Evaluation of different models to define a more suitable Residual Feed Intake estimation in Merino sheep

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INTRODUCTION

- Sheep are deeply entrenched in human culture
- There are more than 6 million sheep in Uruguay
  - >80% are bred to provide wool
  - >30% Australian Merino

Residual Feed Intake (RFI)

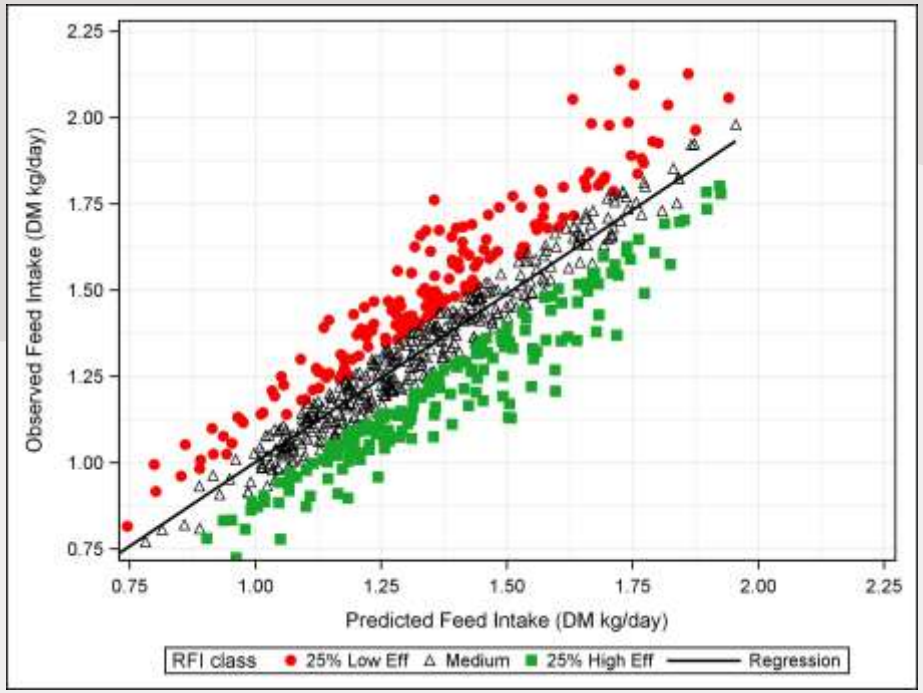
