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](https://doi.org/10.1094/PDIS-06-21-1253-RE)

#install.packages('tinytex')  
#tinytex::install\_tinytex()  
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 ──  
## ✔ dplyr 1.1.2 ✔ readr 2.1.4  
## ✔ forcats 1.0.0 ✔ stringr 1.5.0  
## ✔ lubridate 1.9.2 ✔ tibble 3.2.1  
## ✔ purrr 1.0.1 ✔ tidyr 1.3.0  
## ── Conflicts ────────────────────────────────────────── tidyverse\_conflicts() ──  
## ✖ dplyr::filter() masks stats::filter()  
## ✖ 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

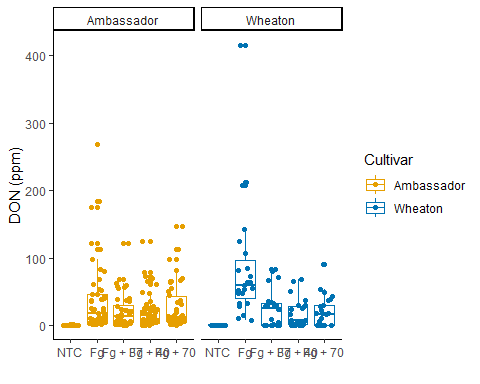
library(knitr)  
  
#getwd()  
mycotoxin <- read.csv("MycotoxinData.csv", na.strings = "na")

#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 + 70"), ordered = TRUE)  
   
  
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()`).

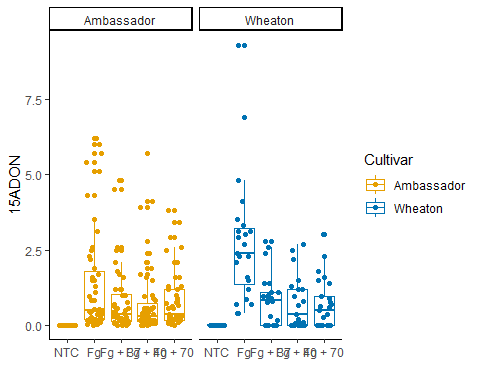


#Question 3a - Change the y-variable to plot X15ADON. The y-axis label should now be “15ADON”.

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()`).

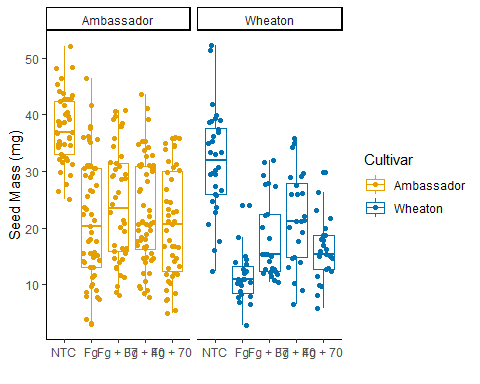


#Question 3b - Change the y-variable to plot MassperSeed\_mg. The y-axis label should now be “Seed Mass (mg)”.

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()`).



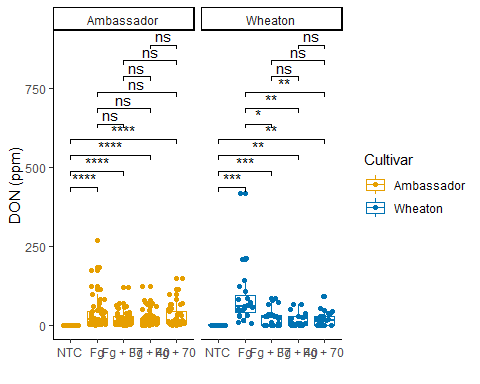
#Question 5 - Use geom\_pwc() to add t.test pairwise comparisons to the three plots made above. Save each plot as a new R object, and combine them again with ggarange as you did in question 4.

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()`).

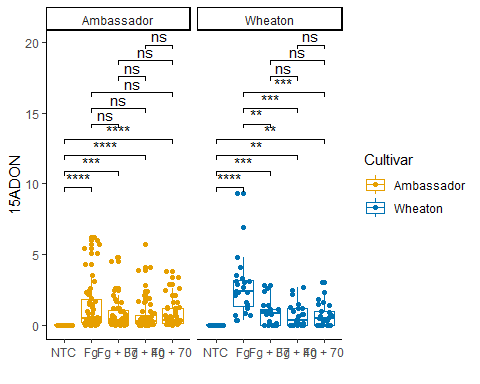


Stats\_Question3a <- Question\_3a +  
 geom\_pwc(aes(group = Treatment), method = "t\_test", label = "p.adj.signif")  
Stats\_Question3a

## 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()`).

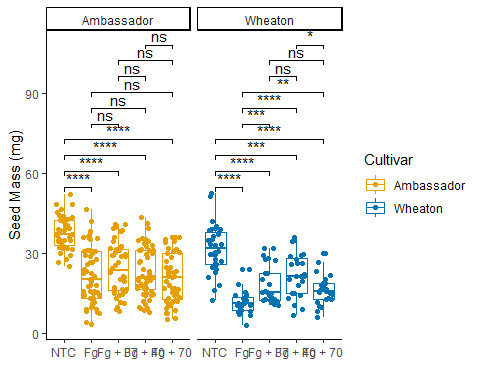


Stats\_Question3b <- Question\_3b +  
 geom\_pwc(aes(group = Treatment), method = "t\_test", label = "p.adj.signif")  
Stats\_Question3b

## 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

