Color and Orientation Preference of *Procambarus clarkii*

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**Introduction**

Vision in organisms plays a very important role, because it helps the organism decipher its environment. This can confer survival benefits such as: locating nutrients, escaping predators and finding mates. It is, therefore, valuable to study vision in organisms to better understand their behavior. Color is a key component of vision, and thus the focus of this experiment. Based on the results of the experiment conducted by George Wald\(^4\) the hypothesis was that *Procambarus clarkii* would show preference to the colors red and blue while showing no preference for the color yellow.

**Materials and Methods**

- *Procambarus clarkii* were obtained from various locations at the Lake Waco Wetlands.
- Three males were utilized in this experiment.
- 3 plastic containers (41.9cmL x 29.2cmW x 15.9cmH) were used (Figure 1) in the experiment.
- Each *Procambarus clarkii* was positioned in the neutral zone in each container and a clear plastic cup was placed over them. They were left to acclimate for 5 minutes.
- They were then released from the cup and observed for 15 minutes for color preference (red, yellow, or blue).
- Orientation preference (left or right) was also observed to determine which side was preferred.
- They were video monitored.
- Three different timers were used to determine the amount of time they spent in each color/side.
- Each *Procambarus clarkii* underwent 4 trials in each container: 2 with one color on the left and another on the right, and 2 with the colors reversed. There was a total of 42 trials.
- The trials were conducted in a brown cabinet free of distractions. (Figure 1)

**Results**

Based on the results of t-tests, there was no statistical difference between the time *Procambarus clarkii* spent on the colors red and blue. There was a statistical difference between the time spent on the color blue and the time spent on the color yellow, regardless of the side (Figure 3). There was a 0.090 probability that the time spent on red was statistically the same as the time spent on yellow, however there was a 0.0016 probability that the time spent on the left and right side during all trials involving red and yellow were the same. This illustrated that there was no preference of red over yellow, but there was a preference of right over left (Figure 4). The overall orientation preference was highly skewed to the right (Figure 5).

**Discussion and Conclusion**

The preliminary findings suggest *Procambarus clarkii* prefer blue over yellow, with no significant difference in preference for the colors red and blue or the colors red and yellow. This rejects the hypothesis because *Procambarus clarkii* did not show a significant preference for red over yellow. Crandall and Cronin\(^1\), indicated there was relatively little variation in \(\lambda_{\text{max}}\) 522–530 nm, which is one explanation for why *Procambarus clarkii* did not respond to the yellow color. Findings by Wald\(^4\) indicated a simple visual spectrum that sees red, only when the color blue is present. This confirms that *Procambarus clarkii* saw both red and blue in Figure 2, while seeing only blue in Figure 3, and neither red nor yellow in Figure 4. Therefore, the *Procambarus clarkii* preferred colors in their visual spectrum.

Although the experiment showed significant findings, there may have been an experimental error. With the possibility of experimental error, the orientation preference was tested along with color preference. The *Procambarus clarkii* preferred the right side unequivocally more than the left (Figure 5). This may be because, in order to keep the *Procambarus clarkii* for experimentation, a blue air stone was placed on the right side of the neutral holding tank. The air stone provided oxygen to the *Procambarus clarkii*. When not in an experimental trial, they frequently located themselves around the air stone. The *Procambarus clarkii* could have been conditioned to choose blue and right.

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**Literature Cited**


