Script-5.R

Ramon

2025-10-07

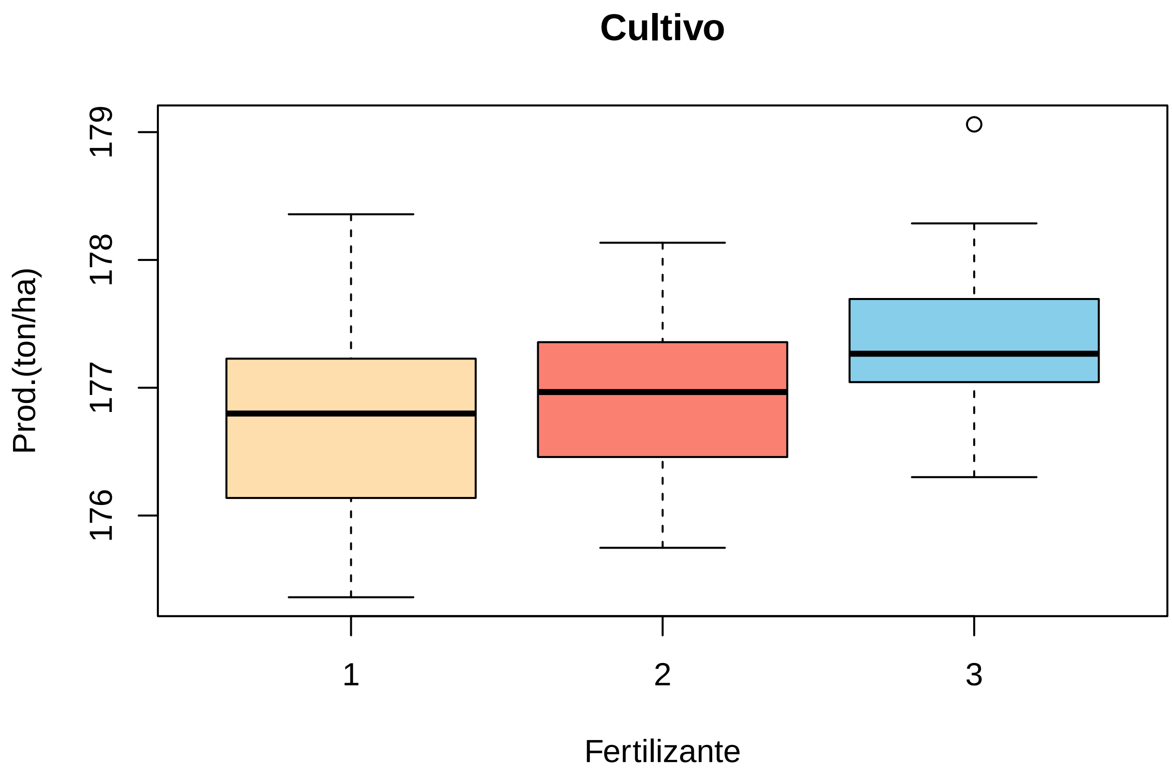
```r
#**Script 5 o semana 7**
  18/09/2025
```

```
## [1] 0.0009876543
```

```r
#  Ramón Copado García

  #Análisis de Variaza
  #Productividad de cultivo

#Anova unifactorial o de un solo factor
  crop <- read.csv ("crop.data.csv", header = T)

  #Lo siguiente es para poder usar los numeros como factores
  crop$density<-as.factor(crop$density)
  crop$block<-as.factor(crop$block)
  crop$fertilizer<-as.factor(crop$fertilizer)
summary(crop)
```

```
##  density block  fertilizer     yield
##  1:48    1:24   1:32       Min.   :175.4
##  2:48    2:24   2:32       1st Qu.:176.5
##          3:24   3:32       Median :177.1
##          4:24              Mean   :177.0
##                            3rd Qu.:177.4
##                            Max.   :179.1
```

```r
colores <-c ("navajowhite", "salmon", "skyblue")

# Crear un boxplot Fertilizante

boxplot (crop$yield ~ crop$fertilizer,
         col = colores,
         main = "Cultivo",
         xlab = "Fertilizante",
         ylab = "Prod.(ton/ha)")
```




```
tapply(crop$yield, crop$fertilizer, mean)
```

```
##        1        2        3
## 176.7570 176.9332 177.3562
```

```
tapply(crop$yield, crop$fertilizer, sd)
```

```
##         1         2         3
## 0.6849233 0.5740668 0.5991214
```

```
