

photobiologyLamps Version 0.1.12

Catalogue of Lamps

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1 Introduction

We will plot the emission spectra of the different lamps for which data is provided in the package. 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.

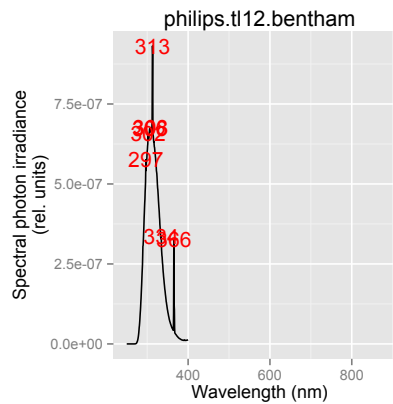
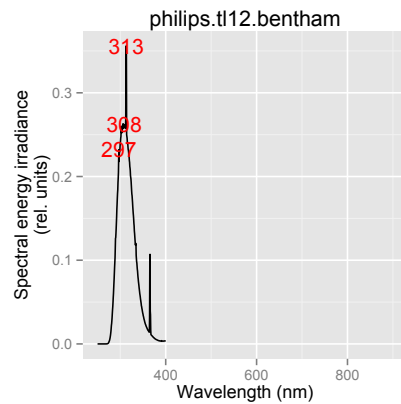
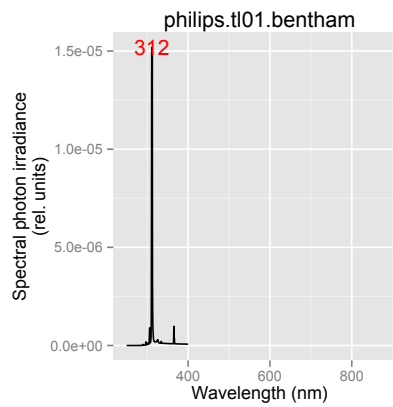
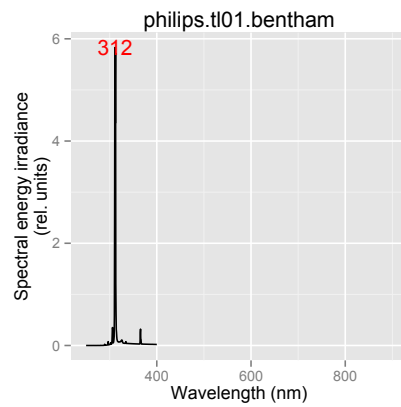
```
library(ggplot2)
library(photobiology)
library(photobiologyLamps)
library(photobiologygg)
```

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

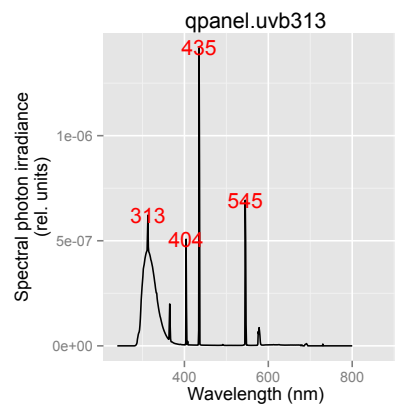
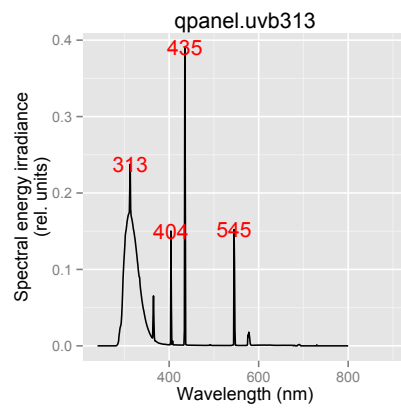
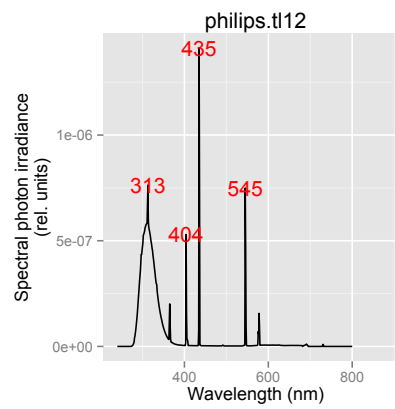
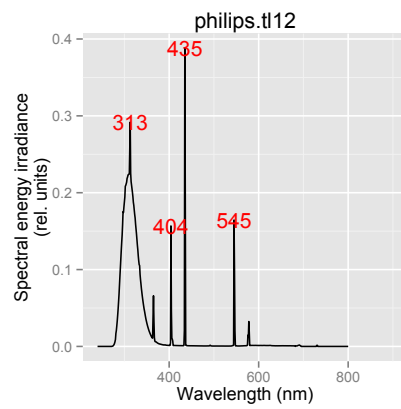
```
lamp.plotter <- function(lamp.name, w.low=250.0, w.high=900.0, scaled="area"){
  spectrum.data <- get(paste(lamp.name, ".spct", sep=""))
  spectrum.data <- e2q(trim_spct(spectrum.data, high.limit = w.high, fill = NA))
  fig_energy <- ggplot(aes(x=w.length, y=s.e.irrad), data=spectrum.data) +
    labs(x="Wavelength (nm)", y="Spectral energy irradiance\n(rel. units)",
         title=lamp.name) +
    geom_line() + stat_peaks(ignore_threshold=0.33, colour="red")
  fig_photon <- ggplot(aes(x=w.length, y=s.q.irrad), data=spectrum.data) +
    labs(x="Wavelength (nm)", y="Spectral photon irradiance\n(rel. units)",
         title=lamp.name) +
    geom_line() + stat_peaks(ignore_threshold=0.33, colour="red")
  print(fig_energy)
  print(fig_photon)
}
```

