



IRISH CATTLE BREEDING FEDERATION

ICBF Dairy Industry Meeting.

Teagasc Moorepark
1st July 2009.

Agenda

- Developments in Genomic Evals & Services (10.30 – 11.45)
 - Genomic evaluations – Technical developments (Francis)
 - ICBF Genomic services (Andrew)
- Development in Dairy Evaluations (11.45 – 12.45)
 - Review economic values in EBI (Donagh)
 - Calving Interval and Survival Evaluations – use of insemination data (Donagh)
 - Beef Sub-Index; live-weight/efficiency, cull cow & calf value (Noirin)
 - Test-day models for milk production traits (Francis)
 - Interbull test runs (Francis)
 - Culling Indexes (Ross)
 - Easy-care cow – health & fertility traits (Andrew)
 - Linear type (Andrew).
 - Feed-back & roll-out plan (Andrew)
- Any other business (12.45 – 1 PM).



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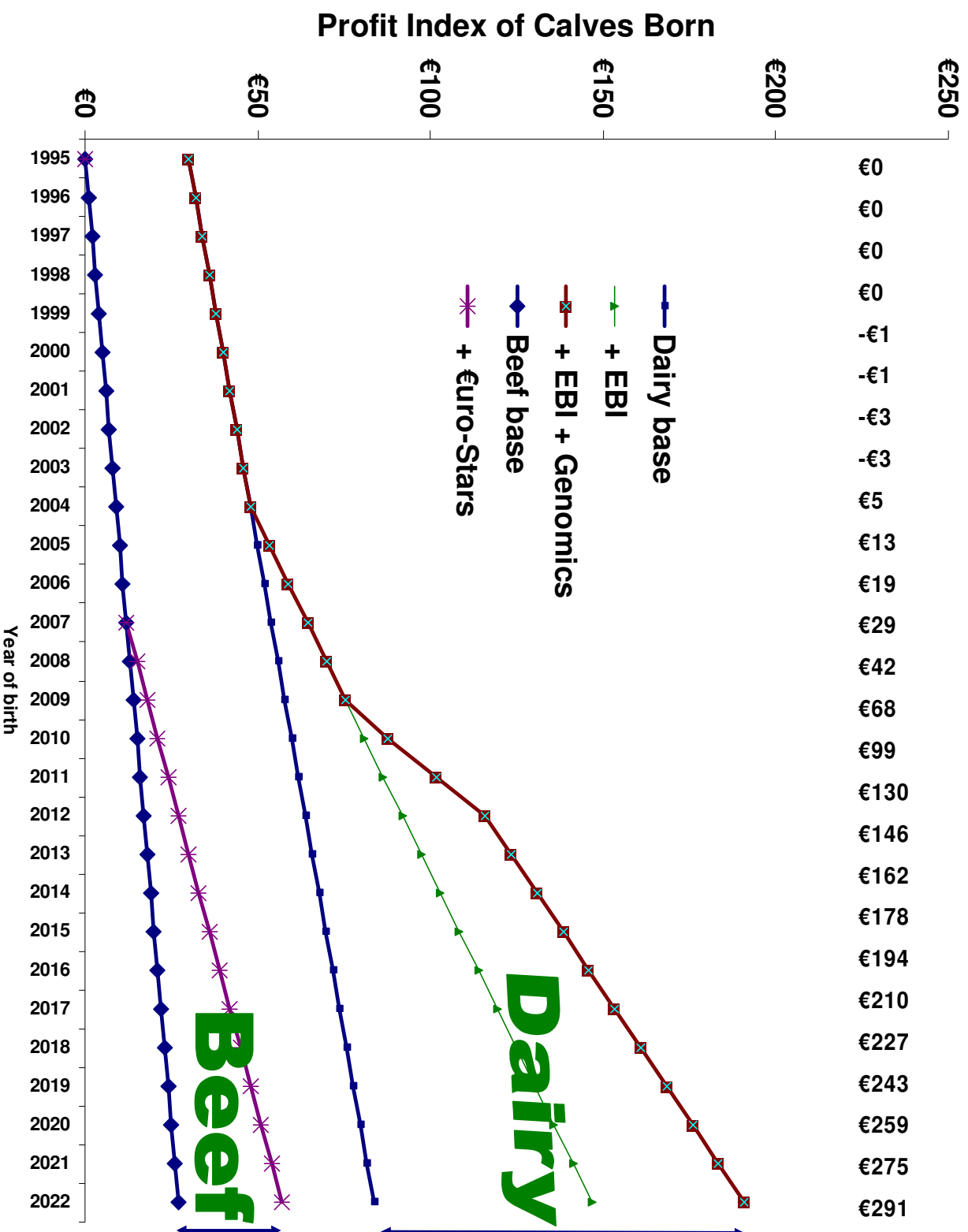
ICBF Genomic Services. Draft Proposition

