

Reptile Lighting Information

Information on how natural and artificial lighting affects reptiles.

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A UV-transmitting skylight helps light the Komodo dragon enclosure at ZSL London Zoo in the U.K.

Lamp Position - All light sources should be above a reptile's head — not to the side.

Does this look safe to you? The temperature of the substrate under this basking lamp might be perfect, but the tortoise's carapace is nearly 10 inches closer than this to the lamp. Take into account your reptile's height when checking temperatures.

Outdoor and Indoor Lighting

In every ecological niche, different species have evolved behaviors and bodily characteristics enabling them to use full-spectrum light from the sun in the most efficient way.

Many reptiles benefit from outdoor enclosures whenever ambient temperatures are suitable. Whether or not they require direct sunlight depends upon the species, but all species require access to full shade and shelter.

Sometimes aspects of outdoor lighting can be brought indoors. Room-sized enclosures can be equipped with skylights and windows glazed with special UV-transmitting acrylic or glass. Trade names for such UV-transmitting products include Perspex, Plexiglas and Lucite (acrylics), and Starphire (low-iron glass), all of which must be special ordered. Even then, supplementary UVB may be required. Heat built up by direct sunlight through glass must never be ignored, either.

Unfortunately, comparatively few reptiles in captivity experience truly natural lighting. Most are housed indoors and behind glass, and they rely upon artificial light to make their day. Adequate light in captivity is best provided by emulating the reptile's natural environment, including a temperature gradient as found in the species' microhabitat. These provisions allow the reptile to decide how much heat, visible light and UV radiation it experiences each day.

Artificial Sunlight Options

Most lizards and chelonians, and many snakes, need high levels of full-spectrum lighting, which must include UVB and UVA. Herpkeepers must aim to use the lamps available to provide pets with their specific lighting needs.

Incandescents (A), "daylight" fluorescents (B), UVB fluorescent tubes (C), mercury vapor lamps (D) and UVB metal halide lamps (E) are among the bulbs used in reptile husbandry. Incandescent (tungsten or halogen) lamps provide excellent heat and visible light for a basking spot, and they can be thermostatically controlled. Standard type-A household bulbs or flood lamps with a beam at least 30 degrees wide work fine. Their predominantly red-and-yellow light is deficient in blue light and UVA, and they do not emit UVB. These complement all UVB-emitting reptile lamps, which have little red or yellow light, extremely well. Incandescent lamps connected to timers can produce a simple effect for dawn and dusk. Timers can switch them on just before, and off just after, the UVB lamps.

"Daylight" fluorescent tubes are sometimes called "full-spectrum" lights, but they do not produce sufficient UVB for vitamin D3 synthesis in reptiles. Some brands produce traces of UVB and a little UVA. They can be useful for improving general light levels in cooler areas of a vivarium.

UVB fluorescent tubes produce diffuse, low levels of UVB resembling outdoor shade on a sunny day. They emit less visible light than other bulb types. These tubes are suitable for supplying UVB to species that do not bask in sunlight, such as some forest shade-dwellers, or for small enclosures where the heat from mercury vapor lamps would cause problems with the thermal gradient. Always combine them with a better visible-light source. Quality tubes emit light with a UV Index between about 0.5 and 1.0 (sunlight in the tropics before 7:30 a.m.) at 12 inches (the usual maximum distance suggested), and they need to be replaced every year.

UVB compact fluorescent lamps also produce diffuse, low levels of UVB at basking distances. However, at close range and/or if reflectors are used, the light and UVB may be intense, making good positioning difficult. These lamps decay more rapidly than tubes and may need replacement after six months.

A few brands of fluorescent lamps for reptiles, both compact and tube types, have been found to emit hazardous

shortwave UVB. These have caused eye problems such as photokeratoconjunctivitis. Some manufacturers that experienced the problem say they have addressed the issue, while others are still addressing it. However, if your reptile develops swollen eyes or refuses to open them shortly after a new lamp is installed, see your herp veterinarian immediately. You may wish to refer him or her to this article. Lamp placement, the lamp itself and/or other factors could be responsible.

