# UVB Lighting for Companion Birds, Reptiles, Amphibians and Arachnids

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the information on this care sheet is a basic overview and not a substitute for veterinary care. For more information and to find a qualified avian/exotic/reptile veterinarian, go to www.AAV.org, www.ARAV.org, www.AEMV.org

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The wild cousins of our captive pets get exposed to solar ultraviolet light during certain periods of the day. Depending on the species, habitat, weather, and daily activity, this natural sun exposure ranges quite a bit. To properly care for our exotic avian and herp pets, we need to provide synthetic ultraviolet lighting for our pet's indoor lifestyle.

Solar ultraviolet light experienced by life on Earth consists of ultraviolet A (UVA), and Ultraviolet B (UVB). The Earth's atmosphere filters out the very short ultraviolet C (UVC) wavelengths. The UVA and UVB wavelengths are necessary for basic reptile and bird (and human) health. UVC can be synthetically produced and is extremely dangerous in high levels.

Unlike mammals, reptiles, amphibians and birds are able to see UVA wavelengths and this portion of the visible spectrum helps them with food recognition and selection, recognition of species, habitat selection, territory marking and mate selection.

Exposure to UVB (ultraviolet B) light is critical in allowing an animal to synthesize vitamin D3 in its skin and metabolize calcium in its body. If an animal is not exposed to an adequate level of UVB light, it will gradually develop physical problems from the result of mineral deficiencies such as low blood calcium (hypocalcemia), soft eggs (females), stunted growth and metabolic bone disorder, which can be fatal if left untreated. In addition, recent studies have linked sub-optimal vitamin D levels with poor immune system function.

All day-active (diurnal) indoor reptiles, amphibians, birds and hermit crabs should be allowed self-selected exposure to UVB lighting for up to 8-12 hours a day. This means they should be able to bask in the light but also get away if desired, much as they might in the wild. Many twilight-active (crepuscular) and night-active (nocturnal) species do get some exposure to the sun and may also benefit from low levels of UVB. This may help regulate their photoperiod and vitamin D levels as well. Scorpions only need visible light and heat and do not need any UVB (UVB will actually kill them). Tarantulas only need visible light.

It is challenging to describe the optimal UV set-up for every species and situation so the recommendations here are general guidelines. Further recommendations should be made based on discussions with the pet owner and veterinarian regarding the individual pet, nutritional and reproductive status, and cage set up.

There is ongoing research on species requirements in the wild and every effort should be made to approximate these features to the captive lifestyle. There are perpetual changes in the manufacture of bulbs. Not all fluorescent bulbs are created equal and there is a wide range of efficacy and safety issues to consider. Some bulbs available may produce virtually zero or very low UVB. Some bulbs may produce the wrong wavelengths of UVB and in some cases, UVC which can be very harmful at close distances.

UVC is emitted by specialized lights, such as black lights and is in some full-spectrum bulbs on the market. Many scorpion keepers use a black light to make the scorpions "glow." While this may be entertaining, it is not healthy for the scorpion, as extended exposure to UVC can be dangerous.

In 2004, a group of reptile keepers and veterinarians produced an extensive study on UV light and its effects on reptiles and birds.[1] Not only was it found that UVB light was necessary for health, but it showed how dangerous high levels of UVB can be. Exposure to very high doses of short-wavelength UVB radiation can lead to inflammation of the cornea, eyelids and skin. In addition, it was discovered that many of the bulbs available for use in reptile and bird enclosures produced UVB and UVC at levels much too high for the animals at the distance they would normally be exposed to the bulb in their enclosures. These ultra-high levels often resulted in health issues such as suppressed immune systems, egg-hatching failure, and thermal burns (burned skin), which can pre-dispose the animal to certain cancers and skin tumors, and serious damage to the eyes.

In order to make sure you have a safe and efficacious bulb, look for companies that publish the UV wavelength (shown as a color graph) on their packaging. Bulbs that have good UV output will have some activity in the 280-320 nm range (UVB) and 320-400 nm range (UVA). These brands should also provide detailed instructions about bulb placement distance, exposure time (as noted above) and replacement intervals (every six to 12 months).

**BULB NOTES:**

Full-spectrum and broad-spectrum are not synonymous. Full-spectrum bulbs contain *both* UVA & UVB in addition to visible light. Broad-spectrum bulbs typically only contain UVA. Incandescent lights produce no UVB.

