Genetics Research

Nóirín Mc Hugh, Nicola Fetherstone, Edel O'Connor, Eoin Dunne, Henry Walsh & Fiona McGovern
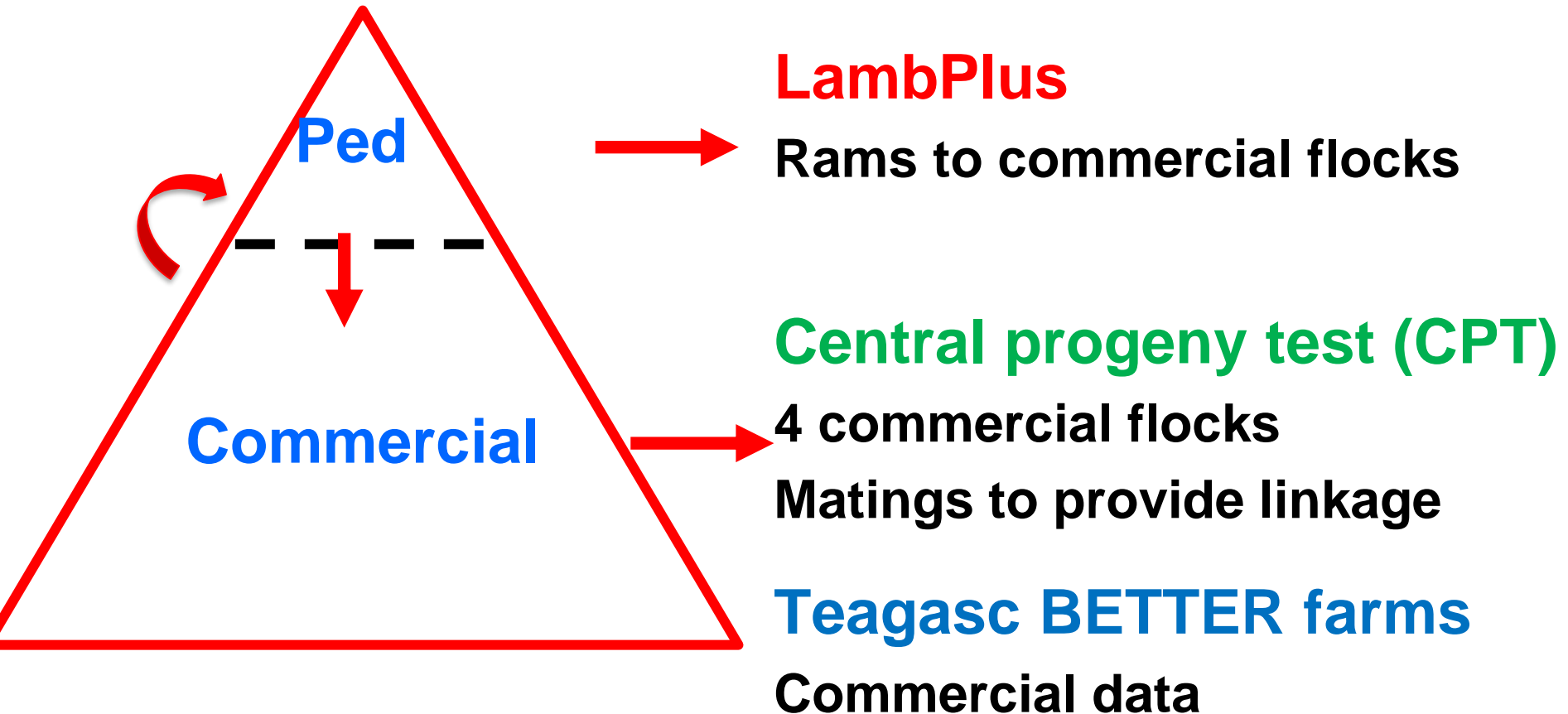
Education Staff IST, 7th July 2021