2 UV-B lamp spectra

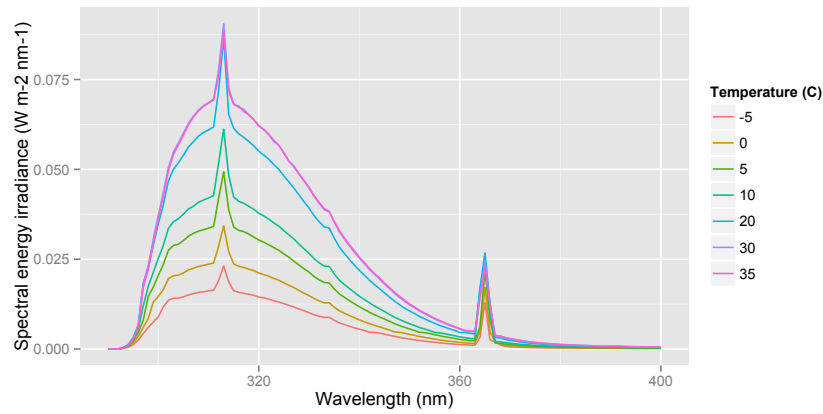
```
UVB.lamps <- c("philips.tl01.bentham", "philips.tl12.bentham")
for (lamp in UVB.lamps) {
  lamp.plotter(lamp.name=lamp)
}
```



```
UVB.M.lamps <- c("philips.tl12", "qpanel.uvb313")
for (lamp in UVB.M.lamps) {
  lamp.plotter(lamp.name=lamp)
}
```

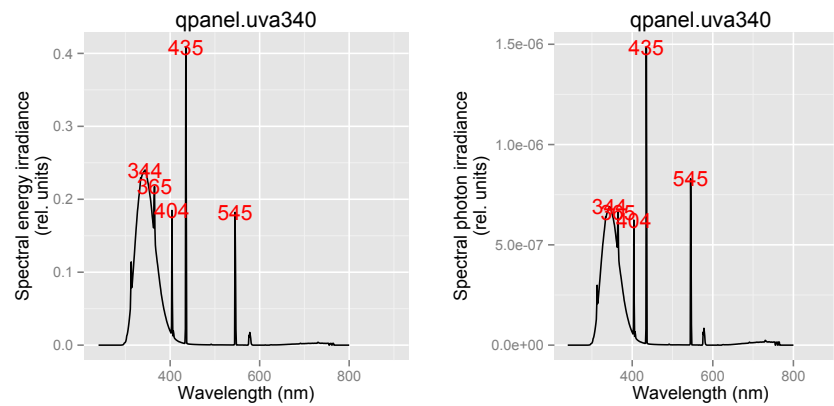


```
fig_temp <- ggplot(data=qpanel.uvb313.temperature.dt,
  aes(x=w.length, y=s.e.irrad, colour=factor(temperature)))
fig_temp <- fig_temp + geom_line() +
  labs(x="Wavelength (nm)", y="Spectral energy irradiance (W m-2 nm-1)",
    colour="Temperature (C)")
print(fig_temp)
```



