Life history in songbirds — Martin 2015

> Martin (2015) studied songbirds in temperate and tropical environments. He showed (Figure 2A) that peak growth rate is higher in species suffering higher nest predation risk, and is lower in tropical species with the same level of risk as temperate species. In the same Figure (2B) he reported that nestling period covaries with growth rate, with tropical species having a shorter nestling periods (for the same growth rate) than temperate species. The file `Martin2015_figure2.pdf` contains a figure generated with `ggplot2` similar to Figure 2 of the original paper. Reproduce the figure using the file `Martin2015_data.csv` deposited in the `CSB/ggplot2/data` folder.

As always, we need to read the data:

```
m2015 <- read.csv("../data/Martin2015_data.csv",sep = '\t', stringsAsFactors = FALSE)
dim(m2015)
```

```
## [1] 72 15
```

```
head(m2015)
```

```
##                  species     nstldpr     nstl     krate     kwing
## 1 Empidonax_occidentalis 0.030200000 15.04500 0.4273536 0.2817678
## 2         Vireo_plumbeus 0.042200000 13.40000 0.4755502 0.3078776
## 3           Vireo_gilvus 0.021600000 13.43700 0.4901149 0.2729885
## 4          Parus_gambeli 0.007380891 21.35714 0.3596292 0.2301780
## 5     Turdus_migratorius 0.030100000 14.66700 0.4999061 0.3161703
## 6      Catharus_guttatus 0.047400000 12.62500 0.5266504 0.3275454
##   PropWCfldg Propmassfldg  trips tripsnstl   cs    armort     lmas aerial
## 1  0.6903986    1.0529779 19.947  6.136000 3.88 0.4126082 1.037426      1
## 2         NA           NA  7.104  2.921000 3.26        NA 1.225309      0
## 3  0.6521742    0.9856032 10.903  3.502992 3.66 0.5009575 1.099076      0
## 4  0.8500607    1.0591968 19.818  3.768000 6.58 0.5178348 1.062556      0
## 5  0.6042932    0.7856921  6.229  1.884000 3.34 0.5029359 1.888179      0
## 6  0.6440784    0.8528176  5.934  1.896000 3.78 0.4786893 1.489958      0
##   regurg site
## 1      0    1
## 2      0    1
## 3      0    1
## 4      0    1
## 5      0    1
## 6      0    1
```

For panel A, we want to plot the peak growth rate (`krate`) against the nestling predation rate (`nstldpr`), coloring the points according to `site`.

Load the packages:

```
require(ggplot2)
```

```
## Loading required package: ggplot2
```

```
require(dplyr)
```

```
## Loading required package: dplyr
##
## Attaching package: 'dplyr'
##
## The following objects are masked from 'package:stats':
##
##     filter, lag
##
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

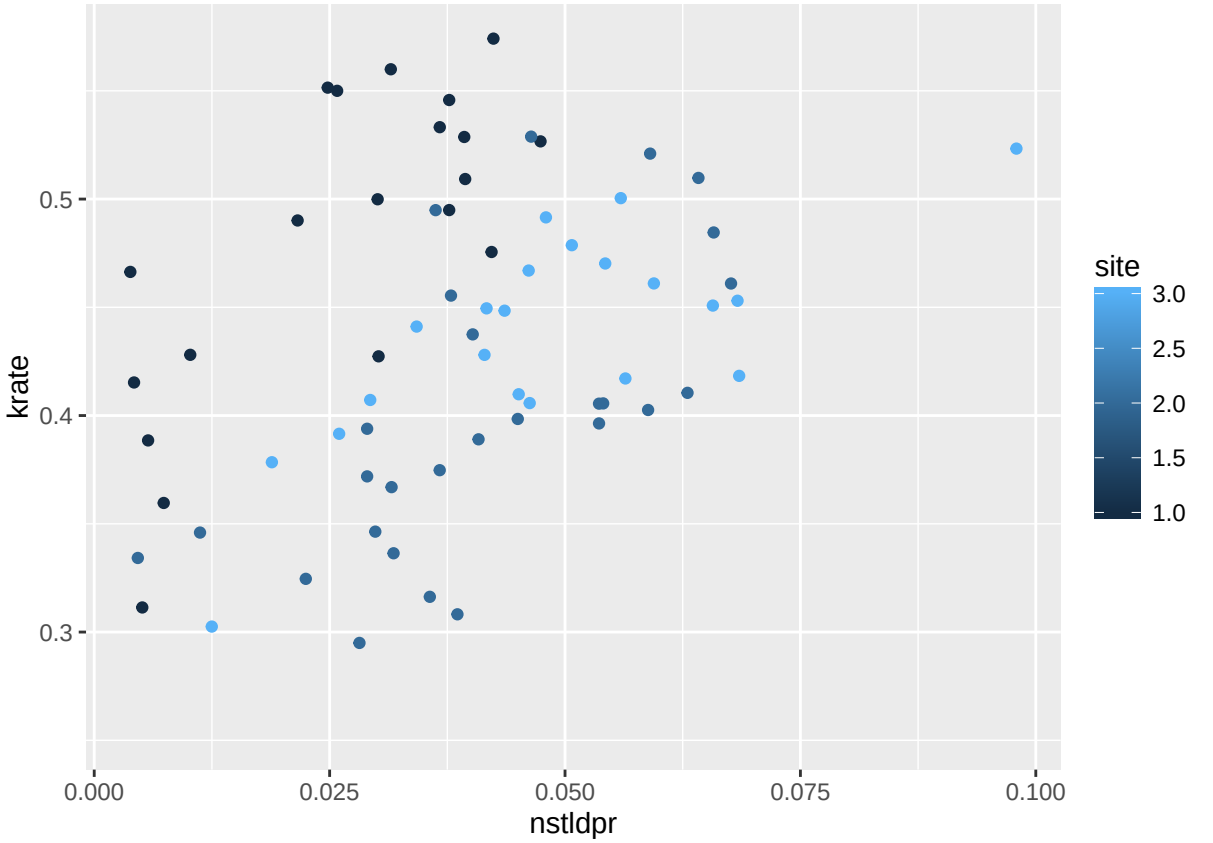
```
require(gridExtra)
```

```
## Loading required package: gridExtra
```

And start plotting:

```
plA <- ggplot(data = m2015, aes(x = nstldpr, y = krate, colour = site)) + geom_point()
plA
```

```
## Warning: Removed 4 rows containing missing values (geom_point).
```

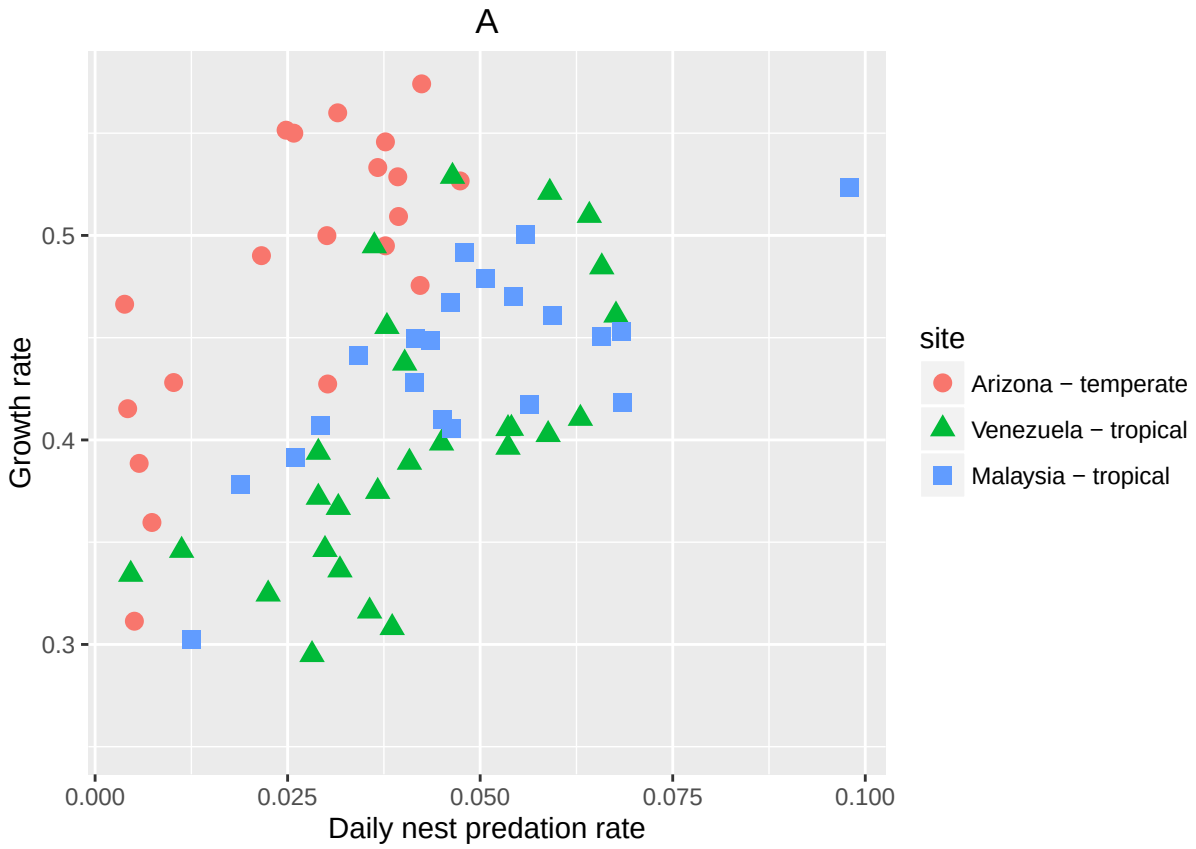


For easier visualization, let's map transform `site` into a factor:

