Supplementary Materials

Bright lights, big city: an experimental assessment of short-term behavioral and performance effects of artificial light at night on *Anolis* lizards

Jason J. Kolbe¹, Haley A. Moniz¹,², Oriol Lapiedra¹,³, and Christopher J. Thawley¹,⁴

¹Department of Biological Sciences, University of Rhode Island, Kingston, RI 02881 USA
²Present address: Department of Biology, University of Nevada, Reno, NV 89557 USA
³Present address: Center for Ecological Research and Forestry Applications, Barcelona, Spain
⁴Present address: Department of Biology, Neumann University, Aston, PA 19014 USA

Corresponding author email: jjkolbe@uri.edu

ORCID IDs: JJK-0000-0002-4236-9960, HAM-0000-0003-2838-511X, OL-0000-0003-0383-0061, CJT-0000-0002-6040-2613
Supplementary Fig S2. c) Experimental lighting in ALAN plots produced a mixture of perches that were lit with others being unlit or in shadows, and (d-e) anoles were observed sleeping on nighttime perches in lit areas.
**Supplementary Fig S3.** Absolute irradiance output spectrum for the 150-watt halogen bulb (GE) used to create ALAN treatments taken with cosine corrected probe on JAZ spectrometer (Ocean Optics).
**Supplementary Fig. S4** Box plots showing perch heights (log transformed) during the day and night for brown anoles in sex/size categories (i.e., adult males, adult females, juveniles and hatchlings) for the control and ALAN treatment plots. No difference in perch height was detected for the interaction between experimental treatment and time period.
Supplementary Fig. S5 Box plots showing perch diameters (log transformed) during the day and night for brown anoles in sex/size categories (i.e., adult males, adult females, juveniles and hatchlings) for the control and ALAN treatment plots. No difference in perch diameter was detected due to the interaction between treatment and time period.
**Supplementary Table S1** Results from mixed model analyses testing for differences in the number of arthropods sampled (log transformed) in bowl traps by the experimental treatment (i.e., ALAN vs. control), time period (i.e., three time periods with the first being pre-ALAN exposure) and their interaction during the a) day and b) night. Analyses include total number of arthropods and the numbers of Diptera, Hymenoptera and Crustacea, the three most common orders. P-values for significant effects are in bold.

### a) Day

<table>
<thead>
<tr>
<th>Factor</th>
<th>Estimate</th>
<th>SE</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total arthropods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>4.37</td>
<td>0.24</td>
<td>39</td>
<td>18.31</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>0.13</td>
<td>0.34</td>
<td>18</td>
<td>0.40</td>
<td>0.70</td>
</tr>
<tr>
<td>Time period</td>
<td>-0.19</td>
<td>0.11</td>
<td>39</td>
<td>-1.79</td>
<td>0.08</td>
</tr>
<tr>
<td>Exp. Treat. x Time period</td>
<td>-0.09</td>
<td>0.15</td>
<td>39</td>
<td>-0.57</td>
<td>0.57</td>
</tr>
<tr>
<td>Diptera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>31.24</td>
<td>0.28</td>
<td>39</td>
<td>11.27</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>0.38</td>
<td>0.39</td>
<td>18</td>
<td>0.97</td>
<td>0.35</td>
</tr>
<tr>
<td>Time period</td>
<td>-0.10</td>
<td>0.12</td>
<td>39</td>
<td>-0.87</td>
<td>0.39</td>
</tr>
<tr>
<td>Exp. Treat. x Time period</td>
<td>-0.13</td>
<td>0.17</td>
<td>39</td>
<td>-0.74</td>
<td>0.47</td>
</tr>
<tr>
<td>Hymenoptera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>30.28</td>
<td>0.33</td>
<td>39</td>
<td>9.30</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.35</td>
<td>0.46</td>
<td>18</td>
<td>-0.76</td>
<td>0.46</td>
</tr>
<tr>
<td>Time period</td>
<td>-0.11</td>
<td>0.13</td>
<td>39</td>
<td>-0.85</td>
<td>0.40</td>
</tr>
<tr>
<td>Exp. Treat. x Time period</td>
<td>0.09</td>
<td>0.18</td>
<td>39</td>
<td>0.51</td>
<td>0.61</td>
</tr>
<tr>
<td>Crustacea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>3.50</td>
<td>0.54</td>
<td>39</td>
<td>6.52</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.08</td>
<td>0.76</td>
<td>18</td>
<td>-0.10</td>
<td>0.20</td>
</tr>
<tr>
<td>Time period</td>
<td>-0.72</td>
<td>0.24</td>
<td>39</td>
<td>-3.01</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Exp. Treat. x Time period</td>
<td>0.11</td>
<td>0.34</td>
<td>39</td>
<td>0.33</td>
<td>0.74</td>
</tr>
</tbody>
</table>

