# Individual Condition vs Nest Size with instar sex and instar number as a factor

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## AIC Values of all possible models with instar always included

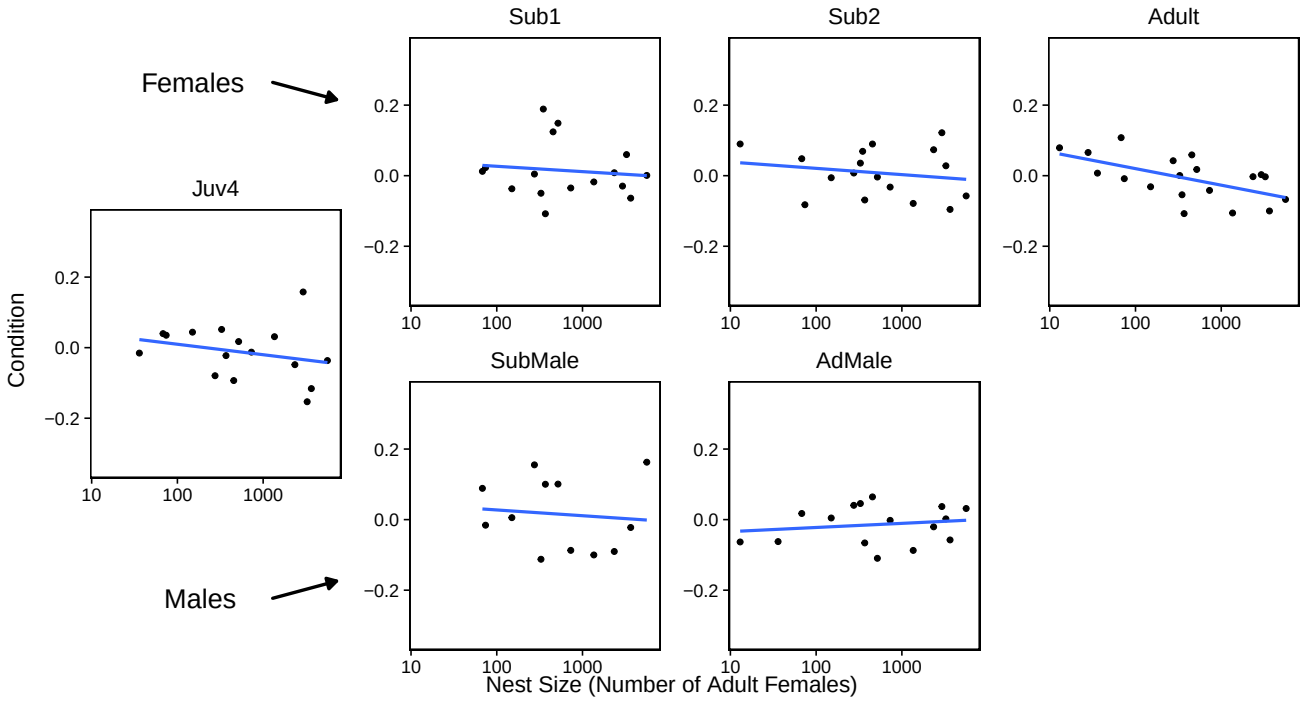
note: InstarNumber is a factor

| AIC_Diff | AIC | model | num.predictors |
|---|---|---|---|
| 0 | -2087 | condResiduals ~ logCtFm + logCtFm:InstarNumber + InstarNumber + InstarSex + (1\|NestID) | 11 |
| 1.28 | -2086 | condResiduals ~ logCtFm + logCtFm:InstarNumber + InstarSex:InstarNumber + InstarNumber + InstarSex + (1\|NestID) | 12 |
| 1.93 | -2086 | condResiduals ~ logCtFm + logCtFm:InstarNumber + InstarSex:logCtFm + InstarNumber + InstarSex + (1\|NestID) | 12 |
| 3.15 | -2084 | condResiduals ~ logCtFm + logCtFm:InstarNumber + InstarSex:InstarNumber + InstarSex:logCtFm + InstarNumber + InstarSex + (1\|NestID) | 13 |
| 5.93 | -2082 | condResiduals ~ logCtFm + InstarSex:logCtFm + InstarNumber + InstarSex + (1\|NestID) | 9 |
| 5.93 | -2082 | condResiduals ~ InstarSex:logCtFm + InstarNumber + InstarSex + (1\|NestID) | 9 |
| 6.08 | -2081 | condResiduals ~ logCtFm + InstarNumber + InstarSex + (1\|NestID) | 8 |
| 7.01 | -2080 | condResiduals ~ logCtFm + InstarSex:InstarNumber + InstarSex:logCtFm + InstarNumber + InstarSex + (1\|NestID) | 10 |
| 7.38 | -2080 | condResiduals ~ logCtFm + InstarSex:InstarNumber + InstarNumber + InstarSex + (1\|NestID) | 9 |
| 10.19 | -2077 | condResiduals ~ InstarSex:InstarNumber + InstarNumber + InstarSex + (1\|NestID) | 8 |

