afbi AGRI-FOOD & BIOSCIENCES INSTITUTE

AgriSearch NI
Driving Excellence & Innovation

cafre
College of Agriculture, Food & Rural Enterprise

LMC
Livestock & Meat Commission

Future Proofing Beef Farming

FINISHING BEEF CATTLE ROADSHOW

Tuesday 10th September at 7pm
BALLYMENA LIVESTOCK MARKET

Thursday 12th September at 7pm
MARKETHILL LIVESTOCK MARKET

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FORWARD

On behalf of AFBI, it is a great pleasure to welcome you to the joint AFBI, AgriSearch, LMC and CAFRE 'Finishing Beef' event.

At this event leading scientists from AFBI alongside experts from CAFRE will outline the latest scientific developments and practical advice related to delivering high quality beef efficiently.

This event is taking place at a time of unprecedented change and challenge. On a global scale, challenges include increased food demand to meet the needs of an increasing world population, climate change, and associated pressure on land and water resources. Locally, challenges being faced by the Northern Ireland beef sector are many and diverse.

These include:

* Uncertainty associated with the UK's exit from the European Union
* Volatility in prices and profitability
* Sub-optimum suckler herd performance
* Bovine tuberculosis and new and emerging cattle diseases
* Antimicrobial resistance and future limitations on antibiotic usage
* Need to optimise grassland management and productivity
* Need to reduce phosphorus, ammonia and greenhouse gas emissions to protect and improve the environment
* Increasing competition from other food protein options
* Concerns about animal welfare
* Increasing retailer and consumer pressure
* Succession and shortage of skilled labour

While some of these challenges are outside of our control, the development of robust production systems can help ensure that farm businesses are more resilient to these outside pressures. Nevertheless, many of the challenges can be controlled, or mitigated in part, through the application of research findings and improved management strategies on farms.

The efficient production of beef in an environmentally responsible manner continues to be of vital importance to the industry. Livestock must be able genetically and through management thrive and deliver the beef product the consumer demands. Therefore the primary objective of this 'Finishing Beef' event' event is to share the latest research knowledge and developments in innovation for beef systems. The specific topics being discussed at the event include: Beef markets and consumer attitudes; Livestock nutrition and diets; Animal health – Planning for housing; Flooring system for livestock housing; Maximising meat quality.

This booklet provides a copy of each of the talks presented during the event and I would encourage you to discuss the topics with AFBI, AgriSearch, LMC and CAFRE staff.

Research undertaken by AFBI would not be possible without the financial support from DAERA, industry levy through AgriSearch, EU grant funding, and a wide range of other funders. Their support is gratefully acknowledged.

Finally, I would like to thank Ballymena and Markethill Livestock Markets for the use of their excellent facilities; and the CAFRE, LMC, AFBI and AgriSearch staff who have worked tirelessly to deliver this event for this beef industry.

Dr Steven Morrison (Head of AFBI Agriculture Branch)

Supplying what the Market Wants

Colin Smith & Seamus McMenamin

Livestock and Meat Commission

Cattle Production NI (December 2018 figures)

- Suckler cows: 245,100 -5%
- Dairy cows 309,000 -1%
- Beef Heifers in calf 45,400 n/c
- 2 years + 104,200 +5%
- Total Population 1,581,600 -3%
- <6 months 200,500 -4%
- 1-2 years 350,900 -2 %
- 6 mths-1 year 266,800 -5%

Where is the end market for NI Beef?

- GB/NI market takes 80% of beef processed in NI
- Mostly for high value retail and foodservice markets
- Remaining 20% is exported to the EU market
- EU market provides an important carcase balancing function

Approx 460,000 cattle for slaughter

approx 450,000 killed locally (98% total output)

80%

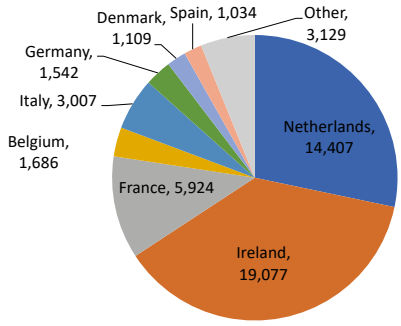
GB and NI market)

20%

approx 10,000 exported live (2%)

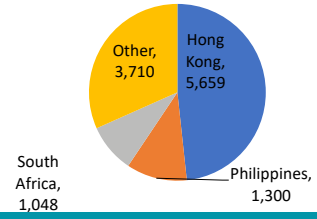
Breakdown of UK Beef Exports January-June 2019

UK Beef Exports 62,632 tonnes



50,915 tonnes
+1,143 tonnes
+2.3%

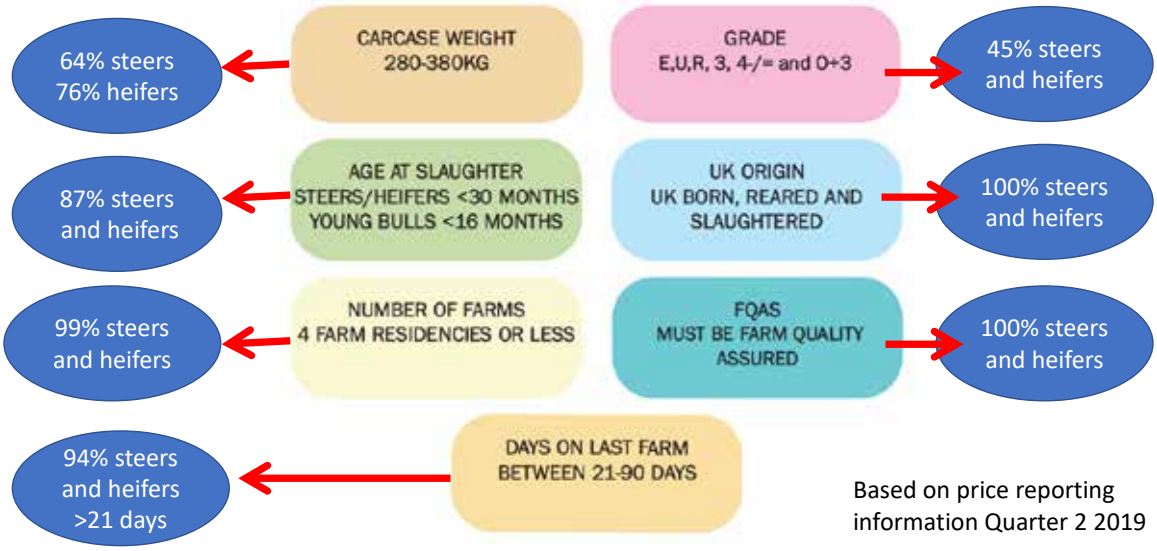
81%
(88% in 2018)



11,717 tonnes
+4,964 tonnes
+73%

19%
(12% in 2018)

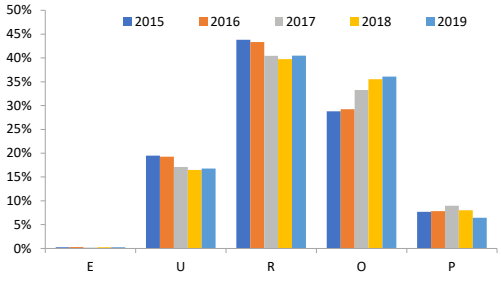
Maximise returns by meeting market specifications



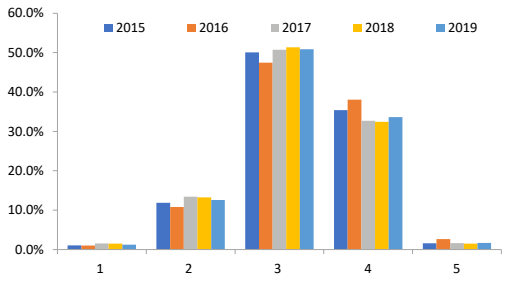
Based on price reporting information Quarter 2 2019

Producing what the markets want… (Quarter 2)

Confirmation

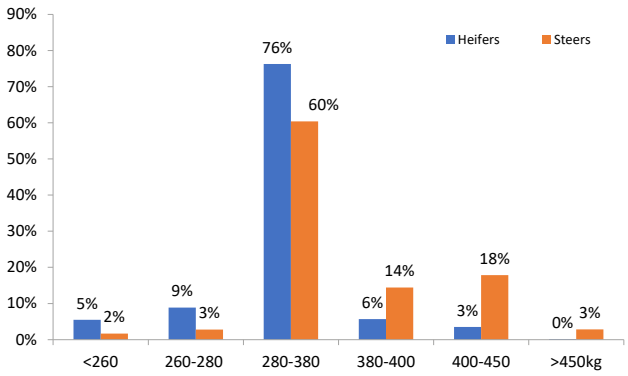


Fat Class



The importance of meeting the weight specification

- Ideal weight range is 280-380kg
- Poor demand for heavier carcases from major retailers



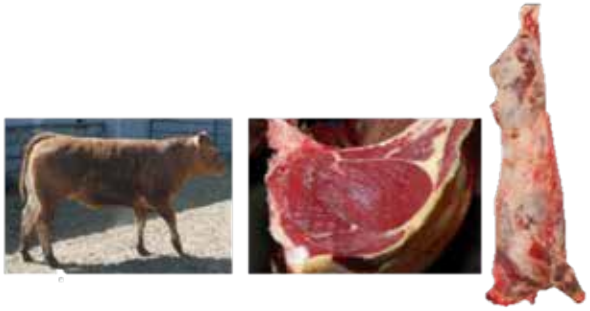
Based on price reporting information Quarter 2 2019

Incentive to meet the weight specification

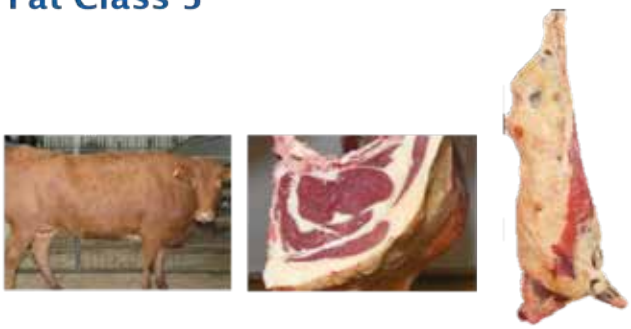
- Quoted penalties for underweight cattle vary with plant but generally £12-24 per head
- Quoted penalties for overweight cattle vary with plant but generally 10p/kg

Impact of Fat Class on End Product

Fat Class 2



Fat Class 5



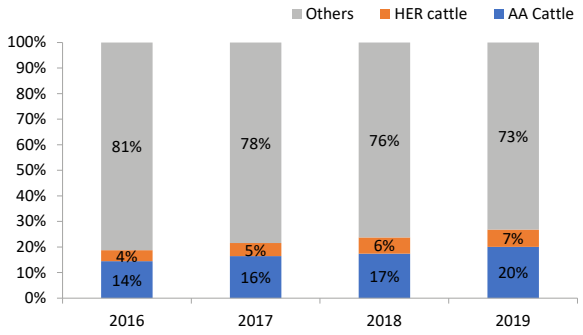
Decision Support tools are available → BovIS Bovine Information System

Impact on Carcass Weight on End Product

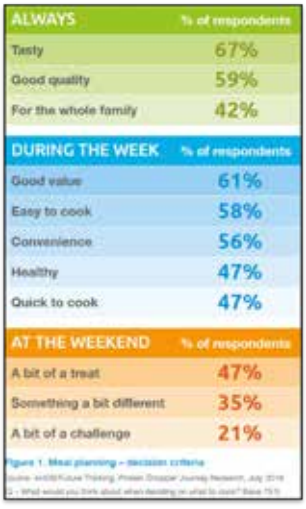
Decision Support tools are available → BovIS Bovine Information System

