

Trapping Variation in Frogs in Ohio Fens

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Introduction



Figure 1: (A) The green frog (*Rana clamitans*). (B) The American bullfrog (*Lithobates catesbeianus*). (C) The northern leopard frog (*Lithobates pipiens*).

- These three frog species above are found throughout Ohio near areas with permanent or semi-permanent water sources¹.
- Early life stage diets vary only slightly and include algae, zooplankton, and other small diatoms.
- Their adult diets consist mainly of insects, insect larvae, and small invertebrates, however some have been observed eating snakes and even other frogs¹⁰.
- Data for this study was collected from a spotted turtle mark-recapture study. This study contained 4353 total trap nights, with 302 total frog captures.

Hypothesis

We hypothesized that capture rates would increase for green frogs, leopard frogs, and bullfrogs during their peak periods of breeding, May – June¹¹, March – June⁸, and March – July⁷, respectively. We believe this would occur due to the increased movement by females, as well as satellite males unable to win proper territory². To understand the variation in capture rate between trap sessions, we will compare the total captures over the 15 trap sessions standardized to 30 traps each. Additionally, a comparison of percent capture rate per trap per trap session, and a Shannon-Weiner index of diversity.

Methods

- This study was conducted in a fen surrounded by agricultural land in Clark County, Ohio.
- Decoys were placed in ProMar Minnow traps (TR-502 36” or TR-503 24”) and traps were checked at 24 hours intervals⁵.
- Decoys consisted of Safari Limited red-eared sliders (269529, 5.3”L x 3.6”W x 1.5”H) spray-painted with Krylon Fusion Flat Black (K02519000), as well as Sargent Art Acrylic yellow (22-2302) and orange (22-2314) colors (G. Lipps, pers.com).

Methods

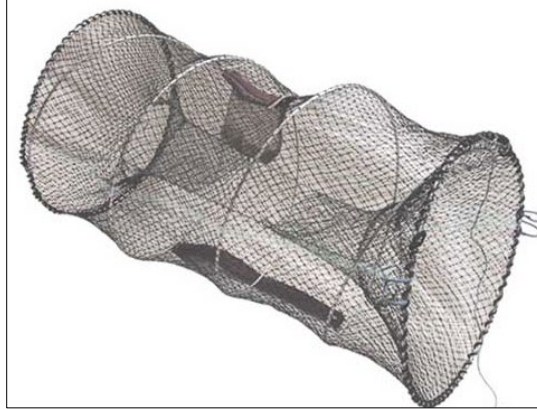


Figure 2: A collapsible bait trap. Traps contained a decoy spotted turtle. <http://www.millernets.com/colibatr24.html>

- Work conducted in accordance with Wittenberg University IACUC #1718-05, OHDNR DNAP #RP 2018-05, and OHDNR #20-183.
- Each collapsible bait trap was checked every 24 hours and I.D. for each individual was checked using a Collins et. al. key⁹
- One trap night = One 24-hour period for each trap.
- Shannon – Weiner Index = $\Sigma(p_i \ln(p_i))$ where p_i = proportion of individuals of species (i) to the total number of individuals

Results

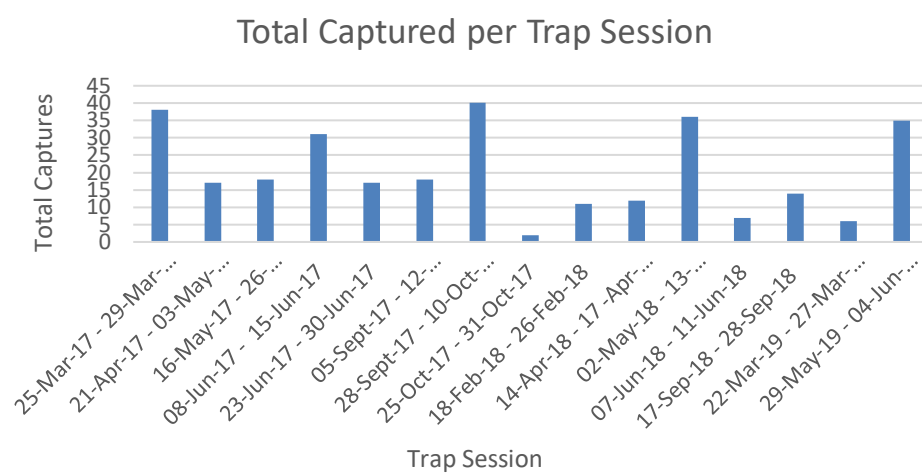


Figure 3: A comparison of total frog captures per trap session. See table 1.

