Manipulação e Apresentação de Dados

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Dia 3 - 09/08/2024

Sumário I

broom

broom

```
modelo.aov <- aov(Sepal.Length ~ Species, data=iris)
modelo.lm  <- lm(Sepal.Width ~ Petal.Width, data=iris)
modelo.wt  <- wilcox.test(iris$Petal.Length, g=iris$Species)
```

broom

```
library(broom)
tidy(modelo.aov)
```

```
## # A tibble: 2 x 6
##   term          df sumsq meansq statistic   p.value
##   <chr>      <dbl> <dbl>  <dbl>     <dbl>     <dbl>
## 1 Species        2  63.2 31.6         119.  1.67e-31
## 2 Residuals    147  39.0  0.265        NA   NA
```

```
tidy(modelo.lm)
```

```
## # A tibble: 2 x 5
##   term         estimate std.error statistic  p.value
##   <chr>           <dbl>     <dbl>     <dbl>    <dbl>
## 1 (Intercept)     3.31     0.0621      53.3  1.84e-98
## 2 Petal.Width    -0.209    0.0437      -4.79 4.07e- 6
```

```
tidy(modelo.wt)
```

```
## # A tibble: 1 x 4
##   statistic  p.value method                                          alterna
##       <dbl>    <dbl> <chr>                                           <chr>
## 1     11325 2.25e-26 Wilcoxon signed rank test with continuity corr~ two.sid
```

broom

```
glance(modelo.aov)
```

```
## # A tibble: 1 x 6
##   logLik   AIC   BIC deviance  nobs r.squared
##    <dbl> <dbl> <dbl>    <dbl> <int>     <dbl>
## 1  -112.  231.  243.     39.0   150     0.619
```

```
glance(modelo.lm)
```

```
## # A tibble: 1 x 12
##   r.squared adj.r.squared sigma statistic    p.value    df logLik   AIC   BI
##       <dbl>         <dbl> <dbl>     <dbl>      <dbl> <dbl>  <dbl> <dbl> <dbl
## 1     0.134         0.128 0.407      22.9 0.00000407     1  -77.0  160.  169
## # i 3 more variables: deviance <dbl>, df.residual <int>, nobs <int>
```

```
glance(modelo.wt)
```

```
## # A tibble: 1 x 4
##   statistic  p.value method                                          alterna
##       <dbl>    <dbl> <chr>                                           <chr>
## 1     11325 2.25e-26 Wilcoxon signed rank test with continuity corr~ two.sid
```

broom

```
augment(modelo.lm, interval="confidence")
```

```
## # A tibble: 150 x 10
##    Sepal.Width Petal.Width .fitted .lower .upper  .resid   .hat .sig
##          <dbl>       <dbl>   <dbl>  <dbl>  <dbl>   <dbl>  <dbl>  <db
##  1         3.5         0.2    3.27   3.16   3.38  0.233  0.0182  0.4
##  2         3           0.2    3.27   3.16   3.38 -0.267  0.0182  0.4
##  3         3.2         0.2    3.27   3.16   3.38 -0.0666 0.0182  0.4
##  4         3.1         0.2    3.27   3.16   3.38 -0.167  0.0182  0.4
##  5         3.6         0.2    3.27   3.16   3.38  0.333  0.0182  0.4
##  6         3.9         0.4    3.22   3.13   3.32  0.675  0.0140  0.4
##  7         3.4         0.3    3.25   3.14   3.35  0.154  0.0160  0.4
##  8         3.4         0.2    3.27   3.16   3.38  0.133  0.0182  0.4
##  9         2.9         0.2    3.27   3.16   3.38 -0.367  0.0182  0.4
## 10         3.1         0.1    3.29   3.17   3.40 -0.187  0.0206  0.4
## # i 140 more rows
## # i 1 more variable: .std.resid <dbl>
```

purrr

purrr

```
lapply(seq(1,5), function(x) {
  paste(x, "é", ifelse(x%%2==0, "par", "ímpar"))
})
```

```
## [[1]]
## [1] "1 é ímpar"
##
## [[2]]
## [1] "2 é par"
##
## [[3]]
## [1] "3 é ímpar"
##
## [[4]]
## [1] "4 é par"
##
## [[5]]
## [1] "5 é ímpar"
```

purrr

```
library(purrr)
map(seq(1,5), function(x) {
  paste(x, "é", ifelse(x%%2==0, "par", "ímpar"))
})
```

```
## [[1]]
## [1] "1 é ímpar"
##
## [[2]]
## [1] "2 é par"
##
## [[3]]
## [1] "3 é ímpar"
##
## [[4]]
## [1] "4 é par"
##
## [[5]]
## [1] "5 é ímpar"
```

purrr

```
map_dfr(seq(1,5), function(x) {
  tibble(par=paste(x, "é", ifelse(x%%2==0, "par", "ímpar")))
})
```

```
## # A tibble: 5 x 1
##   par
##   <chr>
## 1 1 é ímpar
## 2 2 é par
## 3 3 é ímpar
## 4 4 é par
## 5 5 é ímpar
```

purrr

```
map_dfc(tibble(um=1, dois=2, tres=3), function(x) {
  x * seq(1,5)
})
```

```
## # A tibble: 5 x 3
##      um  dois  tres
##   <dbl> <dbl> <dbl>
## 1     1     2     3
## 2     2     4     6
## 3     3     6     9
## 4     4     8    12
## 5     5    10    15
```

```
library(agridat)
caribbean.maize
```

```
##          isle site block plot  trt ears yield
## 1     Antigua DBAN    B1    1 T111   42  4.96
## 2     Antigua DBAN    B1    2 T000   41  3.94
## 3     Antigua DBAN    B1    3 T311   49  6.35
## 4     Antigua DBAN    B1    4 T202   48  5.56
## 5     Antigua DBAN    B1    5 T111   45  5.36
## 6     Antigua DBAN    B1    6 T220   46  6.18
## 7     Antigua DBAN    B1    7 T113   42  4.71
## 8     Antigua DBAN    B1    8 T131   44  6.03
## 9     Antigua DBAN    B1    9 T022   42  2.88
## 10    Antigua DBAN    B2   10 T222   44  5.68
## 11    Antigua DBAN    B2   11 T311   42  5.80
## 12    Antigua DBAN    B2   12 T020   42  4.16
## 13    Antigua DBAN    B2   13 T200   46  4.90
## 14    Antigua DBAN    B2   14 T111   44  5.25
## 15    Antigua DBAN    B2   15 T131   48  5.80
## 16    Antigua DBAN    B2   16 T002   46  2.18
```

purrr

```
caribbean.maize %>%
  group_split(isle)
```

```
## <list_of<
##   tbl_df<
##     isle : factor<2a195>
##     site : factor<459f2>
##     block: factor<cfca5>
##     plot : integer
##     trt  : factor<ed0b9>
##     ears : integer
##     yield: double
##   >
## >[2]>
## [[1]]
## # A tibble: 288 x 7
##    isle    site  block  plot trt    ears yield
##    <fct>   <fct> <fct> <int> <fct> <int> <dbl>
##  1 Antigua DBAN  B1        1 T111     42  4.96
##  2 Antigua DBAN  B1        2 T000     41  3.94
```

purrr

```
caribbean.maize %>%
  group_split(isle) %>%
  map(function(x) x %>%
        pivot_wider(id_cols=c(block,plot), names_from=site,
                    values_from=yield))
```

```
## [[1]]
## # A tibble: 36 x 10
##    block  plot  DBAN  LFAN  TEAN  WEAN  WLAN  NSAN  OVAN  ORA
##    <fct> <int> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl
##  1 B1        1  4.96  2.92  1.27  4.02  2     2.43  2.04  5.2
##  2 B1        2  3.94  1.68  2.1   5.8   2.39  1.28  3.88  6.8
##  3 B1        3  6.35  4.5   2.37  2.16  2.04  0.83  5.53  7.7
##  4 B1        4  5.56  4.74  2.08  5.31  1.64  2.44  6.61  6.7
##  5 B1        5  5.36  4.44  1.74  5.12  1.83  1.3   2.97  6.5
##  6 B1        6  6.18  4.66  3.16  5.98  2.08  1.34  4.47  6.4
##  7 B1        7  4.71  2.94  4.55  5.46  3.13  2.06  4.06  6.7
##  8 B1        8  6.03  1.6   3.2   3.45  1.96  3.02  5.02  6.7
##  9 B1        9  2.88  1.82  3.69  4.96  1.3   2.18  4.56  6.9
## 10 B2       10  5.68  4.44  1.52  4.26  2.16  2.35  3.5   3.7
```

purrr

```
caribbean.maize %>%
  group_split(isle) %>%
  map(\(x) x %>%
        pivot_wider(id_cols=c(block,plot), names_from=site,
                    values_from=yield))
```

```
## [[1]]
## # A tibble: 36 x 10
##    block  plot  DBAN  LFAN  TEAN  WEAN  WLAN  NSAN  OVAN  ORA
##    <fct> <int> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl
##  1 B1        1  4.96  2.92  1.27  4.02  2     2.43  2.04  5.2
##  2 B1        2  3.94  1.68  2.1   5.8   2.39  1.28  3.88  6.8
##  3 B1        3  6.35  4.5   2.37  2.16  2.04  0.83  5.53  7.7
##  4 B1        4  5.56  4.74  2.08  5.31  1.64  2.44  6.61  6.7
##  5 B1        5  5.36  4.44  1.74  5.12  1.83  1.3   2.97  6.5
##  6 B1        6  6.18  4.66  3.16  5.98  2.08  1.34  4.47  6.4
##  7 B1        7  4.71  2.94  4.55  5.46  3.13  2.06  4.06  6.7
##  8 B1        8  6.03  1.6   3.2   3.45  1.96  3.02  5.02  6.7
##  9 B1        9  2.88  1.82  3.69  4.96  1.3   2.18  4.56  6.9
## 10 B2       10  5.68  4.44  1.52  4.26  2.16  2.35  3.5   3.7
```

purrr

```
caribbean.maize %>%
  group_split(isle) %>%
  map(. %>%
        pivot_wider(id_cols=c(block,plot), names_from=site,
                    values_from=yield))
```

```
## [[1]]
## # A tibble: 36 x 10
##    block  plot  DBAN  LFAN  TEAN  WEAN  WLAN  NSAN  OVAN  ORA
##    <fct> <int> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl
##  1 B1        1  4.96  2.92  1.27  4.02  2     2.43  2.04  5.2
##  2 B1        2  3.94  1.68  2.1   5.8   2.39  1.28  3.88  6.8
##  3 B1        3  6.35  4.5   2.37  2.16  2.04  0.83  5.53  7.7
##  4 B1        4  5.56  4.74  2.08  5.31  1.64  2.44  6.61  6.7
##  5 B1        5  5.36  4.44  1.74  5.12  1.83  1.3   2.97  6.5
##  6 B1        6  6.18  4.66  3.16  5.98  2.08  1.34  4.47  6.4
##  7 B1        7  4.71  2.94  4.55  5.46  3.13  2.06  4.06  6.7
##  8 B1        8  6.03  1.6   3.2   3.45  1.96  3.02  5.02  6.7
##  9 B1        9  2.88  1.82  3.69  4.96  1.3   2.18  4.56  6.9
## 10 B2       10  5.68  4.44  1.52  4.26  2.16  2.35  3.5   3.7
```

purrr

```
iris %>%
  select(-Species) %>%
  as.list() %>%
  map(\(x) x %>%
        enframe() %>%
        cbind(Species=iris$Species) %>%
        aov(value ~ Species, data=.) %>%
        residuals() %>%
        shapiro.test() %>%
        tidy()) %>%
  bind_rows(.id="Variável")
```

```
## # A tibble: 4 x 4
##   Variável     statistic p.value method
##   <chr>            <dbl>   <dbl> <chr>
## 1 Sepal.Length     0.988 0.219   Shapiro-Wilk normality test
## 2 Sepal.Width      0.989 0.323   Shapiro-Wilk normality test
## 3 Petal.Length     0.981 0.0368  Shapiro-Wilk normality test
## 4 Petal.Width      0.972 0.00387 Shapiro-Wilk normality test
```

