

Leg Length vs Nest Size with sex and instar as numeric

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Stepwise reduction of model

Warning in summary.merMod(model, ddf = "lme4"): additional arguments ignored

% latex table generated in R 3.1.1 by xtable 1.8-2 package % Thu Jun 15 12:05:29 2017

	Sum Sq	Mean Sq	NumDF	DenDF	F.value	p_value
logCtFm	0.01	0.01	1	284.30	7.42	0.007**
InstarNumber	1.42	1.42	1	1246.77	1558.08	0.000***
InstarNumber:InstarSex	0.00	0.00	1	1259.53	0.40	0.526 RMVD
logCtFm:InstarNumber	0.02	0.02	1	1257.50	26.40	0.000***
logCtFm:InstarNumber:InstarSex	0.00	0.00	1	1258.33	3.46	0.063.

[1] "term with highest p value is: InstarNumber:InstarSex"

Warning in summary.merMod(model, ddf = "lme4"): additional arguments ignored

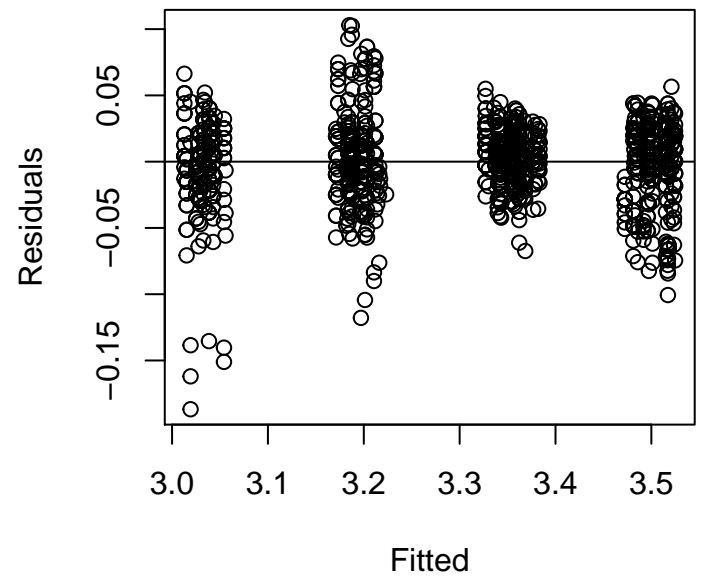
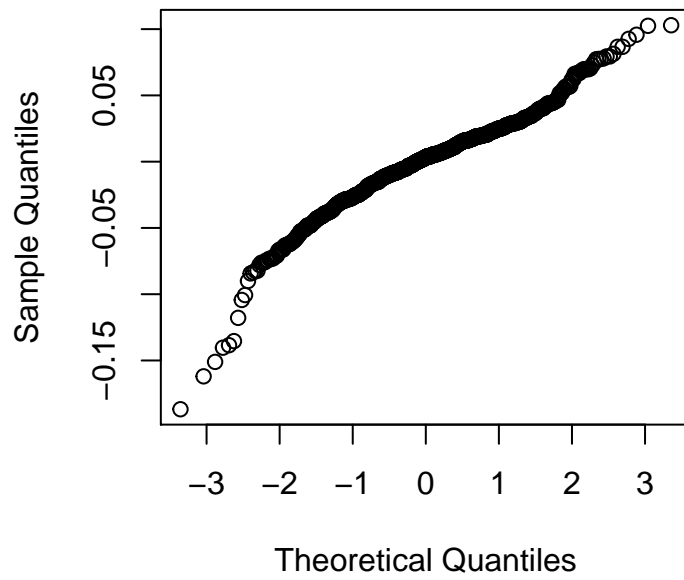
% latex table generated in R 3.1.1 by xtable 1.8-2 package % Thu Jun 15 12:05:31 2017

	Sum Sq	Mean Sq	NumDF	DenDF	F.value	p_value
logCtFm	0.01	0.01	1	282.21	7.32	0.007**
InstarNumber	1.56	1.56	1	1228.26	1712.07	0.000***
logCtFm:InstarNumber	0.02	0.02	1	1245.66	26.67	0.000***
logCtFm:InstarNumber:InstarSex	0.03	0.03	1	1255.23	30.77	0.000***

[1] "term with highest p value is: logCtFm" [1] "final model" logLeg ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex + (1 | NestID) - InstarNumber:InstarSex - logCtFm
<environment: 0x0000000079942cf8>

