SMMS Sternite Dataset Analysis

true

Contents

1 Introduction

This analysis was performed by the University of Florida - Florida Medical Entomology Laboratory, 200 9th Street SE, Vero Becah FL, 32962. This analysis is done in a reproducible research manner. All Tables, Figures and Statistical Analyses were created in the open source software package R.

Date: 10/26/2016 Version: 2.0

2 Data

A copy of this data analysis (PDF) may be downloaded here.

A copy of the original data (XLSX) may be downloaded here. The original data had 1244 records with one (1) record modified due to a data entry error.

A copy of the cleaned data (CSV) used for the analysis may be downloaded here.

3 Analysis

3.1 AEG/ALB Analysis (Both Species)

3.1.1 AEG/ALB Data Summary

Table 1: Table 1. Summary of Sternite Dataset

SCUTUM	STERGUM
Min. :0.0000	Min. :0.0000
1st Qu.:0.1000	1st Qu.:0.8000
Median :0.2000	Median :1.0000
Mean :0.3372	Mean :0.8665
3rd Qu.:0.6000	3rd Qu.:1.0000
Max. :1.0000	Max. :1.0000

3.1.2 AEG/ALB Data Description

Table 2: Table 2. Description of Sternite Dataset

	vars	n	mean	sd	median	trimmed	mad	min	max	range	skew	kurtosis	se
SCUTUM	1	1241	0.3372	0.3283	0.2	0.3015	0.2965	0	1	1	0.7975	-0.8095	0.00932
STERGUM	2	1241	0.8665	0.226	1	0.9224	0	0	1	1	-2.042	3.381	0.006415

3.1.3 AEG/ALB Data Dispersion

3.1.4 AEG/ALB Data Distribution

3.1.5 AEG/ALB Hexbin of Scutum vs Stergum

3.1.6 AEG/ALB Analysis Discussion

When looking at both species as a collective dataset, the scutum and stergum data appear to be heavily skewed, though in opposite directions. Figure 3 indicates that when the stergum is skewed in the direction of 100% coverage and the scutum is skewed in the direction of 0% coverage.

3.2 AEG Analysis

3.2.1 AEG Data Summary

Table 3: Table 3. Summary of AEG Dataset

SCUTUM	STERGUM
Min. :0.0000	Min. :0.0000
1st Qu.:0.4000	1st Qu.:0.9000
Median :0.6000	Median :1.0000
Mean :0.6026	Mean :0.9132
3rd Qu.:0.9000	3rd Qu.:1.0000
Max. :1.0000	Max. :1.0000

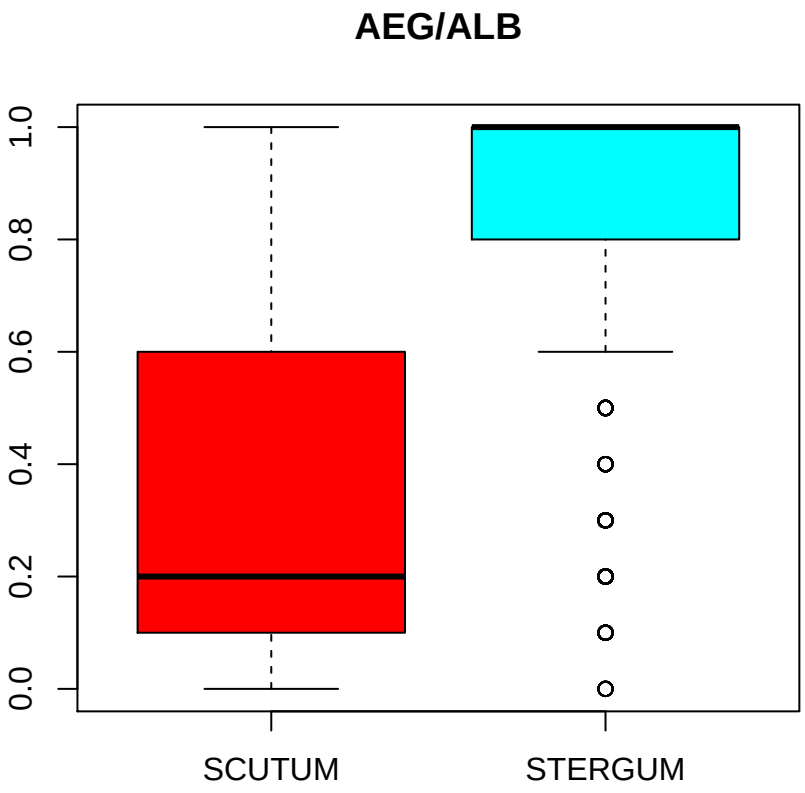

Figure 1: Figure 1.

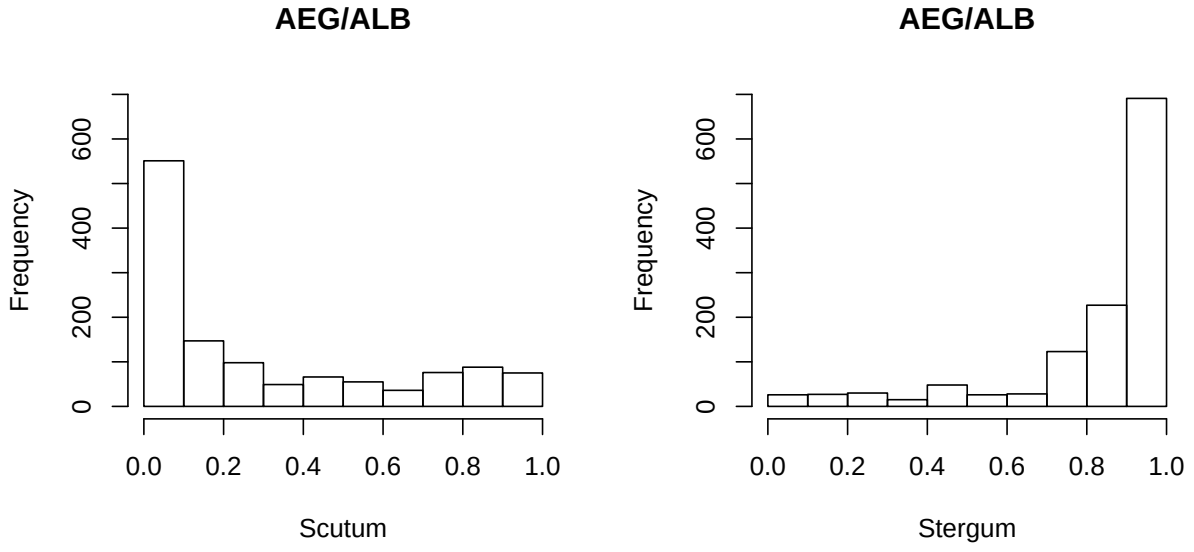

Figure 2: Figure 2.

