

Boxplots Dataset

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Data Import

```
setwd('D:\\ANALYSIS\\All in ONE\\Malini')
malini_control <- read_excel("mkm data-24.8.2022.xlsx")
head(malini_control)
```

```
## # A tibble: 6 x 17
##   Genoty~1 IRIS ~2 Genot~3 Scode TREAT~4      A      E      Gs      Ci      WUE leaf_~5
##   <chr>      <chr>  <chr>  <chr> <chr>    <dbl>   <dbl> <dbl> <dbl> <dbl>   <dbl>
## 1 27C1      IRIS 3~ G1      s1     AT      25.6 0.0105 0.720 297. 0.243    1.5
## 2 27C2      IRIS 3~ G1      s1     AT      22.0 0.00959 0.620 301. 0.229    1.57
## 3 27C3      IRIS 3~ G1      s1     AT      19.5 0.00825 0.488 290. 0.240    1.73
## 4 27C4      IRIS 3~ G1      s1     AT      17.8 0.00653 0.326 268. 0.273     2
## 5 110C1     IRIS 3~ G2      s1     AT      16.5 0.00540 0.354 286. 0.306     2
## 6 110C2     IRIS 3~ G2      s1     AT      15.7 0.00602 0.438 303. 0.263    2.07
## # ... with 6 more variables: CE <dbl>, fv_Per_fm <dbl>,
## #   TotalNoPaniclesPerPlant <dbl>, TotalNoTillersPerPlant <dbl>,
## #   GrainYieldPlant <dbl>, TDW <dbl>, and abbreviated variable names
## #   1: Genotypes, 2: 'IRIS ID', 3: Genotype, 4: TREATMENT, 5: leaf_width
## # i Use 'colnames()' to see all variable names
```

The Plot

Getteing ANOVA and grouping letters

```
dt_tble <- data.frame()
list_aov <- NULL
name_vec <- names(malini_control)[6:17]
for (ii in name_vec) {
  mal_aov <- with(malini_control,
                 aov(as.formula(paste0(ii, '~Scode+TREATMENT'))
                 )
  list_aov[[ii]] <- summary(mal_aov)

  mean_tab <- emmeans(mal_aov, c('Scode', 'TREATMENT'))
  cldmean <- cld(mean_tab, Letters = letters)
  dt_tble <- rbind(dt_tble, cldmean)
```

```

}

dt_tble %>% glimpse()

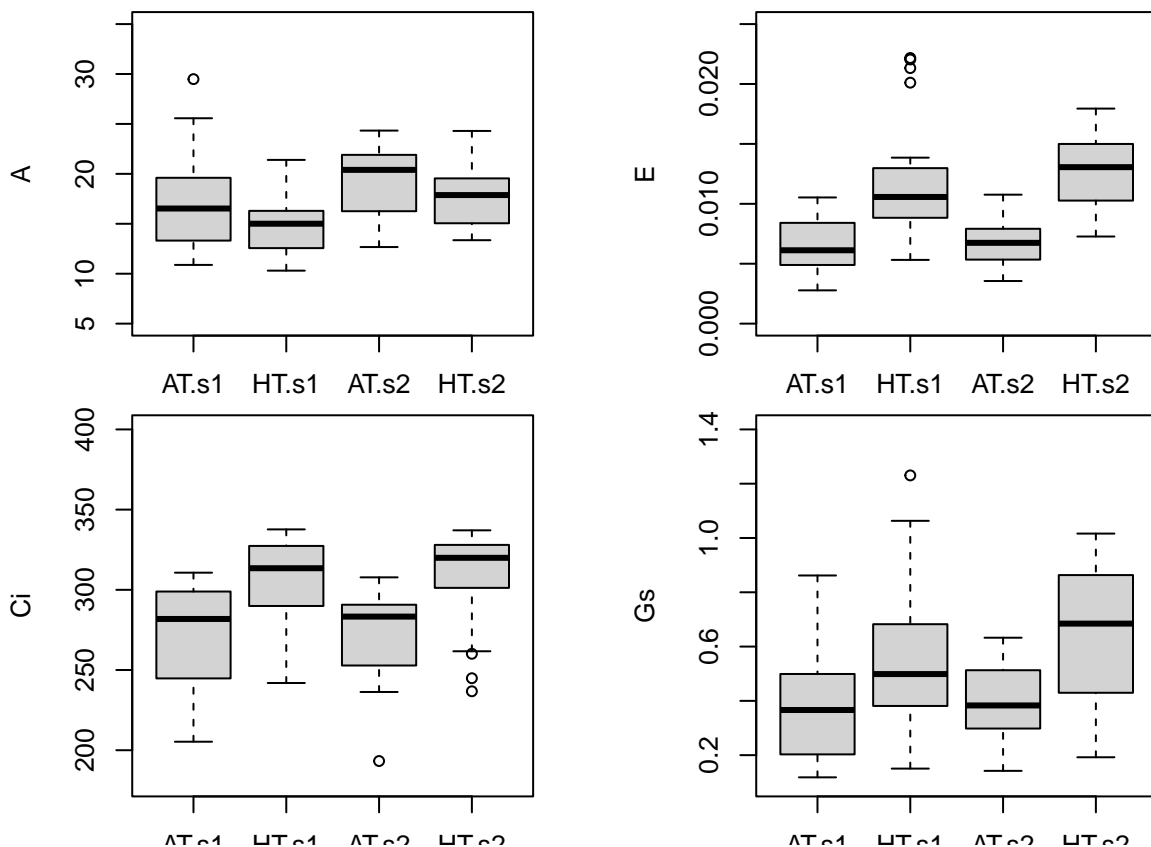
## Rows: 48
## Columns: 8
## $ Scode      <fct> s1, s1, s2, s2, s1, s2, s1, s2, s1, s2, s1, s2, s1, s2, s1, ~
## $ TREATMENT  <fct> HT, AT, HT, AT, AT, AT, HT, HT, AT, AT, HT, HT, AT, AT, HT, ~
## $ emmean     <dbl> 15.06095449, 16.95384294, 17.54090967, 19.43379812, 0.006223~
## $ SE         <dbl> 0.5809206873, 0.5809206873, 0.5809206873, 0.5809206873, 0.00~
## $ df         <dbl> 109, 109, 109, 109, 109, 109, 109, 109, 109, 109, 109, 109, ~
## $ lower.CL   <dbl> 1.390959e+01, 1.580248e+01, 1.638954e+01, 1.828243e+01, 5.23~
## $ upper.CL   <dbl> 1.621232e+01, 1.810521e+01, 1.869228e+01, 2.058516e+01, 7.21~
## $ .group     <chr> " a ", " b ", " b ", " c", " a ", " a ", " b", " b", ~

dt_tble$.group <- gsub(' ', '', dt_tble$.group)
dt_tble <- dt_tble %>%
  mutate(Var=as_factor(rep(name_vec, each=4))) %>%
  arrange(Var, Scode, TREATMENT)

