Assessing the Effect of Light Pollution on Courtship Behavior of Drosophila melanogaster

Washburn, Haidyn (School: Sanger High School)

Light pollution effects organisms throughout the entire ecosystem via disruption and interference of reproductive fitness. Drosophila melanogaster were chosen for this study because of the incredibly fast rate at which a new generation is produced and can be studied, scientifically accepted and established parameters of reproduction, and position among the food web as a primary consumer. Sexually receptive virgin female Drosophila melanogaster were paired with males under various light conditions commonly found in skyglow. Testing involved a control group exposed to a Bortle level 5 sky to mimic suburban conditions, and five subsequent experimental test groups that involved exposure to varying wavelengths along the visible light spectrum commonly found in atmospheric light pollution. Results indicate that the higher intensity of light reduces the performance of mating behaviors such as tapping and courtship song initiation performed by male Drosophila melanogaster during the period of copulation and subsequently increases the risk of population decline and decreases the overall population fitness. The bright white LED light used in testing had the most detrimental effect upon performance of courtship behaviors on behalf of male Drosophila melanogaster, reducing the success rate of copulation by 50% ($p=0.01$). Ultimately the control group had the least interference upon courtship activity of Drosophila melanogaster in comparison to the experimental groups exposed to varying amounts of light pollution. This study suggests that light pollution has an effect upon the fitness of Drosophila melanogaster and a potential impact on collective biodiversity.

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