Leg Length vs Nest Size with sex and instar as numeric

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13 September, 2016

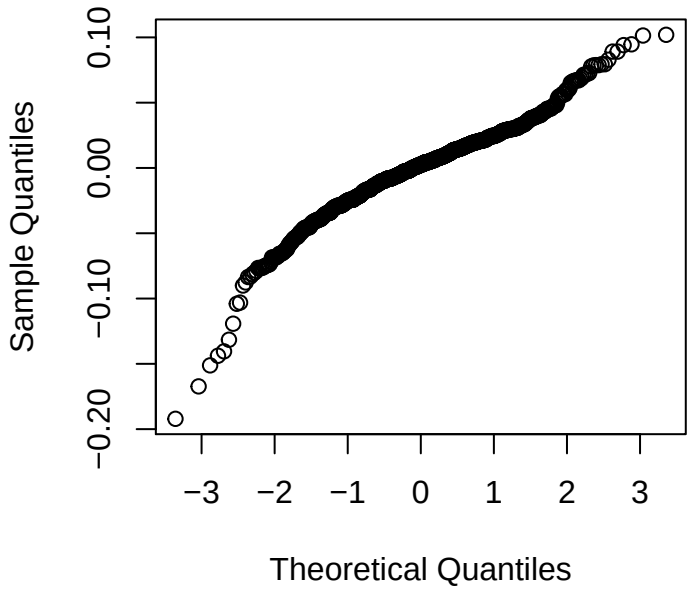
Contents

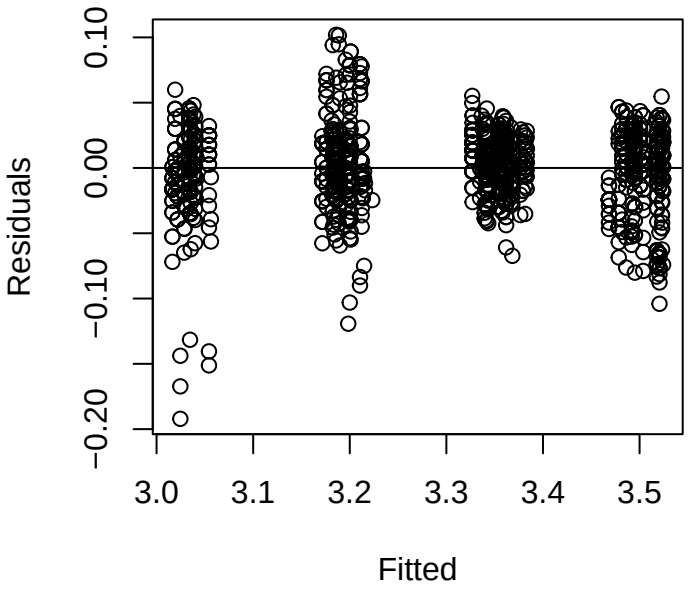
AIC Values of all possible models with instar always included

AIC_Diff	AIC	model	num.predictors
0	-5232	logLeg ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1|NestID)	7
1.6	-5230	logLeg ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1|NestID)	8
1.6	-5230	logLeg ~ logCtFm + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1|NestID)	8
3.05	-5229	logLeg ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + (1|NestID)	7
23.88	-5208	logLeg ~ logCtFm + InstarNumber + InstarNumber:InstarSex + (1|NestID)	6
28.4	-5203	logLeg ~ logCtFm + InstarNumber + logCtFm:InstarNumber + (1|NestID)	6
49.57	-5182	logLeg ~ logCtFm + InstarNumber + (1|NestID)	5
1072	-4159	logLeg ~ logCtFm + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1|NestID)	6
1072	-4159	logLeg ~ logCtFm + logCtFm:InstarNumber:InstarSex + (1|NestID)	6
1082	-4150	logLeg ~ logCtFm + logCtFm:InstarNumber + (1|NestID)	5

Checking full model fit

```
[1] "logLeg ~ logCtFm + InstarNumber + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1 | NestID)"
```