is measure of feed efficiency

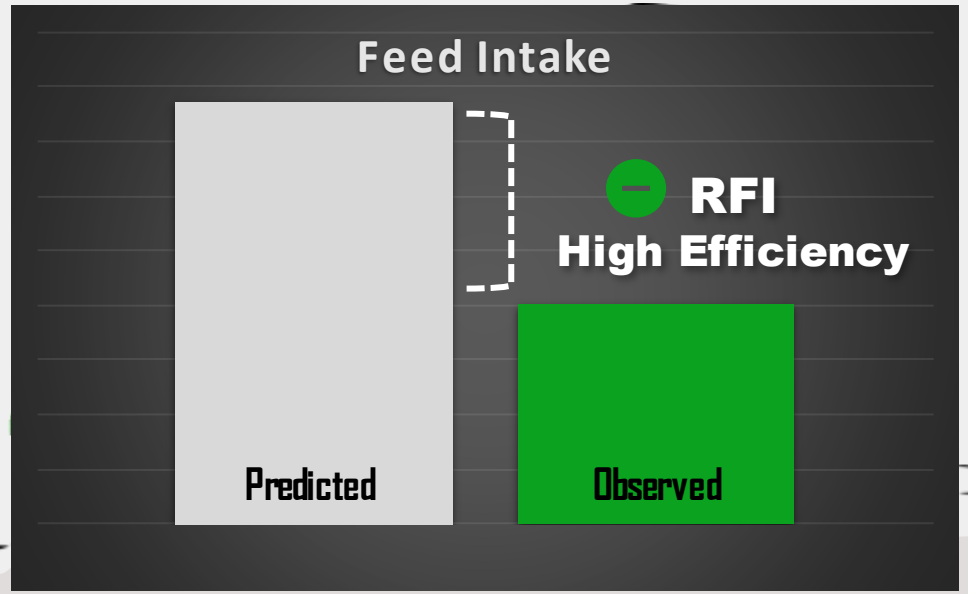
It is calculated by

the difference between an animal's observed intake and its predicted feed intake

Animals that eat less than expected

are more efficient





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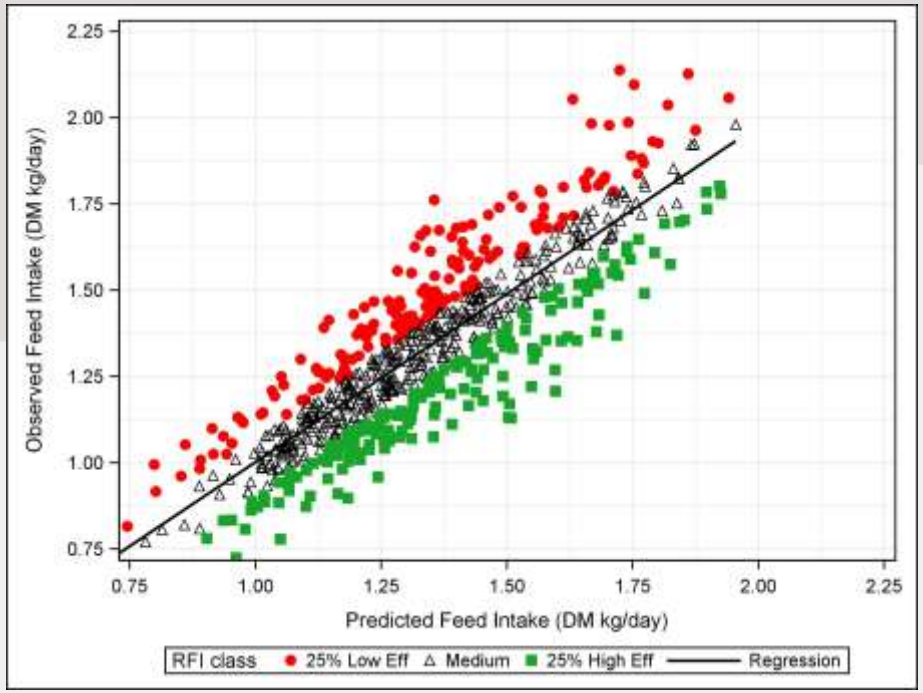
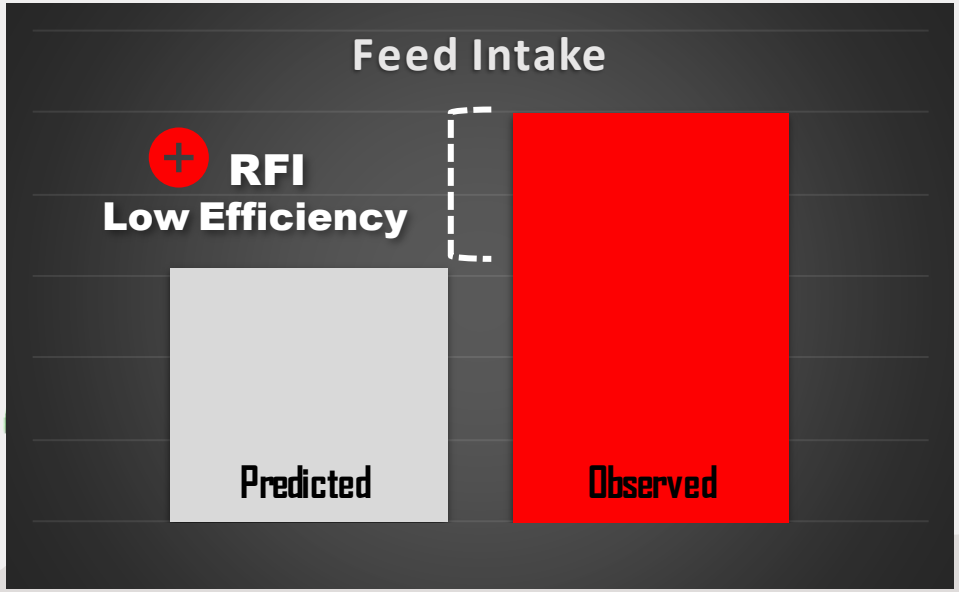




