Supplementary Material

# Supplementary Tables

Table S1.Correlation matrix, standardized principal components loadings, and communality (h2) of continuous species traits. Eigenvalues and cumulative variance explained by components is given.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **correlation matrix** | | | | | **loadings** | | **h2** |
|  | body mass | care time | family time | adult survival | PC1 | PC2 |  |
| body mass |  |  |  |  | **0.86** | 0.47 | 0.97 |
| care time | 0.59 |  |  |  | **0.78** | -0.01 | 0.61 |
| family time | 0.83 | 0.49 |  |  | **0.92** | 0.03 | 0.84 |
| adult survival | 0.64 | 0.00 | 0.24 |  | 0.20 | **0.88** | 0.81 |
| reproductive allocation | -0.28 | -0.16 | 0.10 | -0.51 | 0.02 | **-0.85** | 0.73 |
| eigenvalue |  |  |  |  | 2.59 | 1.38 |  |
| cumulative variance explained (%) |  |  |  |  | 0.45 | 0.79 |  |

Table S2. Mixed model results of effect of total visitation rate on nestling mass gain.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | 95% CI | |  |
| Effects | Estimate (β) | lower | upper | pMCMC |
| fixed effects |  |  |  |  |
| **intercept** | **1.684** | **0.662** | **2.405** | **0.006** |
| **total visitation rate** | **0.241** | **0.125** | **0.364** | **<0.001** |
| random effects |  |  |  |  |
| species | 0.374 | <0.001 | 1.747 |  |
| nest | 3.527 | 2.064 | 5.143 |  |

Table S3 Data included in this study, summarized per nest. Species codes: BEE-European bee-eater, BLT-blue tit, BWE-black wheatear, GRT-great tit, WCS-woodchat shrike. Session: pre=pre-treatment, post=post-treatment. Treatment: H-handicap, C-control. Growth measurements are the change in each measurement averaged across nestlings.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | Visitation | | | Nestling Growth | | |
| species | TerritoryID | sex | treatment | session | clutch size | Total | Focal | Partner | Tarsus | Wing | Mass |
| BEE | BEE01 | F | H | pre | 5 | 6.84 |  |  | 0.20 | 9.20 | -0.90 |
| BEE | BEE01 | F | H | post | 5 | 8.28 |  |  | -0.28 | 10.00 | -0.60 |
| BEE | BEE02 | F | C | pre | 2 |  |  |  | -0.10 | 10.00 | 0.90 |
| BEE | BEE02 | F | C | post | 2 |  |  |  | -0.02 | 10.00 | 2.30 |
| BEE | BEE03 | M | C | pre | 4 | 9.15 | 5.95 | 3.20 | -0.25 | 9.50 | 1.50 |
| BEE | BEE03 | M | C | post | 4 | 6.75 | 4.19 | 2.57 | -0.13 | 7.50 | 2.98 |
| BEE | BEE04 | M | H | pre | 5 | 12.72 | 8.01 | 4.71 | 0.36 | 10.30 | 8.34 |
| BEE | BEE04 | M | H | post | 5 | 8.88 | 2.84 | 6.04 | -0.10 | 29.50 | 4.56 |
