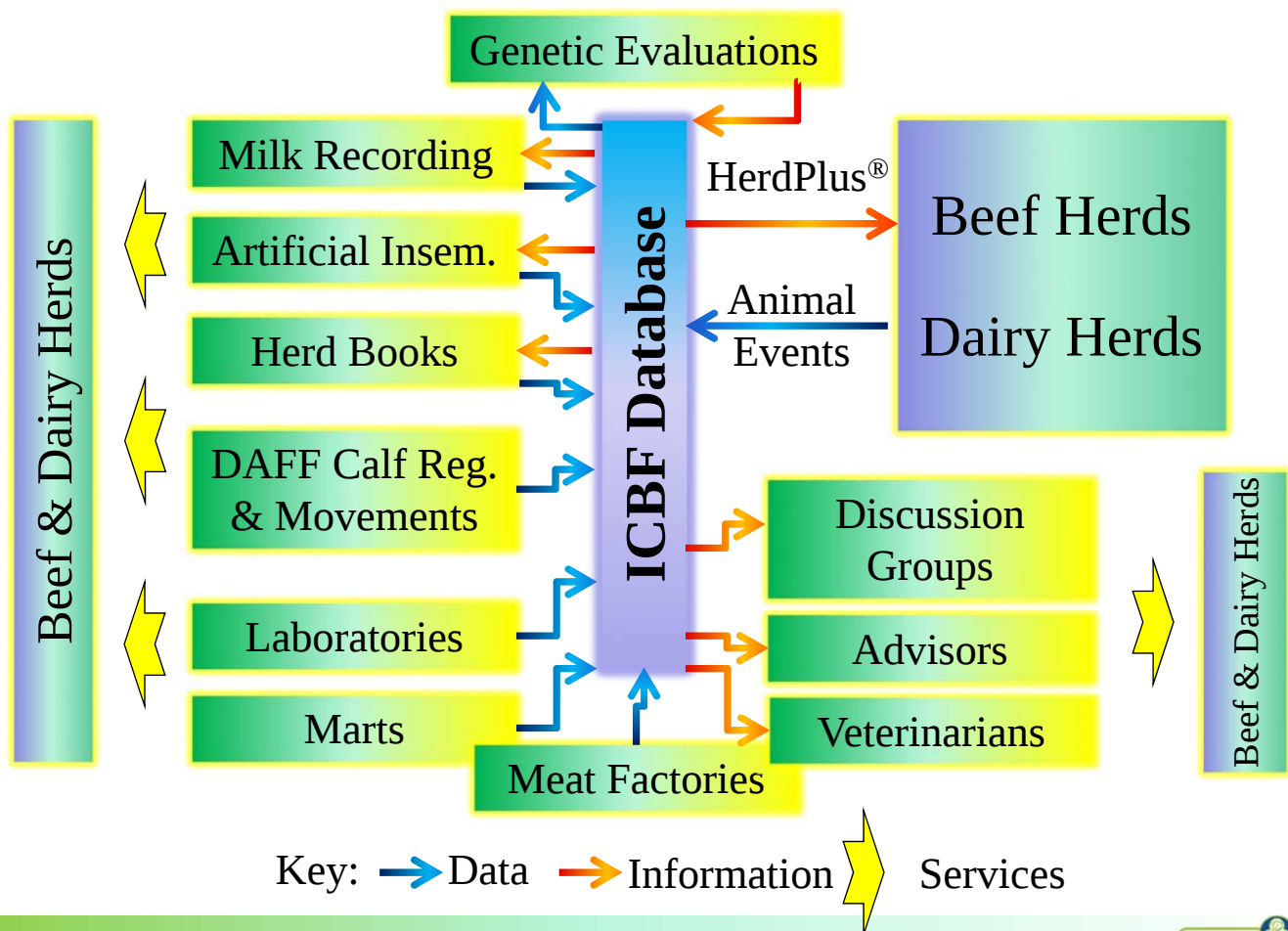
$$\begin{aligned}
 & \text{E}_{\text{conomic}} \text{B}_{\text{reeding}} \text{I}_{\text{ndex}} = \\
 & \text{Milk}_{\text{sub index}} \\
 & + \text{Fertility}_{\text{sub index}} \\
 & + \text{Calving}_{\text{sub index}} \\
 & + \text{Beef}_{\text{sub index}} \\
 & + \text{Maintenance}_{\text{sub index}} \\
 & + \text{Health}_{\text{sub index}}
 \end{aligned}$$