1st July 2009.

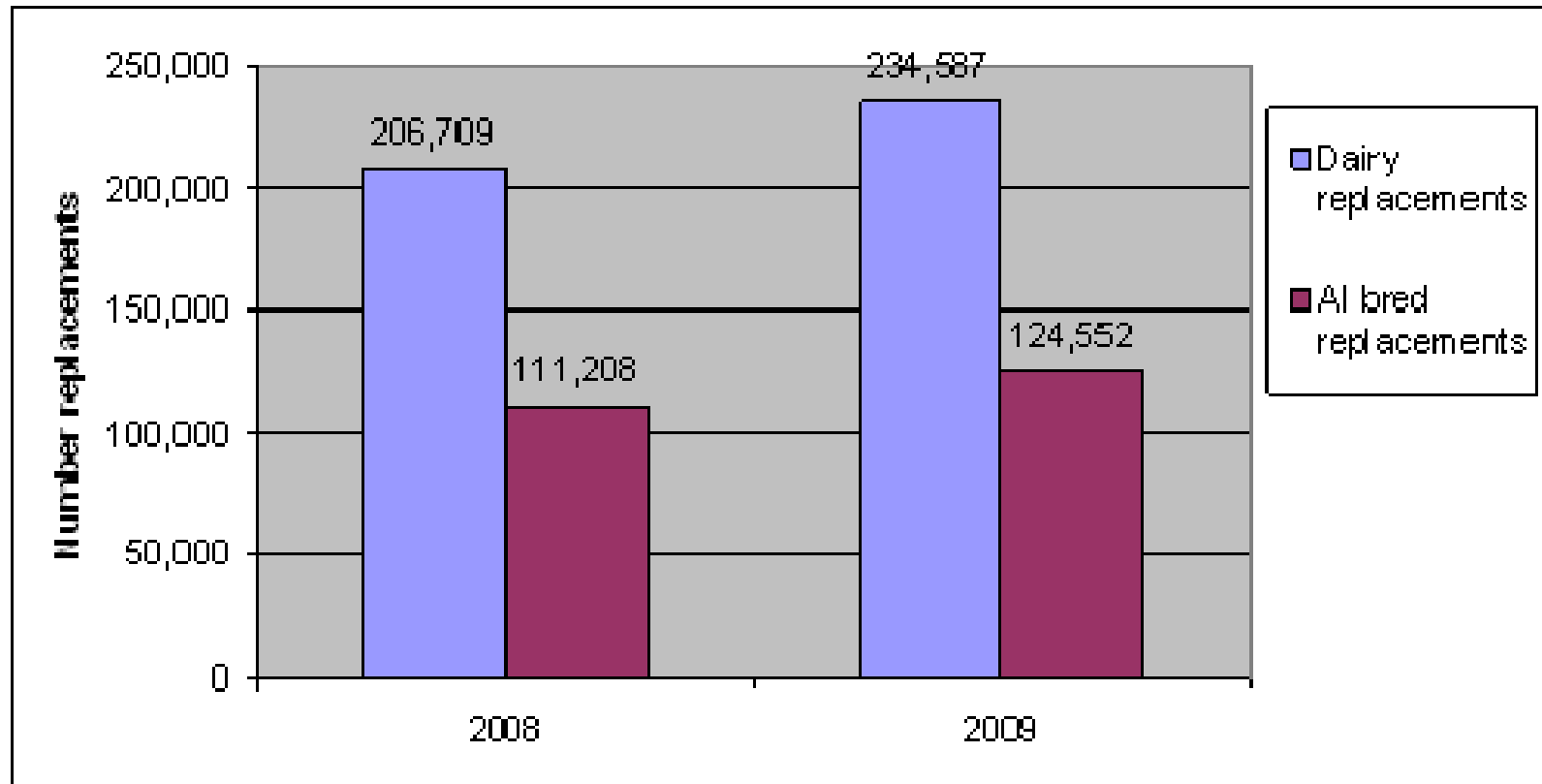
Background.

