

Explorando o pacote ggplot2 do R

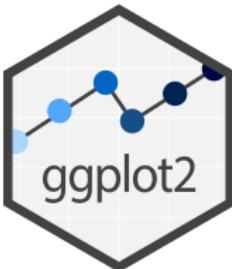


Introdução



O `ggplot2` é um pacote de código aberto para a visualização gráfica de dados para a linguagem de programação R. Foi criada por Hadley Wickham em 2005 (Wickham 2016), sendo uma implementação do livro *Grammar of Graphics* de Leland Wilkinson também lançado em 2005 (Wilkinson 2011).

Ele aborda que visualização gráfica dos dados pode ser dividida em componentes semânticos, como escalas e camadas.



Por que usar o ggplot2?



1. Alta costumização gráfica.
2. Alta diversidade de modelos de gráficos.
3. Integração com outros pacotes do tidyverse, como por exemplo `dplyr` (Wickham et al. 2023), `forcats` (Wickham 2023) e o `plotly` (Sievert 2020).
4. Criação de gráficos a partir de camadas, podendo sobrepor diferentes gráficos.

Como instalar o ggplot2?



Instalando pacotes

```
#instalando pacote ggplot2  
install.packages("ggplot2")  
  
#instalando dplyr,forcats  
# e patchwork  
install.packages("dplyr")  
install.packages("forcats")  
install.packages("patchwork")
```

Carregando pacotes

```
#Carregando o pacote ggplot2  
library(ggplot2)  
  
#Carregando dplyr, forcats  
#e patchwork  
library(dplyr)  
library(forcats)  
library(patchwork)
```

Banco de dados *iris*



Para essa oficina será utilizado bancos de dados **iris**.

iris - é referente tamanho de pétalas e sépalas de 3 espécies do gênero *Iris* do trabalho de Fisher em 1936 (*Iris setosa*, *Iris versicolor* e *Iris virginica*)

```
data(iris)
```

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa

Box-plot



```
iris %>% ggplot(aes(x=Species, y=Petal.Length)) +  
  geom_boxplot()
```

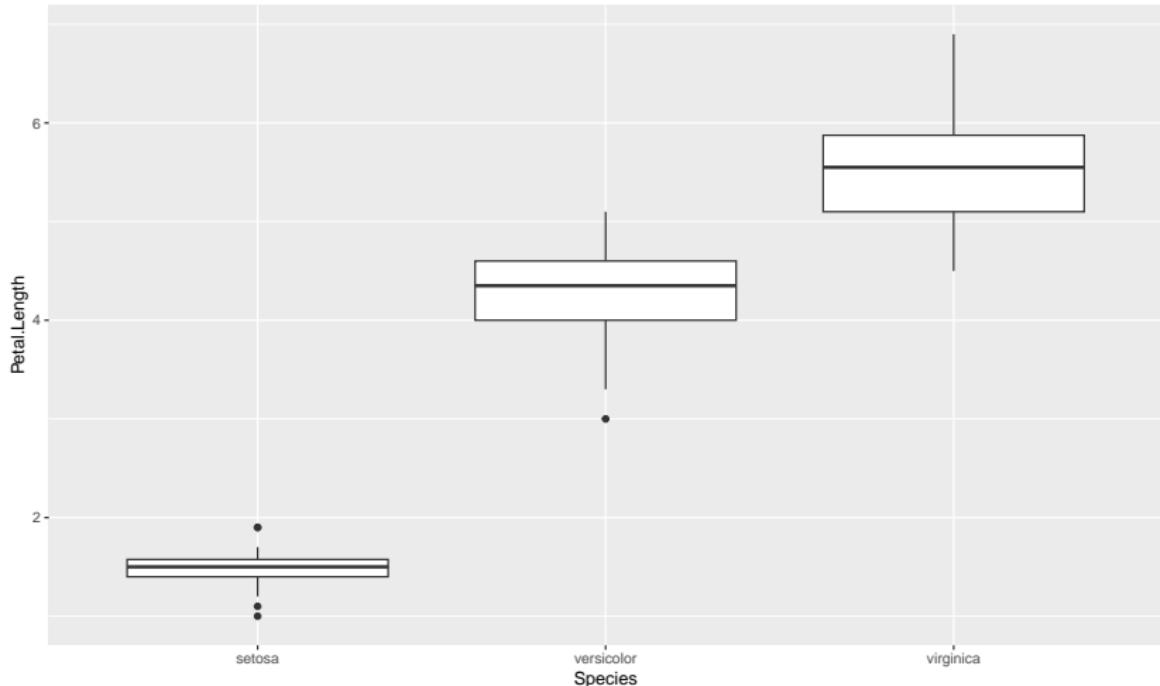
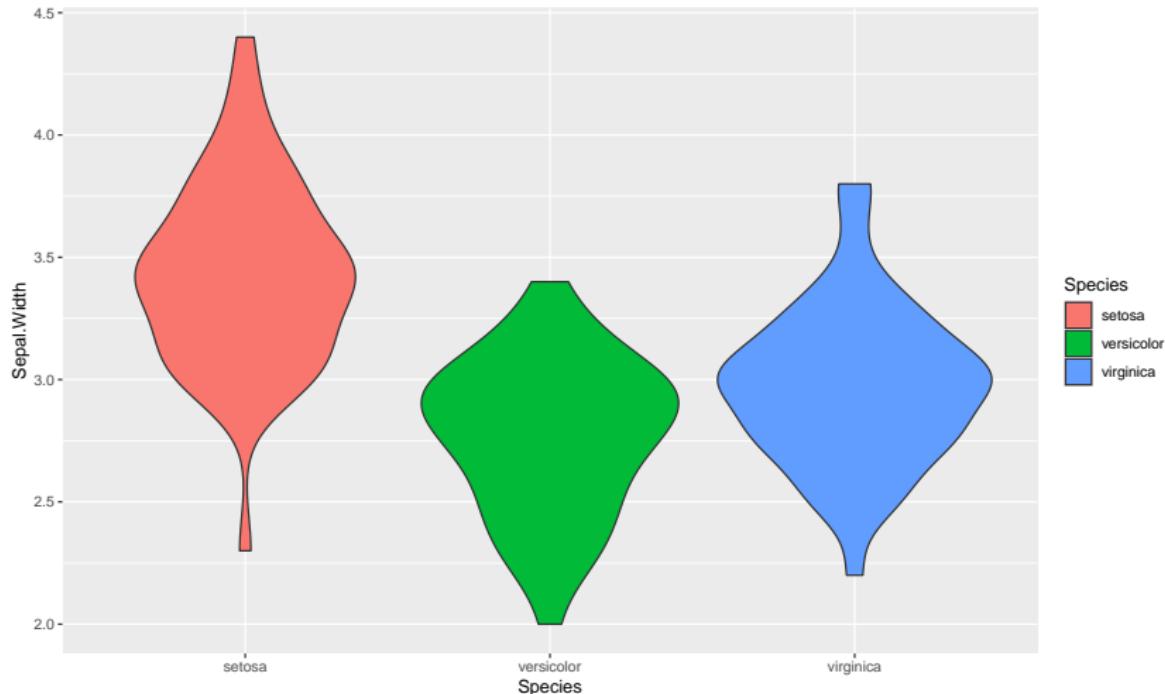




Gráfico violino

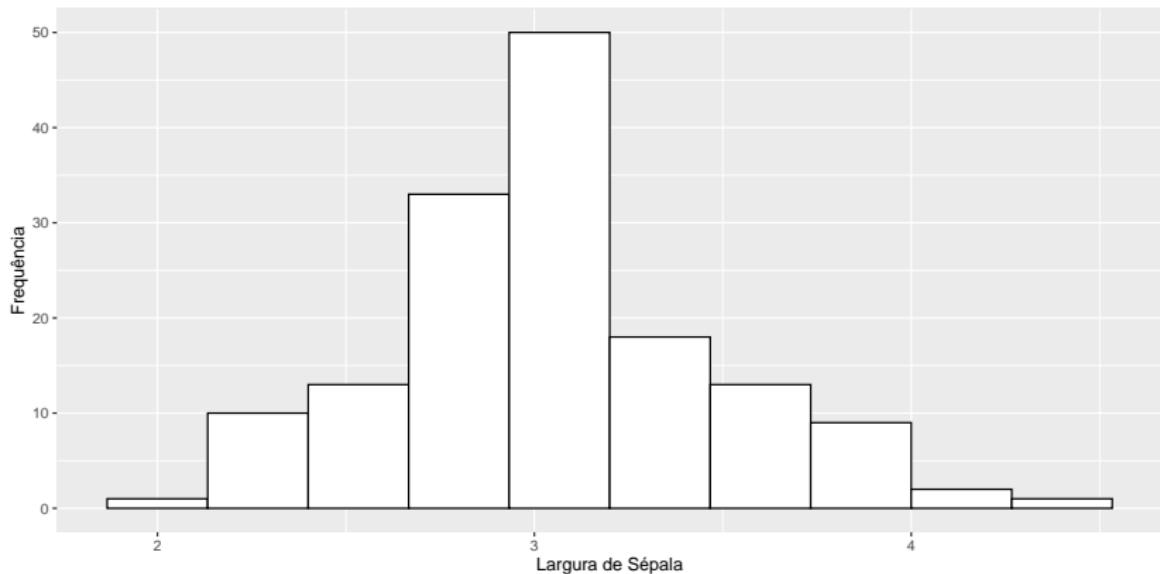
```
ggplot(iris, aes(x=Species, y=Sepal.Width, fill=Species))+  
  geom_violin()
```



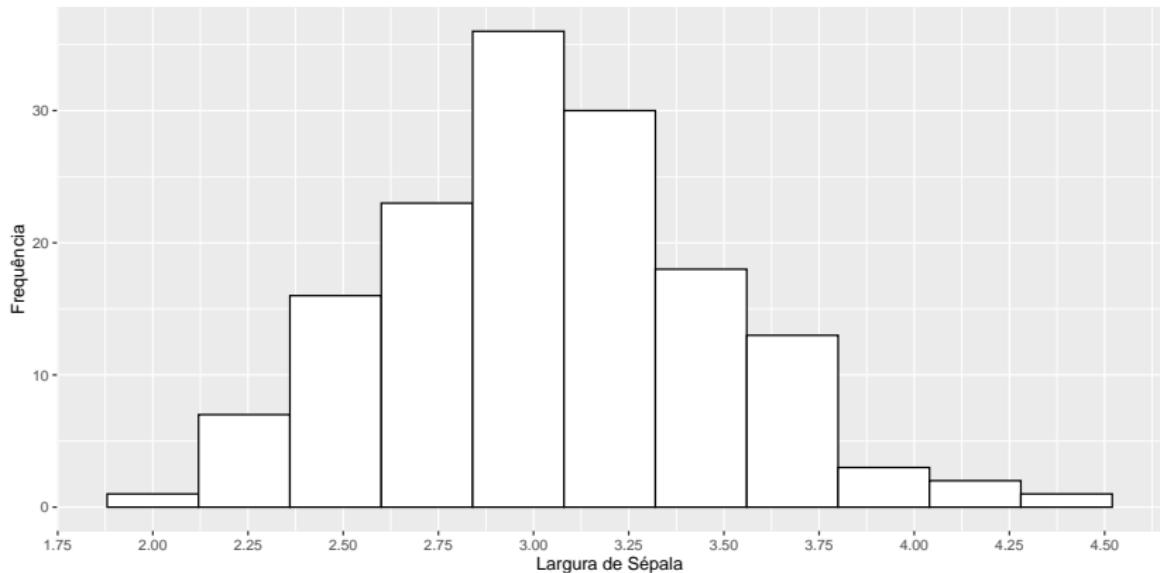


Histograma

```
ggplot(iris,aes(x=Sepal.Width))+  
  geom_histogram(bins=10, color="black",  
                 fill="white") +  
  labs(y="Frequência", x="Largura de Sépala")
```



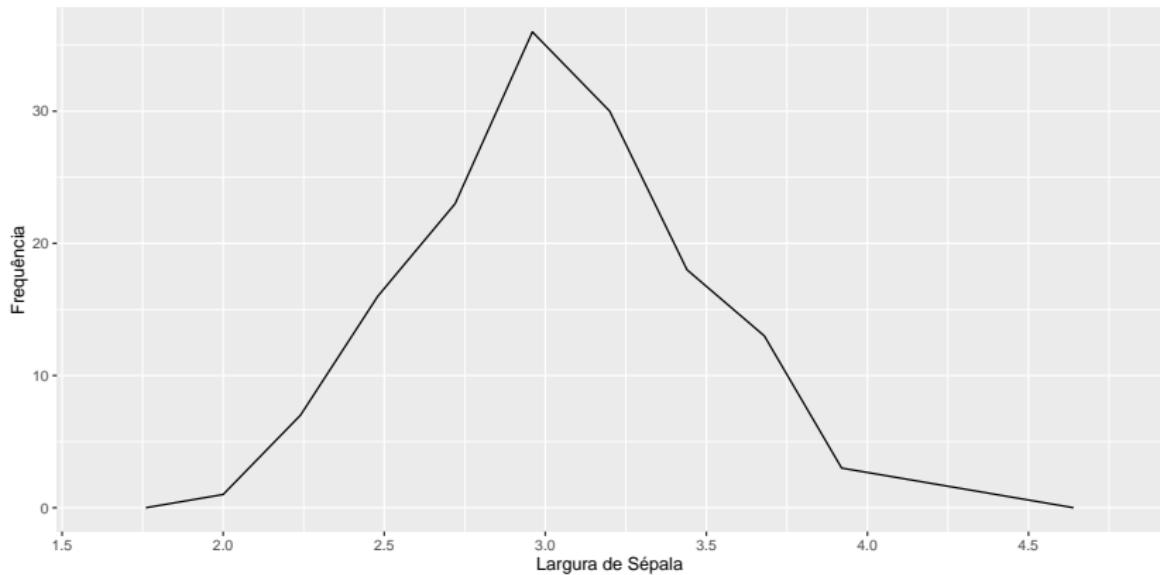
```
ggplot(iris,aes(x=Sepal.Width))+  
  geom_histogram(bins=11, color="black",  
                 fill="white") +  
  labs(y="Frequênci", x="Largura de Sépala") +  
  scale_x_continuous(n.breaks = 11)
```



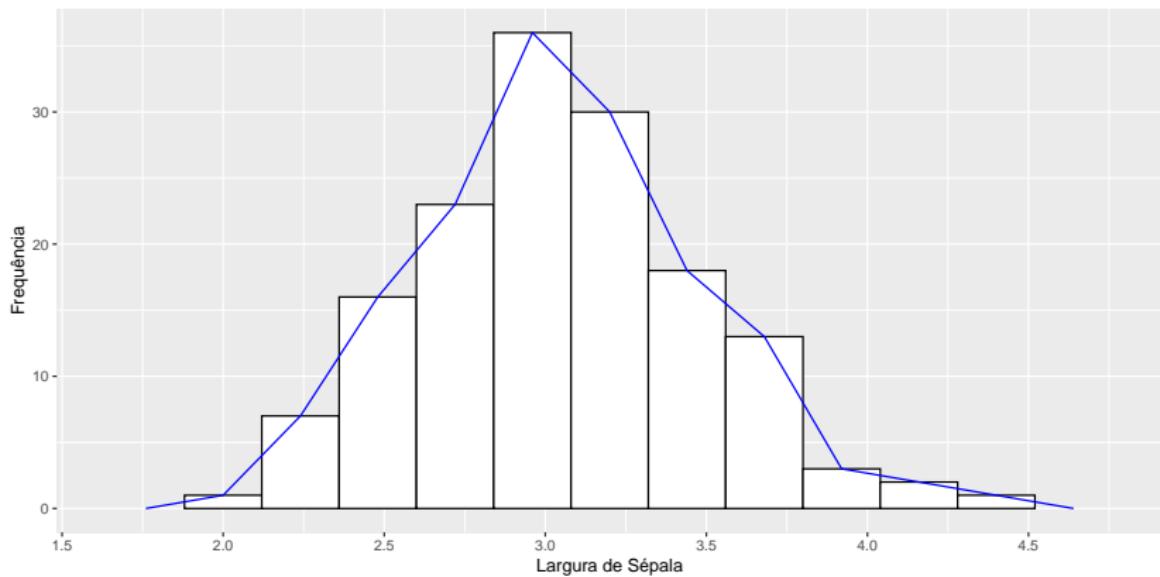
Polígono de frequências



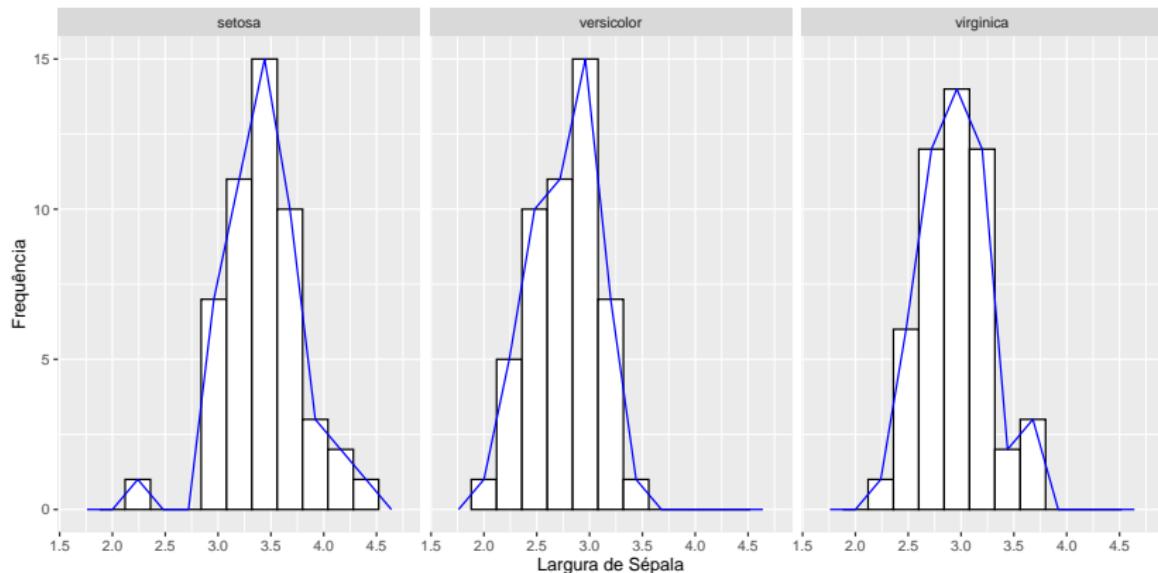
```
ggplot(iris,aes(x=Sepal.Width))+  
  geom_freqpoly(bins=11, color="black") +  
  labs(y="Frequência", x="Largura de Sépala") +  
  scale_x_continuous(n.breaks = 11)
```



```
ggplot(iris,aes(x=Sepal.Width))+  
  labs(y="Frequência", x="Largura de Sépala") +  
  scale_x_continuous(n.breaks = 11) +  
  geom_histogram(bins=11, color="black",  
                 fill="white") +  
  geom_freqpoly(bins=11, color="blue")
```



```
ggplot(iris,aes(x=Sepal.Width))+  
  labs(y="Frequênci", x="Largura de Sépala") +  
  scale_x_continuous(n.breaks = 11) +  
  geom_histogram(bins=11, color="black",  
                 fill="white") +  
  geom_freqpoly(bins=11, color="blue") +  
  facet_grid(~Species)
```



```
ggplot(iris,aes(x=Sepal.Width))+  
  labs(y="Frequência", x="Largura de Sépala") +  
  scale_x_continuous(n.breaks = 11) +  
  geom_histogram(bins=11, color="black",  
                 fill="white") +  
  geom_freqpoly(bins=11, color="blue") +  
  facet_grid(Species~.)
```

