



Farming Connect Management Exchange

Rhys Davies

Impact of the EBI on the Irish spring calving grass based herd

Ireland

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Background

My family and I farm just under 150 acres in Holywell, Flintshire where we milk over 100 spring calving herd of Black and White cows along with 80 followers. We aim to calve as many within 9 weeks from the 1st of March to the beginning of May, with empty cows culled or carried over and sold as fresh calvers in Mold market during the late summer months. In the past we have operated an all year round and autumn calving system based on grazing, but since 2008 we have operated a spring calving system and now supply Arla on a manufacturing contract. I have been

interested in our herds genetics since we registered our first pedigree cow back in 1983 and have milk recorded for over 35 years allowing us to look back on nearly ten generations worth of information. Holstein blood has played a large part in our herd for many years and myself and my father still look for balanced cows with width throughout, correct mammary systems and excellent locomotion. During the transition over to a grass and block calving system we soon found out that the mainly North American origin holstein breed in the herd lacked in terms of fertility, milk solids and condition score. Therefore we introduced Black and White genetics from New Zealand along with some Irish and Dutch Holstein Friesian. These matings resulted in a much more suitable cow for the system. This was then followed by the dawn of the Genomic era which widened the choice of Black and White bulls even further. Despite this, there is still a huge variation in the herd from the high yielding Holstein type to the smaller NZ Kiwi cross.

In the UK the main Index to help farmers select and breed for profitable cows is the £PLI (Profitable lifetime Index) which for years was the only Index available to rank bulls and cows on regardless of the system you operated. In 2014 AHDB Dairy launched the £SCI (Spring Calving Index) and in Summer 2018 launched the £ACI (Autumn Calving Index). All three systems are to complement AHDB’s optimal dairy systems strategy. Currently we use three Indexes to help choose bulls and select cows for matings - The £PLI, £SCI and \$BW (Breeding Worth - New Zealand dollar).

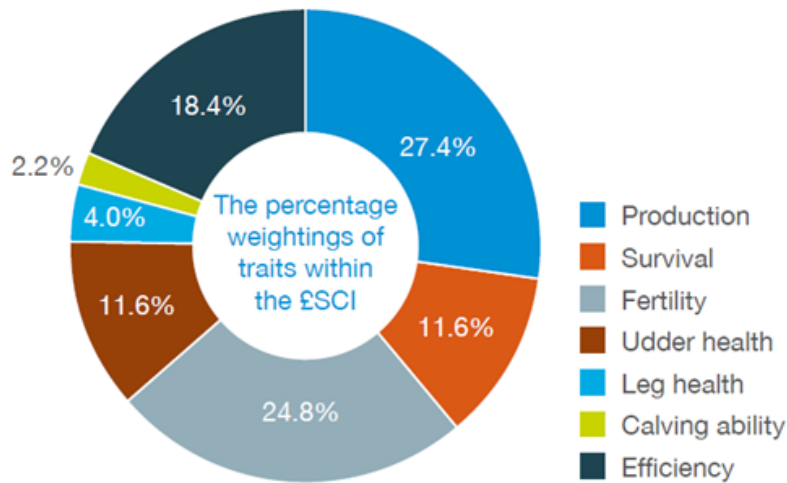


Chart 1. Emphasis on different traits within the Spring Calving Index (£SCI)

The reason I wanted to visit Ireland was not only to see the type of Black and White cow the Economic Breeding Index (EBI) was producing but also how the industry fed data into the genomic and daughter proving system along with any research carried out to underpin the Index. Ireland has very similar conditions to Wales in terms of topography and climate with an ability to grow grass with a strong emphasis on processing for cheese and other products. Eighty five percent of Irish dairy herds operate on a block calving grass based system therefore the

main focus has been on breeding a suitable cow for that particular system. Many of the available bulls for grazing in the UK studs are also Irish bred.

History and make-up of the EBI

The EBI was introduced in 2001 to replace the RBI (Relative Breeding Index) which was primarily made up of production traits including Kg Milk yield which led to many foreign sires populating the top ranks of each proof run with their converted data and not based under actual Irish environmental conditions. With the formation of the EBI, a greater emphasis was placed on other economic traits of importance such as fertility and milk solids, especially protein. Other notable aspects of the EBI are the inclusion of beef characteristics which has helped increase cull cow values and allowed the beef cross industry to benefit without compromising the total amount of KgMS produced. Table 1 below shows relative emphasis of different traits of the EBI.