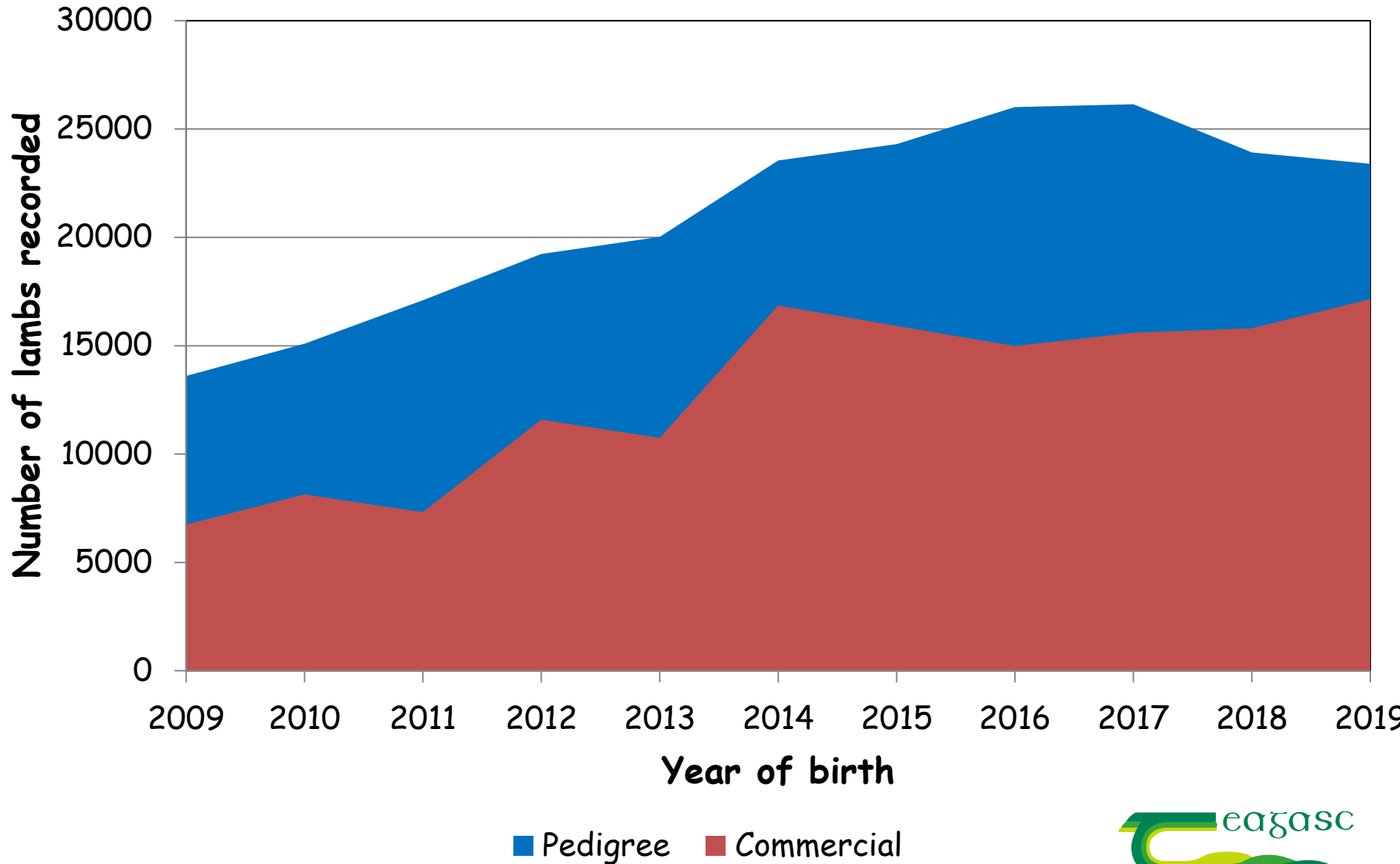# Outline

1. **Overview Irish breeding programme**

2. **Genomics**

3. **INZAC flock & validation**

4. **Methane Research**

Irish sheep breeding programme

Data Sources

Ped

Commercial

LambPlus

Rams to commercial flocks

Central progeny test (CPT)

4 commercial flocks

Matings to provide linkage

Teagasc BETTER farms

Commercial data

Teagasc

Commercial data

Irish sheep breeding programme

Sheep Ireland
www.sheep.ie

Breeding Objectives

Terminal

€ ⭐⭐⭐⭐⭐⭐

Replacement

What's included?

Terminal

Lambing

Difficulty & Survival

Growth
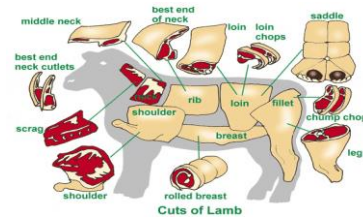
Days to slaughter

Carcass

Carcass fat & conformation

Health

Lameness & dag score

Health 2%

Lambing 36%

Carcass 15%

Growth 47%
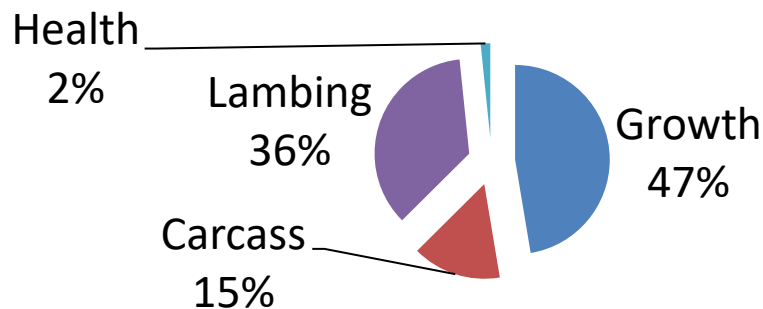
What's included?

Replacement

Ewe traits
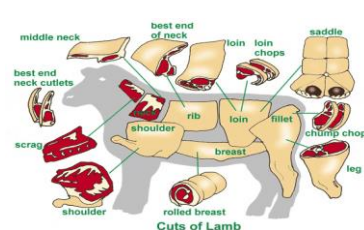
Milk Yield
No. lambs born
Ewe weight
Barren Rate

Lambing

Difficulty &
Survival

Carcass

Carcass fat &
conformation

Health

Lameness &
dag score

Health 1%
Growth 19%
Carcass 6%
Maternal 60%
Lambing 14%
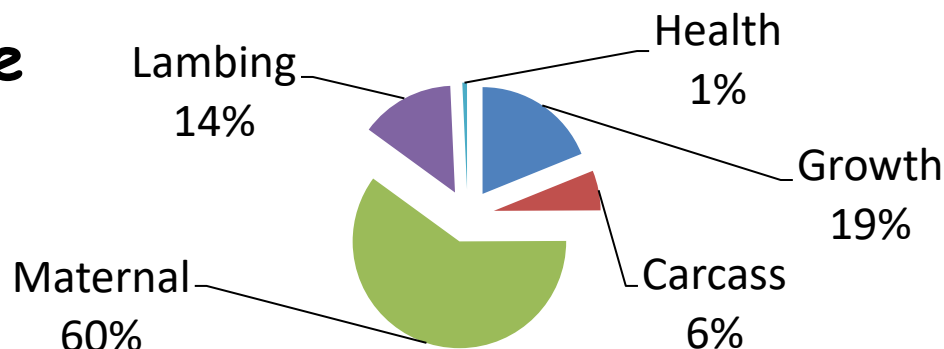
Recent Improvements to the Evaluation
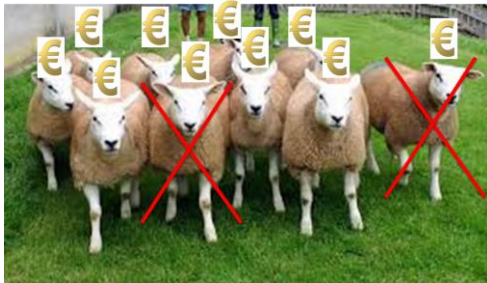
Parentage Corrections

