photobiologyLamps Version 0.2.1
Catalogue of Lamps

Pedro J. Aphalo

January 23, 2015

1 Introduction

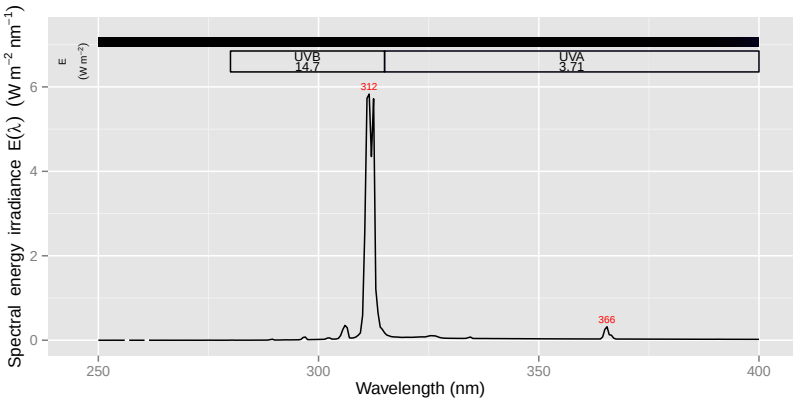
We will plot the emission spectra of the different lamps for which data is provided in the pacakge. We plot side-by-side the lamp output as spectral energy irradiance and as spectral photon irradiance. All spectra are normalized to an area of one under the whole curve.

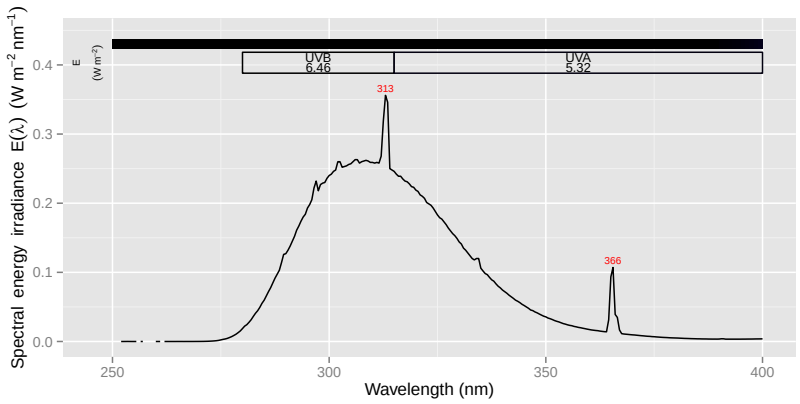
```
library(ggplot2)
library(photobiology)
library(photobiologyLamps)
library(photobiologygg)
```

We define a function to do the actual plotting so as to not repeat code, and to make changes easier in the future.

