Variance in Condition vs Nest Size Instar As Number

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AIC Values of all possible models with instar included and sample size as weight

Rows removed with 2 or fewer data points

[1] "Using a standardized sample size as weight in model"

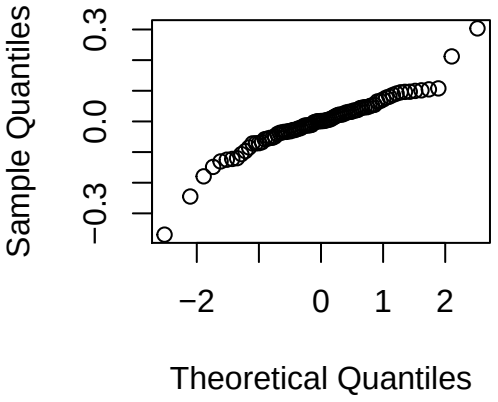
AIC_Diff	AIC	model	num.predictors
0	-175	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	8
1.78	-173.2	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	9
3.09	-171.9	relativeVar ~ logCtFm + InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	7
3.46	-171.5	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
3.62	-171.4	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2) + (1|NestID)	7
3.73	-171.2	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	10
3.74	-171.2	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
4.45	-170.5	relativeVar ~ logCtFm + InstarNumber + I(InstarNumber^2) + (1|NestID)	6
4.92	-170.1	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	8
5.12	-169.9	relativeVar ~ logCtFm + InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
5.2	-169.8	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	11
5.2	-169.8	relativeVar ~ logCtFm + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	11
5.25	-169.7	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
5.27	-169.7	relativeVar ~ logCtFm + logCtFm:InstarNumber + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	7
5.46	-169.5	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
5.46	-169.5	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2) + (1|NestID)	8
5.46	-169.5	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
5.5	-169.5	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + (1|NestID)	8

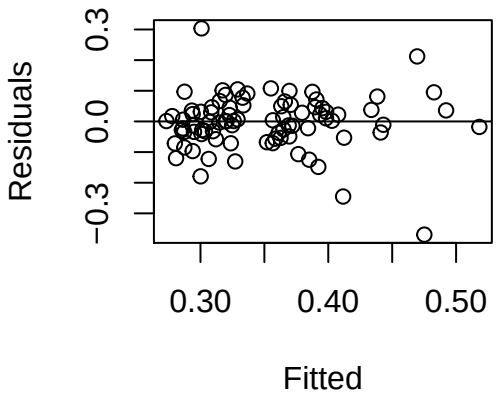
AIC_Diff	AIC	model	num.predictors
6.09	-168.9	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	12
6.26	-168.7	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + I(InstarNumber^2) + (1|NestID)	7
6.52	-168.4	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	11
6.68	-168.3	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	9
6.7	-168.3	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	11
6.79	-168.2	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
6.96	-168	relativeVar ~ logCtFm + InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
7.08	-167.9	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
7.24	-167.7	relativeVar ~ logCtFm + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
7.26	-167.7	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
7.38	-167.6	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
7.44	-167.5	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
7.44	-167.5	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + (1|NestID)	9
8.39	-166.6	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
8.79	-166.2	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
8.95	-166	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
9.24	-165.7	relativeVar ~ logCtFm + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
16.39	-158.6	relativeVar ~ logCtFm + I(InstarNumber^2) + (1|NestID)	5
17.35	-157.6	relativeVar ~ logCtFm + logCtFm:InstarNumber + (1|NestID)	5
17.38	-157.6	relativeVar ~ logCtFm + InstarNumber + (1|NestID)	5
17.65	-157.3	relativeVar ~ logCtFm + logCtFm:InstarNumber + I(InstarNumber^2) + (1|NestID)	6
18.22	-156.8	relativeVar ~ logCtFm + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	6

AIC_Diff	AIC	model	num.predictors
18.23	-156.8	relativeVar ~ logCtFm + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	6
19.28	-155.7	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1|NestID)	6
19.32	-155.7	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + (1|NestID)	6
19.32	-155.7	relativeVar ~ logCtFm + InstarNumber + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	7
19.32	-155.7	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + (1|NestID)	6
19.38	-155.6	relativeVar ~ logCtFm + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	7
19.47	-155.5	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + (1|NestID)	7
20.17	-154.8	relativeVar ~ logCtFm + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	7
20.97	-154	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
21.25	-153.7	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1|NestID)	7
21.26	-153.7	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	8
21.27	-153.7	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + (1|NestID)	7
22.17	-152.8	relativeVar ~ logCtFm + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
23.22	-151.8	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1|NestID)	8

Checking full model fit

```
relativeVar = logCtFm + InstarAge + InstarAge:InstarSex + sqr(InstarAge) + sqr(InstarAge):InstarSex + (1|Nest)
```

