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AgriSearch NI
Driving Excellence & Innovation

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College of Agriculture, Food & Rural Enterprise

LMC
Livestock & Meat Commission

Future Proofing Sheep Farming

LAMB FINISHING ROADSHOW

Tuesday 3rd September at 7pm
SWATRAGH LIVESTOCK MARKET

Wednesday 4th September at 7pm
HILLTOWN LIVESTOCK MARKET

CONTENTS

CONTENTS

FOREWORD

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

At this event leading scientists from AFBI and alongside experts from CAFRE will outline the latest scientific developments and practical advice related to delivering high quality lamb 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 sheep sector are many and diverse. These include:

- volatility in prices and profitability
- sub-optimum flock performance
- new and emerging sheep diseases
- antimicrobial resistance and future limitations on antibiotic usage
- anthelmintic resistance
- need to optimise grassland management and productivity
- need to reduce greenhouse gas emissions to protect and improve the environment
- uncertainty associated with the UK's exit from the European Union
- demand for sheep meat and 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 production of efficient and healthy lambs at a rate per ewe suitable for the range of rearing environments in Northern Ireland continues to be of vital importance to the industry. These lambs once born must be able genetically and through management to thrive and deliver the lamb product the consumer demands. Therefore the primary objective of this 'Finishing Lamb' event is to share the latest research knowledge and developments in innovation for sheep systems. The specific topics being discussed at the event include: Lamb markets and consumer attitudes; lamb nutrition and diets; grazing systems; role of genetics and; novel carcass quality evaluation technologies.

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, LMC, AgriSearch 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 Swatragh and Hilltown Livestock Markets for the use of their excellent facilities and the CAFRE, AFBI, LMC and AgriSearch staff who have worked tirelessly to deliver this event for this sheep industry.

Dr Steven Morrison (Head of AFBI Agriculture Branch)

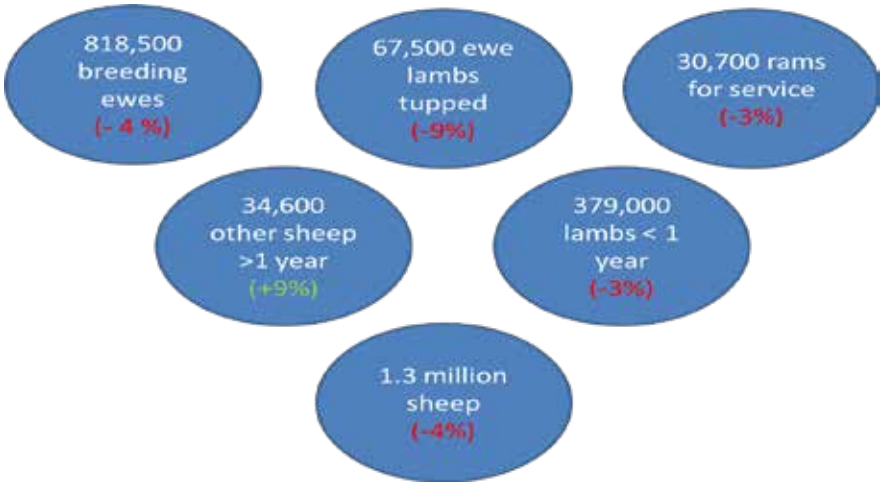
Supplying what the Market Wants

Colin Smith

Industry Development Manager

Livestock and Meat Commission

Sheep production NI (December 2018 figures)



Where is the end market for NI Lamb?

- EU market is the final destination for 75% of NI lambs.
- This shows how significant the impact of Brexit could be for the industry.

Approx 800,000 lambs for slaughter

400,000 killed locally (50%)

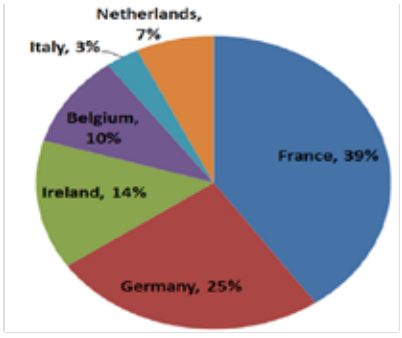
400,000 exported live (50%)

25%

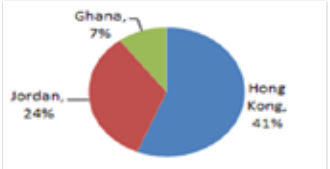
75%

Breakdown of UK Lamb Exports January-June 2019

UK lamb exports 44,375 tonnes



42,740 tonnes
+8,388 tonnes
2018/19
(96% exports)

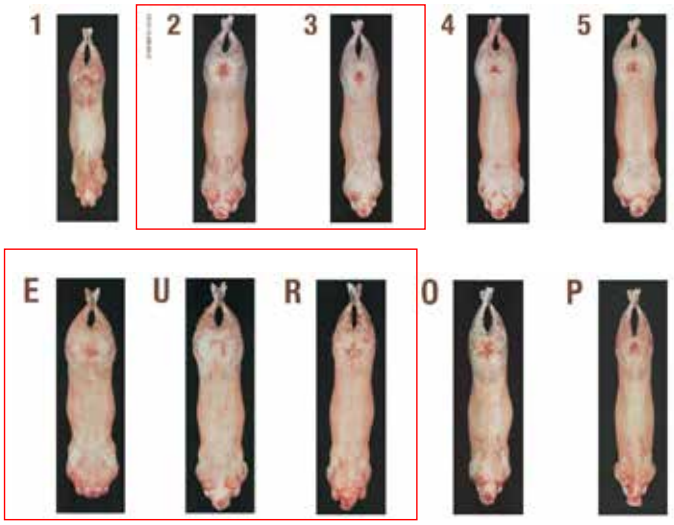


1,634 tonnes
-192 tonnes
2018/19
(4% exports)

Producing what the markets want…

FAT CLASS

CONFIRMATION



% Price Reported in target area in NI 2018

E/U/R 2/3	90%
Fat 4/5	6%
Poor Conformation	3%
Ave Carcase Weight	21.6 kg

Maximise returns by meeting market specifications

NB: Most deadweight markets pay up to 21kg

Typical Specification (subject to seasonal and regional variations)		Supermarket	Local butcher	Exporter
	Weight	18-21kg	18-22kg	18-21kg
	Conformation	E,U, R	E,U,	E,U, R
	Fat Class	2, 3	2, 3	2, 3

WARNING: Conformation P, Fat Class 4 and 5 – Very limited demand & traded at discount prices

Live export market to ROI also provide an important outlet for NI sheep industry

The Importance of meeting the weight specification

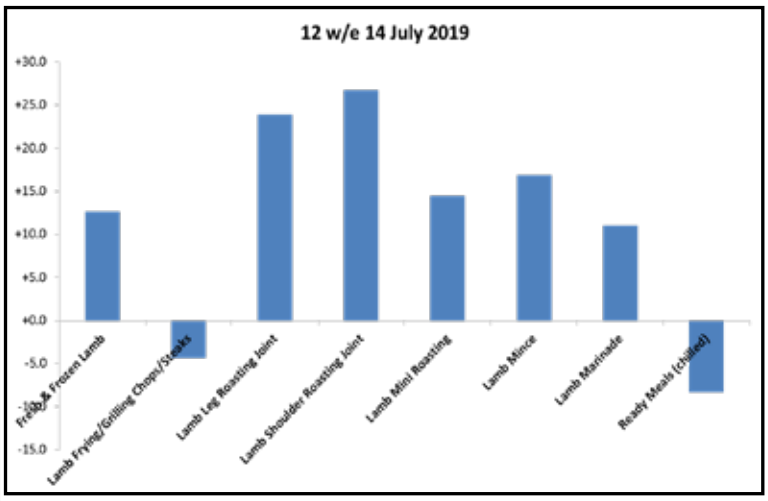
Overweight carcases (>21/22kg)

- Poor demand for heavier carcases from major retailers
- Poorer returns for the producer

Approximately 50% of lambs killed locally are overweight

UK Kantar Lamb 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

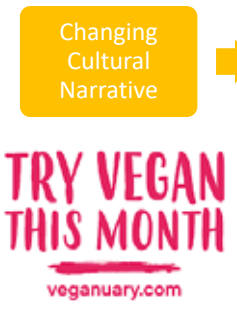
Three Mutually-Incompatible Things Promised

- 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



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

Love Lamb Week 2nd- 8th September

Finishing Lamb

Future Proofing Sheep Farming

Notes

Sheep Scab

Stamp SCAB Out!