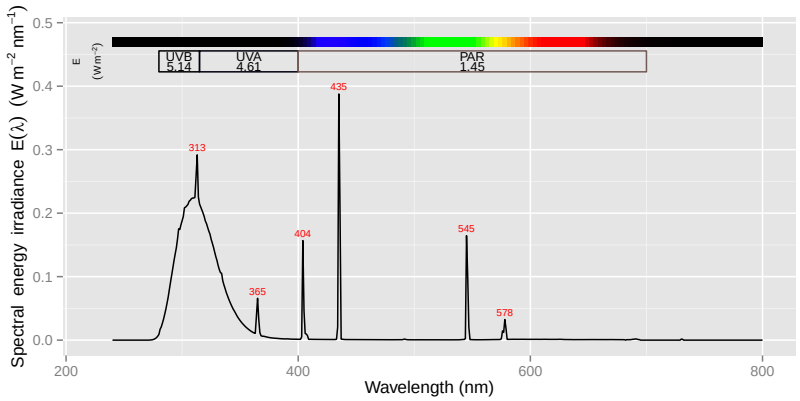
2 UV-B lamp spectra

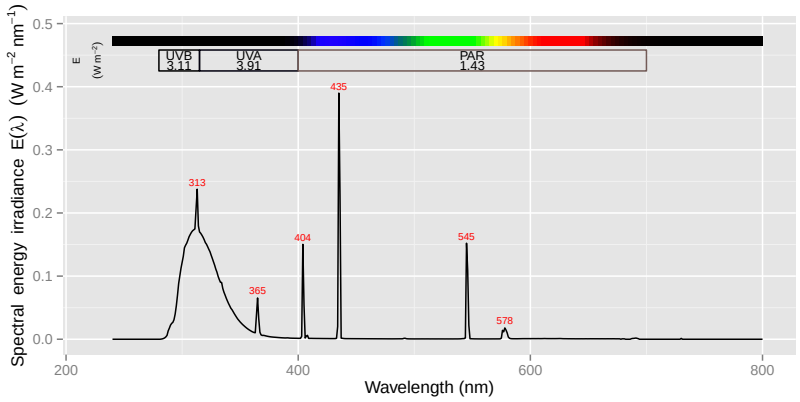
```
plot(philips.tl01.bentham.spct)
plot(philips.tl12.bentham.spct)
```





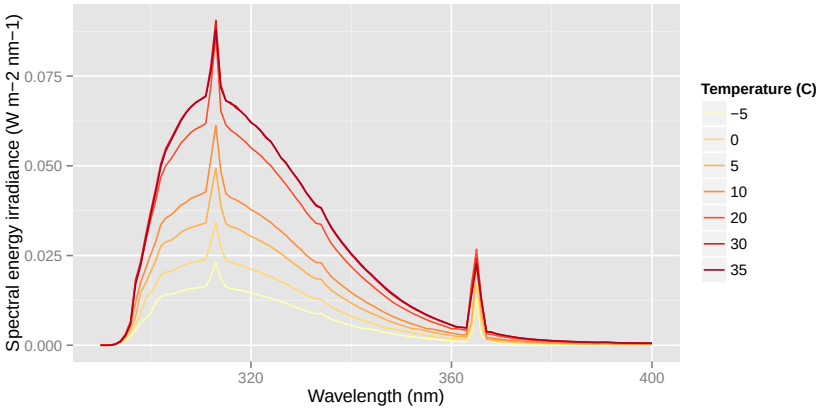

```
plot(philips.tl12.spct)
plot(qpanel.uvb313.spct)
```





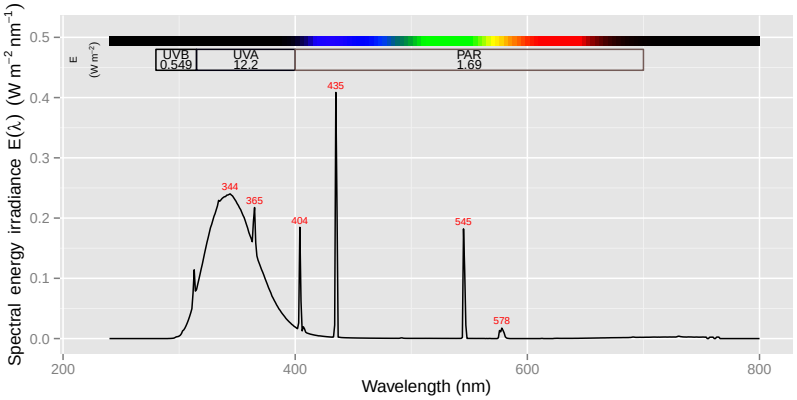

```
fig_temp <- ggplot(data=qpanel.uvb313.temperature.dt,
                   aes(x=w.length, y=s.e.irrad, colour=factor(temperature))) +
              scale_colour_brewer(type="seq", palette="YlOrRd")
```

```
fig_temp <- fig_temp + geom_line() +
  labs(x="Wavelength (nm)", y="Spectral energy irradiance (W m-2 nm-1)",
       colour="Temperature (C)")
print(fig_temp)
```



