**Supplementary Tables**

**Table 1**

**Ethogram of behaviors recorded during focal follows of splendid and variegated fairy-wrens**

|  |  |
| --- | --- |
| Behavior | Description |
| Foraging | Capturing and consuming insects or capturing and giving insects to other social group members. |
| Traveling | Flying short or long distances between vegetation that results in a change in location. |
| Singing | Producing Type I or Type I + II songs while not engaging in any of the behaviors foraging, traveling, or mobbing. Singing may occur during bouts of vigilance behavior. See Greig and Pruett-Jones (2008) for detailed descriptions of song types. |
| Contact calling | Producing contact calls while not engaging in any of the behaviors foraging, traveling, or mobbing. Contact calling may occur during bouts of vigilance behavior. |
| Mobbing | Approaching a potential threat (predator or intruder) while scolding, alarm calling (“seet” call), or clacking bill. |
| Vigilance | Perching high on a bush or exposed tree branch, head moving from side to side while not engaging in any of the behaviors foraging, traveling or mobbing. Contact calling or singing may occur during bouts of vigilance behavior. |

**Table 2**

**Ethogram of response variables recorded during heterospecific and conspecific playback experiments**

|  |  |
| --- | --- |
| Response | Description |
| Latency to first response | Length of time before the focal bird responded to the playback stimulus. First response could be any of the recorded behaviors (vigilance, song, scold, or approach). |
| Duration of vigilance | Amount of time the focal bird was vigilant. Vigilance consisted of perching high on a bush or exposed tree branch, head moving from side to side or looking toward the speaker. |
| Song | Number of Type I or Type I + II songs produced. See Greig and Pruett-Jones (2008) for detailed descriptions of song types. Type II songs were not included as an aggressive response as these songs are display songs aimed primarily at females and produced in duet form with predator calls (Greig and Pruett-Jones 2008). |
| Scold | Number of short calls produced in response to threat (predator or intruder), see Greig and Pruett-Jones (2008) for further description. |
| Approach | Number of times the focal bird moves towards the speaker location (flying or ground hopping), looking toward the speaker. Movement towards the speaker that was part of foraging behavior was not considered an approach. |
| Look\* | Number of times the focal bird turned head toward the speaker. |
| Mate-guarding\* | Number of mate guarding behaviors performed, which included display behaviors directed at the female, as well as chasing, or finding the female. |
| Bill-wipe\* | Number of times the focal bird moves bill back and forth across perch. |
| Responses with \* were only recorded for conspecific experiments. | |

**Table 3**

**Model parameters for general linear mixed models examining vigilance behavior for splendid and variegated fairy-wrens when associating with their heterospecific co-resident and when alone.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | | Parameter | Estimate ± SE (Variance ± SD) | *t* value | *P* |
| Vigilance | | | | | |
|  | Final model | Intercept | 21.59 ± 3.06 | 7.06 | ≤ 0.01\* |
|  |  | Species | -7.92 ± 4.23 | -1.87 | 0.07 |
|  |  | Species\*association status | -10.77 ± 4.53 | -2.38 | 0.03\* |
|  |  | Association status | 3.31 ± 3.27 | 1.01 | 0.32 |
|  | Random terms | Conspecific group ID | (43.90 ± 6.63) |  |  |
|  | Rejected terms | Conspecific group size | -0.05 ± 1.89 | -0.03 | 0.98 |
| \* indicates significance at P ≤ 0.05 | | | | | |

