Effects of Molting on Movement Patterns in Chromatopelma cyanpubescens (Green Bottle Blue Tarantulas)

Circosta, Francesca (School: Massanutten Regional Governor's School)

Molting is the process in which an organism sheds its skin, exoskeleton, fur, or feathers. In arthropods, molting arises at least in part from neurohormone release. Previous studies have explored the behavioral changes associated with molting in vertebrates, however, less is known about behavioral changes that occur in invertebrates. The specific aim of this project was to determine whether Chromatopelma cyaneopubescens, or Green Bottle Blue tarantulas, experience significant changes in their patterns of movement due to molting. Since many arthropods decrease their activity over development, there are two possible effects of molting during development. One hypothesis is that tarantulas will gradually decrease movement. An alternative hypothesis is that overall movement could decrease abruptly following a molt. A webcam (8 fps) recorded tarantulas' (n = 4) movement on an LED light panel. Tarantulas received a 15-minute acclimation period and were recorded for two hours. This protocol was repeated approximately every other day for roughly 20 days before molting and 20 days after. Raw video was then processed, tracked, and analyzed. Results suggest that the spiders' overall movement gradually – not abruptly at molt - decreased over development. In contrast, qualitatively, spiders traveled more irregularly immediately after molting. Further, tarantulas turned less frequently after molting. Control tarantulas not undergoing molting did not show similar changes. Taken together, the results support both hypotheses – overall movement was not affected by molting but alterations in patterning of movement was correlated with molting. Whether the two changes arising from molting represent evolutionarily valuable processes or "side effects" of molting remains to be determined.

Awards Won: