Weight Vs Colony Size Results with instar as numeric

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## Count of number of spiders

% latex table generated in R 3.1.1 by xtable 1.8-2 package  
% Tue Dec 13 12:06:39 2016  
\begin{table}[ht]  
\centering  
\begin{tabular}{rr}  
 \hline  
 & V1 \\   
 \hline  
Adult & 401 \\   
 Sub2 & 250 \\   
 Sub1 & 284 \\   
 Juv4 & 233 \\   
 AdMale & 106 \\   
 SubMale & 32 \\   
 \hline  
\end{tabular}  
\end{table}

## Leg Vs. Colony Size

The model with the lowest AIC value included the two-way interaction colony size by instar age and the three-way interaction colony size by instar age by instar sex as fixed effects, but did not include the instar age by instar sex interaction. After confirming, not surprisingly, that leg length was significantly correlated with instar age (lmer; 24 ,7= 4342.93, p = < 0.001 \*\*\* ), we found that

leg length increased increases as colony size increased (lmer; 24 ,7= 63.64, p = < 0.001 \*\*\* , figure 1),

but there is a significant two-way interaction between colony size and instar age (lmer; 2~5 ,7~= 53.57, p = < 0.001 \*\*\* )

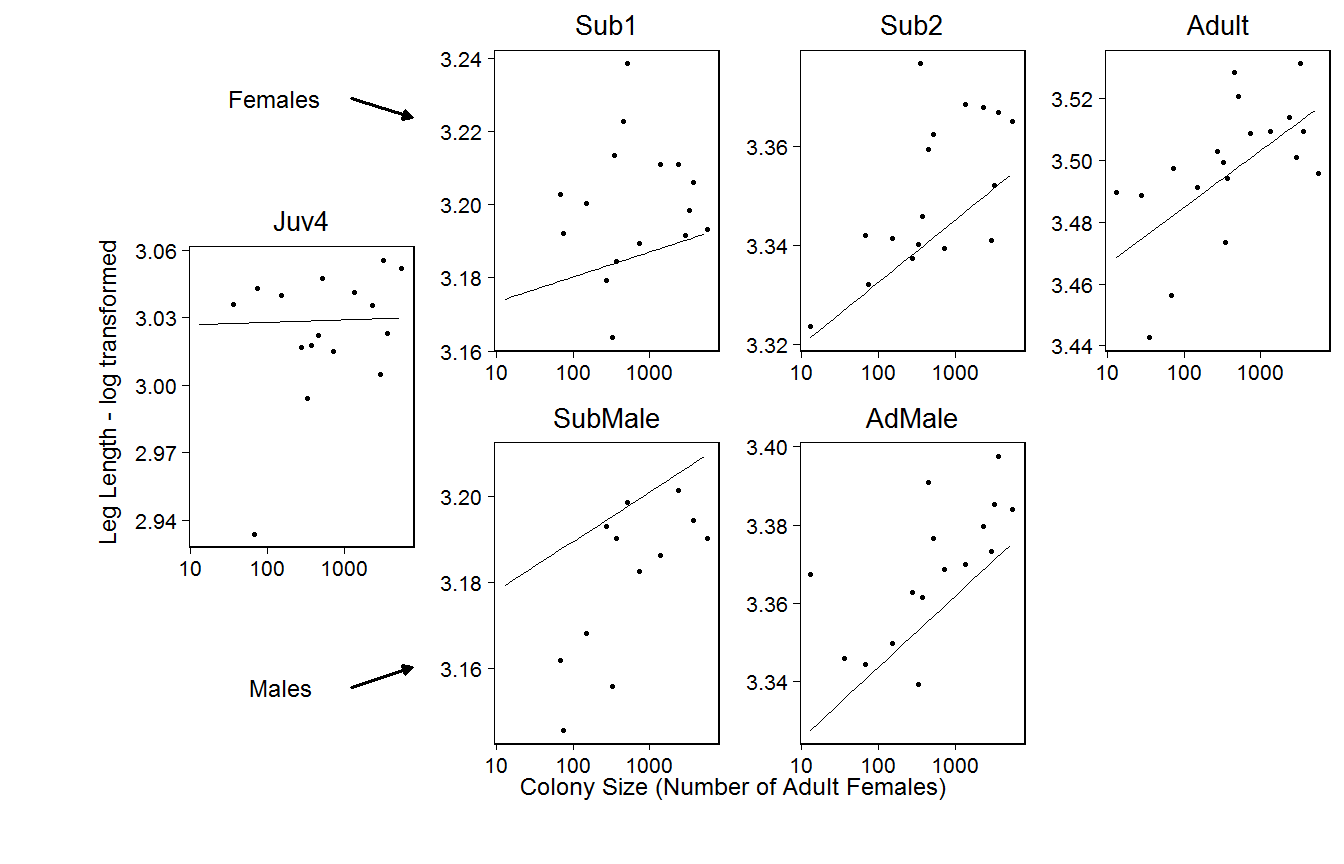
and a significant three-way interaction between colony size, instar age and instar sex (lmer; 26 ,7= 30.4, p = < 0.001 \*\*\* ).