Get an accurate diagnosis

Get the best plan for YOUR farm from your VET today!

Keep SCAB Out!

Don't buy it in

Quarantine & biosecurity

Start today

You cannot afford NOT to!

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Nutritional needs of lambs (recent research)

Aurelie Aubry, CT Yang, T Yan

September 2019

afbini.gov.uk

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Context

- Current sheep rationing systems were developed using data from over 30 years ago
- Energy requirements for maintenance are now higher than those calculated from these rationing systems by > 20%, following improvements in sheep genetics
- Need to update these systems to better reflect higher energy requirements
- Previous studies found that maintenance energy requirements could be similar among different diets, but:
- Diets investigated were mostly conserved forage, pelleted and concentrate mixtures, with **a lack of data available on fresh forage**

"Feed into Lamb": objectives of the research (2016-2018)

- To update the energy requirements of sheep, in order to improve current models of the AFRC (Agriculture and Food Research Council) used to define feeding recommendations
- To investigate the environmental footprint of sheep production systems

Experimental approach

Digestibility & chamber trials at AFBI Hillsborough (2013-2017) using:

- Growing lambs to adult ewes (n = 131 animals)
- Different breed types and live weights (Texel, Suffolk, Meatlinc, Lleyn, Belclare, Highlander) (29 to 70 kg)
- Different genders (males, castrates and females)
- Different diet types (fresh forage, silage and concentrates)
- Different feeding levels

Experimental approach (ctd)

- Feeding arrangement (zero grazing)

Grass cut daily → Fed once a day in pens for 14 days → In 6 Respiration chambers for 4 days



Experimental approach and analyses

- Chamber measurements
  - Sheep housed in crate within chamber
  - Measurement: Feed intake, faeces and urine output, gaseous exchange (CH_4, CO_2, O_2)
  - Chemical analyses to calculate energy balance (= intake – output – heat production)
- Data analyses
  - Statistical models to establish relationships between energy balance and energy intakes
  - Models used to derive maintenance energy requirements




Results

- The energy requirements for maintenance (ME_m) were 0.486MJ/$kg^{0.75}$, which is 40% higher than values used to ration sheep in the UK (AFRC 1993)

- No significant effect of
  - Concentrate supplementation (forage only vs mixed diets)
  - Sire breed type (maternal vs terminal)
  - Physiological stage (lamb vs ewe)

- There was a gender effect: female lambs requirements were 15-22% higher than for male or castrated lambs

Consequences of underpredicting maintenance energy requirements

		Lamb 30 kg		Lamb 40 kg	
DM Intake required for maintenance (g/d)	**AFRC (1993)**	420		520	
	Feed Into Lamb	590		740	
	Difference	170		210	
Targeted LWG (g/d)		150	150	250	250
Actual LWG (g/d)		90	90	190	190
Difference (g/d)		- 60	- 60	- 60	- 60
Additional Days to Slaughter		+ 62 days	+ 18 days	+ 18 days	+ 5 days

Remember other key nutritional requirements!

- Energy requirements for **growth**
- Protein requirements
- Trace elements such as selenium and cobalt play an important role in the immune system:
  - ✓ Monitor ewe's trace element status up to weaning
  - ✓ Most appropriate time to assess deficiency in lambs: 2-3 weeks post weaning (based on recent research at AFBI)
  - ✓ Recent research at Teagasc and AFBI shows that lambs supplemented with cobalt can grow faster and be less affected by worms (but important variability among farms)

Take home messages

- Maintenance energy requirements for lambs are much higher (by up to 40%) than those recommended by current sheep feeding systems
- There is thus a urgent need to update the energy feeding systems to reflect the higher metabolic rates of the current sheep flocks
- Research data indicates that there is a need to adjust the recommendations (for maintenance) depending on gender (female vs others), but not for breed types and age (up to 1.5 years old)
- The research also provided valuable data to reduce the environmental footprint, by improving the predictions of
  - methane emissions
  - nitrogen excretion levels in sheep

  which can be used to develop mitigation strategies

Thank you to all funders and partners

Notes

Lamb finishing

Dr Eileen McCloskey
CAFRE

What to do with lambs – store or finish

- Depends on many factors
  - Weight of lambs
  - Length of time/feed required to finish
  - Availability of grass or concentrates
  - Market trends

Advantage of getting lambs away

- Grass supply can fall substantially
- Releases grass for ewes at tupping and provides grass to go into winter
- Can reduce need to feed ewes
- Take advantage of store trade?

Advantage of finishing or buying stores

- Mop up surplus grass in autumn/winter without poaching the land
- Improves sward quality
- Buy stores at a competitive market price
- Sell into high market price
- What is a competitive price?

Range of finishing systems

Length of keep	Lamb live weight (kg)	Lamb half weight (kg)	Typical weight gain per week (Kg)	Length of finishing period	Finishing system
Short	36+	18+	0.9 – 1.1	6 weeks or less	Good quality grass or grass and concentrate
Medium	30-35	15-17.5	0.6 – 0.8	6-10 weeks	Grass and concentrate
Long	Below 30	Below 15	0.5 – 0.7	10 weeks+	Grass and concentrate Forage crops Ad Lib/ indoor finishing

Grass finishing

- Ideal for lowland dairy / beef farms
- Surplus grass on silage aftermaths or cattle grazing swards
- Lower worm challenge – clean grazing
- Grass quality will depend on management during the summer
- Keep a good grass supply going into fields at 5-7 cm coming out at 3cm

Grass finishing

Pre grazing - Grass cover 5-7 cm

2200 kg dry matter/ha

Post grazing - Grass cover 3 cm

1600 kg dry matter /ha

Targets for grass finishing

- Aim to finish lambs within 6 - 8 weeks
- Utilise 50% of the sward in all fields available – grazing tight may restrict intakes and performance
- During favorable conditions can gain 1 kg/head/week
- Pastures with high clover content (10%) can increase growth rates by 50 g/day compared to grass alone

Supplementary feeding at grass

- Most sense when grass quality/quantity is low
- Still requires good grass management, can help to stretch resource allows higher stocking rate
- Feed a high energy, low protein concentrate along with good quality grass
- Concentrates can be fed at 300g – 1 kg per day level depends on
  - Grass quality/quantity
  - How quickly lambs need to be finished
  - Lamb/conc. price

Supplementary feeding at grass

- Troughs
  - Every lamb must be able to feed at the same time

- Hoppers
  - Can be placed out in fields but are more suitable for feeding ad- lib concentrates than a restricted quantity