3.2.2 AEG Data Description

Table 4: Table 4. Description of AEG Dataset

	vars	n	mean	sd	median	trimmed	mad	min	max	range	skew	kurtosis	se
SCUTUM	1	227	0.6026	0.2969	0.6	0.6224	0.2965	0	1	1	-0.4569	-0.8901	0.0197
STERGUM	2	227	0.9132	0.1735	1	0.9552	0	0	1	1	-3.094	10.62	0.01151

3.2.3 AEG Data Frequency Counts

Table 5: Table 5. AEG Frequencies

AEG$SCUTUM	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
AEG$STERGUM											
0	1	0	0	0	0	1	0	0	0	0	0
0.1	0	0	0	1	0	0	0	0	0	0	0
0.2	1	0	0	0	0	0	0	0	0	0	0
0.3	2	0	0	0	1	0	0	0	1	0	0
0.5	0	1	0	0	0	1	0	0	0	1	0
0.6	0	0	0	0	1	1	1	0	1	0	0
0.7	1	0	0	1	1	0	1	0	0	1	0
0.8	3	3	1	1	1	3	1	1	4	1	1
0.9	1	0	4	6	3	6	4	5	4	11	2
1	4	6	4	11	11	10	16	14	22	22	21

3.2.4 AEG Data Dispersion

3.2.5 AEG Data Distribution

3.2.6 AEG Data Chi-Square Test for Independence

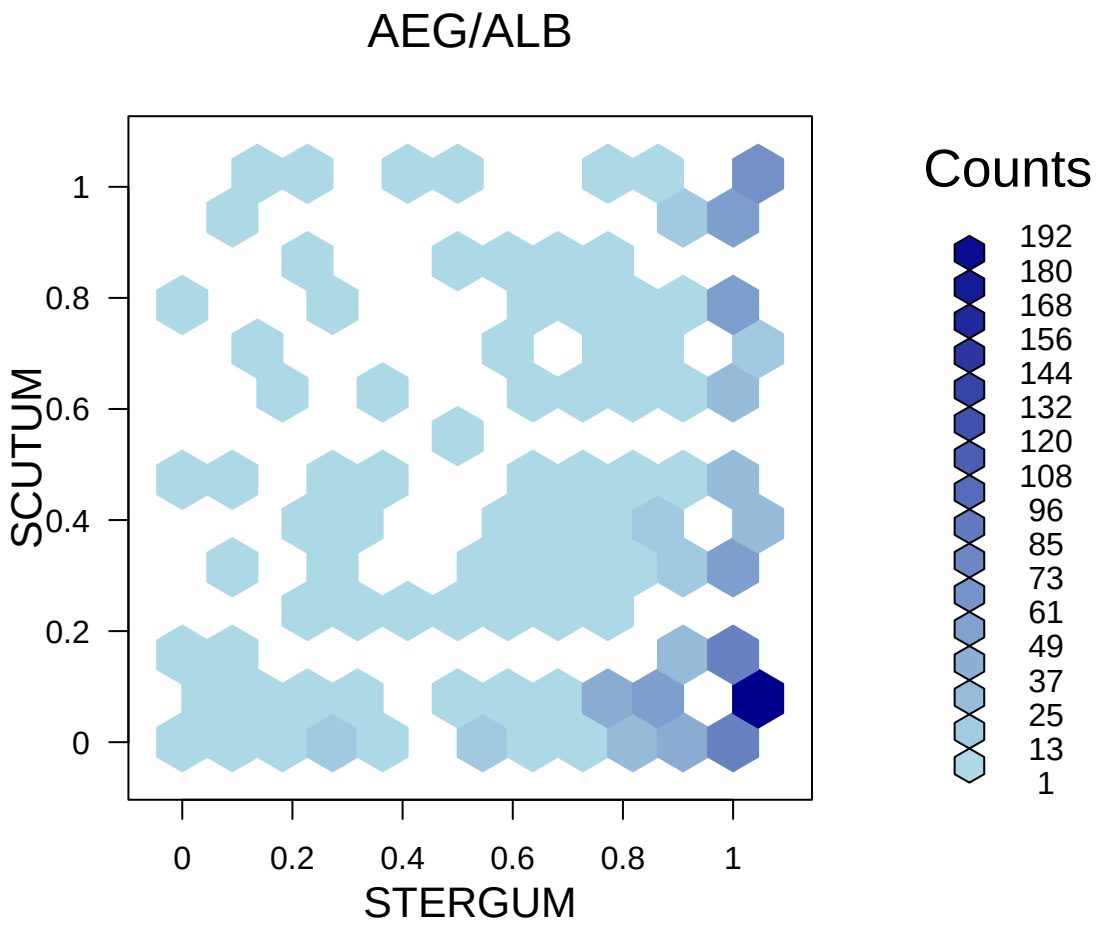

Figure 3: Figure 3.

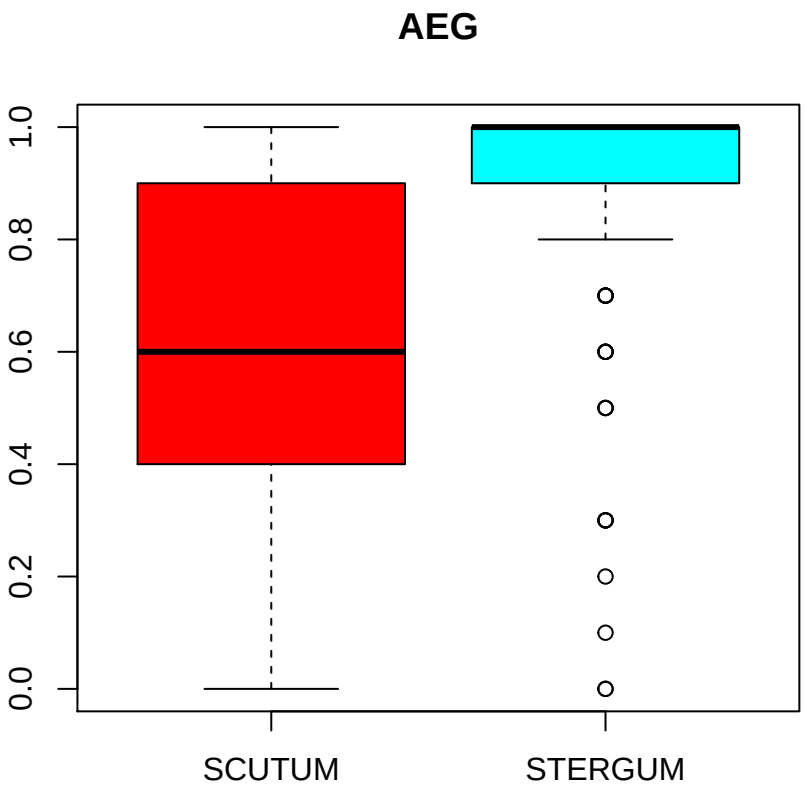

Figure 4: Figure 6.

