A Study on the Orange Coloration of Four Different Populations of the Trinidadian Guppy (*Poecilia reticulata*)

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Abstract

The Trinidadian guppy *Poecilia reticulata* has been the subject of many evolution studies. Some such studies have been focused on the bright ornamental patterns the males have to attract a mate. It has been shown that sexual selection has taken place due to female preference for colorful males. On the other end natural selection has also taken place due to predators being able to see a colorful guppy better then a non-colorful guppy. In the northern range mountains of Trinidad there are two types of populations, one that occurs in a low predation area and one in a high predation area. There are also two populations that 25yrs ago were moved from the high predation area to a low predation area and vice versa. With these four different populations I am looking to see if male orange coloration follows the predicted pattern of guppies in high vs. low predation areas. Based on this predicted pattern, I hypothesized that males coming from the high predation area would be less colorful then those in low predation areas. In 2001, guppies were taken from each of the four different populations and bred in the lab to obtain third generation males. These males were then used in a study that looked at the evolution of locomotion. As part of that study each male was photographed. I took these pictures and analyzed them for orange coloration to test my predictions. Four variables were looked at: hue, saturation, brightness and overall percentage of orange color. Hue saturation and brightness did not show any significant results among populations. This may be due to the fact the pictures were not taken in standardized conditions. Results for the percentage of orange area any one fish had according to population was significant but in the opposite way theorized. Rather, this suggests that the amount of orange on a male has not followed the predicted pattern of natural selection in the last 25yrs. The two populations that were moved to different predation areas followed their ancestral populations instead of evolving to follow their new predation area. Reasons for this result will be discussed in my presentation. This study will be a spring board for further perfecting the documentation part of the guppy research that is happening at Seattle University. Also this color data will be used to see if male coloration correlates with the locomotor data these guppies have provided.