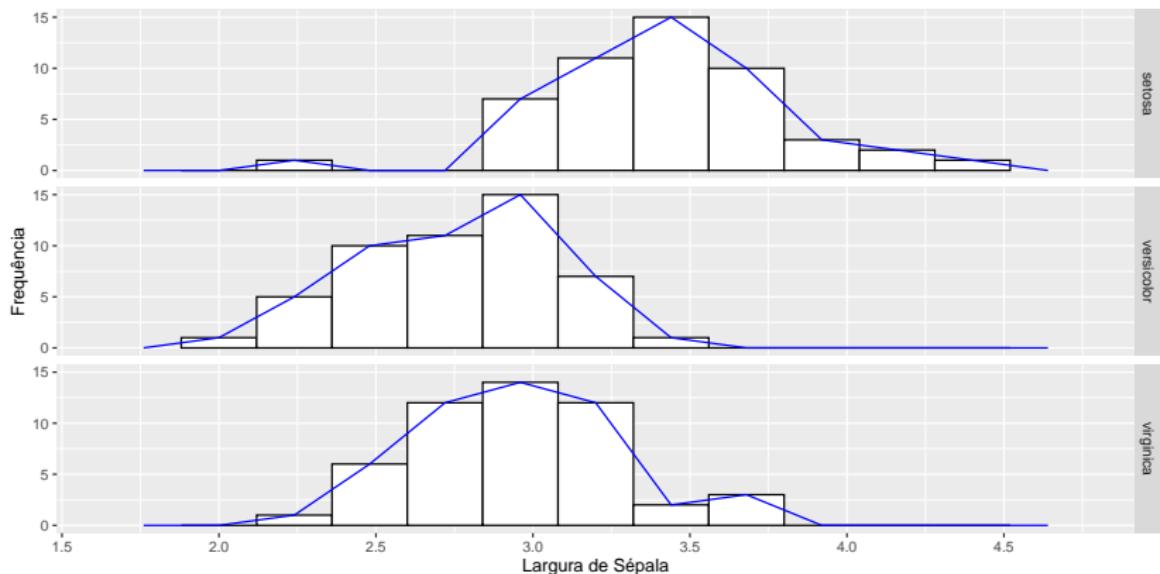




Gráfico de densidade

```
ggplot(iris,aes(x=Sepal.Width))+  
  geom_density(color="black", fill="white") +  
  labs(y="Frequência", x="Largura de Sépala")
```

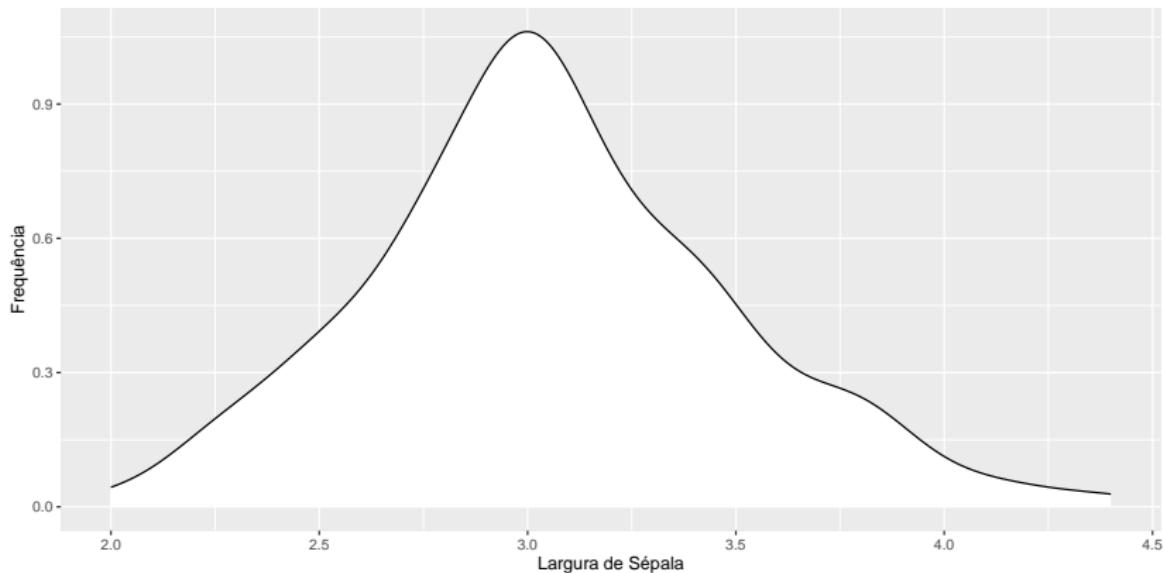
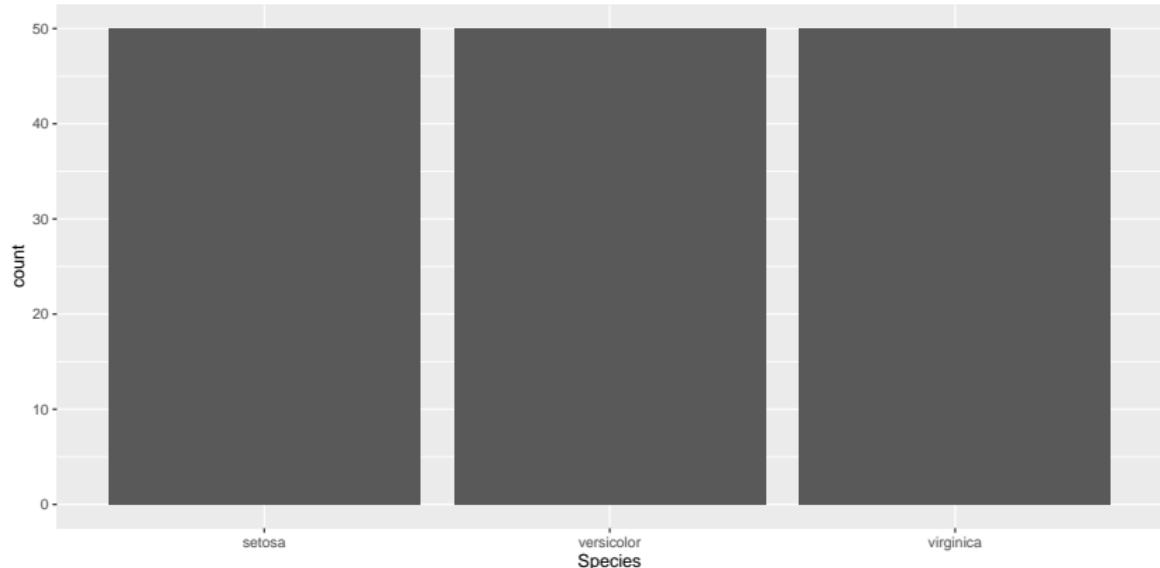


Gráfico de barras de frequênci



```
iris%>%ggplot(aes(x=Species))+  
  geom_bar()
```



```
iris %>% group_by(Species) %>%
  summarise(count = n()) %>%
  ggplot(aes(x = Species, fill = Species, y = count)) +
  geom_col(color = "black")
```

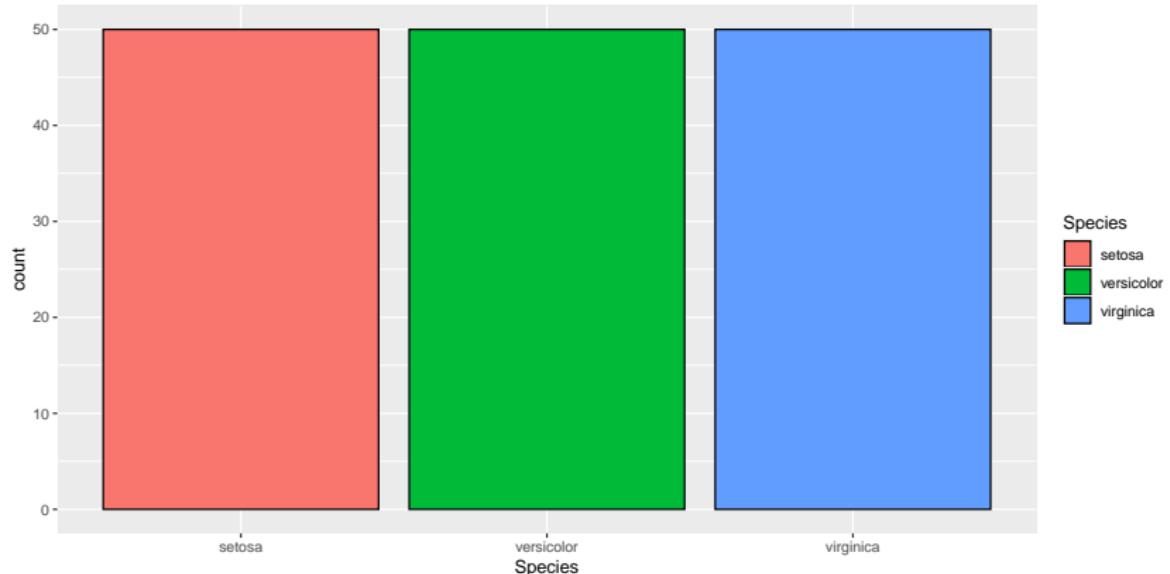
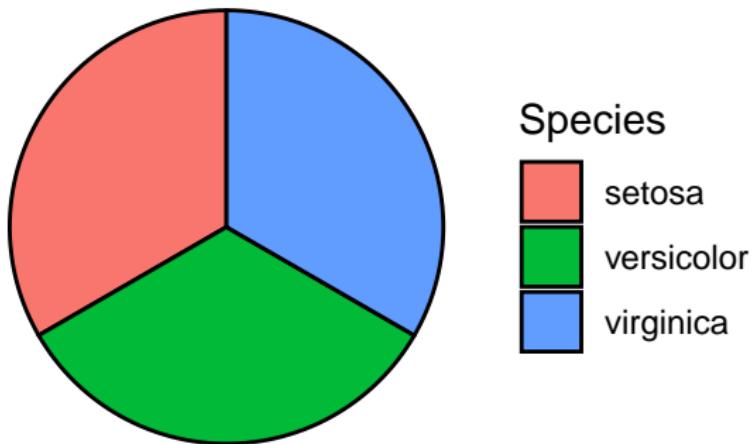


Gráfico de setores



```
iris%>%group_by(Species)%>%
  summarise(count=n()/150*100)%>%
  ggplot(aes(x=" ", fill=Species, y=count))+  
  geom_col(color="black")+
  coord_polar(theta="y")+
  theme_void()
```



```
iris %>% group_by(Species) %>%
  summarise(count=round(n()/150*100, 2)) %>%
  ggplot(aes(x=" ", fill=Species, y=count)) +
  geom_col(color="black") + coord_polar(theta="y") +
  geom_label(aes(label = paste0(count, "%")),
             position = position_stack(vjust = 0.5),
             show.legend = FALSE, size=3) +
  theme_void()
```

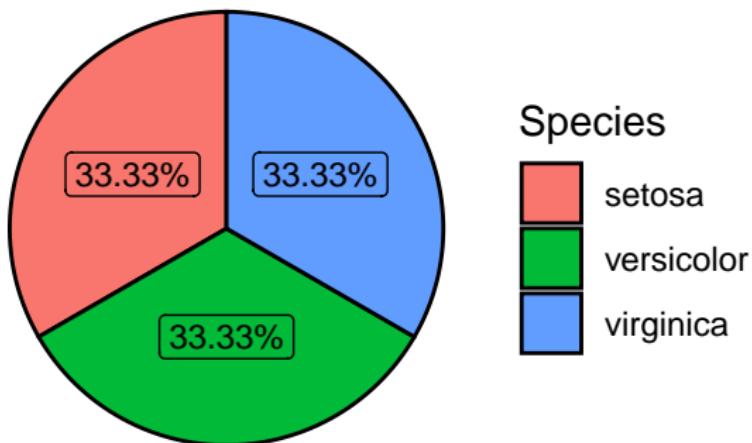
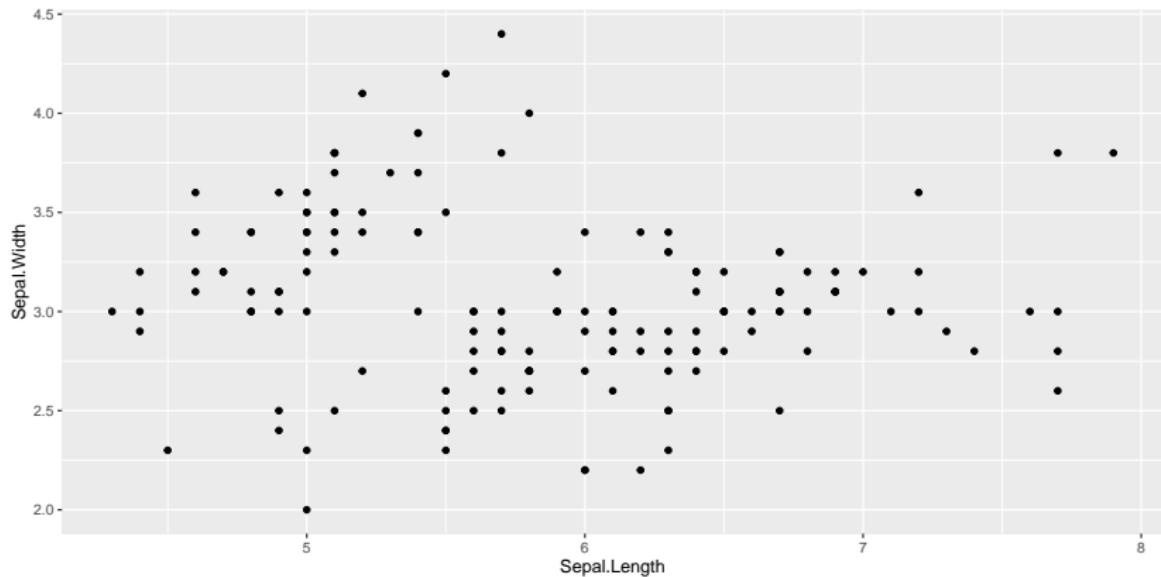


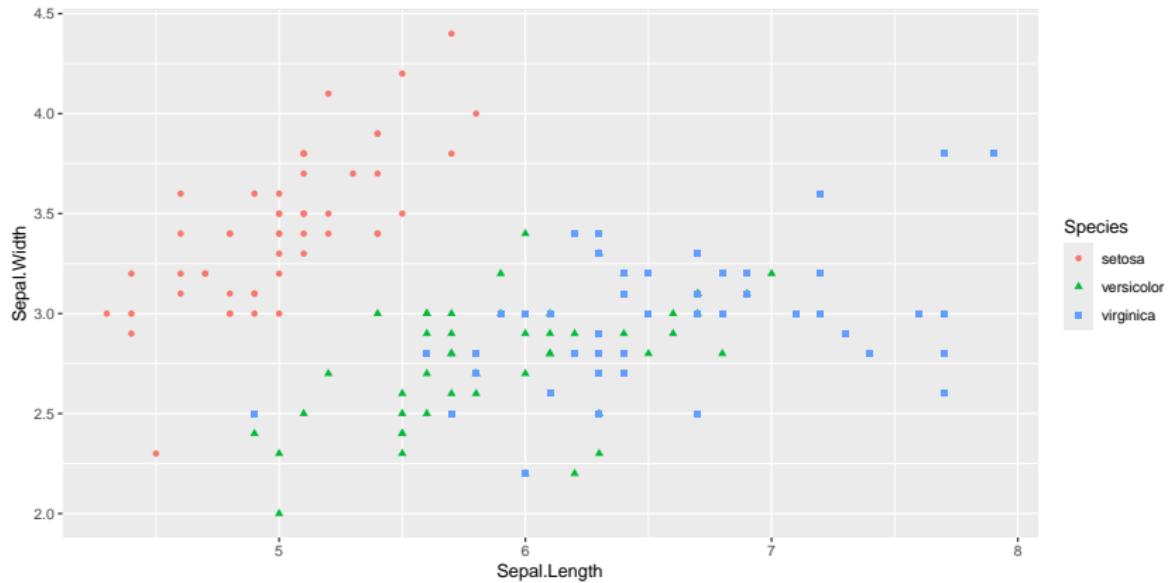
Diagrama de pontos



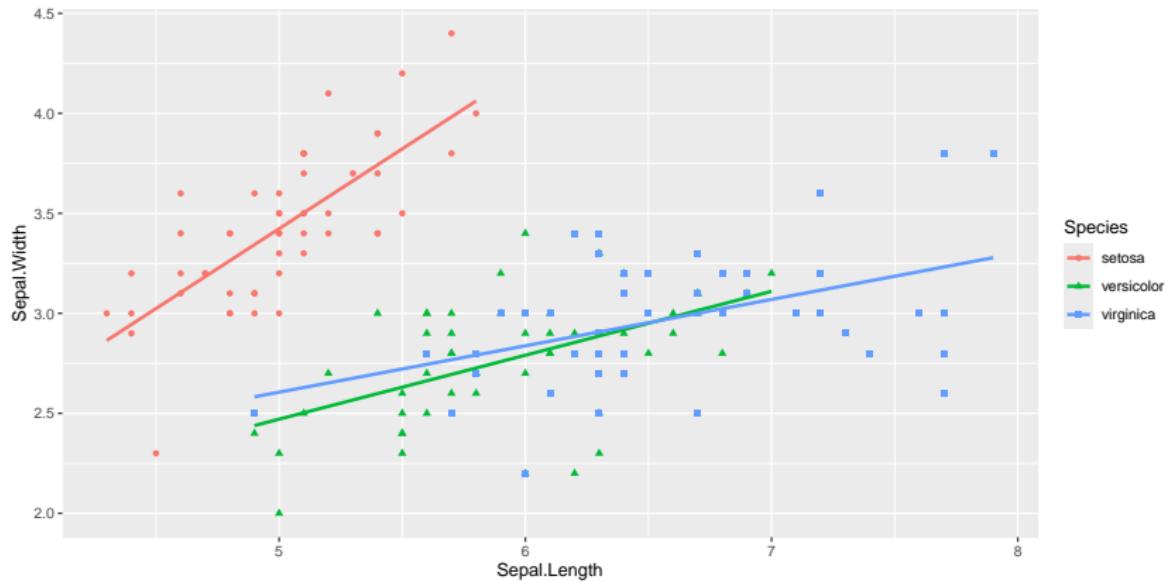
```
ggplot(iris,aes(x=Sepal.Length, y=Sepal.Width))+  
  geom_point()
```



```
ggplot(iris,aes(x=Sepal.Length, y=Sepal.Width,  
color=Species, shape=Species))+  
geom_point()
```



```
ggplot(iris,aes(x=Sepal.Length, y=Sepal.Width,  
                color=Species, shape=Species))+  
  geom_point() +  
  geom_smooth(se=FALSE, method="lm")
```





```
ggplot(iris,aes(x=Sepal.Length, y=Sepal.Width, color=Species,  
shape=Species))+  
  geom_point() +  
  geom_smooth(se=FALSE, method="lm") +  
  coord_flip()
```

