Intro to R for Biologists

IBiS Special Topics, Fall 2021
Class 7: Oct. 14, 2021

Erik Andersen and Shelby Blythe

Today’s class

1. Go through class 6 Activities
2. ggplot2 add-ons: colors, spacing, other packages
3. cowplot
4. Go through your figure outlines

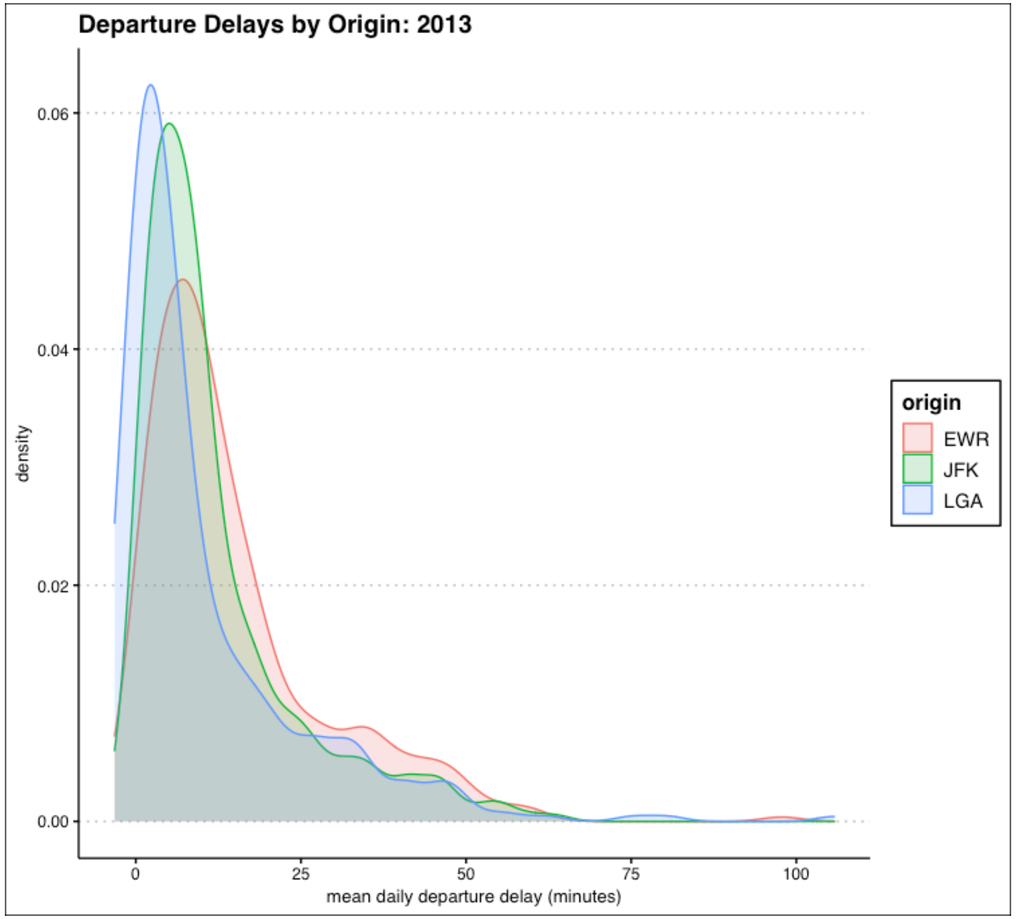
Class 6 Activities

Today’s class

1. Go through class 6 Activities
2. ggplot2 add-ons: colors, spacing, other packages
3. cowplot
4. Go through your figure outlines

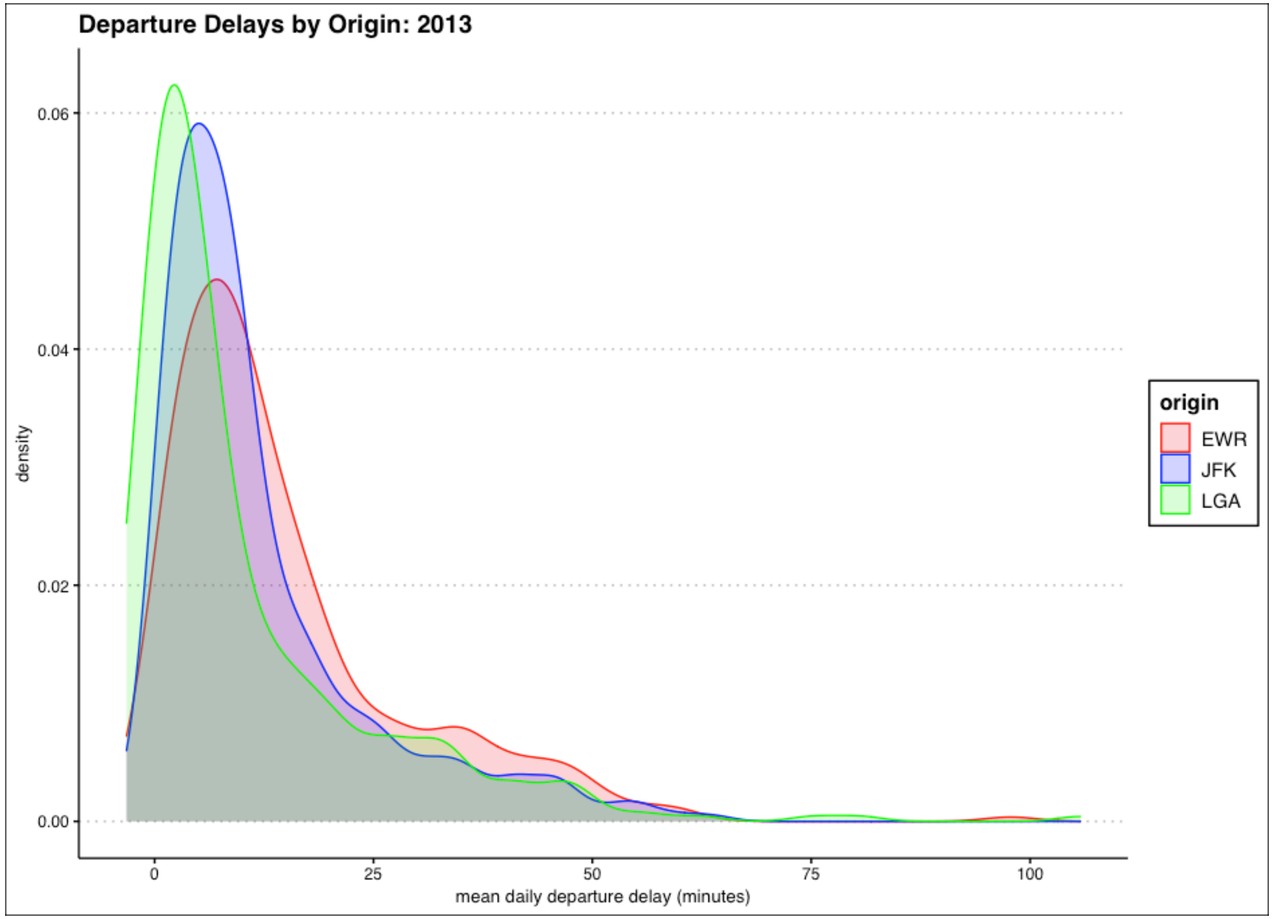
ggplot2 colors

```
ggplot(meanDaily2, aes(x = dailyMean, color = origin, fill = origin)) +
  geom_density(alpha = 0.2) +
  labs(x = 'mean daily departure delay (minutes)', y = 'density', title = 'Departure Delays by Origin: 2013')+
  theme_clean()
```



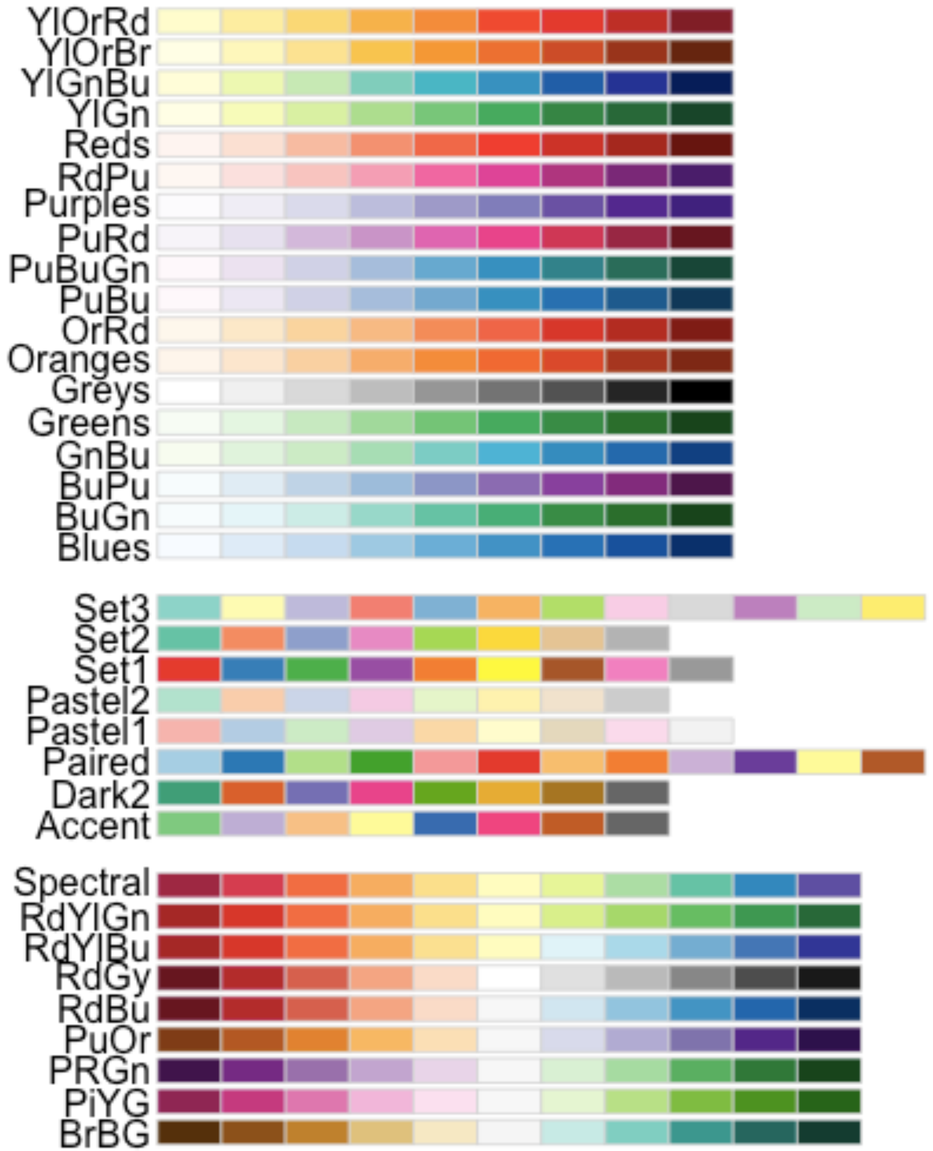
ggplot2 colors

```
ggplot(meanDaily2, aes(x = dailyMean, color = origin, fill = origin)) +
  geom_density(alpha = 0.2) +
  labs(x = 'mean daily departure delay (minutes)', y = 'density', title = 'Departure Delays by Origin: 2013')+
  scale_color_manual(values = c("red", "blue", "green")) +
  scale_fill_manual(values = c("red", "blue", "green")) +
  theme_clean()
```