### b) Night

<table>
<thead>
<tr>
<th>Factor</th>
<th>Estimate</th>
<th>SE</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total arthropods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>4.69</td>
<td>0.27</td>
<td>36</td>
<td>17.15</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.01</td>
<td>0.40</td>
<td>36</td>
<td>-0.02</td>
<td>0.98</td>
</tr>
<tr>
<td>Time period</td>
<td>-0.51</td>
<td>0.12</td>
<td>36</td>
<td>-4.27</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Exp. Treat. x Time period</td>
<td>0.06</td>
<td>0.17</td>
<td>36</td>
<td>0.32</td>
<td>0.75</td>
</tr>
<tr>
<td>Diptera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>29.77</td>
<td>0.40</td>
<td>36</td>
<td>7.43</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.56</td>
<td>0.59</td>
<td>36</td>
<td>-0.94</td>
<td>0.35</td>
</tr>
<tr>
<td>Time period</td>
<td>-0.45</td>
<td>0.18</td>
<td>36</td>
<td>-2.46</td>
<td>0.02</td>
</tr>
<tr>
<td>Exp. Treat. x Time period</td>
<td>0.35</td>
<td>0.27</td>
<td>36</td>
<td>1.31</td>
<td>0.20</td>
</tr>
<tr>
<td>Hymenoptera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>3.28</td>
<td>0.44</td>
<td>36</td>
<td>7.42</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>0.16</td>
<td>0.65</td>
<td>36</td>
<td>0.25</td>
<td>0.81</td>
</tr>
<tr>
<td>Time period</td>
<td>-0.43</td>
<td>0.18</td>
<td>36</td>
<td>-2.43</td>
<td>0.02</td>
</tr>
<tr>
<td>Exp. Treat. x Time period</td>
<td>-0.03</td>
<td>0.26</td>
<td>36</td>
<td>-0.11</td>
<td>0.91</td>
</tr>
<tr>
<td>Crustacea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>3.64</td>
<td>0.40</td>
<td>36</td>
<td>9.20</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.30</td>
<td>0.58</td>
<td>36</td>
<td>-0.52</td>
<td>0.61</td>
</tr>
<tr>
<td>Time period</td>
<td>Exp. Treat. x Time period</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-0.73</td>
<td>0.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.17</td>
<td>0.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-4.31</td>
<td>0.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 0.0001</td>
<td>0.49</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Supplementary Table S2 Results from mixed model analyses testing for differences in the number of arthropods sampled in sticky traps by the experimental treatment (i.e., ALAN vs. control), time period (i.e., three time periods with the first being pre-ALAN exposure) and their interaction during the a) day and b) night.

### a) Day

<table>
<thead>
<tr>
<th>Factor</th>
<th>Estimate</th>
<th>SE</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>10.92</td>
<td>0.33</td>
<td>3.29</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.31</td>
<td>0.49</td>
<td>-0.63</td>
<td>0.53</td>
</tr>
<tr>
<td>Time period</td>
<td>-0.29</td>
<td>0.17</td>
<td>-1.69</td>
<td>0.09</td>
</tr>
<tr>
<td>Experimental treatment x Time period</td>
<td>0.21</td>
<td>0.24</td>
<td>0.86</td>
<td>0.39</td>
</tr>
</tbody>
</table>

