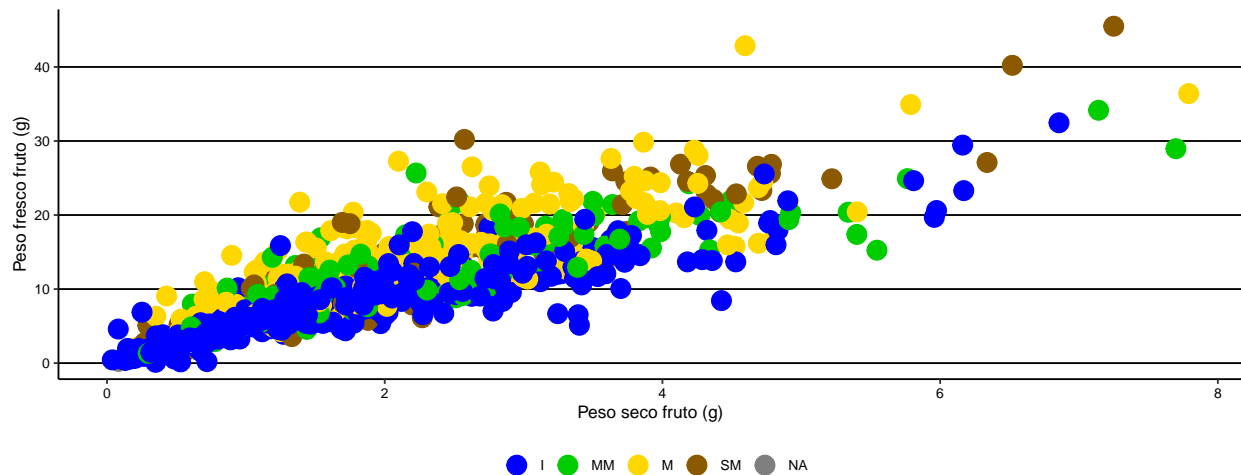


## Peso seco

### Carga de datos y conversión de variables

### Gráfico de dispersión



### Se ajusta el modelo

```
##  
## Call:  
## lm(formula = psf ~ pff, data = datospeso)  
##  
## Coefficients:  
## (Intercept)      pff  
##      0.1749      0.1657
```

### Modelo

```
##  
## Call:  
## lm(formula = psf ~ pff, data = datospeso)  
##  
## Residuals:  
##      Min       1Q   Median       3Q      Max   
## -2.68401 -0.26222 -0.07354  0.22012  2.85114   
##  
## Coefficients:  
##              Estimate Std. Error t value Pr(>|t|)      
## (Intercept)  0.17491    0.03283   5.328 1.19e-07 ***  
## pff          0.16571    0.00281  58.983 < 2e-16 ***  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1  
##  
## Residual standard error: 0.6162 on 1164 degrees of freedom
```

```
## Multiple R-squared:  0.7493, Adjusted R-squared:  0.7491
## F-statistic:  3479 on 1 and 1164 DF,  p-value: < 2.2e-16
```

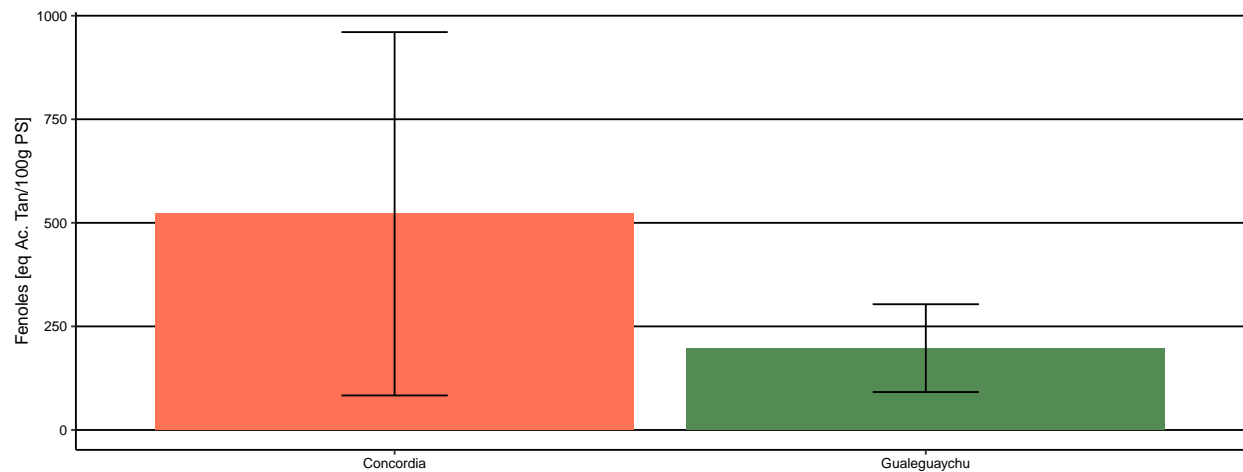
## Análisis univariado

### Fenoles

#### Tabla descriptiva por población

```
## # A tibble: 2 x 6
##   site          n Mean   min   max   sd
##   <fct>      <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia      64 522.  66.1 1666. 439.
## 2 Gualeguaychu   38 198.  79.7 485.  106.
```

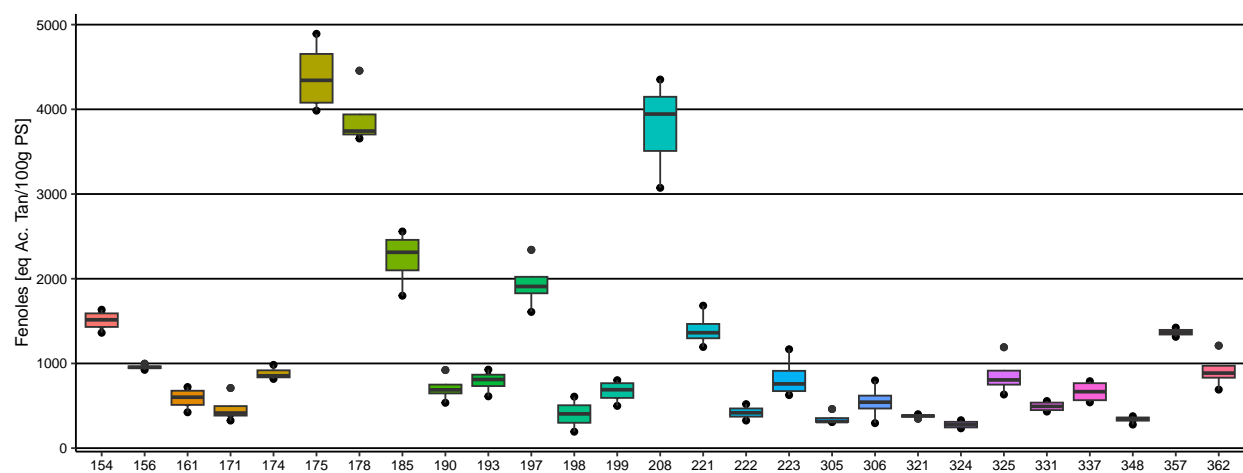
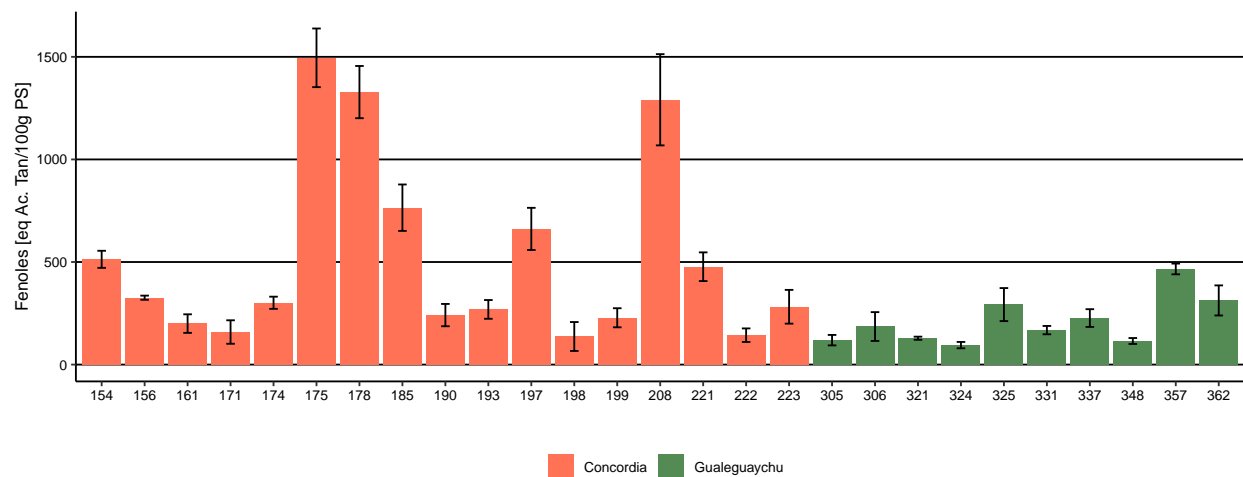
#### Gráfico por población



