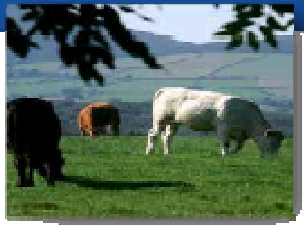
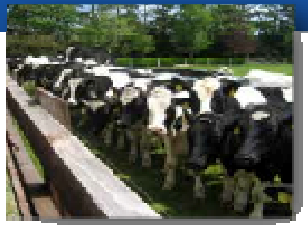
IRISH CATTLE BREEDING FEDERATION

Cow's Own Worth

Test day model and 305 day predictions





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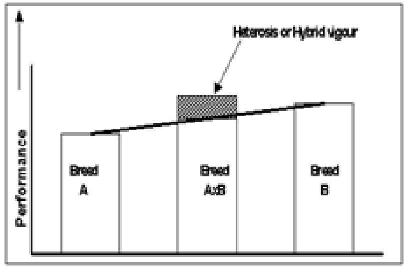
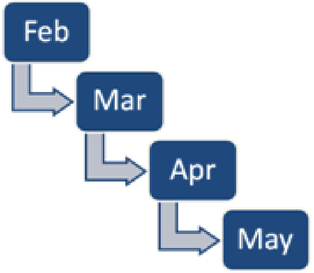
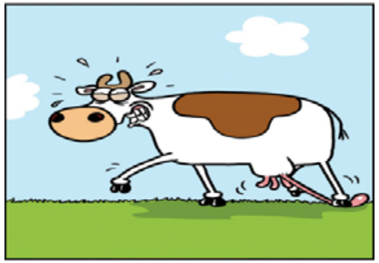
11th February 2018

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

C.O.W. = Cow's Own Worth



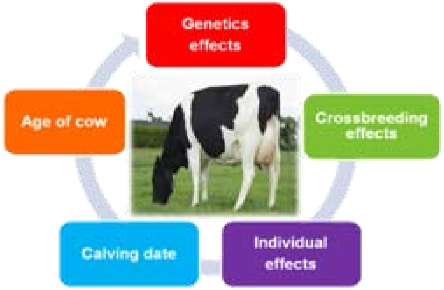




Expected profit from:

C.O.W.
COW'S OWN WORTH

=



Current Lactation

- Production
- Management
- Health (SCC)
- Maintenance
- Fertility (calving date)

Net Replacement Cost

- Cull cow value
- Replacement cost

Future Lactations

- Production
- Management
- Health
- Maintenance
- Beef
- Fertility
- Calving
- Descendants

