



Building an international wiki on data collection and genetic evaluations.

Dr Andrew Cromie
**Chairperson Interbeef & Technical
Director ICBF.**

25 Oct 2022



THE GLOBAL STANDARD
FOR LIVESTOCK DATA



AgTech - it's in our DNA

Overview of Talk.

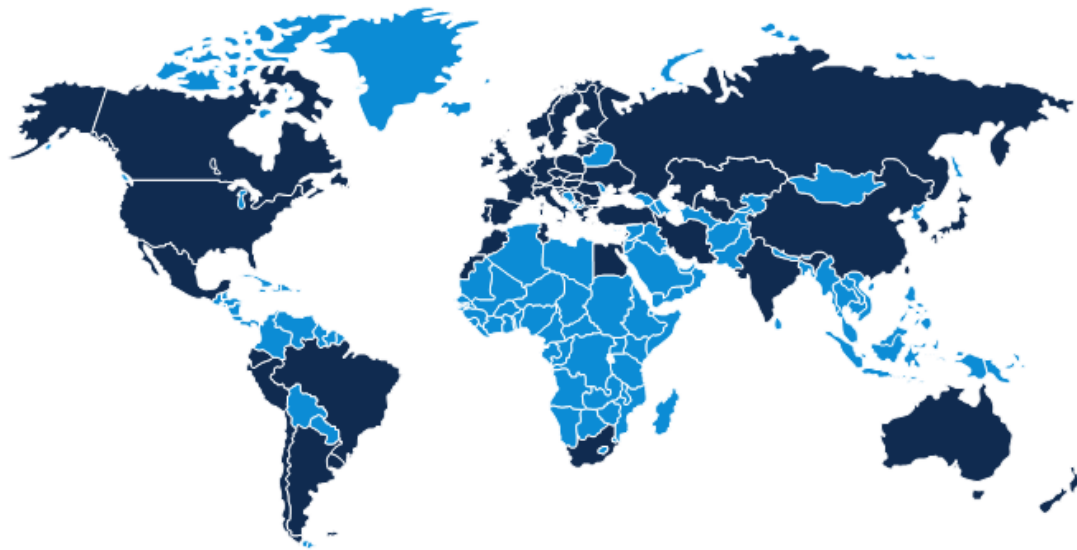
- ICAR & Interbeef; who are they?
- Building an international wiki;
 - Why,
 - How,
 - Challenges and opportunities identified,
 - Next steps.
- Looking to the future re: international collaboration; an ICBF perspective?

ICAR; The International Committee for Animal Recording.

Network. Guidelines. Certification.