Performing tests on each instar individually, we found that leg length increased with colony size in the older instars, but not significantly so in the younger ones (Table 1, figure 1).

*Table 1: Results of post-hoc analysis of leg length against colony size for each instar. Leg length increases as colony size increases, but when tested individually is significant only for the older instars.*

|  |  |  |  |
| --- | --- | --- | --- |
| Instar | Instar Age | 2 | p value |
| Juv4 | 4 | 1.48 | 0.224 |
| Sub1 Female | 5 | 0.29 | 0.588 |
| Sub2 Female | 6 | 10.66 | < 0.001 \*\*\* |
| Adult Female | 7 | 8.54 | 0.003 \*\* |
| Sub Male | 5 | 6.7 | 0.01 \*\* |
| Adult Male | 6 | 11.8 | < 0.001 \*\*\* |

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



1. *Figure: Leg length against colony size. Overall leg length increased with* *colony size (p = < 0.001 \*\*\* ), but only for the older instars (there was a significant interaction between colony size and instar(p = < 0.001 \*\*\* ), n = 19 colonies.*

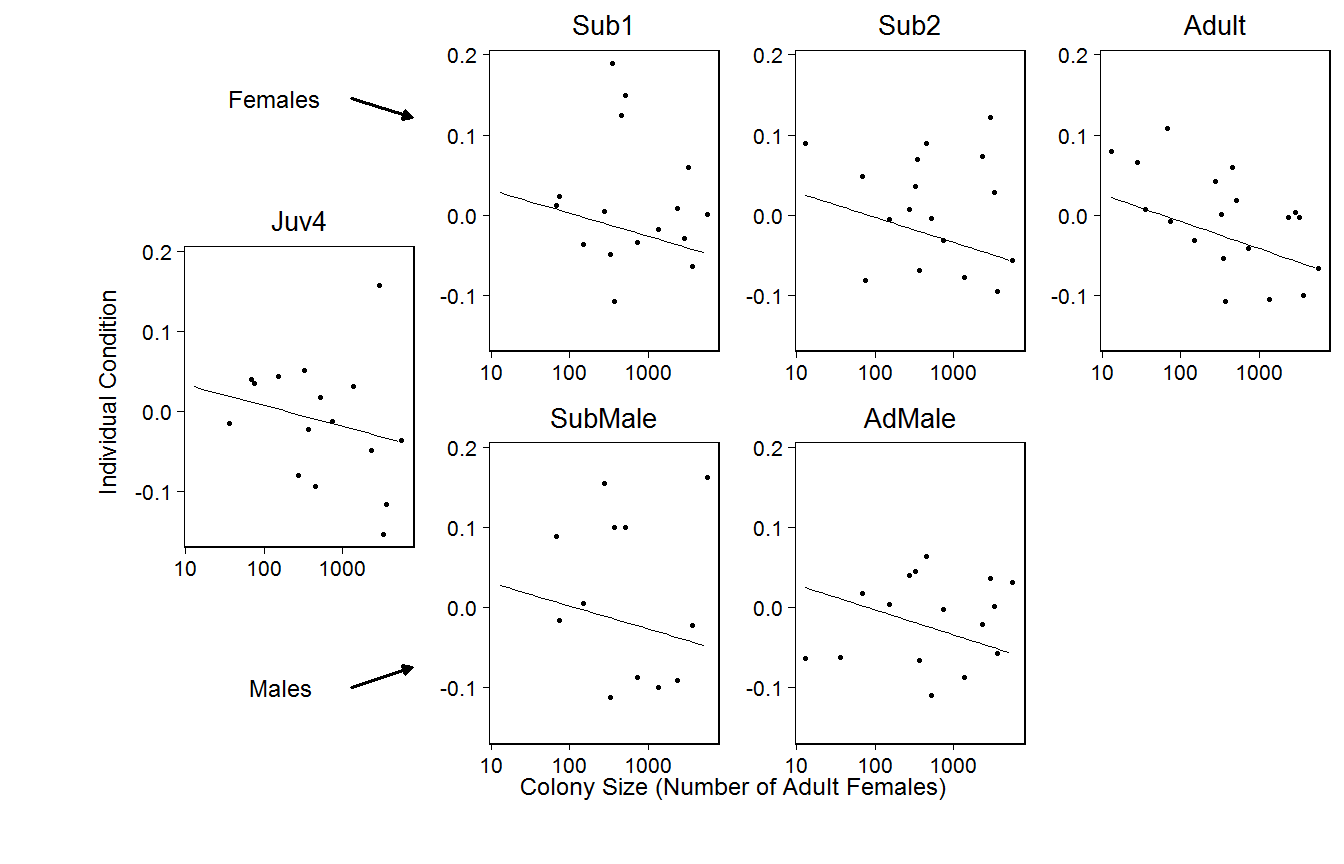
## Condition Vs. Colony Size

The model with the lowest AIC included only one interaction term, instar age by colony size, and it did not include instar sex or instar age as fixed effects. Colony size was significant (lmer; 23,5 = 11.12, p = 0.004 \*\* ) with condition decreasing as colony size increased (figure 2).

