

Supplementary Material

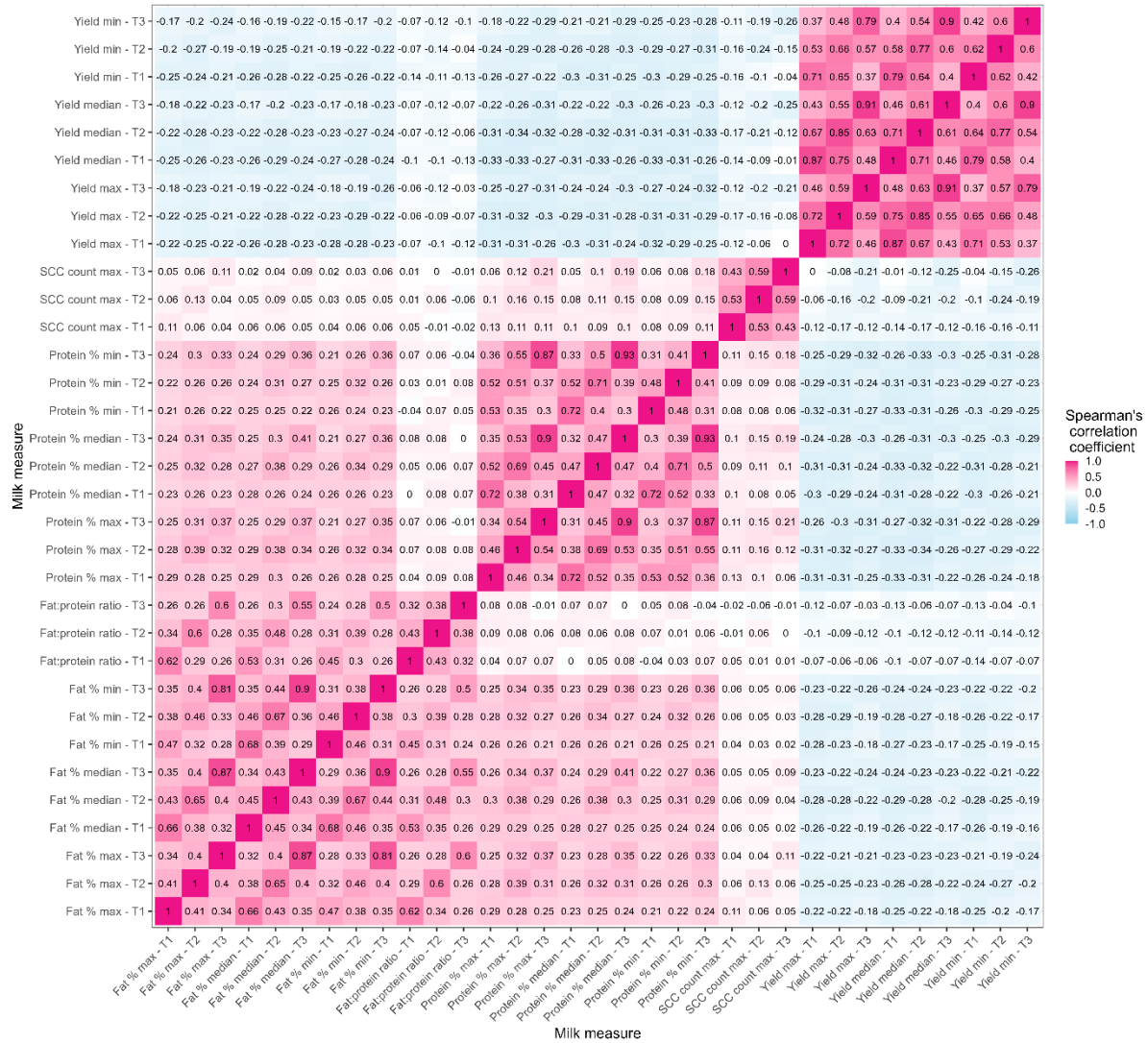
Supplementary Table 1 Summary of the milk quality variables over the pregnancy period for non-first parity animals