More premium cattle in NI slaughter mix

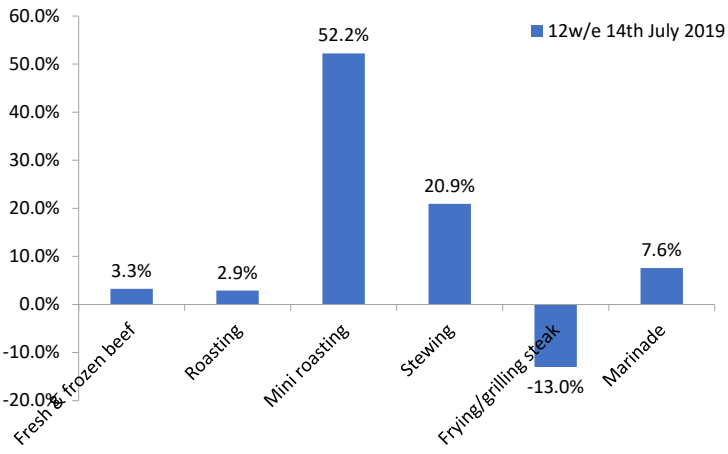
- Demand from retailers for beef from some native breeds
- Premiums for AA and HER cattle in particular have increased calf registrations and driven higher throughput



UK Kantar Beef Sales Data



ALWAYS	% of respondents
Tasty	67%
Good quality	59%
For the whole family	42%
DURING THE WEEK	**% of respondents**
Good value	61%
Easy to cook	58%
Convenience	56%
Healthy	47%
Quick to cook	47%
AT THE WEEKEND	**% of respondents**
A bit of a treat	47%
Something a bit different	35%
A bit of a challenge	21%



The Brexit Problem

KEY FINDINGS – TARIFF IMPACTS

CN Code	Description	EU Common External Tariff	Tariff ROI (%)	Tariff EU-26 (%)
02011000	Fresh/chilled beef carcases and half carcases	12.8% + €176.80/100 kg	99%	65%
02013000	Fresh/chilled boneless beef	12.8% + €303.40 /100 kg	109%	61%
02041000	Fresh/chilled lamb/sheep meat carcases and half carcases	12.8% + €171.30 /100 kg	48%	41%
02042230	Fresh Chilled Lamb Cuts	12.8% + €188.50 /100 kg	49%	42%
02042300	Fresh/chilled boneless lamb/sheep meat	12.8% + €311.80 /100 kg	72%	53%
02044310	Frozen lamb/sheep meat cuts	12.8% + €234.50 /100 kg	44%	50%
02061098	Fresh/chilled beef offal (other)	0.00%	0%	0%

- EU Tariff will vary based on price – ROI prices lower than EU-26, but tariff is higher in % terms.

ANDERSONS

THE BACKSTOP TRILEMMA

Three Mutually-Incompatible Things Promised

- Focus on technology to fix the Customs problems – but physical checks required for agri-food

ANDERSONS

The Future will have Challenges

Changing Cultural Narrative → Climate Change Lobby → Antimicrobial Resistance → Brexit → Lifetime Assurance

As farmers we must continue to produce a fantastic product as competitively as possible and continue to meet consumer demands.

Nutrition of finishing cattle – the science

Dr Francis Lively

(Denise Lowe, Naomi Rutherford and Lauren Chesney)

Animal requirements for growth and performance

5 basic nutritional requirements for animals to grow and perform:

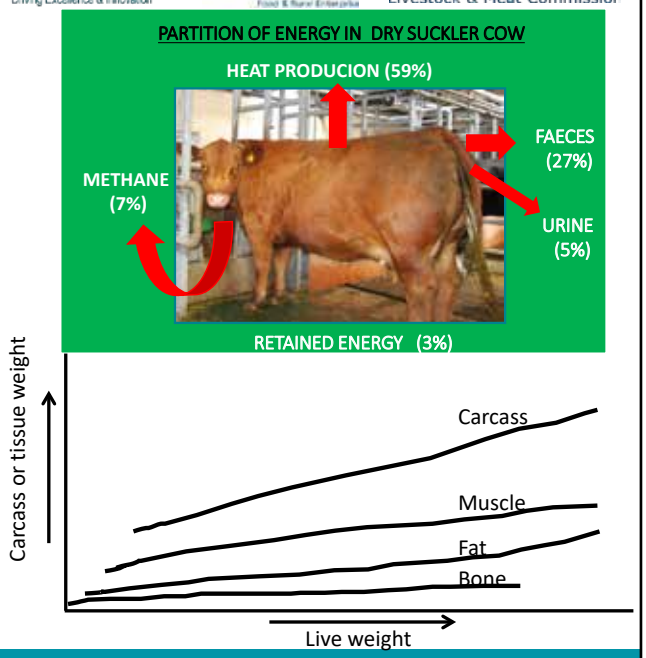
- Water
- Energy
- Protein
- Minerals and vitamins

However, actual performance is very dependant a number of factors including:

- Age of animal
- Gender
- Breed type
- Genetic potential
- Supply of feedstuff
- Quality of feedstuff
- Previous nutrition
- Previous growth

Energy

- Is essential to maintain the animal. Of the energy supplied for maintenance approx. 60% is lost as heat production & 40% in faeces, urine & methane.
- To gain one kg of live weight, cattle need between 35 to 45 MJ ME above that required for maintenance, depending on the stage of production.
- Performance is dependent on energy supply
- Younger cattle tend to lay down more muscle (protein) than fat so have lower energy demand for growth, whereas mature cattle tend to lay down fat so have a higher energy demand for the same rate of gain (fat deposition requires a greater energy supply than protein)



Protein

- Is required for almost all body functions & is key to encourage appetite. Requirements vary according to:
  - Age
  - Growth rate
- Crude protein (CP%) requirements of cattle decreases with maturity:
  - Growing cattle require total diet CP 14 -16%
  - Finishing cattle require total diet CP 11 – 14%
- Response to increasing the crude protein of the diet is better in:
  - Younger animals
  - Bulls than steers than heifers
  - More muscular/better conformed cattle
- CP content of a diet should be reduced if trying to encourage fat deposition relative to muscle deposition
- Concentrate CP content dependant on forage quality & feed level

Nutritional requirements of beef cattle varies depending on breed type

Continental genetics (late maturing)

- Larger heavier animals
- Heavily muscled
- High growth potential
- Leaner

Native genetics (early maturing)

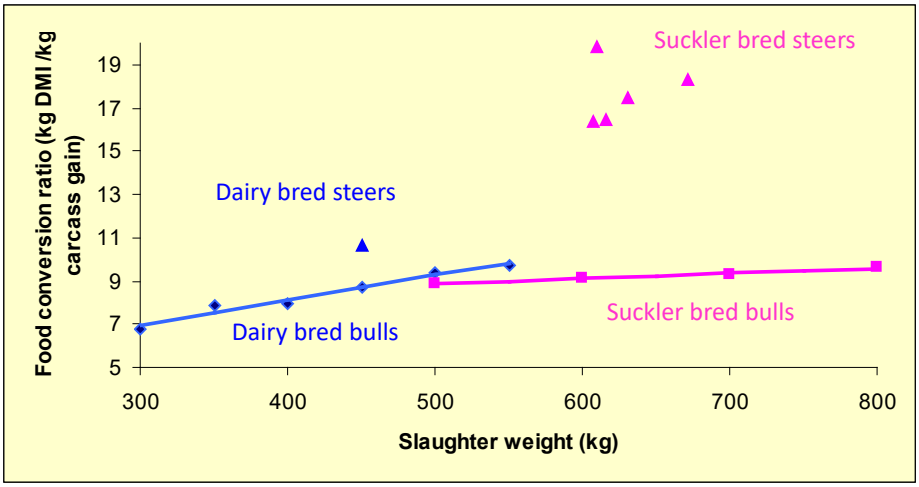
- Smaller lighter animals
- Less conformed
- Lower growth potential
- Fatter

Dairy genetics

- Larger digestive tract
- High bone content
- High growth potential

However significant within breed differences

The effect of slaughter weight, breed type and gender on feed conversion ratio



- As cattle increase in live weight feed conversion efficiency declines
- Dairy bred cattle are less efficient converters of feed to carcass gain than suckler bred cattle
- Bulls are more efficient converters of feed to carcass gain than steers

Meeting carcass specification through nutrition

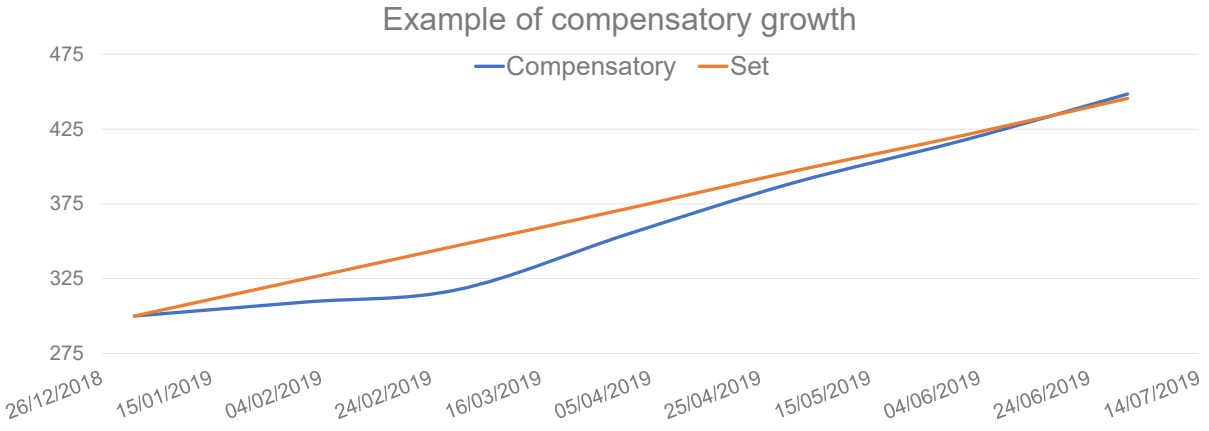
- Current market specifications are generally looking for smaller carcasses with a moderate level of fat cover
- Larger framed continental cattle should be offered low protein high energy diets to encourage fat deposition earlier
- Smaller framed native cattle should not be over fed with concentrates in early life

MEASURE
MONITOR
MANAGE

Compensatory growth

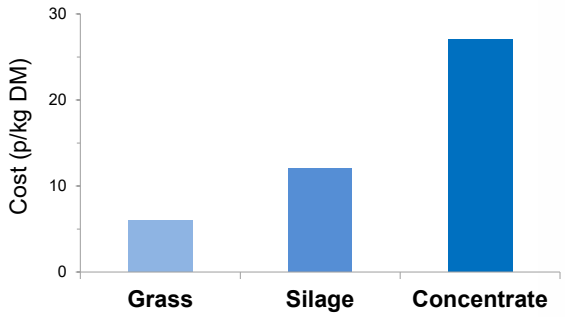
Compensatory growth is the **<u>better than expected</u>** growth performance seen in animals following a period of low performance

- Can be utilised in spring prior to turnout
- Can be utilised in autumn prior to finishing