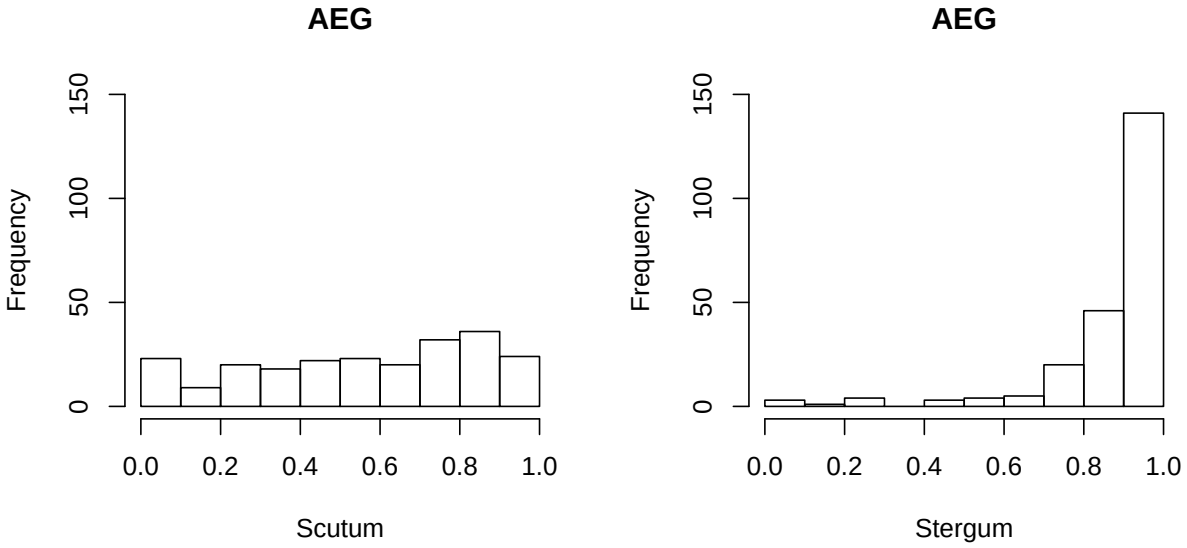

Figure 5: Figure 7.

3.3 ALB Analysis

3.3.1 ALB Data Summary

Table 7: Table 7. Summary of ALB Dataset

SCUTUM	STERGUM
Min. :0.0000	Min. :0.000
1st Qu.:0.1000	1st Qu.:0.800
Median :0.1000	Median :1.000
Mean :0.2778	Mean :0.856
3rd Qu.:0.4000	3rd Qu.:1.000
Max. :1.0000	Max. :1.000

3.3.2 ALB Data Description

Table 8: Table 8. Description of ALB Dataset (continued below)

	vars	n	mean	sd	median	trimmed	mad	min
SCUTUM	1	1014	0.2778	0.3049	0.1	0.2287	0.1483	0
STERGUM	2	1014	0.856	0.2349	1	0.9121	0	0

	max	range	skew	kurtosis	se
SCUTUM	1	1	1.205	0.1296	0.009575
STERGUM	1	1	-1.886	2.623	0.007378

3.3.3 ALB Data Frequency Counts

Table 10: Table 9. ALB Frequencies

	ALB$SCUTUM0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1

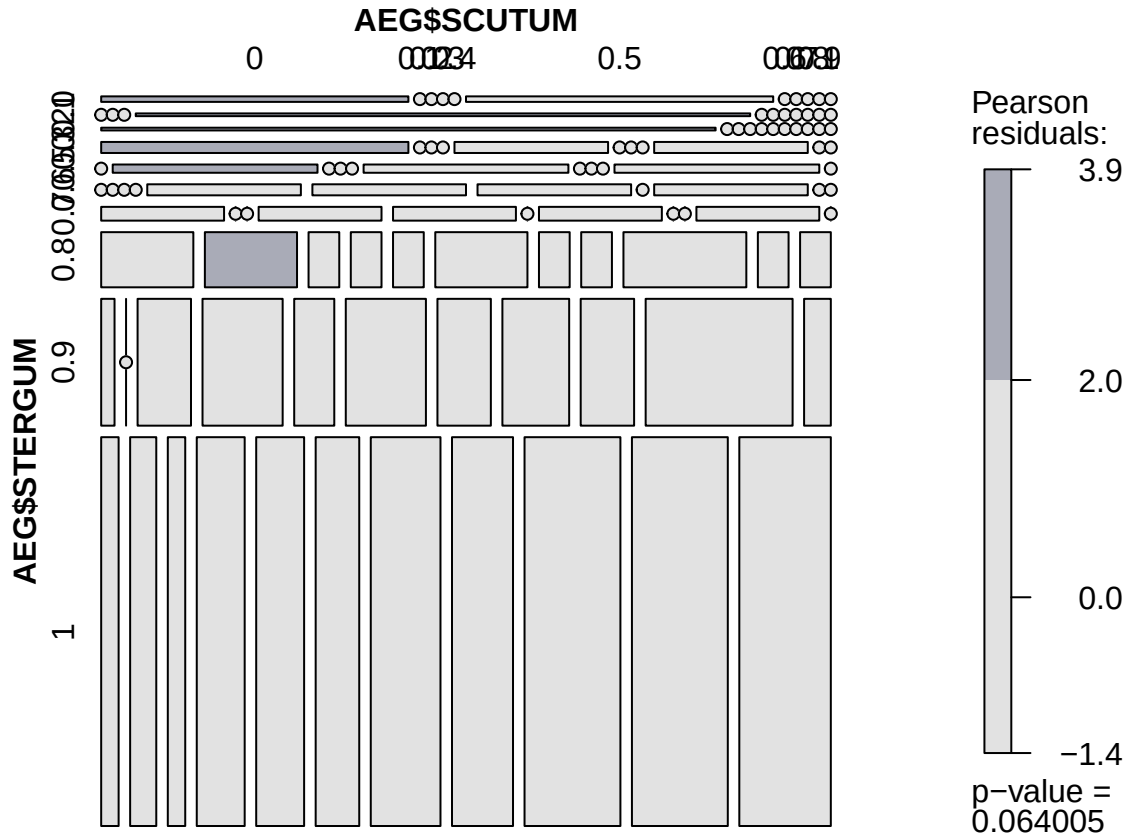

Figure 6: Figure 8.