#### Tabla descriptiva por fenotipo

```
## # A tibble: 27 x 7
## # Groups:   site [2]
##   site    phenotype      n Mean   min   max   sd
##   <fct>    <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia 154      4 513.  464.  557.  41.6
## 2 Concordia 156      4 326.  315.  339.  10.1
## 3 Concordia 161      4 200.  144.  246.  45.2
## 4 Concordia 171      4 159.  111.  242.  57.2
## 5 Concordia 174      3 301.  278.  335.  29.6
## 6 Concordia 175      4 1495. 1357. 1666. 143.
## 7 Concordia 178      4 1328. 1245. 1518. 127.
## 8 Concordia 185      4 765.  613.  871.  113.
## 9 Concordia 190      4 241.  182.  314.  54.3
## 10 Concordia 193      4 269.  208.  316.  45.7
## # i 17 more rows
```

## Gráficos por fenotipo



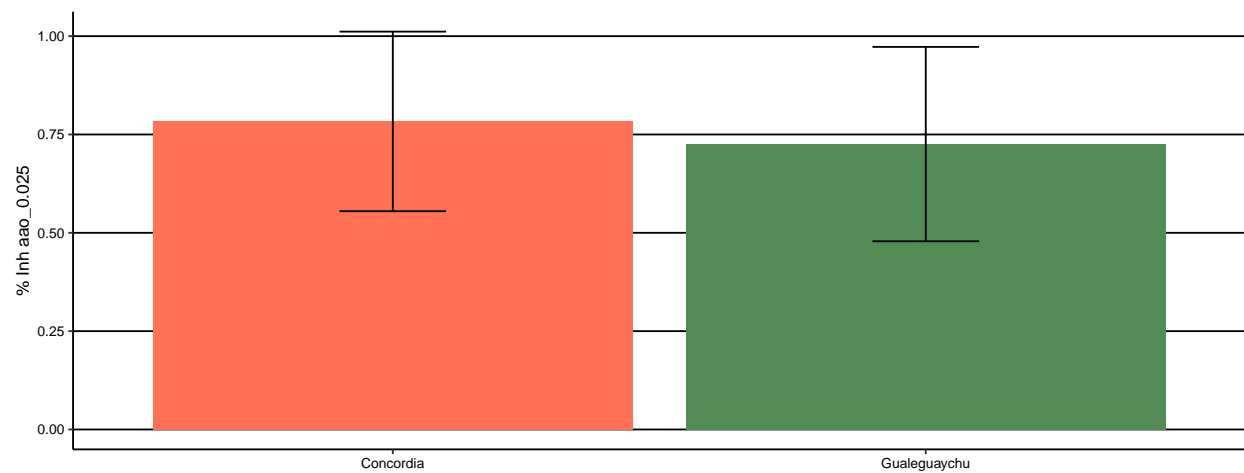
## AAO

0.025

####Tabla descriptiva por población

```
## # A tibble: 2 x 6
##   site      n Mean  min  max  sd
##   <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia    64 0.783 0.175 0.988 0.228
## 2 Gualaguaychu  38 0.726 0.195 0.971 0.247
```

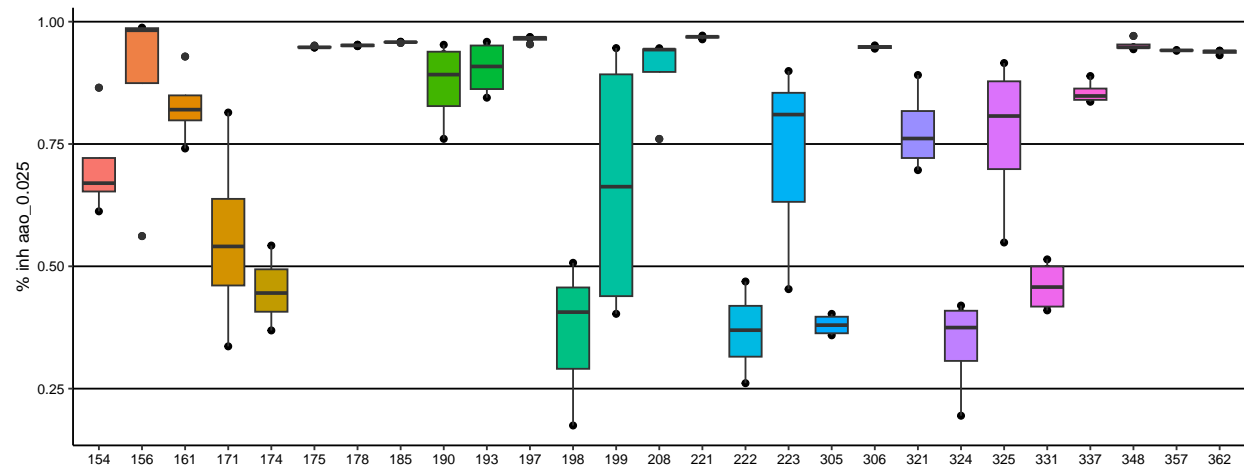
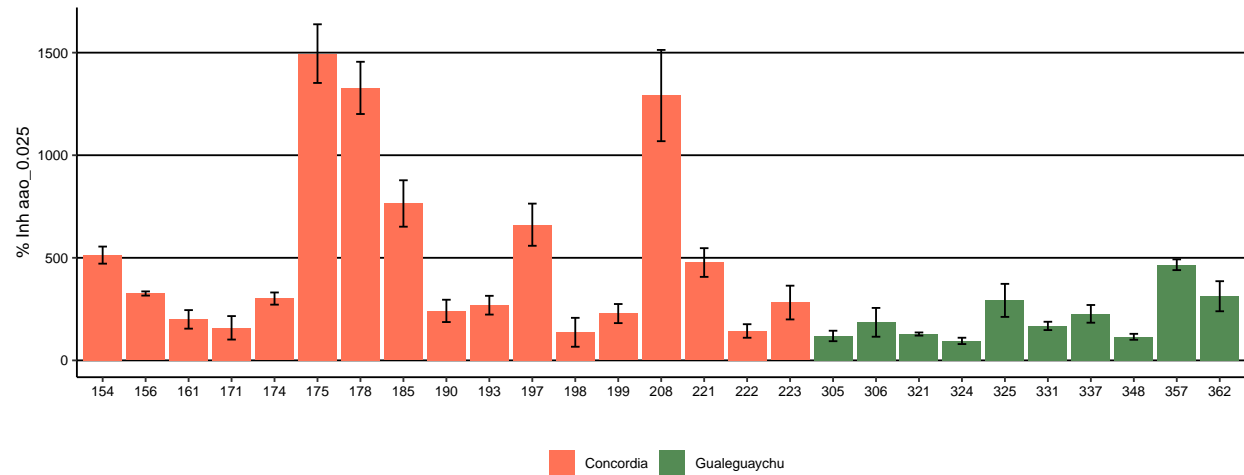
## Gráfico por población



### Tabla descriptiva por fenotipo

```
## # A tibble: 27 x 7
## # Groups:   site [2]
##   site    phenotype      n Mean   min   max    sd
##   <fct>    <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia 154         4 0.704 0.612 0.865 0.111
## 2 Concordia 156         4 0.879 0.562 0.988 0.211
## 3 Concordia 161         4 0.827 0.741 0.929 0.0772
## 4 Concordia 171         4 0.558 0.336 0.814 0.199
## 5 Concordia 174         3 0.452 0.369 0.542 0.0870
## 6 Concordia 175         4 0.948 0.947 0.951 0.00187
## 7 Concordia 178         4 0.951 0.950 0.953 0.00160
## 8 Concordia 185         4 0.958 0.956 0.959 0.00114
## 9 Concordia 190         4 0.874 0.761 0.953 0.0881
## 10 Concordia 193         4 0.905 0.845 0.959 0.0572
## # i 17 more rows
```

### Gráficos por fenotipo

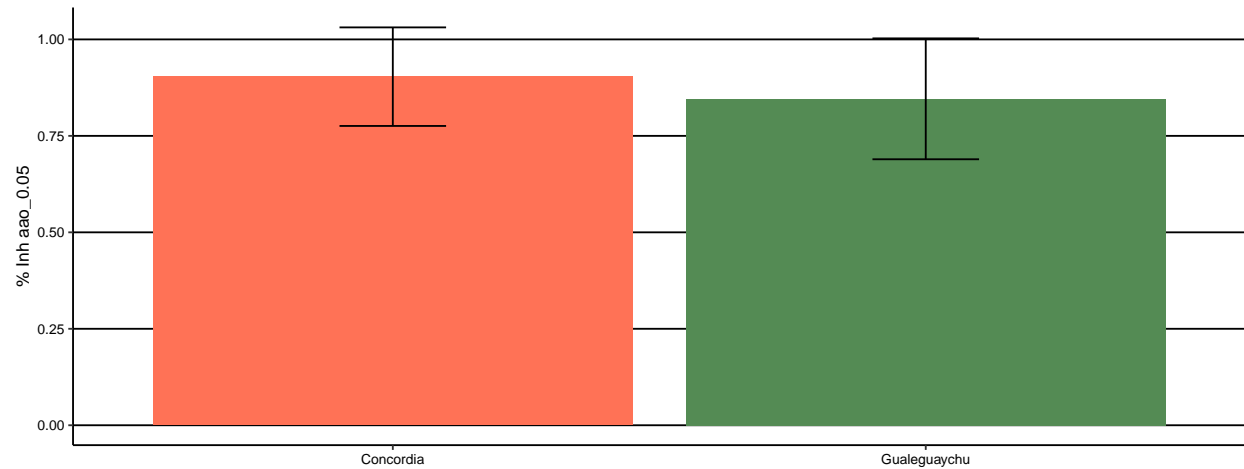


0.050

## Tabla descriptiva por población

```
## # A tibble: 2 x 6
##   site      n Mean  min  max  sd
##   <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia    63 0.903 0.342 0.977 0.128
## 2 Guleguaychu   38 0.846 0.397 0.971 0.157
```