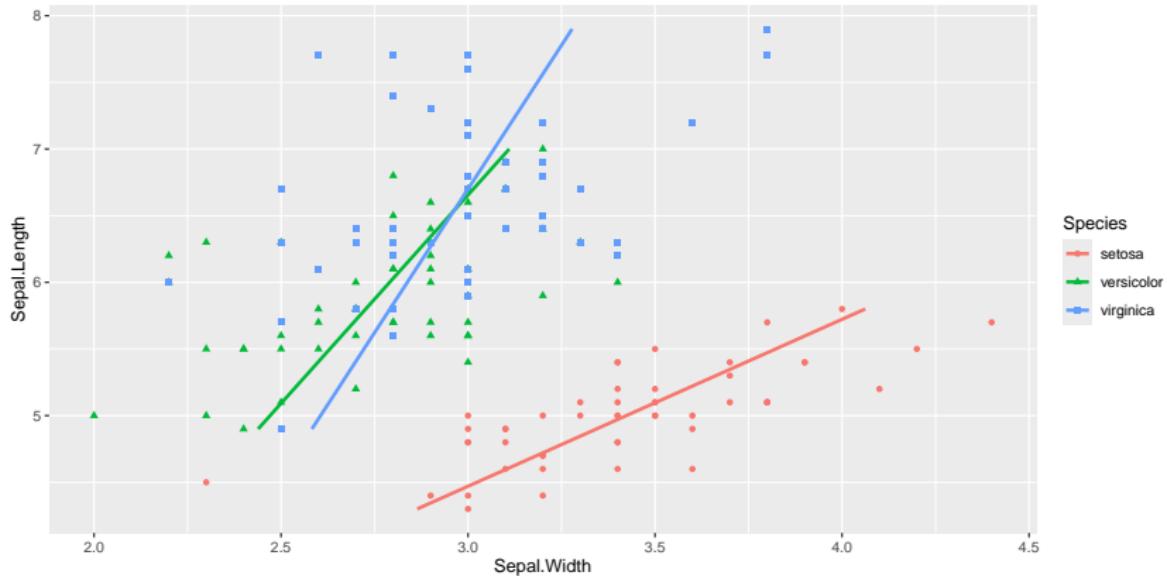
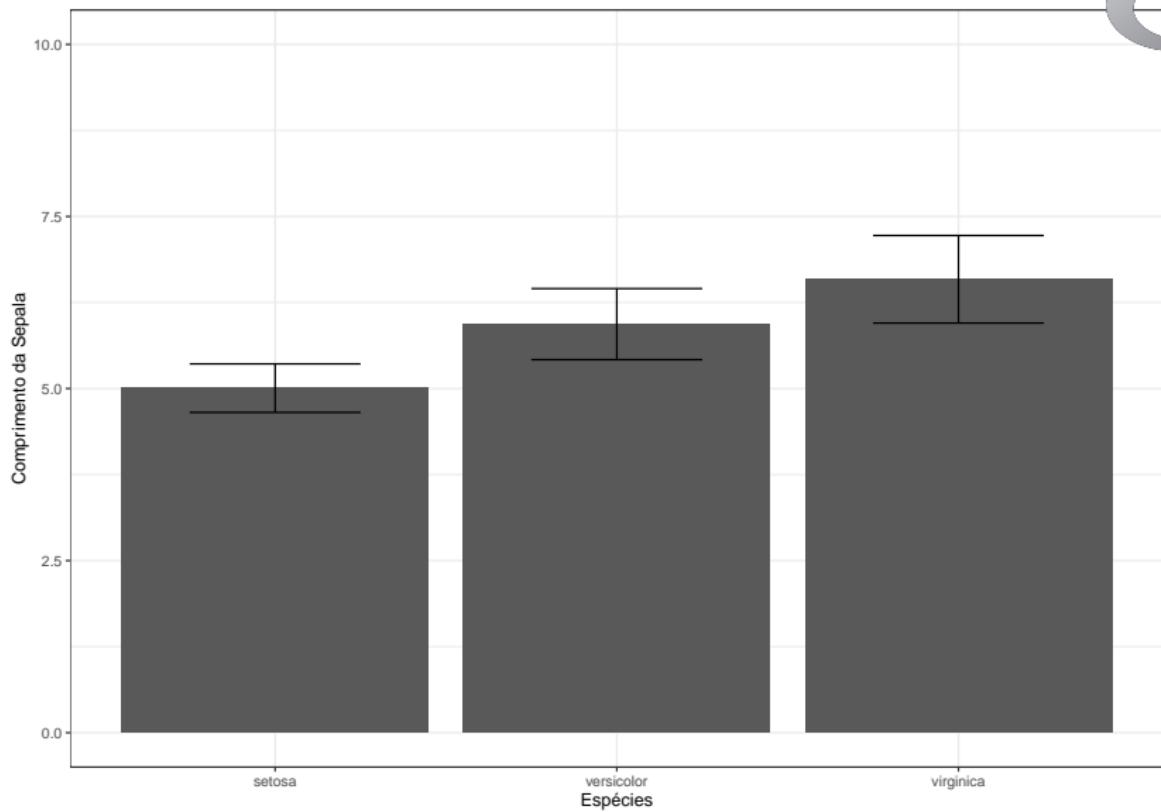


Gráfico de barras (média e desvio)

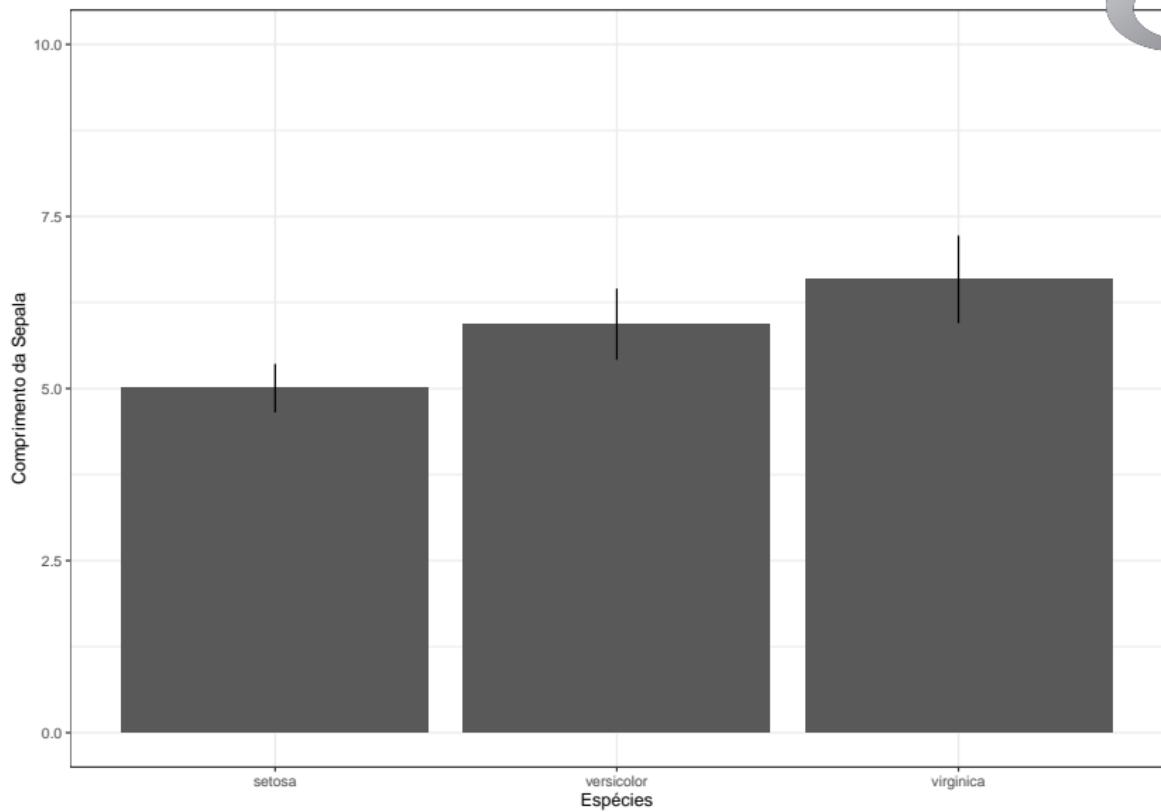


```
iris %>% group_by(Species) %>%
  summarise(mean=mean(Sepal.Length),
            sd=sd(Sepal.Length),
            se=sd(Sepal.Length)/sqrt(length(Sepal.Length))) %>%
  ggplot(aes(x=Species, y=mean)) +
  geom_col() +
  geom_errorbar(aes(ymin=mean-sd, ymax=mean+sd), width=0.5) +
  labs(y="Comprimento da Sepala", x="Espécies") +
  theme_bw() +
  scale_y_continuous(limits=c(0,10))
```



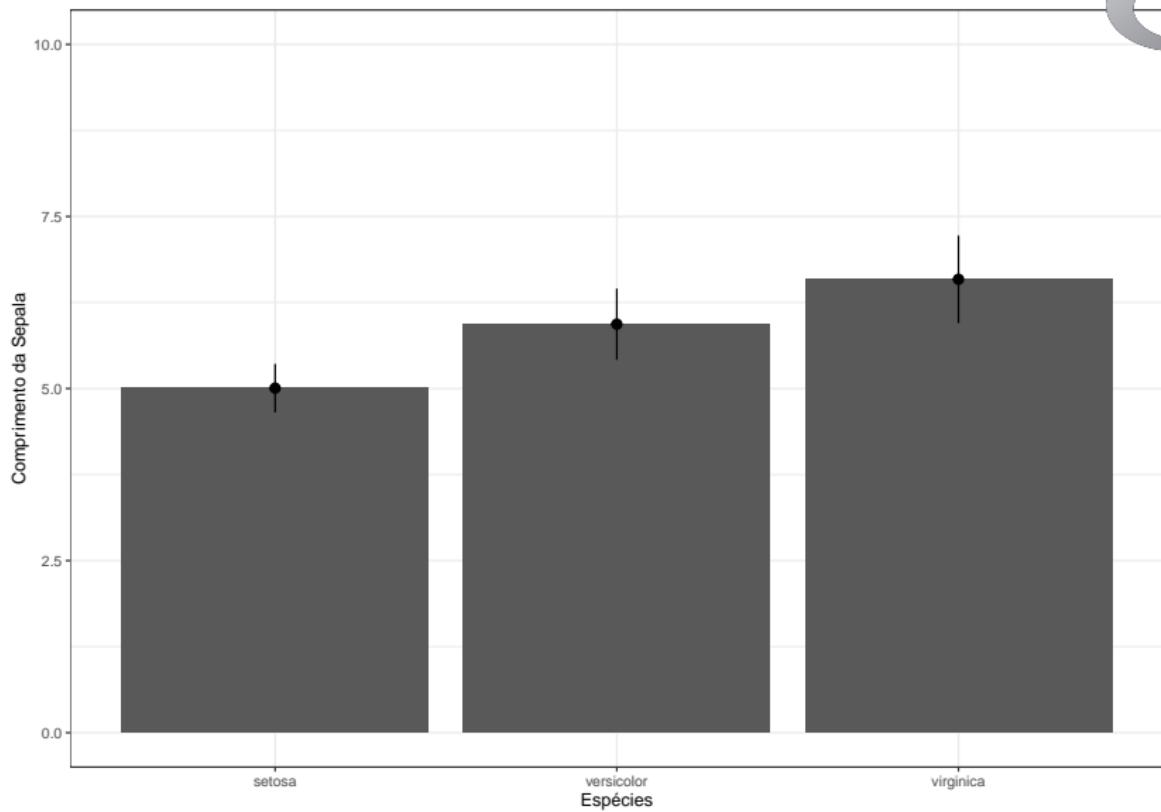


```
iris%>%group_by(Species)%>%
  summarise(mean=mean(Sepal.Length),
            sd=sd(Sepal.Length),
            se=sd(Sepal.Length)/sqrt(length(Sepal.Length)))%>%
  ggplot(aes(x=Species, y=mean))+
  geom_col)+
  geom_linerange(aes(ymin=mean-sd,ymax=mean+sd))+ 
  labs(y="Comprimento da Sepala", x="Espécies")+
  theme_bw()+
  scale_y_continuous(limits=c(0,10))
```



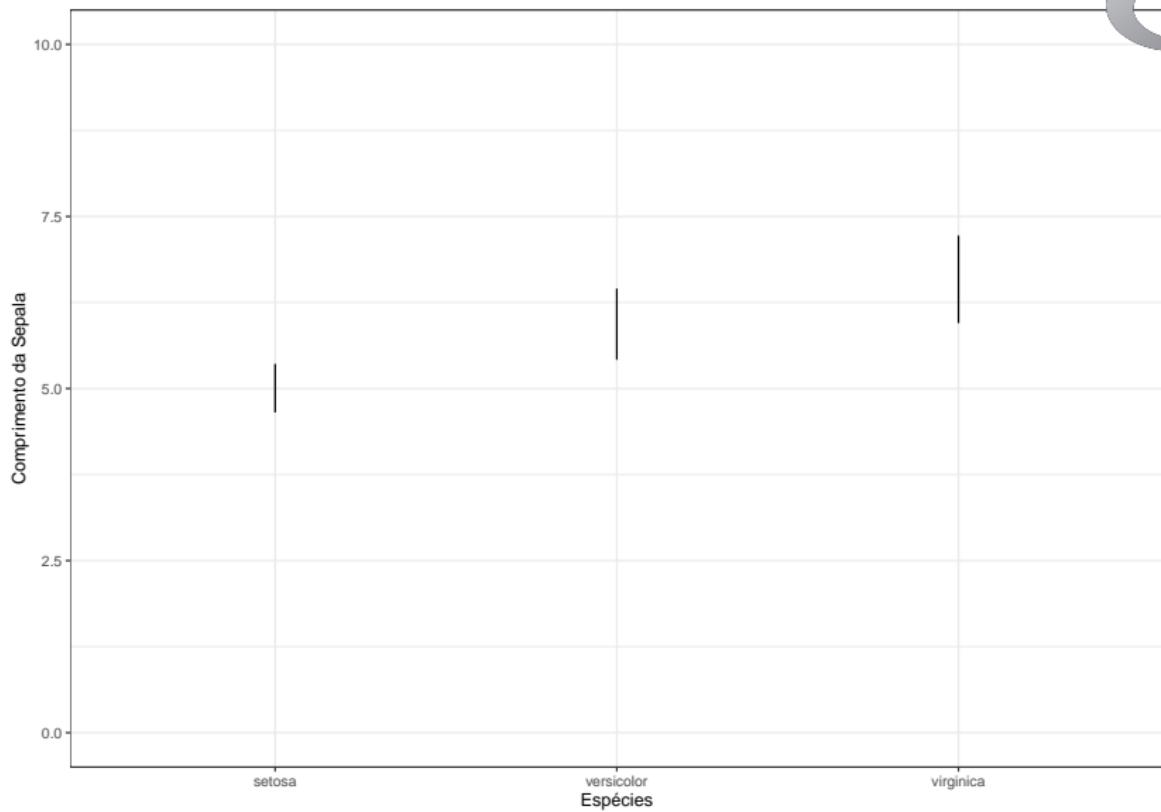


```
iris %>% group_by(Species) %>%
  summarise(mean=mean(Sepal.Length), sd=sd(Sepal.Length), se=sd(Sepal.Length)/sqrt(n()))
  ggplot(aes(x=Species, y=mean)) +
  geom_col() +
  geom_pointrange(aes(ymin=mean-sd, ymax=mean+sd)) +
  labs(y="Comprimento da Sepala", x="Espécies") +
  theme_bw() +
  scale_y_continuous(limits=c(0,10))
```





```
iris%>%group_by(Species)%>%
  summarise(mean=mean(Sepal.Length), sd=sd(Sepal.Length), se=sd(Sepal.Length)/sqrt(n()))
  ggplot(aes(x=Species, y=mean))+
  geom_linerange(aes(ymin=mean-sd,ymax=mean+sd))+
  labs(y="Comprimento da Sepala", x="Espécies")+
  theme_bw()+
  scale_y_continuous(limits=c(0,10))
```



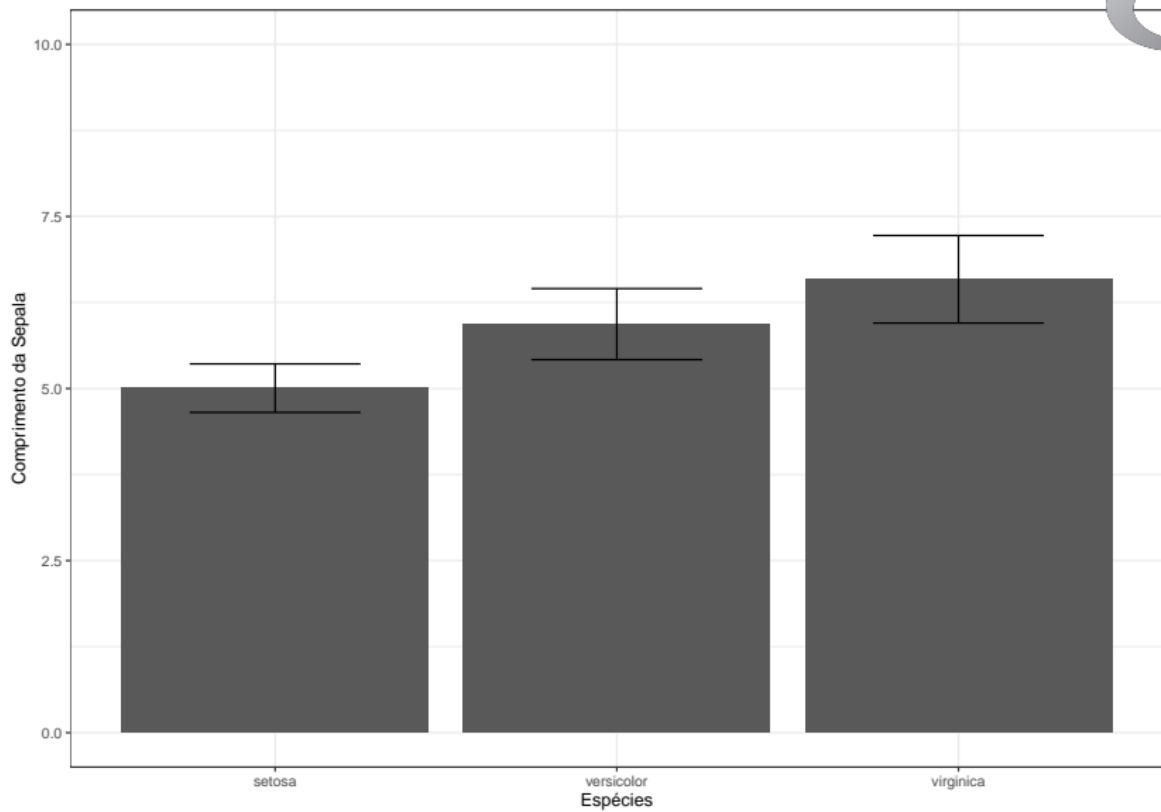


Alterando escalas, cores, fontes e temas

Ajustando escalas no ggplot

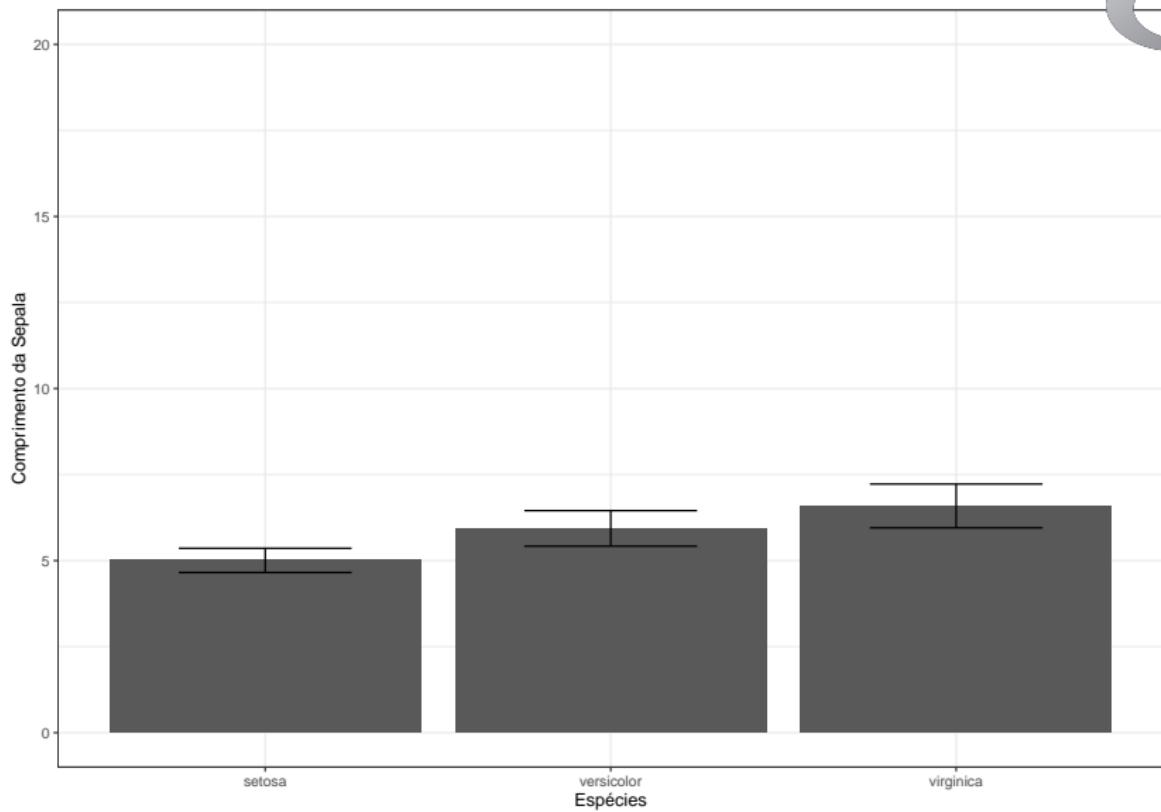


```
iris %>% group_by(Species) %>%
  summarise(mean=mean(Sepal.Length),
            sd=sd(Sepal.Length),
            se=sd(Sepal.Length)/sqrt(length(Sepal.Length))) %>%
  ggplot(aes(x=Species, y=mean)) +
  geom_col() +
  geom_errorbar(aes(ymin=mean-sd, ymax=mean+sd), width=0.5) +
  labs(y="Comprimento da Sepala", x="Espécies") +
  theme_bw() +
  scale_y_continuous(limits=c(0,10))
```