**Table 4**

**Model parameters for binomial, generalized linear mixed models examining reproductive success of splendid and variegated fairy-wrens and for proportion of extra-group young in variegated fairy-wren nests.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | | Parameter | Estimate ± SE or (Variance ± SD) | *z* value | *P* |
| Splendid fairy-wren any nest fledged | | | | | |
|  | Fixed effects | Intercept | -1.12 ± 0.31 | -3.65 | ≤ 0.01\* |
|  |  | Territory status | 0.61 ± 0.38 | 1.61 | 0.11 |
|  | Random effects | Social mother ID | (0.00 ± 0.00) |  |  |
|  |  | Social father ID | (0.00 ± 0.00) |  |  |
|  |  | Year |  |  |  |
| Splendid fairy-wren first nest fledged | | | | | |
|  | Fixed effects | Intercept | -1.89 ± 0.50 | -3.77 | ≤ 0.01\* |
|  |  | Territory status | 0.83 ± 0.47 | 1.76 | 0.08 |
|  | Random effects | Social mother ID | (0.46 ± 0.68) |  |  |
|  |  | Social father ID | (2.32 x 10-8 ± 1.52 x 10-4) |  |  |
|  |  | Year | (1.43 x 10-8 ± 1.19 x 10-4) |  |  |
| Splendid fairy-wren renest | | | | | |
|  | Fixed effects | Intercept | -0.04 ± 0.29 | -0.14 | 0.89 |
|  |  | Territory status | 0.18 ± 0.37 | 0.49 | 0.63 |
|  | Random effects | Social mother ID | (3.88 x 10-12 ± 1.97 x 10-6) |  |  |
|  |  | Social father ID | (0.00 ± 0.00) |  |  |
|  |  | Year | (0.00 ± 0.00) |  |  |
| Variegated fairy-wren any nest fledged | | | | | |
|  | Fixed effects | Intercept | -0.76 ± 0.47 | -1.61 | 0.11 |
|  |  | Territory status | 0.17 ± 0.48 | 0.35 | 0.73 |
|  | Random effects | Social mother ID | (1.71 x 10-10 ± 1.31 x 10-5) |  |  |
|  |  | Social father ID | (1.32 ± 1.15) |  |  |
|  |  | Year | (0.13 ± 0.36) |  |  |
| Variegated fairy-wren first nest fledged | | | | | |
|  | Fixed effects | Intercept | -21.86 ± 3.82 | -5.73 | ≤ 0.01\* |
|  |  | Territory status | 11.61 ± 2.87 | 4.04 | ≤ 0.01\* |
|  | Random effects | Social mother ID | (127.1 ± 11.27) |  |  |
|  |  | Social father ID | (922.3 ± 30.37) |  |  |
|  |  | Year | (0.00 ± 0.00) |  |  |
| Variegated fairy-wren renest | | | | | |
|  | Fixed effects | Intercept | -1.14 ± 0.45 | -2.55 | 0.01\* |
|  |  | Territory status | 1.02 ± 0.50 | 2.04 | 0.04\* |
|  | Random effects | Social mother ID | (6.98 x 10-10 ± 2.64 x 10-5) |  |  |
|  |  | Social father ID | (2.23 x 10-10 ± 1.49 x 10-5) |  |  |
|  |  | Year | (6.28 x 10-2 ± 0.25) |  |  |
| Proportion of extra-group young | | | | | |
|  | Final model | Intercept | 0.12 ± 0.49 | 0.25 | 0.81 |
|  |  | Territory status | -1.29 ± 0.61 | -2.11 | 0.04\* |
|  |  | # Conspecific male auxiliaries | -0.53 ± 0.28 | -1.93 | 0.05 |
|  | Random terms | Social mother ID | (3.99 ± 2.00) |  |  |
|  |  | Social father ID | (0.66 ± 0.81) |  |  |
|  |  | Year | (0.00 ± 0.00) |  |  |
| \* indicates significance at *P* ≤ 0.05 | | | | | |

**Table 5**

**Sample sizes for nesting categories of splendid and variegated fairy-wrens on shared and solitary territories**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Solitary  territory | Shared territory |
| Splendid fairy-wren | Fledged first nest | 10 | 26 |
| Did not fledge first nest | 26 | 72 |
| Fledged (any nest) | 15 | 42 |
| Did not fledge (any nest) | 42 | 58 |
| Re-nested | 24 | 38 |
| Did not re-nest | 24 | 34 |
| Variegated fairy-wren | Fledged first nest | 7 | 29 |
| Did not fledge first nest | 38 | 66 |
| Fledged (any nest) | 20 | 34 |
| Did not fledge (any nest) | 32 | 61 |
| Re-nested | 9 | 30 |
| Did not re-nest | 26 | 35 |