SEARCHING FOR EFFICIENT ANIMALS

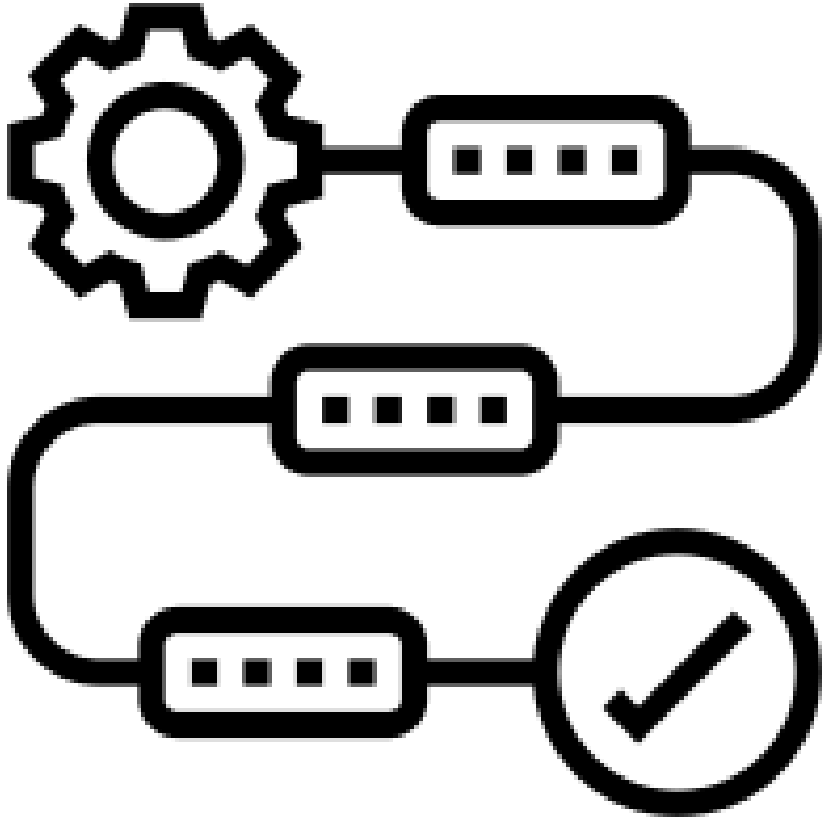
Production

Environmental impact

Initial questions

1) What other factors could be included in RFI models?

2) Is it necessary to include estimations of wool growth?



MATERIAL & METHODS

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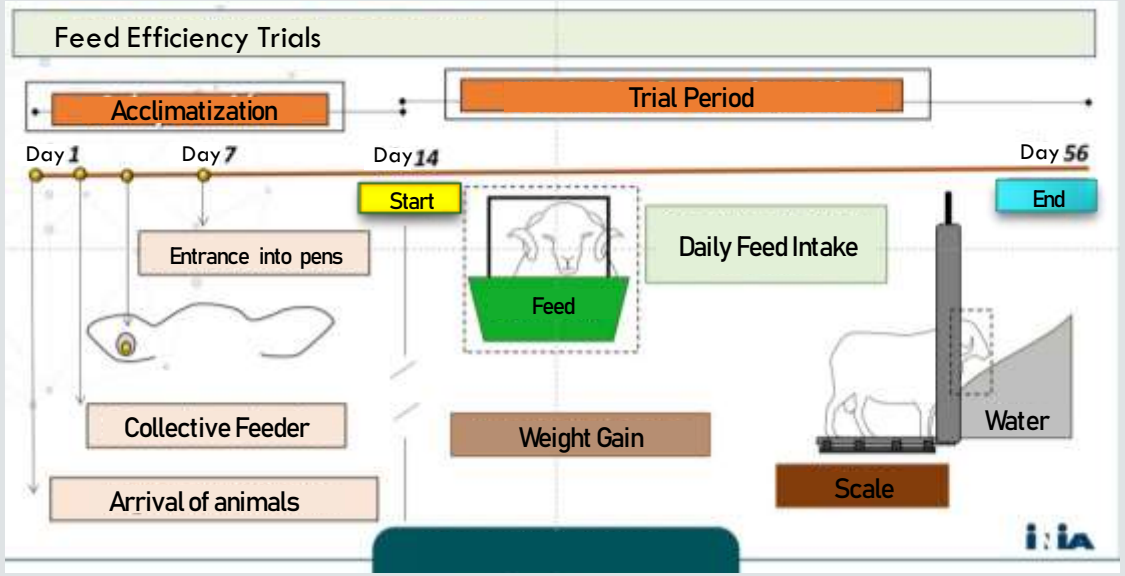