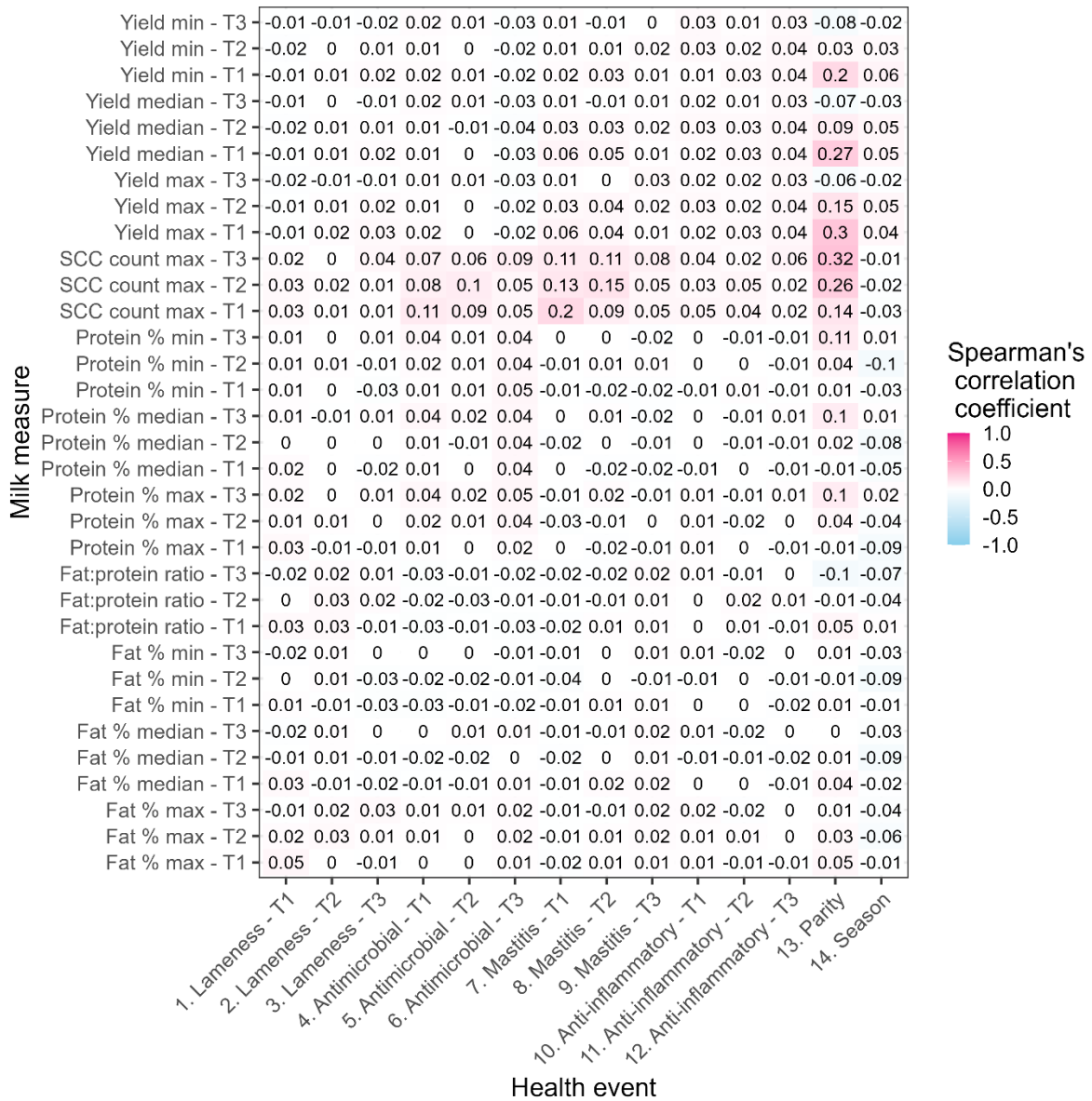
Predictor	N*	Mean	Min	Max
SCC count (100,000)				
Maximum	9,165	399.31	0.00	11,173.00
Fat percentage				
Median	9,244	3.79	0.00	8.66
Minimum	9,244	3.02	0.00	7.84
Maximum	9,244	4.87	0.00	12.12
Protein percentage				
Minimum	9,244	3.11	0.00	4.94
Maximum	9,244	2.77	0.00	4.94
Median	9,244	3.60	0.00	9.92
Fat protein ratio				
Maximum	8,991	1.45	0.43	4.05
Yield				
Median	9,244	27.18	1.50	65.90
Min	9,244	18.10	0.10	65.90
Max	9,244	34.03	2.00	91.40

1. N = number of cows (milk quality variables not present for pregnancies of first parity animals),
- SCC = somatic cell count

Supplementary Figures 1A-D) Spearman's rank correlation coefficients between variables in the dataset of explanatory variables for Dataset 1 (9292 observations)

