

UNDERSTANDING THE DAIRY BEEF INDEX



Modified 11th March 2020
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What is the Dairy Beef Index?

- The Dairy Beef Index (DBI) is a tool to produce quality beef cattle from the dairy herd that have both desirable calving attributes for the dairy herd (i.e., easy calving and short gestation) and valuable carcass merit attributes for the finisher.
- It does this by ranking beef cattle for use in the dairy herd based on their genetic merit for several traits that are important to dairy-beef production systems (i.e., calving and beef traits).

What Does the Dairy Beef Index Select For?

- Easy calving, short gestation, and less calf mortality
- Heavier carcasses of greater conformation and lower fat score
- Cattle that are polled and docile with lower feed intake

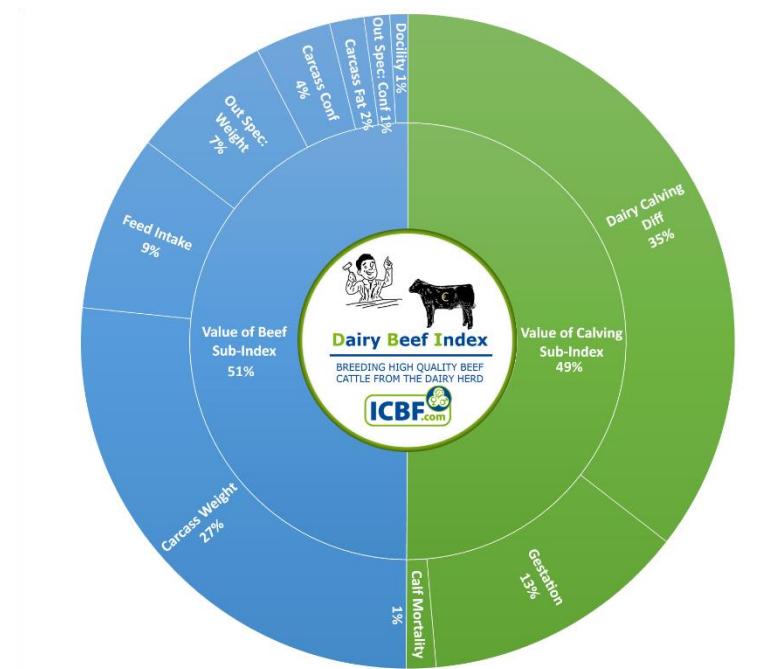


Figure 1. Relative emphasis of traits included in the Dairy Beef Index (Feb 2020). Relative emphasis was calculated using pedigree beef animals born between 2010 and 2020, and weighted by breed usage on dairy dams

Why Use the Dairy Beef Index?

- Using a bull only for his 'easy calving' or 'short gestation' attributes can result in lighter carcasses. However, incorporating several traits simultaneously into selection decisions using an overall index (i.e., the Dairy Beef Index; DBI) can produce more balanced cattle with more favourable economic returns.
- For example, sires that ranked best on calving traits alone (i.e., easy calving, short gestation, and low calf mortality) were compared with sires that ranked best on the DBI (Berry and Ring, 2020). These 2,192 beef sires had farm production records available from 3,065 dairy herds to make comparisons.
- Relative to the best ranked sires on calving traits, the best ranked sires on DBI delivered heavier, more conformed carcasses that had a greater chance of meeting factory specifications for conformation.
- The higher DBI sires achieved the additional performance without increasing the incidence of cow calving difficulty, without increasing gestation length, and without increasing calf mortality.
- The additional revenue to the finisher that slaughtered 20 progeny from sires that ranked best on DBI over sires that ranked best on calving performance, was €829.40. For calving performance, the monetary benefit to the dairy farmer that had 20 calves from high DBI sires compared to sires that ranked best on calving performance was €79.60.

How do I Interpret the Dairy Beef Index?