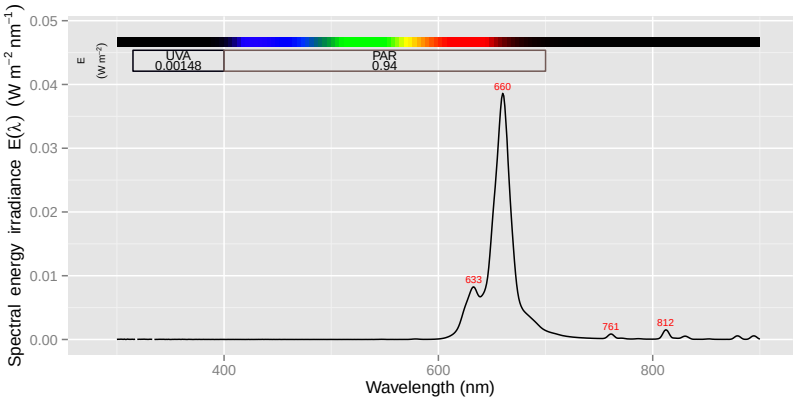
3 UV-A lamp spectra

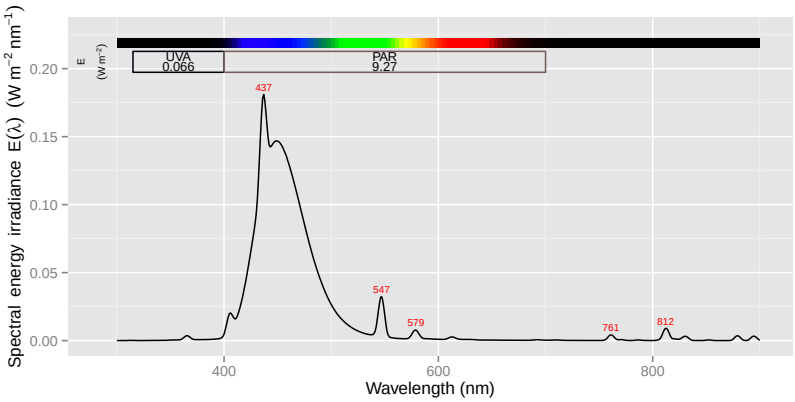
```
plot(qpanel.uva340.spct)
```



4 Narrow spectrum VIS lamps

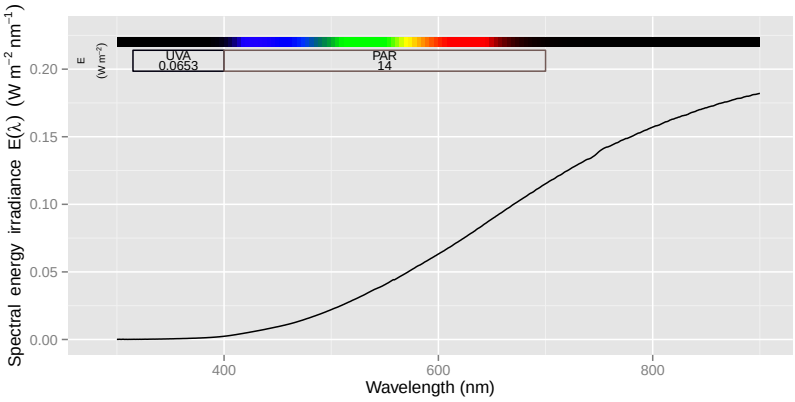
```
plot(philips.tld36w.15.spct)
plot(philips.tld36w.18.spct)
```

