

## DENDOGRAMA

Ocuparemos las siguientes librerías.

```
library(dendextend)
```

```
##
## -----
## Welcome to dendextend version 1.15.2
## Type citation('dendextend') for how to cite the package.
##
## Type browseVignettes(package = 'dendextend') for the package vignette.
## The github page is: https://github.com/talgalili/dendextend/
##
## Suggestions and bug-reports can be submitted at: https://github.com/talgalili/dendextend/issu
es
## You may ask questions at stackoverflow, use the r and dendextend tags:
##   https://stackoverflow.com/questions/tagged/dendextend
##
## To suppress this message use: suppressPackageStartupMessages(library(dendextend))
## -----
```

```
##
## Attaching package: 'dendextend'
```

```
## The following object is masked from 'package:stats':
##
##   cutree
```

```
library(circlize)
```

```
## =====
## circlize version 0.4.15
## CRAN page: https://cran.r-project.org/package=circlize
## Github page: https://github.com/jokergoo/circlize
## Documentation: https://jokergoo.github.io/circlize_book/book/
##
## If you use it in published research, please cite:
## Gu, Z. circlize implements and enhances circular visualization
##   in R. Bioinformatics 2014.
##
## This message can be suppressed by:
##   suppressPackageStartupMessages(library(circlize))
## =====
```

```
library(cluster.datasets)
```

Llamamos nuestra base de datos mediante clipboard

```
Estacion<-read.delim('clipboard')
Estacion
```

```
##      Mes  Obs Olmos CFE Sumidero Crystal Banderilla Magisterial Revolucion
## 1 Ene  6.0   5.2 5.6      6.6    5.0      5.5      5.6      5.5
## 2 Feb  1.7   1.9 3.7      3.5    2.9      4.1      3.0      2.3
## 3 Mar  0.6   0.8 0.8      0.6    0.5      2.0      0.7      0.6
## 4 Abr  1.2   1.0 2.2      1.2    1.6      2.5      1.8      1.4
## 5 May  7.4   4.0 7.5      7.3    7.8      7.6      7.5      7.6
## 6 Jun  8.7   9.7 9.6      8.3    9.2     12.3      9.3      9.0
## 7 Jul  4.5   4.6 4.5      5.3    5.4      6.7      4.7      4.9
## 8 Ago 10.2   9.5 9.5      7.8   10.7      8.7     10.0     10.4
## 9 Sep 10.4   7.3 9.9      6.7    9.3     12.9      9.9      9.9
## 10 Oct  4.0   3.9 3.8      3.9    3.4      4.7      3.8      3.7
## 11 Nov  2.0   1.9 2.3      2.0    2.0      3.6      2.1      2.0
## 12 Dic  0.5   0.6 0.6      0.7    0.8      1.3      0.6      0.6
```

```
AMM=Estacion
```

Mostramos titulos, dimensiones.

```
head(AMM)
```

```
##      Mes Obs Olmos CFE Sumidero Crystal Banderilla Magisterial Revolucion
## 1 Ene  6.0   5.2 5.6      6.6    5.0      5.5      5.6      5.5
## 2 Feb  1.7   1.9 3.7      3.5    2.9      4.1      3.0      2.3
## 3 Mar  0.6   0.8 0.8      0.6    0.5      2.0      0.7      0.6
## 4 Abr  1.2   1.0 2.2      1.2    1.6      2.5      1.8      1.4
## 5 May  7.4   4.0 7.5      7.3    7.8      7.6      7.5      7.6
## 6 Jun  8.7   9.7 9.6      8.3    9.2     12.3      9.3      9.0
```

```
dim(AMM)
```

```
## [1] 12  9
```

```
str(AMM)
```

```
## 'data.frame':  12 obs. of  9 variables:
## $ Mes      : chr  "Ene" "Feb" "Mar" "Abr" ...
## $ Obs      : num  6 1.7 0.6 1.2 7.4 8.7 4.5 10.2 10.4 4 ...
## $ Olmos    : num  5.2 1.9 0.8 1 4 9.7 4.6 9.5 7.3 3.9 ...
## $ CFE      : num  5.6 3.7 0.8 2.2 7.5 9.6 4.5 9.5 9.9 3.8 ...
## $ Sumidero : num  6.6 3.5 0.6 1.2 7.3 8.3 5.3 7.8 6.7 3.9 ...
## $ Crystal  : num  5 2.9 0.5 1.6 7.8 9.2 5.4 10.7 9.3 3.4 ...
## $ Banderilla : num  5.5 4.1 2 2.5 7.6 12.3 6.7 8.7 12.9 4.7 ...
## $ Magisterial: num  5.6 3 0.7 1.8 7.5 9.3 4.7 10 9.9 3.8 ...
## $ Revolucion : num  5.5 2.3 0.6 1.4 7.6 9 4.9 10.4 9.9 3.7 ...
```

```
anyNA(AMM)
```

```
## [1] FALSE
```