- The Dairy Beef Index (DBI) is expressed in euros, where a higher euro value is more desirable. For ease of interpretation, the euro value is also presented as stars where 1 star is very poor (i.e., animal ranks among the worst 20% of animals), and 5 stars is very good (i.e., animal ranks among the best 20% of animals).
- Therefore, a bull with a high DBI should pass-on more desirable characteristics to its progeny than a bull with a low DBI. Consequently, progeny from a high DBI bull should generate more revenue than a low DBI bull.
- For example, Bull A has an DBI of €100, while Bull B has an DBI of €143. It is expected that each calf born from Bull B would generate €43 more profit than those from Bull A, through a combination of calving and beef merit attributes. Over a span of 4 years, Bull B should generate €3,440 more revenue than Bull A if he sires 20 calves/year ($\text{€}43 \times 20/\text{calves} \times 4 \text{ years}$).

Understanding PTAs and Reliabilities

To interrogate how an animal's Dairy Beef Index (DBI) is derived and how to use the DBI, it's essential to have a general understanding of PTAs (i.e., genetic merit) and reliabilities.

PTA

- The predicted transmitting ability, or PTA, is the measure of genetic merit used in the DBI. It tells us how much each animal is expected to pass-on to its progeny for any given trait.
- It is estimated using pedigree information, genomic data (where available), and on-farm performance records (e.g., calving and slaughter data) from an animal itself and its relatives.
- The PTA is generally expressed in the same unit as the trait is scored, and relative to a base group of animals.
- The performance of the base group of animals is not intrinsically important to know, as the key skill is being able to use the PTA to differentiate two animals whose PTA varies for the same trait.
- For example, carcass conformation is scored on a 15-point scale, where 1 is P- and 15 is E+. If Bull A has a PTA (for carcass conformation) of -1.5 and Bull B has a PTA of +1.0, we expect the progeny from Bull B will be, on average, 2.5 conformation grades higher than those from Bull A.
- For ease of interpretation, the PTA for most traits in the DBI are also presented as stars where 1 star is very poor (i.e., animal ranks among the worst 20% of all animals), and 5 stars is very good (i.e., animal ranks among the best 20% of all animals)

Reliability

- Reliability is the measure of confidence surrounding the PTA, expressed as a percentage, typically ranging from 15% to 99%, where a higher % is always more desirable.
- A reliability of 30% indicates that animal's PTA is likely to change substantially as more performance records become available.
- A reliability of 90% indicates that animal's PTA is a very realistic reflection of the performance on-farm, and the PTA is unlikely to change sizably when additional performance records become available.

Understanding the Traits in the Dairy Beef Index

Risk of Dairy Heifer Calving Difficulty

- This determines the likelihood that a bull's true incidence of calving difficulty will go above a safe threshold defined for dairy heifers.
- A bull will be either low, moderate, or high risk.
- Bulls categorised as low risk are preferred for use dairy heifers as they have the easiest calving difficulty % (i.e., PTA), and equally as important, their PTA and on-farm incidence of difficulty is unlikely to increase over-time since they have a high reliability for their breed.

Calving Difficulty

- The PTA for calving difficulty indicates the expected incidence of difficult births (considerable/vet assistance) that will ensue due to using a bull on either dairy heifers or dairy cows.
- Easier calving bulls are more desirable; hence, lower PTA values are preferred.
- For example, where a bull has a PTA for calving difficulty of 8% on dairy heifers, approx. 2 out of every 25 calves (i.e., 8/100) born to dairy heifers are expected to require considerable assistance, due to a heavy birth size, for example.

Gestation

- Gestation is the expected number of days between conception (i.e., AI or natural serve event) and birth.
- Bulls that have a shorter gestation are more desirable since the dairy female will return to the milking parlour sooner; hence, bulls with lower PTA values for gestation are preferable.
- For example, if Bull A has a genetic merit (for gestation) of -5 and Bull B has a genetic merit of +1, we expect the progeny from Bull B, on average, to have a 6 day longer gestation period than those from Bull A.

Calf Mortality

- Calf mortality is an indication of the number of expected calf deaths at, or soon after birth.
- Since no calf deaths are optimal, lower PTA values for calf mortality are preferable.

Carcass Weight

- Bulls with a high PTA for carcass weight are expected to produce progeny with a heavier carcass than bulls with lower PTA values for carcass weight.
- For example, if Bull A has a PTA (for carcass weight) of +10 kg and Bull B has a PTA of -5 kg, we expect the progeny from Bull A will, on average, produce progeny that are 15 kg heavier carcass than Bull B.