| BEE | BEE05 | F | H | pre | 5 | 6.24 | 5.37 | 0.87 | 0.00 | 6.80 | 2.76 |
| BEE | BEE05 | F | H | post | 5 | 4.92 | 2.46 | 2.46 | 0.15 | 5.80 | -5.06 |
| BEE | BEE06 | M | H | pre | 4 | 20.70 |  |  | 0.58 | 8.75 | -0.63 |
| BEE | BEE06 | M | H | post | 4 | 14.40 |  |  | 0.00 | 8.75 | -6.75 |
| BEE | BEE07 | M | H | pre | 4 | 15.30 |  |  | 3.63 | 12.63 | 5.08 |
| BEE | BEE07 | M | H | post | 4 | 3.15 |  |  | 1.68 | 9.63 | 1.28 |
| BEE | BEE08 | F | C | pre | 6 |  |  |  | 0.25 | 7.17 | 2.50 |
| BEE | BEE08 | F | C | post | 5 |  |  |  | -0.20 | 12.80 | 5.80 |
| BEE | BEE09 | M | C | pre | 4 |  |  |  | 0.28 | 8.63 | 1.90 |
| BEE | BEE09 | M | C | post | 4 |  |  |  | 0.10 | 7.88 | 1.95 |
| BEE | BEE10 | M | H | pre | 6 | 9.70 | 5.34 | 4.37 | 0.13 | 9.83 | 1.75 |
| BEE | BEE10 | M | H | post | 6 | 9.00 | 4.86 | 4.14 | 0.13 | 8.17 | 1.83 |
| BEE | BEE11 | M | H | pre | 5 | 10.44 | 5.01 | 5.43 | 0.42 | 11.20 | 10.58 |
| BEE | BEE11 | M | H | post | 5 | 7.20 | 3.02 | 4.18 | 0.28 | 10.90 | 5.22 |
| BEE | BEE12 | M | C | pre | 6 | 8.00 |  |  | 0.50 | 8.83 | 9.50 |
| BEE | BEE12 | M | C | post | 6 | 11.20 |  |  | -0.70 | 7.83 | 3.00 |
| BEE | BEE13 | F | C | pre | 4 | 14.85 |  |  | 0.57 | 7.33 | 4.83 |
| BEE | BEE13 | F | C | post | 4 | 14.70 |  |  | 0.05 | 8.50 | 4.00 |
| BEE | BEE14 | M | H | pre | 5 | 10.56 |  |  | 0.14 | 16.10 | 5.20 |
| BEE | BEE14 | M | H | post | 5 | 4.80 |  |  | 0.16 | 14.80 | 4.52 |
| BEE | BEE15 | M | C | pre | 5 | 13.80 | 7.73 | 6.07 | 0.00 | 15.38 | 3.68 |
| BEE | BEE15 | M | C | post | 5 | 13.56 | 8.00 | 5.56 | 0.50 | 13.64 | 2.04 |
| BLT | BLTF06 | M | C | pre | 8 | 2.40 | 1.42 | 0.98 | 2.63 | 6.94 | 1.90 |
| BLT | BLTF06 | M | C | post | 8 | 3.15 | 1.67 | 1.48 | 1.99 | 7.94 | 1.74 |
| BLT | BLTF07 | F | C | pre | 6 | 3.50 | 1.61 | 1.89 | 2.40 | 6.58 | 1.70 |
| BLT | BLTF07 | F | C | post | 6 | 3.40 | 1.29 | 2.11 | 2.60 | 8.58 | 1.55 |
| BLT | BLTF09 | M | H | pre | 7 | 2.06 | 1.17 | 0.88 | 2.64 | 4.73 | 1.66 |
| BLT | BLTF09 | M | H | post | 7 | 2.91 | 1.28 | 1.63 | 2.84 | 7.36 | 2.43 |
| BLT | BLTF11 | M | C | pre | 9 | 1.47 | 0.56 | 0.91 | 2.63 | 3.00 | 1.40 |
| BLT | BLTF11 | M | C | post | 8 | 3.15 | 1.80 | 1.35 | 2.71 | 8.74 | 1.93 |
| BLT | BLTG11.5 | M | H | pre | 7 | 2.74 |  |  | 2.04 | 3.90 | 0.67 |
| BLT | BLTG11.5 | M | H | post | 6 | 2.30 |  |  | 1.23 | 4.80 | 0.80 |
| BLT | BLTH09.5 | M | H | pre | 8 | 1.65 | 1.32 | 0.33 | 1.99 | 2.63 | 1.15 |
| BLT | BLTH09.5 | M | H | post | 7 | 3.34 | 2.31 | 1.04 | 3.21 | 6.79 | 2.03 |
| BLT | BLTH10 | F | C | pre | 4 | 2.55 |  |  | 2.95 | 5.48 | 1.83 |
