**SUPPLEMENTARY INFORMATION**

**1. Effect of methodological bias on faecal egg counts (FECs)**

Collection Julian date (seasonality), time of the day and storage condition can influence faecal egg counts. To determine if such biases were present in our study we performed a model selection analysis using all 670 faecal egg counts performed in summer 2014. Specifically, we fitted a full mixed model including all 2-way interactions as well as all simpler models and compared their AICc and AICc weight values (Table A1). In all models, horse and group identity were fitted as random effects to control for pseudo-replication (and unbalanced sampling). Because we had no a priori expectation regarding the shape of (any) relationship between FEC, Julian date or the time of day, we tested for non-linear relationships by fitting cubic splines with generalized additive models implemented in the R mgcv package (Wood, 2011), and we also performed the same model selection by adding a second order polynomial term to the variables day of year and time of day. In all cases, models that included non-linear relationships did not perform better and only linear relationships were therefore used in final models.

 The selected null or constant model indicated no effect of time, Julian date, or storage condition on faecal egg counts (Table A1). These variables were therefore not considered in the model selection analyses presented in the main article.

**Wood, S.N.** (2011). Fast stable restricted maximum likelihood and marginal likelihood estimation of semiparametric generalized linear models. *Journal of the Royal Statistical Society (B)* **73**(1):3-36.

**Table A1.** Model selection for the mixed linear models testing for links between log-transformed FECs and potential methodological bias (Julian date ‘Day’, time of day ‘Time’, and storage condition in the field ‘Icepack’) for 670 samples collected from 447 horses. Horse and group identities were included as random factors. k represent the number of parameter, LogLik the log-likelihood, AICcWt the corresponding AIC weight and ER the evidence ratio. The selected model is highlighted in bold.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  ***Models*** | ***df*** | ***LogLik*** | ***AICc*** | ***ΔAICc*** | ***AICcWt*** | **ER** |
| **Constant** | **4** | **-754.23** | **1516.51** | **0.00** | **0.24** | **1** |
| Day | 5 | -753.38 | 1516.86 | 0.34 | 0.20 | 1.19 |
| Icepack | 5 | -753.96 | 1518.01 | 1.49 | 0.11 | 2.11 |
| Time | 5 | -754.22 | 1518.53 | 2.02 | 0.09 | 2.75 |
| Icepack + Day | 6 | -753.23 | 1518.58 | 2.07 | 0.09 | 2.81 |
| Time + Day | 6 | -753.38 | 1518.89 | 2.37 | 0.07 | 3.28 |
| Icepack + Time  | 6 | -753.95 | 1520.03 | 3.52 | 0.04 | 5.81 |
| Icepack : Day  | 7 | -753.13 | 1520.42 | 3.91 | 0.03 | 7.06 |
| Icepack + Time + Day  | 7 | -753.23 | 1520.62 | 4.11 | 0.03 | 7.80 |
| Time : Day  | 7 | -753.36 | 1520.90 | 4.38 | 0.03 | 8.94 |
| Icepack : Time | 7 | -753.95 | 1522.08 | 5.56 | 0.01 | 16.14 |
| Time + Icepack : Day  | 8 | -753.12 | 1522.46 | 5.95 | 0.01 | 19.59 |
| Icepack + Time : Day  | 8 | -753.22 | 1522.65 | 6.14 | 0.01 | 21.49 |
| Day + Icepack : Time | 8 | -753.23 | 1522.67 | 6.16 | 0.01 | 21.73 |
| Icepack : Day + Time : Day  | 9 | -753.11 | 1524.49 | 7.97 | 0.00 | 53.85 |
| Icepack : Time + Icepack : Day  | 9 | -753.12 | 1524.52 | 8.00 | 0.00 | 54.67 |
| Icepack : Time + Icepack : Day + Time : Day  | 9 | -753.22 | 1524.70 | 8.19 | 0.00 | 60.01 |
| Icepack : Time + Icepack : Day + Time : Day  | 10 | -753.11 | 1526.55 | 10.03 | 0.00 | 150.90 |

 

(b)

(a)

**Figure A1**. Distribution of Strongyle faecal egg counts (FEC) in Sable Island horses (eggs per gram, *N* = 670). (a) Raw data and (b) log-transformed.