**Table 6**

**Descriptive statistics of splendid and variegated fairy-wren responses to heterospecific playback stimuli**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Species | Behavior |  | Control | Co-resident | Neighbor | Foreign |
| Splendid fairy-wren | Latency to response (sec) | Mean  Median  Std. Error | 720.07  1080.00  128.84 | 513.36  295.50  124.38 | 175.07  29.00  83.30 | 84.53  27.00  32.06 |
|  | Approach | Mean  Median  Std. Error | 0.07  0  0.07 | 0  0  0.00 | 1.71  2.00  0.29 | 1.47  1.00  0.42 |
|  | Songs | Mean  Median  Std. Error | 0.73  0  0.56 | 1.64  0.50  0.98 | 5.07  4.00  1.13 | 5.00  3.00  1.41 |
|  | Duration of vigilance (sec) | Mean  Median  Std. Error | 0  0  0 | 6.29  0  4.01 | 7.92  10.00  13.84 | 7.47  0  5.58 |
|  | Scold | Mean  Median  Std. Error | 0.20  0  0.14 | 0.14  0  0.14 | 12.21  4.00  7.13 | 7.33  3.00  2.51 |
| Variegated fairy-wren | Latency to response (sec) | Mean  Median  Std. Error | 564.73  457.00  118.06 | 452.80  380.00  104.27 | 14.07  12.00  2.65 | 22.97  18.00  5.55 |
|  | Approach | Mean  Median  Std. Error | 0  0  0 | 0.33  0  0.16 | 1.47  1.00  0.29 | 1.26  1.00  0.21 |
|  | Songs | Mean  Median  Std. Error | 0.60  0  0.34 | 2.00  1.00  0.82 | 6.87  3.00  1.59 | 5.20  5.00  1.22 |
|  | Duration of vigilance (sec) | Mean  Median  Std. Error | 0  0  0 | 0  0  0 | 38.20  0  12.58 | 16.60  0  9.09 |
|  | Scold | Mean  Median  Std. Error | 1.27  0  1.02 | 0.27  0  0.18 | 14.80  11.00  3.71 | 11.27  7.00  3.87 |
| The response “songs” contains both Type I and Type I+II songs, but excludes Type II songs that are sung in response to predators and function as a signal to females (Greig & Pruett-Jones 2010). | | | | | | |

**Table 7**

**Descriptive statistics of splendid and variegated fairy-wren responses to conspecific playback stimuli**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Species | Behavior |  | Control | Neighbor | Foreign |
| Splendid fairy-wren | Latency to response (sec) | Mean  Median  Std. Error | 460.90  390.72  96.83 | 77.18  30.73  31.80 | 21.36  20.91  5.07 |
|  | Approach | Mean  Median  Std. Error | 0.07  0  0.07 | 3.21  2.00  0.64 | 2.64  2.50  0.60 |
|  | Bill-wipe | Mean  Median  Std. Error | 0  0  0 | 0.21  0  0.11 | 0.14  0  0.10 |
|  | Mate-guarding | Mean  Median  Std. Error | 0.21  0  0.11 | 0.93  0  0.40 | 1.86  1.00  0.66 |
|  | Look | Mean  Median  Std. Error | 0  0  0 | 1.00  0  0.42 | 0.50  0  0.23 |
|  | Songs | Mean  Median  Std. Error | 2.79  0.50  1.11 | 6.36  2.50  1.99 | 10.43  9.50  1.89 |
|  | Duration of vigilance (sec) | Mean  Median  Std. Error | 37.51  22.82  11.75 | 219.12  125.06  48.70 | 225.93  133.96  64.79 |
| Variegated fairy-wren | Latency to response (sec) | Mean  Median  Std. Error | 381.40  223.31  98.67 | 132.74  31.06  55.79 | 58.45  16.41  20.21 |
|  | Approach | Mean  Median  Std. Error | 0  0  0 | 2.54  2.00  0.53 | 3.57  4.00  0.49 |
|  | Bill-wipe | Mean  Median  Std. Error | 0  0  0 | 0.23  0  0.12 | 0.14  0  0.10 |
|  | Mate-guarding | Mean  Median  Std. Error | 0  0  0 | 0.54  0  0.24 | 0.86  0  0.34 |
|  | Look | Mean  Median  Std. Error | 0  0  0 | 0.46  0  0.24 | 0.50  0  0.31 |
|  | Songs | Mean  Median  Std. Error | 2.50  1.00  1.32 | 4.69  5.00  0.84 | 7.64  8.00  1.22 |
|  | Duration of vigilance (sec) | Mean  Median  Std. Error | 1.46  0  1.03 | 79.78  46.35  35.94 | 171.49  187.14  35.61 |

**Supplementary Figures**

**Figure 1** The component score measures of male A) splendid and B) variegated fairy-wrens to conspecific neighbor and stranger songs as derived from the seven conspecific aggressive and mate-guarding variables. Treatment categories are songs of a 1) control, the red-capped robin, 2) neighboring conspecific male and 3) foreign conspecific male. Pairwise comparisons between control-neighbor and control-foreign are significant (*P* < 0.05) for splendid fairy-wrens based on pairwise comparisons from generalized linear mixed models. Pairwise comparisons between control-foreign and neighbor-foreign are significant (*P* < 0.05) for variegated fairy-wrens based on pairwise comparisons from generalized linear mixed models. Error bars indicate 95% confidence intervals.

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