Mercury vapor lamps vary in quality and UVB output. These lamps also produce significant heat, and they cannot be thermostatically controlled, so they are most suitable for large enclosures. Be sure to follow the manufacturer's guidelines and instructions for proper lamp placement and distances. Several mercury-vapor-lamp types are available. Inexpensive spot lamps with clear-glass faces may produce extremely narrow, hazardous beams of intense UV light and are best avoided. Flood lamps have much wider beams, and they are ideal for reptiles that naturally bask in the sun. They create directly below the lamp a zone of bright light and UVB resembling a small patch of sunlight. Brands vary in their UV Index. Recordings range from about 2.0 (full tropical sun before 8:30 a.m.) to 7.0 (full tropical sun between 9 a.m. and 10 a.m.) within the basking area.

Metal halide lamps are rapidly gaining a place in, or rather over, the vivarium. Like mercury vapor lamps, metal halides are most suitable for large enclosures and cannot be used with a thermostat. Most do not produce UVB. "Daylight" versions with a color temperature between 5,500 and 6,500 Kelvin are the best choice for creating the look of sunlight. Used with care, these lamps are superb for simulating bright daylight in a large vivarium when combined with a UVB lamp. However, they require an external ballast, and positioning them is crucial. At close range the visible light is extremely intense, and the lamp must never be looked into directly. Manufacturers are developing UVB-emitting metal halides designed specifically for reptiles, and early test results look promising. Although the UV Index range can vary depending upon the brand, some sample lamps I tested for UV Guide U.K. were emitting light with a UV Index between 2.5 and 5.0 (full tropical sun between 8:30 a.m. and 9:30 a.m.) at 18 inches.

To reptiles, sunlight is life. Artificial sunshine is not ideal, but there are now many combinations of lamps, bulbs and tubes available. When used with care and sensitivity, they will go a long way toward meeting the needs of all reptiles in captivity.

Secret in the Shape - One of the most important features determining the usefulness of a UVB lamp is the shape of its UV gradient, or UV footprint, in the basking area. Ideally, the whole reptile should receive warmth, light and UVB while basking. The following iso-irradiance charts show the UV Index gradients for several lamps. The charts are all to the same scale, and each lamp is placed 12 inches above the tortoise or iguana's eye level, a distance often recommended by manufacturers.

Glowing Advice Trust your reptile to know what it needs. Reptiles are extremely competent at deciding how much heat, visible light and ultraviolet radiation they need at any given time. Captive reptiles need a sufficiently large, species-appropriate microhabitat with suitable heat, light and UVB gradients, shelters, and basking areas, so they can select their preferences like they would in the wild. UVB, UVA, visible light and heat go together. Because vitamin D3 synthesis in reptiles occurs only in warm skin exposed to UVB, ideally a UVB lamp needs to be over the basking area. Pairing the UVB source with the basking lamp is always a winning combination. Like the sun, lamps should be overhead. Reptiles have eyebrow ridges, and some have upper eyelids, for a reason: They shade the surface of the eye. All light sources should always be directly above a reptile's head, not to the side. Lights shining sideways into its eyes are stressful (think of driving a car toward the setting sun). Also, intense visible light, as well as UVA and UVB, can seriously damage eyes. Keep a respectful distance. In the author's opinion, no lamp or tube should be closer than six inches from the reptile, even when positioned directly overhead. Heat lamps usually require much greater distances than this. At close range many lamps are frankly dangerous. Most quality UVB lamps have minimum and maximum recommended distances, and these must be carefully observed. No spots please! Basking spots should be basking zones. A reptile's whole body must fit within the high-temperature, brightly lit basking area. Flood lamps are essential. Narrow spot lamps may only heat a small patch of skin, which may become dangerously hot while the rest of the body remains cold. The hapless creature may stay where it is, trying to warm further, and sustain thermal burns. Always double-check your temperatures. It is vital to check the temperatures reached under a lamp. Take into account the height of a lizard's head and shoulders, or a chelonian's carapace, when doing this. Allow reptiles to set their patterns. Reptiles rely upon a distinct day and night to set their circadian rhythms. Day must be light; night must be dark. Use timers to provide the correct photoperiod for the species. If nighttime heat is required, ceramic heaters or heat mats mounted on a rear wall are more suitable than night lamps.

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