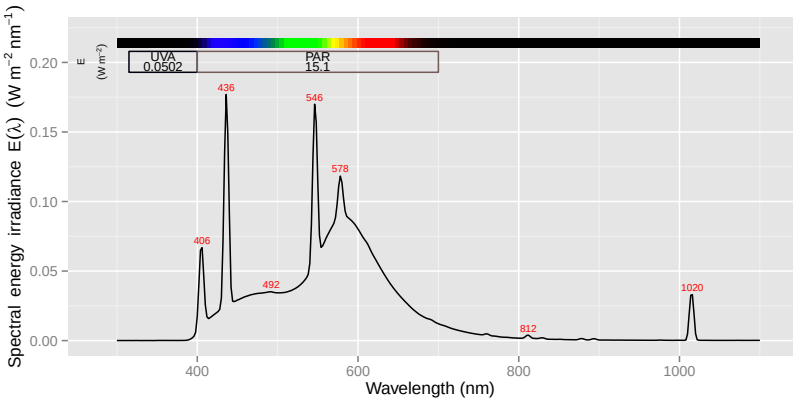


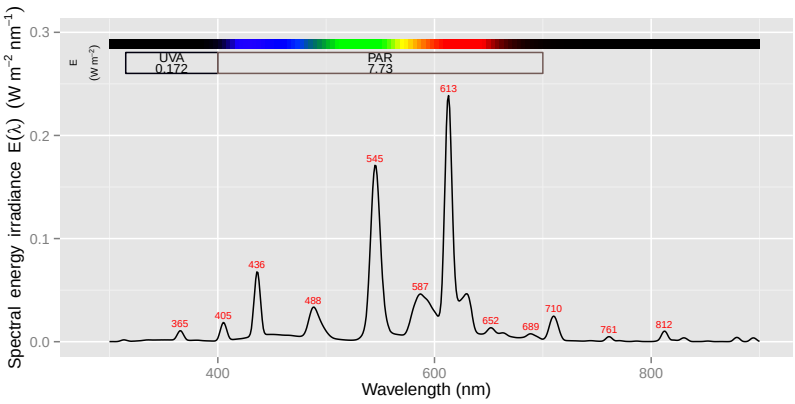


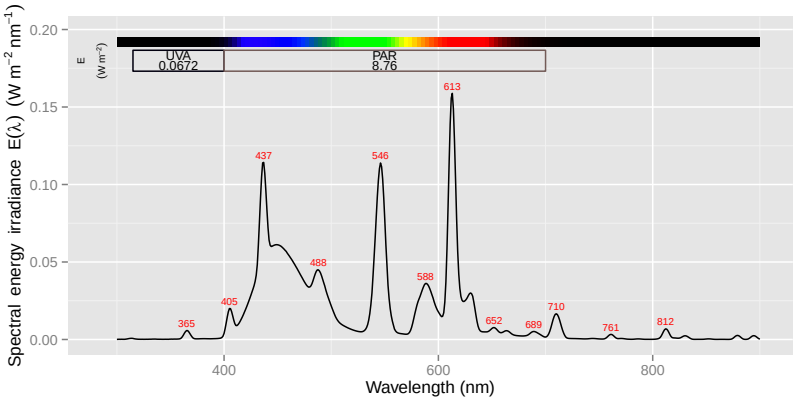
5 Broad VIS lamps

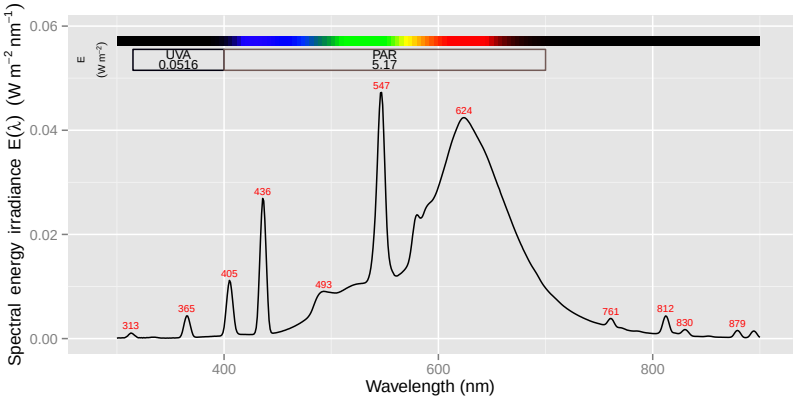
```
plot(incandescent.60w.spct)
plot(osram.36w.25.spct)
plot(philips.tld36w.83.spct)
plot(philips.tld36w.89.spct)
plot(philips.tld36w.92.spct)
plot(philips.tld36w.865.spct)
plot(philips.tl136w.950.spct)
plot(philips.pls11w.827.spct)
plot(sylvania.215w.vho.spct)
```