Scrapie Validation

APPROVED

Carcass Data

Across-Breed Model

ACROSS-BREED GENOMIC EVALUATIONS

Updating Genetic parameters

New Traits
- **Barren Rate**
- **Lameness**
- **Dag Scores**

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

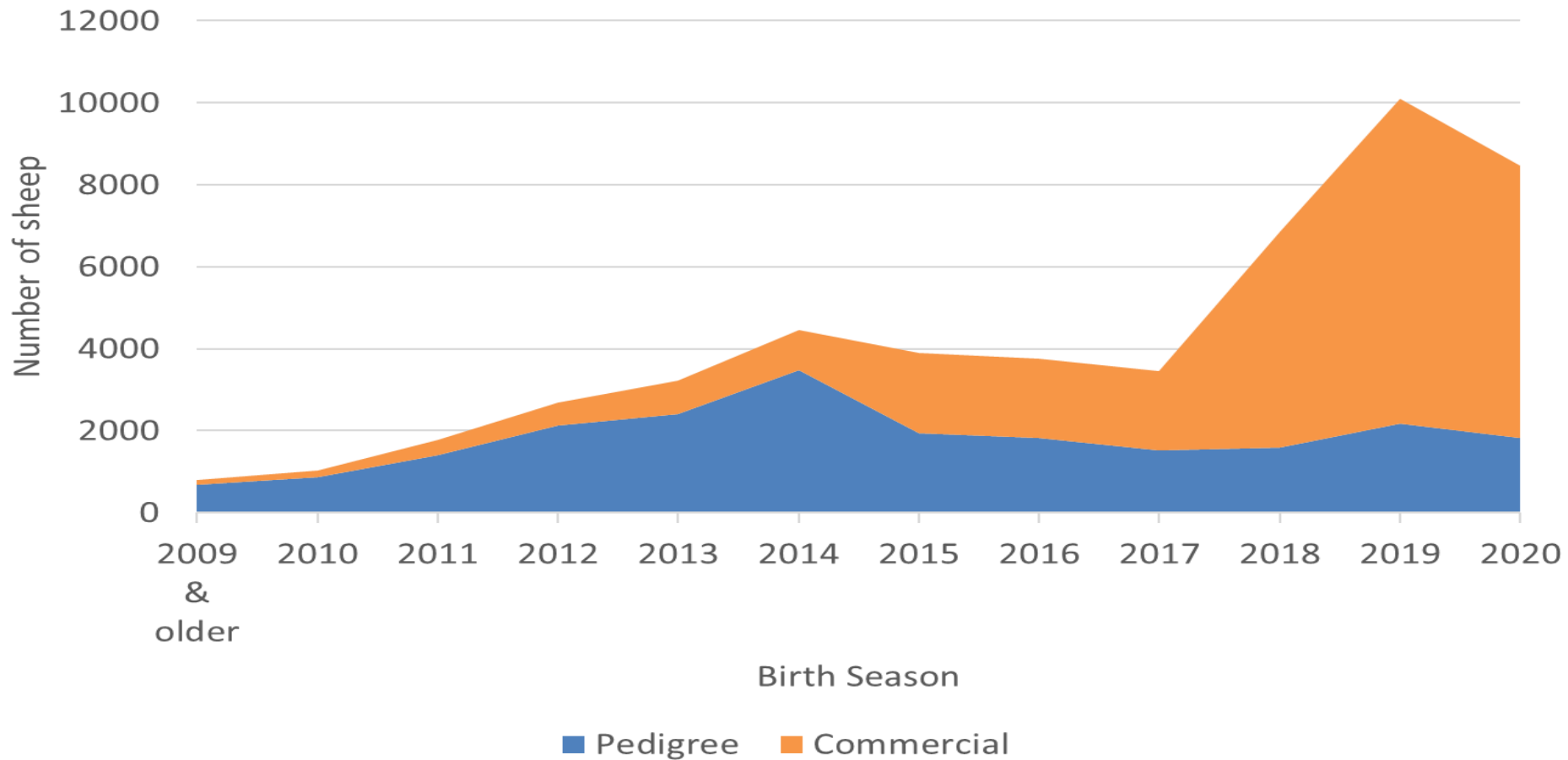Sheep Ireland
www.sheep.ie
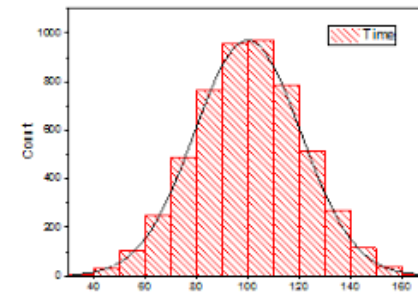
Genomic Selection
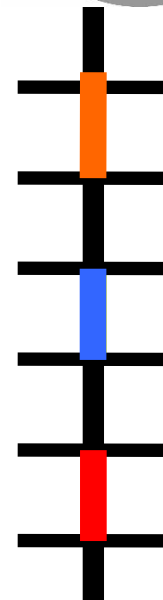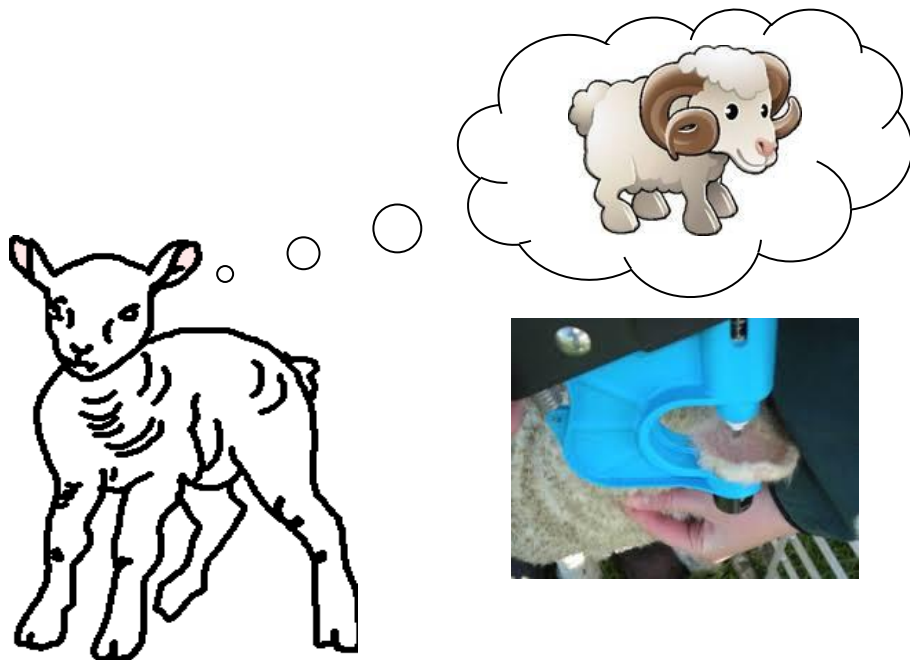
- **At birth we know parts of the lamb's DNA**