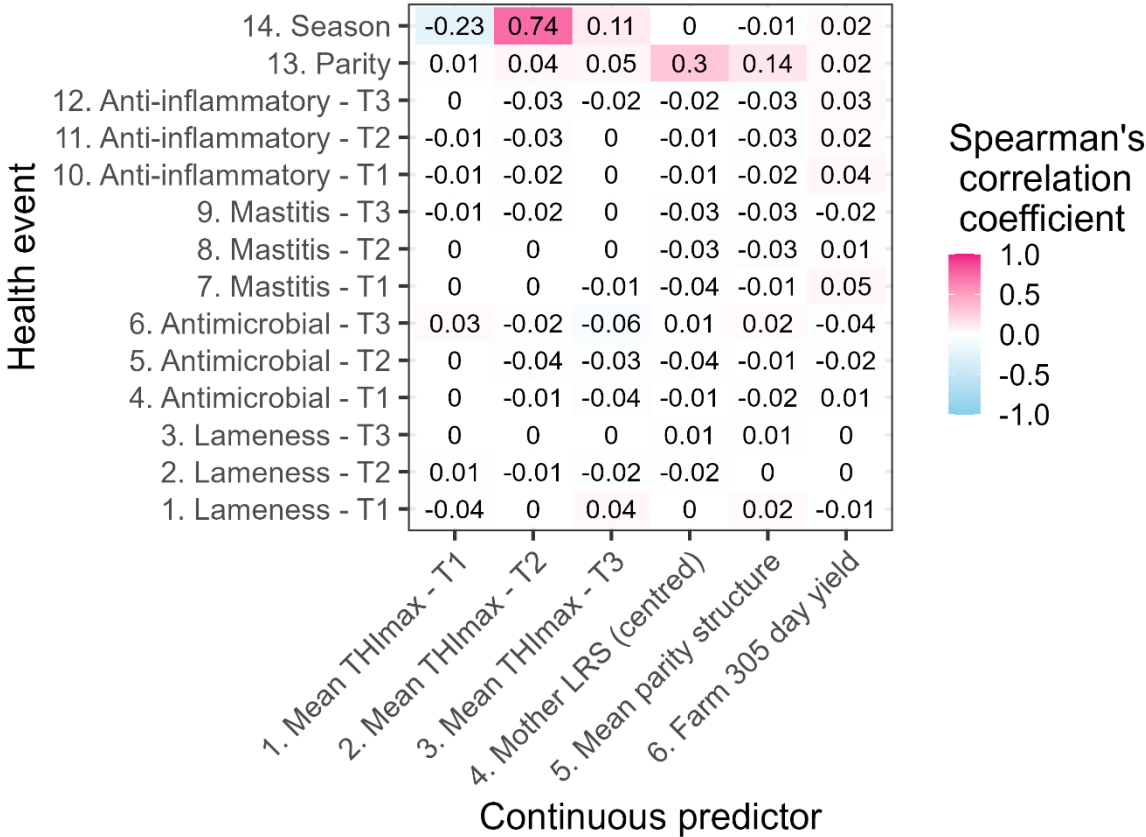
A)