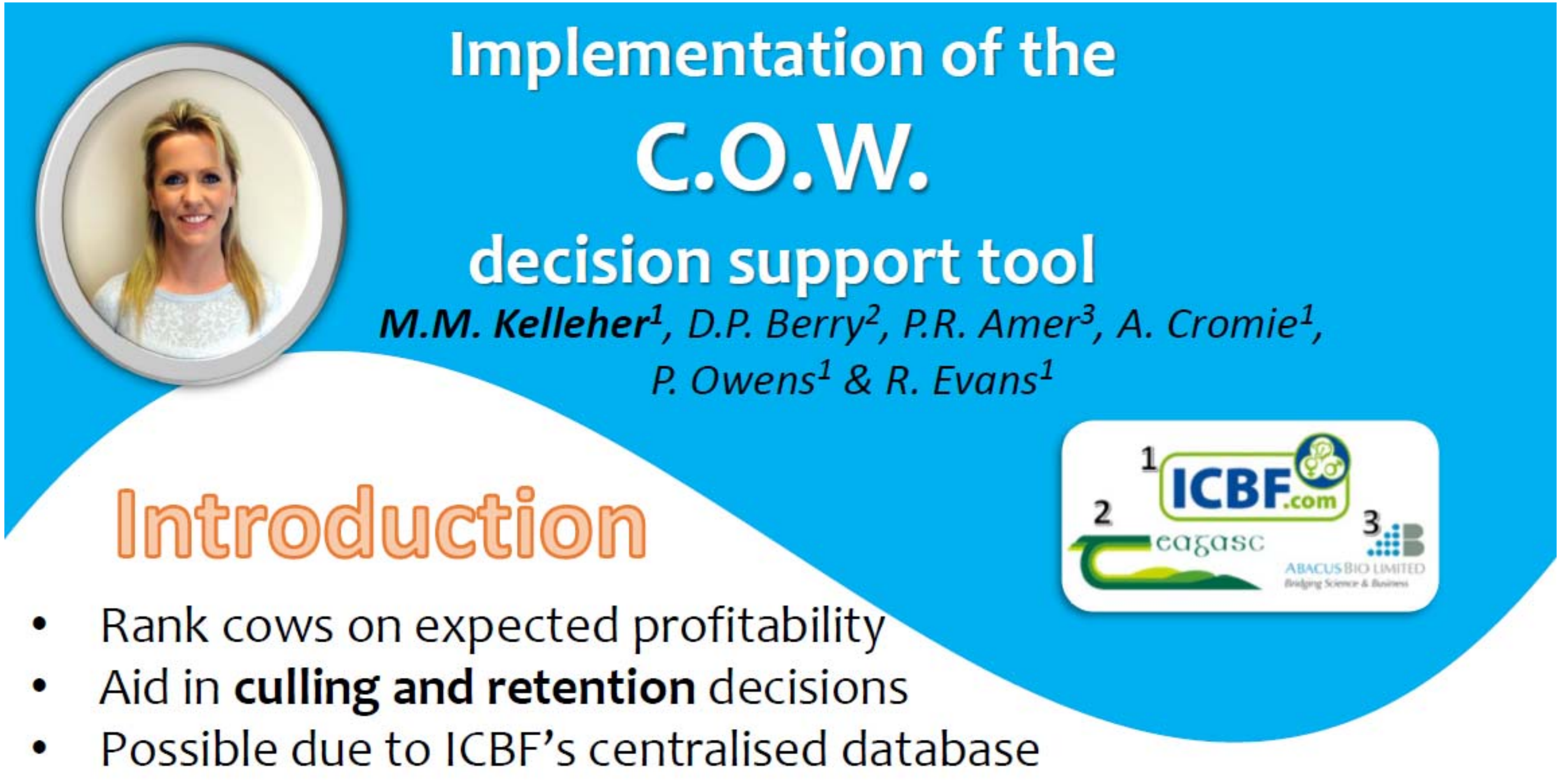
+ predictions on fertility, survival and SCC performance

For more details on C.O.W.

Poster session

Theory to Application

Tomorrow 9.30 – 10.00 am



Introduction

Cow's Own Worth (C.O.W.)

- Researched and published 2015 *(Kelleher et al., 2015 JDS)*
- Trialled on commercial herds 2016 & 2017
- Implemented October 2017
- **Currently uses 305D model solutions for production traits**

Test Day Model (TDM)

- TDM genetic evaluation submitted to Interbull test run September 2017
- TDM implemented in domestic evaluation December 2017
- **Moved from the 305D model for production traits**

Question

What effect do TDM evaluation solutions have on the accuracy of the C.O.W. rankings of dairy females????