- **Lamb accuracy increase by 15 to 52%**

  - » **Equiv. of 6 (51) progeny for high (low) h^2**

Genotyped animals by birth year

## 50,000 sheep Genotyped

DQI - Data Quality Index

- Quantity and quality of data entered by breeders

  1. Timeliness

  2. completeness

  3. Quality of recording

- Indication of how engaged breeders are in the €urostar system

- Purchasing animals with a high DQI → indexes are as accurate as possible

Teagasc

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High DQI flocks making more Genetic Gain
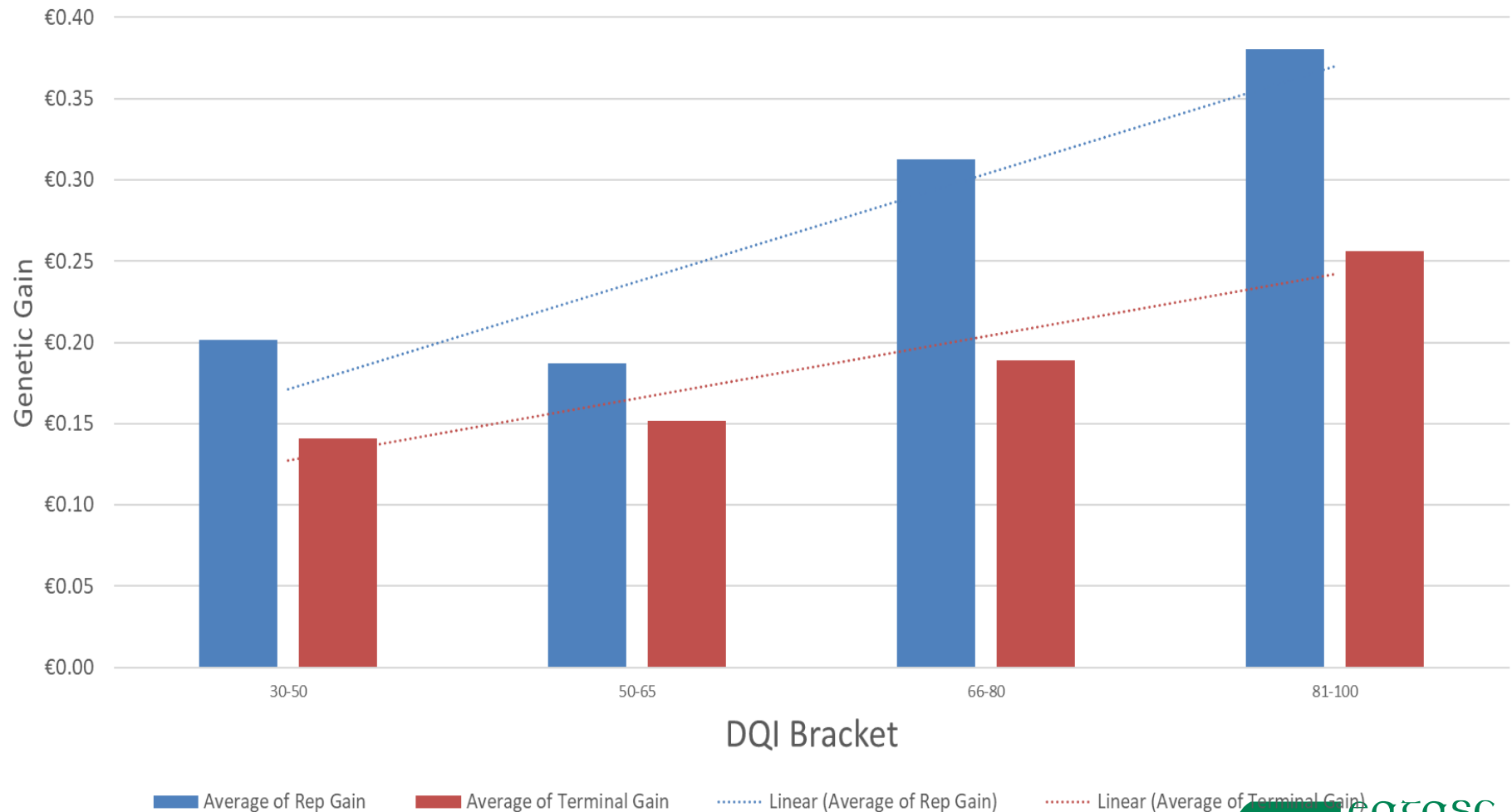
Sales Catalogue

