



## Heating

Heating methods for reptiles and amphibians have advanced in the last few years, but perhaps are still a long way off the 'wish list' of many keepers' in providing heat for their reptiles. Heat, naturally speaking, can all be traced back to the energy of the sun. The sun raises temperatures throughout the world (it's a fact) and also provides a quality of light, which we generally refer to as full spectrum and illuminance. This is covered in our lighting guide.

We can often make our lives easier, in understanding animals needs, by studying and sometimes providing heating and lighting separately. Remember, there are many different methods, not all are agreed upon by all keepers – this guide is biased towards providing heat and light separately to provide full control. It is also worth noting that all commercially available heaters and lights have good and bad points and are best viewed as being “flawed”.

All heat sources, no matter which is used, should have their output controlled by a quality thermostat. Some models control different temperatures for day and night and even independently switch lights on and off – probably the best on the market are Microclimate. Some of their

models will allow for gradual temperature increases and decreases each day and night – very natural. All light emitting heaters need to be connected to a dimming model thermostat.

All heat sources should be carefully positioned to allow a temperature gradient within the vivarium. In large vivaria multiple basking and belly heat sources can be utilised, but in average sized ones this makes a temperature gradient difficult or impossible to achieve. One heater placed at one end of the vivarium in these smaller vivaria is certainly the best option.

## **Heat from Below**

Over the years we have come to understand that some reptiles (in particular) soak up heat primarily through their bellies. To an extent all reptiles do this, but some also bask under the sun at the same time – heat is released from the ground or flat rocks whilst they bask. However, for this guide and the sake of simplicity, we will refer to belly heat reptiles as crepuscular. This means they primarily come out of their hides and burrows after the sun sets, sit on something that has heated up in the sun and then go about their normal activities (anything from feeding, breeding and their stomachs digesting food). The prime examples of species like this are Leopard geckos and Corn snakes.

However there are some discussions and disagreements regarding crepuscular animals. Some keepers would prefer to see them classed as cathermal – a term used to describe a species that will also occasionally bask in sunlight depending on various factors such as season and weather conditions. There is likely some truth to this, more for some species than others. For example, Corn snakes are almost certainly cathermal, they will bask habitually during the spring and autumn months only becoming crepuscular during the hot summer months.

So, back to belly heat and providing it - the simplest method is provide a heat source from below such as by using a heat mat or cable, the commonest by far being the heat mat. It has served the hobby very well over the years, but has some limitations and also some problems. We can only recommend heat mats when using shallow layers of substrate, a maximum of 20mm for most substrates and applications. Of course there is a risk of the animal moving the substrates so the substrate is deeper – the keeper must be aware of this and take every precaution. In this context heat mats if not used correctly can cause burns and even fires, this is a

condition known as thermal blocking. The heat builds up in the substrate and does not escape. Further problems exist, if placed under a melamine, wood or thick construction vivarium the heat mat will again overheat – a fire risk. If placed inside the vivarium most heat mats are not waterproof and thus unsafe – if a heat mat is placed inside a vivarium we would always recommend one of the waterproof models such as Lucky Reptile Thermo Mat Pro.

Some keepers claim that heat cable provides hot and cold spots – however, with correct installation using aluminium reflective tape under the cable we have never experienced this problem. We find it to be a cost effective, easy to install method of heating several vivaria housing species that require under floor heating. Cable can also be useful for those preferring bio-active planted vivaria, as it can be used in the soil.

There are various commercially available rocks that heat up, but they lost favour in the early days as the initial models could cause burns to the animals. The newer models are fully waterproof, look natural and have a temperature sensor that monitors the surface temperature to stop burns occurring. This could be route forward for many keepers if the reputation gained from the early models could be overlooked.

There is one more method of providing a belly heat; it's probably the most natural of all the options currently available but not as convenient and certainly more complex. If an overhead heat source (a bulb or ceramic heater) has a flat rock or other similar non-combustible material placed underneath it the flat rock will natural heat up. This will keep warm for some time after the “sun sets” and many argue this is the most natural method. It will also provide basking heat for cathermal species, should the animal be tempted to “bask” the opportunity is there. However, this system is more difficult to install and has an increased cost potential to factor in.

## **Heat from Above**

In this context we shall refer to the reptiles (and some amphibians) suited to this method as basking diurnal species. These occur through the world from temperate species through to tropical, desert and all those in between and can be lizards, tortoises, snakes and even some frogs / toads. They are active during the day and need the heat from the sun to go about their business. Good examples would be Bearded Dragons, Asian Water Dragons, Garter snakes and tortoises.

If a light emitting light bulb is used, it is more limiting to what can be done and provided for. There is little benefit from using a light emitting bulb, apart from being able to see if it's working or not. It is suggested, at times, that reptiles associate light with heat, however true this may be in the wild; in captivity most light emitting basking bulbs only provide an illuminance of around 7000 lux. This is the equivalent of shade and would not attract a basking reptile. As an exercise take any brand of any light emitting bulb outdoors on a UK sunny summer day. Once outdoors it will appear as its turn off – the sun is really that bright!

We prefer to combine a ceramic heater with a high illuminance light source – a T5 Fluorescent tube will provide illuminance of much higher levels and also full spectrum and UVB (more reading available on our lighting page in the advanced section). A ceramic heater gives high power infra red that soaks into the basking reptile, creates the basking temperatures required and can be used at night (if required) as it gives off no visible light. This is certainly useful for many climbing nocturnal gecko species such as Tokay geckos. As the ceramic heater gives off no light it adds more flexibility to the vivarium, as technology stands.

Other methods of creating basking areas include halogens, mercury vapour and metal halides. Metal Halides are amongst the highest providers of illuminance – however, they may be too intense and concentrated, but are not the best choice in providing high basking temperatures. They cannot be controlled by a dimming thermostat and risk overheating the vivarium / reptile. A normal thermostat will switch the bulb on and off to control the temperature creating a stressful “disco” environment. Mercury vapour hasn't the high output of illuminance of metal halide, and also cannot be connected to a dimming thermostat. There are commercially available dimmable Halogen bulbs and are used by some keepers to create basking hot spots – sometimes in larger vivaria there will be multiple halogens.

**This care sheet was kindly provided by Kevin Stevens of Coast to Coast Exotics.**

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