### b) Night

<table>
<thead>
<tr>
<th>Factor</th>
<th>Estimate</th>
<th>SE</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>0.40</td>
<td>0.34</td>
<td>1.18</td>
<td>0.24</td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.86</td>
<td>0.63</td>
<td>-1.37</td>
<td>0.17</td>
</tr>
<tr>
<td>Time period</td>
<td>0.22</td>
<td>0.15</td>
<td>1.46</td>
<td>0.15</td>
</tr>
<tr>
<td>Experimental treatment x Time period</td>
<td>0.03</td>
<td>0.27</td>
<td>0.12</td>
<td>0.91</td>
</tr>
</tbody>
</table>
**Supplementary Table S3.** Percentage of brown anoles observed on different substrate types. Artificial substrates include garden hoses, metal posts, PVC pipes, plastic signs and sprinklers. Data are divided by sex/size class, day/night and pre- and post-initiation of the artificial light treatment.

<table>
<thead>
<tr>
<th>Substrate type</th>
<th>Control/treatment</th>
<th>sex/size Class</th>
<th>Day/Night</th>
<th>Branch</th>
<th>Cycad or palm leaf/stem/fond</th>
<th>Cycad trunk</th>
<th>Grass</th>
<th>Ground</th>
<th>Leaf</th>
<th>Rock</th>
<th>Tree trunk</th>
<th>Artificial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DAN Control</td>
<td>Female</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>0%</td>
<td>50%</td>
<td>0%</td>
<td>15%</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td>0%</td>
<td>97%</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Post-ALAN</td>
<td>1%</td>
<td>95%</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Post-ALAN</td>
<td>1%</td>
<td>95%</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>juvenile/Hatchling</td>
<td></td>
<td>Pre-ALAN</td>
<td>4%</td>
<td>16%</td>
<td>3%</td>
<td>5%</td>
<td>25%</td>
<td>1%</td>
<td>4%</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>juvenile/Hatchling</td>
<td></td>
<td>Post-ALAN</td>
<td>0%</td>
<td>92%</td>
<td>0%</td>
<td>3%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>9%</td>
<td>49%</td>
<td>0%</td>
<td>7%</td>
<td>1%</td>
<td>0%</td>
<td>13%</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Day</td>
<td>Post-ALAN</td>
<td>9%</td>
<td>49%</td>
<td>0%</td>
<td>7%</td>
<td>1%</td>
<td>0%</td>
<td>13%</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td>0%</td>
<td>96%</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Night</td>
<td>Post-ALAN</td>
<td>0%</td>
<td>95%</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>ALAN Treatment</td>
<td>Female</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>15%</td>
<td>44%</td>
<td>3%</td>
<td>35%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>Day</td>
<td>Post-ALAN</td>
<td>11%</td>
<td>38%</td>
<td>2%</td>
<td>15%</td>
<td>1%</td>
<td>1%</td>
<td>14%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td>1%</td>
<td>85%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>13%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Post-ALAN</td>
<td>3%</td>
<td>84%</td>
<td>0%</td>
<td>0%</td>
<td>15%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>juvenile/Hatchling</td>
<td></td>
<td>Day</td>
<td>60%</td>
<td>44%</td>
<td>3%</td>
<td>35%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>juvenile/Hatchling</td>
<td></td>
<td>Day</td>
<td>7%</td>
<td>48%</td>
<td>0%</td>
<td>1%</td>
<td>27%</td>
<td>1%</td>
<td>1%</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>juvenile/Hatchling</td>
<td></td>
<td>Day</td>
<td>2%</td>
<td>74%</td>
<td>0%</td>
<td>1%</td>
<td>21%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>juvenile/Hatchling</td>
<td></td>
<td>Night</td>
<td>2%</td>
<td>74%</td>
<td>0%</td>
<td>1%</td>
<td>21%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Day</td>
<td>Post-ALAN</td>
<td>7%</td>
<td>36%</td>
<td>1%</td>
<td>15%</td>
<td>1%</td>
<td>0%</td>
<td>28%</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Night</td>
<td>Post-ALAN</td>
<td>2%</td>
<td>88%</td>
<td>0%</td>
<td>0%</td>
<td>9%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Night</td>
<td>Post-ALAN</td>
<td>3%</td>
<td>82%</td>
<td>0%</td>
<td>0%</td>
<td>14%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Supplementary Table S4. Sample sizes, means and standard deviations (SD) for brown anole perch height, perch diameter, perch inclination and lizard orientation from control and ALAN treatment plots. Data are divided by sex/size class, day/night and pre- and post-initiation of the artificial light treatment.