Owner: Finbarr Godfrey (DQI: 99%); Churchground, Kilgarvan, Co. Kerry
Breeder: Finbarr Godfrey; Churchground, Kilgarvan, Co. Kerry

Animal

IE042576105092D

H521006

Cregeen

DOB: 01-Jan-2021

Charollais

Male

Twin

Parentage DNA Verified

Ancestry
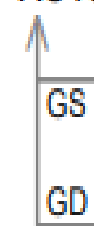
GS **Bawnard Bob**
D3215045

GD **Knockin Sylvia**
17XXJ00375

Redtrench Volcano
J6020008

Cregeen
H518015

GS **Duiske Oscar**
D817016

GD **Cregeen**
H514013

€uroStars   06/05/2021

Replacement (€3.48)	Terminal (€2.2)
Acc 67% Rank Top 3%	Acc 67% Rank Top 4%
★★★★★	★★★★★

Lamb Survivability (-0.08%) — Poor 0% ——V Btm 49%—— 100% Excellent, Acc 62.8%
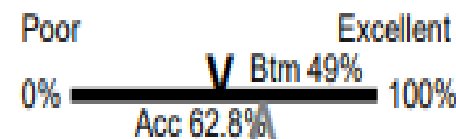
Days to Slaughter -18.88 days — 0% —— Top 2% V 100%, Acc 72.2%

No. of Lambs Born (€0.87) — 0% —— Top 18% V 100%, Acc 66%
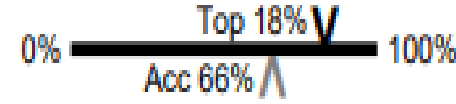
Daughters Milk (€0.14) — 0% —— Top 11% V 100%, Acc 70%
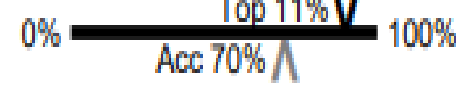
Comment:

Future Traits

- FEC

- Methane emissions

- Survival to Weaning

- Ewe longevity/Stay-ability

- Mastitis

Validation of indexes - INZAC

Study Design

INZAC Flock (180 ewes)

Elite NZ genetics (60)

High Irish genetics (60)

Low Irish genetics (60)

SU (30)

SU (30)

SU (30)

TX (30)

TX (30)

TX (30)
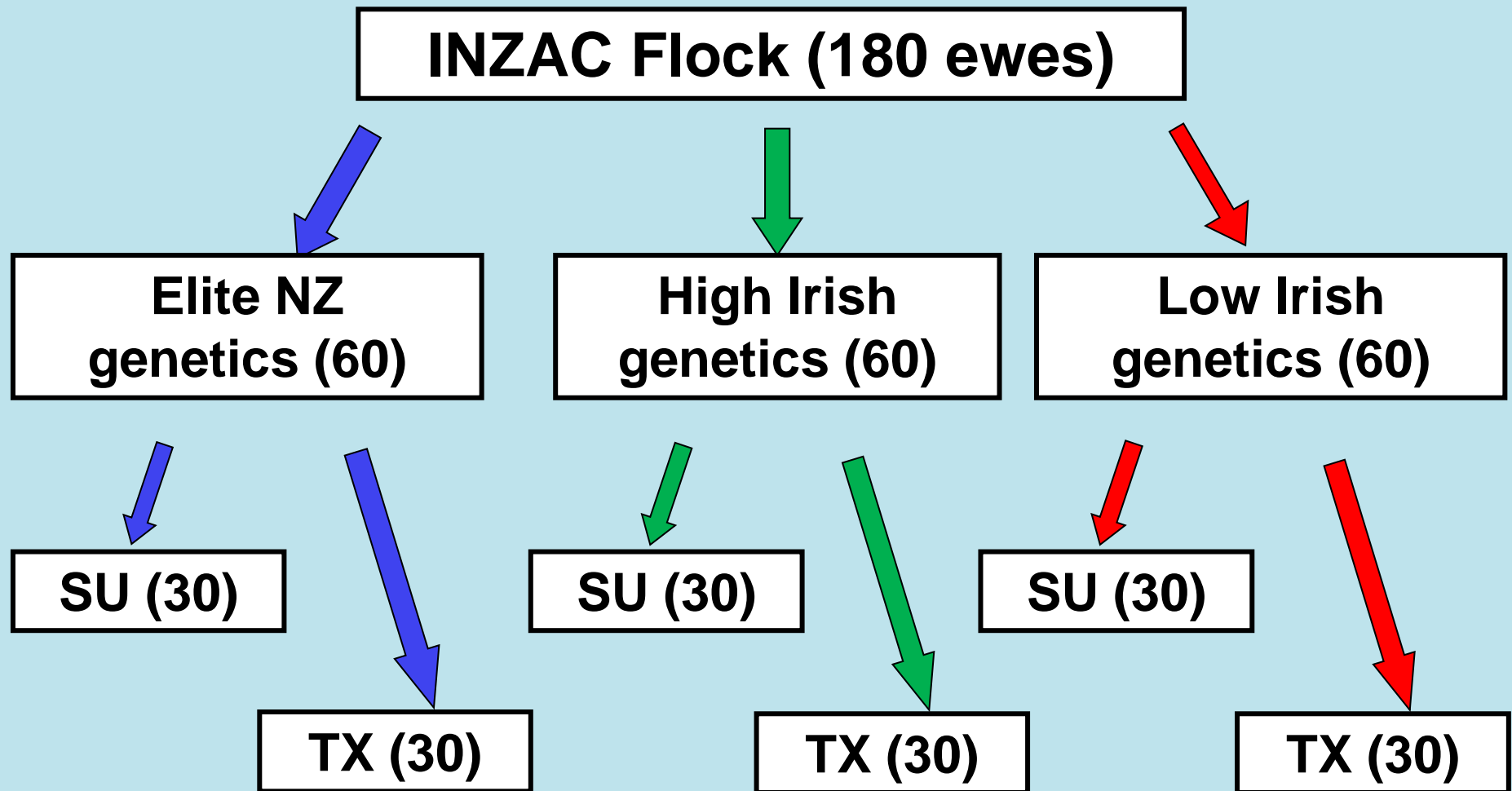
Phenotypes measured (2016-2019)