Carcass Fat and Carcass Conformation

- Carcass fat and conformation are indicators of the fat and conformation grades an animal's

progeny are expected to achieve in the factory.

- The traits are categorised using the EUROP grid which is scored on a 15-point scale, where 1 is 1- and 15 is 5+ for carcass fat, and 1 is P- and 15 is E+ for carcass conformation.
- Bulls with lower PTA values for carcass fat are more desirable, whereas bulls with higher PTA values for carcass conformation are more desirable.
- For example, if Bull A has a PTA for carcass conformation of -1.5 and Bull B has a PTA of +1.0, we expect the progeny from Bull B will be, on average, 2.5 conformation grades higher than those from Bull A.

Out of Spec

- The DBI has two 'out of spec' traits which are an indication of the % of a bull's progeny that are expected not to meet the minimum factory requirements for carcass weight (i.e., at least 280 kg) or carcass conformation (i.e., at least an O-).
- Since economically it is optimal if no cattle fall outside the minimum factory specifications, lower PTA values for both out of spec traits are more desirable.

Feed Intake

- Feed intake is an indication of the expected progeny feed consumption.
- If less feed is required in the diet (e.g., grass, silage, or concentrates) there are less costs on the production system; therefore, bulls with lower PTA values for feed intake are preferable.

Docility

- Docility is an indicator of how quiet or docile a bull's progeny are expected to be.
- Docility is scored by farmers on a scale of 1 to 5 where 1 is a very flighty animal, and 5 is a very quiet animal.
- Therefore, bulls with higher PTA values for docility are more desirable.

Polledness

- Polledness is an indication of whether all, none, or half, a bull's progeny is expected to have horns.
- Polled animals are more desirable since there is no requirement for disbudding, therefore, polled bulls are rewarded in the DBI.

How is the Dairy Beef Index Calculated?

- The PTA for each trait in the Dairy Beef Index is simply multiplied by its respective economic weight (i.e., euro values in equation below). Each trait is then summed together to derive a single monetary value that is expressed in euros.

- Dairy Beef Index =

(Combined Dairy Calving Difficulty PTA * Economic Weight (Figure 2) +
 Gestation PTA * -€7.47 +
 Calf mortality PTA * -€1.73 +
 Feed intake PTA * -€35.17 +
 Docility PTA * €11.71 +
 Carcass weight PTA * €2.37 +
 Carcass conformation PTA * €10.90 +
 Carcass fat PTA * -€5.11 +
 Out of spec: carcass weight PTA * -€1.41 +
 Out of spec: carcass conformation PTA * -€0.81 +
 Polledness * €5.33)