- Industry-based initiative; ICBF, Teagasc, AI companies, farmers, DAF...
- Ireland 2nd country in world to implement GS in National evaluations.
- Major uptake in technology this Spring;
 - 35% of technician inseminations to GS bulls.
 - Average EBI of GS inseminations = €179.
- Major increase in genetic gain (*next slide*).
- Continue roll-out of this technology.

Impact of Increased Genetic Gain on Dairy and Beef



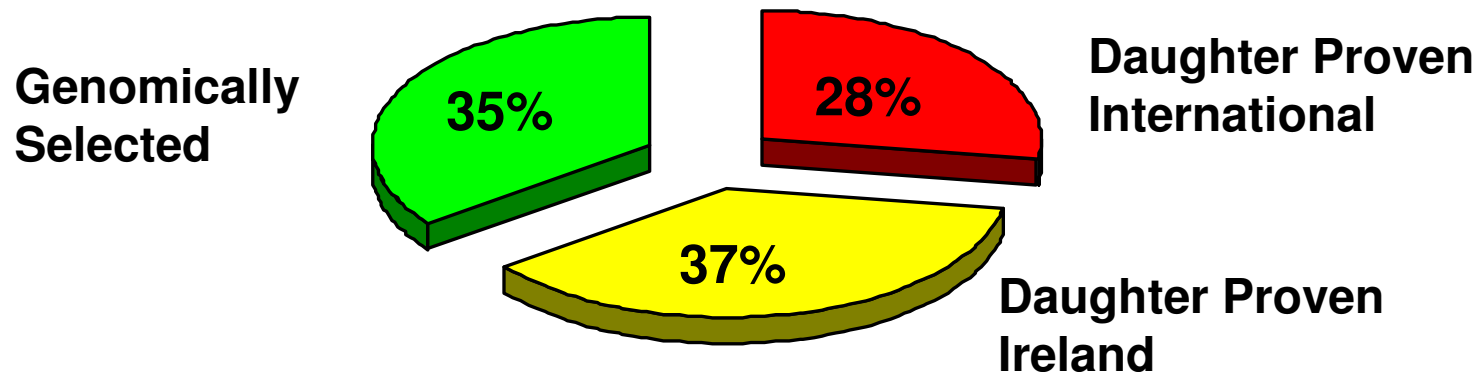
12%+ Increase in AI Bred Replacements - 2009



- Additional ~15k from technician handheld.
- 140k AI bred replacements (~60%)

A.I. Breeding Season - Spring 2009

AI usage Spring 09 (340,000 handheld inseminations)



Type of Proof	Spring 2009		Spring 2008	
	Average EBI	Average EBI Rel	Average EBI	Average EBI Rel
DP-INT	€132	56%	€99	43%
DP-IRL	€120	86%	€109	75%
GS	€179	54%	N/A	N/A
Average	€144	66%	€106	64%

Objective.

- *To increase genetic gain in the National dairy herd, through provision of a “genomics service” for farmers & the AI industry.*

Key Elements.

- Customer (AI company or Farmer) pays for service.
- Two service options.
 1. Provides hair sample & requests genomic EBI.
 2. Provides genotype & requests genomic EBI.
- ICBF provide service with the following key elements.
 - Genotype (*if not already provided*)
 - Genomic EBI according to defined schedule.
 - 4 times/year “official” evaluations & bi-weekly “unofficial”.
 - Storage of genotypes & genomic EBI’s.
 - Administrative & technical support.

User-pays service.

- Customer (AI Co/Farmer) pays for service.
- Operated through ICBF HerdPlus structure.
 - Farmer must be a ICBF HerdPlus member.
- Charged on a per item basis
 - Options for volume-based discounts based on level of uptake.
- Contract between customer & ICBF for provision of service (i.e., nature of service from both parties, terms & conditions, fee, payment method, duration....)

Services – Option 1.

