Coding Challenge 4

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The data used in this project was provided by: Noel, Z.A., Roze, L.V., Breunig, M., Trail, F. 2022. Endophytic fungi as promising biocontrol agent to protect wheat from Fusarium graminearum head blight. Plant Disease. See the paper here

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 4.3.3
```

```
library(tidyverse)
```

```
## Warning: package 'tidyverse' was built under R version 4.3.3
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.2     v readr     2.1.4
## v forcats   1.0.0     v stringr   1.5.0
## v lubridate 1.9.2     v tibble    3.2.1
## v purrr     1.0.1     v tidyr     1.3.0
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(ggpubr)
library(ggrepel)
library(ggprism)
```

```
## Warning: package 'ggprism' was built under R version 4.3.3
```

```
#getwd()
mycotoxin <- read.csv("MycotoxinData.csv", na.strings = "na")
```

#Question 2 - Change the factor order level so that the treatment "NTC" is first, followed by "Fg", "Fg + 37", "Fg + 40", and "Fg + 70".

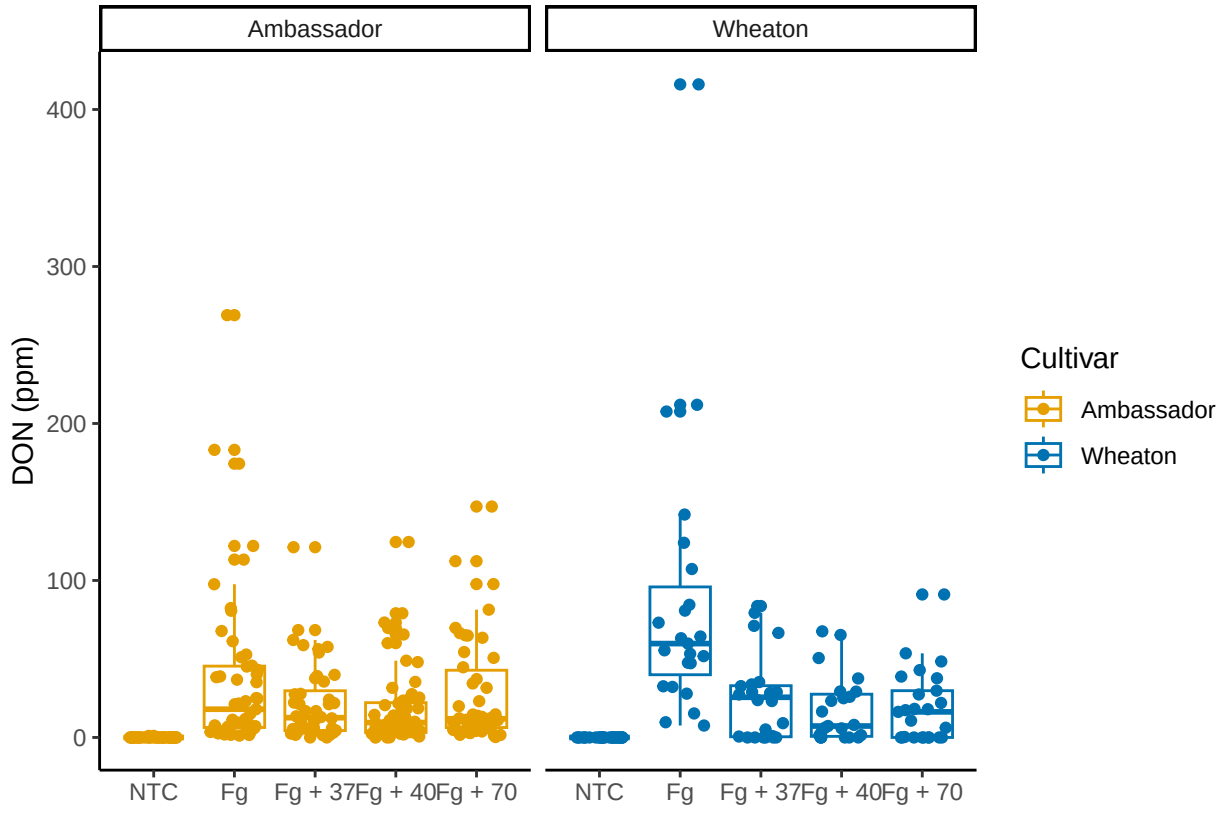
```
mycotoxin$Treatment <- factor(mycotoxin$Treatment, levels = c("NTC", "Fg", "Fg + 37", "Fg + 40", "Fg + 7
```