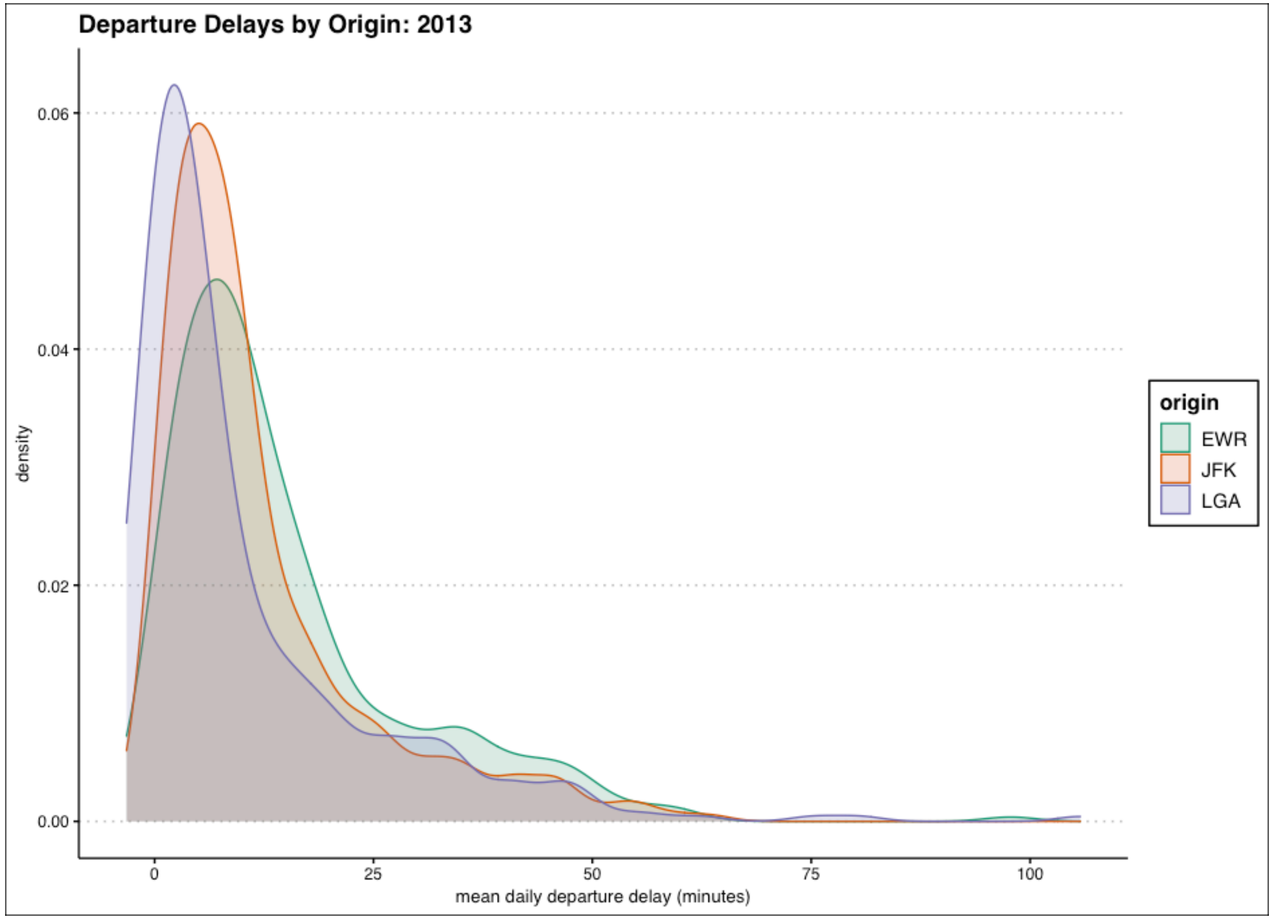
ggplot2 colors - palettes

`RColorBrewer`



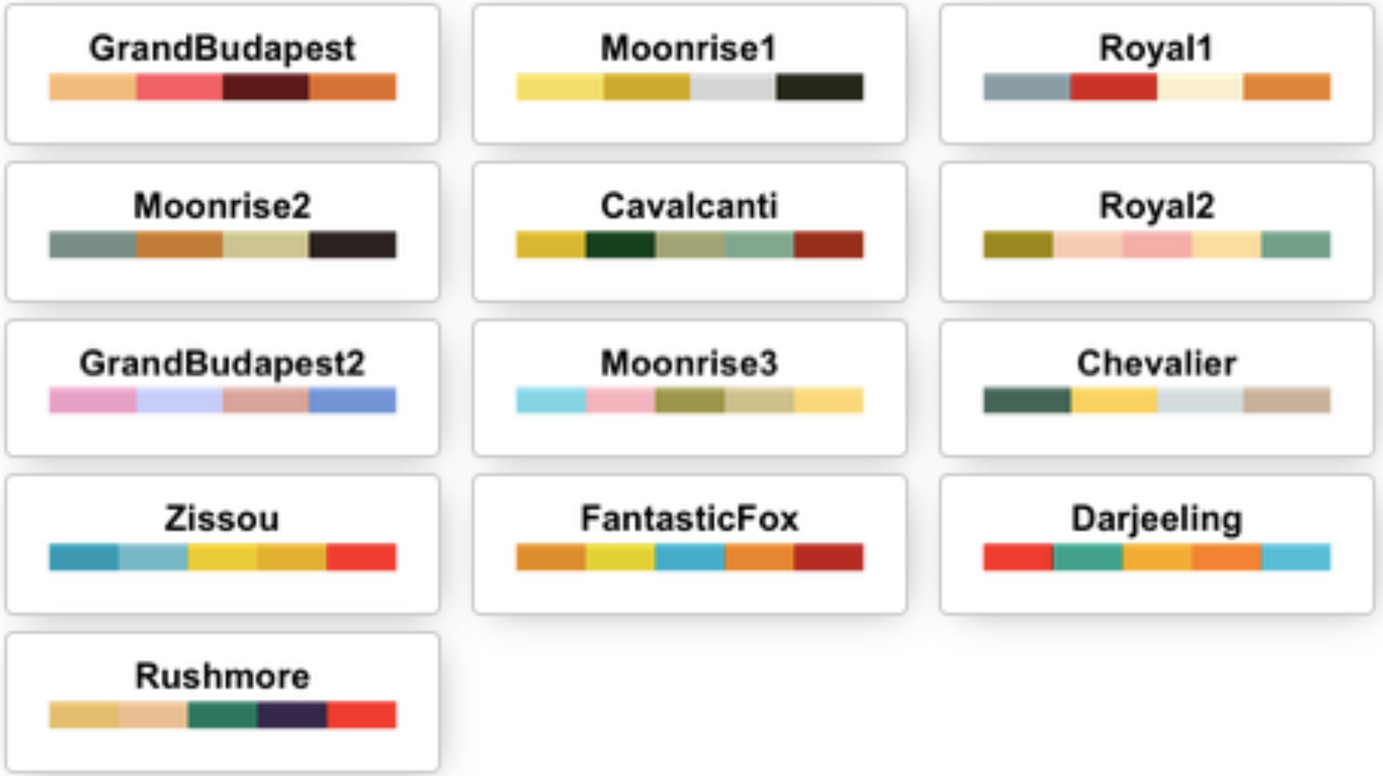
ggplot2 colors

```
ggplot(meanDaily2, aes(x = dailyMean, color = origin, fill = origin)) +
  geom_density(alpha = 0.2) +
  labs(x = 'mean daily departure delay (minutes)', y = 'density', title = 'Departure Delays by Origin: 2013')+
  scale_color_brewer(palette="Dark2") +
  scale_fill_brewer(palette="Dark2") +
  theme_clean()
```