purrr

```
iris %>%
  select(starts_with("Sepal")) %>%
  as.list() %>%
  map(. %>%
        enframe() %>%
        cbind(Species=iris$Species) %>%
        aov(value ~ Species, data=.) %>%
        tidy()) %>%
  bind_rows(.id="Variável")
```

```
## # A tibble: 4 x 7
##   Variável     term         df sumsq meansq statistic   p.val
##   <chr>        <chr>     <dbl> <dbl>  <dbl>     <dbl>     <db
## 1 Sepal.Length Species       2  63.2 31.6        119.   1.67e-
## 2 Sepal.Length Residuals   147  39.0  0.265       NA    NA
## 3 Sepal.Width  Species       2  11.3  5.67        49.2  4.49e-
## 4 Sepal.Width  Residuals   147  17.0  0.115       NA    NA
```

purrr

```
iris %>%
  select(starts_with("Sepal")) %>%
  as.list() %>%
  map_dfr(. %>%
            enframe() %>%
            cbind(Species=iris$Species) %>%
            aov(value ~ Species, data=.) %>%
            tidy())
```

```
## # A tibble: 4 x 6
##   term          df sumsq meansq statistic   p.value
##   <chr>      <dbl> <dbl>  <dbl>     <dbl>     <dbl>
## 1 Species        2  63.2 31.6        119.   1.67e-31
## 2 Residuals    147  39.0  0.265       NA    NA
## 3 Species        2  11.3  5.67        49.2  4.49e-17
## 4 Residuals    147  17.0  0.115       NA    NA
```

purrr

```
cor(iris[-5])
```

```
##                Sepal.Length Sepal.Width Petal.Length Petal.Widt
## Sepal.Length    1.0000000  -0.1175698    0.8717538   0.817941
## Sepal.Width    -0.1175698   1.0000000   -0.4284401  -0.366125
## Petal.Length    0.8717538  -0.4284401    1.0000000   0.962865
## Petal.Width     0.8179411  -0.3661259    0.9628654   1.000000
```

```
cor.test(iris[-5])
```

```
## Error in cor.test.default(iris[-5]): 'X' deve ser um vetor nu
```

```
expand_grid(Var1=names(iris)[-5],
            Var2=names(iris)[-5]) %>%
  pmap_dbl(\(Var1, Var2){
    cor.test(iris[,Var1], iris[,Var2])$p.value
  }) %>%
  matrix(nrow=4)
```

```
##              [,1]         [,2]         [,3]         [,4]
## [1,] 0.000000e+00 1.518983e-01 1.038667e-47 2.325498e-37
## [2,] 1.518983e-01 0.000000e+00 4.513314e-08 4.073229e-06
## [3,] 1.038667e-47 4.513314e-08 0.000000e+00 4.675004e-86
## [4,] 2.325498e-37 4.073229e-06 4.675004e-86 0.000000e+00
```

purrr

```
expand_grid(Var1=names(iris)[-5],
            Var2=names(iris)[-5]) %>%
  pmap_chr(\(Var1, Var2){
    if(Var1==Var2) return("-")
    cor.test(iris[,Var1], iris[,Var2]) %>%
      .$p.value %>%
      scales::pvalue(acc=.0001, dec=",")
  }) %>%
  matrix(nrow=4)
```

```
##      [,1]       [,2]       [,3]       [,4]
## [1,] "-"        "0,1519"   "<0,0001" "<0,0001"
## [2,] "0,1519"   "-"        "<0,0001" "<0,0001"
## [3,] "<0,0001" "<0,0001" "-"        "<0,0001"
## [4,] "<0,0001" "<0,0001" "<0,0001" "-"
```

```
map2(c(1,2,3,4), c("a","b","c","d"),
     \(num, chr) paste0("Número: ", num, "; Caractere: ", chr))
```

```
## [[1]]
## [1] "Número: 1; Caractere: a"
##
## [[2]]
## [1] "Número: 2; Caractere: b"
##
## [[3]]
## [1] "Número: 3; Caractere: c"
##
## [[4]]
## [1] "Número: 4; Caractere: d"
```

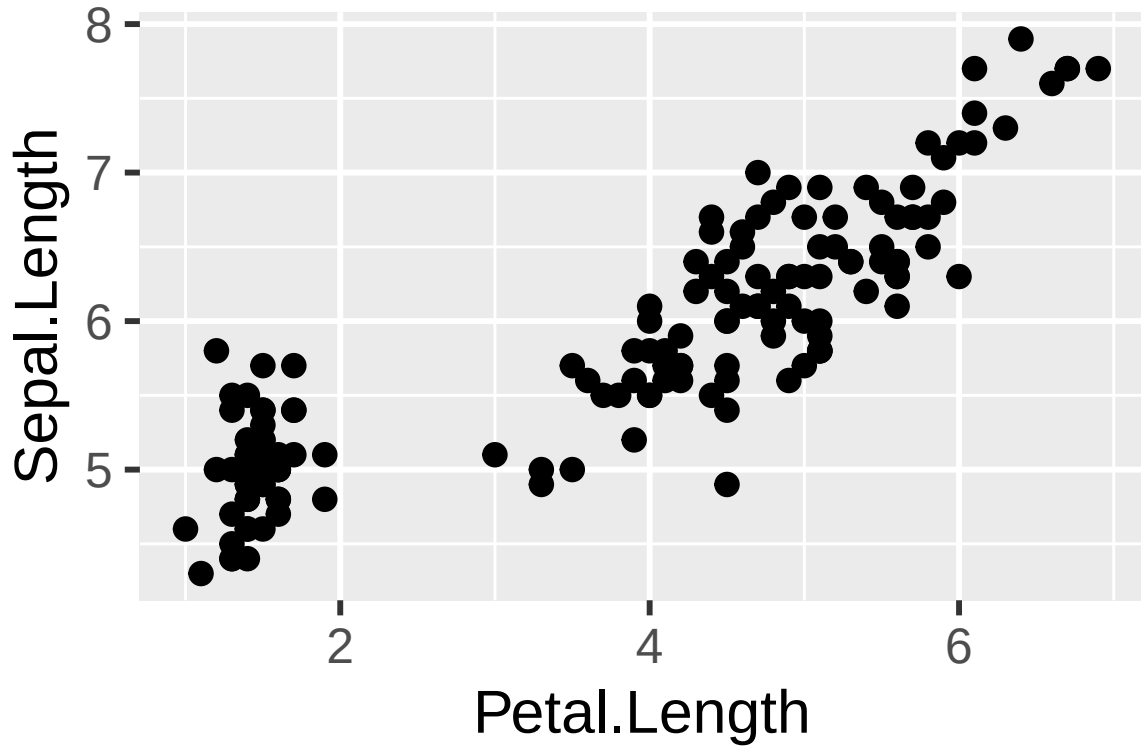
ggplot2

ggplot2

```
library(ggplot2)
iris %>%
  ggplot(aes(x=Species, y=Sepal.Length)) +
  geom_boxplot()
```

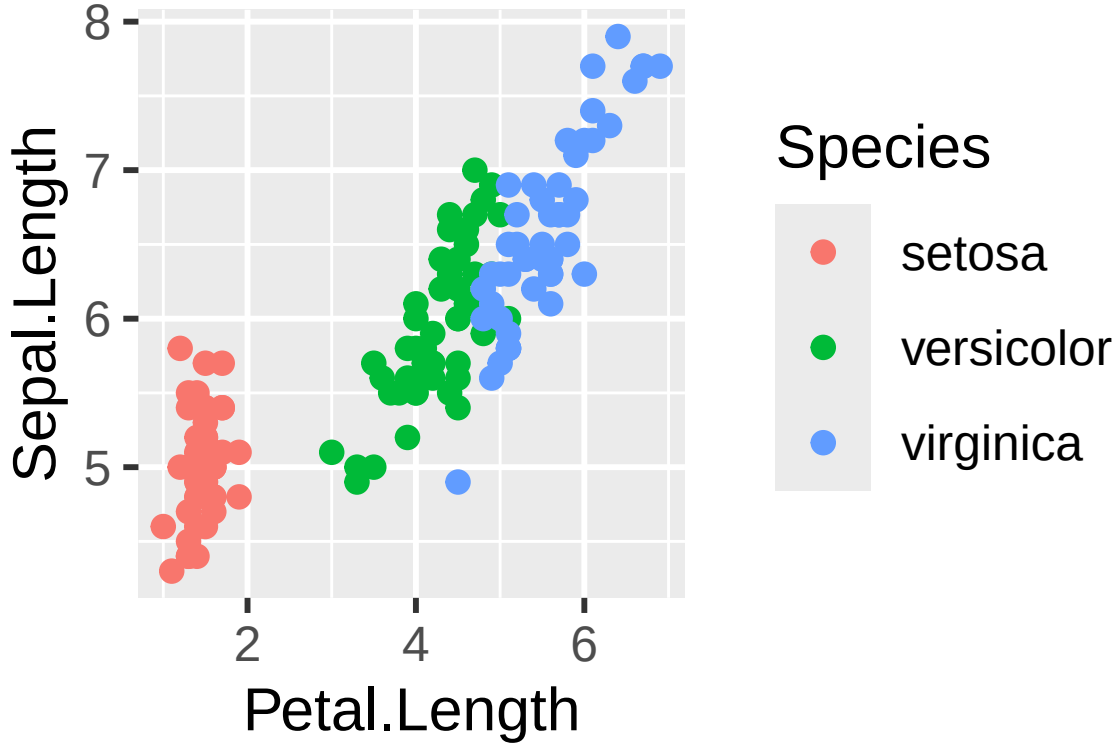
ggplot2

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



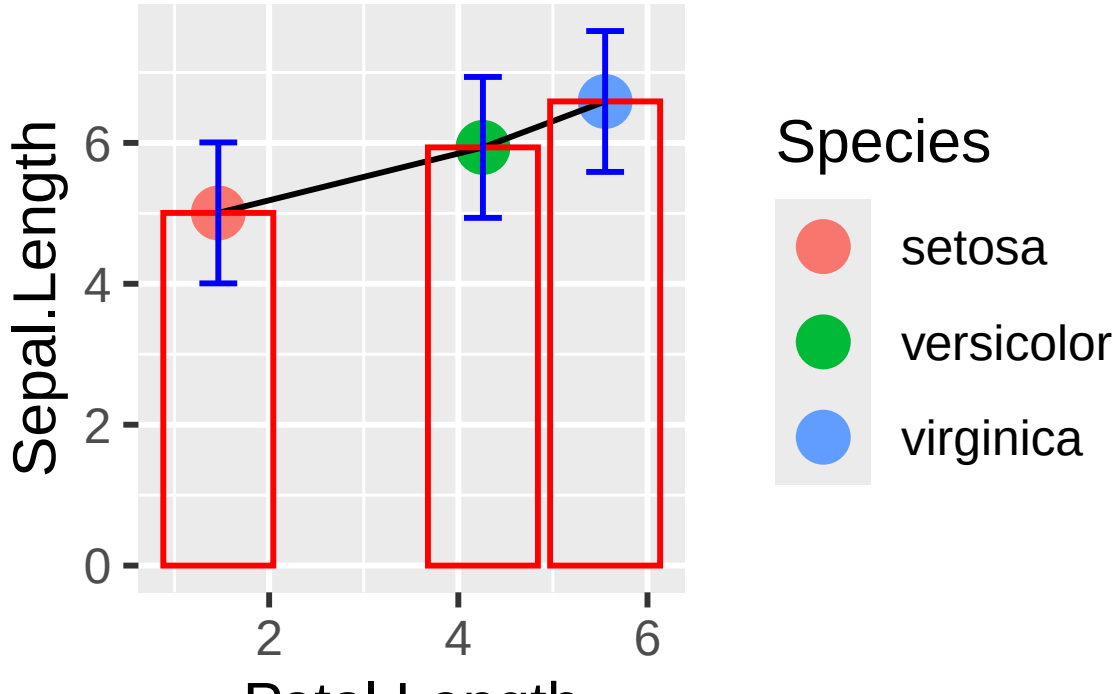
ggplot2

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



ggplot2

```
iris %>%
  group_by(Species) %>%
  summarise_at(vars(Petal.Length, Sepal.Length), mean) %>%
  ggplot(aes(x=Petal.Length, y=Sepal.Length, col=Species)) +
  geom_point(size=4) +
  geom_line(col="black") +
  geom_col(col="red", fill="transparent") +
  geom_errorbar(aes(ymax=Sepal.Length+1, ymin=Sepal.Length-1),
                col="blue", width=.4)
```