Sub-Index	Trait	Economic Weight	Trait Emphasis	Overall Emphasis
Production	Milk	-€0.09	10.6%	33%
	Fat	€1.04	3.4%	
	Protein	€6.64	18.9%	
Fertility	Calving Interval	-€12.43	24.0%	35%
	Survival	€12.01	10.9%	
Calving	Direct Calving Difficulty	-€3.52	2.8%	9%
	Maternal Calving Difficulty	-€1.73	1.3%	
	Gestation Length	-€7.49	4.1%	
	Calf Mortality	-€2.58	1.0%	
Beef	Cull Cow Weight	€0.15	0.7%	9%
	Carcass Weight	€1.38	5.1%	
	Carcass Conformation	€10.32	1.7%	
	Carcase Fat	-€11.71	1.1%	
Maintenance	Cull Cow Weight	-€1.65	7.2%	7%
Management	Milking Time	-€0.25	2.1%	4%
	Milking Temperament	€33.69	1.9%	
Health	Lameness	-€54.26	0.6%	3%
	SCC	-€43.49	1.8%	
	Mastitis	-€77.10	0.8%	

(Table 1) Relative emphasis of the main sub-index traits on the overall EBI

Each €1 gain in a Herds average EBI is worth €1.96 per cow per lactation in terms of net profit. For a 100 cow herd with a €150 EBI over a same sized herd with a €50 EBI average, this would be equivalent to an additional €19,600 profit.

Itinerary

I decided to choose half term week in October as a convenient period to visit Ireland as most spring calvers will have some time to spare before the busy dry off period in November. Also cows will have nearly completed lactations to allow for a discussion on the total yield of milk solids achieved, 6 week calving rate and average SCC etc. It would also prove to be a treat to the

senses driving across Ireland in splendid Autumnal sunshine with the impressive range of colours from falling leaves and the giddy smells of fine Irish manure with the closed spreading period fast approaching at the end of that week!!

Day 1

Larry Hannon - Fullers Court, Co Kildare

A split 200 cow herd of autumn and spring calving producing 6,700 kgs of milk at 520 kg of milk solids per cow, with emphasis on a tight calving block with 86% of the spring block calving within 6 weeks and all cows in the autumn block calving in within 6 weeks. His main selection criteria were for fertility (Calving interval) and milk solids and was very commercial in his approach to breeding. He trusted the EBI and the ICBF (Irish Cattle Breeding Federation) in delivering the type of genetics he wanted in his herd and used the unbiased ICBF Sire Advice software to select and individually mate his cow based on reducing inbreeding using a team average to maximise the EBI of the resulting calf. The herd displayed how suitable the EBI was to breed efficient cows for both a housed winter milk and pasture based milk production systems. The herd made significant genetic gains in the last few years with the 2018 batch of calves meriting €198 which is over €45 over the national average.



Day 2

Kiearan Hearne, Ballinacurra

Home of the 140 cow Curra herd which has bred many grazing type bulls for Genus and Cogent in the UK and also home to the highest EBI herd in Ireland. I was expecting the mentality of the owner to be similar to a pedigree breeder back in the UK. However the reality was contrary to my expectations. The herd is only partially registered with the IHFA (Irish Holstein Friesian Society) and classification is only carried out when request by the breeding company on potential bull mothers. No cow was freeze branded but despite this, Kieran knew the pedigree of

each one. The herd genetic make up is 70% Holstein Friesian 30% Irish Friesian. The 305 day average is 6000 kg of milk at 4.45% Fat and 3.77% Protein. All animals were genomically tested with any high EBI bull calves sold to stud or privately as breeding bulls. Despite the breeding value and EBI status of certain animals, no sexed semen or ET was carried out on farm as this compromised the compact calving season and reduced the potential for a high value high EBI bull calf from a different family of cows. Interestingly one comment Kieran made was that over the years, selection for EBI has resulted in the gestation length to shorten by over a week. Kieran has adapted by pushing the planned start date of calving forward to the second week of February. A team of 12 bulls nominated by the owner is inputted into the ICBF Sire Advice programme with the main breeding focus being milk solids, fertility and an easy care type of cow. One of the most impressive features of the Curra herd was the number of very old cows (10+ lactation cows) remaining in the herd and the EBI of the older cows (cows over 4 lactations). Indeed the average EBI for the 4th lactation cows was double that of the national average at €185 with many individuals having bred some notable bulls within the Irish AI industry. One challenge perhaps facing the Curra herd was finding enough equally high genetic merit bulls to continue increasing the EBI of the younger animals as the rate of genetic gain was slower than that of the national average, with 2018 born calves averaging €199 compared to €152 nationally. The herd left a large impression on me who worked with the sort of Holstein Friesian cow that we aspire to milk in our herd. Kieran has excellent milk records, pedigree information and places emphasis on cow families without compromising the two key breeding objectives of fertility and yield of milk solids. Through private sweeper and AI bull sales, the careful breeding strategy of the Hearne family's herd has had an impact on the wider dairy industry in Ireland and the UK, which must be satisfying as it is rewarding.



(L) Dam to Curra High King available in the UK through Genus (R) Daughter of Pigeonwood RED a sire that had a big impact in the Curra Herd

NextGen Herd, Killworth, Co.Cork

A satellite farm of the Teagasc Moorpark research center, the farm had various groups of cows under different conditions, all grass based. One herd of 85 cows was being milked through a robot under an ABC grazing system whilst another two herds were managed under identical conditions to evaluate the impact of high EBI genetics over animals with the lower National Average EBI. Smaller scale studies are also being undertaken to see the effect of high and low concentrate feeding on the two genotypes. Another trial is evaluating Danish and New Zealand origin pure bred Jerseys. The NextGen herd has generated considerable data and continues to reinforce the work undertaken by ICBF on the development of the EBI. This is an excellent example of industry integration and a model that should be considered for the UK to ensure the £SCI has research and study at a dedicated spring calving research herd to back up any PTA base changes, formulation and weighting of sub indexes. This would allow the geneticists at AHDB to constantly test individual traits of the £SCI and demonstrate the effectiveness of the Index on improving key traits within UK spring calving herds.

	NextGen Herd	National Average EBI herd
EBI	203	104
Submission rate 3 weeks %	92%	86%
6 wk in calf rate	80%	55%
12 wk in calf rate	92%	86%
Cumulative Milk Solids to date Kg/Cow (last week in october 2018)	423	402

(Table 2) Comparison of 2018 herd performance data between the two EBI herds at Killworth Farm

The data from the table above clearly shows how the EBI has an impact on the KPI of the two identically managed herds. As the national herd evolves and increases its EBI, the Kilworth project will continue to look at how a significantly higher EBI animal will perform under different circumstances and various parameters, including climate change, milk markets and government policies.

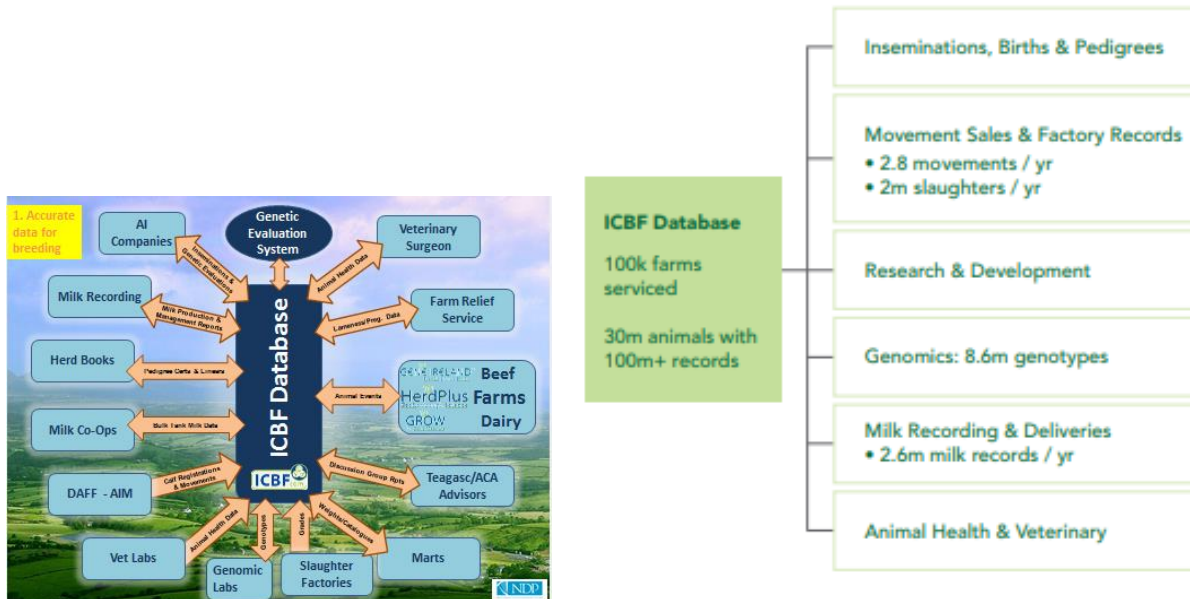


(left) Cow art installation at Moorepark

Day 3

ICBF, Brandon, Co Cork.