There are three types of full-spectrum bulbs: linear (tube) fluorescents, compact (spiral) fluorescents and mercury vapor floods. With compact fluorescents, there is an initial "burn-in" period, where the bulb emits more intense UV output. This means the bulb should be moved several inches further away during the first few weeks. Mercury flood bulbs also emit heat, which is often more intense than incandescent, ceramic or infrared bulbs and these bulbs must be mounted further from the animal. Thus, floods are recommended for larger enclosures. For smaller enclosures, it is recommended to use separate bulbs for heat and UV because the combination bulbs do not put out the proper UV output at a safe heat distance.

The numbers 2.0, 5.0 and 10.0 on the bulbs refer to percentage of UVB (2%, 5% and 10% respectively). The intensity of the UVB the animal experiences is determined by several factors such as: type of glass used in bulb, age of bulb, percentage of UVB in the phosphors, distance to the animal and the presence of a reflector in the bulb housing. For compact fluorescents (5.0 and 10.0), generally, bulbs should be no closer than 4-6" from the top of the animal's head and ideally no farther than 9-12." Low UV (2.0) bulbs are appropriate for snakes, frogs, toads, salamanders, and nocturnal animals. Moderate UV (5.0) bulbs are required for shady/sub-tropical species, and high UV (10.0) bulbs are indicated for sun-loving/tropical and desert species or for situations where the bulb will be between 12-20" from the animal (see figures 1 & 2).

If you are concerned about a possible unsafe bulb, monitor for squinting, face rubbing, and redness of the skin around the eyes. If the problem develops after the introduction of a new bulb, turn off the bulb and usually the signs will go away within 72 hours. If not, seek veterinary treatment.

For reptiles, desert species are able to tolerate higher levels of UVB than tropical species. Also, thin skinned and lightly pigmented species (birds, geckos, frogs), are more sensitive to UVB levels. For these animals, shorter UV exposure times (3-4 hours) and lower UV outputs are recommended. For all species, a UVB gradient allows the animal to make its own adjustments.

Fluorescent tubes and compact fluorescent bulbs that produce UVB rays should be replaced every six months, as the UVB levels drop significantly after this time. Although the bulb's UV output will be ineffective, it will still put-out light and can be used in another location until it burns-out. If you are uncertain to your bulb's output, your veterinarian may be able to check the UV levels of your bulbs with a special meter.

Simply putting a cage near a glass window does not provide enough UV exposure. All glass and plastic block UVB light, so overhead light sources should be kept only behind a mesh cover, never a glass or plastic cover. The mesh will filter a portion of the usable light. Reflective surfaces in lamp housing will intensify the UV output and is one strategy to boosting the effectiveness of the bulbs.

Use caution with vitamin supplements that contain vitamin D. It is possible to cause an overdose of vitamin D with oral supplementation. It's much safer and more natural to obtain vitamin D from UVB exposure. Carnivorous species still need UV light because not all carnivorous prey is capable of supplying the necessary vitamin D.

## Reference:


1. UV Guide.CO.UK – 2010 – Available at http:// http://www.uvguide.co.uk/intro.htm (accessed 06/27/126)


**Figure 1.** Simplified drawing of a cage set-up that allows a lizard to self-regulate exposure to a gradient of heat (focal source depicted by dark triangle) and UV light (concentrated source depicted by striped tube), Downward arrows indicate maximum UV and heat locations.

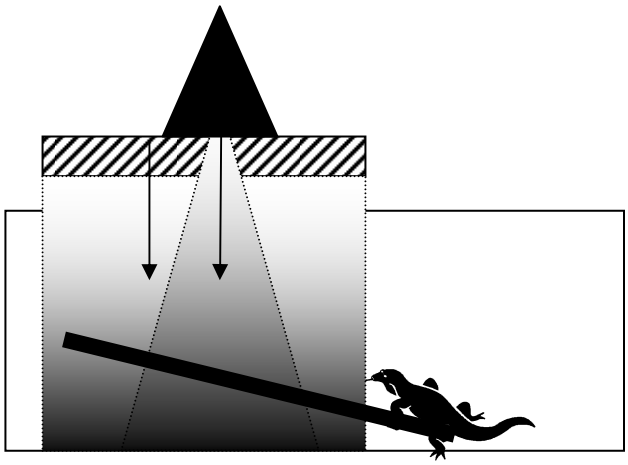

**Figure 2**. Drawing of a cage set-up using a compact fluorescent bulb for UV light source (depicted by striped triangle).