## Graph with lowest AIC model superimposed

```
Model:
condResiduals ~ logCtFm + InstarNumber + InstarSex + logCtFm:InstarNumber + (1 | NestID)

Note: If line on graph is blue R could not plot the lmer, plotting a simple lm instead
```




## Statistics using model with lowest AIC

Full Model: condResiduals ~ logCtFm + InstarNumber + InstarSex + logCtFm:InstarNumber + (1 | NestID)

Anova of full model alone

| | Sum Sq | Mean Sq | NumDF | DenDF | F.value | Pr(>F) |
|---|---|---|---|---|---|---|
| logCtFm | 0.038 | 0.038 | 1 | 22.406 | 3.542 | 0.073 |
| InstarNumber | 0.099 | 0.033 | 3 | 1,259.303 | 3.093 | 0.026 |
| InstarSex | 0.0001 | 0.0001 | 1 | 1,250.752 | 0.007 | 0.931 |
| logCtFm:InstarNumber | 0.130 | 0.043 | 3 | 1,264.162 | 4.045 | 0.007 |

Testing Individual Variables by preforming an Anova of full vs reduced model)

Testing Interaction Term nest size * instar against full model

| | Df | AIC | BIC | logLik | deviance | Chisq | Chi Df | Pr(>Chisq) |
|---|---|---|---|---|---|---|---|---|
| ..1 | 8 | -2,081.356 | -2,040.201 | 1,048.678 | -2,097.356 | | | |
| object | 11 | -2,087.432 | -2,030.844 | 1,054.716 | -2,109.432 | 12.076 | 3 | 0.007 |

Reduced Model: condResiduals = logCtFm + InstarNumber + InstarSex + (1 | NestID)

Testing Instar Number against full model

| | Df | AIC | BIC | logLik | deviance | Chisq | Chi Df | Pr(>Chisq) |
|---|---|---|---|---|---|---|---|---|
| ..1 | 5 | -2,080.018 | -2,054.296 | 1,045.009 | -2,090.018 | | | |
| object | 11 | -2,087.432 | -2,030.844 | 1,054.716 | -2,109.432 | 19.414 | 6 | 0.004 |

Reduced Model: condResiduals = logCtFm + InstarSex + (1 | NestID)

Testing Instar Sex against full model

| | Df | AIC | BIC | logLik | deviance | Chisq | Chi Df | Pr(>Chisq) |
|---|---|---|---|---|---|---|---|---|
| ..1 | 10 | -2,089.425 | -2,037.980 | 1,054.712 | -2,109.425 | | | |
| object | 11 | -2,087.432 | -2,030.844 | 1,054.716 | -2,109.432 | 0.007 | 1 | 0.931 |

Reduced Model: condResiduals = logCtFm + InstarNumber + +logCtFm:InstarNumber + (1 | NestID)

Testing Nest Size against full model

| | Df | AIC | BIC | logLik | deviance | Chisq | Chi Df | Pr(>Chisq) |
|---|---|---|---|---|---|---|---|---|
| ..1 | 7 | -2,078.512 | -2,042.501 | 1,046.256 | -2,092.512 | | | |
| object | 11 | -2,087.432 | -2,030.844 | 1,054.716 | -2,109.432 | 16.920 | 4 | 0.002 |

Reduced Model: condResiduals = InstarNumber + InstarSex + (1 | NestID)

# Testing Individual Instars

**As the interaction is significant testing instar individually**

note: pops up saying 'refitting model(s) with ML (instead of REML)' but if make anova refit = FALSE results don't make sense

Adult

| | Df | AIC | BIC | logLik | deviance | Chisq | Chi Df | Pr(>Chisq) |
|---|---|---|---|---|---|---|---|---|
| ..1 | 3 | -764.8555 | -753.1558 | 385.4278 | -770.8555 | NA | NA | NA |
| object | 4 | -770.4985 | -754.8989 | 389.2492 | -778.4985 | 7.642948 | 1 | 0.0056995 |

Sub2

| | Df | AIC | BIC | logLik | deviance | Chisq | Chi Df | Pr(>Chisq) |
|---|---|---|---|---|---|---|---|---|
| ..1 | 3 | -346.0882 | -335.5359 | 176.0441 | -352.0882 | NA | NA | NA |
| object | 4 | -344.5367 | -330.4669 | 176.2683 | -352.5367 | 0.4484218 | 1 | 0.5030854 |

Sub1

| | Df | AIC | BIC | logLik | deviance | Chisq | Chi Df | Pr(>Chisq) |
|---|---|---|---|---|---|---|---|---|
| ..1 | 3 | -415.8428 | -404.9064 | 210.9214 | -421.8428 | NA | NA | NA |
| object | 4 | -413.9760 | -399.3942 | 210.9880 | -421.9760 | 0.133194 | 1 | 0.7151432 |

Juv4

| | Df | AIC | BIC | logLik | deviance | Chisq | Chi Df | Pr(>Chisq) |
|---|---|---|---|---|---|---|---|---|
| ..1 | 3 | -338.6935 | -328.3403 | 172.3467 | -344.6935 | NA | NA | NA |
| object | 4 | -337.8281 | -324.0239 | 172.9140 | -345.8281 | 1.134603 | 1 | 0.2867956 |