

Online Appendix 3 - Phylogenetic Signal (A) and independent contrasts (B) for raw data.

Phylogenetic signal was calculated by using both Pagel's  $\lambda$  and Blomberg et al's K statistics.

Significant and marginally significant (at  $p < 0.1$ ) relationships are highlighted in bold face.

Statistically significant Phylogenetic Independent Contrasts correlations are highlighted in bold face.

### A – Phylogenetic Signal

| Phylogeny Species 1           | Occ1         | MeanOcc | MaxOcc | Area1  | MeanArea | MaxArea |
|-------------------------------|--------------|---------|--------|--------|----------|---------|
| Lambda                        | >0.001       | >0.001  | >0.001 | 0.133  | 0.073    | 0.040   |
| <i>p</i> ( <i>lambda</i> = 0) | 1.000        | 1.000   | 1.000  | 0.204  | 0.474    | 0.721   |
| K                             | 0.056        | 0.049   | 0.064  | 0.077  | 0.095    | 0.102   |
| <i>p</i> ( <i>K</i> = 0)      | 0.647        | 0.833   | 0.703  | 0.331  | 0.400    | 0.343   |
| <b>Phylogeny Species 2</b>    |              |         |        |        |          |         |
| Lambda                        | >0.001       | >0.001  | >0.001 | 0.125  | 0.073    | 0.039   |
| <i>p</i> ( <i>lambda</i> = 0) | 1.000        | 1.000   | 1.000  | 0.228  | 0.476    | 0.730   |
| K                             | 0.083        | 0.058   | 0.077  | 0.092  | 0.100    | 0.106   |
| <i>p</i> ( <i>K</i> = 0)      | 0.371        | 0.817   | 0.662  | 0.208  | 0.416    | 0.395   |
| <b>Phylogeny Genera 1</b>     |              |         |        |        |          |         |
| Lambda                        | <b>0.969</b> | 0.440   | 0.071  | >0.001 | >0.001   | >0.001  |
| <i>p</i> ( <i>lambda</i> = 0) | <b>0.006</b> | 0.473   | 0.566  | 1.000  | 1.000    | 1.000   |
| K                             | <b>0.862</b> | 0.548   | 0.629  | 0.281  | 0.296    | 0.303   |
| <i>p</i> ( <i>K</i> = 0)      | <b>0.003</b> | 0.109   | 0.095  | 0.493  | 0.563    | 0.602   |
| <b>Phylogeny Genera 2</b>     |              |         |        |        |          |         |
| lambda                        | <b>0.916</b> | 0.527   | 0.068  | >0.001 | >0.001   | >0.001  |
| <i>p</i> ( <i>lambda</i> = 0) | <b>0.007</b> | 0.407   | 0.567  | 1.000  | 1.000    | 1.000   |
| K                             | <b>0.725</b> | 0.517   | 0.596  | 0.222  | 0.250    | 0.245   |
| <i>p</i> ( <i>K</i> = 0)      | <b>0.009</b> | 0.114   | 0.080  | 0.589  | 0.731    | 0.783   |

### B – Independent Contrasts

| Phylogeny Species 1 | Body size | Duration | Mean Occ     | Max Occ      | Mean Area    | Max Area     | Occ1         | Area1        |
|---------------------|-----------|----------|--------------|--------------|--------------|--------------|--------------|--------------|
| Body size           | 0         | -0.177   | <b>0.407</b> | <b>0.479</b> | <b>0.565</b> | <b>0.509</b> | 0.081        | 0.280        |
| Duration            | 0.223     | 0        | 0.216        | 0.153        | 0.052        | 0.130        | <b>0.571</b> | <b>0.416</b> |
| MeanOcc             | 0.004     | 0.136    | 0            | <b>0.916</b> | <b>0.541</b> | <b>0.498</b> | <b>0.380</b> | 0.147        |
| MaxOcc              | 0.000     | 0.295    | 0.000        | 0            | <b>0.554</b> | <b>0.537</b> | <b>0.295</b> | 0.138        |
| MeanArea            | 0.000     | 0.723    | 0.000        | 0.000        | 0            | <b>0.951</b> | 0.207        | <b>0.662</b> |
| MaxArea             | 0.000     | 0.372    | 0.000        | 0.000        | 0.000        | 0            | 0.263        | <b>0.725</b> |
| Occ1                | 0.579     | 0.000    | 0.007        | 0.040        | 0.154        | 0.068        | 0            | <b>0.551</b> |
| Area1               | 0.052     | 0.003    | 0.312        | 0.343        | 0.000        | 0.000        | 0.000        | 0            |