Finishing Lamb Future Proofing Sheep Farming

All meal diets

- Expensive, useful to achieve necessary finish and meet target market
- Viability depends on lamb and meal prices
- Can take up to 8kg meal to support 1kg of liveweight or 0.48kg of carcass
- Lambs can get excessively fat especially ewe lambs
- Don't exceed the payable carcase weight (21 or 22 kg)

Monitor performance on a regular basis check does it pay

Typical FCR 8kg meal for 1kg liveweight

Meal	Lamb
7 kg @ £220 per tonne = £1.54	1kg of liveweight x 48 % kill out = 0.48 kg carcase
8 kg @ £220 per tonne = £1.76	0.48 kg carcase @ £3.50 = £1.68
10 kg @ 220 per tonne = £2.20	0.48 kg carcase @ £3.70 = £1.78
Cost 8-1 = £1.76	Return = £1.68 - £1.78

Potential ingredients for finishing diets

High Energy	Medium Energy	Low energy
Cereals (Barley, maize, Wheat, Oats)	Maize gluten	Pollard/wheat feed
Pulps (beet & citrus)	Soya hulls	Palm kernel
Soyabean meal	Rapeseed meal	Sunflower
Distillers grains		Oatfeed
Peas & beans		
Molasses (<5%)		

All meal diets – key points

- Ensure diet is appropriately formulated, build up gradually
- Offer small quantity of long roughage
- Ensure good supply of water
- NEVER use ewe minerals in lamb rations
  - Include ammonium chloride if finishing males over a longer period

All meal diets - Key points

- Lighter lambs (below 35kg) require more protein for growing feed diets with 13-14% crude protein
- Lambs 35kg+ wont benefit for additional protein, feed diets with 10-12% crude protein
- Avoid to much starch or finely ground diets
- Coarsely ground or cracked ingredients are digested slower
  - Lambs may sort and leave behind less palatable ingredients eg. rapeseed

Housing lambs

- Up to 4 lambs per mesh slat 0.7 m^2/lamb
- On restricted feeding allow 350-400 mm trough space per lamb
- On Ad lib feeding allow 125 mm trough space per lamb
- Good ventilation – prevent sticky housing/damp bedding

If buying lambs

- Select lambs free from Orf /scab
- Little or no feet problems/ lameness/joint-ill
- Avoid mixed groups of lambs
- Similar breed type and sex
- Keep entire ram lambs away from ewe lambs

Management after purchase

- Dose with ‘an effective wormer’ and house/yard for min 18-24 hours
- Keep separate from own sheep
- Footbath and keep on clean concrete for 1 hour
- Vaccinate with clostridial / pasteurella vaccine
- Dip if necessary or apply pour on depending on season

Selecting lambs for slaughter

- Weigh lambs regularly
- Assess flesh/fat cover by handling the lambs
- Females will fatten at lower liveweight
- Don't allow lambs to go over weight or over fat

Take Home Message

- Finishing system depends on the resources - Prepare a budget
  - Plan your feeding system grass is your cheapest and most valuable resource
  - Have a target slaughter weight/finishing period
  - If intensive feeding check your costs
- Weigh lambs on a regular basis
- Read the market trends
- Sell as stores if finishing will affect performance of ewes

Grazing Systems – making the most of grass

GrassCheck NI

Elizabeth Earle and Tara Meeke

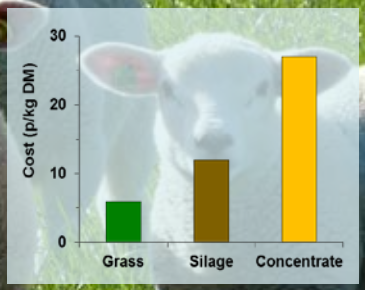
Value of Grass £££

Can supply up to 90-95% of annual energy requirements of sheep

16 - 20% Crude protein

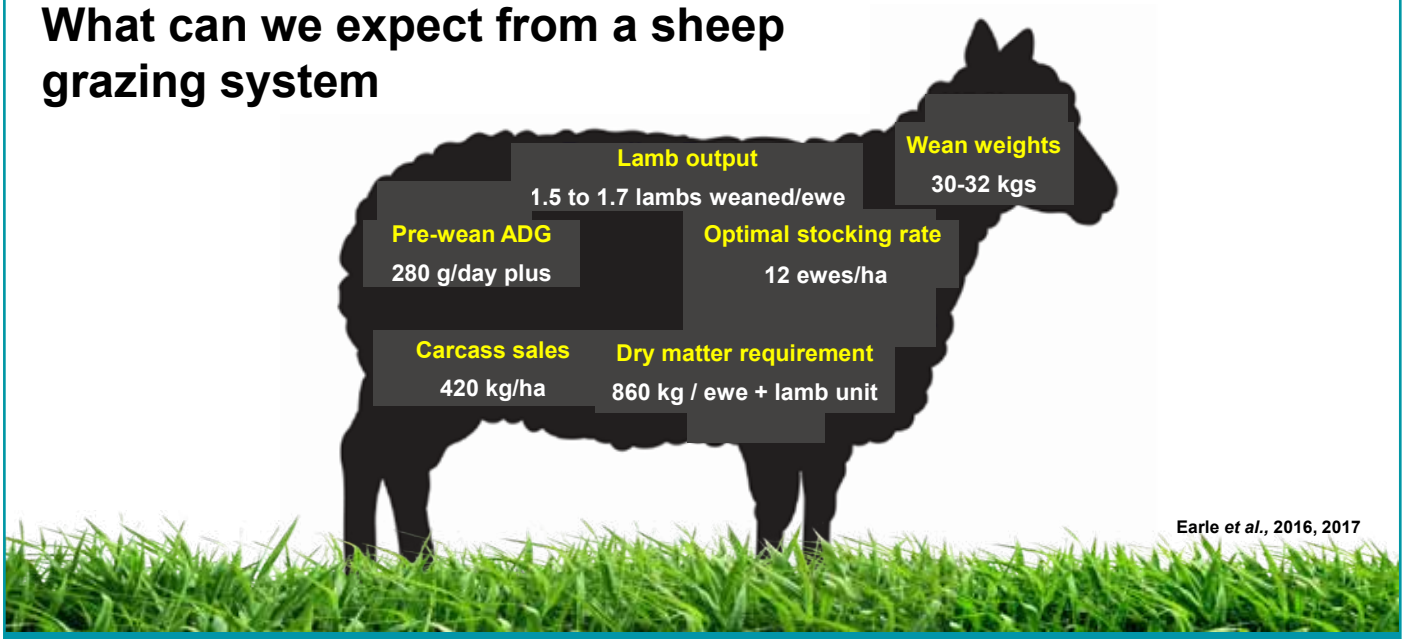
11 - 12 MJ ME / kg DM

6 - 7 pence/kg DM



Competitive advantage - ability to produce lamb from almost entirely grass-based diet

What can we expect from a sheep grazing system



Earle *et al.*, 2016, 2017

Finishing Lamb — Future Proofing Sheep Farming

"Lamb from Grass"

- 3 year project funded by DAERA and AgriSearch
- Grazing trials to investigate different grazing strategies and sward types
- On-farm work to:
  - Provide detailed understanding of grass growth
  - Identify variability in grass production and quality
  - Evaluate 4- versus 8-paddock rotational grazing systems

Finishing Lamb — Future Proofing Sheep Farming

GrassCheck: background

- Long term grass growth and quality monitoring project
- Grass growth forecasting:
  - 7 day
  - 14 day
- Network of 48 commercial dairy, beef and sheep grass monitor farms

Grass growth

Weather data

Grass quality

GrassCheck sheep farms
- grazing management

- Target pre-grazing covers:

  2400 – 3000 kg DM/Ha (8-10 cm)

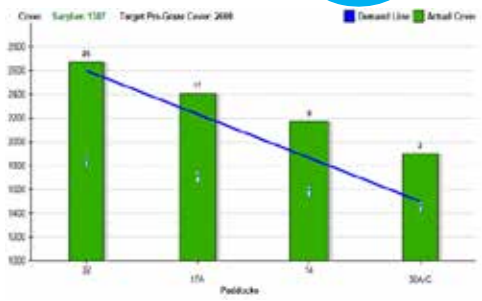
- Target post-grazing covers:

  1500 – 1700 kg DM (3.7-4.5 cm)

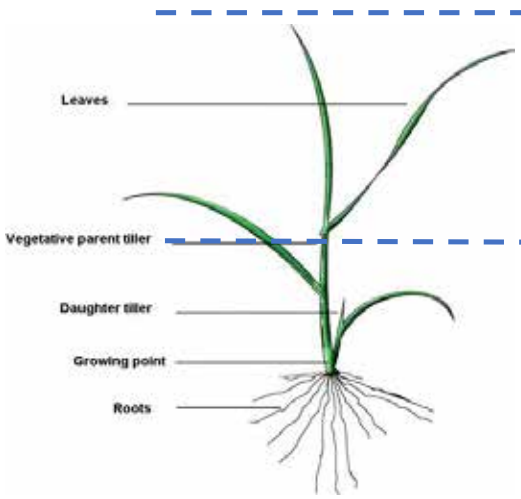
- Measure grass covers weekly
- Record it on AgriNet software package
- Monitor and use the following information:
  - Grass growth
  - Farm cover
  - Grazing days ahead

AgriNet

"You can't manage what you don't measure"



Keeping a supply of high quality leafy grass



8-10 cm
2400 – 3000 kg DM / ha

4-5 cm
1500 – 1700 kg DM / ha

Golden rule
Graze at 3 leaf stage,
Graze for 3 days,
Regrow for 3 weeks,

Achieving target pre- and post-grazing residuals key to:

- Higher intakes of good quality pasture
- Increase animal performance
- Reduction in herbage wastage
- Higher quality re-growths
- Improved response to N fertiliser

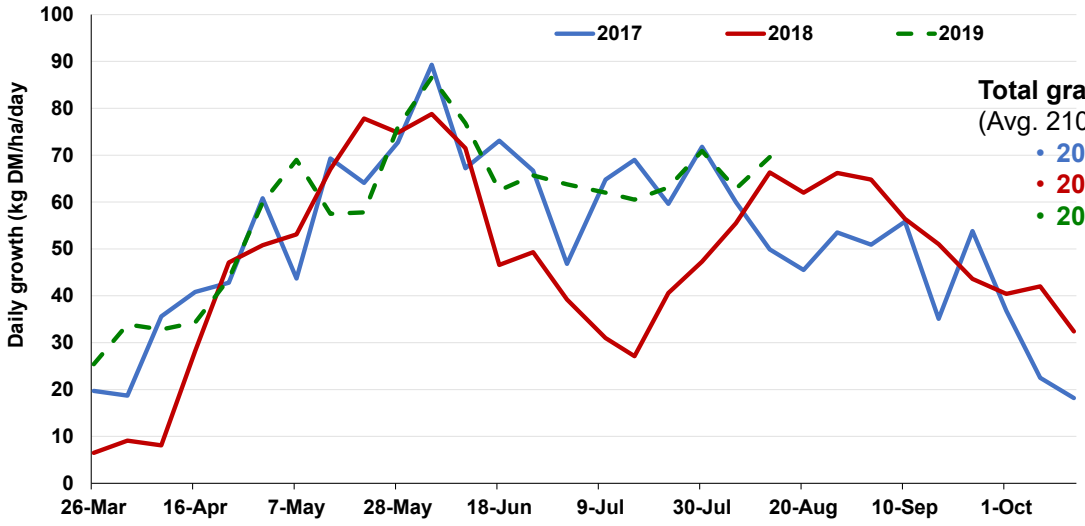
What to graze at

2800 kg grazing

All Leaf

1600 kg (2-3 days)

Beef and Sheep Farms – on farm growth 17-19



Total grass grown:
(Avg. 210 d growing season)

- 2017 = 10.9 tonne
- 2018 = 10.0 tonne
- 2019 = 8.6 tonne to date

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GrassCheck Beef and Sheep farms – Key figures (2017-2018)

- Average paddock production 9.3 – 10.4 tonne/ha
- Utilising 80 - 90 % of grass grown = (Avg: 7.5 – 9 tonne/ha)
- Average grazing events per paddock = 6 – 7 times year
- Average paddock size 0.97 ha

Table 1: Top 5 performing paddocks on Beef and Sheep Farms in 2018

Paddock	Pre-graze Cover (kg DM/ha)	Post-graze Cover (kg DM/ha)	Total Offtake (kg DM/ha)	Number of Grazing events
1	3346	1510	14690	8
2	3179	1661	14545	8
3	3229	1657	14155	9
4	3156	1595	14044	9
5	3163	1555	12862	8

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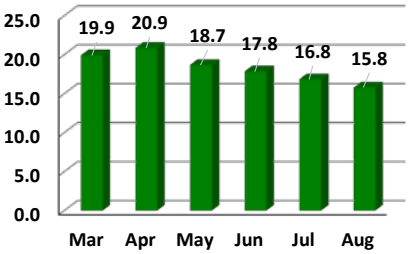
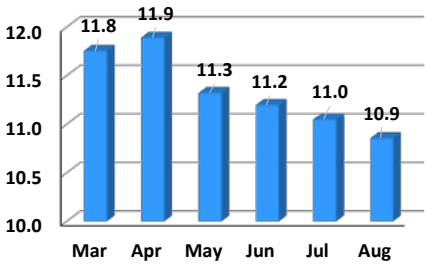
Beef and Sheep Farms – Grass quality 2019

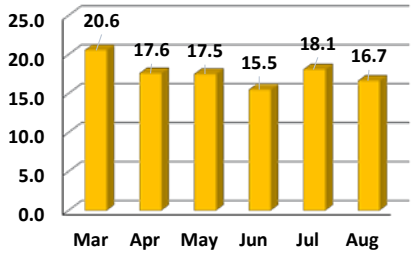
Dry matter content (%)



Energy content (MJ ME/ kg DM)



Crude protein content (%)



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The effects of sheep grazing strategies on animal performance and grass production, utilisation, and quality

Tara Meeke

September 2019

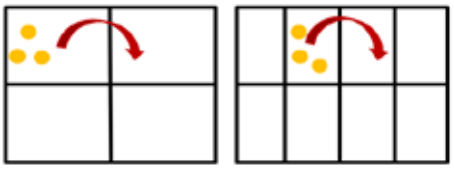
afbini.gov.uk

Background

- Grass utilisation is one of the key factors influencing profitability of grass-based livestock systems (Creighton, 2015).
- Previous research shows rotational grazing systems can deliver higher levels of animal and grassland performance compared to set stocking.
- Research by Warner and Sharrow (1984) showed a 4-paddock rotational system to achieve a higher grass production than a set stock system across a 3-year study.

