
Luke L. Powell
Thomas P. Hodgman
William E. Glanz
Breeding Range Overlap

Key
Rust: Rusty
Black: Grack
“Red”: Red-wing
Ellison (1990): Red-winged Blackbirds

- RWBL respond aggressively to RUBL playback on four occasions.

- “On 22 and 23 May I saw male Red-winged Blackbirds attack and drive off male Rusty Blackbirds. The Red-winged Blackbirds flew at foraging male rusties on two occasions in full aggressive flight display with the red coverts exposed and song given in flight. After displacing the smaller blackbird the red-wings rose to high perches and gave song-spread displays”.

- RWBL prefer open areas – less foraging in “ephemeral pools in swamps and clearcuts”.

- “Clearing of most of the trees in wet coniferous woodlands and from the margins of ponds may lead to more intense competition between red-wings and rusties leading to local declines of the latter”. –Walter Ellison, 1990
Common Grackles

“Clear-cutting of forests around wooded swamps favours Grackles, which depend on more open areas for foraging and may lead to replacement of the Rusty by the larger blackbird“.

- Erskine 1990, Maritimes BBA

“Common Grackles did not appear to react aggressively to Rusty Blackbirds in spite of their tendency to respond to playback of Rusty Blackbird song”.

- Ellison 1990
Conditions required to prove existence of interspecific competition

1. Fitness of one species reduced by presence of another
2. Distribution or abundance of one species is reduced by the presence of another
3. Resource use by one species affects resource availability of another

Photo: James Osenton
Dhondt (2012)
Conditions required to \textit{prove} existence of interspecific competition

1. Fitness of one species reduced by presence of another

\textit{Prediction I}: RUBL body condition reduced in presence of COGR / RWBL

\textit{Prediction II}: RUBL stress hormones increased in presence of COGR / RWBL

\textit{Prediction III}: RUBL parasite loads increased in presence of COGR / RWBL

\textit{Prediction IV}: RUBL Nest success negatively correlated w/ COGR / RWBL presence
Nest Survival/Success
2006-2008 ME & VT

Nest Success:

100%  46%  38%  51%

Daily Nest Survival

Uncut for 20 years (n=10)
Heavy Partial Cut (n=7)
Regenerating clearcut (n=23)
All nests (n=40)

Timber Management Within Nest Plot

Photos by J. Osentoh
Dhondt (2012)

Conditions required to prove existence of interspecific competition

1. Fitness of one species reduced by presence of another
2. Distribution or abundance of one species is reduced by the presence of another

Prediction I: COGR/RWBL colonization drives RUBL occupancy in following years (lag)

Prediction II: RUBL occupancy reduced by COGR / RWBL occupancy
RUBL Occupancy Affected by Icterids?