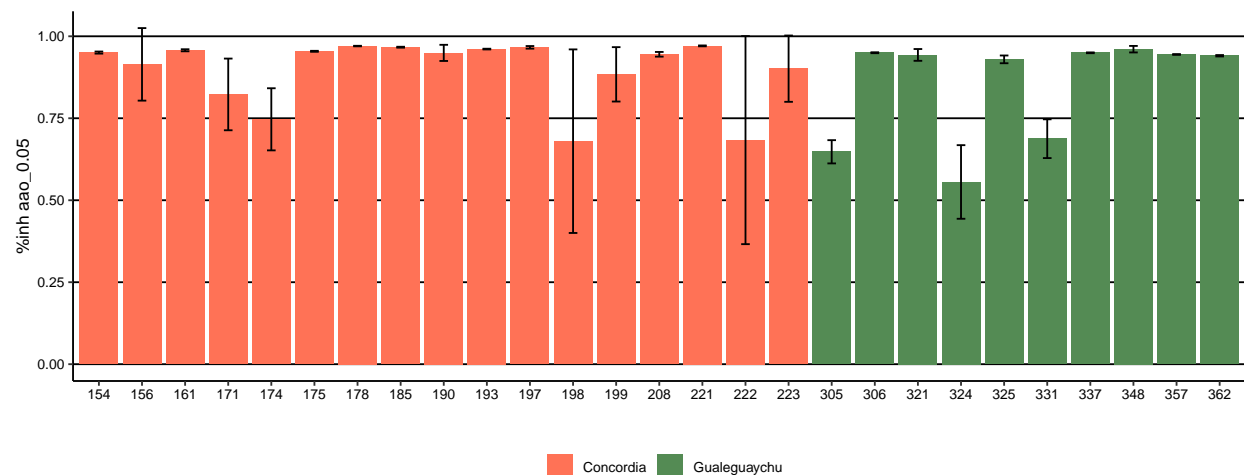
## Gráfico por población

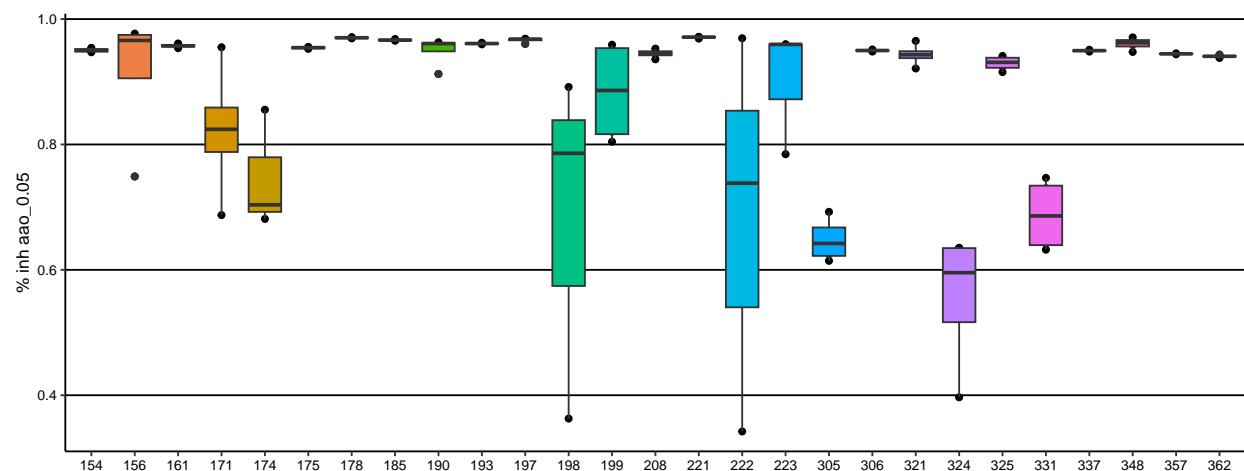


### Tabla descriptiva por fenotipo

```
## # A tibble: 27 x 7
## # Groups:   site [2]
##   site    phenotype      n Mean   min   max    sd
##   <fct>    <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia 154         4 0.950 0.947 0.954 0.00315
## 2 Concordia 156         4 0.914 0.749 0.977 0.111
## 3 Concordia 161         4 0.957 0.954 0.961 0.00312
## 4 Concordia 171         4 0.823 0.687 0.955 0.109
## 5 Concordia 174         3 0.747 0.681 0.855 0.0947
## 6 Concordia 175         4 0.954 0.952 0.956 0.00145
## 7 Concordia 178         4 0.970 0.969 0.971 0.000801
## 8 Concordia 185         3 0.967 0.965 0.968 0.00139
## 9 Concordia 190         4 0.949 0.912 0.963 0.0246
## 10 Concordia 193         4 0.961 0.960 0.962 0.00108
## # i 17 more rows
```

### Gráficos por fenotipo



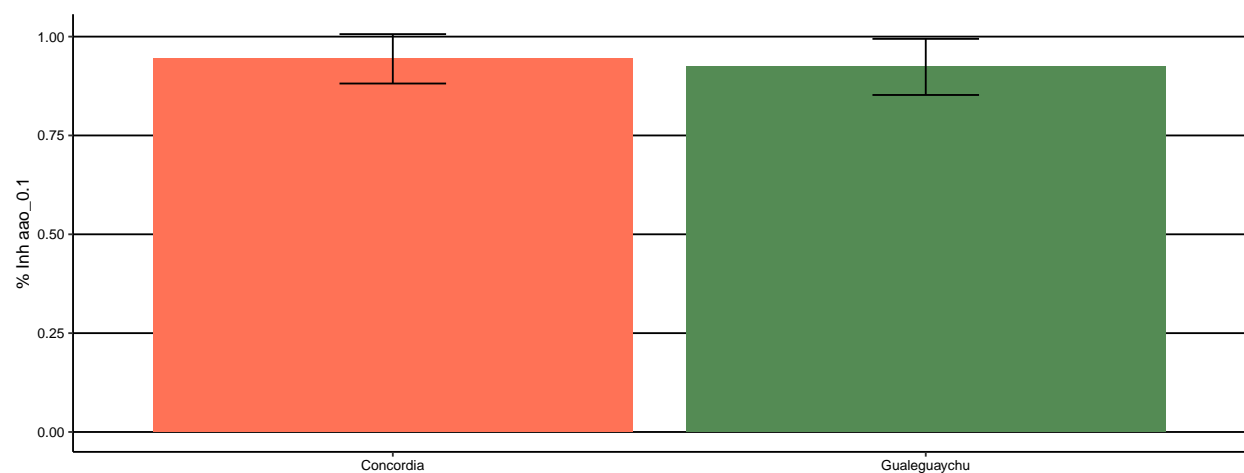


0.100

### Tabla descriptiva por población

```
## # A tibble: 2 x 6
##   site      n Mean  min  max  sd
##   <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia      63 0.944 0.603 0.977 0.0625
## 2 Gualeguaychu   38 0.923 0.561 0.966 0.0710
```

### Gráfico por población

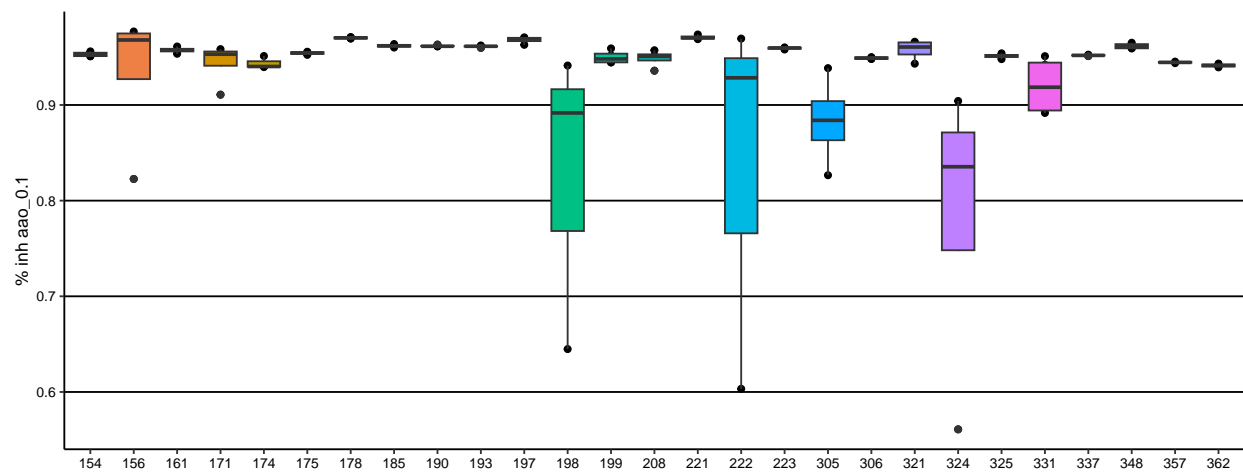
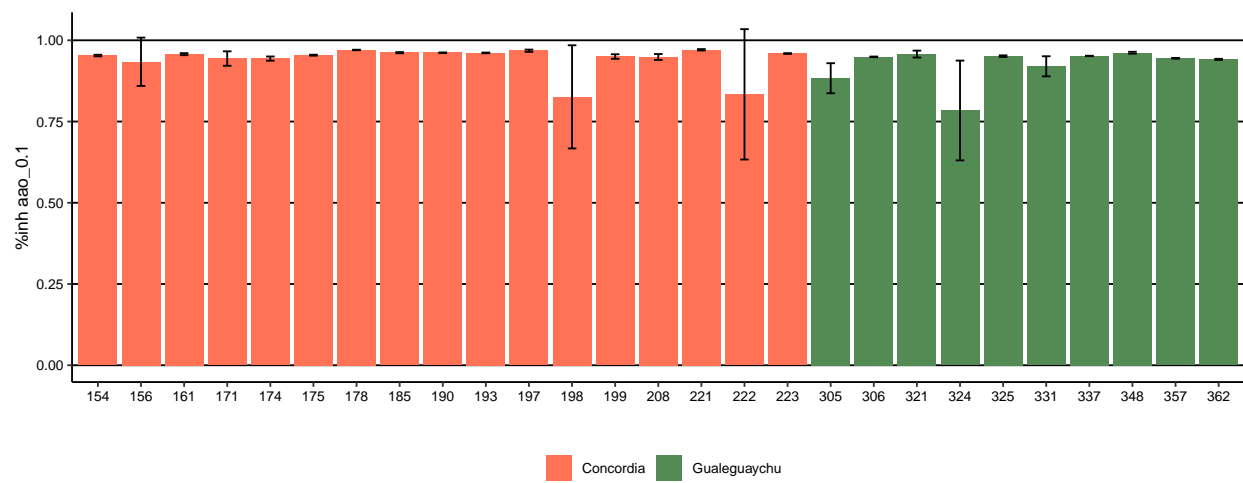