tapply(crop$yield, crop$fertilizer, var)
```

```
##         1         2         3
## 0.4691199 0.3295526 0.3589464
```

```
#aplicar prueba de normalidad de datos
shapiro.test(subset(crop$yield, crop$fertilizer=="1"))
```

```
##
##  Shapiro-Wilk normality test
##
## data:  subset(crop$yield, crop$fertilizer == "1")
## W = 0.97914, p-value = 0.7743
```

```r
shapiro.test(subset(crop$yield, crop$fertilizer=="2"))
```

```
##
##  Shapiro-Wilk normality test
##
## data:  subset(crop$yield, crop$fertilizer == "2")
## W = 0.98329, p-value = 0.8875
```

```r
shapiro.test(subset(crop$yield, crop$fertilizer=="3"))
```

```
##
##  Shapiro-Wilk normality test
##
## data:  subset(crop$yield, crop$fertilizer == "3")
## W = 0.95878, p-value = 0.2542
```

```r
#Prueba de Bartlett
bartlett.test(crop$yield~crop$fertilizer)#sirve para tres varianzas que comparar
```

```
##
##  Bartlett test of homogeneity of variances
##
## data:  crop$yield by crop$fertilizer
## Bartlett's K-squared = 1.0622, df = 2, p-value = 0.5879
```

```r
#Ho = 1=2=3
#Ha = 1=2 no igual 3 o no igual a 2

#Se acepta Ha

#Prueba ANOVA
crop.aov<-aov(crop$yield~crop$fertilizer+crop$block)
summary(crop.aov)
```

```
##                 Df Sum Sq Mean Sq F value   Pr(>F)
## crop$fertilizer  2  6.068  3.0340   9.018 0.000269 ***
## crop$block       3  5.608  1.8693   5.556 0.001522 **
## Residuals       90 30.278  0.3364
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