Checking full model fit

$\log(\text{LegLength}) = \log(\text{ColonySize}) + \text{InstarAge} + \text{InstarAge}:\text{InstarSex} + \log(\text{ColonySize}):\text{InstarAge} + \log(\text{ColonySize})$

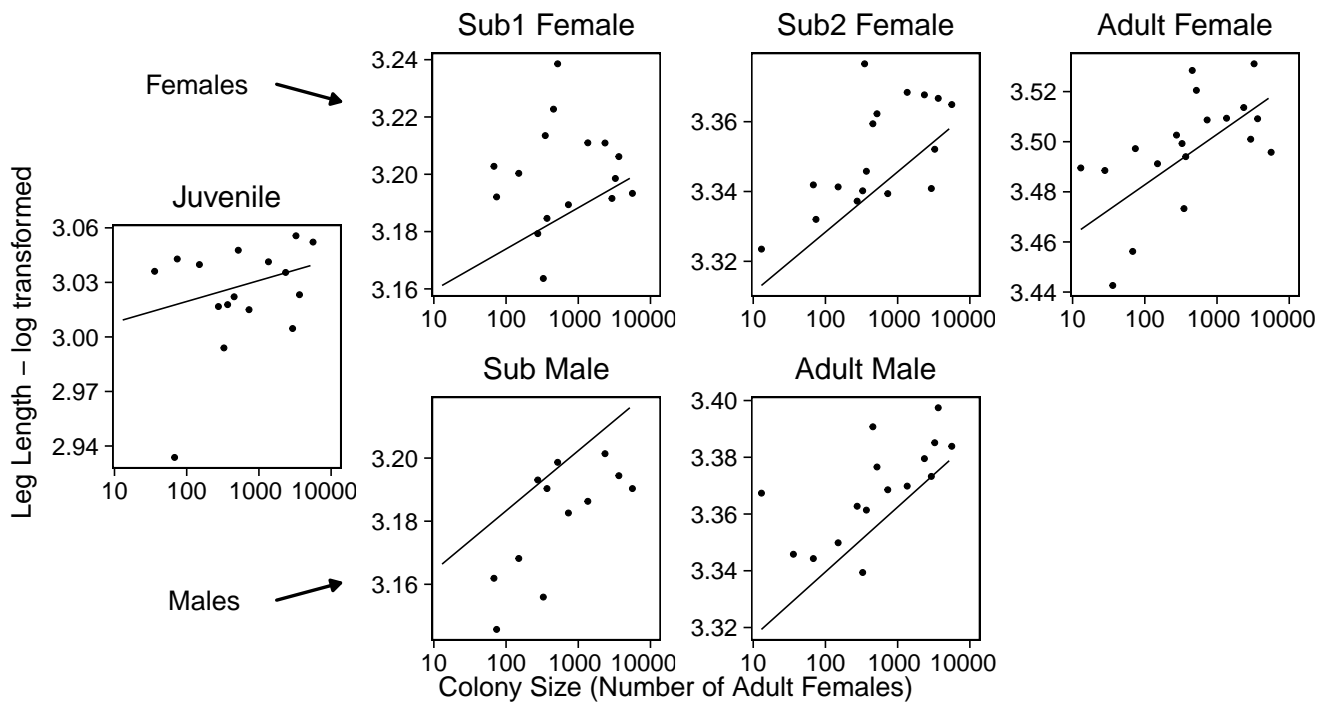


Graph with full model superimposed

Model:

```
logLeg ~ logCtFm + InstarNumber + InstarNumber:InstarSex + logCtFm:InstarNumber + logCtFm:InstarNumber:InstarSex
```

Note: If line on graph is blue R could not plot the lmer, plotting a simple lm instead[1] "lmer"



Statistics

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

Warning in summary.merMod(model, ddf = "lme4"): additional arguments ignored

Full Model: $\log\text{Leg} \sim \log\text{CtFm} + \text{InstarNumber} + \text{InstarNumber}:\text{InstarSex} + \log\text{CtFm}:\text{InstarNumber} + \log\text{CtFm}:\text{InstarNumber}:\text{InstarSex} + (1 \mid \text{NestID}) - \text{InstarNumber}:\text{InstarSex} - \log\text{CtFm}$

Anova of full model alone

	Sum Sq	Mean Sq	NumDF	DenDF	F.value	Pr(>F)
InstarNumber	6.956	6.956	1	44.619	7,596.805	0
InstarNumber:logCtFm	0.026	0.026	1	0		
InstarNumber:logCtFm:InstarSex	0.028	0.028	1	1,253.252	30.713	0.00000