**Table A2. Number of observations** (FEC and body condition score) used in the analyses for each sub-sample. The numbers in parenthesis refer to the corresponding number of individuals. The mean ± SD of log-transformed FEC or body condition scores for each sub-sample are also reported.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Trait*** | ***Dataset*** | ***Sample size*** | ***Mean*** | ***SD*** |
| FEC | All | 670 (447) | 7.05 | 0.87 |
| All females | 313 (213) | 7.16 | 0.95 |
| All males | 357 (234) | 6.95 | 0.79 |
| Adult females | 183 (125) | 6.93 | 1.08 |
| Adult males | 242 (153) | 6.81 | 0.76 |
| Lactating adult females | 103 (66) | 7.27 | 0.90 |
| Non-lactating adult females | 80 (59) | 6.51 | 1.13 |
| Adult bachelors | 99 (62) | 6.82 | 0.84 |
| Dominant band stallions | 143 (91) | 6.80 | 0.70 |
| Condition | All | 1607 (447) | 2.58 | 0.45 |
| All females | 748 (213) | 2.42 | 0.46 |
| All males | 859 (234) | 2.72 | 0.39 |
| Adult females | 439 (125) | 2.39 | 0.52 |
| Adult males | 573 (153) | 2.83 | 0.36 |
| Lactating adult females | 237 (66) | 2.19 | 0.5 |
| Non-lactating adult females | 202 (59) | 2.63 | 0.43 |
| Adult bachelors | 251 (62) | 2.79 | 0.4 |
| Dominant band stallions | 322 (91) | 2.87 | 0.31 |

**Table A3. Testing for non-linear relationships.** Differences in AICc between the null model (‘ΔAICc null’) or the complete model (‘ΔAICc complete’) without second order polynomials and the complete model including second order polynomials fitted to account for non-linear relationships (one variable at a time).k represent the number of parameters.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Trait*** | ***Model*** | ***Second order polynomial Factor*** | ***k*** | ***AICc*** | ***ΔAICc complete*** | ***ΔAICc null*** |
| FEC | Null model (LMM) | None | 4 | 1516.45 | 77.10 | 0.00 |
| Complete model (LMM) | None | 19 | 1439.35 | 0.00 | -77.10 |
| LMM with second order polynomial | Age | 24 | 1430.22 | -9.13 | -86.23 |
| LMM with second order polynomial | Location | 24 | 1426.96 | -12.39 | -89.49 |
| LMM with second order polynomial | Group size | 24 | 1445.57 | 6.22 | -70.88 |
| LMM with second order polynomial | Density | 24 | 1445.06 | 5.71 | -71.39 |
| Body condition | Null model (LMM) | None | 4 | 1177.94 | 104.03 | 0.00 |
| Complete model with location(LMM) | None | 25 | 1073.91 | 0.00 | -104.03 |
| LMM with second order polynomial | Age | 31 | 1058.23 | -15.68 | -119.71 |
| LMM with second order polynomial | Location | 31 | 1074.14 | 0.23 | -103.80 |
| LMM with second order polynomial | Density | 31 | 1081.93 | 8.02 | -96.01 |
| LMM with second order polynomial | Scoring date | 31 | 1084.46 | 10.55 | -93.48 |
| LMM with second order polynomial | Group size | 31 | 1075.61 | 1.70 | -102.33 |

***FEC complete model*** *= Age + location + Sex + GroupSize + density + Age\*Sex + Age\*mean\_longitude\_2013 + Age\*density + Age\*GroupSize + location \*Sex + density\*Sex + Sex\*GroupSize + location \*density + location \*GroupSize + density\*GroupSize*

***Body condition complete model*** *= Age + location + Sex + GroupSize + yday + density + Age\*Sex + Age\*yday + Age\* location + Age\*density + Age\*GroupSize + Sex\*yday + location \*Sex + density\*Sex + Sex\*GroupSize + location \*yday + location \*density + location \*GroupSize + yday\*density + density\*GroupSize + GroupSize\*yday*

*Note that for all models horse and group identities were included as random factors*

