GEORGE MASON UNIVERSITY
COLLEGE OF SCIENCE
DEPARTMENT OF BIOLOGY SEMINAR

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"Host plants & wing patterns in Vanessa cardui"

Lepidoptera co-evolve with their plant hosts. Yet, the role of plants in generating variation in butterfly wing morphology is understudied, especially given the primary role that colors and patterns play in mating, mimicry, and camouflage in these organisms. Plants may affect butterfly wing morphology via nutritional impacts on larval growth, but also directly by providing pigment compounds such as carotenoids. To determine if host plants generate variation in wing patterns in the model butterfly, *Vanessa cardui*, and to investigate the interaction of host plant effects with temperature, we reared *V. cardui* larvae on plant taxa of differing quality and chemistry, as well as on artificial diet, and exposed pupae to heat shock. Plants included *Plantago lancelota*, *Carduus acanthoides*, *Trifolium repens*, *Medicago sativa,* as well as *Hibiscus* and *Ulmus.* After pupation, pupae from each larval host plant were weighed, measured, and assigned to control (ambient temperature) or heat shock (24 hours at 40°C) treatments. At eclosion, butterflies were euthanized and wings removed and photographed. Pattern analysis to determine changes in eyespot size; area of yellow, orange, or blue eyespot pigments; size of parafocal elements; and distance of parafocal elements from the submarginal vein was conducted using ImageJ software and Principle Component Analysis. Although survivorship was too low on most host plants to assess differences, larvae reared on *Plantago* were smaller in hindwing size and differed in wing pattern elements compared to *Carduus* and artificial diet reared larvae prior to heat shock. After pupae were exposed to heat shock, both *Carduus* and *Plantago*-reared specimens differed in hindwing size and total area of yellow, blue, and orange pigments primarily in the M2 and CuA2 eyespots compared to specimens feed artificial diet. Our results are the first to demonstrate that host plant identity creates variation in eyespot size and color rather than just in overall wing hue or melanism. Consequences of such phenotypic variation for the evolution of new Lepidoptera species will depend on links between observed phenotypes and genotypes or gene expression.

TUESDAY October 24, 2017
3:00-4:15 PM
Innovation Hall Room 207