

Presence of disruptive coloration does not affect successful prey capture in *Rhinella Marina*

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Introduction

Camouflage is a common evasion method for predators and prey. One camouflage method is disruptive coloration, involving low or high contrast areas of color distracting from the organism's overall shape^{1,2}.

In toads, motion is the primary visual detection method, though color may contribute despite mixed use of color in mate choice^{3,4}. While other studies confirmed motion-dependent detection, none have addressed the role of color and its effectiveness in camouflage⁵.

To determine if color does have a role in prey evasion for toads, I presented cane toads (*Rhinella marina*) with crickets that varied in disruptive coloration and crickets without color. I expect that marked crickets will be eaten less compared to those who were unmarked. As background matching and form breakage play roles in disruptive coloration², I expect white crickets to experience lower capture than green due to the white background used.

Methods

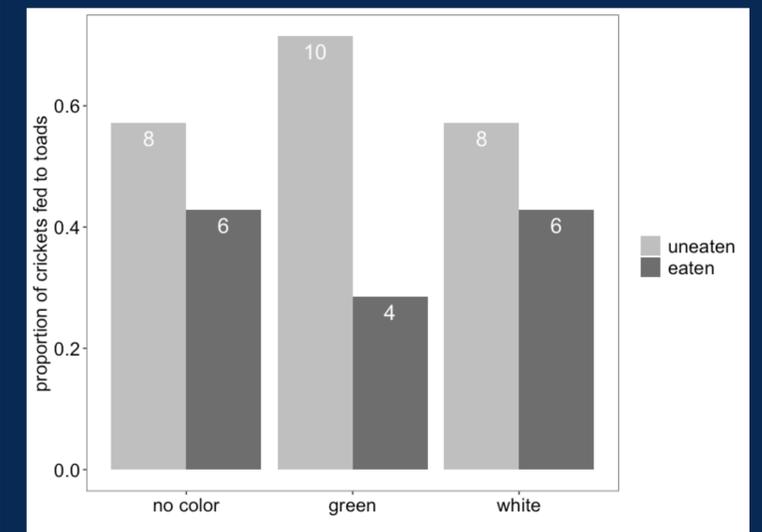
6 *Rhinella marina* toads were presented with an overall 12 crickets per trial that either had no added coloration or had an added white or green spot to represent disruptive coloration. The toads were tested a total of 3 trials at different days and times. Crickets were given a spot on the dorsal side of their abdomen (Fig 1) using a mixture of 1 spoonful wheat flour and 9 mL distilled water for white spots. This was repeated with an added drop of gel food coloring (Ann Clark, "Leaf Green") for green spots. I reviewed the video footage and looked at whether the crickets were eaten or not, their color, and for eaten crickets whether they were moving or not (within 5 frames before the frame of capture).

I used logistic regression with the stats package in R to assess if cricket color predicted whether it was eaten.

Results

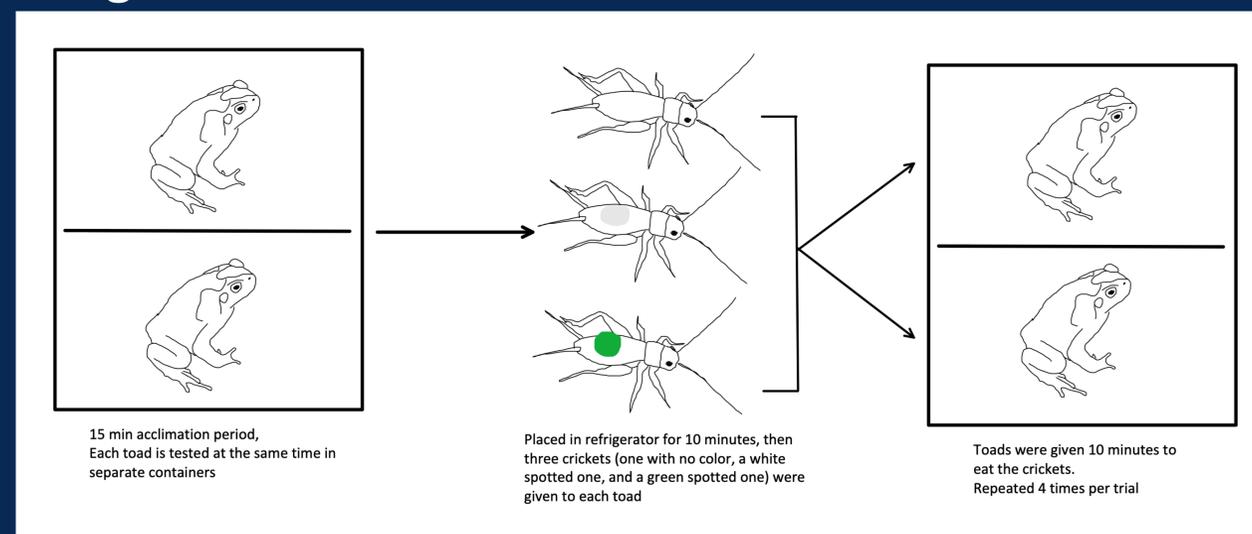
16 of the 42 total crickets were eaten. 6/14 crickets with no added coloration were eaten, 4/14 green crickets were eaten, and 6/14 white crickets were eaten (Fig 2). All 16 of the eaten crickets were also in motion at time of capture, however as motion was not recorded for uneaten crickets I cannot statistically test for a strong positive correlation. The logistic regression results suggest that disruptive coloration is not a predictor for being eaten ($p > 0.05$, McFadden's Pseudo $R^2 = 0.015$).

Figure 2 – Eaten and uneaten crickets based on added color.



For no color, green, and white added color, more crickets were left uneaten than eaten.

Figure 1 – Schema of Cricket Presentation to Toads



Before being fed 3 crickets four times, toads were given a 15-minute acclimation period in the behavior room.

Conclusions

Crickets with no added color and with applied disruptive coloration saw no difference in capture by toads. However, preliminary observations may suggest that motion and distance play roles in prey capture by toads, which have stereopsis⁶. In the future, I would also recommend attempting this in the toads' holding tanks. This would not only control possible stress caused by moving to a behavioral room but may also affect background blending that influences the effectiveness of disruptive coloration².



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