Autumn/winter
- Scanning
- Breeding
- Health data
- Ewe weight & BCS

Spring
- Lambing
- Milk yield
- Six weeks weights
- Ewe intake

Summer
- Ultrasound scanning
- Lamb growth/drafting
- Weaning

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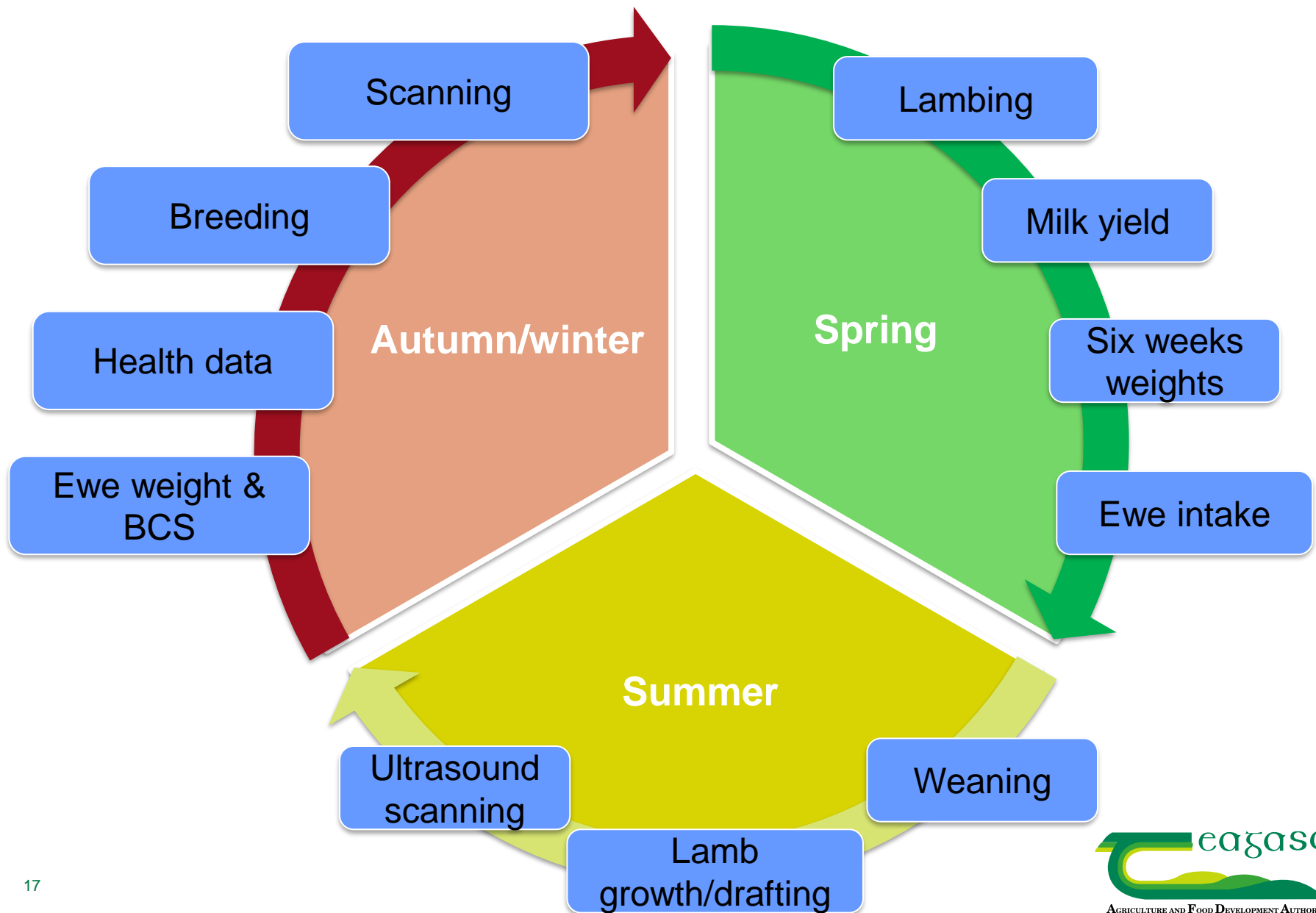
Results to date

	NZ	Elite Irish	Irish Low
Litter Size	1.96	1.76	1.73
Dystocia	13%	24%	24%
Lamb Mortality	5.1%	4.7%	6.7%
Milk Yield	3.56	3.48	2.99
DTS	154	163	170
Feed intake	28	27	35
Ewe wt: litter wt	0.62	0.62	0.59

Teagasc

INZAC II

INZAC Flock (240 ewes)

Elite NZ (60)	High NZ * Irish (60)	High Irish (60)	Low Irish (60)