| BLT | BLTH10 | F | C | post | 4 | 3.30 |  |  | 1.73 | 5.20 | 1.43 |
| BLT | BLTN09 | F | C | pre | 7 | 1.54 | 0.83 | 0.71 | 2.84 | 5.71 | 1.46 |
| BLT | BLTN09 | F | C | post | 6 | 2.50 | 1.08 | 1.43 | 1.57 | 3.25 | 1.37 |
| BLT | BLTN11 | F | H | pre | 8 |  |  |  | 3.08 | 7.95 | 2.47 |
| BLT | BLTN11 | F | H | pre | 7 | 1.97 |  |  | 1.50 | 2.00 | 1.47 |
| BLT | BLTN11 | F | H | post | 7 |  |  |  | 2.73 | 9.21 | 2.47 |
| BLT | BLTN11 | F | H | post | 6 | 3.30 |  |  | 2.05 | 5.76 | 1.30 |
| BLT | BLTR10.5 | F | H | pre | 7 | 2.31 | 1.06 | 1.25 | 3.11 | 3.21 | 1.89 |
| BLT | BLTR10.5 | F | H | post | 7 | 3.00 | 0.90 | 2.10 | 3.26 | 9.19 | 1.99 |
| BLT | BLTU10 | F | C | pre | 8 | 1.65 | 0.87 | 0.78 | 2.52 | 9.39 | 2.13 |
| BLT | BLTU10 | M | C | pre | 10 | 2.70 | 1.84 | 0.86 | 2.85 | 5.60 | 1.41 |
| BLT | BLTU10 | F | C | post | 8 | 3.23 | 1.32 | 1.90 | 1.91 | 8.68 | 1.66 |
| BLT | BLTU10 | M | C | post | 9 | 3.20 | 2.30 | 0.90 | 3.50 | 7.33 | 2.23 |
| BWE | BWE01 | M | H | pre | 4 | 1.35 | 0.74 | 0.61 | 0.96 | 7.13 | 1.60 |
| BWE | BWE01 | M | H | post | 4 | 2.85 | 1.68 | 1.17 | 0.25 | 7.13 | -0.60 |
| BWE | BWE02 | M | C | pre | 4 |  |  |  | 2.60 | 10.13 | 1.70 |
| BWE | BWE02 | M | C | post | 4 |  |  |  | 1.13 | 10.13 | 3.35 |
| BWE | BWE03 | F | C | pre | 2 | 4.20 |  |  | 4.00 | 10.50 | 1.60 |
| BWE | BWE03 | F | C | post | 2 | 3.60 |  |  | 1.50 | 12.00 | 6.75 |
| BWE | BWE04 | F | C | pre | 3 | 4.40 | 2.29 | 2.11 | 3.65 | 10.67 | 5.22 |
| BWE | BWE04 | F | C | post | 3 | 3.60 | 2.48 | 1.12 | 3.65 | 10.67 | 5.22 |
| BWE | BWE05 | F | H | pre | 4 | 2.70 | 1.49 | 1.22 | 3.18 | 12.00 | 2.93 |
| BWE | BWE05 | F | H | post | 4 | 3.30 | 1.95 | 1.35 | 2.88 | 10.00 | 3.05 |
| BWE | BWE06 | M | C | pre | 4 |  |  |  | 4.03 | 12.50 | 5.10 |
| BWE | BWE06 | M | C | post | 4 |  |  |  | 2.15 | 10.00 | 2.80 |
| BWE | BWE07 | M | H | pre | 4 |  |  |  | 1.70 | 9.38 | 0.75 |
| BWE | BWE07 | M | H | post | 4 |  |  |  | 0.60 | 8.63 | 1.73 |
| BWE | BWE08 | M | H | pre | 2 |  |  |  | 3.55 | 11.00 | 4.85 |
| BWE | BWE08 | M | H | post | 2 |  |  |  | 3.45 | 1.00 | 3.40 |
| BWE | BWE09 | M | C | pre | 4 | 3.30 | 1.78 | 1.52 | 3.73 | 11.50 | 4.28 |
| BWE | BWE09 | M | C | post | 4 | 1.80 | 1.12 | 0.68 | 1.55 | 15.50 | 3.65 |
| BWE | BWE10 | F | H | pre | 5 |  |  |  | 1.58 | 6.60 | 2.62 |
| BWE | BWE10 | F | H | post | 5 |  |  |  | 1.20 | 11.50 | 0.58 |
| BWE | BWE11 | F | H | pre | 2 | 2.28 | 1.03 | 1.25 | 4.20 | 15.00 | 6.15 |