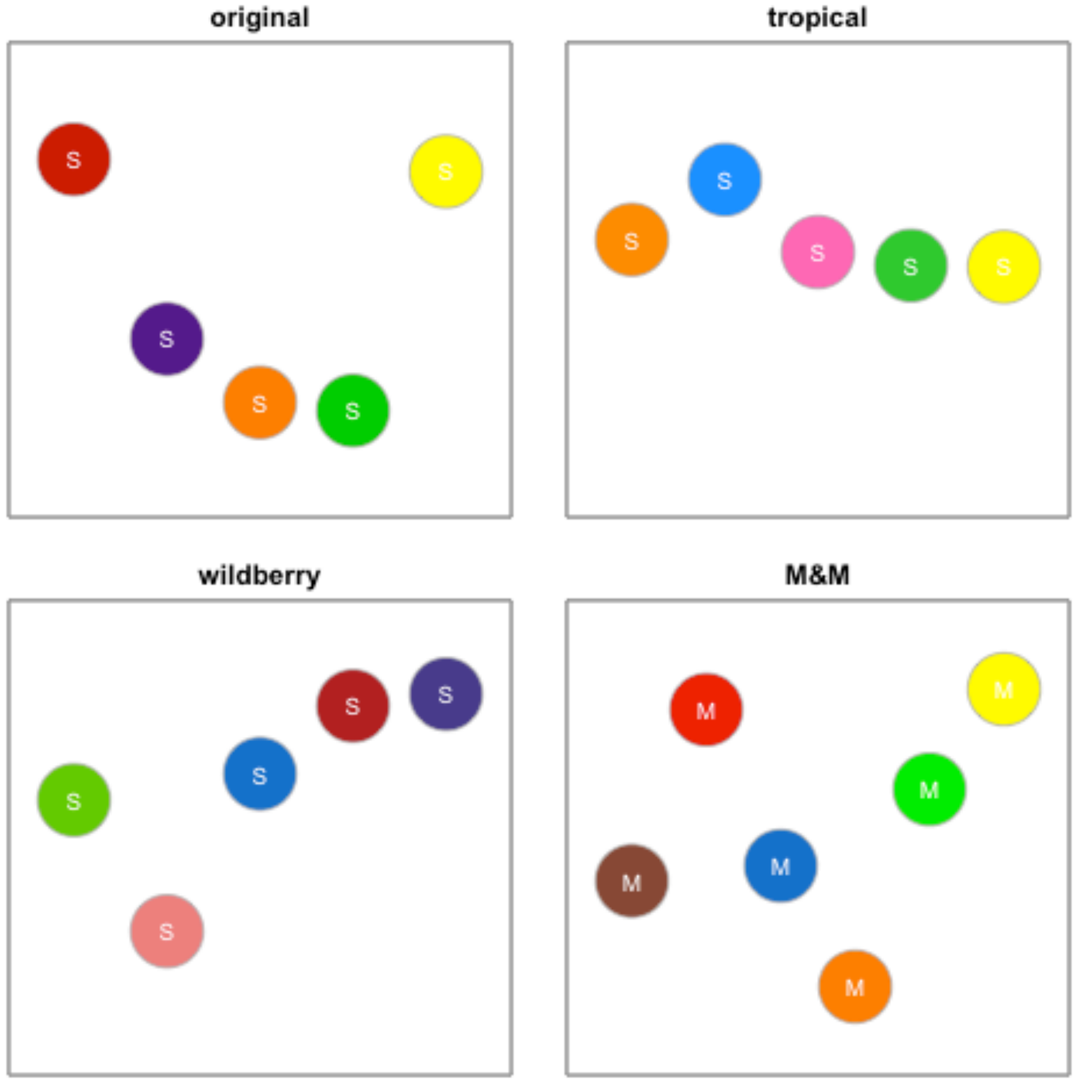
ggplot2 colors - palettes

`wesanderson`



ggplot2 colors - palettes

`RSkittleBrewer`

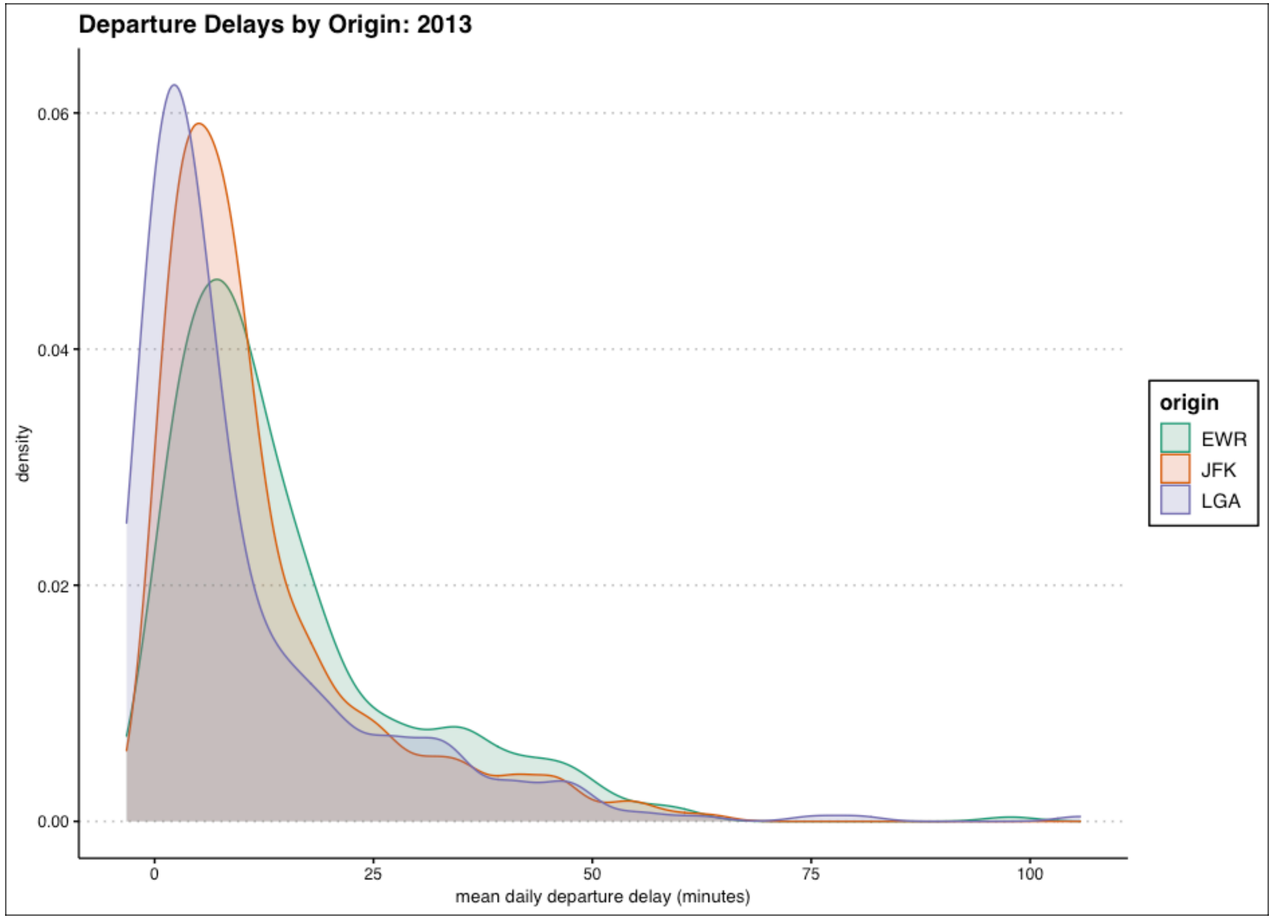


ggplot2 colors

- Make your own palettes
- Use Hex color codes

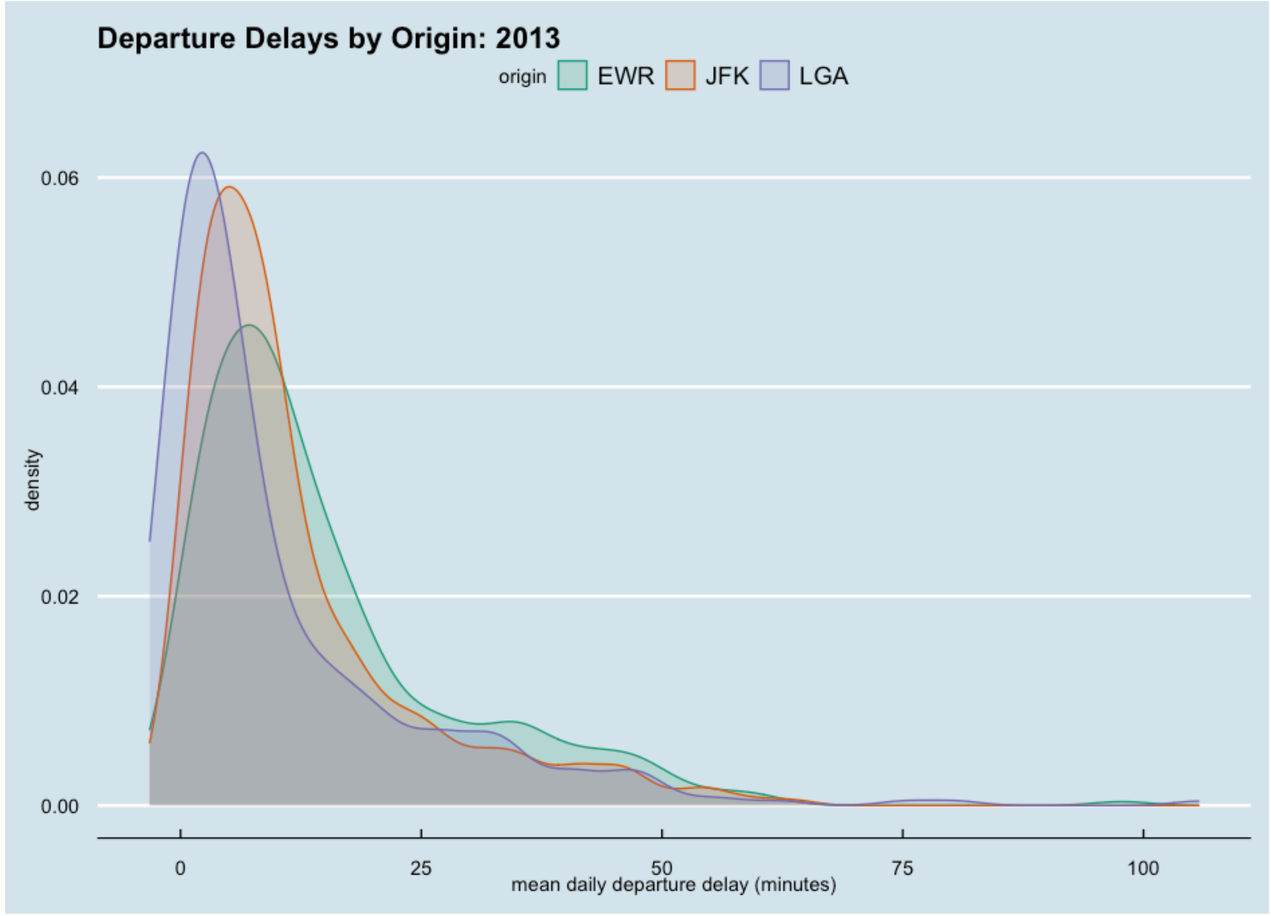
ggplot2 themes

```
ggplot(meanDaily2, aes(x = dailyMean, color = origin, fill = origin)) +
  geom_density(alpha = 0.2) +
  labs(x = 'mean daily departure delay (minutes)', y = 'density', title = 'Departure Delays by Origin: 2013')+
  scale_color_brewer(palette="Dark2") +
  scale_fill_brewer(palette="Dark2") +
  theme_clean()
```



