

Light Lure: Why are moths attracted to light?

Aim

The photographs taken focus on understanding why moths are attracted to light, and the impact that excessive artificial lighting has on this process. The aim of the photos is to demonstrate the detrimental effects of light pollution on moths. This is particularly highlighted in the final photograph, which shows an artificially lit city, emphasizing the issue of light pollution. The photography seeks to evoke an emotional response and encourage much-needed changes to reduce artificial light, and protect the environment.

Method

The photographs were taken with a Canon PowerShot SX500 IS and edited using Canva Photo Editor. Photograph 1 (moths flying around an outdoor light) was taken in manual mode with a slow shutter speed of 1/30 second and an ISO of 200. A narrow aperture of f/8 was used, and no flash was needed as the outdoor light provided enough brightness for the photo. Using adjust features in Canva, a few minor enhancements were added to the photo such as increased brightness and additional blur on the moths. Also, a slight warm glow was added to highlight the artificial lighting. Photograph 2, depicting a macro shot of a moth's compound eyes, was taken in macro focus mode with a fast shutter speed of 1/250 second and an ISO of 400. The aperture was set to f/5.6, with the zoom level at approximately 5x to get a close-up of the moth's eyes. Additional lighting was provided to ensure proper illumination of the photograph. Using the sharpness and clarity features, the image was slightly altered to include more detail and texture of the moth's eyes. Additionally, the blur function was used to add a slight blur of the background. Photograph 3 (a landscape of the moon) was taken in manual mode, using a fast shutter speed of 1/250 second and an ISO of 400. The aperture was set to f/8 to ensure the moon was in focus. Manual focus was used to capture the moon in detail. The photo was taken at dusk and some additional lighting was used. Using Canva photo editor, a slight warm glow was added around the moon, emphasising its natural glow and how moths would use it for nighttime navigation. Additionally, the proportion of the moon was slightly enlarged to make it more central in the photograph. Photograph 4 shows a cityscape at night with excessive artificial lighting. The camera was set to an aperture of f/8 for a clear view of the city lights. A slower shutter speed (1/15 second) was used to capture the glow of the city, with an ISO of 800 to balance the exposure. The photograph shows bright city lights creating a distinct contrast against the darkened sky. A warm glow surrounding the cityscape was added to the photograph in Canva to highlight the distinct contrast between the bright city lights and the natural darkened sky.

Scientific Content

The photographs explore key scientific ideas related to moth behaviour and their interaction with light. These concepts include positive phototaxis, ommatidia, celestial navigation, and light pollution. Photograph 1 depicts moths swarming around artificial light, demonstrating positive phototaxis, where organisms are attracted to light sources. This behaviour occurs because artificial lights disrupt moths' natural navigation systems, which typically rely on the moon and stars, causing them to circle light sources instead. Photograph 2 provides a macro shot of a moth's compound eye, highlighting its complex structure composed of thousands of tiny lenses called ommatidia. These ommatidia act as individual light detectors, contributing to a mosaic-like image and providing moths with a wide field

of view and high sensitivity to low light conditions, crucial for their nighttime navigation. Photograph 3 shows a moth flying alongside the moon, illustrating celestial navigation, where moths orient themselves by maintaining a constant angle relative to the moon's position in the sky. This strategy allows moths to use the moon as a fixed reference point, aiding accurate navigation and straight flight paths at night. Finally, photograph 4 captures a cityscape at night, demonstrating the effects of light pollution caused by excessive artificial light scattering in the atmosphere. This light pollution creates a luminous glow that obscures the night sky, disrupts natural light-dark cycles.

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