2017_08_26 Lifehist glm

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R Markdown

Description of columns:

Independent variables

- Biome [Amazon, Cerrado, Mata Atlantica]- Categorical/nominal
    - State [Amazonas, Rondonia, Tocantins, Mata Atlantica]-Ordinal
    - Locality [ARS, APR, RPV, RMO, TLC, TPN, SJU]-Ordinal
    - Latitude [-2.864, -3.028, -8.742, -9.223, -10.7, -10.796, -22.611]- Ordinal
- Family [for lab reared, which female within the biome/locality they came from]- Categorical
- Well grouping [1,2,3]- Ordinal (5 larvae raised in each of 3 wells per female per temperature)
- Temperature [20 (A), 24 (B), 28C (C)]- Ordinal
- Sex [M/F]- Categorical

Dependent variables

- Death status (0,1,2) - Ordinal 0=died as larvae, 1= died as pupae, 2=died as adult
- LL- Larvae life length (days)- Discrete, all
- sLL- Larvae life length (days)- Discrete, only ones that went to adult
- PL- Pupal life length (days)- Discrete (Emergence.date-pupation.date)
- AL- Adult life length (days)- Discrete (Deathtime-Emergence.date)
- EmTime- time to emergence (Emergence.date-Hatch.day)
- Wing length (mm)- Continuous
- Rate of development
- Sex ratio

```
print("Gamma distribution results")
```

```
## [1] "Gamma distribution results"
```

```
print(modelAIC)
```

```
##      df       AIC
## mod1 45 -19713.44
## mod2  4 -18832.49
## mod3  9 -18834.34
## mod4 22 -19719.68
## mod5 10 -19343.92
## mod6 21 -19352.36
## mod7 27 -19655.53
## mod8 13 -19651.75
```

```
print("mod1<-glm(rate~Temp*Locality*Sex,data=lifedat,family=Gamma);summary(mod1)")
```

```
## [1] "mod1<-glm(rate~Temp*Locality*Sex,data=lifedat,family=Gamma);summary(mod1)"
```

```
print(summary(mod1))
```

```
##
## Call:
## glm(formula = rate ~ Temp * Locality * Sex, family = Gamma, data = lifedat)
##
## Deviance Residuals:
##      Min        1Q    Median        3Q       Max
## -0.34794  -0.07935  -0.00933   0.07091   0.44500
##
## Coefficients: (19 not defined because of singularities)
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)             16.975641   2.345447   7.238 5.97e-13 ***
## TempB                   -3.337201   0.358109  -9.319  < 2e-16 ***
## TempC                   -4.041481   2.922904  -1.383 0.166877
## LocalityAPR              1.146346   0.366982   3.124 0.001805 **
## LocalityRPV              2.558976   0.393079   6.510 8.98e-11 ***
## LocalityRMO              3.837704   0.406206   9.448  < 2e-16 ***
## LocalityTLC              3.024359   0.485761   6.226 5.56e-10 ***
## LocalityTPN              4.101536   0.801693   5.116 3.35e-07 ***
## LocalitySJU              5.911875   0.472918  12.501  < 2e-16 ***
## SexF                     3.776063   2.363964   1.597 0.110310
## SexM                     3.403779   2.328496   1.462 0.143918
## TempB:LocalityAPR       -0.612066   0.474985  -1.289 0.197651
## TempC:LocalityAPR        0.168012   0.451899   0.372 0.710079
## TempB:LocalityRPV       -1.077469   0.506006  -2.129 0.033318 *
## TempC:LocalityRPV       -0.437372   0.486425  -0.899 0.368653
## TempB:LocalityRMO       -2.026473   0.510236  -3.972 7.33e-05 ***
## TempC:LocalityRMO       -1.771864   0.495576  -3.575 0.000356 ***
## TempB:LocalityTLC       -0.003076   0.638906  -0.005 0.996159
## TempC:LocalityTLC        0.419779   0.604596   0.694 0.487548
## TempB:LocalityTPN       -0.031690   0.992508  -0.032 0.974531
## TempC:LocalityTPN        0.795714   1.012193   0.786 0.431864
## TempB:LocalitySJU       -2.571974   0.596253  -4.314 1.67e-05 ***
## TempC:LocalitySJU       -2.238695   0.713524  -3.138 0.001723 **
## TempB:SexF              -0.593561   0.529894  -1.120 0.262753
## TempC:SexF              -1.724324   2.947086  -0.585 0.558535
## TempB:SexM                    NA         NA      NA       NA
## TempC:SexM              -2.040178   2.903228  -0.703 0.482288
## LocalityAPR:SexF        -0.585215   0.538355  -1.087 0.277118