<table>
<thead>
<tr>
<th>Control/Treatment</th>
<th>Sex/Size Class</th>
<th>Day/Night</th>
<th>Perch Height (cm)</th>
<th>Perch Diameter (cm)</th>
<th>Perch Inclination (°)</th>
<th>Lizard Orientation (°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAN Control</td>
<td>Female</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>146</td>
<td>36.6</td>
<td>30.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>163</td>
<td>35.1</td>
<td>31.2</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td>120</td>
<td>79.7</td>
<td>33.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>155</td>
<td>73.2</td>
<td>43.3</td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>291</td>
<td>31.4</td>
<td>35.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>307</td>
<td>30.7</td>
<td>28.9</td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td>325</td>
<td>58.8</td>
<td>26.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>298</td>
<td>60.7</td>
<td>32.0</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>136</td>
<td>62.9</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>140</td>
<td>53.3</td>
<td>40.9</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td>94</td>
<td>90.8</td>
<td>33.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>115</td>
<td>83.9</td>
<td>48.3</td>
</tr>
<tr>
<td>ALAN Treatment</td>
<td>Female</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>145</td>
<td>41.6</td>
<td>48.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>151</td>
<td>35.9</td>
<td>33.2</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td>117</td>
<td>84.8</td>
<td>39.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>134</td>
<td>81.8</td>
<td>37.9</td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>235</td>
<td>22.4</td>
<td>26.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>277</td>
<td>27.4</td>
<td>27.1</td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td>344</td>
<td>60.2</td>
<td>32.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>372</td>
<td>65.2</td>
<td>32.6</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>128</td>
<td>62.2</td>
<td>45.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>136</td>
<td>53.3</td>
<td>41.4</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td>89</td>
<td>93.6</td>
<td>39.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-ALAN</td>
<td>105</td>
<td>88.8</td>
<td>90.0</td>
</tr>
</tbody>
</table>
Supplementary Table S5. Percentage of observations of brown anoles in the shade or sun during the day and in the dark, shadow or artificial light during the night. Data are divided by sex/size class, day/night and pre- and post-initiation of the artificial light treatment. Pre-ALAN exposure to light at night was inferred to be zero given the lack of artificial lighting in our study plots and lack of lizards exposed to light at night in controls after the initiation of the ALAN treatment (shown in italics).

<table>
<thead>
<tr>
<th>Control/Treatment</th>
<th>Sex/Size Class</th>
<th>Day/Night</th>
<th>Pre/Post-ALAN</th>
<th>Daytime basking</th>
<th>Nighttime ALAN exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Shade</td>
<td>Sun</td>
</tr>
<tr>
<td>DAN Control</td>
<td>Female</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>66%</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Day</td>
<td>Post-ALAN</td>
<td>66%</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Post-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>78%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Day</td>
<td>Post-ALAN</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Night</td>
<td>Post-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAN Control</td>
<td>Male</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>66%</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Day</td>
<td>Post-ALAN</td>
<td>73%</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Night</td>
<td>Post-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALAN Treatment</td>
<td>Female</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>69%</td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Day</td>
<td>Post-ALAN</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Night</td>
<td>Post-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALAN Treatment</td>
<td>Juvenile/Hatchling</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Day</td>
<td>Post-ALAN</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Night</td>
<td>Post-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Juvenile/Hatchling</td>
<td>Night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALAN Treatment</td>
<td>Male</td>
<td>Day</td>
<td>Pre-ALAN</td>
<td>77%</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Day</td>
<td>Post-ALAN</td>
<td>66%</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Night</td>
<td>Pre-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Night</td>
<td>Post-ALAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Night</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Supplementary Table S6. Results of generalized linear models testing for differences in behavior due to experimental treatment (i.e., ALAN vs. control), time period (i.e., three time periods with the first being pre-ALAN exposure) and the interaction between experimental treatment and time period. Observation time was included as a covariate in all analyses. Significant p-values are indicated in bold.