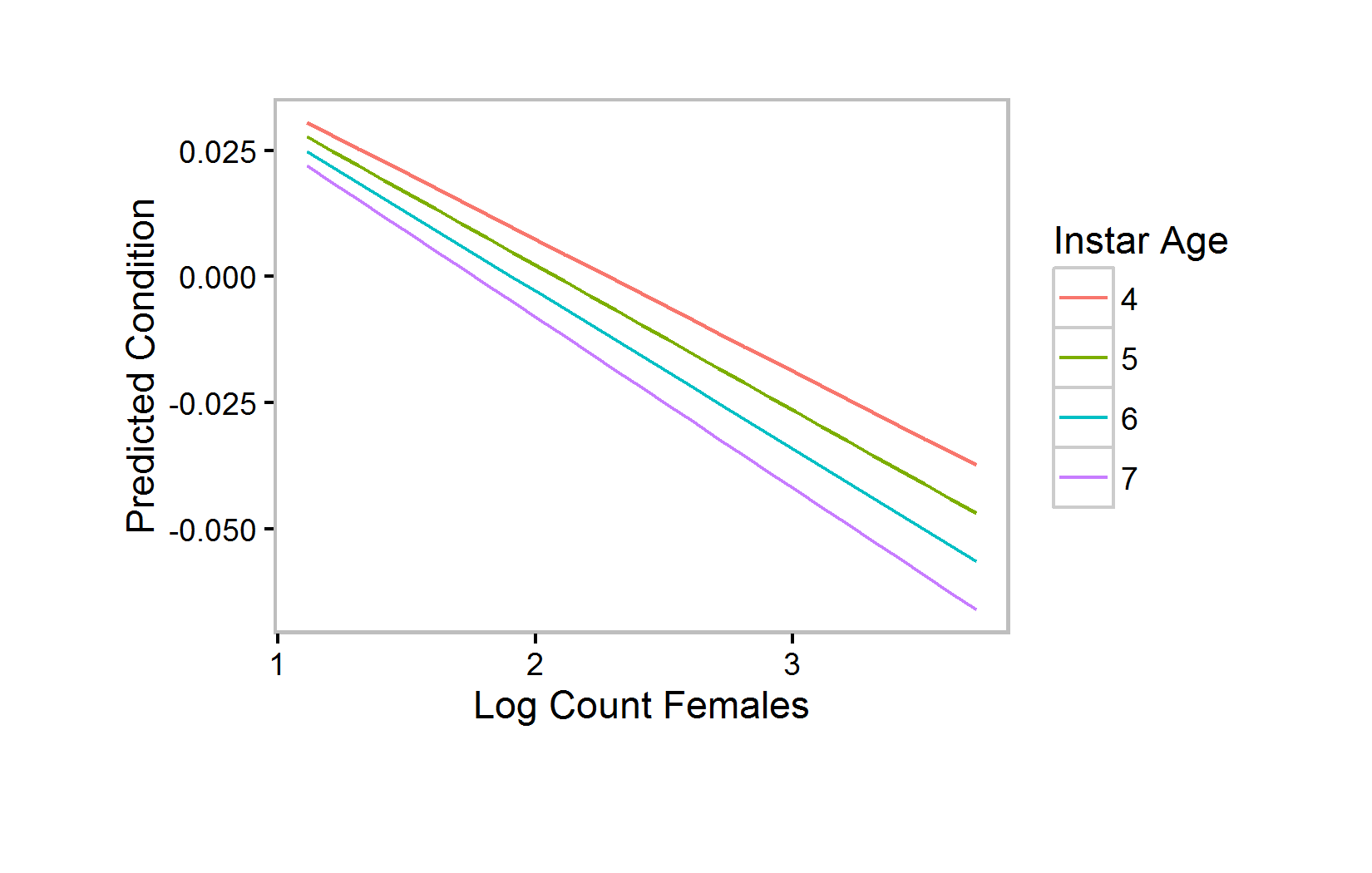
There was a significant interaction between instar age and colony size (lmer; 2~4, 5~ = 6.76, p = 0.009 \*\* ), with condition appearing to decrease at a faster rate with colony size as the instar age increases (figure 3).

However, when performing tests on the instars individually we found that only adult female condition decreased significantly with colony size (lmer; 2~3, 4~ = 7.64, p = 0.006 \*\* ).

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



1. *Figure : Individual condition against colony size. Overall condition decreases with colony size (p = 0.004 \*\* ), with a significant interaction with instar(p = < 0.001 \*\*\* ).*



1. *Figure : The results of the linear model showing individual condition of each instar age against colony size with both sexes combined as instar sex was insignificant. However, when testing each instar individually, only the adult female condition change with nest size had a significant effect (p = 0.006 \*\* ), n = 19 colonies.*

## Within Colony Variance Vs. colony size

### Leg Length Variance

There was no significant effect of nest size on within colony variance in leg, but the average leg variance was 0.09 0.02, which is small as the possible values the boot strap variance could take are between zero to one.