## LocalityRPV:SexF         0.003271   0.567543   0.006 0.995402
## LocalityRMO:SexF        -0.313481   0.572939  -0.547 0.584326
## LocalityTLC:SexF        -0.219749   0.696766  -0.315 0.752495
## LocalityTPN:SexF        -1.076552   1.069265  -1.007 0.314117
## LocalitySJU:SexF         0.095863   0.673549   0.142 0.886834
## LocalityAPR:SexM              NA         NA      NA       NA
## LocalityRPV:SexM              NA         NA      NA       NA
## LocalityRMO:SexM              NA         NA      NA       NA
## LocalityTLC:SexM              NA         NA      NA       NA
## LocalityTPN:SexM              NA         NA      NA       NA
## LocalitySJU:SexM              NA         NA      NA       NA
## TempB:LocalityAPR:SexF  1.303061   0.699049   1.864 0.062427 .
## TempC:LocalityAPR:SexF -0.084661   0.672263  -0.126 0.899794
## TempB:LocalityRPV:SexF  0.248134   0.731583   0.339 0.734506
```

```
## TempC:LocalityRPV:SexF -0.265909   0.718615  -0.370 0.711390
## TempB:LocalityRMO:SexF  0.649245   0.733667   0.885 0.376275
## TempC:LocalityRMO:SexF -0.091857   0.712794  -0.129 0.897471
## TempB:LocalityTLC:SexF  1.963332   0.934158   2.102 0.035674 *
## TempC:LocalityTLC:SexF  0.158383   0.913394   0.173 0.862351
## TempB:LocalityTPN:SexF  1.798372   1.400330   1.284 0.199169
## TempC:LocalityTPN:SexF  1.525218   1.457403   1.047 0.295413
## TempB:LocalitySJU:SexF  1.249390   0.870449   1.435 0.151310
## TempC:LocalitySJU:SexF -1.922464   1.013394  -1.897 0.057931 .
## TempB:LocalityAPR:SexM        NA         NA      NA       NA
## TempC:LocalityAPR:SexM        NA         NA      NA       NA
## TempB:LocalityRPV:SexM        NA         NA      NA       NA
## TempC:LocalityRPV:SexM        NA         NA      NA       NA
## TempB:LocalityRMO:SexM        NA         NA      NA       NA
## TempC:LocalityRMO:SexM        NA         NA      NA       NA
## TempB:LocalityTLC:SexM        NA         NA      NA       NA
## TempC:LocalityTLC:SexM        NA         NA      NA       NA
## TempB:LocalityTPN:SexM        NA         NA      NA       NA
## TempC:LocalityTPN:SexM        NA         NA      NA       NA
## TempB:LocalitySJU:SexM        NA         NA      NA       NA
## TempC:LocalitySJU:SexM        NA         NA      NA       NA
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for Gamma family taken to be 0.01316289)
##
##     Null deviance: 102.052  on 2652  degrees of freedom
## Residual deviance:  33.967  on 2609  degrees of freedom
##   (778 observations deleted due to missingness)
## AIC: -19713
##
## Number of Fisher Scoring iterations: 4
```

```
print("Binomial distribution results")
```

```
## [1] "Binomial distribution results"
```

```
print(modelAICb)
```

```
##       df      AIC
## mod1b 44 372.2764
## mod2b  3 290.2323
## mod3b  8 300.2330
## mod4b 21 326.2748
## mod5b  9 302.2572
## mod6b 20 324.2586
## mod7b 26 336.2721
## mod8b 12 308.2708
```

```
print("mod2b<-glm(rate~Temp,data=lifedat,family=binomial);summary(mod2b)")
```

```
## [1] "mod2b<-glm(rate~Temp,data=lifedat,family=binomial);summary(mod2b)"
```

```
print(summary(mod2b))
```

```
##
## Call:
## glm(formula = rate ~ Temp, family = binomial, data = lifedat)
##
## Deviance Residuals:
##       Min         1Q     Median         3Q        Max
## -0.103906  -0.024918   0.000161   0.020172   0.123856
##
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept)  -3.0918     0.1585 -19.509   <2e-16 ***
## TempB         0.2155     0.2141   1.006   0.3142
## TempC         0.3723     0.2201   1.691   0.0908 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 5.6422  on 2652  degrees of freedom
## Residual deviance: 2.7366  on 2650  degrees of freedom
##   (778 observations deleted due to missingness)
## AIC: 290.23
##
## Number of Fisher Scoring iterations: 6
```

Including Plots

You can also embed plots, for example:

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.