# Script6_AOV.R

Sofia

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```
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#Importar datos de internet
url <-
"https://raw.githubusercontent.com/mgtagle/Exp_Met_Est_AD2023/refs/heads/
main/Scripts/localidades.csv"

datos <- read.csv(url, header = T)
datos$Paraje <- as.factor(datos$Paraje)

boxplot(datos$DAP~datos$Paraje,
        xlab = "Paraje",
        ylab = "DAP")
```
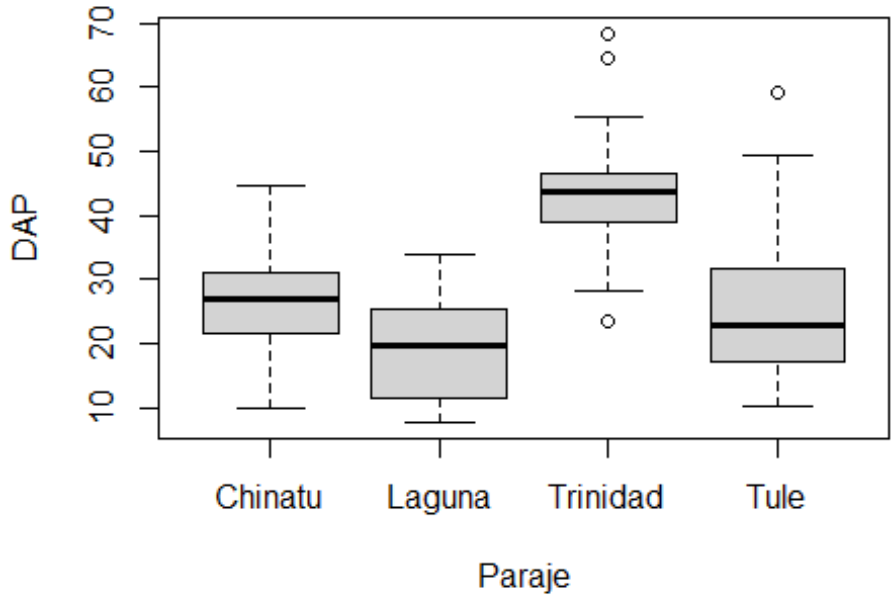




```
tapply(datos$DAP, datos$Paraje, mean)

##  Chinatu   Laguna Trinidad     Tule
## 26.10000 19.31333 43.67667 25.44667
```

```r
tapply(datos$DAP, datos$Paraje, var)
```

```
##   Chinatu    Laguna  Trinidad      Tule
##  71.46414  61.71775  81.51840 146.52395
```

```r
shapiro.test(datos$DAP)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  datos$DAP
## W = 0.96548, p-value = 0.003575
```

```r
bartlett.test(datos$DAP ~ datos$Paraje)
```

```
##
##  Bartlett test of homogeneity of variances
##
## data:  datos$DAP by datos$Paraje
## Bartlett's K-squared = 6.6622, df = 3, p-value = 0.08348
```

```r
#transformación de datos para que tengan normalidad u homogeneidad
datos$tlog <- log10(datos$DAP+1)
shapiro.test(datos$tlog)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  datos$tlog
## W = 0.97171, p-value = 0.01243
```

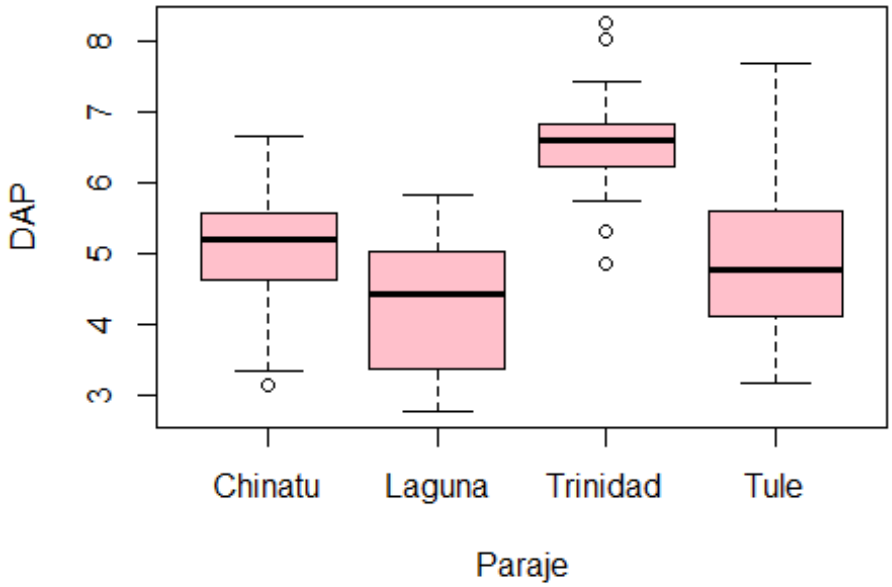
```r
datos$tsqrt <- sqrt(datos$DAP)#transformación de datos
shapiro.test(datos$tsqrt)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  datos$tsqrt
## W = 0.98341, p-value = 0.1473
```

