Tully Progeny Test Centre

PJ Hegarty

Tully Test Centre, Kildare Town

Role of Tully is to collect data on the
traits that are not easily recorded.

1. Feed Intake
2. Meat Quality
   a) Muscle and Fat Depth
   b) Intramuscular Fat
3. Methane Emissions

G€N€ IR€LAND progeny test program

- **Background:** Progeny testing allows for increased accuracy in genetic evaluations.

- **Aim:** Collect information on commercial progeny from AI sires.

- Selection Process:
  - ICBF Database: G€N€ IR€LAND AI sires (15-20 progeny), Sire & MGS recorded, age & gender (bulls, steers & heifers)
  - On-Farm: Parentage verification, weight & health.

- Aim is to slaughter 650 progeny per annum.

Tully Performance Test

All commercial progeny of AI sires – DNA verified

2431 (1299 bulls, 810 steers & 322 heifers) animals finished at Tully test station.

Slaughtered from 2013 to present

ICBF.com

Data capture

Animals spend 120 days at the center

Capture hard to record and expensive traits for genetic indexes and industry

Tully Performance Test.

- ## Acclimatisation period: (30 days)

  - Vaccination IBR, BVD, RSV, PI3, Blackleg & other clostridia diseases.

- ## Diet

  - Bulls (ad-lib concentrates); Steers and Heifers (8kg concentrates & 5kg hay freshweight)

- ## Performance test measures (90 day testing period).

  - Average daily gain (kg/day), Feed conversion efficiency (DMI/ADG), Linear Scores, Scanned muscle and fat depth and intramuscular fat (mm) & Scrotal circumference(cm)

- ## Health & disease traits.

  - Recording lameness, genetic defects, pneumonia and other illnesses.

- ## Genomics.

  - Genotyped using customised chip. All progeny are sire verified.

- ## Age at slaughter

  - Bulls (15-18 months), Steers (17-23 months of age), Heifers (15-20 months)

Feed intake data

- Insentec is used to collect feed intake data at Tully

Tully commercial progeny results

Index	Num	Index	Swt	Ewt	ADG	DMI/day	Cwt	KO%	Cut kg	VHV cuts	Tender
5 Star	280	€112	488	691	2.14	12.04	414	60	336.1	27.4	6
4 Star	140	€88	491	697	2.16	12.66	411	59	329.3	27	5.7
3 Star	89	€74	484	689	2.15	13.08	399	58	321	26	5.7
2 Star	73	€56	484	689	2.15	13.58	393	57	316.5	25.7	5.8
1 Star	46	€34	481	681	2	14.02	382	56	298.6	24.4	5.8

* Based on Terminal Index of the animals as weanlings

❖ Performance of 628 young bulls, from G€N€ IR€LAND AI sires.

❖ ***Delivering*** *~€90 more profit/progeny through better carcass performance & better feed efficiency .*

❖ *Additional benefits of more meat cuts*

Expansion

- Additional 38 insentec troughs installed. 5 new GreenFeed boxes to add to the 2 already in Tully

- Increase capacity – 180 more animals (650 per year)

Research projects

Meat Technology Ireland: To identify and boost the production of superior eating quality, high-value, red meat yields nationally through economically and environmentally sustainable cattle breeding programs. 7000 animals over 30 months.

RumenPredict: To enhance our understanding of the role of diet, host genetics, feed efficiency and rumen microbiome on environmental outputs. Also, to discover DNA based biomarkers that can be integrated into the genomics selection breeding programme for the selection of cattle with a rumen microbiome that facilitates greater feed efficiency and lower environmental footprint

**Master:** Extension of RumenPredict with more international collaboration.

GreenBreed: Quantify the relationship between genetic merit for feed intake measured on growing animals indoors with feed intake at grass by deeply phenotyping a carefully selected cohort of very informative commercial beef animals. Phenotype up to 2,000 growing beef (-dairy cross) cattle (and some adult cows) for methane emissions indoors including some of the animals phenotyped on grass.

