



green and brown lizard

There's a little earless lizard living in the gypsum dune fields southwest of Alamogordo, New Mexico, that can hide from its predators in broad daylight. The dune field is the White Sands National Monument, the world's largest, at 275 square miles. Because of gypsum's high albedo, White Sands is also one of the brightest areas in the world, in the company of massive salt flats, glaciers, and the Antarctic Plateau. Under such high-intensity light, human eyes, and the eyes of other mammals, avians, and reptiles, lose their ability to distinguish color. That's great for *Holbrookia Maculata*, the little earless lizard. Under the harsh glare of the white sands, this lizard is nearly indistinguishable from the sand when motionless. That means little by itself. Many reptiles have developed adept camouflage, even changing colors to blend in. However, when measured with a spectrophotometer, the earless lizard's color is revealed to diverge as much as 30%<sup>1</sup> from the surrounding sand. And *that* stands out.



Ever play find the lizard? Image Credit: flickr user irmiller ([CC BY 2.0](#))

### **Lizard Coloration Unveils Secrets of the Reptile World**

In the reptilian world, color is essential to survival. Whether blending in with their surroundings, [displaying mating fitness](#), or signaling toxicity to predators, reptiles have evolved a variety of color-specific survival mechanisms. Colors differ between members of the same species living in the same area, between those living in different areas, and between different species. Understanding this can help herpetologists piece together the complex ecological puzzle of reptilian survival. So, for herpetologists to understand the social and environmental worlds of their subjects, they must have access to an accurate method of identifying the color.





Dang, lizard, what color are you? Image Credit: Flickr User Jim Makos ([CC BY 2.0](#))

### **Spectrophotometers Improve on the Human Eye in Color Measurement**

As evidenced by the *Holbrookia Maculata*, the human eye is not always an accurate instrument for the measurement of color. Our eyes are limited by what they can and cannot perceive. The texture of objects can change how humans perceive color. Differing lighting conditions—the glare of the White Sands vs. the gloom of nearby Carlsbad Caverns—can cause color perception disagreements. Further, no matter how adept we are at color perception, a descriptive gap prevents that perception from being translated into communicable shades. This last point is highly pertinent to researchers. An observation in the scientific realm is meaningless if it cannot be communicated and repeated. If a color cannot even be described specifically, it cannot be communicated, nor can the observation be repeated.

Hence, the use of spectrophotometers in herpetological research. These objective instruments are capable of taking accurate, repeatable measurements of the colors of lizards and other “creeping” animals. The effects texture can be accounted for, and the instrument has a greater range of vision than the eye. Lighting differences can be mitigated by illumination settings on these devices, allowing for researchers to control this variable as well. Also, spectrophotometers return color information in coordinates on the tri-value CIE L\*a\*b\* scale. This scale sets an objective, precise standard that can be specifically described and communicated with other researchers.

Spectrophotometers are useful for field and lab research alike. Handheld instruments can be used to assess the color of a reptile and its environment in situ. These machines are built for durability and can handle difficult jungle, swamp, and desert environments as they bring the research to the lizard. In the lab, spectrophotometers can quickly and accurately scan large numbers of lizards to identify statistical deviations.



That's a lizard you can trip over if you're not careful. Image Credit: flickr user glowing alien ([CC BY 2.0](#))

### **Spectrophotometers Enhance Academic Institutional Reputation**

Universities, Zoos, and Museums with herpetology divisions can augment their programs with the procurement of spectrophotometric equipment. This aids their researchers by offering them modern, precise tools to prosecute their hypotheses. Zoos and museums seeking to bolster their reputations and attract top research talent stand to benefit by procuring spectrophotometers as well.

With over six decades of experience in building spectrophotometric instruments, the experts at HunterLab are well-versed in the unique requirements of herpetological and other academic

disciplines. To learn which instrument may be the best for your field of study, [contact the professionals at HunterLab.](#)

1. "Mountain Time: Reflections on the Wild World and Our Place in it," 2010, [https://books.google.ca/books?id=CEzDAgAAQBAJ&pg=PA108&lpg=PA108&dq=lizard+color+measurement+spectrophotometer&source=bl&ots=4ALA1Vuaze&sig=g7SNRsOLn86nRRM3ikaUjs08Kbg&hl=en&sa=X&redir\\_esc=y#v=onepage&q=lizard%20color%20measurement%20spectrophotometer&f=false](https://books.google.ca/books?id=CEzDAgAAQBAJ&pg=PA108&lpg=PA108&dq=lizard+color+measurement+spectrophotometer&source=bl&ots=4ALA1Vuaze&sig=g7SNRsOLn86nRRM3ikaUjs08Kbg&hl=en&sa=X&redir_esc=y#v=onepage&q=lizard%20color%20measurement%20spectrophotometer&f=false)