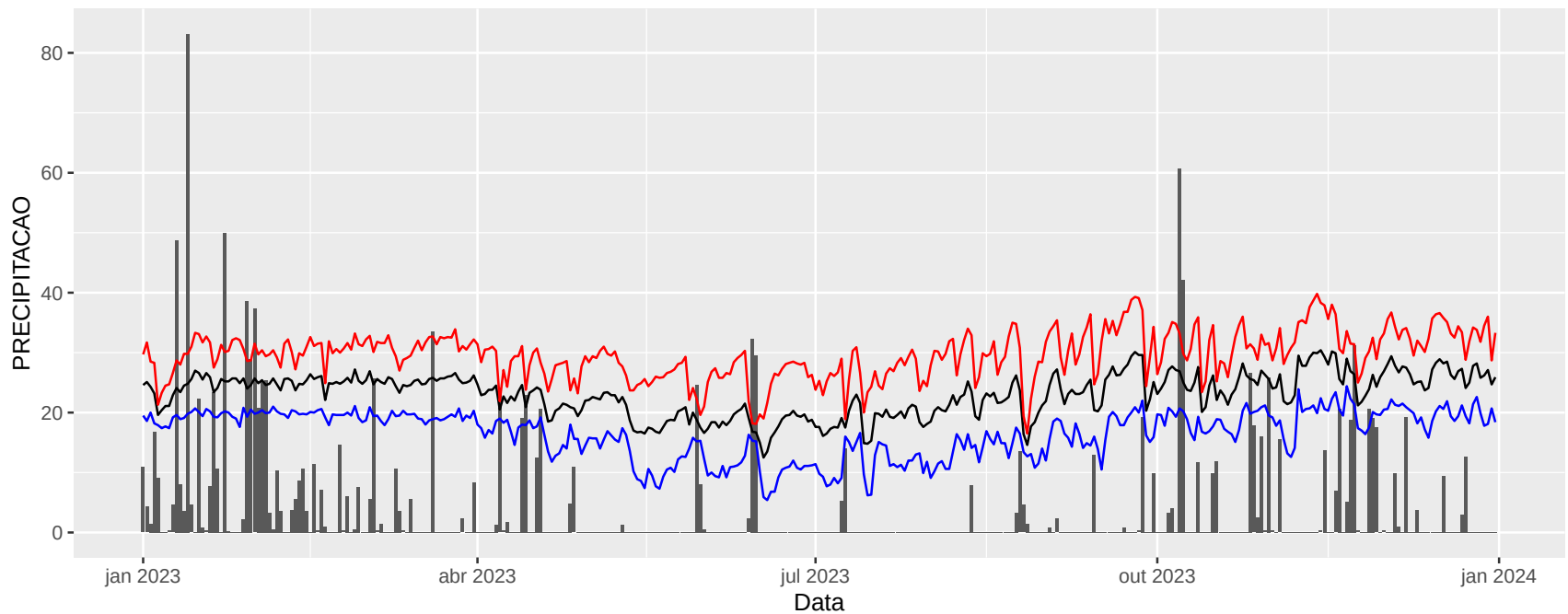


ggplot2

```
linhas <- read_lines(
  "http://www.leb.esalq.usp.br/leb/exceldados/DCE2023.TXT")

inicio <- which(str_starts(linhas, "="))[c(1, seq(3, 37, 3))]
final <- which(str_starts(linhas, "="))[c(2, seq(5,37,3), 37)]
pular <- sapply(seq(1,13), function(i){
  seq(inicio[i], final[i])
})
pular2 <- which(linhas=="")

linhas2 <- linhas[-c(unlist(pular),pular2)]

dados_metereologicos <- as_tibble(linhas2) %>%
  separate(value,
           c("No", "ANO", "DIA", "MES", "R.GLOBA",
             "INSOLACAO", "PRECIPITACAO", "UMIDADE RELATIV",
             "VENTO MAXIMO", "VENTO MEDIO", "TEMPER MAXIMA",
             "TEMPER MINIMA", "TEMPER MEDIA", "EVAPORACAO"),
           sep=" +") %>%
  unite(Data, DIA, MES, ANO) %>%
  mutate(Data=lubridate::dmy(Data)) %>%
  mutate_at(vars(-Data), str_replace, ",", ".") %>%
  mutate_at(vars(-Data), parse_number) %>%
  filter(!is.na(Data))
```

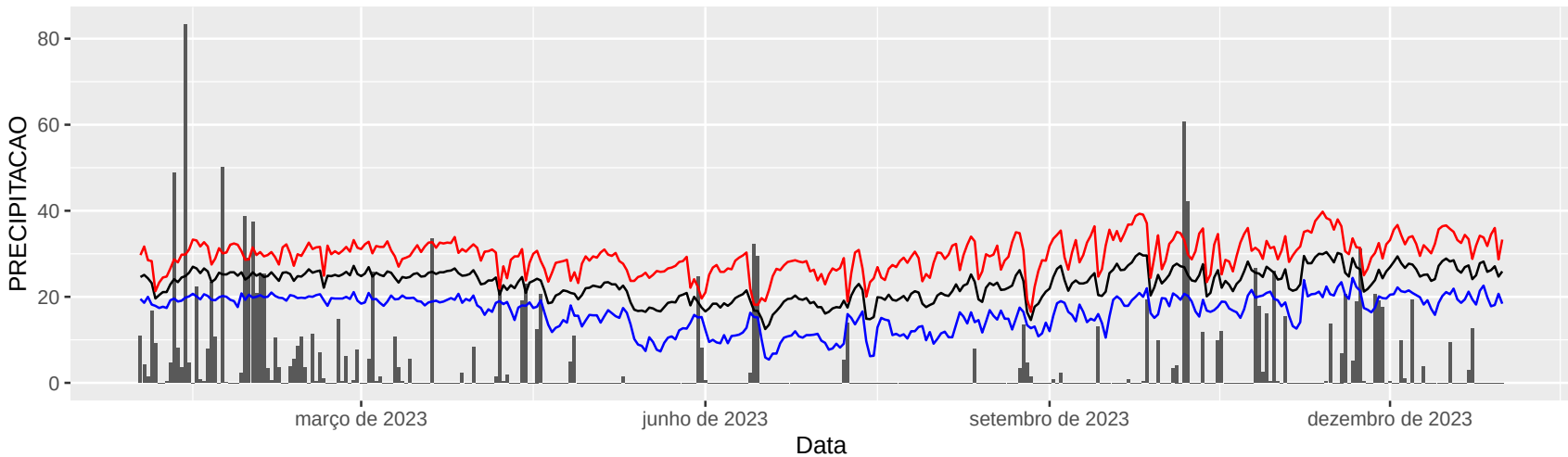
ggplot2

```
dados_metereologicos %>%
  ggplot(aes(x=Data)) +
  geom_col(aes(y=PRECIPITACAO)) +
  geom_line(aes(y=`TEMPER MEDIA`)) +
  geom_line(aes(y=`TEMPER MINIMA`), col="blue") +
  geom_line(aes(y=`TEMPER MAXIMA`), col="red")
```



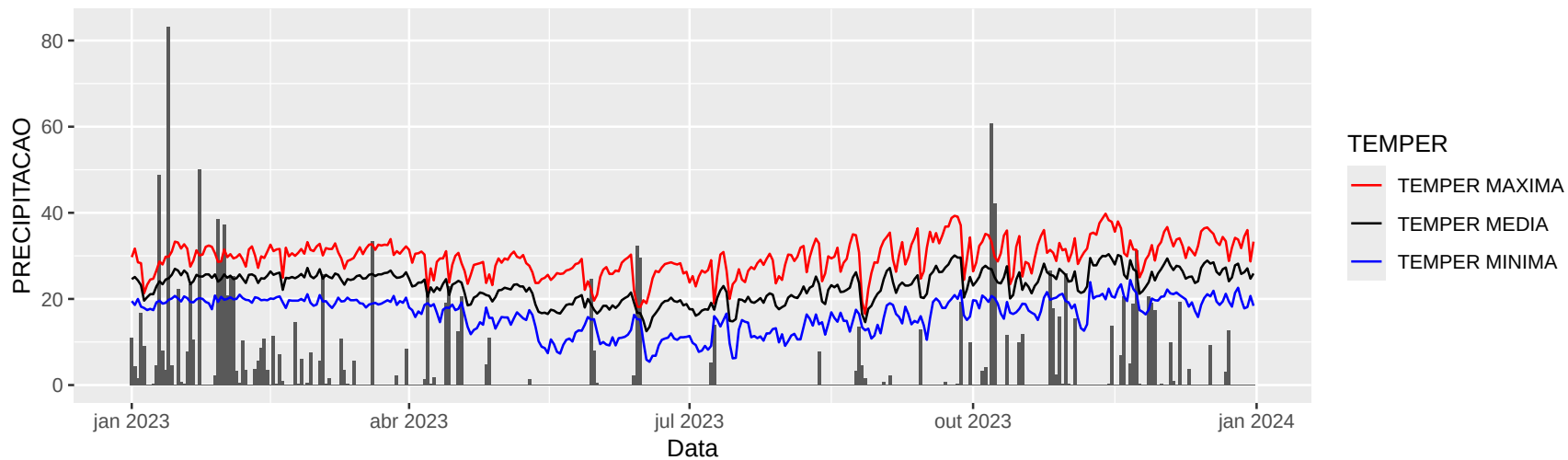
ggplot2

```
dados_metereologicos %>%
  ggplot(aes(x=Data)) +
  scale_x_date(date_breaks="3 months",
               date_labels="%B de %Y") +
  geom_col(aes(y=PRECIPITACAO)) +
  geom_line(aes(y=`TEMPER MEDIA`)) +
  geom_line(aes(y=`TEMPER MINIMA`), col="blue") +
  geom_line(aes(y=`TEMPER MAXIMA`), col="red")
```



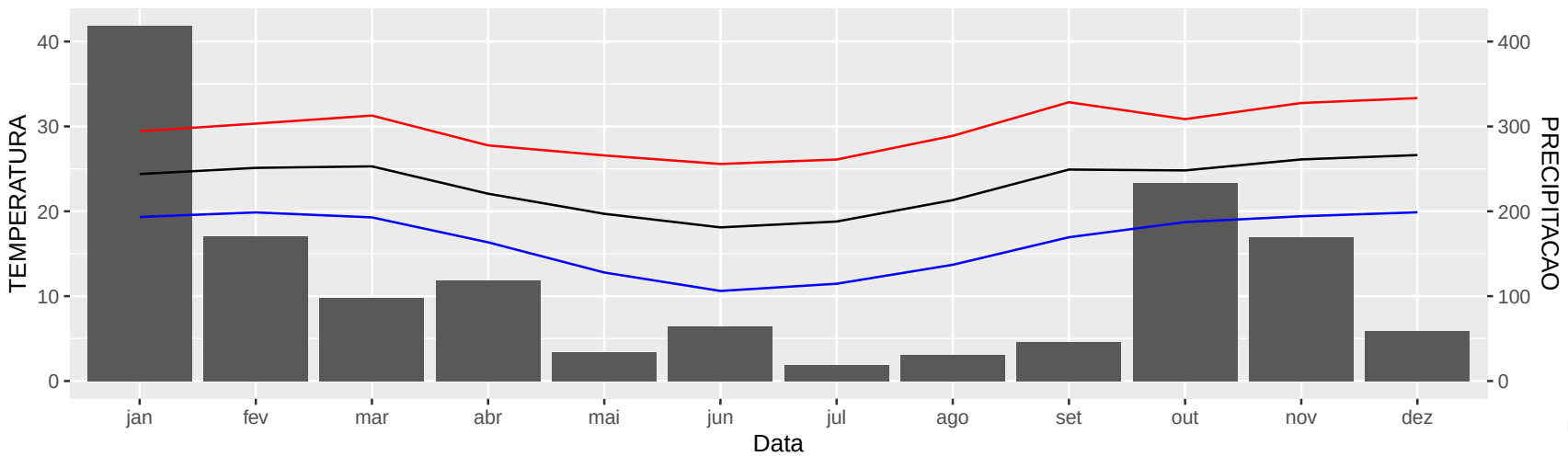
ggplot2

```
dados_metereologicos %>%
  select(Data, PRECIPITACAO, starts_with("TEMPER")) %>%
  pivot_longer(starts_with("TEMPER"), names_to="TEMPER") %>%
  ggplot(aes(x=Data)) +
  geom_bar(stat="unique", aes(y=PRECIPITACAO)) +
  geom_line(aes(y=value, color=TEMPER)) +
  scale_color_manual(values=c("red", "black", "blue"))
```



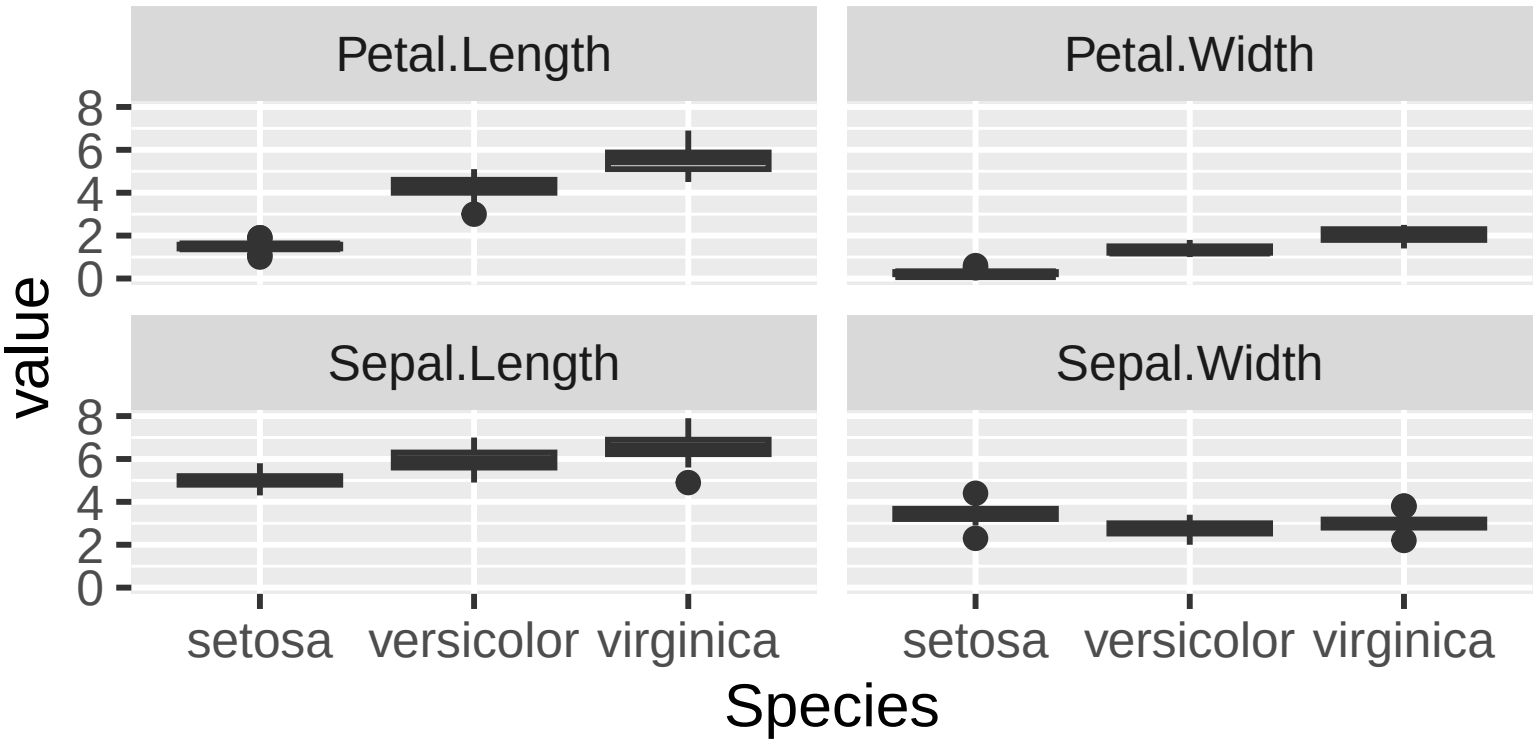
ggplot2

```
dados_metereologicos %>%
  mutate_at(vars(Data), month, label=T) %>%
  group_by(Data) %>%
  summarise(PRECIPITACAO = sum(PRECIPITACAO),
            `TEMPER MEDIA` = mean(`TEMPER MEDIA`),
            `TEMPER MINIMA` = mean(`TEMPER MINIMA`),
            `TEMPER MAXIMA` = mean(`TEMPER MAXIMA`)) %>%
  ggplot(aes(x=Data)) +
  scale_y_continuous(name="TEMPERATURA",
                     sec.axis = sec_axis(~.*10, name="PRECIPITACAO")) +
  geom_col(aes(y=PRECIPITACAO/10)) +
  geom_line(aes(y=`TEMPER MEDIA`, group=1)) +
  geom_line(aes(y=`TEMPER MINIMA`, group=1), col="blue") +
  geom_line(aes(y=`TEMPER MAXIMA`, group=1), col="red")
```



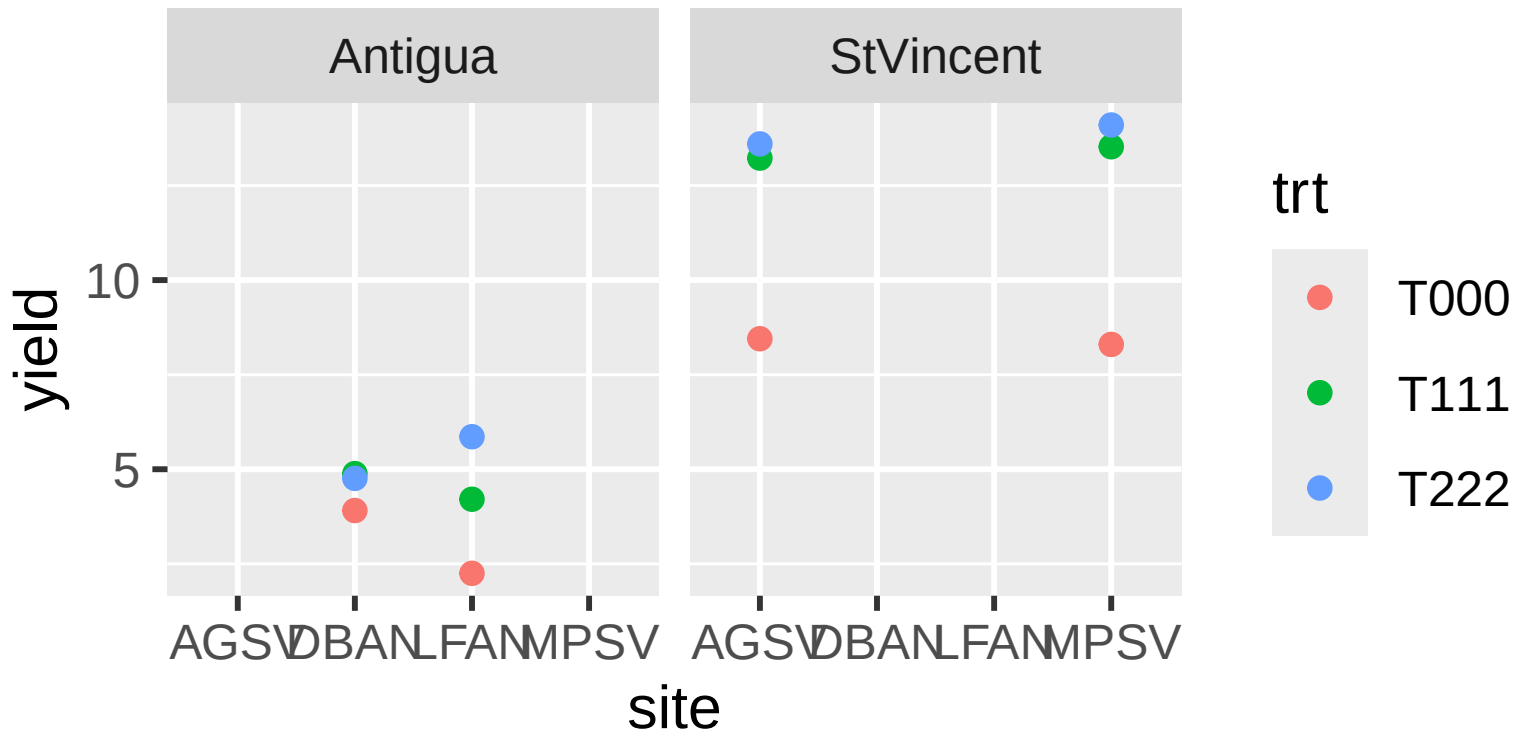
ggplot2

```
iris %>%
  pivot_longer(-Species) %>%
  ggplot(aes(x=Species, y=value)) +
  geom_boxplot() +
  facet_wrap(~name)
```



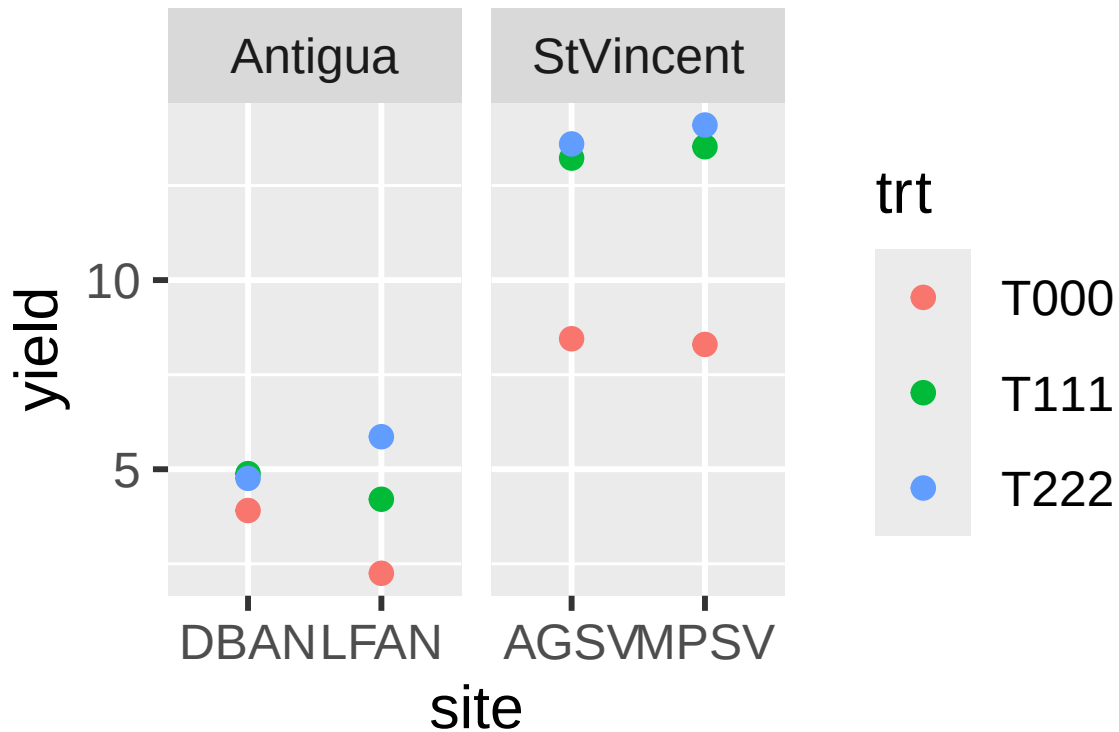
ggplot2

```
agridat::caribbean.maize %>%
  filter(site %in% c("DBAN", "LFAN", "MPSV", "AGSV")) %>%
  filter(trt %in% c("T000", "T111", "T222")) %>%
  group_by(isle, site, trt) %>%
  summarise_at(vars(yield), mean) %>%
  ggplot(aes(x=site, col=trt, y=yield)) +
  geom_point() +
  facet_wrap(~isle)
```



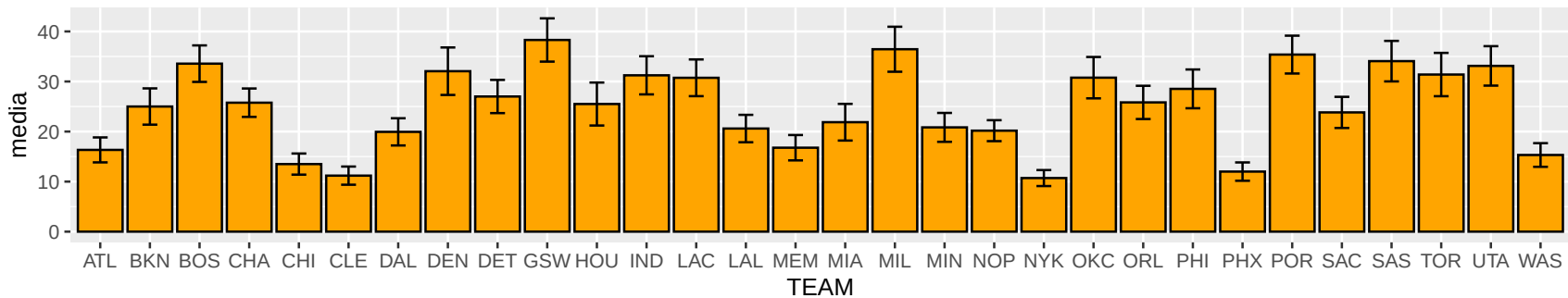
ggplot2

```
agridat::caribbean.maize %>%
  filter(site %in% c("DBAN", "LFAN", "MPSV", "AGSV")) %>%
  filter(trt %in% c("T000", "T111", "T222")) %>%
  group_by(isle, site, trt) %>%
  summarise_at(vars(yield), mean) %>%
  ggplot(aes(x=site, col=trt, y=yield)) +
  geom_point() +
  facet_wrap(~isle, scales = "free_x")
```



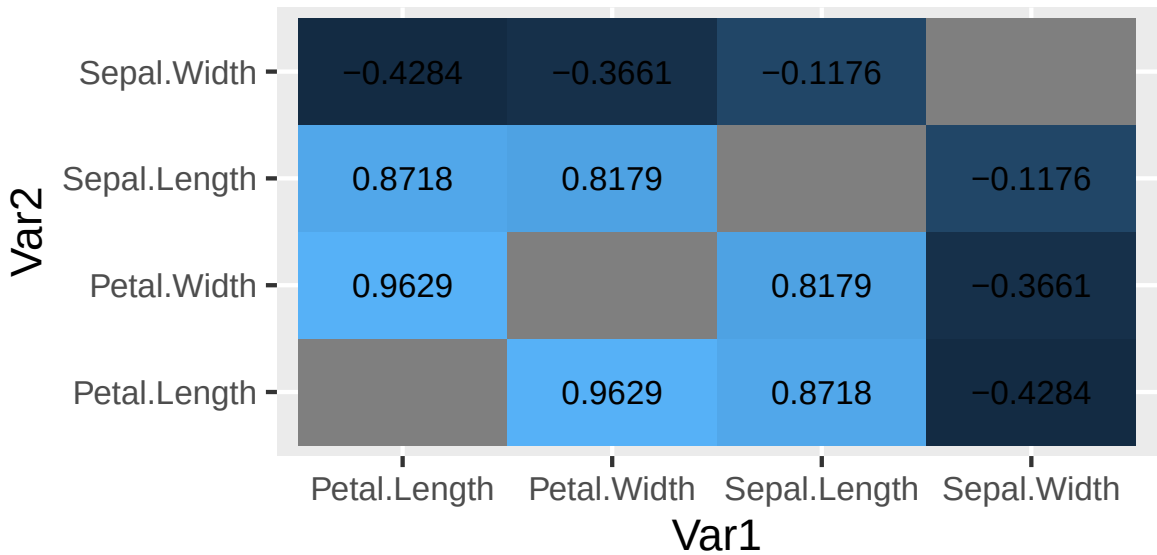
ggplot2

```
library(datasetsICR)
data(NBA.game)
NBA.game %>%
  group_by(TEAM) %>%
  summarise_at(vars(W),
               list(media=mean,
                    erro=\(x) sd(x)/sqrt(length(x)))) %>%
  ggplot(aes(x=TEAM, y=media)) +
  geom_col(fill="orange", col="black") +
  geom_errorbar(aes(ymin=media-erro, ymax=media+erro),
                width=.3, col="black")
```

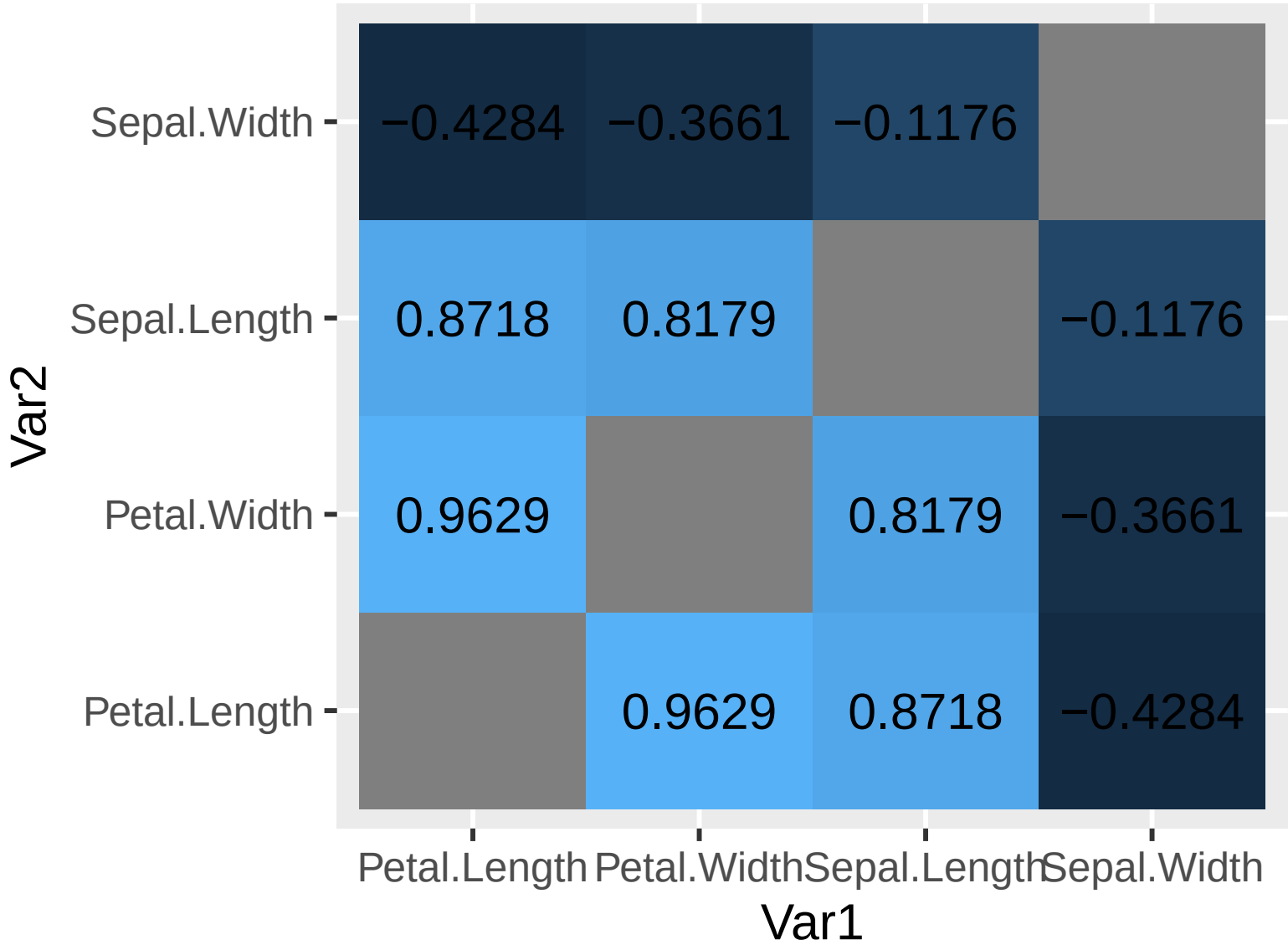


ggplot2

```
iris %>%
  select(-Species) %>%
  cor() %>%
  as.data.frame() %>%
  rownames_to_column("Var1") %>%
  pivot_longer(-Var1, names_to="Var2", values_to="Cor") %>%
  mutate(Cor = ifelse(Var1==Var2, NA, Cor)) %>%
  ggplot(aes(x=Var1, y=Var2, fill=Cor)) +
  geom_tile(show.legend=F) +
  geom_text(aes(label=round(Cor, 4)), size=2) +
  theme_grey(base_size = 8)
```

