

# photobiologyLamps Version 0.1.10

## Catalogue of Lamps

Pedro J. Aphalo

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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)

## Loading required package: data.table
## Loading required package: lubridate
##
## Attaching package: 'lubridate'
##
## The following objects are masked from 'package:data.table':
##
##   hour, mday, month, quarter, wday, week, yday, year
## Warning: replacing previous import by 'lubridate::hour' when loading 'photobiology'
## Warning: replacing previous import by 'lubridate::mday' when loading 'photobiology'
## Warning: replacing previous import by 'lubridate::month' when loading 'photobiology'
## Warning: replacing previous import by 'lubridate::quarter' when loading 'photobiology'
## Warning: replacing previous import by 'lubridate::wday' when loading 'photobiology'
## Warning: replacing previous import by 'lubridate::week' when loading 'photobiology'
## Warning: replacing previous import by 'lubridate::yday' when loading 'photobiology'
## Warning: replacing previous import by 'lubridate::year' when loading 'photobiology'

library(photobiologyLamps)
library(photobiologygg)

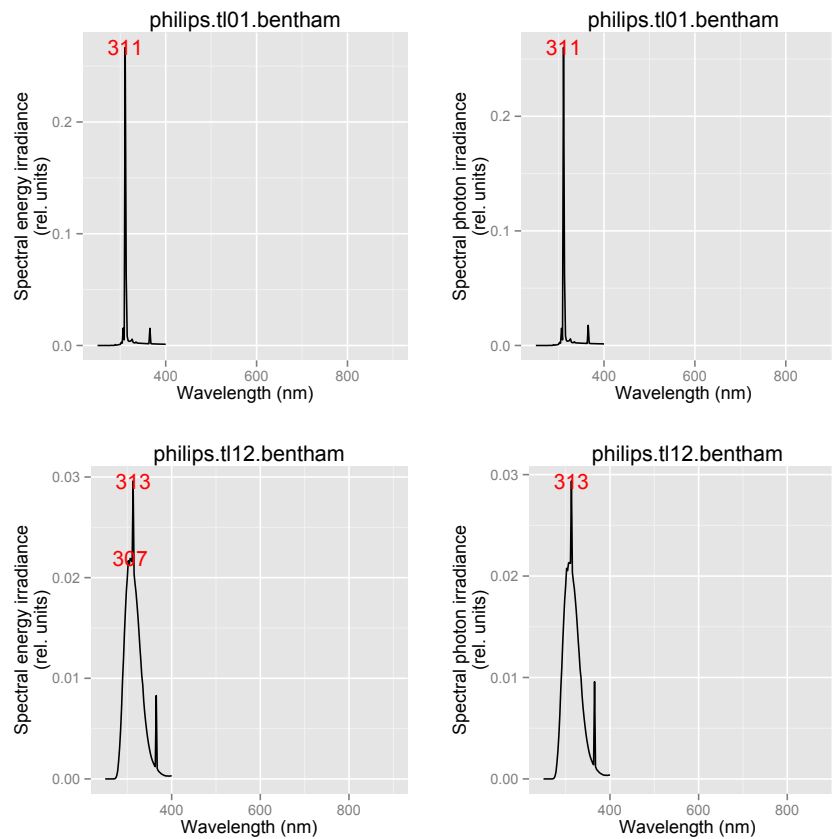
## Loading required package: proto
## Loading required package: spls2R
## Loading required package: plyr
##
## Attaching package: 'plyr'
##
## The following object is masked from 'package:lubridate':
##
##   here
```

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

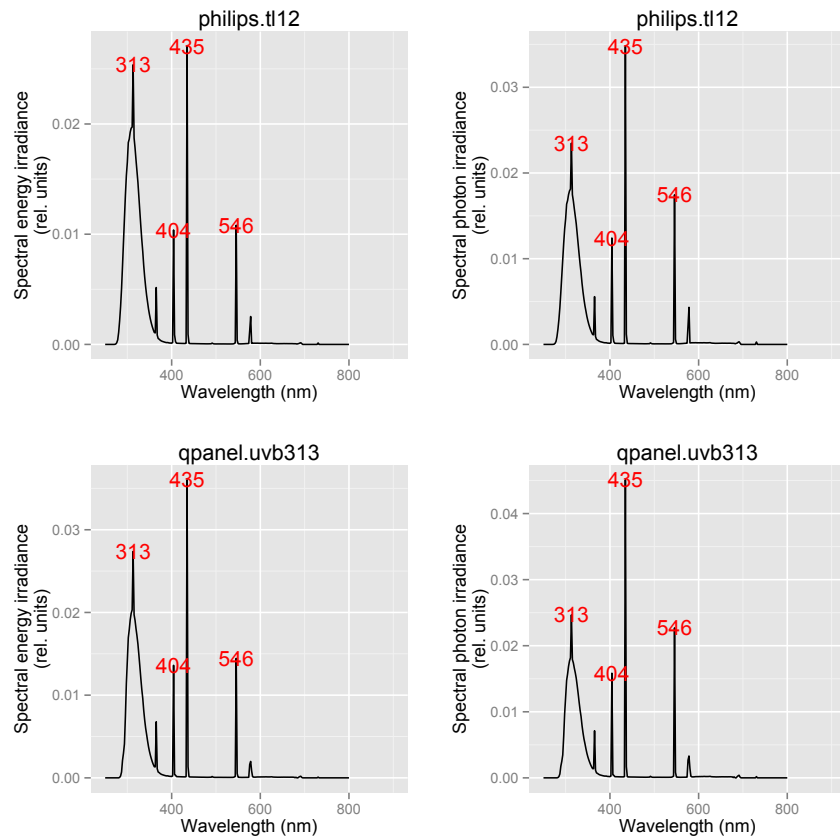
```
lamp.plotter <- function(lamp.name, w.low=250.0, w.high=900.0, scaled="area"){
  w.length.out <- seq(from=w.low, to=w.high, length.out=300)
  spectrum.data <- calc_source_output(w.length.out=w.length.out, source.name=lamp.name, scaled=scaled, fill=NULL)
  spectrum.data <- na.omit(spectrum.data)
  fig_energy <- ggplot(aes(x=w.length, y=s.e.irrad), data=spectrum.data) + xlim(w.low, w.high) +
    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) + xlim(w.low, w.high) +
    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