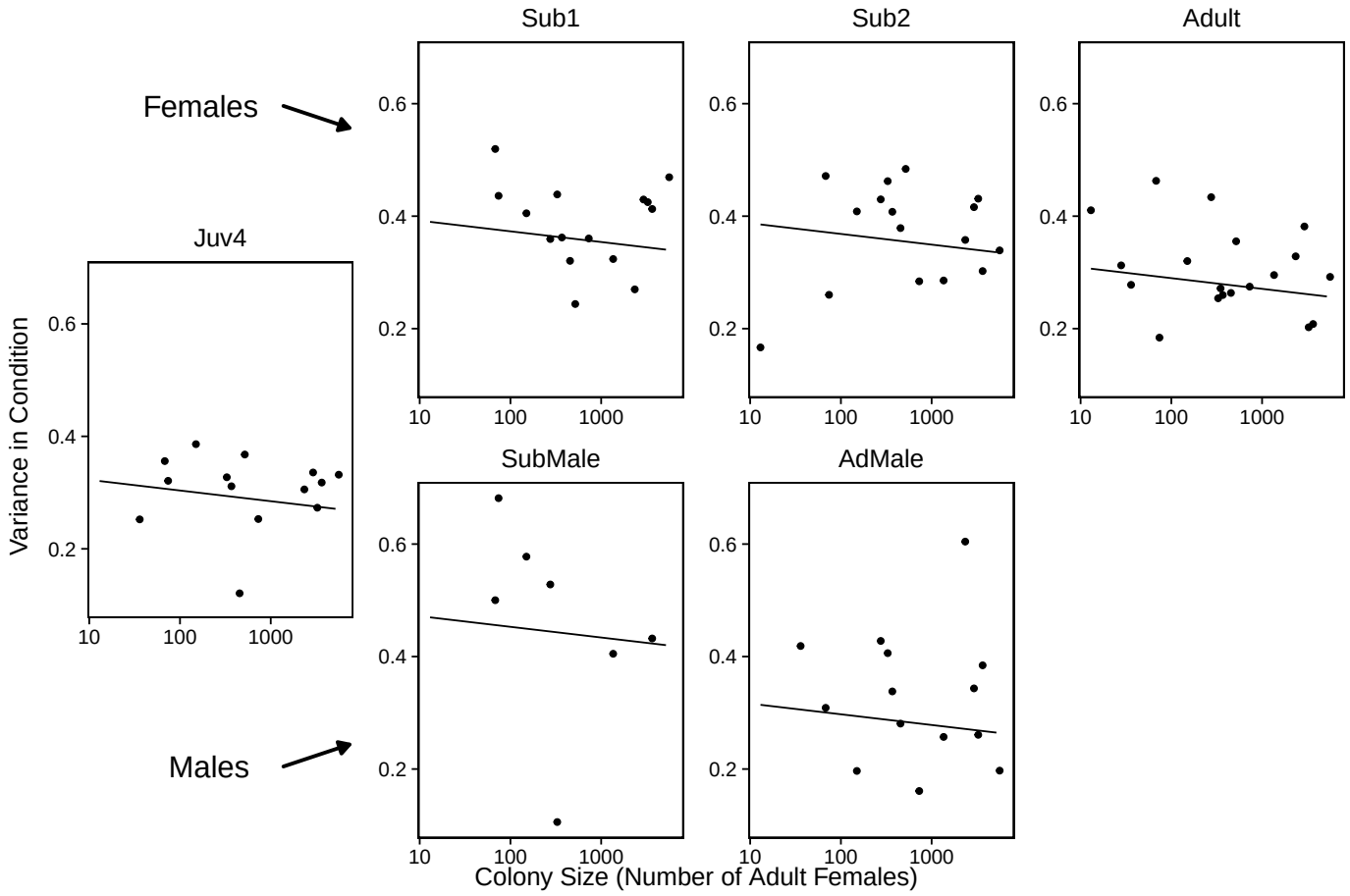




Graph

note: blue line just lm model

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



Statistics using model with the almost lowest AIC as full model

Full Model: relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1 | NestID)

Table 2: Anova of full model alone

	Sum Sq	Mean Sq	NumDF	DenDF	F.value	Pr(>F)
logCtFm	0.0001	0.0001	1	22.581	1.797	0.193
InstarNumber	0.001	0.001	1	74.121	24.984	0.00000
I(InstarNumber^2)	0.001	0.001	1	73.464	26.418	0.00000
InstarNumber:InstarSex	0.0003	0.0003	1	70.481	5.256	0.025
I(InstarNumber^2):InstarSex	0.0003	0.0003	1	70.527	5.829	0.018

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

Table 3: Testing NestSize against full model. - NOT significant

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	7	-175.297	-158.198	94.648	-189.297			
object	8	-174.977	-155.436	95.489	-190.977	1.681	1	0.195

Reduced Model: relativeVar = InstarAge + sqr(InstarAge) + (1|Nest) + InstarAge:InstarSex + InstarSex:sqr(InstarAge)

Table 4: Testing Instar age against full model. - $p < 0.001$ SIGNIFICANT ***

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	6	-156.754	-142.098	84.377	-168.754			
object	8	-174.977	-155.436	95.489	-190.977	22.223	2	0.00001

Reduced Model: relativeVar = logCtFm + (1|Nest) + InstarSex:sqr(InstarAge)

Graph of condition variance against instar