<table>
<thead>
<tr>
<th>Modelling:</th>
<th>Factor</th>
<th>Estimate</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in perch: males</td>
<td>(Intercept)</td>
<td>0.68</td>
<td>0.44</td>
<td>1.55</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Experimental treatment</td>
<td>0.05</td>
<td>0.27</td>
<td>0.18</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>Time period</td>
<td>0.29</td>
<td>0.26</td>
<td>1.12</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td>Observation time</td>
<td>0.01</td>
<td>0.02</td>
<td>0.46</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>Experimental treatment*Time period</td>
<td>-0.68</td>
<td>0.39</td>
<td>-1.73</td>
<td>0.09</td>
</tr>
<tr>
<td>Change in perch: females</td>
<td>(Intercept)</td>
<td>0.15</td>
<td>0.52</td>
<td>0.28</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td>Experimental treatment</td>
<td>-0.19</td>
<td>0.26</td>
<td>-0.72</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td>Time period</td>
<td>-0.29</td>
<td>0.28</td>
<td>-1.01</td>
<td>0.31</td>
</tr>
<tr>
<td></td>
<td>Observation time</td>
<td>0.04</td>
<td>0.03</td>
<td>1.63</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>Experimental treatment*Time period</td>
<td>0.29</td>
<td>0.40</td>
<td>0.71</td>
<td>0.48</td>
</tr>
<tr>
<td>Dewlap: males</td>
<td>(Intercept)</td>
<td>24.68</td>
<td>0.40</td>
<td>6.17</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>Experimental treatment</td>
<td>0.31</td>
<td>0.21</td>
<td>1.49</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>Time period</td>
<td>0.08</td>
<td>0.22</td>
<td>0.37</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td>Observation time</td>
<td>0.05</td>
<td>0.02</td>
<td>2.71</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Experimental treatment*Time period</td>
<td>-0.09</td>
<td>0.29</td>
<td>-0.30</td>
<td>0.77</td>
</tr>
<tr>
<td>Dewlap: females</td>
<td>(Intercept)</td>
<td>-9.02</td>
<td>5.36</td>
<td>-1.68</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Experimental treatment</td>
<td>0.95</td>
<td>0.89</td>
<td>1.07</td>
<td>0.29</td>
</tr>
<tr>
<td></td>
<td>Time period</td>
<td>-0.41</td>
<td>1.36</td>
<td>-0.30</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td>Observation time</td>
<td>0.44</td>
<td>0.26</td>
<td>1.69</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Experimental treatment*Time period</td>
<td>-0.65</td>
<td>1.78</td>
<td>-0.37</td>
<td>0.71</td>
</tr>
<tr>
<td>Pushup: males</td>
<td>(Intercept)</td>
<td>2.46</td>
<td>0.51</td>
<td>4.85</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>Experimental treatment</td>
<td>0.08</td>
<td>0.28</td>
<td>0.27</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>Time period</td>
<td>0.07</td>
<td>0.28</td>
<td>0.26</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>Observation time</td>
<td>0.04</td>
<td>0.02</td>
<td>1.58</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Experimental treatment*Time period</td>
<td>-0.20</td>
<td>0.40</td>
<td>-0.51</td>
<td>0.61</td>
</tr>
<tr>
<td>Pushup: females</td>
<td>(Intercept)</td>
<td>-0.67</td>
<td>1.17</td>
<td>-0.57</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>Estimate</td>
<td>Std. Error</td>
<td>z value</td>
<td>Pr(&gt;</td>
<td>z</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>------------</td>
<td>---------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.23</td>
<td>0.45</td>
<td>-0.51</td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td>Time period</td>
<td>-0.40</td>
<td>0.51</td>
<td>-0.78</td>
<td>0.44</td>
<td></td>
</tr>
<tr>
<td>Observation time</td>
<td>0.11</td>
<td>0.06</td>
<td>1.83</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment*Time period</td>
<td>0.85</td>
<td>0.69</td>
<td>1.23</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headbob: males</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>2.57</td>
<td>0.57</td>
<td>4.48</td>
<td>&lt;0.0001</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.03</td>
<td>0.28</td>
<td>-0.12</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Time period</td>
<td>-0.14</td>
<td>0.29</td>
<td>-0.47</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>Observation time</td>
<td>0.06</td>
<td>0.03</td>
<td>2.21</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment*Time period</td>
<td>0.08</td>