- Customer provides hair sample & requests genomic EBI.
- Hair sample – preferred medium for 2009/2010 program (will be reviewed based on technical developments).

Option 1 - Protocol

- Customer contacts ICBF via Website and orders service for specific animals (must have full ancestry recorded.....or insemination data for calf to be born).
- ICBF sends out hair sampling kit.
- Customer forward hair sample(s) to ICBF
- ICBF pool hair samples and send batches of 96 samples to contracted laboratory.
- Laboratory returns genotype to ICBF.
- ICBF run genomic evaluation.
- Entire process including status can be viewed on-line (i.e., requested, extracted, genotyped, genomic).

Option 2 - Protocol

- Customer provides *genotype* & requests genomic EBI via ICBF website.
 - Genotype provided from Illumina BovineSNP50 Whole Genome BeadChip.
 - Customer forwards genotypes.
 - Include missing ancestors from Ireland training population to maximise accuracy of Genomic EBI. *No charge on these ancestors.*
- ICBF run genomic evaluation.
- Entire process including status can be viewed on-line (i.e., requested, genotyped, genomic).

ICBF Service - Genotype

- ICBF will contract a laboratory for provision of genotypes.
 - Take hair sample and return genotype (based on Illumina 50k SNP chip) in large batches (50-100).
 - Storage of any residual DNA?
 - Open tendering process (National & International laboratories).
 - Laboratory selected based on; (i) competency (>95% call rates) (ii) turn-around (< 2 weeks) & (iii) cost (~€200).
- Tendering process will start in August.

ICBF Service – Genomic EBI

- Genomic EBI according to defined schedule.
- 4 times/year “official” evaluations.
 - Release dates (approx) = 1 Sept, 15 Nov, 1 Feb & 15 Apr.
 - Linked with 3 Interbull evaluations (Sept, Feb & May) & 1 additional evaluation.
- More frequent “unofficial” evaluations.
 - Starting 1st November (testing).
 - Fully operational (1st January).
 - Linked with onset of peak calf births.
 - Frequency according to agreed schedule.
- Genomic EBI will include; Traditional EBI, Genotype EBI, Genomic EBI (blended) & relevant weightings.

“Unofficial” evaluations.

- Dedicated service to allow quick selection decisions (6 week time window at calf birth).
- Proofs posted in “password protected” area on ICBF website – HerdPlus screens.
- Can only be accessed by the customer that has requested genomic EBI on that particular animal - *first mover advantage*.
- Genomic proof available for own selection decisions. Not for publication.
- Genomic EBI will become official at next full official evaluation run.

Storage of Genotypes & Genomic EBI's.

- Full tracking & storage of all relevant information relating to genomic EBI.
 - Animal tag number.
 - Sample ID for hair.
 - Full genotype.
 - Data from 50k SNP chip.
 - Phenotypes & breeding values.
 - Genomic EBI (including EBI, Genotype EBI & blended Genomic EBI).
- All information can be accessed.

Administration & Technical Support.

- Full administration & technical support associated with the service.
 - Administration & Support – ICBF HerdPlus
 - Technical Queries – ICBF Animal Evaluation Unit.
- Extensive use of ICBF website for tracking & publication of relevant information.

*Estimated Cost of Service**

Option 1 (testing and evaluation)	€250/animal
Option 2 (evaluation)	€75/animal

** Prices are exclusive of VAT and subject to regular review based on cost of genotyping, volume of service uptake and any change in ICBF policy on accounting for infrastructure costs.*

- Currently getting quotes from laboratories.
- Indications are that prices will come down.
- “Final price” will be set after tendering process

Issues for discussion (i)

- Pedigree stock bulls & DNA parentage requirement.
 - Need to remove unnecessary duplication on behalf of farmer/AI company.
 - “All-in” service – Genotype, DNA parentage & Genomic EBI.
 - Options currently being investigated.
 - Currently verifying ancestry as part of the genomic evaluation....
 - Potential saving of ~€30/sample.

Issues for discussion (ii)

- Ownership of genotype.
 - Real value is in Genomic EBI (not genotype).
 - Must avoid duplication in genotyping.
 - Once Genomic EBI is official, genotype becomes part of ICBF database.
 - Copy of genotype (*not genomic EBI*) is available to customer.
 - Covered in contract between Customer & ICBF.