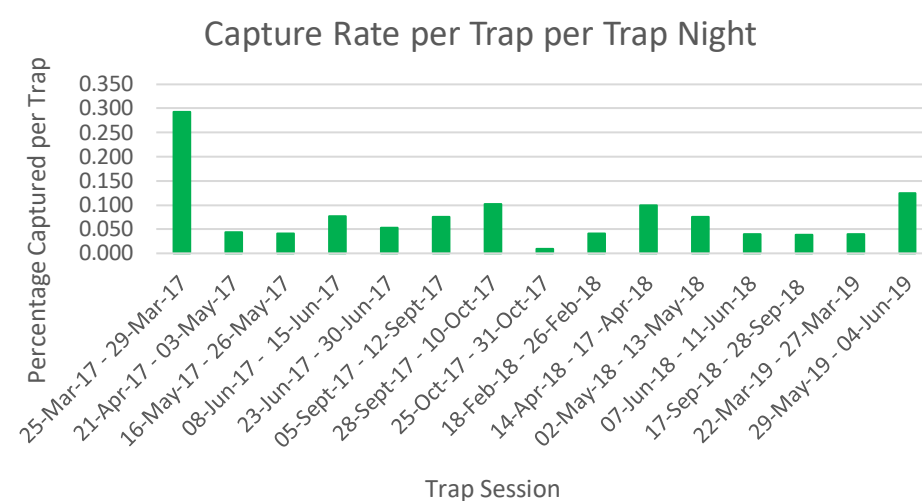


Figure 4: A comparison of the capture rate of each trap per trap session

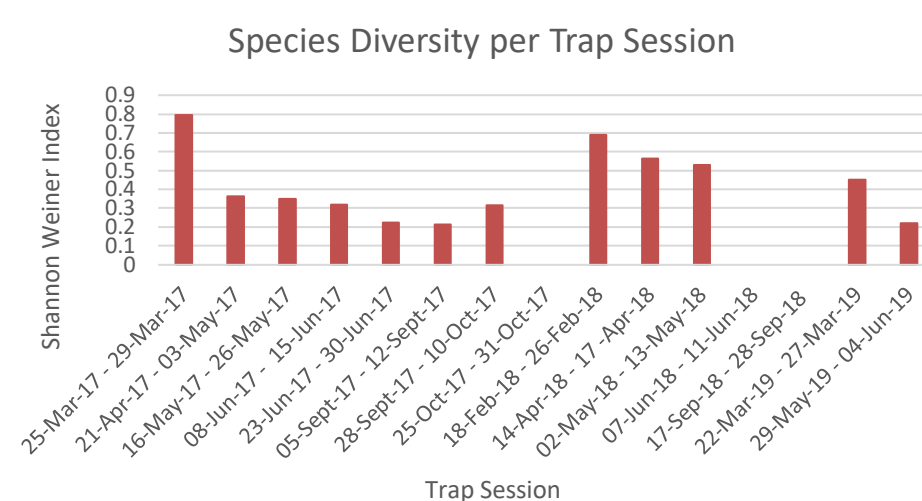


Figure 5: A Shannon Weiner diversity index for each trap session.

Results

Table 1: Total traps per session, and total trap nights per session. There were 4353 trap nights

Trap Session	Total Traps per Session	Total Trap Nights
25-Mar-17 – 29-Mar-17	26	130
21-Apr-17 – 03-May-17	30	390
16-May-17 – 26-May-17	40	440
08-Jun-17 – 15-Jun-17	50	400
23-Jun-17 – 30-Jun-17	40	320
05-Sept-17 – 12-Sept-17	30	240
28-Sept-17 – 10-Oct-17	30	390
25-Oct-17 – 31-Oct-17	30	210
18-Feb-18 – 26-Feb-18	30	268
14-Apr-18 – 17-Apr-18	30	120
02-May-18 – 13-May-18	40	480
07-Jun-18 – 11-Jun-18	35	175
17-Sep-18 – 28-Sep-18	30	360
22-Mar-19 – 27-Mar-19	30	150
29-May-19 – 04-Jun-19	40	280

Statistic	Value
Sample Size	15
Mean	2.309
Standard Deviation	2.010
Minimum	0.285714286
Q ₁	1.214
Median	1.594
Q ₃	2.663
Maximum	8.769230769

Table 2: Summary Statistics for figure 7. Table 2 and Figure 7 from Lock5Stat.com