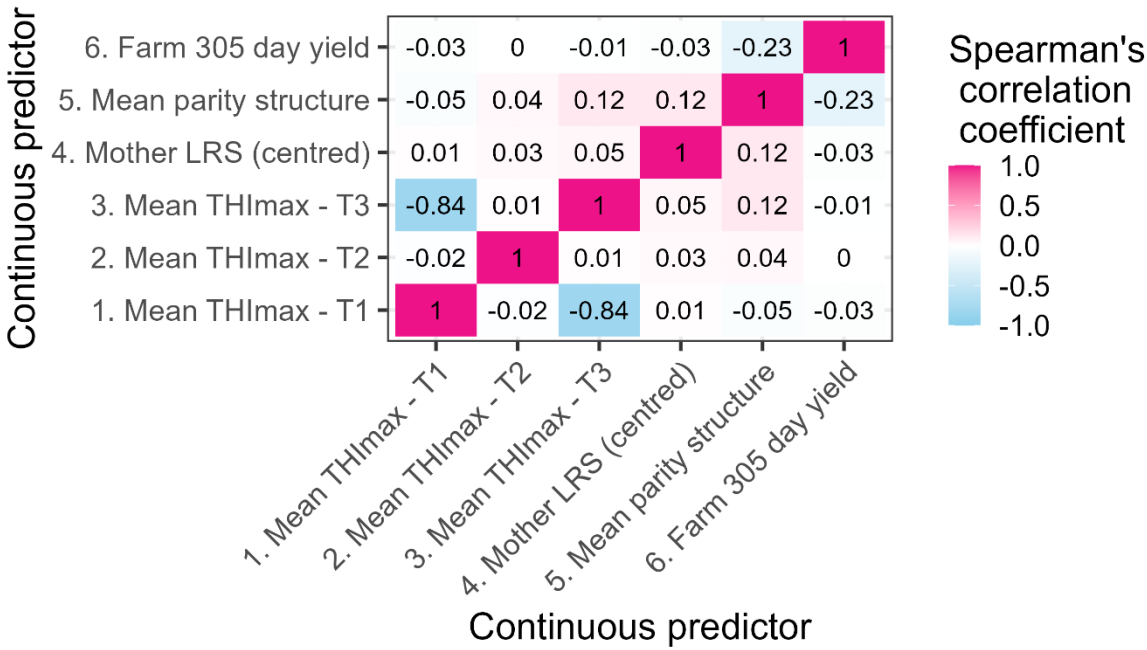


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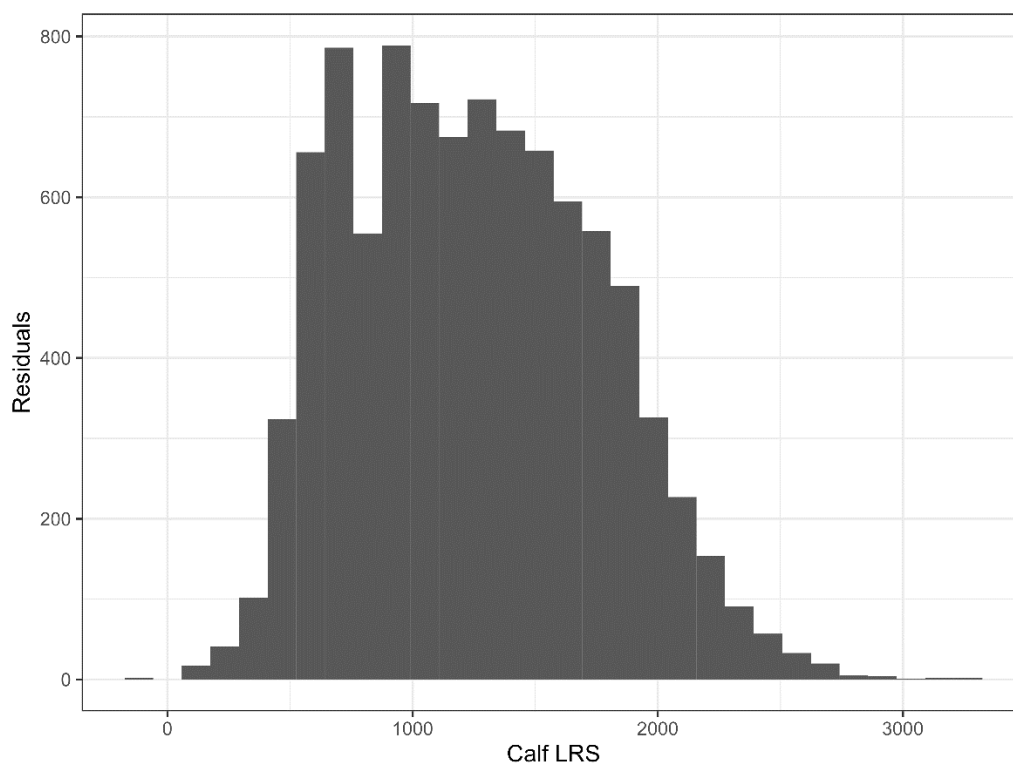
15 c)