Project aims

- Evaluate 4 vs. 8 paddock rotational grazing systems
- Evaluate different sward types under rotational grazing
- Identify realistic targets for lowland sheep systems in terms of:
  - Herbage production and utilisation
  - Animal performance
  - Lamb output per hectare



Study design

- 2 rotational grazing systems:
  - 4 paddock
  - 8 paddock
- 1.6 hectares per treatment
- 22 ewes and their twin lambs (14 ewes/ha)
- Grazing management:

Pre-Weaning	Height (cm)	Cover (kg DM/ha)
Pre-grazing	8-10	2400-2800
Post-grazing	4	1600
Post-Weaning		
Pre-grazing	8-10	2400-2800
Post-grazing	5-7 (Lambs) 4 (Ewes)	1900-2200 1600

Flock management

- Managed in a Mid-season lamb production
- Post lambing: Ewes & lambs were turned out to pasture
- All Lambs weaned on average at 14 weeks of age
- Leader follower grazing system operated post-weaning
- Lambs were drafted for slaughter to produce a target carcass weight of 20 kg

Animal Measurements

- Ewe body weight and body condition score recorded at turnout, 6 and 10 weeks post-lambing and weaning.
- Lamb LWG - Birth weight, Week 6, 8,10,12 14
- Parasite challenge - Faecal egg counts Week 8,10,12,14
- Slaughter data - days to slaughter, carcass weight, conformation and fat score
- Ewe and lamb grazing behaviour monitored using GPS/accelerometer collars

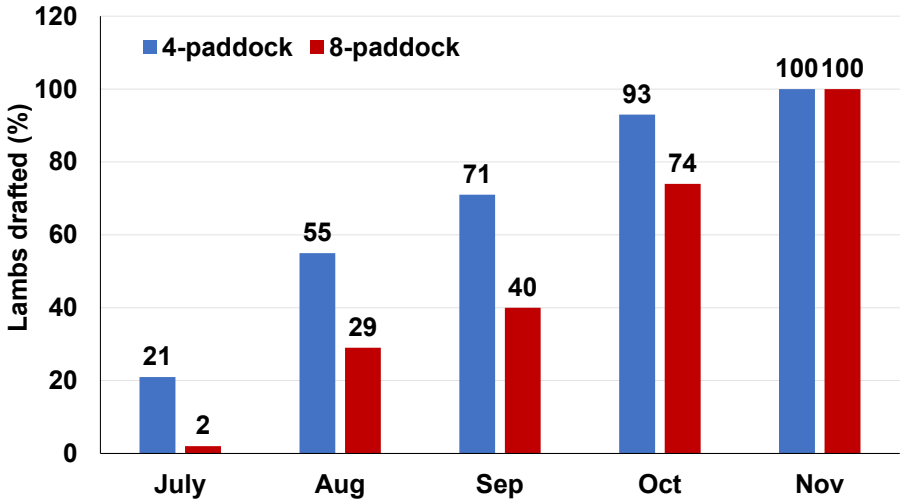
Results

- No difference in lamb performance up to 10 weeks
- Lambs grazing the 4-paddock rotational system had higher average daily gains from 10 to 14 weeks of age
- This resulted in higher weaning weights for lambs on the 4-paddock rotational system

Table 1. Lamb performance from birth to weaning

	4-paddock	8-paddock	Sign
ADG (g/day);			
Birth to 10 weeks	323	313	NS
10 to 14 weeks	267	202	***
Birth to weaning	257	232	**
Weaning weight (kg)	30.2	27.5	**

Results – Lamb output and drafting pattern



Avg. weaning rate = 1.9 lambs/ewe

Lambs output = 26.8 lambs/ha

Avg. age at slaughter = 27 weeks

Results – Carcass traits / carcass output

	4-paddock	8-paddock	Sign
Carcass weight (kg)	20.1	20.3	NS
Carcass conformation	3.4	3.4	NS
Fat score	2.7	2.6	NS
Kill out %	46.6	46.2	NS
Carcass output (kg/ha)	538	544	NS

Results- Grassland Performance

- Avg. yearly grass production = 8.2 tonne/ha
- Grass quality:
  - Dry matter = 20.2 %
  - ME = 11.2 MJ ME/ kg DM
  - Crude protein = 14.2 %
- Grass Utilisation: 78%

Summary:

- Lamb performance was higher on the 4-paddock system compared to the 8-paddock system
- Potential to achieve a carcass output of >530 kg/ha
- Important to find a grazing system that works for you!!
  - Allows you to manage grass effectively
  - Optimising lamb growth and output

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

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Leading | Protecting | Enhancing

Genetics of lamb production

Aurelie Aubry

September 2019

afbini.gov.uk

Agriculture, Environment and Rural Affairs | The Research Challenge Fund | RamCOMPARE

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Appearance = Genetics + Environment

Finishing Lamb Future Proofing Sheep Farming

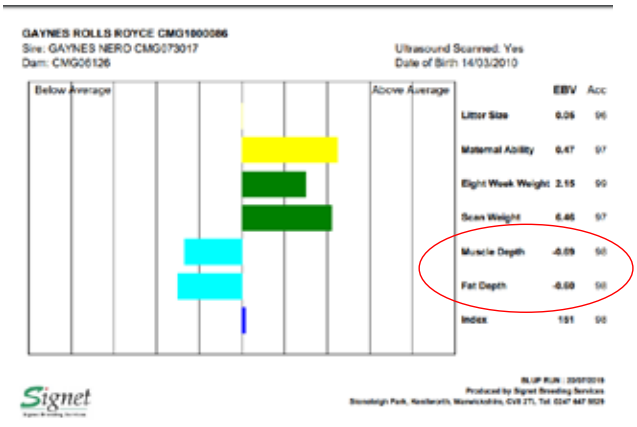
Genetic selection leads to increases in profitability

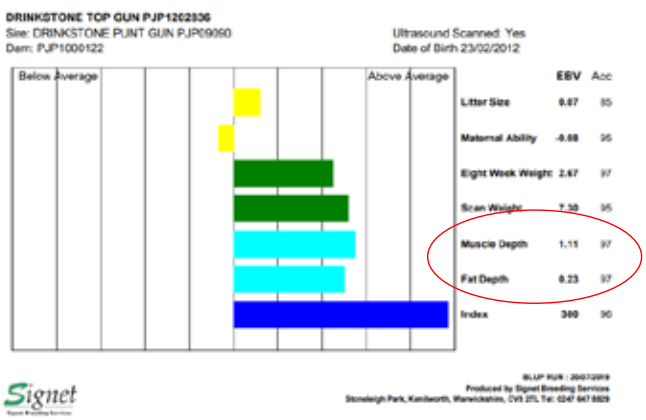
- Across 9 RamCompare farms, high index terminal sire rams have produced lambs that were £3 to £5 a head more valuable than those produced by stock rams, due to:
  - More lambs hitting market specifications (% graded U and R)
  - Reduced days to slaughter
  - Heavier carcass weights (but within target weight!)
- Example of RamCompare Charollais farm in Yorkshire:

Charollais sires comparison	U	R	O
Stock Ram	10%	79%	10%
High EBV AI Ram	62%	38%	

How to select rams?

- By using EBV charts, see below two Texel rams used at AFBI in 2017/18:





Why RamCompare?

