

Week2_Supplementary

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January 20, 2017

```
rm(list=ls())
getwd()
setwd("~/GitHub/QB-2017/Week2-Alpha")
```

```
#install.packages("vegan")
require("vegan")
```

```
soilbac <- read.table("data/soilbac.txt", sep = "\t", header = TRUE, row.names = 1)
soilbac.t <- as.data.frame(t(soilbac))
soilbac1 <- soilbac.t[1,]
```

More on EVAR

E_{var} uses the arctangent, which varies between $-\pi/2$ and $\pi/2$ and without being periodic like waves of the sine and cosine functions. Multiplying the arctangent by $2/\pi$ forces the result to take values between 0 and 1. Finally, subtracting this from one allows low evenness to be associated with values near 0 and high evenness to be associated with values near 1. We can confirm this with a more explicit R chunk:

```
site1.ab <- soilbac1[soilbac1 > 0]
P <- log(site1.ab) # log-transform the abundances of the RAC and assign them to a vector P
AvgAb <- mean(P) # find the average of the log abundances
X <- 0 # assign zero to variable X
Evar <- 0 # declare a scalar variable Evar
S <- length(which(site1.ab > 0))

for (x in P) { # making use of a 'for' loop. for loops are an elementary control structure in all programs
  X = X + (x - AvgAb)^2 / (S - 1)
}

Evar = 1 - (2/pi)*atan(X) # these operations make the value of Evar range between 0 and 1
Evar # print Evar for Site1

## [1] 0.7659779
```

More on rarefaction

We can also use the information from the `rarefy` function to create a barplot that compares each site. Remember, we can calculate 95% confidence intervals using $95\%CI = \bar{x} \pm SEM \times 1.96$.

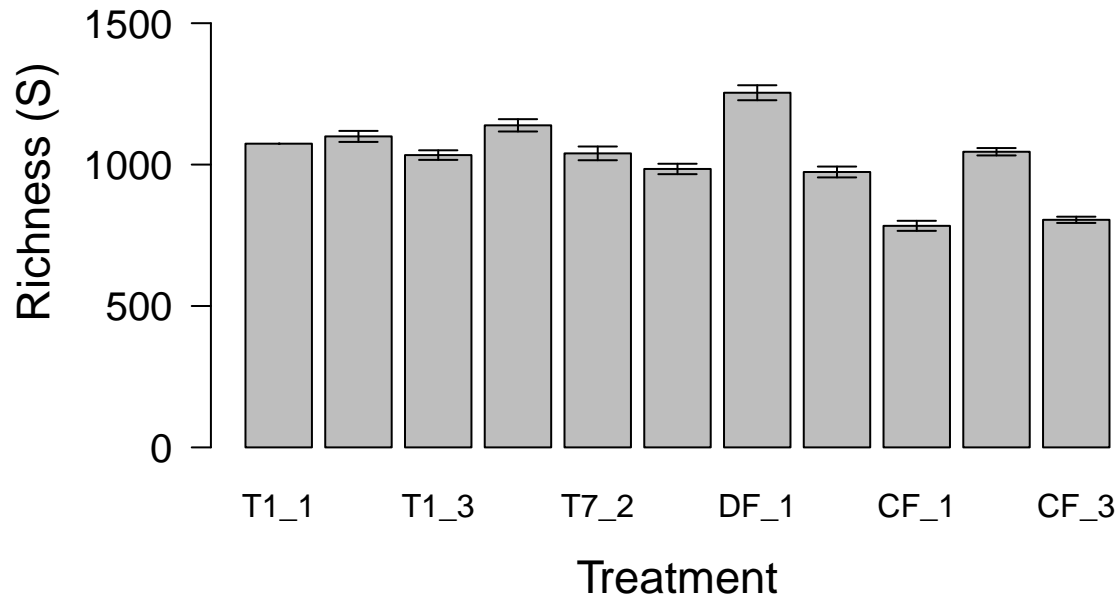
```
S.obs <- function(x = ""){
  rowSums(x > 0) * 1
}

soilbac.S <- S.obs(soilbac.t)
min.N <- min(rowSums(soilbac.t))
opar <- par(no.readonly = TRUE)
par(mar=c(5.1, 6.1, 4.1, 2.1)) # set graph margins
```

```

S.rarefy <- rarefy(x = soilbac.t, sample = min.N, se = TRUE)
S.plot <- barplot(S.rarefy[1, ], xlab = "Treatment", ylab = NULL,
                 ylim = c(0, round(max(soilbac.S), digits = 0)),
                 pch = 15, las = 1, cex = 1, cex.lab = 1.4, cex.axis = 1.25)
arrows(x0 = S.plot, y0 = S.rarefy[1, ], y1 = S.rarefy[1, ] - (S.rarefy[2, ] * 1.96),
       angle = 90, length=0.1, lwd = 1)
arrows(x0 = S.plot, y0 = S.rarefy[1, ], y1 = S.rarefy[1, ] + (S.rarefy[2, ] * 1.96),
       angle = 90, length=0.1, lwd = 1)
title(ylab = "Richness (S)", line = 4, cex.lab = 1.4)

```



```

par(opar)

```