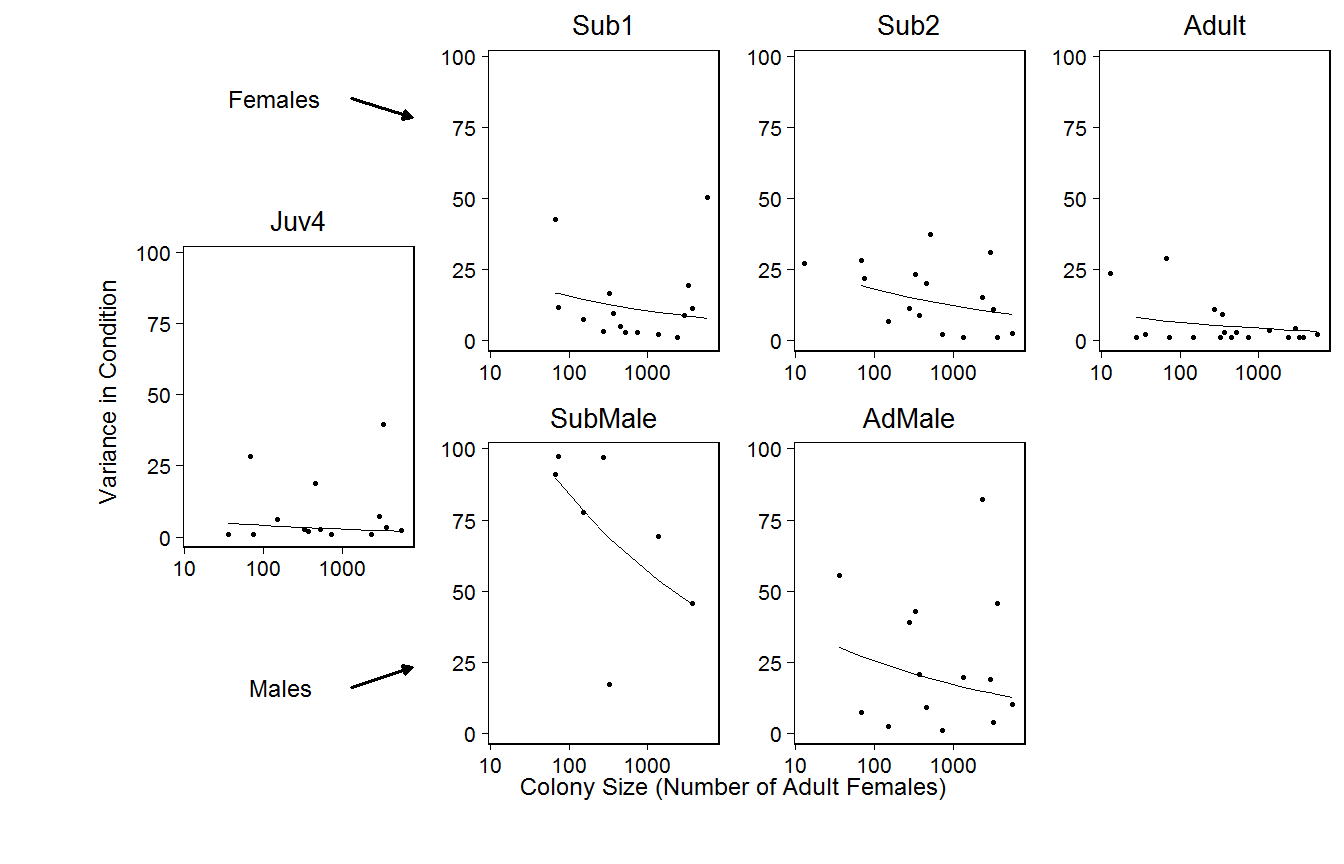
### Condition Variance

In contrast, there were significant effects of colony size on within-colony condition variance. The average within-colony condition variance was 0.07 0.02, which again is low. The final model included only colony size, the two-way interaction instar age by sex interaction and the two-way interaction instar age squared by instar sex. Colony size was significant (glmmPQR; 21 = 7.244, p = 0.007 \*\* ) as within-colony condition variance decreased with increasing colony size (figure 4).

