Catching cane toads: Determining biological differences in cane toad (*Rhinella marina*) trappability and assessing the effect of acoustic attractant position and light presence on cane toad capture rates

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Introduction

“Most introduced amphibian in the world”

Carmichael and Williams (1991)

Australian Invasion

Current Distribution

Projected Distribution

(modified from Urban et al. 2007)
World’s largest and most toxic toad


Management

Biocontrol

Exclusion
Fencing

Toad Roundup

Trapping
Current Trap Use

http://www.entity1.com/index.cfm?attributes.fuseaction=shop&goto=trap
Purposes:

• Determine biological parameters influencing cane toad trappability
• Identify trap modifications for increasing cane toad capture

Hypotheses:

• Traps will catch larger, more sexually mature, and healthier toads.
• Traps with a light on top will catch more toads than traps with no light.
• Traps with a mating call inside will catch more toads than traps with a mating call on top.
Methods: Experimental Design

No Light
- Call Inside
- Call On Top

3x

Light On
- Call Inside
- Call On Top

3x

10 Males
10 Females
10 Juveniles

http://www.entity1.com/index.cfm?attributes.fuseaction=shop&goto=trap
Methods: Dissection

http://www.flickr.com/photos/robandstephanielevy/3092240036/
http://www.pnas.org/content/104/45/17557
http://www.flickr.com/photos/robandstephanielevy/3092241594/in/photostream/
http://www.flickr.com/photos/robandstephanielevy/3091403217/in/photostream/
http://www.flickr.com/photos/robandstephanielevy/3092240036/
Spinal Arthritis

χ²=4.73, df=1, p=0.0296

The graph shows the proportion of toads with spinal arthritis between trapped and untrapped groups. The chi-squared test indicates a significant difference (χ²=4.73, df=1, p=0.0296).
Sex

\[ \chi^2 = 49.39, \text{ df}=2, p<0.0001 \]
Light Experiment

\[ \chi^2 = 13.3, \text{ df} = 1, p = 0.0003 \]
Light Experiment

Proportion of Toads Trapped

Female: $\chi^2=6.41$, df=1, $p=0.0113$

Juvenile: $\chi^2=3.54$, df=1, $p=0.0599$

Male: $\chi^2=3.26$, df=1, $p=0.071$
Sound Treatment

\[ \chi^2 = 2.17, \text{ df}=1, \text{ p}=0.1407 \]
Sound Treatment

Female: $\chi^2 = 30.45$, df=1, p<0.0001

Juvenile: $\chi^2 = 0.68$, df=1, p=0.4096

Male: $\chi^2 = 1.37$, df=1, p=0.2418
## Binary Logistic Regression (Light & Sex)

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<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Trapped</td>
<td>Untrapped</td>
</tr>
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<td>48</td>
</tr>
<tr>
<td>Untrapped</td>
<td>12</td>
<td>201</td>
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<tr>
<td>Overall</td>
<td>Percentage</td>
<td></td>
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</table>
## Binary Logistic Regression
*(Light On Experiment: Sound & Sex)*

<table>
<thead>
<tr>
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<tbody>
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<td></td>
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<td>Trapped</td>
<td>Untrapped</td>
<td></td>
</tr>
<tr>
<td>Trapped</td>
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<td>21</td>
<td>19</td>
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<tr>
<td>Untrapped</td>
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<td>8</td>
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<td>Overall Percentage</td>
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<td>76.7</td>
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Light, Sound, and Sex

![Graph showing the proportion of toads trapped under different conditions of light and sound placement.]

- **Sex**: F = 24.724, df = 2, p < 0.001
- **Light**: F = 6.210, df = 1, p = 0.019
- **Sound**: F = 0.115, df = 1, p = 0.737
- **Sound*Sex**: F = 4.475, df = 2, p = 0.020
Conclusions

UV Light already in use:
Increases capture, but
More males being trapped

Target Adult Females:
Sound attractant inside
increases capture
Acknowledgements

Gettysburg College, Environmental Studies
Dr. John Commito
Dr. Andrew Wilson

JCU, Townsville
Dr. Lin Schwarzkopf
Deborah Bower

SIT Cairns: World Learning
Tony Cummings
Questions?

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UR DOING IT WRONG