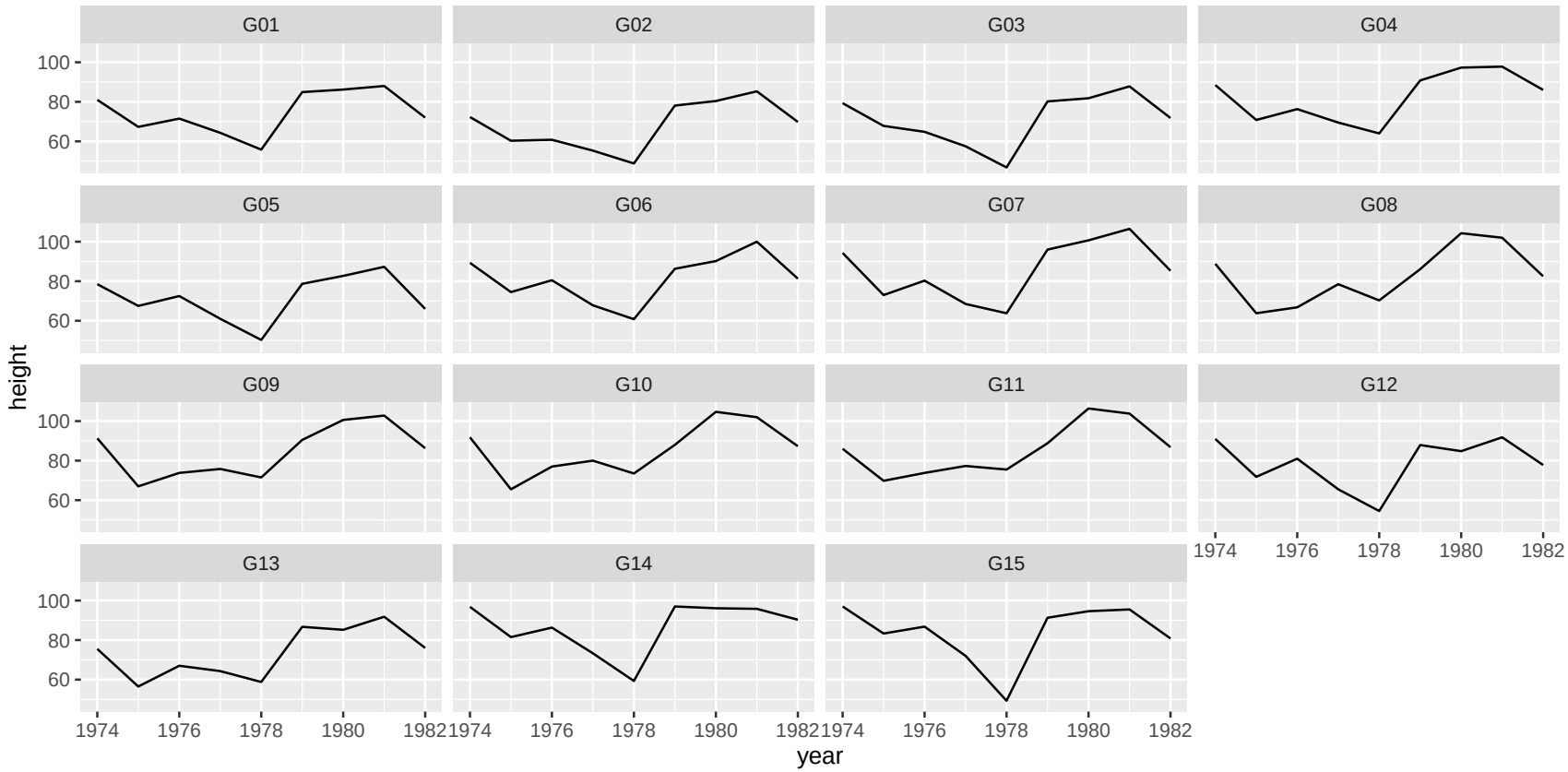


ggplot2


Sepal.Width
Sepal.Length
Petal.Width
Petal.Length
Var2
−0.4284
−0.3661
−0.1176
0.8718
0.8179
−0.1176
0.9629
0.8179
−0.3661
0.9629
0.8718
−0.4284
Petal.Length
Petal.Width
Sepal.Length
Sepal.Width
Var1

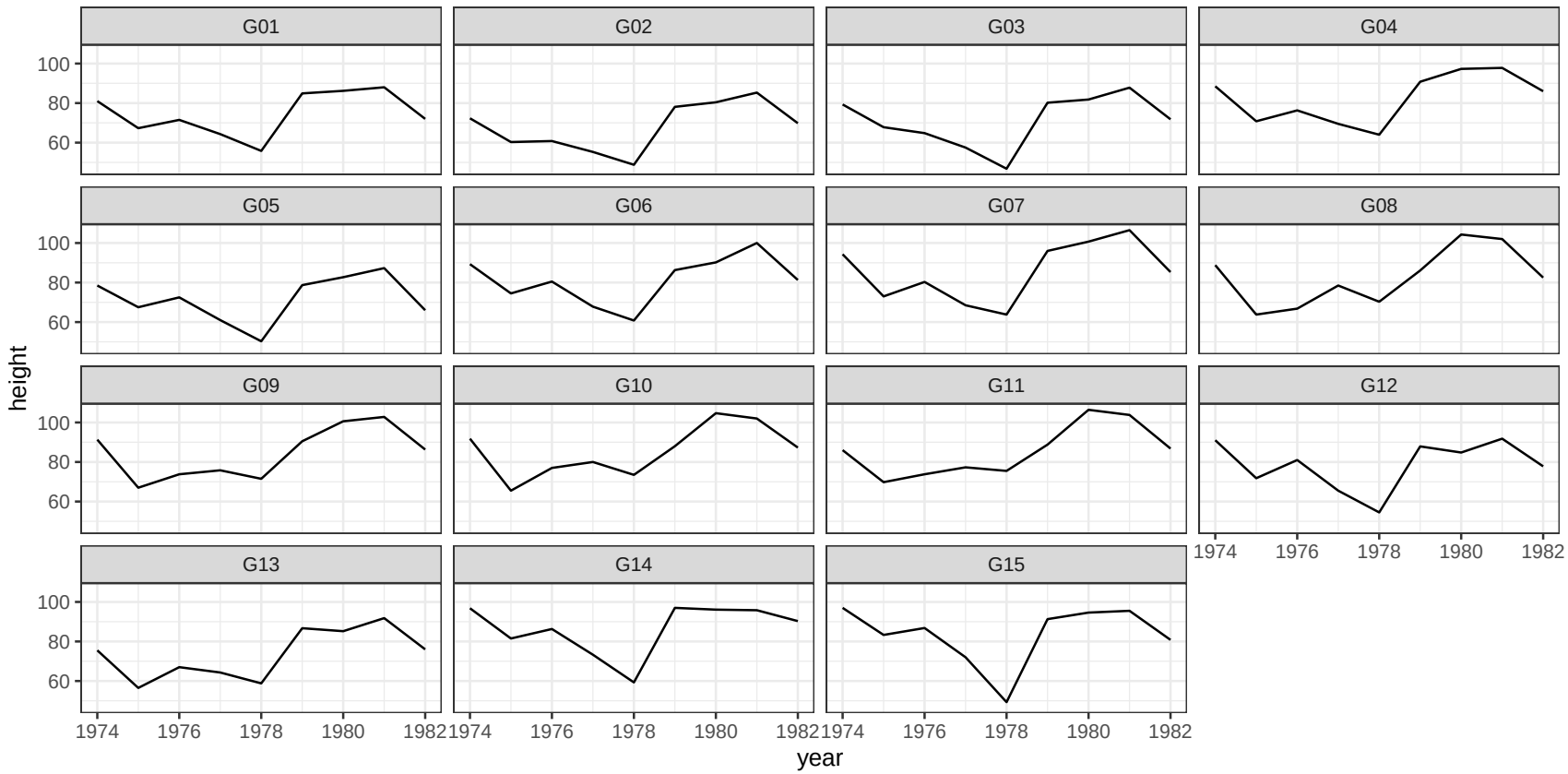
ggplot2

```
agridat::aastveit.barley.height %>%
  ggplot(aes(x=year, y=height)) +
  facet_wrap(~gen) +
  geom_line()
```



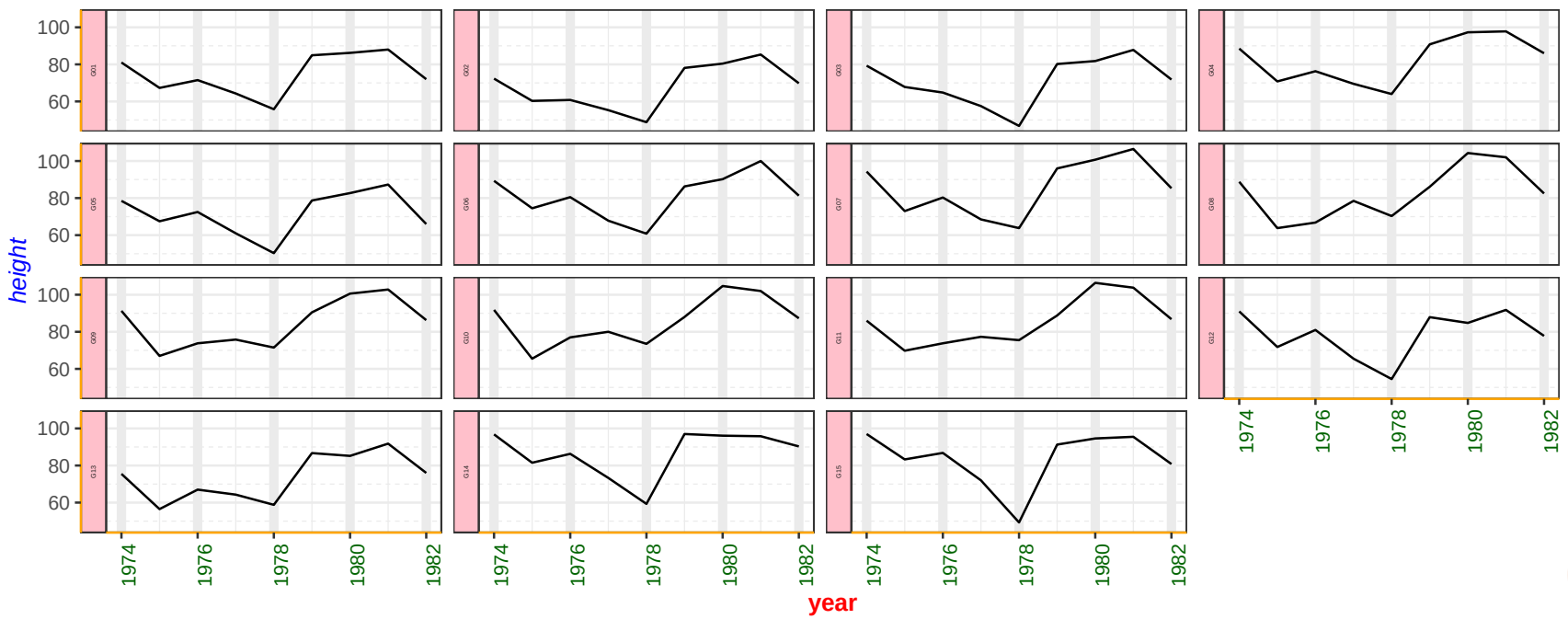
ggplot2

```
agridat::aastveit.barley.height %>%
  ggplot(aes(x=year, y=height)) +
  facet_wrap(~gen) +
  geom_line() +
  theme_bw()
```



ggplot2

```
agridat::aastveit.barley.height %>%
  ggplot(aes(x=year, y=height)) +
  facet_wrap(~gen, strip.position = "left") +
  geom_line() +
  theme_bw() +
  theme(axis.title.x = element_text(color="red", face="bold"),
        axis.title.y = element_text(color="blue", face="italic"),
        axis.text.x = element_text(color="darkgreen", angle=90),
        strip.background = element_rect(fill="pink"),
        strip.text = element_text(size=3),
        axis.line = element_line(color="orange"),
        panel.grid.major.x = element_line(linewidth=2),
        panel.grid.minor.y = element_line(linetype="dashed"))
```



Exemplo

Conjuntos de dados do governo

https://dados.gov.br/dados/conjuntos-dados

Plantas alternativas a exóticas invasoras

Fonte: https://dados.gov.br/dados/conjuntos-dados/plantas-alternativas-as-plantas-exoticas-invasoras-rj

```
library(readxl)
read_xlsx(
  paste0("../dados/listagem-de-plantas-alternativas-as-",
         "plantas-exoticas-invasoras-listadas-para-o-",
         "estado-do-rio-de.xlsx"),
  range="A7:L268")
```

```
## New names:
## * `Nome científico` -> `Nome científico...5`
## * `Nativa (N) ou Exótica (E)` -> `Nativa (N) ou Exótica (E)..
## * `Nome científico` -> `Nome científico...7`
## * `Nativa (N) ou Exótica (E)` -> `Nativa (N) ou Exótica (E)..
## * `Nome científico` -> `Nome científico...9`
## * `Nativa (N) ou Exótica (E)` -> `Nativa (N) ou Exótica (E)..
```

```
## # A tibble: 261 x 12
##    `Código de uso` `Família EEI` `Nome científico EEI`
##    <chr>           <chr>         <chr>
```

Plantas alternativas a exóticas invasoras

Fonte: https://dados.gov.br/dados/conjuntos-dados/plantas-alternativas-as-plantas-exoticas-invasoras-rj

```
library(readxl)
invasoras <- read_xlsx(
  paste0("../dados/listagem-de-plantas-alternativas-as-",
         "plantas-exoticas-invasoras-listadas-para-o-",
         "estado-do-rio-de.xlsx"),
  col_names=c("Codigo", "Familia_EEI", "NomeCient_EEI",
              "NomePop_EEI",
              "NomeCient_Ombro", "NouE_Ombro",
              "NomeCient_Semidec", "NouE_Semidec",
              "NomeCient_InfMar", "NouE_InfMar",
              "Ecossist_EEI", "Categoria"),
  range="A8:L268")
```

