

IRISH CATTLE BREEDING FEDERATION

Love Meat Tender



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Background



Species Breeding: Be

234 - Phenotypic and Genetic An Presenting Author: Francis K

Conclusions

- Meat eating quality as assessed by trained scorers exhibits additive genetic variation
- No significant differences between breeds based on current small dataset
- Potential useful relationships with traits collected routinely e.g. temperament and pH at factory post slaughter
- No indication yet of major genes at play
- Need to collect larger volumes of data and run validation studies with consumers to confirm results

O Irish Cattle Breeding Federation Soc Ltd 2013

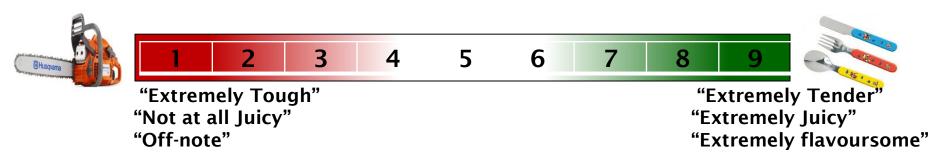




Background

Meat Tasting Phenotypes

3 phenotypes: **Tenderness**, **Juiciness**, & **Flavour** - Scored 1 to 9



Meat Tasting Protocol

Longissimus thoracis muscle from right side of each carcass 2.5cm steaks which were thawed at 4°C at 24 hours before analysis Grilled to a 'medium' cooking finish, allowed to rest for two minutes



- · Eolas International, Co. Cork
- · 7-10 trained panellists
- · http://www.eolasinternational.com



What's new?

- Meat Eating Quality (MEQ) phenotypes collected
 - Tully test station
 - WCGALP 2014 ~ 500 animals
 - ICAR 2016 ~1.500 animals

What's been investigated?

- New Variance Components
- Estimation of EBVs and Reliabilities
- Breeds and Bulls
- EBV Validation



New Variance Components

 Across-breed model using repeated records (date of tasting & scorer)

	Ireland International		
	2014	2016	
Tenderness	0.27	0.24	0.22
Juiciness	0.07	0.09	0.17
Flavour	0.16	0.13	0.10

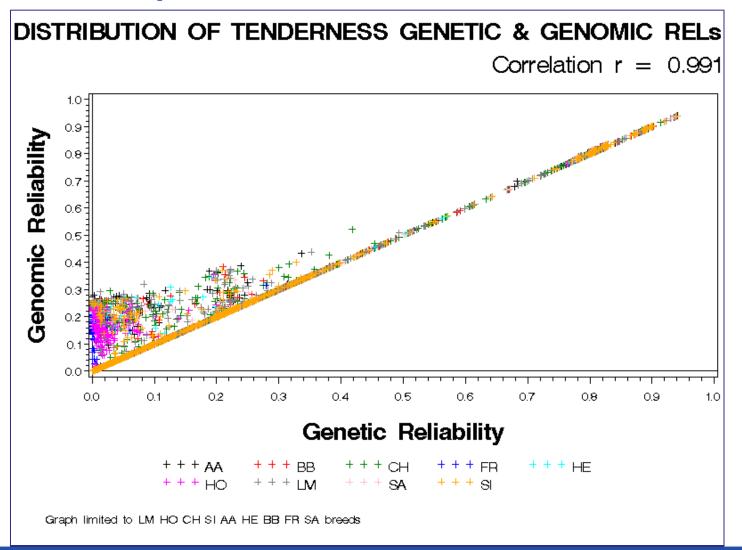


Data for EBV estimation

- MEQ data
 - 1,513 animals finished in Tully test station
 - Slaughtered from 09/2013 to present
- Across-breed model
 - Correcting for breed composition (AA, BB, FR, HE, HO, LM, SA & SI)
- 2 types of evaluations / EBVs
 - Genetic evaluation using pedigree relationship matrix
 - 1-step genomic evaluation
 - · 2,770 animals genotyped (1,244 with phenotypes)
 - MiX99 (Luke, Finland)