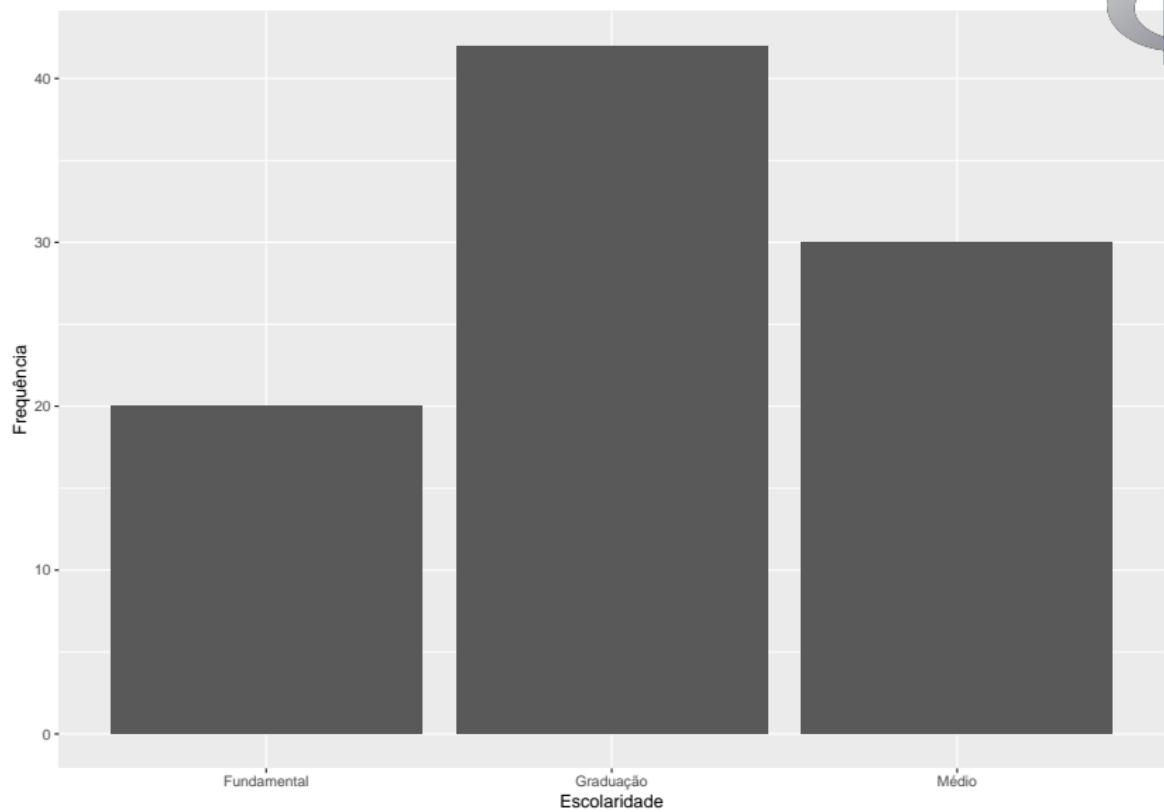
```
#exemplo com a escala maior
iris%>%group_by(Species)%>%
  summarise(mean=mean(Sepal.Length),
            sd=sd(Sepal.Length),
            se=sd(Sepal.Length)/sqrt(length(Sepal.Length)))%>%
  ggplot(aes(x=Species, y=mean))+
  geom_col()+
  geom_errorbar(aes(ymin=mean-sd,ymax=mean+sd), width=0.5)+
  labs(y="Comprimento da Sepala", x="Espécies")+
  theme_bw()+
  scale_y_continuous(limits=c(0,20))
```



Ordenando variáveis ordinais no ggplot

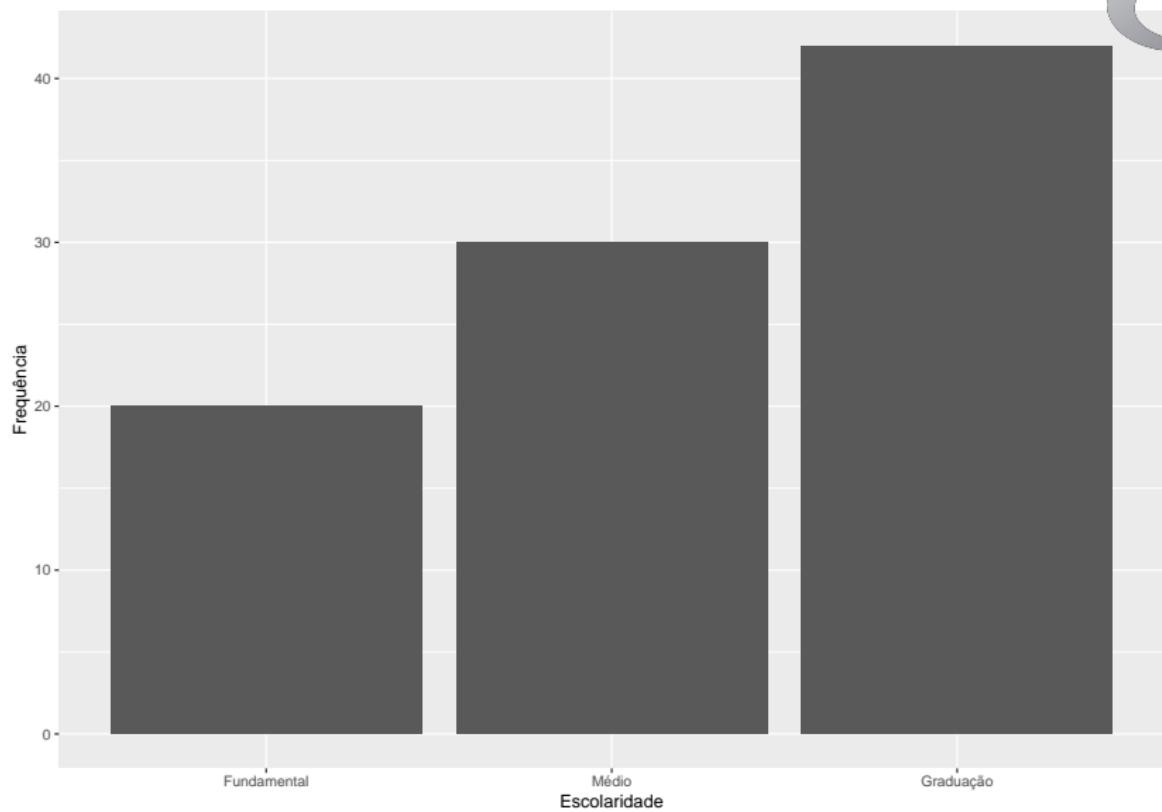


```
Escolaridade<-c(rep("Graduação", 42),  
                  rep("Médio", 30),  
                  rep("Fundamental", 20))  
  
Escolaridade<-as.data.frame(Escolaridade)  
  
Escolaridade%>%ggplot(aes(x=Escolaridade))+  
  geom_bar()  
  labs(y="Frequência", x="Escolaridade")
```





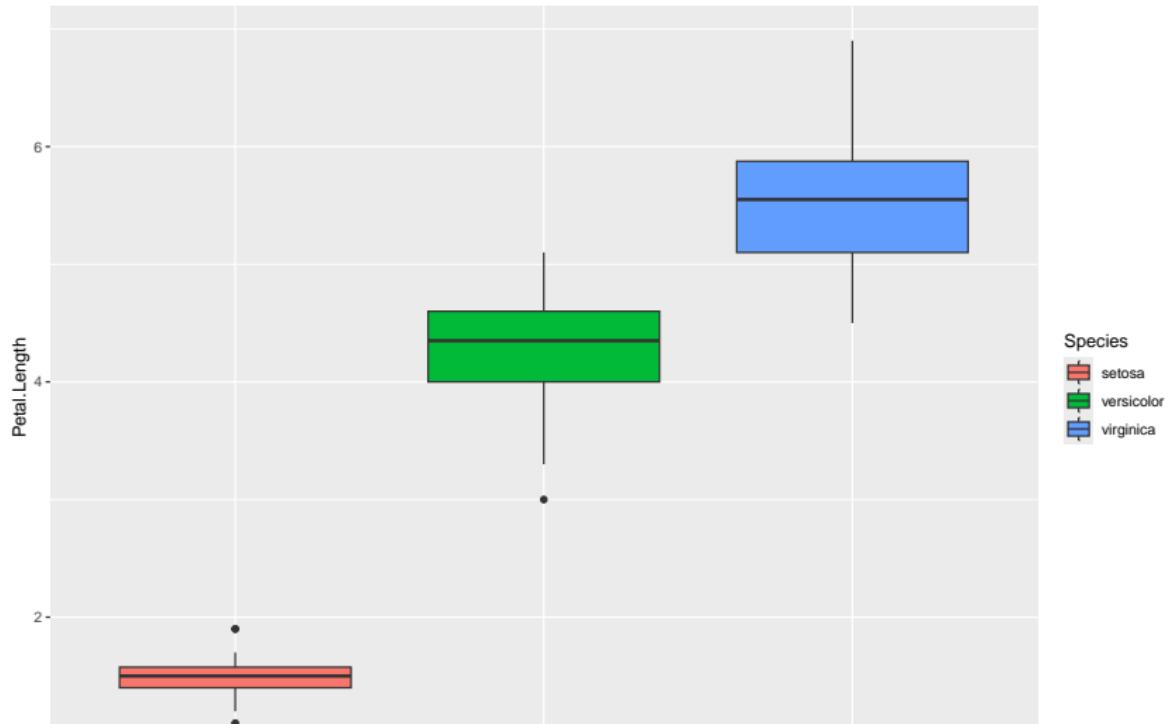
```
Escolaridade %>% mutate(Escolaridade=fct_relevel(Escolaridade,
                                                    "Fundamental",
                                                    "Médio",
                                                    "Graduação")) %>%
ggplot(aes(x=Escolaridade)) +
geom_bar() +
labs(y="Frequência", x="Escolaridade")
```



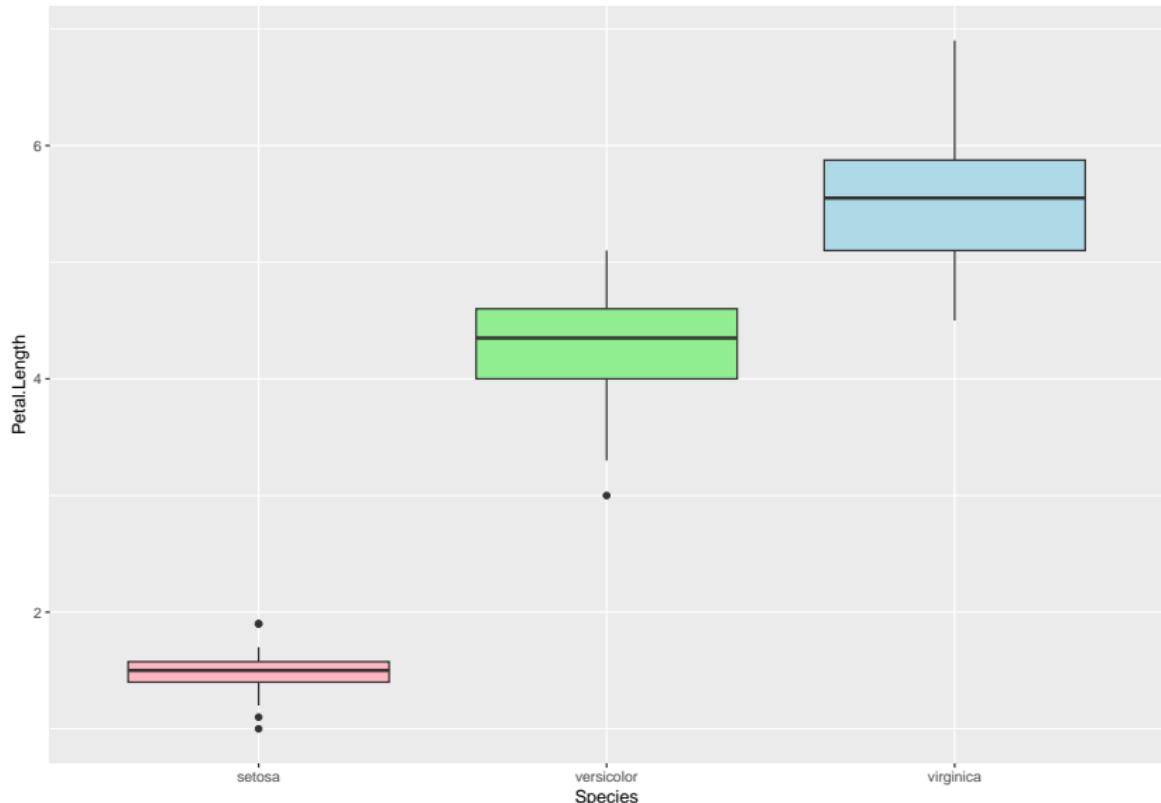
Mudando cores de preenchimento no ggplot



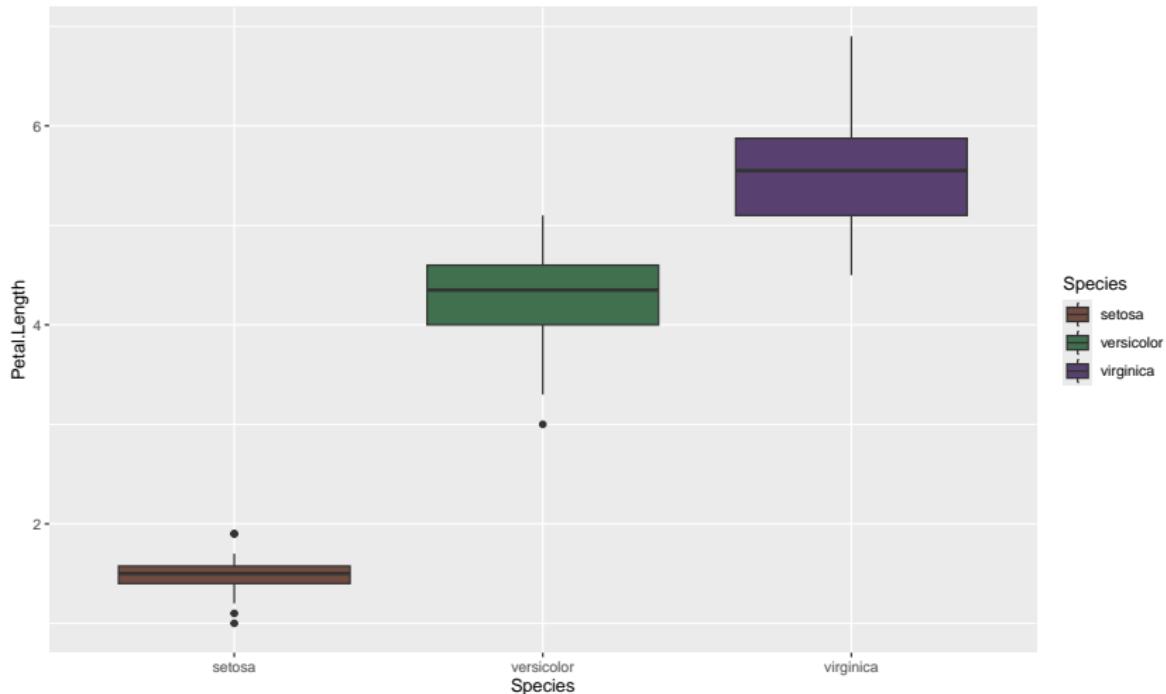
```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot()
```



```
iris%>%ggplot(aes(x=Species, y=Petal.Length))+  
  geom_boxplot(fill=c("lightpink","lightgreen","lightblue"))
```



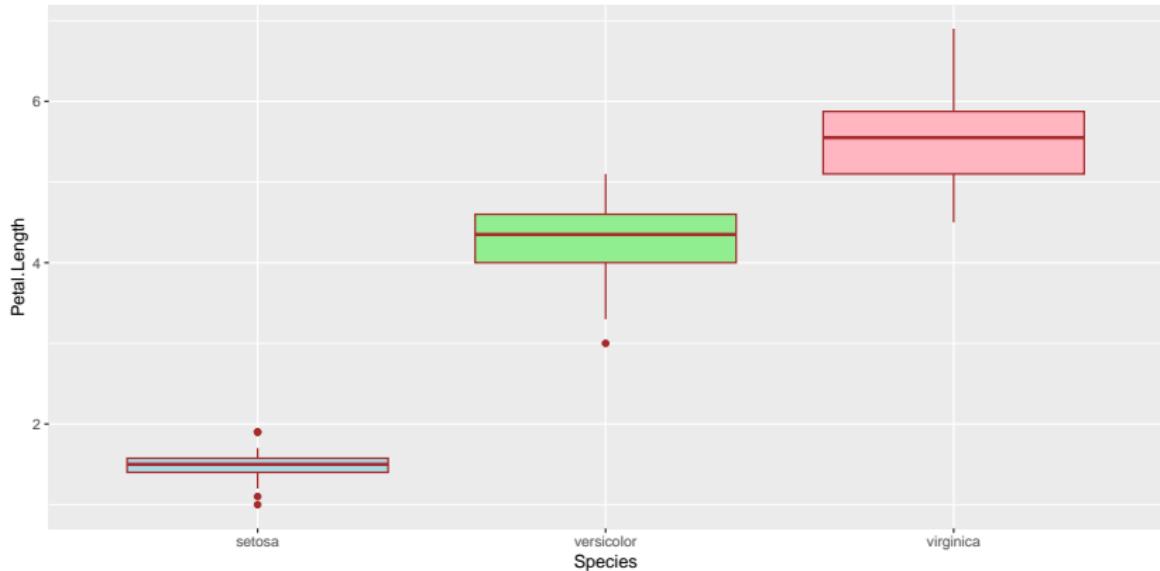
```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot() +  
  scale_fill_manual(values=c("#704c41", "#41704f", "#584170"))
```



Mudando cores de contorno no ggplot



```
iris %>% ggplot(aes(x=Species, y=Petal.Length, fill=Species)) +  
  geom_boxplot(fill=c("lightblue", "lightgreen", "lightpink"),  
               color="brown")
```



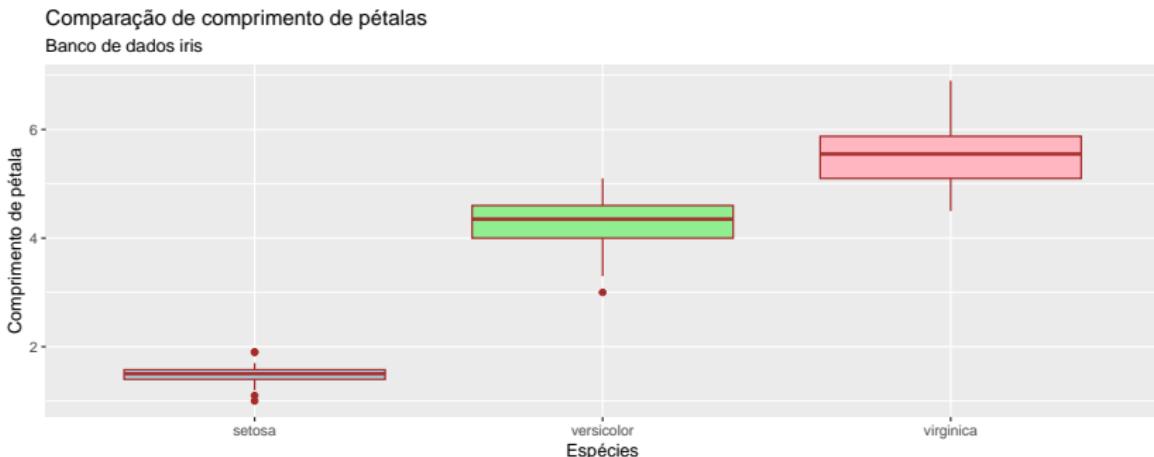
Alterando elementos textuais no ggplot



Os nomes dos eixos são alterados pela função `labs`, onde você indica qual elemento gráfico você quer renomear. Lembre-se: o nome que você quer renomear tem que estar entre aspas " ".

