Efficacy of Targeted Mist Netting to Capture Northern Bobwhites During the Non-Breeding Season in Ohio

Mark J. Wiley
Adam K. Janke
Robert J. Gates
Ohio Bobwhite Research

- **Study Area**
  - Southwestern Ohio
  - 4 private land sites
    - >50 landowners

- **Habitat Composition**
  - 55% Row crops
    - Corn, soybeans, and wheat
  - 19% Early successional
    - Grasslands, old fields, fencerows, and ditches
  - 13% Forest
    - Woodlots
Common Capture Techniques

• **Baited Funnel Traps (Stoddard 1931)**
  – Effective (Truitt and Dailey 2000)
  – Effectiveness varies with environmental conditions
  – Not always suitable on private land
    • Increased presence can irritate landowners
    • Trap checks likely to disrupt hunters
  – Inefficient when targeting individuals
    • Radiomarked
    • Pointing dogs
    • Incidental contact

• **Nightlighting (Labisky 1968)**
  – Effective (Truitt and Dailey 2000)
  – Potentially alarming
    • landowners, neighbors, law enforcement
Alternative Capture Techniques

• Targeted Mist Netting
  – Gallinaceous species
    • Pointing dogs (Skinner 1998)
    • Radiotelemetry (Schladweiler and Mussehl 1969)
    • Researchers driving birds (Silvy and Robel 1968, Campbell 1972, Bowers and Conelly 1986)
Alternative Capture Techniques

• Targeted Netting for Bobwhites

“Clapnets” (Stoddard 1931: 441)
Alternative Capture Techniques

• Mist Netting Bobwhites
  – Breeding season with audio lure (Cink 1975, Lohr et al. 2011)
  – Nonbreeding season?
Introduction

• Evaluate the efficacy of targeted mist netting
• Compare targeted mist netting with baited funnel trapping...
  – Body mass
  – Age ratio
  – Sex ratio
  – Post-capture survival
Methods

• Netting and trapping used concurrently
  – 1 October-28 February 2009-2011
  – Maintain ≥ 1 radio in each known covey

• Implementation of capture technique
  – Non-random
  – Opportunistic
Methods

• Traps
  – 30x40x45cm
  – Burlap buffer

• Trapping
  – Concealed within cover in areas with evidence of activity
  – Pre-baited, Baited
    • Cracked corn
  – Checked twice daily
    • After sunrise
    • Sunset
Methods

- **Mist Nets**
  - 2.6x12m, four-shelf nets
    - 61mm mesh
  - Suspended between 3.05m conduit poles
  - Furled and rolled on poles
Methods

- **Mist Netting**
  - Locate bobwhite
    - Radiotelemetry
    - Pointing dogs
    - Incidental contact
  - Erect nets near bobwhite
    - Intersect predicted flush direction
  - Flush toward nets
Methods

- **Capture/handling**
  - Age and sex (Rosene 1969)
  - Body mass
  - Leg band
  - Radiotransmitters
    - 6.6g pendant
    - Mortality-sensing

- **Radiotracking**
  - ≥ 6 times/week
Comparisons

• Age and sex capture ratios
  – Chi Square test

• Body mass
  – t-test

• Survival
  – Nest Survival Model in Program MARK
    • 21 day post-capture interval
    • Models with days-since-capture (3, 7, 14, 21), capture technique covariates, and their interaction (Holt et al. 2009)
    • AICc
Results

<table>
<thead>
<tr>
<th></th>
<th>2009-10</th>
<th>2010-11</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trapping captures</td>
<td>137</td>
<td>120</td>
<td>257</td>
</tr>
<tr>
<td>Netting captures</td>
<td>105</td>
<td>148</td>
<td>253</td>
</tr>
</tbody>
</table>

- **Trapping (2010-2011)**
  - 484 trap-days
  - .306 birds /trap-day

- **Netting (2009-2011)**
  - 201 targeted netting attempts
    - ≥ 1 bobwhite flushed after nets deployed
  - 141 successful
    - ≥ 1 bobwhite captured