ICAR's members

ICAR has 117 members (87 Full members + 30 Associate members) in 59 countries



Countries (in dark blue) with at least one organisation as ICAR Member



25-10-2022

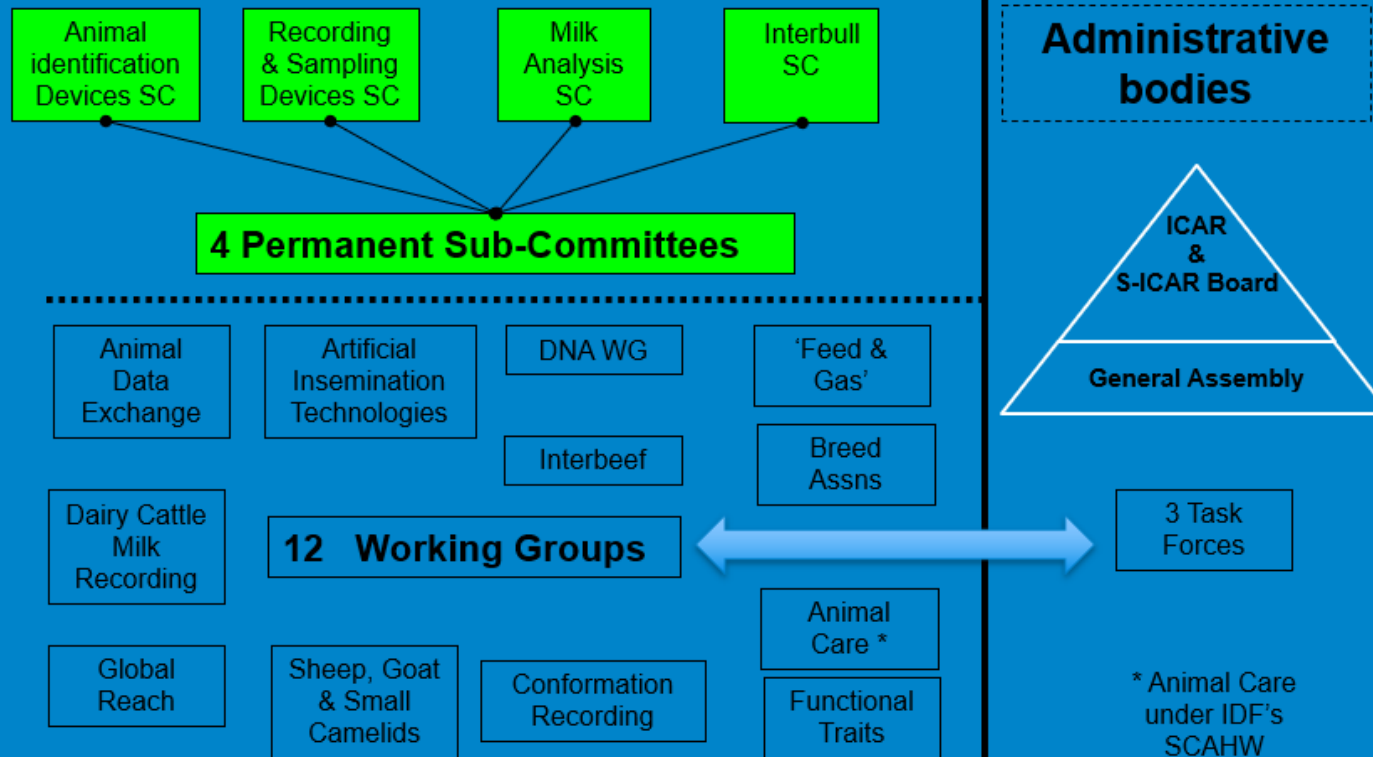
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- Goal => To improve the profitability & sustainability of farm animals by;
 - Establishing and maintaining **guidelines and standards** for best practice in all aspects of animal identification and recording.
 - **Certifying equipment and processes** used in animal identification, recording and genetic evaluations.
 - Stimulating and leading: continuous improvement, innovation, research, knowledge development, and **knowledge exchange**.
- Network => a big part of activity.

ICAR & Interbeef.

Network. Guidelines. Certification.

ICAR Current Technical Organisation



- ICAR => 4 permanent sub-committees (established in early days of ICAR) & 12 working groups.”
- Interbeef is a working group within ICAR, focused on genetic evaluation services.
- Structured into a working group (chaired by Andrew Cromie) & technical group (chaired by Roman Santillon).
- Bi-monthly meetings + an annual meeting.
- Next year in Toledo Spain!

Interbeef; Goal & services.

	ADWW					CALV									
	aww					bwt					cae				
	AAN	CHA	HER	LIM	SIM	AAN	CHA	HER	LIM	SIM	AAN	CHA	HER	LIM	SIM
AUS		✓		✓											
CHE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CZE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DEU	✓	✓	✓	✓	✓										
DFS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EST	✓	✓	✓	✓							✓	✓	✓	✓	
FRA		✓		✓			✓		✓			✓		✓	
GBR				✓					✓					✓	
IRL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ITA		✓		✓											
LVA		✓		✓											
SVN		✓		✓			✓		✓			✓		✓	

- Goal => more accurate national and international evaluation of beef cattle.
 - Members have national evaluations => sharing data (phenotypes, pedigree & genotypes) for "common-good".
- Joint evaluation incorporating 14 countries (12 populations), 5 breeds & 2 trait groups => ~45m phenotypes.
- Service operated through the Interbull Centre (Uppsala, Sweden) => two routine evals/year & one test run.
- New R&D & services => carcass, female fertility, genomics & new wiki based guidelines.

