

# Lighting and Heating for Reptiles

## **Heat**

Providing the right type of heat to a reptile is just as important as the temperatures you provide. Reptile vets, biologists and an increasing number of experienced herpetoculturists are all saying that that best source of heat is through an overhead radiant source, not by a hot rock or heat tape. So, when confronted with a shelf full of pretty boxes of light bulbs produced to attract your attention, how do you know which one to select for your reptile? Here are a few things to keep in mind...

## **Incandescent bulbs**

Any incandescent bulb can be used for daytime heating...even the bulbs you use in your own lamp fixtures. The wattage you need will depend on what it takes to do the job. The higher wattage bulbs throw out more heat and so can be used a little farther away from the animal than lower wattage bulbs. Make sure the light fixture you use is rated for the wattage you end up using.

## **Reptile Basking Lights**

Reptile basking lights may also be used for daytime heating - they are just more expensive than regular incandescent bulbs. Some may be coated to affect the color of the light produced - this may alter the way your eye perceives your animal's color and the way your reptile's eyes perceive the things in its environment. It is important to note that the "neodymium" coated lights do *not* produce anything but a pleasantly tinted light. They do not produce any ultraviolet B wavelengths.

## **Spotlights / Silvered Reflector Lights**

Spot lights/Silvered lights are just lights that are shaped and backed with a non-light emitting film so as to focus their light in a specific direction. Some are high wattage, suitable for use for daytime heating; some are low wattage, such as those used for exterior landscaping lighting.

## **Infrared Heat Lamps**

Infrared heat lights, such as those used in the food service industry to keep hot food warm until it is served, may be used for daytime heating.

## **Lights for Nighttime Use**

For night time use, you *cannot* use a white or any bright light. Doing so causes disruption of the animal's sleep cycles, even if it appears to be sleeping (remember that sleep is comprised of different types of cycles which alternate during the course of the sleep session - bright light disrupts deep sleep and can result in chronic stress and depressed immune function and behavioral abnormalities). Nocturnal reptile light bulbs produce a dim light. They are generally

available at higher wattages than the regular decorative red, green or blue incandescent lights you can find at hardware and lighting stores.

### **"Full-Spectrum" Hype**

"Full spectrum" lights which look like incandescent light bulbs are incandescent light bulbs and so are good **only for producing heat**. They do **not** produce any UVB. Tungsten filament technology cannot produce UVB. The use of the term "full spectrum" is grossly misleading. Any pet store that tells you they produce UVB is either completely ignorant or lying to you to make a sale.

There are mercury vapor and metal halide lights which produce both heat and UVB. Unfortunately, they may be dangerous to your reptile. They put out very high levels of ultraviolet wavelengths requiring them to be turned off when you are near them and/or needing to limit their time in use with the reptile. (For my take on such products, please see my article [\*"ACTIVE UV" Heat and UV Lamps: Are they suitable or safe for typical home use?\*](#)) It is safer, though more cumbersome, to use a heat source and a separate UV fluorescent tube if you cannot assure your UVB-dependent reptile access to sufficient sunlight on a regular basis.

# Non-light Emitting Heat Sources

## **Ceramic Heating Elements**

Ceramic Heating Elements (CHEs) are non-light emitting ceramic units embedded with heating elements. They get extremely hot but disperse heat over a very narrow (15" in diameter) and shallow area. 60 watt CHEs range is 8" down; 100 watts CHEs is 10" down, 150 watt CHEs is 12" down, and 250 watts goes 14" down. They are not effective in heating large enclosures...and the lowest wattage ones may be too much for small enclosures so must be used with a rheostat or lamp dimmer switch. It is imperative that CHEs only be used in porcelain light sockets as the amount of heat that they throw back is enough to melt the plastic light sockets in most clamp light fixtures.

## **People Heating Pads**

These are suitable for providing gentle under the tank or on the bottom of the tank heating. They cover a wide surface area of the tank floor and may be sufficient to warm temperate snakes during the day and night and provide night time heat for diurnal lizards. When used with diurnal reptiles, however, they should always be used *in conjunction with* overhead radiant basking heat. Thermometers need to be used to assure that the proper temperature gradients are being attained and maintained. These pads, which include in-line three-way heat settings, are self-contained, easily moved around, and can be safely cleaned and disinfected as needed.

## **Reptile Heating Pads**

These are expensive and less "convertible" than the people heating pads. Once they are stuck on to the bottom of the tank, they cannot be easily removed, and once removed they cannot be safely used. They cannot be cleaned and disinfected as water can seep under the pad. They do have multiple heat settings, but because they are glued to the tank, the tank can not be moved away from it to provide more of an air space to use to dissipate the heat.