```
m2015$site <- factor(m2015$site, levels = c(1,2,3),
                     labels = c("Arizona - temperate",
                                "Venezuela - tropical",
                                "Malaysia - tropical"))

# Now add labels
plA <- ggplot(data = m2015, aes(x = nstldpr, y = krate, colour = site, shape = site)) +
  geom_point(size = 3)
plA <- plA + xlab("Daily nest predation rate") + ylab("Growth rate") + ggtitle("A")
plA
```

```
## Warning: Removed 4 rows containing missing values (geom_point).
```

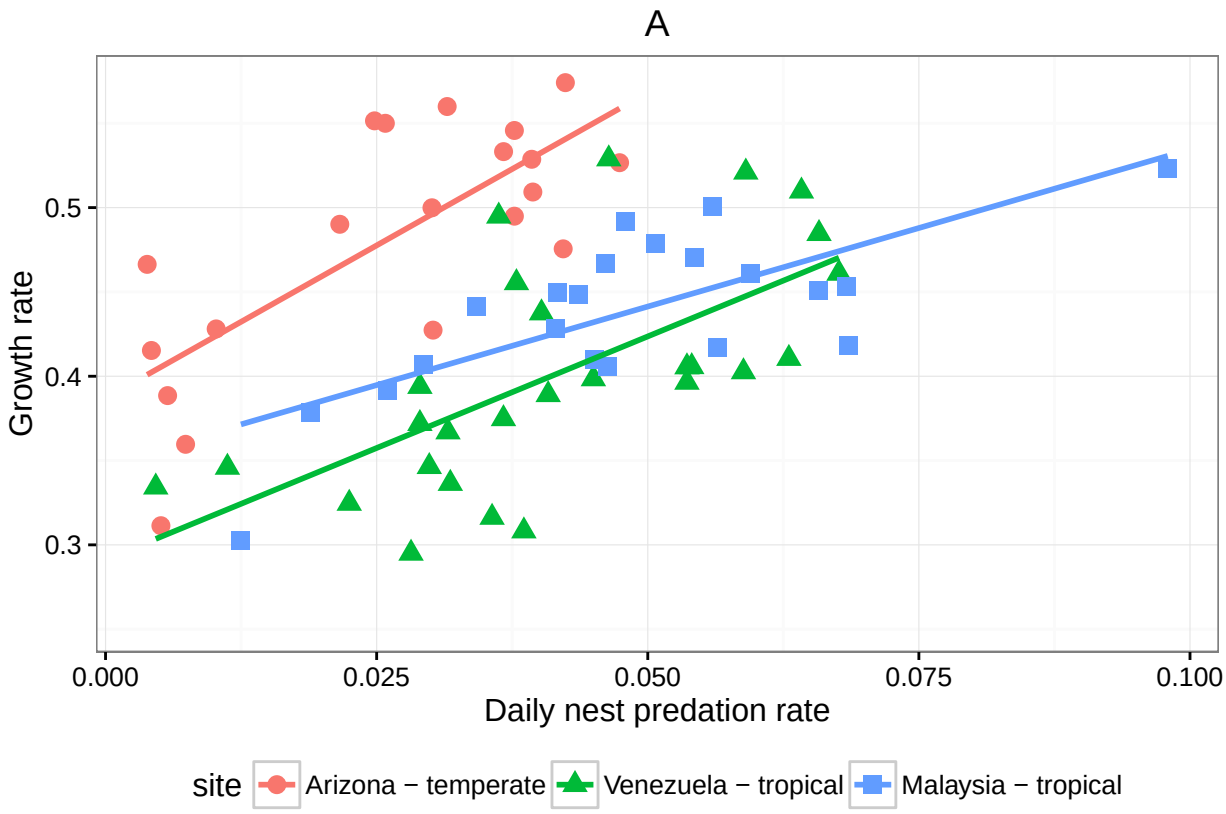


And make it prettier:

```
plA <- plA + theme_bw() + theme(legend.position = "bottom") +
  geom_smooth(method = "glm", se = FALSE)
plA
```

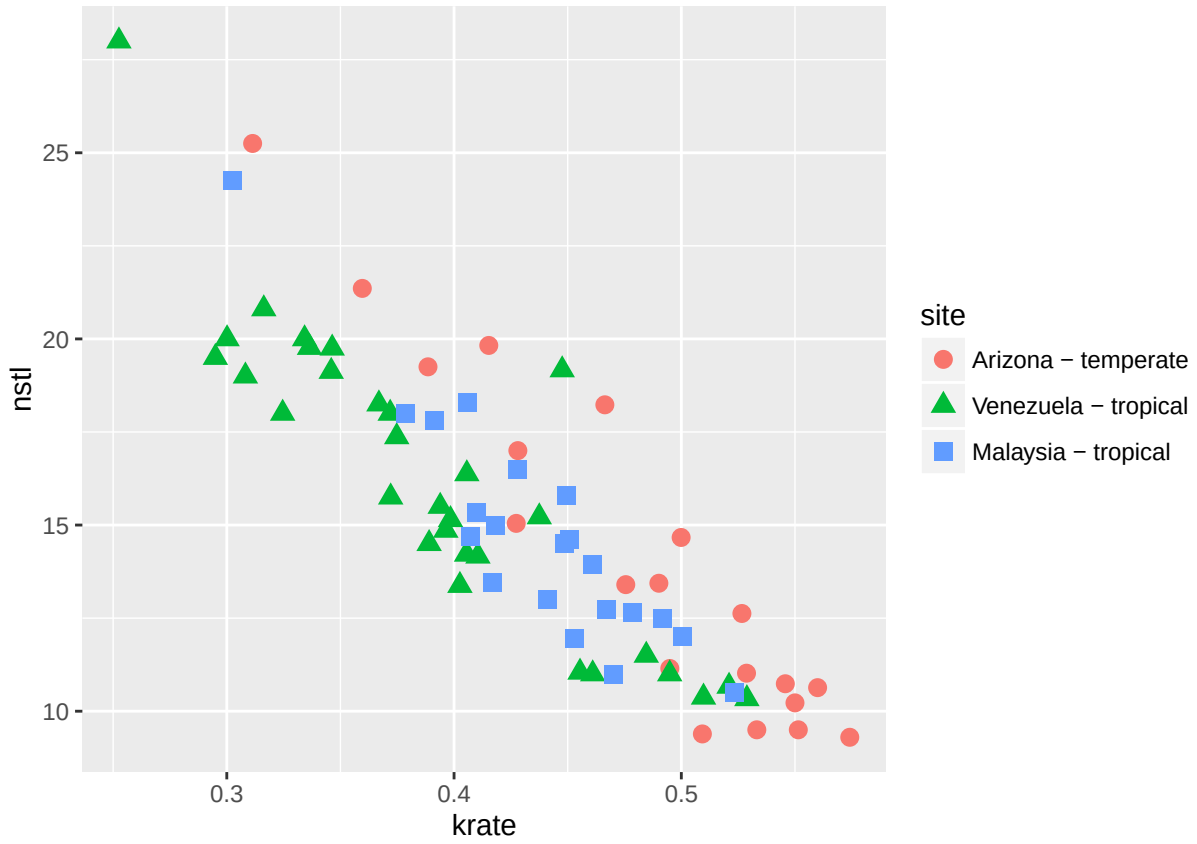
```
## Warning: Removed 4 rows containing non-finite values (stat_smooth).