**Table A4.** **FEC model selection** tables for (a) all individuals (*N*horse = 447, *N*sample = 670), (b) adult females (*N*horse = 125, *N*sample = 183) and (c) adult males (*N*horse = 153, *N*sample = 242). The full model included fixed effects of age (continuous), sex or female’s reproductive status (‘Repro’) or male’s social status (‘Status’), summer location along an east-west axis, local density, group size and their two-way interactions. Horse and group identities were included as random factors. The loglikelihood (LogLik), corresponding AIC weight (AICcWt) and evidence ration (ER) are presented for all models with a ΔAICc < 3. The selected model is in bold.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***(a) Model*** | ***df*** | ***LogLik*** | ***AICc*** | ***ΔAICc*** | ***AICcWt*** | ***ER*** |
| **Age : Location + Location : Sex** | **15** | **-685.37** | **1401.46** | **0.00** | **0.12** | **1.00** |
| Group size + Age : Location + Location : Sex | 16 | -685.08 | 1402.99 | 1.53 | 0.06 | 2.15 |
| Density + Age : Location + Location : Sex | 16 | -685.09 | 1403.01 | 1.54 | 0.06 | 2.16 |
| Age : Location + Age : Sex + Location : Sex | 17 | -684.35 | 1403.63 | 2.17 | 0.04 | 2.95 |
| Group size : Sex + Age : Location + Location : Sex | 17 | -684.57 | 1404.08 | 2.62 | 0.03 | 3.70 |
| Age : Location | 12 | -689.94 | 1404.36 | 2.90 | 0.03 | 4.26 |
| … |  |  |  |  |  |  |
| Constant | 4 | -754.23 | 1516.51 | 115.05 | 0.00 | 9.61E+24 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***(b) Model*** | ***df*** | ***LogLik*** | ***AICc*** | ***ΔAICc*** | ***AICcWt*** | ***ER*** |
| **Repro + Age : Location** | **13** | **-218.18** | **464.51** | **0.00** | **0.10** | **1.00** |
| Density + Repro + Age : Location | 14 | -217.54 | 465.59 | 1.08 | 0.06 | 1.72 |
| Group size + Repro + Age : Location | 14 | -217.78 | 466.06 | 1.55 | 0.04 | 2.17 |
| Density : Repro + Repro : Location + Age : Location | 17 | -214.49 | 466.68 | 2.18 | 0.03 | 2.97 |
| Group size + Density + Repro + Age : Location | 15 | -217.10 | 467.07 | 2.56 | 0.03 | 3.59 |
| Density : Repro + Age : Location | 15 | -217.25 | 467.36 | 2.86 | 0.02 | 4.18 |
| Age + Location + Repro | 9 | -224.20 | 467.44 | 2.93 | 0.02 | 4.33 |
| … |  |  |  |  |  |  |
| Constant | 4 | -244.75 | 497.73 | 33.22 | 0.00 | 1.64E+07 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***(c) Model*** | ***df*** | ***logLik*** | ***AICc*** | ***ΔAICc*** | ***AICc Wt*** | ***ER*** |
| **Density : Status + Status : Location + Age : Location + Status : Age** | **19** | **-196.79** | **435.01** | **0.00** | **0.17** | **1.00** |
| Group size + Density : Status + Status : Location + Age : Location + Status : Age | 20 | -196.49 | 436.79 | 1.78 | 0.07 | 2.44 |
| Density : Location + Density : Status + Status : Location + Age : Location + Status : Age | 21 | -195.70 | 437.60 | 2.59 | 0.05 | 3.65 |
| ... |  |  |  |  |  |  |
| Constant | 4 | -225.62 | 459.41 | 24.40 | 0.00 | 1.99E+05 |