Calculo de la matriz distancia de mahalonobis

```
dist.AMM<-dist(AMM[,2:6])
dist.AMM
```

```
##           1           2           3           4           5           6           7
## 2    6.8563839
## 3   11.3053085    5.0000000
## 4    9.6415766    3.2078030    1.9824228
## 5    3.9166312    9.4757585   14.1262168   12.2955276
## 6    8.0043738   14.4006944   18.9007936   17.1717792    6.4459289
## 7    2.3811762    5.0259327    9.4572723    7.7711003    5.2469038    9.6488341
## 8    9.2341757   15.5878158   19.9854947   18.2458214    7.1239034    2.1908902   10.7628992
## 9    7.7948701   13.9459672   18.3234822   16.5275528    5.3160135    3.3630343    9.4037227
## 10   4.3335897    3.1160873    7.0334913    5.4166410    7.4953319   11.9318900    2.6814175
## 11   8.2425724    2.2605309    3.1032241    1.5033296   11.0607414   15.8287713    6.3898357
## 12  11.3516519    4.9989999    0.4358899    2.0248457   14.1187818   18.9570567    9.4620294
##           8           9          10          11
## 2
## 3
## 4
## 5
## 6
## 7
## 8
## 9    2.8653098
## 10   13.0686648   11.5056508
## 11   16.9165599   15.2597510    3.9774364
## 12   20.0232365   18.3749830    7.0978870    3.1559468
```

Convertir los reultados del calculo de la distancia a una matriz de datos y me indique 3 digitos.

```
round(as.matrix(dist.AMM)[1:6, 1:6],3)
```

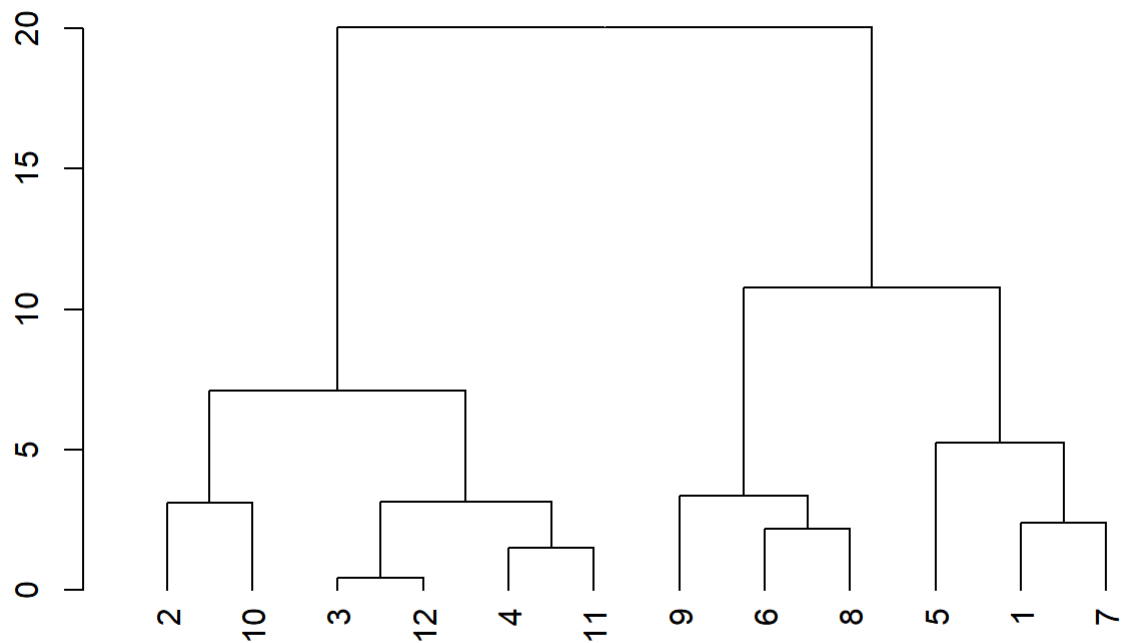
##	1	2	3	4	5	6
## 1	0.000	6.856	11.305	9.642	3.917	8.004
## 2	6.856	0.000	5.000	3.208	9.476	14.401
## 3	11.305	5.000	0.000	1.982	14.126	18.901
## 4	9.642	3.208	1.982	0.000	12.296	17.172
## 5	3.917	9.476	14.126	12.296	0.000	6.446
## 6	8.004	14.401	18.901	17.172	6.446	0.000