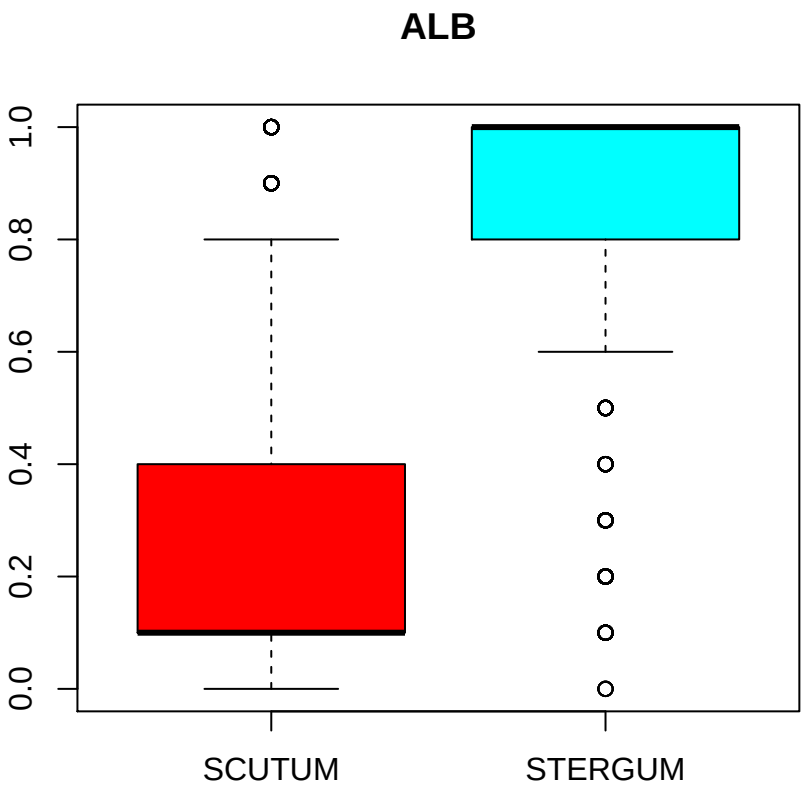

Figure 7: Figure 9.

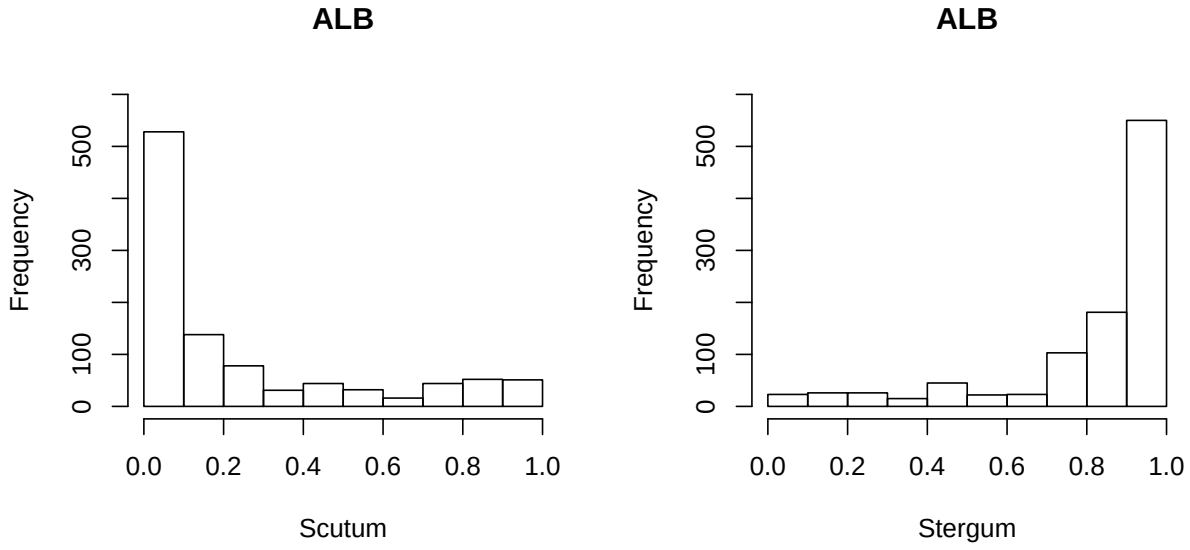

Figure 8: Figure 10.

3.3.4 ALB Data Dispersion

3.3.5 ALB Data Distribution

3.3.6 ALB Data Chi-Square Test for Independence

Table 11: Table 10. ALB Chi-Square Test for Independence

Test statistic	df	P value
168.8	100	2.073e-05 * * *

3.3.7 ALB Data Mosaic Plot

3.3.8 ALB Analysis Discussion

When looking at the ALB species, the scutum and stergum datasets appear to be heavily skewed, though in opposite directions. Table 10 and Figure 11 indicate that there are significant differences between AEG scutum and stregum coverages at the 0.05 and 0.01 level.

3.4 Between Species Data (AEG and ALB)

3.4.1 Between Species Data Frequency Counts

Table 12: Table 11. Stergum Frequencies

STERGUM	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
SPECIES											
AEG	2	1	1	4	0	3	4	5	20	46	141
ALB	4	19	26	26	10	15	45	22	23	103	181	550

Table 13: Table 12. Scutum Frequencies

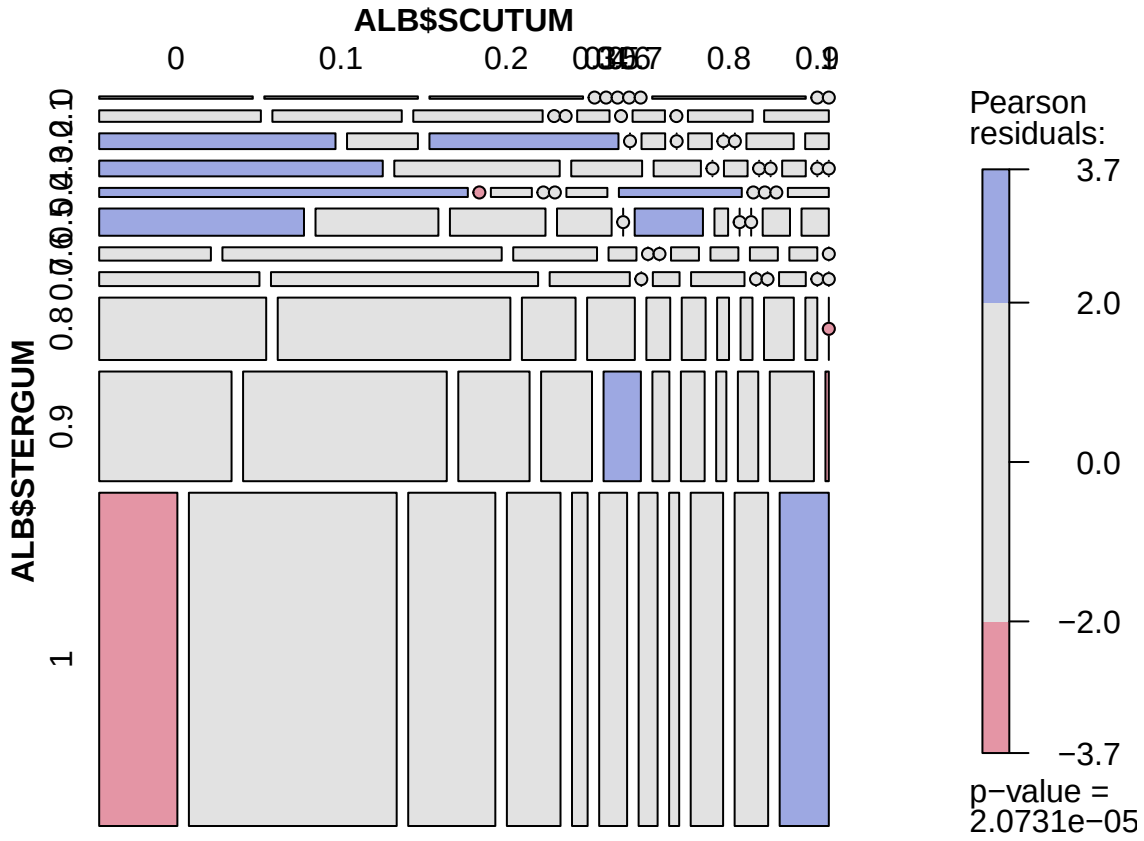

Figure 9: Figure 11.

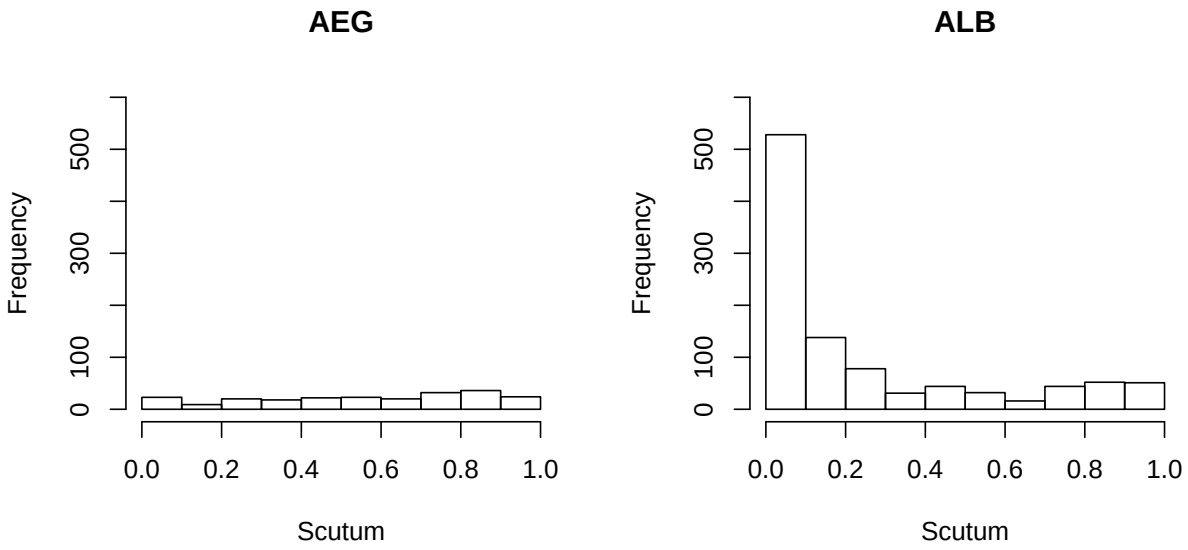

Figure 10: Figure 12.

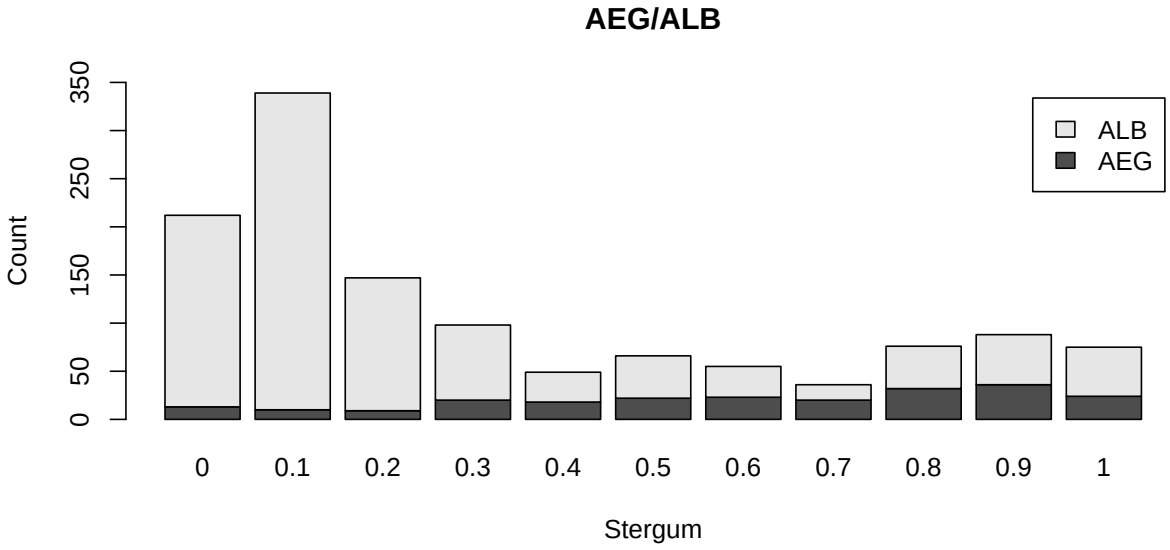

Figure 11: Figure 13.