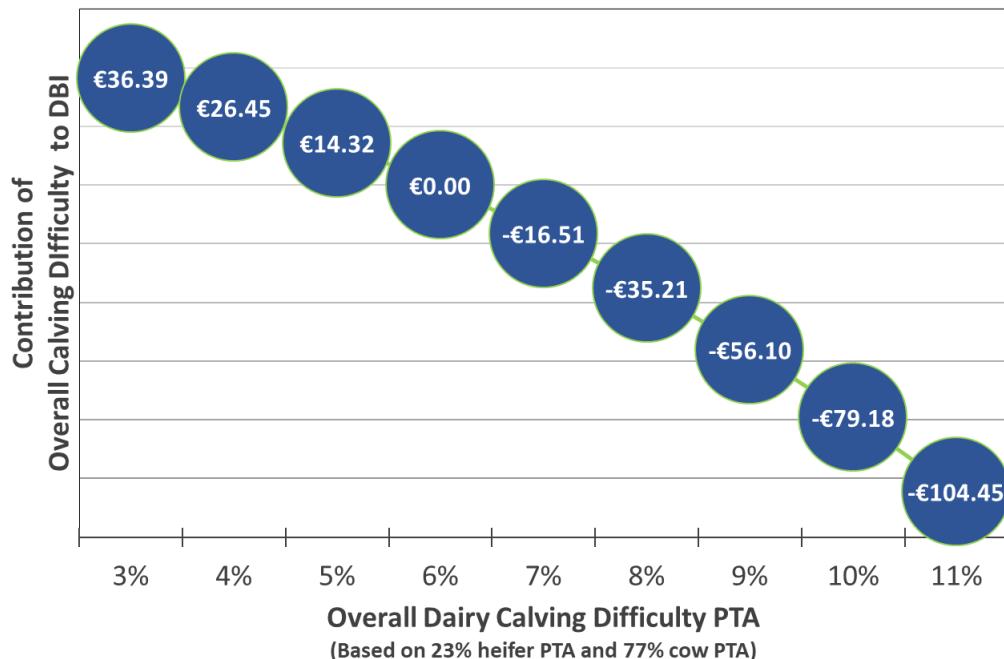


Figure 2. The economic weight of calving difficulty in the Dairy Beef Index penalises harder calving bulls much more severely than easier calving bulls, meaning the more difficult calving a bull is the less likely he is to rank high on the Dairy Beef Index. The economic weight of calving difficulty in the Dairy Beef Index is calculated based on the overall dairy calving difficulty PTA, which is combination of 23% of the dairy heifer PTA and 77% of the dairy cow PTA. For example, a bull with a dairy heifer calving difficulty PTA of 9% and a dairy cow calving difficulty PTA of 4% would have an overall dairy calving difficulty PTA of 5%

$$((9\% \times 0.23) + (4\% \times 0.77)) = 5\%$$

Who Should Use the Dairy Beef Index?

- Dairy farmers that use beef bulls, and
- Beef breeders that target the dairy-beef market for bull sales

Advice for Dairy Farmers

- Maximise the genetic potential of your dairy herd by breeding your best stock to dairy AI
 - Generally, heifers are the most genetically elite animals in a herd; therefore, to maximise the genetic potential of their progeny, use dairy AI, not a beef bull.
 - Poorer, 'problem' cows, of higher SCC, that calve late, or are of lower EBI (Figure 3) should be considered for beef matings, irrespective of whether they are bred in the 1st week or 8th week of the breeding season.

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Economic Breeding Index (EBI)
 Top/Bottom cows - Nov 2019

ICBF.com

TOP 10 COWS ON EBI							
	Jumbo	Lac	Milk	Fert	Calv	Other	EBI
1	588	2	€119	€59	€35	€10	€223
2	929	9	€24	€168	€27	€-1	€218
3	587	2	€82	€98	€31	€4	€215
4	537	2	€86	€58	€52	€3	€199
5	117	7	€33	€134	€13	€17	€197
6	704	1	€95	€60	€43	€-3	€195
7	896	9	€24	€126	€27	€16	€194
8	378	4	€79	€91	€21	€0	€192
9	577	2	€97	€56	€33	€1	€187
10	637	1	€60	€74	€49	€-5	€178

BOTTOM 10 COWS ON EBI							
	Jumbo	Lac	Milk	Fert	Calv	Other	EBI
1	149	6	€-58	€-11	€26	€1	€-42
2	400	4	€40	€-9	€11	€9	€51
3	585	2	€9	€3	€40	€0	€53
4	357	4	€40	€-14	€29	€-1	€53
5	257	5	€70	€-18	€20	€-8	€63
6	552	2	€16	€27	€35	€-13	€66
7	232	5	€-18	€53	€35	€-3	€67
8	536	2	€13	€35	€26	€4	€79
9	270	5	€34	€5	€36	€5	€79
10	273	5	€24	€35	€10	€15	€85

Figure 3. Consider mating some of the bottom cows in your herd ranked on EBI to beef bulls. These can be identified using your EBI report

- To maximise dairy-beef profitability, use beef bulls with the highest Dairy Beef Index.
 - If using beef AI, identify the best bulls from the active bull list; ideally use a team of bulls.
 - If purchasing a stock bull, ask the breeder for the bull's tag and obtain his DBI from the animal search, sales catalogue, or stock bull finder.
- Consider the traits that make up a bull's Dairy Beef Index. On average, 49% of an animal's DBI will come from calving value traits while the remaining 51% will come from beef value traits. That said, where a bull is extremely good on 1 trait (e.g., calving difficulty) almost all its index could come from that trait. With that in mind it's good practice to look at some key traits:

- **Calving Difficulty:** is the expected incidence of difficulty tolerable for your herd and the females being mating? Remember a PTA of 3% on dairy cows is expected to result in considerable assistance in 3 out of 100 dairy cow calvings. Also remember if you are mating cows, you should only consider the dairy cow calving difficulty PTA, not the dairy heifer PTA.
- **Gestation:** shorter gestations are most desirable. However, consider using longer gestation bulls early in the breeding season, provided they excel in other traits.
- **Carcass Merit:** Try to maximise carcass merit, by selecting bulls with the highest PTAs for carcass weight and conformation.

Advice for Beef Breeders

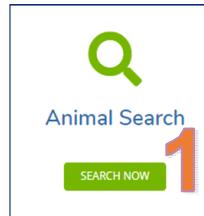
- Use the index that best reflects your system:
 - When selecting sires for the beef herd continue to use either the replacement or terminal index. Use the Replacement Index to generate replacement heifer calves for the beef herd, where all other offspring are destined for slaughter. Use the Terminal Index to generate offspring that are solely destined for slaughter (i.e., no replacements retained).
 - Use the Dairy Beef Index to identify breeding males and females to produce beef bulls for the dairy herd. The DBI of each animal in your herd can be viewed under the Euro-Star Profile or on the Animal Search Tool.
- Remember some of the key traits that make up an animal's Dairy Beef Index:
 - **Calving Difficulty:** Dairy farmers are only concerned with dairy calving difficulty figures, not beef, so this needs to be reflected in selection decisions. A bull that is easy calving on beef cows is not necessarily easy calving on dairy cows.
 - **Gestation:** shorter gestation bulls are most desirable.
 - **Carcass Merit:** Try to maximise carcass merit, by selecting bulls with the highest PTAs for carcass weight and conformation.
- Provide the most up-to date Dairy Beef Index to potential bull buyers

Accessing the Dairy Beef Index

- The Dairy Beef Index is available for all beef animals via the:
 - Animal Search
 - Active Bull List
 - Sales Catalogue
 - Eurostar Profile
 - Stock Bull Finder

Animal Search

1. Go to the Animal Search on www.icbf.com



2. Enter the animal's tag or AI code; press search

ICBF Animal Search

Search By:

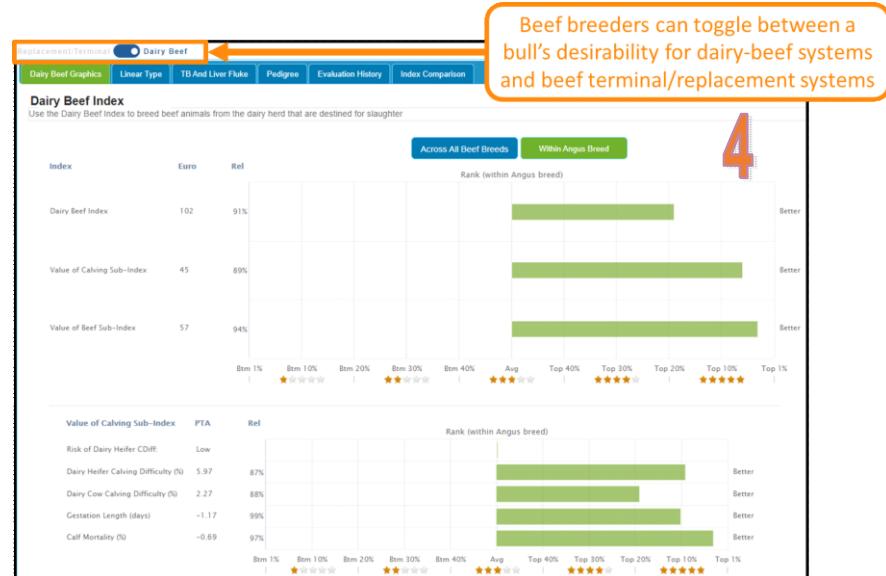
Animal Tag, AI Code, Herd Book Number
 Name or part of name (Males Only)

