Variance in Leg 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"

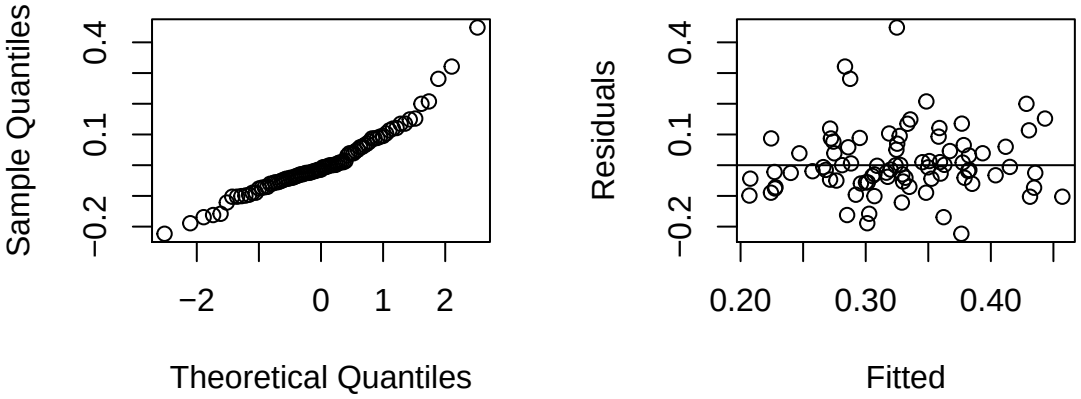
AIC_Diff	AIC	model	num.predictors
0	-119.6	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2) + (1|NestID)	8
0	-119.6	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	8
0.08	-119.5	relativeVar ~ logCtFm + logCtFm:InstarNumber + I(InstarNumber^2) + (1|NestID)	6
0.13	-119.5	relativeVar ~ logCtFm + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
0.14	-119.5	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + (1|NestID)	8
0.15	-119.5	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + I(InstarNumber^2) + (1|NestID)	7
0.18	-119.5	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
0.19	-119.4	relativeVar ~ logCtFm + logCtFm:InstarNumber + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	7
0.29	-119.3	relativeVar ~ logCtFm + InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
1.17	-118.5	relativeVar ~ logCtFm + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	7
1.22	-118.4	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + (1|NestID)	7
1.88	-117.8	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + (1|NestID)	6
1.88	-117.8	relativeVar ~ logCtFm + logCtFm:InstarNumber + (1|NestID)	5
2	-117.6	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + (1|NestID)	9
2	-117.6	relativeVar ~ logCtFm + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + (1|NestID)	9
2	-117.6	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	9
2	-117.6	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	9
2.06	-117.6	relativeVar ~ logCtFm + InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
2.06	-117.6	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
2.06	-117.6	relativeVar ~ logCtFm + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9

AIC_Diff	AIC	model	num.predictors
2.09	-117.5	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
2.1	-117.5	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
2.13	-117.5	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
2.14	-117.5	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	9
2.16	-117.5	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
2.41	-117.2	relativeVar ~ logCtFm + InstarNumber + I(InstarNumber^2) + (1|NestID)	6
2.47	-117.2	relativeVar ~ logCtFm + InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	7
2.48	-117.2	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2) + (1|NestID)	7
3.17	-116.5	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	8
3.34	-116.3	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + (1|NestID)	7
3.37	-116.3	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1|NestID)	7
3.43	-116.2	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1|NestID)	6
3.98	-115.7	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
3.98	-115.7	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
4	-115.6	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	10
4.03	-115.6	relativeVar ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
4.05	-115.6	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
4.05	-115.6	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
4.11	-115.5	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	10
4.24	-115.4	relativeVar ~ logCtFm + InstarNumber + (1|NestID)	5
4.45	-115.2	relativeVar ~ logCtFm + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	7
4.47	-115.2	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	8
4.51	-115.1	relativeVar ~ logCtFm + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	6
5.03	-114.6	relativeVar ~ logCtFm + I(InstarNumber^2) + (1|NestID)	5

AIC_Diff	AIC	model	num.predictors
5.34	-114.3	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1|NestID)	8
5.82	-113.8	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + (1|NestID)	6
5.94	-113.7	relativeVar ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	11
5.97	-113.7	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + I(InstarNumber^2) + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	11
5.98	-113.7	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	11
6.11	-113.5	relativeVar ~ logCtFm + InstarNumber + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	7
6.4	-113.2	relativeVar ~ logCtFm + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8
6.69	-112.9	relativeVar ~ logCtFm + I(InstarNumber^2) + I(InstarNumber^2):InstarSex + (1|NestID)	6
7.59	-112	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
8.08	-111.5	relativeVar ~ logCtFm + InstarNumber + InstarNumber:InstarSex + I(InstarNumber^2):InstarSex:logCtFm + (1|NestID)	8