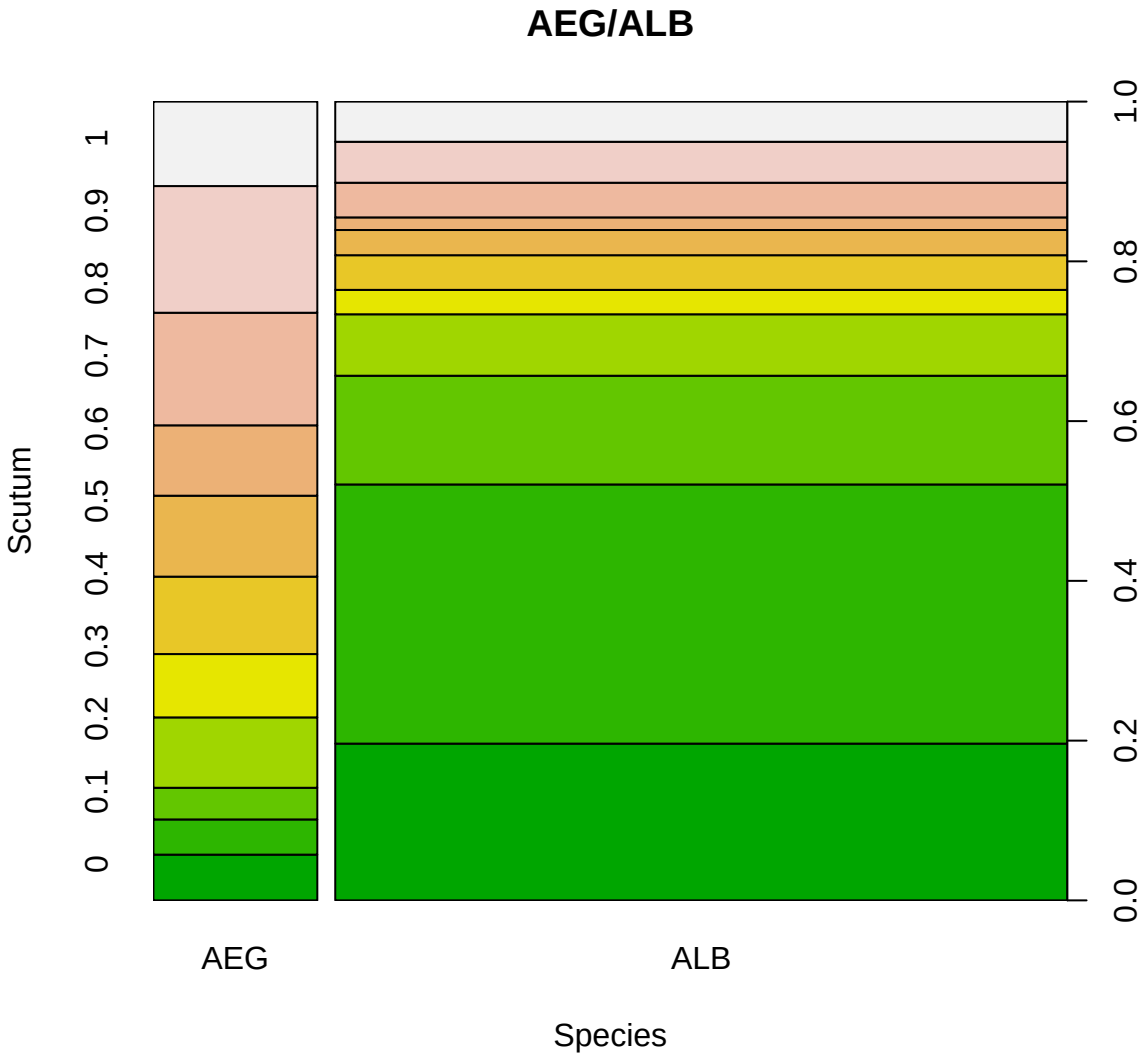

Figure 12: Figure 14.

Table 14: Table 13. Between Species Scutum Chi-Square Test for Independence

Test statistic	df	P value
232.6	10	2.492e-44 * * *

3.4.6 Between Species Data Scutum Mosaic Plot

3.4.7 Between Species Data Stergum Distribution

3.4.8 Between Species Data Stergum Distribution - Stacked

3.4.9 Between Species Data Stergum Spine Plot

3.4.10 Between Species Data Stergum Chi-Square Test for Independence

Table 15: Table 14. Between Species Stergum Chi-Square Test for Independence

Test statistic	df	P value
18.77	10	0.04326 *

3.4.11 Between Species Data Stergum Mosaic Plot

3.4.12 Between Species Analysis Discussion

When looking between the AEG and ALB species, the stergum datasets appear to be heavily skewed in the same direction while the scutum datstets appear to be different between species. **Table 13** indicates that there are *significant differences between AEG and ALB species scutum coverages* at the 0.05 and 0.01 level. **Figure 15** shows that range of 0.6 - 0.9 scutum coverages for AEG had *significantly more* values than expected and the range of 0.0 - 0.1 scutum coverages for AEG had *significantly less* values than expected. **Figure 15** also indicates that for ALB the range of 0.7 - 0.9 scutum coverages had *less* values than expected **Table 14** indicates that there are *significant differences between AEG and ALB species stergum coverages* at the 0.05 level. **Figure 19** shows that no coverages for either species had *significantly* more or less values than expected.