IE151225390616

3. Choose the Dairy Beef Index; press submit. If this screen is not shown to you, skip to step 4



4. Beef breeders can move between the Dairy Beef Index and Replacement/Terminal Index using the toggle button



Understanding the Dairy Beef Index



Active Bull List

1. Log on to www.icbf.com

2. Scroll down the homepage and select Active Bull Lists

3. Select Dairy Beef Index from the available lists

4. Bulls are ordered based on their desirability for dairy-beef systems. Using the filters, you can reduce the number of bulls available that meet your selection criteria

1

2

3

INDEX	PURPOSE
Economic Breeding Index	To breed cows for the dairy herd
Dairy Beef Index	To breed beef cattle from the dairy herd that are designed for slaughter
Stand-Alone Health Traits	To breed cattle more resistant to TB and liver fluke infection

4

Bull Details		Dairy Beef Index(DBI) Summary				Calving Value Traits				Beef Value Traits				Progeny Records				Semen Details			
Bull	Code	Name	Breed	DBI C %	DBI B %	Calving Ease	Beef C %	Residual	Residual Date	Dairy C %	Dairy C %	Cows	Cows	Offspring	Cows	Offspring	Dairy C %	Cows, Wt.	Age	Assess	Price
1	AQH01	DAUPHIN	AB	180	60	46	114	-1.4	10/08/2019	1.5	1.5	21	15	2.4	81	157	0	Green	High	12	
2	AQH02	ENTREPRENEUR	AB	182	74	36	122	-0.6	10/08/2019	1.1	1.2	29	9	1.9	82	307	4	Green	High	10	
3	AQH03	CEASAR	AB	148	69	31	124	0.3	10/08/2019	1.4	1.4	24	8	2.2	82	112	11	Green	High	14	
4	M0001	LA BAN	SH	144	83	46	89	-1.0	Low	9.3	1.9	29	8	1.2	1.2	141	485	Yellow	High	10	
5	LE001	ENDEAVOUR	CF	140	91	4	145	0.0	10/08/2019	1.1	1.2	21	2	2.5	81	216	687	Green	High	10	
6	EP1	DU FORTGUE PLANTUR	SH	133	63	-11	144	-1.4	10/08/2019	1.4	18	11	2.3	81	2185	3559	Green	Medium	30		
7	EP2	DAISY DOWMOUNT	SH	131	83	-42	173	-1.5	10/08/2019	1.1	1.1	34	7	3.1	81	111	695	Green	Medium	14	
8	AB1	ROSE ALICE (BT)	SH	127	68	-46	172	-0.7	10/08/2019	1.4	16	7	3.0	81	274	3570	Yellow	Low	10		

Last Modified: 11 March 2020

Sales Catalogue

1. The Dairy Beef Index is not presented at the start of the catalogue. You must move to the end of the catalogue (approximately last 3rd of the catalogue)
2. The Dairy Beef Index and key traits are provided for each bull at the sale; 3 bulls per page are presented. To compare a bull on key traits against his breed or other breeds use the breed averages box (highlighted in green below)



Dairy-Beef Index and Key Profit Traits							
		Evaluation Date: Jan 2020		Next Evaluation Date: 24-Mar-2020			
	Dairy Beef Index	Calving Value SI	Beef Value SI	Gestation	Dairy Heifer CDiff	Dairy Cow CDiff	Carcass Weight
All Breed Average	€35.44	-€49.05	€89.79	+2.65 days	12.88%	6.08%	16.39kg
Angus Breed Average	€61.37	€19.95	€42.49	+0.35 days	8.73%	2.92%	5.98kg

