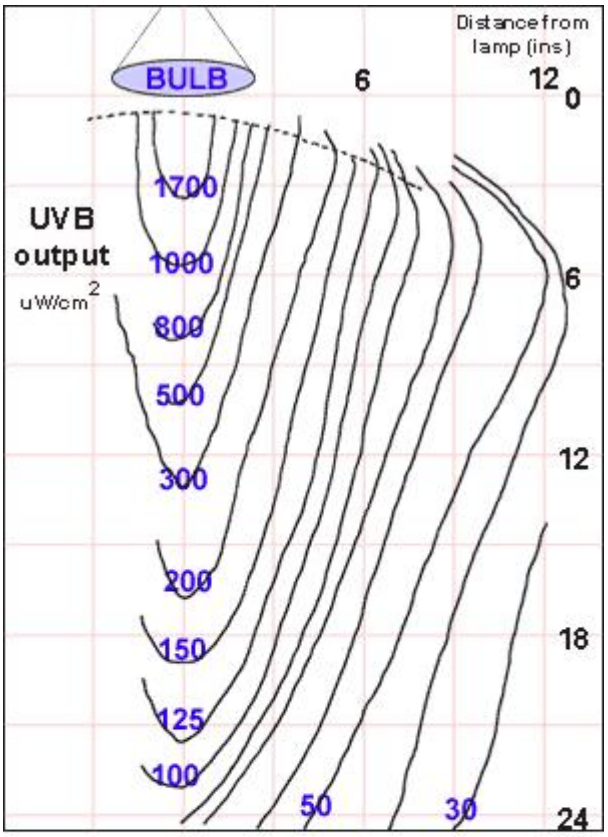
How to Make Yourself a Simple UVB Spread Chart for Home Use.

It's very useful to know what your UVB equipment is emitting, and a few months ago I devised a very simple method of recording UVB output in the form of a 2-dimensional chart, representing a cross section of the three-dimensional "cone" of light put out by a lamp. This is useful to have, as it enables me to predict what UVB my various basking platforms, etc, will receive in my vivarium. They are not all directly under the light, but I need to know roughly what level of UVB my animals are then exposing themselves to, if they sit on these shelves and turn to face the light directly.



What does this diagram show? Well, consider a small lizard sitting directly below the lamp at a distance of 18". The parts of him directly facing the lamp are receiving maybe 160 - 170uW/cm2.
If he moves sideways three inches, that is reduced to about 100uW/cm2, and if he moves sideways seven inches he'll only get 50uW/cm2.
If he stays directly under the lamp but moves closer to it, the amount of UVB he receives will increase, of course. If he moves straight up three inches, to 15" from the lamp, we can see from the chart that his exposure increases to about 230-240uW/cm2.
These diagrams are thus useful when planning where to place lamps, basking shelves, etc.

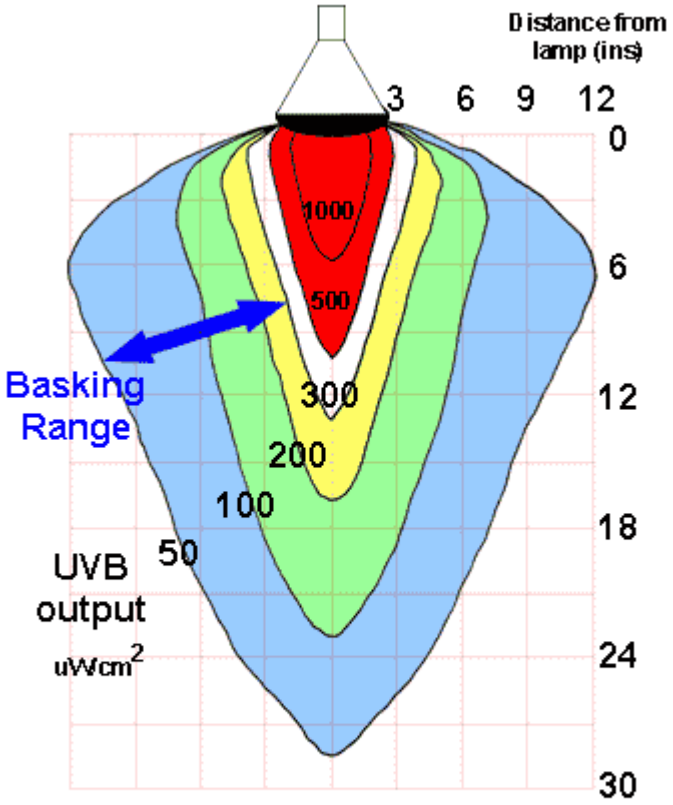
This is the actual UVB Spread Chart I made for my own Megaray 60 watt EB Narrow Flood lamp, after I'd transferred the data from the large sheet of card it was on, to my computer and tidied it up a bit.