Many aims, including:

- ❑Ram comparison irrespective of breed
- ❑Assess recorded rams under **commercial** conditions
- ❑Assess traits of economic importance
  - New EBVs for days to slaughter, carcase muscle, carcass fat and carcass value

RamCompare NI: Objectives

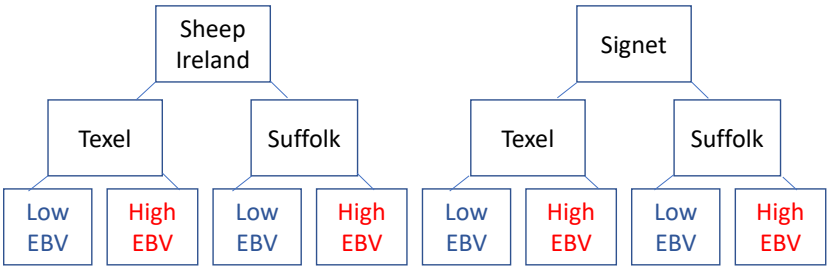
- Contribute to the activities of the RamCompare programme (UK wide), Signet and Sheep Ireland evaluation systems by
  - ✓monitoring the progeny from high and low EBV sires, from birth to slaughter
  - ✓Support the development of existing and new EBVs
- Evaluate the effect of sire EBV for muscle and finishing diet (subset of 80 lambs) on:
  - ✓Lamb performance
  - ✓Net feed efficiency
  - ✓Meat quality

RamCompare NI: Approach

- **How to achieve this?**
  - Use existing and novel techniques such as ultra sound scans, CT scans, feed boxes
- **What is the overall goal?**
  - Findings and discussions will improve our understanding and awareness of EBVs and support NI industry to improve the rate of genetic gain
  - New knowledge on novel traits (feed efficiency) will support the development of new EBVs

RamCompare NI: breeding programme

- **October 2017**
  - 290 ewes AI'd (3rd and 12th Oct 2017), average of 61kg mating weight
  - 9 rams used



- **October 2018**
  - 374 ewes AI'd (5th and 11th Oct 2018)
  - 15 rams used

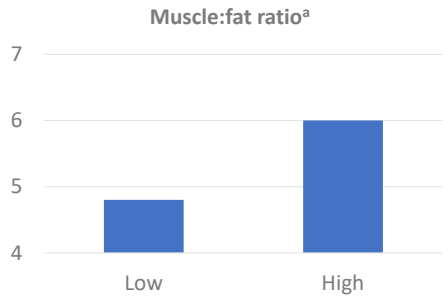
Slaughter data (2018)

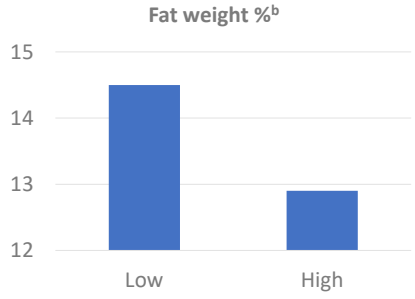
Days to slaughter	Low	High
Days to slaughter (days)	206	194

	Low	High
Kill out %	46.7	46.6
Fat score	2.7	2.5

- Lambs from the high EBV group were slaughtered on average 12 days earlier
- On average, 30% of lambs achieved E and U grades, with little differences among groups
- No clear pattern yet in terms of KO% and fat scores
- Only preliminary data (2019 to be included)

CT scanning data (2018)





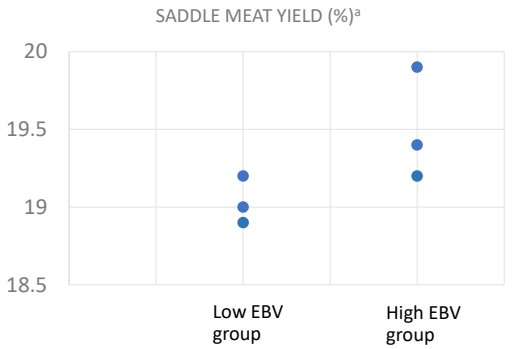
[a] (Muscle weight)/(fat weight) in the carcass

[b] % of total weight in the carcass

- As expected, higher muscle:fat ratio for lambs from High sire group (+25%)
- CT methods can be used to improve current carcass grading systems

New traits on saleable meat yields

- Data from all 9 RamCompare farms provide data on primal yields: weights of the front, middle and haunch of the carcass
- These new traits have been shown to be highly heritable
- This led to the production of new EBVs for primal cuts
- AFBI Example:
  - Saddle meat yield for progeny from 6 rams used at AFBI in 2018, with SMY data available for more than 10 lambs (n = 100 lambs)
  - Clear differences among rams
- Next steps:
  - 2019 data to be included
  - Further analyses on meat quality
  - Further analyses from all RamCompare farms



[a] (saddle weight – fat weight – bones weight)/(carcass weight)

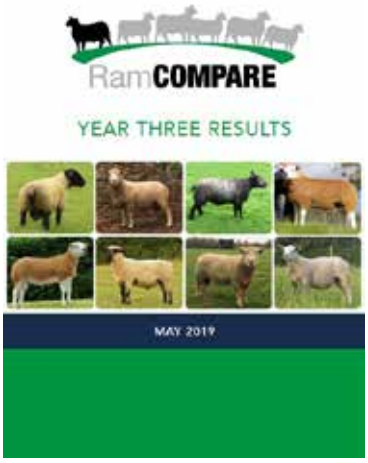
RamCompare UK findings

What we know:

- Genetics influencing each trait, including days to slaughter
- Ranking of rams for standard traits
- Ranking of rams for primals and meat quality
- Economic value of sires with different genetics

What we need to think about:

- How can we have more industry impact?
- The genetic relationships between all traits



Take home messages

- Low uptake of using recorded rams, despite evidence of financial benefits
- Using high index rams can increase lamb value by £3 to £5
- Preliminary data from RamCompare NI found higher muscle depth and muscle:fat ratio for high EBV (muscle)-sired lambs, without reducing lamb growth
- Clear potential for the use of new EBVs relating to meat yields
- Better genetics improve animal efficiency and thus reduce environmental footprint
- In practice: Use breeding information to target your needs:
  - ✓Focus on your flock breeding objectives and identify EBVs of importance
  - ✓Source EBVs online or at sales
- Don't forget about ram health and fertility!

Thank you to all funders and partners

AHDB Signet Sheep Ireland dunbia afbi AgriSearch cafre LMC Livestock & Meat Commission
Agriculture, Environment and Rural Affairs The Research Challenge Fund RamCOMPARE

Carcass quality and evaluation

David Farrell[1], Linda Farmer[1], Declan Devlin[1] and Frances Titterington[2]

1. AFBI, Food Research Branch
2. AFBI, Agriculture Branch

Contents

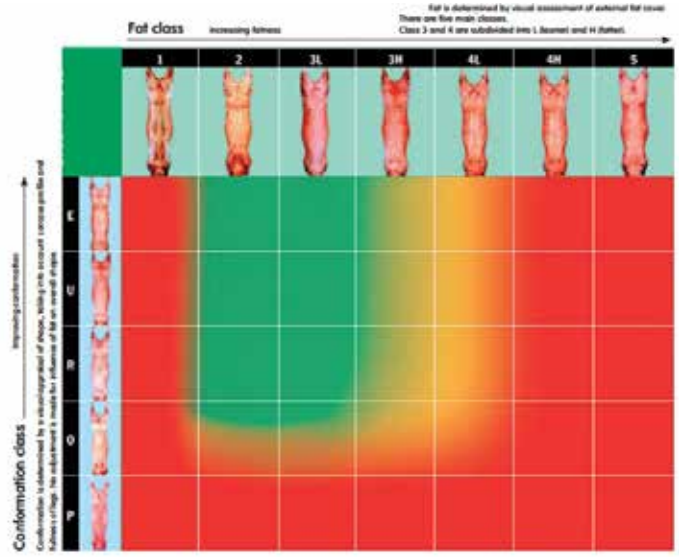
- What is carcass quality?
- Evaluating carcass quality.
- EUROP system.
- Potential for new grading methods.
- Eating quality: what and why?