Lot 2 LANIGAN RED DEEP CANYON ET ZLL							
Breed	Angus						
Birthdate	18-Nov-2007						
Sire	AA948971 (Red Leachman Grand Canyon);						
Dam	AA1297723 (Red Bar Mm Annie 51r);						
GENOTYPED 							
Dairy Beef Index	Dairy Beef Index €102 (Rel:91%)	Calving Value SI €45 (Rel:89%)	Beef Value SI €57 (Rel:94%)				
Calving Traits	Gestation -1.2 days (Rel:99%)	Dairy Cow CDiff +2.3% (Rel:88%)	Risk of Dairy Heifer CDiff Low	Dairy Heifer CDiff +6% (Rel:87%)			
Beef Traits	Carcass Weight +12.8kg (Rel:99%)	Carcass Conformation +0.87 (Rel:99%)					
Additional Information							

Compare bull against breed averages

Dairy Beef Index & Sub-indexes

Key Dairy Beef Index Traits

Eurostar Profile

1. Log on to www.icbf.com

2. Select Log In from the home screen

3. Enter your username and password. Your username is your herd number. If you cannot remember your password:
 - i. Text the word PASS to 089 4577663 to receive your password. NOTE: Your mobile number needs to be stored on our database for this system to work
 - ii. Email Support (query@icbf.com)
 - iii. Call us on 023-8820452 during office hours (Mon-Fri, 9am – 5.30pm)

4. From the toolbar select “View Profiles” and the “Euro-Star”

5. The Dairy Beef Index is presented as the 3 last columns in the profile. To view more information for an animal, click on the animal’s tag and use the toggle button to see the Dairy Beef Index Traits

1

2

3

4

5

Jumbo	Animal Number	Breed	Birth Date	Sex	Calves	Dam	Sire	Genetic Eink	Index	Replacement Index			Terminal Index			Dairy Beef Index		
										Euro Star	Within Breed	Euro Star	Within Breed	Euro Star	Within Breed	Euro Star	Within Breed	Euro Star
3706	37212200040050	HO (HPLAA) (HPL)	10-MAR-19	F	0	37212200040050	MISSING SIRE	No										
3724	37212200000000	HO (HPLAA) (HPL)	10-MAR-19	F	0	37212200000000	MISSING SIRE	No										
3744	37212200000000	AH (HPL/HPL) (HPL)	21-MAR-19	F	0	37212200000000	MISSING SIRE	No										
3745	37211871000100	CH (HPL/LM) (HPL)	27-FEB-19	M	0	37211871000100	FIZ	No	101	*****	133	*****	32	*****	32	*****	32	
3753	37211871000100	BB (HPL/LM) (HPL)	26-APR-19	M	0	37211871000100	FIZ	No	101	*****	119	*****	43	*****	43	*****	43	
4746	37211871000100	AB (HPL/HPL) (HPL)	19-MAR-19	M	0	37211871000100	ZLT	No	100	*****	83	*****	100	*****	100	*****	100	
4750	37211871000100	AU (HPL/LM) (HPL)	21-JAN-20	M	0	37211871000100	AU4000	No	100	*****	123	*****	50	*****	50	*****	50	
4757	37211871000100	OB (HPL/B) (HPL)	24-MAR-19	M	0	37211871000100	LB0000	No	101	*****	119	*****	61	*****	61	*****	61	
4748	37211871000100	AA (HPL/LM) (HPL)	25-MAR-19	M	0	37211871000100	ZLT	No	103	*****	72	*****	34	*****	34	*****	34	
4759	37211871000100	LM (HPL/HPL) (HPL)	07-JAN-20	M	0	37211871000100	37211871000100	No	76	*****	119	*****	54	*****	54	*****	54	
LM44	37211871000100	LM (HPL/HPL) (HPL)	02-MAR-19	M	0	37211871000100	LM4000	Yes	80	*****	127	*****	100	*****	100	*****	100	
LM45	37211871000100	LM (HPL/HPL) (HPL)	20-MAR-19	M	0	37211871000100	LM4000	Yes	77	*****	123	*****	62	*****	62	*****	62	
LM47	37211871000100	LM (HPL/HPL) (HPL)	04-APR-19	M	0	37211871000100	LM4000	Yes	118	*****	131	*****	39	*****	39	*****	39	
LM48	37211871000100	LM (HPL/HPL) (HPL)	02-AUG-19	M	0	37211871000100	LM4000	No	101	*****	123	*****	50	*****	50	*****	50	