| BWE | BWE11 | F | H | post | 2 | 1.32 | 0.61 | 0.71 | -1.10 | 11.50 | 4.05 |
| BWE | BWE12 | F | C | pre | 5 | 2.64 | 1.43 | 1.21 | 1.46 | 8.30 | 0.24 |
| BWE | BWE12 | F | C | post | 5 | 3.00 | 1.38 | 1.62 | 0.58 | 6.92 | 4.18 |
| BWE | BWE13 | M | C | pre | 3 |  |  |  | 1.53 | 13.67 | 0.60 |
| BWE | BWE13 | M | C | post | 3 |  |  |  | 0.60 | 6.00 | -0.43 |
| BWE | BWE14 | F | H | pre | 3 | 2.20 |  |  | 2.23 | 11.17 | 3.73 |
| BWE | BWE14 | F | H | post | 3 | 2.00 |  |  | 1.40 | 11.50 | 0.77 |
| BWE | BWE15 | M | H | pre | 4 | 1.95 | 1.05 | 0.90 | 2.65 | 13.50 | 1.90 |
| BWE | BWE15 | M | H | post | 4 | 2.40 | 1.49 | 0.91 | 0.58 | 9.00 | 2.73 |
| GRT | GRTF03 | M | C | pre | 8 | 1.20 |  |  | 3.86 | 9.58 | -1.85 |
| GRT | GRTF03 | M | C | post | 8 | 1.58 |  |  | 3.81 | 11.88 | 3.76 |
| GRT | GRTF04 | F | H | pre | 9 | 2.00 |  |  | 3.87 | 8.83 | 1.96 |
| GRT | GRTF04 | F | H | post | 9 | 2.20 |  |  | 2.06 | 9.94 | 3.09 |
| GRT | GRTG07 | M | C | pre | 5 | 2.52 |  |  | 2.50 | 9.90 | 3.24 |
| GRT | GRTG07 | M | C | post | 5 | 2.88 |  |  | 1.68 | 8.80 | 2.52 |
| GRT | GRTG11 | M | C | pre | 6 | 2.30 | 1.31 | 0.99 | 2.60 | 6.83 | 1.15 |
| GRT | GRTG11 | M | C | post | 5 | 4.20 | 2.35 | 1.85 | 1.54 | 7.20 | 0.74 |
| GRT | GRTI14 | F | H | pre | 4 | 3.15 | 1.17 | 1.98 | 2.93 | 7.00 | 3.08 |
| GRT | GRTI14 | F | H | post | 4 | 2.70 | 0.73 | 1.97 | 3.48 | 9.25 | 2.83 |
| GRT | GRTK13 | M | H | pre | 8 | 1.65 |  |  | 3.33 | 3.36 | 2.89 |
| GRT | GRTK13 | M | H | post | 8 | 2.10 | 0.86 | 1.82 | 4.06 | 10.29 | 3.96 |
| GRT | GRTM11 | F | H | pre | 7 | 2.14 |  |  | 3.40 | 6.71 | 2.51 |
| GRT | GRTM11 | F | H | post | 7 | 3.34 |  |  | 2.61 | 8.00 | 4.10 |
| GRT | GRTN09 | M | C | pre | 7 | 3.51 | 0.95 | 2.57 | 3.88 | 7.77 | 3.27 |
| GRT | GRTN09 | M | C | post | 7 | 3.94 | 1.58 | 2.37 | 2.51 | 9.21 | 3.00 |
| GRT | GRTR09 | M | H | pre | 8 | 1.88 |  |  | 3.26 | 6.69 | 1.70 |
| GRT | GRTR09 | M | H | post | 6 | 2.20 |  |  | 1.42 | 7.75 | 2.47 |
| GRT | GRTS10 | M | H | pre | 7 |  |  |  | 4.06 | 6.64 | 3.59 |
| GRT | GRTS10 | M | H | pre | 9 | 1.67 |  |  | 3.47 | 4.36 | 2.59 |
| GRT | GRTS10 | M | H | post | 7 |  |  |  | 2.67 | 8.14 | 2.81 |
| GRT | GRTS10 | M | H | post | 8 | 1.20 |  |  | 3.04 | 7.57 | 2.47 |
| GRT | GRTT10.5 | F | C | pre | 9 | 1.80 |  |  | 3.45 | 3.49 | 1.98 |
| GRT | GRTT10.5 | F | C | post | 8 | 1.95 |  |  | 3.85 | 10.14 | 4.44 |
| GRT | GRTT101A | M | C | pre | 8 | 1.35 |  |  | 4.33 | 8.22 | 3.56 |
| GRT | GRTT101A | M | C | post | 8 | 1.65 |  |  | 3.96 | 11.04 | 4.26 |