```
Question_2 <- ggplot(mycotoxin, aes(x = Treatment, y = DON, color = Cultivar)) +
```

```
  geom_boxplot() +
  geom_point(position = position_jitterdodge(jitter.width = 0.6)) +
  scale_color_manual(values = c("#E69F00", "#0072B2")) +
  xlab("") +
  ylab("DON (ppm)") +
  theme_classic() +
  facet_wrap(~Cultivar)
Question_2
```

```
## Warning: Removed 8 rows containing non-finite outside the scale range
## (`stat_boxplot()`).
```

```
## Warning: Removed 8 rows containing missing values or values outside the scale range
## (`geom_point()`).
```



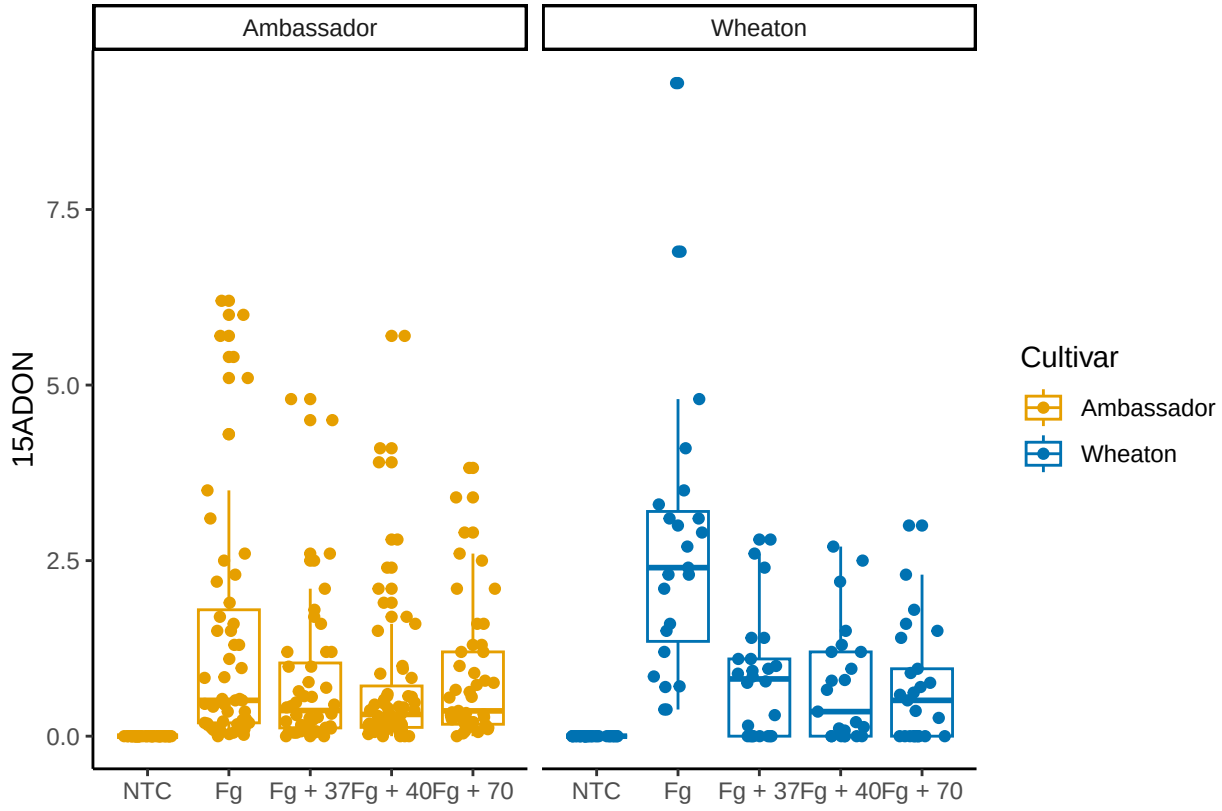
#Question 3a - Change the y-variable to plot X15ADON. The y-axis label should now be "15ADON".