### Tabla descriptiva por fenotipo

```
## # A tibble: 27 x 7
## # Groups:   site [2]
```

##	site	phenotype	n	Mean	min	max	sd
##	<fct>	<fct>	<int>	<dbl>	<dbl>	<dbl>	<dbl>
##	1 Concordia	154	4	0.953	0.951	0.956	0.00249
##	2 Concordia	156	4	0.934	0.823	0.977	0.0744
##	3 Concordia	161	4	0.957	0.954	0.961	0.00312
##	4 Concordia	171	4	0.944	0.911	0.958	0.0222
##	5 Concordia	174	3	0.944	0.940	0.951	0.00650
##	6 Concordia	175	4	0.954	0.952	0.956	0.00145
##	7 Concordia	178	4	0.970	0.969	0.971	0.000801
##	8 Concordia	185	3	0.962	0.960	0.964	0.00182
##	9 Concordia	190	4	0.962	0.961	0.963	0.000858
##	10 Concordia	193	4	0.961	0.960	0.962	0.00106
##	# i 17 more rows						

## Gráficos por fenotipo





0.250

#### Tabla descriptiva por población

```
## # A tibble: 2 x 6
##   site      n Mean   min   max    sd
##   <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia      63 0.954 0.827 0.974 0.0184
## 2 Gualeguaychu   38 0.956 0.940 0.973 0.00901
```

Gráfico por población

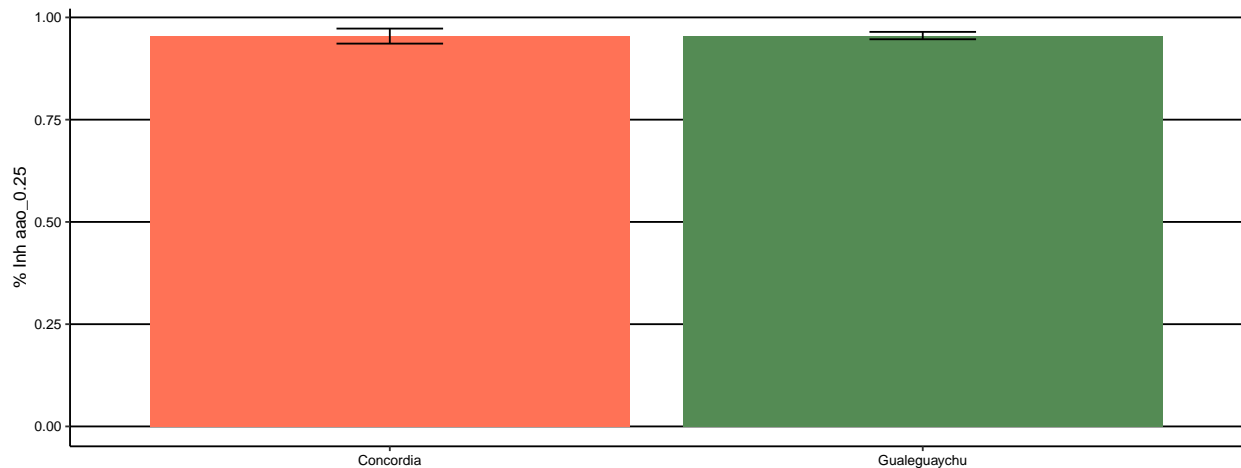
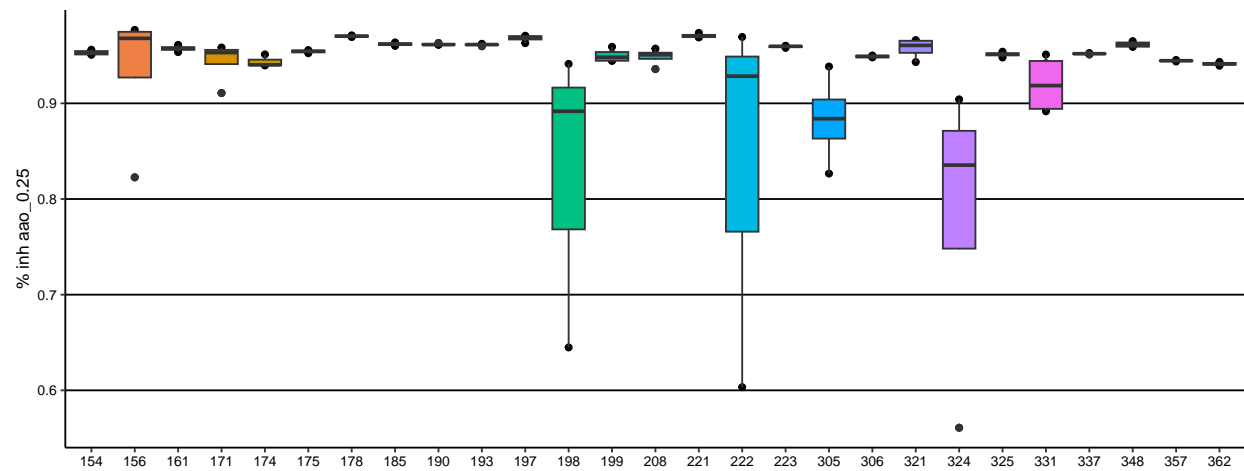
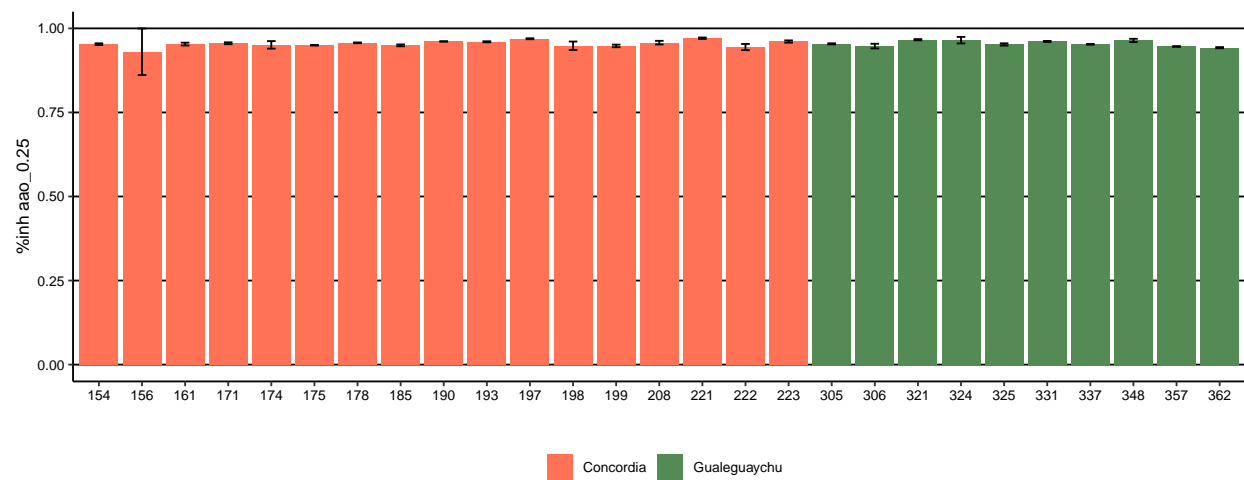


Tabla descriptiva por fenotipo

```
## # A tibble: 27 x 7
## # Groups:   site [2]
##   site    phenotype      n Mean   min   max    sd
##   <fct>    <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia 154         4 0.953 0.951 0.956 0.00249
## 2 Concordia 156         4 0.930 0.827 0.967 0.0692
## 3 Concordia 161         4 0.953 0.949 0.959 0.00417
## 4 Concordia 171         4 0.956 0.952 0.958 0.00280
## 5 Concordia 174         3 0.951 0.940 0.962 0.0112
## 6 Concordia 175         4 0.950 0.949 0.951 0.000922
## 7 Concordia 178         4 0.957 0.956 0.958 0.00113
## 8 Concordia 185         3 0.949 0.946 0.952 0.00277
## 9 Concordia 190         4 0.961 0.961 0.961 0.000429
## 10 Concordia 193         4 0.960 0.958 0.961 0.00145
## # i 17 more rows
```