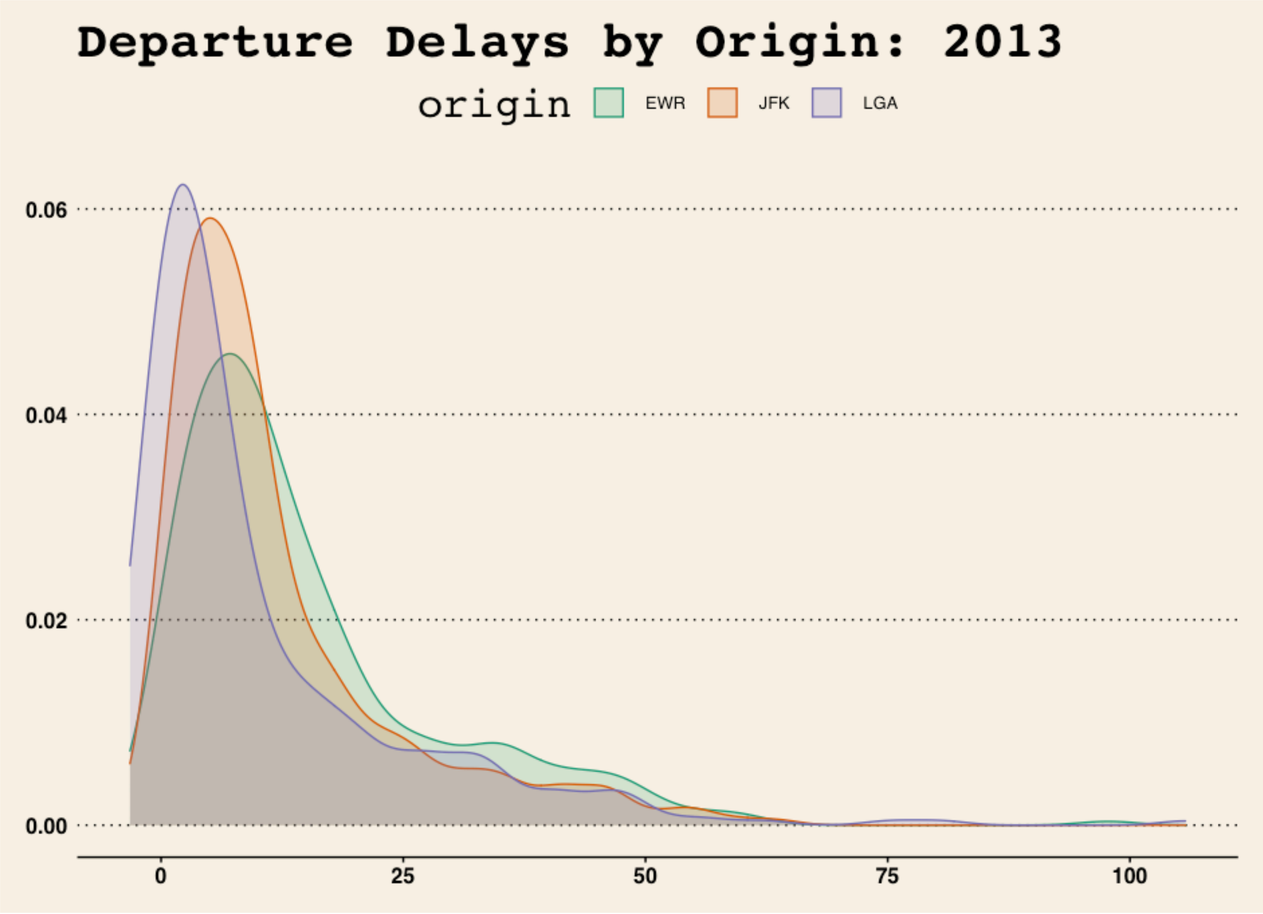
ggplot2 themes

```
ggplot(meanDaily2, aes(x = dailyMean, color = origin, fill = origin)) +
  geom_density(alpha = 0.2) +
  labs(x = 'mean daily departure delay (minutes)', y = 'density', title = 'Departure Delays by Origin: 2013')+
  scale_color_brewer(palette="Dark2") +
  scale_fill_brewer(palette="Dark2") +
  theme_economist()
```



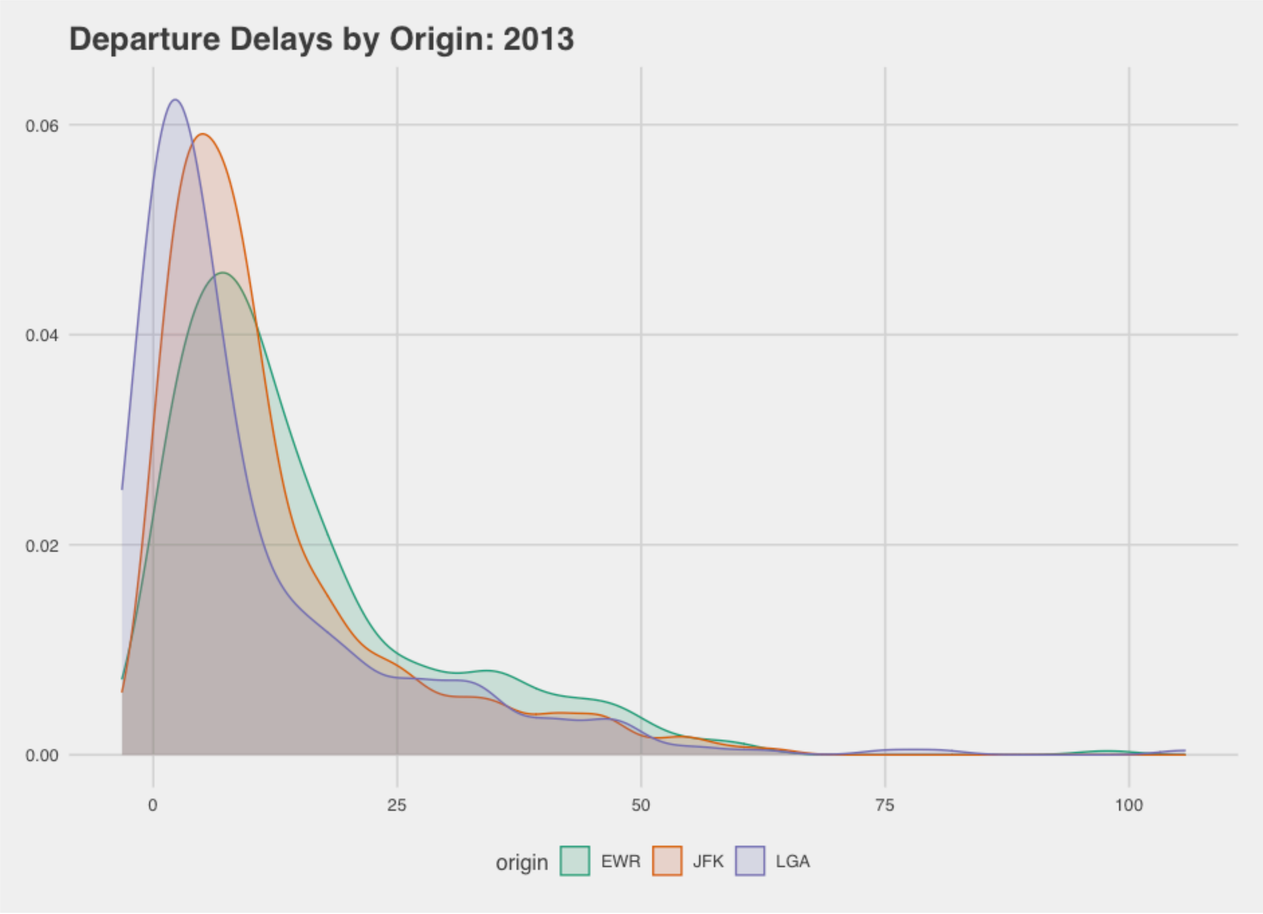
ggplot2 themes

```
ggplot(meanDaily2, aes(x = dailyMean, color = origin, fill = origin)) +
  geom_density(alpha = 0.2) +
  labs(x = 'mean daily departure delay (minutes)', y = 'density', title = 'Departure Delays by Origin: 2013')+
  scale_color_brewer(palette="Dark2") +
  scale_fill_brewer(palette="Dark2") +
  theme_wsj()
```



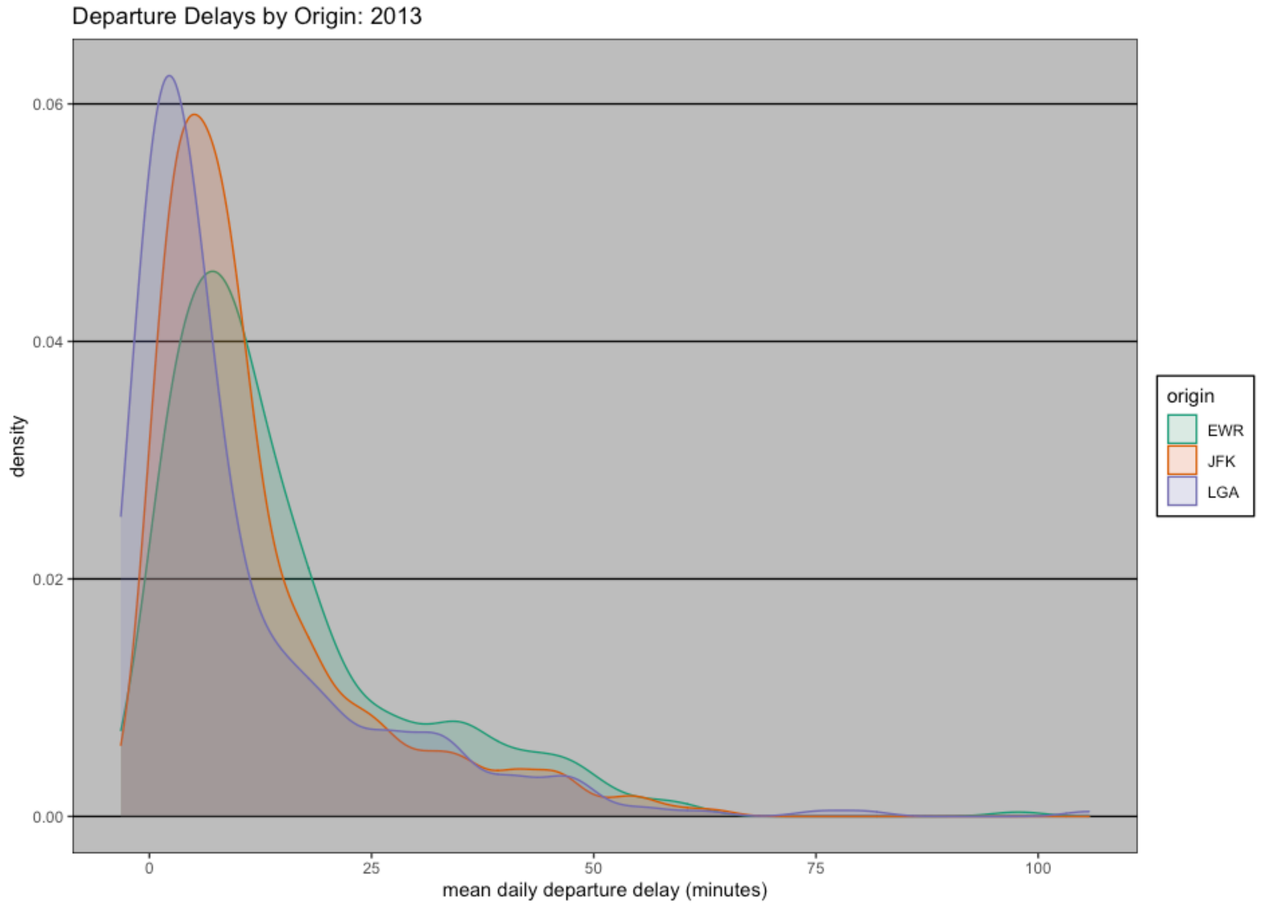
ggplot2 themes

```
ggplot(meanDaily2, aes(x = dailyMean, color = origin, fill = origin)) +
  geom_density(alpha = 0.2) +
  labs(x = 'mean daily departure delay (minutes)', y = 'density', title = 'Departure Delays by Origin: 2013')+
  scale_color_brewer(palette="Dark2") +
  scale_fill_brewer(palette="Dark2") +
  theme_fivethirtyeight()
```