What is carcass quality?

Commercial value of the carcase

- The yield of saleable meat (SM%)
- The distribution of saleable meat between the higher and lower priced cuts and,
- The eating quality of saleable meat

Evaluating carcass quality: EUROP



- UK employs EU grid for beef and sheep
- Provides pricing continuity across EU

EUROP: Strengths & Limitations

Strengths

- Visual assessment of external fat and conformation used to predict meat yield.
- Yields and returns can be predicted and monitored.
- Common language that facilitates trade.
- Acts as a catalyst for breed and herd improvement

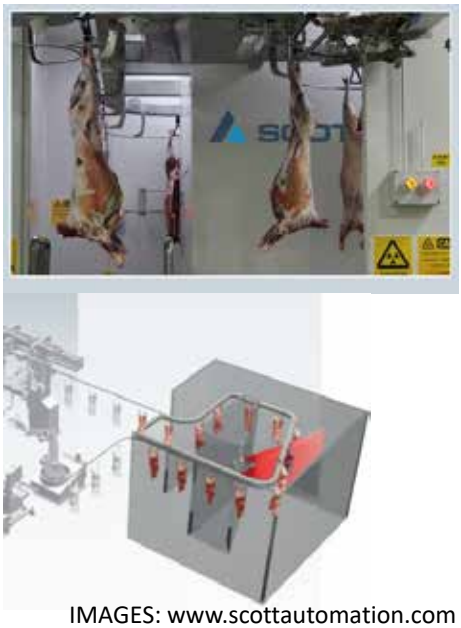
Limitations

- Criticised on accuracy, consistency and subjectivity.
- Does not adequately represent carcass value.
- Payment made only on meat yield.
- Eating quality is ignored.

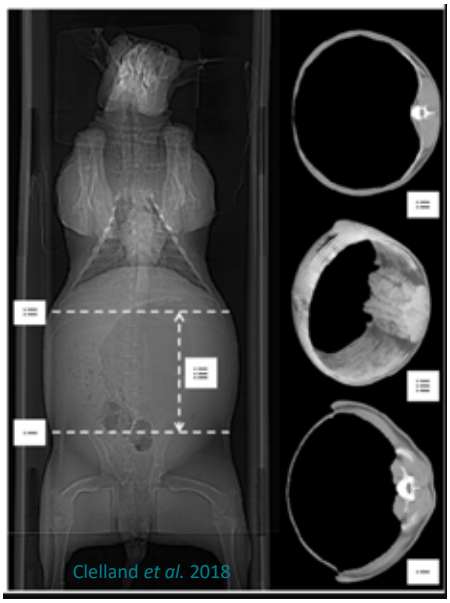
Potential for new grading methods

Methods include:

- Computed Tomography (CT)
- DEXA
- Hyperspectral Imaging



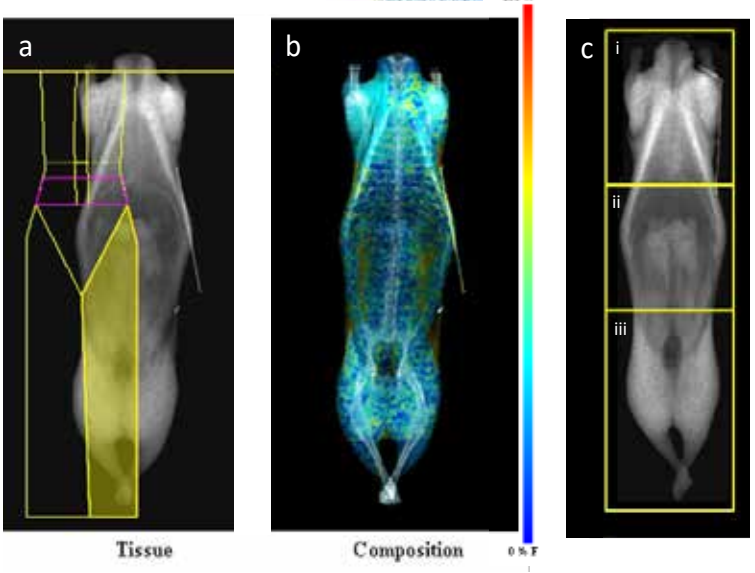
IMAGES: www.scottautomation.com



Computed Tomography (CT)

- Reference method for calibration of other methods (VIA or US)
- Currently carried out on live animals but,
- Potential for online carcase grading and yield prediction
- Expensive to implement

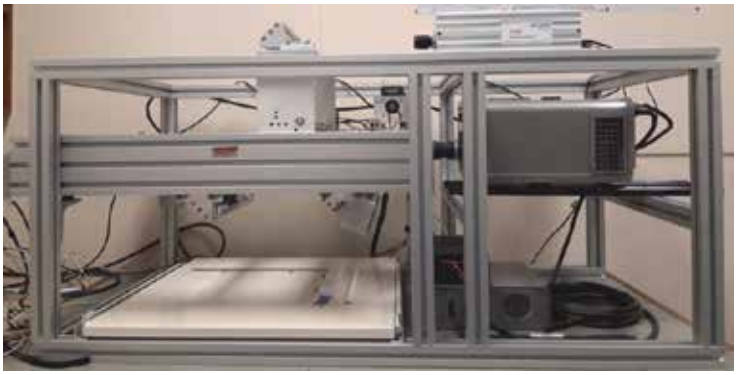
DEXA



Potential for online carcase grading and yield prediction

Hyperspectral Imaging

- **Novel spectral technology**
- **On-line Prediction and Measurement**
- **Multiple opportunities for applications**



Potential for online carcase grading, yield prediction and **eating quality**

Preliminary Results

DEXA

Carcase Section	Comp	% Correlation with weights
Forequarter	Lean	83- 85
	Fat	66
	BMC	78
Middle	Lean	65
	Fat	80
	BMC	57-60
Haunch	Lean	80-82
	Fat	73-77
	BMC	71-77

N= 162-164

HSI

	Predicted Variable	% Correlation
Carcase	FQ	73
	Haunch	55
	Middle	79
Comp	All	61-72
Colour	L, a*,b*	69-74
Chem	pH	93
EQ	Aroma	80
	Flavour	78
	Tenderness	73

Eating quality: What and Why?

- Tenderness
- Flavour
- Juiciness

"I bought lamb for Easter weekend, it was a beautiful joint-moist, full of flavour and was soft to eat"

"The meat smelt bad from the start of cooking until the finish"

"Oven cooked this lamb joint as per the instructions and it was absolutely beautiful - tender and full of flavour"

"I have been cooking slow cooked leg of lamb for a number of years now and this has got to have been the Fattiest and worst joint I have ever cooked"

Why?