**Table A5.** **Body condition model selection** tables for (a) all individuals (*N*horse = 447, *N*score = 1607), (b) adult females (*N*horse = 125, *N*score = 439) and (c) adult males (*N*horse = 153, *N*score = 573). The full model included fixed effects of age (continuous), sex or female reproductive status (‘Repro’) or male social status (‘Status’), mean summer location on the island along an east-west axis, local density, group size, scoring date and their two-way interactions. Horse and group identities were included as random factors. The loglikelihood (LogLik), corresponding AIC weight (AICcWt) and evidence ratio (ER) are presented for all models with a ΔAICc < 3. The selected models are in bold.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***(a) Model*** | ***df*** | ***LogLik*** | ***AICc*** | ***ΔAICc*** | ***AICcWt*** | ***ER*** |
| Density : Date + Age : Location + Age : Sex + Sex : Date | 16 | -502.80 | 1037.95 | 0.00 | 0.01 | 1.00 |
| Density : Date + Age : Location + Location : Sex + Age : Sex + Sex : Date | 17 | -501.79 | 1037.97 | 0.01 | 0.01 | 1.01 |
| **Age : Location + Age : Sex + Sex : Date** | **14** | **-504.94** | **1038.15** | **0.20** | **0.01** | **1.10** |
| Age : Location + Location : Date + Age : Sex + Sex : Date | 15 | -503.92 | 1038.15 | 0.20 | 0.01 | 1.10 |
| Density : Sex + Density : Date + Age : Location + Age : Sex + Sex : Date | 17 | -501.89 | 1038.16 | 0.21 | 0.01 | 1.11 |
| Age : Location + Location : Sex + Location : Date + Age : Sex + Sex : Date | 16 | -502.94 | 1038.22 | 0.27 | 0.01 | 1.15 |
| Age : Location + Location : Sex + Age : Sex + Sex : Date | 15 | -503.98 | 1038.27 | 0.32 | 0.01 | 1.17 |
| Density : Sex + Density : Date + Age : Location + Location : Sex + Age : Sex + Sex : Date | 18 | -501.55 | 1039.54 | 1.58 | 0.01 | 2.21 |
| Density : Location + Density : Date + Age : Location + Age : Sex + Sex : Date | 17 | -502.61 | 1039.60 | 1.65 | 0.01 | 2.29 |
| Density : Location + Density : Date + Age : Location + Location : Sex + Age : Sex + Sex : Date | 18 | -501.60 | 1039.64 | 1.69 | 0.01 | 2.33 |
| Group size + Density : Date + Age : Location + Age : Sex + Sex : Date | 17 | -502.70 | 1039.79 | 1.84 | 0.00 | 2.51 |
| Density : Location + Density : Sex + Density : Date + Age : Location + Age : Sex + Sex : Date | 18 | -501.71 | 1039.85 | 1.90 | 0.00 | 2.58 |
| Density : Date + Age : Location + Location : Date + Age : Sex + Sex : Date | 17 | -502.73 | 1039.85 | 1.90 | 0.00 | 2.58 |
| Density : Date + Age : Location + Location : Sex + Location : Date + Age : Sex + Sex : Date | 18 | -501.72 | 1039.86 | 1.91 | 0.00 | 2.60 |
| Group size + Density : Date + Age : Location + Location : Sex + Age : Sex + Sex : Date | 18 | -501.73 | 1039.88 | 1.93 | 0.00 | 2.63 |
| Density + Age : Location + Age : Sex + Sex : Date | 15 | -504.82 | 1039.95 | 1.99 | 0.00 | 2.71 |
| Density + Age : Location + Location : Date + Age : Sex + Sex : Date | 16 | -503.82 | 1039.98 | 2.02 | 0.00 | 2.75 |
| Group size + Age : Location + Age : Sex + Sex : Date | 15 | -504.84 | 1039.99 | 2.04 | 0.00 | 2.77 |
| Group size + Age : Location + Location : Date + Age : Sex + Sex : Date | 16 | -503.83 | 1040.00 | 2.05 | 0.00 | 2.78 |
| Density + Age : Location + Location : Sex + Location : Date + Age : Sex + Sex : Date | 17 | -502.82 | 1040.03 | 2.08 | 0.00 | 2.83 |
| Density + Age : Location + Location : Sex + Age : Sex + Sex : Date | 16 | -503.85 | 1040.05 | 2.10 | 0.00 | 2.85 |
| Density : Sex + Density : Date + Age : Location + Location : Date + Age : Sex + Sex : Date | 18 | -501.81 | 1040.05 | 2.10 | 0.00 | 2.86 |
| Group size + Density : Sex + Density : Date + Age : Location + Age : Sex + Sex : Date | 18 | -501.83 | 1040.09 | 2.14 | 0.00 | 2.92 |
| Group size + Age : Location + Location : Sex + Location : Date + Age : Sex + Sex : Date | 17 | -502.88 | 1040.15 | 2.19 | 0.00 | 3.00 |
| Group size + Age : Location + Location : Sex + Age : Sex + Sex : Date | 16 | -503.92 | 1040.18 | 2.23 | 0.00 | 3.05 |
| Density : Sex + Age : Location + Location : Date + Age : Sex + Sex : Date | 17 | -502.91 | 1040.21 | 2.26 | 0.00 | 3.10 |