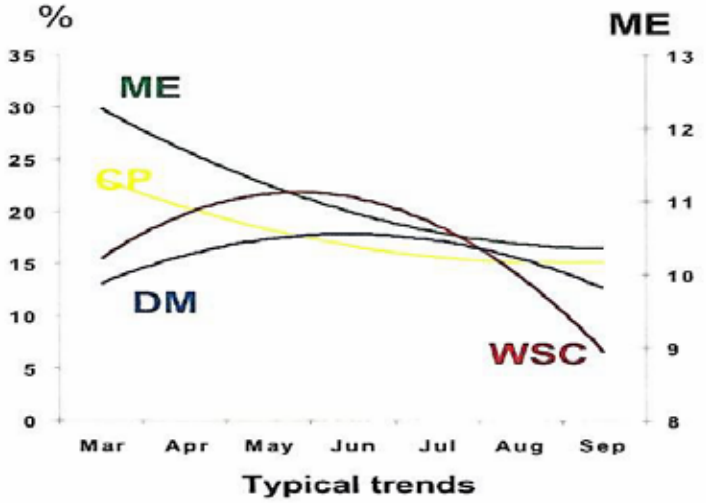
Potential of grass

- Grass is the cheapest feedstuff available followed by high quality grass silage



- Grass is a highly nutritious feedstuff
- Grass quality varies during the season but is very dependent on sward management
- High animal performance is achievable from high quality forage

Typical annual trend for the nutritional quality of grass



Feeding concentrate at grass (1)

Performance of autumn born Holstein bulls either grazed with various concentrate levels or housed on ad lib concentrates

	Grazed	Grazed 2kg	Grazed Ad lib	Housed Ad lib
Housing weight (kg)	279[a]	299[b]	346[c]	339[c]
Slaughter weight (kg)	579	579	622	602
Summer DLWG (kg/d)	0.90[a]	1.15[b]	1.67[c]	1.59[c]
Finishing DLWG (kg/d)	1.51	1.43	1.44	1.42
Average DLWG (kg/d)	1.38[a]	1.34[a]	1.52[b]	1.48[ab]

- Feeding autumn born Holstein bulls 2 kg concentrate at pasture increased performance during the grazing season but compensatory growth during the finishing period resulted in both groups having similar life time performance
- Performance of bulls offered ad libitum concentrate feedings decreased as time on feeding increased

Feeding concentrate at grass (2)

Performance of continental store cattle either supplemented or not during the later part of the grazing season

	Grass only	Grass plus 2.5kg
Grazing DLWG (kg/d)	0.58[a]	0.89[b]
Housing weight (kg)	517[a]	536[b]
Slaughter weight (kg)	671	669
Carcass weight (kg)	369	372

- Feeding store cattle concentrate during the later part of the grazing season increased performance during that period resulting in heavier cattle at housing but compensatory growth during the finishing period removed any long term benefit
- Better to delay concentrate feeding until housed and prevent poaching around troughs
- Although dependant on duration of finishing

High quality grass silage

Performance of bulls finished on either ad libitum concentrates or 50:50 grass silage: concentrate

	Study 1 Holstein bulls		Study 2 Continental bulls	
	Ad libitum concentrate	**50:50 Silage : Concentrate**	**Ad libitum concentrate**	**50:50 Silage : Concentrate**
Finishing duration (days)	216	215	218	219
Concentrate input (t)	1.85	1.13	1.9	1.1
Silage input (t)	0.30	0.93	1.2	3.8
Straw input (kg DM)	97	0	-	-
Finishing live weight gain (kg/day)	1.45	1.44	1.48	1.42
Carcass weight (kg)	274	267	398	392

- Replacing 50% of an ad libitum concentrate diet with high quality grass silage will maintain performance and offer the potential to reduce production cost

Summary

- Meeting the nutritional requirements of beef cattle is vital to ensure cost effective production
- Nutritional requirements of beef cattle is complex and very dependant on a number of factors (eg. age, gender, breed)
  - Young cattle of high growth potential respond to high protein diets
  - Finishing cattle require a lower protein higher energy diet
- Grass is a highly nutritious feedstuff that can support high levels of animal performance
- High quality grass silage can replace 50% of an ad libitum concentrate diet
- Compensatory growth can offer opportunity to reduce concentrate input prior to turnout in spring or prior to housing in autumn provided an adequate realignment period

Notes

Winter Feeding of Finishing Cattle

Ciaran Hamill
Senior Beef & sheep Adviser, CAFRE

Basic Decisions for You to Make

- Target performance
- Monitoring performance
  - Weight
  - Condition score
- Silage quality and quantity
- Concentrates
- Specialist Market?
- Budgets




Finishing Beef Future Proofing Beef Farming

Finishing Cattle: Target Performance

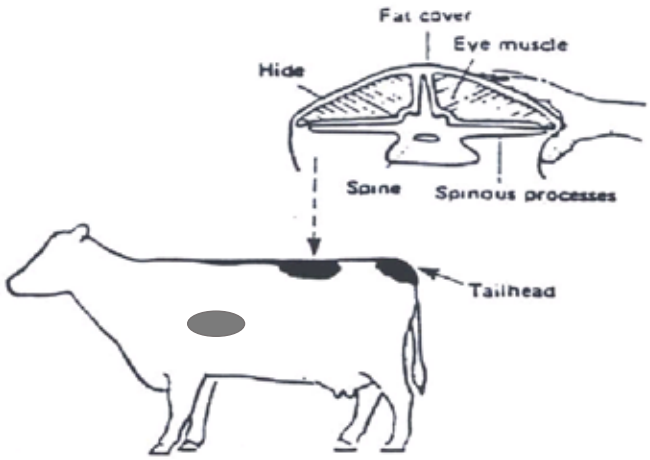
Growing to finishing – the big change!

How long do you want to feed them for?

What feeding regime were they on before starting the finish period?

	Target Days on Finishing ration	Daily Liveweight Gain (kg)	Feed Period Gain (kg)
Continental	80 - 100	1.2 - 1.5	120 - 150
Traditional	60 - 80	1.0 - 1.4	80 - 90

Finishing Cattle: Monitoring Backfat Cover



Silage Quality - Sampling

- Wait until six weeks after harvest
- Take several cores across the clamp face
- Take composite sample
- Send to lab early in the week
- Provide as much information as possible

Assessing Silage Feeding Value

Value	Indicates	High quality silage	Good quality silage	Average quality silage	Poor quality silage
Metabolisable energy (ME) (MJ/kg DM)	Measure of the energy content of the silage.	**>12**	11.5-11.8	11.5 -10.5	<10.5
Crude protein (CP) (%)	Measure of the silage crude protein content	**>13**	11-13	10 – 11	<10
Dry matter (DM) (%)	Measure of the quantity of material left after drying	**> 30**	25 – 30	20 – 25	<20

Also consider: pH, Fibre (NDF/ADF), D Value, Ash, VFA, minerals,……

Silage Analysis

Sample & analysis details

Sample no.	15-08-0713	Sample type	Grass Silage	*Feeding reports requested*	
Date received	10/8/15	Additive	Inoculant	Dairy cows	
Date reported	20/8/15	Cut date	18/5/15	Suckler cows	Yes
HFIS no.	98.769	Cut no.	First	Breeding ewes	
Farmer acc.		Cut system	Precision	Growing lambs	
Farmer silo id.		Comments	Beef & Sheep Centre 1st cut	Growing cattle	Yes

Practical Feeding Information		*Comments*	*First cut av. 2014*	*Range*
Dry matter (%) [1 2]	32.6	Good	25.6	15 to 55
pH [1 2]	4.1	Good	4.2	3.5 to 5.0
Ammonia (% total N)	6.0	Good	11.0	7 to 15
Protein (% DM) [1 2]	13.9	Average	11.5	7 to 16
ME (MJ/kg DM) [1 2]	12.0	Excellent	10.5	9 to 12
D-value (% DM) [1 2]	75	Excellent	66	55 to 77
HFIS intake (g/kgW0.75) [1 2]	97	Excellent	73	50 to 105

The comments above are for guidance on silage quality only and are not covered by any accreditation system

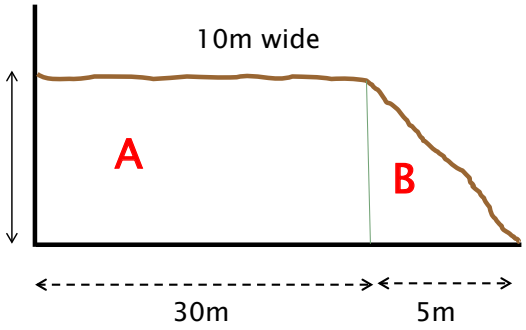
Silage - Quantity

Section A:
30 x 3 x 10 = 900m³

Plus

Section B:
5 x 3 x 10 = 150m3 X 0.5 = 75 m³

Total = 900 + 75 = 975m³



Single Dry Matter Content (%)		Conversion (volume in m³ to tonnes of fresh silage)
Grass Silage:	18	Multiply by 0.81
	20	Multiply by 0.77
	25	Multiply by 0.68
	30	Multiply by 0.60
Whole-crop:	40	Multiply by 0.67
Forage Maize:	30	Multiply by 0.75

Tonnes of Silage = Silage Pit Volume x Dry Matter Conversion Factor

975 x 0.6 (30% DM) = 585 Tonnes of Silage

Silage - Quantity

Silo	Dry Matter (%)	Length (m)	Breadth (m)	Height (m)	Volume (m3)	Tonnes
1	25	10	7	2.1	147	100
2	25	15	8	2.5	300	205
3						0
4						0
5						0
				Tonnes		305
Silage DM	25%					
	0.68 t/m3			Bales Made		70
				Average Bale Weight (kg)		850
				Tonnes		59.5
				Total Silage (Tonnes)		365

FORAGE PLAN

How much do you have

Livestock	Number of Stock	Silage required (tonnes/month)	Months Housed	Silage required (t)	
Ewes		0.2	1.0	0	
Dairy cow Milking		1.5		0	
Dairy Cow Dry		1.0		0	
500kg Steers	34	0.8	4.0	109	
500kg Heifers	25	1.0	4.0	100	
300kg Heifers	9	0.8	4.0	29	
Suckler Cows (+ calf)	7	1.2	4.0	34	
Suckler Cows (dry)		1.0		0	
	116				
				Total Silage required	435
		850			
	Or	Average bale weight	Total bales needed	512	

How much do you need

Finishing Beef — Future Proofing Beef Farming

Silage Feeding Order

- Target best silage to most productive stock –

- Finishing cattle
- Lactating cows
- Young growing cattle
- Dry cows

Finishing Beef — Future Proofing Beef Farming

Concentrate Feedstuffs

- Ration Ingredients
- Relative Feed Value

Blends, Pellets and Coarse feeds are a combination of straights, designed for a specific feed task

Protein	Energy	Fibre
Soya bean meal	Barley	Oats
Rapeseed meal	Wheat	Beet pulp
Peas & Beans	Maize gluten	Citrus pulp
Linseed	Maize (yellow meal)	Soya hulls
Maize distillers	Vegetable/fish oil	Straw

Relative Feeding Value

	Cost (£/Tonne)
Dried Barley (14% MC)	175
Soyabean meal 50	320

Energy Sources	Protein%	ME (MJ/Kg)	Relative Value	Actual Cost
Dried Barley (14% MC)	9.5	11.4	175	175
Moist Barley (18% MC)	9.0	11.2	171	
Wheat (14% MC)	11.0	11.4	175	180
Maize meal (High Silage)	8.0	13.2	191	192
Maize meal (High Conc)	8.0	14.7	209	192
Maize Gluten (Growing Cattle)	18.0	10.9	202	190
Maize Gluten (Finishing Cattle)	18.0	9.6	186	190
Citrus Pulp	6.0	10.6	152	
Soya Hulls	10.7	11.0	174	158
Molasses	4.0	8.0	112	185
Molasses sugarbeet pulp	9.0	10.6	163	210
Protected fat	0.0	0.0	0	-