Others have also made similar charts which can be viewed online; see for example Chris's one at:

Chris's Chart

Once I had the basic pattern to look at, I could see that the lamp is producing a fairly predictable spread and I felt confident, bearing in mind this is for home use, that this data was adequate to construct a simple full spread diagram, which I could tidy up even more, and colour code as well.

This is the result:



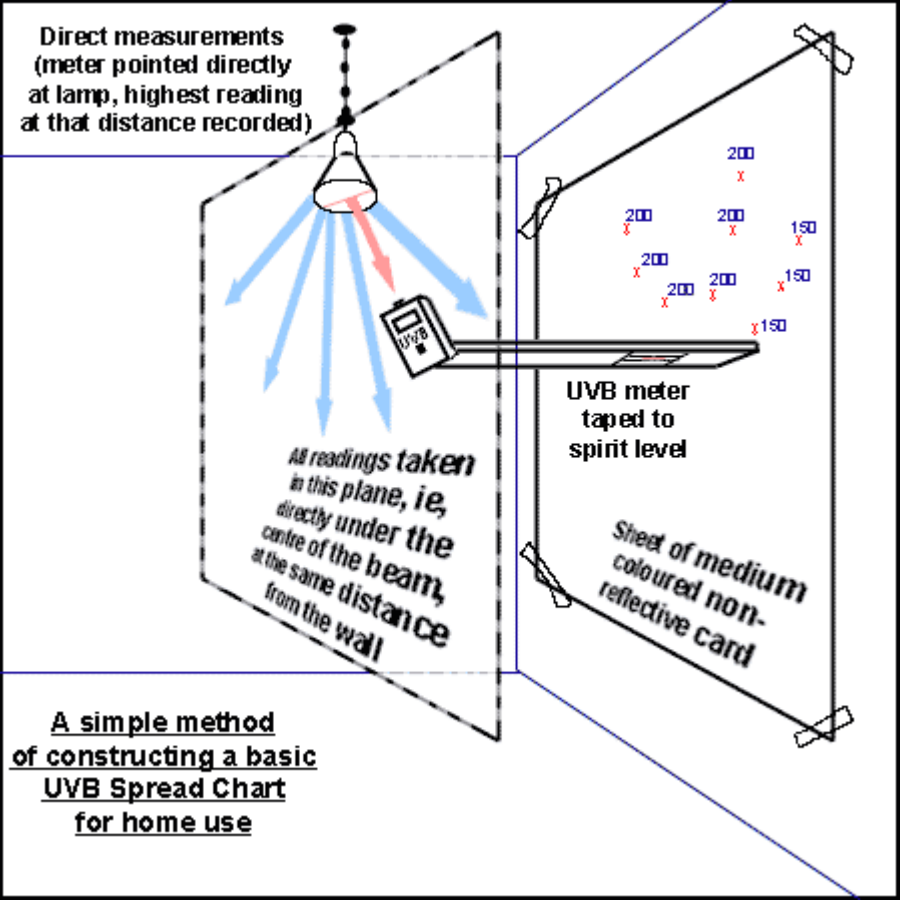
UVB spread chart
for my lamp (simplified)