Beef Selection Criteria

$$\begin{aligned}
 & \text{S}_{\text{uckler}} \text{B}_{\text{eef}} \text{V}_{\text{alue}} = \text{wtd} \\
 & + \text{Weanling export}_{\text{sub index}} \\
 & + \text{Beef Carcass}_{\text{sub index}} \\
 & + \text{Daughter Fertility}_{\text{sub index}} \\
 & + \text{Daughter Milk}_{\text{sub index}} \\
 & \text{Expressed as Euro-Stars} \\
 & 1^* \text{ to } 5^{*****}
 \end{aligned}$$

Data and information needed to facilitate genetic improvement.

ICBF DATABASE



ROLE OF GENOMIC TECHNOLOGY

How might genomics help?

- **Increase accuracy** of evaluation on selection candidates – stock bulls & replacement females
- **Reduce age** at which accurate evaluations are available on selection candidates – AI bulls
- **Increase number** of selection candidates – AI bulls

RESEARCH

Actions - Research

- **Relationships**
 - **Open sharing** with anybody willing and able
 - **ICBF & Teagasc** – Teagasc research, ICBF implement for benefit of Irish farmers
- **Skills**
 - PhD program quantitative genetics – 1 completion/yr for 13 years
 - Teagasc Walsh fellowship provides funds
- **Knowledge**
 - **Papers and participation in International Scientific meetings** by Scientists on routine basis
 - Scientists regularly **present and publish for Irish farming audiences**
 - **Breeding consultation** meetings – 3/yr involving breeding industry – research plans, research results, implementation plans

Actions - Research

- **Phenotype Data**

- ICBF database
- ICBF across breed genetic evaluations
- Interbull dairy AI sire MACE evaluations in Irish base & scale
- Interbeef soon?

- **Genotypes**

- **Irish:** AI sires & stock bulls – 1,100 50K for dairy, expect >1,000 800K for beef in near future
- **International:** bi-lateral exchanges – ca 6,500 50K for dairy, growing number of countries
- **IGenoP:** prototype database for international sharing of cattle genotypes (3k, 50k, 800k) to eventually be hosted by Interbull

Actions - Research

- **Tools**

- **Software** – freely sharing with whoever is interested
WWW.GENOMICSELECTION.NET