- ▶ **y** para alterar o título do eixo y.
- ▶ **x** para alterar o título do eixo x.
- ▶ **title** para alterar o título ou acrescentar um título.
- ▶ **subtitle** para alterar o subtítulo ou acrescentar um subtítulo.
- ▶ **fill** para alterar o título da legenda referente ao fator colocado no `fill`.
- ▶ **color** para alterar o título da legenda referente ao fator colocado no `color`.
- ▶ **shape** para alterar o título da legenda referente ao fator colocado no `shape`.
- ▶ **size** para alterar o título da legenda referente ao fator colocado no `size`.

```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot(fill=c("lightblue","lightgreen","lightpink"),  
               color="brown") +  
  labs(y="Comprimento de pétala",  
       x="Espécies",  
       title="Comparação de comprimento de pétalas",  
       subtitle = "Banco de dados iris")
```



Alterando a fonte



```
# Instalando o pacote extrafont
install.packages("extrafont")

#Carregando o pacote extrafont
library(extrafont)

#Carregando as fontes presentes no computador
loadfonts(device="all")
```

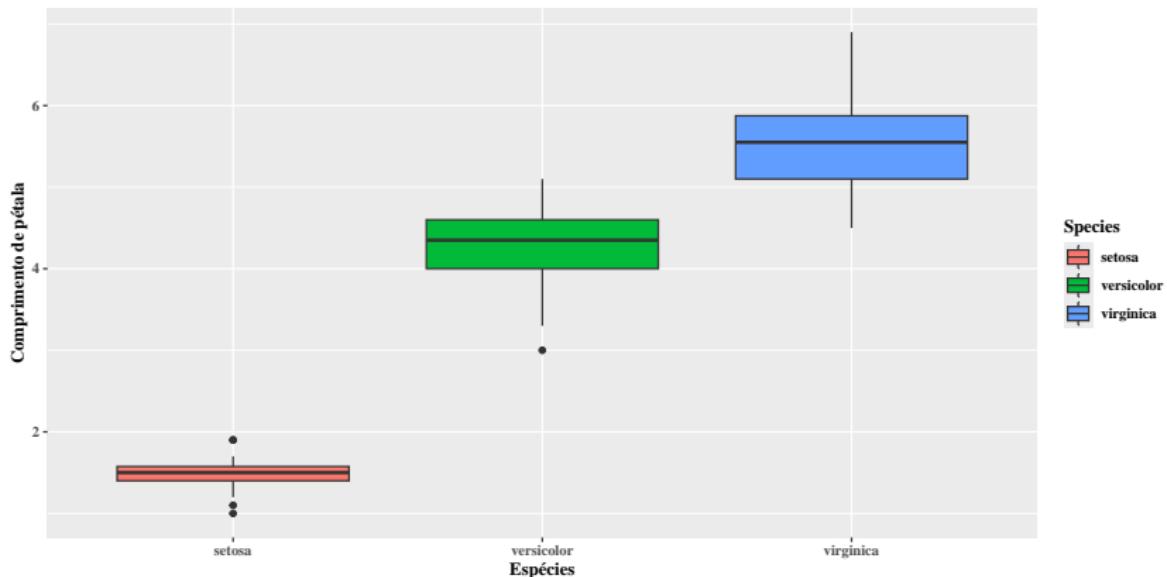


Aqui alteramos as fontes através do comando `theme()` este comando altera elementos temáticos do gráfico, como por exemplo fontes, tamanhos, cor de fundo, entre outros. Neste exemplo colocamons o argumento `text = element_text()`. Dentro dele vai alguns argumentos:

- ▶ **face** é para definir se a fonte estará em itálico ("italic"), negrito ("bold") ou ambos ("italic.bold")
- ▶ **family** é para definir se o tipo de fonte. Esse argumento pode ter variações de acordo com sistema operacional do computador. Em sistema windows pode-se utilizar "TT Times New Roman", "Arial", etc. Enquanto em sistemas Linux e MacOS estarão "serif", "mono", etc.
- ▶ **size** é para definir se o tamanho da fonte.

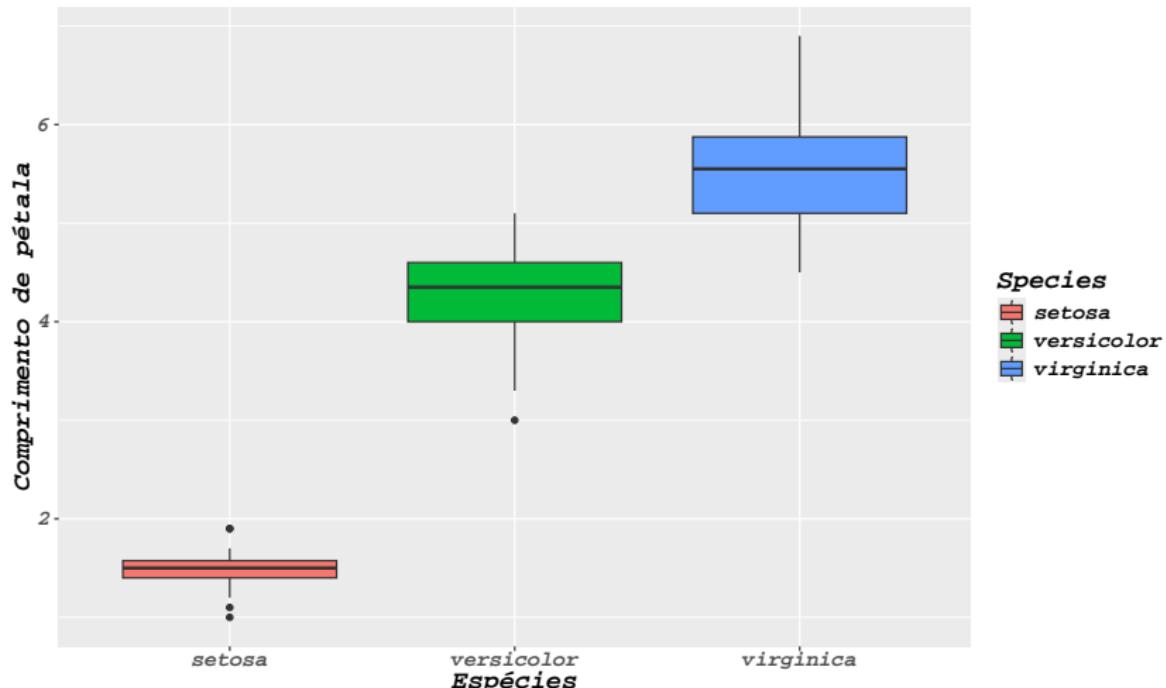


```
iris %>% ggplot(aes(x=Species, y=Petal.Length, fill=Species)) +  
  geom_boxplot() +  
  labs(y="Comprimento de pétala", x="Espécies") +  
  theme(text = element_text(face="bold",  
                            family="serif"))
```



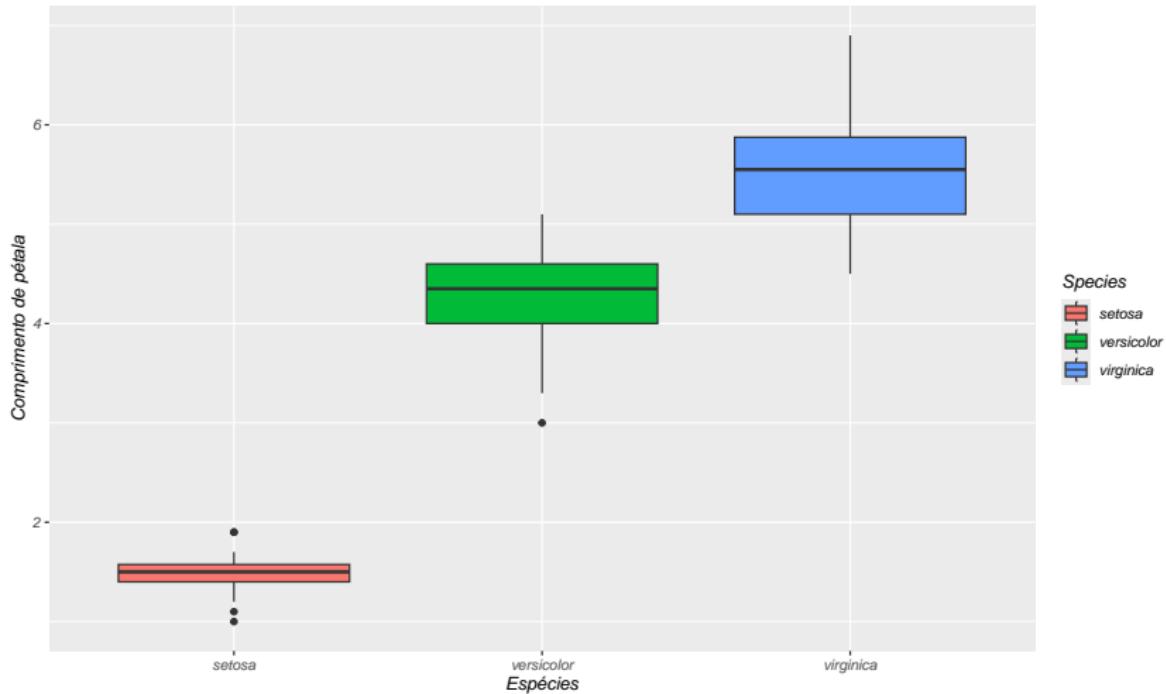


```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot() +  
  labs(y="Comprimento de pétala", x="Espécies") +  
  theme(text = element_text(face = "bold.italic",  
                            family="mono", size=16))
```



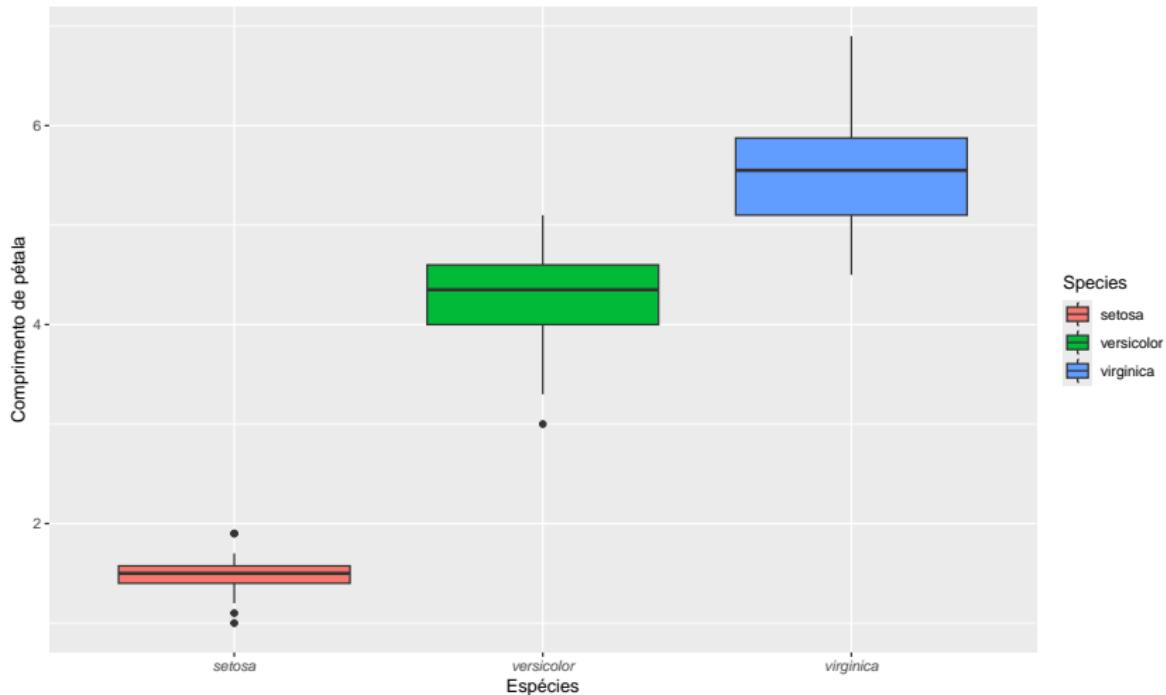


```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot() +  
  labs(y="Comprimento de pétala", x="Espécies") +  
  theme(text = element_text(face="italic"))
```



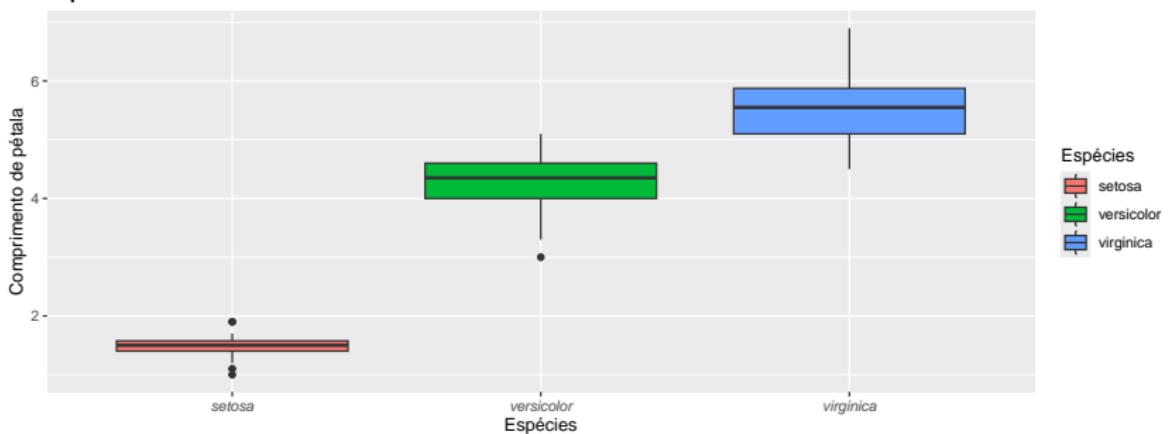


```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot()  
  labs(y="Comprimento de pétala", x="Espécies")  
  theme(axis.text.x = element_text(face="italic"))
```



```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot() +  
  labs(y="Comprimento de pétala", x="Espécies", fill="Espécies",  
       title="Aqui é o título") +  
  theme(axis.text.x = element_text(face="italic"),  
        plot.title = element_text(face="bold"))
```

Aqui é o título



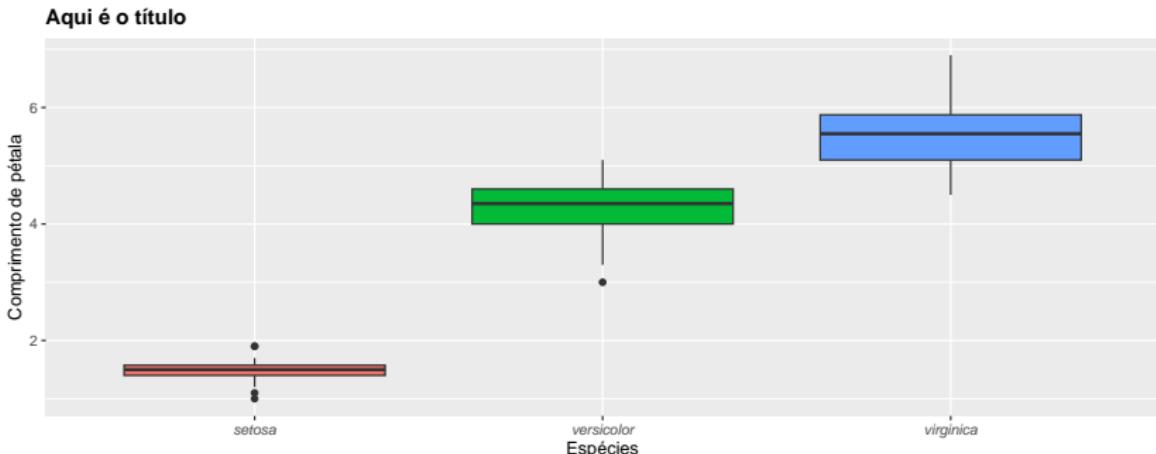
Manipulação da legenda



Caso queremos tirar a legenda ou alterar a posição da legenda, utilizaremos o argumento `legend.position` =:

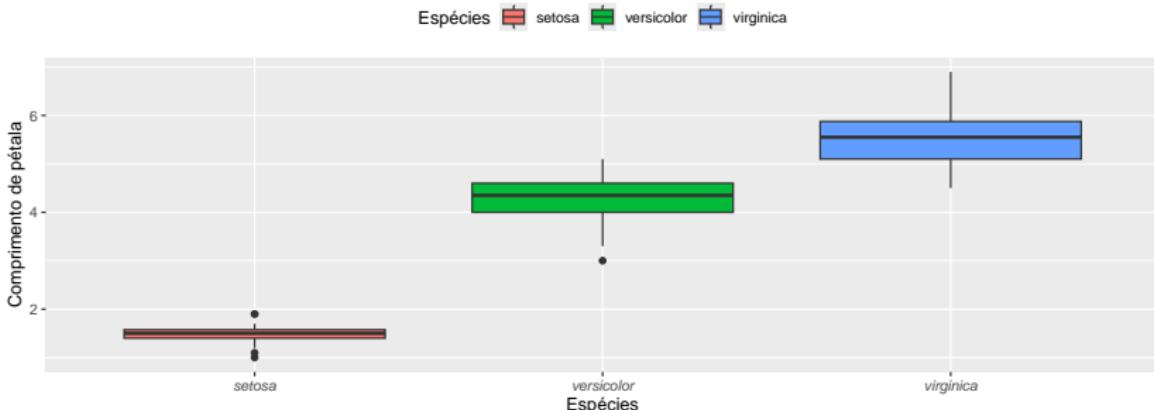
- ▶ “**none**” para tirar a legenda
- ▶ “**top**” para a legenda ficar em cima
- ▶ “**bottom**” para a legenda ficar em baixo
- ▶ “**left**” para a legenda ficar na esquerda
- ▶ “**right**” para a legenda ficar na direita

```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot() +  
  labs(y="Comprimento de pétala", x="Espécies", fill="Espécies",  
       title="Aqui é o título") +  
  theme(axis.text.x = element_text(face="italic"),  
        plot.title = element_text(face="bold"),  
        legend.position = "none")
```

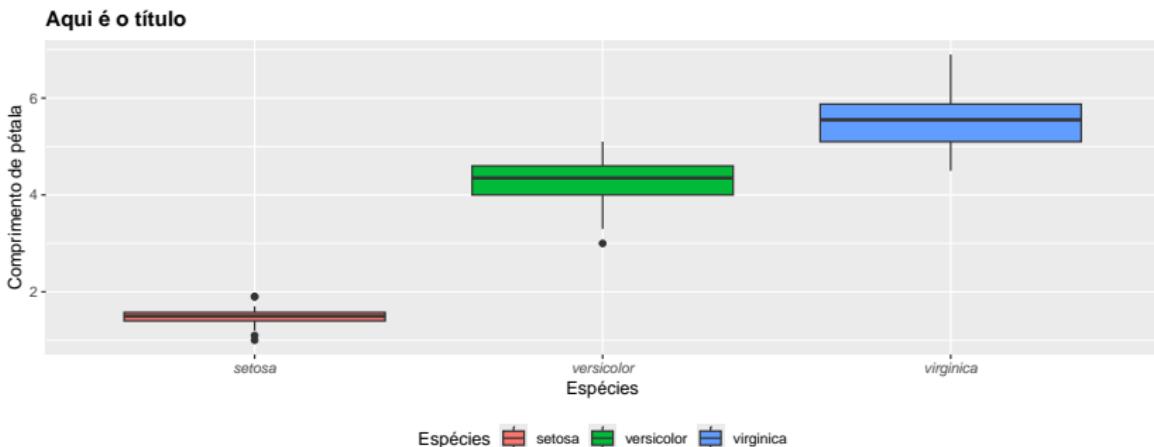


```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot() +  
  labs(y="Comprimento de pétala", x="Espécies", fill="Espécies",  
       title="Aqui é o título") +  
  theme(axis.text.x = element_text(face="italic"),  
        plot.title = element_text(face="bold"),  
        legend.position = "top")
```

Aqui é o título

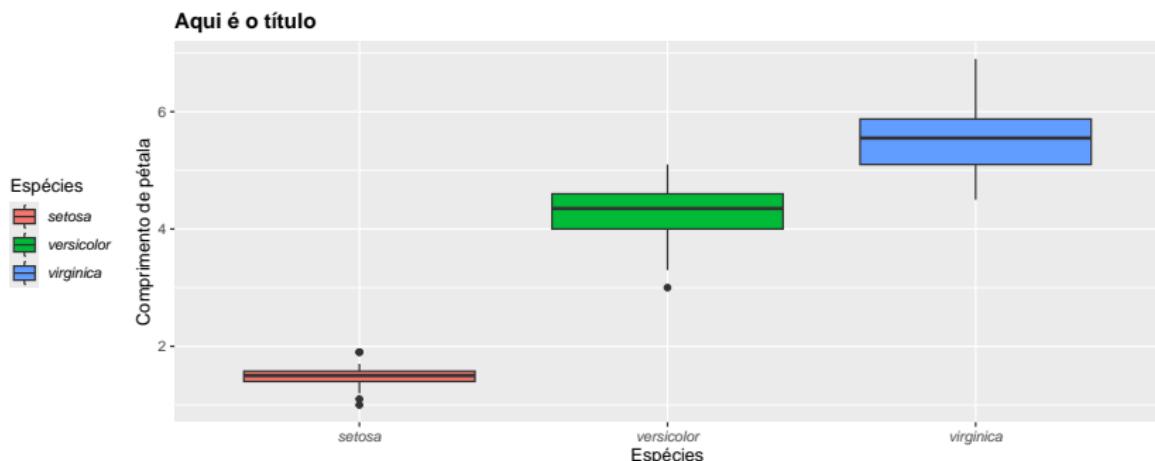


```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot() +  
  labs(y="Comprimento de pétala", x="Espécies", fill="Espécies",  
       title="Aqui é o título") +  
  theme(axis.text.x = element_text(face="italic"),  
        plot.title = element_text(face="bold"),  
        legend.position = "bottom")
```





```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot()  
  labs(y="Comprimento de pétala", x="Espécies", fill="Espécies",  
       title="Aqui é o título")  
  theme(axis.text.x = element_text(face="italic"),  
        plot.title = element_text(face="bold"),  
        legend.position = "left",  
        legend.text = element_text(face="italic"))
```

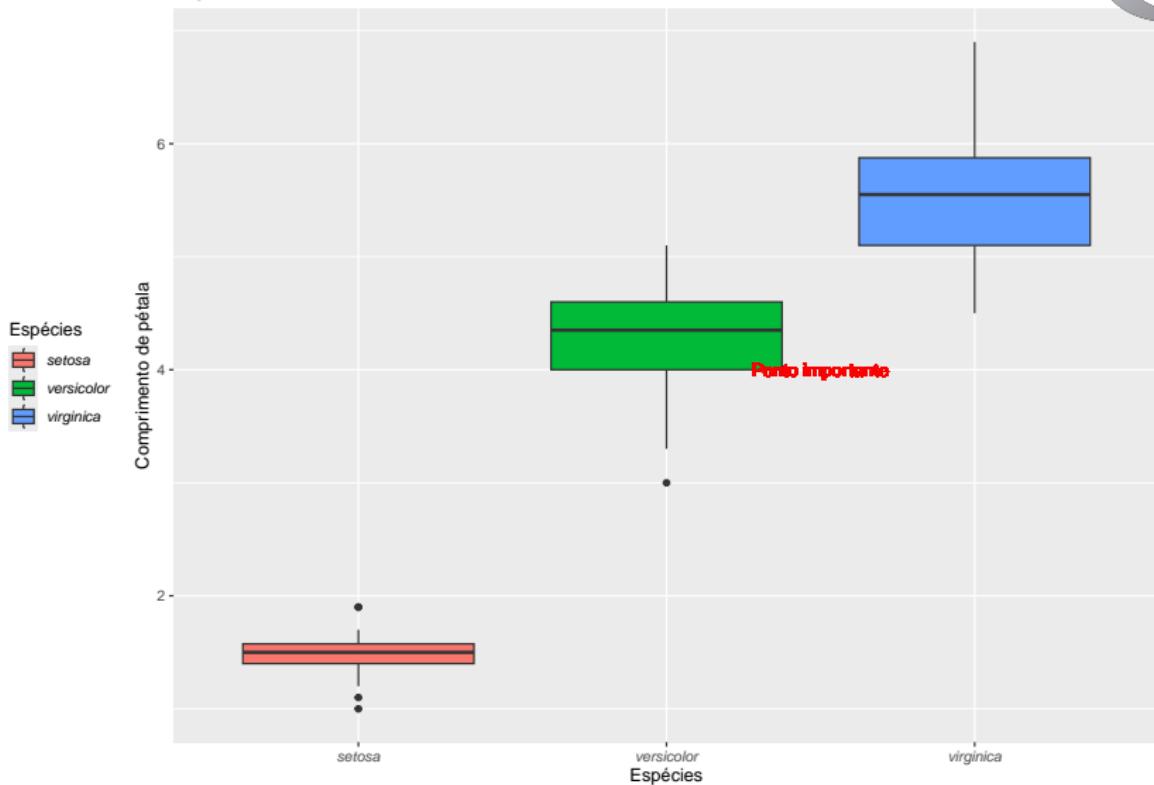


Anotação em gráfico



```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot() +  
  labs(y="Comprimento de pétala", x="Espécies", fill="Espécies",  
       title="Aqui é o título") +  
  theme(axis.text.x = element_text(face="italic"),  
        plot.title = element_text(face="bold"),  
        legend.position = "left",  
        legend.text = element_text(face="italic")) +  
  geom_text(x = 2.5, y = 4, label = "Ponto importante",  
            color = "red", face="bold")
```

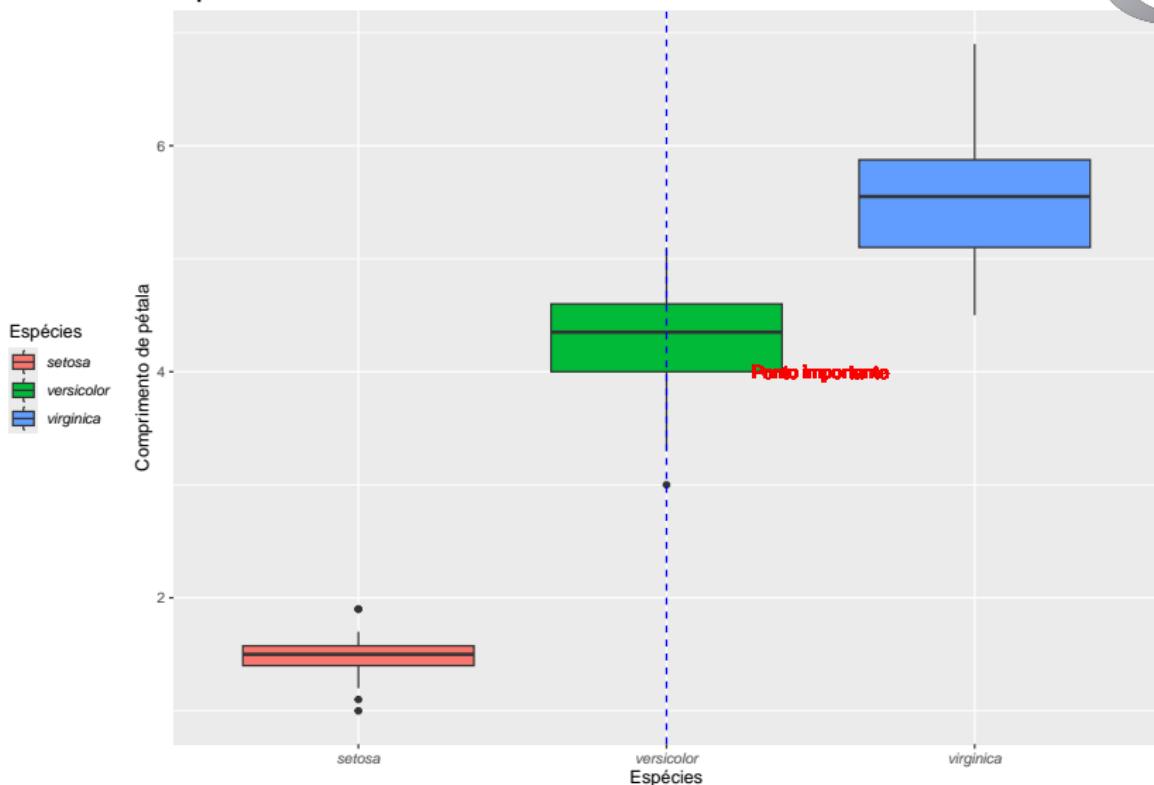
Aqui é o título





```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot() +  
  labs(y="Comprimento de pétala", x="Espécies", fill="Espécies",  
       title="Aqui é o título") +  
  theme(axis.text.x = element_text(face="italic"),  
        plot.title = element_text(face="bold"),  
        legend.position = "left",  
        legend.text = element_text(face="italic")) +  
  geom_text(x = 2.5, y = 4, label = "Ponto importante",  
            color = "red") +  
  annotate("vline", x = 2, xintercept = 2, linetype = "dashed",  
          color = "blue")
```

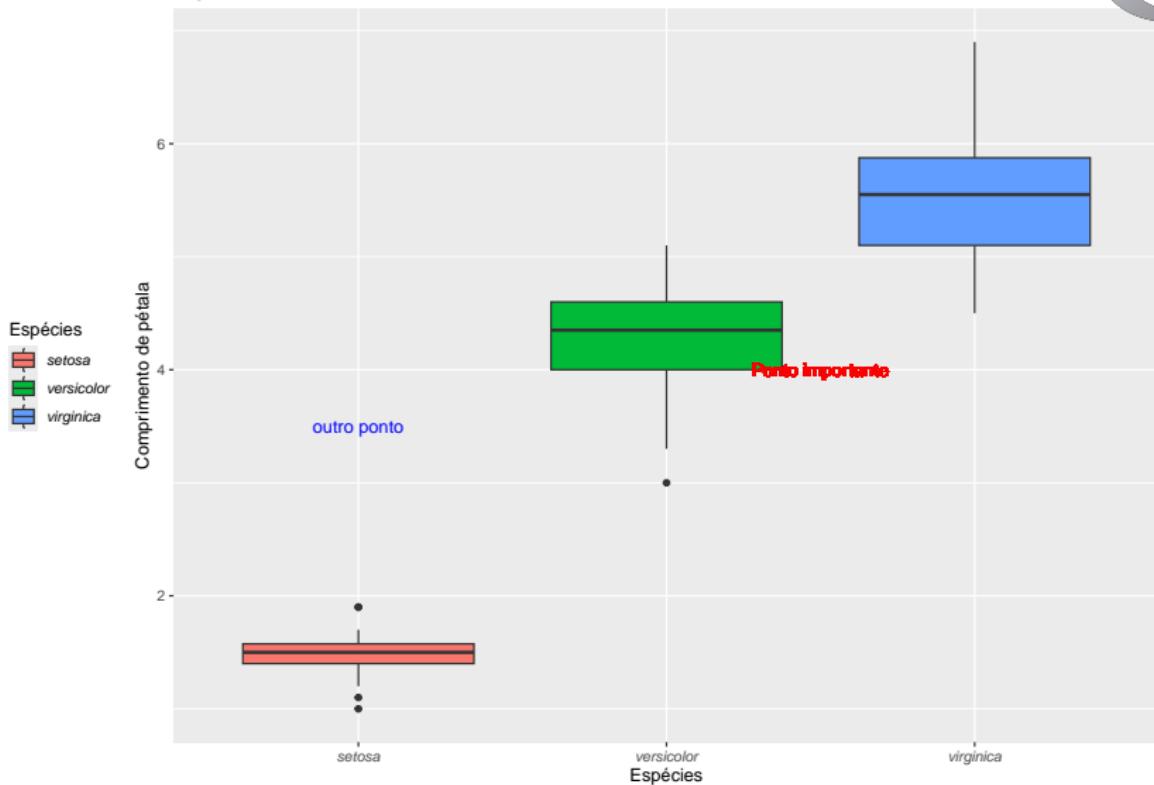
Aqui é o título



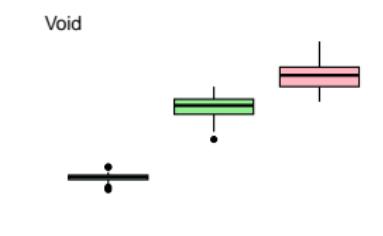
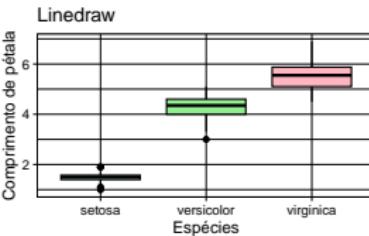
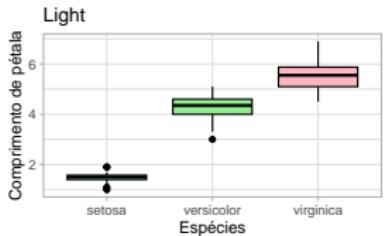
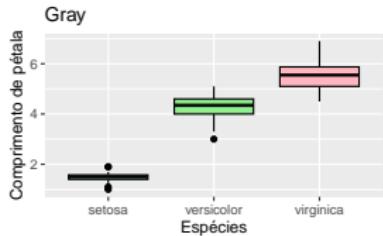
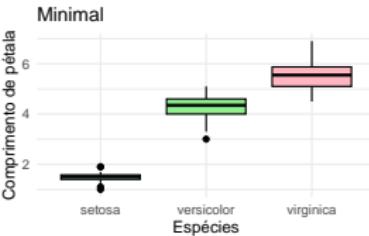
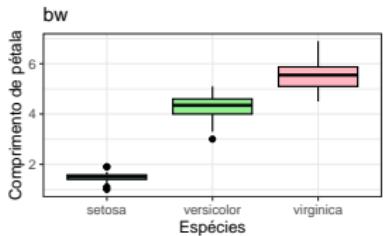
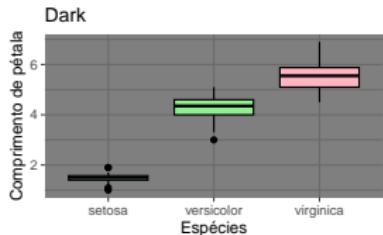
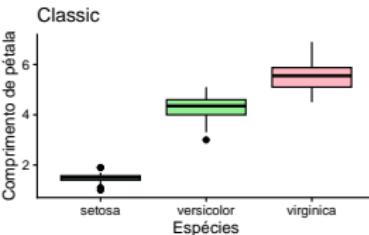
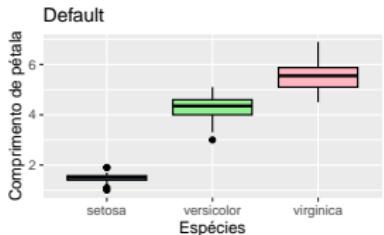


```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot() +  
  labs(y="Comprimento de pétala", x="Espécies", fill="Espécies",  
       title="Aqui é o título") +  
  theme(axis.text.x = element_text(face="italic"),  
        plot.title = element_text(face="bold"),  
        legend.position = "left",  
        legend.text = element_text(face="italic")) +  
  geom_text(x = 2.5, y = 4, label = "Ponto importante",  
            color = "red") +  
  annotate("text", x = 1, y = 3.5, label = "outro ponto",  
          color = "blue")
```

Aqui é o título



Temas (theme_*)



Unindo vários gráficos em uma imagem só



```
#Criando ggplots
barra<-Escolaridade%>%
  mutate(Escolaridade=fct_relevel(Escolaridade, "Fundamental", "Médio", "Superior"))+
  ggplot(aes(x=Escolaridade))+
  geom_bar()+
  labs(y="Frequência", x="Escolaridade")

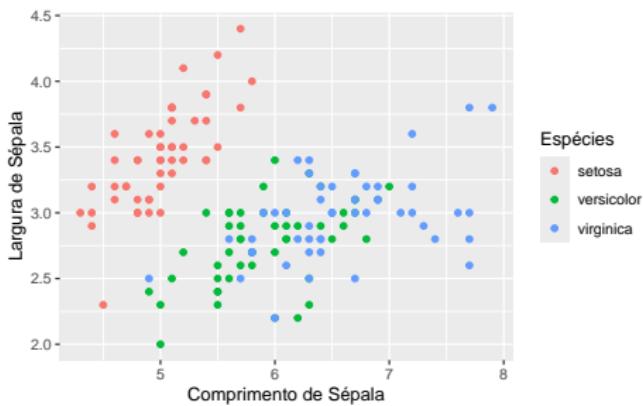
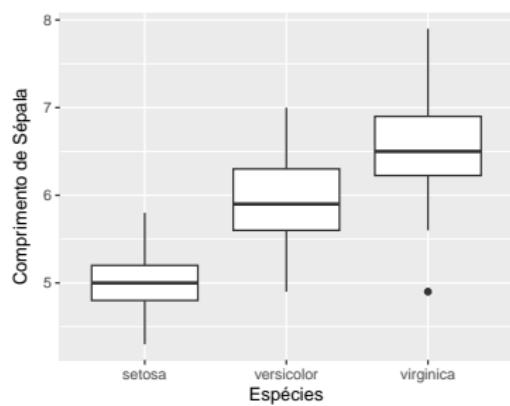
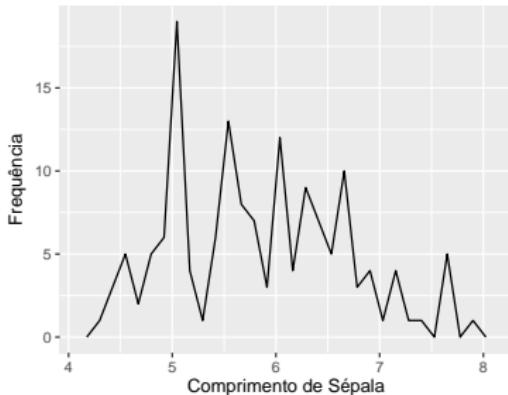
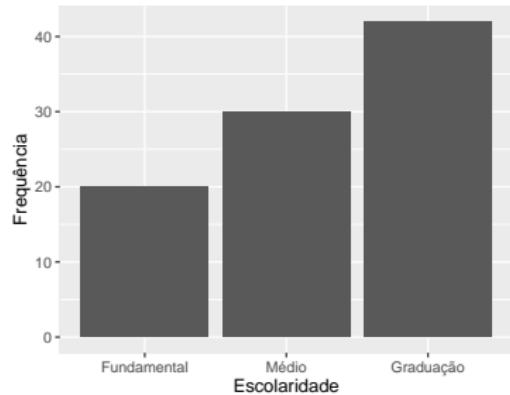
polígono<-iris%>%
  ggplot(aes(x=Sepal.Length))+
  geom_freqpoly()+
  labs(y="Frequência", x="Comprimento de Sépala")

boxplot<-iris%>%
  ggplot(aes(y=Sepal.Length, x=Species))+
  geom_boxplot()+
  labs(y="Comprimento de Sépala", x="Espécies")
```