Checking full model fit

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

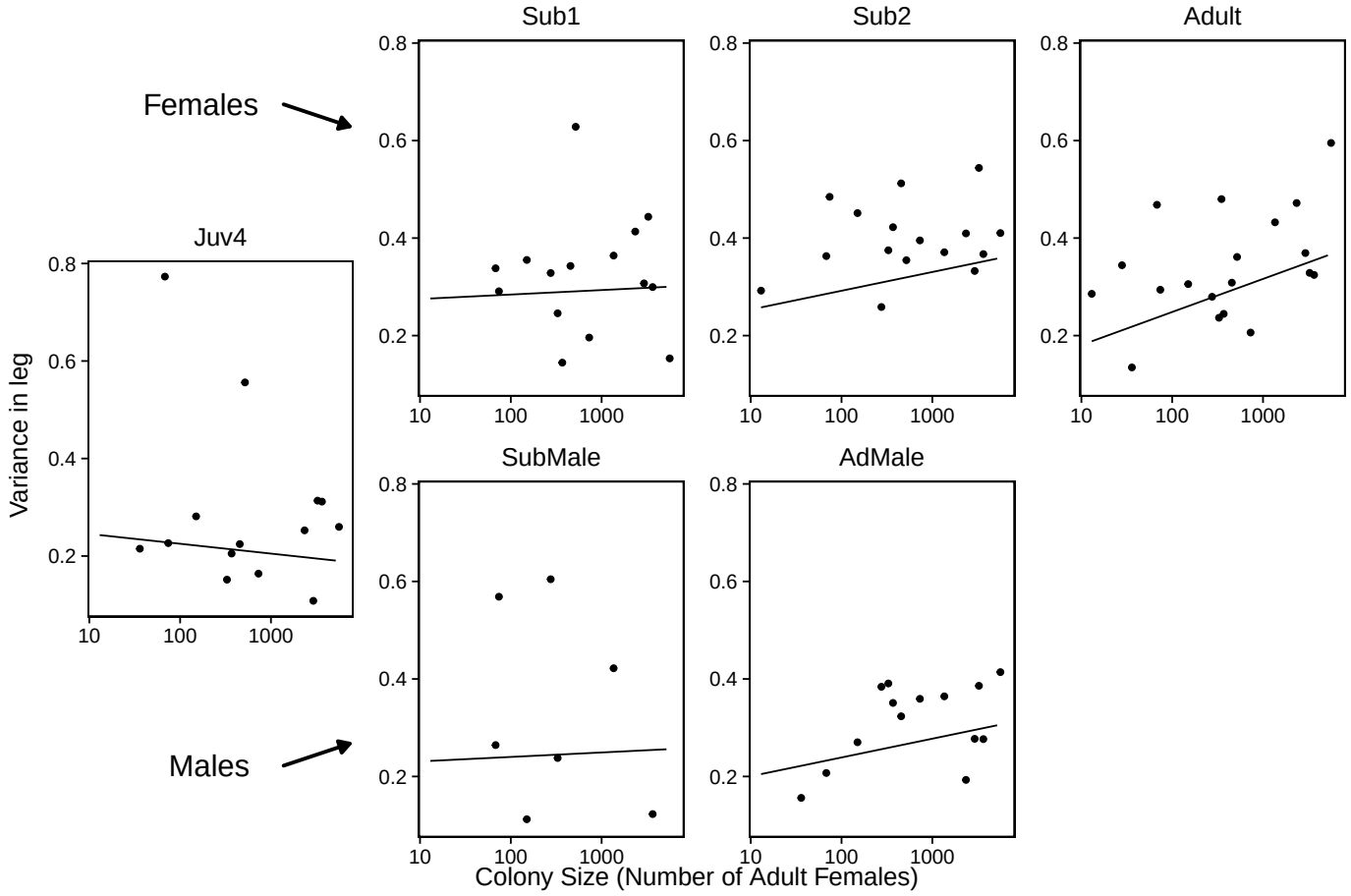


Graphs

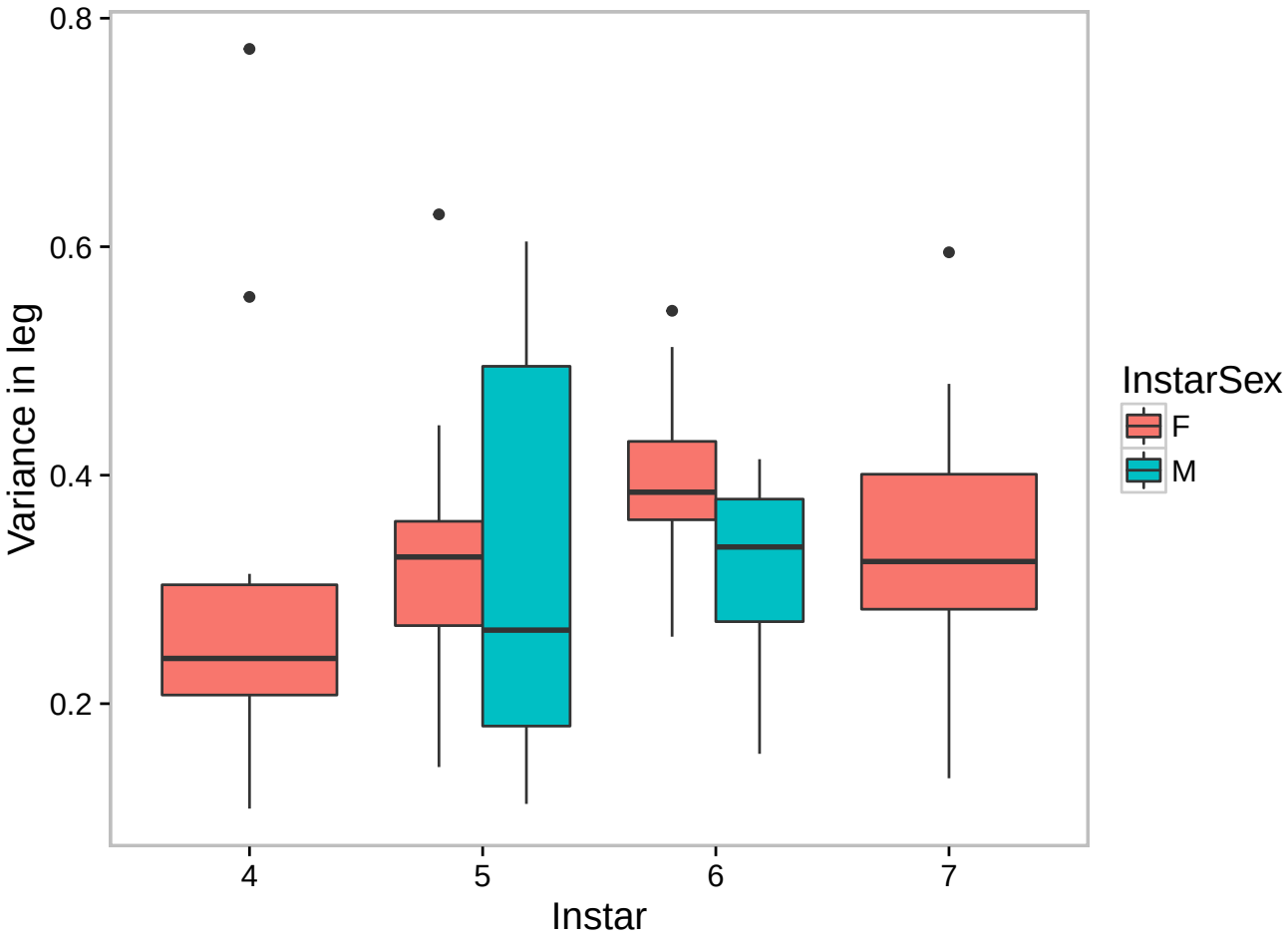
Leg Variance against nest size

note: blue line just lm model

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



Graph of leg variance against instar



Statistics using model with the almost lowest AIC as full model

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

Table 2: Anova of full model alone

	Sum Sq	Mean Sq	NumDF	DenDF	F.value	Pr(>F)
logCtFm	0.0003	0.0003	1	83.496	2.774	0.100
InstarNumber	0.0003	0.0003	1	71.335	3.152	0.080
I(InstarNumber^2)	0.001	0.001	1	71.252	5.531	0.021
InstarNumber:InstarSex	0.0002	0.0002	1	67.506	2.175	0.145
logCtFm:InstarNumber	0.0005	0.0005	1	74.651	4.661	0.034

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

Table 3: Testing NestSize against full model. - p < 0.05 SIGNIFICANT *

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	6	-116.838	-102.182	64.419	-128.838			
object	8	-119.633	-100.092	67.817	-135.633	6.796	2	0.033

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

Table 4: Testing Instar age against full model. - p < 0.01 SIGNIFICANT **

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	4	-111.393	-101.622	59.696	-119.393			
object	8	-119.633	-100.092	67.817	-135.633	16.241	4	0.003

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

Testing individual instar numbers

Table 5: Adult - age 7 not significant

Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
17	0.0091402	NA	NA	NA	NA
18	0.0115183	-1	-0.0023781	4.423007	0.0506554

Table 6: Sub2 and Adult Males - age 6 not significant

Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
28	0.0059976	NA	NA	NA	NA
29	0.0064443	-1	-0.0004467	2.085398	0.1598108

Table 7: Sub1 and sub males- age 5 not significant

Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
20	0.0131899	NA	NA	NA	NA
21	0.0132233	-1	-3.35e-05	0.0507286	0.8240857

Table 8: Juv4 - age 4 not significant

Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
12	0.0177973	NA	NA	NA	NA
13	0.0179137	-1	-0.0001164	0.0785021	0.7841092

Instar Age x nest size Interaction Graph

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