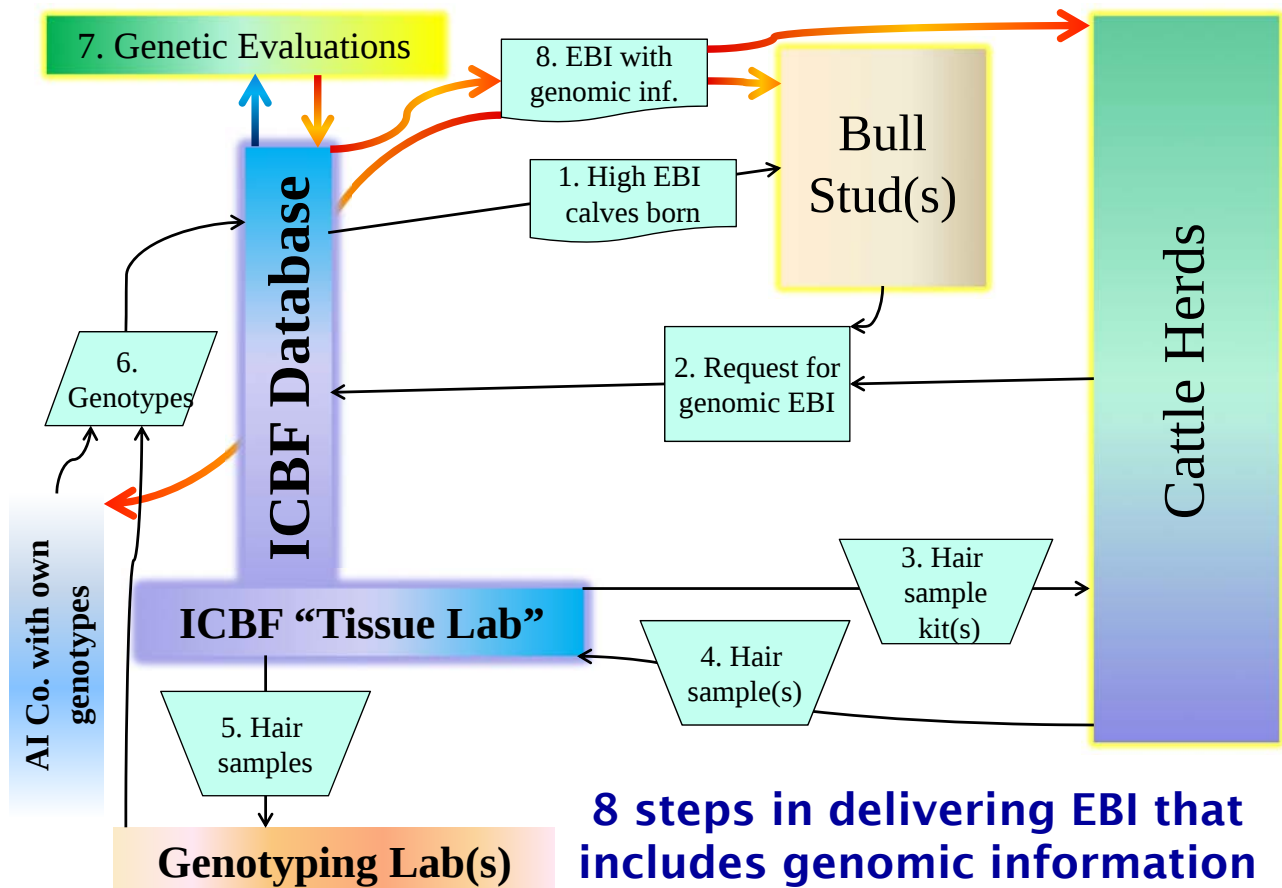
- **Funding**

- **ICBF** – public & industry funding for; semen purchase, blood sampling, & genotyping
- **Teagasc** – public funding for genotyping & salaries
- **Data** – “free” for use in research

IMPLEMENTATION

Actions- Implementation

- **System Development**
 - Transfer knowledge & software from Research
 - Develop efficient interfaces between database & genetic evaluation system
- **Funding**
 - By ICBF – State, Farmer & Services
- **Operational steps**



www.icbf.com – Dairy Active Bull List

View as Excel

Evaluation Date: Dec 2010

Rank	Tag	Bull Name	Sire	Main Breed	Herd Book Status	HO %	EBI	Rel %	Proof Source	Milk	Fert	Calv	Beef	Maint	Health	Calv Recs	Avail.	Price	Supplier
1	<u>SOK</u>	(IG) SUNNYBANK OMAN	OJI	HO	PED	63	279	5	GS	73	170	32	-7	2	8	1508	Low	20	NCBC
2	<u>KOZ</u>	KEVINSFORT OJI HAZE	OJI	HO	PED	94	264	6	GS	59	159	43	-4	-2	10	330	Medium	20	NCBC
3	<u>MJI</u>	MORRISHEEN OJI FRANK	OJI	HO	PED	88	262	5	GS	121	108	36	-20	12	4	1390	Low	19	Eurogene/LIC