Protein Sources	Protein%	ME (MJ/Kg)	Relative Value	
Soyabean meal 50	46.0	11.6	320	320
Rapeseed Meal	35.9	10.8	271	222
Maize distillers dark grains	26.0	11.6	242	207
Sunflower meal	27.0	8.0	202	

Ration Quality

Two 17% CP Store cattle blends - which is best?:

Ration 1

Maize Meal, Wheatfeed, Palm Kernel, Oatfeed, Rapeseed Meal, Sunflower Ext, Soyabean Meal

Ration 2

Maize Meal, Distillers, Barley, Rapeseed Meal, Soya Hulls

Ration 1: ME 11.4

Ration 2: ME 13.4

Finishing Rations

Example 1

Beef Blend	Composition
Maize Meal Soya Hulls Corn Gluten Sugar Beet Citrus Pulp Barley Maize Flakes Molasses	Crude Protein – 10% Crude oil – 3% Crude Fibre – 9% Crude Ash – 5.5% Sodium – 0.4%

Example 2

Beef Pellet	Composition
Maize Wheat Maize Gluten Distillers Dried Grains Soya Hulls Wheat Feed Molasses Rapeseed Extracted Meal Feed	Crude Protein – 14% Crude oil – 4% Crude Fibre – 7.5% Crude Ash – 7.5% Sodium – 0.32%

Example 3

Blend	Composition
Maize Barley Rapeseed Meal Beet Pulp Soya Hulls Wheat Soyabean Meal Molasses Wheat Distillers Vegetable Oil	Crude Protein – 14.5% Crude oil – 4% Crude Fibre – 8.6% Crude Ash – 6.2% Sodium – 0.4%

All rations contain minerals and vitamins

Maximise Intake

- Present fresh palatable feed.
- Have CLEAN water available at all times
- Provide adequate feed space
- Provide adequate lying space
- Provide a dry lying area

- A well designed and managed feed area
  - ✓Very smooth clean surface
  - ✓Eating surface 10cm above hoof height
  - ✓Clean out refused food regularly
  - ✓Site water trough to avoid feed being splashed

Winter Feed Requirement:

500kg Beef Finishing Animal
Target Growth: 1.2kg Average Daily Liveweight Gain

Silage Quality	Silage Fed (Kg)	Concentrate (Kg)	Daily Feed Cost (£/day)
Good	22	4.5	1.45
Average	20.0	5.5	1.60
Poor	15.0	7.0	1.77

Assume: Silage £25/T, Concentrate £200/T

Producing high quality silage will lower concentrate requirement, lower feed cost and increase gross margin. Overall aim to improve efficiency.

Specialist Markets

CAFRE Hill Farm Development Centre Slaughter Information 2019

Gender	Breed Type	Av. Age (days)	Av. Weight (kg)	Conformation score	Fat score	Av. Carcass weight (kg)	Av. KO (%)	Price Difference
Heifer (14)	LIM	671	585	R+	4-	324	55.3	
Heifer (10)	SH	684	649	R=	4=	344	53.0	+32
Heifer (8)	AA	642	639	R=	4=	341	53.3	+13
Steer (18)	LIM	709	661	U-	3+	383	57.8	
Steer (19)	SH	682	703	R+	4-	396	56.5	+10
Steer (10)	AA	643	715	R+	4-	385	53.8	+16

Know Your Market Requirements?

- **Bulls?**
- **Heifers?**
- **Steers?**
- **Aberdeen Angus**
- **Shorthorn**
- **Hereford**
- **…..**

Steer Finishing Budget

550kg steer @ 1.80/kg = £990

90 day feed period
20 kg silage + 6 kg Conc.
= £1.80/day x 90 days = £162
Veterinary & Miscellaneous = £35
£197

Total Cost = = £1187

670kg @ 55% KO = 369kg

369kg @ 325p = £1199

Total costs = £1187

Margin = £12

Margin/month = £3.70

Sensitivity Analysis: +/- 10p/kg beef price = £36 /hd
+/- 10p /kg buying = £55 /hd
Interest @ 6% ~£16

Summary

- Assess silage quality and quantity on farm
- Remember compensatory growth
- Know your animal requirements
- Select a suitable concentrate to suit your silage quality
- Aim for high DLWG from grass and grass silage diets to improve carbon footprint and potential to develop a new niche product

For further information contact:

Senior Beef and Sheep Technologist - **Graeme Campbell** 028 9442 6641
Beef Technologist - **Natasha Ferguson** 028 9442 6938

Beef & Sheep Adviser Team – Armagh/Dungannon/Newry

Animal Health Planning for Housing

Lindsey Drummond MRCVS
AFBI, Veterinary Sciences Division

Critical to maintaining animal health during the period of change at housing is **MINIMISING STRESS**

The Suckler Cow and Calf

- Wean group gradually at grass, prior to housing if appropriate
- AVOID unnecessary veterinary procedures
- Remove BVDV positive calves immediately on confirmation

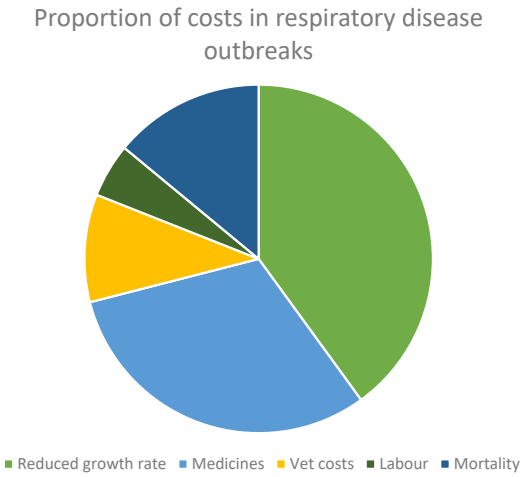
Buying Weanlings

- **<u>Biosecurity</u>** -ideally obtain from a single source and in a single group
- Minimise transport stress
- Allow a period to 'rest' after arrival (48-72 hours) on straw bed with plenty of space and unlimited access to ad lib highly palatable forage prior to administering routine treatments

Bovine Respiratory Disease (BRD)

- Dullness and reduced appetite
- High body temperature
- Rapid and loud breathing, sometimes with coughing
- Fluid discharge from nose and eyes
- Impact of concurrent disease e.g. lungworm, BVDV

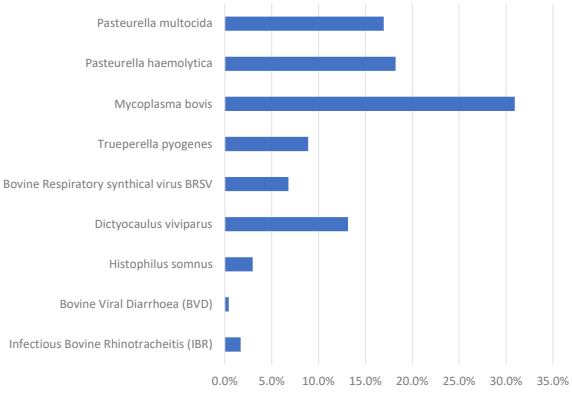
Costs of Bovine Respiratory Disease (BRD)



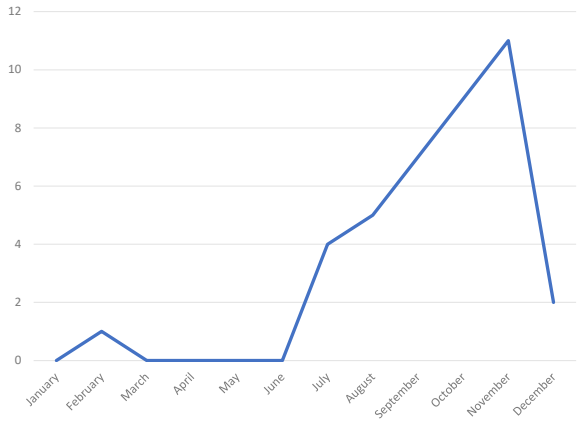
- **Est cost of £82 per simple case in a suckler calf**
- Avg DLWG reduced by up to 0.2kg/day
- Costs significantly increase when retreatments are necessary
- When 30% of cattle in a group show actual signs of BRD, a further 40% show lung damage at slaughter
- Even mild lung damage has shown to result in poorer carcase quality

BRD cases diagnosed at AFBI in 2018

Relative frequency of the different aetiological agents identified in cases of pneumonia diagnosed during post mortem by AFBI in 2018 (n=236)



Number of lungworm cases diagnosed during post mortem by AFBI per month in 2018

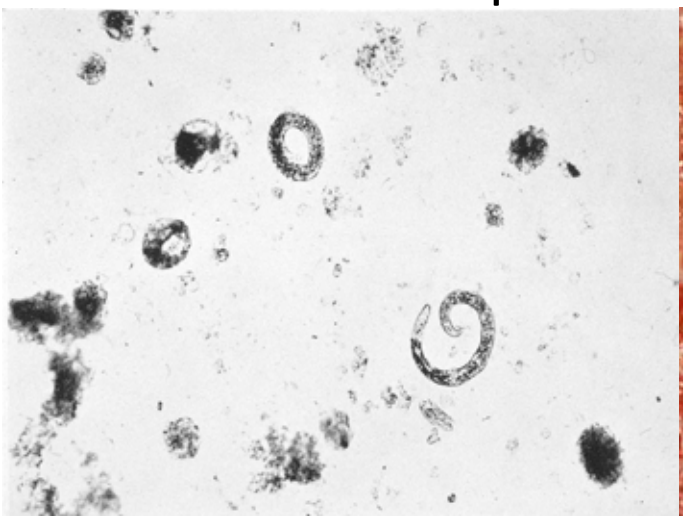


Vaccination against Pneumonia

- Valuable preventative strategy – provides protection and reduces exposure in group
- Review vaccine choices with your vet annually
- Store, reconstitute and administer as per vaccine insert – READ IT!!
- Be aware of the time until onset of immunity
- MINIMISE ANIMAL STRESS AND PLAN AHEAD!!

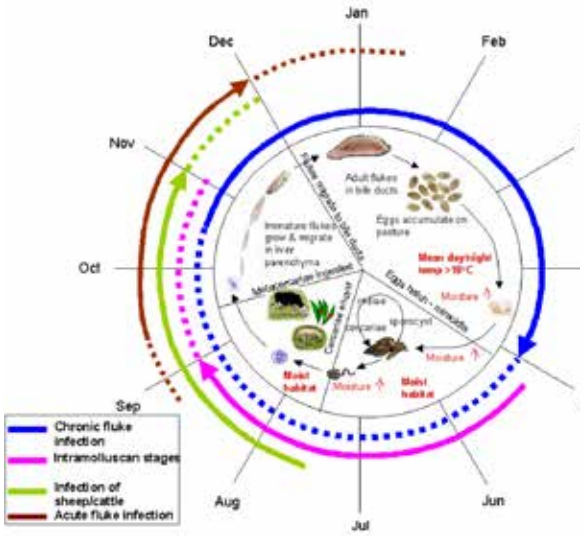
Internal Parasites – Gut worms

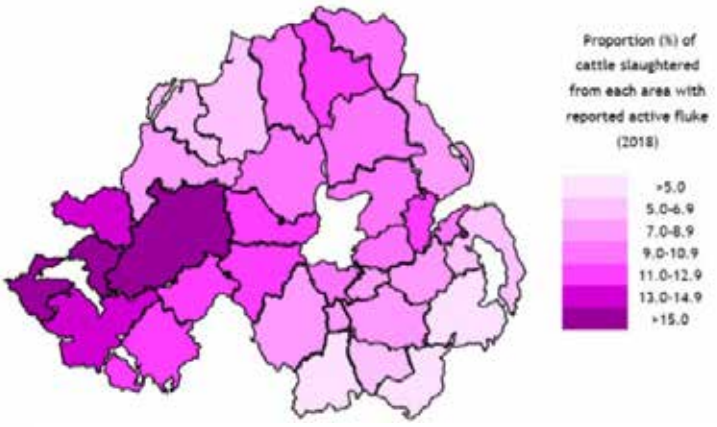
Internal parasites - Lungworm



Internal Parasites – Liver Fluke

- Weight loss (anaemia)
- Poor performance
- Depressed appetite
- Reduced weight gain
- Increased barren rate
- Death
- Livers condemned at slaughter
- Cattle can take an extra 80 days to reach market weight if affected by fluke





Other Parasites to consider

- Rumen fluke / paraphistomosis
- Questionable significance?
- Limited effective treatments

- Lice and mites (sucking and biting)
- Become an issue during housing
- Know what treatments are effective

Considerations when Selecting Parasite Treatments

- **Golden rule – 'As little as possible but as much as necessary'**
- Get informed guidance – Vet/SQP. What parasite are you targeting?
- Monitor effectiveness of use of products
- Administer the correct dose in the correct way. READ THE LABEL!!
- Observe product withdrawals and record administrations
- Develop a quarantine protocol

Take Home Messages

- Minimise stress at every opportunity
- Plan a health strategy annually, well in advance of housing, with your vet
- Be mindful of increasing resistance to parasite treatments and antibiotics – use responsibly
- Failing to try and maximise the health of your herd costs you money in many ways!

