Costa Rican Moth (Lepidoptera) Wing Coloration Diversity at Ultraviolet and Incandescent Lights

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ABSTRACT

Suitable conditions of increased precipitation and temperatures bring high biodiversity to the tropics. There are around 160,000 species of moths worldwide with new species constantly being found. Lepidoptera are essential for ecosystem management via pollination, decomposition, and nutrient cycling. It has been argued that natural selection shapes the evolution of camouflage as an anti-predator defense. It is currently controversial whether cryptis and disruptive coloration are alternative mechanisms of camouflage or whether they are interrelated anti-predator defenses. Disruptively colored prey is characterized by highly contrasting patterns to conceal the body shape, whereas cryptic prey minimizes the contrasts to background. This study compares the abundance and diversity of coloration of moths in three different life zones in Costa Rica: a seasonally dry forest, a premontane cloud forest, and a lowland moist forest. It is hypothesized that environmental conditions that favor high epiphyte loads should also favor disruptive coloration while conditions resulting in low epiphyte loads should favor cryptic coloration. Moths diversity was sampled using a white sheet with an ultraviolet light from one side and an incandescent light on the opposite side. Moths were classified according to their morphology and wing coloration into morpho-species. Preliminary results have found that ecosystems with cloud forests (higher epiphytic coverage for refuge) had higher diversity of moth wing coloration than the seasonally dry forest or lowland moist forest, and thus supporting my hypothesis. Comparing the diversity of Costa Rican moths provides further insight upon rapidly evolving adaptations against intense predation.

Key words: Lepidoptera; wing coloration; epiphyte coverage; ultraviolet; incandescent; Costa Rica