```

The 2×2 boxplot without using ggplot

- Setting initial values for placing letters at right position



- Final plot

```

layout(mat = matrix(c(1, 2, 3, 4),
                      nrow = 2,
                      ncol = 2),
       heights = c(3.5, 4),    # Heights of the two rows
       widths = c(1, 1))
par(mar=c(1.5,6,1,1))
with(malini_control, boxplot(A~TREATMENT+Scode, col= Col_vec, ylim=c(5,35),
                             ylab = parse(text=trait_names['A']), xlab='', las=1,
                             names= c('', '', '', ''))
)
)
text(
  x=c(1:nbGroup),
  y=boundaries_A$stats[nrow(boundaries_A$stats),]+7,
  dt_tble[dt_tble$Var=='A', '.group']
)
par(mar=c(3.25,6,1,1))

with(malini_control, boxplot(Ci~TREATMENT+Scode, col= Col_vec, ylim=c(180,400),
                             ylab = parse(text=trait_names['Ci']), xlab='', las=1,
                             names= c(parse(text=paste0('AT', '(italic(S[1]))')),
                                       parse(text=paste0('~HT', '(italic(S[1]))')),
                                       parse(text=paste0('~AT', '(italic(S[2]))')),
                                       parse(text=paste0('~HT', '(italic(S[2]))'))
)
)
)
text(
  x=c(1:nbGroup),
  y=boundaries_Ci$stats[nrow(boundaries_Ci$stats),]+30,
  dt_tble[dt_tble$Var=='Ci', '.group']
)

par(mar=c(1.5,6,1,1))

with(malini_control, boxplot(E~TREATMENT+Scode, col= Col_vec, ylim=c(0,.025),
                             ylab = parse(text=trait_names['E']), xlab='', las=1,
                             names= c('', '', '', ''))
)
)
text(
  x=c(1:nbGroup),
  y=boundaries_E$stats[nrow(boundaries_E$stats),]+.0021,
  dt_tble[dt_tble$Var=='E', '.group']
)
legend("topright", legend = c("AT", "HT") ,
      col = Col_vec, bty = "n", pch=20,
      pt.cex = 3, cex = 1, horiz = T, inset = c(0.03, 0.03))

par(mar=c(3.25,6,1,1))

with(malini_control, boxplot(Gs~TREATMENT+Scode, col= Col_vec, ylim=c(.1,1.4),

```

```

        ylab = parse(text=trait_names['Gs']), xlab='', las=1,
        names= c(parse(text=paste0('AT', '(S[1])')),
                  parse(text=paste0('~HT', '(S[1])')),
                  parse(text=paste0('~AT', '(S[2])')),
                  parse(text=paste0('~HT', '(S[2])')))
    )
)
)
text(
    x=c(1:nbGroup),
    y=boundaries_Gs$stats[nrow(boundaries_Gs$stats),]+.3,
    dt_tble[dt_tble$Var=='Gs','.group']
)

```