```
Question_3a <- ggplot(mycotoxin, aes(x = Treatment, y = X15ADON, color = Cultivar)) +
  geom_boxplot() +
  geom_point(position = position_jitterdodge(jitter.width = 0.6)) +
  scale_color_manual(values = c("#E69F00", "#0072B2")) +
  xlab("") +
  ylab("15ADON") +
  theme_classic() +
```

```
  facet_wrap(~Cultivar)
Question_3a
```

```
## Warning: Removed 10 rows containing non-finite outside the scale range
## (‘stat_boxplot()‘).
```

```
## Warning: Removed 10 rows containing missing values or values outside the scale range
## (‘geom_point()‘).
```

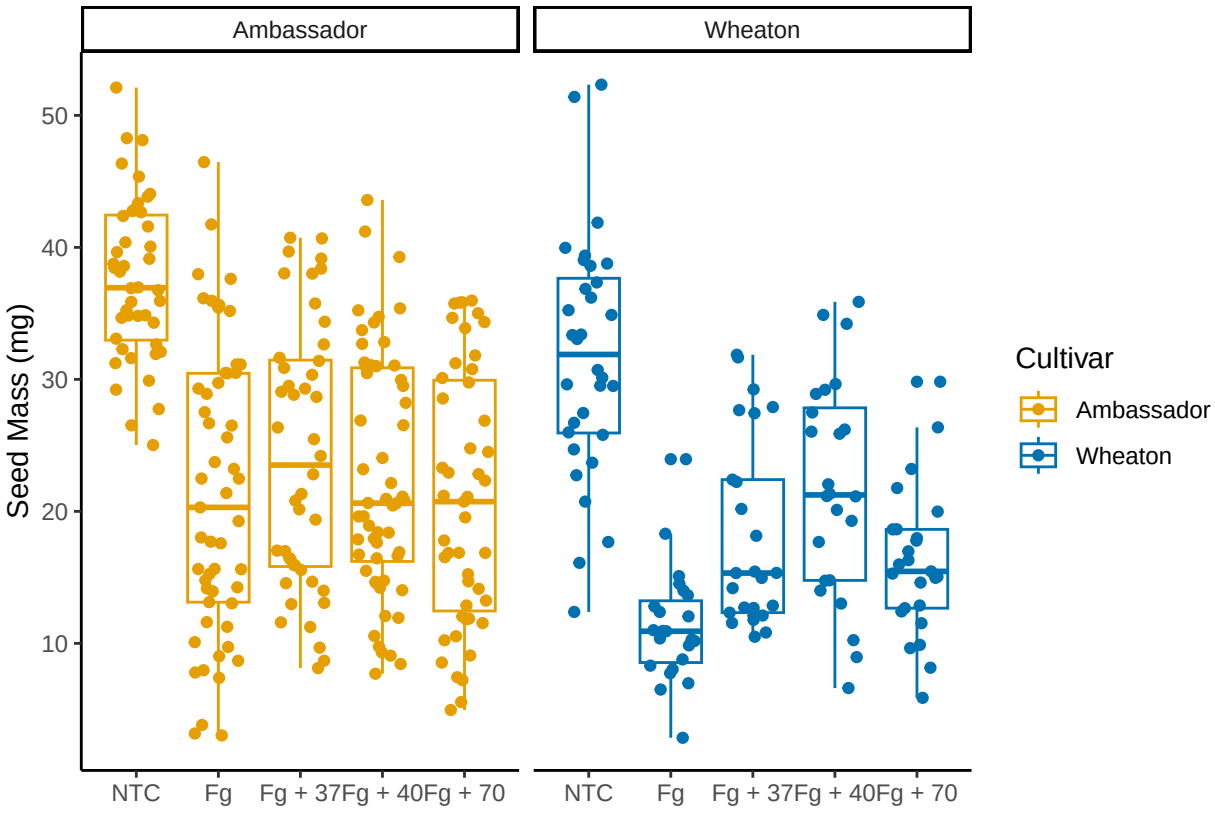


#Question 3b - Change the y-variable to plot MassperSeed_mg. The y-axis label should now be “Seed Mass (mg)”.