- Thank you to Prof B Hanna and Dr Steven Morrison for providing some of the images used in this presentation

- Thank you for listening

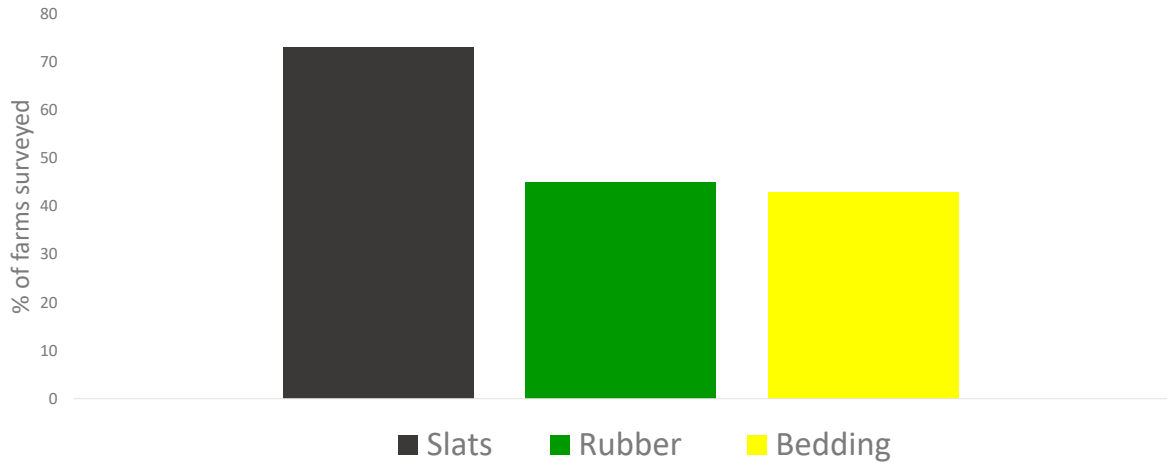
An evaluation of flooring for housed beef cattle in N. Ireland

Impact on animal performance, welfare and meat quality

Dr Denise Lowe

(Denise Lowe, Victoria Murphy and Francis Lively)

What floors are used in beef farms in NI?



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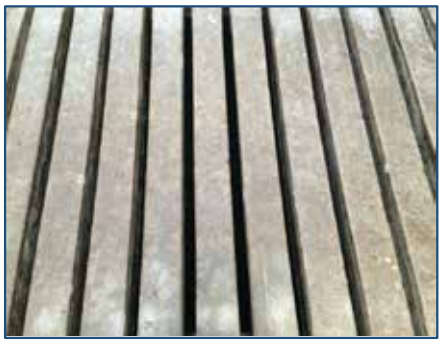
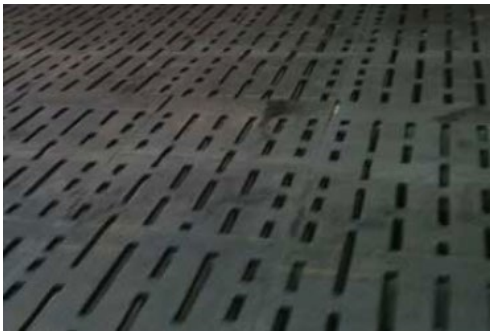
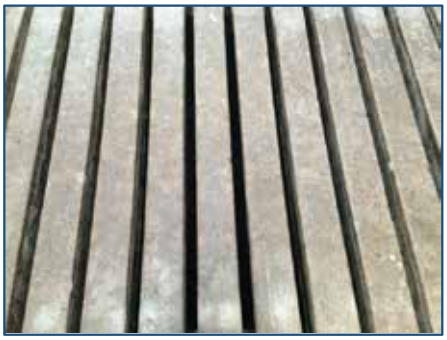
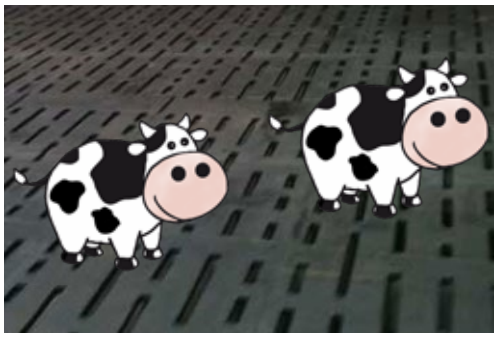
What do cattle prefer?





Very strong evidence that cattle prefer rubber to concrete slats



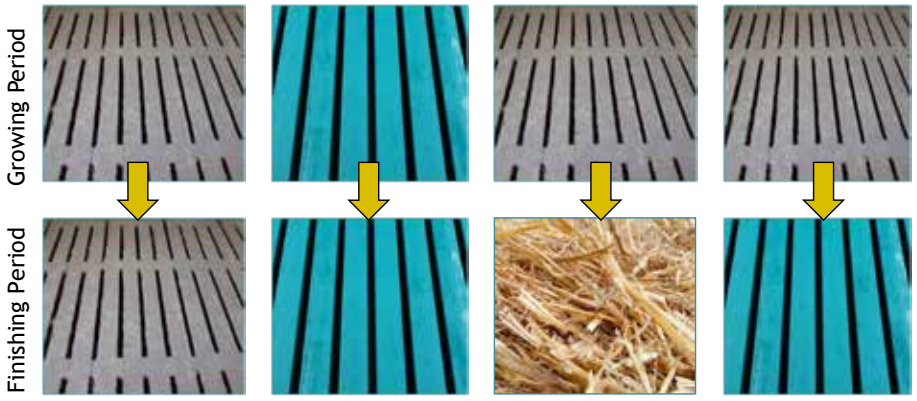


What has the science had told us so far…

- Conflicting effect of floor type on animal performance
- Cleanliness largely dependent on void area
- Evidence of changes in lying behaviours
- Concerns about overgrown hooves on rubber floors

Can we improve animal welfare by adapting concrete slats by overlaying with rubber?

The effect of floor type on performance, cleanliness and hoof health of dairy origin bulls



Treatment 1
Concrete slats (CS)

Treatment 2
Rubber strips (RS)

Treatment 3
Straw bedding (CS-S)

Treatment 4
Rubber strips (CS-RS)

The effect of **floor type** and **pen space allowance** on the performance, dirt scores and net hoof growth in dairy-origin bulls

Floors:
- concrete slats
- rubber covered slats

At 2 space allowances:
either equal to the recommended or double space allowance

The effect of **floor type** and **diet** on the performance, cleanliness and net hoof growth in dairy-origin bulls

	Start of experiment	Weekly increase in concentrate	Concentrates offered	Forage offered
INTENSIVE diet	All initially offered grass silage and 2kg concentrates	1kg /animal	Ad lib	Chopped barley straw
LESS INTENSIVE diet		0.5kg / animal	Capped at 6kg	Grass silage

Overview of Results

The effect of floor type on performance of finishing bulls in Study 1

	CS	RS	CS-S	CS-RS
Slaughter weight (kg)	527	536	526	537
Daily live weight gain (kg/day)	1.62	1.67	1.63	1.71
Carcass weight (kg)	274	280	273	282
Dressing proportion (g carcass/ kg live weight)	520	522	519	525
Est carcass gain (kg /d)	0.78	0.80	0.77	0.81

CS: Concrete slats RS: Rubber strips S: Straw

The effect of floor type on performance of finishing bulls in Study 2

	Floor type			Space allowance	
	Concrete slats	Rubber slats		single	double
Slaughter weight (kg)	510	524		515	519
Daily live weight gain (kg/day)	1.51	1.58		1.53	1.55
Carcass weight (kg)	253	264		261	257
Dressing proportion (g carcass/ kg live weight)	496	505		499	502
Est carcass gain (kg /d)	0.75	0.80		0.77	0.78

The effect of floor type on performance of finishing bulls in Study 3

	Floor type		Diet	
	Concrete slats	Rubber slats	Intensive	Less intensive
Slaughter weight (kg)	523	544	537	531
Daily live weight gain (kg/day)	1.49	1.55	1.49	1.50
Carcass weight (kg)	270	279	277	272
Dressing proportion (g carcass/ kg live weight)	517	513	517	512
Est carcass gain (kg /d)	0.75	0.79	0.78	0.76

Combined analysis of the three studies in the project

	Slats	Rubber
Slaughter weight (kg)	524	539
Daily live weight gain (kg/d)	1.48	1.54
Carcass weight (kg)	266	275
Est carcass gain (kg/d)	0.75	0.78

Economics

- Increase in carcass weight of 9kg using rubber compared with concrete slats
- @ £3/kg = increase of £27
- Cost of rubber ~£100/ animal

Payback time of 3.5 – 4 years

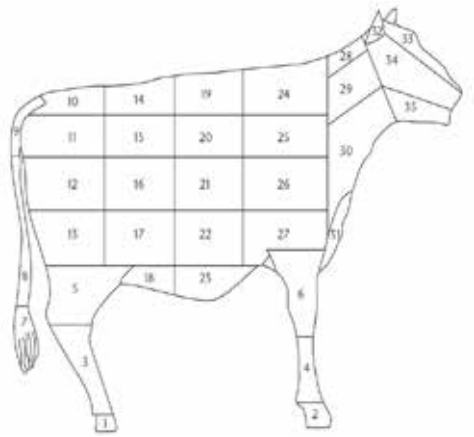
- less if full use of house throughout the year

Meat quality

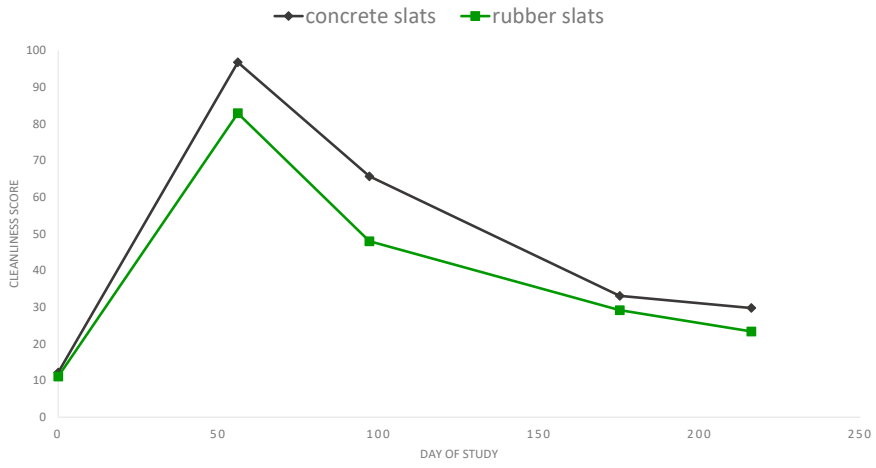
- Floor type had no significant effect on meat quality