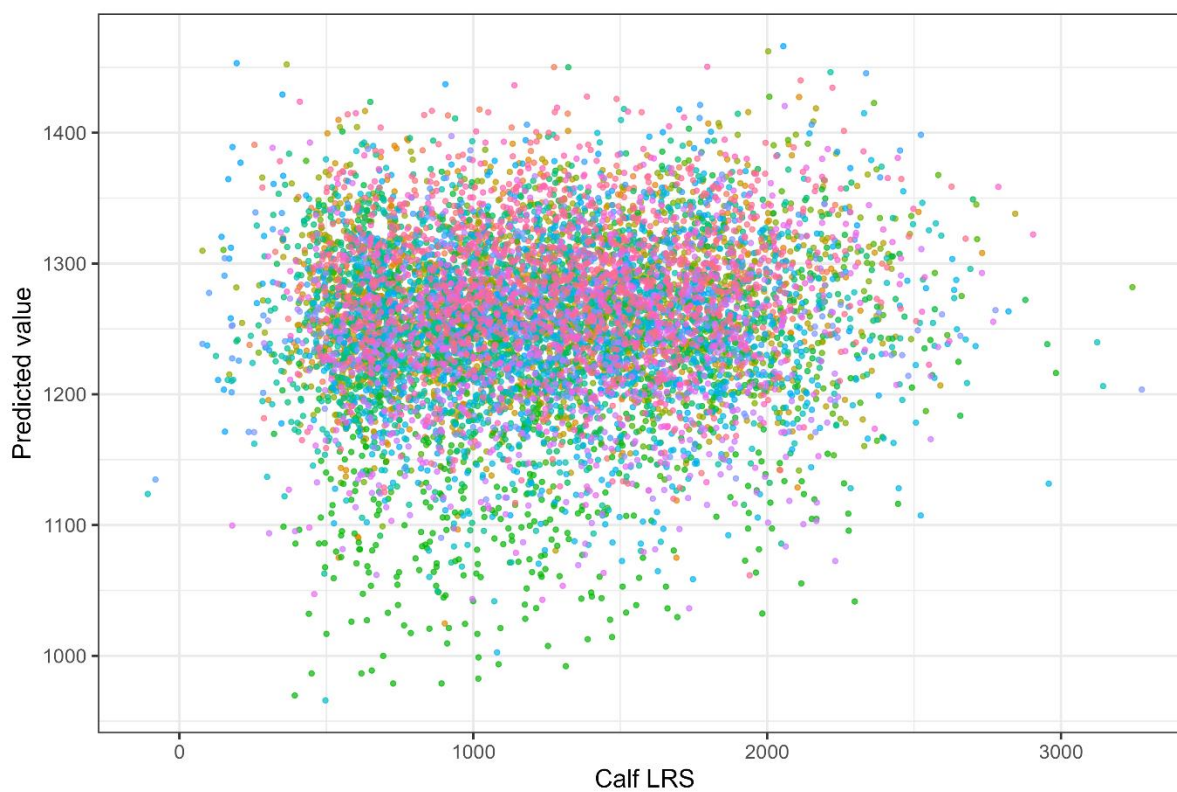
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19 Supplementary Figure 2 Residual vs fitted values plot for the final model of *in-utero* event predictors
20 associated with lifetime resilience score of 9292 daughters



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23 Supplementary Figure 3A Predictions from leave-one-farm out cross validation of the final model for
24 *in-utero* events and lifetime resilience score of daughters