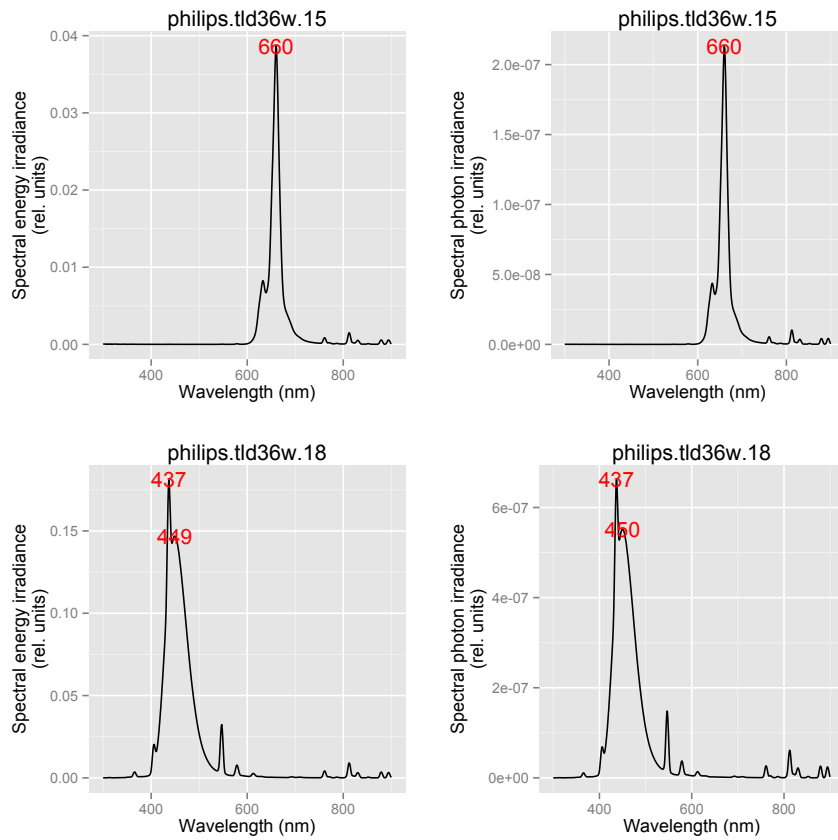
3 UV-A lamp spectra

```
UVA.lamps <- c("qpanel.uva340")
for (lamp in UVA.lamps) {
  lamp.plotter(lamp.name=lamp)
}
```



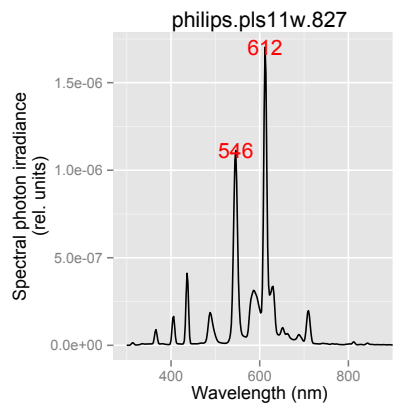
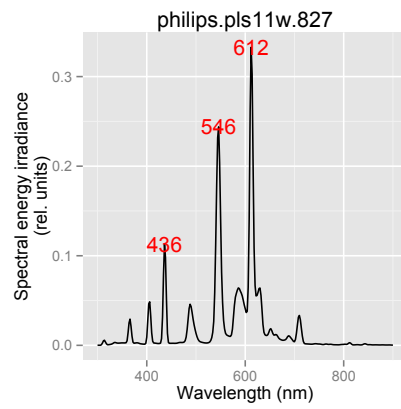
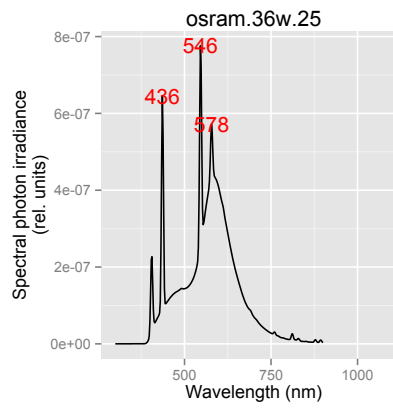
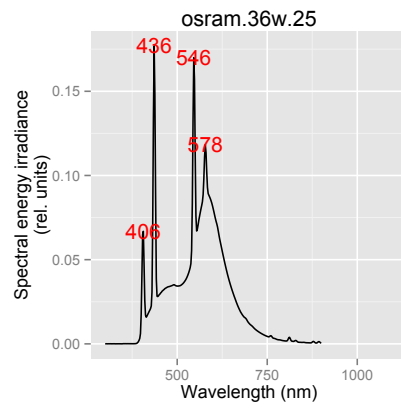
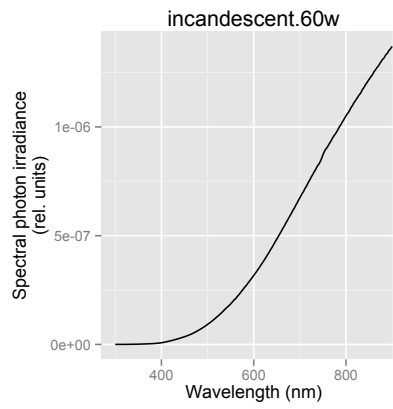
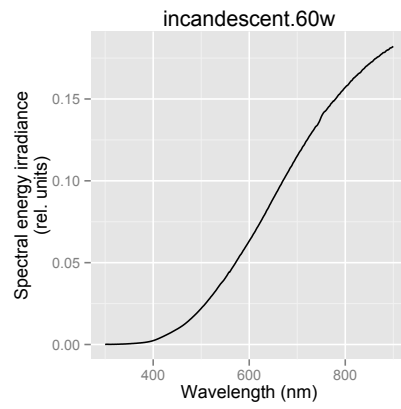
4 Narrow spectrum VIS lamps