```r
bartlett.test(datos$tsqrt ~ datos$Paraje)
```

```
##
##  Bartlett test of homogeneity of variances
##
## data:  datos$tsqrt by datos$Paraje
## Bartlett's K-squared = 7.6911, df = 3, p-value = 0.05285
```

```r
boxplot(datos$tsqrt~datos$Paraje,
        col = "pink",
        xlab = "Paraje",
        ylab = "DAP")
```



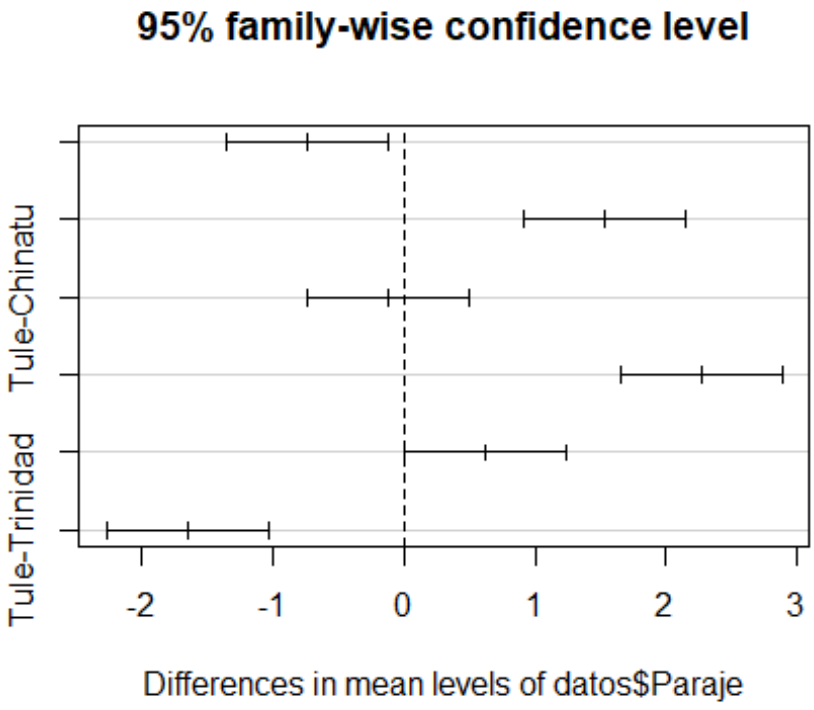

```r
#Iniciar con el AOV (analisis de varianza)
par.aov <- aov(datos$tsqrt ~ datos$Paraje)
summary(par.aov)#mostrar la tabla del anova
```

```
##               Df Sum Sq Mean Sq F value   Pr(>F)
## datos$Paraje   3  84.09  28.029    33.2 1.45e-15 ***
## Residuals    116  97.94   0.844
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
TukeyHSD(par.aov) #prueba para identificar donde están las diferencias significativas
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = datos$tsqrt ~ datos$Paraje)
##
## $`datos$Paraje`
##                         diff          lwr        upr     p adj
## Laguna-Chinatu    -0.7331899 -1.351610796 -0.1147691 0.0131794
## Trinidad-Chinatu   1.5391985  0.920777631  2.1576194 0.0000000
## Tule-Chinatu      -0.1190328 -0.737453617  0.4993881 0.9585122
## Trinidad-Laguna    2.2723884  1.653967564  2.8908093 0.0000000
## Tule-Laguna        0.6141572 -0.004263685  1.2325780 0.0523230
## Tule-Trinidad     -1.6582312 -2.276652111 -1.0398104 0.0000000
```

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


95% family-wise confidence level
Tule-Chinatu
Tule-Trinidad
-2
-1
0
1
2
3
Differences in mean levels of datos$Paraje