ICAR Guidelines.



THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Network. Guidelines. Certifications.

ABOUT US ▾

TECHNICAL BODIES ▾

CERTIFICATIONS ▾

PUBLICATIONS ▾

GUIDELINES

MEETINGS ▾

ICAR has updated how we structure and present our Guidelines. The new format makes them easier to browse and to access your specific interests.

▼ Section 0 - Preamble

▼ Section 01 - General Rules

▼ Section 02 - Cattle Milk Recording

▼ Section 03 - Beef Cattle Recording

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What's new

Latest news from ICAR here ... On 16 June 2021

- Results of the work of the ICAR Sub-Committees and Working Groups are the “ICAR RECORDING GUIDELINES” => 20 sections, “hard-copy”, accessible “on-line”.
- Guidelines are a “living being” of amendments & updates, according to new technologies, tools and developments => Updated annually, in line with annual meetings.

ICAR & BIF; An opportunity for collaboration.



Guidelines for Uniform Beef Improvement Programs

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- BIF transitioned from an eDocument of their Guidelines for Uniform Beef Improvement Programs posted on their website to a Wiki format
- ICAR board have identified a need to transition its guidelines to a wiki-based format => suggestion to start with beef!
- Initiated by Dr. Brian Wickham, a group of participants from both organizations met to discuss the possibility of working more closely together in the future in development of international beef guidelines.

Approach Taken.

Project page [Talk](#)

Wikipedia:Sandbox

From Wikipedia, the free encyclopedia

Welcome to this [sandbox page](#), a space

To edit this sandbox, you can either edit it directly or click the "Edit source" link to make your changes, and click the "Publish" link to save your changes. If you are about to save, or "Show changes" to see what you have done.



[Edit source code](#) or [Edit page view](#)

Any user can edit this page and it is automatically clear sandbox.

If you are logged in, you can access your user page.

Please **DO NOT** place copyrighted, offensive or defamatory content here.

For more information on what is a sandbox, see the help page.

- A sandbox Wiki was developed based on the BIF Wiki and both groups started exploring possible approaches for a joint Wiki.
- Teams were assigned, with a focus on specific trait areas.
 - Carcass, growth, health, management & reproduction.
- Progress continued on incorporating new traits into the wiki and identifying commonality and differences between trait definitions, recording approaches etc.
- A number of key outcomes (i.e., challenges and opportunities) identified from the initial pilot project.



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Beef Guidelines

[About](#) [Data Collection and Processing](#) [Genetic Evaluation](#) [Selection and Mating](#) [Useful Pages](#)

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Forward:

The Beef Improvement Federation and initially the Beef Working Group and currently the Interbeef Working Group of ICAR have been collaborating on guidelines for over 20 years, but have maintained two independent guidelines. Each set of guidelines has their strengths and limitations, however, a combined set of guidelines could result in a more complete document that could be utilized by both organizations.

This wiki is a prototype used to explore and develop ways that may integrate the Guidelines developed by the Beef Improvement Federation and the guidelines developed by the Interbeef Working Group of ICAR ([ICAR](#)). At this point, this is not an official project of either organization. We are using these pages to determine if it is possible to integrate the two sets of guidelines into a single wiki that still meets the requirement of both organizations.

All of the pages are starting from the BIF Guidelines version. We will modify a few of the BIF pages to test ideas for integration of the ICAR information. Our current proposal is to work in teams of one ICAR and one BIF member on each of the trait categories to determine similarities and differences and how to bridge the gaps; ultimately to determine if a joint wiki is feasible and beneficial to both organizations.

This article was last edited 17:22, 19 April 2022 by [Bruce L. Golden](#). Based on work by [Darrh Bullock](#), Beef Guidelines Wiki users [Burke](#) and [Cromie](#) and [others](#).