```
Question_3b <- ggplot(mycotoxin, aes(x = Treatment, y = MassperSeed_mg, color = Cultivar)) +
  geom_boxplot() +
  geom_point(position = position_jitterdodge(jitter.width = 0.6)) +
  scale_color_manual(values = c("#E69F00", "#0072B2")) +
  xlab("") +
  ylab("Seed Mass (mg)") +
  theme_classic() +
  facet_wrap(~Cultivar)
Question_3b
```

```
## Warning: Removed 2 rows containing non-finite outside the scale range
## (‘stat_boxplot()‘).
```

```
## Warning: Removed 2 rows containing missing values or values outside the scale range
## (`geom_point()`).
```



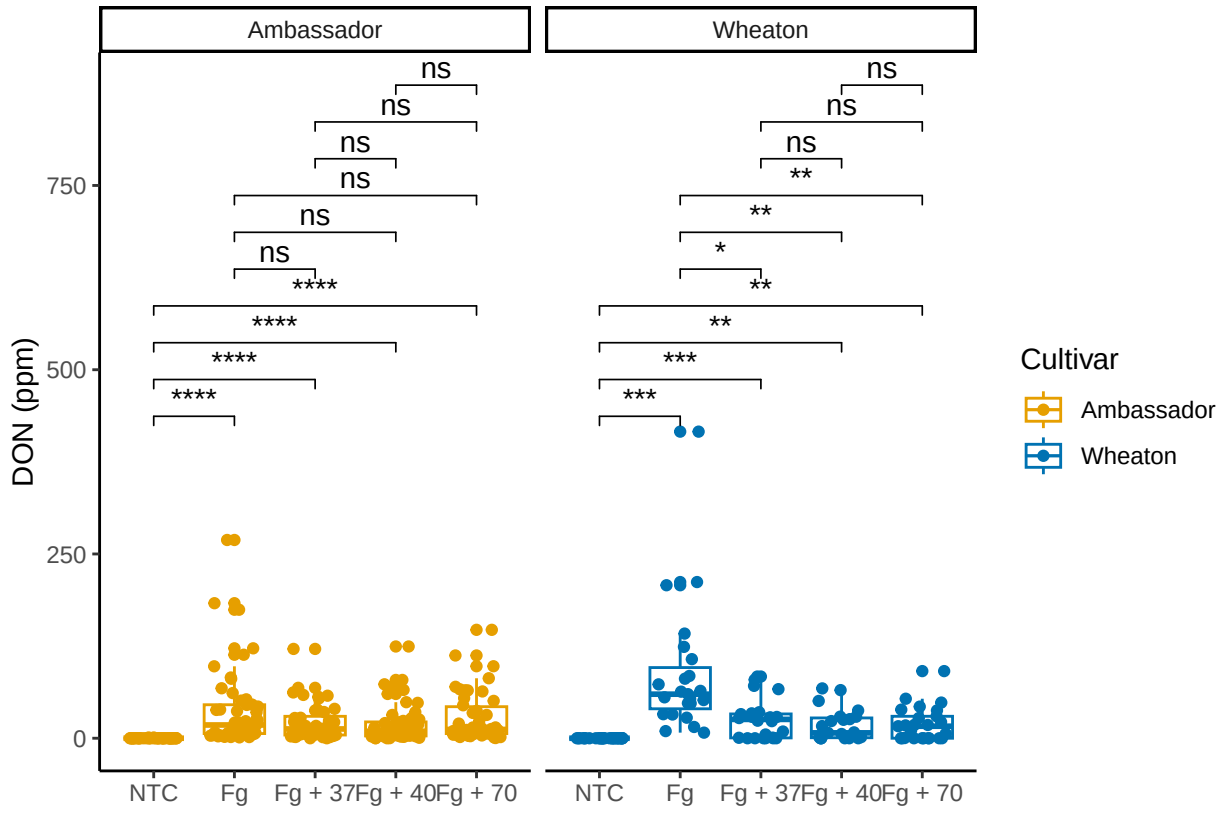
#Question 5 - Use geom_pwc() to add t.test pairwise comparisons to the three plots made above. Save each plot as a new R object, and combine them again with ggarange as you did in question 4.

```
Stats_Question_2 <- Question_2 +
  geom_pwc(aes(group = Treatment), method = "t_test", label = "p.adj.signif")
Stats_Question_2
```

```
## Warning: Removed 8 rows containing non-finite outside the scale range
## (`stat_boxplot()`).
```

```
## Warning: Removed 8 rows containing non-finite outside the scale range
## (`stat_pwc()`).
```