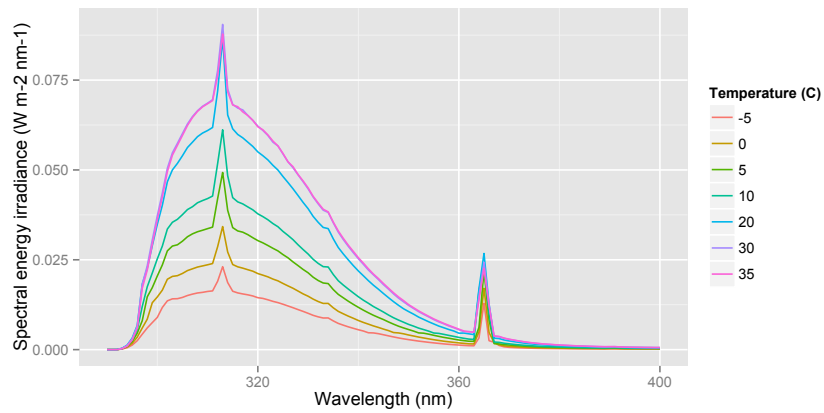
```
UVB.lamps <- c("philips.tl01.bentham", "philips.tl12.bentham")
for (lamp in UVB.lamps) {
  lamp.plotter(lamp.name=lamp)
}
```



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

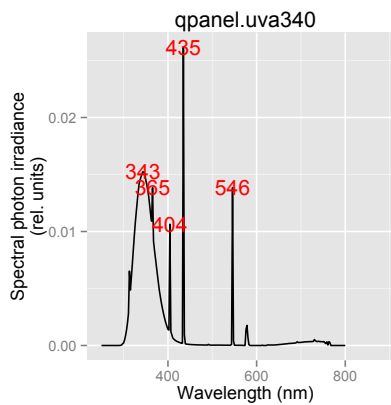
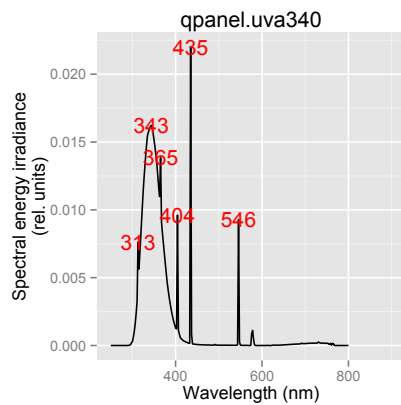


```
fig_temp <- ggplot(data=qpanel.uvb313.temperature.data, aes(x=w.length, y=s.e.irrad, colour=factor(temperature)))
fig_temp <- fig_temp + geom_line() + labs(x="Wavelength (nm)", y="Spectral energy irradiance (W m-2 nm-1)", colour=
print(fig_temp)
```



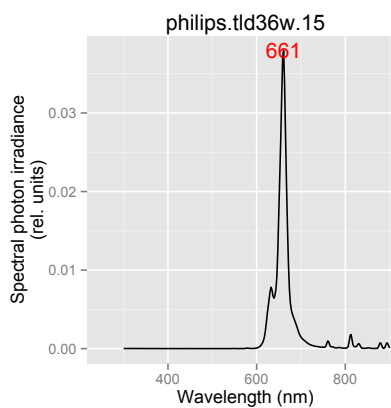
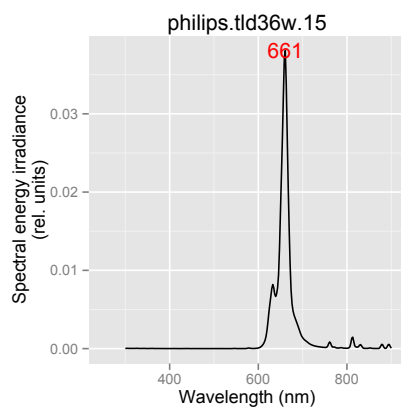
### 3 UV-A lamp spectra

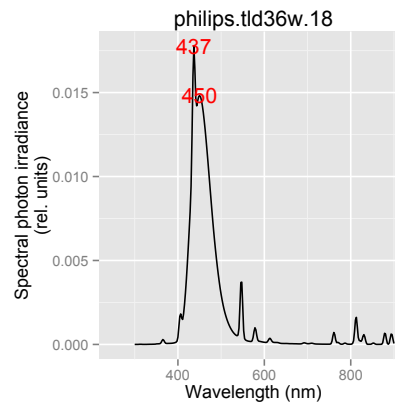
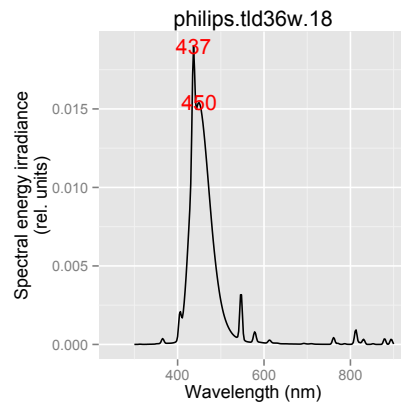
```
UVA.lamps <- c("qpanel.uva340")
for (lamp in UVA.lamps) {
  lamp.plotter(lamp.name=lamp)
}
```



### 4 Narrow spectrum VIS lamps

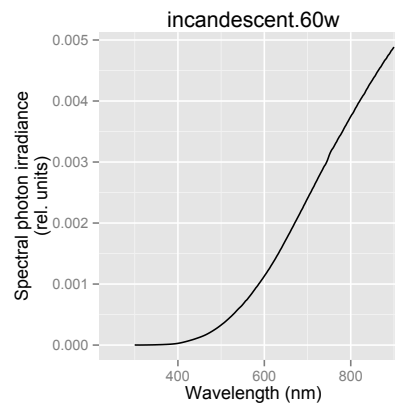
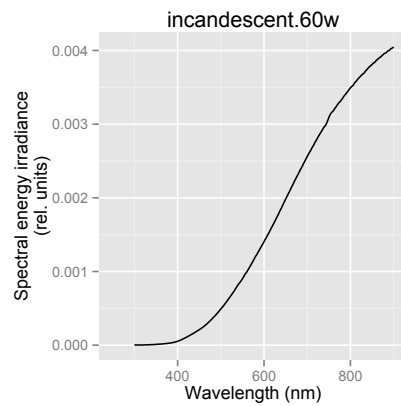
```
colour.lamps <- c("philips.tld36w.15", "philips.tld36w.18")
for (lamp in colour.lamps) {
  lamp.plotter(lamp.name=lamp)
}
```

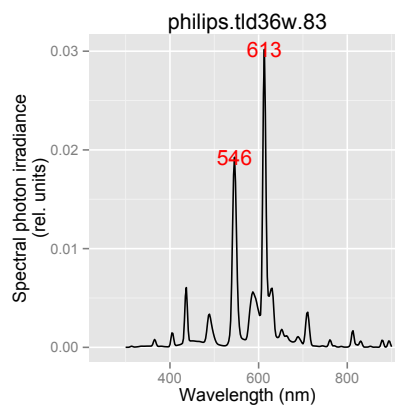
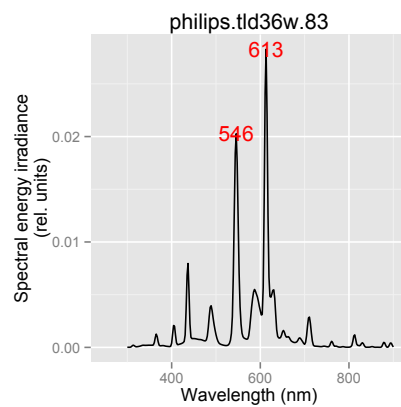
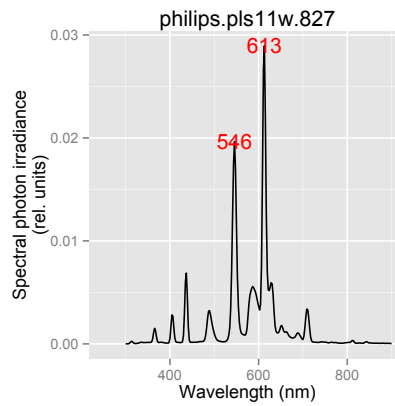
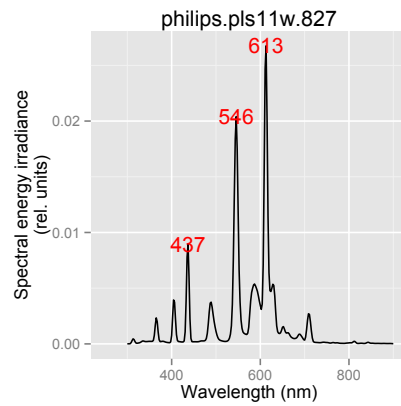
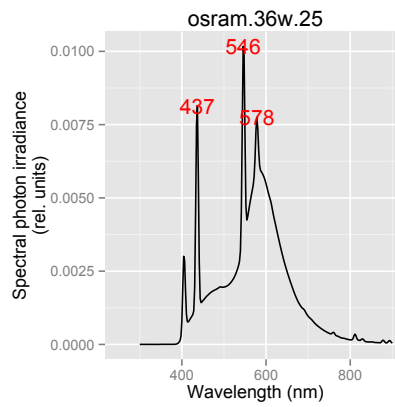
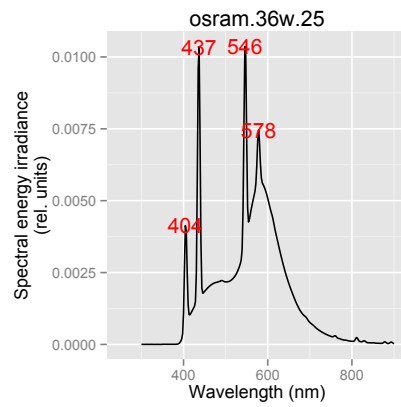


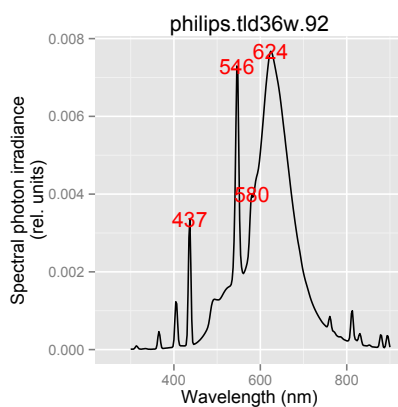
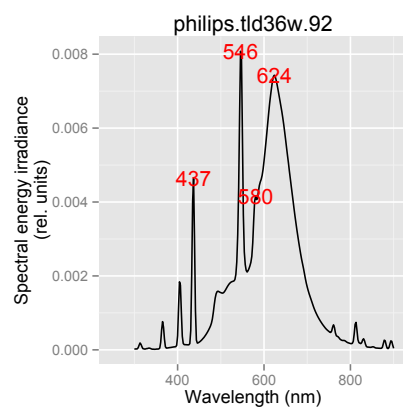
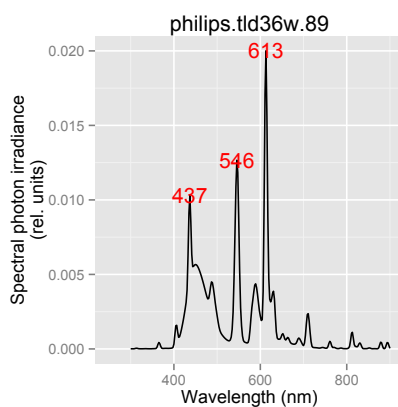
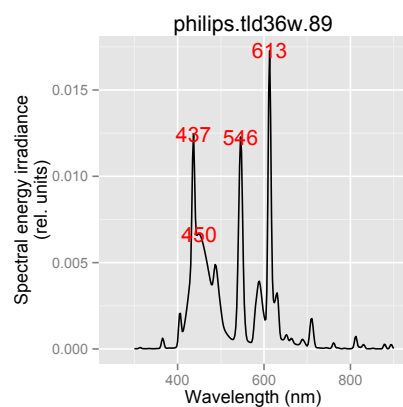
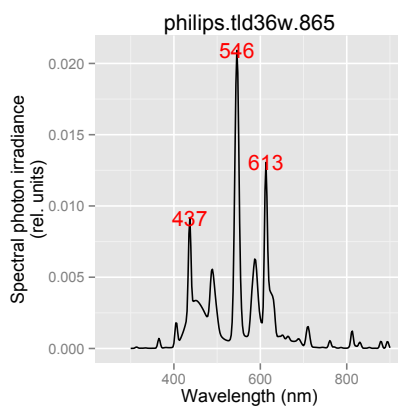
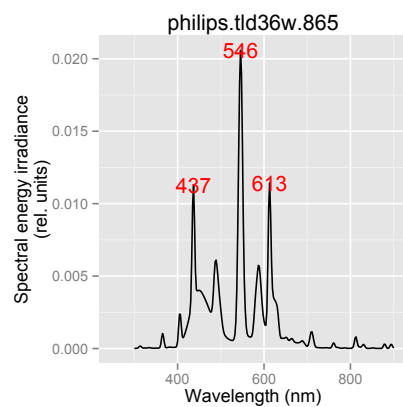


## 5 Broad VIS lamps

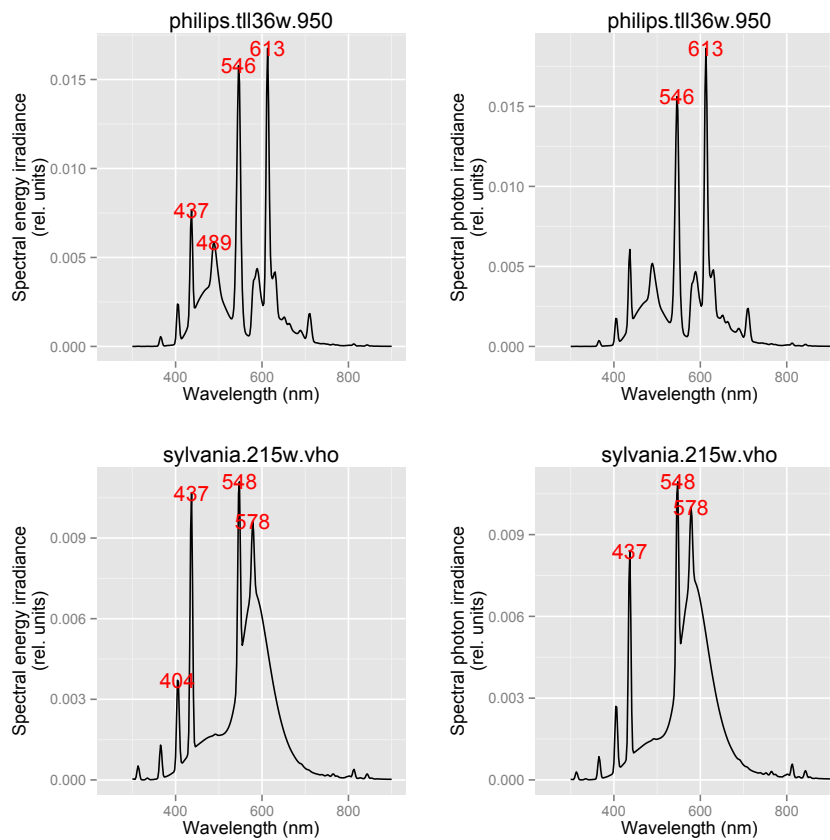
```
white.lamps <- c("incandescent.60w", "osram.36w.25", "philips.pls11w.827", "philips.tld36w.83",
  "philips.tld36w.865", "philips.tld36w.89", "philips.tld36w.92", "philips.tl136w.950",
  "sylvania.215w.vho")
for (lamp in white.lamps) {
  lamp.plotter(lamp.name=lamp)
}
```











## 6 Calibration lamps

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