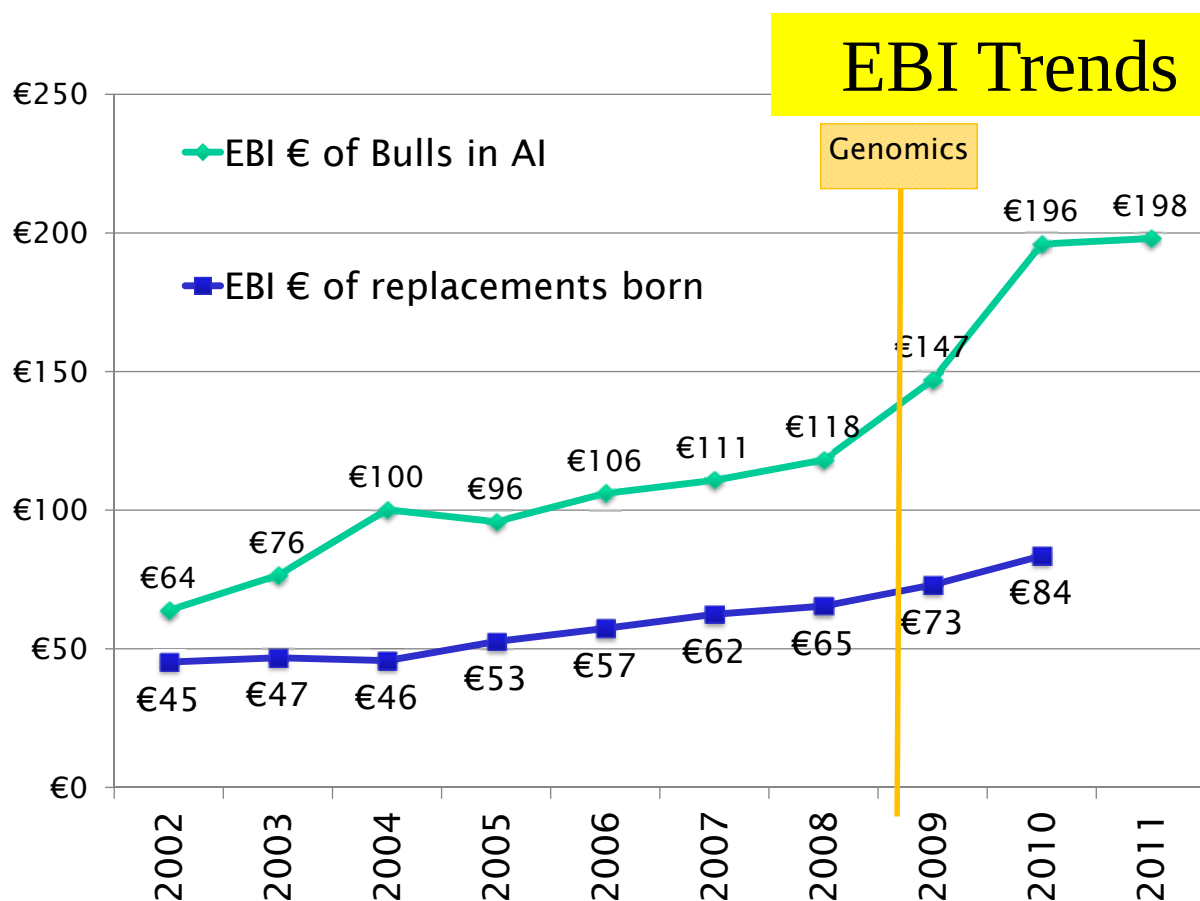
Main Breed	Herd Book Status	HO %	EBI	Rel %	Proof Source	Milk	Fert	Calv	Beef
O					GS	73	170	32	-7
O					GS	59	159	43	-4
O					GS	121	108	36	-20