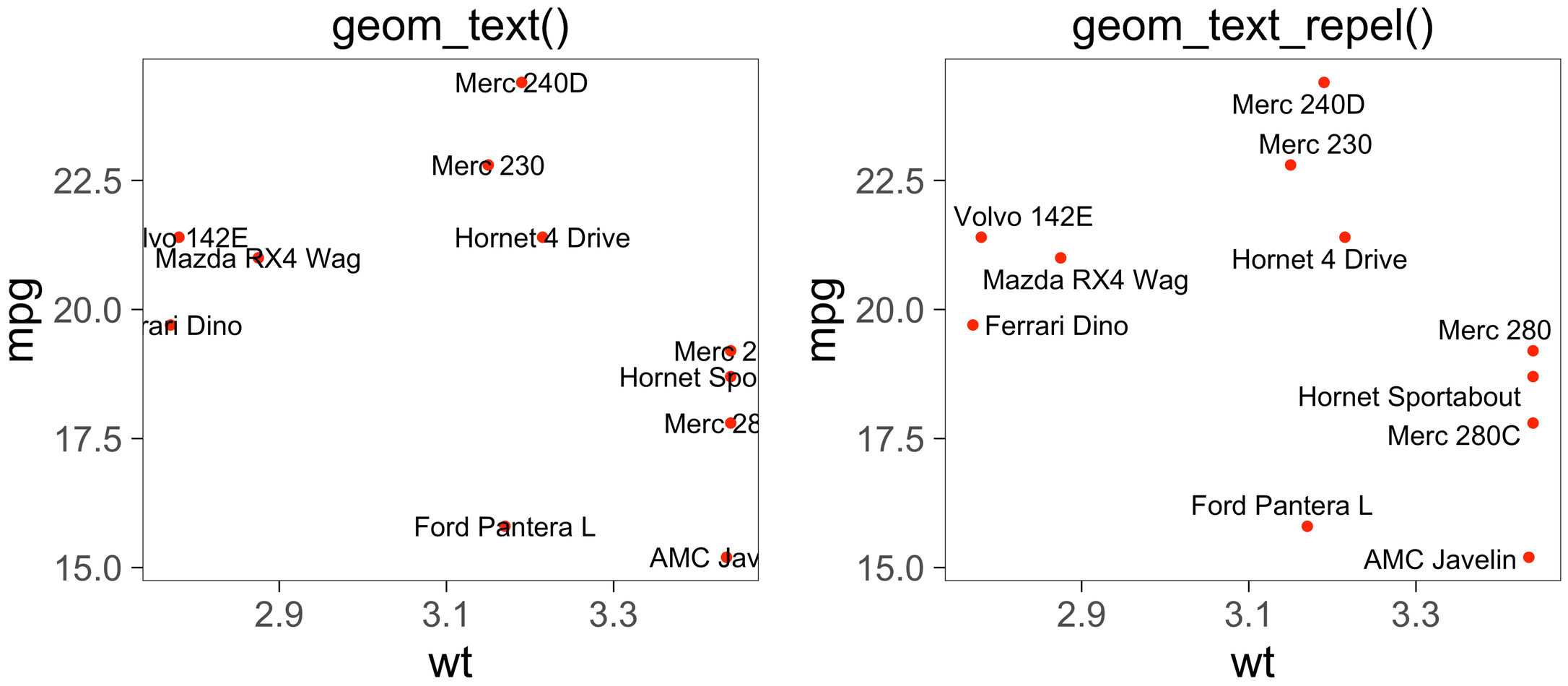


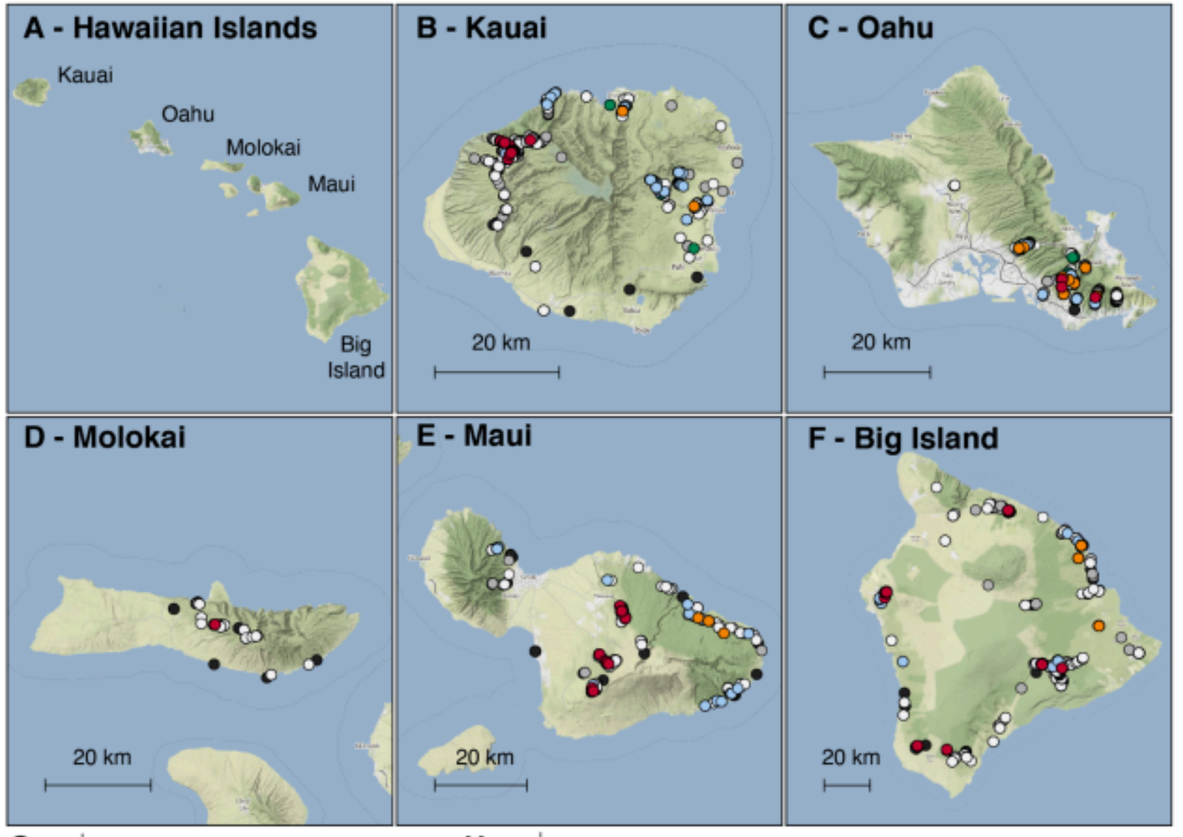
ggplot2 themes

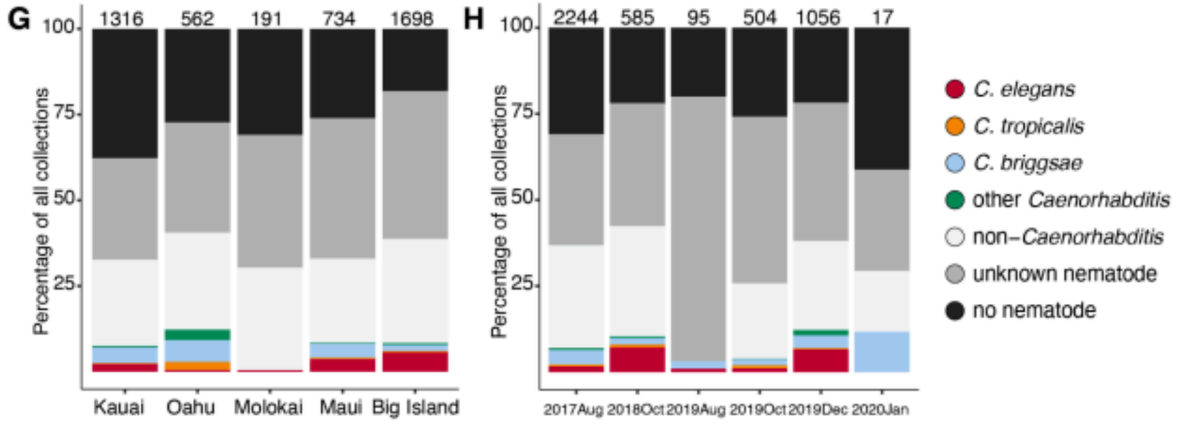
```
ggplot(meanDaily2, aes(x = dailyMean, color = origin, fill = origin)) +
  geom_density(alpha = 0.2) +
  labs(x = 'mean daily departure delay (minutes)', y = 'density', title = 'Departure Delays by Origin: 2013')+
  scale_color_brewer(palette="Dark2") +
  scale_fill_brewer(palette="Dark2") +
  theme_excel()
```