| Density : Sex + Age : Location + Age : Sex + Sex : Date | 16 | -503.95 | 1040.24 | 2.29 | 0.00 | 3.14 |
| Density : Age + Density : Date + Age : Location + Age : Sex + Sex : Date | 18 | -501.92 | 1040.28 | 2.33 | 0.00 | 3.20 |
| Group size : Age + Density : Date + Age : Location + Age : Sex + Sex : Date | 19 | -501.08 | 1040.64 | 2.68 | 0.00 | 3.83 |
| Density : Age + Density : Date + Age : Location + Location : Sex + Age : Sex + Sex : Date | 19 | -501.11 | 1040.71 | 2.75 | 0.00 | 3.96 |
| Group size : Age + Age : Location + Age : Sex + Sex : Date | 17 | -503.21 | 1040.80 | 2.85 | 0.00 | 4.16 |
| Group size : Age + Age : Location + Location : Date + Age : Sex + Sex : Date | 18 | -502.19 | 1040.81 | 2.86 | 0.00 | 4.17 |
| Group size : Age + Density : Date + Age : Location + Location : Sex + Age : Sex + Sex : Date | 20 | -500.20 | 1040.92 | 2.97 | 0.00 | 4.42 |
| … |  |  |  |  |  |  |
| Constant | 4 | -584.97 | 1177.97 | 140.02 | 0.00 | 2.54E+30 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***(b) Model*** | ***df*** | ***LogLik*** | ***AICc*** | ***ΔAICc*** | ***AICcWt*** | ***ER*** |
| Repro : Location + Repro : Date | 9 | -145.16 | 308.75 | 0.00 | 0.01 | 1.00 |
| Repro : Location + Age : Date | 12 | -142.26 | 309.25 | 0.50 | 0.01 | 1.28 |
| Repro : Location + Repro : Date + Age : Date | 13 | -141.30 | 309.45 | 0.70 | 0.01 | 1.42 |
| Repro : Location + Repro : Date + Location : Date | 10 | -144.54 | 309.60 | 0.85 | 0.01 | 1.53 |
| Density : Date + Repro : Location + Repro : Date | 11 | -143.53 | 309.67 | 0.92 | 0.01 | 1.58 |
| **Date + Repro : Location** | **8** | **-146.69** | **309.72** | **0.97** | **0.01** | **1.62** |
| Repro : Location + Location : Date + Age : Date | 13 | -141.79 | 310.44 | 1.69 | 0.01 | 2.33 |
| Density + Repro : Location + Repro : Date | 10 | -145.00 | 310.51 | 1.76 | 0.01 | 2.41 |
| Group size + Repro : Location + Repro : Date | 10 | -145.02 | 310.55 | 1.80 | 0.01 | 2.46 |
| Repro : Location + Repro : Date + Location : Date + Age : Date | 14 | -140.81 | 310.61 | 1.86 | 0.01 | 2.53 |
| Repro : Location + Location : Date | 9 | -146.11 | 310.65 | 1.90 | 0.01 | 2.59 |
| Density : Date + Repro : Location + Age : Date | 14 | -140.88 | 310.74 | 2.00 | 0.00 | 2.71 |
| Density : Date + Repro : Location  | 10 | -145.14 | 310.79 | 2.04 | 0.00 | 2.78 |
| Density + Repro : Location + Age : Date | 13 | -142.00 | 310.85 | 2.10 | 0.00 | 2.86 |
| Density : Date + Repro : Location + Repro : Date + Age : Date | 15 | -139.87 | 310.87 | 2.12 | 0.00 | 2.89 |
| Group size + Repro : Location + Age : Date | 13 | -142.02 | 310.89 | 2.14 | 0.00 | 2.92 |
| Density + Repro : Location + Repro : Date + Age : Date | 14 | -141.03 | 311.06 | 2.31 | 0.00 | 3.18 |
| Group size + Repro : Location + Repro : Date + Age : Date | 14 | -141.07 | 311.13 | 2.38 | 0.00 | 3.29 |
| Group size : Location + Repro : Location + Repro : Date | 11 | -144.28 | 311.19 | 2.44 | 0.00 | 3.39 |
| Density + Repro : Location + Repro : Date + Location : Date | 11 | -144.37 | 311.36 | 2.61 | 0.00 | 3.69 |
| Group size : Date + Repro : Location + Repro : Date | 11 | -144.39 | 311.40 | 2.66 | 0.00 | 3.77 |
| Group size + Repro : Location + Repro : Date + Location : Date | 11 | -144.40 | 311.41 | 2.66 | 0.00 | 3.78 |
| Group size : Location + Repro : Location + Age : Date | 14 | -141.23 | 311.45 | 2.70 | 0.00 | 3.86 |
| Density + Date + Repro : Location | 9 | -146.52 | 311.46 | 2.71 | 0.00 | 3.88 |
| Group size + Date + Repro : Location | 9 | -146.54 | 311.49 | 2.74 | 0.00 | 3.94 |
| Group size + Density : Date + Repro : Location + Repro : Date | 12 | -143.40 | 311.54 | 2.79 | 0.00 | 4.03 |
| Repro : Location + Location : Age + Age : Date | 14 | -141.31 | 311.61 | 2.86 | 0.00 | 4.18 |
| Age + Repro : Location + Repro : Date | 11 | -144.51 | 311.64 | 2.90 | 0.00 | 4.26 |
| Density : Location + Density : Date + Repro : Location + Repro : Date | 12 | -143.47 | 311.68 | 2.93 | 0.00 | 4.32 |
| Density : Date + Repro : Location + Repro : Date + Location : Date | 12 | -143.50 | 311.73 | 2.98 | 0.00 | 4.44 |