DP–IRL daughter proven in Ireland

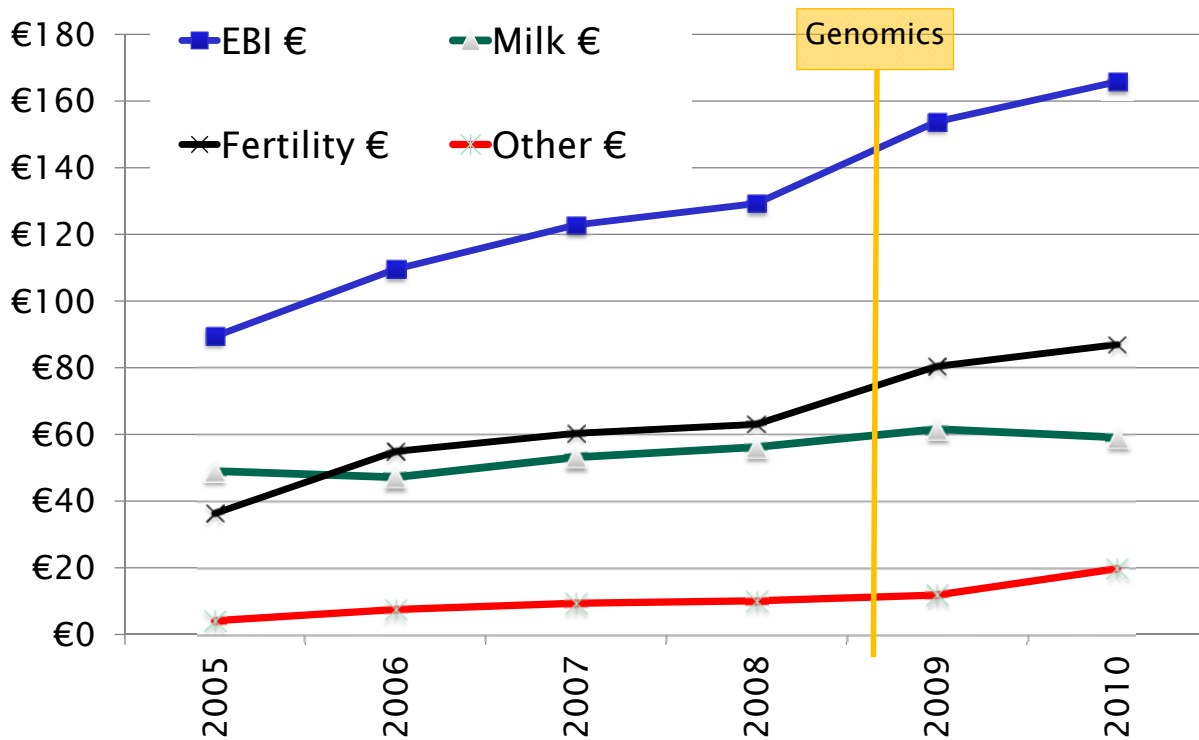
DP–INT daughter proven internationally

GS genomic selection

RESULTS – SO FAR

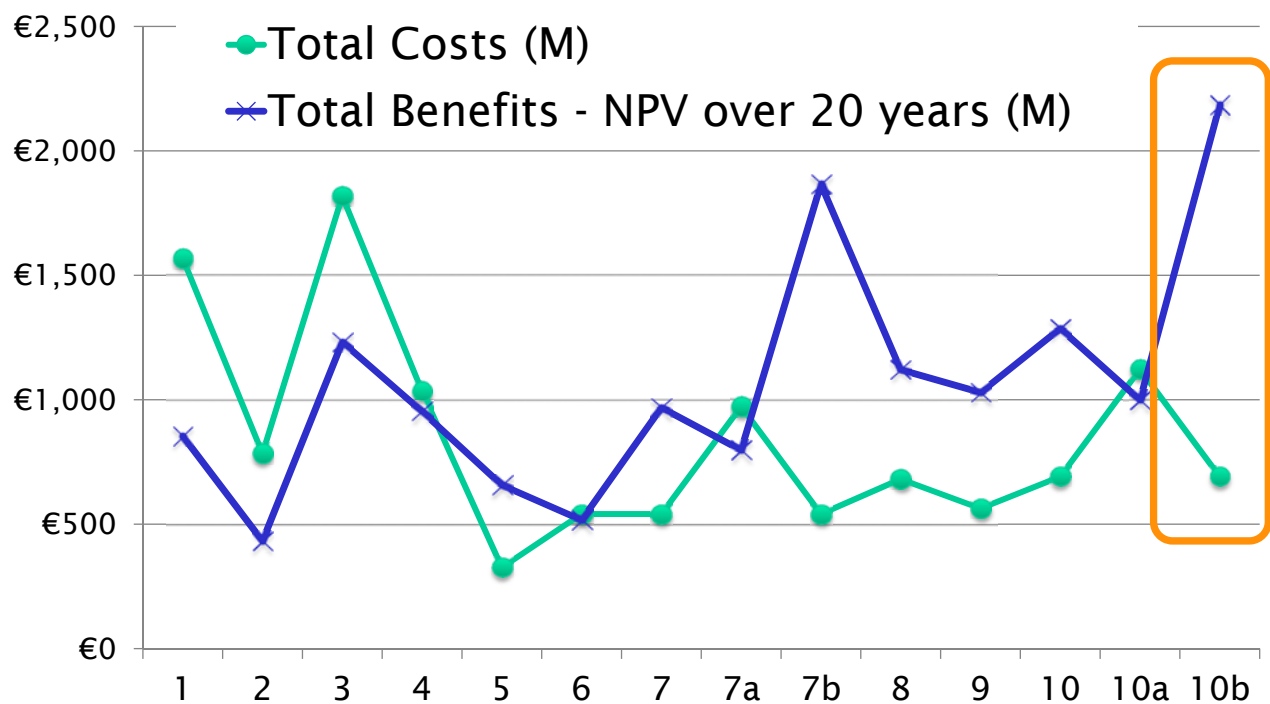


EBI and economic sub-indexes for dairy bulls entering progeny test in last six years.