Dairybeef: Collaborating with Teagasc, ABP and other stakeholders to collect valuable data on beef from the Dairy herd and Dairy bulls and steers. (45% progeny will be from Dairy dams in 2019)

Meat Eating Quality

- Objective: Increase the mean genetic merit of the national herd for meat eating quality and red meat yield.

- Meat Technology Ireland
    - Collect data on 7000 animals over 30 months.
    - 20 animals from each AI sire of interest.
    - Bulls, Steers and Heifers (Beef and Dairy bred animals).
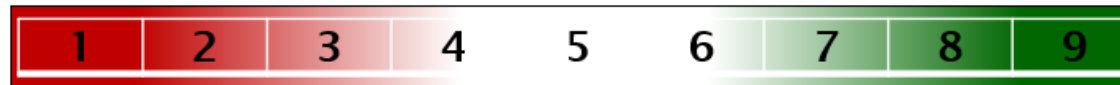
Heritability for eating quality traits:
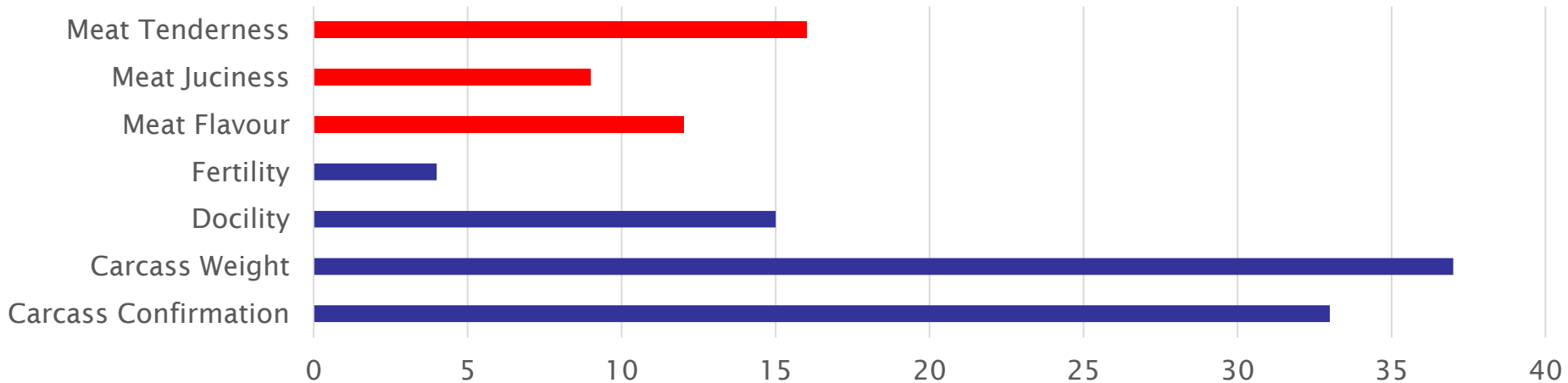
Collecting meat eating quality data

- All animals are slaughtered in the same abattoir.

  - Steaks are obtained from the striploin

- Sensory Evaluation.

  Trained panellists (Teagasc Ashtown)