It's important to understand that although it is likely that all lamps of the same brand and design will have a similar spread pattern – since this depends upon the shape of the bulb and type of reflector (flood, spot, etc) each lamp will produce *different values* for its UVB output, depending on its original specifications (Megarays, for example, are all calibrated individually, eg. 200 uW/cm^2 at 12" ; 350 uW/cm^2 at 12"; and so on.) and of course, its age…. some brands of lamp show a noticeable decay with use, so re-measuring would be necessary over time.

I'm planning to create spread charts for each type of lamp I use, eventually, though I must admit it's a rather time-consuming process so after I have done basic charts for each type, I'll use them to *estimate* output for my individual bulbs, assuming the same spread pattern but at different intensities due to original output, decay, etc… which I can measure in the traditional way, using direct readings perpendicular to the bulb surface at 6", 9", 12"… we all know what that involves by now!

How to obtain the data.

All you need to test a mercury vapour bulb, or any bulb in fact that sits in a hanging fixture, is a UVB meter, a measuring rule with a spirit level or something similar, and a wall with a large sheet of card taped to it. I used card of a medium green as unlike white, it didn't seem to reflect much UVB and influence my readings.



Tape your UVB meter to the spirit level rule so that the meter sensor is not obstructed by the rule, but when you hold both (this takes a bit of practice) you can press the button with your thumb whilst holding the rule steady, and horizontal, against the wall.

Set up the lamp so that it is clear of the wall, but near enough that you can easily hold the meter-and-spirit-level-rule-combo with the meter *directly* under the lamp and the rule resting on the card.

You are now going to take readings from the meter, angled so that it is aiming directly at the lamp surface (direct readings) and keeping the meter exactly the same distance from the wall – so all your readings are in the same vertical plane as the wall..it is then a fair "cross section" of the lamp's output. Use the rule to transfer your data to the card on the wall, by marking each reading at the corresponding point on the card.

Anyone who's used a UVB meter to test a mercury vapour lamp knows how the readings "dance" and that the slightest wrist movement alters the reading. You need to find the *highest possible* readings at each distance, for these represent the most accurate alignment of sensor with beam. With practice you will find it quite easy…and to make your chart much easier to draw, why not seek out the readings you actually wish to plot, ie. 50, 100, 200, 300uW/cm^2 and find the furthest points at which you can achieve these readings, to construct your chart. You can then literally "join up the dots" to obtain the spread chart.

An example of a Spread Chart used to visualise UVB output in the vivarium.

This is a spread chart for a Megaray putting out 300uW at 12", used to show what the UVB would "look" like in a real set-up. By overlaying the graphic at the same scale as the photograph, you can get a good idea of the UVB exposure available. Please note that the graphic is two-dimensional and the upper basking branch is not directly under the lamp, but in front of it. Hence although it looks as if my beardies are too close to the very high intensity area, I can assure you they could only reach that part of the beam if they learned to hover in the air! They are sitting in a gradient of about 80 – 250 uW/cm^2; both often occupy this space or the angled bar touched by the green part of the graphic –which **is** right under the lamp at that point.

A visualisation of the UVB output of the Mega-Ray mercury vapour Narrow Flood Midrange UVB Lamp in the vivarium. (This visualisation is to scale, and is of a real set-up.) The beam produces a three-dimensional "cone" of UVB radiation. In this set-up, the upper basking branch is **not** directly under the lamp, but close to the front of the vivarium. This puts the whole branch in the area receiving between 50 - 300 uW/cm2. The lower branch, directly under the lamp, also receives good UVB coverage.

Spread Charts for other types of UVB lamps.

I'm working on spread charts for fluorescent tubes, and when complete I hope to add these to the files as well. I would very much like to see other people's spread charts for all types of lamps and would really encourage you to add your charts so we can build a collection.

Frances Baines