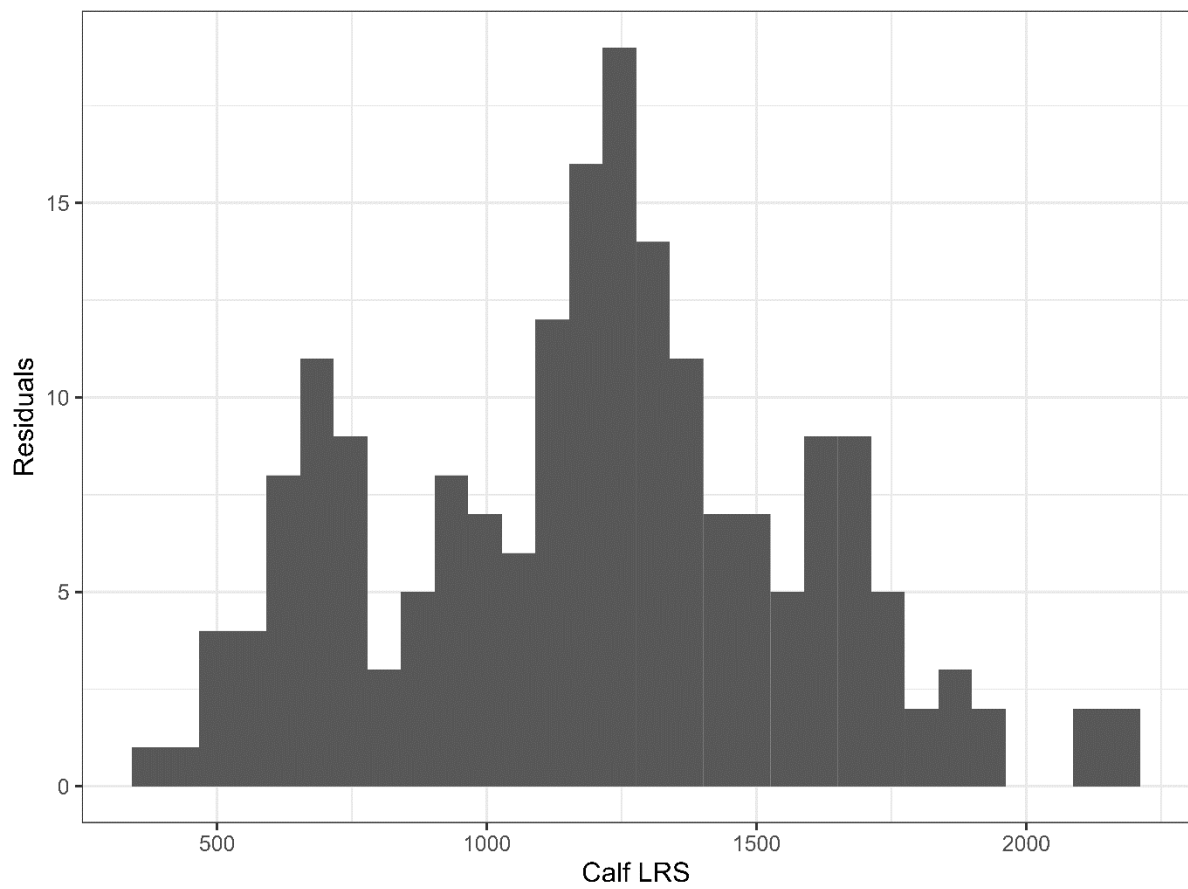


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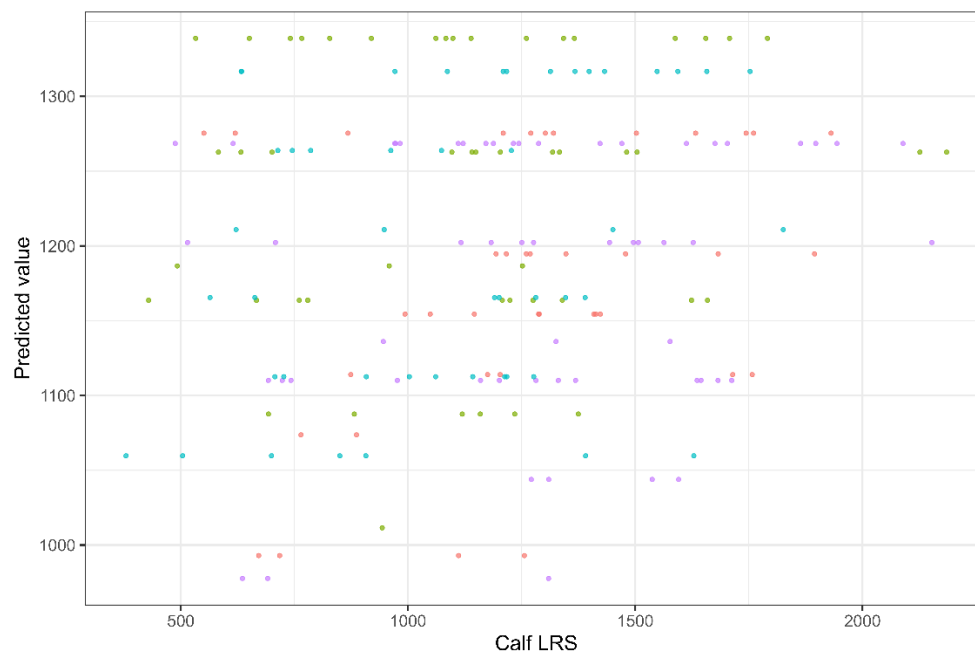
Supplementary Figure 3B Predictions from leave-one-farm out cross validation of the final model for *in-utero* events and lifetime resilience score of daughters, by farm



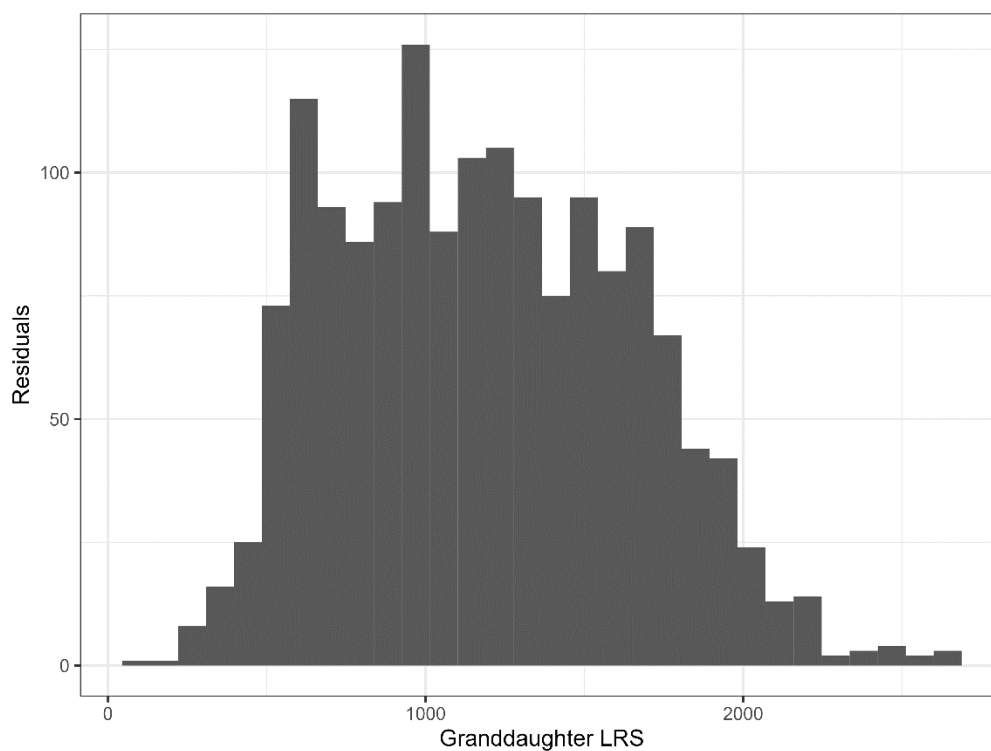
Supplementary Figure 4 Residual vs fitted values plot for the final model of *in-utero* event predictors associated with lifetime resilience score of 193 daughters from the Langhill research herd