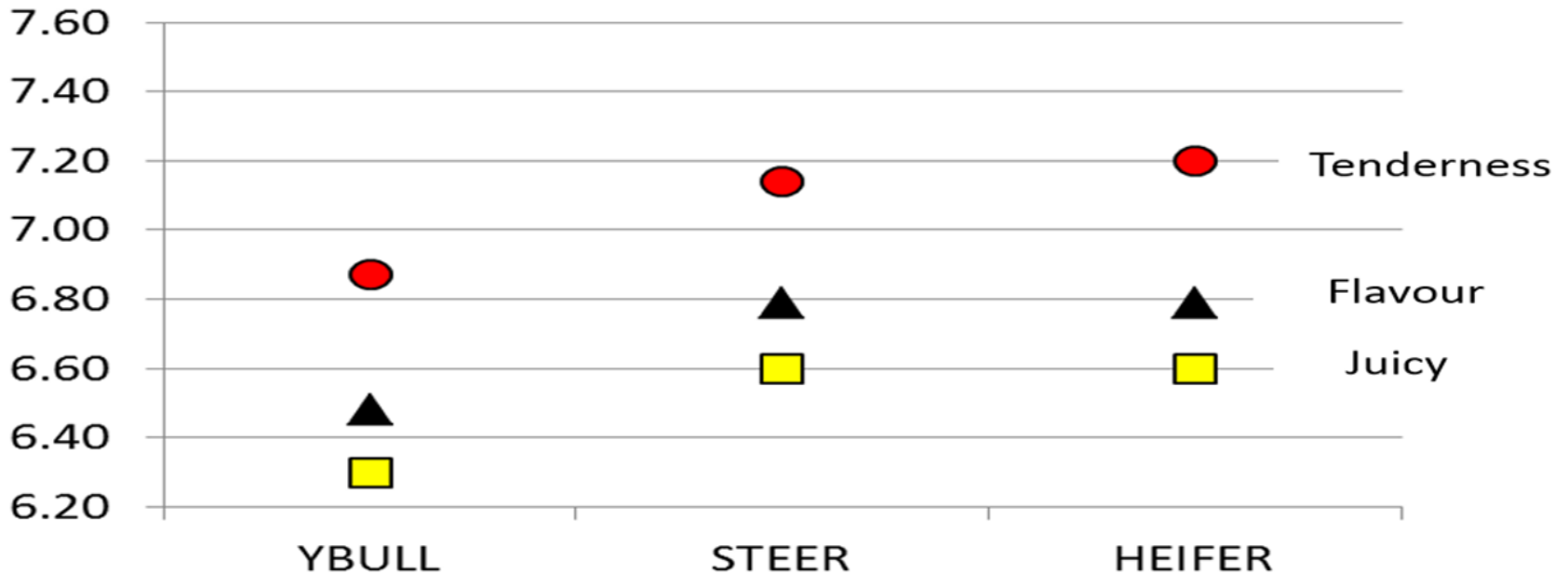 Tenderness, Juiciness and Flavour.

- Additional meat eating quality predictors

  - Ultrasound scanning (Live animal measurement).

  - pH.

  - Visual marbling of the loin.

  - Loin and eye muscle measurements.

Results to date

Future work:

- Publish a genetic index for meat eating quality.
- Identify the best sires for meat eating quality to use in the breeding program.

GreenBreed

- Overall objective is to develop, validate and deploy the necessary tools and optimal strategies to achieve sustainable and quantifiable genetic gain in environmental and economic efficiency in dairy, beef and sheep. The project is a collaboration between, Teagasc, ICBF, UCD, CIT, WIT and industry partners.

- In Beef were looking at direct measures of animal efficiency (methane output, feed intake)

Role of Tully:

1. Quantify the relationship between genetic merit for feed intake measured on growing animals indoors with feed intake at grass by deeply phenotyping a carefully selected cohort of very informative commercial beef animals.

2. Phenotype up to 2,000 growing beef (-dairy cross) cattle (and some adult cows) for methane emissions indoors including some of the animals phenotyped on grass.

Methane

- Methane production occurs in the stomach and is a natural by-product of the fermentation process
  - GWP of 25 times that of CO_2
  - Livestock produce 40% of global methane

- A group of rumen microbes, known as methanogens, produce methane
- Methane production captures 2-12% of the gross energy intake of feed.
- Therefore, methane production results in less energy available for production (growth, milk production, etc.)
- Diet, feed intake, genetics all influence methane production!!!