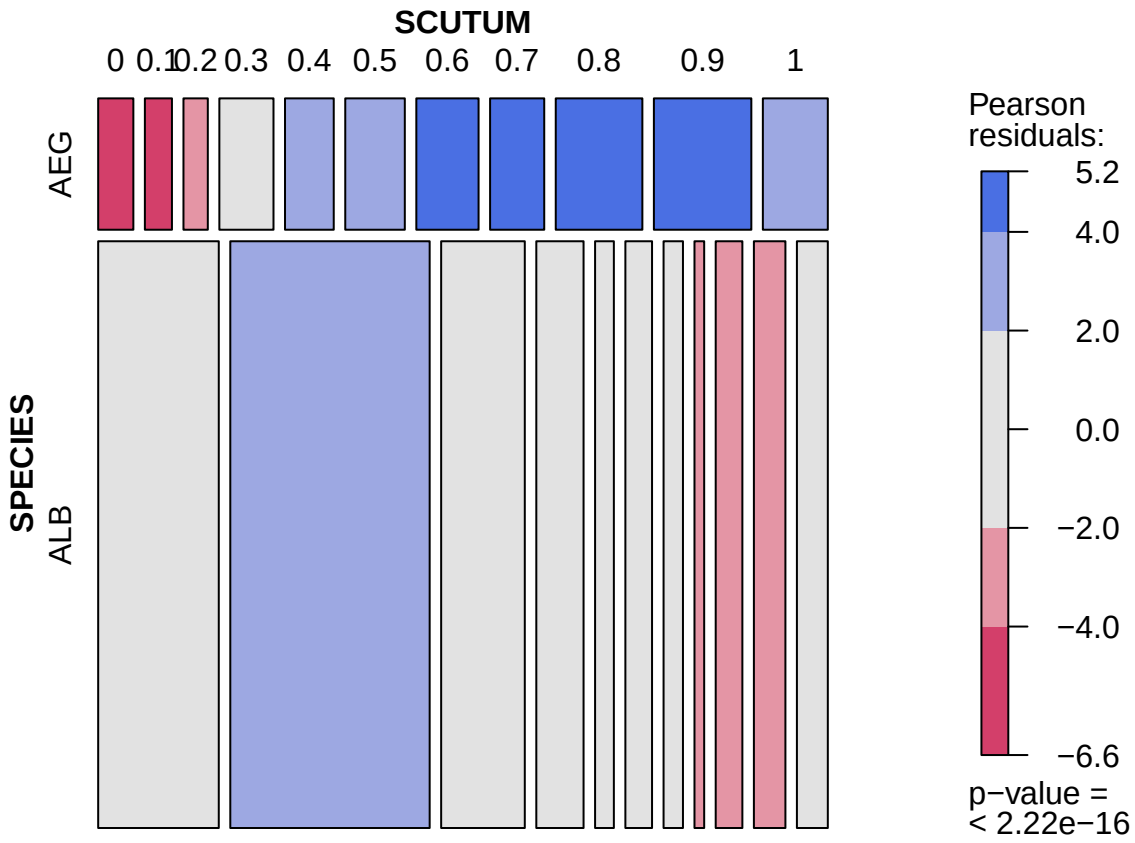

Figure 13: Figure 15.

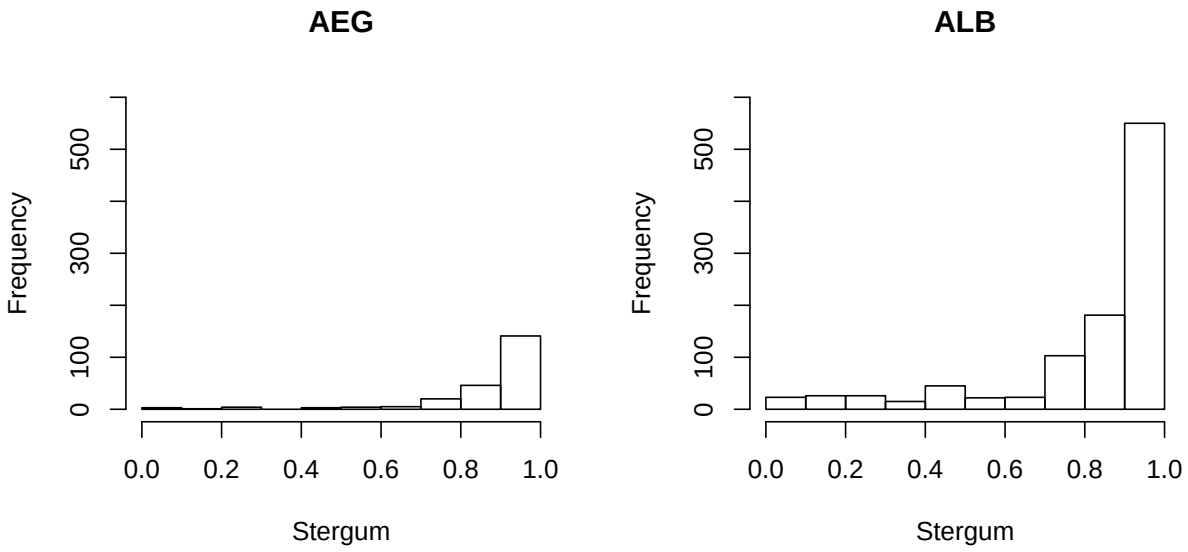

Figure 14: Figure 16.

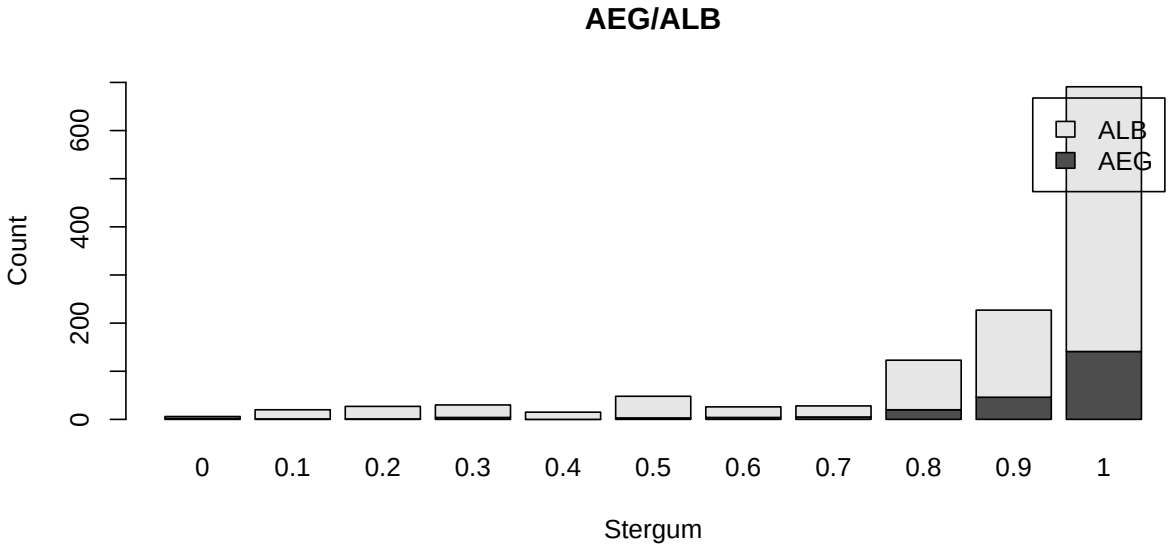

Figure 15: Figure 17.

