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## UV Lighting for Reptiles

### 1. What is ultraviolet light?

UV is a band of electromagnetic energy between 200 and 400 nanometers. It is an invisible form of light that can unknowingly and profoundly affect many animal species in both physiological and psychological ways.

### 2. What are the different spectrums of ultraviolet light?

The three bandwidths of ultraviolet within the UV spectrum are UV-A, UV-B, and UV-C. UV-A is from 320 – 400 nm. UV-B is from 290 – 320 nm. UV-C is from 200 – 290 nm.

### 3. Why is ultraviolet light important for reptiles?

It plays a role in calcium metabolism through being a precursor to Vitamin D. It also plays a role in photoperiod regulations. Reptiles from the equator region typically have more consistent ability to be exposed to UV with 12 hours of light exposure year around. Photoperiods have profound reproductive influences on reproduction and behavior.

### 4. How are ultraviolet light levels measured or assessed?

Your veterinarian may have a UV meter that can measure UV intensity. The least expensive and qualitative way is to place a small piece of newspaper where the reptile basks for its ultraviolet. The paper usually turns yellowish in 2-3 days if the bulb is producing enough unfiltered UV and is close enough distance from the basking area.

### 5. What are the different sources of ultraviolet available for keeping reptiles?

Our typical recommendations are based upon both safety and effectiveness. We take into consideration what will do the most good and “above all do no harm”. We typically use Reptisun products by ZooMed and use different strengths based upon the reptiles’ closeness to the equator and known photo regulation practices in the wild.

### 6. How should ultraviolet lights be positioned for reptiles in terms of filtration, distance, duration, and frequency of changing?

This is a great question, which entails everything there is to know about a reptile’s wild niche. Reptile owners should understand the captive environments are not only about



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photoregulation, but also thermoregulation and humidity. These concepts are all connected as well.

The obvious answer is that the light is 100% filtered by glass and about 30% filtered by screen. The distance from the reptiles basking spot is also important. The distance and the formula for its determination operate by the inverse square rule. The basic rule is that the light has to be within 24 inches of the basking area to receive any appreciable UV. Moving the UV half the distance or increasing the height of the basking area (if appropriate) will square the intensity of the UV by a factor equal to half the distance the light is from the reptile. In other words, if the reptile is 20 inches from the UV source and you move the bulb 10 inches closer (or raise the perch) the reptile will get 100 times as much UV.

Duration of light depends on the individual's habitat in the wild. Equatorial species need a 12-hour photoperiod and non-equatorial species need variable amounts of photoperiod depending on the distance they are from the equator. If the species is being kept in its native area, it is easy to know the seasonal variation in the photoperiod. However, UV intensity varies seasonally. So, any recommendation is a best guess situation. Our recommendation for changing the light is every 6-8 months. Write the date the light was purchased with a felt tip marker and write on the calendar to replace it 6-8 months later.

The complex question has some simple solutions, but can only be accomplished with owners that have the perspective of "what is the best I provide for my reptile" not "what is the minimum I can get by with for this reptile". The simple solution is habitat construction with complete microhabitats. The fundamental question is, how does this animal live in the wild? What niche or niches is it known to utilize? How do these niches (microhabitats) change seasonally? Is the species of concern nocturnal, diurnal, crepuscular, or seasonally variable? Is the species of concern an obligate carnivore, opportunistic, omnivorous, or herbivorous? Is this species aquatic, sub-terrestrial, terrestrial, semi arboreal, or arboreal? Is the species of concern from a tropical area, desert area, or deciduous area – (humidity variability)?

Microhabitats can only be constructed with space. Compartmentalization will allow less space to be used but the key is sufficient space. Practically speaking, we recommend the owner to build or purchase (new or used) an entertainment center that will be large enough for the adult reptile (The bigger center the better). Entertainment centers are an ideal concept because of the compartments in it (TV, stereo, nick-nac shelf, and dark storage areas). A hole-saw can be used to drill out the enclosure between compartments. The hole should be as small as possible but should allow for the adult reptile to gain access to the desired niche. The niches to be designed are species specific. Substrates, viewable areas, lights (UV and basking), perches/logs, humidity chambers (using plastic boxes to fit into a compartment with appropriate substrate), aquatic areas, cross-air ventilation, dark warm areas, dark cool areas etc... The process of cage design allows the owners to bond with their reptile/amphibian and teaches them a lot during the thinking process. Our goal is to get the process started and educate in general designs.

7. Are there any particular species you have ultraviolet lighting concerns for?



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All herbivores and any young rapidly growing young herp (UV deficiency often coupled with dietary phosphorus excess (NSHP)).

8. What are the clinical signs of ultraviolet light deficiency in reptiles/amphibians?

Twitching, seizures, swollen limbs, poor growth, reproductive production, anorexia, gut stasis, constipation, opportunistic infections, and potentially pyramiding.

9. What diagnostics help to determine ultraviolet light deficiency in reptiles/amphibians?

Ionized Calcium, cholecalciferol level, radiographs, and often times viewing the cage is diagnostic (glass filtering UV). A UV meter would help solve UV assessment in the cage.

10. How is ultraviolet light deficiency treated in reptiles/amphibians?

Predominantly with phototherapy and calcium where needed, as well as vitamin D injection. I also rule out concomitant disease with blood work and fecals to ensure more than one etiology is not affecting the herp.

11. What are the clinical signs of over-exposure to ultraviolet light in reptiles/amphibians?

The same signs as UV deficiency, except they are usually result from renal secondary hyperparathyroidism acute overexposure. We have seen sun burns occur over the top of bony prominences, such as the ribs and the pelvic bones of iguanas.

12. What diagnostics help to determine over-exposure to ultraviolet light in reptiles/amphibians?

History, calcium levels (in males)– r/o ovulation with females by lipid profile, radiographs (calcification of great vessels of the heart, renal mineralization, etc.... At Avian and Exotic Animal Hospital, we would perform a rectal exam to palpate the size of the kidneys (biopsy if large or small).

13. How is over-exposure to ultraviolet light treated in reptiles/amphibians?

Usually it is not a single causation problem with UV over-exposure. The problem is usually multifactorial, but the result is usually the same (Dystrophic calcification of the soft tissues). This scenario decreases blood flow to the kidneys that are hypo-functional already, and leads to renal failure. Treatments are largely ineffective but we give phosphate binders



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such as aluminum hydroxide and soak them daily in water. We would remove them from UV-B light sources and allow UV-A to continue. We recommend store bought greens and add Metamucil to the salad mix (if still eating). Also, we would tailor the treatment specifically however to the signs the individual is having with the disease. Again, treating secondary disease and administering supportive care as needed. We have placed catheters and given IV fluids from time to time, but it seems like if a herp needs IV fluids it was an emergency three months ago and the owners are acutely recognizing a chronic problem.