  -ultimate pH
  -cooking loss
  -shear force
  -colour parameters

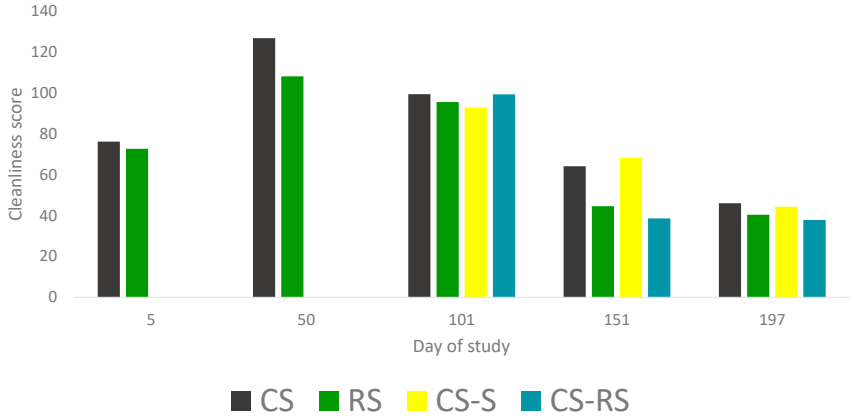
Animal Cleanliness



The effect of overlaying slats with rubber on the cleanliness of dairy origin bulls



Effect of floor on animal cleanliness



CS: Concrete slats RS: Rubber strips S: Straw

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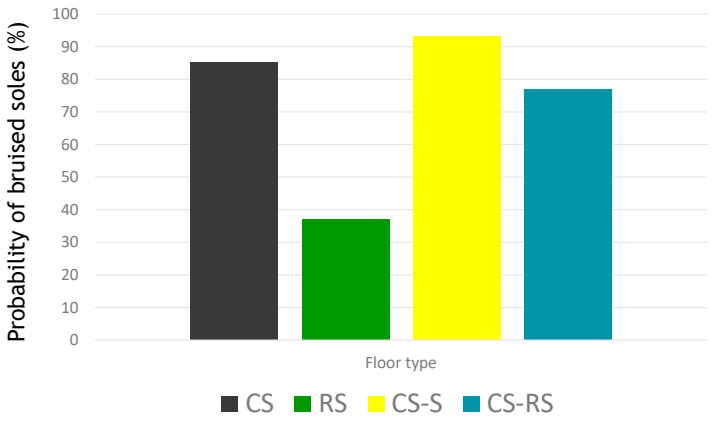
Sole Bruising



CS: Concrete slats RS: Rubber strips S: Straw

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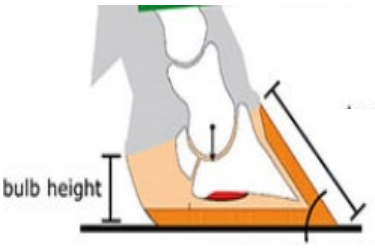
Hoof Growth



- Evidence of small increase in claw growth in bulls accommodated on rubber compared to concrete slats
- No effect of floor on locomotion scores

The effect of floor type on behaviour of finishing bulls in Study 1

	CS	RS	CS-S	CS-RS
Number of steps (steps/day)	674^{a}	1266^{b}	1835^{c}	1162^{ab}
Total Lying time (min/day)	1057^{a}	934^{b}	845^{b}	883^{b}
Number of lying bouts (bouts/day)	11.6^{a}	16.5^{a}	20.8^{b}	15.7^{a}
Mean duration of lying bouts (min)	91.3^{a}	57.3^{b}	41.7^{c}	58.4^{c}

CS: Concrete slats RS: Rubber strips S: Straw

Key messages

- Evidence of improved performance of bulls when concrete slats are overlaid with rubber
- No effect of floor on carcass measurements or meat quality
- Overlaying slats with rubber reduced hoof bruising and increased toe growth, but had no impact on locomotion score

Key messages

- Lying behaviours improved by overlaying concrete slats with rubber

Finishing Beef Future Proofing Beef Farming

Conclusion

Notes

Maximising Meat Quality

David Farrell[1], Linda Farmer[1], Declan Devlin[1], Joan Tollerton[1], Colin McRoberts[1] and Irene Chong[1,2]

1. AFBI, Food Research Branch
2. University College Cork

Contents

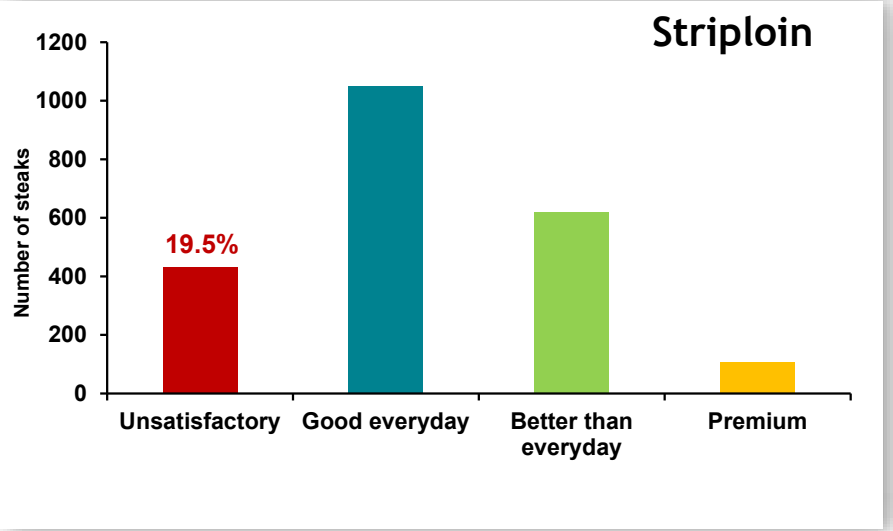
- What's the problem?
- What is meat quality?
- Consumers.
- The supply chain.
- Can farmers influence meat quality?
- What can we change to improve meat quality?

Beef Eating Quality: What's the problem?

European consumer studies on beef:

- 774 carcases, 18 muscles, 15,000 consumers, 5 countries:
  - 20% grilled striploin
  - 25% grilled rump
  - 54% roast topside

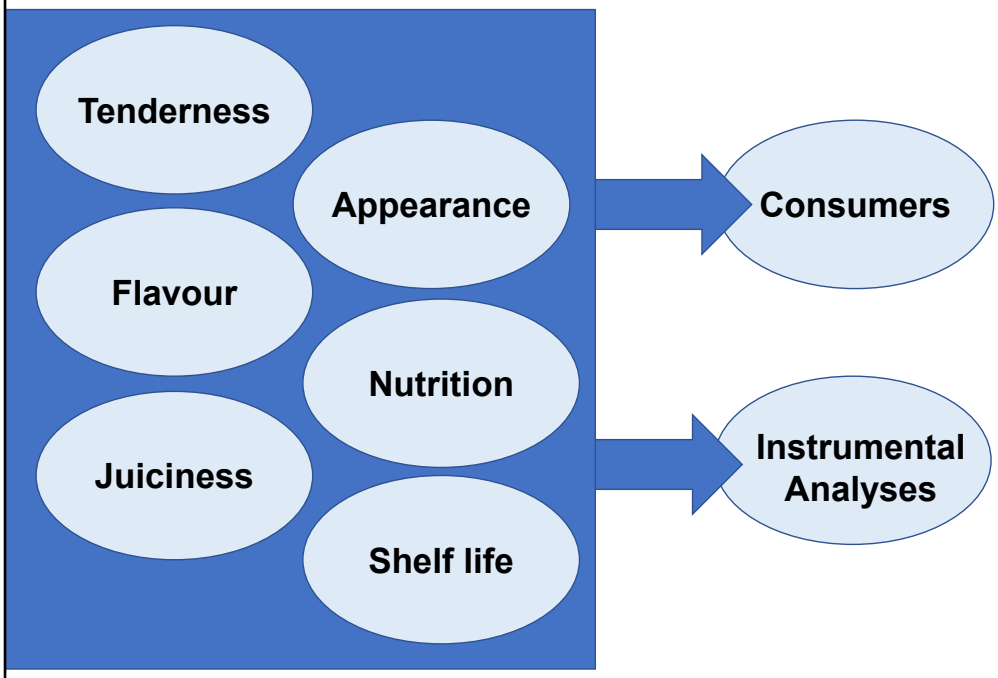
= "Unsatisfactory"



Is this sustainable for an expensive food product?

Bonny, S. et al. 2015; Farmer et al., 2016

What is Meat Quality?



Main Concerns

- Meat quality is not consistent.
- Many factors known to contribute to meat quality.
- Current grading does not reward meat quality!!

Why are consumers important?

- All the ££ $$ €€ comes from the consumers

Consumer aspirations?

Quality attributes

- Search / Experience / Credence

Ranking 22 attributes from15 papers

1.	Origin	C
2.	Price	S
3.	Labels, brands, certification	S
4.	Visible fat	S
5.	Flavour	E
6.	Animal welfare	C
7.	Production system	C
8.	Freshness, shelf-life	E
9.	Natural, organic	C
10.	Tenderness	E
11.	Health, nutrition	C
12.	Meat colour	S