Gráficos por fenotipo

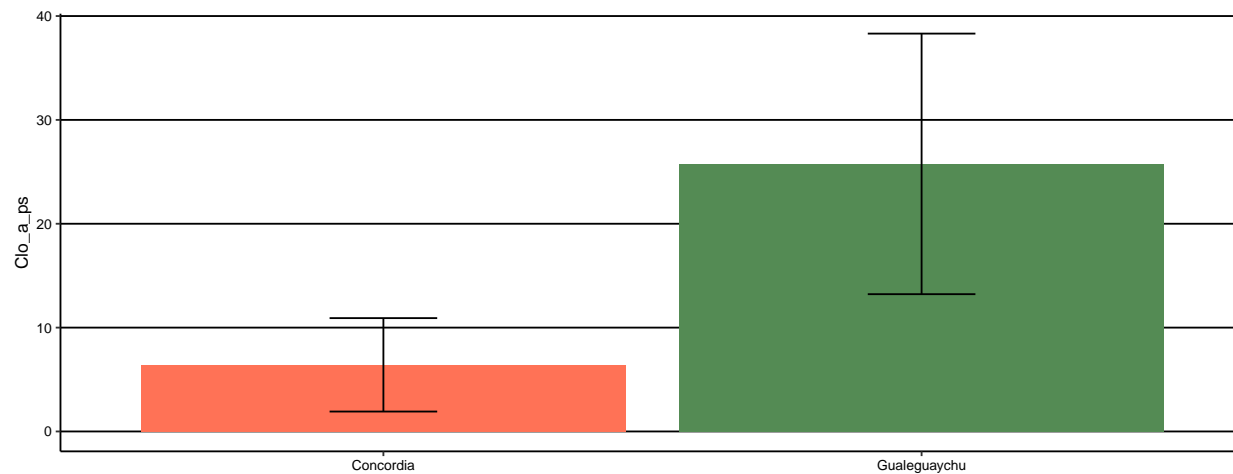


## Clorofila a

### Tabla descriptiva por población

```
## # A tibble: 2 x 6
##   site      n Mean   min  max   sd
##   <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia    63  6.42  0.386 16.3  4.50
## 2 Guleguaychu   37 25.8 10.2  62.8 12.5
```

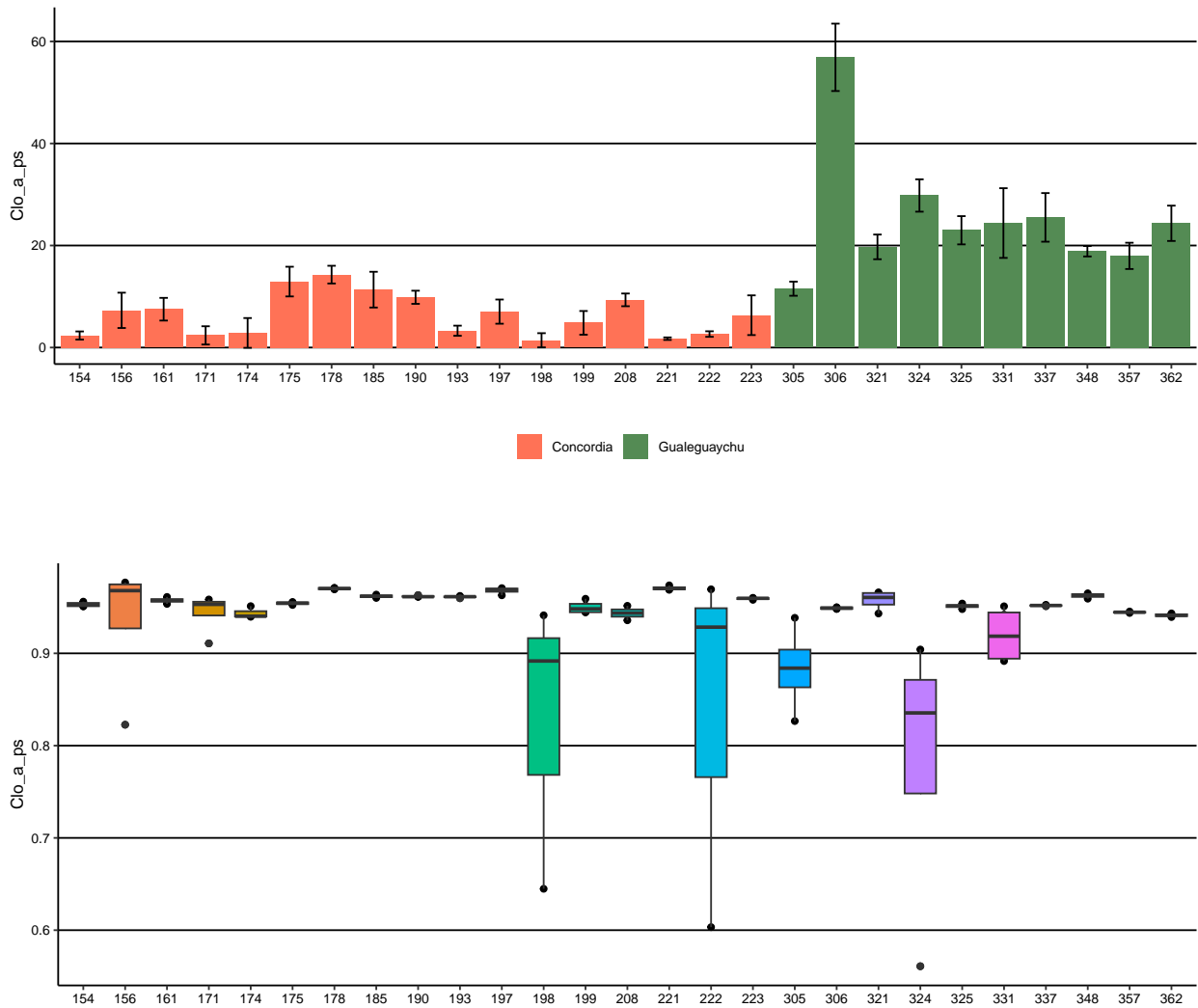
## Gráfico por población



## Tabla resumen por fenotipo

```
## # A tibble: 27 x 7
## # Groups:   site [2]
##   site    phenotype     n Mean   min   max   sd
##   <fct>    <fct>   <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia 154         4  2.36  1.38  3.22 0.798
## 2 Concordia 156         4  7.29  2.54 10.8  3.46
## 3 Concordia 161         4  7.51  5.35 10.3  2.22
## 4 Concordia 171         4  2.38  0.851 4.76 1.79
## 5 Concordia 174         3  2.86  0.688 6.18 2.92
## 6 Concordia 175         4 12.9   9.31 16.2  2.91
## 7 Concordia 178         4 14.3  12.3 16.3  1.74
## 8 Concordia 185         4 11.3   8.25 14.8  3.50
## 9 Concordia 190         4  9.85  8.08 10.8  1.29
## 10 Concordia 193         4  3.30  2.42  4.71 0.992
## # i 17 more rows
```

Gráfico resumen por fenotipo

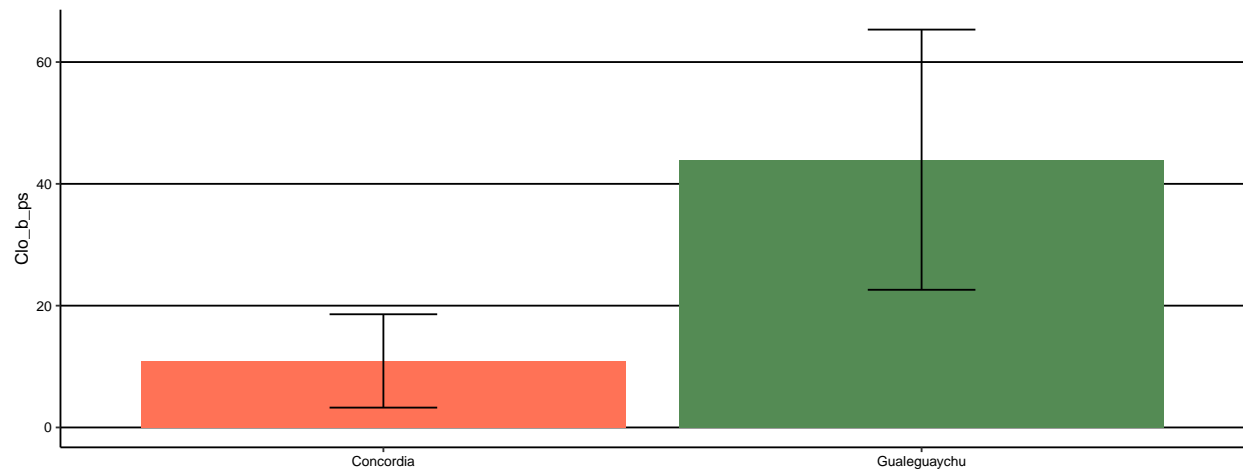


Clorofila b

Tabla descriptiva por población

```
## # A tibble: 2 x 6
##   site      n Mean   min  max   sd
##   <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia    63  10.9  0.659  27.8  7.66
## 2 Gualeduaychu  37  44.0  17.4  107.  21.4
```

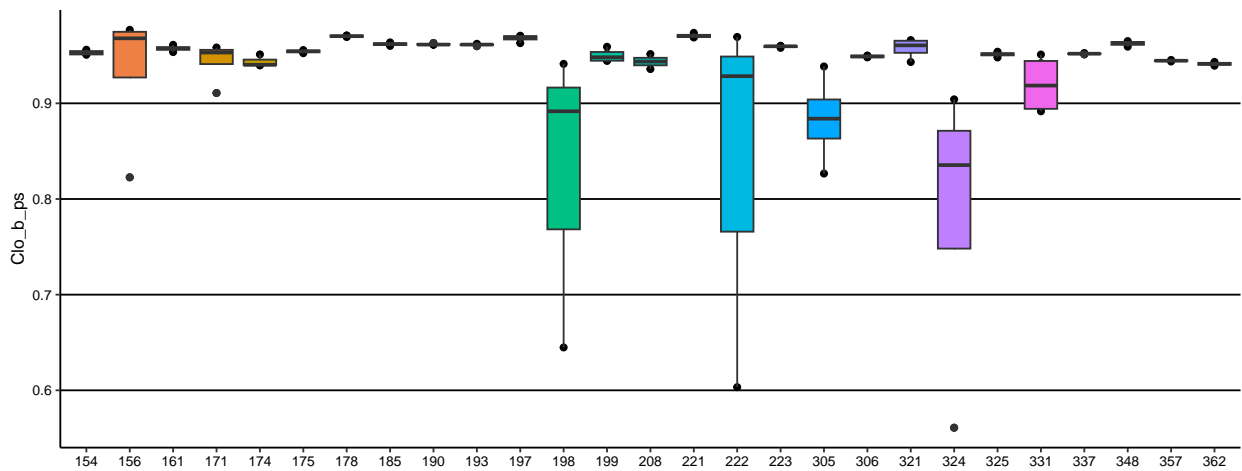
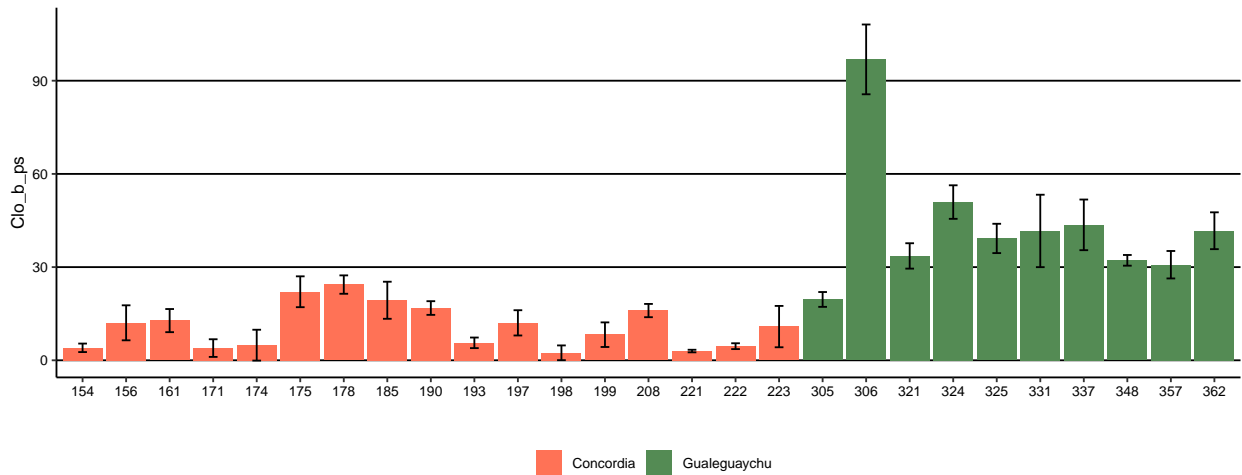
## Gráfico por población



## Tabla resumen por fenotipo

```
## # A tibble: 27 x 7
## # Groups:   site [2]
##   site    phenotype      n Mean   min   max   sd
##   <fct>    <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia 154         4  4.02  2.35  5.50  1.37
## 2 Concordia 156         4 12.1   4.24 17.6   5.63
## 3 Concordia 161         4 12.8   9.14 17.4   3.73
## 4 Concordia 171         4  3.93  1.46  7.66  2.84
## 5 Concordia 174         3  4.87  1.18 10.5   4.97
## 6 Concordia 175         4 22.1  15.9 27.7   4.97
## 7 Concordia 178         4 24.4  21.1 27.8   2.96
## 8 Concordia 185         4 19.3  14.1 25.1   5.97
## 9 Concordia 190         4 16.8  13.8 18.5   2.20
## 10 Concordia 193         4  5.62  4.12  8.04  1.70
## # i 17 more rows
```

Gráfico resumen por fenotipo

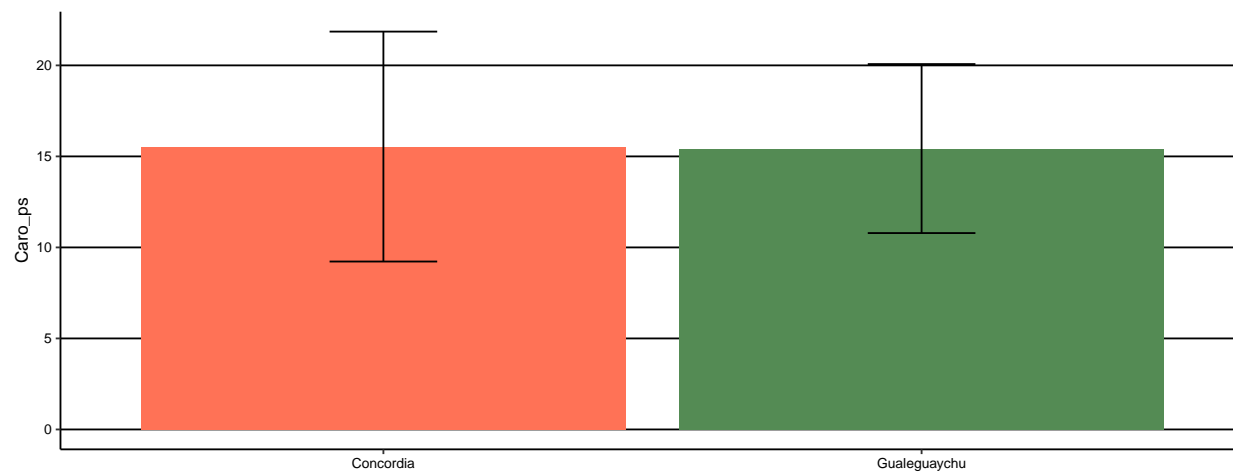


Carotenoides

Tabla descriptiva por población

```
## # A tibble: 2 x 6
##   site          n Mean   min   max   sd
##   <fct>        <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia     63  15.5  6.59  29.3  6.32
## 2 Gualeduaychu  37  15.4  9.08  27.7  4.64
```

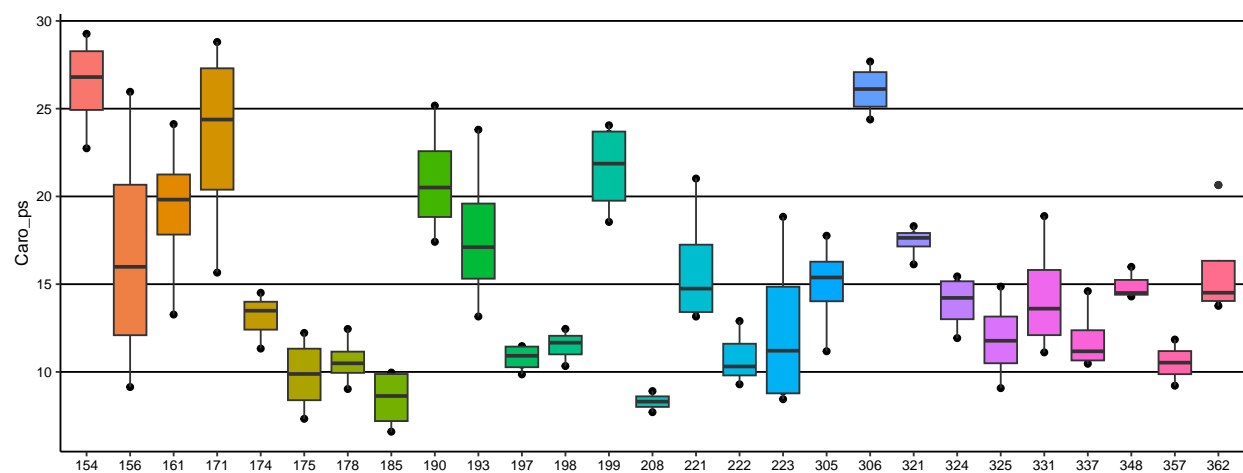
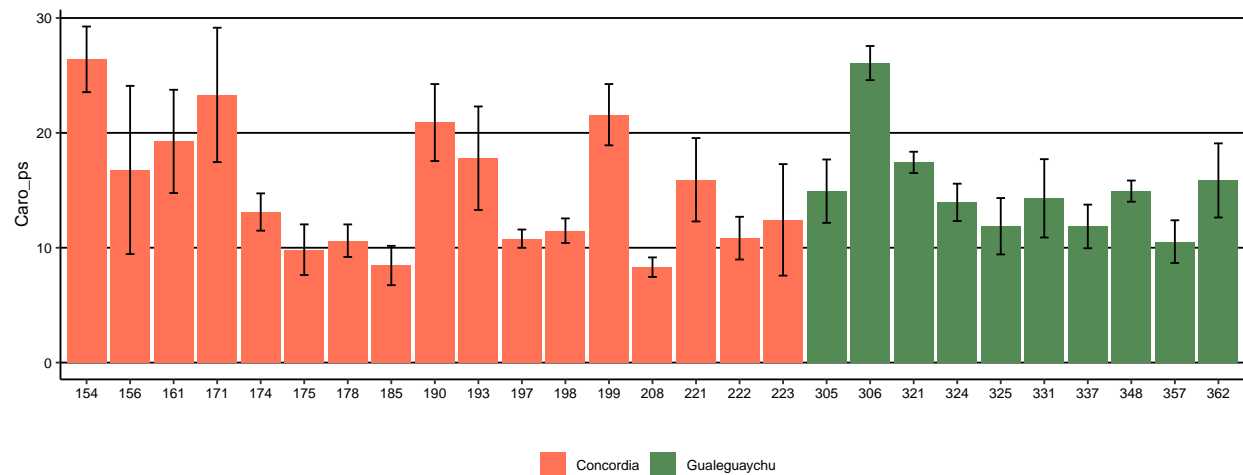
## Gráfico por población