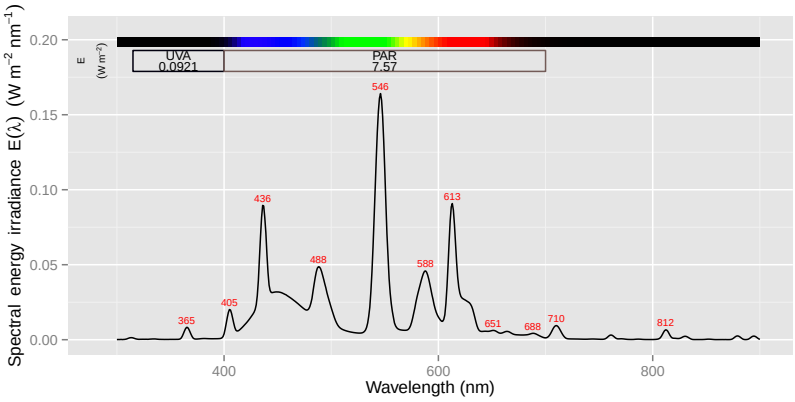

Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVA 0.0653
PAR 14
0.00
0.05
0.10
0.15
0.20
400
600
800
Wavelength (nm)

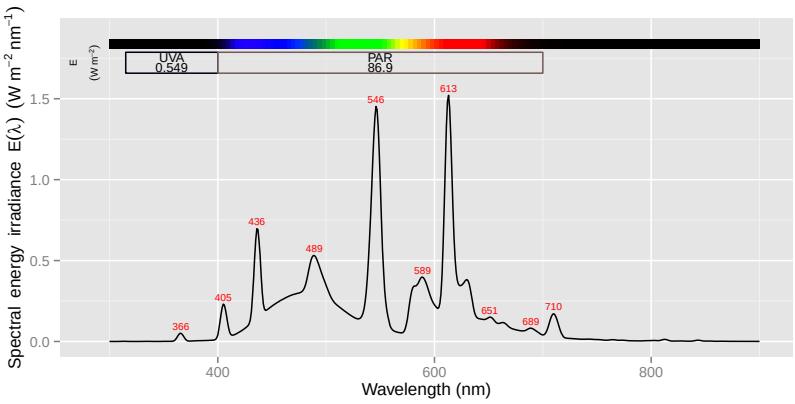

Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVA 0.0502
PAR 15.1
436
546
578
406
492
1020
812
0.00
0.05
0.10
0.15
0.20
400
600
800
1000
Wavelength (nm)

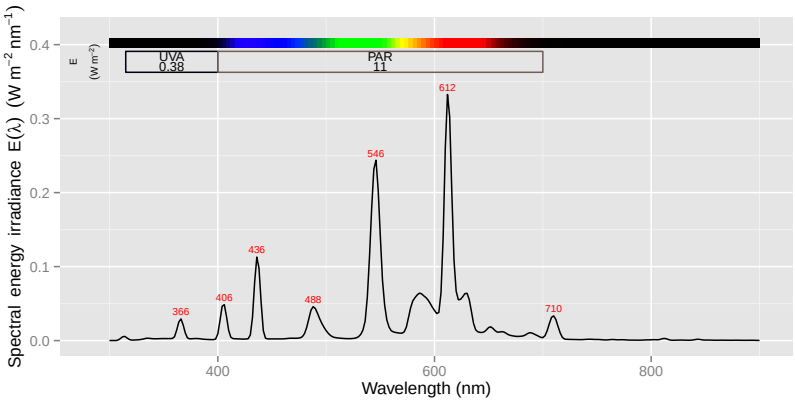

Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVA 0.172
PAR 7.73
613
545
436
587
488
365
405
652
689
710
761
812
0.0
0.1
0.2
0.3
400
600
800
Wavelength (nm)