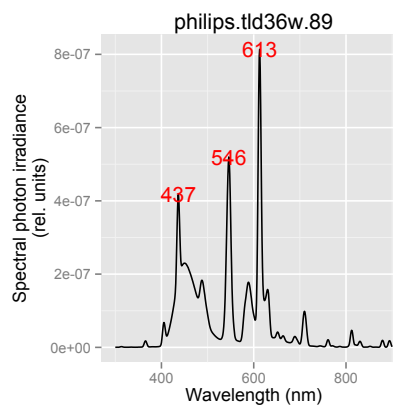
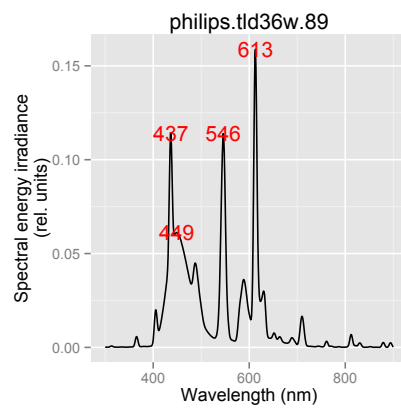
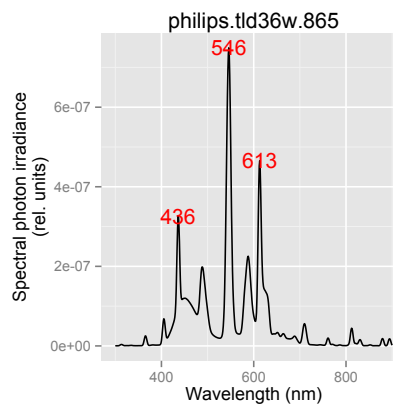
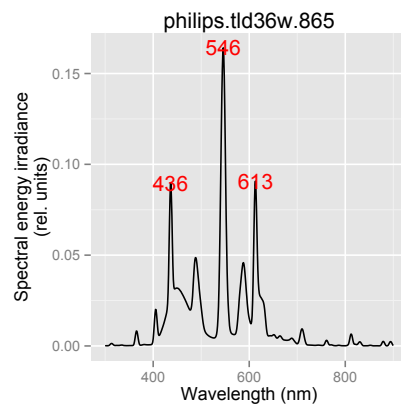
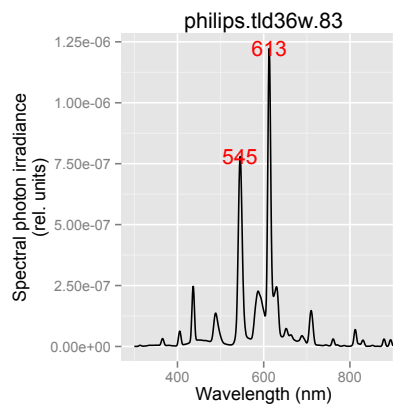
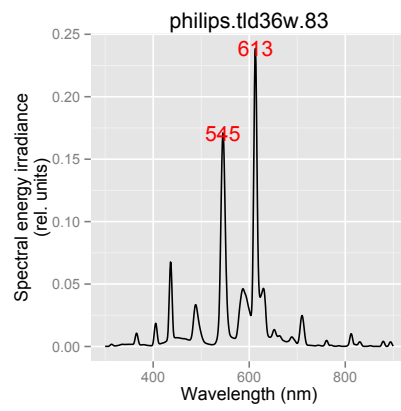
```
colour.lamps <- c("philips.tld36w.15", "philips.tld36w.18")
for (lamp in colour.lamps) {
  lamp.plotter(lamp.name=lamp)
}
```