Lucerne haylage : DM 53.8-74.9%; crude protein 22.0%; NDF 35.1%; ADF 27.4%; EE 2.2%;

MATERIAL & METHODS

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COMPARING DIFFERENT MODELS FOR THE ESTIMATION OF RFI

Basic model

Feed intake = Sex-Pen-Trial + ADG[1] + MW[2] + e

[1]Average Daily Gain [2] Mean Metabolic Weight

1 "What other factors could be included in RFI models?"

+ Birth type (1 or 2)
+ Lambing batch-year
+ Age at trial (days)
+ Rib-eye area (cm2)
+ Fat thickness (mm)

Models were compared using:

Akaike Information Criterion (AIC)

Correlation between RFIs

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2 "Is it necessary to include estimations of wool growth?"

2018-2019 estimations based on growth in trial and yearly wool production

+ GFW or CFW estimated
+ SL estimated

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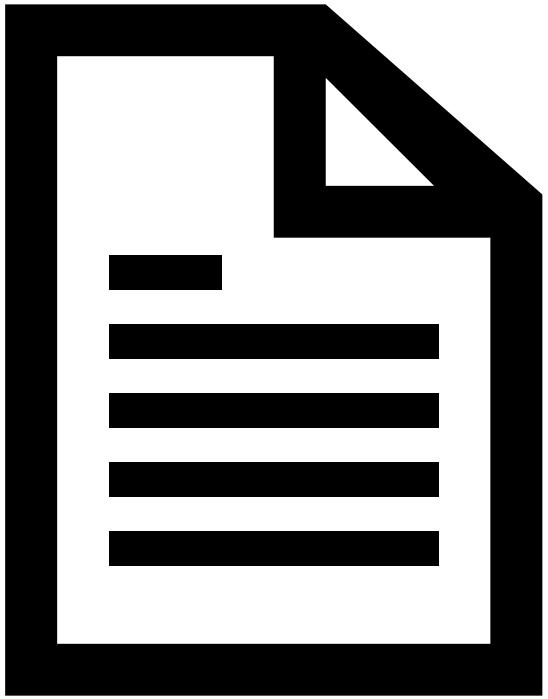
2019: Staple Length Growth record:

+ SLG on trial
+ GFW (SLG)
+ ADG (-GFW based on SL growth on trial)



RESULTS AND DISCUSSION

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Variable	N	Mean	sd	Minimum	Maximum
Age	577	296.7	47.9	204.0	378.0
Feed Intake	577	1.42	0.27	0.73	2.35
MW	577	16.01	1.86	11.74	23.23
ADG	577	0.184	0.060	0.055	0.355
Gain on trial	573	7.8	2.6	0.6	16.3
GFW estimated	569	0.658	0.217	0.039	1.442

2018 and 2019 generations

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2018 and 2019 generations

Variable	N	Mean	sd	Minimum	Maximum
Feed Intake	316	1.52	0.26	0.78	2.29
SLG on trial	314	14.9	4.7	2.0	32.4
SL estimated	312	22.0	5.8	7.7	42.6
GFW (SLG)	314	0.523	0.175	0.070	1.233
GFW estimated	312	0.761	0.180	0.241	1.422

2019 generation

1) What other factors could be included in RFI models?

2) Is it necessary to include estimations of wool growth?

1 "What other factors could be included in RFI models?"