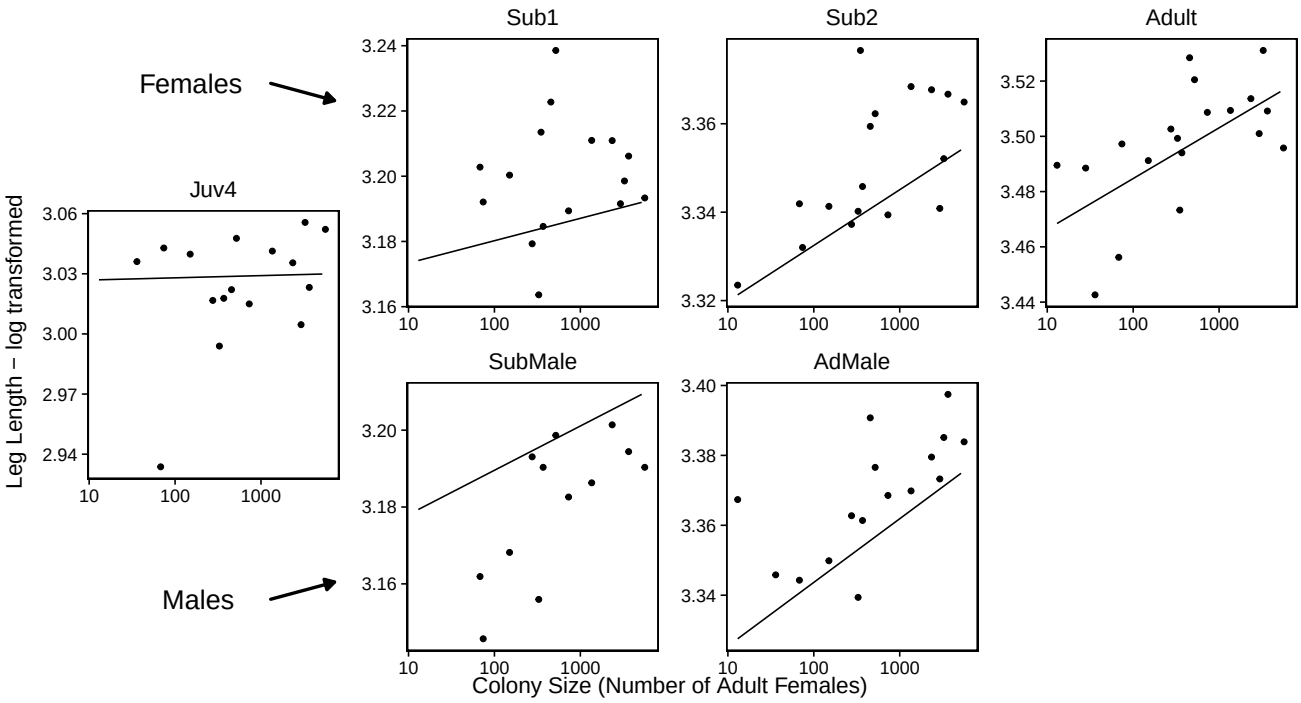




Graph with lowest AIC model superimposed

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

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


Females
Males
Juv4
Sub1
Sub2
Adult
SubMale
AdMale
Leg Length – log transformed
Colony Size (Number of Adult Females)
3.06
3.03
3.00
2.97
2.94
3.24
3.22
3.20
3.18
3.16
3.36
3.34
3.32
3.52
3.50
3.48
3.46
3.44
3.40
3.38
10
100
1000

Statistics

Note: There is no point testing instar number against leg length as it will vary of course, same with instar size

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

Anova of full model alone

	Sum Sq	Mean Sq	NumDF	DenDF	F.value	Pr(>F)
logCtFm	0.007	0.007	1	282.208	7.319	0.007
InstarNumber	1.559	1.559	1	1,228.259	1,712.068	0
logCtFm:InstarNumber	0.024	0.024	1	1,245.657	26.666	0.00000
logCtFm:InstarNumber:InstarSex	0.028	0.028	1	1,255.232	30.765	0.00000

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

Three way interaction against full model. - $p < 0.001$ SIGNIFICANT ***

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	6	-5,203.186	-5,172.306	2,607.593	-5,215.186			
object	7	-5,231.582	-5,195.554	2,622.791	-5,245.582	30.395	1	0.00000

Reduced Model: logLeg logCtFm InstarNumber 1 NestID logCtFm InstarNumber

Nest size x Instar Number against full model. - $p < 0.001$ SIGNIFICANT ***

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	5	-5,182.014	-5,156.280	2,596.007	-5,192.014			
object	7	-5,231.582	-5,195.554	2,622.791	-5,245.582	53.568	2	0

Reduced Model: logLeg logCtFm InstarNumber 1 NestID

Instar age against full model. - $p < 0.001$ SIGNIFICANT ***

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	4	-894.656	-874.069	451.328	-902.656			
object	7	-5,231.582	-5,195.554	2,622.791	-5,245.582	4,342.926	3	0

Reduced Model: logLeg logCtFm 1 NestID

NestSize against full model. - $p < 0.001$ SIGNIFICANT ***

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	5	-5,197.949	-5,172.215	2,603.974	-5,207.949			
object	7	-5,231.582	-5,195.554	2,622.791	-5,245.582	37.633	2	0

Reduced Model: logLeg InstarNumber 1 NestID logCtFm InstarNumber

Testing Individual Instars

As the three way 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 * SIGNIFICANT *

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	3	-1496.660	-1484.952	751.3299	-1502.660	NA	NA	NA
object	4	-1503.201	-1487.591	755.6007	-1511.201	8.541558	1	0.0034713

Sub2 * SIGNIFICANT *

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	3	-1228.262	-1217.709	617.1308	-1234.262	NA	NA	NA
object	4	-1236.919	-1222.849	622.4595	-1244.919	10.65751	1	0.0010962

Sub1 not significant

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	3	-1112.989	-1102.042	559.4943	-1118.989	NA	NA	NA
object	4	-1111.281	-1096.685	559.6407	-1119.281	0.2927162	1	0.5884852

Juv4 not significant

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	3	-922.1183	-911.7652	464.0592	-928.1183	NA	NA	NA
object	4	-921.5977	-907.7935	464.7988	-929.5977	1.47934	1	0.2238779

AdMale * SIGNIFICANT *

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	3	-547.1792	-539.1889	276.5896	-553.1792	NA	NA	NA
object	4	-556.9807	-546.3269	282.4903	-564.9807	11.80143	1	0.0005919

SubMale * SIGNIFICANT *

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	3	-125.0124	-120.6152	65.50620	-131.0124	NA	NA	NA
object	4	-129.7154	-123.8524	68.85769	-137.7154	6.702965	1	0.0096253