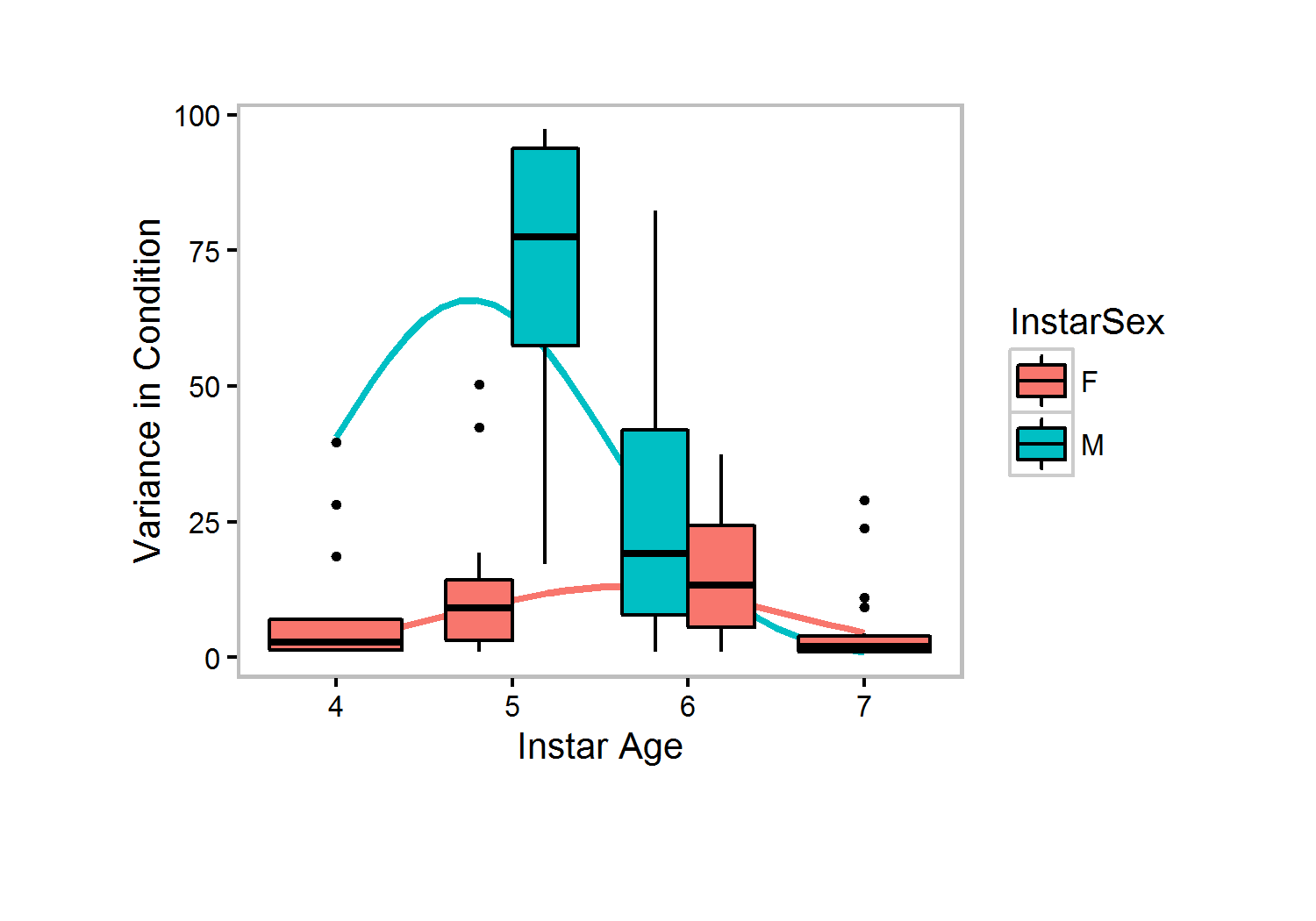
The interaction instar age by sex was significant (glmmPQR; 22 = 30.525, p < 0.001 \*\*\* , figure 5), as was instar age squared crossed with sex (glmmPQR; 22 = 25.315, p < 0.001 \*\*\* , figure 5). The within-colony variance in condition peaked at intermediate instar ages and being larger for males (figure 5). However, doing post-hoc analysis we found that none of the instars were significant when tested individually.

