

A Comparison of Scorpions: Visible Light vs. Ultraviolet Reflectance

Jameson Wright



Scorpions are a type of invertebrate that fall within the class Arachnida, making them closely relate to spiders, mites, and ticks. They are carnivorous creatures that typically survive 3 to 8 years in the wild. As for their size, they have been known to be anywhere from less than an inch up to 8.3 inches. Although there are almost 2,000 individually identified species of scorpions, only 30 to 40 or so have strong enough poison to kill a person.

Visible Spectrum



Both of these images were created using the StackShot and are compiled of over 40 total shots each to capture all the different planes of focus.

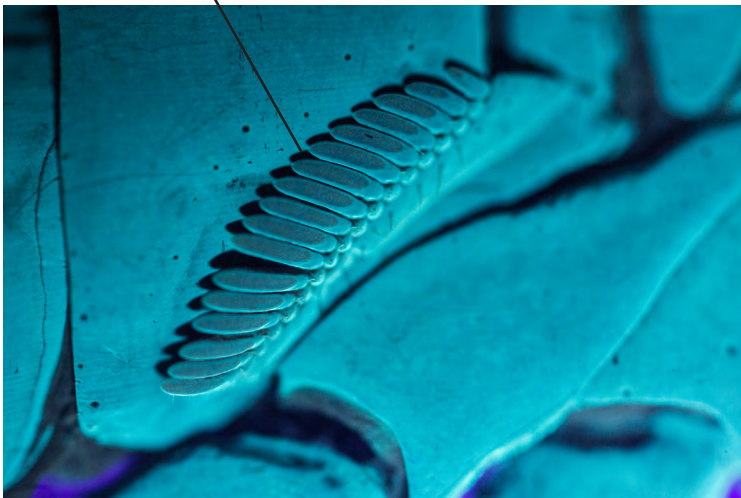


Ultraviolet Light

Another bizarre and intriguing fact that inspired this project is that when illuminated under ultraviolet light sources, scorpions' bodies fluoresce to reveal an entirely different looking creature to the naked eye. The glow comes from a substance found in the hyaline layer, a very thin but extremely tough coating in part of the scorpion's exoskeleton called the cuticle. As for the purpose of the fluorescence, scientists are not fully certain but some theories include that it helps protect them from sunlight, find each other, and even potentially confuse their prey. Considering that scorpions are primarily nocturnal hunters this could play a key role in how they go about catching their food. Another intriguing detail involving the molting process is that when a scorpion first sheds its shell, the newly revealed body will not fluoresce until the new cuticle of the exoskeleton fully hardens. This could indicate that the substance causing fluorescence could be a byproduct of the hardening process itself, or that it might be secreted not long after the creature molts.

Various magnified photos of Black Scorpion comparing visible to UV reflectance

Pectines



Pectines



Pre-Abdomen

Median Eyes

Various magnified photos of Golden scorpion comparing visible to UV reflectance



Ultraviolet Light

Photographic Setup

Equipment Used:

Canon 5D Mark III

SD Card

StackShot for Canon Kit

100 mm Canon Macro Lens

65 mm 1-5x Canon Macro Lens

CopyStand

Fiber Optic Lights (2)

LED mini light

Ultraviolet Flashlight

Single Black Scorpion Specimen

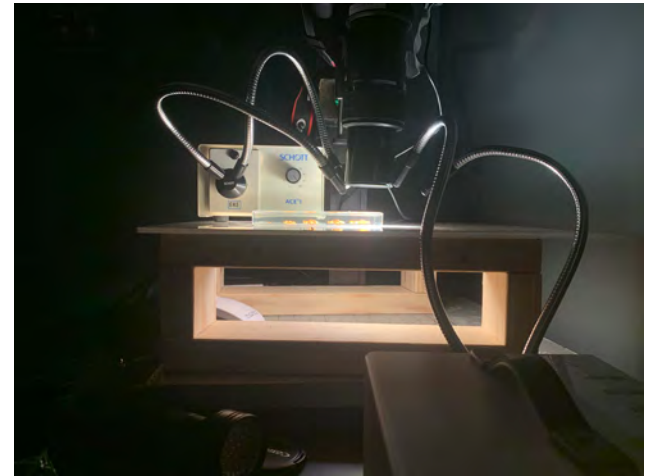
“Life Cycle” 5-piece Scorpion Specimen

Article Resources:

<https://www.kidsdiscover.com/quick-reads/makes-scorpions-glow-ultraviolet-light/>

<https://a-z-animals.com/animals/scorpion/>

<https://www.nationalgeographic.com/animals/invertebrates/group/scorpions/>



About the Creator

Jameson Wright is a current Photographic Sciences senior at Rochester Institute of Technology. He has completed a co-op internship at Flaum Eye Institute as a diagnostic ophthalmic imaging technician and plans to continue working in that field after graduating. Some of his other interests include forensic photography as well as criminal justice.

Contact Information:

jsw8123@g.rit.edu

Jameson_Wright@URMC.rochester.edu

This Article was created as a final project for Photomacrography, taught by Ted Kinsman at Rochester Institute of Technology Fall 2022. All images taken and owned by Jameson Wright.

