



IRISH CATTLE BREEDING FEDERATION

Genomic Selection In Practice

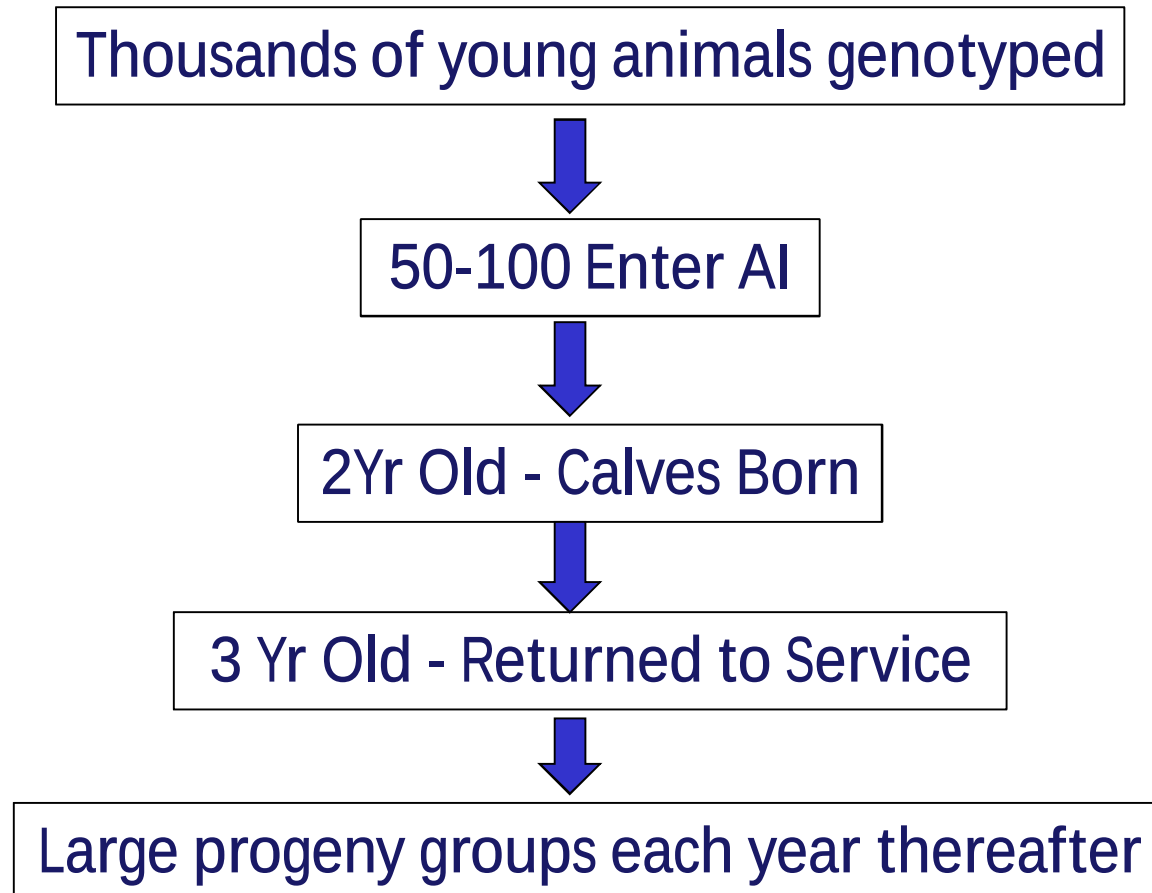
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ICBF



Genomic Selection

- § Has revolutionised dairy cattle breeding
- § Estimate EBI for a young bull based on a DNA profile
- § Combine DNA & parentage information to generate a higher reliability EBI
- § A genomic EBI is equivalent to having 10-15 daughters milking

Genomics – Genetic Gain



Genomics – Genetic Gain

- § In past waiting 10+ years to get high fertility & survival reliability
- § With use of genomics we can get bigger daughter groups faster
 - § higher reliability at a much younger age
- § Only best quality proven bulls kept
- § High quality GS & proven bulls to choose from