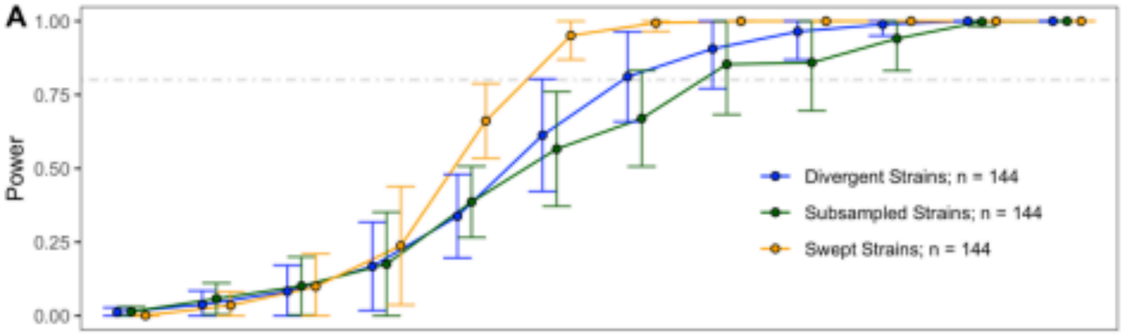


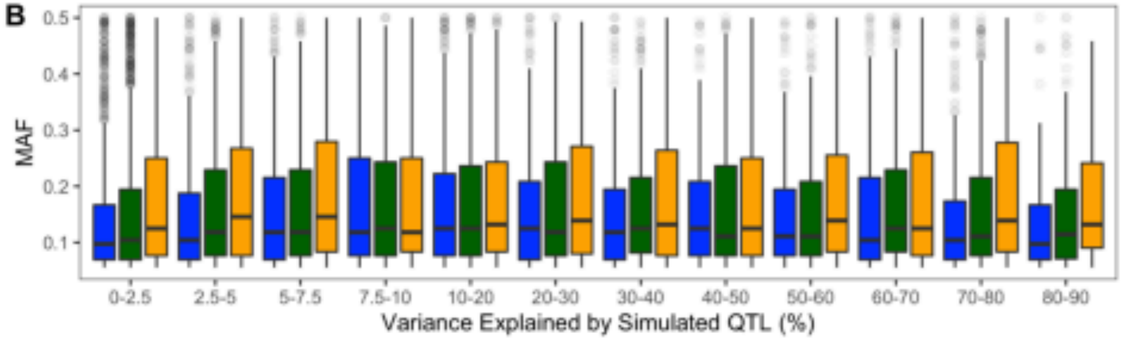
ggplot2 spacing - geom_repel

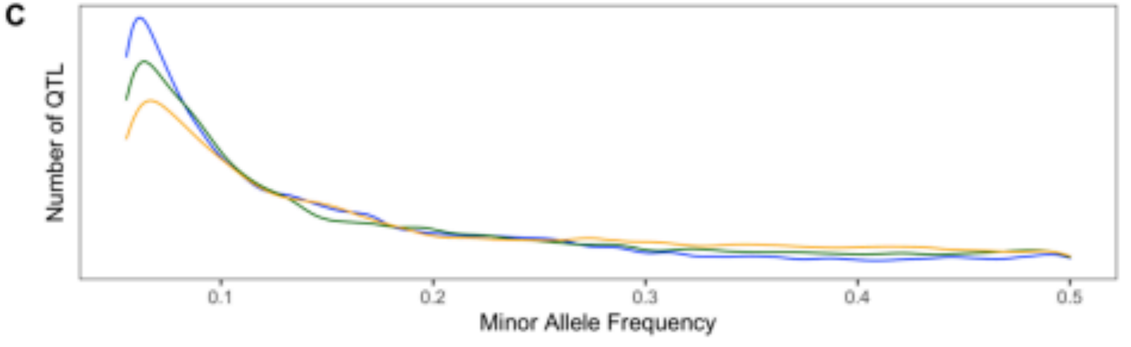


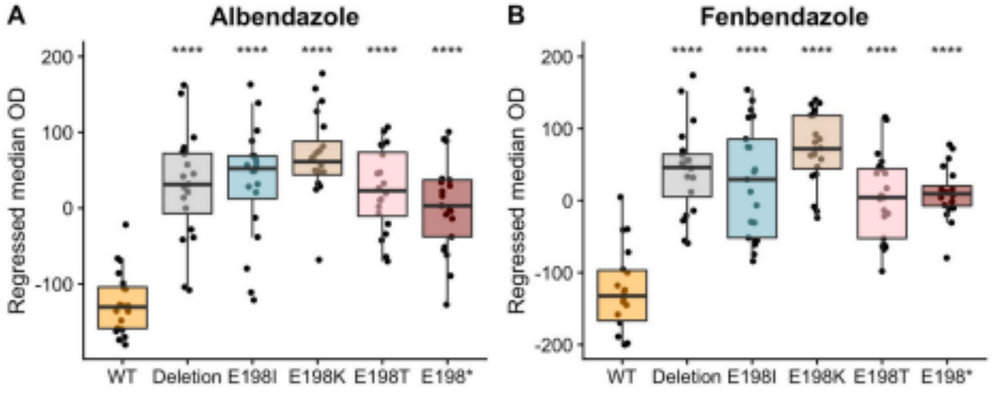

A - Hawaiian Islands
Kauai
Oahu
Molokai
Maui
Big Island
B - Kauai
20 km
C - Oahu
20 km
D - Molokai
20 km
E - Maui
20 km
F - Big Island
20 km

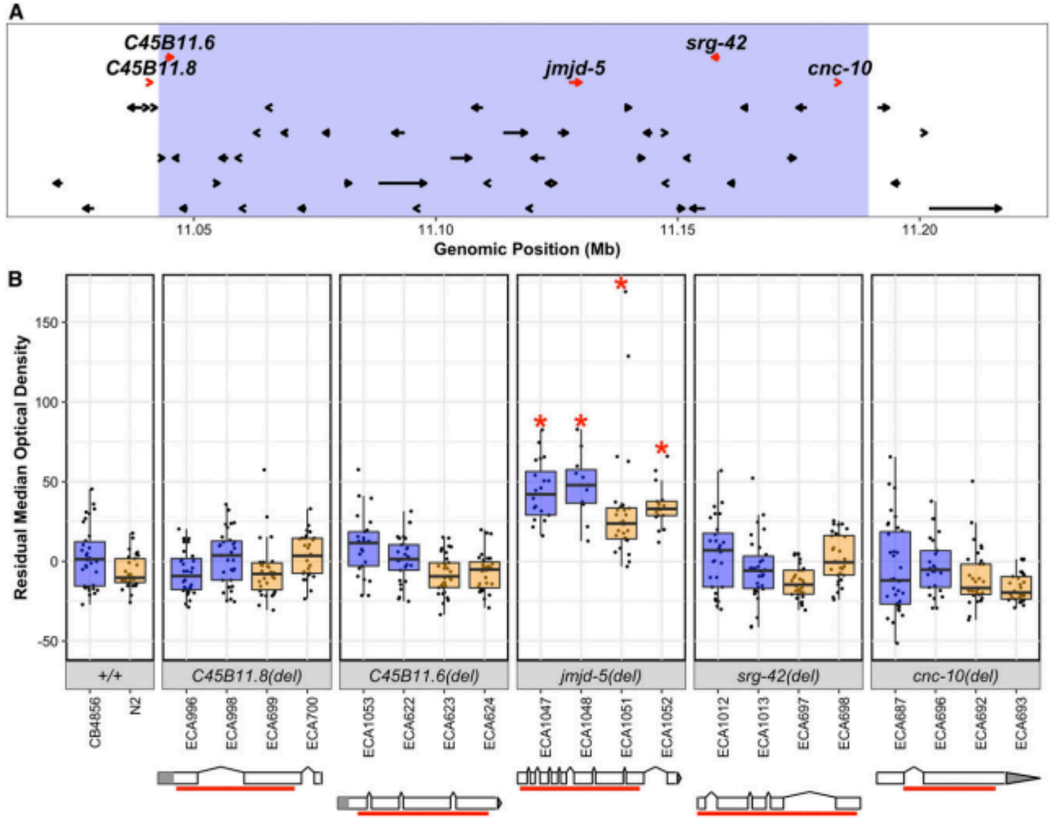

G
H
1316
562
191
734
1698
2244
585
95
504
1056
17
100
75
50
25
Percentage of all collections
Kauai
Oahu
Molokai
Maui
Big Island
2017Aug
2018Oct
2019Aug
2019Oct
2019Dec
2020Jan
C. elegans
C. tropicalis
C. briggsae
other Caenorhabditis
non−Caenorhabditis
unknown nematode
no nematode