My next visit was at the very rurally situated ICBF headquarters in Shinagh, Co.Cork, Lisa Ring from the Genetic Evaluations team, explained how the full integration of data collection from milk recordings, AI companies, slaughterhouses, markets, movements and the various breed societies etc. was evaluated onsite. The centre was home to one of the most powerful and fastest computers in Ireland which was crucial in interpreting raw data into meaningful Indexes and sub-indexes for breeding decisions within Irish dairy and beef herds. Ireland is one of the only countries in the world that can collect large volumes of financial data and link to genetic improvement.



(above) diagrams depicting the source and flow of information to and from ICBF

Female Herd List					Event Details		
FB	Tag Number	DOB	Brd	Sire Dam	EBI	Dry Off Date	Other Events (Mastitis, Lameness, Weights, Dosing etc.)
180	IE123456780180	05/01/03	HO	35E 132			
233	IE123456720233	28/01/04	HO	77 84			
295	IE123456760295	28/02/13	HO	825			
297	IE123456780297	23/02/13	HO	720			
320	IE123456770320	13/03/05	HO	0303 101			
430	IE123456710430	30/01/07	FR	0678 133			
441	IE123456740441	22/02/07	FR	0678 47			
444	IE123456770444	25/02/07	FR	0678 94			
455	IE123456710455	10/03/07	FR	0678 124			
458	IE123456740458	14/03/07	FR	0678 118			
464	IE123456730464	22/03/06	HO				
465	IE123456740465	01/04/06	HO		87		
486	IE123456780486	23/04/07	FR	0678 123			
498	IE123456730498	03/05/07	FR	0678 142			

(above) Bespoke Herdplus pocket booklet pre populated ahead of the calving period

HerdPlus is a service provided by ICBF to manage breeding records and the flow of genetic data between the farmer and ICBF allowing producers to make informed breeding decisions. Dairy producers pay €60 per year along with 50c/cow for a range of services including a detailed herd genetic report including Sire Advice which is a bespoke breeding and mating plan based on EBI and to reduce inbreeding. Another interesting tool that was being developed by ICBF was C.O.W or the Cow's Own Worth - a way to select surplus animals on the potential financial value they would bring to the herd based on their actual performance and EBI.



(above) entrance to ICBF in Co. Cork

Connor Kehler, Rearour, Co. Cork

Was the first of the two crossbred herds I visited during the exchange with a 160 spring calving herd made up of Friesian x Jersey x Norwegian Red blood on a limited grazing platform. Although not as uniform in terms of colour and markings, uniformity in terms of size and strength of the cows along with their excellent body condition was evident and a credit to the Kelleher's considering the growing season. The herd despite being crossbred has managed to significantly increase the EBI over the years with the average EBI being €29 more than that of the national Herd average which is mainly made up of Holstein Friesians. Two of the main standout KPIs of the herd were the high yield of milk solids per cow (528kg) along with excellent fertility (an average calving interval of 367 days, a 6 week calving rate of 87% and a calving season of 10 weeks and 3 days). In addition, the farm grew an average of over 16tDM of grass per hectare in 2017. Connor explained how crucial the type of cow was to aid his grass management contributing to the milk solids output of nearly 1300Kg/Ha being achieved on the farm. His main aim was for a simple profitable system which increased output on a limited cost base whilst allowing him to spend time with his young family. What was interesting listening to Connor was despite the fact the cow was key in his farming philosophy, he was unashamedly frank about his lack of interest in the names of individual sires and their backgrounds. However he was still fully bought in to the use of the EBI and the potential impact of genetics and good breeding which led to his farms impressive solids output and becoming a grassland manager of national recognition.



(above) Part three way crossbreds at Hillcrest Dairy

Day 4

John Kelly, Baltinglass, Co.Wicklow

A new entrant into dairying since 2015 and the abolition of milk quotas in Ireland. This ex Irish Grassland Association sheep and beef monitor farmer invested in a herringbone parlour, dairy and grazing infrastructure to further increase output per hectare. In-calf heifers were sourced from farms across Ireland based on their EBI values which gave John a good base to start. Well established herds with EBI herd summaries were targeted as the source of animals with large batches bought in preparation for the 1st calving season. In comparison, similar new herds in the UK would not have a reliable base of genetic information to source these types of animals reliably. With many new herds in the UK using services of Irish cattle agents to source EBI animals, which unfortunately would likely be surplus lower EBI animals. The Kellys now milk 215 New Zealand and Irish Friesian Jersey crossbreeds that has quickly established itself well above the the national herd in terms of KPI's. The Kelly's herd is a fine example of how the EBI has helped new entrants to quickly establish a functional and profitable dairy enterprise.