Plantas alternativas a exóticas invasoras

```
invasoras %>%
  pivot_longer(c(ends_with("Ombro"),
                 ends_with("Semidec"),
                 ends_with("InfMar"))) %>%
  separate(name, c("Var", "Ecossist"))
```

```
## # A tibble: 1,566 x 9
##    Codigo     Familia_EEI NomeCient_EEI NomePop_EEI Ecossist_
##    <chr>      <chr>       <chr>         <chr>       <chr>
##  1 ornamental Acanthaceae Asystasia ga~ asistásia,~ Formações
##  2 ornamental Acanthaceae Asystasia ga~ asistásia,~ Formações
##  3 ornamental Acanthaceae Asystasia ga~ asistásia,~ Formações
##  4 ornamental Acanthaceae Asystasia ga~ asistásia,~ Formações
##  5 ornamental Acanthaceae Asystasia ga~ asistásia,~ Formações
##  6 ornamental Acanthaceae Asystasia ga~ asistásia,~ Formações
##  7 ornamental Acanthaceae Asystasia ga~ asistásia,~ Formações
##  8 ornamental Acanthaceae Asystasia ga~ asistásia,~ Formações
##  9 ornamental Acanthaceae Asystasia ga~ asistásia,~ Formações
## 10 ornamental Acanthaceae Asystasia ga~ asistásia,~ Formações
## # i 1,556 more rows
```

Plantas alternativas a exóticas invasoras

```
invasoras %>%
  pivot_longer(c(ends_with("Ombro"),
                 ends_with("Semidec"),
                 ends_with("InfMar"))) %>%
  separate(name, c("Var", "Ecossist")) %>%
  pivot_wider(id_cols=c(Codigo,ends_with("EEI"),Categoria,Ecossi
              names_from=Var)
```

```
## # A tibble: 354 x 9
##    Codigo  Familia_EEI NomeCient_EEI NomePop_EEI Ecossist_EEI
##    <chr>   <chr>       <chr>          <chr>       <chr>
##  1 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  2 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  3 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  4 orname~ Acanthaceae Brillantaisi~ erva-de-bi~ Floresta Om~
##  5 orname~ Acanthaceae Brillantaisi~ erva-de-bi~ Floresta Om~
##  6 orname~ Acanthaceae Brillantaisi~ erva-de-bi~ Floresta Om~
##  7 orname~ Acanthaceae Thunbergia a~ amarelinha~ Floresta Om~
##  8 orname~ Acanthaceae Thunbergia a~ amarelinha~ Floresta Om~
##  9 orname~ Acanthaceae Thunbergia a~ amarelinha~ Floresta Om~
```

Plantas alternativas a exóticas invasoras

```
invasoras %>%
  pivot_longer(c(ends_with("Ombro"),
                 ends_with("Semidec"),
                 ends_with("InfMar"))) %>%
  separate(name, c("Var", "Ecossist")) %>%
  pivot_wider(id_cols=c(Codigo,ends_with("EEI"),Categoria,Ecossi
              names_from=Var) %>%
  unnest_longer(c(NomeCient, NouE))
```

```
## # A tibble: 783 x 9
##    Codigo  Familia_EEI NomeCient_EEI NomePop_EEI Ecossist_EEI
##    <chr>   <chr>       <chr>         <chr>       <chr>
##  1 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  2 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  3 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  4 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  5 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  6 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  7 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formaçõ
```

Plantas alternativas a exóticas invasoras

```
invasoras %>%
  pivot_longer(c(ends_with("Ombro"),
                 ends_with("Semidec"),
                 ends_with("InfMar"))) %>%
  separate(name, c("Var", "Ecossist")) %>%
  pivot_wider(id_cols=c(Codigo,ends_with("EEI"),Categoria,Ecossi
              names_from=Var) %>%
  unnest_longer(c(NomeCient, NouE)) %>%
  filter(!is.na(NomeCient), !is.na(NouE))
```

```
## # A tibble: 504 x 9
##    Codigo  Familia_EEI NomeCient_EEI NomePop_EEI Ecossist_EEI
##    <chr>   <chr>       <chr>          <chr>       <chr>
##  1 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  2 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  3 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  4 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  5 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
##  6 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formaçõ  P~
##  7 orname~ Acanthaceae Asystasia ga~ asistásia,~ Formações P~
```

Programa de Fomento Rural

```
library(readr)

fomentoRural <- read_csv("https://aplicacoes.mds.gov.br/sagi/ser

head(fomentoRural)
```

```
## # A tibble: 6 x 1,077
##   paa_qtd_agricul_familiar_modal~1 qtd_pes_pbf_idade_7_~2 bol
##   <lgl>                                             <dbl> <lg
## 1 NA                                                  128 NA
## 2 NA                                                   90 NA
## 3 NA                                                   94 NA
## 4 NA                                                  101 NA
## 5 NA                                                  105 NA
## 6 NA                                                  186 NA
## # i abbreviated names: 1: paa_qtd_agricul_familiar_modal_form
## #   2: qtd_pes_pbf_idade_7_a_15_sexo_feminino_i,
## #   3: bolsa_atleta_qtd_atletas_ens_fund_incomp_16_18_anos_i
## # i 1,074 more variables: bolsa_atleta_qtd_atletas_sexo_m_c
## #   bolsa_atleta_qtd_atletas_ens_superior_compl_14_15_anos_i
```

Programa de Fomento Rural

```
fomentoRural %>%
  select_if(~!all(is.na(.))) %>%
  select_if(~!all(.==0))
```

```
## # A tibble: 559 x 265
##    qtd_pes_pbf_idade_7_a_15_sexo~1 igd_pbf_qtd_total_pu~2 qtd
##                                <dbl>                  <dbl>
##  1                             128                  11724
##  2                              90                   8478
##  3                              94                   2655
##  4                             101                   2340
##  5                             105                   2340
##  6                             186                   5651
##  7                             243                   9114
##  8                             484                  13868
##  9                             186                   5555
## 10                             154                   3162
## # i 549 more rows
## # i abbreviated names: 1: qtd_pes_pbf_idade_7_a_15_sexo_masc
## #   2: igd_pbf_qtd_total_publico_saude_i
```

Programa de Fomento Rural

```
fomentoRural %>%
  select_if(~mean(is.na(.)|.==0)<.5) %>%
  select(mes_ano, matches( paste0(
    "qtd\\_pes\\_(cad\\_nao\\_)?pbf",
    "\\_idade\\_.+\\_sexo.+\\_i")))
```

```
## # A tibble: 559 x 53
##    mes_ano             qtd_pes_pbf_idade_7_a_15_sexo_fe~1 qtd
##    <dttm>                                           <dbl>
##  1 2024-03-01 00:00:00                                128
##  2 2024-01-01 00:00:00                                 90
##  3 2024-05-01 00:00:00                                 94
##  4 2024-03-01 00:00:00                                101
##  5 2024-02-01 00:00:00                                105
##  6 2024-05-01 00:00:00                                186
##  7 2024-05-01 00:00:00                                243
##  8 2024-05-01 00:00:00                                484
##  9 2024-05-01 00:00:00                                186
## 10 2024-05-01 00:00:00                                154
## # i 549 more rows
```

Programa de Fomento Rural

```
fomentoRural %>%
  select_if(~mean(is.na(.)|.==0)<.5) %>%
  select(mes_ano, matches("qtd\\_pes\\_(cad\\_nao\\_)?pbf\\_idad
  group_by(mes_ano) %>%
  summarise_all(sum, na.rm=T)
```

```
## # A tibble: 5 x 53
##   mes_ano             qtd_pes_pbf_idade_7_a_15_sexo_fem~1 qtd
##   <dttm>                                                <dbl>
## 1 2024-01-01 00:00:00                                   33980
## 2 2024-02-01 00:00:00                                   48934
## 3 2024-03-01 00:00:00                                   41020
## 4 2024-04-01 00:00:00                                   65027
## 5 2024-05-01 00:00:00                                   86640
## # i abbreviated names: 1: qtd_pes_pbf_idade_7_a_15_sexo_femin
## #   2: qtd_pes_cad_nao_pbf_idade_16_a_17_sexo_masculino_i
## # i 50 more variables: qtd_pes_cad_nao_pbf_idade_60_a_64_sexo
## #   qtd_pes_pbf_idade_50_a_54_sexo_feminino_i <dbl>,
## #   qtd_pes_cad_nao_pbf_idade_60_a_64_sexo_masculino_i <dbl>,
```

Programa de Fomento Rural

```
fr <- fomentoRural %>%
  select_if(~mean(is.na(.)|.==0)<.5) %>%
  select(mes_ano, matches("qtd\\_pes\\_(cad\\_nao\\_)?pbf\\_idad
  group_by(mes_ano) %>%
  summarise_all(sum, na.rm=T) %>%
  pivot_longer(-mes_ano)

head(fr)
```

```
## # A tibble: 6 x 3
##   mes_ano             name
##   <dttm>              <chr>
## 1 2024-01-01 00:00:00 qtd_pes_pbf_idade_7_a_15_sexo_feminino_
## 2 2024-01-01 00:00:00 qtd_pes_cad_nao_pbf_idade_16_a_17_sexo_
## 3 2024-01-01 00:00:00 qtd_pes_cad_nao_pbf_idade_60_a_64_sexo_
## 4 2024-01-01 00:00:00 qtd_pes_pbf_idade_50_a_54_sexo_feminino
## 5 2024-01-01 00:00:00 qtd_pes_cad_nao_pbf_idade_60_a_64_sexo_
## 6 2024-01-01 00:00:00 qtd_pes_pbf_idade_16_a_17_sexo_masculin
```

Programa de Fomento Rural

```
fr <- fr %>%
  mutate(pbf = str_extract(name, "(nao\\_)?pbf"),
         idade=str_extract(
           name,
           "idade\\_(maior\\_que\\_)?\\d+(\\_[ea]\\_\\d+)?"),
         sexo =str_extract(name, "sexo\\_[^\\_]+ino"))

head(fr)
```

```
## # A tibble: 6 x 6
##   mes_ano             name                                  value pbf
##   <dttm>              <chr>                                 <dbl> <chr>
## 1 2024-01-01 00:00:00 qtd_pes_pbf_idade_7_a_15_sexo_fem~ 33980 pbf
## 2 2024-01-01 00:00:00 qtd_pes_cad_nao_pbf_idade_16_a_17~  9534 nao_~
## 3 2024-01-01 00:00:00 qtd_pes_cad_nao_pbf_idade_60_a_64~  8224 nao_~
## 4 2024-01-01 00:00:00 qtd_pes_pbf_idade_50_a_54_sexo_fe~ 24579 pbf
## 5 2024-01-01 00:00:00 qtd_pes_cad_nao_pbf_idade_60_a_64~ 21729 nao_~
## 6 2024-01-01 00:00:00 qtd_pes_pbf_idade_16_a_17_sexo_ma~ 17702 pbf
```

Programa de Fomento Rural

```
fr <- fr %>%
  mutate(pbf = factor(pbf, levels=c("pbf", "nao_pbf"),
                      labels=c("PBF", "Não-PBF")),
         idade=str_replace_all(str_remove(idade, "idade\\_"),
                               "\\_", " "),
         sexo =str_to_title(str_remove(sexo, "sexo\\_"))) %>%
  mutate_at(vars(idade, sexo), factor)

levels(fr$idade)
```

```
##  [1] "0 e 4"       "16 a 17"     "18 a 24"       "25 a 34"
##  [6] "40 a 44"     "45 a 49"     "5 a 6"         "50 a 54"
## [11] "60 a 64"     "7 a 15"      "maior que 65"
```