## **Flex-watt Heat Tape**

This is tape that was developed for use in plant nurseries to heat large flats of seedlings and to wrap around water pipes to prevent their freezing. They are not UL approved. Make a mistake in how you do the installation (which requires wiring them to electrical cords and light switches or rheostats) may result in fires or smoke outs...which has been known to happen even when they have been installed by licensed electricians.

## **Lighting**

Any incandescent white light can be used for daytime lighting and heating. Nocturnal reptile lights and dark decorative red, blue and green incandescents provide dim lighting that will not disturb the sleep of diurnal (active during the day) reptiles and isn't stressful to nocturnal reptiles. Diurnal reptiles need a bright white light during the day if the ambient room lighting is dim or the only other source of light is a UVB producing fluorescent.

## **Incandescent Lamp/Ceiling Fixture Bulbs**

Any light bulb you use in your own table lamps or incandescent ceiling or wall light fixtures to provide light for your home can be used during the day to provide bright white light and heat for your reptiles. The only difference between the incandescent bulbs you buy in your grocery or

hardware store and the more expensive bulbs marketed for reptiles at the pet stores (besides the price tag!) is that some of the reptile bulbs have been "color corrected" to remove the yellow wavelengths; all this does is alter the apparent of the reptile to you, and will affect slightly how the reptile perceives its environment. However, when using a household incandescent in conjunction with a UVB-producing fluorescent, yellow wavelengths will be provided and, more importantly, UVA, into which spectrum many reptiles can see.

### **Reptile Basking Lights/Spots**

These are simply incandescent light bulbs that have been treated to block part of the visible spectrum. They produce heat, and may affect somewhat the colors *you* see when looking at your reptiles. As stated above, they do *not* produce UVB. These bulbs are considerably more expensive than household lights. My recommendation is to use household lights during the day, spending the money you save on nocturnal reptile lights for night time heating if you cannot find household red, blue or green incandescents of high enough wattage for your needs. A word of warning: ESU makes the "rare earth" "black phosphorous" nocturnal lights. They are nice as they come in a good choice of wattages and produce a dim purply-blue glow that won't disturb your reptile nor you if your reptile is in your bedroom. However, these bulbs regularly burn out within a few months of purchase. Most people don't bother to complain to the manufacturer or even the pet stores, so this problem just continues on and on. Please: if you haven't dropped it and have used it properly, installing it in a light fixture rated for the wattage, **complain to the manufacturer *and* pet store!**

### **UVB (Ultraviolet B) and UVA (Ultraviolet A)**

The only lights that can safely provide these two critical wavelengths to your diurnal reptiles are the UVB/A producing fluorescents made for the reptile pet trade. (Note: for the problems associated with the use of screw-in compact fluorescents, please see my comments in the UV Table article referenced below.)

Fish/Aquarium and plant "grow" lights-incandescent and fluorescent-do not produce UVB. Tanning salon fluorescents, tubes made for phototherapy for humans, germicidal UV tubes, and mercury vapor lights, all of which produce UV, do so at levels that are unsafe for the reptiles *and* their keepers. Many of these produce very high levels of UV and are designed to be used for *very* limited periods of time and require that protective eye gear be worn (and to my knowledge, despite the availability of ponchos, sombreros, and motorcycle jackets, no one has made UV resistant goggles for iguanas yet...).

Some of these lights also produce UVC, that range of wavelengths (< 290 nm) known to cause immune suppression and cancer in humans and animals. UVB producing fluorescents that produce a decent amount of UVB (1-5%) aren't very bright (have lower CRI) - bright UVB producing fluorescents (high CRI) do not produce much UV; that is a tradeoff required by the technology itself. So, when using a UVB producing fluorescent, you should be using a white light emitting incandescent as well - this will give your diurnal reptiles both the UV and the bright light they need. A list of UVB producing fluorescents can be found at the end of the [UV Table article](#) in the Lighting clusters at my iguana care page and main webpage. See also the new article by William Gehrmann, [Reptile Lighting: A current perspective](#) which includes a table of tubes.

### **CRI - Color Rendering Index**

Those of you who are bothered by low interior lighting or who get somewhat grumpy or depressed on cloudy days, but who find life wonderful indeed on bright, sunny days or in well lit

rooms, are responding to the difference that low CRI and high CRI make - the higher the Color Rendering Index (CRI), the better things look to us.