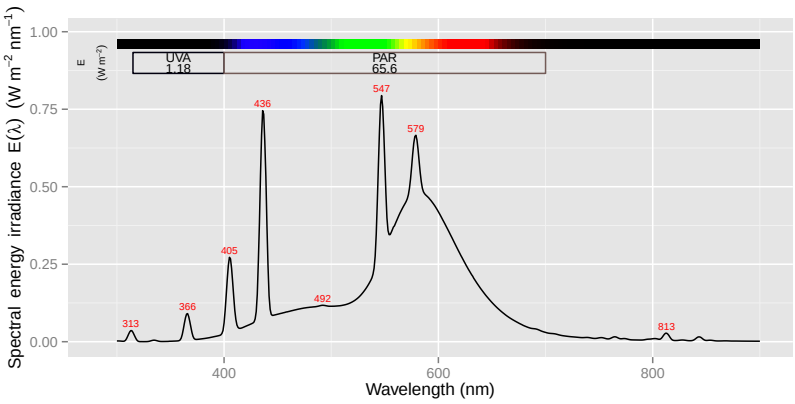

Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
0.20
0.15
0.10
0.05
0.00
E (W m⁻²)
UVA 0.0672
PAR 8.76
365
405
437
488
546
588
613
652
689
710
761
812
400
600
800
Wavelength (nm)


Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
0.06
0.04
0.02
0.00
E (W m⁻²)
UVA 0.0516
PAR 5.17
313
365
405
436
493
547
624
761
812
830
879
400
600
800
Wavelength (nm)


Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
0.20
0.15
0.10
0.05
0.00
E (W m⁻²)
UVA 0.0921
PAR 7.57
365
405
436
488
546
588
613
651
688
710
812
400
600
800
Wavelength (nm)



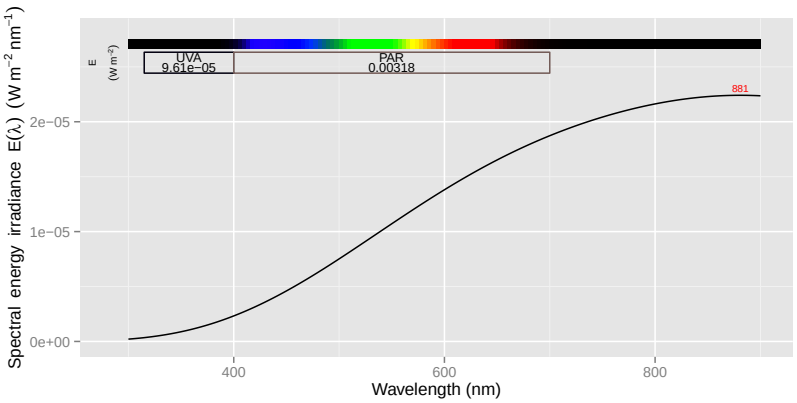


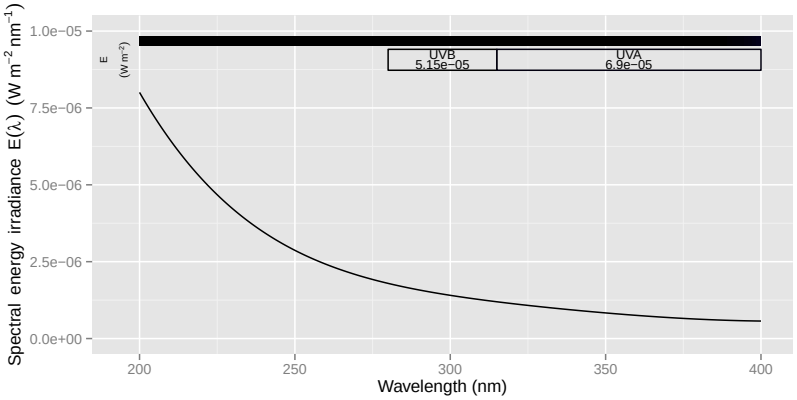


6 Calibration lamps

```
FEL.spct <- FEL_spectrum(300:900)
D2.spct <- D2_spectrum(200:400)
plot(FEL.spct)
```

```
plot(D2.spct)
```


Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVA 9.61e−05
PAR 0.00318
881
2e−05
1e−05
0e+00
400
600
800
Wavelength (nm)


Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVB 5.15e−05
UVA 6.9e−05
1.0e−05
7.5e−06
5.0e−06
2.5e−06
0.0e+00
200
250
300
350
400
Wavelength (nm)