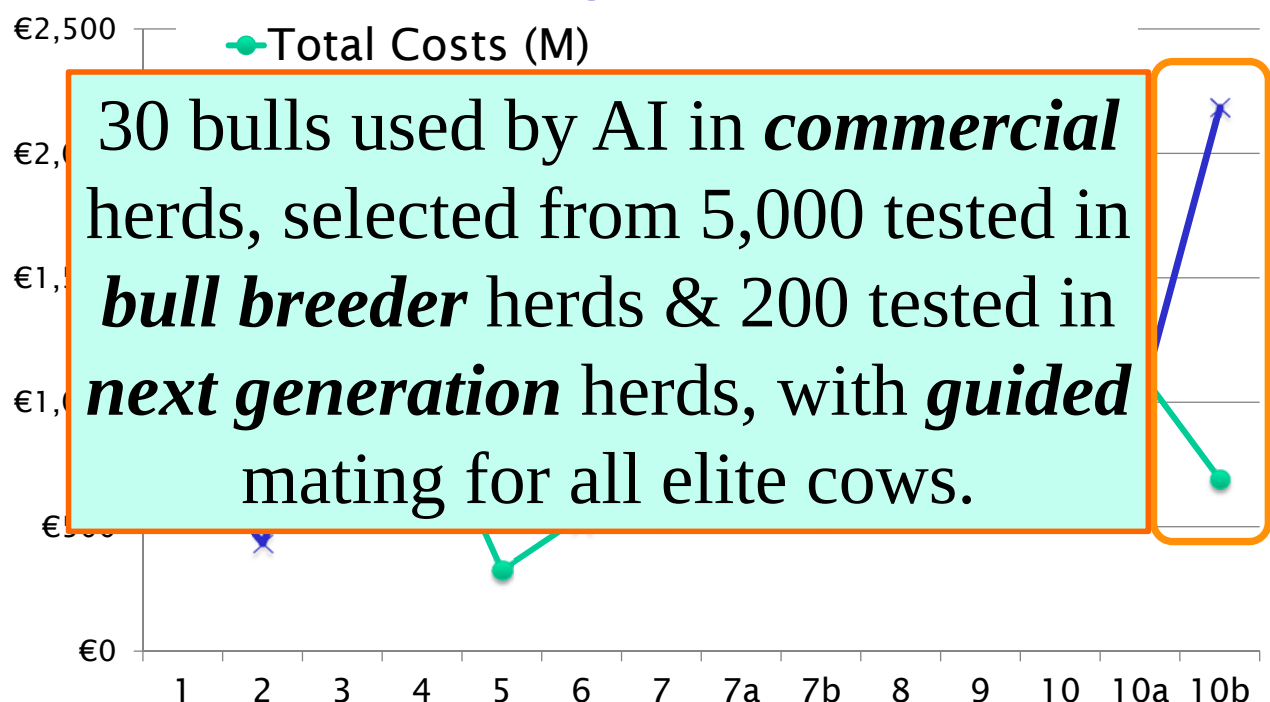


BREEDING SCHEME

Costs & benefits for different dairy breeding schemes



Costs & benefits for different dairy breeding schemes



Conclusions

- Animal breeding is a unique and powerful tool for improving the profitability of cattle farming in Ireland.
- Irish animal breeding has been transformed through a unique partnership between farmers, the breeding industry and DAFF.
- Genomic technologies, used appropriately, are already contributing by improving the profitability of dairy production in Ireland.
- We are working on beef.
- Continued investment in genomics is expected to give excellent returns.
- A strategy of openness, international collaboration and sharing is paying large dividends for Ireland.

ICAR 2012 CONFERENCE

**CORK
IRELAND**

Mon 28th May
- Fri 1st June 2012



www.icar2012.ie