Henchion et al., Meat Science, 2016

Meat quality and the supply chain

Producer

Genetics
Nutrition
Husbandry
Conformation
/ fat class

Haulier

Animal welfare
& handling

Retailer

Cuts & muscles
Packaging
Shelf life

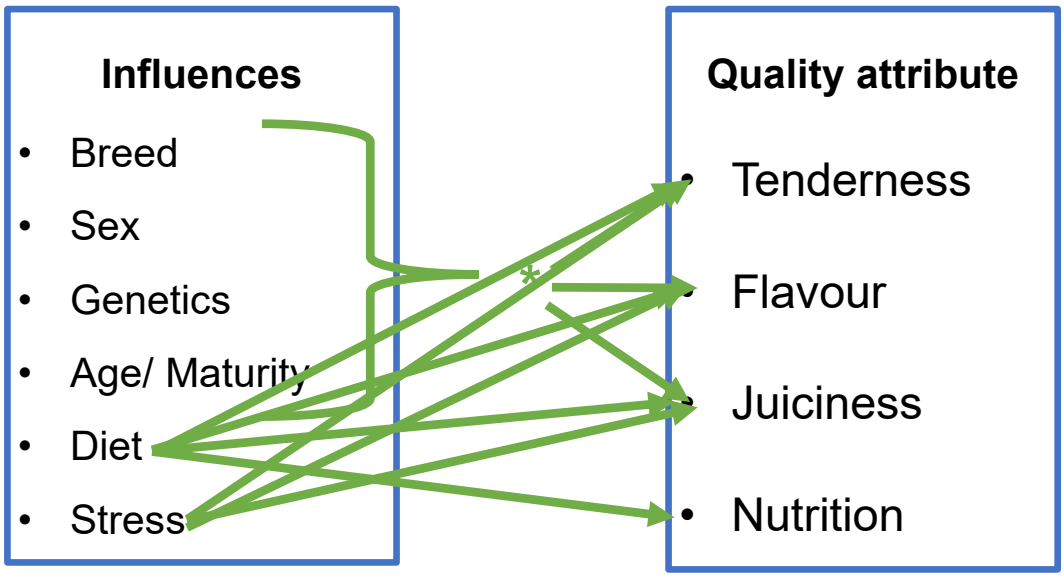
Consumer

Cooking Method
Nationality

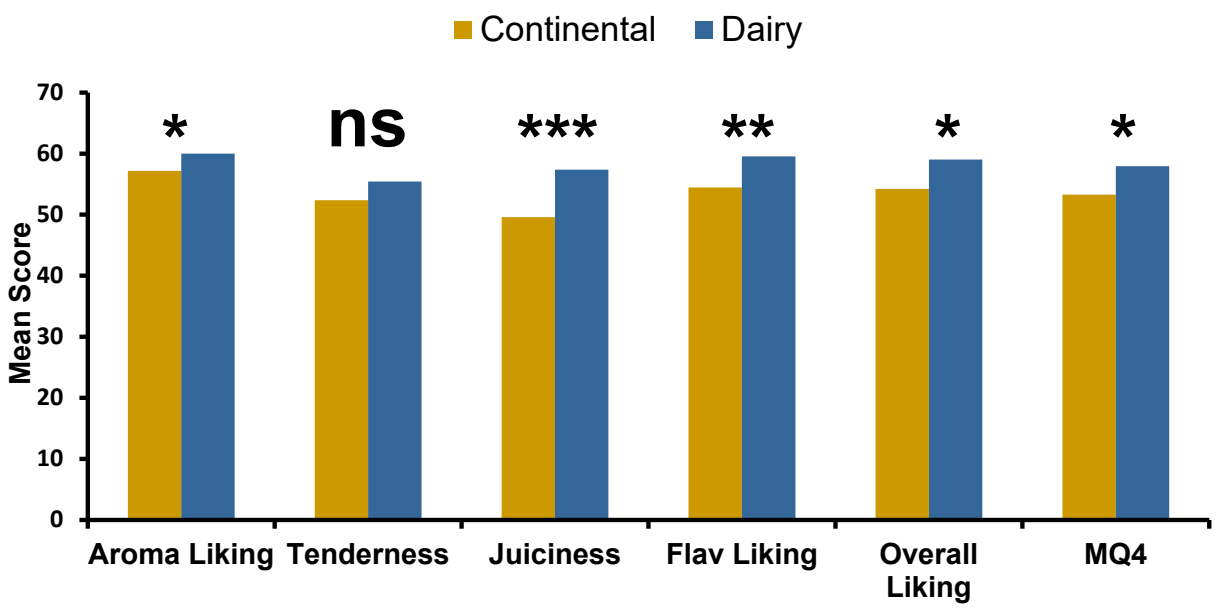
Abattoir

Lairage
Electrical stimulation
Hanging method
Chilling rate
Ageing

Meat Quality: What can the farmer do?

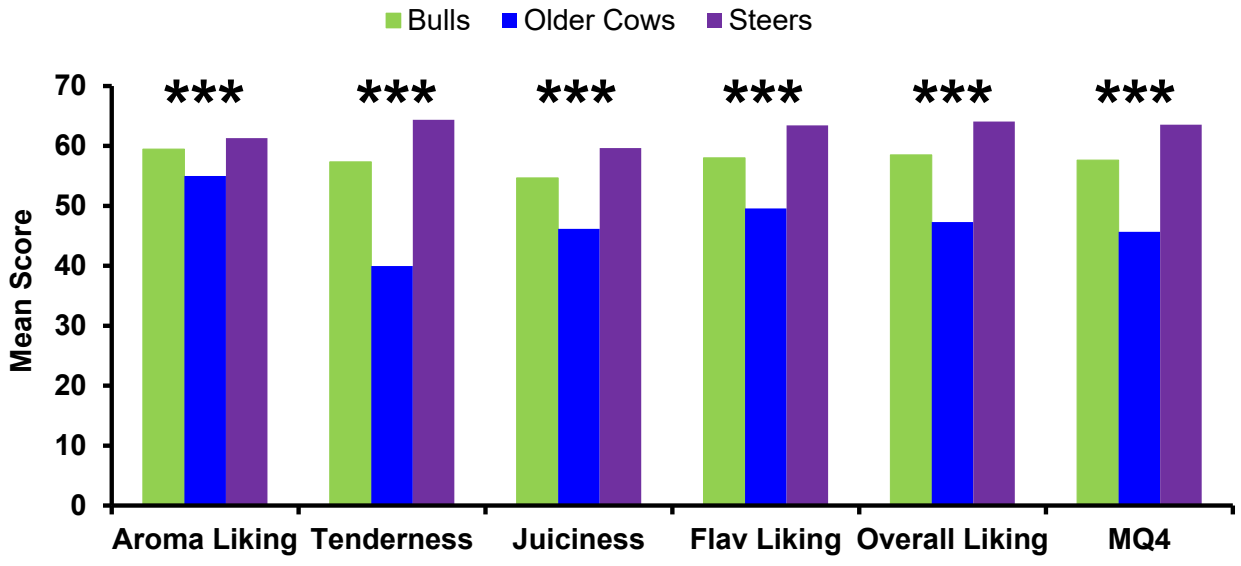


Meat Quality: Breed



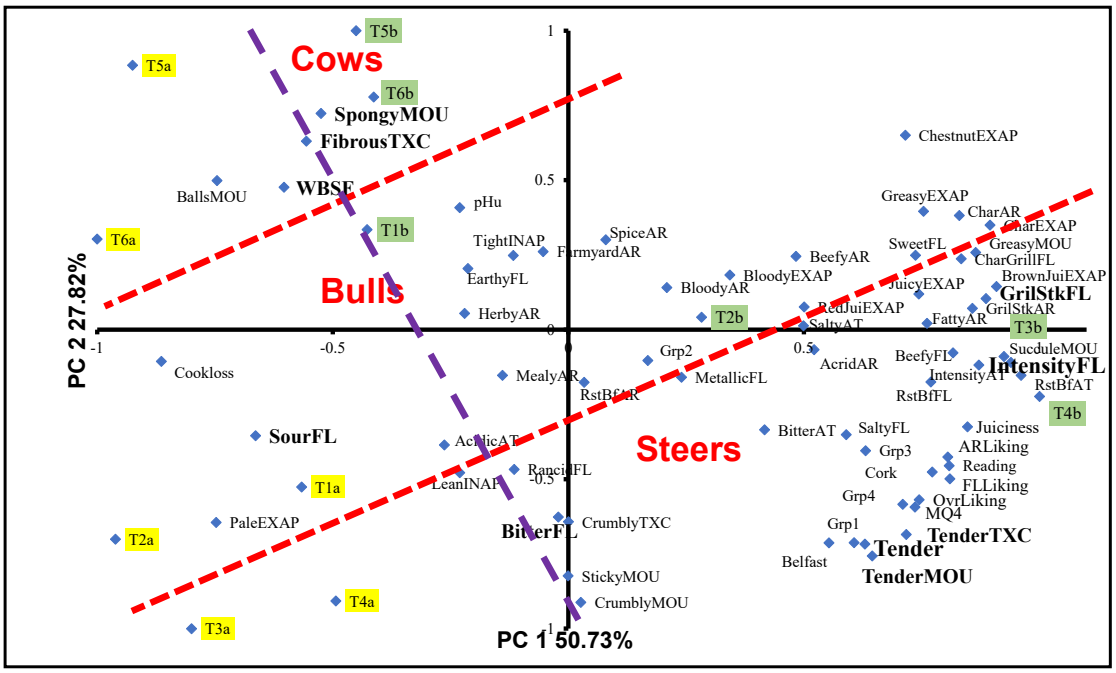
Chong, I. et al. 2019

Meat Quality: Sex and Maturity



Chong, I. et al. 2019

Meat Quality: External Preference Map



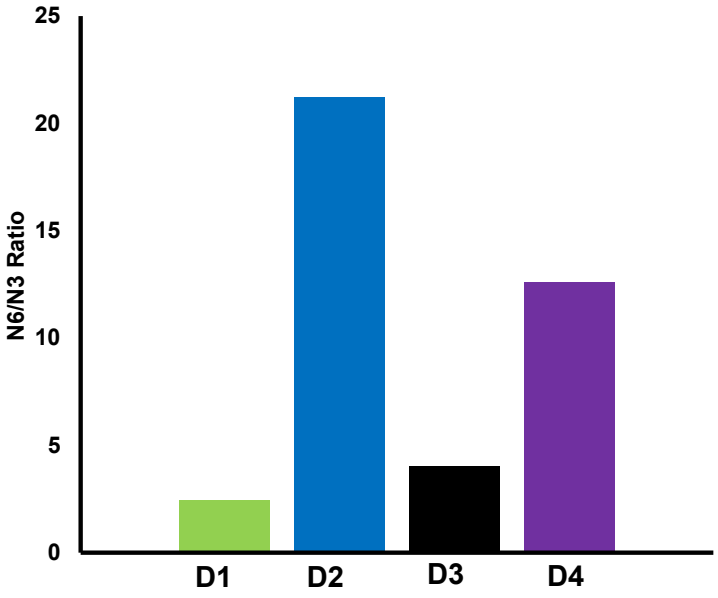
a= continental breed

b= dairy breed

Meat Quality: Nutrition

Beef contains:

- Rich source of protein,
- Certain vitamins and minerals
- Omega 3 and Omega 6 fatty acids
- Diet can control important fatty acid ratios!



Meat Quality: Stress and DFD Meat

DFD Meat
pHu – 6.32

Normal
pHu – 5.69

Devlin, D., Farrell, D. et al. 2018

- Pre-slaughter stress linked to DFD meat
- DFD Meat has pH> 6.0
- Colour defects
- Texture issues
- Poor flavour
- Poor shelf life
- Reduced value!

What can we do? MSA?

- Current grading systems do not reward meat quality.
- Are there other systems that do reward meat quality? MSA?

How does it work?

Information input

e.g, Age
Sex
Breed
Husbandry
Lairage
Electrical stimulation
Hanging method
pH/temperature
Conditioning
Cut
Cooking method

Computer model

Information output

Predicted eating quality of beef depending on:
- Conditioning time
- Cut
- Cooking method

AFBI 2003- 07

★ Premium
★ Better than everyday
★ Everyday
★ Unsatisfactory

Take Home Message

- Beef Eating Quality is inconsistent!
- Many factors affect beef eating quality but
- **Farmers can help!**
- Current grading doesn't reward quality.
- MSA like system could deliver:
  - Quality for the consumer and
  - Value based payment for the farmer!

Notes

BovIS
Bovine Information System

AFBI, through DAERA & AgriSearch funding have created the Bovine Information System (BovIS). Currently this intergrates animal data from APHIS and carcass data from the main Northern Ireland meat plants. In the future it is planned to capture animal weight data from livestock markets.

