Kobe Maristela
Summary and Critique 4

Paper: "The Selective Advantage of Crypsis in Mice"

Authors: Sacha N. Vignieri, Joanna G. Larson, and Hopi E. Hoekstra

Summary: Natural selection hinders evolution by selecting advantageous traits within a population reducing the overall allelic diversity. The paper examines camouflage in *Peromyscus* mice being an advantageous trait in natural selection in correlation with predation rate in their environment. The authors seek to understand the relationship between color patterning in *Peromyscus* mice and the visual cue predators search for during their hunt. The author hypothesizes low predation rate of mice with coat colors that matches the local background (cryptic), while on the other hand, high predation rate of mice with coat colors that contrasts their local background (noncryptic). The author predicts if color coating is advantageously selected by the environment, then mice with matching colors to their environment will have a lower predation rate in comparison to mice that have mismatching colors to their environment. The authors studied two subspecies of the *Peromyscus polionotus* mice, one being the dark oldfield mouse (*Peromyscus polionotus subgriseus*) and the other being the light Santa Rosa Island beach mouse (*P. p. leucocephalus*). 250 mouse models, made of nonhardening plasticine, were created to mimic the coat color and pattern of these two subspecies. The models were then deployed in eight linear transects with a set of four being at the beach environment of Topsail Hill Preserve State Park, and the other set of four being at the inlands field of Lafayette Creek Wildlife Area. During the deployment process, live mice were captured in their corresponding environments to aid in future comparative analysis. Each of the eight transects, which consisted of 14 light and 14 dark models, were placed randomly in open soil with gaps separating each model by 10 meters. Models were checked regularly, every 24 hours, for bite marks or any imprints that could identify a predators' presence. Additionally, soil samples were collected from each models' spot to measure brightness of the soil. An average of the brightness of the soil and the model was taken over multiple independent measurements for subsequent analysis assuring the data obtained matches real mice in their habitat. The experiment was aimed in determining the relationship between coat color, and the predation and survival rate of these subspecies of mice. The authors found the results showed a significant relationship in that 75% of all predation events occurred with mice that had mismatching colors with their environment, supporting their prediction of color coating being advantageous thus selected by natural selection. Additionally, model mice that were at the beach habitat showed lower predation rate signifying an increase in survivability in matching color coats as active predator controls were in place. In conclusion, natural selection has selected traits that allows for animals to hide from their predators in plain sight. In the case with *Peromyscus polionotus* mice, they have adapted over time by selecting their coat color to match their habit to better camouflage themselves thus increasing their overall level of survivability.

Critique: My critique on this experiment would be to sample other animal species that showcases different forms of camouflage and compare their rate of survivability to their form of camouflage. Many factors can affect camouflage and its ability of survival such as size, odor, and environment. The authors should have accounted for a wider range of animals that can encompass different camouflage techniques as focusing on color coating is only one variable. For example, if the animal was bigger and used the same camouflage technique of matching color coats will it yield the same rate of survivability. Further

research in this field should be explored, for instance with savannah animals that have cryptic color coats, will their predation and survival rate be the similar?