Testing Individual Variables by performing 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	5	-5,197.949	-5,172.215	2,603.974	-5,207.949			
object	6	-5,226.294	-5,195.413	2,619.147	-5,238.294	30.345	1	0.00000
Reduced Model: $\log(\text{LegLength}) = \text{InstarAge} + (1 \text{Colony}) + \log(\text{ColonySize}) : \text{InstarAge}$								

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

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	4	-5,173.946	-5,153.359	2,590.973	-5,181.946			
object	6	-5,226.294	-5,195.413	2,619.147	-5,238.294	56.348	2	0
Reduced Model: $\log(\text{LegLength}) = \text{InstarAge} + (1 \text{Colony})$								

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

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	3	-895.481	-880.040	450.740	-901.481			
object	6	-5,226.294	-5,195.413	2,619.147	-5,238.294	4,336.813	3	0
Reduced Model: $\log(\text{LegLength}) = (1 \text{Colony})$								

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

	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	4	-5,173.946	-5,153.359	2,590.973	-5,181.946			
object	6	-5,226.294	-5,195.413	2,619.147	-5,238.294	56.348	2	0
Reduced Model: $\log(\text{LegLength}) = \text{InstarAge} + (1 \text{Colony})$								

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

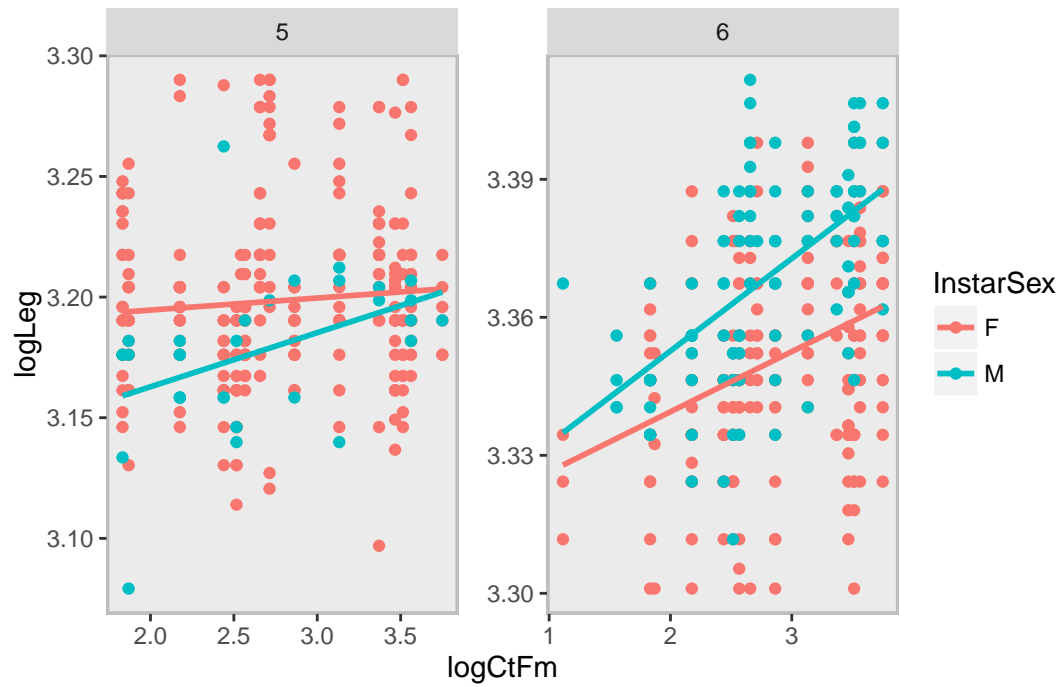
	Df	AIC	BIC	logLik	deviance	Chisq	Chi Df	Pr(>Chisq)
..1	3	-922.1183	-911.7652	464.0592	-928.1183	NA	NA	NA
object	4	-921.5977	-907.7935	464.7988	-929.5977	1.47934	1	0.2238779

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



Instar Age x nest size Interaction Graph

Model:

$\log\text{Leg} \sim \log\text{CtFm} + \text{InstarNumber} + \text{InstarNumber}:\text{InstarSex} + \log\text{CtFm}:\text{InstarNumber} + \log\text{CtFm}:\text{InstarNumber}:\text{InstarSex}$