+ ~~Birth type (1 or 2)~~
+ ~~Lambing batch-year~~
+ ~~Age at trial (days)~~
+ ~~Rib-eye area (cm2)~~
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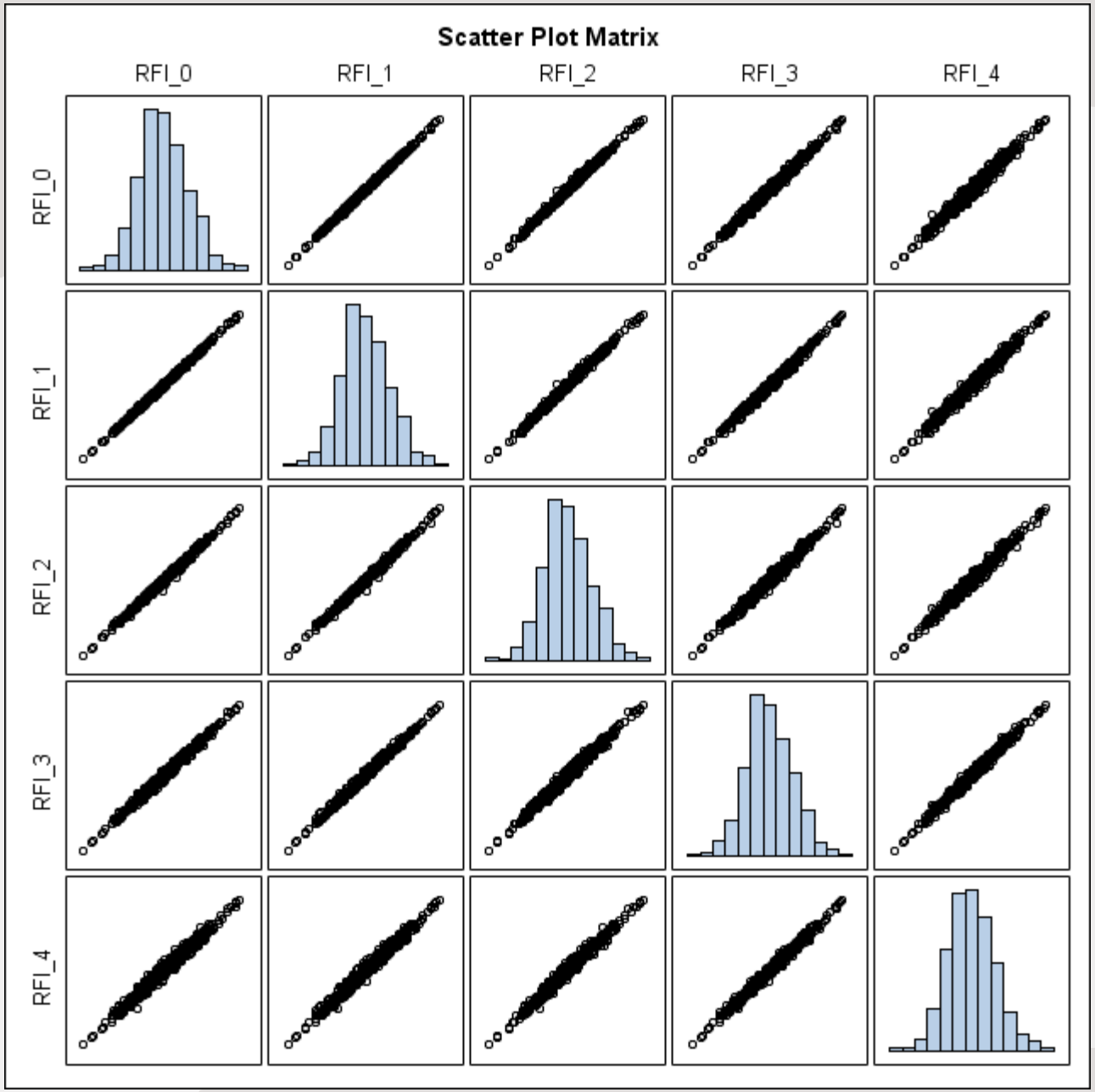
Correlation between RFI models >0.99



CONCLUSIONS

When evaluating Merino sheep…

- The basic model is the most parsimonious

Feed intake = Sex-Pen-Trial + ADG + MW + e

- It might be not necessary to include estimations of wool growth in RFI models

THANK YOU

RUMIAR INIA @INIA_UY

Smarter SMAll RuminanTs breeding for Efficiency and Resilience @SmarterprojectE

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