| GRT | GRTW10 | F | C | pre | 8 | 1.88 |  |  | 3.28 | 4.94 | 2.33 |
| GRT | GRTW10 | F | C | post | 8 | 2.03 |  |  | 2.95 | 8.13 | 3.48 |
| WCS | WCS16 | M | C | pre | 5 | 4.44 | 3.24 | 1.20 | 3.80 | 8.50 | 4.90 |
| WCS | WCS16 | M | C | post | 5 | 6.00 | 3.18 | 2.82 | 3.56 | 11.70 | 6.18 |
| WCS | WCS201B | F | H | pre | 3 | 5.20 | 1.72 | 3.48 | 1.93 | 6.00 | 1.03 |
| WCS | WCS201B | F | H | post | 3 | 5.40 | 1.84 | 3.56 | 2.87 | 10.17 | 4.30 |
| WCS | WCS29 | M | C | pre | 4 | 3.60 | 2.27 | 1.33 | 3.98 | 11.50 | 3.40 |
| WCS | WCS29 | M | C | post | 4 | 6.15 | 3.01 | 3.14 | 2.43 | 9.88 | 4.50 |
| WCS | WCS31 | F | H | pre | 5 | 5.04 | 1.51 | 3.53 | 3.36 | 8.00 | 4.78 |
| WCS | WCS31 | F | H | post | 5 | 3.60 | 0.14 | 3.46 | 2.52 | 8.30 | 1.34 |
| WCS | WCS34 | F | H | pre | 3 | 6.20 | 1.55 | 4.65 | 2.68 | 8.00 | 4.00 |
| WCS | WCS34 | F | H | post | 3 | 7.60 | 1.22 | 6.38 | 3.78 | 11.33 | 5.17 |
| WCS | WCS35 | M | C | pre | 5 | 3.60 | 2.20 | 1.40 | 4.26 | 7.70 | 5.80 |
| WCS | WCS35 | M | C | post | 4 | 4.50 | 2.75 | 1.76 | 4.33 | 11.50 | 7.65 |
| WCS | WCS39 | F | C | pre | 6 | 3.70 | 1.00 | 2.70 | 2.78 | 7.07 | 2.48 |
| WCS | WCS39 | F | C | post | 4 | 4.95 | 2.43 | 2.52 | 1.73 | 5.75 | 0.90 |
| WCS | WCS51 | M | H | pre | 3 | 5.00 | 2.65 | 2.35 | 3.07 | 6.67 | 4.00 |
| WCS | WCS51 | M | H | post | 3 | 4.60 | 1.52 | 3.08 | 3.17 | 9.33 | 2.97 |
| WCS | WCS52 | F | H | pre | 4 |  |  |  | 2.78 | 8.36 | 2.33 |
| WCS | WCS52 | F | H | post | 3 |  |  |  | 1.03 | 8.50 | 1.17 |
| WCS | WCS54 | F | C | pre | 6 | 6.40 | 2.18 | 4.22 | 2.65 | 7.83 | 2.57 |
| WCS | WCS54 | F | C | post | 5 | 3.72 | 0.15 | 3.57 | 1.90 | 10.20 | 0.73 |
| WCS | WCS59 | F | C | pre | 6 | 3.00 |  |  | 1.88 | 5.58 | 1.63 |
| WCS | WCS59 | F | C | post | 6 | 6.10 |  |  | 3.40 | 10.58 | 6.08 |
| WCS | WCS60 | M | H | pre | 4 | 3.00 |  |  | 1.70 | 10.19 | 2.95 |
| WCS | WCS60 | M | H | post | 2 | 3.30 |  |  | 2.60 | 6.25 | 6.65 |
| WCS | WCS61 | M | C | pre | 3 | 10.60 |  |  | 2.07 | 6.17 | 3.40 |
| WCS | WCS61 | M | C | post | 3 | 13.00 |  |  | 2.73 | 6.50 | 3.87 |
| WCS | WCS71 | M | C | pre | 3 | 5.40 |  |  | 11.00 | 0.20 | 6.93 |
| WCS | WCS71 | M | C | post | 3 | 4.40 |  |  | -3.37 | 17.97 | 3.47 |
| WCS | WCS80 | F | H | pre | 4 | 3.15 |  |  | 3.45 | 5.88 | 3.63 |
| WCS | WCS80 | F | H | post | 4 | 2.40 |  |  | 3.15 | 7.63 | 3.45 |

**Supplementary Figure**

**Figure S1** Sex-specific visitation rates in nests where the (A) female was handicapped and (B) male was handicapped. Shaded bars signify handicapped individuals.