<table>
<thead>
<tr>
<th>Model</th>
<th>-2 Log-likelihood</th>
<th>$K^a$</th>
<th>AIC</th>
<th>ΔAIC</th>
<th>$w_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\psi$(SOFTWD_UP + BEAVER + PUDDLES) $^b$</td>
<td>471.7</td>
<td>11</td>
<td>493.7</td>
<td>0.0</td>
<td>0.47</td>
</tr>
<tr>
<td>$\psi$(SOFTWD_UP + BEAVER + PUDDLES + YEAR)</td>
<td>470.9</td>
<td>12</td>
<td>494.9</td>
<td>1.2</td>
<td>0.26</td>
</tr>
<tr>
<td>$\psi$(SOFTWD_UP + PUDDLES)</td>
<td>476.2</td>
<td>10</td>
<td>496.2</td>
<td>2.6</td>
<td>0.13</td>
</tr>
<tr>
<td>$\psi$(SOFTWD_UP + PUDDLES + WETAREA)</td>
<td>471.4</td>
<td>13</td>
<td>497.4</td>
<td>3.7</td>
<td>0.07</td>
</tr>
<tr>
<td>$\psi$(SOFTWD_UP + BEAVER + PUDDLES + ROAD)</td>
<td>469.9</td>
<td>15</td>
<td>499.9</td>
<td>6.3</td>
<td>0.02</td>
</tr>
<tr>
<td>$\psi$(PUDDLES + YNGSF)</td>
<td>480.8</td>
<td>10</td>
<td>500.8</td>
<td>7.1</td>
<td>0.01</td>
</tr>
<tr>
<td>$\psi$(MUD + HARVEST5TO15)</td>
<td>481.0</td>
<td>10</td>
<td>501.0</td>
<td>7.3</td>
<td>0.01</td>
</tr>
<tr>
<td>$\psi$(PUDDLES + YNGSF + YEAR)</td>
<td>479.2</td>
<td>11</td>
<td>501.2</td>
<td>7.5</td>
<td>0.01</td>
</tr>
<tr>
<td>$\psi$(WETAREA + MUD + BEAVER)</td>
<td>476.3</td>
<td>13</td>
<td>502.3</td>
<td>8.7</td>
<td>0.01</td>
</tr>
<tr>
<td>$\psi$(YNGSF + MUD)</td>
<td>483.0</td>
<td>10</td>
<td>503.0</td>
<td>9.4</td>
<td>0.00</td>
</tr>
<tr>
<td>$\psi$(WETAREA + MUD + BEAVER + COGR)</td>
<td>476.0</td>
<td>14</td>
<td>504.0</td>
<td>10.3</td>
<td>0.00</td>
</tr>
<tr>
<td>$\psi$(WETAREA + HARVEST5TO15)</td>
<td>480.3</td>
<td>12</td>
<td>504.3</td>
<td>10.7</td>
<td>0.00</td>
</tr>
<tr>
<td>$\psi$(YNGSF + MUD + YEAR)</td>
<td>482.8</td>
<td>11</td>
<td>504.8</td>
<td>11.1</td>
<td>0.00</td>
</tr>
<tr>
<td>$\psi$(MUD + HARVEST5TO15 + COGR) $^b$</td>
<td>487.1</td>
<td>10</td>
<td>507.1</td>
<td>13.4</td>
<td>0.00</td>
</tr>
<tr>
<td>$\psi$(BEAVER + YNGSF)</td>
<td>487.3</td>
<td>10</td>
<td>507.3</td>
<td>13.7</td>
<td>0.00</td>
</tr>
<tr>
<td>$\psi$(MUD + HARVEST5TO15 + COGR + RWBL) $^b$</td>
<td>486.1</td>
<td>11</td>
<td>508.1</td>
<td>14.5</td>
<td>0.00</td>
</tr>
<tr>
<td>$\psi$(MUD + HARVEST5TO15 + YEAR)</td>
<td>489.1</td>
<td>10</td>
<td>509.1</td>
<td>15.5</td>
<td>0.00</td>
</tr>
<tr>
<td>$\psi$(BEAVER + YNGSF + RWBL) $^b$</td>
<td>487.2</td>
<td>11</td>
<td>509.2</td>
<td>15.5</td>
<td>0.00</td>
</tr>
<tr>
<td>$\psi$(BEAVER)</td>
<td>491.8</td>
<td>9</td>
<td>509.8</td>
<td>16.1</td>
<td>0.00</td>
</tr>
<tr>
<td>$\psi$(·)</td>
<td>495.6</td>
<td>8</td>
<td>511.6</td>
<td>18.0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

$^a$ $K$, no. of parameters; $\Delta AIC$, difference in AIC relative to the most parsimonious value; $w_i$, Akaike wt.