SU (30) SU (30) SU (30) SU (30)

TX (30) TX (30) TX (30) TX (30)
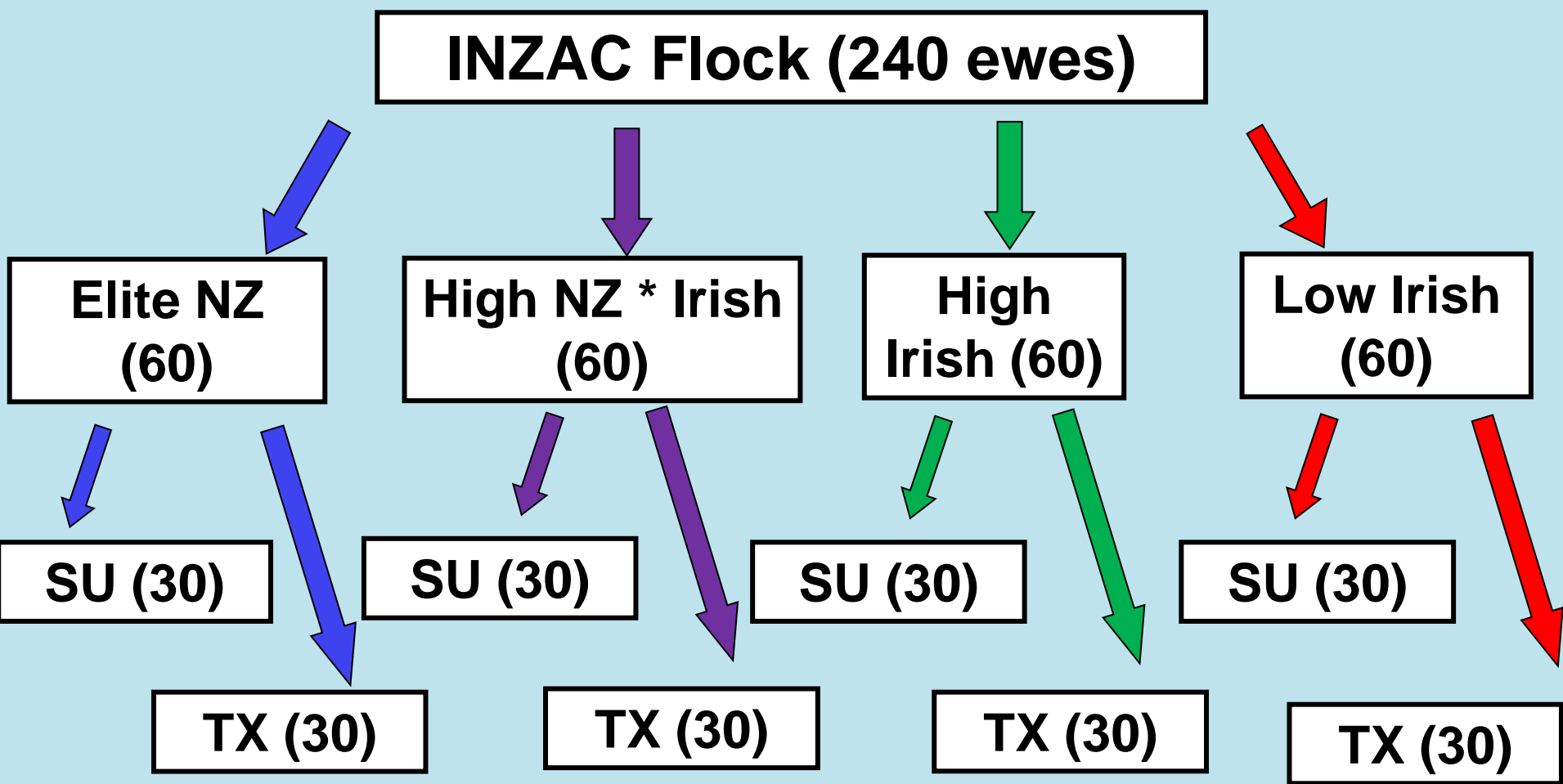
What's different?

- **Evaluate new changes to indexes**

  - **Genomic Selection**

  - **Across breed**

  - **Health and carcass data**

- **Carcass data**

  - **subset of lambs from each group slaughtered**

- **Focus on efficiency traits:**

  - **Greenhouse gases**

  - **Feed intake/ efficiency**

Developing tools to measure GHG in sheep

Climate & Environment

Comment: Farming cannot be left off the hook when it comes to climate action

The 2030 Agri-Food Strategy does not go far enough in relation to emissions reduction from agriculture and places an unfair burden on other sectors

Plant Based News

ALL   WATCH   LISTEN   OPINION ⌄   LIFESTYLE ⌄   YOUR HEALTH HUB ⌄   OTHER NEWS ⌄   CULTURE ⌄   RECIPES ⌄

TOPIC HIGHLIGHTS   Plant Based Meat   TikTok   Sustainable Fashion   Vegan Business   Vegan Shoes

Home » Other News » Environment » Animal Agriculture Responsible For 87% Of Greenhouse Gas Emissions, Finds New Report