## Warning: Removed 4 rows containing missing values (geom_point).
```

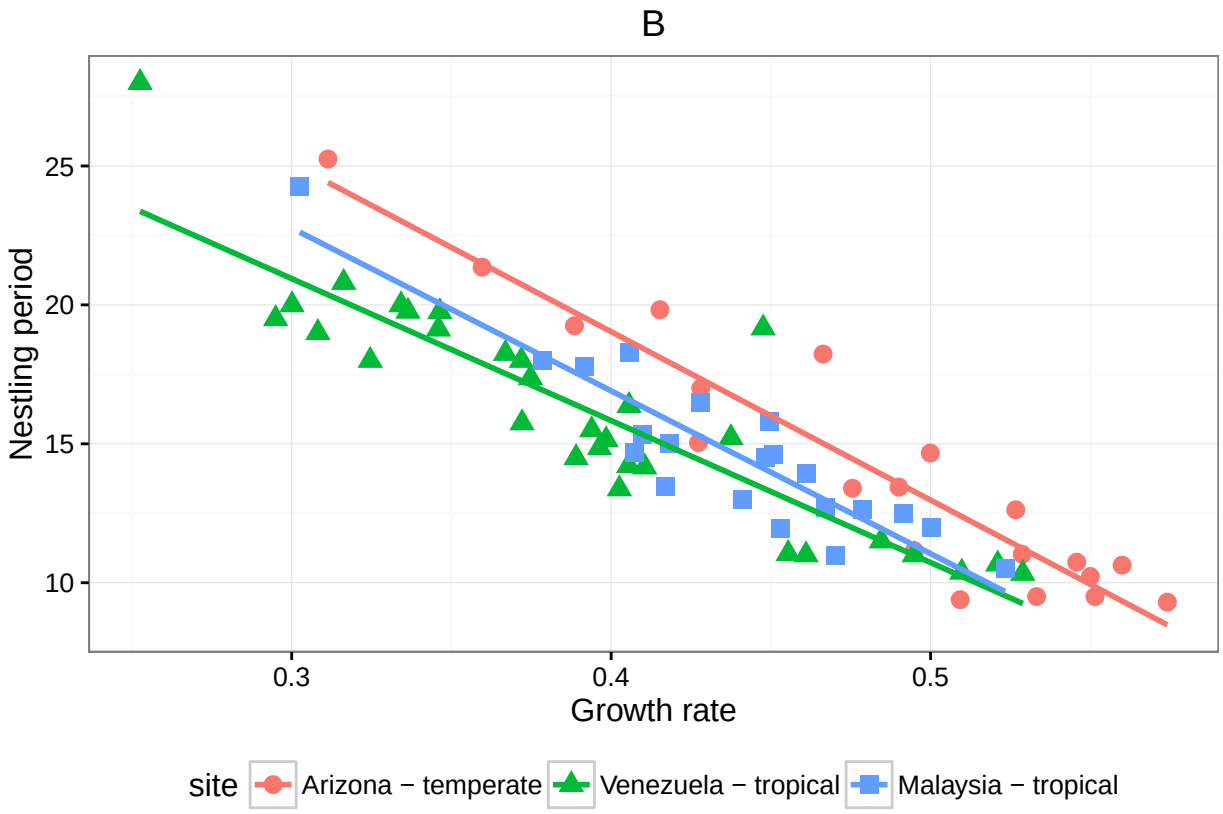


Good. Now let's start working on panel B: we need to plot the nestling period (`nstl`) against the growth rate (`krate`). Again, we color and choose shapes according to `site`.