| … |  |  |  |  |  |  |
| Constant | 4 | -174.67 | 357.43 | 48.68 | 0.00 | 3.72E+10 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***(c) Model*** | ***df*** | ***LogLik*** | ***AICc*** | ***ΔAICc*** | ***AICc******Wt*** | ***ER*** |
| Status : Location + Status : Age + Status : Date | 13 | -140.07 | 306.79 | 0.00 | 0.01 | 1.00 |
| Group size : Date + Status : Location + Status : Age + Status : Date | 15 | -138.33 | 307.53 | 0.74 | 0.01 | 1.45 |
| Status : Location + Status : Age + Status : Date +Location : Date | 14 | -139.48 | 307.71 | 0.92 | 0.01 | 1.59 |
| **Location + Status : Age + Status : Date** | **12** | **-141.98** | **308.51** | **1.72** | **0.00** | **2.37** |
| Group size + Status : Location + Status : Age + Status : Date | 14 | -139.88 | 308.52 | 1.73 | 0.00 | 2.38 |
| Group size : Date + Status : Location + Status : Age + Status : Date + Location : Date | 16 | -137.84 | 308.65 | 1.86 | 0.00 | 2.54 |
| Density : Date + Status : Location + Status : Age + Status : Date | 15 | -138.93 | 308.72 | 1.94 | 0.00 | 2.63 |
| Group size : Location + Group size : Date + Status : Location + Status : Age + Status : Date | 16 | -137.91 | 308.80 | 2.01 | 0.00 | 2.73 |
| Density + Status : Location + Status : Age + Status : Date | 14 | -140.05 | 308.86 | 2.07 | 0.00 | 2.81 |
| Age + Group size : Date + Status : Location + Status : Date | 13 | -141.14 | 308.94 | 2.15 | 0.00 | 2.93 |
| Group size : Density + Group size : Location + Group size : Date + Status : Location + Status : Age + Status : Date | 18 | -135.88 | 309.00 | 2.21 | 0.00 | 3.01 |
| Location + Group size : Date + Status : Age + Status : Date | 14 | -140.13 | 309.02 | 2.23 | 0.00 | 3.05 |
| Age + Status : Location + Status : Date | 11 | -143.29 | 309.06 | 2.27 | 0.00 | 3.11 |
| Group size : Density + Group size : Location + Group size : Date + Status : Age + Status : Date | 17 | -137.03 | 309.15 | 2.37 | 0.00 | 3.26 |
| Status : Location + Status : Age | 11 | -143.36 | 309.18 | 2.39 | 0.00 | 3.31 |
| Location + Age + Group size : Date + Status : Date | 12 | -142.36 | 309.29 | 2.50 | 0.00 | 3.49 |
| Group size : Status + Group size : Date + Status : Location + Status : Age + Status : Date | 16 | -138.17 | 309.31 | 2.52 | 0.00 | 3.53 |
| Status : Age + Status : Date + Location : Date + | 13 | -141.33 | 309.32 | 2.53 | 0.00 | 3.55 |
| Group size : Density + Group size : Location + Density : Date + Status : Location + Status : Age + Status : Date | 18 | -136.08 | 309.40 | 2.61 | 0.00 | 3.69 |
| Group size : Density + Group size : Location + Status : Location + Status : Age + Status : Date | 17 | -137.16 | 309.42 | 2.63 | 0.00 | 3.72 |
| Group size : Density + Group size : Location + Group size : Date + Density : Date + Status : Age + Status : Date | 18 | -136.10 | 309.44 | 2.65 | 0.00 | 3.77 |
| Group size : Density + Group size : Location + Group size : Date + Density : Date + Status : Location + Status : Age + Status : Date | 19 | -135.04 | 309.46 | 2.67 | 0.00 | 3.80 |
| Group size : Density + Group size : Location + Density : Date + Status : Age + Status : Date | 17 | -137.18 | 309.46 | 2.67 | 0.00 | 3.81 |
| Group size + Status : Location + Status : Age + Status : Date +Location : Date | 15 | -139.31 | 309.49 | 2.70 | 0.00 | 3.85 |
| Density : Status + Density : Date + Status : Location + Status : Age + Status : Date | 16 | -138.27 | 309.51 | 2.72 | 0.00 | 3.90 |
| Location + Age + Status : Date | 10 | -144.57 | 309.52 | 2.74 | 0.00 | 3.93 |
| Group size : Location + Status : Location + Status : Age + Status : Date | 15 | -139.33 | 309.53 | 2.74 | 0.00 | 3.93 |
| Density + Group size : Date + Status : Location + Status : Age + Status : Date | 16 | -138.29 | 309.57 | 2.78 | 0.00 | 4.01 |
| Group size : Density + Group size : Location + Status : Age + Status : Date | 16 | -138.35 | 309.69 | 2.90 | 0.00 | 4.26 |
| Density : Status + Status : Location + Status : Age + Status : Date | 15 | -139.42 | 309.70 | 2.91 | 0.00 | 4.29 |
| … |  |  |  |  |  |  |
| Constant | 4 | -161.82 | 331.70 | 24.91 | 0.00 | 2.57E+05 |