International Partners.

- International partners (NZ, US, Interbull...) have played a significant role in helping Ireland roll-out GS
 - Methodology & genotypes
- Methodology is now well developed.
- Genotype pool is still small. Increases in reliability for Gen EBI are lower than in other countries.
- We need to increase size of training population.
 - Exchange & sharing on an equivalence basis, e.g., Switzerland.
 - Contract services for international partners interested in marketing genetics in Ireland (including missing ancestors).
 - Participation in Interbull R&D initiatives.

GENE IRELAND - Review

- To have accurate Genomic EBI's in future we must have a co-ordinated progeny test program.
 - Benchmark for validation.
- Target of 100 bulls & 100 daughters is still advisable
 - *Meuwissen 2008.*
- Review in light of “best science” – EAAP/Interbull meeting in August.
- What if AI companies are not prepared to progeny test 100 bulls/year?
- Must keep in mind the long term benefits of the industry.

ICBF Involvement.

- Past; $EBI = \text{Ancestry} + \text{Phenotype}$ (stored in ICBF database).
- Future; $EBI = \text{Ancestry} + \text{Phenotype} + \text{Genotype}$ (stored in ICBF database).
- Clear benefits from;
 - Central co-ordination & reduced costs for farmers & industry.
 - Opportunities for international collaboration.
 - Maximise genetic gain (€20m/annum cumulative).

Summary.

- GS has huge potential for Irish dairy industry.
- Need attractive service to promote further roll-out & uptake of service.
- Proposed service for 2009/2010 being offered “at cost” to promote uptake.
- Comments & feedback welcome.
- Draft proposition – ICBF board (16th July).



IRISH CATTLE BREEDING FEDERATION

Culling Indexes

Teagasc Moorepark
1st July 2009.