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Traits

This article is a list of traits commonly observed in beef cattle. Some traits are economically relevant traits (ERTs), directly affecting costs and income realized by an individual producer. Depending on me may be highly relevant, largely irrelevant, or an indicator of an ERT. Most of the entries in this table have links to a specific article with details about that trait. Also, you are encouraged to see the [Selection on using traits](#).

Authors, please feel free to add to this table, even if there is no specific linkable article with more details.

Also, if you make changes please arrange them in alphabetical order within row/column.

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Growth	Reproduction	Carcass	Management/Convenience	Health
Average daily gain	Age at Puberty	Back fat thickness	Body condition score	Bovine respiratory disease (BRD)
Birth Weight	Days To Calving	Carcass weight	Calving Ease/Calving Difficulty	Liver Fluke Infestation
Days to finish	Calving Interval	Dressing percentage	Docility	Parasite egg count
Dry matter intake	Gestation length	Marbling score	Foot and leg score	Pre-weaning survival
Feed efficiency	Heifer Pregnancy	Quality grade	Maintenance energy	Pulmonary arterial pressure (PAP)
Frame score	Lactational Anoestrus	Ribeye area	Linear Type - General	Tuberculosis Resistance
Hip height	Length of productive life	Shear force	Linear Type - Frame Traits	Tick score
Mature height	Percent Normal Sperm	Ultrasound back fat thickness	Linear Type - Muscle Traits	Somatic Cell Count
Mature weight	PG30	Ultrasound intramuscular fat	Linear Type - Leg Traits	
Muscle score	Reproductive tract score	Ultrasound rib eye area	Linear Type - Udder Traits	
Slaughter weight	Scrotal circumference	Ultrasound rump fat	Linear Type - Other Traits	
Weaning weight	Sexual behaviour (male)	Yield grade	Linear Type - Composite Traits	
Yearling weight	Stayability		Pelvic area	
	Sustained Cow Fertility		Shedding score	
			Teat and Udder Scores	
			Tooth score	



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Mature weight	PG30	Ultrasound intramuscular fat	Linear Type - Leg Traits	
Muscle score	Reproductive tract score	Ultrasound rib eye area	Linear Type - Udder Traits	
Slaughter weight	Scrotal circumference	Ultrasound rump fat	Linear Type - Other Traits	
Weaning weight	Sexual behaviour (male)	Yield grade	Linear Type - Composite Traits	
Yearling weight	Stayability		Pelvic area	
	Sustained Cow Fertility		Shedding score	
			Teat and Udder Scores	
			Tooth score	



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Slaughter weight		Ultrasound rump fat		
Weaning weight		Yield grade		
Yearling weight				

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Calving Ease/Calving Difficulty

The terms Calving Ease and Calving Difficulty are both used to describe the same trait, but from opposite perspectives. BIF reports the results of the genetic evaluation as Calving Ease and ICAR reports it as Calving Difficulty. Calving Ease/Calving Difficulty is a subjective measure of the degree of *dystocia*. Dystocia can be caused by a large pre-natal calf, small pelvic area of the dam, lack of sufficient uterine contractions, insufficient dilation of the cervix, or mispositioned calf prior to parturition. Predictors of genetic merit (*EPDs* or *EBVs* are produced from calving difficulty scores and birth weight observations.

Due to differences in computation and reporting between the organizations please click on the appropriate logo:



Category: [Management/Convenience Traits](#)

This article was last edited 18:03, 21 April 2022 by [Darrh Bullock](#).

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Calving Difficulty

ICAR reports EBV associated with dystocia as Calving Difficulty EBV (BIF reports [Calving Ease EPD](#)). Calving Difficulty is a subjective measure of the degree of [dystocia](#). Dystocia can be caused by a large pre-natal calf, small pelvic area of the dam, lack of sufficient uterine contractions, insufficient dilation of the cervix, or mispositioned calf prior to parturition. This information can then be used to compute Calving Difficulty EBV.