### **Importance of UVA**

Humans and reptiles alike see into the visible light range (400-700 nanometers). Reptiles and many other animals (but not humans) can also see into the UVA range (320-400 nm). UVB producing lights also produce UVA. UVA subtly affects the way things look to a reptile, from the color of their food to the color of their bodies. To us, male anole dewlaps look reddish - to another anole with sufficient UVA, however, they are brilliant, radiating, flaring red. The tongue of a blue-tongue skink looks, to us, like the skink has been eating a basket of blueberries. To another blue-tongue skink, however, the tongue is a bright, fluorescent, day-glo pink. Failure to provide UVA to diurnal reptiles can cause subtle stress by altering the reptile's perception of its universe and how it responds to it. This can be crucial if you are thinking about breeding them or keeping them around for the length of their natural lifespan...

UVB (290-320 nm), of course, is critical for the formation of the chemical which ultimately is transformed by the animal's body into vitamin D3. D3, as the articles on calcium and [metabolic bone disease](#) tell us, is critical for the proper uptake and metabolization of calcium in the body.

## **Some Points to Remember When Setting Up Your Enclosure**

### **Placing the Lights**

Cluster your incandescents used for heat and your fluorescents used for UVB/A at the same end of the enclosure. You can certainly use a fluorescent tube that extends partially or completely down the full length of your enclosure, but if you are using a short tube, be sure to house it adjacent to the basking light. I find that too many people are putting the fluorescent at one end and the white basking light at the other.

The reason you need to place them adjacent to each other is that the bright white light will attract the reptile to the warmest area so it can bask. It will spend most of its time during the day there, and while there, will be exposed to the UVB and UVA produced by the fluorescent. As it thermoregulates, it will move along the gradient of heat, but always going towards the bright white light to warm up. If provided with a non-white light emitting heat source on one end of the enclosure, and a cool white light at the other, such as that emitted by fluorescents, the reptile will elect to sit under the white light because it is attracted to the light. Thus it will fail to attain the temperatures it needs to ensure proper digestion and good health.

### **Replace UVB Fluorescents Regularly**

Over a period of time, the amount of UVB (and, presumably, UVA) emitted by the fluorescents decreases to the point where it will fail to provide sufficient UVB for vitamin D formation. This degradation occurs long before the bulb "burns out" - ceases to produce any visible light. Unfortunately, there is little data to indicate just how long the various bulbs produce sufficient levels of ultraviolet wavelengths. Experienced herpetoculturists change these tubes every 6-12 months. Mark your calendar, or pick a particular day of the year (your birthday, New Year's day, etc.) on which to do it that will be easy to remember.

### **Watch the Distance Between the Reptile and the Light**

The farther away from the fluorescent tube your reptile is, the less UVB it will actually get. The drop off is dramatic: at two feet away from the light, the reptile is getting only one-fourth of the UV it would get at only one foot away. It is recommended that the light not be any further than 18 inches (46 cm) from the reptile, and preferably much closer, such as 10-12 inches (25-30 cm). This may call for some creativity on your part if your reptile is housed in the typical glass tank sold by most pet stores, or is set up as a free roamer. In custom built enclosures, the lights can be securely ceiling-mounted in the enclosure, with the basking areas set up the appropriate distance beneath them.

### **Do snakes need ultraviolet B wavelengths, too?**

No. When snakes evolved from lizards some 120 million years ago, they also evolved other ways of dealing with the issue of calcium metabolism. Snakes are carnivores, consuming, depending on the species, a variety of vertebrate and invertebrate prey from which they obtain the D they need. There is some speculation that snakes may need some UVB given the habits of some crepuscular and nocturnal ones in the who regularly emerge before sunset and "bask" in the setting sun. However, these same species have been kept for decades in solid enclosures indoors where they are not exposed to any more UVB than what little permeates through window glass and the glass of their enclosures.

There is some evidence that some reluctant feeders may be enticed to eat when exposed to a

UVB/A light for sunlight for a while (during day time hours for up to a week). This has worked with corn snakes that I know of. I don't know the mechanism at play - maybe they are responding to the UVA and so things look more appetizing to them. Care *must* be taken when exposing your snake to sunlight. Too many owners have found out the hard way just how hot it gets inside a glass tank set outside on a sunny day - and just how quickly their snake becomes toast. Make sure your snake has a cool area to retreat to, and that it is not exposed to sun during the hottest parts of the day, nor left unattended when exposed.

### **In Closing...**

So...when looking at what you need to make sure your reptile is getting what it needs to have the best chance of health and behavior, you need to consider lighting and heating as having three distinct but interrelated functions: heating (day and night), metabolism, and behavior.

Just as it is critical to provide the proper lighting and heating for diurnal reptiles, so too is it important to provide the proper lighting and heat for nocturnal ones....and that generally means no light or very dim light. Using a white light to heat a nocturnal reptile at night is just as stressful to it as using the same light to heat a diurnal reptile at night. We must tailor the equipment used to the animal's evolved requirements/needs.