A range of tools are currently available:

- Carcass benchmaring tool
- Herd of origin tool
- Growth monitoring tool (can be used for both finishing stock and replacement heifers)
- Dairy greenhouse gas benchmarking

Additional tools are in the pipeline:

- Livestock market tool
- Livestock disease benchmarking (improved ante- / post-mortem reporting)
- Beef greenhouse gas benchmarking
- Market requirement (in-spec) calculator

The BovIS carcass benchmarking tool automatically provides information to help inform breeding and management decisions – with no new data input needed from the farmer This can be used to:

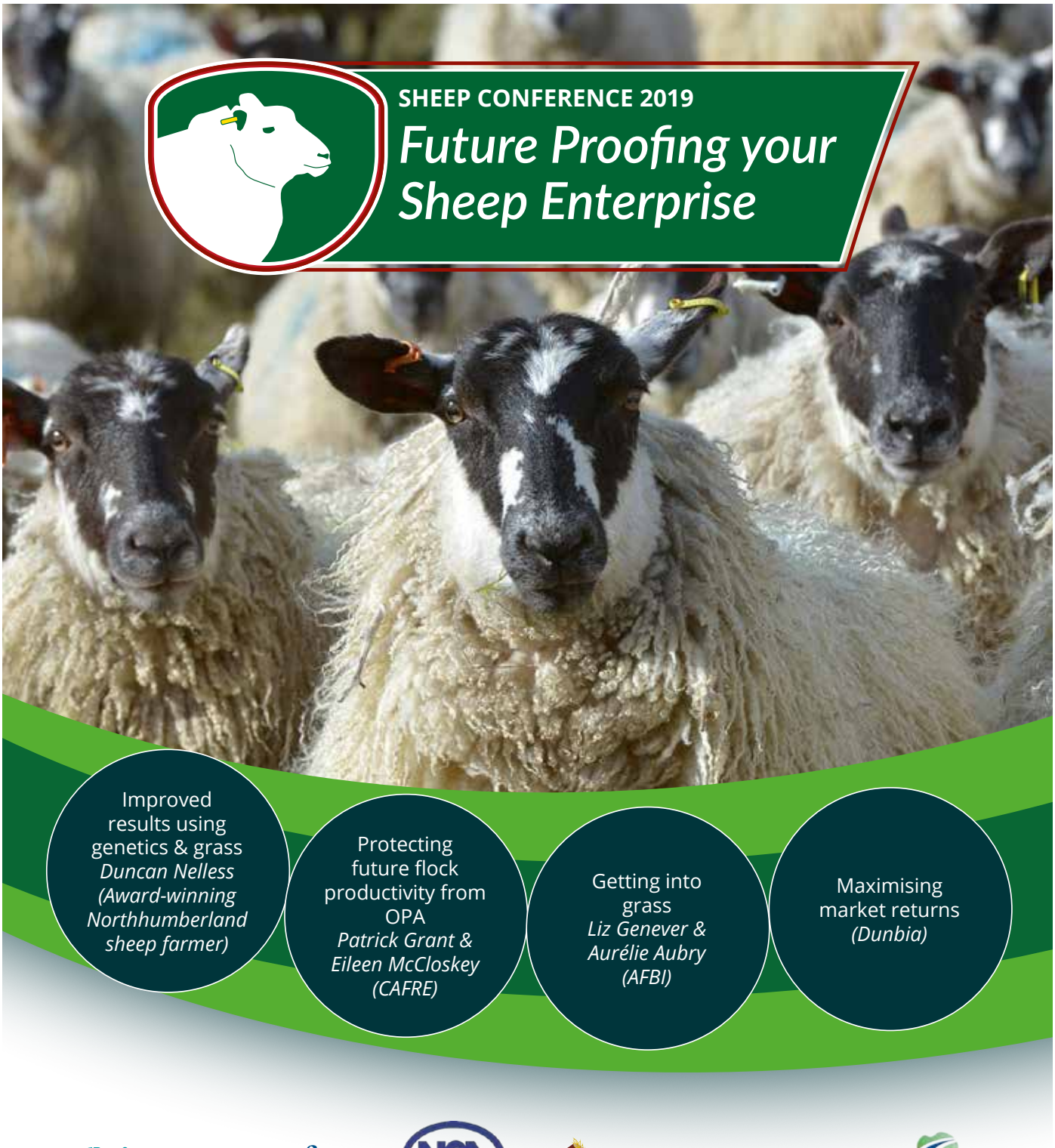
- Compare performance of breeds within herd
- Compare performance of terminal sires
- Compare performance of home grown cattle and those bought in
- Compare performance of livestock from several suppliers
- Calculate margin over feed cost for cattle slaughtered
- Assist in the selection of breeding stock
- Compare performance over different date ranges

The BovIS applications are accessed through DAERA on-line services.

afbi AGRI-FOOD & BIOSCIENCES INSTITUTE

Department of Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk

AgriSearch NI
Driving Excellence & Innovation



afbi AGRI-FOOD & BIOSCIENCES INSTITUTE
cafre College of Agriculture, Food & Rural Enterprise
NSA National Sheep Association
Ulster Farmers' Union
LMC Livestock & Meat Commission
nimea

Wednesday 2 October
Greenmount Campus, CAFRE

Thursday 3 October
Silverbirch Hotel, Omagh

Both events start at 6pm
Attendance £15
Fee includes light supper. Book your place through www.ufuni.org/events

LMC

Why join FQAS?

Northern Ireland Beef and Lamb Farm Quality Assurance Scheme (FQAS)

- **Financial benefits** associated with presenting FQA cattle/sheep for slaughter
- To **widen the marketplace** for your beef and lamb.
- Membership **reduces likelihood of selection for statutory inspections** in GAEC (Good Agricultural and Environmental Condition) and Food and Feed Law
- FQAS is a **recognised equivalent scheme to Red Tractor**
- Provides **best practice standards** for husbandry, welfare, nutrition and environment
- Helps to assist farmers with **better record keeping and prepare for cross-compliance**
- We have a dedicated **Farm Liaison Service and FQAS Helpline**
- **Gives consumers assurances** about the source of the product and the standards under which the animals have been raised
- **Competitive membership fees** in comparison with other schemes in GB.

FQAS Helpline

If you have had a recent inspection and need assistance to rectify any non-conformances or you would like to join the scheme.

Contact FQAS helpline:

(028) 9263 3024

SUPPORTING SUSTAINABLE BEEF PRODUCTION IN NORTHERN IRELAND

SUMMARY

- AgriSearch is an independent organisation whose purpose is to help make the Northern Ireland ruminant livestock sector become more competitive, profitable and sustainable.
- The value of the outputs of AgriSearch to farmers is many times greater than the levy investment
- A wide range of resources are available on our website www.agrisearch.org

What is AgriSearch

AgriSearch (The Northern Ireland Agricultural Research and Development Council) is an independent charity. It was formed in 1997 to help beef, sheep and dairy farmers become directly involved with production-oriented research and development and to ensure a continuation of government funding for such research. Our mission is to drive profitability and sustainability of the ruminant livestock sector. We do this through funding and commissioning research directly applicable on farms to farmers. AgriSearch welcomes innovative ideas and identified needs for research that may solve problems. Farmers are involved throughout our decision-making processes. We are an independent organisation (separate from AFBI) governed by a Board of Trustees (who are directors of a Company Limited by Guarantee and registered with the Charities Commission for Northern Ireland).

The value of the levy investment

Northern Ireland's beef industry needs to continuously improve technical efficiency to remain in business. At AgriSearch, we aim to provide the current and next generation of beef farmers with the research-based knowledge they will need to build efficient, sustainable and profitable farming businesses which can help them compete in a global marketplace. To achieve this AgriSearch works with research organisations and industry bodies across Europe bringing innovation to Northern Ireland.

A review of AgriSearch co-funded research carried out in 2006 showed a 22:1 return on farmers levy, assuming adoption rates of between 5 and 10% for the various recommendations arising from the research.

AgriSearch has been heavily involved in funding a wide range of beef research activities spanning subjects such as nutrition, improved grassland utilisation, heifer rearing and use of synchronisation in sucker herds.

With levy investments of around £400,000 per year over the past 20 years we have been able to play a key role in large scale research projects co-funded by more than £48 million of contributions from industry organisations, government and international bodies. This collaboration has brought considerable benefit to Northern Ireland farmers. Much of the 'cutting edge', independent research is generated within Northern Ireland at AFBI Hillsborough and on farms of co-researchers.

In addition to the potential gains to be made from applying the findings of research conducted under Northern Ireland conditions, one direct financial payback of the data collected under the "GrassCheck" programme was that Northern Ireland was able to obtain £4.57M in 2002 for 'weather aid' payment. This source of data was also used to provide a business case for the 2013 fodder transport scheme, which brought aid of £1M to the qualifying farms in Northern Ireland. In 2018 GrassCheck weather data was used as evidence by DAERA to make a case to the European Commission for an uplift in the rate of advance payment of BPS from 50% to 70%. The 2002 aid alone is equivalent to more than 10 years of AgriSearch levy income.

It should also be noted that the on-farm BVD prevalence study which was led by AgriSearch provided the business case for Animal Health and Welfare Northern Ireland's BVD eradication scheme. Research carried out into the diagnosis of Johne's disease has also been incorporated into AHWNI's Johne's control programme.

Pioneering on-farm research

Together with researchers at AFBI, AgriSearch has pioneered the use of on-farm research. Key benefits for both farmers and scientists include:

- Much greater numbers of animals, leading to more robust data
- Range of genetics, environments and farm management systems
- First-hand farmer experience
- These on-farm research projects often involve industry partners who bring knowledge and experience to the project as well as other in-kind contributions of products and services.

How is it funded?

AgriSearch is funded by means of a voluntary levy collected by dairy and red meat processors. The levy rate for beef is 40 pence per head of cattle (of which 10 pence is passed on to AHWNI to assist with the BVD eradication programme).

Who makes the decision on how the beef levy money is spent?

Research projects are recommended for funding by Sectoral Advisory Committees (Dairy, Beef and Sheep). These are composed mainly of farmers along with a processing representative and an independent scientific expert. Stewardship of AgriSearch resides with the Board of Trustees. The guiding principles behind all AgriSearch projects are that they will provide research which will be of practical benefit to farmers and provide them with tools to help reduce costs, increase performance, drive innovation and improve welfare and environmental sustainability.

Why should farmers fund research, should the government not fund it all?

Government still does fund a considerable amount of research. Understandably this tends to focus on evidence needs for guidance of policy makers. However, by the industry being willing to commit some contribution of money and by making the case for particular projects, we are able to 'lever' government funding from the available budget to commission research. In the financial year 2017/18, for every £1 committed to research projects by AgriSearch there was a further £20 obtained from other sources.

There have been very significant changes to research funding mechanisms over the past seven years. Across all funding streams there is a requirement for active industry involvement and leadership. Collaborative projects are becoming more common and this trend is likely to continue.

In circumstances where AgriSearch's levy income on its own will not go far in payment for research, the real value of AgriSearch is the industry engagement it can bring and represent in a project, particularly the ability and experience in facilitating on-farm research.

Conclusion

AgriSearch's primary focus is to provide a return to Northern Ireland's dairy, beef and sheep farmers for the levy investment they put in. Reviews have estimated that return to be between 20 to 1 and 40 to 1 (based on 5 to 10% adoption rates).

AgriSearch provides farmers with the latest research and knowledge to help them improve technical efficiency.

AgriSearch provides a means for farmers to have a voice and role in research projects, the findings of many of which will inform government policy in the future as well as providing farmers with the tools and information needed to compete in an ever-changing world.

Get the most out of your levy by engaging with AgriSearch, bring forward questions / research needs and use the information available on the website www.agrisearch.org and following our social media channels.

CURRENT BEEF RESEARCH PROJECTS:

- Beef from Grass: An evaluation of beef grazing systems and trace element supplementation within suckler beef production
- Development of systems to improve dairy origin beef young stock health and performance
- BovIS Mart Data Project
- Rumen fluke in cattle and sheep: measuring impacts and improving diagnosis
- Redefining nutrition standards for improving beef production efficiency
- An evaluation of rumen temperature as proxy for the indication of key stages in the lifecycle of breeding beef animals
- Strategic Antimicrobial Use in Dairy, Beef and Lamb Production (STAMP)
- Food Futures: Smart Sustainability Tool
- Evaluation of ammonia emissions from livestock enterprises
- SUPER-G: Developing sustainable permanent grassland systems and policies

AFBI, AgriSearch, CAFRE and LMC would like to thank the management and staff of Ballymena and Markethill Livestock Markets for hosting these events