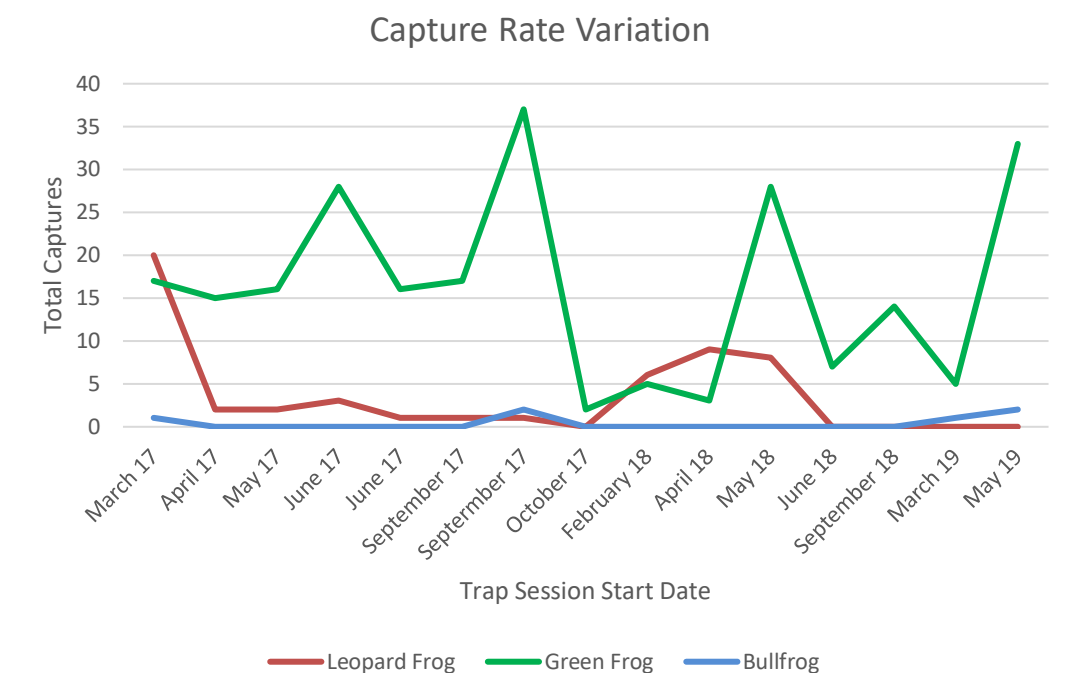


Figure 6: Comparison of total capture rate per species per trap session.

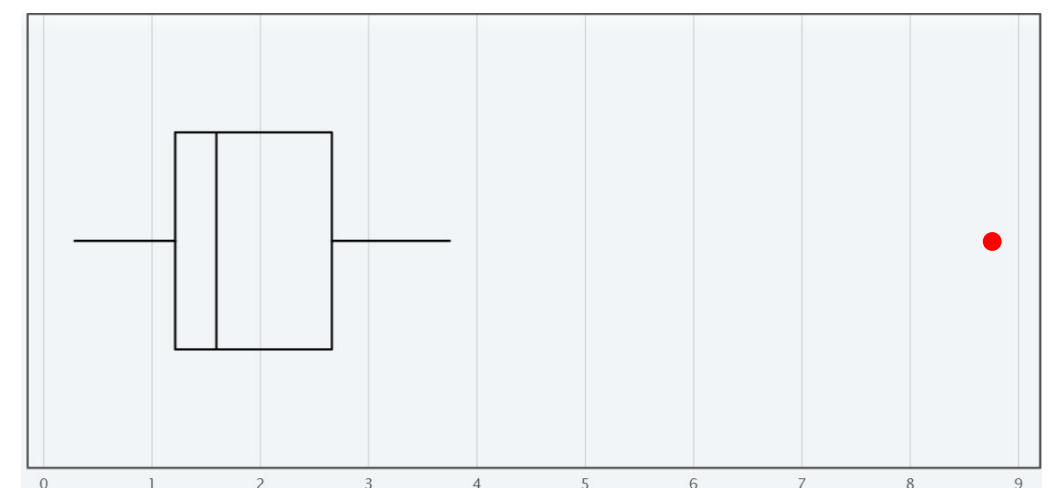


Figure 8: A box-and-whisker plot displaying the number of frogs expected per trap night, when standardized at 30 traps in each session. For 75% of trap sessions, total expected capture is between 1.2 and 2.7 total frogs. There is only one significant outlier, of 8.76 total frog captures per night.

Conclusions

- A chi-squared p-value of 0.0397 was calculated, stating that there was significant difference between total number of frog captures per night. This significant difference was due to the outlier of 8.76 captures per night in the Mar-17 trap session. Without this outlier, the data would not be significant.
- Due to the nature of fens being fed by ground and surface water year round, the presence of frogs in these areas may not vary greatly, causing the data to not be representative of other frog habitats such as lakes, ponds, etc.
- Variations in air and water temperature may also play a role in the variation of capture rates, and these values may have greater variation in areas other than fens.
- The data used for this comparative study originated from a turtle capture project. A mark-recapture study using frog capture techniques instead of turtle trapping techniques may produce different data that could better illustrate the variation in capture based on breeding periods.

References

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