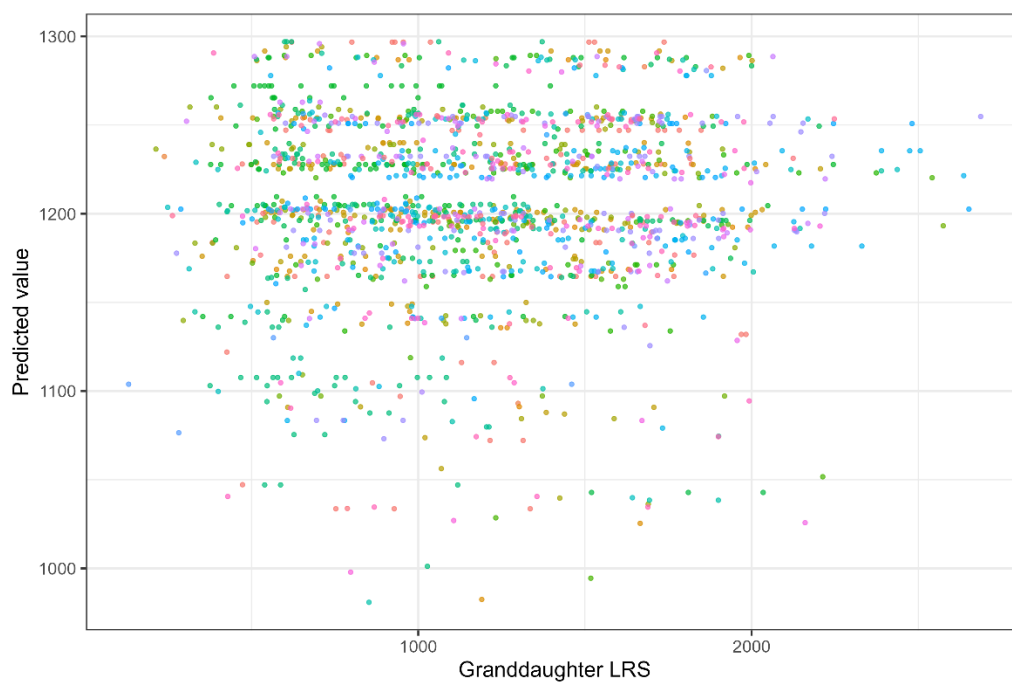
- 1 Supplementary Figure 5A Predictions from leave-one-group out cross validation of the final model for
- 2 *in-utero* events and lifetime resilience score of daughters from the Langhill research herd. 'Groups'
- 3 were sub-herds based on feed trial and genetic group



5 Supplementary Figure 6 Residual vs fitted values plot for the final model of *in-utero* event predictors
6 associated with lifetime resilience score of 1586 granddaughters