Materials and methods

Data

- Milk yield
- Fat
- Protein

2013 | 2014

- 305D and TDM evaluations
- Phenotypic performance
- Spring calving herds

Alternative cow ranking indices

Genetic model ranking

305D model ranking

Test day model ranking

Validation dataset

Validation phenotype

n = 108,827

Materials and methods

Genetic model ranking

$$\sum_{t=1}^{3} €_t * (EBV_t)$$

305D model ranking

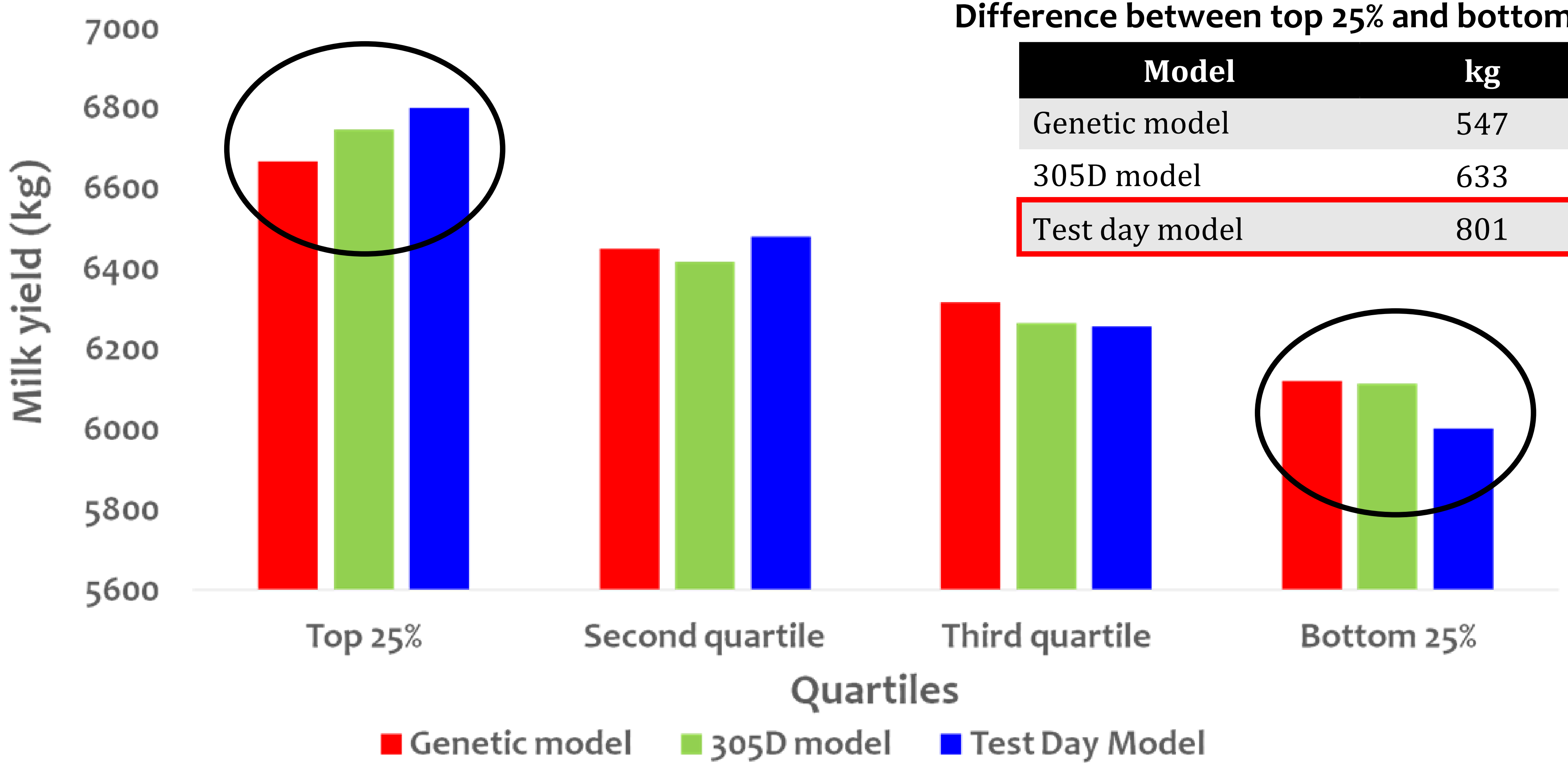
$$\sum_{t=1}^{3} €_t * (EBV_t + Gen.het_t + Gen.rec_t + Perm\ env_t)$$