```
plB <- ggplot(data = m2015, aes(x = krate, y = nstl, colour = site, shape = site)) +
  geom_point(size = 3)
plB
```




```
# Add labels
plB <- plB + xlab("Growth rate") + ylab("Nestling period") + ggtitle("B")
# Add linear model, and move legend
plB <- plB + theme_bw() + theme(legend.position = "bottom") +
  geom_smooth(method = "glm", se = FALSE)
plB
```

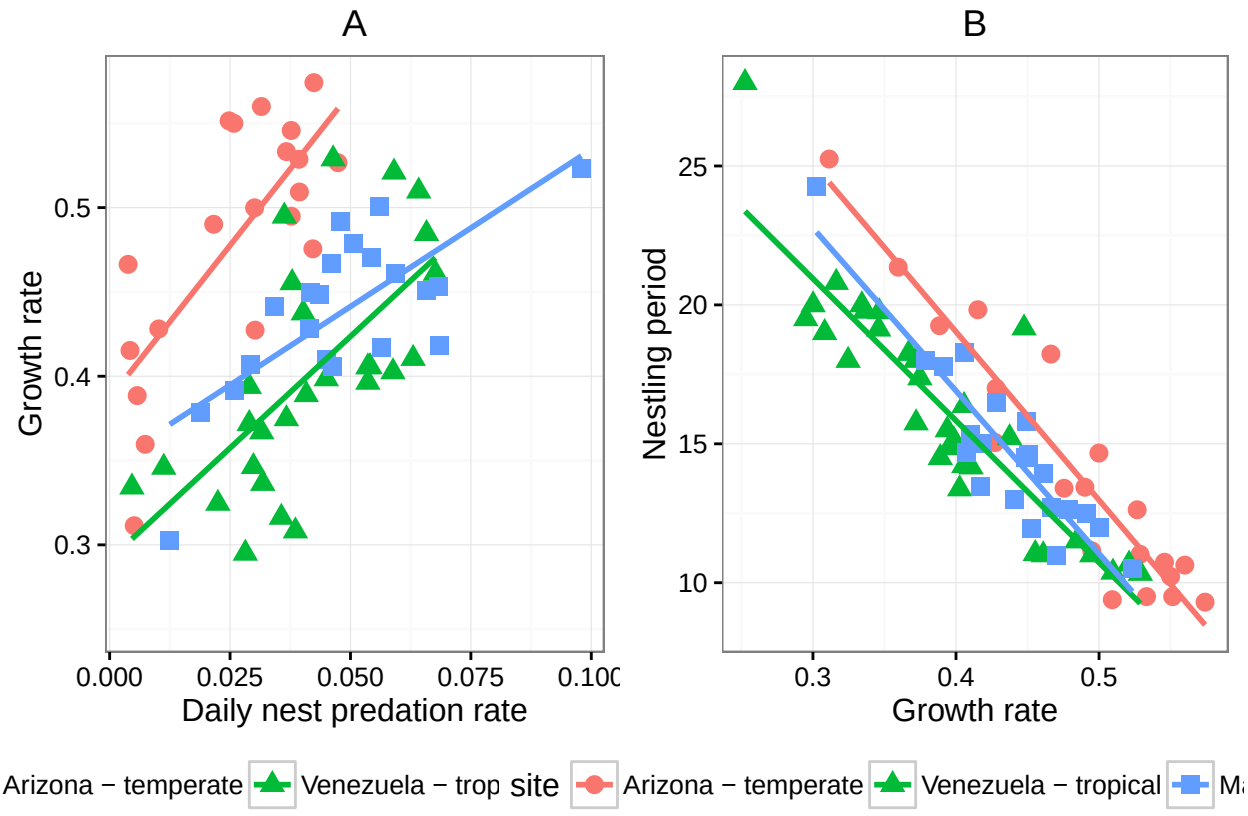


Finally, combine the two plots using `gridExtra`:

```
grid.arrange(plA, plB, ncol = 2)
```

```
## Warning: Removed 4 rows containing non-finite values (stat_smooth).
```

```
## Warning: Removed 4 rows containing missing values (geom_point).
```



That's it! Try playing with the colors and shapes. When you are happy with your results, you can save the graph using the command `pdf`.

```
pdf(file = "../data/Martin2015_figure2.pdf", width = 12, height = 7)
grid.arrange(plA, plB, ncol = 2)
```

```
## Warning: Removed 4 rows containing non-finite values (stat_smooth).
```

```
## Warning: Removed 4 rows containing missing values (geom_point).
```

```
dev.off()
```

```
## pdf
##   2
```