GreenFeed System

- Estimates individual animal methane emissions
- GF identifies individual animals via RFID tag when animal uses feeder
- ~30 grams of feed dropped every 30s for 3 minutes (max 6 drops of feed)
- Animal emits methane in breath and estimated in-between feed drops
- Fan extracts emissions and passes air by sensor
- Sensor determines amount of methane expelled by animal
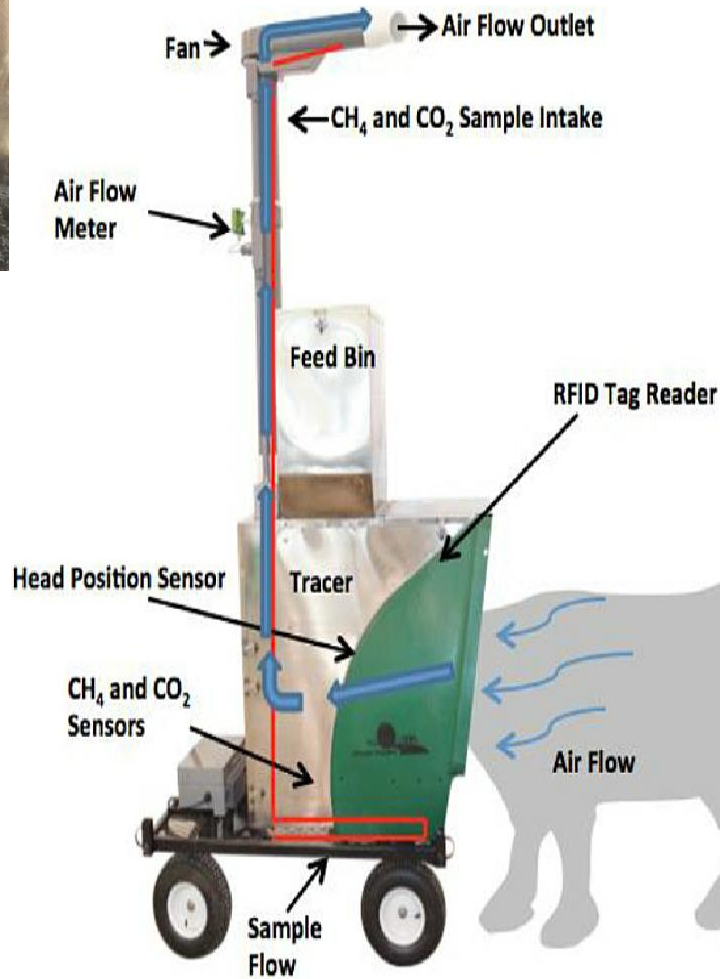- Animal feed periods spread across day

Gate to allow single animal access

Feed drop

Calibrating machine

Air Flow Outlet

Fan →

← CH$_4$ and CO$_2$ Sample Intake

Air Flow Meter →

Feed Bin

RFID Tag Reader

Head Position Sensor

Tracer

CH$_4$ and CO$_2$ Sensors

Air Flow

Sample Flow

Methane results

Group	CH4 (g/d)	SD CH4 (g/d)	CO2 (g/d)	SD CO2 (g/d)	Number of Visits	Intake	Initial Weight (kg)	CH4 g/BW kg
Low	166	61	8982	1552	65	21.22	491	0.34
High	217	70	10047	1704	70	24.79	521	0.42
Diff %	23.3%		14.1%		6.8%	14.4%	5.8%	17.2%
Diff actual	51		1065		5	3.57	30	0.08

- 17% difference in methane emission's - Limousin sired animals between top third and bottom third

- RumenPredict, Master and GreenBreed projects will allow us to collect methane data on all

ICBF.com

Summary

- Increase reliability on key traits for sires of interest in order to identify elite sires that produce progeny with:

  - Desirable carcass characteristics to meet market requirements
  - Efficient users of feed
  - Excellent meat eating quality attributes
  - Reduced methane output

Tully Video