```
## Warning: Removed 8 rows containing missing values or values outside the scale range
## (`geom_point()`).
```

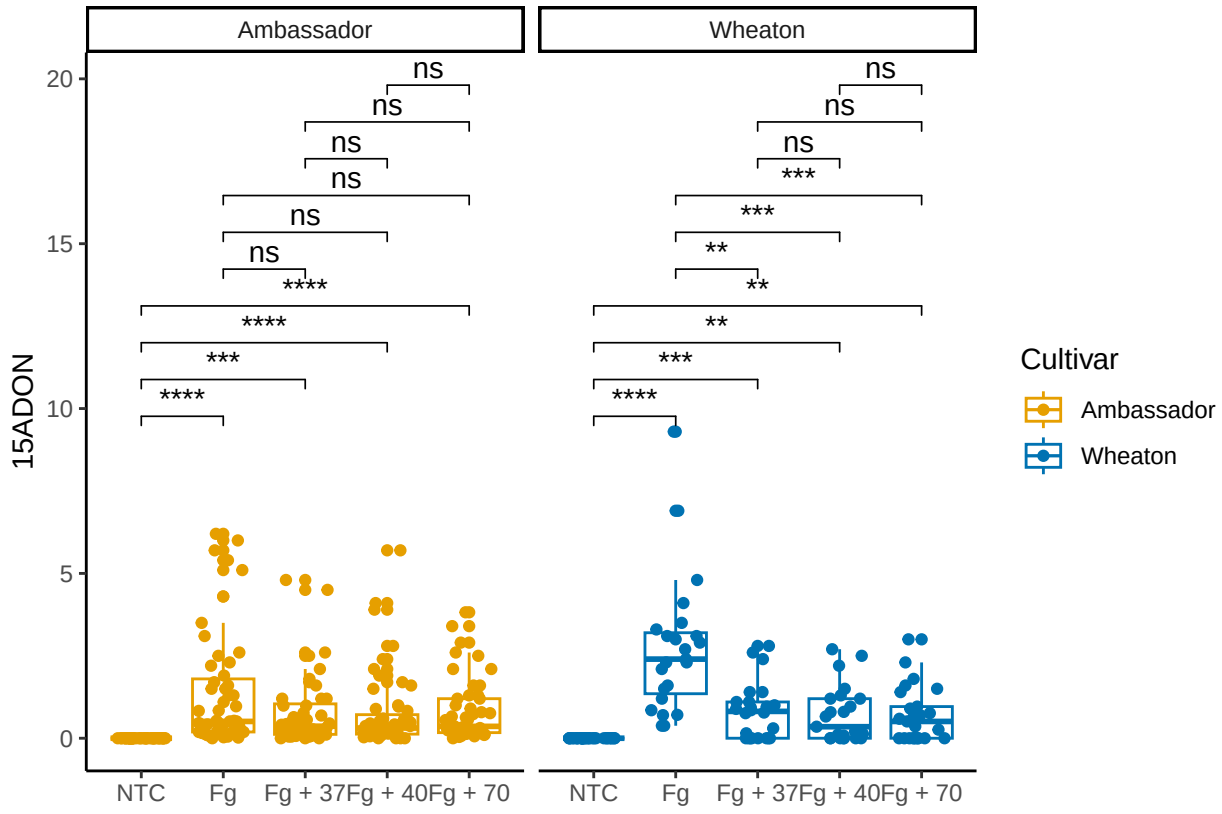



```
Stats_Question3a <- Question_3a +
  geom_pwc(aes(group = Treatment), method = "t_test", label = "p.adj.signif")
Stats_Question3a
```

```
## Warning: Removed 10 rows containing non-finite outside the scale range
## (‘stat_boxplot()‘).
```

```
## Warning: Removed 10 rows containing non-finite outside the scale range
## (‘stat_pwc()‘).
```