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

Factors affecting lamb meat flavour: "RamLamb"

Linda Farmer,
Janeen Speers, Aurelie Aubry, Terence Hagan, David Sanderson, Colin McRoberts, Alison White, Alan Gordon (AFBI), Frank Monahan (UCD) and many others…

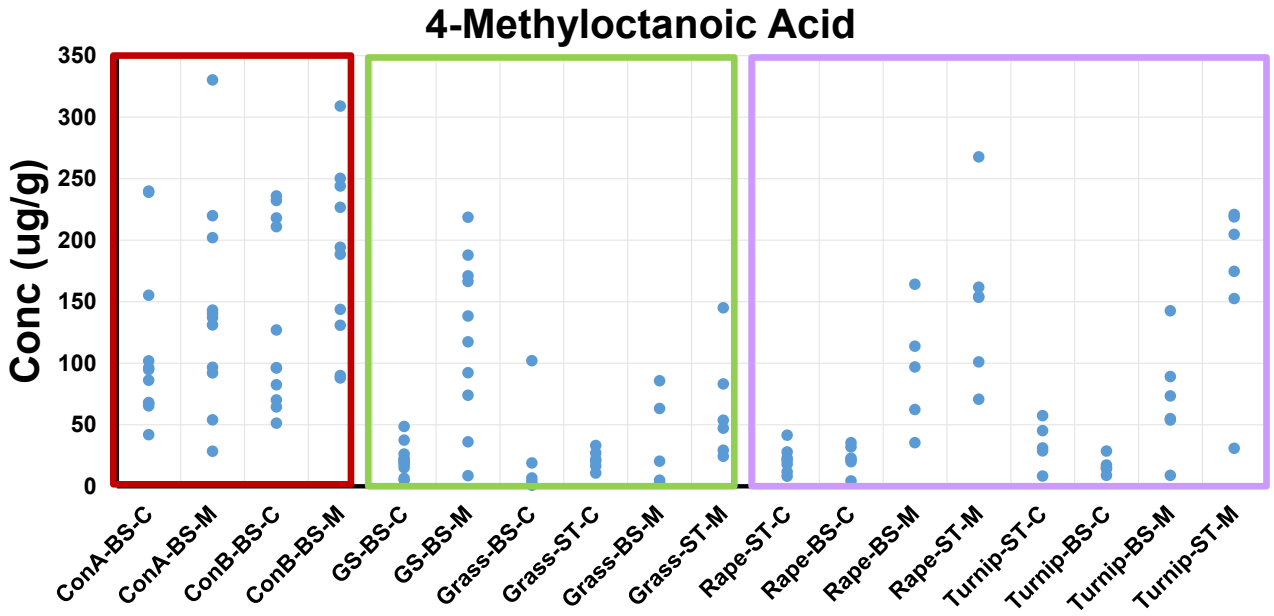
Trial A Experimental design

Farm	Diet
Outdoor	Fresh Grass
Outdoor	Stubble Turnip
Outdoor	Forage Rape
Indoor	Conc
Indoor	Clover silage
Indoor	Grass Silage

Design:
- **Breeds:** Suffx and BSx
- **Sex:** Ram and Castrates
- **Total:** 144 lambs

Analyses:
- Sensory
- Volatile odour compounds
- Fatty acids

Results



Take home messages

- We need **better grading systems**
  - that **deliver for farmers, consumers and industry**
- AFBI are evaluating **new systems**
- Combinations of technologies show promise for:
  - **Measuring** saleable meat and
  - **Predicting** aspects of meat quality
- Consumers are important.
  - Don't forget Lamb Eating Quality

Future Proofing Beef Farming

FINISHING BEEF ROADSHOW

Tuesday 10th September 2019 at 7pm
BALLYMENA LIVESTOCK MARKET

Thursday 12th September 2019 at 7pm
MARKETHILL LIVESTOCK MARKET

TOPICS:

* Introduction to markets / consumer demand
* Nutrition of finishing cattle
* Animal health planning for housing
* Beef housing systems
* Maximising meat quality

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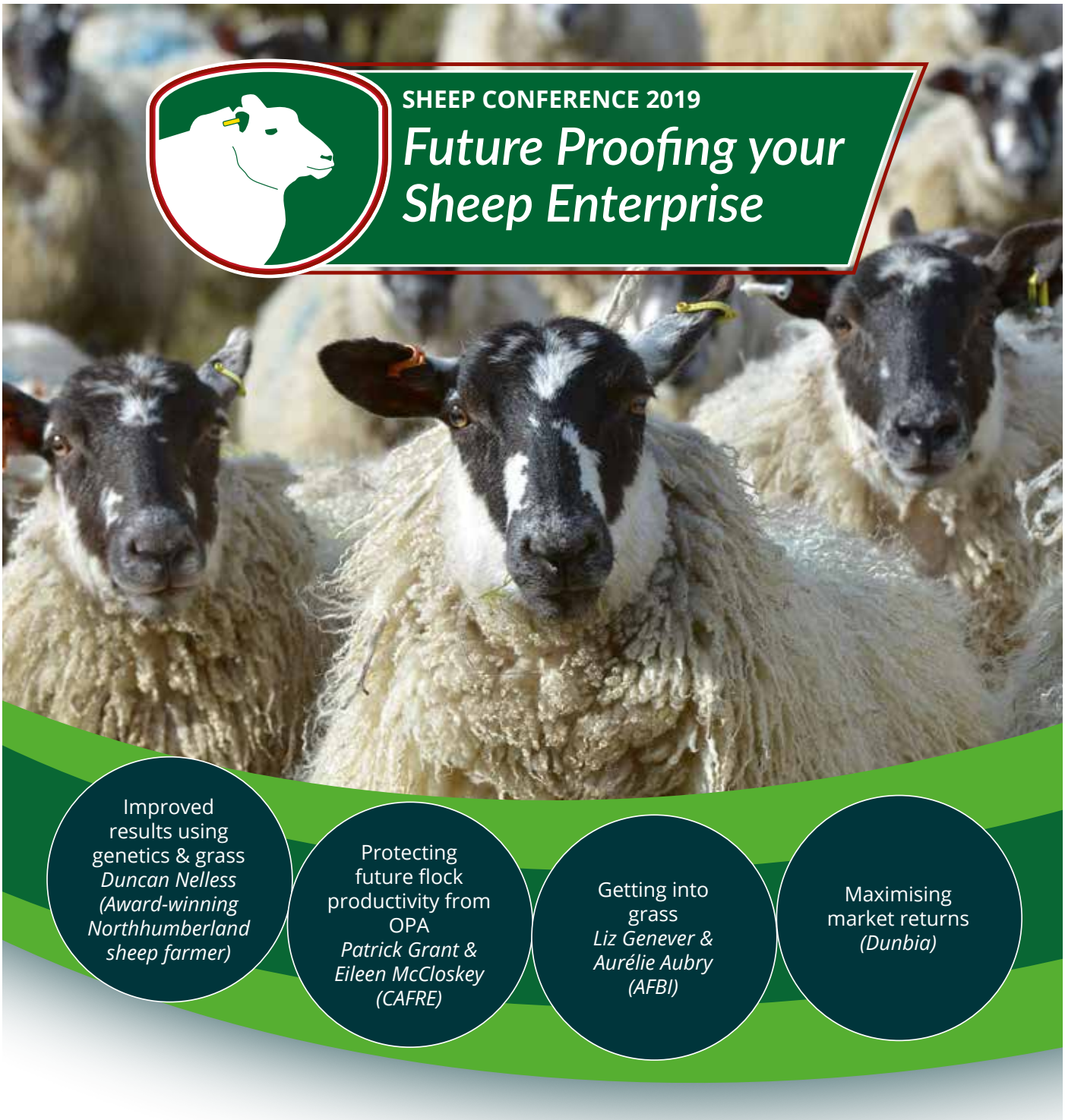

afbi AGRI-FOOD & BIOSCIENCES INSTITUTE
cafre College of Agriculture, Food & Rural Enterprise
NSA National Sheep Association
Ulster Farmers' Union
LMC Livestock & Meat Commission
nimea

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 SHEEP 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 sheep 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 sheep 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 sheep 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 SHEEP RESEARCH PROJECTS:

- RamCompare
- Lamb from Grass
- Rumen fluke in cattle and sheep: measuring impacts and improving diagnosis
- 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 Swatragh and Hilltown Livestock Markets for hosting these events