2016

Session A, 2016 First Place: Forest Bird Behavior in Response to the Calls of Native and Non-Native Owl Species at Cranberry Lake Biological Station in Clifton, NY

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The Effect of Native and Non-Native Owl Calls on the Behavior of Forest Birds at Cranberry Lake Biological Station

Shannon Booth, Cameron Piper, Mikayla Call, Emma Buckardt and Madison Hand

Photo by: Mikayla Call (2016)
Introduction: Mobbing Behavior

- **Importance:** Bioacoustics offers a way of observing animal behavior and life histories, such as predator-prey interactions (Pijanowski, Villanueva-Rivera, Dumyahn, Farina, Krause, Napoletano, et al., 2011)

- **Mobbing:** is a behavior meant to harass or drive away a predator in the area (Mo, Waterhouse, Hayler & Hayler, 2016)
Introduction: Hypotheses

- **H₀:** There is no difference in forest bird mobbing reaction after hearing the Barred Owl (*Strix varia*), the Spotted Owl (*Strix occidentalis*), and the Eurasian Tawny Owl (*Strix aluco*).

- **Hₐ:** Forest birds exhibit mobbing behavior after hearing the Barred Owl (*Strix varia*), but not after hearing the non-native Spotted Owl (*Strix occidentalis*) or Eurasian Tawny Owl (*Strix aluco*).
• Diurnal forest birds have an advantage over the nocturnal owls.
• The Cranberry Lake Biological Station forest birds do not recognize the non-native owl calls, so they will not react as strongly.

Photo by Charlie Sargent (2010)
Methods: Locations

• 8 total locations
  o 3 on Tower Trail
  o 3 on Chair Rock Trail
  o 2 on Skid Trail

• 4 times per day
  o Rotated between locations June 5-8

• Experimental Unit: the 8 locations around CLBS

• Sampling Unit: the four times tested per day
Methods: Procedure

**Step 1:** Recorded birds present before playing calls (setting baseline)

**Step 2:** Played the bird calls for 2 minutes

**Step 3:** Listened during and after the call for alarm calls and fly-ins

**Step 4:** Waited 10 minutes to allow birds to return to normal behavior before repeating process

Photos by Mikayla Call, Emma Buckardt & Cameron Piper (2016)
Methods: Call Broadcasting

Photo by: Emma Buckardt
# Methods: Scale

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Greater than or equal to 3 individuals sounding alert calls</td>
</tr>
<tr>
<td>1</td>
<td>Less than 3 individuals sounding alert calls</td>
</tr>
<tr>
<td>0</td>
<td>No alert calls and no change in songs from initial behavior (before first call is played)</td>
</tr>
<tr>
<td>-1</td>
<td>Decrease in song volume</td>
</tr>
<tr>
<td>-2</td>
<td>Silence</td>
</tr>
</tbody>
</table>
Calls Used: Black-Capped Chickadee

*Poecile atricapillus*

Photo by Mikayla Call (2016)
Calls Used: Barred Owl

Strix varia

Photo by Ed Schneider
Calls Used: Spotted Owl

*Strix occidentalis*

Photo by Kameron Perensovich

Map by Cornell Lab of Ornithology
Range data by NatureServe
Calls Used: Eurasian Tawny Owl

Strix aluco

Photo by Jan Piecha

Methods: Statistical Analysis

- **Independent Variable**: the calls broadcasted
- **Dependent Variable**: the individuals that fly in with mobbing behavior and alert calls heard (measured using the determined scale)
- **Tests used**: ANOVA, Tukey Test, and Chi-Squared
Results: ANOVA

The Number of Individuals that Flew in due to the Barred Owl Call Broadcast

<table>
<thead>
<tr>
<th>Order of when Barred Owl call was played</th>
<th>Individuals that Flew into the Area (Average #)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>4</td>
<td>0.4</td>
</tr>
</tbody>
</table>

F = 0.18, p = 0.909

The Number of Individuals that Flew in due to the Spotted Owl Call Broadcast

<table>
<thead>
<tr>
<th>Order of when Spotted Owl call was played</th>
<th>Individuals that Flew into the Area (Average #)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>3</td>
<td>0.4</td>
</tr>
<tr>
<td>4</td>
<td>0.2</td>
</tr>
</tbody>
</table>

F = 0.33, p = 0.857

The Number of Individuals that Flew in due to the Eurasian Tawny Owl Call Broadcast

<table>
<thead>
<tr>
<th>Order of when Eurasian Tawny Owl call was played</th>
<th>Individuals that Flew into the Area (Average #)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>2</td>
<td>0.2</td>
</tr>
</tbody>
</table>

F = 0.69, p = 0.567
The Average Number of Birds that Flew into the Area in Response to Call Broadcasts

- **Barred Owl**: A
- **Spotted Owl**: B
- **Eurasian Tawny Owl**: B
- **Black-Capped Chickadee**: B

ANOVA & Tukey

- F = 8.69
- p < 0.001
Results: Chi-Squared

The Distribution of the Strength of Bird Alarm Calls in Response to Calls Played at CLBS

\[ x^2 = 43.315, \text{ df}=9 \]
\[ p < 0.001 \]
Discussion

• Mobbing could be an instinctual or learned behavior (Altmann, 1956)

• “Learning could also provide a necessary link, since many antipredator behaviors are experience-dependent” (Sandoval & Wilson, 2012)

• “Naive juveniles remained on the periphery of mobs where they may learn through cultural transmission” (Gehlbach & Leberett, 1995)
Discussion

• Critique Methods
  o Better broadcasting of calls
  o Record the decibel
  o More locations

• Follow-up studies
  o Study Specific Species
  o Responses to Other Predators
  o Reactions in different Seasons

Photo by Emma Buckardt (2016)
Conclusion

It was found that the forest birds at Cranberry Lake Biological Station tended to exhibit mobbing behavior more often in response to the native Barred Owl than to the non-native Spotted Owl and Eurasian Tawny Owl.
Acknowledgements

- Alan Belford (and Wren Belford)
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- Joel Mabie
- SUNY ESF
- Cranberry Lake Biological Station
- Rite in the Rain Outdoor Notebooks
- Anna Buckardt

Emma Buckardt (2016)
References


Questions?

Simon Pierre Barrette (2011)