## Tabla de carotenoides

```
## # A tibble: 27 x 7
## # Groups:   site [2]
##   site    phenotype      n Mean   min   max   sd
##   <fct>    <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia 154         4 26.4  22.7  29.3  2.86
## 2 Concordia 156         4 16.8   9.14 26.0  7.32
## 3 Concordia 161         4 19.3  13.3 24.1  4.49
## 4 Concordia 171         4 23.3  15.7 28.8  5.85
## 5 Concordia 174         3 13.1  11.3 14.5  1.62
## 6 Concordia 175         4  9.83  7.33 12.2  2.20
## 7 Concordia 178         4 10.6   9.03 12.4  1.42
## 8 Concordia 185         4  8.45  6.59  9.96  1.71
## 9 Concordia 190         4 20.9  17.4 25.2  3.35
## 10 Concordia 193         4 17.8  13.2 23.8  4.50
## # i 17 more rows
```

## Gráfico de carotenoides

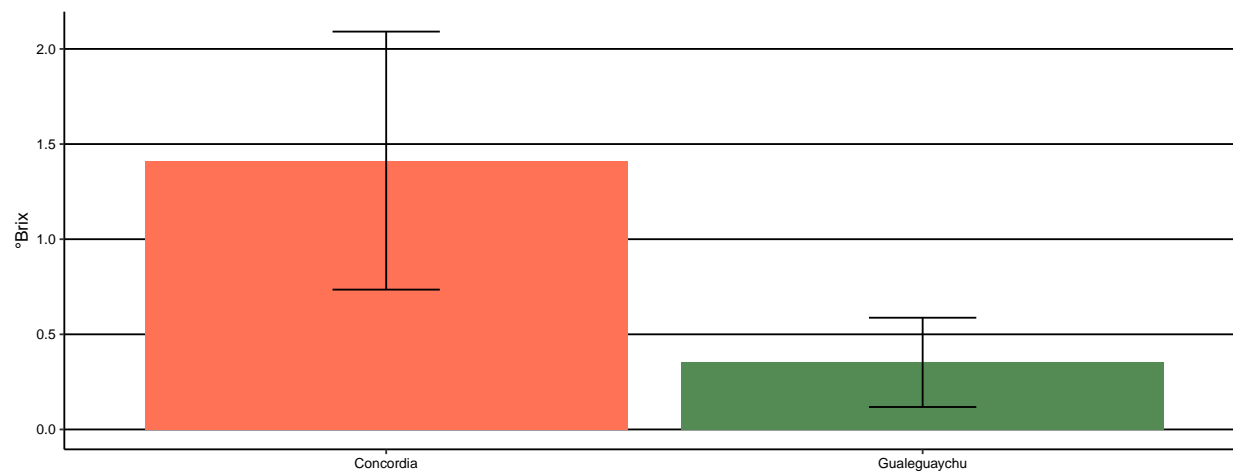


## Acidez Total Titulable (ATT)

```
## # A tibble: 2 x 6
##   site          n Mean   min   max   sd
##   <fct>      <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia    29  1.41  0.29  2.59  0.678
## 2 Guleguaychu  15  0.353 0.15  0.88  0.235
```



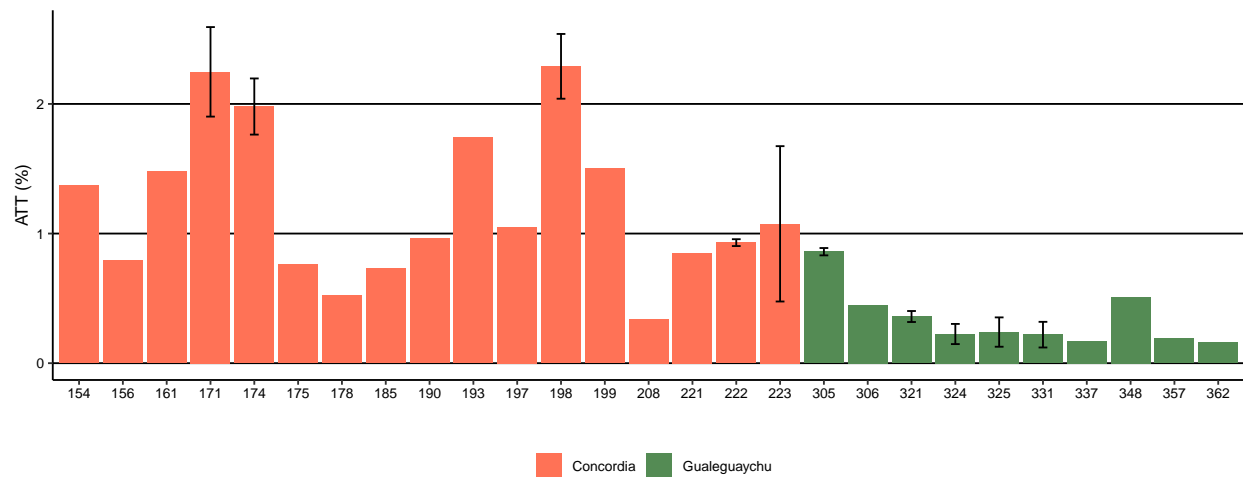
## Gráfico por población



## Tabla descriptiva

```
## # A tibble: 27 x 7
## # Groups:   site [2]
##   site    phenotype      n Mean   min   max   sd
##   <fct>    <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia 154         1  1.37  1.37  1.37  NA
## 2 Concordia 156         1  0.79  0.79  0.79  NA
## 3 Concordia 161         1  1.48  1.48  1.48  NA
## 4 Concordia 171         4  2.25  1.84  2.59  0.345
## 5 Concordia 174         3  1.98  1.85  2.23  0.217
## 6 Concordia 175         1  0.76  0.76  0.76  NA
## 7 Concordia 178         1  0.52  0.52  0.52  NA
## 8 Concordia 185         1  0.73  0.73  0.73  NA
## 9 Concordia 190         1  0.96  0.96  0.96  NA
## 10 Concordia 193         1  1.74  1.74  1.74  NA
## # i 17 more rows
```

## Gráfico por fenotipo

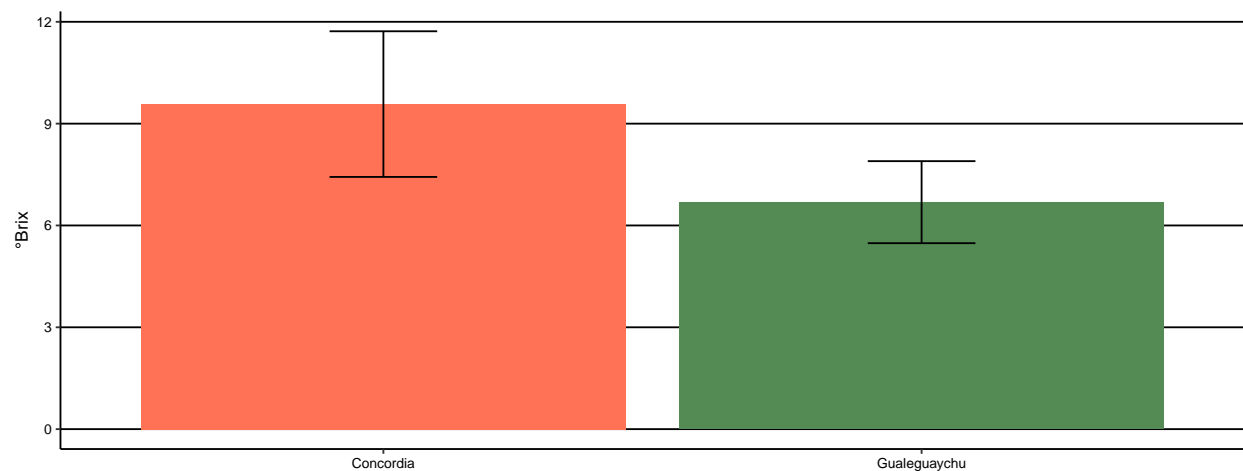


## Sólidos solubles

### Tabla descriptiva

```
## # A tibble: 2 x 6
##   site      n Mean  min  max  sd
##   <fct>   <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia    29  9.58  5.9  13.1  2.15
## 2 Gualeguaychu  15  6.69  5.3   9.3  1.21
```