Calculo del dendrograma

```
dend.AMM<-as.dendrogram(hclust(dist.AMM))
```

Generaci?n del dendrograma y agregar etiquetas al gráfico

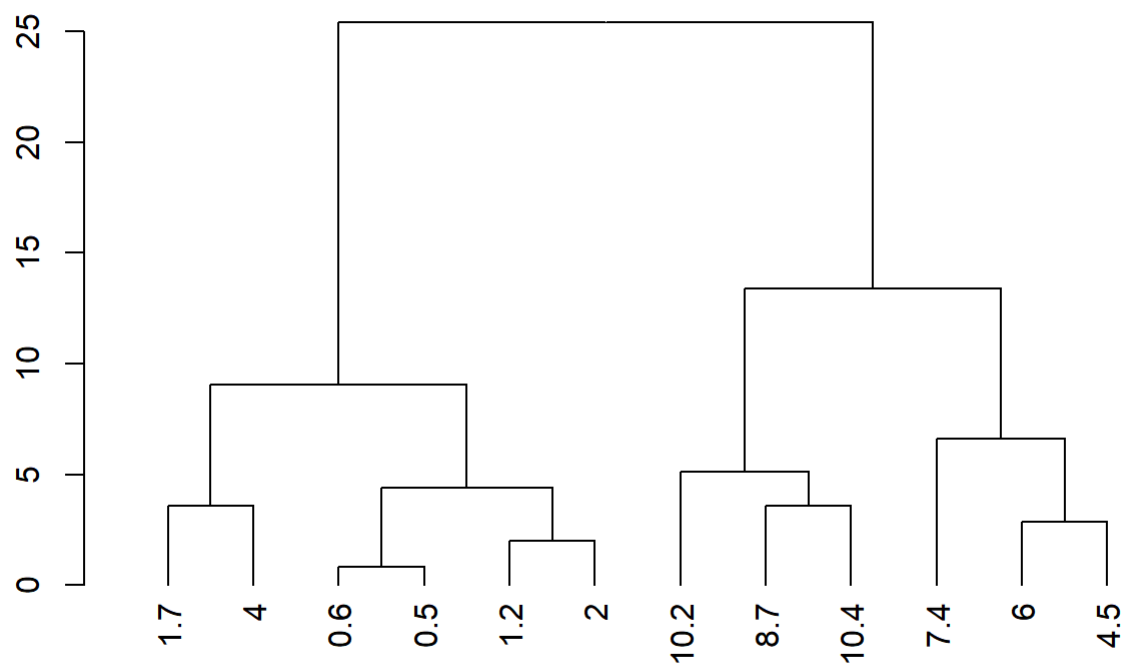
```
plot(dend.AMM)
```



```
AMM.nombres=AMM
rownames(AMM.nombres)= AMM.nombres$Obs
AMM.nombres=AMM.nombres[, -1]
```

Construimos de nuevo el grafico

```
plot(as.dendrogram(hclust(dist(AMM.nombres))))
```



```
summary(AMM)
```

```
##      Mes                Obs                Olmos                CFE
## Length:12      Min.   : 0.500      Min.   :0.600      Min.   :0.600
## Class :character 1st Qu.: 1.575      1st Qu.:1.675      1st Qu.:2.275
## Mode  :character Median : 4.250      Median :3.950      Median :4.150
##                Mean  : 4.767      Mean  :4.200      Mean  :5.000
##                3rd Qu.: 7.725      3rd Qu.:5.725      3rd Qu.:8.000
##                Max.   :10.400      Max.   :9.700      Max.   :9.900
##      Sumidero      Crystal      Banderilla      Magisterial
## Min.   :0.600      Min.   : 0.500      Min.   : 1.300      Min.   : 0.600
## 1st Qu.:1.800      1st Qu.: 1.900      1st Qu.: 3.325      1st Qu.: 2.025
## Median :4.600      Median : 4.200      Median : 5.100      Median : 4.250
## Mean   :4.492      Mean   : 4.883      Mean   : 5.992      Mean   : 4.917
## 3rd Qu.:6.850      3rd Qu.: 8.150      3rd Qu.: 7.875      3rd Qu.: 7.950
## Max.   :8.300      Max.   :10.700      Max.   :12.900      Max.   :10.000
##      Revolucion
## Min.   : 0.600
## 1st Qu.: 1.850
## Median : 4.300
## Mean   : 4.825
## 3rd Qu.: 7.950
## Max.   :10.400
```

Modificar el dendrograma

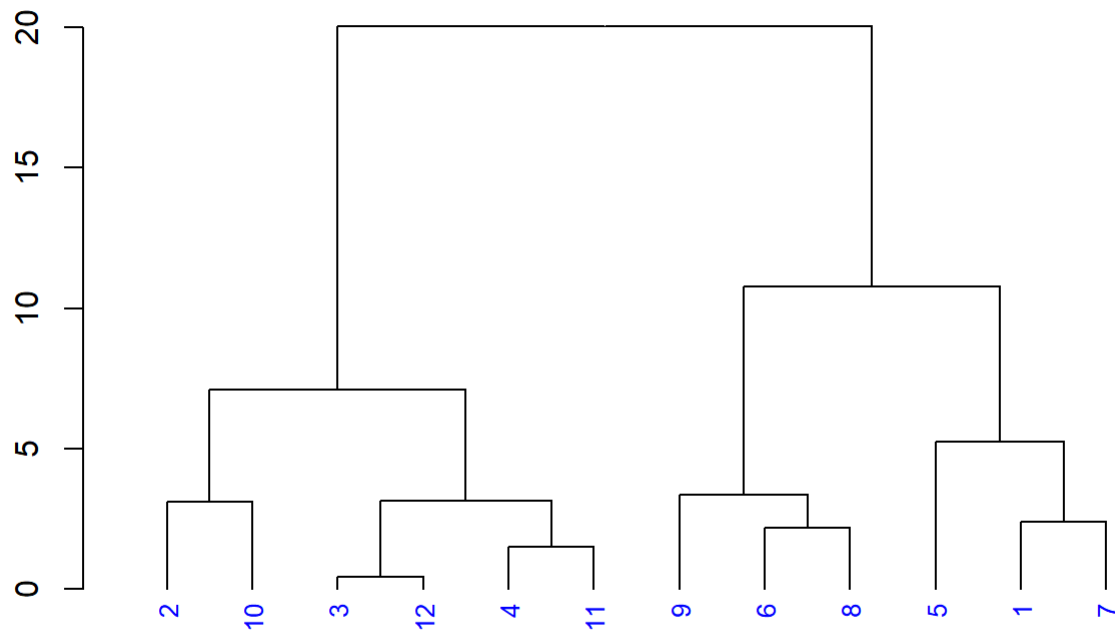
Guardar las etiquetas en el objeto "L"

```
L=labels(dend.AMM)
```

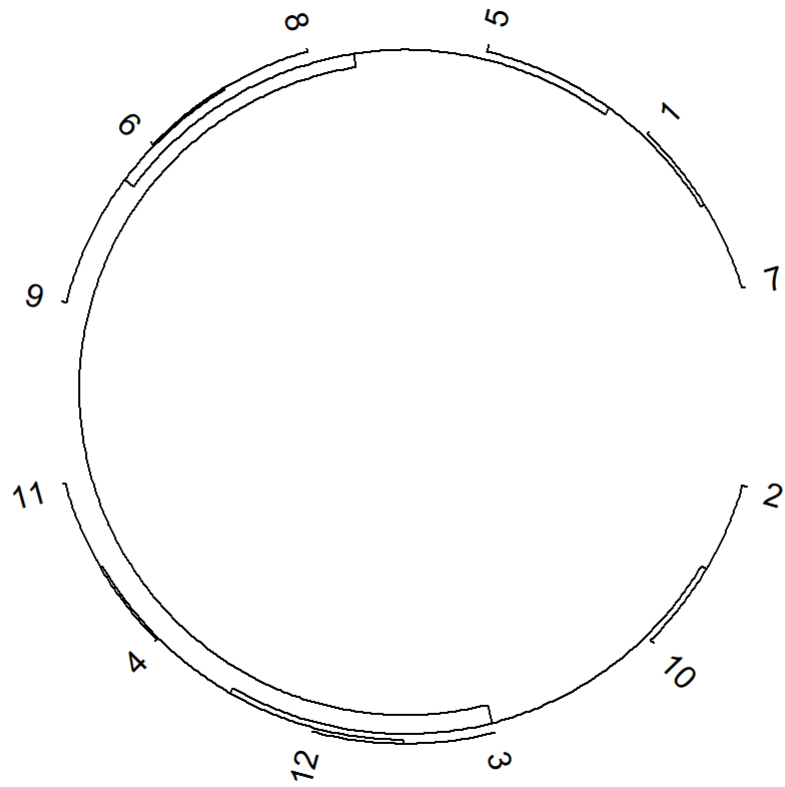
Cambiar el tamaño de las etiquetas

```
dend.AMM %>%  
  set(what="labels_col", "blue") %>% # Colores etiqueta  
  set(what="labels_cex", 0.8) %>% # Tamaño de la etiqueta  
  plot(main="Dendrograma de Estación de observatorio")
```

## Dendrograma de Estación de observatorio



```
circlize_dendrogram(dend.AMM, labels_track_height = NA,  
  dend_track_height = 0.1)
```



En conclusión, podemos observar que los meses durante el año 2021 en la estación de observatorio en algunos meses tiene similitud en comparación a otros meses, esto quiere decir que tienen similitudes en distintos meses del año.