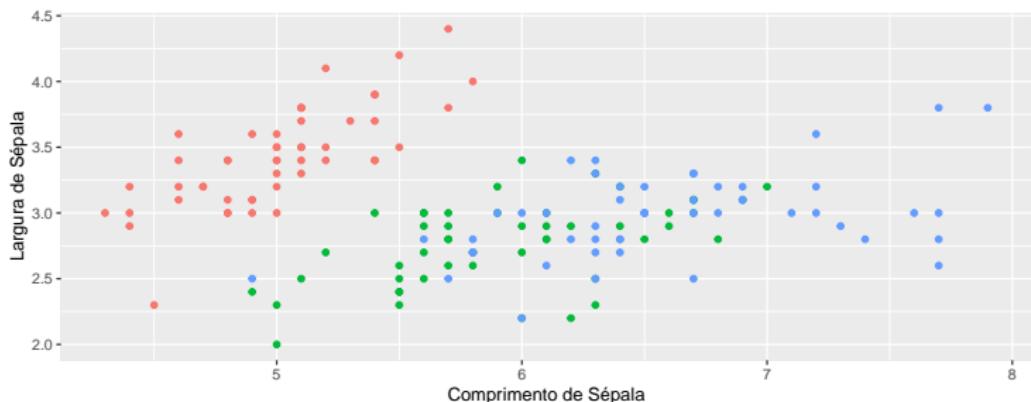
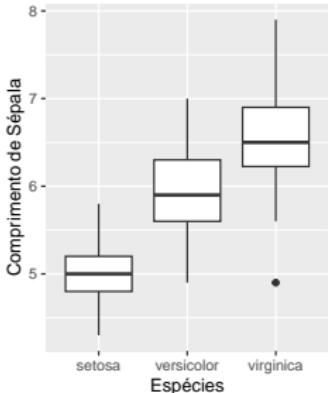
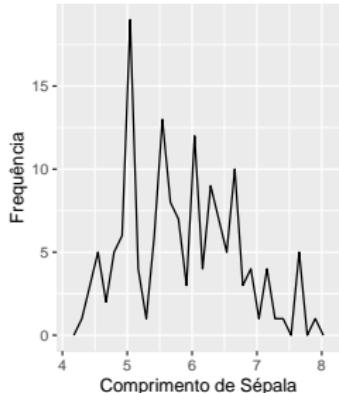
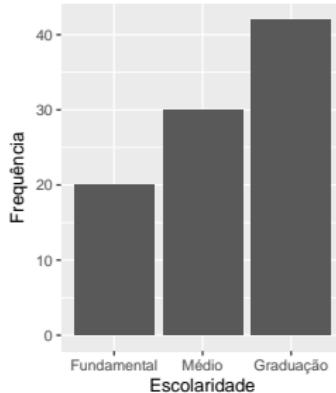


```
pontos<-iris%>%
  ggplot(aes(x=Sepal.Length,y=Sepal.Width, color=Species))+
  geom_point()+
  labs(x="Comprimento de Sépala", y="Largura de Sépala", color="Espécie")
```

barra + polígono + boxplot + pontos



3. Também é possível utilizar diferentes conformações utilizando elementos matemáticos, como / e () .



Espécies

- setosa
- versicolor
- virginica



Extra

Mapas



```
#instalando o pacote raster e sf
install.packages("raster")
install.packages("sf")
```

```
#carregando o pacote raster e sf
library(raster)
library(sf)
```



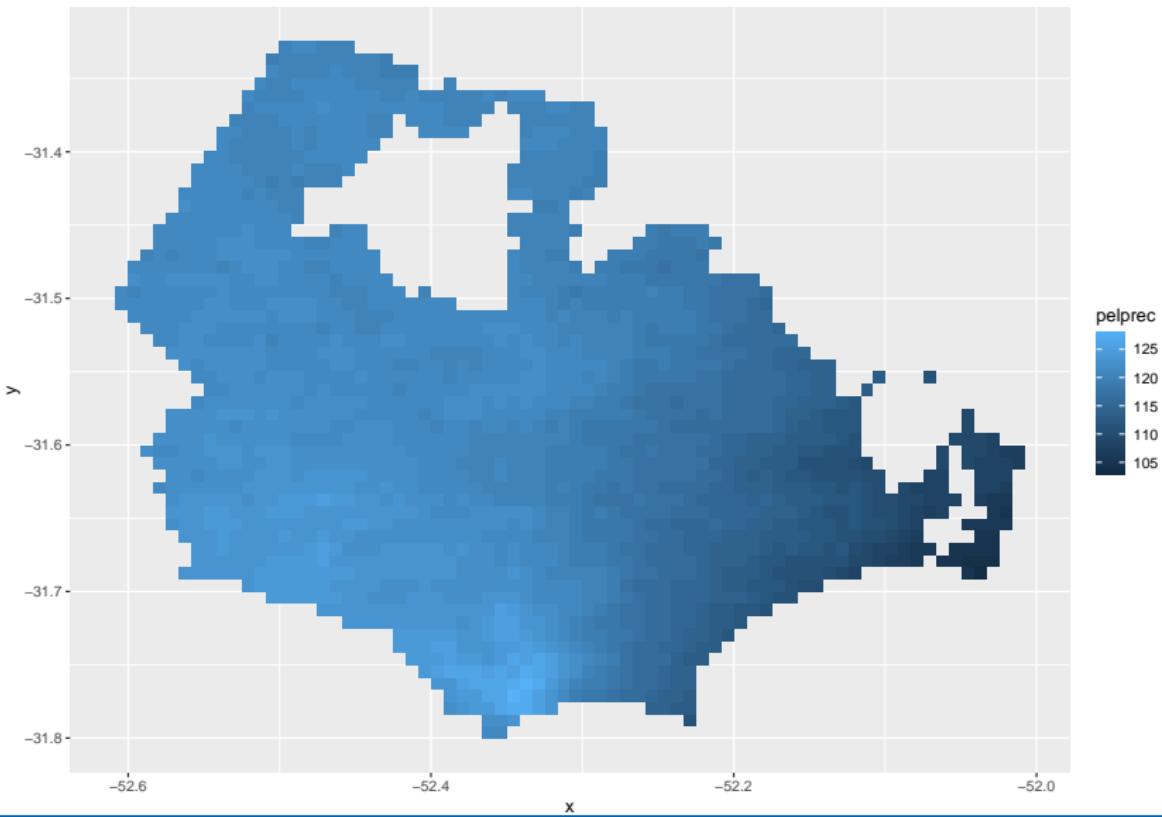
```
# Importando dados
prec<-raster("pelprec.tif")
pel<-read_sf("Pelotas/Pelotas.shp")

# Convertendo raster para data frame para o ggplot processar o dado
prec_df<-as.data.frame(prec, xy = TRUE, na.rm = TRUE)

head(prec_df)
```

	x	y	pelprec
14	-52.49583	-31.32917	120
15	-52.48750	-31.32917	121
16	-52.47917	-31.32917	121
17	-52.47083	-31.32917	120
18	-52.46250	-31.32917	120
19	-52.45417	-31.32917	120

```
ggplot(prec_df,aes(x=x,y=y,fill=pelprec))+  
  geom_raster()
```

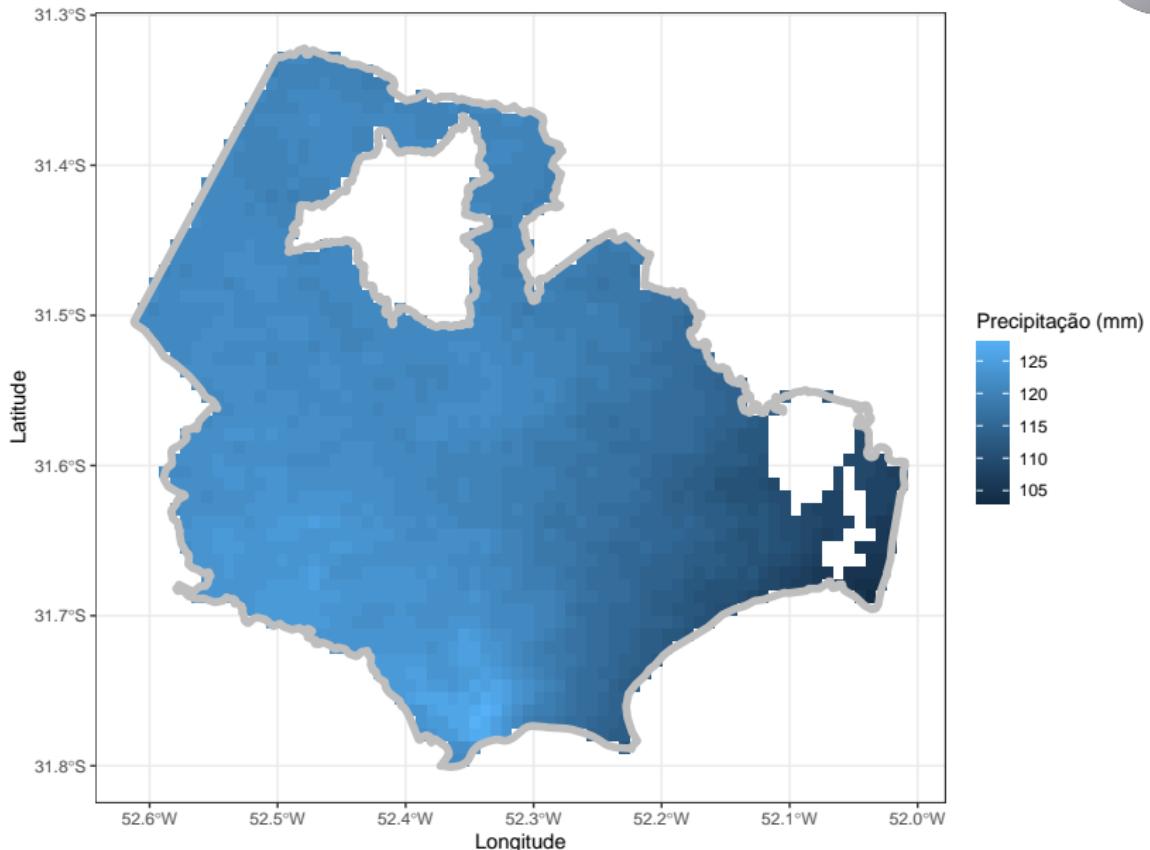




```
# Cores padrão
ggplot()+
  geom_raster(data=prec_df,aes(x=x,y=y,fill=pelprec))+ 
  geom_sf(data=pel,fill=NA, color="gray", linewidth=2, alpha=.01) +
  labs(title="Mapa da média anual da precipitação \n
          em Pelotas-RS entre 1970-2000",
       y="Latitude",
       x="Longitude",
       fill="Precipitação (mm)")+
  theme_bw()
```

Mapa da média anual da precipitação

em Pelotas–RS entre 1970–2000

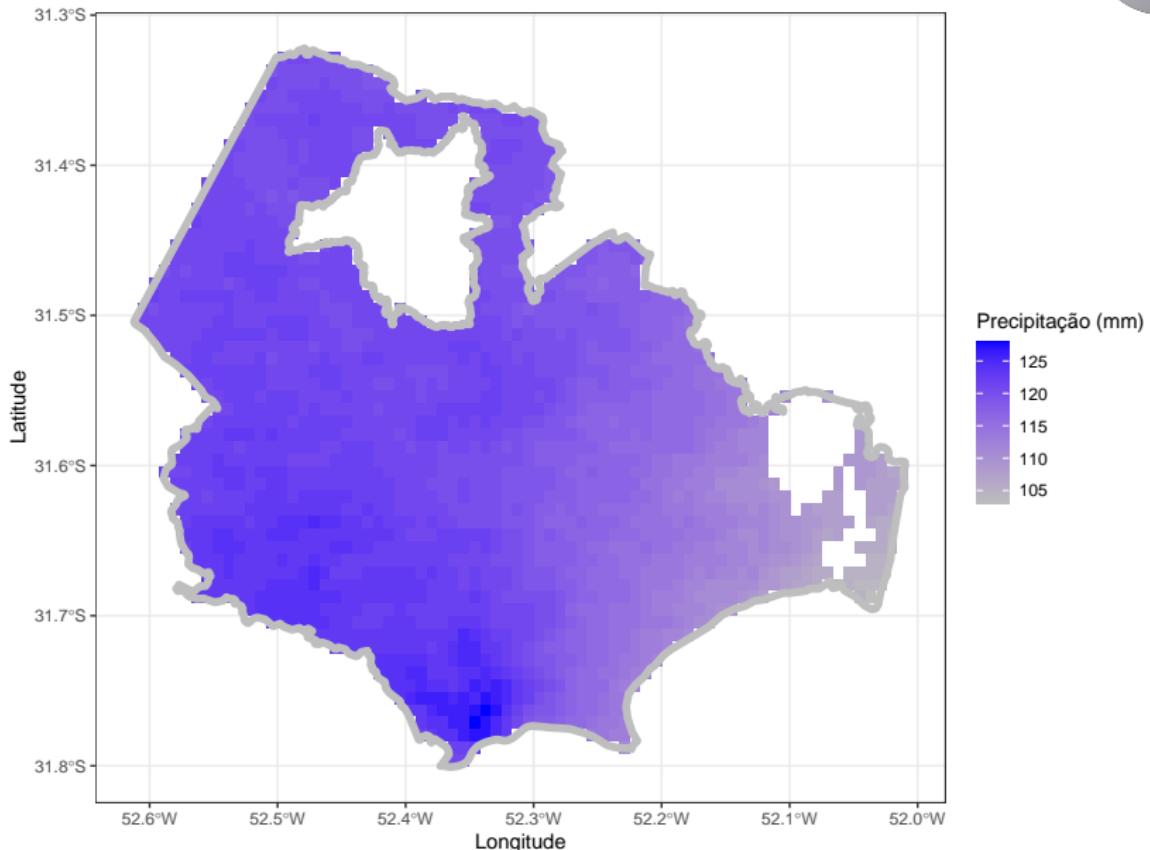




```
ggplot()+
  geom_raster(data=prec_df,aes(x=x,y=y,fill=pelprec))+  
  geom_sf(data=pel,fill=NA, color="gray", linewidth=2, alpha=.01)+  
  labs(title="Mapa da média anual da precipitação \n  
    em Pelotas-RS entre 1970-2000",  
    y="Latitude",  
    x="Longitude",  
    fill="Precipitação (mm)")+  
  theme_bw()  
  scale_fill_gradient(low="gray",high="blue")
```

Mapa da média anual da precipitação

em Pelotas–RS entre 1970–2000

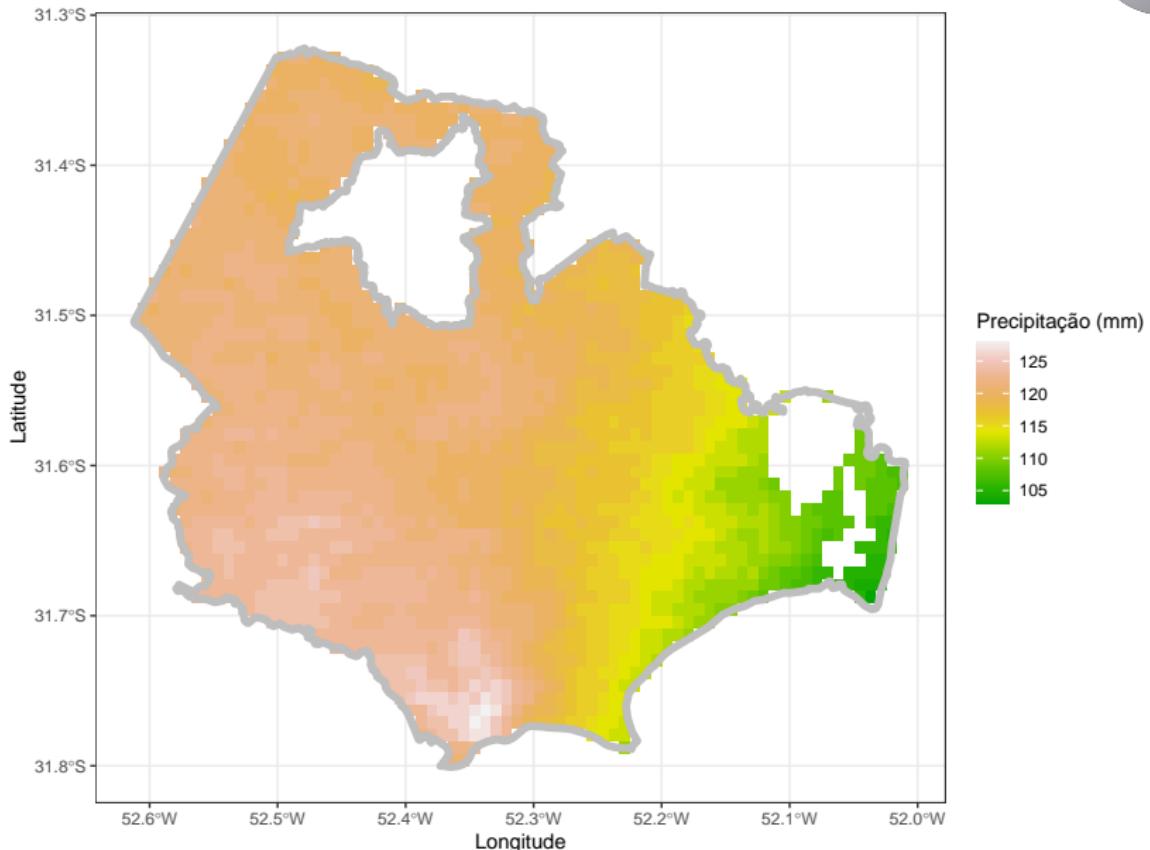




```
ggplot()+
  geom_raster(data=prec_df,aes(x=x,y=y,fill=pelprec))+  
  geom_sf(data=pel,fill=NA, color="gray", linewidth=2, alpha=.01)+  
  labs(title="Mapa da média anual da precipitação \n  
    em Pelotas-RS entre 1970-2000",  
    y="Latitude",  
    x="Longitude",  
    fill="Precipitação (mm)")+  
  theme_bw()+
  scale_fill_gradientn(colours = terrain.colors(10))
```