## Gráfico por población

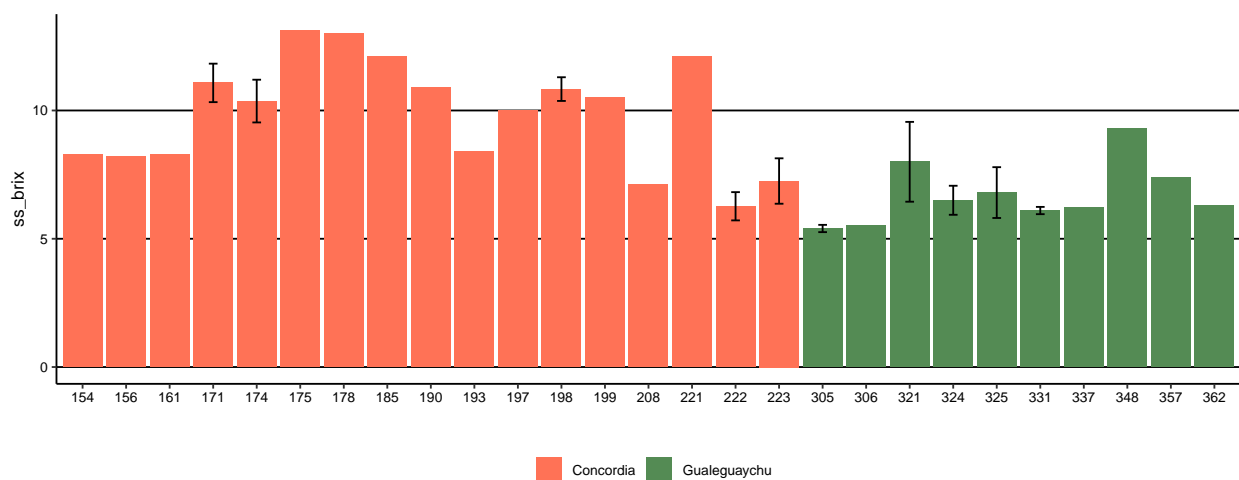


### Tabla descriptiva

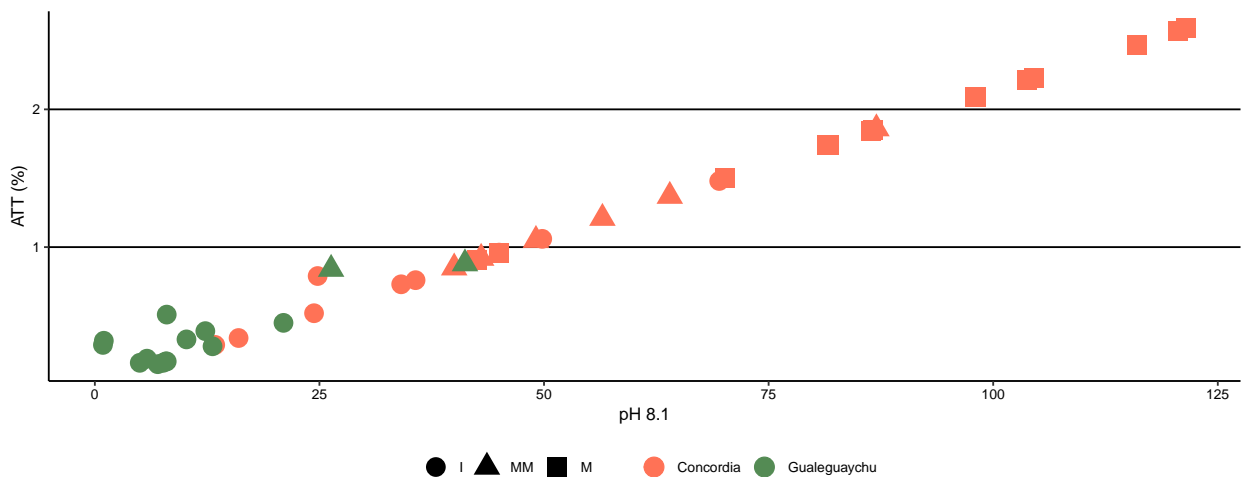
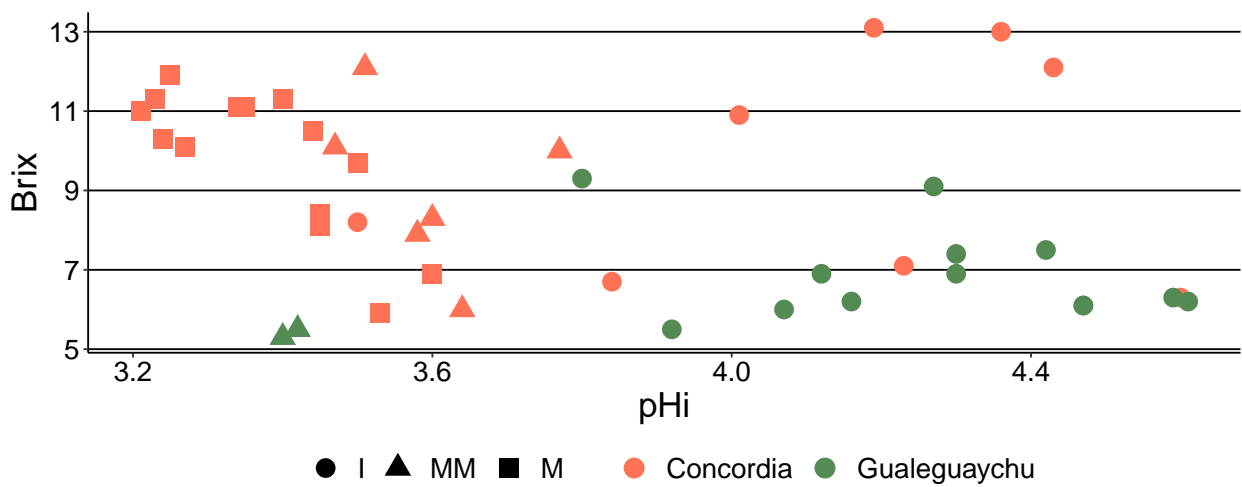
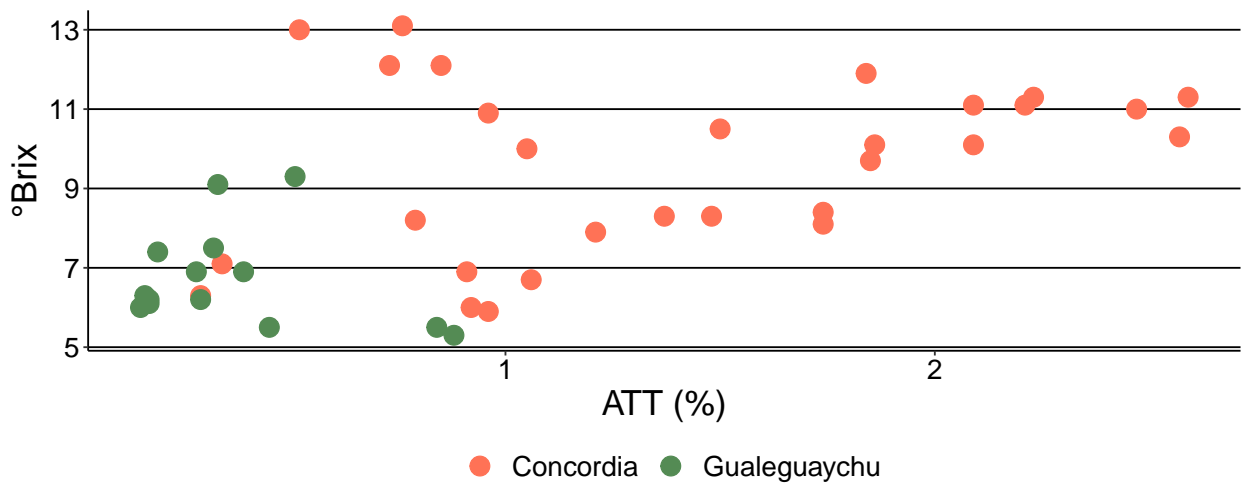
```
## # A tibble: 27 x 7
```

```
## # Groups:   site [2]
##   site      phenotype      n Mean   min   max   sd
##   <fct>     <fct>    <int> <dbl> <dbl> <dbl> <dbl>
## 1 Concordia 154        1   8.3   8.3   8.3  NA
## 2 Concordia 156        1   8.2   8.2   8.2  NA
## 3 Concordia 161        1   8.3   8.3   8.3  NA
## 4 Concordia 171        4  11.1  10.1  11.9  0.75
## 5 Concordia 174        3  10.4   9.7  11.3  0.833
## 6 Concordia 175        1  13.1  13.1  13.1  NA
## 7 Concordia 178        1  13     13    13    NA
## 8 Concordia 185        1  12.1  12.1  12.1  NA
## 9 Concordia 190        1  10.9  10.9  10.9  NA
## 10 Concordia 193       1   8.4   8.4   8.4  NA
## # i 17 more rows
```

### Gráfico por fenotipo



Relación ATT y SS



## **Análisis de CCI**

### **Resumen del modelo**

### **Supuestos del modelo**

Test de normalidad para muestras biológicas (frutos)

Test de normalidad para genotipos

### **Conclusiones**

### **ICC del modelo**

- $\longrightarrow$  %
- $\longrightarrow$  %
- $\longrightarrow$  %

ICC del modelo =

## **Análisis multivariado**