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Phenotype

Producers are asked to score the degree of calving difficulty using the following subjective scores:

ICAR Recommended codes for calving mode or ease **TABLE**

Score	Description
a	Easy calving without assistance
b	Easy calving with some assistance
c	Difficult calving (hard pulling, assistance by 2 or more persons, mechanical assistance)
d	Caesarian section
e	Embryotomy

Cows that calve without assistance between daily checks can be assumed to have calved without assistance even if the calving was not observed. A score of 1 should be reported for these. All calvings should

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Calving Ease

BIF reports EPD associated with dystocia as Calving Ease EPD (ICAR reports [Calving Difficulty EBV](#)). Calving difficulty is a subjective measure of the degree of [dystocia](#). Dystocia can be caused by a large pre-natal calf, small pelvic area of the dam, lack of sufficient uterine contractions, insufficient dilation of the cervix, or mispositioned calf prior to parturition. Calving ease [EPDs](#) are produced from calving difficulty scores and birth weight observations.

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Phenotype

Producers are asked to score the degree of calving difficulty using the following subjective scores:

Score	Description
1	No difficulty, no assistance required
2	Minor difficulty, some assistance
3	Major difficulty, usually mechanical assistance
4	Caesarian section or other surgery
5	Abnormal presentation

Cows that calve without assistance between daily checks can be assumed to have calved without assistance even if the calving was not observed. A score of 1 should be reported for these. All calvings should receive a score even if the calf is born dead.

Adjusted Value

Challenges & opportunities identified.



1. Differences in Traits
2. Philosophical Differences
3. Maintaining the identify of both organizations
4. Mutual Benefits of Collaboration

Differences in Traits.

- Similar traits, but defined/recorded differently;
 - Different definition, e.g., Calving ease & calving difficulty
 - Different scales, e.g., udder score (1-5 in BIF & 1-9 in ICAR).
- Suggestion re a logo type “toggle” that would allow users explore both examples.

Philosophical Differences.

- ICAR Approach
 - ICAR approach is more focused on standards for recording (i.e., exactness).
 - ICAR guidelines are more extensive, covering the needs of many stakeholders.
 - Important traits for the future are captured at an early stage e.g., health, disease & GHG traits.
 - Lacks prioritization of these traits based on economics.
- BIF Approach
 - BIF guidelines focused on traits of current economic importance ensuring greater focus by farmers & industry
 - Lacks foresight on future needs => more dealing with the present set of traits.
- ICAR & BIF Collaboration
 - Integrate these philosophies to streamline/focus on current economics while developing novel trait & ideas for the future.

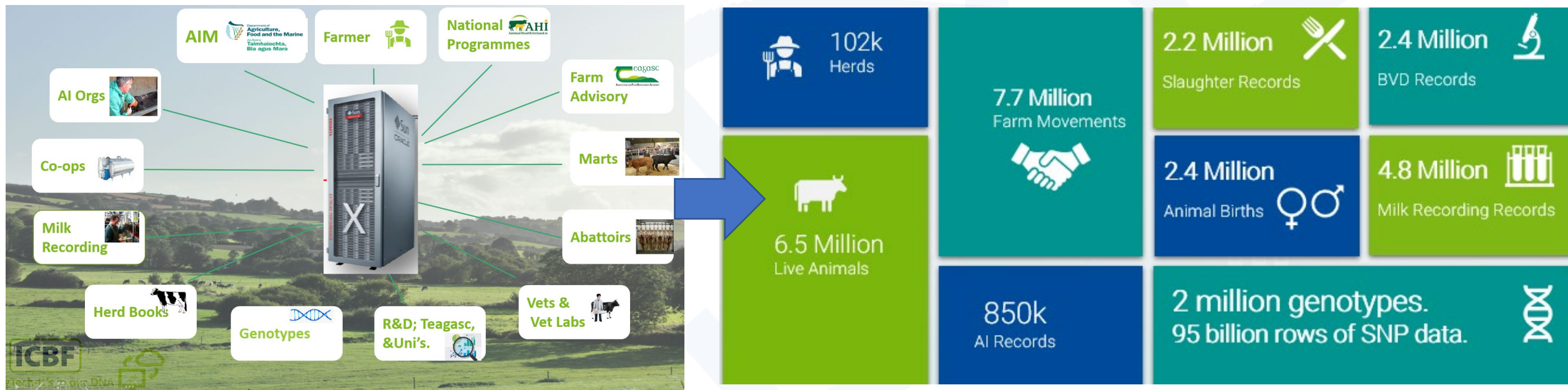
Maintaining the identify of both organizations.