Predicting performance versus genetic merit

High EBI cow

- Calved late
- No heterosis
- Low milk yield last lactation
- Old cow

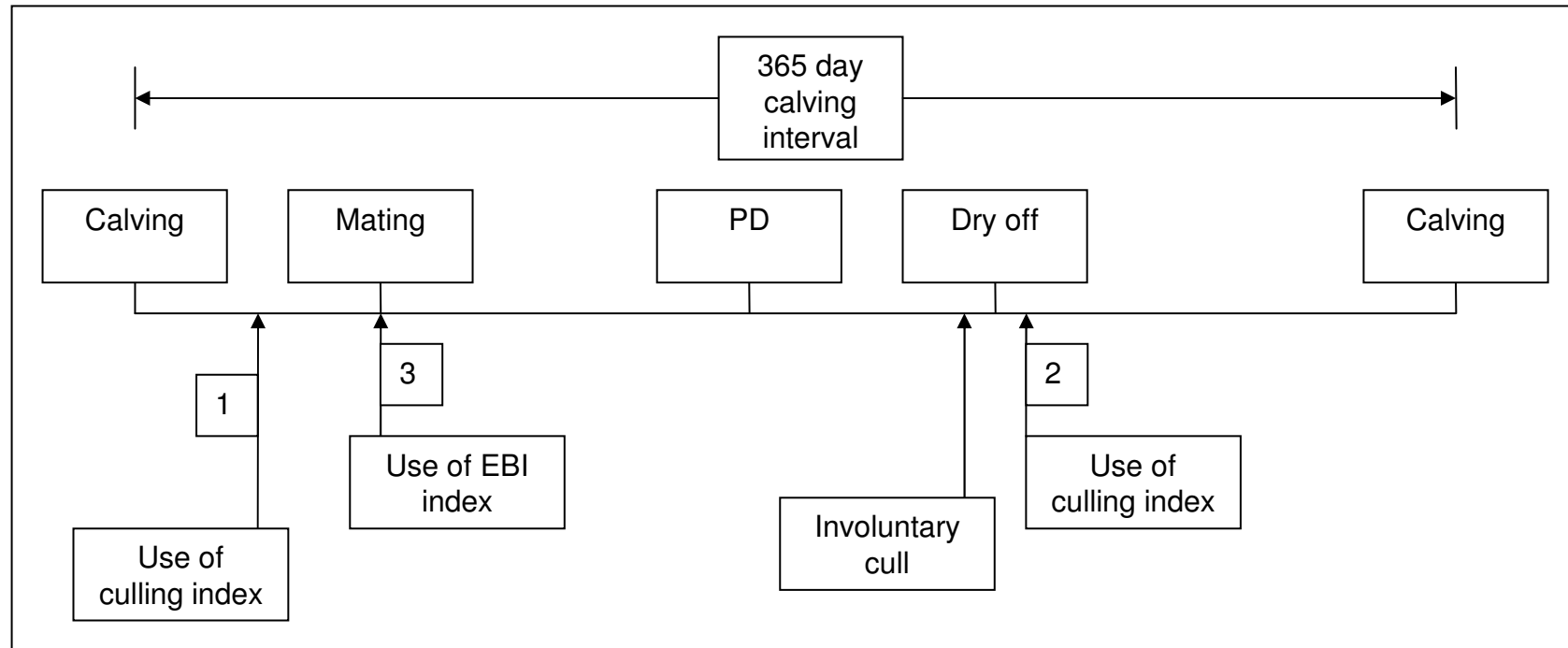
Moderate EBI cow

- Calved early
- Maximum heterosis
- Young cow

Which one do you keep?

Which one do you mate to a beef bull?

Use of culling versus EBI for COWS



1. Culling early lactation to manage quota
2. Culling late lactation to make way for new replacements
3. Use the EBI when deciding to mate to a dairy versus a beef breed bull

Feedback....

- Should the culling index account for age of the cow
 - culling older cows results in less replacements because she would have been culled anyway.
 - Age of cow is a dominating factor in the culling index
- Should the culling index be expressed as:
 - Total future lifetime value
 - Value per lactation

Still to be done

- Accurate estimates of heterosis (breed composition)
- Access to genetic evaluation results (non genetic) to obtain permanent environmental affects
- Penalising the later calving cow – data currently being analysed to determine future survival and calving interval for late calving COWS
- Penalising the older cow – decision required



IRISH CATTLE BREEDING FEDERATION

Farmer Management Traits

Teagasc Moorepark
1st July 2009.



Background

- Increasing scale; farmers want “easy-care” cows.
 - Calve herself, go back in calf, wont get mastitis, wont go lame.....
- Weight on farmer management traits will increase in future.
- Research project to evaluate bulls for “easy-care”.

Available data – Score Card?

<i><u>Trait</u></i>	<i><u>Score Card</u></i>
• Calve herself	Very good (5)
• Go back in calf	Good (4)
• No mastitis (SCC)	Poor (2)
• No lameness	Very Poor (1)
• No retained plascenta	Very Poor (1)
• Milking Speed	Poor (2)
• Good temperament	Poor (2)
• Stay on farm	Very good (5)

Research Issues.

- Improve data recording for key traits (MA, LM, RP.....).
 - Incidence of these traits is increasing.
- Consolidate new and existing data into an “easy-care” index.
- Review how to present;
 - Stand-alone index for farmers (initially)
 - Milking speed/temperament.
 - Sub-index within EBI....
 - Labour costs associated with fertility, mastitis, lameness, temperament, milking speed.....



IRISH CATTLE BREEDING FEDERATION

Linear Type Evaluations

Cork Airport Hotel
20th January 2009

Research Issues.

- Multiple breeds.
 - First GENE IRELAND bulls from other breeds (NRed, JE & MO) will calve next year.
- Use of data from other sources.
 - Data from marts (price as an indicator of quality). Correlation of ~ 0.7 for beef weanlings.
 - Farmer recorded data (e.g., farmer satisfaction)
- Irish base & scale.
 - Same base & scale as UK. Appropriate?
- Definition of overall type.
 - Is it appropriate for grass based systems?



IRISH CATTLE BREEDING FEDERATION

Roll-out Plan

Cork Airport Hotel
20th January 2009

Plan for 2009 & 2010

- Official Interbull run dates;
 - Jan 15, April 1, August 19.
 - ICBF “additional” run November 1.
 - AI bulls ~ 1 week after these dates.
 - All animals ~ 3 weeks after these dates.
- Interbull test run on 8 September.
- Test proofs – 1st week October & 1st week December.
- Proposed implementation – 15th January.