crop.aov<-aov(crop$yield~crop$fertilizer*crop$fertilizer)
summary(crop.aov)
```

```
##                 Df Sum Sq Mean Sq F value Pr(>F)
## crop$fertilizer  2   6.07  3.0340   7.863  7e-04 ***
## Residuals       93  35.89  0.3859
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
crop.aov<-aov(crop$yield~crop$fertilizer)
summary(crop.aov)
```

```
##                 Df Sum Sq Mean Sq F value Pr(>F)
## crop$fertilizer  2   6.07  3.0340   7.863  7e-04 ***
## Residuals       93  35.89  0.3859
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
# LSD determinar el valor
qt(.975,93)
```

```
## [1] 1.985802
```

```r
sqrt((2*0.3859)/32)*qt(.975,93) #diferencia mínima de las medias que debe existir
```

```
## [1] 0.3083992
```

```r
tapply(crop$yield, crop$fertilizer, mean)
```

```
##        1        2        3
## 176.7570 176.9332 177.3562
```

```r
#Primer diferencia de medias F1 vs F2
176.7570 - 176.9332 #no hay diferencia
```

```
## [1] -0.1762
```

```r
#Primer diferencia de medias F2 vs F3
176.9332-177.3562 #si hay deferencia
```

```
## [1] -0.423
```

```r
#Primer diferencia de medias F2 vs F3
176.7570-177.3562 #si hay diferencia
```

```
## [1] -0.5992
```

```r
# Prueba Tukey
sqrt((2*0.3859)/32)*qtukey(.95, nmeans = 3, df = 93) #diferencia mínima de las