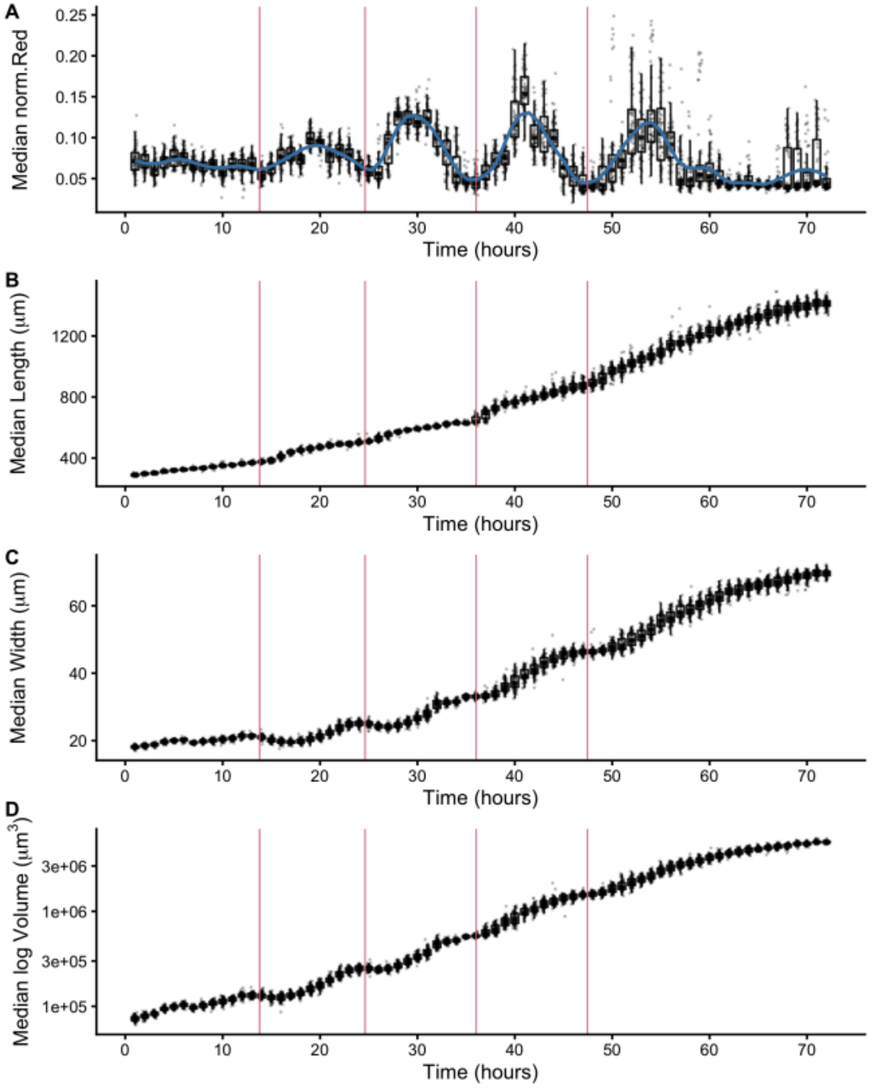

A
Power
1.00
0.75
0.50
0.25
0.00
Divergent Strains; n = 144
Subsampled Strains; n = 144
Swept Strains; n = 144

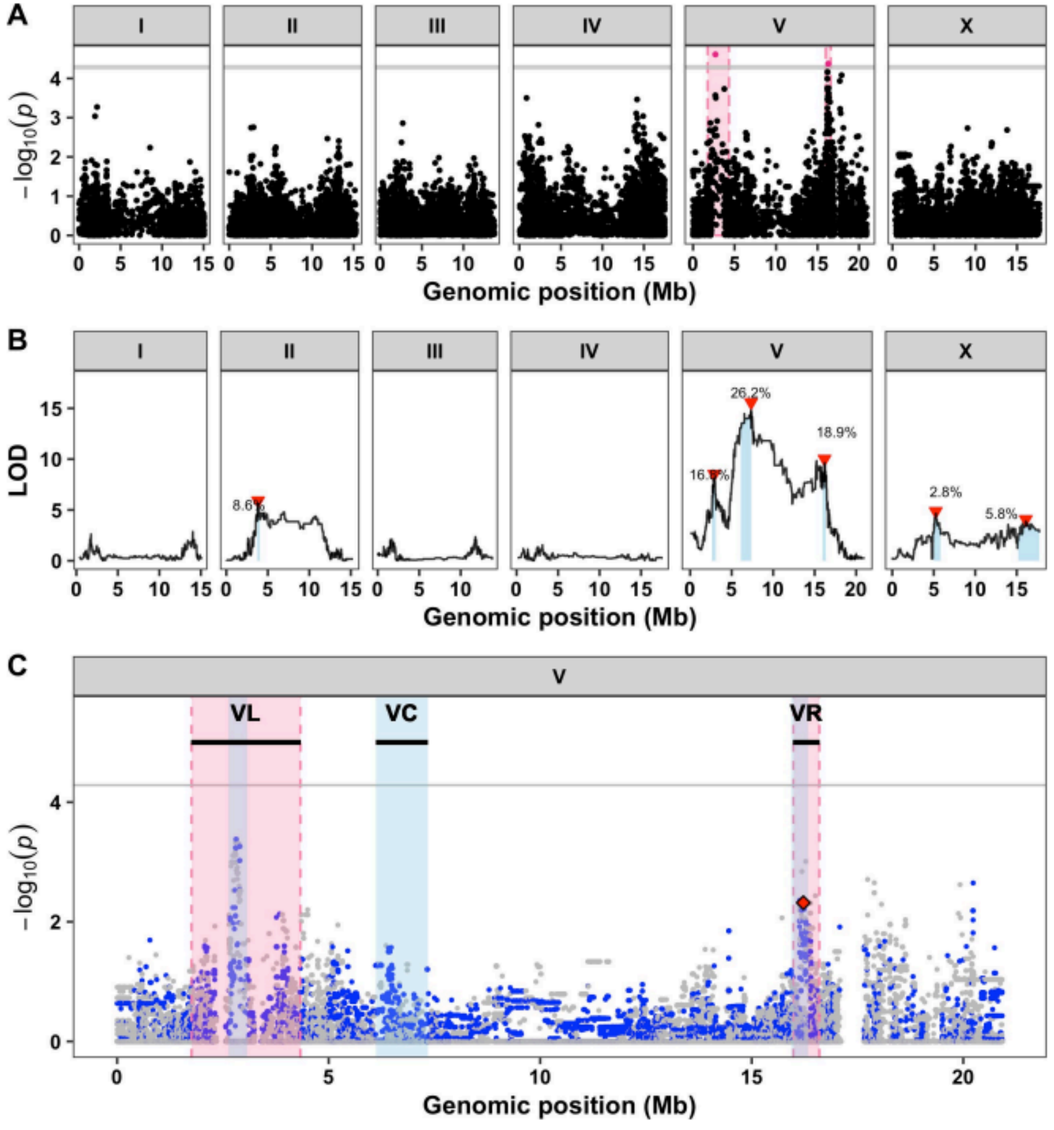

B
MAF
0.5
0.4
0.3
0.2
0.1
0-2.5
2.5-5
5-7.5
7.5-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
Variance Explained by Simulated QTL (%)

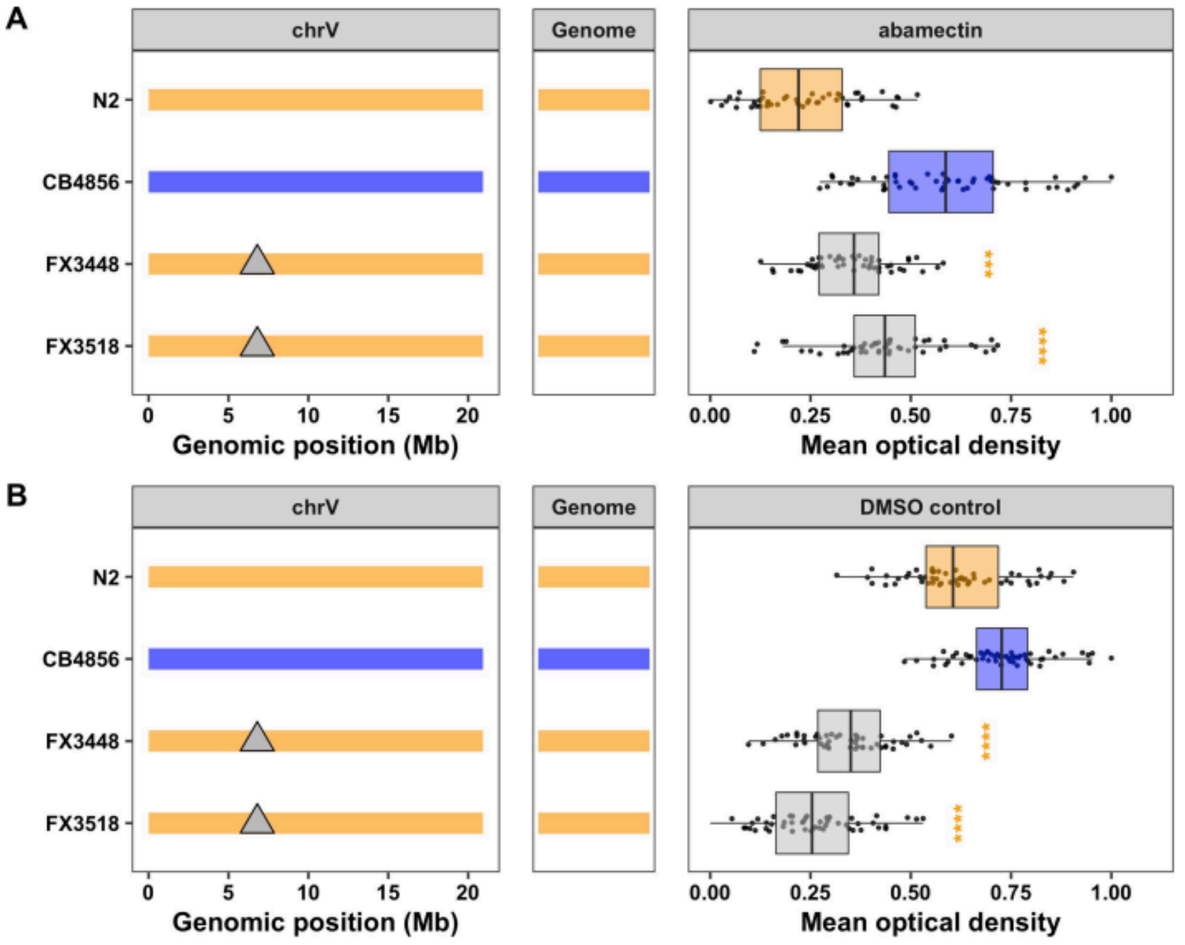

C
Number of QTL
0.1
0.2
0.3
0.4
0.5
Minor Allele Frequency


A
Albendazole
B
Fenbendazole
Regressed median OD
200
100
0
-100
-200
****
WT
Deletion
E198I
E198K
E198T
E198*


A
C45B11.6
C45B11.8
jmjd-5
srg-42
cnc-10
11.05
11.10
11.15
11.20
Genomic Position (Mb)
B
Residual Median Optical Density
150
100
50
0
-50
+/+
C45B11.8(del)
C45B11.6(del)
jmjd-5(del)
srg-42(del)
cnc-10(del)
CB4856
N2
ECA996
ECA998
ECA699
ECA700
ECA1053
ECA622
ECA623
ECA624
ECA1047
ECA1048
ECA1051
ECA1052
ECA1012
ECA1013
ECA697
ECA698
ECA687
ECA696
ECA692
ECA693