- Both ICAR and BIF have their own set of guidelines. Critical to maintain this, from an identify and service perspective.
- The work of the collaborative group has identified opportunities to improve these guidelines for both organizations in the future.
- We need to do this in a way that respects the identify of both organizations.
- Suggestion that we work on technical ways to support this important requirement, e.g., shared format/structure, toggle options, shared platform etc.

Mutual benefits of collaboration.

- There are many additional “high level” benefits to the collaboration.
 - International collaboration for improved genetic evaluation methodology and implementation.
 - Increased international exposure for BIF through association with respected international organization.
 - Increased exposure for ICAR to the US beef industry which has had limited input into the organization.
 - Understanding the tools offered across countries to facilitate greater exchange of genetic material => How do we make this happen?
- Collaboration in areas such as networks & guidelines, is an important first step in this exchange of genetic material.

Why are ICBF especially interested?



- Farmer's co-operative (i.e., farmers, AI, stud books & recording organization's) focused on genetic gain in beef & dairy cattle.
- ICBF's role is to **align industry** (i.e., shareholders, stakeholders and farmers) around our core objective => **genetic gain** (i.e., profit/sustainability based on science).
- Systematic approach taken; (i) understand the problem (even if its unpopular!), (ii) apply a science based solution and (iii) validate the outcomes.

Aligning Industry; Genetic Gain in Beef.



Farmer uproar over BDGP

Anger erupts at Claremorris farmer meeting

NATHAN TUFFY
WESTERN LIVESTOCK
SPECIALIST
ntuffy@farmersjournal.ie

One thousand farmers left a meeting on Tuesday night frustrated and disappointed after Minister for Agriculture Simon Coveney announced that no changes



ANIMAL GENETICS AND GENOMICS

Validation of a beef cattle maternal breeding objective based on a cross-sectional analysis of large national cattle database

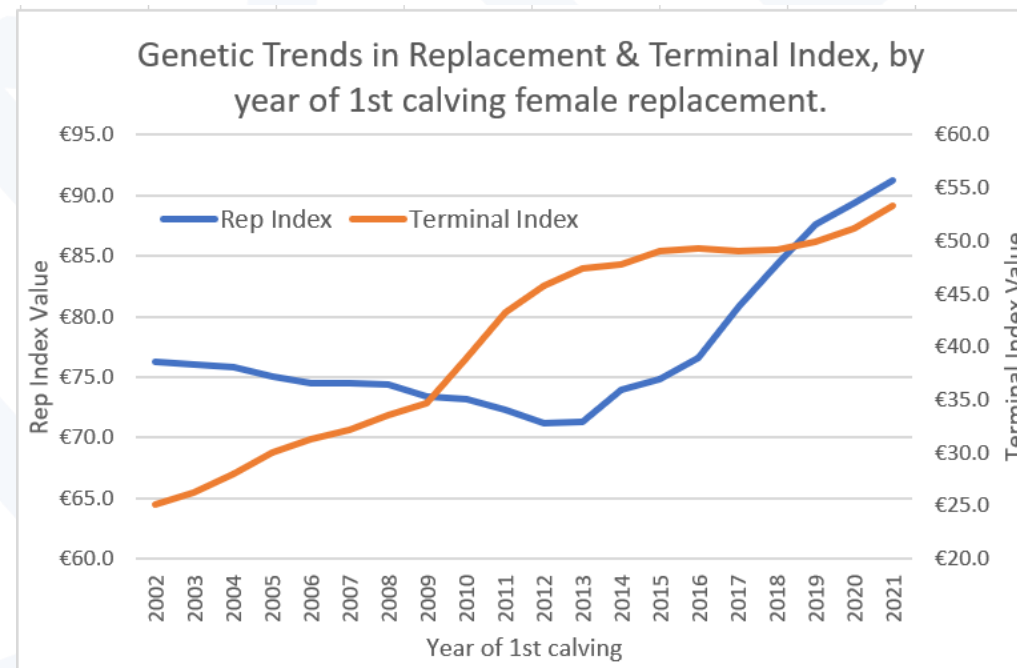


Alan J. Twomey,^{†1} Andrew R. Cromie,[‡] Noirin McHugh,[†] and Donagh P. Berry[†]