THE PBN PODCAST WITH SEASPIRACY   Ali and Lucy Tabrizi Directors and film makers   HOSTED BY KLAUS MITCHELL EPISODE 60
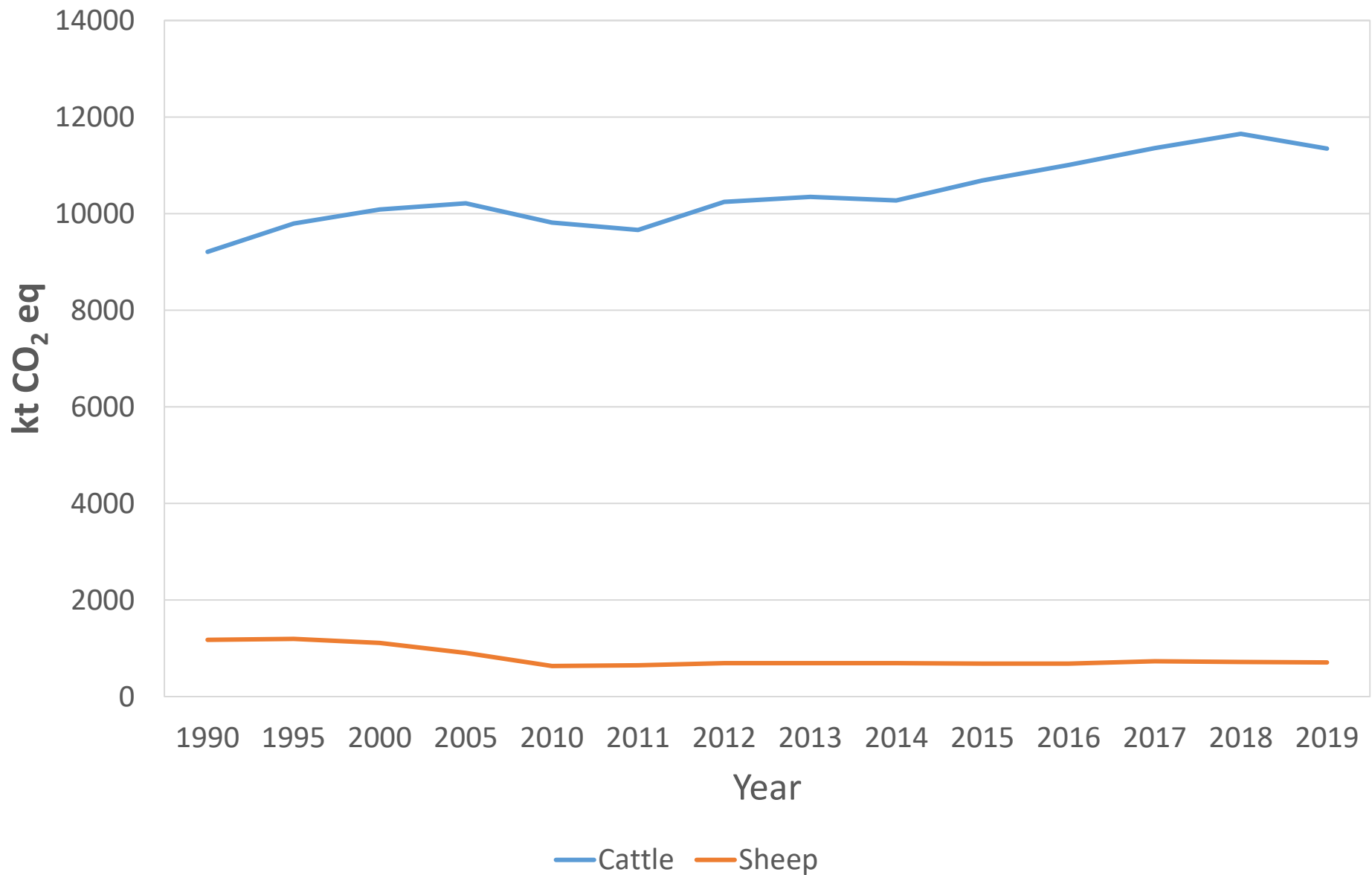
ENVIRONMENT

Animal Agriculture Responsible For 87% Of Greenhouse Gas Emissions, Finds New Report

Climate Healers says the United Nations' Food and Agriculture Organizations (FAO) has 'underestimated' the environmental impact of animal ag

22

eagasc

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Methane emissions

Why measure methane in sheep?

- Identify high and low emitters in the flock

- Develop breeding values for methane

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Home > News & views > Sheep farmers now able to breed "low methane" sheep

Topics:
Media Release

Sheep farmers now able to breed "low methane" sheep

In a world first, New Zealand sheep farmers now have the ability to breed animals that emit less methane.

Wednesday, 27 November 2019

Beef + Lamb New Zealand (B+LNZ) Genetics has launched a "methane research breeding value". Breeding value (BV) is a term used to help select important traits that ram breeders want to bolster within their flock (e.g. low methane-producing animals).

PAC chambers

Measuring methane in sheep

Ewes

245 g/day

Dry 19.27 g/day

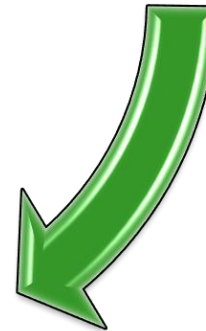Lactating 23.57 g/day

260 g/day

Lambs

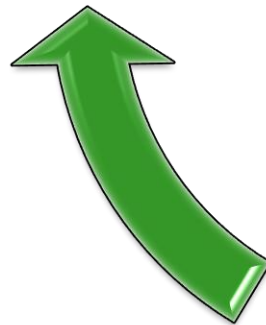At grass 3.63 g/day
On silage 8.62 g/day

7.5 g/day

Hoggets

13.54 g/day

Genetics of methane

Genetics of methane across large population sheep

- PACs are mobile

  - Can measure 12 animals/ hour

  - 72 animals per day

- Flocks: CPT, BETTER farms & research

- **Preliminary results:**

  - 2,181 methane records → 921 animals

  - Heritability estimates 0.25

  - Top versus bottom 10%: 16.7 g/ day

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Acknowledgements

GreenBreed (17/S/2135)

SMARTER PARTNERS

Thank you for your attention

www.smarterproject.eu