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

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1. *Figure : Transformed bootstrap calculated variance in condition against colony size with the linear model superimposed , n = 19 colonies.*

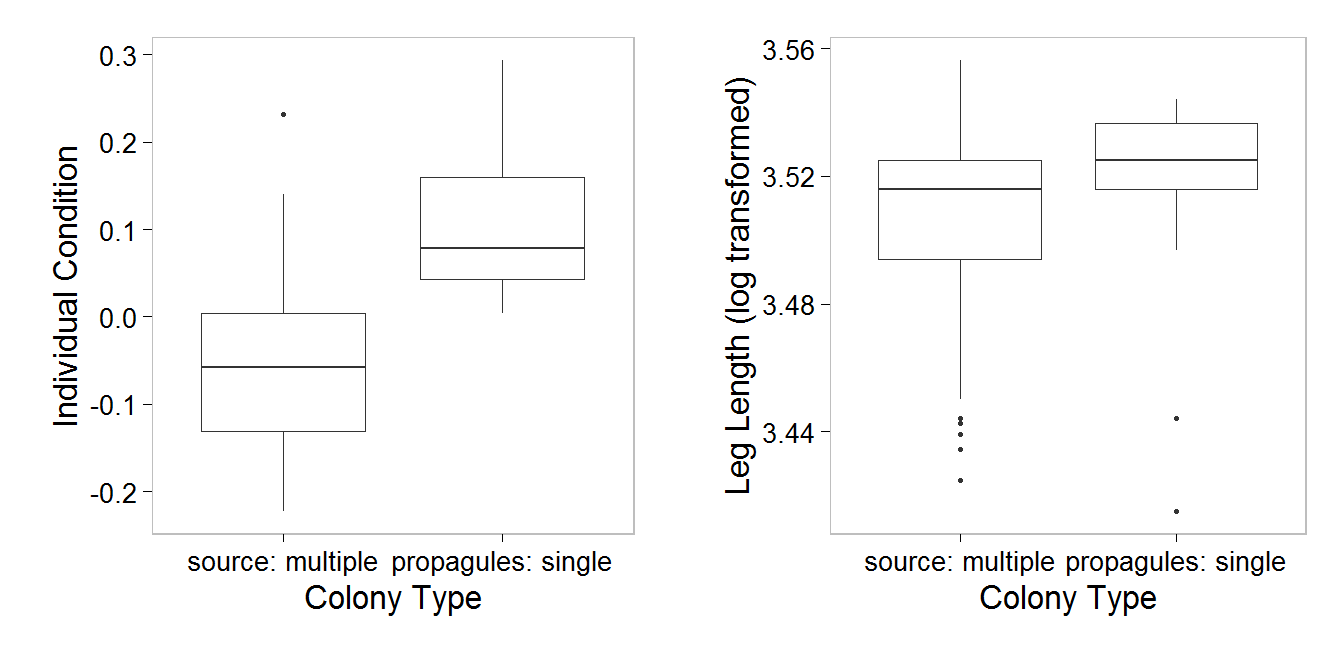


1. *Figure :Within-colony condition variance by instar. Overlaid is the linear model with a significant quadratic term.*

# Original Colony Vs Propagule

Adult female leg length was larger in propagules compared to their source colony (lmer; 24,5= 3.9, p = 0.048 \* ),