**Table A6.** **Parameter estimates** from the selected generalized linear mixed model describing variation in strongyle faecal egg count (log transformed) and body condition for each dataset. Horse and group identities were included as random effects in all models.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Trait*** | ***Dataset*** | ***Fixed effects*** | ***Coef*** | ***SD*** | ***df*** | ***t-value*** | ***P-value*** |
| *FEC* | *All individuals (N=447, Nsample=670)* | Intercept | 7.11 | 0.05 | 242.90 | 135.42 | <0.001 |
| poly(Location,2)1 | -2.30 | 1.29 | 265.30 | -1.78 | 0.076 |
| poly(Location,2)2 | -3.39 | 1.34 | 295.00 | -2.53 | 0.012 |
| poly(Age,2)1 | -7.87 | 0.90 | 429.60 | -8.79 | <0.001 |
| poly(Age,2)2 | -1.24 | 0.95 | 357.10 | -1.31 | 0.191 |
| Sex M category | -0.09 | 0.07 | 289.60 | -1.16 | 0.246 |
| poly(Location,2)1 : Sex M | -4.83 | 1.76 | 453.00 | -2.75 | 0.006 |
| poly(Location,2)2 : Sex M | -0.87 | 1.76 | 454.70 | -0.50 | 0.621 |
| poly(Location,2)1 : poly(Age2,2)1 | -3.51 | 21.28 | 442.80 | -0.17 | 0.869 |
| poly(Location,2)2 : poly(Age2,2)1 | -60.52 | 21.40 | 441.30 | -2.83 | 0.005 |
| poly(Location,2)1 : poly(Age2,2)2 | -91.19 | 23.26 | 449.60 | -3.92 | <0.001 |
| poly(Location,2)2 : poly(Age2,2)2 | -20.47 | 23.36 | 444.60 | -0.88 | 0.381 |
| *Adults females (N=125, Nsample=183)* | Intercept | 7.21 | 0.11 | 125.18 | 67.28 | <0.001 |
| poly(Location,2)1 | -0.82 | 1.09 | 129.02 | -0.75 | 0.454 |
| poly(Location,2)2 | -3.61 | 1.20 | 129.32 | -3.01 | 0.003 |
| poly(Age,2)1 | -3.55 | 1.07 | 127.61 | -3.31 | 0.001 |
| poly(Age,2)2 | 0.88 | 1.05 | 130.51 | 0.84 | 0.400 |
| Lactating No category | -0.61 | 0.16 | 128.11 | -3.91 | <0.001 |
| poly(Location,2)1 : poly(Age2,2)1 | -41.33 | 14.91 | 127.86 | -2.77 | 0.006 |
| poly(Location,2)2 : poly(Age2,2)1 | -16.96 | 16.77 | 128.87 | -1.01 | 0.314 |
| poly(Location,2)1 : poly(Age2,2)2 | 11.92 | 14.93 | 133.03 | 0.80 | 0.426 |
| poly(Location,2)2 : poly(Age2,2)2 | 17.02 | 16.53 | 133.23 | 1.03 | 0.305 |
| *Adults males (N=153, Nsample=242)* | Intercept | 8.88 | 0.69 | 143.57 | 12.90 | <0.001 |
| poly(Age,2)1 | -0.63 | 1.39 | 150.41 | -0.45 | 0.654 |
| poly(Age,2)2 | 2.34 | 1.22 | 152.11 | 1.91 | 0.058 |
| poly(Location,2)1 | -7.97 | 1.81 | 147.72 | -4.41 | <0.001 |
| poly(Location,2)2 | 0.67 | 1.42 | 155.72 | 0.48 | 0.634 |
| Density | -0.08 | 0.03 | 143.62 | -3.23 | 0.002 |
| Social status Stallion category | -2.81 | 0.92 | 148.95 | -3.07 | 0.003 |