Programa de Fomento Rural

```
fr <- fr %>%
  mutate(idade1 = parse_number(str_extract(idade, "\\d+"))) %>%
  mutate_at(vars(idade, sexo), factor) %>%
  mutate(idade = fct_reorder(idade, idade1))

levels(fr$idade)
```

```
##  [1] "0 e 4"         "5 a 6"         "7 a 15"        "16 a 17"
##  [6] "25 a 34"       "35 a 39"       "40 a 44"       "45 a 49"
## [11] "55 a 59"       "60 a 64"       "maior que 65"
```

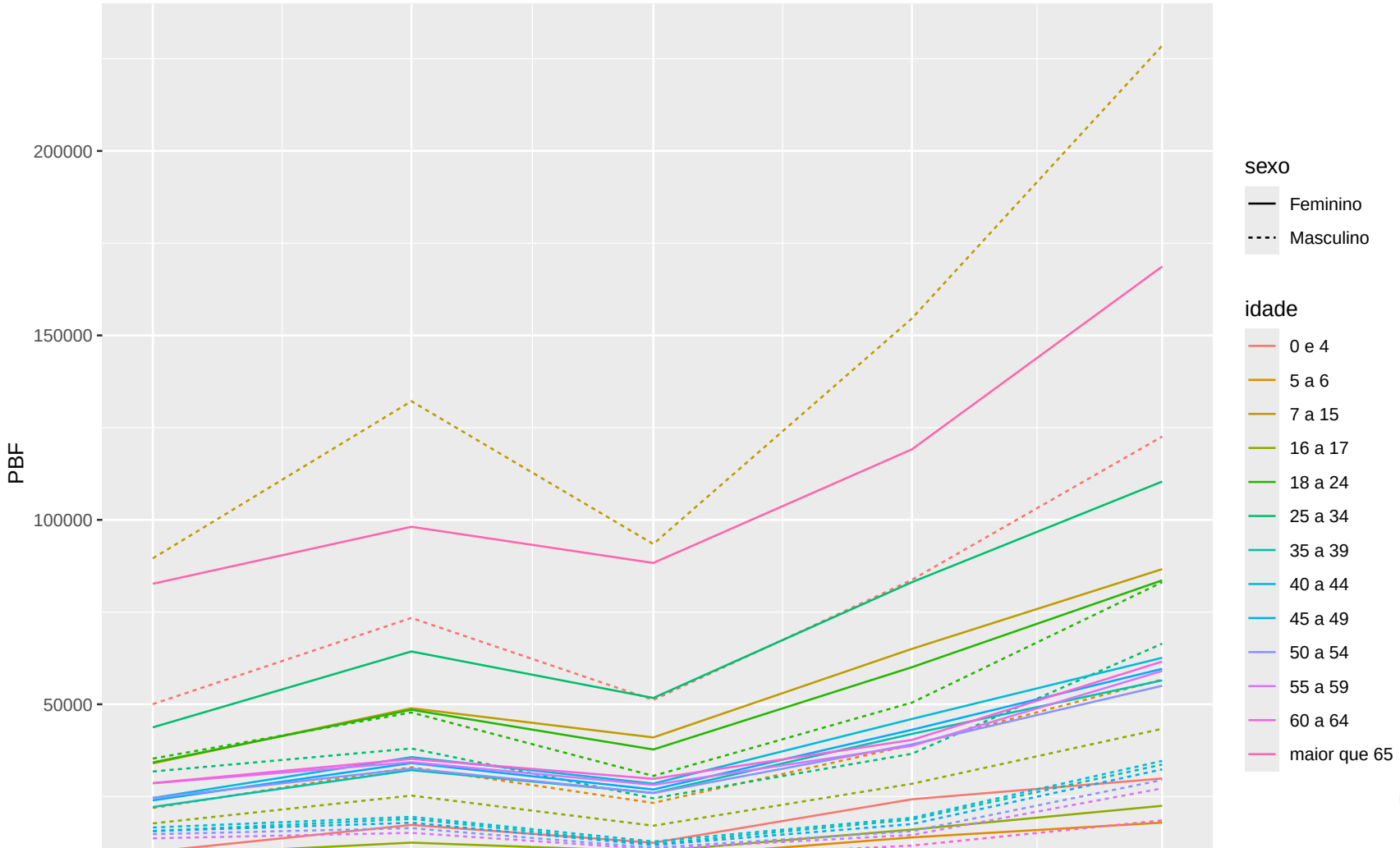
Programa de Fomento Rural

```
fr <- fr %>%
  select(mes_ano, pbf, idade, sexo, name, value) %>%
  arrange(mes_ano, pbf, idade, sexo) %>%
  pivot_wider(id_cols=c(mes_ano, idade, sexo), names_from=pbf)

head(fr)
```

```
## # A tibble: 6 x 5
##   mes_ano             idade  sexo        PBF `Não-PBF`
##   <dttm>              <fct>  <fct>     <dbl>     <dbl>
## 1 2024-01-01 00:00:00 0 e 4  Feminino  10059     47620
## 2 2024-01-01 00:00:00 0 e 4  Masculino 50038     10887
## 3 2024-01-01 00:00:00 5 a 6  Feminino   6789     21025
## 4 2024-01-01 00:00:00 5 a 6  Masculino 21885      7325
## 5 2024-01-01 00:00:00 7 a 15 Feminino  33980     85698
## 6 2024-01-01 00:00:00 7 a 15 Masculino 89566     36549
```

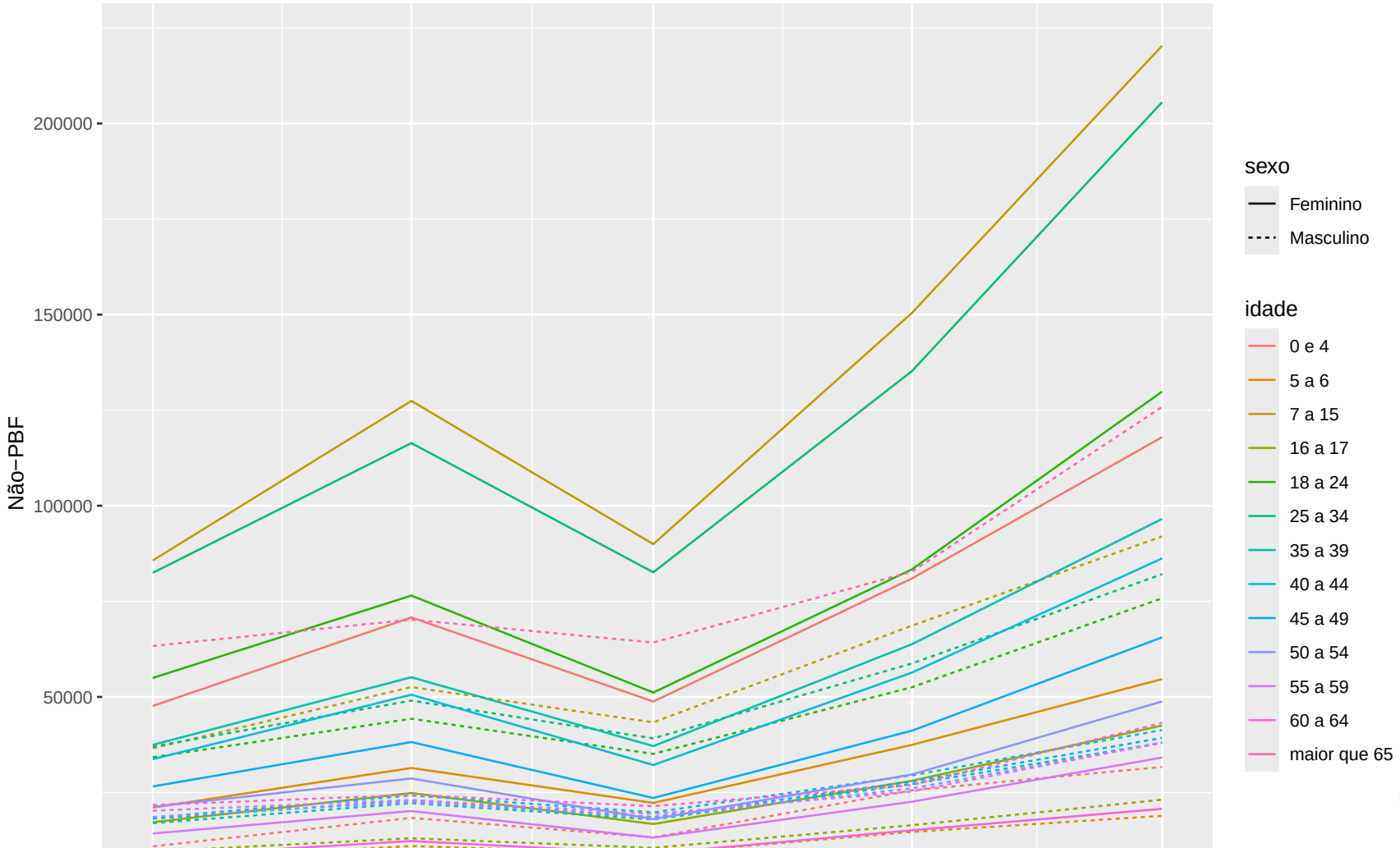
Programa de Fomento Rural

```
fr %>%
  ggplot(aes(x=mes_ano, col=idade, linetype=sexo, y=PBF)) +
  geom_line()
```



Programa de Fomento Rural

```
fr %>%
  ggplot(aes(x=mes_ano, col=idade, linetype=sexo, y=`Não-PBF`))
  geom_line()
```



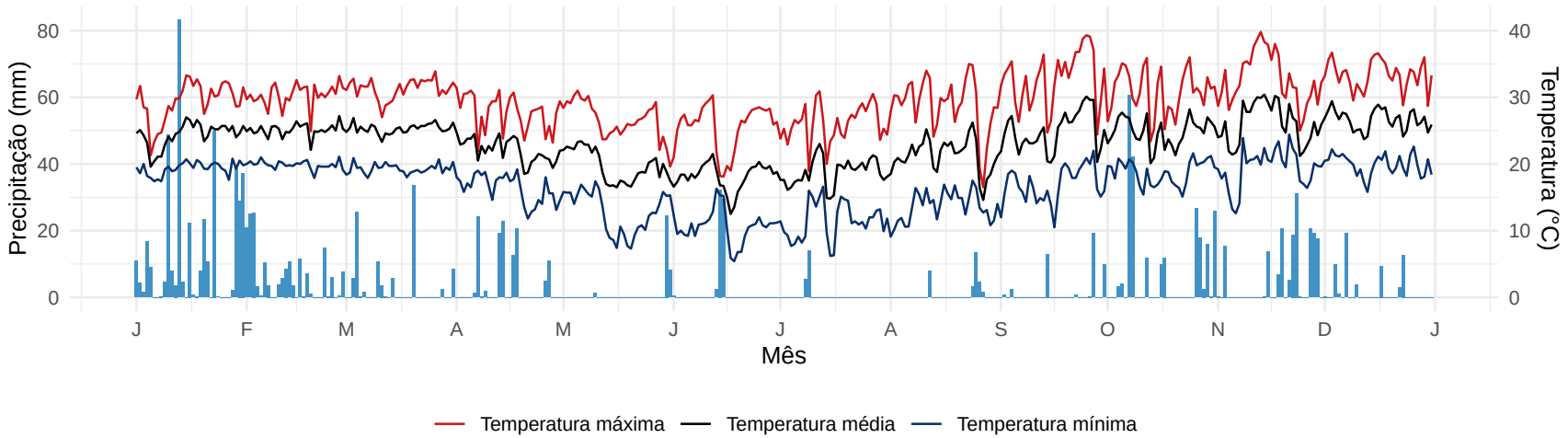
Exercícios

Exercício 1

Personalizar o gráfico a seguir:

```
dados_metereologicos %>%
  select(Data, PRECIPITACAO, starts_with("TEMPER")) %>%
  pivot_longer(starts_with("TEMPER")) %>%
  ggplot(aes(x=Data)) +
  geom_bar(stat="unique", aes(y=PRECIPITACAO)) +
  geom_line(aes(y=value, color=name))
```

Exemplo:



Exercício 2