

## Companion Animal Hospital Exotic Animal Care



### Lighting for Reptiles and Amphibians

Some reptiles and amphibians require broad spectrum lighting that includes ultraviolet A and ultraviolet B radiation (wavelengths found in natural sunlight). Providing this special lighting in captivity is critical for the health of many common companion species.

#### 1. What is ultraviolet light?

Ultraviolet light is invisible to the human eye, but important to many members of the animal kingdom. There are three classifications of ultraviolet light:

- **Ultraviolet A:** UVA is also called long wave or "black light" ultraviolet radiation. This class of UV is important in regulating natural cycles in some reptiles, such as brumation ("hibernation") and reproduction.

Many species of reptile (Fleishman et al. 1993), insects (Salcedo et al. 2003) and birds (Cuthill et al. 2000) can see UVA light. It is important in helping to see members of the same species or even prey. It has been demonstrated that reptiles provided with UVA light generally do better in captivity, with increased levels of natural activities, greater reproductive success, and better appetites (Klaphake et al. 2004).

UVA is produced by the sun, by broad spectrum fluorescent bulbs and black lights (Gehrmann 2006).

UVA is definitely beneficial to diurnal species (species active during daylight hours). It may be most important in visually-oriented species, like members of the iguana (Iguanidae), agama or dragon (Agamidae) and true chameleon (Chamaeleonidae) families of lizards, as well as in turtle and tortoise species.

- **Ultraviolet B:** UVB is also called medium wave ultraviolet radiation, and is essential in vitamin D<sub>3</sub> production (the "sunshine vitamin"). Vitamin D<sub>3</sub> allows the body to use calcium from the diet. Some species can use vitamin D<sub>3</sub> from dietary sources (animal matter), but many species either cannot absorb dietary D<sub>3</sub> or do not encounter vitamin D<sub>3</sub> in their natural diet.

It is uncertain whether reptiles can see or detect UVB. It is produced by the sun, and by some broad spectrum artificial lighting (Gehrmann 2006).

UVB is important to provide for most diurnal lizards, chelonians and some amphibians. Herbivorous (plant-eating) animals absolutely need UVB lighting as they cannot use dietary vitamin D<sub>3</sub>. Without UVB lighting, calcium deficiency occurs and manifests as many health

problems, including the metabolic bone diseases (a group of pathologies related to calcium metabolism).

There is a growing amount of research suggesting that species that we have not traditionally recommended UV-B lighting for can benefit from exposure. For example, some studies (Acierno et al 2008, Hedley and Eatwell 2013) have demonstrated that snakes can certainly use UV-B lighting. More investigation is needed to determine the health benefits of providing broad spectrum lighting to these species, however in the meantime it may be safest to allow for lighting that is as natural as possible for these captive snakes.

- **Ultraviolet C:** UVC, or short wave ultraviolet radiation, is produced by the sun but filtered by our atmosphere. Some lights will produce UVC radiation very close to the bulb surface. It is germicidal and used in air and water disinfection systems. Exposure to UVC radiation is harmful to the skin and eyes, and does not need to be provided to reptiles or amphibians in captivity.

## 2. Types of broad-spectrum lights

There are several types of commercial bulb available to provide your companion animal with broad spectrum lighting. Select a bulb according to the animal you have, and the type of enclosure you are using.

- Linear fluorescents are suitable for enclosures with a lot of floor space, as well as for long animals that have a large body area that needs UV exposure. Examples of brands include: **Exo Terra Repti Glo** by Hagen, **Iguana Light** and **Reptisun** by Zoo Med, **Desert Series 50** and **Tropical Series 25** by Zilla.



- Compact fluorescents are limited in their "spread" (place them horizontally towards the basking area, to increase surface area exposed) but have a greater relative irradiance closer to the bulb, so they are more suitable for small enclosures.

Examples of brands include:

**Exo Terra Repti Glo** by Hagen, **Reptisun** by Zoo Med, **Desert Series 50** and **Tropical Series 25** by Zilla.



- Mercury vapour lamps are only suitable for very large enclosures. They produce a large amount of heat as well as visible light, UVA and UVB (Baines et al. 2006). Users must be very careful to avoid thermal burns, always test the environmental temperatures before introducing your pet to the enclosure when using a mercury vapour lamp.

Examples of brands include:

**PowerSun UV** by Zoo Med, **Exo Terra Solar Glo** by Hagen.



### 3. Using broad-spectrum lighting

Keep the following points in consideration when lighting reptile or amphibian enclosure:

- Always research recent current care information about what kind of lighting your species needs. Reptile and amphibian care and medicine is a field that is constantly evolving.
- Never allow a glass or plastic barrier to occlude your broad spectrum light. Glass and plastic filter 99-100% of UVB radiation, even if visible light may pass through (Baines et al. 2006).
- The amount of UV produced decreases with distance from the bulb. Most bulbs are effective at a distance of less than 30 cm (12") from the basking spot (but read the manufacturer's recommendations). However, because bulbs may also produce small amounts of harmful UVC radiation near the bulb's surface, keep a minimum distance of 10

cm (4") (Baines et al. 2006).

- Screen or mesh covers or enclosures will physically block some UV from reaching the animal (Baines et al. 2006). If you have mesh or screen between your broad spectrum bulb and the animal, ensure that your pet can get relatively close to the bulb, or add a reflector to increase how much UV is projected to the basking spot.
- Reptiles and amphibians are never in direct sunlight for the entire day. Always ensure that your pet can choose a location as a shelter from UV light exposure.
- Replace the light every 6-12 months, or according to the manufacturer's recommendations. The UV output of a bulb decreases over time, even if the light is still producing visible light (Klaphake et al. 2003).
- Consider using "high output" bulbs (with an 8.0 or 10.0 rating) with species that would be exposed to a lot of UV light (like desert animals) or in large enclosures, and mid-range output bulbs (5.0) with other species or in smaller enclosures. Low output bulbs (2.0) are probably useless in terms of UVB output.

Thank you for your trust in taking care of your reptile companion. If you have any questions or concerns about his or her care at home, please call the hospital to speak with our staff.

#### 4. Sources and further reading

- Acierno, MJ, MA Mitchell, TT Zachariah, MK Roundtree, MS Kirchgessner, D Sanchez-Migallon Guzman. 2008. Effects of ultraviolet radiation on plasma 25-hydroxyvitamin D3 concentrations in corn snakes (*Elaphe guttata*). *American Journal of Veterinary Research*, 69(2):294-297.
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- Klaphake, E, E Adkins, T Driggers, G Ferguson, W Gehrman, Z Gyimesi, E May, M Ogle and T Owens. 2003. Roundtable: Ultraviolet Light and Reptiles, Amphibians. *Journal of Herpetological Medicine and Surgery*, 13:27-37.
- Salcedo, E, L Zheng, M Phistry, EE Bagg and SG Britt. 2003. Molecular Basis for Ultraviolet Vision in Invertebrates. *The Journal of Neuroscience*, 23:10873-10878.