$^b$ Base model for all models shown: $\psi$(CHOICE), $p$(WIND + DATE + PLAYBACK), where $p$ denotes detectability.
**Dhondt (2012)**

Conditions required to **prove** existence of interspecific competition

1. Fitness of one species reduced by presence of another
2. Distribution or abundance of one species is reduced by presence of another
3. Resource use by one species affects resource availability of another

*Prediction I*: COGR/RWBL consume RUBL food (indirect competition)

*Prediction II*: COGR / RWBL directly exclude RWBL from resources (food, space)

*Prediction III*: If COGR / RWBL compete directly with RUBL, they will respond to RUBL playback more often than by chance
> 550 Wetlands Surveyed in Range, 2006-2007
Field Methods

- May - June of 2006 & 2007
- 8.6 minute callback surveys
  - 3 observation periods
    1. 3 min passive
    2. 38 sec. broadcast
    3. 5 min post-broadcast
- Recorded behaviors during each observation period

<table>
<thead>
<tr>
<th>#/Sex Rusty</th>
<th>#/Sex Red-winged</th>
<th>#/Sex Grackles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 male</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Species for which behavior(s) are described below:
- RUBL
- RWBL
- COGR

- Behavior during 3 min passive:
  - N/A
  - Flew Towards
  - Perched
  - Flew Away

- Behavior during 38 sec broadcast:
  - N/A
  - Flew Towards
  - Perched
  - Flew Away

- Behavior after 5 min post-broadcast:
  - N/A
  - Flew Towards
  - Perched
  - Flew Away

- Song
- Chucks
- Squiggle

- Song
- Chucks
- Squiggle

- Song
- Chucks
- Squiggle
Statistical Methods

- GLM on behavior counts with poisson errors
- Deviance distributed as chi-square
- Offset accounts for difference in period lengths
  - 3-min passive, 38-sec b’cast, 5-min post-b’cast
  - Compare behavior counts among periods
    - $H_0$: behavior observed no more often than in passive period
    - $H_A$: behavior observed more/less often than in passive period
Response to Broadcast

*** $P < 0.001$ ; * $P < 0.1$

RUBL
$n = 47$

COGR
$n = 49$

RWBL
$n = 30$

**Period**

- 1 pre: 3 min
- 2 broadcast: 38 sec
- 3 post: 5 min

**Action**

- Flew Towards
- Song
- Chucks
- Perched
- Flew away
Summary – Evidence for Competition

1. Fitness of one species reduced by presence of another
   - Unevaluated
   - Recommendation: Evaluate RUBL blood parasites, body condition & nest success among mgmt. conditions and in the presence of other icterids

2. Distribution or abundance of one species is reduced by presence of another
   - Currently no evidence
   - Recommendation: Multi-sp, multi-season occupancy model

3. Resource use by one species affects the resource availability of another
   - Weak evidence – non-aggressive response to RUBL playback
   - Recommendations:
     - Playback experiments, all ways, with decoys, early in breeding season
     - Food supplementation experiment -> e.g. add puddles w/ amphibian eggs
     - RWBL/COGR removal experiments – probably only feasible in winter
Conclusions

- Competition is difficult to prove

HOWEVER

- Without rigorous tests, interspecific competition cannot be excluded as a contributor to RUBL declines

- COGR and RWBL have very flexible foraging behaviors – RUBL less flexible

- Habitat change has disturbed vast areas, allowing for colonization by COGR/RWBL

- Great potential for manipulative experiments, especially on the wintering grounds
Acknowledgements

• Statistical Guru
  – William Halteman

• Insect-bitten, sleep-deprived field technicians
  – James Osenton (2 yrs), Ryan Jones & Caitlin Holmberg
  – Caleb Fisher, Sterling College

• Selfless Volunteers
  – David “That Feeling” Ellis, Brian Tyne, Eric Miller, Sam Edmonds, Tom Powell

• ME IF&W
  – Bob Cordes & Lindsay Tudor

• International Rusty Blackbird Tech. Group (IRBTG)
  – Claudia Mettke-Hoffman & Gerhard Hoffman
  – Russ Greenberg, Smithsonian
  – Steve Matsuoka, USFWS AK

• Financial Support
  – Maine Outdoor Heritage Fund
  – UMaine Graduate Student Gov’t

• Photos
  – Ted Swem, Dave Shaw

• Emotional Support
  – Tom & Ines Powell
  – Angela Januzzi
  – Jason Oliver & Dr. T.R.

Questions?