Mapa da média anual da precipitação

em Pelotas–RS entre 1970–2000



Paleta de cores para daltônicos

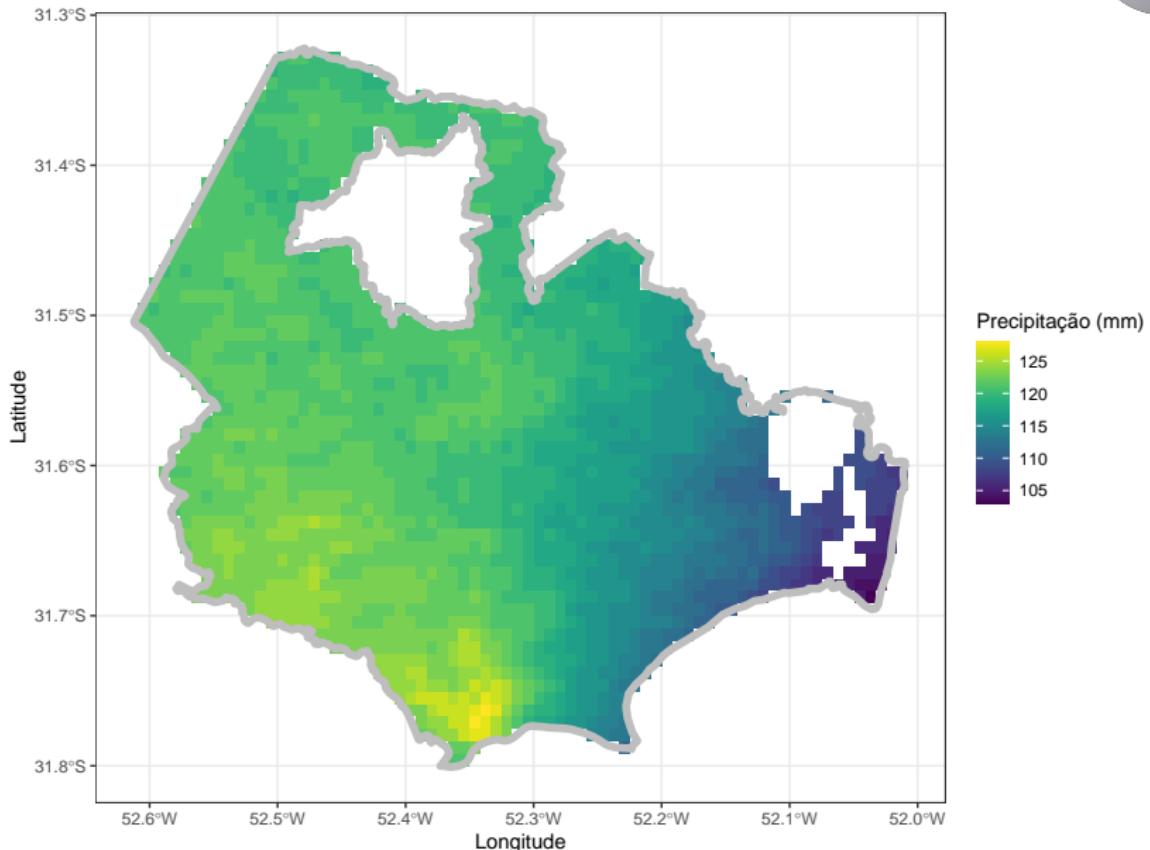


```
#intalando pacote viridis
install.packages("viridis")
#carregando pacote viridis
library(viridis)

ggplot()+
  geom_raster(data=prec_df,aes(x=x,y=y,fill=pelprec))+  
  geom_sf(data=pel,fill=NA, color="gray", linewidth=2, alpha=.01)+  
  labs(title="Mapa da média anual da precipitação \n  
    em Pelotas-RS entre 1970-2000",  
    y="Latitude",  
    x="Longitude",  
    fill="Precipitação (mm)")+  
  theme_bw()+
  scale_fill_viridis()
```

Mapa da média anual da precipitação

em Pelotas–RS entre 1970–2000



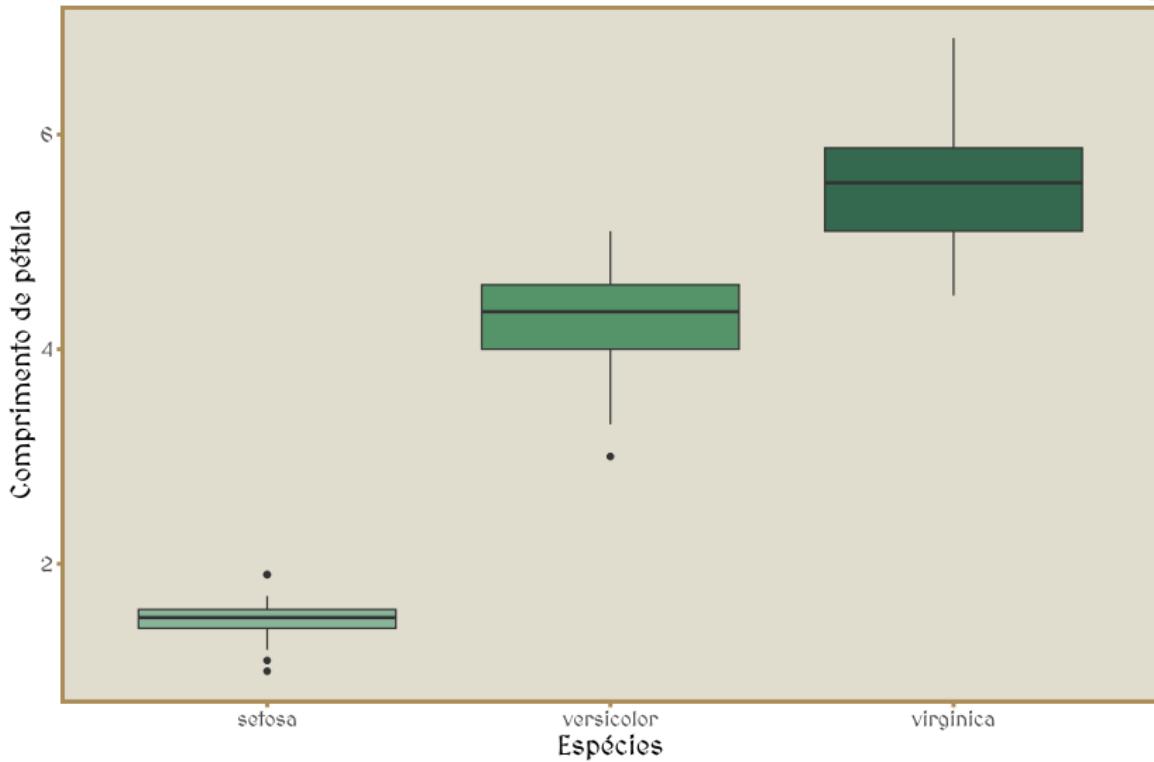
Temas divertidos



```
install.packages("remotes")
remotes::install_github("MatthewBJane/ThemePark")
library(ThemePark)

iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot(fill=c(lordoftherings_theme_colors["light"],  
                      lordoftherings_theme_colors["medium"],  
                      lordoftherings_theme_colors["dark"]))+  
  labs(y="Comprimento de pétala", x="Espécies",  
       title= "Tema Senhor dos Anéis")+
  theme_lordoftherings()
```

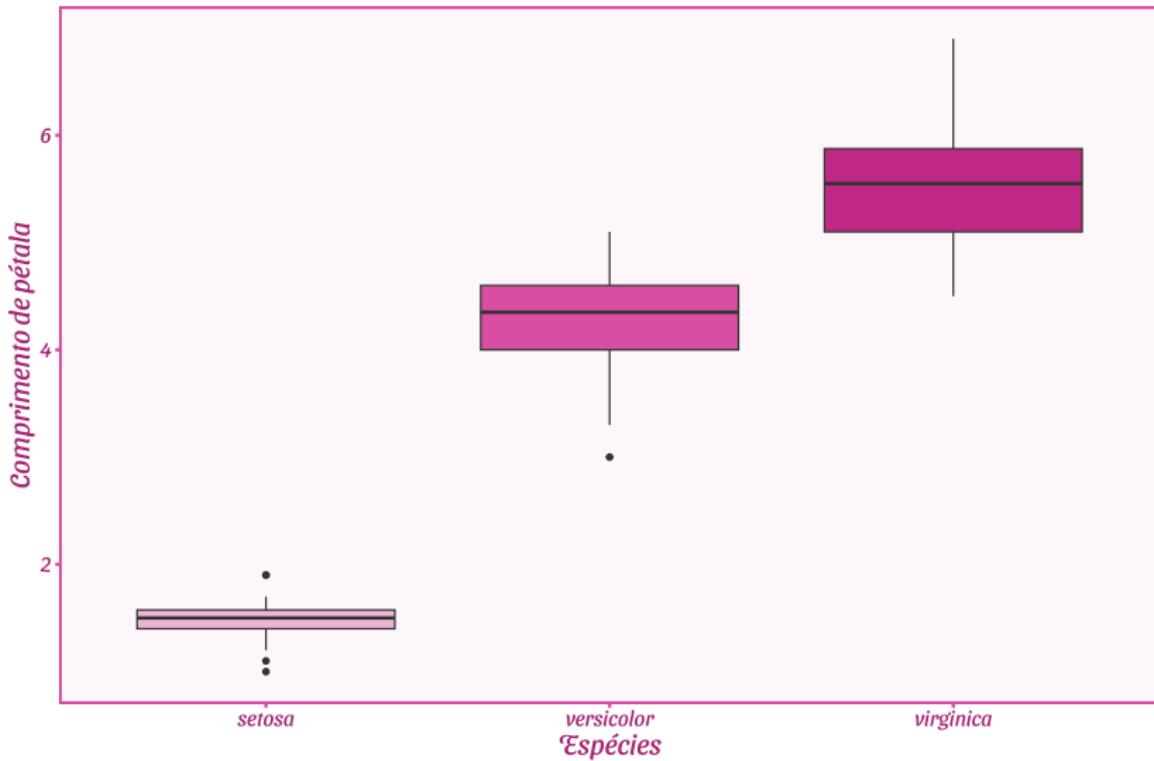
Tema Senhor dos Anéis





```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot(fill=c(barbie_theme_colors["light"],  
                      barbie_theme_colors["medium"],  
                      barbie_theme_colors["dark"]))+  
  labs(y="Comprimento de pétala", x="Espécies",  
       title="Tema Barbie") +  
  theme_barbie()
```

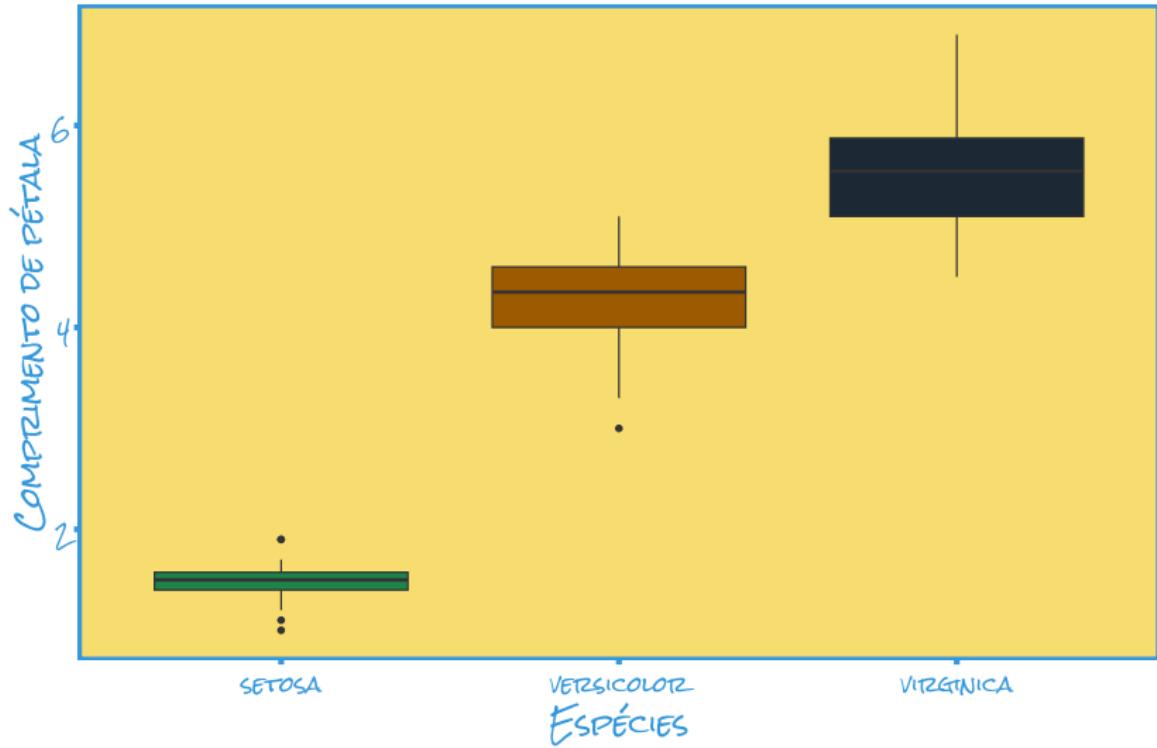
Tema Barbie





```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot(fill=c(simpsons_theme_colors["light"],  
                      simpsons_theme_colors["medium"],  
                      simpsons_theme_colors["dark"]))+  
  labs(y="Comprimento de pétala", x="Espécies", title= "Tema Simpsons")  
  theme_simpsons()
```

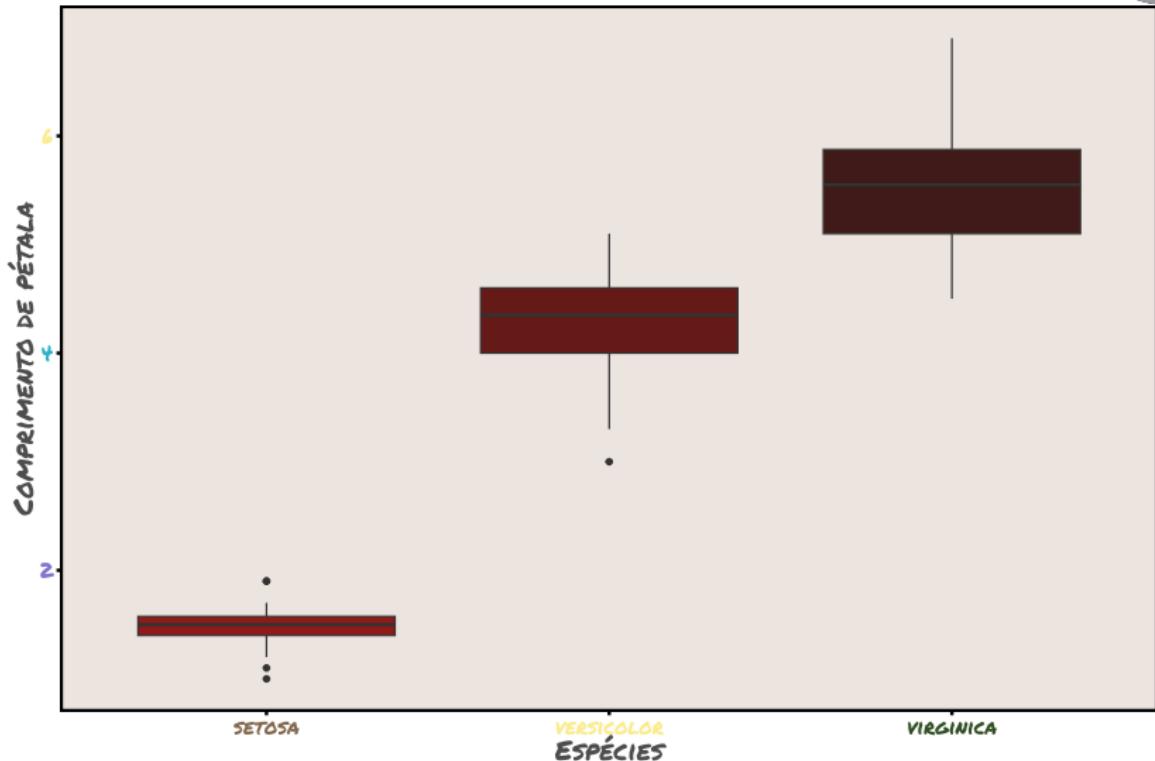
TEMA SIMPSONS





```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot(fill=c(friends_theme_colors["light"],  
                      friends_theme_colors["medium"],  
                      friends_theme_colors["dark"]))+  
  labs(y="Comprimento de pétala", x="Espécies", title= "Tema Friends") +  
  theme_friends()
```

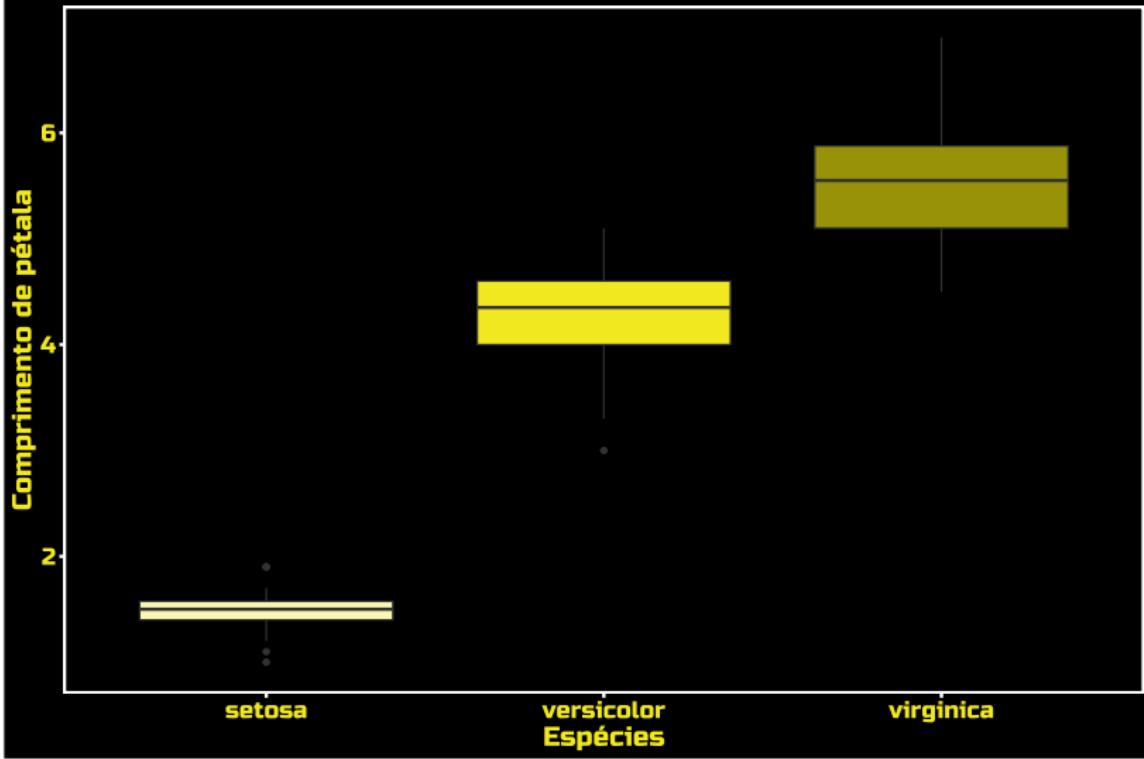
TEMA FRIENDS





```
iris%>%ggplot(aes(x=Species, y=Petal.Length, fill=Species))+  
  geom_boxplot(fill=c(starwars_theme_colors["light"],  
                      starwars_theme_colors["medium"],  
                      starwars_theme_colors["dark"]))+  
  labs(y="Comprimento de pétala", x="Espécies",  
       title= "Tema Star wars") +  
  theme_starwars()
```

Tema Star wars



Referências



- Sievert, Carson. 2020. *Interactive Web-Based Data Visualization with r, Plotly, and Shiny*. Chapman; Hall/CRC.
<https://plotly-r.com>.
- Wickham, Hadley. 2016. *Ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York.
<https://ggplot2.tidyverse.org>.
- . 2023. *Forcats: Tools for Working with Categorical Variables (Factors)*. <https://forcats.tidyverse.org/>.
- Wickham, Hadley, Romain François, Lionel Henry, Kirill Müller, and Davis Vaughan. 2023. *Dplyr: A Grammar of Data Manipulation*. <https://dplyr.tidyverse.org>.
- Wilkinson, Leland. 2011. “The Grammar of Graphics.” In *Handbook of Computational Statistics: Concepts and Methods*, 375–414. Springer.



Agradecimento!

Agradecimento!



Para mais informações

<https://ggplot2.tidyverse.org/reference/index.html>

Documentação desta oficina com maior detalhe

<https://izzyreal18.github.io/oficinaggplotufpel.github.io/>