Genomics – Usage

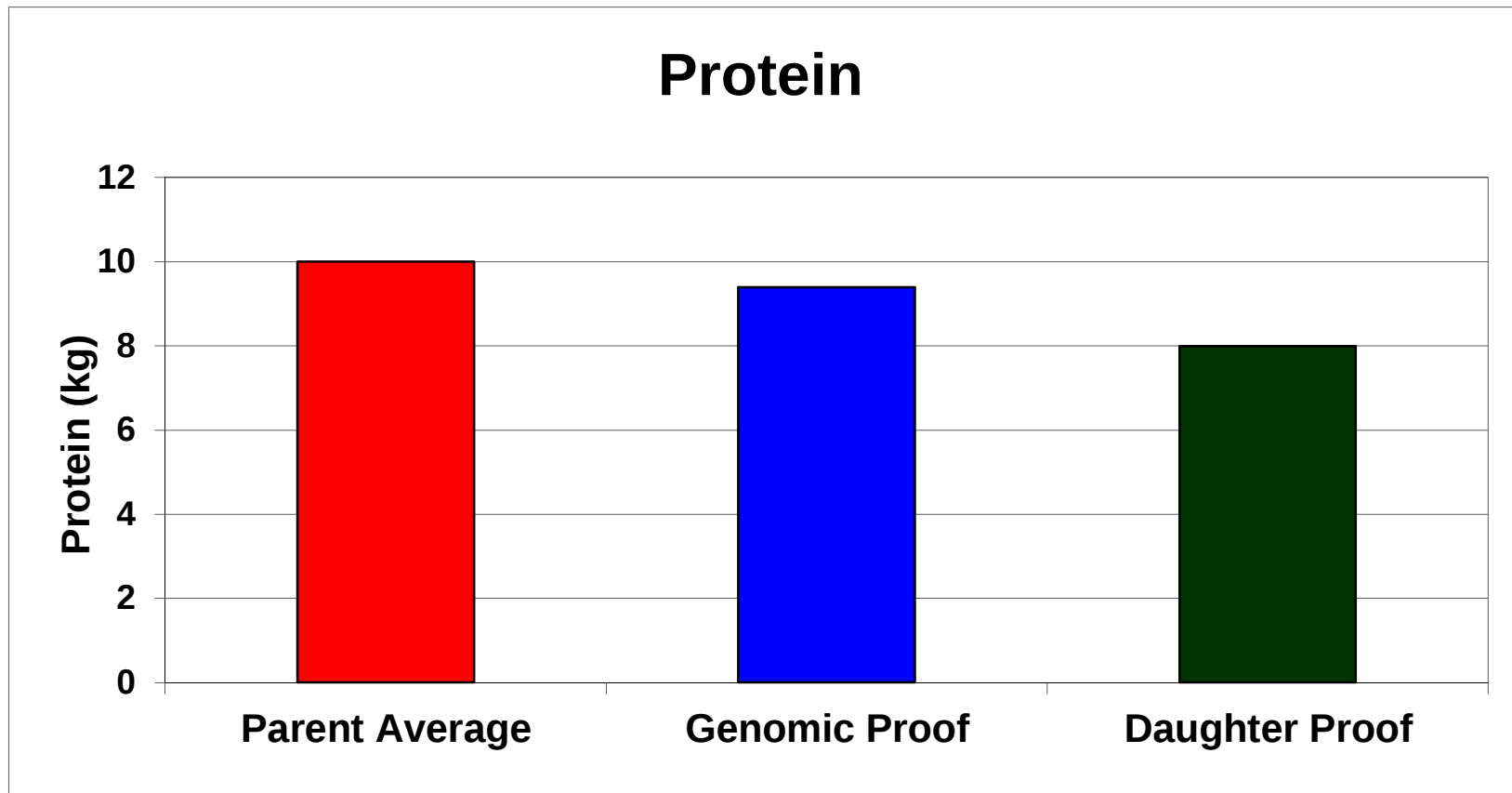
	2011		
Proof	% Use	Bulls/hrd	EBI (Rel)
DP-IRL	29	2.8	143(75)
DP-INT	24	3.3	155(47)
GS	47	5.1	218(57)

- Based on > 500k serves/year
- Usage of GS bulls has from 34% to 47% since 2009
- Farmers still using more GS bulls to spread their risk