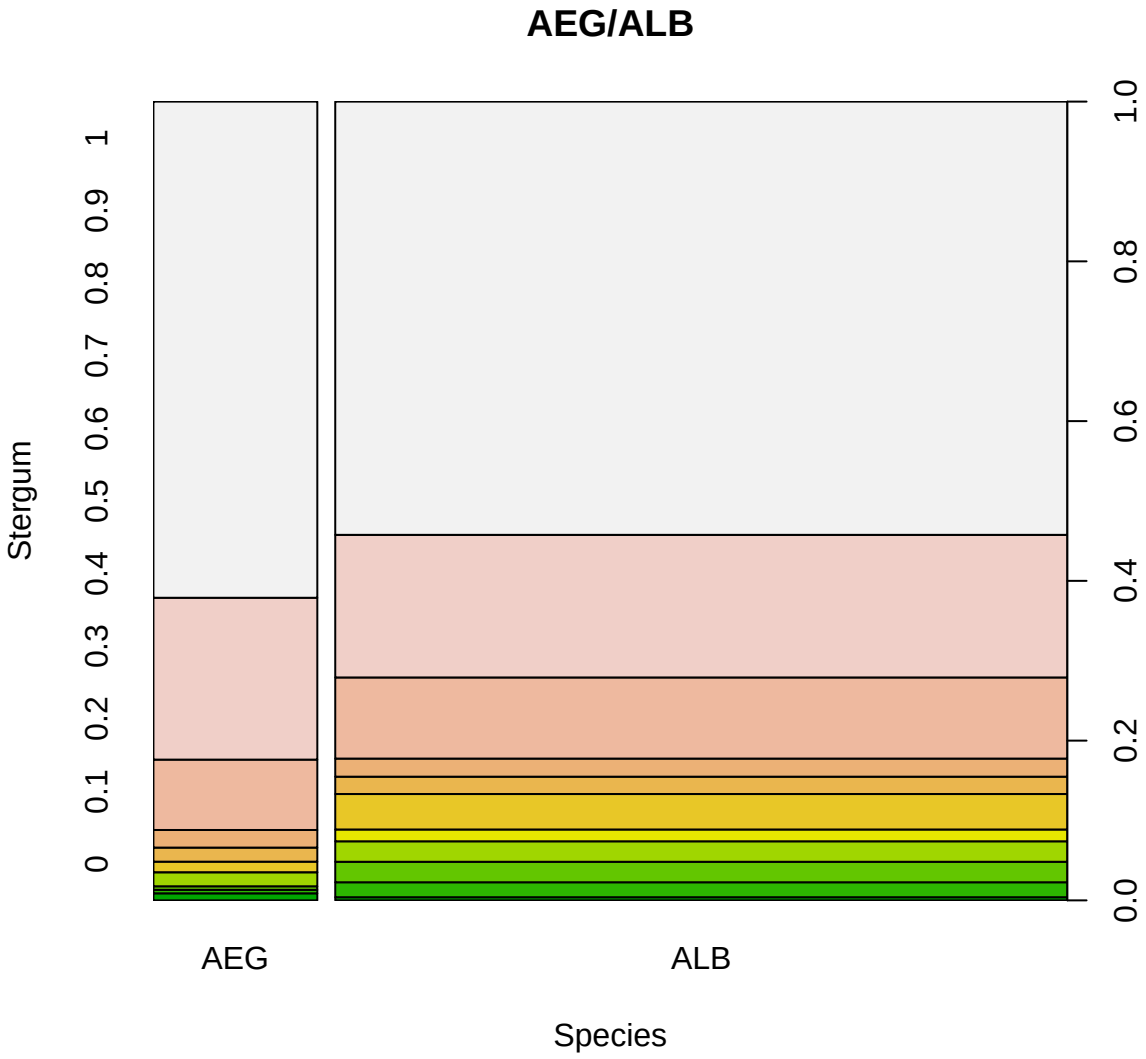

Figure 16: Figure 18.

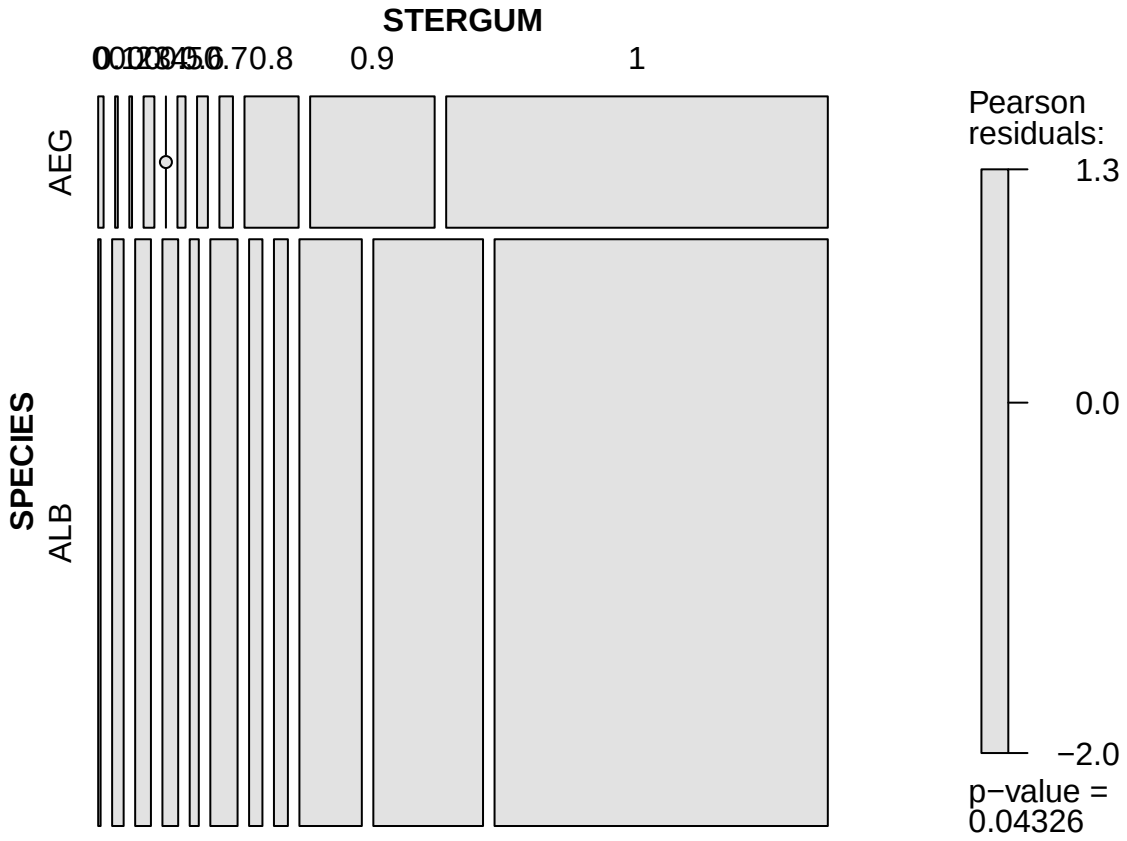

Figure 17: Figure 19.