Test day model ranking

$$\sum_{t=1}^{3} €_t * (EBV_t + Brd\ sp.het_t + Brd\ sp.rec_t + Perm\ env_t)$$

Validation phenotype

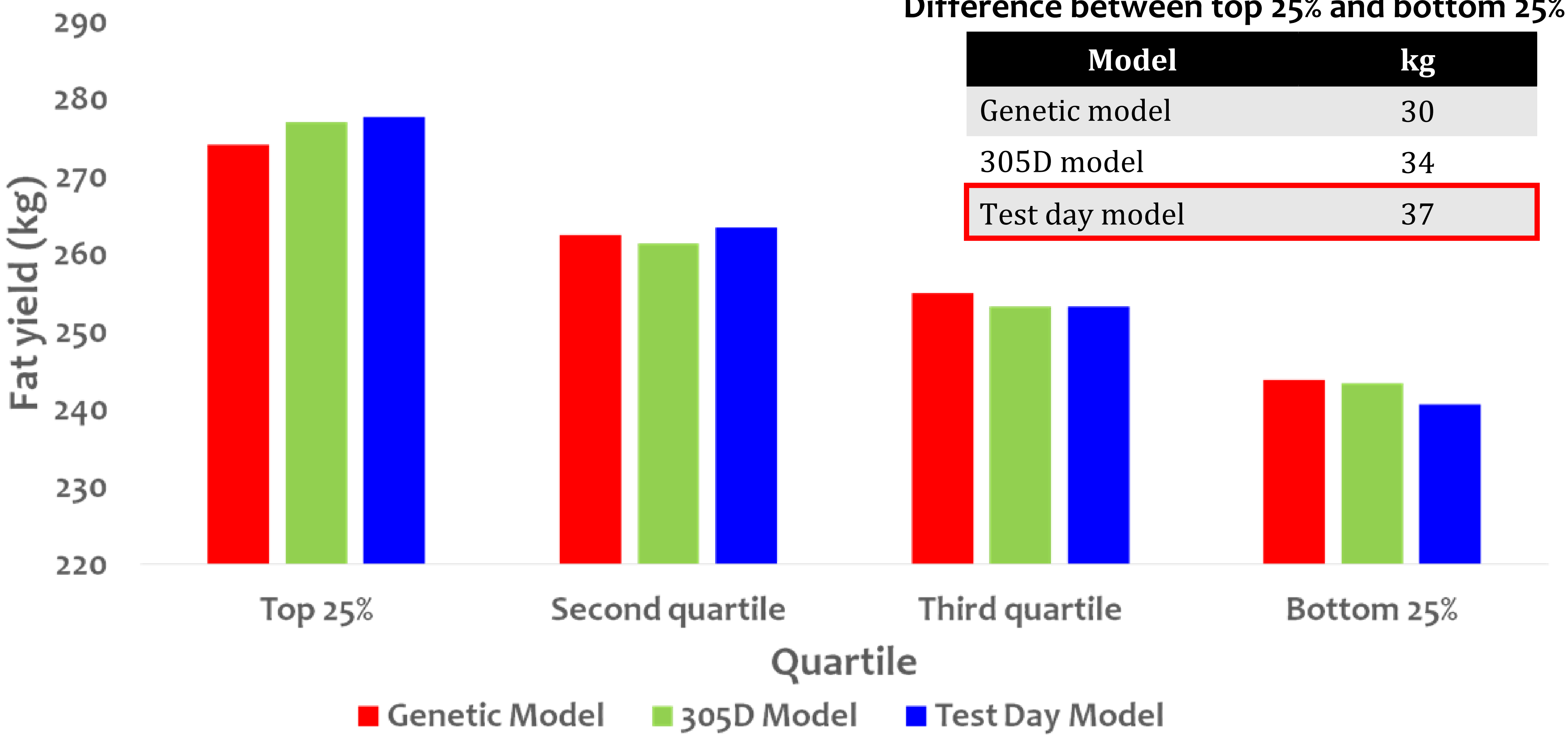
Results: Milk yield



Difference between top 25% and bottom 25%

Model	kg
Genetic model	547
305D model	633
Test day model	801