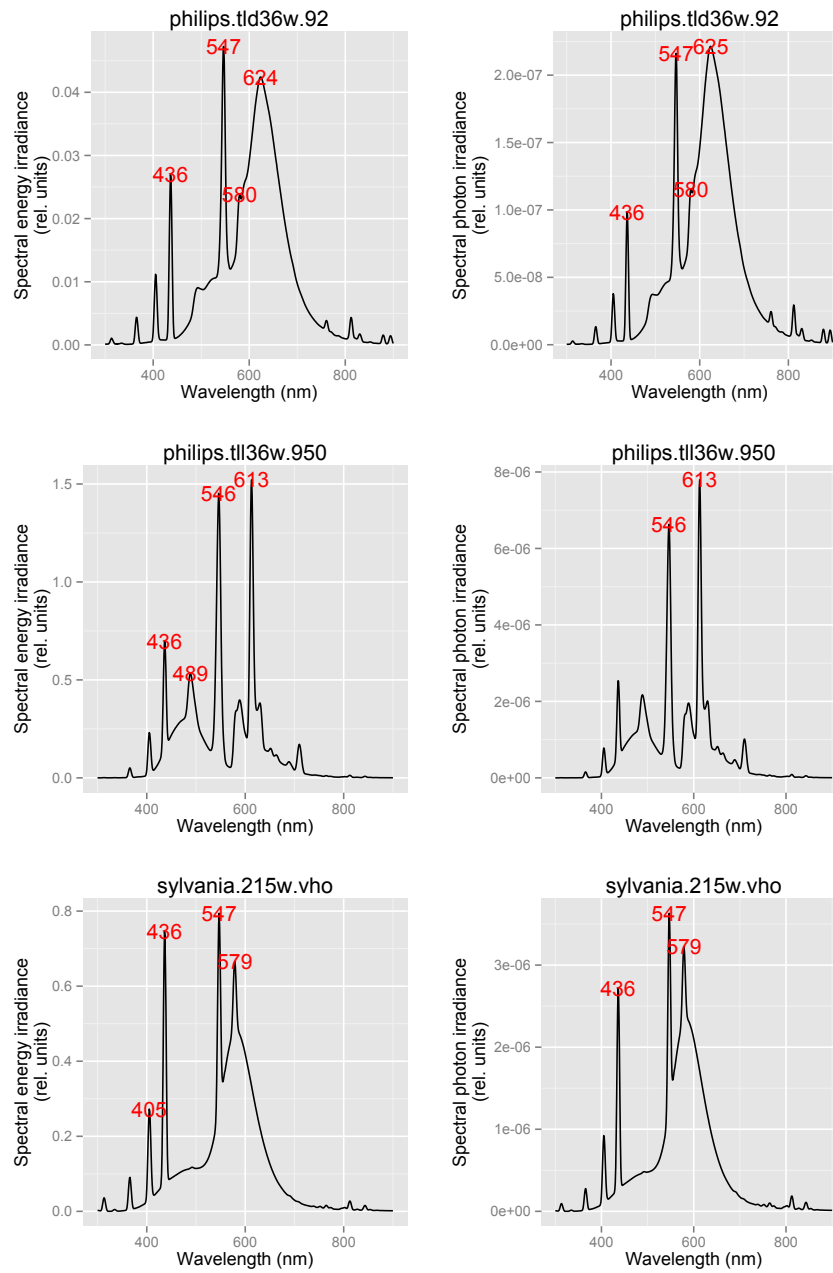


5 Broad VIS lamps

```
white.lamps <- c("incandescent.60w", "osram.36w.25", "philips.pls11w.827",
                 "philips.tld36w.83", "philips.tld36w.865", "philips.tld36w.89",
                 "philips.tld36w.92", "philips.tll36w.950", "sylvania.215w.vho")
for (lamp in white.lamps) {
  lamp.plotter(lamp.name=lamp)
}
```







6 Calibration lamps


```

FEL.spct <- FEL_spectrum(250:900)
D2.spct <- D2_spectrum(250:900)
calibration.lamps <- c("FEL","D2")
for (lamp in calibration.lamps) {
  lamp.plotter(lamp.name=lamp, scaled=NULL)
}

```