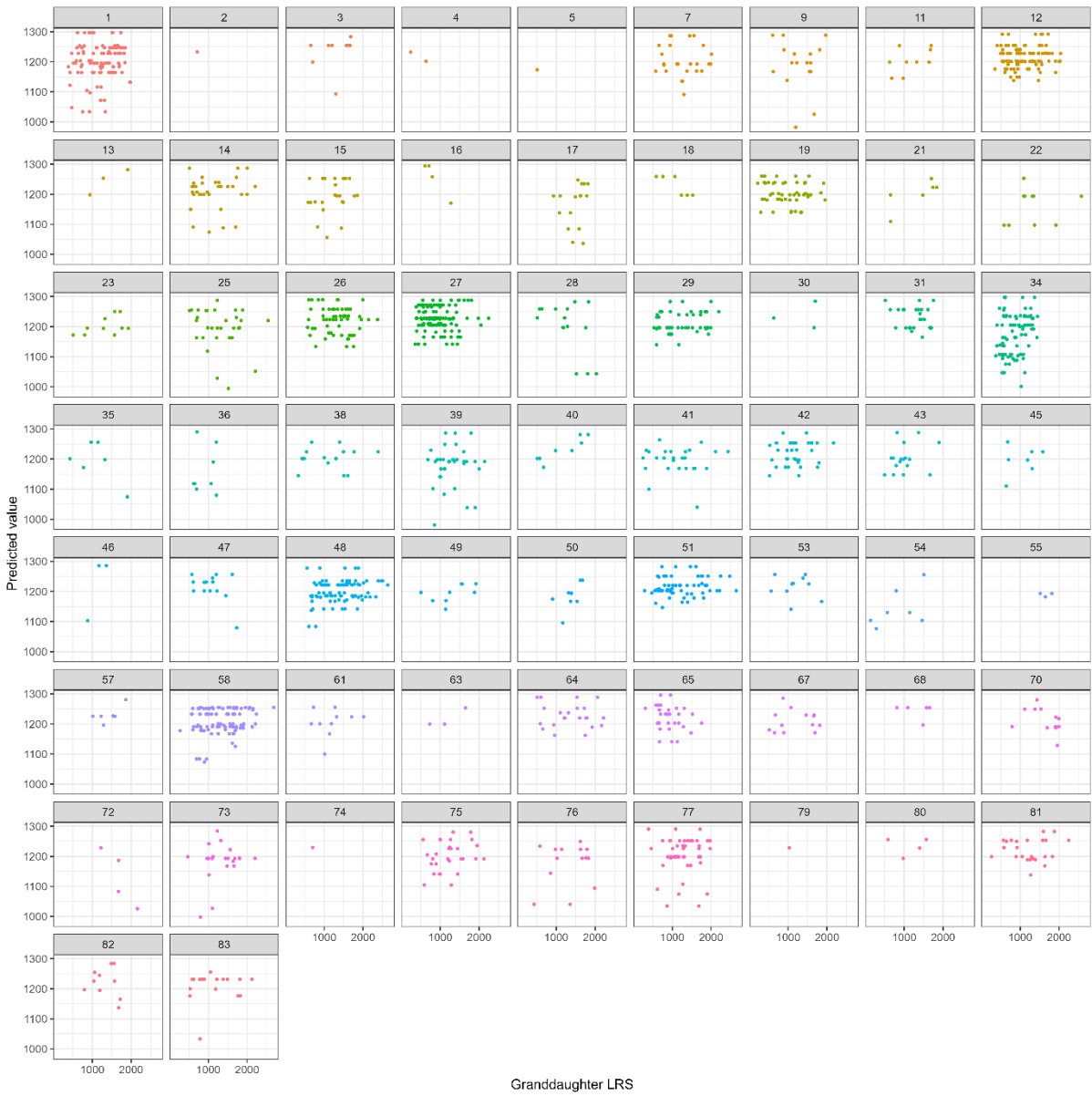


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9 Supplementary Figure 7A Predictions from leave-one-farm out cross validation of the final model for
10 *in-utero* events and lifetime resilience score of granddaughters



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Supplementary Figure 7B Predictions from leave-one-farm out cross validation of the final model for *in-utero* events and lifetime resilience score of granddaughters, by farm



Supplementary Table 2 Summary of health events recorded during 295 dam pregnancies for the Langhill research herd

Health Event Description	Frequency	No of Cows
Mastitis	23	20
Lost Quarter	2	2
Retained Placenta	1	1
Mucopurulent Exudate/Metritis/Pyometra/Whites	1	1
Dull Post Calve	1	1
Off Feed	1	1
Gastrointestinal Infection/Scouring	4	3
Pneumonia	2	2
Kidney Infection/Pyelonephritis	1	1
Hypocalcaemia/Milk Fever	1	1
Skeletal	3	3
Nerve Damage	1	1
Locomotion General/Off Legs/Leg-foot Injury/Stifle Lameness	13	11
Slurry/Underrun Heel/Interdigital Dermatitis	47	45
Sole Ulcer	27	21
Digital Dermatitis (Mortellaro)	61	41
White Line Disease/Separation	117	103
Sole Separation/Underrun Sole (Not Heel)	26	25
Interdigital Granuloma/Growth/Tyloma	13	8
Punctured Sole & Pus	9	9
Leg Abscess/Swollen Hock	5	4
Arthritis	1	1
Thin Sole	12	12
Foot/Toe/Wall Abscess	15	13
Septic Foot/Joint	1	1
Foreign Body Penetration	10	10
Hospitalisation Starts	42	32
Hospitalisation Ends	42	32