<td>0.41</td>
<td>0.19</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headbob: females</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>-0.81</td>
<td>1.33</td>
<td>-0.61</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>0.13</td>
<td>0.37</td>
<td>0.34</td>
<td>0.73</td>
<td></td>
</tr>
<tr>
<td>Time period</td>
<td>-0.13</td>
<td>0.43</td>
<td>-0.29</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>Observation time</td>
<td>0.17</td>
<td>0.07</td>
<td>2.63</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment*Time period</td>
<td>0.42</td>
<td>0.57</td>
<td>0.74</td>
<td>0.46</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Run: males</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>0.85</td>
<td>0.47</td>
<td>1.80</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>0.09</td>
<td>0.28</td>
<td>0.30</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>Time period</td>
<td>-0.35</td>
<td>0.32</td>
<td>-1.08</td>
<td>0.28</td>
<td></td>
</tr>
<tr>
<td>Observation time</td>
<td>0.00</td>
<td>0.02</td>
<td>-0.09</td>
<td>0.93</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment*Time period</td>
<td>-0.10</td>
<td>0.45</td>
<td>-0.23</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Run: females</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>0.40</td>
<td>0.63</td>
<td>0.63</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.16</td>
<td>0.30</td>
<td>-0.54</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>Time period</td>
<td>-0.87</td>
<td>0.40</td>
<td>-2.18</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>Observation time</td>
<td>0.04</td>
<td>0.03</td>
<td>1.16</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment*Time period</td>
<td>0.72</td>
<td>0.53</td>
<td>1.37</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jump: males</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>0.56</td>
<td>0.49</td>
<td>1.14</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>-0.07</td>
<td>0.31</td>
<td>-0.22</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>Time period</td>
<td>0.45</td>
<td>0.28</td>
<td>1.62</td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>Observation time</td>
<td>0.01</td>
<td>0.02</td>
<td>0.56</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment*Time period</td>
<td>-0.87</td>
<td>0.45</td>
<td>-1.93</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jump: females</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>-0.18</td>
<td>0.60</td>
<td>-0.29</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment</td>
<td>0.02</td>
<td>0.27</td>
<td>0.08</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>Time period</td>
<td>-0.31</td>
<td>0.31</td>
<td>-1.00</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Observation time</td>
<td>0.06</td>
<td>0.03</td>
<td>1.93</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Experimental treatment*Time period</td>
<td>0.11</td>
<td>0.44</td>
<td>0.26</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crawl: males</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------</td>
<td>------------------</td>
<td>------------------</td>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Intercept)</td>
<td>0.24</td>
<td>0.54</td>
<td>0.46</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>Experimental tmt</td>
<td>0.39</td>
<td>0.29</td>
<td>1.37</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>Time period</td>
<td>0.27</td>
<td>0.30</td>
<td>0.92</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>Observation time</td>
<td>0.05</td>
<td>0.03</td>
<td>1.93</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Experimental tmt*Time period</td>
<td>-0.48</td>
<td>0.40</td>
<td>-1.21</td>
<td>0.23</td>
</tr>
<tr>
<td>Crawl: females</td>
<td>(Intercept)</td>
<td>0.32</td>
<td>0.60</td>
<td>0.54</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td>Experimental tmt</td>
<td>0.01</td>
<td>0.27</td>
<td>0.03</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>Time period</td>
<td>-0.27</td>
<td>0.31</td>
<td>-0.88</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>Observation time</td>
<td>0.05</td>
<td>0.03</td>
<td>1.78</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Experimental tmt*Time period</td>
<td>-0.06</td>
<td>0.44</td>
<td>-0.14</td>
<td>0.89</td>
</tr>
</tbody>
</table>