Genetic / Genomic Evaluations





Breeds and Bulls

TENDERNESS EBV BY A.I. SIRES BREED

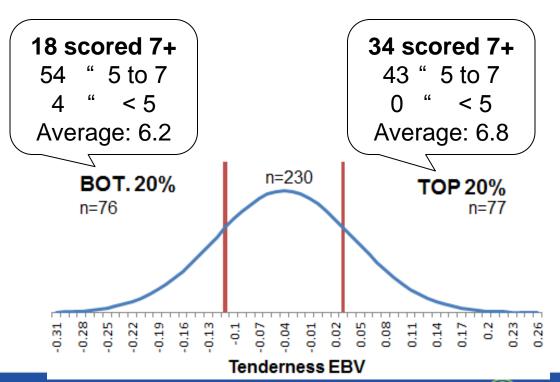
Top Romantic A.I. bulls in Ireland: Best for Tenderne

			Birth
Breed	International ID	Name	year
Angus	AANIRLM121657620895	LISDUFF DANDY K895	2010
Belgian Blue	BBLBELM000455716400	KUBITUS DE BRAY	2009
Charolais	CHAFRAM008130562111	ULRICH	2003
Hereford	HERGBRM700495200634	DENDOR 1 KOHINOOR PP	2012
Limousine	LIMFRAM003615030964	ROCKY	2000
Salers	SALFRAM001998004082	CORLURGAN OURSON	1998
Simmental	SIMAUTM000276570944	ENFIELD HURRICANE HUGO	1988
—0.6 ⊤∟ Graph limit	HE BB AA ed to 1040 A.I. sires of AA, BB, CH, HE, LM, SA	LM CH SA	SI



Lab Validation

- Validation on 383 animals (142 steers + 241 bulls) slaughtered on consecutive dates
- Evaluations ran on 1,513 validation animals



Validation for Tenderness				
Genetic Genomic				
Accuracy	0.31	0.31		
Bias	1.02	1.24		
Accuracy: r(ŷ,y) / h Bias: b(ŷ,y)				

Consumer Validation

IRISH FARMERS JOURNAL MEMORY 23 July 2016

Breeding better beef

The ICBF puts eating-quality index to the test

to the test at BEFF2016 last week and the n

In quite case to larger who chemics insportant persons in the foed in durry reality to the continues. It is on a supermarker shall on or Michalin Surr menu, hexping the or the remnance's perfections. cracial for chawell-being of eve vell in heef production, valling consumer desires a

d'ver our production divisions ets tend materia small, nous a délescais ests, which is the driets action compression limits. In adnary are will kny in pay more h turn contain breeds, hence breed

ng than the potential to further letido, he gap between productrized customer. Generic selection for mean outing positivy is now a multiny. The ICBF, in cal-taleostation with Tragger Astronom, has bruckquetta benteating quality breeding nder, The index is learned on measuring

testicible bed'esting-quality train.

A haritable mit is one that it passed from a parent to offspring - the more rom a parezz so compring - coe more contactifie the craix, the move is can be af-lected by beneding. There are three main near carting-quality main, sendement, pictrems and flavour. Herica billity for heur icquire good when compared with other constant, parks (Figure 1).

Series production and slengther proce-ph were followed (held sized by Slency Books International) to ensure that re-volutiveers not showed through manage-

rate each united. A number were sen: or sensors analysis by crained cascing

resided between samples and the mans stated as a small state of the mans stated as a smaller state of the mans stated as a smaller state of the small state of the smaller stated as a smaller state of the smaller stated as a smaller state of the smaller stated as a smaller state of the smaller state of well on the mean enting quality index is antificed in Table is nonemingly, not use single heard is on preferring a mocher sty. is termed of meetic appolity so the Milithia

his might rome as a surprise to those of the opinion that maditional breeds produce a better-quality mark. However, med-driven beef cases and units presigned on each transfer in based as worth from to prescrip

* Key points

tedes for been entire researchy. 2 Data Vary LEGG halfs, led at Tally 2 Tested on ICI companyors at DEEP

2018. Given here steak samples, one from a high- and one from a lowindex animal.

If Asked to Identify high setting quali 2 79% particity liberated the high index outing quality beet

arms, such as the USA. lage blive of her which is only these entire quality of ence do not always manifest themselves here. Based on the results, each animal was assigned an economic breeding subset (1996) the enacy could be the revenue.

gomed to one died to all plans. The next roop is to accipt a menerary what to each unit on the beef eacing-quality index in other words, discussions the financial gain, if any from beveling produce, data force is pose hold to record and data for high equality sheet. The latest process and the process of the latest proces

Consumers were offered two pieces of rough both from heilfy of the same bened har one from a ball belonging to a high heef-quality generic line and the other from a ball storing lower in surne of

not weak that it is a first of the control of the c

Increasingly within the Aberdees ery beend there appears to be unimals. Augus companion or Groups, all seves or produce heef of high-soring quality: become agreed with the beef quality index and filterative animals whose mean is of a subsets selecting the infaronists, which shows that which the supposed ground up to be proposed ground as bord broad since is look highly and lew-coality borf-producing animals.