Results: Fat yield



Difference between top 25% and bottom 25%

Model	kg
Genetic model	30
305D model	34
Test day model	37

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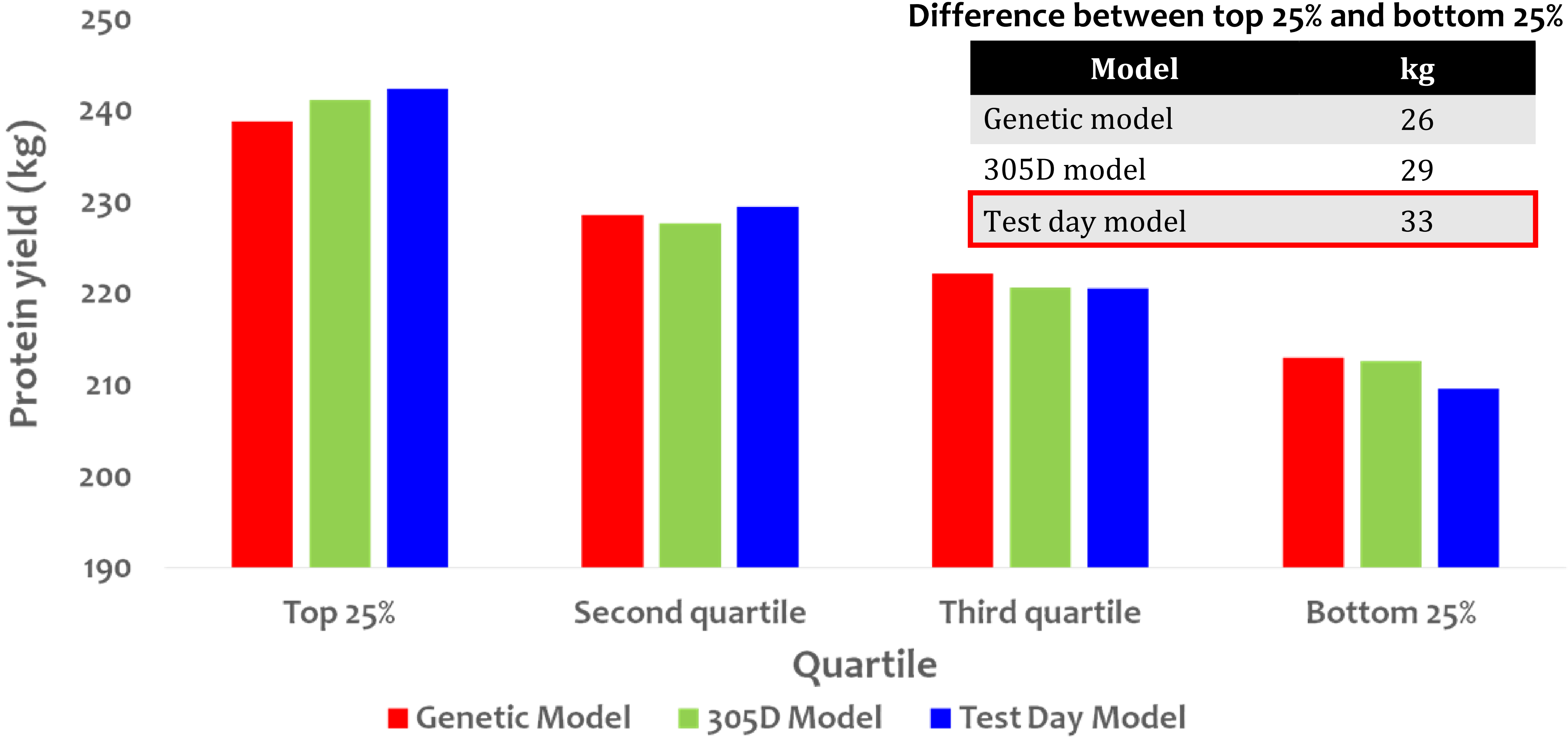
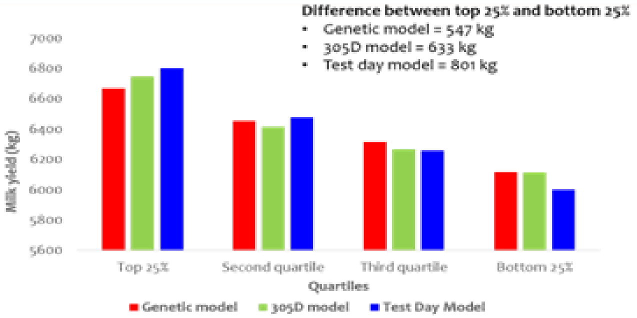
Results: Protein yield