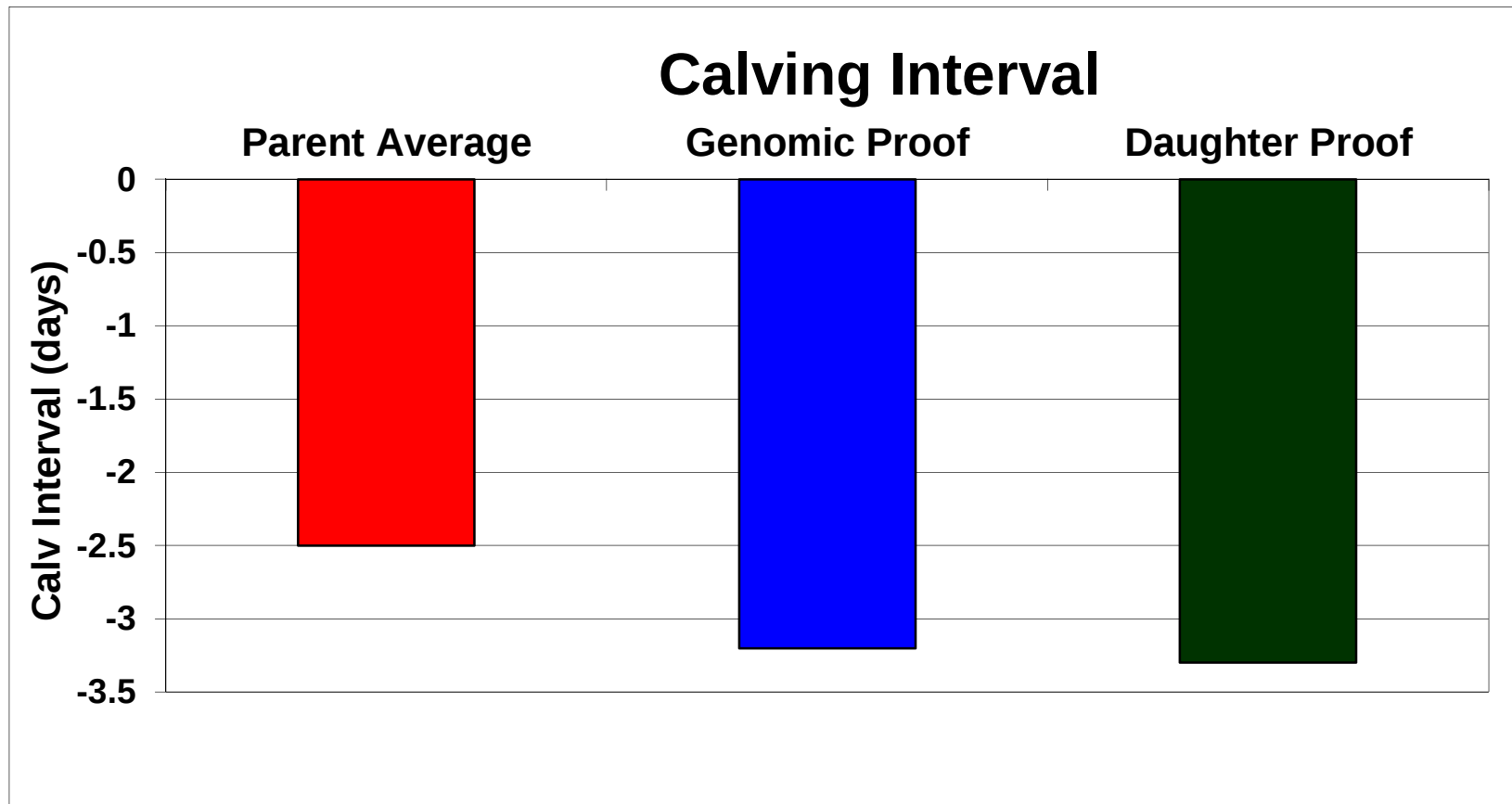
Genomics – Results

- § 142 bulls marketed on GS now with daughter proof
 - § 35 in 2009, 39 in 2010, 68 in 2011
- § Correlation between GS & DP > PA & DP
 - § 10-20% greater depending on trait
 - § Correlation of 60-80%
- § Increasing across years
 - § More animals in reference population
- § In-line with results from other countries

Genomics – Results



Genomics – Results



Genomics – Results

§ Production

§ Milk 50kg, fat 1.7kg, protein 1.9kg

§ Overestimate of €9

§ This will be subtracted from Milk SI for all genotyped animals

§ Fertility

§ Currently no evidence of bias – no adjustment required

Genomics – Results

	2011		
Proof	% Use	Bulls/hrd	EBI (Rel)
DP-IRL	29	2.8	143(75)
DP-INT	24	3.3	155(47)
GS	47	5.1	209*(57)

* GS bulls still well ahead of other bulls even after correction

Genomics – Future

- § Moving from Bovine3k chip to BovineLD (~7k SNPs)
- § Higher accuracy
- § Hol/Fr (and no greater 6.25% 3rd breed)
- § Cows will be used in the reference population
- § Increases in reference population > higher reliability
- § New service launched for genotyping females

Options	Description
OPTION 1	<u>ALL YOUNG STOCK</u> All Dairy Replacements (2010 & 2011 born heifers)
OPTION 2	<u>All 2010</u> born heifers only
OPTION 3	<u>All 2011</u> born heifers only
OPTION 4	<u>Cows & Young Stock</u> All Dairy Females in Herd (Cows & Heifers)
OPTION 5	2010 and/or 2011 born heifers and selected COWS
Call Herdplus for further inquiries.	
€30(incl. Vat) for first 10,000. Normally €50! Over 5000 sampling kits sent out to date!	

Genomics – Other dairy breeds

- Need a large number (min 700) of well proven bulls to be able to conduct genomic selection
- Very small number of bulls for other breeds
- Research project is underway to collect females from crossbred herds (4 cows = 1 bull)
- Letters sent to herds with interesting cows

Genomics – Summary

- § Demand remains strong for GS bulls
- § Results are in line with expectations
 - § Correlations higher with GS than PA
 - § Slight overestimation with production (also the case for PA)
- § Providing a great platform to have high reliability EBIs in a much shorter time
- § CONTINUE TO USE A TEAM OF GS BULLS
 - § Individual proofs will change more than the team average
 - § Spread usage of bulls EQUALLY!!!
- § Research on other breeds is on-going