Results

<table>
<thead>
<tr>
<th></th>
<th>Targeted netting</th>
<th>Funnel traps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>132</td>
<td>136</td>
</tr>
<tr>
<td>Female</td>
<td>104</td>
<td>106</td>
</tr>
<tr>
<td>Unknown</td>
<td>21</td>
<td>11</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>59</td>
<td>52</td>
</tr>
<tr>
<td>Juvenile</td>
<td>191</td>
<td>200</td>
</tr>
<tr>
<td>Unknown</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

- No difference in sex ratio of captures
  - \((\chi^2 = 0.001, \ df = 1, \ P = 0.973)\)
- No difference in age ratio of captures
  - \((\chi^2 = 0.480, \ df = 1, \ P = 0.4884)\)
Body Mass

- **Netting Mean** – 185.6 g
  - 95% CI = 183.5, 187.6 g
- **Funnel Trapping Mean** - 191.4 g
  - 95% CI = 188.7, 194.1 g
- **Mean body mass of netted captures was less than trap captures**
  - $P = 0.009$
## Survival Results

<table>
<thead>
<tr>
<th>Model</th>
<th>$\Delta AIC_c$</th>
<th>$w_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 DSC</td>
<td>0.000</td>
<td>0.275</td>
</tr>
<tr>
<td>14 DSC</td>
<td>0.807</td>
<td>0.183</td>
</tr>
<tr>
<td>21 DSC</td>
<td>1.873</td>
<td>0.108</td>
</tr>
<tr>
<td>Technique + 7 DSC</td>
<td>1.989</td>
<td>0.102</td>
</tr>
<tr>
<td>Technique + 14 DSC</td>
<td>2.796</td>
<td>0.068</td>
</tr>
<tr>
<td>3 DSC</td>
<td>2.826</td>
<td>0.067</td>
</tr>
<tr>
<td>Technique + 21 DSC</td>
<td>3.860</td>
<td>0.040</td>
</tr>
<tr>
<td>Technique + 7 DSC + Technique x 7 DSC</td>
<td>3.992</td>
<td>0.037</td>
</tr>
</tbody>
</table>

- **Short-term acute effect of capture**
  - $\beta_{net} = 0.002$
    - (-0.214, 0.219)
  - odds ratio = 1.002
    - (0.807, 1.244)

$n = 259$ (netting $n = 156$, trapping $n = 103$)
Summary

• Targeted mist netting is an effective and versatile alternative to traditional capture techniques
• Short term effect of capture, handling, radiomarking
• No difference in post-capture survival between techniques
Summary

• Capture rates of age and sex classes were similar

• Netting may provide more accurate estimates of body mass
  – “Crop full”, “Crop FULL”, “Crop bulging”
Netting is well suited for use...

• On private land
  – Reduces investigator presence
  – Avoid recreational users (e.g. hunters)
• Radiotelemetry studies
  – Capture specific individuals
  – Quickly capture individuals multiple unmarked coveys
• With other techniques to optimize capture
• Breeding season
  – Calling males
  – Radiomarked pairs
  – Incidental contact
  – Fledged young
    • May merit additional research
Research and Management
Implications

• Corral (Smith et al. 2003)
  – Roosted, brooding adult
  – Effective
  – Requires that chicks can not fly
    • 1-12 days post-hatch

• Targeted Netting
  – Flying chicks
    • ≥ 12 days post-hatch
  – Smaller chicks capable of passing through nets
    • Experiment with smaller mesh
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  - Mauri Liberati
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  - Matt Crowell

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  - Federal Aid
  - ≥ 50 Cooperating Landowners
  - Fallsville Wildlife Area
  - Indian Creek Wildlife Area

Terrestrial Wildlife Ecology Laboratory
The Ohio State University
Ohio Division of Wildlife
Questions