| Phylogeny Species 2 | Body size | Duration | Mean Occ | Max Occ      | Mean Area    | Max Area     | Occ1         | Area1        |
|---------------------|-----------|----------|----------|--------------|--------------|--------------|--------------|--------------|
| Body size           | 0         | -0.270   | 0.149    | 0.220        | <b>0.344</b> | <b>0.309</b> | -0.083       | 0.072        |
| Duration            | 0.060     | 0        | 0.205    | 0.130        | -0.007       | 0.103        | <b>0.564</b> | 0.410        |
| MeanOcc             | 0.307     | 0.158    | 0        | <b>0.882</b> | <b>0.336</b> | <b>0.310</b> | <b>0.290</b> | -0.057       |
| MaxOcc              | 0.128     | 0.373    | 0.000    | 0            | <b>0.321</b> | <b>0.339</b> | 0.176        | -0.102       |
| MeanArea            | 0.016     | 0.962    | 0.018    | 0.0246       | 0            | <b>0.931</b> | 0.057        | <b>0.586</b> |
| MaxArea             | 0.031     | 0.480    | 0.030    | 0.0173       | 0.0000       | 0            | 0.149        | <b>0.663</b> |
| Occ1                | 0.570     | 0.000    | 0.043    | 0.227        | 0.698        | 0.305        | 0            | <b>0.501</b> |
| Area1               | 0.622     | 0.003    | 0.695    | 0.485        | 0.000        | 0.000        | 0.000        | 0            |

| Phylogeny Genera 1 | Duration | Mean Occ | Max Occ | Mean Area    | Max Area     | Body Size    | Occ1         | Area1  |
|--------------------|----------|----------|---------|--------------|--------------|--------------|--------------|--------|
| Duration           | 0        | 0.339    | -0.125  | 0.224        | 0.039        | -0.088       | -0.011       | 0.173  |
| MeanOcc            | 0.133    | 0        | 0.080   | 0.384        | 0.187        | 0.119        | 0.090        | 0.230  |
| MaxOcc             | 0.591    | 0.731    | 0       | <b>0.509</b> | <b>0.448</b> | <b>0.524</b> | <b>0.531</b> | 0.118  |
| MeanArea           | 0.328    | 0.086    | 0.01855 | 0            | <b>0.579</b> | 0.292        | <b>0.586</b> | -0.010 |
| MaxArea            | 0.865    | 0.417    | 0.042   | 0.006        | 0            | 0.146        | 0.057        | 0.005  |
| Body size          | 0.703    | 0.608    | 0.015   | 0.198        | 0.528        | 0            | 0.148        | 0.003  |
| Occ1               | 0.963    | 0.698    | 0.013   | 0.005        | 0.806        | 0.523        | 0            | 0.215  |
| Area1              | 0.452    | 0.316    | 0.612   | 0.965        | 0.983        | 0.989        | 0.349        | 0      |

| Phylogeny Genera 2 | Duration | Mean Occ | Max Occ      | Mean Area | Max Area     | Body Size | Occ1          | Area1        |
|--------------------|----------|----------|--------------|-----------|--------------|-----------|---------------|--------------|
| Duration           | 0        | 0.064    | 0.085        | -0.221    | -0.322       | -0.288    | <b>-0.475</b> | 0.069        |
| MeanOcc            | 0.784    | 0        | <b>0.875</b> | 0.412     | <b>0.517</b> | 0.412     | <b>0.468</b>  | 0.172        |
| MaxOcc             | 0.714    | 0.000    | 0            | 0.071     | 0.331        | 0.423     | 0.179         | -0.053       |
| MeanArea           | 0.336    | 0.064    | 0.760        | 0         | <b>0.817</b> | 0.393     | <b>0.654</b>  | <b>0.601</b> |
| MaxArea            | 0.154    | 0.016    | 0.143        | 0.000     | 0            | 0.364     | <b>0.622</b>  | <b>0.507</b> |
| Body Size          | 0.206    | 0.064    | 0.056        | 0.078     | 0.104        | 0         | 0.180         | 0.199        |
| Occ1               | 0.030    | 0.032    | 0.437        | 0.001     | 0.003        | 0.434     | 0             | 0.335        |
| Area1              | 0.768    | 0.455    | 0.820        | 0.004     | 0.019        | 0.388     | 0.138         | 0            |