```

```
## [1] 0.5231185
```

```r
#Primer diferencia de medias F1 vs F2
176.7570 - 176.9332 #no hay diferencia
```

```
## [1] -0.1762
```

```r
#Primer diferencia de medias F2 vs F3
176.9332-177.3562 #no hay deferencia
```

```
## [1] -0.423
```

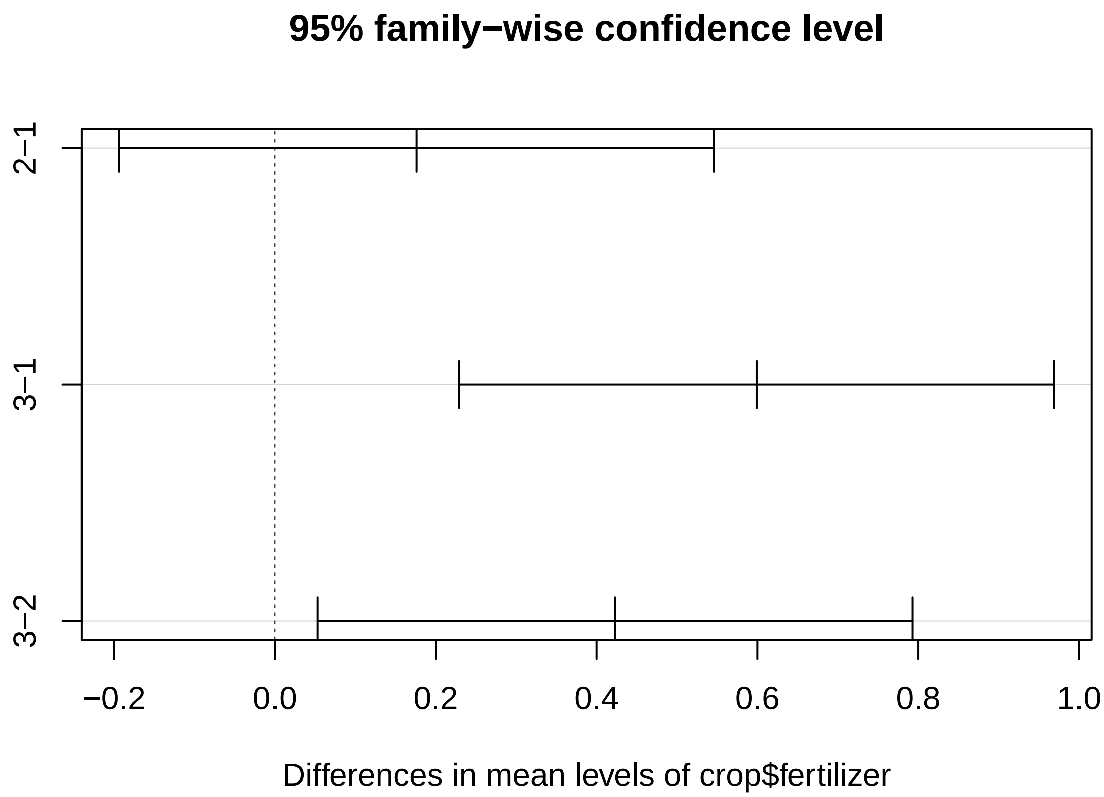
```r
#Primer diferencia de medias F2 vs F3
176.7570-177.3562 #si hay diferencia
```

```
## [1] -0.5992
```

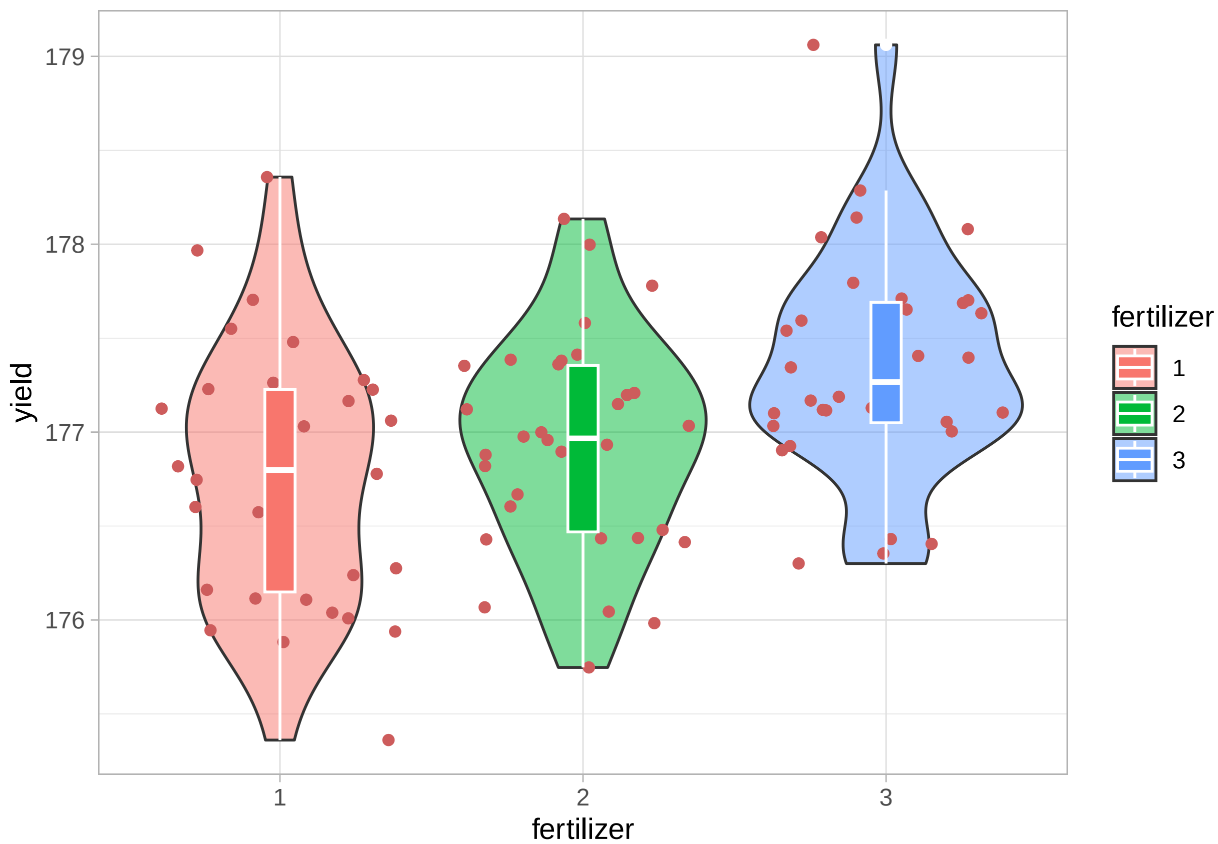
```r
#solo hay diferencia en F1 y F3

#Gráficar con Tukey

TukeyHSD(crop.aov)#aqui si hay diferencias como en el LSD
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = crop$yield ~ crop$fertilizer)
##
## $`crop$fertilizer`
##          diff         lwr       upr     p adj
## 2-1 0.1761687 -0.19371896 0.5460564 0.4954705
## 3-1 0.5991256  0.22923789 0.9690133 0.0006125
## 3-2 0.4229569  0.05306916 0.7928445 0.0208735
```

```r
plot(TukeyHSD(crop.aov))
```




```
#####TAREA HACER LO MISMO PARA BLOCKES



library(ggplot2)

ggplot(crop, aes(x=fertilizer, y= yield, fill = fertilizer))+
  geom_violin(alpha = 0.5) +
  geom_jitter(col = "indianred")+
  geom_boxplot(width = 0.1, col = "White")+
  theme_light()
```




```
  labs(x ="Fertilizante",
       y= "Rendimiento (Ton/ha.)")
```

```
## $x
## [1] "Fertilizante"
##
## $y
## [1] "Rendimiento (Ton/ha.)"
##
## attr(,"class")
## [1] "labels"
```