(above) In calf R2's on Kale overlooked by the R1's at the Kelly's, Co Wicklow.

Key findings

- Close links between all industry partners - less friction than UK (or so it seems)
- Genetic indexes backed up with focused research at Teagasc
- An index not dictated by big AI companies and topped by foreign bulls with converted proofs
- One system approach as an industry

- EBI held well post quota abolition
- Cull and beef cross calves an important aspect of EBI make up
- Focus always on efficient grass utilisation
- High EBI cows are moderate sized, get in calf easily and have high milk solids
- Possible to breed Black and White cows with Jersey like solids and crossbred like fertility
- Through widespread Genotyping of bull calves, ICBF improving all herds not just EBI focused herds as High EBI sweeper bulls and cheap elite young bulls used almost unknowingly by the more commercially minded farmers
- Lifestyle important to all farmers and that the cow should work for them, not the other way round.

Next steps

My exchange opened my eyes and further reinforced what I suspected we needed to improve on not only on the type of cow but also on how we manage her and the herd as a whole.

1. Tighten the calving block and front load B&W sires

One of the first things that needs to happen is to stop any cows calving to Black and White bulls after the nine weeks - too many females are kept as replacement from these later calving cows furthering their legacy of compromised fertility. Culling of these cows should be considered either as barren cows or sold as fresh calvers during May and June. Not only will this improve the management of fresh and early lactation cows it will also ensure lower fertility is not inherited into the herd.

2. Choose one Index to select bulls - or ensure Indexes are converted as accurately as possible to the index of choice. Use Clarifide genomic interpretation tool to develop a 'Moor Farm Spring Calving Index'.

3. Use selection tools to rank females in the herd - i.e Calving Interval, Total KgMS/Cow, KgMS/KgLW and KgMS/Day. This should replace yardsticks for selection such as Milk Kgs, Classification scores and on who the dam and grand-dam was.

4. Identify an elite group of genomically tested heifer calves from cows with good fertility records and milk solids and track progress against other groups of animals.

5. Incorporate flat rate feeding in the parlour - the current feeding regime of concentrate leads to variability in intakes and on a dry year like this year, lighter and younger animals have not had

their full allocation of dry matter leading to some issues with lower BCS than normal. New parlour feeders to be considered.

Conclusion

The Exchange started off as being an opportunity to look at what sort of cows the EBI was responsible for breeding, however I quickly realised the EBI was a result of much wider Industry integration that was also partly driven by government department policies. The work of Teagasc is also important in facilitating effective research and focused KT, this none more evident than in the quick and effective response by the exchange farms Teagasc advisors in my assistance for which I am very grateful. All farmers along with the institutions that I visited were very open about their farming business and were more than happy to engage in frank and open discussions which is as refreshing to see as it is informative. Without this openness the exchange outcomes would have been achieved. Again this lateral industry co-operation has also been key to the success of the EBI.

It is also very apparent that individual breed societies, the showing circuit and AI companies have much less sway in Ireland compared to the UK, allowing breed development to be focused on feed efficiencies, animal health whilst also being linked to overall farm profit.

Lastly on the high EBI cow herself, she is a no fuss, 550kg moderately sized functional Black & White animal capable of achieving 5000 - 8000kg+ on mainly grass and limited concentrate whilst easily achieving 9% solids. She displays strong early heats and gets back in calf quickly with only one service after transitioning seamlessly from the dry period to early lactation where she holds condition during the often interchangeable weather at turnout. She's a cow you can see over, but not under her with a wide muzzle and deep capacious body which allows for high grass dry matter intakes which leads to efficient conversion of grass to milk. At the same time large volumes of milk is being held hygienically in a functional well attached udder where she goes on to milk out quickly before moving easily and freely back to the grazing paddock. Using her slightly sickled leg set with plenty of flex in the pastern and good depth of heel for excellent locomotion to ensure a lameness free lactation regardless of walking surface. And when she finally does reach the end of her time on the farm, often approaching her tenth lactation, she is still fit and well fleshed enough to further increase profits for her owner's farm.

Acknowledgments

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