A
Median norm.Red
0.25
0.20
0.15
0.10
0.05
B
Median Length (µm)
1200
800
400
C
Median Width (µm)
60
40
20
D
Median log Volume (µm³)
3e+06
1e+06
3e+05
1e+05
0
10
20
30
40
50
60
70
Time (hours)


A
I
II
III
IV
V
X
$-\log_{10}(p)$
Genomic position (Mb)
B
LOD
26.2%
18.9%
16.1%
8.6%
2.8%
5.8%
Genomic position (Mb)
C
V
VL
VC
VR
$-\log_{10}(p)$
Genomic position (Mb)


A
chrV
Genome
abamectin
N2
CB4856
FX3448
FX3518
Genomic position (Mb)
Mean optical density
B
chrV
Genome
DMSO control
N2
CB4856
FX3448
FX3518
Genomic position (Mb)
Mean optical density

https://github.com/erikgahner/awesome-ggplot2

- ggmaps
- gantrify
- ggbeeswarm
- ggcor
- ggenomes
- ggbio
- ggdendro
- ggradar
- ggridges
- ggrepel
- ggwordcloud
- ggsci
- ggthemes

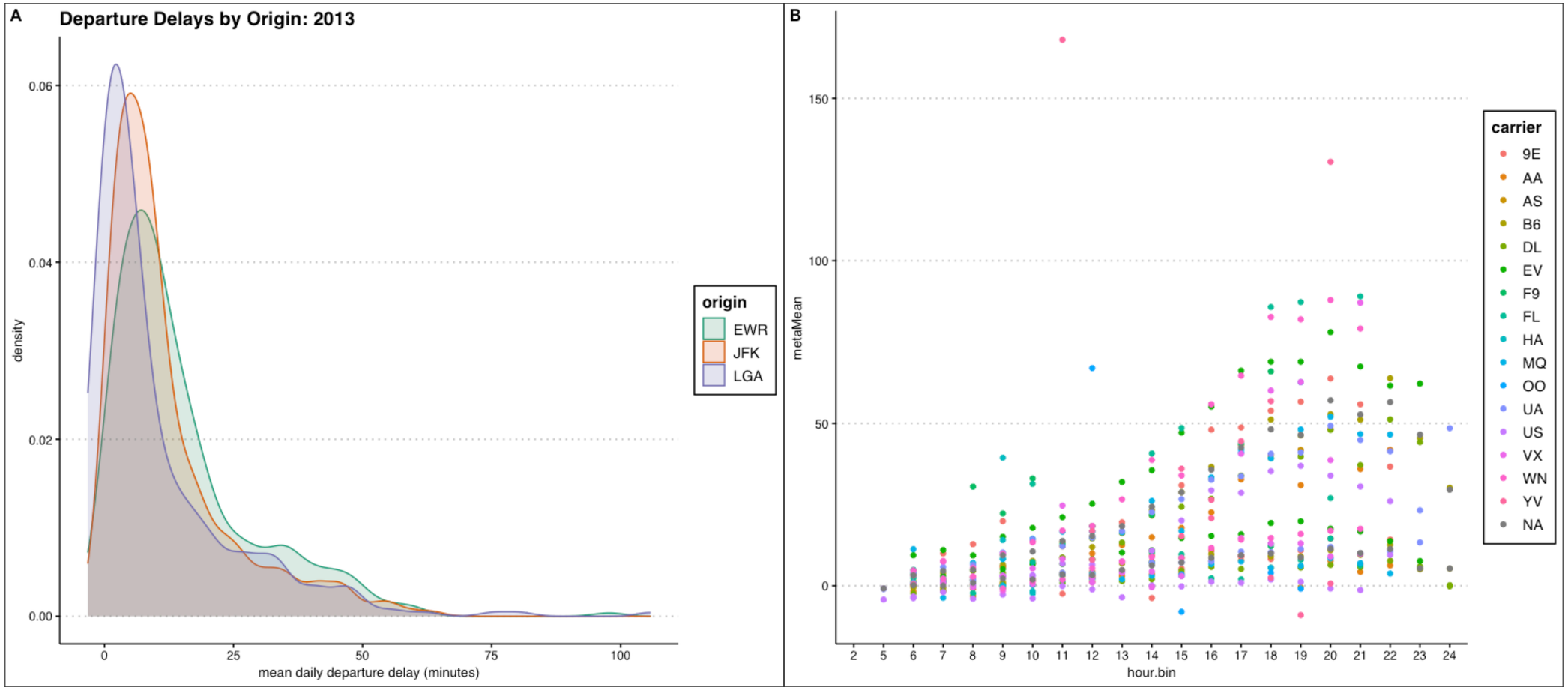
Today’s class

1. Go through class 6 Activities
2. ggplot2 add-ons: colors, spacing, other packages
3. cowplot, ggsave
4. Go through your figure outlines

cowplot by Claus O. Wilke

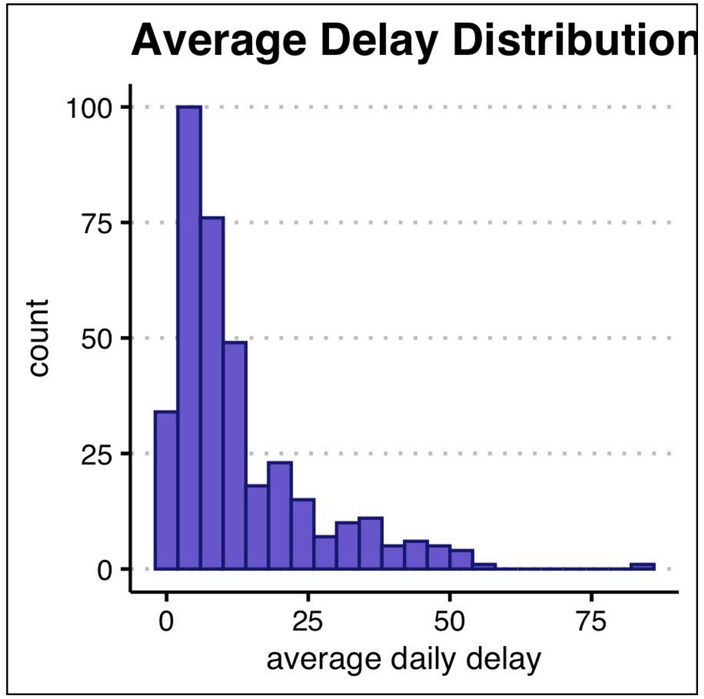
- Save ggplots as objects
- Use `plot_grid()` to combine plots

```
plot_grid(p1, p2, labels = c('A', 'B'), label_size = 12)
```

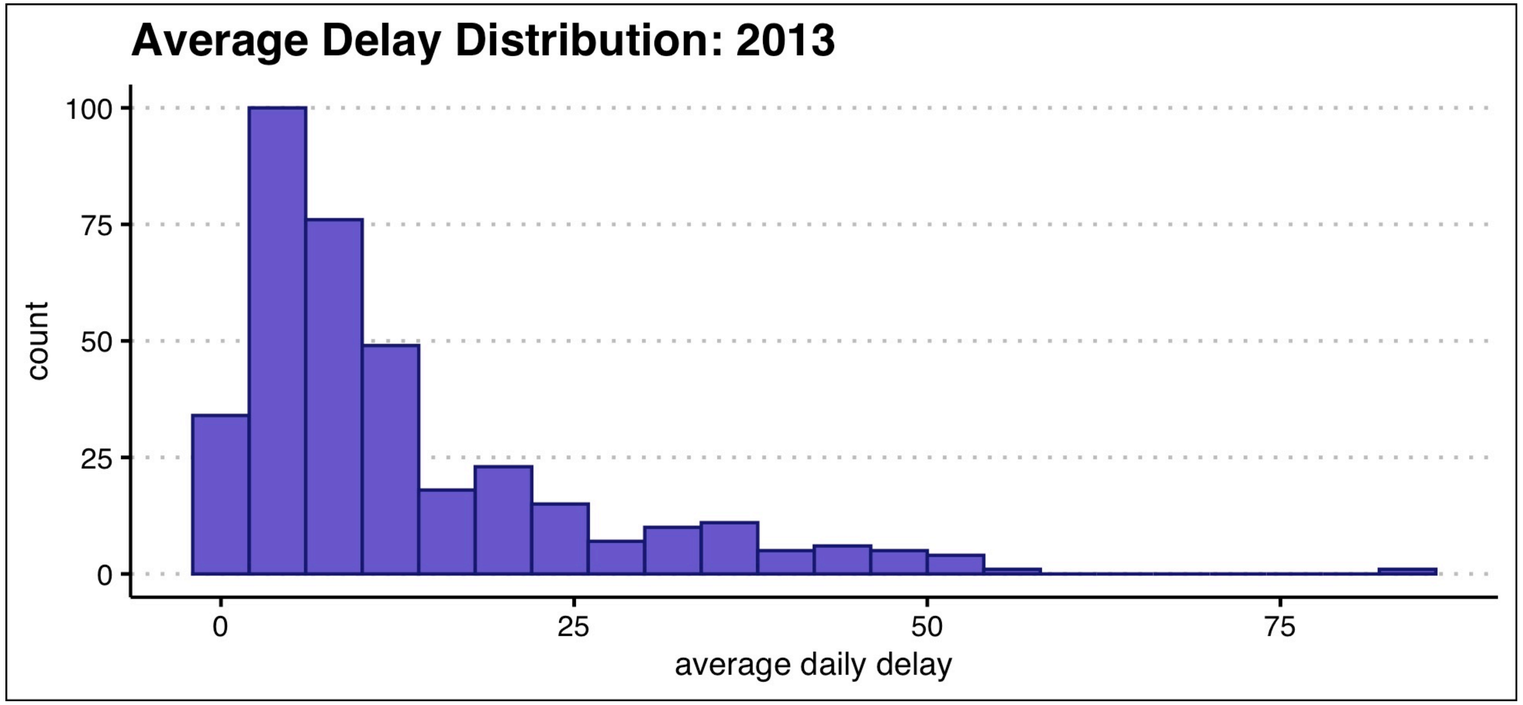


ggsave

```
ggsave(filename = “xxx.jpg”, plot = lastplot, dpi = 300, width = 6.5,
height = 3, units = “in”)
```



width=3



width=6.5, height = 3, units = “in”

Today’s class

1. Go through class 6 Activities
2. ggplot2 add-ons: colors, spacing, other packages
3. cowplot, ggsave
4. Go through your figure outlines