| Social status Stallion : Density | 0.12 | 0.03 | 149.29 | 3.41 | 0.001 |
| Social status Stallion : poly(Age,2)1 | -5.79 | 2.06 | 147.77 | -2.82 | 0.006 |
| Social status Stallion : poly(Age,2)2 | -0.51 | 1.78 | 149.68 | -0.29 | 0.773 |
| Social status Stallion : poly(Location,2)1 | 7.17 | 2.29 | 149.24 | 3.14 | 0.002 |
| Social status Stallion : poly(Location,2)2 | -6.42 | 2.02 | 154.73 | -3.18 | 0.002 |
| poly(Location,2)1 : poly(Age2,2)1 | -21.76 | 12.58 | 151.84 | -1.73 | 0.086 |
| poly(Location,2)2 : poly(Age2,2)1 | -22.03 | 12.36 | 155.35 | -1.78 | 0.077 |
| poly(Location,2)1 : poly(Age2,2)2 | 23.01 | 12.80 | 154.88 | 1.80 | 0.074 |
| poly(Location,2)2 : poly(Age2,2)2 | -25.65 | 12.46 | 153.98 | -2.06 | 0.041 |
| *Condition* | *All individuals (N=447, Nsample=1607)* | Intercept | 2.45 | 0.03 | 283.30 | 81.86 | <0.001 |
| poly(Age,2)1 | -0.41 | 0.93 | 416.40 | -0.44 | 0.662 |
| poly(Age,2)2 | 2.77 | 0.97 | 447.00 | 2.86 | 0.005 |
| Location | -0.10 | 0.02 | 85.30 | -6.04 | <0.001 |
| Sex M category | 0.25 | 0.04 | 470.00 | 6.09 | <0.001 |
| Scoring date | 0.00 | 0.00 | 1219.00 | -3.88 | <0.001 |
| Scoring date : Sex M | 0.00 | 0.00 | 1236.00 | 2.62 | 0.009 |
| poly(Age,2)1 : Sex M | 5.32 | 1.23 | 427.80 | 4.32 | <0.001 |
| poly(Age,2)2 : Sex M | -6.56 | 1.30 | 335.60 | -5.03 | <0.001 |
| poly(Age,2)1 : Location | -0.60 | 0.60 | 400.70 | -1.00 | 0.320 |
| poly(Age,2)2 : Location | 1.84 | 0.66 | 438.00 | 2.79 | 0.005 |
| *Adults females (N=125, Nsample=439)* | Intercept | 2.18 | 0.06 | 125.30 | 38.24 | <0.001 |
| Location | -0.27 | 0.05 | 100.90 | -4.97 | <0.001 |
| Lactating No category | 0.48 | 0.07 | 121.70 | 6.64 | <0.001 |
| Scoring date | 0.00 | 0.00 | 321.70 | -3.25 | 0.001 |
| Location : Lactating No | 0.23 | 0.07 | 122.90 | 3.18 | 0.002 |
| *Adults males (N=153, Nsample=573)* | Intercept | 2.68 | 0.05 | 336.30 | 59.39 | <0.001 |
| Social status Stallion category | 0.21 | 0.06 | 349.30 | 3.41 | <0.001 |
| Scoring date | 0.00 | 0.00 | 470.10 | 1.92 | 0.056 |
| Location | -0.10 | 0.02 | 150.80 | -4.72 | <0.001 |
| poly(Age,2)1 | -2.39 | 0.78 | 139.50 | -3.07 | 0.003 |
| poly(Age,2)2 | -1.59 | 0.73 | 148.50 | -2.17 | 0.032 |
| Social status Stallion : scoring date | 0.00 | 0.00 | 469.50 | -2.41 | 0.016 |
| Social status Stallion : poly(Age,2)1 | 2.23 | 1.15 | 145.30 | 1.94 | 0.054 |
| Social status Stallion : poly(Age,2)2 | 1.03 | 1.05 | 151.80 | 0.99 | 0.324 |