Removaber that these bull-sweet trivel and slaugharred under similar condi-tions and were of similar queues dearcase. grades - and difference is paintly down



Bable 9: Too III sizes for most various sual by

Breed	Hamo	Code	Owner
66	Reeburn Lord Recket	PRVD:	Dayse
84.	Kilmaney Bruse	HCE.	Deves
0.0	Villabilum Crigins	YMP	Deves
E 8	Fistor	FNE	Notic
HE.	Gaulding Foll Seperauty	GES.	HCBC
UMI	Difty Flieg	072	HCDC
PE	cardridge	cita	Notice
SA	Danaparte	728	NCBC
5#	Crewge Olco	629	Deves
h i	Description of the Library Colleges	Delta de L	Steen ware

Albert down it all manua? Trials contracted in uper De Soephen Councy ups that in the furare these may be possedable proces-tom to curwant higher-quality curs for

more becaring nurious.
"The halp grail is a levicarily where a frager or contamer pays more formers from an unimal with reperior excisoquality genetics and subsequently fami-ers are paid a premium for producing that animal. It present, there are premiand based on genetics (breed), but this work is much more accurate and up to late? be with

den value for heef quality, inst are for calving difficulty or milk yield. The question will then be whether the read: its immerperatured into an animal's everall sension linder value.

severall terminal indervolus. "For that no happer, there will have on be a nomerany gain for the lanner in it. Whether that happers will obstrainly depend on how the index develops – we have upon an leady security in transit the plan is for a soul of types to be remaid.

Who, it must be pushed and marketed, comedy. There's a bit to youyer, less it's extensibly promising so fair," he con-

Rable 2: ICST consumer faciling session, Teacage Change SECT 2016, 5 July 2016

Pair	high eating quality steak		Law eating-quality steak		"1441"			
	Breed	Tag No.	686	Breed	Tag No.	684	High EBV	Lone EBV
1	90	176	3.3	00	402	10.3	5	2
	64	77	3.6	04	967	-0.0		- 1
3	01	305	2.6	- 01	943	-9.6	5	2
+	LM	100	2.8	LM	465	14.0	7	0
6	LM	190	7.6	LM	414	-0.9	+	
	LM.	537	2.2	LM.	954	15.6		1
7	SA	192	1.7	SA	191	156	7	0
Pr.	AA	291	2.3	AA	224	48.4	7	D
9	90	301	2.6	0.0	412	0.0	- 3	4
10	-01	966	3.0	-01	536	13.0	5	. 3
ti	64	193	2.2	CH	680	42.5		+
12	LM	366	2.4	LM	947	1.0	5.	- 3
10	LM	317	2.2	LM	240	10.5	6	2
14	56	647	-0.8	56	644	-67		- 1
			2.4			-2.5	75	26

*Key points

- The ICBF has developed a genetic index for beef eating-quality.
- Data from 1,200 bulls fed at Tully progeny-testing centre used to develop index.
- Tested on 101 consumers at BEEF 2016. Given two steak samples, one from a high- and one from a lowindex animal.
- Asked to identify high eating-quality index beef.
- ⇒75% correctly identified the highindex eating quality beef.



Conclusion

- Encouraging results!
 - Data collection is growing
 - Major topic for the industry: Pilot EBVs are well looked at
 - Validation work starting to back EBVs up
- More to do!
 - Focus on more routinely available predictors (pH, shear force, imagery...)
 - Explore major genes roles (CAPN1, CAST, MYO)



Full Steam Ahead

- Meat Technologie Center (est. Oct 2016)
 - Industry and Industry Ireland funded initiative
 - All aspects of meat: grading, safety, consumer...
 - Work packages on genetic and genomic for MEQ
- Need for international sharing
 - data, standards... through ICAR/Interbeef
- Explore full potential of MEQ traits
 - In time, include MEQ traits as part of indexes in Ireland
 - Using genotypes, provide MEQ predictions to industry



Love Meat Tender

Love meat blue!













Thanks for your attention.