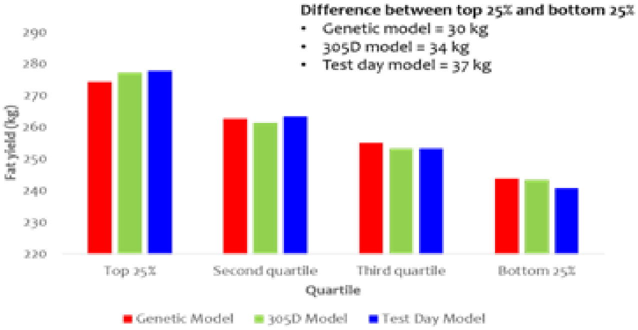


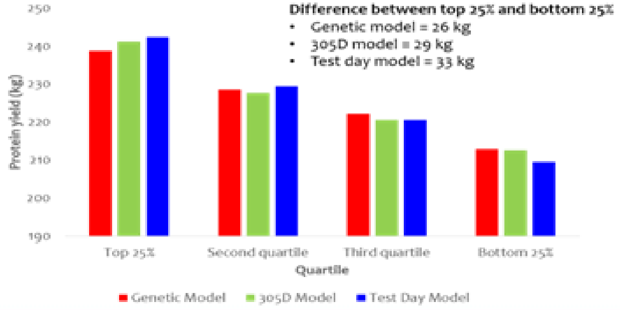
Difference between top 25% and bottom 25%

Model	kg
Genetic model	26
305D model	29
Test day model	33

Results: Monetary value







Difference between top 25% and bottom 25% and milk price for each model

Group	Price (€)	Genetic model	305D model	Test Day Model
Milk	-0.040	-22.53	-26.07	-32.98
Fat	4.066	123.77	137.24	150.66
Protein	6.653	171.83	189.88	217.63
Total (€)		273.07	301.05	335.31

- The difference between top 25% and bottom 25% using TDM is **€335 per cow** per lactation
- Worth **€8375** in a 100 cow herd
- €34 per cow per lactation improvement between the 305D model and Test Day Model

Analysis by component

Validation accuracy and slope between phenotypic production traits and both the 305D and Test Day Model

	Accuracy: r(ŷ, y)				*Bias: b(ŷ, y)*			
	Breeding Value		Permanent Environment		Breeding Value		Permanent Environment	
Traits	305D	TDM	305D	TDM	305D	TDM	305D	TDM
Milk (kg)	0.455	0.462	0.152	0.308	1.718	1.552	2.078	0.564
Fat (kg)	0.323	0.334	0.148	0.310	1.262	1.164	2.056	0.591
Protein (kg)	0.351	0.341	0.146	0.313	1.454	1.331	2.053	0.523

- Breeding values accuracy very similar
- Accuracy doubles for **TDM permanent environment** effects and production traits
- Improvements in the validation bias as measure by the slope for TDM over 305D model

Conclusions

- C.O.W. currently uses 305D model evaluation solutions

- Using TDM production solutions in C.O.W. have shown **favourable outcomes** due to more accurate prediction of future phenotypic performance of production traits

  - The **permanent environment** effects from TDM account for the majority of the improvements

  - However the method of handling these needs more **refinement**

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Department of Agriculture, Food and the Marine
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Irish Creamery Milk Suppliers Association

IFA

Our AI & Milk Recording Organisations

Dovea GENETICS

munster cattle breeding group

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AYRSHIRES Cattle Society of Great Britain and Ireland

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IBBCS

EASBB

Irish Aubrac

Blonde d'Aquitaine

Irish Charolais Cattle Society

Irish Hereford

IHFA

Irish Limousin Cattle Society

Parthenais

Irish Piemontese Society

Irish Shorthorn Society Ltd.

Simmental

ISP

Ireland's native dairy breed

Montbeliarde

MRI Cattle Society of Ireland
Meuse Rhine Issel – Milk & Muscle!

Norwegian Red Cattle Society

Salers Cattle Society of Ireland Ltd.

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