```
## Warning: Removed 10 rows containing missing values or values outside the scale range
## (‘geom_point()‘).
```

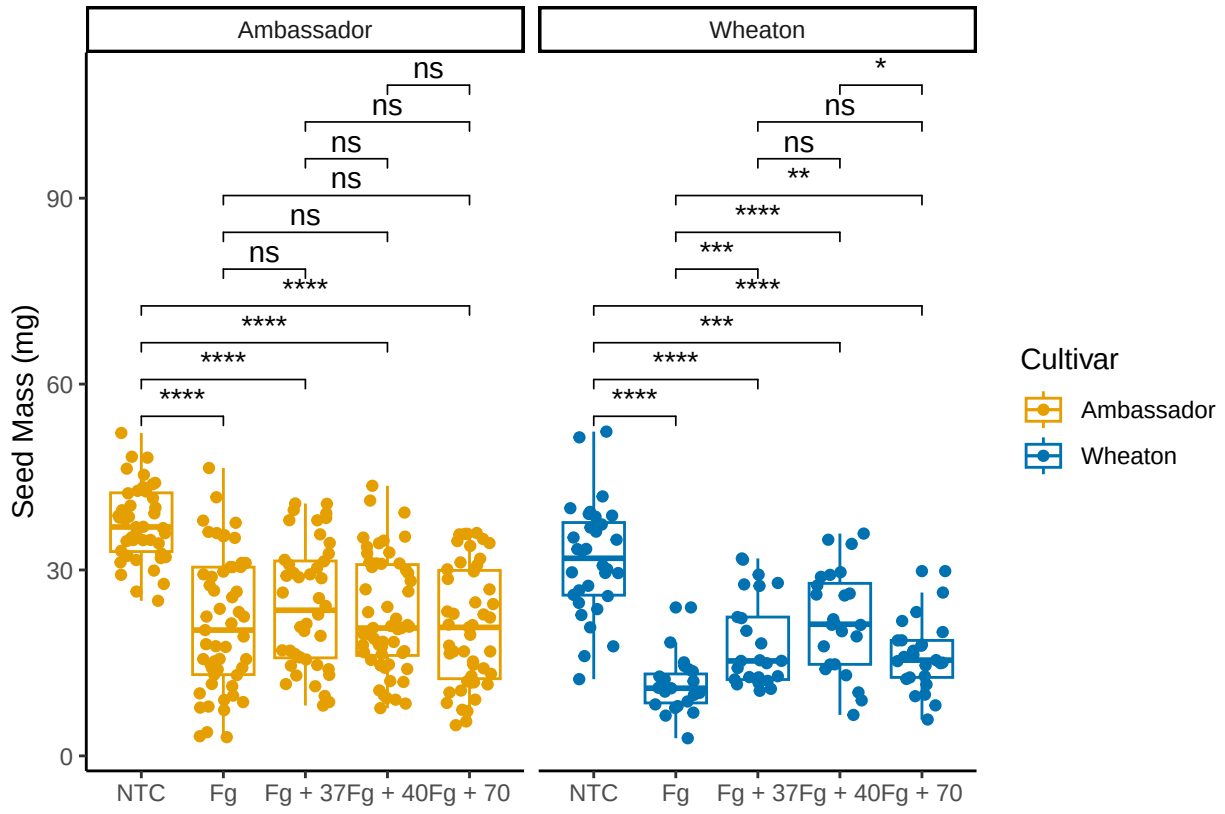



```
Stats_Question3b <- Question_3b +
  geom_pwc(aes(group = Treatment), method = "t_test", label = "p.adj.signif")
Stats_Question3b
```

```
## Warning: Removed 2 rows containing non-finite outside the scale range
## (`stat_boxplot()`).
```

```
## Warning: Removed 2 rows containing non-finite outside the scale range
## (`stat_pwc()`).
```

```
## Warning: Removed 2 rows containing missing values or values outside the scale range
## (`geom_point()`).
```




```
#combination graph
Question_5Combo <- ggarrange(Stats_Question_2, Stats_Question3a, Stats_Question3b, labels = "auto",
  nrow = 1,
  ncol = 3,
  common.legend = T)
```

```
## Warning: Removed 8 rows containing non-finite outside the scale range
## (`stat_boxplot()`).

## Warning: Removed 8 rows containing non-finite outside the scale range
## (`stat_pwc()`).

## Warning: Removed 8 rows containing missing values or values outside the scale range
## (`geom_point()`).

## Warning: Removed 8 rows containing non-finite outside the scale range
## (`stat_boxplot()`).

## Warning: Removed 8 rows containing non-finite outside the scale range
## (`stat_pwc()`).

## Warning: Removed 8 rows containing missing values or values outside the scale range
## (`geom_point()`).
```

```
## Warning: Removed 10 rows containing non-finite outside the scale range
## (`stat_boxplot()`).

## Warning: Removed 10 rows containing non-finite outside the scale range
## (`stat_pwc()`).

## Warning: Removed 10 rows containing missing values or values outside the scale range
## (`geom_point()`).

## Warning: Removed 2 rows containing non-finite outside the scale range
## (`stat_boxplot()`).

## Warning: Removed 2 rows containing non-finite outside the scale range
## (`stat_pwc()`).

## Warning: Removed 2 rows containing missing values or values outside the scale range
## (`geom_point()`).
```

```
Question_5Combo
```