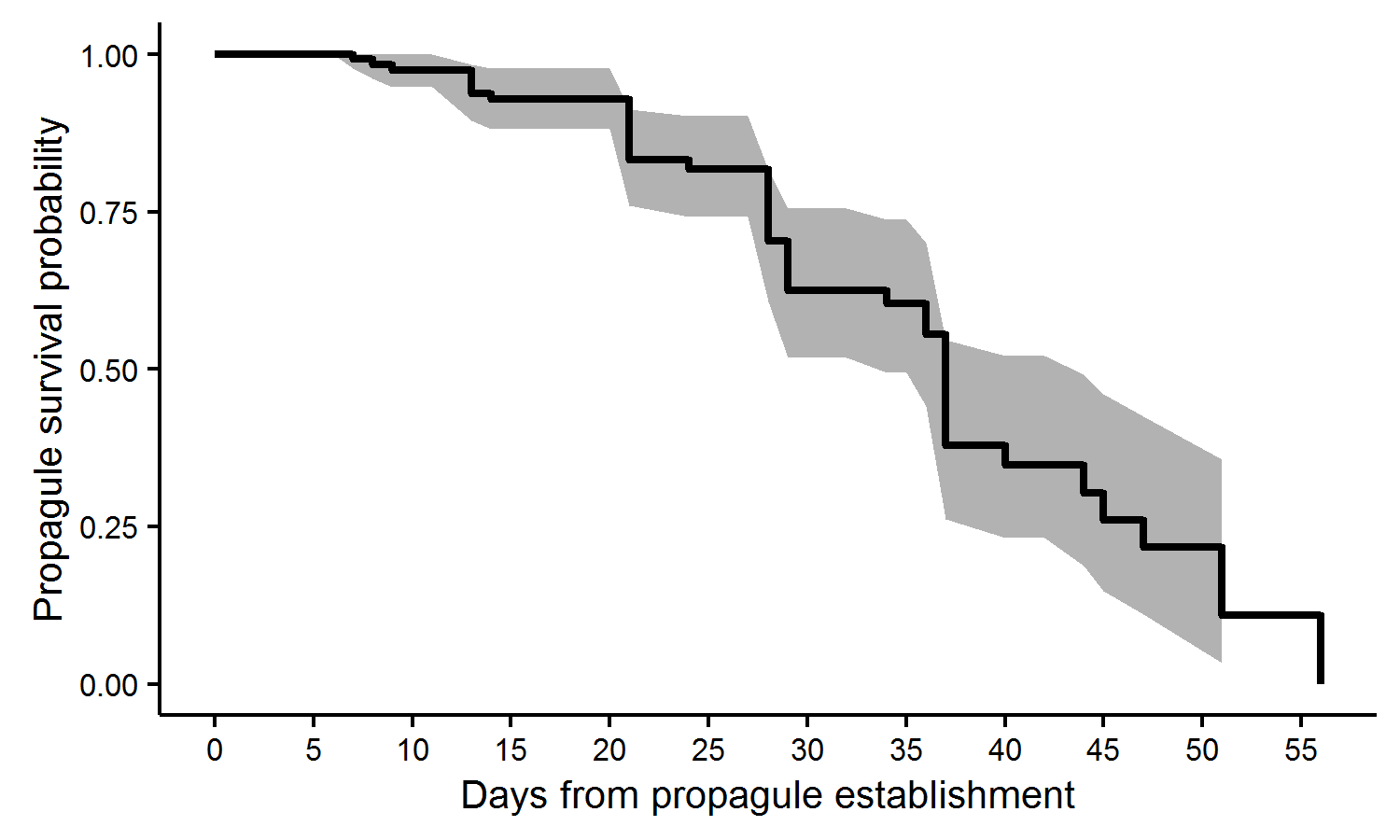
as was individual condition (lmer; 24,5= 9.45, p = 0.002 \*\* ), with those in propagules having longer legs and greater condition compared to those in the source colony.



1. *Figure: Condition and leg length of adult females in propagues compared to adult females in their source colony. Both were significant, n source colonies = 2, n propagules = 39*

## Propagule survival

We found that colonies with single female spiders had a very low survival rate, with there being only around a 15% chance that the single colony would survive to 50 days after establishment (figure 7).



1. *Figure: The survival function of 40 propagules from 10 source colonies. The grey shading is the 95% confidence interval.*

## List of full models used

|  |  |
| --- | --- |
| test | fullModel |
| Leg length | logLeg=logCtFm + InstarAge + logCtFm:InstarAge + logCtFm:InstarAge:InstarSex + (1|Nest) |
| Condition | condResiduals=logCtFm + logCtFm:InstarAge + (1|Nest) |
| Condition Variance | Variance=logCtFm + InstarAge:InstarSex + InstarSex:sqr(InstarAge) |
| Single nest leg | logLeg=type + (1|Nest) + (1|OrigNst) |
| Single nest condition | condResiduals=type + (1|Nest) + (1|OrigNst) |