The Dark Side of Light: The Potential Impact of Artificial Light on Libellulid Feeding Behavior and Activity

Rogers, Hannah (School: Camdenton High School)

Ecological light pollution implicates physiological disruption to individual organisms and the ecosystem structure as a whole particularly with the involvement of keystone species. The majority of studies pertaining to light pollution have concerned terrestrial systems while the effect on aquatic ecosystems is understudied. Libellulids (dragonfly nymphs) were chosen for this study due to their ecological importance as a keystone species. Preliminary trials were conducted to qualitatively determine the natural prey consumption of nymphs. Subsequent testing involved a control group with no artificial light at night and full spectrum during daytime to mimic natural conditions as well as two experimental groups representing both urban and suburban light pollution levels and spectral types. Spectrographs of light polluted areas were analyzed to determine the specific type of lighting involved in light polluted areas to better represent effects on Libellulid activity. Finally, Libellulids were exposed to specific types of lights contributing to light pollution and the individual effects were recorded. Results indicated higher intensities of artificial nighttime lighting caused a significant increase in prey consumption and mortality rates of Libellulids in addition to an unexpected finding; LED spectra significantly decreased prey consumption in comparison to Metal Halide and low-pressure sodium. Furthermore, Metal Halide, which emits a bluer wavelength, caused a greater percentage of nymphs to burrow in the substrate. Lastly, exposure to Metal Halide and LED resulted in significantly higher mortality rates of nymphs.

Awards Won:
Third Award of $1,000