[†]Animal and Grassland Research and Innovation Centre, Teagasc, Moorepark, Fermoy, Co., Cork, Ireland, [‡]Irish Cattle Breeding Federation, Highfield House, Bandon, Co., Cork, Ireland

[†]Corresponding author: alan.twomey@teagasc.ie

- Despite major challenges initially, Rep Index has delivered for farmers & industry.



T1. Impact of Herd Replacement Index on key performance & sustainability metrics*

Herd Average Trait	Source	Replacement Index Eurostars					
		SD	Btm 20%	Btm 21-40%	Average	Top 21-40%	Top 20%
Average Replacement Index	ICBF/BDGP		€42	€63	€80	€96	€122
Cow Liveweight (All parities; kg)	BEEP	56.0	688.8	669.5	664.3	655.5	651.6
Calf 200 day Liveweight (kg)	BEEP	34.8	279.7	280.1	284.9	286.3	287
Weaning Efficiency (%)	BEEP	5.5	40.8	42.0	43.0	43.9	44.3
Calving Interval (days)	ICBF	28.7	399.1	394.2	389.8	384.6	387.7
Calves/cow/year	ICBF	0.12	0.85	0.88	0.89	0.91	0.91
Profit/livestock unit	Teagasc		€207	€219	€238	€244	€262
Carbon Footprint (GHG/kg)	Bord Bia	1.82	13.16	12.97	12.82	12.42	11.91

David Kelly, PhD, Teagasc.

ICBF & Government Policy.

A. Direct Impact measures to mitigate Greenhouse Gas Emissions from the dairy sector		
Measure	Target GHG	Timeframe*
1. Consider a Voluntary Dairy Exit/Deintensification Scheme	All	Short term
2. Explore the potential of Cap-and-Trade emissions model	CH4	Short-term Medium-term
3. Explore the possibility of measuring and monitoring carbon production at individual farm level	All	Short-term
4. Reduce chemical N use in the dairy sector by 30% in the short term (2025), with a 35% reduction target in the medium term (2030)	N2O	Short-term Medium-term
5. Target a 100% replacement rate of CAN with Protected Urea by the end of 2025 for grass based dairy production systems	N2O	Short-term
6. Develop methane-mitigating feed technologies	CH4	Short-Medium term
7. Develop methane mitigating Breeding Strategies <i>(Direct Impact and Enabling Factor)</i>	CH4	Short-term (EF) Medium-Long term (DI)
8. Adopt a common co-op charter on sustainable milk production that underpins the family farm model.	CH4	Short-term

- Genetics is now a key component of our government and industries GHG mitigation strategy.
- Ireland's Ag Food industry has a legal requirement to reduce GHG output by 25% by 2030 (from 23 MT to 17 MT).
- **Already moving in the right direction re: efficiency traits => but can we go faster.....international breeding programs.**
- Will also require us to shift our focus towards traits and approaches that will result in further GHG mitigation.
 - New Carbon sub index in our indexes.
 - New “earlier finish” evaluations.
 - Direct selection for methane.
 - Genotyping every calf.
 - Animal & herd carbon models, with Teagasc & Bord Bia.
 - Direct initiatives with milk & meat processors.
 - Close alignment with National Inventory Models.
- Expected that breeding will deliver ~1.2 MT of mitigation by 2035 (~20% of current 5.75 MT target).

ICBF GENE IRELAND Beef Program.













- Irish AI Companies normally progeny test ~20 Beef Bulls every year.
 - Main breeds; LM, CH, SI, AA & HE.
- 400 Commercial Irish Beef Herds use the Test Semen.
- We also want to:
 - Build genetic links across Countries.
 - Identify suitable International bulls for our breeding programs.

ICBF GENÉ IRELAND Beef Program.

Country	Company	Angus	Aubrac	Charolais	Hereford	Limousin	Saler	Shorthorn	Simmental	Totals
Australia	Genetics Australia	4		3	1				2	10
Australia	Charnelle Charolais			1						1
Canada	Semex	6			1				4	11
Czech Rep.	Natural SPOL	11		9	6	8	2	1	25	62
Estonia	ETKU	6		3	5	11				25
France	Evolution/Crealim		3	69		83	5			160
Scandinavia	Viking	1				8			3	12
Spain	Aberekin	7				6				13
Switzerland	Swiss Genetics	10				10			8	28
Totals		45	3	85	13	126	7	1	42	322

- We have built a list of over 300 bulls x 8 breeds x 8 Countries.
- Approach based on making contact with relevant countries & companies re: bulls, semen, data, genotype etc.

ICBF - International Beef AI Bull Summary Table

On Test	AI Code	Name	Breed	Birth Year	1st Replacement Index	Rel %	1st Dairy Beef Index	Rel %	1st Terminal	Rel %	Source
2021	AA7422	LAWSONS MOMENTOUS M518	AA	2016	€110	33	€86	34	€74	35	Genetics Australia 
2021	AA7095	WARRAWEE PATROL P29	AA	2018	€153	36	€123	39	€101	38	Genetics Australia 
2021	AA7092	KCF BENNETT HEAVYWEIGHT E578	AA	2017	€133	34	€90	35	€79	36	Semex 
2021	AA7089	SPRING GROVE OVERHAUL 6133	AA	2016	€112	33	€79	34	€63	35	Semex 
2022	AA7818	INSAGURBE LORD HILLER	AA	2017	€133	36	€78	39	€67	39	Aberekin 
2022	AA7821	LIGHTNING TOTAL	AA	2010	€99	33	€85	36	€68	36	Aberekin 
2022	AA7815	ZORRO	AA	2017	€107	33	€83	36	€68	36	Aberekin 
2022	AA8100	BALMACHIE RODGER P190	AA	2014	€98	36	€76	40	€74	39	Natural 
2022	AA8409	SMX AMPLIFY 042H	AA	2020	€91	33	€89	36	€69	35	Semex 
2023	AA7098	TOPBOS LEADING EDGE L292	AA	2015	€122	35	€94	38	€71	37	Genetics Australia 

- Focusing now also on the Dairy Beef Index => 1st priority is that they have a high 'Dairy Beef Index' (as with all programs), based on pedigree + genotypes.

Next steps re: project.

- Initial pilot project (with BIF) identified the clear need for ICAR to transition its guidelines across to a wiki-based format.
- New beef project started in Autumn 2022 with Dr Rob Banks and Dr Bruce Golden taken on (by ICAR) as technical consultants.
 - Rob (re: guidelines) & Bruce (re: infrastructure).
- Goal of having full set of ICAR beef guidelines transitioned over into wiki-based format by Spring 2023.
- New guidelines will have a similar approach & infra-structure to existing BIF guidelines => important for future collaboration opportunities between ICAR/Interbeef & BIF.
- Expect that the ICAR/Interbeef & BIF teams will revisit the collaboration opportunities on a more formal basis Spring/Summer next year => *conditional on continued support from both sets of organizations.*

Summary.

- Mutual benefits exist for ICAR and BIF, through closer collaboration in the area of international guidelines.
- Initial pilot project identified a number of challenges & opportunities to be consider in context of any future collaboration.
- ICAR have now initiated a project to transition its guidelines across to a wiki-based format => expect to be in a position to re-engage with BIF in 2023, conditional on the continued support of both organizations.
- There is much to be gained through greater international collaboration in beef cattle; guidelines, methodologies, exchange of genetic material etc.
- From an ICBF, ICAR & Interbeef perspective, we are always keen to engage with “like-minded” partners.